Infoprint Server Operation and Administration
Note:

Before using this information and the product it supports, read the information in "Notices" on page 521.

This edition applies to these IBM products:
- Version 2 Release 1 of z/OS (5650-ZOS)
- Version 2 Release 1 of Infoprint Coaxial Printer Support for z/OS (5655-N62)

This edition applies to all subsequent releases and modifications until otherwise indicated in new editions.

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Contents

Figures ........................................ ix

Tables .......................................... xi

About this publication ......................... xiii
Who should read this publication ........ xiii
How to read syntax diagrams ............... xiii
Where to find more information ........... xiv
  Preventive Service Planning information . xiv
  Infoprint Server migration information . xv
Documents ....................................... xv
  Infoprint Server online help ............. xvii

How to send your comments to IBM ...... xix
If you have a technical problem ........... xix

Summary of changes ............................ xxi
z/OS Version 2 Release 1 ....................... xxi

Chapter 1. Starting and stopping
Infoprint Server daemons ..................... 1
  Starting Infoprint Server with the AOPSTART JCL procedure ................. 2
  Stopping Infoprint Server with the AOPSTOP JCL procedure ................. 3
  Starting Infoprint Server with the aopstart command ....................... 4
    Format ..................................... 4
    Description ............................... 5
    Usage notes ................................ 5
    Environment variables .................... 6
    Files ...................................... 9
    Exit values ................................ 10
    Related information ...................... 10
  Stopping Infoprint Server with the aopstop command ....................... 10
    Format ..................................... 10
    Description ............................... 10
    Options ................................... 10
    Usage notes ................................ 11
    Examples ................................... 12
    Environment variables .................... 12
    File ...................................... 12
    Exit values ................................ 12
    Related information ...................... 12

Chapter 2. Starting and stopping the
NetSpool task and NetSpool LUs .......... 13
  Starting the NetSpool task ................. 13
  Entering NetSpool commands ............... 14
  Stopping the NetSpool task ............... 15
    Stopping NetSpool after current sessions end normally .................... 15
    Stopping NetSpool immediately .......... 15
    Stopping NetSpool abnormally ............. 15
    Using VTAM HALT commands ............... 16
    Starting NetSpool printer LUs .......... 16
    Stopping NetSpool printer LUs ........... 17
    Displaying the status of NetSpool printer LUs ....................... 19

Chapter 3. Starting and stopping IP
PrintWay FSAs (basic mode) .............. 23
  Starting an IP PrintWay functional subsystem (basic mode) ............... 23
  Stopping an IP PrintWay functional subsystem (basic mode) ............... 24
    Stopping an FSA (basic mode) .......... 24
    Stopping an FSS (basic mode) .......... 25
    Ending an FSA (basic mode) .......... 25

Chapter 4. Using the IP PrintWay
transmission queue (basic mode) .......... 27
  Starting an Infoprint Server ISPF session .... 28
  Listing transmission-queue entries (basic mode) ............... 28
    Listing all transmission-queue entries (basic mode) ............... 28
    Listing selected transmission-queue entries (basic mode) ............... 28
    Browsing a transmission-queue entry (basic mode) ............... 29
    Holding a transmission-queue entry (basic mode) ............... 30
    Holding a queue entry (basic mode) .......... 30
    Holding all transmission-queue entries in a list (basic mode) ............... 30
    Reseting a transmission-queue entry (basic mode) ............... 31
    Reseting a queue entry (basic mode) .......... 31
    Reseting all queue entries in a list (basic mode) ............... 31
    Modifying a transmission-queue entry (basic mode) ............... 32
    Rerouting a data set (basic mode) .......... 33
    Changing retention periods (basic mode) ............... 33
    Changing the time between retries (basic mode) ............... 33
    Changing the retry limit (basic mode) .......... 34
    Changing the maximum document size and response timeout value (basic mode) ............... 34
    Changing formatting options (basic mode) ............... 34
    Changing translation options (basic mode) .......... 34
    Deleting a transmission-queue entry (basic mode) ............... 35
    Querying the status of a print queue (basic mode) ............... 35

Chapter 5. Starting sendmail .......... 37

Chapter 6. Using Infoprint Central ...... 39
  Infoprint Central actions ................... 41
  Infoprint Central actions compared to JES commands ............... 44
  Infoprint Central actions compared to VTAM and NetSpool commands ............... 45
  Infoprint Central actions compared to IP PrintWay basic mode ISPF panels ............... 46
  Customizing your web browser .......... 46

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<table>
<thead>
<tr>
<th>Chapter 7. Working with output data sets on the JES spool using JES commands and SDSF</th>
<th>49</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locating output data sets allocated by Infoprint Server</td>
<td>49</td>
</tr>
<tr>
<td>Using JES commands and SDSF to work with output data sets</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 8. Viewing messages</th>
<th>53</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viewing messages in the common message log</td>
<td>53</td>
</tr>
<tr>
<td>aoplogu command</td>
<td>53</td>
</tr>
<tr>
<td>Format of messages in the common message log</td>
<td>55</td>
</tr>
<tr>
<td>Viewing IP PrintWay basic mode messages</td>
<td>58</td>
</tr>
<tr>
<td>Viewing NetSpool messages</td>
<td>59</td>
</tr>
<tr>
<td>Viewing transform messages</td>
<td>59</td>
</tr>
<tr>
<td>Viewing z/OS UNIX sendmail messages</td>
<td>59</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 9. Planning the Printer Inventory</th>
<th>61</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning printer definitions</td>
<td>62</td>
</tr>
<tr>
<td>Selecting the type of printer definition</td>
<td>63</td>
</tr>
<tr>
<td>Determining how many printer definitions to create</td>
<td>64</td>
</tr>
<tr>
<td>Specifying attributes in a printer definition</td>
<td>66</td>
</tr>
<tr>
<td>Including components in printer definitions</td>
<td>68</td>
</tr>
<tr>
<td>Planning printer pool definitions</td>
<td>71</td>
</tr>
<tr>
<td>Planning FSS definitions</td>
<td>71</td>
</tr>
<tr>
<td>IP PrintWay basic mode FSS definitions</td>
<td>72</td>
</tr>
<tr>
<td>PSF FSS definitions</td>
<td>72</td>
</tr>
<tr>
<td>Planning PSA definitions</td>
<td>73</td>
</tr>
<tr>
<td>IP PrintWay basic mode PSA definitions</td>
<td>73</td>
</tr>
<tr>
<td>PSF PSA definitions</td>
<td>73</td>
</tr>
<tr>
<td>Planning job selection rules</td>
<td>74</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 10. Planning printer definitions for Print Interface</th>
<th>75</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specifying JES allocation parameters</td>
<td>75</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>76</td>
</tr>
<tr>
<td>Validating that documents can print as requested</td>
<td>78</td>
</tr>
<tr>
<td>Data formats</td>
<td>78</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>80</td>
</tr>
<tr>
<td>Using the aopfiltr.so filter</td>
<td>81</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>81</td>
</tr>
<tr>
<td>Using the LPD compatibility filter</td>
<td>82</td>
</tr>
<tr>
<td>Filter options</td>
<td>84</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>85</td>
</tr>
<tr>
<td>Using an installation-provided filter</td>
<td>87</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>87</td>
</tr>
<tr>
<td>Converting data from EBCDIC to ASCII or ASCII to EBCDIC</td>
<td>88</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>88</td>
</tr>
<tr>
<td>Mapping output bin and input tray names to numbers for an AFP printer</td>
<td>89</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>89</td>
</tr>
<tr>
<td>Using the Print Interface subsystem</td>
<td>90</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>91</td>
</tr>
<tr>
<td>Creating the Infoprint Server default printer definition</td>
<td>96</td>
</tr>
<tr>
<td>Procedure for specifying the name of the default printer definition</td>
<td>96</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 11. Planning printer and printer pool definitions for NetSpool</th>
<th>97</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specifying the NetSpool printer LU name</td>
<td>98</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>98</td>
</tr>
<tr>
<td>Grouping NetSpool printer LUs into LU classes</td>
<td>98</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>99</td>
</tr>
<tr>
<td>Specifying JES allocation parameters</td>
<td>99</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>100</td>
</tr>
<tr>
<td>Converting SCS and 3270 data streams to line data streams</td>
<td>102</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>103</td>
</tr>
<tr>
<td>Converting SCS and 3270 data streams to PCL data streams</td>
<td>105</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>108</td>
</tr>
<tr>
<td>Selecting no data stream conversion</td>
<td>112</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>112</td>
</tr>
<tr>
<td>Specifying a default user ID and job attribute prefix</td>
<td>113</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>114</td>
</tr>
<tr>
<td>Selecting a font</td>
<td>114</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>115</td>
</tr>
<tr>
<td>Specifying how NetSpool determines end-of-file</td>
<td>116</td>
</tr>
<tr>
<td>End-of-file rules</td>
<td>117</td>
</tr>
<tr>
<td>Delete form-feed option</td>
<td>118</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>119</td>
</tr>
<tr>
<td>Broadcasting data using multiple printer definitions</td>
<td>120</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>121</td>
</tr>
<tr>
<td>Validating that documents can print as requested</td>
<td>122</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>123</td>
</tr>
<tr>
<td>Using an installation-provided filter</td>
<td>123</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>124</td>
</tr>
<tr>
<td>Mapping output bin and input tray names to numbers for an AFP printer</td>
<td>124</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>125</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 12. Planning printer definitions for IP PrintWay</th>
<th>127</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comparing printer definitions for IP PrintWay</td>
<td>129</td>
</tr>
<tr>
<td>basic mode and extended mode</td>
<td>129</td>
</tr>
<tr>
<td>IP PrintWay extended mode fields</td>
<td>129</td>
</tr>
<tr>
<td>IP PrintWay basic mode fields</td>
<td>131</td>
</tr>
<tr>
<td>IP PrintWay basic mode and extended mode fields</td>
<td>131</td>
</tr>
<tr>
<td>Selecting the LPR protocol</td>
<td>133</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>134</td>
</tr>
<tr>
<td>Selecting the direct sockets protocol</td>
<td>138</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>139</td>
</tr>
<tr>
<td>Selecting the IPP protocol</td>
<td>140</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>141</td>
</tr>
<tr>
<td>Selecting the VTAM protocol</td>
<td>142</td>
</tr>
<tr>
<td>Creating VTAM resource definitions for VTAM-controlled printers</td>
<td>143</td>
</tr>
<tr>
<td>Procedure for specifying attributes</td>
<td>144</td>
</tr>
<tr>
<td>Selecting the email protocol</td>
<td>146</td>
</tr>
</tbody>
</table>
## Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sections of printer definitions</td>
<td>66</td>
</tr>
<tr>
<td>2.</td>
<td>Components for an IP PrintWay printer definition</td>
<td>69</td>
</tr>
<tr>
<td>3.</td>
<td>Components for a PSF printer definition</td>
<td>70</td>
</tr>
<tr>
<td>4.</td>
<td>Relationship between printer pool definition and printer definitions</td>
<td>71</td>
</tr>
<tr>
<td>5.</td>
<td>Processing when <code>resubmit for filtering</code> option is selected</td>
<td>204</td>
</tr>
<tr>
<td>6.</td>
<td>Sample APPL statements for NetSpool LUs</td>
<td>228</td>
</tr>
<tr>
<td>7.</td>
<td>Sample JCL for running the PIDU program as a batch job — SYS1.SAMPLIB(AOPPIDU)</td>
<td>258</td>
</tr>
</tbody>
</table>
### Tables

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Documents for Infoprint Server</td>
</tr>
<tr>
<td>2</td>
<td>Documents for IBM transform products</td>
</tr>
<tr>
<td>3</td>
<td>Documents for Ricoh products</td>
</tr>
<tr>
<td>4</td>
<td>Infoprint Central actions for Infoprint Server print jobs</td>
</tr>
<tr>
<td>5</td>
<td>Infoprint Central actions for JES print jobs</td>
</tr>
<tr>
<td>6</td>
<td>Infoprint Central actions for IP PrintWay printers</td>
</tr>
<tr>
<td>7</td>
<td>Infoprint Central actions for PSF printers</td>
</tr>
<tr>
<td>8</td>
<td>Infoprint Central actions for IP PrintWay job selection rules</td>
</tr>
<tr>
<td>9</td>
<td>Infoprint Central actions for NetSpool logical units (LUs)</td>
</tr>
<tr>
<td>10</td>
<td>Infoprint Central actions for printer definitions</td>
</tr>
<tr>
<td>11</td>
<td>Infoprint Central actions for system</td>
</tr>
<tr>
<td>12</td>
<td>SDSF fields</td>
</tr>
<tr>
<td>13</td>
<td>Printer Inventory objects</td>
</tr>
<tr>
<td>14</td>
<td>Administration tasks for Print Interface</td>
</tr>
<tr>
<td>15</td>
<td>Printer definition fields used for validation in Print Interface</td>
</tr>
<tr>
<td>16</td>
<td>Data formats</td>
</tr>
<tr>
<td>17</td>
<td>LPD command codes supported by Print Interface LPD</td>
</tr>
<tr>
<td>18</td>
<td>Administrative tasks for NetSpool</td>
</tr>
<tr>
<td>19</td>
<td>Printer definition fields used for validation in NetSpool</td>
</tr>
<tr>
<td>20</td>
<td>Administration tasks for IP PrintWay</td>
</tr>
<tr>
<td>21</td>
<td>Printer definition fields that apply only to IP PrintWay extended mode</td>
</tr>
<tr>
<td>22</td>
<td>Printer definition fields that apply only to IP PrintWay basic mode</td>
</tr>
<tr>
<td>23</td>
<td>Printer definition fields that have special considerations for IP PrintWay</td>
</tr>
<tr>
<td>24</td>
<td>Fields in an email</td>
</tr>
<tr>
<td>25</td>
<td>Environment variables and configuration attributes for email suffixes</td>
</tr>
<tr>
<td>26</td>
<td>Data formats for email attachments and viewers</td>
</tr>
<tr>
<td>27</td>
<td>How retry limit and retry time work together</td>
</tr>
<tr>
<td>28</td>
<td>IP PrintWay successful print jobs</td>
</tr>
<tr>
<td>29</td>
<td>Pages printed when no error occurs</td>
</tr>
<tr>
<td>30</td>
<td>Pages printed when IP PrintWay retries a print job</td>
</tr>
<tr>
<td>31</td>
<td>Pages printed when IP PrintWay prints a failed print job</td>
</tr>
<tr>
<td>32</td>
<td>FCB functions supported by IP PrintWay</td>
</tr>
<tr>
<td>33</td>
<td>Printer definition fields used for validation in IP PrintWay</td>
</tr>
<tr>
<td>34</td>
<td>How table reference characters determine the characters per inch.</td>
</tr>
<tr>
<td>35</td>
<td>OUTPUT JCL statements that override allocation values when <strong>resubmit for filtering</strong> option is selected</td>
</tr>
<tr>
<td>36</td>
<td>Transforms that work with Infoprint Server</td>
</tr>
<tr>
<td>37</td>
<td>Infoprint transforms, filter names, and data formats</td>
</tr>
<tr>
<td>38</td>
<td>Transform filter options</td>
</tr>
<tr>
<td>39</td>
<td>VTAM BIND parameter requirements</td>
</tr>
<tr>
<td>40</td>
<td>Summary of PIDU commands</td>
</tr>
<tr>
<td>41</td>
<td>Classes of objects used by the PIDU program</td>
</tr>
<tr>
<td>42</td>
<td>Operators for attributes</td>
</tr>
<tr>
<td>43</td>
<td>Object classes</td>
</tr>
<tr>
<td>44</td>
<td>Attributes and valid object classes</td>
</tr>
<tr>
<td>45</td>
<td>Object classes whose attributes are valid for printer object class</td>
</tr>
<tr>
<td>46</td>
<td>Required protocol attributes</td>
</tr>
<tr>
<td>47</td>
<td>Contents of fields SMF6JBID, SMF6JCID, and SMF6USID in SMF type 6 record</td>
</tr>
<tr>
<td>48</td>
<td>Contents of field SMF6URI in SMF type 6 record</td>
</tr>
<tr>
<td>49</td>
<td>Attributes used for job allocation and the corresponding OUTPUT parameters</td>
</tr>
<tr>
<td>50</td>
<td>Printer definition fields used by Print Interface</td>
</tr>
<tr>
<td>51</td>
<td>Printer definition fields used by NetSpool</td>
</tr>
<tr>
<td>52</td>
<td>Printer attributes for IP PrintWay</td>
</tr>
</tbody>
</table>

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About this publication

This publication helps you operate and administer Infoprint Server. It describes how to:

• Start and stop Infoprint Server
• Use Infoprint Central
• Manage the IP PrintWay™ basic mode transmission queue
• Use SDSF and JES commands to work with output data sets on the JES spool
• View Infoprint Server messages
• Create entries in the Printer Inventory using ISPF panels or Printer Inventory Definition Utility (PIDU) program
• Define NetSpool printer logical units (LUs) to VTAM®
• Use information in SMF type 6 accounting records

It also contains reference information, including:

• Attributes that you can specify with PIDU
• Options that IP PrintWay transmits to Ricoh InfoPrint Manager and to Ricoh ProcessDirector
• Sample ISPF panels
• Sample printer definitions

In this publication:

• VTAM refers to the Communications Server SNA Services element of z/OS.
• TCP/IP refers to the Communications Server IP Services element of z/OS.
• PSF refers to PSF for z/OS® and to the AFP Download Plus feature of PSF.

Who should read this publication

This publication is for these audiences:

• System operators who need to start and stop Infoprint Server daemons, NetSpool, and IP PrintWay basic mode
• Help desk operators who need to work with Infoprint Central or with the IP PrintWay basic mode transmission queue
• Administrators who need to create entries in the Infoprint Server Printer Inventory and define NetSpool printer logical units to VTAM

You should be familiar with z/OS UNIX System Services, TCP/IP, VTAM, the job entry subsystem (JES), and Print Services Facility™ (PSF) for z/OS if you use it.

How to read syntax diagrams

This section explains the general notations that this document uses in syntax diagrams. For ease of reading, this document breaks some examples into several lines. However, when you enter a command, enter it all on one line. Do not press Enter until you have typed the entire command.
<table>
<thead>
<tr>
<th>This notation:</th>
<th>Means:</th>
<th>You enter:</th>
<th>For example:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apostrophes</td>
<td>String</td>
<td>As shown</td>
<td>SEND ‘123’</td>
</tr>
<tr>
<td>Bold</td>
<td>Keyword</td>
<td>As shown</td>
<td>CLASS</td>
</tr>
<tr>
<td>Braces</td>
<td>List of items</td>
<td>The braces and one or more items from the list</td>
<td>{GT10 GT12}</td>
</tr>
<tr>
<td>Brackets</td>
<td>Optional item</td>
<td>One item or no items</td>
<td>aopstop [now]</td>
</tr>
<tr>
<td>Comma</td>
<td>Separator</td>
<td>As shown</td>
<td>DISPLAY C,K</td>
</tr>
<tr>
<td>Ellipsis</td>
<td>Repeatable item</td>
<td>One or more items</td>
<td>filename ...</td>
</tr>
<tr>
<td>Lowercase</td>
<td>Item the system defines</td>
<td>As shown, in lowercase</td>
<td>lp</td>
</tr>
<tr>
<td>Lowercase italics</td>
<td>Variable item</td>
<td>A value for the item</td>
<td>MOUNT devnum</td>
</tr>
<tr>
<td>Parentheses</td>
<td>List of items</td>
<td>The parentheses and one or more items from the list</td>
<td>(GT10,GT12)</td>
</tr>
<tr>
<td>Special characters</td>
<td>Various symbols</td>
<td>As shown</td>
<td>%filter-options</td>
</tr>
<tr>
<td>Underline</td>
<td>Default</td>
<td>The item, or you can omit it</td>
<td>K T REF</td>
</tr>
<tr>
<td>Uppercase</td>
<td>Item the system defines</td>
<td>As shown, in uppercase</td>
<td>PRMODE</td>
</tr>
<tr>
<td>Vertical bar</td>
<td>UNIX pipe (the output of the first is input to the second)</td>
<td>As shown</td>
<td>ls</td>
</tr>
<tr>
<td>Vertical bar in braces</td>
<td>Required choice</td>
<td>One item</td>
<td>{NOW</td>
</tr>
<tr>
<td>Vertical bar in brackets</td>
<td>Optional choice</td>
<td>One item or no items</td>
<td>[PORTNO</td>
</tr>
</tbody>
</table>

---

**Where to find more information**

This section describes where to find information related to z/OS and Infoprint Server.

**Preventive Service Planning information**

Before installing Infoprint Server, you should review the current Preventive Service Planning (PSP) information, also called the PSP bucket. You should also periodically review the current PSP information. The PSP upgrade ID depends on your z/OS operating system, for example: ZOSV2R1. The subset for Infoprint Server is: INFOPRINT.

To obtain the current PSP bucket, contact the IBM® Support Center or use z/OS SoftwareXcel (IBMLink). If you obtained z/OS as part of a CBPDO, HOLDDATA
and PAP information is included on the CBPDO tape. However, this information might not be current if the CBPDO tape was shipped several weeks prior to installation.

**Infoprint Server migration information**

This section lists documents that can help you migrate from previous releases of z/OS and from IP PrintWay basic mode to IP PrintWay extended mode.

<table>
<thead>
<tr>
<th>Document</th>
<th>Form number</th>
</tr>
</thead>
<tbody>
<tr>
<td>z/OS Migration</td>
<td>GA32-0889</td>
</tr>
<tr>
<td>Describes the tasks required to migrate to z/OS V2R1. Includes the migration tasks for Infoprint Server.</td>
<td></td>
</tr>
<tr>
<td>z/OS Summary of Message and Interface Changes</td>
<td>SA23-2300</td>
</tr>
<tr>
<td>Describes new and changed messages and interfaces in z/OS V2R1. Includes the messages and interfaces for Infoprint Server.</td>
<td></td>
</tr>
<tr>
<td>z/OS Infoprint Server Customization</td>
<td>SA38-0691</td>
</tr>
<tr>
<td>Describes the tasks required to migrate to IP PrintWay extended mode from IP PrintWay basic mode. Also, describes the tasks required to use the new functions introduced in z/OS V2R1.</td>
<td></td>
</tr>
</tbody>
</table>

**Documents**

This section lists related documents that can help you use Infoprint Server and transform products. For documents for all z/OS products, see [z/OS Information Roadmap](#).

**Table 1. Documents for Infoprint Server**

<table>
<thead>
<tr>
<th>Document</th>
<th>Form number</th>
</tr>
</thead>
<tbody>
<tr>
<td>z/OS Infoprint Server Introduction</td>
<td>SA38-0692</td>
</tr>
<tr>
<td>Introduces Infoprint Server. This document contains printing scenarios that show how you can use Infoprint Server in your installation.</td>
<td></td>
</tr>
<tr>
<td>z/OS Infoprint Server Customization</td>
<td>SA38-0691</td>
</tr>
<tr>
<td>Describes customization tasks for Infoprint Server. This document describes Infoprint Server environment variables, configuration files, startup procedures, how to write exit routines and filter programs, and how to use the Infoprint Server API.</td>
<td></td>
</tr>
<tr>
<td>z/OS Infoprint Server Operation and Administration</td>
<td>SA38-0693</td>
</tr>
<tr>
<td>Describes operator procedures and administrative tasks for Infoprint Server. This document describes how to start and stop Infoprint Server and how operators can use Infoprint Central. It describes how administrators can create entries in the Printer Inventory using either ISPF panels or the Printer Inventory Definition Utility (PIDU) program and define NetSpool printer LUs to VTAM.</td>
<td></td>
</tr>
</tbody>
</table>
Table 1. Documents for Infoprint Server (continued)

<table>
<thead>
<tr>
<th>Document</th>
<th>Form number</th>
</tr>
</thead>
<tbody>
<tr>
<td>z/OS Infoprint Server Printer Inventory for PSF</td>
<td>SA38-0694</td>
</tr>
<tr>
<td>Describes the Printer Inventory for PSF for PSF customers who do not purchase an Infoprint Server license. It describes the tasks required to customize Infoprint Server, start and stop Infoprint Server, create PSF FSS and FSA definitions in the Printer Inventory, and diagnose problems in Infoprint Server.</td>
<td></td>
</tr>
<tr>
<td>z/OS Infoprint Server User’s Guide</td>
<td>SA38-0695</td>
</tr>
<tr>
<td>Describes user tasks for Infoprint Server. This document describes how to submit print jobs from remote systems (including Windows systems), the local z/OS system, and Virtual Telecommunications Access Method (VTAM) applications. It describes z/OS UNIX commands; the AOPPRINT JCL procedure; the AOPBATCH program; DD and OUTPUT JCL parameters that Infoprint Server supports; and how to download and install the Infoprint Port Monitor for Windows.</td>
<td></td>
</tr>
<tr>
<td>z/OS Infoprint Server Messages and Diagnosis</td>
<td>GA32-0927</td>
</tr>
<tr>
<td>Describes messages from Infoprint Server. This document also describes how to use Infoprint Server tracing facilities to diagnose and report errors.</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Documents for IBM transform products

<table>
<thead>
<tr>
<th>Document</th>
<th>Form number</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM Infoprint Transforms to AFP for z/OS</td>
<td>G550-0443</td>
</tr>
<tr>
<td>Describes IBM Infoprint Transforms to AFP for z/OS (5655-N60)</td>
<td></td>
</tr>
<tr>
<td>IBM Print Transforms from AFP for Infoprint Server for z/OS</td>
<td>G325-2634</td>
</tr>
<tr>
<td>Describes these products:</td>
<td></td>
</tr>
<tr>
<td>• IBM Print Transform from AFP to PCL for Infoprint Server for z/OS (5655-TF2)</td>
<td></td>
</tr>
<tr>
<td>• IBM Print Transform from AFP to PDF for Infoprint Server for z/OS (5655-TF1)</td>
<td></td>
</tr>
<tr>
<td>• IBM Print Transform from AFP to PostScript for Infoprint Server for z/OS (5655-TF3)</td>
<td></td>
</tr>
<tr>
<td>IBM Infoprint XT for z/OS</td>
<td>GI11-9492</td>
</tr>
<tr>
<td>Describes IBM Infoprint XT for z/OS (5655-O15)</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Documents for Ricoh products

<table>
<thead>
<tr>
<th>Ricoh Document</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>InfoPrint Transform Manager for AIX®, Linux, and Windows</td>
<td></td>
</tr>
<tr>
<td>Describes InfoPrint Transform Manager for AIX, Linux, and Windows</td>
<td></td>
</tr>
<tr>
<td>InfoPrint Transform Manager for AIX, Linux, and Windows: afp2pdf Transform Installation and User’s Guide</td>
<td></td>
</tr>
<tr>
<td>Describes the InfoPrint Transform Manager for Linux AFP to PDF transform</td>
<td></td>
</tr>
</tbody>
</table>
Infoprint Server online help

The Infoprint Server ISPF panels contain integrated online help for each panel and field. To view the help, place your cursor on a panel or in a field on a panel and press the Help function key (F1).

Infoprint Central contains an integrated online help system. To view the help system, select the question mark (?) in the left navigation bar. To view the help for a particular Web page, select the question marks (?) or the Help buttons on the Web page.
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  z/OS V2R1.0 Infoprint Server Operation and Administration
  SA38-0693-00
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• The text of your comment.

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• Call IBM technical support.
Summary of changes

This section describes the release enhancements that were made.

z/OS Version 2 Release 1

Refer to the following publications for specific enhancements for z/OS Version 2 Release 1:

- z/OS Summary of Message and Interface Changes, SA23-2300
- z/OS Introduction and Release Guide, GA32-0887
- z/OS Planning for Installation, GA32-0890
- z/OS Migration, GA32-0889
Chapter 1. Starting and stopping Infoprint Server daemons

You can start and stop these Infoprint Server daemons:

- **aopd**, a Printer Inventory Manager daemon
  This daemon manages the Printer Inventory.
- **aophinvd**, a Printer Inventory Manager daemon
  This daemon maintains the Historical Inventory, which contains information about Infoprint Server output data sets that are not on the JES spool.
- **aopippdxp**, the IPP Server daemon
  This daemon supports printing from remote clients that use the Internet Printing Protocol (IPP).
  The JES job name of the **aopippdxp** daemon is AOPIPPD.
- **aoplogd**, a Printer Inventory Manager daemon
  This daemon manages the common message log.
- **aoplpd**, the line printer daemon (LPD)
  This daemon supports printing from remote clients that use the TCP/IP line printer requester (LPR) protocol.
- **aopnetd**, the NetSpool daemon
  This daemon, together with the NetSpool task, supports printing from VTAM applications such as CICS® and IMS™.
- **aopoutd** and **aopwsmd**, the IP PrintWay extended mode daemons
  These daemons select output data sets from the JES spool and send them to remote printers in a TCP/IP network.
- **aopsapd**, the SAP Callback daemon
  This daemon handles callback notification for the SAP Output Management System (OMS). It starts automatically when a print request is received from SAP R/3.
- **aopsdbd**, a Printer Inventory Manager daemon
  This daemon maintains a search database, which Infoprint Central uses.
- **aopsnmpd**, the SNMP subagent daemon
  This daemon provides printer status information for PSF-controlled printers to the z/OS SNMP agent for viewing with an SNMP manager.
- **aopssid**, an Infoprint Central daemon
  This daemon communicates with JES to display information and do actions on output groups (print jobs) and PSF printers.
- **aopsubd**, the Print Interface subsystem daemon
  This daemon processes output data sets that specify the Print Interface subsystem on the SUBSYS parameter of the DD statement.
- **aopxfd**, the Infoprint Server Transform Manager daemon
  This daemon manages other transform daemons, which transform data from one format to another. The Infoprint Server Transform Manager daemon starts and stops transform daemons that are configured in the **aopxfd.conf** configuration file.

These topics describe how to do these tasks:

<table>
<thead>
<tr>
<th>Task</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting Infoprint Server with the AOPSTART JCL procedure</td>
<td>2</td>
</tr>
</tbody>
</table>
Starting Infoprint Server with the AOPSTART JCL procedure

The AOPSTART procedure starts Infoprint Server daemons. If a daemon is already running, AOPSTART does not stop and restart that daemon.

The AOPSTART procedure always starts daemons aopd, aopsdbd, aophinvd, and aoplogd. The AOPSTART procedure also starts the optional daemons specified in the start-daemons attribute in the Infoprint Server configuration file (aopd.conf) and stops any optional daemons that are no longer specified in the start-daemons attribute.

To start Infoprint Server daemons with the AOPSTART JCL procedure, enter this MVS START command:

```
START AOPSTART
```

After you run the AOPSTART procedure, you see one or more messages in the STDOUT or STDERR data set, or in the console log. The messages can include:

- AOP075I Daemon daemon was started successfully.
- AOP076E Start of daemon daemon failed.
- AOP077I Daemon daemon is already started.
- AOP137E Required Infoprint Server daemon daemon is not running.
  Stop all daemons and restart.

When all Infoprint Server daemons have started, you see this message:

```
$HASP395 AOPSTART ENDED
```

Guidelines:

1. Before you run the AOPSTART procedure, your installation might need to customize the aopstart EXEC and the AOPSTART procedure. For information, see [z/OS Infoprint Server Customization](#).

2. Make sure that TCP/IP has finished initialization before you start the LPD (aoplpd), the IPP server daemon (aopippdxp), the IP PrintWay extended mode daemons (aopoutd and aopwsmd), or the z/OS SNMP agent. You do not have to start TCP/IP to start other daemons.

3. Start the Printer Inventory Manager daemons before you start IP PrintWay basic mode or the NetSpool task. Also, start the Printer Inventory Manager daemons before you start PSF if PSF uses the Printer Inventory.

4. Start the z/OS SNMP agent (osnmpd) before you start the Infoprint Server SNMP subagent daemon (aopsnmpd). For information about how to start osnmpd, see [z/OS Communications Server: IP Configuration Reference](#).

5. To request that Infoprint Server validate internal databases, set the AOPVALIDATEDB environment variable to any value (for example, AOPVALIDATEDB=1) either in the aopstart EXEC or the AOPSTART STDENV data set. IBM suggests that you validate internal databases if Infoprint Server

---

**Tip:** You can use MVS™ automation tools or the /etc/rc shell script to start Infoprint Server daemons automatically during system initialization. For more information, see [z/OS Infoprint Server Customization](#).

---

<table>
<thead>
<tr>
<th>Task</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stopping Infoprint Server with the AOPSTOP JCL procedure</td>
<td>3</td>
</tr>
<tr>
<td>Starting Infoprint Server with the aopstart command</td>
<td>4</td>
</tr>
<tr>
<td>Stopping Infoprint Server with the aopstop command</td>
<td>10</td>
</tr>
</tbody>
</table>
ended abnormally or if you specified the **force** option when you stopped Infoprint Server daemons. The AOPVALIDATEDB environment variable applies only when the Printer Inventory Manager daemons start. When you specify the AOPVALIDATEDB environment variable, Infoprint Server takes a few extra minutes to start.

6. The AOPSTART procedure can end with abend EC6 (reason code FFFF) or abend 33E. These abends do not indicate an error. Your installation can suppress these abends in the IEASLP00 member of SYS1.PARMLIB.

### Stopping Infoprint Server with the AOPSTOP JCL procedure

The AOPSTOP procedure stops all Infoprint Server daemons or only the specified daemons.

After you run the AOPSTOP procedure, you see one or more messages in the STDOUT or STDERR data set, or in the console log. The messages can include:

- **AOP044I** Shutdown complete. (program: daemon)
- **AOP078W** Daemon daemon is not running.
- **AOP079I** A shutdown of daemon daemon has been initiated.
- **AOP135I** An abrupt shutdown of daemon daemon has been initiated.
- **AOP136I** A destructive shutdown of daemon daemon has been initiated.

When all Infoprint Server daemons have ended, you see this message:

```
$HASP395 AOPD ENDED
```

To stop Infoprint Server daemons with the AOPSTOP JCL procedure, enter this MVS START command:

```
START AOPSTOP,[OPTIONS='-d daemon... [now] [force]']
```

- **-d daemon** Specifies the daemon to stop. If you omit this option, all active daemons are stopped, including the Printer Inventory Manager daemons (**aopd**, **aophinvd**, **aoplogd**, and **aopsdbd**). You can specify one of these values:
  - **ippd** Stops the Internet Printing Protocol daemon, **aopippdxp**.
  - **lpd** Stops the line printer daemon, **aoplpd**.
  - **netd** Stops the NetSpool daemon, **aopnetd**.
  - **outd** Stops the IP PrintWay extended mode daemons, **aopoutd** and **aopwsmd**. When you start IP PrintWay again, any IP PrintWay printers that were stopped return to the started state, and any printers that were redirected to other printers are no longer redirected.
  - **snmpd** Stops the SNMP subagent daemon, **aopsnmpd**.
  - **ssid** Stops the Infoprint Central daemon, **aopssid**.
  - **subd** Stops the Print Interface subsystem daemon, **aopsubd**.
  - **xfd** Stops the Infoprint Server Transform Manager daemon, **aopxfd**.

- **now** Stops the daemons immediately. If work is in progress, incorrect output or data loss might result. If this option is not specified, the daemons stop after current activity completes.
**force**  
Stops the daemons immediately using a “destructive” shutdown. If work is in progress, incorrect output or data loss might result. For daemons that manage a database, such as `aopd`, `aophinvd`, or `aopsdbd`, the database might be corrupted. If this option is not specified, the daemons stop after current activity completes.

**Notes:**
1. Use this command with extreme caution.
2. Before you use this command, use the `export` command to backup the Printer Inventory (if Infoprint Server is running).
3. After you stop daemons using this option, specify the `AOPVALIDATEDB` environment variable to validate internal databases when you start Infoprint Server daemons again. You can specify `AOPVALIDATEDB=1` either in the `aopstart` EXEC or in the `AOPSTART STDENV` data set. If databases are corrupted, you might need to restore the Printer Inventory and the search databases.

**Examples:**
1. To stop all daemons after current activity ends, enter this MVS START command. The Print Interface component of Infoprint Server stops accepting new print requests and completes all work in progress before shutting down.
   ```
   START AOPSTOP
   ```
2. To stop the Infoprint Server Transform Manager and line printer daemons, enter this MVS START command:
   ```
   START AOPSTOP,OPTIONS='-d xfd -d lpd'
   ```
3. To stop all daemons immediately, enter this MVS START command. Documents that are being processed might be lost.
   ```
   START AOPSTOP,OPTIONS='now'
   ```
4. To stop all daemons immediately using a “destructive” shutdown, enter this MVS START command. Documents that are being processed might be lost. For daemons that manage a database, such as `aopd`, `aophinvd`, or `aopsdbd`, the database might be corrupted. Use this command with extreme caution.
   ```
   START AOPSTOP,OPTIONS='force'
   ```

**Guidelines:**
1. Before you run the `AOPSTOP` procedure, your installation might need to customize it. For information, see [z/OS Infoprint Server Customization](#).
2. Before you stop all daemons, stop other programs that are using the Printer Inventory, such as NetSpool, IP PrintWay basic mode, and PSF.
3. Before you stop Infoprint Server, back up the Printer Inventory if you have made changes to it since the last backup. For information about how to back up the Printer Inventory, see [z/OS Infoprint Server Customization](#).
4. The `AOPSTOP` procedure can end with abend EC6 (reason code FFFF) or abend 33E. These abends do not indicate an error. You can suppress these abends in the IEASLP00 member of SYS1.PARMLIB.

---

**Starting Infoprint Server with the aopstart command**

**Format**

```
aopstart
```
Description

The **aopstart** command starts Infoprint Server daemons. If a daemon is already running, **aopstart** does not stop and restart that daemon.

The **aopstart** command always starts daemons **aopd**, **aopsdbd**, **aophinvd**, and **aoplogd**. The **aopstart** command also starts the optional daemons specified in the **start-daemons** attribute in the Infoprint Server configuration file (**aopd.conf**) and stops any optional daemons that are no longer specified in the **start-daemons** attribute.

**Result:** After you enter the **aopstart** command, you see one or more messages. Some messages might be written only in the console log. The messages can include:

AOP075I Daemon *daemon* was started successfully.
AOP076E Start of daemon *daemon* failed.
AOP077I Daemon *daemon* is already started.
AOP137E Required Infoprint Server daemon *daemon* is not running.

   Stop all daemons and restart.

When all Infoprint Server daemons have started, you see this message:

AOP075I Daemon aopd was started successfully.

Usage notes

1. Before you use the **aopstart** command, your installation might need to customize the **aopstart** EXEC. For information, see **z/OS Infoprint Server Customization**.

2. To use the **aopstart** command, you must either be a member of the RACF® AOPOPER group or have an effective UID of 0. You can use the z/OS UNIX **su** command to switch to an effective UID of 0 if you have access to the BPX.SUPERUSER profile in the RACF FACILITY class.

3. IBM strongly suggests that you use the AOPSTART procedure to run the **aopstart** command instead of entering the **aopstart** command. For more information about this guideline, see “Customizing startup and shutdown commands and procedures” in **z/OS Infoprint Server Customization**.

4. Make sure that TCP/IP has finished initialization before you start the LPD (**aolplpd**), the IPP Server daemon (**aopippdxd**), the IP PrintWay extended mode daemons (**aopoutd** and **aopwsmd**), or the z/OS SNMP agent. You do not have to start TCP/IP to start other daemons.

5. Start the Printer Inventory Manager daemons before you start IP PrintWay basic mode or a NetSpool task. Also, start the Printer Inventory Manager daemons before you start PSF if PSF uses the Printer Inventory.

6. Start the z/OS SNMP agent (**osnmpd**) before you start the Infoprint Server SNMP subagent daemon (**aopsnmpd**). For information about how to start **osnmpd**, see **z/OS Communications Server: IP Configuration Reference**.

7. Before you start Infoprint Server daemons, you might need to increase the maximum size of memory that is available. This table shows the minimum storage required by Infoprint Server daemons:

<table>
<thead>
<tr>
<th>Daemon</th>
<th>Minimum MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>PostScript to AFP and PDF to AFP transform</td>
<td>42 MB (256 MB is suggested)</td>
</tr>
<tr>
<td>IPP Server</td>
<td>200 MB</td>
</tr>
</tbody>
</table>

To make sure that sufficient memory is available, either set the MAXASSIZE parameter in the BPXPRMxx member of SYS1.PARMLIB or enter the...
SETOMVS command from the console. For example, to set the maximum size to 256 MB, enter:

```
SETOMVS MAXASSIZE=268435456
```

For more information about setting the MAXASSIZE parameter in the BPXPRMxx member, see [z/OS Infoprint Server Customization](#).

The security administrator might have specified a maximum region size for your user ID in the RACF ASSIZEMAX parameter. The ASSIZEMAX parameter overrides the MAXASSIZE parameter.

If you start Infoprint Server daemons from the OMVS shell under TSO, the SIZE parameter on your TSO/E logon determines the amount of memory available. If you use data stream transforms, set SIZE=42000 or larger. IBM suggests that you set SIZE=256000 (or larger) so that you can transform large or complex data streams. If you start the IPP Server daemon, set SIZE=200000 (or larger).

8. From ISPF, you can use the TSO oshell or omvs command to run the aopstart command. On the ISPF Command Shell panel (ISPF option 6), type one of these commands:
   - oshell aopstart
   - omvs

   Then, on the OMVS command line, type aopstart

9. You can use the TSO ishell command to enter the aopstart command. You must, however, type the full path name of the aopstart command because the z/OS ISPF shell does not use environment variables set in the /etc/profile profile. For example, if the aopstart command is in the default directory, run this command:

   ```
   /usr/lpp/Printsrv/bin/aopstart
   ```

10. To request that Infoprint Server validate internal databases, set the AOPVALIDATEDB environment variable to any value (for example, AOPVALIDATEDB=1) either in the aopstart EXEC or in the environment. IBM suggests that you validate internal databases if Infoprint Server ended abnormally or if you specified the force option when you stopped Infoprint Server daemons. The AOPVALIDATEDB environment variable applies only when the Printer Inventory Manager daemons start. When you specify the AOPVALIDATEDB environment variable, Infoprint Server takes a few extra minutes to start.

11. The aopstart command can end with abend EC6 (reason code FFFF) or abend 33E. These abends do not indicate an error. Your installation can suppress these abends in the IEASLP00 member of SYS1.PARMLIB.

### Environment variables

Infoprint Server uses these environment variables, which you can set in the environment or in the aopstart EXEC. Variables in the aopstart EXEC take precedence over variables in the environment.

- **AOPDUMPON**
  - Creates a full dump for internal errors.

- **AOPTRACEBYTES**
  - The maximum size of a trace file.

- **AOPTRACEMAXFILES**
  - The number of trace files to produce.

- **AOPTRACEON**
  - Turns tracing on.
AOPTRACEON_DATA, AOPTRACEON_FILTER, AOPTRACEON_MSGLOG
The type of data to trace.

AOPVALIDATEDB
Causes Infoprint Server to check internal databases for validity before starting.

LANG
The language used for messages.

LC_ALL
The locale used to format date and time information in common log messages.

LC_CTYPE
The locale used to determine the code page for validating attributes.

LC_TIME
The locale used to format date and time information in common log messages.

TZ
The time zone displayed in common log messages.

Infoprint Server uses these environment variables, which you can set only in the aopstart EXEC:

_BPX_SHAREAS
Causes the spawn() callable service to create some Infoprint Server subtasks in the parent’s address space.

_BPX_UNLIMITED_OUTPUT
Lets Infoprint Server daemons write an unlimited amount of data to the JES spool without ending abnormally.

_BPX_SETIBMOPT_TRANSPORT
The TCP/IP job name associated with the TCP/IP stack you want to use.

AOP_SAP2AFP_RESOURCES
Directory that contains all of the SAP to AFP transform resources.

AOPCONF
Names the Infoprint Server configuration file. The file named in this variable takes precedence over configuration file /etc/Printsrv/aopd.conf.

AOPMSG_CONF
Names the Infoprint Server message configuration file. The file named in this variable takes precedence over configuration file /etc/Printsrv/aopmsg.conf.

AOPRESUBMITUSER
Lets the job submitter’s z/OS user ID be used for RACF authorization checks during the resubmit for filtering function.

AOPRXF_CONF
Names the remote transform configuration file. The file named in this variable takes precedence over configuration file /etc/Printsrv/aoprxf.conf.

AOPSAPD_CONF
Names the SAP Callback daemon configuration file. The file named in this variable takes precedence over configuration file /etc/Printsrv/aopsapd.conf.

AOPTRACEDIR
Names the directory where trace files are to be written. The directory named in this variable takes precedence over directory /var/Printsrv/trace.

AOPXFD_CONF
Names the transform configuration file. The file named in this variable takes precedence over configuration file /etc/Printsrv/aopxfd.conf.
**CLASSPATH**  
Lists the full path names of the Java™ Archive (JAR) files that the Infoprint Server IPP Server uses.

**JAVA_HOME**  
Lists the directory where Java files that the Infoprint Server IPP Server uses are located.

**LIBPATH**  
The path used to locate dynamic link libraries (DLL), including DLLs for Infoprint Server and SAP remote function calls.

**NLSPATH**  
Lists the directory where the Infoprint Server message catalogs are located.

**PATH**  
Lists the directory where Infoprint Server daemons are located.

**STEPLIB**  
Names libraries that are not in the system LNKLST, including the IP PrintWay extended mode exit library, the FCB image library (SYS1.IMAGELIB), and language environment and C++ run-time libraries.

If dynamic configuration is not enabled, Infoprint Server uses these environment variables, which you can set only in the `aopstart` EXEC. If dynamic configuration is enabled, Infoprint Server ignores these environment variables and instead uses the equivalent configuration attributes.

**AOP_APPLID**  
The VTAM application program ID that IP PrintWay extended mode uses to communicate with VTAM-controlled printers.

**AOP_ALLOW_ALL_CHARACTERS_IN_LINE_DATA**  
Controls how line data is detected.

**AOP_BLANK_TRUNCATION_CLASSES**  
List of output classes for which IP PrintWay extended mode should truncate blank characters at the end of lines.

**AOP_IGNORE_DCF_ROUTING_ERRORS**  
Controls IP PrintWay extended mode routing.

**AOP_MAIL_DO_NOT_ADD_SUFFIX**  
Controls suffixes that are appended to email documents.

**AOP_MAIL_PRESERVE_SUFFIXES**  
Preserves suffixes of email documents.

**AOP_MAIL_USE_FIRST_ADDRESS**  
Determines the email addresses that IP PrintWay extended mode uses when print jobs contain more than one document.

**AOP_MAXTHREADTASKS**  
The MAXTHREADTASKS limit for these Infoprint Server daemons: `aophinvd`, `aopipd`, `aoplpd`, `aopnetd`, `aopoutd`, `outsdbd`, `aopssid`, `aopsuid`, and `aopwsmd`.

**AOP_SELECT_WORK_FROM_HOLD_QUEUE**  
Controls whether IP PrintWay extended mode selects new held output groups from the JES spool.

**AOP.Suppress_POST_UNIX_FILTER_FORMATTING**  
Suppresses IP PrintWay extended mode formatting for data that a UNIX filter formats.

**AOPHINV_MAXTHREADTASKS**  
The MAXTHREADTASKS limit for daemon `aophinvd`. 

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8  
_z/OS V2R1.0 Infoprint Server Operation and Administration_
**AOPIPPD_MAXTHREADTASKS**
The MAXTHREADTASKS limit for daemon aopipdp.

**AOPLPD_MAXTHREADTASKS**
The MAXTHREADTASKS limit for daemon aoplpd.

**AOPMAILER**
The full path name of the z/OS UNIX sendmail command.

**AOPMAILER_OPTIONS**
Options for the z/OS UNIX sendmail command.

**AOPNETD_MAXTHREADTASKS**
The MAXTHREADTASKS limit for daemon aopnetd.

**AOPNETD_USE_FIXED_JOBID**
Determines the job ID for output data sets that NetSpool creates.

**AOPNETD_USE_UNALTERED_JOBID**
Determines the job ID of output data sets that NetSpool creates.

**AOPOUTD_MAXTHREADTASKS**
The MAXTHREADTASKS limit for daemon aopoutd.

**AOPSDBD_MAXTHREADTASKS**
The MAXTHREADTASKS limit for daemon aopsdbd.

**AOPSSID_MAXTHREADTASKS**
The MAXTHREADTASKS limit for daemon aopssid.

**AOPSUBD_MAXTHREADTASKS**
The MAXTHREADTASKS limit for daemon aopsubd.

**AOPWSMD_MAXTHREADTASKS**
The MAXTHREADTASKS limit for daemon aopwsmd.

### Files

**/etc/Printsrv/aopd.conf**
The default Infoprint Server configuration file. This file is required. The file named in the AOPCONF environment variable takes precedence over this file.

**/etc/Printsrv/aopmsg.conf**
The default message configuration file. This file is optional. The file named in the AOPMSG_CONF environment variable takes precedence over this file. If dynamic configuration is enabled, Infoprint Server ignores this file.

**/etc/Printsrv/aoprxf.conf**
The default remote configuration file. This file is required if you use InfoPrint Transform Manager for Linux. The file named in the AOPRXF_CONF environment variable takes precedence over this file.

**/etc/Printsrv/aopsapd.conf**
The default SAP Callback daemon configuration file. This file is required if the SAP Callback daemon receives a print request from SAP R/3. The file named in the AOPSAPD_CONF environment variable takes precedence over this file.

**/etc/Printsrv/aopxfd.conf**
The default Transform Manager configuration file. This file is required if you start the Transform Manager daemon. The file named in the AOPXFD_CONF environment variable takes precedence over this file.
Exit values

0 Successful completion.

>0 An error prevented one or more daemons from being started.

Related information

For more information about the AOPOPER group, environment variables, dynamic configuration, configuration files, and the aopstart EXEC, see z/OS Infoprint Server Customization.

Stopping Infoprint Server with the aopstop command

Format

aopstop [-d daemon]... [now] [force]

Description

The aopstop command stops all Infoprint Server daemons or only the specified daemons. Unless you specify the now or the force option, the daemons stop after current activity completes.

Result: After you enter the aopstop command, you see one or more messages. Some messages might be written only in the console log. The messages can include:

AOP044I Shutdown complete. (program:daemon)
AOP078W Daemon daemon is not running.
AOP079I A shutdown of daemon daemon has been initiated.
AOP134E The stop of daemon daemon failed.
AOP135I An abrupt shutdown of daemon daemon has been initiated.
AOP136I A destructive shutdown of daemon daemon has been initiated.

When all daemons have stopped except for the last daemon (aopd), you see this message:

AOP079I A shutdown of daemon aopd has been initiated. (program:aopstop)

When you issue the aopstop command to stop all daemons and no daemons are running, you see this message:

AOP078W Daemon aopd is not running. (program:aopstop)

Options

-d daemon Specifies the daemon to stop. If you omit this option, all active daemons are stopped, including the Printer Inventory Manager daemons (aopd, aophinvd, aoplogd, and aopsdbd). You can specify one of these values:

ipd Stop the Internet Printing Protocol daemon, aopipdexp.
lpd Stops the line printer daemon, aoplpd.
etd Stops the NetSpool daemon, aopnetd.
outd Stops the IP PrintWay extended mode daemons, aopoutd and aopwsmd. When you start IP PrintWay again, any IP PrintWay printers that were
stopped return to the started state, and any
printers that were redirected to other printers are
no longer redirected.

**snmpd**  Stops the SNMP subagent daemon, **aopsnmpd**.

**ssid**   Stops the Infoprint Central daemon, **aopssid**.

**subd**   Stops the Print Interface subsystem daemon, **aopsubd**.

**xfd**    Stops the Transform Manager daemon, **aopxfd**.

now       Stops the daemons immediately. If work is in progress, incorrect
output or data loss might result. If this option is not specified, the
daemons stop after current activity completes.

**force**   Stops the daemons immediately using a “destructive” shutdown. If
work is in progress, incorrect output or data loss might result. For
daemons that manage a database, such as **aopd**, **aophinvd**, or
**aopsdbd**, the database might be corrupted. If this option is not
specified, the daemons stop after current activity completes.

**Notes:**
1. Use this option with extreme caution.
2. Before you use this option, use the Printer Inventory Definition
   Utility (PIDU) **export** command to backup the Printer Inventory
   if Infoprint Server is running.
3. After you stop daemons using this option, specify the
   AOPVALIDATEDB environment variable to validate internal
databases when you start Infoprint Server daemons again. You
   can specify AOPVALIDATEDB=1 either in the **aopstart** EXEC or
   in the environment. If databases are corrupted, you might need
   to restore the Printer Inventory and the search databases.

**Usage notes**
1. To use the **aopstop** command, you must either be a member of the RACF
   AOPOPER group or have an effective UID of 0. You can use the z/OS UNIX **su**
   command to switch to an effective UID of 0 if you have access to the
   BPX.SUPERUSER profile in the RACF FACILITY class.
2. To stop all Infoprint Server daemons, enter the **aopstop** command without
   specifying any daemon names.
3. Before you stop all daemons, stop other programs that are using the Printer
   Inventory, such as NetSpool, IP PrintWay basic mode, and PSF.
4. Before you stop Infoprint Server, back up the Printer Inventory if you have
   made changes to it since the last backup. For information about how to back
   up the Printer Inventory, see [z/OS Infoprint Server Customization](#).
5. Before you restart Infoprint Server, wait for the daemon or daemons that you
   stopped to end.
6. The **aopstop** command can end with abend EC6 (reason code FFFF) or abend
   33E. These abends do not indicate an error. You can suppress these abends in
   the IEASLP00 member of SYS1.PARMLIB.
Examples

1. To stop all active daemons (including the Printer Inventory Manager daemons) after current activity ends, use this command. The Print Interface component of Infoprint Server stops accepting new print requests and completes all work in progress before shutting down.
   
aopstop

2. To stop the Transform Manager and line printer daemons, use this command:
   
aopstop -d xfd -d lpd

3. To stop all daemons immediately, use one of these commands. Documents that are being processed might be lost.
   
aopstop now
   aopstop force

Environment variables

Infoprint Server uses these environment variables, which you can set only in the aopstart EXEC:

AOPCONF
Names the Infoprint Server configuration file. The file named in this variable takes precedence over configuration file /etc/Printsrv/aopd.conf.

LANG
The language used for messages.

LIBPATH
The path used to locate dynamic link libraries (DLL).

NLSPATH
The directory where the Infoprint Server message catalogs are located.

File

/etc/Printsrv/aopd.conf
The default Infoprint Server configuration file. This file is required. The file named in the AOPCONF environment variable takes precedence over this file.

Exit values

0  Stopping of the daemons was successfully initiated.

>0  An error occurred that prevented stopping the daemons.

Related information

For more information about the AOPOPER group, environment variables, and configuration files, see z/OS Infoprint Server Customization.
Chapter 2. Starting and stopping the NetSpool task and NetSpool LUs

These topics describe how to start and stop the NetSpool task and how to control NetSpool printer logical units (LUs) from the system console:

- Starting the NetSpool task
- Entering NetSpool commands
- Stopping the NetSpool task
- Starting NetSpool printer LUs
- Stopping NetSpool printer LUs
- Displaying the status of NetSpool printer LUs

Tip: You can start, stop, and display the status of NetSpool LUs from Infoprint Central. For more information, see Chapter 6, “Using Infoprint Central,” on page 39. Also, see the Infoprint Central online help system.

Starting the NetSpool task

Each NetSpool started task runs in its own system address space and processes data sets for different classes of NetSpool printer LUs. When a NetSpool task starts, it attempts to start any printer LUs defined in the Printer Inventory and assigned to one of the started LU classes specified in the NetSpool startup procedure. If the administrator defines a new printer LU in the Printer Inventory after you start the NetSpool task, NetSpool automatically starts that printer LU if it is in one of the started LU classes.

Before you begin:

- Make sure that the Printer Inventory Manager and NetSpool have been customized. See z/OS Infoprint Server Customization.
- Start the Printer Inventory Manager daemon (aopd) and the NetSpool daemon (aopnetd). See Chapter 1, “Starting and stopping Infoprint Server daemons,” on page 1.

These administrative tasks can be done before or after you start the NetSpool task:


Steps to start the NetSpool task:

1. Make sure that VTAM is started, and then activate any printer LUs defined in the Printer Inventory in the LU classes NetSpool will process. Use the VTAM VARY ACT command to activate the printer LUs.
   If NetSpool cannot start a printer LU because the printer LU is inactive in VTAM or because it is started by another NetSpool started task, NetSpool starts the printer LU automatically when the printer LU becomes available.

2. Run the NetSpool startup procedure. Use this MVS START command:

   ```
   START procedure_name[,JOBNAME=jobname]
   ```
For example, if the NetSpool startup procedure is a member named APIJPJCL in the SYS1.PROCLIB library, enter this command:

```
START APIJPJCL
```

(Optional) You can specify a jobname for each NetSpool task that you start. A jobname lets you easily distinguish between different NetSpool started tasks. To specify a jobname of NETSPOOL, enter this command:

```
START APIJPJCL,JOBNAME=NETSPOOL
```

Result: After you start NetSpool, use either (1) Infoprint Central or (2) the NetSpool DISPLAY SELECTED command (described on page [19]), to display the status of the printer LUs that NetSpool started or attempted to start. However, you cannot use Infoprint Central to display LU status if your installation starts more than one NetSpool task.

### Entering NetSpool commands

To control NetSpool printer LUs, you can use the MVS MODIFY command to direct NetSpool commands to NetSpool. You can also use the MVS STOP command to stop a NetSpool started task.

The MVS MODIFY and STOP commands use the jobname and identifier fields to direct the command to the appropriate NetSpool task. If only one NetSpool task is started on a system, or if you specified a different jobname for each started task the JOBNAME parameter of the START command, specify only the jobname field in the command. However, if you started multiple NetSpool tasks with the same jobname, use the identifier field to distinguish between them. For more information about how to specify the jobname and identifier for your installation, see [z/OS MVS System Commands](z/OS MVS System Commands).

The format of the MODIFY command is:

```
Syntax

{F | MODIFY} jobname.[id].,NetSpool_command
```

- **F | MODIFY**
  The MODIFY command name. You can enter either F or MODIFY.

- **jobname**
  The job name of the NetSpool startup procedure. This can be the member name (for example, APIJPJCL) or the name you specified on the JOBNAME parameter of the START command.

- **id**
  A number that identifies the NetSpool startup procedure to which you want the NetSpool command directed. If only one NetSpool startup procedure is running on a system, or you specified different job names in the JOBNAME parameter on the START command, you do not need to specify this field. However, if you started more than one NetSpool task using the same NetSpool startup procedure, and you did not specify the JOBNAME parameter on the START command, you must specify the identifier to distinguish among them.

- **NetSpool_command**
  The NetSpool command, for example, LUNAME=LUPRT001,ADD. The next sections describe NetSpool commands.
Stopping the NetSpool task

You can enter one of several NetSpool operator commands to stop a NetSpool started task, depending on how quickly you want to stop NetSpool. You can stop NetSpool:

- After all VTAM sessions end normally.
- Immediately, after NetSpool ends all VTAM sessions.
- Immediately, without ending VTAM sessions. Use this method only if other methods fail.

The VTAM HALT command also can cause sessions with NetSpool printer LUs to end or can stop the NetSpool task.

**Tip:** To stop NetSpool processing, you do not need to stop the NetSpool daemon (`aopnetd`). When you stop the NetSpool task, NetSpool processing ends. You can restart the NetSpool task without restarting the NetSpool daemon.

**Stopping NetSpool after current sessions end normally**

Use the QUIT command to stop the NetSpool started task after all current sessions end normally. The QUIT command prevents new sessions from starting. Each current session ends only when the VTAM application that established the session ends it. Thus, a long delay might occur before NetSpool stops and returns to the operating system.

The format of the QUIT command is:

```
Syntax
F jobname[,id],QUIT
```

**Stopping NetSpool immediately**

Use the QUIT FORCE command to stop the NetSpool started task after ending all current sessions immediately. Because NetSpool ends all current sessions immediately, some output data sets might be incomplete. NetSpool creates data sets with all data received.

The format of the QUIT FORCE command is:

```
Syntax
F jobname[,id],QUIT FORCE
```

**Stopping NetSpool abnormally**

Use the KILL or MVS STOP command to stop the NetSpool started task immediately, without ending any VTAM sessions or creating output data sets. Data already sent to NetSpool is lost.

**Attention:** Use the KILL and STOP commands only when a hang condition prevents completion of a QUIT FORCE command.

The format of the KILL command is:
The MVS STOP command provides the same function as the KILL command. The format of the STOP command is:

```
Syntax
STOP jobname[,id]
```

Using VTAM HALT commands

When you enter a VTAM HALT command, NetSpool does one of these actions, depending on the type of HALT command you entered:

- **Standard HALT**
  The HALT command causes all VTAM sessions to end normally. New sessions are not allowed to start. No data is lost. NetSpool creates output data sets with all received data. NetSpool places all started printer LUs in the WAITING state, periodically (every 60 seconds) attempting to restart the printers.

- **HALT QUICK**
  The HALT QUICK command causes all VTAM sessions to end immediately. New sessions are not allowed to start. No data is lost. NetSpool creates output data sets with all received data. NetSpool places all started printer LUs in the WAITING state, periodically (every 60 seconds) attempting to restart the printers.

- **HALT CANCEL**
  The HALT CANCEL command causes all VTAM sessions to end immediately. New sessions are not allowed to start. No data is lost. NetSpool creates output data sets with all received data. The NetSpool started task stops, returning to the operating system.

Starting NetSpool printer LUs

When you start NetSpool, the NetSpool printer LUs that are assigned to the LU classes specified on the EXEC statement in the NetSpool startup procedure are started. After NetSpool is started, you can use either (1) Infoprint Central or (2) the VTAM VARY ACT and LUNAME ADD commands to start an LU. You might want to start an LU that is assigned to a NetSpool LU class that has not been started, or to restart an LU that you stopped.

This section describes the VTAM VARY ACT and LUNAME ADD commands. The Infoprint Central action to start a NetSpool LU is equivalent to entering both the VTAM VARY ACT and LUNAME ADD commands. For information about how to use Infoprint Central, see the Infoprint Central online help system.

**Limitation:** You cannot use Infoprint Central to start, stop, or display the status of NetSpool LUs if you start more than one NetSpool task. However, you can use Infoprint Central to do other functions.

**Tips:**
If you specify a printer LU name in a printer definition after NetSpool is started, NetSpool automatically tries to start the LU if it is assigned to one of the LU classes that NetSpool has already started. This means that you do not need to start the LU with the NetSpool ADD command. However, you must still activate it in VTAM using either Infoprint Central or the VARY ACT command.

After NetSpool has started, if you want to start all printers in another LU class, you can start another NetSpool task and specify the LU class on the EXEC statement. This eliminates the need to enter the LUNAME ADD command numerous times to start many printer LUs. However, if you start more than one NetSpool task, you cannot use Infoprint Central to work with NetSpool LUs.

**Before you begin:** The LU to be started must be defined in a printer definition in the Printer Inventory and also must be defined to VTAM with an APPL statement. For more information about APPL statements, see "Creating APPL statements for NetSpool printer LUs" on page 228.

**Steps to start an LU with the VTAM VARY and LUNAME ADD commands:**

1. If the printer LU is not active in VTAM, activate it using the VTAM VARY ACT command.

2. Add the printer LU to NetSpool, using the LUNAME ADD command.

The format of the LUNAME ADD command is:

```
jobname(.id),LUNAME=lu-name,ADD
```

**Syntax**

```
jobname(.id),LUNAME=lu-name,ADD
```

`lu-name` Specifies the name of the printer LU. The name must match the LU name in a printer definition in the Printer Inventory.

If NetSpool cannot start a printer LU because it is not active in VTAM or because it has been started in another NetSpool started task, NetSpool starts the printer LU automatically at a later time, when the printer LU becomes available. If you display printer LUs using the DISPLAY command or Infoprint Central, the printer LU will be in the WAITING state.

**Example:** In this example, printer LU LUPRT003 is varied active in VTAM and then is added to NetSpool.

```
VARY NET,ACT,ID=LUPRT003
F jobname.id,LUNAME=LUPRT003,ADD
```

**Stopping NetSpool printer LUs**

While NetSpool is running, you can use (1) Infoprint Central, (2) the LUNAME PURGE command, or (3) the VTAM VARY INACT and LUNAME DEL commands to deactivate the VTAM session with a printer and to stop NetSpool from processing any more print requests for the printer LU.

This section describes the VTAM VARY INACT, LUNAME DEL, and LUNAME PURGE commands. The Infoprint Central action to stop a NetSpool LU is
equivalent to entering the LUNAME PURGE command. For information about how to use Infoprint Central, see the Infoprint Central online help system.

Infoprint Central and the LUNAME PURGE command provide a fast way to stop a printer LU because the VTAM session ends immediately and no more data is sent to the printer LU. The printer LU finishes processing data it has already received so no data is lost. The LUNAME DEL command lets you stop a printer LU after the VTAM session has ended normally.

**Limitation:** You cannot use Infoprint Central to start, stop, or display the status of NetSpool LUs if you start more than one NetSpool task. However, you can use Infoprint Central to do other functions.

**Tip:** If you remove a printer LU name from a printer definition after NetSpool is started, NetSpool automatically stops the printer LU after the VTAM application ends the session. Therefore, you do not need to use stop the printer LU in this case.

### Steps to stop an LU with the VTAM VARY and LUNAME DEL commands:

1. If the printer is started, deactivate the printer LU in VTAM, using the VTAM VARY INACT command. The type of VARY command you choose depends on how quickly you want the VTAM session to end. In either case, NetSpool creates an output data set with all data received. Therefore, no data is lost.
   - Specify the TYPE=IMMED option to end the VTAM session immediately.
   - Specify no TYPE option to wait until the VTAM application sending the data ends the session normally. A long delay might occur until the session ends.

   When you deactivate the printer LU in VTAM, the printer is placed in the WAITING state, meaning that NetSpool automatically restarts the printer LU when you reactivate the printer LU in VTAM.

   **Tip:** If a printer LU is already in the WAITING state because NetSpool could not start it, you do not need to first deactivate the printer in VTAM.

2. Delete the printer LU from NetSpool using the LUNAME DEL command. This command frees resources for the printer LU and prevents NetSpool from restarting it when you reactivate the printer LU using VTAM. After you enter the LUNAME DEL command, the printer LU will be in a PENDING CLOSE state until NetSpool has created an output data set with data received prior to the LUNAME DEL command.

   **Tip:** Wait for the printer to become inactive in VTAM before you enter this command.

The format of the LUNAME DEL command is:

```
Syntax

F jobname[,id],LUNAME=lu-name,DEL
```

**lu-name** Specifies the name of the printer LU. The name must match the LU name in a printer definition in the Printer Inventory.
Examples:
- In this example, printer LU LUPRT003 is deactivated in VTAM after the VTAM session for printer LU LUPRT003 ends immediately. The LUNAME DEL command, entered after the printer is inactive in VTAM, causes NetSpool to delete LUPRT003 from its list of selected printers LUs.

    VARY NET,INACT,ID=LUPRT003,TYPE=IMMED
    F jobname.id,LUNAME=LUPRT003,DEL

- In this example, NetSpool deletes printer LU LUPRT003 from its list of selected printers. Use the LUNAME DEL command without preceding it with a VARY INACT command only when the printer LU has not been successfully started. That is, the printer LU is in the WAITING state.

    F jobname.id,LUNAME=LUPRT003,DEL

Stopping an LU with the LUNAME PURGE command:

The LUNAME PURGE command deactivates the printer LU in VTAM immediately and closes the printer LU, deleting it from NetSpool's list of selected printers. NetSpool creates an output data set with any data received from VTAM before you enter the LUNAME PURGE command. However, the VTAM session is ended as soon as the command is entered, and the printer LU does not receive any new data from VTAM.

Tip: The LUNAME PURGE command is useful when, because of a significant error with the printer LU, you want processing to stop immediately for that printer LU and you do not want to allow any more data to be sent to it.

The format of the LUNAME PURGE command is:

```
Syntax
F jobname[.id],LUNAME=lu-name,PURGE
```

lu-name
Specifies the name of the printer LU. The name must match the LU name in a printer definition in the Printer Inventory.

Example: In this example, the VTAM session with printer LU LUPRT003 ends immediately. LUPRT003 is in a PENDING CLOSE state while NetSpool creates an output data set for any data it has received. NetSpool deletes LUPRT003 from its list of selected printers.

    F jobname.id,LUNAME=LUPRT003,PURGE

Displaying the status of NetSpool printer LUs

Use either (1) Infoprint Central or (2) the DISPLAY command to display the status of printer LUs.

Limitation: You cannot use Infoprint Central to start, stop, or display the status of NetSpool LUs if you start more than one NetSpool task. However, you can use Infoprint Central to do other functions.

The DISPLAY command returns these states:
- STARTED
NetSpool selected this printer LU for processing. The printer LU is either in a session with a VTAM application or is ready to accept a request from a VTAM application to establish a session.

- **WAITING**

  NetSpool selected the printer LU for processing, but has been unable to start the printer LU because it is not available. NetSpool periodically (every 60 seconds) attempts to start the printer, automatically starting it when it becomes available. You do not receive a message on the console when NetSpool automatically starts a printer LU at a later time.

  Because NetSpool periodically attempts to start printer LUs in the WAITING state, you might want to either start or stop a printer LU that is in the WAITING state.

  - To start a printer LU that is not active in VTAM, activate the printer LU with the VTAM VARY ACT command. When the printer becomes active, NetSpool automatically starts the printer LU.
  - To stop a printer LU, enter the LUNAME DEL command. Because NetSpool has not successfully started the printer LU, you do not need to first vary the printer inactive in VTAM.
  - To start a printer LU that is started by another NetSpool task, first stop the printer in the other NetSpool started task, using the VTAM VARY INACT command and the LUNAME DEL command. Then, activate the printer LU in VTAM. This NetSpool task automatically starts it.

- **PENDING CLOSE**

  NetSpool selected this printer LU for stopping because you entered the LUNAME DEL or LUNAME PURGE command. NetSpool will stop the printer LU after NetSpool creates an output data set with all data received before the LUNAME DEL or LUNAME PURGE command was entered.

  After the printer LU stops, it no longer is displayed when you enter the DISPLAY command for this NetSpool started task. At that point, you can restart the printer LU by activating the printer LU with the VTAM VARY ACT command and then adding the printer LU to NetSpool using the LUNAME ADD command.

**Tip:** The status displayed is the status for this NetSpool started task only. For example, a printer LU might not display as STARTED, WAITING, or PENDING CLOSE, but it might be started in another NetSpool task.

The format of the DISPLAY command is:

```plaintext
Syntax
F jobname.id,DISPLAY {LUNAME=luname | SELECTED | STARTED | WAITING | TRACE}
```

- **LUNAME=luname**
  Requests that NetSpool display the status for the printer LU. You see a message like one of these:
  - `luname IS NOT SELECTED`.
  - `luname IS STARTED SESSION=ACTIVE PRINTERNAME=MYPRINTER LTYPE=1 PLU=IMS001 EOFRULE=EB`.
  - `luname IS WAITING`.
  - `luname IS PENDING CLOSE`.
**SELECTED**  Requests that NetSpool display the printer LUs that are selected for processing. The status of the printers is STARTED, WAITING, or PENDING CLOSE. The minimum abbreviation allowed is SEL.

**STARTED**  Requests that NetSpool display all printer LUs in the STARTED state. The minimum abbreviation allowed is STA.

**WAITING**  Requests that NetSpool display all printer LUs in the WAITING state. The minimum abbreviation allowed is WAI.

**TRACE**  Requests that NetSpool display all printer LUs that are being traced and whether internal tracing is active. For more information about tracing printer LUs, see **z/OS Infoprint Server Messages and Diagnosis**. The minimum abbreviation allowed is TRA.

**Additional information for STARTED status:**

When you use the DISPLAY command with LUNAME, SELECTED, or STARTED, you see additional information that can help you diagnose problems with NetSpool LUs, VTAM definitions, and VTAM application programs. The information can include:

- **SESSION=**status
  The indicator of whether the VTAM session with NetSpool is currently established (ACTIVE) or not established (INACTIVE). The session status can help you diagnose problems when you are not sure if a primary logical unit (PLU) has established a session with the NetSpool printer LU.

- **PRINTERNAME=**printer-definition-name or **POOLNAME=**printer-pool-definition-name
  The name of the printer definition or printer pool definition for this LU. The printer definition name can help you diagnose problems when you need to determine which printer definition contains the NetSpool items associated with the LU, such as end-of-file rules and formatting options.

- **LUTYPE=**lu-type
  The type of LU (0, 1, or 3). For active sessions, you see the current LU type. For inactive sessions, you see the LU type of the previous session. If a session has not been established, you do not see this information. The LU type can help you diagnose problems when you see a NetSpool data stream message or when you are trying to change the page format. NetSpool does not control page formatting for 3270 data streams (LU0 and LU3) or when **netspool-formatting=none**.

- **PLU=**plu-name
  The name of the primary logical unit. For active sessions, you see the current PLU name. For inactive sessions, you see the PLU name of the previous session. If a session has not been established, you do not see this information. The PLU name can help you diagnose problems when more than one VTAM application prints on the LU and a print request is in error.

- **EOFRULE=**rule
  The End of File rule that NetSpool is using (End-of-bracket (EB), End-of-chain (EC), End-of-session (ES), String, or Timer). The EOF rule can help you diagnose problems when jobs do not close on the spool or when print requests are separated into several jobs.

**Example:** In this example, NetSpool lists the status of all printer LUs selected for processing.

```
F jobname.id,DISPLAY SELECTED
```
This is sample output from the DISPLAY command:

API1008I Display of SELECTED LUs.
API1002I LUPRT002 — LU IS STARTED SESSION=ACTIVE PRINTERNAME=MYPRINTER
    LUTYPE=1 PLU=IMS001 EOFRULE=EB.
API1050I LUPRT000 — LU IS PENDING CLOSE.
API1002I LUPRT001 — LU IS STARTED SESSION=INACTIVE PRINTERNAME=YOURPRINTER
    LUTYPE=0 PLU=IMS002 EOFRULE=TIMER.
API1003I LUPRT003 — LU IS WAITING.
Chapter 3. Starting and stopping IP PrintWay FSAs (basic mode)

These topics describe how to start and stop IP PrintWay basic mode functional subsystem applications (FSAs). These topics to not apply to IP PrintWay extended mode.

Related information: For more information about the JES2 and JES3 commands, see one of these:
- z/OS JES2 Commands
- z/OS JES3 Commands

For more information about the MVS commands, see z/OS MVS System Commands.

Starting an IP PrintWay functional subsystem (basic mode)

IP PrintWay basic mode operates as a JES functional subsystem (FSS), an extension of JES that runs in its own system address space. Before you start an IP PrintWay functional subsystem (FSS) and the functional subsystem applications (FSAs) under its control, your installation must:
- Customize the Printer Inventory Manager.
- Define an IP PrintWay FSS and one or more FSAs under control of the FSS to JES.
- Customize IP PrintWay and create a cataloged start procedure for each FSS.
- Create an FSS definition for some or all IP PrintWay FSSs in the Printer Inventory.
- Create an FSA definition for some or all IP PrintWay FSAs in the Printer Inventory.

These tasks are described in z/OS Infoprint Server Customization.

IP PrintWay uses the configuration information specified in the FSS and FSA definitions when the FSS and each FSA starts. FSS and FSA definitions are optional. If an FSS or FSA definition does not exist in the Printer Inventory, IP PrintWay uses default configuration information.

After these tasks are done, you can enter commands at the operator console to start each IP PrintWay FSA. You do not need to enter a command to start the FSS because JES starts the FSS automatically when you start the first FSA under control of that FSS.

Notes:
1. If you change either the IP PrintWay startup JCL procedure or the IP PrintWay FSS definition after IP PrintWay is already started, you must stop and restart the IP PrintWay FSS to pick up the changes.
2. If you change the IP PrintWay FSA definition after IP PrintWay is already started, you must stop and restart the IP PrintWay FSA.
3. You do not need to stop and restart IP PrintWay FSAs if you restart TCP/IP. IP PrintWay automatically reestablishes connection with TCP/IP.

If an FSA is defined with the START=YES parameter on the JES2 PRTnnnnn statement, JES2 automatically starts the FSA when you bring up the z/OS system. JES3 does not support the automatic start option.
To start an IP PrintWay basic mode FSA:

1. Make sure that TCP/IP is started on the z/OS system.

2. Make sure that the Printer Inventory Manager daemon is started. See Chapter 1, “Starting and stopping Infoprint Server daemons,” on page 1.

3. Verify that the printers and print servers are online or started. You can start the printers and print servers after you start the IP PrintWay FSA. However, they should be started before the FSA attempts to transmit data to the printer or server. Otherwise, a TCP/IP error occurs.

4. Start the IP PrintWay FSA and the FSS by entering this JES2 or JES3 start command:
   
   **JES2:**
   
   `$Sfsa_name[,fsa_name ... ]`
   
   **JES3:**
   
   `*CALL WTR,OUT=fsa_name`
   
   Replace `fsa_name` with one of these:
   
   - In JES2, the name of the JES PRTnnnn statement. For example: PRT0001.
   - In JES3, the name in the JNAME parameter of the JES DEVICE statement.

   Note: If your installation has created an FSA definition for the IP PrintWay FSA, make sure that the name in the FSA definition matches the name you specify to JES when you start the FSA. If the names do not match, IP PrintWay does not use the information in the FSA definition when the FSA starts.

---

**Stopping an IP PrintWay functional subsystem (basic mode)**

To stop an IP PrintWay basic mode functional subsystem (FSS), you should first stop all FSAs under its control.

**Stopping an FSA (basic mode)**

Use these JES2 or JES3 commands to stop an IP PrintWay FSA. The FSA stops after transmitting the current data set and data sets already selected for transmission.

**JES2:**

`$Pfsa_name[,fsa_name ... ]`

**JES3:**

`*VARY,fsa_name[,fsa_name ... ],OFFLINE`

  + *CANCEL,fsa_name`

Replace `fsa_name` with one of these:

- In JES2, the name of the JES PRTnnnn statement. For example, PRT123.
- In JES3, the name in the JNAME parameter of the JES DEVICE statement.

The *VARY command makes the FSA unavailable for transmitting data sets but lets the current data set finish. The *CANCEL command stops the FSA.

**Note:** IP PrintWay does not support the JES2 Cancel command ($C).
Processing of data sets retained on JES spool or waiting to be retried (basic mode)

When you stop an FSA, IP PrintWay releases to JES all data sets that have been retained after successful or unsuccessful transmission to the printer and all data sets that are waiting to be retried. These data sets can be processed by another IP PrintWay FSA or can be reselected by the same IP PrintWay FSA when the FSA is restarted.

IP PrintWay saves routing, retry, and retention information when it releases a data set to JES. When IP PrintWay reselects a data set that has already been processed, IP PrintWay uses the saved information to resume processing at the correct point. IP PrintWay retransmits the data set if the retry limit has not yet been reached and deletes the data set from the JES spool if the retention time has expired.

After an IP PrintWay FSA stops and releases data sets to JES, you can use JES commands and other spool management products (such as SDSF) to modify the output class, form name, and destination of the released data sets. IP PrintWay, however, does not use the new class, form name, or destination to locate a new printer definition. Instead, IP PrintWay uses the saved routing information.

Tip: After IP PrintWay releases a data set to JES, IP PrintWay ignores any changes you make to the host name, IP address, URL, LU name, print queue name, port number, logmode, retry and retention parameters, and name of Inventory components that contain print options.

Stopping an FSS (basic mode)

Before stopping an FSS, you must stop all FSAs under its control. If the FSS was configured with the AUTOSTOP=YES option on the JES2 FSS(fss_name) statement, JES2 stops the FSS automatically after you have stopped all FSAs. In a JES3 environment, JES automatically stops the FSS after you stop all FSAs under its control.

If JES does not automatically stop the FSS, use this MVS operator command to stop the FSS after stopping all FSAs under its control:

C fss_name

Replace fss_name with one of these:
• In JES2, the name on the JES FSS(fss_name) statement
• In JES3, the name in FSSNAME parameter of the JES FSSDEF statement

Ending an FSA (basic mode)

If you are not able to stop an FSA with the commands described in “Stopping an FSA (basic mode)” on page 24, in both JES2 and JES3, you can use the MODIFY command with the FORCE parameter. The syntax of this command is:

Syntax

{MODIFY | F} fss_name,FORCE,fsa_name

fss_name Specifies the name of the FSS that manages the FSA. The fss_name parameter must match the FSSNAME parameter of the JES FSSDEF statement for the FSS.

FORCE Specifies that the FSA is to be stopped.
**fsa_name** Specifies the FSA to be stopped.

**Tip:** IP PrintWay writes message ANFM027I when the FORCE parameter is processed. If the FSA is tracing to an external trace data set when the FORCE parameter is used, an abend might occur when the FSS address space ends.

If the MODIFY command is unsuccessful on JES3 systems, enter this JES3 command:

```
*FAIL,fsa_name
```
Chapter 4. Using the IP PrintWay transmission queue (basic mode)

These topics apply only to IP PrintWay basic mode. IP PrintWay extended mode does not use the same transmission queue as IP PrintWay basic mode. If you run IP PrintWay extended mode, use Infoprint Central, JES commands and other spool management products (such as SDSF) to manage print jobs that IP PrintWay has selected from the JES spool. You should use Infoprint Central because it lets you do more actions on IP PrintWay print jobs and printers. See Chapter 6, “Using Infoprint Central,” on page 39.

The IP PrintWay basic mode transmission queue contains an entry for each data set that IP PrintWay basic mode has selected from the JES spool to process. Each entry contains the status of the transmission of the data set, routing information, and transmission options.

After IP PrintWay basic mode selects a data set from the JES spool for transmission, you cannot use JES commands and other spool management products (such as SDSF) to manage the data set. You must use Infoprint Server ISPF panels to monitor, reroute, retransmit, and delete data sets that IP PrintWay has selected.

IP PrintWay initially creates a queue entry for each data set to be transmitted. IP PrintWay retains the queue entry until either (1) IP PrintWay deletes the data set from the JES spool or (2) the IP PrintWay FSA processing the data set ends normally or abnormally and releases the data sets it is processing back to JES so that another IP PrintWay FSA can process them.

Under usual circumstances, you do not need to maintain the IP PrintWay transmission queue because IP PrintWay retains queue entries and deletes queue entries automatically. IP PrintWay retains and deletes entries based on retry and retention parameters specified either in the printer definition or in the JCL for each data set:

- If the transmission of a data set is successful, IP PrintWay retains the queue entry until the retention period specified for successful transmissions has expired and then automatically deletes the queue entry.
- If the transmission of a data set fails (the transmission is still unsuccessful after being retried the requested number of times), IP PrintWay retains the queue entry until the retention period specified for failed transmissions has expired and then automatically deletes the queue entry.

If all IP PrintWay FSAs stop processing, the transmission-queue should be empty. If any entries do remain, delete the entries or reallocate the data set before restarting IP PrintWay. If you reallocate the data set, you must also reinitialize it, as described in Z/OS Infoprint Server Customization.

If your installation has used RACF or a similar product to protect the IP PrintWay transmission-queue data set, you might not be authorized to do some or all of these functions. If, for example, you have read-only access to the IP PrintWay transmission-queue data set, you are allowed to list and browse entries but not hold, reset, modify, or delete them. The Infoprint Server ISPF panels show only those functions you are allowed to do.
Starting an Infoprint Server ISPF session

To maintain the IP PrintWay transmission queue using ISPF panels, you must first start an Infoprint Server ISPF session. For information, see “Starting the ISPF session and configuring the panels” on page 231. Online help is available for each panel, input field, and message. To obtain help, press the HELP function key.

Listing transmission-queue entries (basic mode)

You must display a list of transmission-queue entries before you can do other functions, such as browsing or modifying an individual entry. You can either list all transmission-queue entries, or you can select the entries you want to list.

**Listing all transmission-queue entries (basic mode)**

To display a list of all entries on the IP PrintWay transmission queue:

1. On the Infoprint Server Printer Inventory Manager panel, select 5 PrintWay Queue and press Enter.

   2. On the IP PrintWay Transmission Queue Selection panel:
      a. Change the name of the transmission-queue data set, if necessary. The name of the transmission-queue data set represents the data set that IP PrintWay uses when displaying and updating entries. During an ISPF session, you can work with multiple transmission-queue data sets. For example, if your installation has defined multiple IP PrintWay FSSs, you might need to access the transmission-queue data set for each FSS. To change the name of the data set during your ISPF session, change the name on the IP PrintWay Transmission Queue Selection panel.
         i. If you do not change the name of this data set, IP PrintWay uses name ANFQUEUE.
      b. Leave all other selection fields blank.
      c. Press Enter to display the IP PrintWay Transmission Queue panel.

3. On the IP PrintWay Transmission Queue panel:
   a. Press Enter at any time to obtain a current list.
   b. Press the END function key to exit the list.

**Listing selected transmission-queue entries (basic mode)**

You can select entries based on one or more of these characteristics of queue entries:
- Printer definition name
- Class, form, and destination name
- Job name
- Date the data set arrived on the IP PrintWay transmission queue
- Time the data set arrived on the IP PrintWay transmission queue
- Status of the transmission
- Port number of the socket
- Name of the print queue
VTAM logmode
Host name, IP address, URL, or VTAM LU name of the printer or print server
Email addresses

To display a list of selected queue entries:
1. On the Infoprint Server Printer Inventory Manager panel, select **5 PrintWay Queue** and press Enter.

2. On the IP PrintWay Transmission Queue Selection panel:
   a. Change the name of the transmission-queue data set, if necessary. If your installation has defined multiple transmission-queue data sets, use this panel several times to list entries in all transmission-queue data sets.
   b. Type values in one or more fields to specify selection criteria. To be listed, transmission-queue entries must meet all of the criteria you specify. Leave blank any fields that you do not want IP PrintWay to consider in selecting entries.
      You can use an asterisk (*) in these ways:
      • By itself to mean any value
      • At the start of a string (*ABC matches values ending with ABC)
      • At the end of a string (ABC* matches values starting with ABC)
      • As a part of the date or time field, for example: */03/* or 9:***
      Tip: You cannot use an asterisk as a wild card in the **Port Number** field.
   c. Press Enter.

3. On the IP PrintWay Transmission Queue panel:
   a. A hyphen (-) in front of the name in the **Route Name** field indicates that the entry represents a single data set. The data set grouping specified in the printer definition is either **None** or **Job**. An asterisk (*) in front of the name indicates that the entry represents one or more data sets that belong to a concatenation. The data set grouping specified in the printer definition is **Concatenate Job**. For more information about grouping data sets, see “Transmitting multiple data sets in a JES output group” on page 185.
   b. Press Enter at any time to obtain a current list.
   c. Press the END function key to exit the list.

---

**Browsing a transmission-queue entry (basic mode)**

When you browse an entry on the IP PrintWay transmission queue, you can view fields, but you cannot change any of them. If a field in an entry is blank when you browse it, it means that IP PrintWay uses a default value for the field.
When the name in the Route Name field is preceded by an asterisk, the data displayed is from the first data set of the concatenation.

To browse the entry:

1. List the entry or entries that you want to browse, as described in “Listing transmission-queue entries (basic mode)” on page 28.

_______________________________________________________

2. On the IP PrintWay Transmission Queue panel, type B in the Action column in front of the entries you want to browse, and press Enter.

_______________________________________________________

3. On the IP PrintWay Transmission Queue Entry panel, press the END function key when you want to exit the panel.

Holding a transmission-queue entry (basic mode)

To prevent IP PrintWay from transmitting or automatically deleting a data set on the IP PrintWay transmission queue, you can hold the queue entry. However, you cannot hold the queue entry for a data set that IP PrintWay is currently transmitting to its destination.

When you hold an entry, IP PrintWay retains the data set on the JES spool and changes the status to H (hold). When an entry is in the hold status (H), you can delete, modify, or reset it.

You can hold an entry for an individual data set, all entries for a selected list of data sets, or all entries with a certain name on a selected list. When you hold an entry whose name in the Route Name field is preceded by an asterisk, all data sets in the concatenation are held.

To restore a queue entry to its original status, hold the entry again. IP PrintWay restores the original status of any entry that is already in the hold status.

Holding a queue entry (basic mode)

To hold one or more individual queue entries:

1. List the entry or entries that you want to hold, as described in “Listing transmission-queue entries (basic mode)” on page 28.

_______________________________________________________

2. On the IP PrintWay Transmission Queue panel, type H in the Action column in front of the entries you want to hold, and press Enter.

_______________________________________________________

Holding all transmission-queue entries in a list (basic mode)

You can hold a list of transmission-queue entries, selected based on criteria such as printer definition name, status, or address of the printer. You can also hold only those entries in the list that have a specified route name. The route name is displayed in the Route Name field and contains either the printer definition name or the CLASS, FORM, and DEST values specified in the printer definition.

To hold a list of queue entries:
1. List the entries that you want to hold, as described in "Listing transmission-queue entries (basic mode)" on page 28.

2. On the IP PrintWay Transmission Queue panel, enter one of these on the command line:
   a. HOLD to hold all entries in the list
   b. HOLD routename to hold all entries in the list with the specified name in the Route Name field.

3. To exit the panel, press the END function key.

---

### Resetting a transmission-queue entry (basic mode)

To retransmit a data set on the IP PrintWay transmission queue, you can reset its queue entry. However, you cannot reset the queue entry for a data set that IP PrintWay is currently transmitting to its destination.

When you reset a queue entry, IP PrintWay retransmits the data set as soon as possible as if this were the first transmission attempt. Before you reset a queue entry, you can modify the entry and change routing information, formatting options, and translation options. For information, see "Modifying a transmission-queue entry (basic mode)" on page 32.

You can reset an entry for one data set or you can reset entries for a list of data sets. When you reset an entry whose name in the Route Name field is preceded by an asterisk, all data sets in the concatenation are reset.

When you reset an entry, IP PrintWay automatically changes these fields:
- The Transmission Status field is set to Z (queued for first attempt).
- The Next Activity field is set to the current date and time.
- The Retries field is set to 0.

### Resetting a queue entry (basic mode)

To reset one or more queue entries:

1. List the entry or entries that you want to reset, as described in "Listing transmission-queue entries (basic mode)" on page 28.

2. On the IP PrintWay Transmission Queue panel:
   a. If you want to change routing or options information in the entry before resetting it, type E in the Action column in front of the entries you want to edit and press Enter. Edit the entries and then press the END function key.
   b. Type R in the Action column in front of the entries you want to reset, and press Enter.

---

### Resetting all queue entries in a list (basic mode)

You can reset an entire list of queue entries, selected based on criteria such as printer definition name, status, or address of the printer. You can also reset only those data sets in the list that have a specified route name. The route name is
displayed in the **Route Name** field and contains either the printer definition name or the CLASS, FORM, and DEST values specified in the printer definition.

To reset a list of queue entries:

1. List the entries that you want to reset, as described in [Listing transmission-queue entries (basic mode)](page 28).

2. On the IP PrintWay Transmission Queue panel, enter one of these on the command line:
   - `RESET` to reset all entries in the list
   - `RESET routename` to reset all entries in the list with the specified name in the **Route Name** field

3. To exit the panel, press the END function key.

### Modifying a transmission-queue entry (basic mode)

You can edit fields in a transmission-queue entry only if IP PrintWay is not currently transmitting the data set to its destination. That is, the status of the entry cannot be A (active). When you edit a field, the change takes effect immediately. If, for example, you change the address of the printer, IP PrintWay uses the new address when it next transmits the data set.

When you modify an entry whose name in the **Route Name** field is preceded by an asterisk, the asterisk indicates that the entry contains data for the first data set of the concatenation. Except for LPR options, changes you make to this entry affect all data sets in the concatenation. For example, if you change the retry time for an entry, the retry time is changed for all the data sets in the concatenation because all the data sets are sent together. Because IP PrintWay allows different LPR options for individual data sets of a concatenation, changes you make to the LPR options field apply only to the first data set of the concatenation.

**Attention:** While you are editing a queue entry, IP PrintWay does not transmit the data set or any other data sets scheduled for transmission to the same address. Therefore, make your changes and press the END function key as quickly as possible. If you take longer than 12 minutes, IP PrintWay proceeds with transmission of data sets to the destination.

You can do these tasks by modifying a queue entry:
- Reroute a data set to a different print queue.
- Retain the data sets on the JES spool for a shorter or longer time.
- Expedite or delay the next retry attempt.
- Increase or decrease the number of retry attempts.
- Change the maximum document size and response timeout.
- Change formatting options for the next transmission of the data set.
- Change translation options for the next transmission of the data set.

To modify an entry:

1. List the entries to modify, as described in [Listing transmission-queue entries (basic mode)](page 28).
2. On the IP PrintWay Transmission Queue panel, type E in the Action column in front of the entries you want to edit, and press Enter.

3. On the IP PrintWay Transmission Queue Entry panel:
   a. Edit the fields as necessary. Press Enter to validate the fields.
   b. To save the queue entry, but maintain the panel on the screen, enter SAVE on the command line. You can now continue editing the entry:
      - To save the options entry and exit the panel, press the END function key.
      - To exit the panel without saving your changes, enter CANCEL on the command line.

Rerouting a data set (basic mode)
To reroute a data set to another destination, change the routing information in these fields:
- If the transmission protocol is LPR, specify the Host/IP Address/URL/LUName and Print Queue/Logmode fields.
- If the transmission protocol is SOCKET, specify the Host/IP Address/URL/LUName and Port Number fields.
- If the transmission protocol is IPP, specify the Host/IP Address/URL/LUName field.
- If the transmission protocol is VTAM, specify the Host/IP Address/URL/LUName and Print Queue/Logmode fields.
- If the transmission protocol is email, specify the Host/IP Address/URL/LUName/e-mail field.

If the status of the queue entry is S (succeeded), F (failed), or H (entry held), you must reset the entry after you change the routing information. Resetting the entry causes IP PrintWay to retransmit the data set. For information, see “Resetting a transmission-queue entry (basic mode)” on page 31.

If the status of the queue entry is Z (queued for first attempt), or R (queued for retry), do not reset the entry after you change the routing information.

Changing retention periods (basic mode)
To retain a queue entry with a status of Z (queued for first attempt) or R (queued for retry) for a longer or shorter time, change the Retain Time: Success or Retain Time: Failure fields. Type FOREVER in the Retain Time field if you want IP PrintWay to retain the queue entry forever.

To retain a queue entry with a status of S (succeeded) or F (failed) for a longer or shorter time, change the date and time in the Next Activity field. Type NEVER in the Next Activity Date and Next Activity Time fields if you want IP PrintWay to retain the queue entry forever.

Changing the time between retries (basic mode)
To increase or decrease the time between retries of a queue entry with a status of Z (queued for first attempt) or R (queued for retry), change the time in the Retry: Time field. The new retry time takes effect after the next transmission.
To retransmit the data set immediately, reset the queue entry, as described in “Resetting a transmission-queue entry (basic mode)” on page 31.

Changing the retry limit (basic mode)

To increase or decrease the retry limit for a queue entry with a status of Z (queued for first attempt) or R (queued for retry), change the retry limit in the **Retries** field. To stop retry attempts, change the retry limit in the **Retries** field to 0.

To retry a failed transmission (status F), increase the retry limit in the **Retries** field. Also, change the date and time in the **Next Activity** field to the time you want for the next retry attempt.

Tip: You can also retry a failed transmission by resetting the queue entry, as described in “Resetting a transmission-queue entry (basic mode)” on page 31.

Changing the maximum document size and response timeout value (basic mode)

To increase or decrease the maximum number of bytes that IP PrintWay can transmit to the printer, specify the number of bytes in the **Maximum document size** field. This field does not apply when the VTAM protocol is used. IP PrintWay uses the new size when it retransmits the data set.

To increase or decrease the number of seconds that IP PrintWay waits for a response from the printer, change the value in the **Response timeout** field. This field does not apply when the email protocol is used. IP PrintWay uses the new value when it retransmits the data set.

If the status of the queue entry is S (succeeded), F (failed), or H (entry held), you must reset the queue entry after you change the values. Resetting the entry causes IP PrintWay to retransmit the data set. For information, see “Resetting a transmission-queue entry (basic mode)” on page 31.

If the status of the queue entry is Z (queued for first attempt), or R (queued for retry), do not reset the entry after you change the values.

Changing formatting options (basic mode)

To change the formatting options and formatting rules of a data set, select **Change Formatting Options** and press Enter. Edit the fields in the Formatting Options Entry panel. IP PrintWay uses the new formatting options and formatting rules when it retransmits the data set.

If the status of the queue entry is S (succeeded), F (failed), or H (entry held), you must reset the queue entry after you change the formatting options and rules. Resetting the entry causes IP PrintWay to retransmit the data set. For information, see “Resetting a transmission-queue entry (basic mode)” on page 31.

If the status of the queue entry is Z (queued for first attempt), or R (queued for retry), do not reset the entry after you change the formatting options and rules.

Changing translation options (basic mode)

To change the translation options of a data set, select **Change Translation Options** and press Enter. Edit the fields in the translation Options Entry panel. IP PrintWay uses the new translation options when it retransmits the data set.
If the status of the queue entry is S (succeeded), F (failed), or H (entry held), you must reset the queue entry after you change the translation options. Resetting the entry causes IP PrintWay to retransmit the data set. For information, see “Resetting a transmission-queue entry (basic mode)” on page 31.

If the status of the queue entry is Z (queued for first attempt), or R (queued for retry), do not reset the entry after you change the translation options.

### Deleting a transmission-queue entry (basic mode)

Under usual circumstances, you do not need to delete queue entries. IP PrintWay automatically deletes a transmission-queue entry after retrying an unsuccessful transmission the specified number of times and after the retain time specified for the data set, if any, has expired.

Under some circumstances, you might need to delete a specific queue entry. For example, if the RETAINF or RETAINS JCL parameter or the printer definition specifies a retention time of **FOREVER**, you need to delete the queue entry manually.

To delete a queue entry:

1. List the entries you want to delete, as described in “Listing transmission-queue entries (basic mode)” on page 28.

2. On the IP PrintWay Transmission Queue panel, type **D** in the Action column in front of the queue entries you want to delete, and press Enter.

3. On the Delete Confirmation panel, press Enter to delete the entry. Press the END function key to cancel the delete request.

When you delete a transmission-queue entry, IP PrintWay also removes the data set from the JES spool.

### Querying the status of a print queue (basic mode)

If a data set did not successfully print and a data-set entry still remains on the transmission queue, you might want to query the status of the printer’s queue. You can query the status of the printer’s queue only if IP PrintWay used the LPR protocol to transmit the data set to the printer.

To query the status of the printer’s queue:

1. List entries for the printer you want to query, as described in “Listing transmission-queue entries (basic mode)” on page 28.

2. On the IP PrintWay Transmission Queue panel, type **S** (for short queue status) or **L** (for long queue status) in the Action column in front of the queue entry for the data set, and press Enter.

Results:
• If IP PrintWay was able to establish a connection with the printer:

  Queue State for
  PASS
  On remote host:
  9.99.176.81

  2 entries
  0 - port busy. No info

• If IP PrintWay was not able to establish a connection with the printer:

  CONNECT ERROR
Chapter 5. Starting sendmail

If you use IP PrintWay to send print output to email destinations, start z/OS UNIX sendmail if you want to:

- Send output to sendmail alias names
- Receive sendmail messages, for example messages about bounced emails

If neither of these conditions apply, you do not need to start sendmail.

If you start sendmail, start it as a daemon so that you can receive messages. Use the `-bd` option to start sendmail as a daemon. Use the `-q` option to specify how often sendmail is to look in its queue to process pending mail.

**Example:** These commands switch to an effective UID of 0 and start sendmail as a daemon that processes pending mail every minute:

```
su
/usr/sbin/sendmail -bd -q1m &
```

To use the `su` command, you must be permitted to the BPX.SUPERUSER profile in the FACILITY class in RACF.

**Tip:** To start sendmail automatically, you can put the `sendmail` command in the `/etc/rc` file.

**Related information:** For information about how to customize sendmail, see [z/OS Infoprint Server Customization](z/OS Infoprint Server Customization).
Chapter 6. Using Infoprint Central

Infoprint Central is a print management application that runs on the web. It is primarily used by help desk operators. However, other authorized users and job submitters can also use Infoprint Central. These topics give you an overview of how you can use Infoprint Central and describes these tasks:

<table>
<thead>
<tr>
<th>Task</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customizing your web browser</td>
<td>46</td>
</tr>
<tr>
<td>Logging on to Infoprint Central from the web</td>
<td>47</td>
</tr>
</tbody>
</table>

Tips:
- If you run IP PrintWay extended mode, use Infoprint Central because it lets you work with IP PrintWay extended mode printers. It also lets you work with output data sets that IP PrintWay extended mode is currently processing, and it displays the status of output data sets, including whether IP PrintWay has retained them.
- If you run IP PrintWay basic mode, you cannot use Infoprint Central to work with jobs submitted to IP PrintWay basic mode or work with IP PrintWay printers. However, you can use Infoprint Central to do other functions.

With Infoprint Central you can do these actions (images shown are from Infoprint Central):

- **Work with print jobs**: You can find and work with groups of output data sets (called *print jobs*) that are on the JES spool. You can see more information about print jobs that Infoprint Server processes. For example, you can see whether an Infoprint Server print job completed successfully and where it printed – even if the print job is no longer on the JES spool.

You can use search criteria such as job name and owner to find print jobs. After you find a print job, you can delete, hold, release, move, and change the priority of the print job. And, you can see all messages from Infoprint Server for that one print job without having to search through message logs.

Tips:
- A print job consists of one or more output data sets that JES has grouped together. In JES2, a print job is called an *output group*.
- Infoprint Central does not display some print jobs. See “Limitations”.

- **Work with printers**: You can find and work with printers that are defined in the Printer Inventory – including AFP printers controlled by PSF (called *PSF printers*), and printers to which IP PrintWay can send print jobs (called *IP PrintWay printers*).

You can also work with PSF AFP Download Plus senders as if they were PSF printers. An AFP Download Plus sender sends print jobs to a receiver on another system for printing, emailing, or faxing.

You can use search criteria such as printer name and location to find printers. After you find a printer, you can see its status, the printer’s job queue, and view other properties of the printer. For example, you can see whether the
printer is processing, idle, or offline, and you can see the level of paper and
toner. You can also do these printer actions:

- PSF printers: Start, stop, interrupt, pause (JES2 only), ping, repeat, space,
turn online, turn offline, and reset. Also, you can change forms and other
job-selection criteria, and you can link to the web pages of some printers. If
the PSF printer is an AFP Download Plus sender, you can do a limited set of
PSF printer actions.

- IP PrintWay printers: Start, stop, redirect, restore, ping, turn online, turn
offline, and reset. Also, you can see all the messages from Infoprint Server
for that one printer, and you can link to the web pages of some printers.

Tips:

- Some status information and printer actions (ping, turn online, turn offline,
reset, display web page) are available only for TCP/IP-attached printers.

- If multiple printer definitions in the Printer Inventory have the same printer
IP address or host name, Infoprint Central displays only one IP PrintWay
printer. However, if the printer definitions have different queue names or
port numbers, Infoprint Central displays a separate IP PrintWay printer for
each queue name or port number.

Work with NetSpool logical units: You can work with any NetSpool
logical units (LUs) that are defined to NetSpool in the Printer Inventory and
also defined to VTAM.

You can find LUs by name. After you find a NetSpool LU, you can start and
stop it. When you start an LU, that LU is started in both Infoprint Server and
VTAM. Likewise, when you stop an LU, that LU is stopped in both Infoprint
Server and VTAM. You can also display information about the current VTAM
session established with a NetSpool LU.

Display printer definitions: You can display the properties of any printer
definition in the Printer Inventory. You can use search criteria, such as the
printer definition name and the printer's location, to find printer definitions.
This can help you find the name of a printer in your area.

Check system status: You can see the status of all Infoprint Server
daemons and tasks. This can help you determine the cause of a printing
problem. You can also start and stop IP PrintWay job selection rules to change
which print jobs IP PrintWay processes.

Auditing Infoprint Central actions: Infoprint Central writes a message to the
Infoprint Server common message log each time someone selects an Infoprint
Central action. To find out who used Infoprint Central to do actions, select the
View log action for Infoprint Server print jobs, JES print jobs, IP PrintWay printers,
PSF printers, and NetSpool LUs.

Limitations:

- You can only work with objects to which your security administrator has given
you RACF authorization. For information about the authorization
required to work with different objects, see [z/OS Infoprint Server Customization]

- You can only work with printers to which either PSF or IP PrintWay extended
mode can print.
• You cannot work with NetSpool LUs if more than one NetSpool task is running. Instead, you must use NetSpool commands and VTAM commands as described in Chapter 2, “Starting and stopping the NetSpool task and NetSpool LUs,” on page 13.

• Infoprint Central does not display these types of print jobs because they are numerous and users typically do not print them:
  – TSU print jobs
  – Held print jobs with only documents that have these DD names: JESJCL, JESMSGLG, JESYSMSG, SYSPRINT, and SYSTSPRT
  – Print jobs with job name BPXAS

• Infoprint Central does not display print jobs that were sent to a JES spool on a different system.

### Infoprint Central actions

Infoprint Central lets you do the actions listed in the following tables. For a complete description of each action, see the online help for Infoprint Central. The images shown are from Infoprint Central.

**Table 4. Infoprint Central actions for Infoprint Server print jobs**

<table>
<thead>
<tr>
<th>Infoprint Central action</th>
<th>Brief description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Change priority" /></td>
<td>Change the priority of print jobs.</td>
</tr>
<tr>
<td><img src="image" alt="Delete" /></td>
<td>Delete print jobs.</td>
</tr>
<tr>
<td><img src="image" alt="Hold" /></td>
<td>Hold print jobs.</td>
</tr>
<tr>
<td><img src="image" alt="Move" /></td>
<td>Move print jobs to another printer.</td>
</tr>
<tr>
<td><img src="image" alt="Release" /></td>
<td>Release print jobs for processing.</td>
</tr>
<tr>
<td><img src="image" alt="View log" /></td>
<td>View messages for print jobs.</td>
</tr>
<tr>
<td><img src="image" alt="View properties" /></td>
<td>View all properties of print jobs.</td>
</tr>
</tbody>
</table>

**Table 5. Infoprint Central actions for JES print jobs**

<table>
<thead>
<tr>
<th>Infoprint Central action</th>
<th>Brief description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Change priority" /></td>
<td>Change priority of print jobs.</td>
</tr>
<tr>
<td><img src="image" alt="Delete" /></td>
<td>Delete print jobs.</td>
</tr>
</tbody>
</table>
Table 5. Infoprint Central actions for JES print jobs (continued)

<table>
<thead>
<tr>
<th>Infoprint Central action</th>
<th>Brief description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hold</td>
<td>Hold print jobs.</td>
</tr>
<tr>
<td>Release</td>
<td>Release print jobs for processing.</td>
</tr>
<tr>
<td>View log</td>
<td>View messages for print jobs.</td>
</tr>
<tr>
<td>View properties</td>
<td>View all properties of print jobs.</td>
</tr>
</tbody>
</table>

Table 6. Infoprint Central actions for IP PrintWay printers

<table>
<thead>
<tr>
<th>Infoprint Central action</th>
<th>Brief description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ping</td>
<td>Ping IP PrintWay printers.</td>
</tr>
<tr>
<td>Redirect</td>
<td>Redirect print jobs to an alternate IP PrintWay printer.</td>
</tr>
<tr>
<td>Reset</td>
<td>Reset TCP/IP-connected IP PrintWay printers.</td>
</tr>
<tr>
<td>Restore</td>
<td>Restart printing to original printers that were redirected.</td>
</tr>
<tr>
<td>Start</td>
<td>Resume printing to IP PrintWay printers.</td>
</tr>
<tr>
<td>Stop</td>
<td>Stop printing to IP PrintWay printers.</td>
</tr>
<tr>
<td>Turn offline</td>
<td>Turn TCP/IP-connected IP PrintWay printers offline.</td>
</tr>
<tr>
<td>Turn online</td>
<td>Turn TCP/IP-connected IP PrintWay printers online.</td>
</tr>
<tr>
<td>View log</td>
<td>View messages for IP PrintWay printers.</td>
</tr>
</tbody>
</table>

Table 7. Infoprint Central actions for PSF printers

<table>
<thead>
<tr>
<th>Infoprint Central action</th>
<th>Brief description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change forms</td>
<td>Change forms loaded on PSF printers.</td>
</tr>
</tbody>
</table>
Table 7. Infoprint Central actions for PSF printers (continued)

<table>
<thead>
<tr>
<th>Infoprint Central action</th>
<th>Brief description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change job selection</td>
<td>Change the job-selection criteria (also called work-selection criteria) for PSF printers.</td>
</tr>
<tr>
<td>Interrupt</td>
<td>Interrupt the current print job on PSF printers.</td>
</tr>
<tr>
<td>Pause</td>
<td>Pause the current print jobs (JES2 only).</td>
</tr>
<tr>
<td>Ping</td>
<td>Ping PSF printers.</td>
</tr>
<tr>
<td>Repeat</td>
<td>Repeat current print jobs on PSF printers.</td>
</tr>
<tr>
<td>Reset</td>
<td>Reset TCP/IP-connected PSF printers.</td>
</tr>
<tr>
<td>Space</td>
<td>Backspace or forwardspace PSF printers.</td>
</tr>
<tr>
<td>Start</td>
<td>Start printing to PSF printers.</td>
</tr>
<tr>
<td>Stop</td>
<td>Stop printing to PSF printers.</td>
</tr>
<tr>
<td>Turn offline</td>
<td>Turn TCP/IP-connected PSF printers offline.</td>
</tr>
<tr>
<td>Turn online</td>
<td>Turn TCP/IP-connected PSF printers online.</td>
</tr>
<tr>
<td>View log</td>
<td>View messages for PSF printers.</td>
</tr>
<tr>
<td>View properties</td>
<td>View properties of PSF printers.</td>
</tr>
</tbody>
</table>

Table 8. Infoprint Central actions for IP PrintWay job selection rules

<table>
<thead>
<tr>
<th>Infoprint Central action</th>
<th>Brief description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start</td>
<td>Start selecting print jobs from the JES spool using the criteria in the IP PrintWay job selection rule.</td>
</tr>
<tr>
<td>Stop</td>
<td>Stop selecting print jobs from the JES spool using the criteria in the IP PrintWay job selection rule.</td>
</tr>
</tbody>
</table>
Table 9. Infoprint Central actions for NetSpool logical units (LUs)

<table>
<thead>
<tr>
<th>Infoprint Central action</th>
<th>Brief description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start</td>
<td>Vary NetSpool logical units online and start receiving print requests.</td>
</tr>
<tr>
<td>Stop</td>
<td>Vary NetSpool logical units offline and stop receiving print requests.</td>
</tr>
</tbody>
</table>

Table 10. Infoprint Central actions for printer definitions

<table>
<thead>
<tr>
<th>Infoprint Central action</th>
<th>Brief description</th>
</tr>
</thead>
<tbody>
<tr>
<td>View properties</td>
<td>View properties of printer definitions. (You cannot change any properties.)</td>
</tr>
</tbody>
</table>

Table 11. Infoprint Central actions for system

<table>
<thead>
<tr>
<th>Infoprint Central action</th>
<th>Brief description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check system status</td>
<td>View status of all Infoprint Server daemons and the NetSpool started task.</td>
</tr>
</tbody>
</table>

Infoprint Central actions compared to JES commands

Infoprint Central lets you do some of the same tasks you can do using JES commands. This table shows Infoprint Central actions you can do and the comparable JES commands.

<table>
<thead>
<tr>
<th>Infoprint Central action</th>
<th>JES2 commands</th>
<th>JES3 commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display print jobs</td>
<td>$D O JOB jobno</td>
<td>*INQUIRY,J=jobno</td>
</tr>
<tr>
<td>Hold print jobs</td>
<td>$T O JOB jobno,OUTGRP=groupid,</td>
<td>*MODIFY,U,J=jobno,NQ=HOLD</td>
</tr>
<tr>
<td></td>
<td>NDISP=HOLD</td>
<td></td>
</tr>
<tr>
<td>Release print jobs</td>
<td>$T O JOB jobno,OUTGRP=groupid,</td>
<td>*MODIFY,U,J=jobno,Q=HOLD,NQ=WTR,</td>
</tr>
<tr>
<td></td>
<td>NDISP=WRITE,REL=ALL</td>
<td>NH=N</td>
</tr>
<tr>
<td>Delete print jobs</td>
<td>$C O JOB jobno,OUTGRP=groupid</td>
<td>*MODIFY,U,J=jobno,C</td>
</tr>
<tr>
<td>Change priority of print jobs</td>
<td>$T O JOB jobno,OUTGRP=groupid,</td>
<td>*MODIFY,U,J=jobno,NP=priority</td>
</tr>
<tr>
<td></td>
<td>PRIORITY=nnn</td>
<td></td>
</tr>
<tr>
<td>Display printers</td>
<td>$D PRTnnnn</td>
<td>*INQUIRY,D,D=devname</td>
</tr>
<tr>
<td>Stop PSF printers</td>
<td>$P PRTnnnn</td>
<td>*RESTART,devname,T</td>
</tr>
<tr>
<td>Infoprint Central action</td>
<td>JES2 commands</td>
<td>JES3 commands</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Stop PSF printers, delete current print jobs</td>
<td>$P PRTnnnn</td>
<td>*CANCEL,devname</td>
</tr>
<tr>
<td></td>
<td>$C PRTnnnn</td>
<td></td>
</tr>
<tr>
<td>Start PSF printers</td>
<td>$S PRTnnnn</td>
<td>[*VARY,devname,ONLINE ]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*CALL,WTR,OUT=devname</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*S,devname</td>
</tr>
<tr>
<td>Pause PSF printers</td>
<td>$Z PRTnnnn</td>
<td>N/A</td>
</tr>
<tr>
<td>Interrupt PSF printers</td>
<td>$I PRTnnnn</td>
<td>*RESTART,devname,HOLD</td>
</tr>
<tr>
<td>Change PSF printers' job selection criteria</td>
<td>$T PRTnnnn[,F=form][,C=classes] [,PLIM=pagelimits][,PRM=prmode] [,CR=creator][,W=writer][,R=dest]</td>
<td>One of these:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*RESTART,devname [F=form] [WC=classes] [PG=pagelimits] [PM=prmode]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[*VARY,devname,ONLINE]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*CALL,WTR,OUT=devname [F=form] [WC=classes] [PG=pagelimits] [PM=prmode]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*S,devname</td>
</tr>
<tr>
<td>Change forms on PSF printers</td>
<td>$T PRTnnnn,F=form</td>
<td>One of these:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*RESTART,devname F=form</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[*VARY,devname,ONLINE]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*CALL,WTR,OUT=devname F=form</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*S,devname</td>
</tr>
<tr>
<td>Space PSF printers</td>
<td>One of these:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$B PRTnnnn[D][,C][,pages]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$F PRTnnnn[D][,C][,pages]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*RESTART,devname, R=[0] [-pages] [+pages] [P] [C]</td>
</tr>
<tr>
<td>Repeat current print jobs on PSF printers</td>
<td>$N PRTnnnn</td>
<td>*RESTART,devname,J</td>
</tr>
</tbody>
</table>

Infoprint Central actions compared to VTAM and NetSpool commands

Infoprint Central lets you do some of the same tasks you can do using NetSpool and VTAM commands. This table shows Infoprint Central actions and comparable NetSpool and VTAM commands.

<table>
<thead>
<tr>
<th>Infoprint Central action</th>
<th>NetSpool and VTAM commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display NetSpool LUs</td>
<td>NetSpool: DISPLAY command</td>
</tr>
<tr>
<td>Start NetSpool LUs</td>
<td>NetSpool: LUNAME ADD</td>
</tr>
<tr>
<td>VTAM: VARY NET,ACT</td>
<td></td>
</tr>
</tbody>
</table>
Infoprint Central action | NetSpool and VTAM commands
---|---
Stop NetSpool LUs | NetSpool: LUNAME PURGE

### Infoprint Central actions compared to IP PrintWay basic mode ISPF panels

Infoprint Central lets you do some of the same tasks for IP PrintWay extended mode that you can do for IP PrintWay basic mode using IP PrintWay basic mode ISPF panels. This table shows Infoprint Central actions and comparable IP PrintWay basic mode ISPF panels.

<table>
<thead>
<tr>
<th>Infoprint Central action</th>
<th>IP PrintWay basic mode ISPF panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>View messages</td>
<td>IP PrintWay Message panel</td>
</tr>
<tr>
<td>Display print jobs that are processing or retained on IP PrintWay printers</td>
<td>R (Browse) action on IP PrintWay Transmission Queue panel</td>
</tr>
<tr>
<td>Hold print jobs that are processing or retained on IP PrintWay printers</td>
<td>H (Hold) action on IP PrintWay Queue panel</td>
</tr>
<tr>
<td>Release print jobs for printing that are waiting for retry or retained on IP PrintWay printers</td>
<td>R (Reset) action on IP PrintWay Transmission Queue panel</td>
</tr>
<tr>
<td>Move print jobs that are processing, waiting for retry, or retained on IP PrintWay printers</td>
<td>E (Edit) action on IP PrintWay Transmission Queue panel</td>
</tr>
<tr>
<td>Delete print jobs that are processing, waiting for retry, or retained on IP PrintWay printers</td>
<td>D (Delete) action on IP PrintWay Transmission Queue panel</td>
</tr>
</tbody>
</table>

### Customizing your web browser

Infoprint Central only supports the Microsoft Internet Explorer 6.0 (and later) web browser.

Use these Internet settings for your browser.

**Required settings:**
- Enable JavaScripts.
- Enable style sheets.

**Suggested settings:**
- Set your browser to always retrieve the latest pages from the web so that the Infoprint Central refresh function works correctly. In Microsoft Internet Explorer, change the setting for temporary Internet files to check for newer versions of stored pages on every visit to a page. Do not use the Microsoft default setting, which is to check for newer versions of stored pages automatically.
- Do not block or disable all cookies. Infoprint Central stores cookies on your system to save your search values.
- In Microsoft Internet Explorer, do not disable the meta refresh security option. Infoprint Central uses the meta refresh function to display your search results automatically.

Logging on to Infoprint Central from the web

To start Infoprint Central, enter a URL in the browser:
- For the English version:
  If the HTTP Server uses Secure Sockets Layer (SSL):
- For the Japanese version:
  If the HTTP Server uses Secure Sockets Layer (SSL):

hostname
  The address of the z/OS system where the HTTP Server is running.

port
  The port where the HTTP Server receives requests. If the HTTP Server receives requests at the default port, you can omit the port number. The default port number depends on whether you have customized the HTTP Server to use Secure sockets layer (SSL):
  • The SSL default port is 443.
  • Otherwise, the default port is 80.

Example: If the HTTP Server receives requests at the default port, you can enter:
  or

Tip: When you log on to Infoprint Central, you can log on to only one z/OS system. You can see all the print jobs, printer queues, and Infoprint Server messages for that one z/OS system only. Therefore, if you configure IP PrintWay extended mode to print on the same printers from different z/OS systems, you must open separate instances of your web browser so that you can see all print jobs on a printer's queue and all messages from IP PrintWay about a printer.
Chapter 7. Working with output data sets on the JES spool using JES commands and SDSF

This section describes how to use JES commands and the JES2 System Display and Search Facility (SDSF) to work with output data sets that Infoprint Server processes. This section describes these tasks:

<table>
<thead>
<tr>
<th>Task</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locating output data sets allocated by Infoprint Server</td>
<td>49</td>
</tr>
<tr>
<td>Using JES commands and SDSF to work with output data sets</td>
<td>50</td>
</tr>
</tbody>
</table>

Locating output data sets allocated by Infoprint Server

Table 12 shows the fields that the JES2 System Display and Search Facility (SDSF) (or a comparable product) displays that can help you locate data sets that Infoprint Server has allocated on the JES spool. The information that SDSF displays in each field depends on how the print request was submitted.

Table 12. SDSF fields

<table>
<thead>
<tr>
<th>If the print request was submitted in this way:</th>
<th>The contents of these SDSF fields are:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Job name</td>
</tr>
<tr>
<td>z/OS UNIX lp command</td>
<td>User ID of the job submitter ¹</td>
</tr>
<tr>
<td>AOPPRINT JCL procedure</td>
<td>Job name</td>
</tr>
<tr>
<td>Batch job using a DD JCL statement ⁴</td>
<td>Job name</td>
</tr>
<tr>
<td>Print command or application on a remote system ⁶</td>
<td>Name of the job submitter on the remote system ¹, ⁷</td>
</tr>
<tr>
<td>VTAM application (such as a CICS and IMS application)</td>
<td>Owner name from the printer definition or print data, or the member name of the NetSpool startup procedure ¹</td>
</tr>
</tbody>
</table>
Table 12. SDSF fields (continued)

<table>
<thead>
<tr>
<th>If the print request was submitted in this way:</th>
<th>The contents of these SDSF fields are:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Job name</td>
</tr>
<tr>
<td>1. The job submitter or VTAM application can specify a job name in the <strong>sysout-job-name</strong> job attribute. If specified, this job name is used instead.</td>
<td></td>
</tr>
<tr>
<td>2. The Infoprint Server job ID starts with the 2-character prefix that is defined in the <strong>job-prefix</strong> attribute in the Infoprint Server configuration file (<strong>aopd.conf</strong> or in the system configuration definition. The default prefix is <strong>PS</strong>. The job submitter or VTAM application can specify a job ID in the <strong>sysout-job-id</strong> job attribute. If specified, this job ID is used instead. The <strong>lp</strong> command returns this job ID to the job submitter.</td>
<td></td>
</tr>
<tr>
<td>3. A # in the data set name indicates that JES does not allow the character in this field. For example, if the file to be printed is <strong>myfile.print</strong>, this field contains <strong>le#print</strong>.</td>
<td></td>
</tr>
<tr>
<td>4. Infoprint Server allocates the data set on the JES spool when (1) the job submitter uses the Print Interface subsystem and (2) IP PrintWay basic mode sends data sets to the Print Interface LPD, a situation that can occur when the <strong>resubmit for filtering</strong> option is selected in the printer definition.</td>
<td></td>
</tr>
<tr>
<td>5. A ? in the data set name indicates that the <strong>DSNAME</strong> parameter was not specified.</td>
<td></td>
</tr>
<tr>
<td>6. Print commands include the <strong>lpr</strong>, <strong>enq</strong>, <strong>lp</strong>, and <strong>print</strong> commands. Job submitters can also print from a remote system using SAP R/3 or a standard Windows print submission method.</td>
<td></td>
</tr>
<tr>
<td>7. If the document was submitted with an <strong>lpr</strong> command, this is the user ID specified in the <strong>P</strong> control code in the LPD control file. If the user ID is unknown, the job name might contain <strong>UNKNOWN</strong> or <strong>ANONYMOU</strong>. A # in the name indicates that the name contains a character that JES does not allow.</td>
<td></td>
</tr>
</tbody>
</table>

**Tips:**

- JES commands might return a different job ID from the job ID that SDSF displays. JES commands display the **z/OS job ID** that **z/OS** assigns to the data set. If the Print Interface subsystem allocated the data set on the JES spool, the JES commands return the same job ID as SDSF displays.
- The fully qualified data set name might not contain the same values as SDSF displays. For example, the job ID in the fully qualified data set name is always a job ID assigned by **z/OS** to the data set. The job ID in the data set name matches the job ID displayed by SDSF only for data sets that NetSpool allocates on the JES spool.
- If Print Interface or NetSpool has already converted EBCDIC data to ASCII, using approximately 32K byte records, you might not be able to use your standard tools to view the data on the spool.
- When a user requests more than 255 copies of the same data set, multiple output groups for the data set are created on the JES spool. Each output group has the same user ID and job ID. To delete the data set, you must individually delete all output groups for the same data set.

**Using JES commands and SDSF to work with output data sets**

You can use JES and SDSF commands to do these actions on output data sets, depending on whether you run IP PrintWay extended mode or basic mode:

**IP PrintWay extended mode:** If IP PrintWay extended mode is not currently processing a data set, you can delete, hold, and release it. And, you can change its attributes, such as its priority, **DEST**, **CLASS**, and **FORMS** values. You can do these actions on data sets that IP PrintWay has not yet processed, is waiting to retry, or has retained on the JES spool after completion. You cannot do these actions on data sets that IP PrintWay extended mode is processing. Infoprint Central, however, lets you work with data sets that IP PrintWay extended mode is processing. See Chapter 6, “Using Infoprint Central,” on page 39.
These considerations apply when you run IP PrintWay extended mode:

- If you hold a retained data set, the data set remains held until you release or delete it. IP PrintWay does not delete it automatically when the retain time expires.
- If you hold a data set between retries, the next data set prints on the printer. If you subsequently release the held data set, it prints as soon as the printer is available, after any print jobs with a higher priority. IP PrintWay does not wait for the retry interval to expire.
- If you release a retained data set, it prints as soon as the printer is available, after any print jobs with a higher priority. Notice that you can release retained data sets even though they are not held.
- If you release a data set between retries, it prints as soon as the printer is available. IP PrintWay does not wait for the retry interval to expire. Notice that you can release data sets while IP PrintWay is waiting for the retry interval to expire, even though they are not held.
- If you change attributes of any data set, IP PrintWay uses the new attributes when it prints the data set again. If the data set is retained or between retries, the data set prints as soon as the printer is available. (See “Limitation”.)

**IP PrintWay basic mode:** If IP PrintWay basic mode has not selected a data set for processing, you can delete, hold, and release it. And, you can change its attributes, such as its DEST, CLASS, and FORMS values. However, you cannot delete, hold, or release data sets that IP PrintWay is waiting to retry or data sets that IP PrintWay has retained on the JES spool. The Infoprint Server ISPF panels, however, let you work with data sets that IP PrintWay basic mode is retrying or has retained on the JES spool. See [Chapter 4, “Using the IP PrintWay transmission queue (basic mode),” on page 27](#).

These considerations apply when you run IP PrintWay basic mode:

1. If you change attributes of a data set, IP PrintWay uses the new attributes when it prints the data set. (See “Limitation”.)
2. If IP PrintWay stops, which causes it to release data sets to JES, you cannot change the host name or IP address, print-queue name, component name, retry time, retry limit, or retention times of the data sets. IP PrintWay ignores any changes you make to these values.

**Limitation:** If a print request selects an IP PrintWay printer by specifying the name of its printer definition, you cannot use JES commands or SDSF to move the data set to an alternate IP PrintWay printer by changing the DEST, CLASS, and FORMS values of the output data set. This is because Infoprint Server uses the printer name, if specified, to select a printer. All print requests submitted through Print Interface or NetSpool select the printer by specifying the name of its printer definition. Also, the printer name can be specified in the FSSDATA and SUBSYS JCL parameters.

However, if you run IP PrintWay extended mode, you can use Infoprint Central to move a data set to an alternate IP PrintWay printer even though the print request has selected the IP PrintWay printer by specifying the name of its printer definition. For more information, see the Infoprint Central online help system.
Chapter 8. Viewing messages

This section describes how you can view messages from:

- Infoprint Server common message log
- IP PrintWay basic mode
- NetSpool
- Data transforms
- z/OS UNIX sendmail

Viewing messages in the common message log

The common message log lets you see messages from most Infoprint Server components and from PSF for z/OS (PSF) in one place. The log can contain messages from:

- All components of Infoprint Server except for IP PrintWay basic mode
  
  IP PrintWay extended mode writes its messages only to the common message log. Other components (such as NetSpool and Print Interface), also write messages to other locations (such as the NetSpool message-log data set and the system console log).

- IBM transform products that work with Infoprint Server
  
  For information about whether a transform writes messages to the common message log, see the documentation for the transform.

- PSF for z/OS (PSF)
  
  PSF V4R4 and later can be customized to write messages for print jobs and printers to the common message log.

Infoprint Central lets authorized users view messages in the common message log for selected print jobs and printers. In addition, Infoprint Server administrators can use the `aoplogu` command to select messages in a particular time range and copy them to a file or view them on the terminal.

You can enter the `aoplogu` command on the z/OS UNIX command line, or you can submit a batch job that runs the `aoplogu` command. Infoprint Server provides sample job AOPLOGUS in SYS1.SAMPLIB to run the `aoplogu` command. You must edit sample job AOPLOGUS before submitting it.

**aoplogu command**

**Format**

```
aoplogu [-n log-stream]
aoplogu [-b time] [-e time] [-n log-stream]
aoplogu -l time [-n log-stream]
```

**Description**

The `aoplogu` command lets Infoprint Server administrators view messages in the common message log. You can specify that you want to view:

- All the messages.
- The messages in a range of times. For example, the messages from 6 September 2013 to 10 September 2013, or the messages beginning on 6 September 2013.
The most recent messages for a length of time. For example, the messages for the last day or for the last two minutes.

The messages are written to standard output (stdout).

The aoplogu command can read messages that were written in a z/OS UNIX file system (by default, the /var/Printsrv file system) or in an MVS system logger log stream.

**Options**

- `-b time` The beginning time of the range of messages that you want to view. The default is the oldest message that is available in the common message log.

- `-e time` The ending time of the range of messages that you want to view. The default is the most recent message that is available in the common message log.

- `-l time` The most recent messages for the length of time that you specify.

- `-n log-stream` The name of a log stream defined to the MVS system logger for the Infoprint Server common message log. Specify this option only if your installation has defined a log stream and Infoprint Server is not running. If Infoprint Server is running, the aoplogu command can automatically determine the name of the log stream.

   If you specify this option, the aoplogu command reads messages only from the specified log stream. It does not read any messages that were written in the z/OS UNIX file system or in any other log streams.

   The format of `time` is one of these:

   - `year:month:day:hour:minute`
   - `month:day:hour:minute`
   - `day:hour:minute`
   - `hour:minute`
   - `minute`

**Usage notes**

1. To use the aoplogu command, you must be defined to RACF as a z/OS UNIX user and be connected to the RACF AOPADMIN group. For more information, see `z/OS Infoprint Server Customization`.

2. If your installation uses the MVS system logger for the Infoprint Server common message log, you must also have READ access to the resource profile for the log stream in the RACF LOGSTRM class. For more information, see `z/OS Infoprint Server Customization`.

3. When you specify the `-b` or `-e` option, the defaults for the year, month, day, and hour are the current year, month, day, and hour.

4. When you specify the `-b` or `-e` option, you can enter 2-4 digits for the year. For example, 13, and 2013 all mean the year 2013.

5. You can enter any value for the units of time, beginning with 0. For example, you can enter 25 for the hour or 61 for the minute.

6. The time is inclusive. For example, aoplogu -b 0 -e 0 includes all messages that occurred in the first minute of the current hour.
Examples
1. To view all the messages:
   `aoplogu`
2. To view all the messages from 6 September 2013 to 10 September 2013:
   `aoplogu -b 2013:09:06:0:0 -e 2013:09:10:0:0`
3. To view all the messages for the last day:
   `aoplogu -l 1:0:0`
4. To view all the messages for the last two minutes:
   `aoplogu -l 2`
5. To view all the messages for the last day plus the last three hours and to put them in a file called `mymessages`:
   `aoplogu -l 1:3:0 > mymessages`

Environment variables

**AOPCONF**
Names the Infoprint Server configuration file. The file named in this variable takes precedence over configuration file `/etc/Printsrv/aopd.conf`.

**LANG**
The language used for messages.

**LC_ALL**
The locale used to format date and time information in common log messages.

**LC_TIME**
The locale used to format date and time information in common log messages.

**LIBPATH**
The path used to locate dynamic link libraries (DLL).

**NLSPATH**
The directory where the Infoprint Server message catalogs are located.

**TZ**
The time zone displayed in common log messages.

Files

/`etc/Printsrv/aopd.conf`
The default Infoprint Server configuration file. The file named in the AOPCONF environment variable takes precedence over this file.

Exit values

0  Successful completion.
>0  An error prevented the messages from being displayed.

Format of messages in the common message log
The `aoplogu` command displays messages in the common message log in this format:

`date time priority:level user:id [job:id] [system:name] [inventory:name] [filename:name] [dsn:name] [output_device:name] [job_selection_rule:name] [fsa:name] [luname:name] [jes_jobname:name] [program:name] msg:message`

For example:
5/19/13 17:04:13 (UTC-7) priority:info user:OMVSID job:PS000469
system:SYS1 inventory:AOP1 output_device:lpr://myprinter.xyz.com/RAW
program:aopoutd msg:AOP3613I The print job was completed successfully.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>date</td>
<td>The date the message was written.</td>
</tr>
<tr>
<td>dsn</td>
<td>The fully qualified data set name that JES assigns. The document name is</td>
</tr>
<tr>
<td></td>
<td>the last qualifier. The # symbol in the document name replaces any</td>
</tr>
<tr>
<td></td>
<td>character that JES does not allow in a document name. For example, if the</td>
</tr>
<tr>
<td></td>
<td>last 8 characters of the document name are file.1wp, this field contains</td>
</tr>
<tr>
<td></td>
<td>FILE#LWP. This field might not contain the system ID, which is the first</td>
</tr>
<tr>
<td></td>
<td>qualifier in a fully qualified data set name.</td>
</tr>
<tr>
<td>filename</td>
<td>The name of the file to be printed. Blanks are converted to an underscore</td>
</tr>
<tr>
<td></td>
<td>(_).</td>
</tr>
<tr>
<td>fsa</td>
<td>The name of the JES functional subsystem application (FSA) for the PSF</td>
</tr>
<tr>
<td></td>
<td>printer.</td>
</tr>
<tr>
<td>inventory</td>
<td>The name of the Printer Inventory.</td>
</tr>
<tr>
<td>jes_jobname</td>
<td>The job name, or the name of the job submitter or owner:</td>
</tr>
<tr>
<td></td>
<td>• For a batch job, the name of the job that created the print job.</td>
</tr>
<tr>
<td></td>
<td>• For print requests submitted from remote systems (such as Windows),</td>
</tr>
<tr>
<td></td>
<td>the first 8 characters of the logon name used on the remote system. A #</td>
</tr>
<tr>
<td></td>
<td>symbol in the name replaces a character (such as a period) that z/OS</td>
</tr>
<tr>
<td></td>
<td>does not allow in the job name.</td>
</tr>
<tr>
<td></td>
<td>• For print requests submitted from VTAM applications (such as CICS or</td>
</tr>
<tr>
<td></td>
<td>IMS), the owner name in the data stream, the default owner in the</td>
</tr>
<tr>
<td></td>
<td>printer definition, or the name of the NetSpool startup procedure.</td>
</tr>
<tr>
<td>job</td>
<td>The job ID.</td>
</tr>
<tr>
<td></td>
<td>• A job ID with a PS prefix indicates that Infoprint Server created the</td>
</tr>
<tr>
<td></td>
<td>output data set on the JES spool. (Your installation can specify a</td>
</tr>
<tr>
<td></td>
<td>different job prefix in the \job-prefix attribute in the Infoprint Server</td>
</tr>
<tr>
<td></td>
<td>configuration file, aopd.conf, or the system configuration definition.)</td>
</tr>
<tr>
<td></td>
<td>• A job ID with a JOB, STC, or TSU prefix indicates that either JES or the</td>
</tr>
<tr>
<td></td>
<td>Print Interface subsystem created the output data set on the JES spool.</td>
</tr>
<tr>
<td></td>
<td>• Job submitters can specify the \sysout-job-id job attribute to override</td>
</tr>
<tr>
<td></td>
<td>the job ID.</td>
</tr>
<tr>
<td>job_selection_rule</td>
<td>The name of an IP PrintWay job selection rule that IP PrintWay extended</td>
</tr>
<tr>
<td></td>
<td>mode used to select the print job from the JES spool for processing.</td>
</tr>
<tr>
<td>luname</td>
<td>The NetSpool logical unit (LU) name for the printer.</td>
</tr>
<tr>
<td>msg</td>
<td>The message number and text.</td>
</tr>
<tr>
<td>output_device</td>
<td>An identifier of the IP PrintWay extended mode printer where the print job</td>
</tr>
<tr>
<td></td>
<td>printed or is scheduled to print, in one of these formats:</td>
</tr>
<tr>
<td></td>
<td>\direct_sockets\hostname:port</td>
</tr>
<tr>
<td></td>
<td>The hostname and port number of the IP PrintWay printer.</td>
</tr>
<tr>
<td></td>
<td>\lpr\hostname:queue</td>
</tr>
<tr>
<td></td>
<td>The hostname and print queue name of the IP PrintWay printer.</td>
</tr>
<tr>
<td></td>
<td>mailto:</td>
</tr>
<tr>
<td></td>
<td>An indication that the output data set is to be sent to an email</td>
</tr>
<tr>
<td></td>
<td>destination.</td>
</tr>
<tr>
<td></td>
<td>\vtam\luname</td>
</tr>
<tr>
<td></td>
<td>The VTAM logical unit (LU) name of the IP PrintWay printer.</td>
</tr>
</tbody>
</table>
**uri**
The Uniform Resource Identifier (URI) of the Internet Printing Protocol (IPP) server running in the printer. Examples are:

```
ipp://myprinter.xyz.com
http://myprinter.xyz.com:631
```

**fsa_name**
The name of the JES functional subsystem application (FSA) for the PSF printer.

**priority**
The severity of the message:

- **action** A terminating situation occurred.
- **error** An error occurred.
- **info** This is an information message.
- **severe** A severe error occurred.
- **warning** A warning situation occurred.

**program**
The name of the Infoprint Server daemon, command, or program that issued the message:

- **aopd** The Printer Inventory Manager daemon.
- **aopd.JESStatusDaemon** The Printer Inventory Manager status daemon.
- **aopd.JESScavenger** The Printer Inventory Manager scavenger daemon.
- **aophinvd** The Historical Inventory daemon. It maintains information about Infoprint Server print jobs that are not on the JES spool.
- **aopipdpdxp** The IPP Server daemon. It processes print requests from remote clients that use the Internet Printing Protocol (IPP).
- **aoplogd** The log daemon. It manages the Infoprint Server common message log.
- **aoplpd** The line printer daemon (LPD). It processes print requests from remote clients that use the TCP/IP line printer requester (LPR) protocol.
- **aopnetd** The NetSpool daemon. Together with the NetSpool started task, it processes print requests from VTAM applications such as CICS and IMS.
- **aopoutd** An IP PrintWay extended mode daemon. It sends output to remote printers in the TCP/IP network and to email destinations.
- **aopsapd** The SAP callback daemon. It handles callback notification for the SAP Output Management System (OMS).
- **aopsdbd** The search data base daemon. It manages the Printer Inventory search data base that Infoprint Central uses.
- **aopsnmpd** The SNMP subagent daemon. It provides printer status information for PSF-controlled printers to the z/OS SNMP agent for viewing with an SNMP manager.
- **aopssid** The Infoprint Central daemon. It communicates with JES.
- **aopsubd** The Print Interface subsystem daemon. It processes output data sets that specify the Print Interface subsystem on the SUBSYS parameter of the DD statement.
- **aopwsmd** An IP PrintWay extended mode daemon. It uses the IP PrintWay job selection rules in the Printer Inventory to select output data sets from the JES spool.
- **aopxfd** The Infoprint Server Transform Manager daemon. It manages other transform daemons, which transform data from one format to another.
cancel
  The cancel command.

InfoprintCentral
  Infoprint Central

lp
  The lp command.

PSF_z/OS
  PSF for z/OS

NetSpool started task
  The name of the NetSpool started task. Together with the NetSpool daemon, it processes print requests from VTAM applications such as CICS and IMS.

other values
  The name of an Infoprint Server program or the name of a program that used the Infoprint Server application programming interface (API).

system
  The 1-8 character name for the MVS system.

time
  The time that Infoprint Server wrote the message, followed by the time zone. For information about time zones, see z/OS UNIX System Services Command Reference.

user
  The z/OS user ID or the name of the user who submitted the print job, the z/OS user ID of the user who did the Infoprint Central action on the print job, or the z/OS user ID of the user who started the Infoprint Server daemons.

---

**Viewing IP PrintWay basic mode messages**

IP PrintWay basic mode writes a message to the IP PrintWay message-log data set when it receives a data set from JES, when IP PrintWay successfully or unsuccessfully transmits the data set to the target printer or email destination, and when IP PrintWay releases the data set to JES. Also, IP PrintWay writes other messages to this data set, and IP PrintWay installation exits can write messages to this data set.

The messages wrap around to the beginning when the data set becomes full. The timestamp preceding each message indicates when IP PrintWay wrote the message. IP PrintWay writes a string containing equal signs, ========, at the end of the last message written.

Your installation can write an IP PrintWay Message exit to suppress unwanted messages from the message-log data set. For more information, see z/OS Infoprint Server Customization.

To view the messages:

1. Start an Infoprint Server ISPF session.
   
   For information about how to start an Infoprint Server ISPF session, see “Starting the ISPF session and configuring the panels” on page 231.
   
   ────

2. On the main Infoprint Server ISPF panel, select: 7 Configure.
   Make sure that the Message log field contains the name of the IP PrintWay message log used by the IP PrintWay functional subsystem (FSS). This name must match the data set name specified in the IP PrintWay startup procedure.
   
   ────

3. On the main Infoprint Server ISPF panel, select: 6 PrintWay Message.
4. To find the latest message, press the REFRESH function key on the Infoprint Server ISPF panels, or search for a string of equal signs.

---

**Viewing NetSpool messages**

NetSpool writes messages to several locations:

- NetSpool writes all messages to the operator console.
- NetSpool writes most messages, with the exception of messages written at initialization and termination, to the Infoprint Server common message log if it is enabled. For information about how to enable the common message log, see [z/OS Infoprint Server Customization](z/OS Infoprint Server Customization). For information about how to view messages in the common message log, see "Viewing messages in the common message log" on page 53.
- NetSpool writes some messages, with the exception of messages written at initialization and termination and job-related messages, to the NetSpool message log data set if it is specified in the NetSpool startup procedure. You can view messages in this data set by browsing it.

**Viewing transform messages**

If you use transforms, you can find messages in these locations:

- Common message log: Most transforms that work with Infoprint Server write messages in the Infoprint Server common message log. These messages are related to errors in the transform or transform configuration. For information about whether the transform writes messages to the common message log, see the documentation for the transform.
- Transform stderr file: Messages in this file are related to errors in the transform or transform configuration. For information about how to find the transform stderr file, see [z/OS Infoprint Server Messages and Diagnosis].

Tip: The transform stderr files are deleted when you restart the Infoprint Server Transform Manager.

- Printed output: Some transforms write messages related to errors in the input data stream on a separate page at the end of the transformed output.

**Viewing z/OS UNIX sendmail messages**

When IP PrintWay transmits output to an email destination, it uses the z/OS UNIX sendmail facility. Sendmail returns an error message when it cannot deliver an email:

- If the target email address is for a *local* system, the sendmail error message is recorded in the IP PrintWay message log (basic mode) or the common message log (extended mode).
- If the target email address is for a *remote* system, no error message is recorded in the IP PrintWay message log (basic mode) or common message log (extended mode). Sendmail instead sends a message about the failed delivery to one of these users:
  - If the email address was specified in a sendmail alias, sendmail notifies the owner of the alias.
  - If the email address was specified directly in the printer definition, or if no owner is specified for the alias, sendmail notifies the user associated with the
IP PrintWay startup procedure. This user ID is AOPSTC if your installation used the user ID suggested in [z/OS Infoprint Server Customization](#).

You might need to wait several days before sendmail returns an error message to you about an email that could not be delivered to a remote system. How long you need to wait depends in part on how long it takes the remote system to notify sendmail that an email is not deliverable and in part on how your installation has customized sendmail. For more information about customizing sendmail timeout values, see [z/OS Infoprint Server Customization](#).

To receive messages from sendmail, run the z/OS UNIX `mail` or `mailx` command. For information about these commands, see [z/OS UNIX System Services Command Reference](#).
Chapter 9. Planning the Printer Inventory

These topics contain information to help you plan your Printer Inventory. The Printer Inventory consists of UNIX files (such as z/FS files) that contain information about your printing environment.

In this information, PSF refers to PSF for z/OS and to the AFP Download Plus feature of PSF.

The Printer Inventory can contain these types of objects, called definitions:

**Printer definitions**
Describe the printers in your system. IP PrintWay, PSF, or JES can control the printers.

Printer definitions can also:
- Describe an email destination. The destination can be one email address or a list of email addresses.
- Include other Printer Inventory objects called components. Components let you use one object to specify information that is common to several printer definitions.

**Printer pool definitions**
Describe groups of printer definitions that you want to broadcast data to (applies only to NetSpool). Only VTAM applications can print to a printer pool definition.

**FSS definitions**
Describe the IP PrintWay basic mode and PSF functional subsystems (FSSs) that the system programmer has defined to your JES system.

**FSA definitions**
Describe the IP PrintWay basic mode and PSF functional subsystem applications (FSAs) that the system programmer has defined to your JES system.

**Job selection rules**
Describe the rules that IP PrintWay extended mode uses to determine which print jobs to select from the JES spool to print.

**System configuration definition**
Contains configuration information for all components of Infoprint Server. Infoprint Server automatically creates this definition. Authorized administrators can edit it if dynamic configuration is enabled.

Table 13 summarizes the types of objects you can create or edit in the Printer Inventory and indicates when the definitions are required. Required definitions are required by all installations. Optional definitions are required only if the condition is met. See the page reference for more information about the definition.

<table>
<thead>
<tr>
<th>Table 13. Printer Inventory objects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inventory definition</strong></td>
</tr>
<tr>
<td>Printer definition</td>
</tr>
<tr>
<td>Components</td>
</tr>
</tbody>
</table>

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Table 13. Printer Inventory objects (continued)

<table>
<thead>
<tr>
<th>Inventory definition</th>
<th>Condition</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printer pool definition</td>
<td>Optional: To broadcast data from VTAM applications through NetSpool to multiple printer definitions</td>
<td>71</td>
</tr>
<tr>
<td>FSS definition for IP</td>
<td>Optional: To print on VTAM-controlled printers or to customize the IP PrintWay basic mode FSS</td>
<td>71</td>
</tr>
<tr>
<td>PrintWay basic mode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSS definition for PSF</td>
<td>Optional2</td>
<td>71</td>
</tr>
<tr>
<td>FSA definition for IP</td>
<td>Optional: To specify unique trace parameters for the FSA</td>
<td>73</td>
</tr>
<tr>
<td>PrintWay basic mode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSA definition for PSF</td>
<td>Optional2</td>
<td>73</td>
</tr>
<tr>
<td>Job selection rule</td>
<td>Optional: To have IP PrintWay extended mode select print jobs from the JES spool</td>
<td>74</td>
</tr>
<tr>
<td>System configuration</td>
<td>Required 3</td>
<td></td>
</tr>
</tbody>
</table>

1. In some cases you can support more than one printer with the same printer definition. For more information, see “One printer definition for several actual printers” on page 64.
2. You must create FSS and FSA definitions for PSF if you configure PSF to use the Printer Inventory. For information about how to configure PSF to use the Printer Inventory, see:
   - PSF for z/OS: Customization
   - PSF for z/OS: AFP Download Plus
3. Infoprint Server automatically creates the system configuration definition. If dynamic configuration is enabled, authorized administrators can edit it. For information about dynamic configuration and the system configuration definition, see z/OS Infoprint Server Customization.

To create and manage Printer Inventory definitions, you can use one of these methods or a combination of these methods:

- **Infoprint Server ISPF panels:** The ISPF panels let you add, list, browse, copy, edit, and delete definitions. For information about how to use the ISPF panels, see Chapter 16, “Using ISPF panels to manage the Printer Inventory,” on page 231.

- **Printer Inventory Definition Utility (PIDU):** The PIDU program lets you create, display, list, modify, rename, delete, export, and dump definitions. You might find the PIDU program convenient for creating a large number of definitions at one time or for making the same change to many definitions. For information about how to run the PIDU program, see Chapter 17, “Using the PIDU program to manage the Printer Inventory,” on page 253.

- **Infoprint Server migration program:** The migration program can create PSF FSS and FSA definitions in the Printer Inventory from information in your PSF startup procedures and JES definitions.

### Planning printer definitions

A printer definition contains information about one or more printers or email destinations. The printer can be a local printer or remote printer in your TCP/IP network, or it can be a printer defined to VTAM.

A printer definition contains these general types of information:

- Information that Print Interface and NetSpool use to allocate data sets on the JES spool.
For example, the JES output class (CLASS), the destination name (DEST), the forms name (FORMS), and the form definition name for all data sets submitted to the printer definition.

- Information that IP PrintWay uses to transmit data sets from the JES spool to the printer or the email destination. For example, the IP address of the printer or the email addresses of the email recipients.

Users, who can be job submitters or applications, submit print jobs to a printer by specifying the name of the printer definition or, in some cases, the CLASS, DEST, and FORMS values for the printer definition. The name of a printer definition is case-sensitive and can contain up to 17 printable characters.

Before you create printer definitions, you should understand these topics:

- The types of printer definitions you can create
- How many printer definitions you need to create for each actual printer
- The printer attributes that you can specify in the printer definitions
- How to use components to help you manage large numbers of printer definitions

### Selecting the type of printer definition

One of the first decisions to make when you plan the Printer Inventory is the type of printer definition to create for each printer or email destination. The type indicates the program that sends data from the JES spool to the printer. The types of printer definitions you can create are:

- **IP PrintWay**: Select this type for:
  - TCP/IP-attached, non-AFP printers
  - VTAM-controlled printers
  - AFP printers controlled by Ricoh InfoPrint Manager or Ricoh ProcessDirector V3.0 and later
  - Email destinations
  - TCP/IP-attached printers defined to Infoprint Server running on another z/OS system

When you use the Infoprint Server ISPF panels to select the printer definition type, you also must select the transmission protocol that IP PrintWay is to use to transmit data to the printer. You can select the LPR, direct sockets, Internet Printing Protocol (IPP), VTAM, or email protocol. For information about how to determine which protocol to select, see Chapter 12, “Planning printer definitions for IP PrintWay,” on page 127.

- **PSF**: Select this type for AFP printers that PSF for z/OS or a comparable product controls. AFP printers can be locally-attached, SNA-attached, or TCP/IP-attached. *overview*

- **General**: Select this type for printers that do not fall into the other two categories. For example, select General for line printers that JES controls.

This is the ISPF screen you use to select the type of printer:
Choose a Definition Type and Protocol

<table>
<thead>
<tr>
<th>Option</th>
<th>Type</th>
<th>Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IP PrintWay</td>
<td>LPR</td>
</tr>
<tr>
<td>1</td>
<td>IP PrintWay</td>
<td>direct sockets</td>
</tr>
<tr>
<td>2</td>
<td>IP PrintWay</td>
<td>IPP</td>
</tr>
<tr>
<td>3</td>
<td>IP PrintWay</td>
<td>VTAM</td>
</tr>
<tr>
<td>4</td>
<td>IP PrintWay</td>
<td>email</td>
</tr>
<tr>
<td>5</td>
<td>PSF</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>General</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tip: Select the type of definition carefully because Infoprint Server processing differs according to the selected type. For example, if the printer definition type is PSF, Print Interface converts text data to line data before placing it on the JES spool. Also, if the printer definition type is IP PrintWay, the Infoprint Server ISPF panels let you specify information specific to IP PrintWay, such as the IP address of the printer.

Determining how many printer definitions to create

You can create:

- One printer definition to represent each actual printer or email destination.
- One printer definition to represent several actual printers or email destinations.
- Several printer definitions to represent one actual printer or email destination.

One printer definition for one actual printer

This is the most common configuration for all types of printer definitions. In this configuration, you create one printer definition for each print queue or printer and for each email destination. This configuration lets job submitters direct output to a specific printer or email destination.

Note that you can use the same printer definition to process different types of data. For example, you can use the same printer definition for printing data submitted by VTAM applications, data submitted by workstation applications, and data submitted from TSO.

Each printer definition can be associated with only one NetSpool printer LU name. Therefore, if your installation needs to print on the same actual printer using different printer LU names, you need to create more than one printer definition for the same printer.

To work in this configuration, the JES work-selection criteria for each PSF functional subsystem application (FSA) must be unique. For example, one FSA could be defined to JES with work-selection criterion of destination BLDG5, while the other printer FSA could be defined with work-selection criterion of destination BLDG6. For information about specifying JES work-selection criteria, see z/OS JES2 Initialization and Tuning Guide or z/OS JES3 Initialization and Tuning Guide.

One printer definition for several actual printers

If you want to minimize the number of printer definitions you create in the Printer Inventory, you can create one printer definition for several actual printers or email destinations in these situations:

- If job submitters can specify the address of an IP PrintWay printer or the addresses of email recipients on either the OUTPUT JCL statement or in Infoprint Server job attributes, you can create one printer definition for all
printers or email destinations that share the same characteristics. This is because job submitters can print to one printer definition, but direct the output data set to a specific printer or email address by using a JCL parameter or job attribute. For more information, see “Selecting the LPR protocol” on page 133, “Selecting the direct sockets protocol” on page 138, and “Selecting the email protocol” on page 146.

- If job submitters use the Print Interface subsystem to submit print requests to PSF printers, you can create one printer definition for printers that share the same characteristics. This is because job submitters can print to one printer definition, but direct the output data set to a specific PSF printer by specifying that printer’s work-selection criteria (for example, the printer’s CLASS and DEST values) on the OUTPUT JCL statement. For more information, see “Using the Print Interface subsystem” on page 90.

- If your installation has several PSF or JES printers that share the same JES work-selection criteria, you need to create only one printer definition for all the printers. For example, if there are several similar PSF printers in building 5, you could specify the same JES work-selection criterion (for example, destination BLDG5) in the JES FSA definitions for all printers in building 5. This lets JES balance the workload among the printers in building 5. Job submitters can submit all output data sets to the same printer definition and let JES direct the output data set to the printer that becomes available first.

For information about how to specify JES work-selection criteria, see z/OS JES2 Initialization and Tuning Guide or z/OS JES3 Initialization and Tuning Guide.

**Guideline:** Create at least one printer definition for each printer so that all job submission methods can be used to print on a printer, including those job submission methods that do not permit the specification of the JES output class, destination name, or IP address. For example, the `lp` command does not let you specify the JES output class or destination name. And, when the IP PrintWay basic mode `resubmit for filtering` option is used, the printer’s IP address cannot be specified on the OUTPUT JCL statement.

**Several printer definitions for one actual printer**

You might need to create more than one printer definition for the same actual printer or print queue in these situations:

- To print documents with different requirements on the same actual printer or print queue. For example, to print documents on a PSF printer with different overlays. You would create two printer definitions for the actual printer. In one printer definition, specify the name of one overlay. In the other printer definition, specify the name of the other overlay.

  As an alternative, job submitters who use the `lp` command or an OUTPUT JCL statement can specify the name of the overlay during job submission. However, not all job-submission methods allow specification of job attributes such as an overlay name.

- To print VTAM application data on the same actual printer with different requirements. For example, to print on the same printer with different NetSpool end-of-file rules, you would create two printer definitions with two different NetSpool printer LU names.

- To print ASCII or formatted data (such as PCL data) and EBCDIC data to the same IP PrintWay print queue from the local z/OS system using an OUTPUT JCL statement to submit the print job. For information, see “Printing data without formatting (basic mode)” on page 209.
Specifying attributes in a printer definition

The characteristics of a printer and print jobs that you specify in a printer definition are called printer attributes. When you use ISPF panels to create or edit printer definitions, you specify printer attributes as values in panel fields. If you use the Printer Inventory Definition Utility to create or edit printer definitions, you specify printer attributes as keyword and value pairs. Although you can specify many attributes in a printer definition, you do not need to specify all of them because Infoprint Server and JES supply default values for many of the attributes.

Some attributes are used by all components of Infoprint Server. However, other attributes are used only by one component of Infoprint Server. Therefore, depending on which components of Infoprint Server you plan to use in your installation, you might not need to specify all of the attributes. For example, if you do not plan to use NetSpool to print VTAM application data, you do not need to specify attributes that only NetSpool uses. The online help for each panel field describes which components use the field.

Most of the attributes that you can specify in a printer definition are divided into logical groups called sections. The sections of a printer definition are: Allocation, Processing, NetSpool Options, NetSpool End-of-File, IP PrintWay Options, and Protocol. Figure 1 shows the different types of printer definitions and the sections that each type contains.

<table>
<thead>
<tr>
<th>IP PrintWay</th>
<th>PSF</th>
<th>General</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printer Definitions</td>
<td>Printer Definitions</td>
<td>Printer Definitions</td>
</tr>
<tr>
<td>Allocation</td>
<td>Allocation</td>
<td>Allocation</td>
</tr>
<tr>
<td>Processing</td>
<td>Processing</td>
<td>Processing</td>
</tr>
<tr>
<td>NetSpool Options</td>
<td>NetSpool Options</td>
<td>NetSpool Options</td>
</tr>
<tr>
<td>IP PrintWay Options</td>
<td></td>
<td>IP PrintWay Options</td>
</tr>
<tr>
<td>Protocol</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 1. Sections of printer definitions*

Appendix B, “ISPF panels,” on page 465 shows the panels that you use to specify attributes in a printer definition.

**Allocation section**

The Allocation section contains attributes that tell NetSpool and Print Interface how to allocate output data sets on the JES spool. For example, in this section you can specify the output class, destination name, or job priority.

Each attribute in the Allocation section corresponds to a parameter that you can specify on an OUTPUT JCL statement. For a table that shows all field names in the Allocation section and the corresponding OUTPUT parameters, see “Allocation attributes and corresponding OUTPUT or DD statement parameters” on page 453. Because each field corresponds to an OUTPUT parameter, if you need more information about any of the attributes in this section, see z/OS MVS JCL Reference.

Some print-submission methods let the user specify the same attributes that you can specify in the Allocation section. In this case, the attribute specified during job submission overrides the attribute in the printer definition. For example, if the lp command contains the form-definition attribute, Print Interface allocates the job on the JES spool with the form definition name on the lp command.
“ISPF panel for the Allocation section or component” on page 467 shows the panel that you use to specify attributes in the Allocation section of a printer definition.

**Processing section**
The Processing section contains attributes that tell NetSpool, Print Interface, and IP PrintWay how to process data. For example, in this section you can specify attributes that control the page-formatting done by NetSpool and IP PrintWay and attributes that control data transforms done by Print Interface.

The Processing section also contains attributes that Print Interface and IP PrintWay use to determine whether the document can print on the printer. These are called validation attributes. If the document cannot print on the printer, Print Interface rejects the print request, and IP PrintWay places the job on the system hold queue. For example, you can specify the types of data formats that the printer supports or the maximum size job that can print.

“ISPF panel for the Processing section or component” on page 468 shows the panel that you use to specify attributes in the Processing section of a printer definition.

**NetSpool options section**
The NetSpool Options section contains attributes that tell NetSpool how to convert the input data stream before writing the data to the JES spool. NetSpool can convert the input data stream to either a line or PCL data stream. Or, you can request that NetSpool write the input data stream without change to the JES spool.

“ISPF panel for the NetSpool Options section or component” on page 470 shows the panel that you use to specify attributes in the NetSpool Options section of a printer definition.

**NetSpool end-of-file section**
The NetSpool End-of-File section contains attributes that tell NetSpool when to close the output data set on the JES spool so that the data can be printed. “ISPF panel for the NetSpool End-of-File section or component” on page 471 shows the panels that you use to specify attributes in the NetSpool End-of-File section of a printer definition.

**IP PrintWay options section**
The IP PrintWay Options section contains attributes that tell IP PrintWay such things as how long to retain data sets on the JES spool after transmission to the remote system, how often to retry unsuccessful transmissions, or which exits to call while processing data. “ISPF panel for the IP PrintWay Options section or component” on page 472 shows the panel that you use to specify attributes in the IP PrintWay Options section of a printer definition.

**Protocol section**
The Protocol section contains attributes that tell IP PrintWay which transmission protocol to use to transmit data sets to the remote system: line printer requester (LPR), direct-sockets printing, Internet Printing Protocol (IPP), VTAM, or email. This section also contains attributes that are specific to the type of transmission protocol you select. For example, in this section you can specify LPR options such as whether you want the LPD on the remote system to print a banner page.

The Protocol section also contains the name of the RACF profile that controls who can work with a printer using Infoprint Central for the web. The RACF profile applies only if you run IP PrintWay extended mode.
Including components in printer definitions

Because a Printer Inventory might contain hundreds or thousands of printer definitions, changing information in many printer definitions can be time-consuming. Therefore, you might want to create additional objects in the Printer Inventory called components and include them in printer definitions. Consider creating components when several printer definitions share the same attributes. To use components:

1. Specify the shared attributes in a component, instead of specifying the same attributes in many printer definitions.
2. Include the component in all printer definitions to which those attributes apply.

When you change the attributes in a component, all printer definitions that include that component pick up the new attributes.

Creating components is optional. Some printer definitions in the Printer Inventory might include components, while other printer definitions might not. Whether or not you use components, you can use the Printer Inventory Definition Utility (PIDU) to make changes to many printer definitions at one time. For information about PIDU, see Chapter 17, “Using the PIDU program to manage the Printer Inventory,” on page 253.

When you create components, you do not need to specify every attribute in that component. Instead, you might want to specify some attributes in the printer definitions. For example, the Protocol component contains an attribute that defines the host name or IP address of the remote printer. Because the host name or IP address is usually unique for each remote printer, you could omit the host name or IP address from the component and instead specify it in the printer definition.

When you include components in a printer definition, you can override some of the attributes specified in the components by specifying a different value in the printer definition itself. For example, if one printer definition requires a longer retention time on the JES spool, you can override the attribute that specifies the retention time in the printer definition itself. You do not need to create a new component. Notice, however, that if you override an attribute in a printer definition, when you change the same attribute in the component, the printer definition does not pick up the new attribute.

You can create these types of components (one type for each section of a printer definition): Allocation, Processing, NetSpool Options, NetSpool End-of-File, IP PrintWay Options, and Protocol.

Tip: Another reason to create components is so that job submitters who use JCL can override printer attributes specified in the printer definition. Job submitters can specify a component name in the PRTOPTNS parameter of the OUTPUT JCL statement. The printer attributes specified in components with that name override the printer attributes specified in the printer definition. For more information, see “Creating components for the PRTOPTNS JCL parameter” on page 196.

Example of components for IP PrintWay printer definitions

Figure 2 on page 69 shows an example of components that you can include in IP PrintWay printer definitions. After the figure is a description of the components.
1. **Allocation component**: Both IP PrintWay printer definitions shown include the same Allocation component. In this component, you could specify the work-selection criteria defined for the IP PrintWay FSA (basic mode) or in the IP PrintWay job selection rule (extended mode). For example, if IP PrintWay selects jobs in output class P, specify class P in this component.

   You might need to specify some allocation attributes in the printer definitions themselves. For example, if job submitters need to select these printer definitions using the CLASS, DEST, or FORMS parameters on an OUTPUT JCL statement, the value for the DEST or FORMS attribute must be unique for each printer definition. Because this value is unique, do not specify it in the component. Instead, specify the DEST or FORMS value in the printer definition itself. For more information, see "Using DEST, CLASS, and FORMS to select a printer definition" on page 161.

2. **Processing component**: Both IP PrintWay printer definitions include the same Processing component. In this component, you could specify the data formats that the printer’s print queues can accept. For example: line data, text data, and PCL data. You could also specify whether you want the printer’s LPD to print a page header.

3. **NetSpool End-of-File components**: Each IP PrintWay printer definition includes a different NetSpool End-of-File component. In these components, you could specify different end-of-file rules for NetSpool to use.

   Only printer definitions that are configured for use with NetSpool need to include a NetSpool End-of-File component. However, you can include a NetSpool End-of-File component even if NetSpool is not configured.

4. **IP PrintWay Options component**: Both IP PrintWay printer definitions include the same IP PrintWay Options component. In this component, you could specify a retry time and a retention time for unsuccessfully transmitted data sets. You could also specify the name of an IP PrintWay exit program.
5. **Protocol components**: Each IP PrintWay printer definition includes a different Protocol component. In the first Protocol component, you could specify attributes for the LPR protocol, while in the second Protocol component, you could specify attributes for the VTAM protocol.

Because the host name or IP address (for the LPR and direct sockets protocols), the URL (for the IPP protocol), the logical unit name (for the VTAM protocol), and the email addresses (for the email protocol) are typically unique, do not specify these values in the component. Instead, specify the IP address, URL, logical unit name, and email addresses in each printer definition that includes the component.

**Tip:** Neither printer definition in this example includes a NetSpool Options component.

**Example of components for PSF printer definitions**

Figure 3 shows an example of components you can include in PSF printer definitions. After the figure is a description of each component and printer definition.

You can include the same components in different types of printer definitions. For example, IP PrintWay and PSF printer definitions can share the NetSpool End-of-File components, if the same NetSpool end-of-file rule is appropriate.

---

**PSF Printer Definitions**

<table>
<thead>
<tr>
<th>Printer 3</th>
<th>Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allocation</td>
<td>1</td>
</tr>
<tr>
<td>Processing</td>
<td>1</td>
</tr>
<tr>
<td>NetSpool Options</td>
<td>2a</td>
</tr>
<tr>
<td>NetSpool End-of-File</td>
<td>2b</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Printer 4</th>
<th>Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allocation</td>
<td>1</td>
</tr>
<tr>
<td>Processing</td>
<td>1</td>
</tr>
<tr>
<td>NetSpool Options</td>
<td>2b</td>
</tr>
<tr>
<td>NetSpool End-of-File</td>
<td>2a</td>
</tr>
</tbody>
</table>

*Components not shown: Allocation and NetSpool Options

Figure 3. Components for a PSF printer definition

1. **Processing component**: Both PSF printer definitions include the same Processing component. In this component, you could specify the data formats that the PSF printers support and the data transforms that you want to use.

2. **NetSpool End-of-File component**: Each PSF printer definition includes a different NetSpool End-of-File component. In these components, you might specify different end-of-file rules for NetSpool to use.

Only printer definitions that are configured for use with NetSpool need to include a NetSpool End-of-File component. However, you can include a NetSpool End-of-File component even if NetSpool is not configured.
Notes:
1. Neither printer definition in this example includes an Allocation component because each PSF printer FSA in this example has unique work-selection criteria, which means that Print Interface and NetSpool must allocate data sets on the JES spool with different allocation values. Therefore, the allocation values are specified in the printer definitions themselves.
2. Neither printer definition in this example includes a NetSpool Options component.

Planning printer pool definitions

Printer pool definitions let you broadcast data to more than one printer at a time. Each printer pool definition defines the group of printer definitions to which you want to broadcast data.

Only NetSpool supports broadcasting. Therefore, only VTAM applications can print to a printer pool definition. NetSpool uses the attributes specified in the Allocation section of each printer definition to create output data sets on the JES spool, one output data set for each printer definition.

Figure 4 shows the relationship between a printer pool definition and printer definitions.

Planning FSS definitions

An FSS definition contains information about a JES functional subsystem (FSS). You can define these types of FSS definitions:

- IP PrintWay basic mode FSS definitions. IP PrintWay can use the information in this definition when the FSS starts.
- PSF FSS definitions. PSF can use the information in this definition when the FSS starts.
You can use the Infoprint Server ISPF panels to create and manage FSS definitions. "ISPF panel for an IP PrintWay FSS definition" on page 478 shows the panel that you use to create an FSS definition. For information about how to use the ISPF panels, see "Managing FSS definitions" on page 246. You can also use the Printer Inventory Definition Utility (PIDU) to create FSS definitions. For information, see Chapter 17, "Using the PIDU program to manage the Printer Inventory," on page 253.

Note: You must also define each IP PrintWay basic mode and PSF FSS to JES. The FSS definition in the Printer Inventory does not replace the JES definition.

**IP PrintWay basic mode FSS definitions**

In an IP PrintWay basic mode FSS definition you can specify configuration information that applies to all functional subsystem applications (FSAs) in the IP PrintWay FSS. You can define one IP PrintWay FSS definition for each FSS that your installation has defined to JES.

In the FSS definition you can specify this information:
- The name of the TCP/IP startup procedure
- The language IP PrintWay basic mode uses for messages
- The type of tracing to start for each FSA and the size of tracing tables
- The number of hiperspace blocks each FSA can use
- Whether IP PrintWay basic mode is to use the standard TCP/IP translation table to convert data from EBCDIC to ASCII
- The default document code page that IP PrintWay basic mode uses when it converts data from an EBCDIC code page to the printer's code page
- The VTAM ID of the application program that IP PrintWay basic mode uses to transmit data to a VTAM-controlled printer

Creating IP PrintWay FSS definitions is optional unless your installation plans to print on VTAM-controlled printers. If your installation plans to print on VTAM-controlled printers, you must specify the ID of the application program you defined to VTAM for IP PrintWay. If an IP PrintWay FSS definition is not created when IP PrintWay starts, IP PrintWay uses default values for the other attributes you can specify in an FSS definition.

If you create an FSS definition after the FSS has started or if you change any information in the FSS definition, you must restart the IP PrintWay FSS to pick up the changes.

Tip: [z/OS Infoprint Server Customization](#) and the ISPF help panels contain more information about the values you can specify in an IP PrintWay FSS definition.

**PSF FSS definitions**

In a PSF FSS definition you can specify configuration information that applies to all PSF functional subsystem applications (FSAs) in the FSS (functional subsystem). You must create one FSS definition for each FSS that your installation has defined to JES.

If you want PSF to use configuration information specified in an FSS definition, you must customize PSF to use the Printer Inventory. If PSF uses the Printer Inventory, an FSS definition must exist in the Printer Inventory.
If you create an FSS definition after the PSF FSS is started or if you change any information that PSF uses in the FSS definition, you must restart the PSF FSS to pick up the changes.

Tip: For complete information about the fields and values you can specify in a PSF FSS definition, see:
- PSF for z/OS: Customization
- PSF for z/OS: AFP Download Plus
PSF for z/OS: Customization also tells you how to use a migration program to create PSF FSS definitions.

**Planning FSA definitions**

An FSA definition contains information about functional subsystem applications (FSAs) defined to JES. You can define these types of FSA definitions:
- IP PrintWay basic mode FSA definition. IP PrintWay uses the information in this definition when the FSA starts.
- PSF FSA definition. PSF uses the information in this definition when the FSA starts.

You can use the Infoprint Server ISPF panels to create and manage FSA definitions. "ISPF panel for an IP PrintWay FSA definition" on page 478 shows the panel that you use to create an FSA definition. For information about how to use the ISPF panels, see "Managing FSA definitions" on page 248. You can also use the Printer Inventory Definition Utility (PIDU) to create FSS definitions. For information, see Chapter 17, “Using the PIDU program to manage the Printer Inventory,” on page 253.

Note: You must also define each IP PrintWay basic mode and PSF FSA to JES. The FSA definition in the Printer Inventory does not replace the JES definition.

**IP PrintWay basic mode FSA definitions**

You can create one IP PrintWay basic mode FSA definition for each IP PrintWay FSA that your installation has defined to JES. In each IP PrintWay FSA definition you can specify the type of tracing to start for the FSA.

Creating IP PrintWay FSA definitions is optional. If an IP PrintWay FSA definition has not been created for an FSA, IP PrintWay uses the tracing value specified in the FSS definition.

If you create an FSA definition after the FSA is started or if you change the FSA definition, you must restart the IP PrintWay FSA to use the changed values. However, you do not need to restart the FSS and any other IP PrintWay FSA.

Tip: z/OS Infoprint Server Customization and the ISPF help panels contain information about values you can specify in an IP PrintWay FSA definition.

**PSF FSA definitions**

You can create one PSF FSA definition for each PSF FSA that your installation has defined to JES. In each PSF FSA definition you can specify configuration information that applies to that FSA.
If you want PSF to use configuration information specified in FSA definitions, you must customize PSF to use the Printer Inventory. If PSF uses the Printer Inventory, an FSA definition must exist in the Printer Inventory for each PSF FSA in the FSS.

If you create an FSA definition after the PSF FSA is started or if you change any information in the FSA definition, you must restart the PSF FSA to pick up the changes. However, you do not need to restart the PSF FSS.

If you create an FSA definition for a PSF printer, you can use Infoprint Central to control it.

**Tip:** For complete information about the fields and values you can specify in a PSF FSA definition, see:

- *PSF for z/OS: Customization*
- *PSF for z/OS: AFP Download Plus*

*PSF for z/OS: Customization* also tells you how to use a migration program to create PSF FSA definitions.

### Planning job selection rules

IP PrintWay extended mode uses the job selection rules to determine which print jobs to select from the JES spool for printing. You must create at least one job selection rule for IP PrintWay to select print jobs. The attributes of the print job must match all of the values in a rule to be selected.

You can use the Infoprint Server ISPF panels to create and manage job selection rules. "ISPF panel for an IP PrintWay job selection rule" on page 477 shows the panel that you use to create a job selection rule. For information about how to use the ISPF panels, see "Managing job selection rules" on page 250. You can also use the Printer Inventory Definition Utility (PIDU) to create job selection rules. For information, see Chapter 17, "Using the PIDU program to manage the Printer Inventory," on page 253.

For detailed information about how to set up and use job selection rules, see *z/OS Infoprint Server Customization*. 
Chapter 10. Planning printer definitions for Print Interface

Before using Print Interface to allocate output data sets on the JES spool, you must specify the attributes that Print Interface uses in the printer definitions. If a printer definition does not already exist for a printer, you must create one. If a printer definition already exists, edit it and specify the attributes that Print Interface uses.

Once you have specified the attributes that Print Interface uses, users can use one of several different methods to submit print jobs to Print Interface. For example: the `lp` command, the AOPPRINT JCL procedure, an `lpr` command, the Server Message Block (SMB) protocol from a Windows system, the Infoprint Port Monitor for Windows, or the Print Interface subsystem. The attributes you specify in a printer definition are the same regardless of the method users might use to submit print jobs.

Table 50 on page 456 summarizes the attributes that Print Interface uses and indicates whether each attribute is required or optional. You can use the Infoprint Server ISPF panels or the Printer Inventory Definition Utility (PIDU) to specify these attributes.

Table 14 lists the tasks related to Print Interface and refers to the topic that describes how to do each task.

<table>
<thead>
<tr>
<th>Task</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specifying JES allocation parameters</td>
<td>75</td>
</tr>
<tr>
<td>Validating that documents can print as requested</td>
<td>78</td>
</tr>
<tr>
<td>Using the aopfilt.so filter</td>
<td>81</td>
</tr>
<tr>
<td>Using the LPD compatibility filter</td>
<td>82</td>
</tr>
<tr>
<td>Using an installation-provided filter</td>
<td>87</td>
</tr>
<tr>
<td>Converting data from EBCDIC to ASCII or ASCII to EBCDIC</td>
<td>88</td>
</tr>
<tr>
<td>Mapping output bin and input tray names to numbers for an AFP printer</td>
<td>89</td>
</tr>
<tr>
<td>Using the Print Interface subsystem</td>
<td>90</td>
</tr>
<tr>
<td>Creating the Infoprint Server default printer definition</td>
<td>96</td>
</tr>
</tbody>
</table>

Note: For detailed information about each attribute (including the values you can specify, restrictions, and examples), use the online help for each field on the ISPF panels.

Specifying JES allocation parameters

You can specify attributes in the Allocation section of the printer definition to tell Print Interface how to allocate output data sets on the JES spool. For example, you can specify the JES output class and destination name.

Some job submission methods let job submitters specify Infoprint Server job attributes, which override the attributes you specify in this section. When the Print
Interface subsystem is used, parameters specified on the DD and OUTPUT JCL statements override the values specified in this section.

Each attribute in the Allocation section of a printer definition corresponds to a parameter on a DD or OUTPUT JCL statement. "Allocation attributes and corresponding OUTPUT or DD statement parameters" on page 453 lists fields in the Allocation section and the corresponding JCL parameters. For a full explanation of each JCL parameter, see z/OS MVS JCL Reference. Also, the ISPF online help for each field summarizes the meaning of each field.

NetSpool also uses these attributes in the Allocation section to allocate data sets on the JES spool. In most cases, the same attributes are suitable for both NetSpool and Print Interface. To specify unique attributes for Print Interface and NetSpool, you must create two separate printer definitions for the printer: one for print requests submitted to Print Interface and another for print requests submitted to NetSpool.

As an alternative to specifying attributes in the Allocation section, job submitters can specify InfoPrint Server job attributes and application programmers can embed job attributes in the VTAM application data sent to NetSpool. For information about how to specify job attributes, see z/OS InfoPrint Server User's Guide.

Procedure for specifying attributes

On the Allocation panel, specify:

- **Spool allocation values** heading: The fields under this heading correspond to the OUTPUT JCL parameters that JES uses to direct output data sets from the JES spool to IP PrintWay, PSF, or another JES functional subsystem application (FSA):
  - In a PSF printer definition, specify the JES work-selection criteria for the PSF printer FSA. For example, if the JES work-selection criteria are class E and destination BLDG5, specify E in the CLASS field and BLDG5 in the DEST field.
  - In an IP PrintWay basic mode printer definition, specify the JES work-selection criteria defined for the IP PrintWay basic mode FSA. For example, if the work-selection criterion is class P, specify P in the CLASS field.
  - In an IP PrintWay extended mode printer definition, specify the job-selection criteria defined in the IP PrintWay extended mode job selection rule. For example, if the job-selection criterion is class P, specify P in the CLASS field.

JES work-selection criteria are defined in the JES3 DEVICE statement and the JES2 PRTnnnnn statement.

- Specify other fields that the PSF, IP PrintWay, transforms, and JES use.

**Tip:** If you need to specify the same allocation attributes in more than one printer definition, specify the attributes in an Allocation component. Then, include that component in each printer definition to which the component applies.

**Example**

This ISPF panel shows how to specify an output class and destination in the Allocation section of a PSF printer definition.
### Allocation

**Spool allocation values:**

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLASS</td>
<td>E</td>
</tr>
<tr>
<td>DEST</td>
<td>BLDG5</td>
</tr>
<tr>
<td>JES node</td>
<td></td>
</tr>
<tr>
<td>FCB</td>
<td></td>
</tr>
<tr>
<td>FLASH count</td>
<td></td>
</tr>
<tr>
<td>FLASH name</td>
<td></td>
</tr>
<tr>
<td>FORMS</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>USERDATA</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BURST</td>
<td>1. Yes 2. No</td>
</tr>
<tr>
<td>HOLD</td>
<td>1. Yes 2. No</td>
</tr>
</tbody>
</table>

**Values for Separator Pages:**

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>Building</td>
<td></td>
</tr>
<tr>
<td>Department</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td></td>
</tr>
<tr>
<td>Room</td>
<td></td>
</tr>
<tr>
<td>Title</td>
<td></td>
</tr>
</tbody>
</table>

**Resource Related Values:**

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form definition</td>
<td></td>
</tr>
<tr>
<td>Character sets</td>
<td></td>
</tr>
<tr>
<td>Overlay front</td>
<td></td>
</tr>
<tr>
<td>Input tray</td>
<td></td>
</tr>
<tr>
<td>Output bin</td>
<td></td>
</tr>
<tr>
<td>Page definition</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource library.</td>
<td></td>
</tr>
<tr>
<td>Resource directories.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image shift x-direction front</td>
<td></td>
</tr>
<tr>
<td>Image shift y-direction front</td>
<td></td>
</tr>
</tbody>
</table>

**Error Reporting Values:**

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print error reporting</td>
<td>1. None 2. All 3. Character 4. Position</td>
</tr>
<tr>
<td>Print error messages</td>
<td>1. No 2. Yes</td>
</tr>
</tbody>
</table>

**Other Values:**

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notify</td>
<td>at node . . .</td>
</tr>
<tr>
<td>Checkpoint pages</td>
<td></td>
</tr>
<tr>
<td>Checkpoint seconds</td>
<td></td>
</tr>
<tr>
<td>Copies</td>
<td></td>
</tr>
<tr>
<td>Copy group</td>
<td></td>
</tr>
<tr>
<td>Color map</td>
<td></td>
</tr>
<tr>
<td>Com setup member</td>
<td></td>
</tr>
<tr>
<td>JES form length</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DUPLEX</td>
<td>1. Simplex 2. Duplex 3. Tumble</td>
</tr>
<tr>
<td>Label data pages</td>
<td>1. Yes 2. No</td>
</tr>
</tbody>
</table>

**Result:** Print Interface allocates output data sets in JES output class E and with destination name BLDG5. The PSF printer (FSA) defined to JES with work-selection criteria of class E and destination BLDG5 selects the output data set for printing.
Validating that documents can print as requested

Before accepting a print request, Print Interface can validate that the document can print as requested. For example, Print Interface can verify that the printer supports the data format of the input document. If Print Interface determines that a document cannot print, Print Interface rejects the print request with a message and does not allocate a data set on the JES spool.

Table 15 lists the fields in a printer definition that Print Interface uses to validate that the print request can print on the selected printer. The third column in the table indicates the job attribute or JCL parameter that the job submitter specifies to request a print function.

Table 15. Printer definition fields used for validation in Print Interface

<table>
<thead>
<tr>
<th>Field name</th>
<th>Meaning</th>
<th>Job attribute and JCL parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data format</td>
<td>Input data formats the printer supports. For more information, see &quot;Data formats.&quot;</td>
<td>document-format job attribute</td>
</tr>
<tr>
<td>Duplexes supported</td>
<td>Duplexing supported by the printer (simplex, duplex, and tumble)</td>
<td>duplex job attribute</td>
</tr>
<tr>
<td>Forms supported</td>
<td>Forms names allowed</td>
<td>forms JCL parameter</td>
</tr>
<tr>
<td>Maximum copies</td>
<td>Maximum number of copies allowed</td>
<td>copies JCL parameter</td>
</tr>
<tr>
<td>Maximum document size</td>
<td>Maximum size of document (in bytes) allowed. This number does not include copies.</td>
<td>None. Print Interface determines the document size.</td>
</tr>
<tr>
<td>Print-error reporting supported</td>
<td>Types of error-reporting supported by the printer (invalid-character and print-positioning errors)</td>
<td>print-error-reporting job attribute</td>
</tr>
</tbody>
</table>

Notes:
1. Print Interface does not inspect options specified in the form definition used to print the job during validation. For example, if the form definition specifies five copies, Print Interface does not use this copy count to determine whether the print request exceeds the copy limit.
2. Print Interface validates the JCL parameters if (1) the Print Interface subsystem is used or (2) the IP PrintWay basic mode resubmit for filtering option is used.

Data formats

In the Data format field, select all input data formats that the printer supports. Also select all input data formats that can be transformed into a supported data format by the associated filter.

Print Interface automatically determines the type of data format in each input document unless the job submitter specifies the data format in the document-format job attribute. If Print Interface cannot determine the input data format, the default is other.

Guidelines:
1. In a PSF printer definition, select line data, text, and MO:DCA-P. PSF accepts line data and MO:DCA-P formats. Print Interface automatically transforms text data into line data when the printer definition is a PSF printer definition.

   If you have installed a transform product, you can also select other data formats. For information, see Chapter 13, “Planning printer definitions for transforms,” on page 213.

   Tip: If your installation has installed PSF for z/OS, you can select the XML data format without specifying a filter because PSF can process XML files using a page definition.

2. In an IP PrintWay printer definition, select the data formats accepted by the printer.

   If the printer accepts text data, select line data as well as text because Print Interface automatically converts line data to text data.

   If you install a transform product, you can also select other data formats. For information, see Chapter 13, “Planning printer definitions for transforms,” on page 213.

3. Select other as one of the supported data formats only if you want Print Interface to send documents with an unknown data format to the printer, or for the Xerox data format. By default, the other data format is selected, so be sure to deselect it unless the printer can accept data formats other than those Print Interface can automatically detect.

4. If several printers support the same data formats, consider creating a Processing component in which you select the data formats and specify any associated filters. Then include this component in the printer definitions for all printers that support the same data formats. However, make sure that you do not specify any values in the Data format and Filter fields in the printer definition itself because the values that you specify in the printer definition completely override all values that are specified in the same fields in the Processing component.

Table 16 explains the types of input data formats that you can select. You can select more than one type of data format.

Table 16. Data formats

<table>
<thead>
<tr>
<th>Data format</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>JPEG</td>
<td>Joint Photographic Experts Group file format (JFIF).</td>
</tr>
<tr>
<td>Line data</td>
<td>Character data. It can contain carriage-control characters and table-reference characters. This type of data is typically found in mainframe data sets and is usually EBCDIC data.</td>
</tr>
<tr>
<td>MO:DCA-P</td>
<td>The Mixed Object Document Content Architecture for Presentation defined by Ricoh. Line-data records can be mixed with the MO:DCA-P data. This data format is also called Advanced Function Presentation (AFP) format.</td>
</tr>
<tr>
<td>PCL</td>
<td>The Printer Control Language data format defined by Hewlett Packard.</td>
</tr>
<tr>
<td>PDF</td>
<td>The Portable Document Format defined by Adobe.</td>
</tr>
<tr>
<td>PostScript</td>
<td>The PostScript data format defined by Adobe.</td>
</tr>
<tr>
<td>SAP</td>
<td>The SAP Output text format (OTF) or ABAP format defined by SAP.</td>
</tr>
<tr>
<td>Text</td>
<td>Character data. It can contain control characters LF (or NL), CR, HT, VT, and FF. This type of data is typically found in workstation files and is often ASCII data.</td>
</tr>
<tr>
<td>TIFF</td>
<td>Tagged image file format.</td>
</tr>
</tbody>
</table>
Table 16. Data formats (continued)

<table>
<thead>
<tr>
<th>Data format</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>XML</td>
<td>The Extensible Markup Language.</td>
</tr>
<tr>
<td>Other</td>
<td>All data formats that do not fall into one of the above categories, such as the Xerox data format. This is the default data format when Infoprint Server cannot determine the data format.</td>
</tr>
</tbody>
</table>

Procedure for specifying attributes

On the Processing panel, specify the fields listed in Table 15 on page 78.

Tip: When you leave the default settings on the Processing panel, Print Interface does not validate print requests.

Example

This ISPF panel shows how to specify the valid data formats, duplexing options, and print-error reporting options. Only a portion of the panel is shown.

```
Processing

Supported Data Formats and Associated Filters:
Data format: Filter:
/ Line data ___________________________________________________ (extend)
/ MO:DCA-P ___________________________________________________ (extend)
/ PostScript ___________________________________________________ (extend)
/ Text ___________________________________________________ (extend)
/ PCL ___________________________________________________ (extend)
/ PDF ___________________________________________________ (extend)
/ SAP ___________________________________________________ (extend)
/ XML ___________________________________________________ (extend)
/ TIFF ___________________________________________________ (extend)
/ JPEG ___________________________________________________ (extend)
/ Other ___________________________________________________ (extend)

- Resubmit for filtering

Maximum document size . __________
Maximum copies..... _____
Forms supported.... ________ ________ ________ _________ _________ (more)
Duplex supported. . . / Simplex ___ Duplex ___ Tumble ------- (more)
Print-error reporting supported . / Character  - / Position
```

Result: Print Interface rejects any print request that contains these data formats or print options:
- A data format of PostScript, PCL, PDF, SAP, TIFF, JPEG, or an unknown data format.
- The `duplex=yes` or `duplex=tumble` job attribute.
- The `DUPLEX=NORMAL` or `DUPLEX=TUMBLE` parameter on the OUTPUT JCL statement.
Using the aopfiltr.so filter

For each type of data format that Print Interface supports, you can specify the name of an associated filter. A filter is a program that can inspect and modify data before Print Interface writes the data to an output data set on the JES spool. When you specify the name of an filter for a supported data format in a printer definition, Print Interface automatically calls that filter before writing data to the JES spool.

Infoprint Server provides filter aopfiltr.so, which prepares text data for printing on ASCII printers. This filter converts ASCII line-feed controls that are not preceded by carriage-return controls to carriage-return and line-feed controls (X'0D0A'). The X'0D0A' control is suitable for most ASCII printers.

Guidelines:
• Specify filter aopfiltr.so for the text data format in all IP PrintWay printer definitions except when you select the VTAM protocol or the email protocol.
• Do not specify filter aopfiltr.so in a PSF printer definition.

Procedure for specifying attributes
On the Processing panel of an IP PrintWay printer definition, specify:
• Data format field: Select the Text data format.
• Filter field: Specify the name of the aopfiltr.so filter. Type the absolute pathname if the filter is not in a directory named in the LIBPATH environment variable.
• Resubmit for filtering field: Do not select this field if the only filter you specify in the printer definition is aopfiltr.so. For more information about this field, see "Resubmitting documents to Print Interface for filtering (basic mode)" on page 204. Selecting this field can adversely impact system performance. This field applies only to IP PrintWay basic mode. IP PrintWay extended mode ignores it.

Tip: When you use the Infoprint Server ISPF panels to create an IP PrintWay printer definition, filter aopfiltr.so is automatically displayed in the Filter field on the Processing panel of an IP PrintWay printer definition when you select the LPR, direct sockets, IPP, or email protocol.

Example
This ISPF panel shows how to specify the aopfiltr.so filter that Infoprint Server provides in the Processing section of an IP PrintWay printer definition. Only a portion of the ISPF panel is shown.
Using the LPD compatibility filter

For each type of data format that Print Interface supports, you can specify the name of an associated filter. A filter is a program that can modify data before Print Interface writes the data to an output data set on the JES spool. When you specify the name of a filter for a supported data format in a printer definition, Print Interface automatically calls that filter before writing data to the JES spool.

Infoprint Server provides the LPD compatibility filter, `lpd_compat.so`, which formats text data and line data in a similar way to the z/OS TCP/IP LPD and creates line data. This filter is suitable for use with the line data and text data formats for printers that accept line data.

The LPD compatibility filter, `lpd_compat.so`, provides support for some LPD command codes and parameters that the Print Interface LPD does not otherwise support. (LPD command codes and parameters are specified in the LPD control file sent by the LPR with each document to be printed.) This filter also lets you specify the `-f`, `-l`, and `-w` filter options, which correspond to the FILTER, LINECOUNT, and WIDTH parameters of the TCP/IP LPR command.

Table 17 summarizes the LPD command codes supported by the Print Interface LPD, with and without the LPD compatibility filter. For a full description of the LPD command codes, see RFC 1179.

<table>
<thead>
<tr>
<th>Command code</th>
<th>Description</th>
<th>Supported by Print Interface LPD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Without compatibility filter</td>
</tr>
<tr>
<td>C</td>
<td>Class</td>
<td>No</td>
</tr>
<tr>
<td>H</td>
<td>Host name</td>
<td>No</td>
</tr>
<tr>
<td>I</td>
<td>Indent printing</td>
<td>No</td>
</tr>
</tbody>
</table>
Table 17. LPD command codes supported by Print Interface LPD (continued)

<table>
<thead>
<tr>
<th>Command code</th>
<th>Description</th>
<th>Supported by Print Interface LPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>Job name. This value becomes the title in the Infoprint Server title-text job attribute if the T command code does not exist.¹</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td></td>
<td>Job name parameters ¹</td>
<td>No/No</td>
</tr>
<tr>
<td>L</td>
<td>Print banner page</td>
<td>No/No</td>
</tr>
<tr>
<td>M</td>
<td>Mail when printed. This value activates notification.</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>N</td>
<td>Name of source file. This value becomes the filename displayed by the \texttt{lpq} or \texttt{lpstat} command. The compatibility filter also uses this name as the title if the T command code does not exist and the p command code is specified.</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>P</td>
<td>Owner. Print Interface allocates data sets on the JES spool with this value in the job name field. ²</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>T</td>
<td>Title. This value becomes the title in the Infoprint Server title-text attribute.</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>W</td>
<td>Width of output</td>
<td>No/Yes</td>
</tr>
<tr>
<td>X</td>
<td>Infoprint Server job attributes. If attributes are prefixed with AOP, the LPD validates that the job attributes are supported by the printer.</td>
<td>Yes/No</td>
</tr>
<tr>
<td>1, 2, 3, 4</td>
<td>File names for troff fonts.</td>
<td>No/No</td>
</tr>
<tr>
<td>c</td>
<td>Plot CIF file</td>
<td>Yes³/Yes³</td>
</tr>
<tr>
<td>d</td>
<td>Print DVI file</td>
<td>Yes³/Yes³</td>
</tr>
<tr>
<td>f</td>
<td>Print formatted file</td>
<td>Yes³⁴/Yes³⁴</td>
</tr>
<tr>
<td>g</td>
<td>Plot file</td>
<td>Yes³/Yes³</td>
</tr>
<tr>
<td>l</td>
<td>Print file leaving control characters</td>
<td>Yes⁴/Yes³</td>
</tr>
<tr>
<td>n</td>
<td>Print ditroff output file</td>
<td>Yes³/Yes³</td>
</tr>
<tr>
<td>o</td>
<td>Print PostScript output file</td>
<td>Yes³/Yes³</td>
</tr>
<tr>
<td>p</td>
<td>Print a header and page numbers on each page</td>
<td>No/Yes</td>
</tr>
<tr>
<td>r</td>
<td>Print with FORTRAN (ANSI) carriage controls</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>t</td>
<td>Print troff output file</td>
<td>Yes³/Yes³</td>
</tr>
<tr>
<td>v</td>
<td>Print raster file</td>
<td>Yes³/Yes³</td>
</tr>
</tbody>
</table>
Table 17. LPD command codes supported by Print Interface LPD (continued)

<table>
<thead>
<tr>
<th>Command code</th>
<th>Description</th>
<th>Supported by Print Interface LPD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Without compatibility filter</td>
</tr>
</tbody>
</table>

1. The z/OS TCP/IP LPR command lets you specify these parameters as part of the job name: DEST, FOR, FORM, IDENTIFIER, LINECOUNT, OTHER, PASS, and PRIORITY. Print Interface does not support these parameters.

2. JES does not permit the Print Interface LPD to allocate data sets on the JES spool with the owner's name. Therefore, to make the owner name visible on the JES spool, the Print Interface LPD makes the owner name the job name except when IP PrintWay submits the data set to the Print Interface LPD. In this case, the Print Interface LPD keeps the original job name so that the operator can use the original job name to find the data set on the spool.

3. Print Interface automatically detects the data format of the input data stream and ignores the format specification in the command code. For example, Print Interface detects a PostScript data stream even if the o command code is not specified.

4. Without the compatibility filter, command codes f and l are equivalent. Print Interface leaves all ASCII control characters in the output data stream.

5. If an unsupported command code is specified in the LPD control file, the command code is ignored and no error is reported.

6. The Print Interface LPD, with or without the compatibility filter, does not support these functions that you can specify with the z/OS TCP/IP LPR command:
   - Carriage control specification
   - Top margin

7. The Print Interface LPD, with or without the compatibility filter, can print multiple copies of the same file when the LPD control file contains multiple lowercase command codes followed by the name of the same print file. (The Print Interface LPD always prints at least one copy of a file, even if no lowercase command code is specified in the LPD control file.)

Guidelines:
- If you want the functions that filter lpd_compat.so provides, specify it for the Text and Line data data formats in PSF printer definitions, General printer definitions, and in IP PrintWay printer definitions when you select the VTAM protocol.
- Do not specify filter lpd_compat.so in IP PrintWay printer definitions except when you select the VTAM protocol.

Filter options
As an option, when you specify the lpd_compat.so filter, you can also specify a filter code, a maximum line count, and a maximum line width in the printer definition. You specify these values in filter options. Job submitters can specify the same filter options in the Infoprint Server filter-options job attribute.

The lpd_compat.so filter accepts these options:

%filter-options
Causes options specified in the filter-options job attribute (specified, for example, on the lp command) to be passed to the transform.
You can type the `%filter-options` option in any position relative to the other filter options. If you specify filter options to the right of `%filter-options`, those options override the same options specified in the `filter-options` job attribute.

- `f filter`
  Specifies the type of filter processing. This option is used only if the `f`, `l`, `p`, and `r` command codes are not specified in the LPD control file. The default value is `f`. Valid values are:

<table>
<thead>
<tr>
<th>Filter</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>f</code></td>
<td>Paginate the data, but do not add a heading. Truncate lines that exceed the maximum width. Discard any ASCII control characters except CR, FF, LF, BS, NL, VT, and HT.</td>
</tr>
<tr>
<td><code>l</code></td>
<td>Do not paginate the data or add a heading. Pass through all control characters.</td>
</tr>
<tr>
<td><code>p</code></td>
<td>Paginate the data, adding a heading to each page. The heading includes the date and time that Infoprint Server received the data, the title, and the page number. The title is the name of file as specified by the N (name) command code in the LPD control file, unless the T (title) command code is specified. After a page of text, a new page is started with a new page number. Truncate lines that exceed the maximum width.</td>
</tr>
<tr>
<td><code>r</code></td>
<td>Interpret the first column of each input line as a FORTRAN (ANSI) carriage control. Blank, &quot;1&quot;, &quot;0&quot;, &quot;+&quot;, and &quot;.&quot; carriage controls are supported. Truncate lines that exceed the maximum width.</td>
</tr>
</tbody>
</table>

The filter values correspond to the values allowed on the FILTER parameter of the z/OS TCP/IP LPR command.

- `-l length`
  Specifies the maximum number of lines to include on a page. This value applies only to filters `f` and `p`. The default value is 60 lines. To prevent Print Interface from inserting page breaks, specify 0.

  This option corresponds to the LINECOUNT subparameter of the z/OS TCP/IP LPR command and also to the PAGESIZE parameter of the z/OS TCP/IP SERVICE statement.

- `-w width`
  Specifies the maximum number of columns to allow on a line. Lines longer than the number specified (except for the title line) are truncated. The number specified does not include the carriage control character at the beginning of each line. This value applies only to filters `f`, `p`, and `r`. It is used only if the W (width) command code is not specified in the LPD control file. The default action is that lines are not truncated.

  This option corresponds to the WIDTH parameter of the TCP/IP LPR command and to the LINESIZE parameter of the TCP/IP SERVICE statement.

**Procedure for specifying attributes**

On the Processing panel of a printer definition, specify:
• **Data format** field: Select the data format to which the filter applies. For filter `lpd_compat.so`, select **Line data** and **Text**.

• **Filter** field: Specify `lpd_compat.so`. Type the absolute pathname if the filter is not in a directory named in the LIBPATH environment variable.

• **Resubmit for filtering** field: Do not select this field if the only filter you specify in the printer definition is `lpd_compat.so`. For more information about this field, see “Resubmitting documents to Print Interface for filtering (basic mode)” on page 204. Selecting this field can adversely impact system performance. This field applies only to IP PrintWay basic mode. IP PrintWay extended mode ignores it.

**Example**

This ISPF panel shows how to specify the `lpd_compat.so` filter that Infoprint Server provides in the Processing section of a PSF printer definition. Only a portion of the ISPF panel is shown.

```
Processing

Printer definition name . myprinter

Supported Data Formats and Associated Filters:
Data format: Filter:
/ Line data lpd_compat.so -w 72 %filter-options (extend)
  _ MO:DCA-P __________________________________________________ (extend)
  _ PostScript __________________________________________________ (extend)
/ Text lpd_compat.so -w 72 %filter-options (extend)
  _ PCL __________________________________________________ (extend)
  _ PDF __________________________________________________ (extend)
  _ SAP __________________________________________________ (extend)
  _ XML __________________________________________________ (extend)
  _ TIFF __________________________________________________ (extend)
  _ JPEG __________________________________________________ (extend)
  _ Other __________________________________________________ (extend)
  _ Resubmit for filtering

...
```

The filter options mean:

• The `%filter-options` option causes the filter to use any filter options that a job submittter specifies in the `filter-options` job attribute. For example, on an `lp` command.

• The `-w` option causes the filter to truncate lines that exceed 72 printable characters.

Because the `-w` option is specified to the left of `%filter-options`, a `-w` option specified in the `filter-options` job attribute overrides this value.

To print an MVS data set with a header on each page and a maximum width of 80 characters, a user could specify the `filter-options` job attribute on this `lp` command:

```
lp -d myprinter -o "filter-options='\"f p -w 80\"' \"MYDATA\"
```
Using an installation-provided filter

For each type of data format (line-data, MO:DCA-P, PostScript, text, PCL, PDF, SAP, XML, and other), you can specify the name of an associated filter. A filter is a program that can inspect and modify data. When you specify the name of a filter for a supported data format in a printer definition, the filter is called when the data format is detected. Print Interface can call the associated filter (a filter is called only once for each data set) before it writes the data to an output data set on the JES spool.

Your installation can write its own filter program, either a DLL filter or a UNIX filter. For information about how to write a filter, see z/OS Infoprint Server Customization.

Procedure for specifying attributes

On the Processing panel, specify:

- **Data format** field: Select the data format of the input document that your filter applies to.
- **Filter** field: Specify the name of the filter followed by the options that you want to provide as command line arguments to the filter.
  - If the filter is a DLL filter, type the absolute pathname unless the filter is in a directory named in the LIBPATH environment variable.
  - If the filter is a UNIX filter, type `spawn` before the filter name. Type the absolute pathname of the filter unless the filter is in a directory named in the PATH environment variable.

Example

This ISPF panel shows how to specify a UNIX filter written by your installation for line data. Only a portion of the ISPF panel is shown.

```
Processing...
Data format: Filter:
/ line data spawn /usr/mylib/my_unix_filter -a option operand (extend)
 - MO:DCA-P (extend)
 - PostScript (extend)
 - Text (extend)
 - PCL (extend)
 - PDF (extend)
 - SAP (extend)
 - XML (extend)
 - TIFF (extend)
 - JPEG (extend)
 - Other (extend)
```

If the input data stream contains line data, Print Interface calls the `my_unix_filter` filter to transform line data. The option and operand that follow the filter name are passed to the filter.
Converting data from EBCDIC to ASCII or ASCII to EBCDIC

Print Interface can convert data from EBCDIC to ASCII or from ASCII to EBCDIC before writing text data to the JES spool. Print Interface automatically detects these types of formatted data and does not convert the data: JPEG, MO:DCA-P (also called AFP), PCL, PDF, PostScript, SAP, TIFF, and XML.

Print Interface uses the `iconv` utility provided with z/OS to convert text data between EBCDIC and ASCII code pages. You can specify the document and printer code pages that Print Interface uses as the source and target code pages. For more information about the `iconv` utility, see [z/OS XL C/C++ Programming Guide](#).

If a filter is specified in the printer definition, Print Interface converts data from one code page to another before calling the filter.

**Procedure for specifying attributes**

On the Processing panel, specify:

- **Document code page** field: Leave this field blank, or specify the code page used to create documents submitted to this printer definition. In most cases, you should leave this field blank. If the field is blank, Print Interface determines the appropriate code page:
  - If the print request was submitted from the local z/OS system (with, for example, the `lp` command or the AOPPRINT procedure), Print Interface uses the document code page for the z/OS locale. This is usually an EBCDIC code page.
  - If the print request was submitted from a remote system, Print Interface uses the ASCII code page defined in the `ascii-codepage` attribute in the Infoprint Server configuration file (`aopd.conf`) or system configuration definition. If the attribute is not specified, it uses the default ASCII code page, ISO8859-1. For information about the `ascii-codepage` attribute, see [z/OS Infoprint Server Customization](#).

  **Tip:** To print ASCII documents from the local z/OS system, specify an ASCII code page (for example, IBM-850) in this field or ask the job submitter to specify the ASCII code page in the `document-codepage` job attribute.

- **Printer code page** field: Specify the code page the printer uses to print the job. In an IP PrintWay printer definition, specify the name of an ASCII code page (such as IBM-850). In a PSF printer definition, specify the name of an EBCDIC code page (such as IBM-037). If you use ISPF panels to create printer definition, the ASCII or EBCDIC code page specified in the Infoprint Server configuration file (`aopd.conf`) or system configuration definition is displayed in this field.

  **Tip:** If this field is blank, Print Interface does not convert data from one code page to another.

**Tips:**

1. You can specify any code pages supported by z/OS. For code page names, see [z/OS XL C/C++ Programming Guide](#).
2. If you specify a custom code page, make sure that conversion tables exist to convert between these code page:
   - The code pages in the **Document code page** and **Printer code page** fields.
   - The code page for the z/OS locale and the custom code page. The locale is set in the LC_CTYPE environment variable and in the **Language** field of the Infoprint Server ISPF Configuration panel.
For information about how to create conversion tables, see information about code set conversion utilities in z/OS XL C/C++ Programming Guide.

3. You do not need to specify code page attributes in the printer definition unless you need to change either the document or printer code page. If you use the Infoprint Server ISPF panels to create printer definitions, by default, the printer code page field already contains the name of either an EBCDIC or ASCII code page, depending on the printer. In an IP PrintWay printer definition, the default code page is the ASCII code page specified in the ascii-codepage attribute in the Infoprint Server configuration file (aopd.conf) or in the system configuration definition. In a PSF or General printer definition, the default code page is the EBCDIC code page specified in the ebcdic-codepage attribute in the Infoprint Server configuration file (aopd.conf) or in the system configuration definition.

Mapping output bin and input tray names to numbers for an AFP printer

The input tray is the tray on the printer that serves as the paper source. The output bin is a bin on the printer where printed jobs are delivered. The input-tray and output-bin job attributes let users specify a tray name, such as 3-hole and a bin name, such as staple.

If you define input tray or output bin names in a printer definition, a job submitter or VTAM application can use those names in the input-tray or output-bin job attribute. If you do not define any tray or bin names, Print Interface and NetSpool ignore the input-tray or output-bin job attribute. If, however, you define some tray or bin names, Print Interface and NetSpool reject a print request that specifies an undefined tray or bin name in the job attribute.

When you define input tray names, you must map the names to the numbers that an AFP printer uses for paper-source identification. When you define output bin names, you must map the names to the bin numbers that an AFP printer uses for output-bin identification. For tray and bin numbers that the printer uses, see your printer documentation.

Tip: Whether or not you define input tray or output bin names in a printer definition, a job submitter can specify the tray and bin number directly using the input-tray-number and output-bin-number job attributes or the INTRAY and OUTBIN JCL parameters. The job submitter can specify any tray and bin numbers. You do not need to specify the numbers in the printer definition.

Procedure for specifying attributes

On the Processing panel, specify:

• **Input tray name** and **Number** fields: Specify a name and the tray number used by the AFP printer.

• **Output bin name** and **Number** fields: Specify a name and the bin number used by the printer.

Example

This ISPF panel shows how to map input tray names and output bin names to numbers in the Processing section of a PSF printer definition. Only a portion of the ISPF panel is shown.
If a user specifies the `input-tray=envelope` job attribute, Print Interface and NetSpool allocate the output data set on the JES spool with tray number 65. If the printer is an AFP printer, PSF uses tray number 65 when communicating with the printer.

If a user specifies the `output-bin=staple` attribute on the `lp` command, Print Interface and NetSpool allocate the output data set with bin number 4. If the printer is an AFP printer, PSF uses bin number 4 when communicating with the printer.

### Using the Print Interface subsystem

A z/OS job submitter can specify the `SUBSYS` parameter on the DD JCL statement to request that the Print Interface subsystem process output data created by the batch application. `SUBSYS` subparameters are:

- Name of the Print Interface subsystem
- Name of the printer definition to use
- Infoprint Server job attributes

The job submitter can also specify other parameters on the DD and OUTPUT JCL statements that the Print Interface subsystem supports.

The Print Interface subsystem transforms data from one format to another (if transforms are requested in the printer definition) and allocates a sysout data set on the JES spool. The Print Interface subsystem can be used to print on any type of printer.

When you create a printer definition to be used with the Print Interface subsystem, you do not need to specify any special fields. Therefore, if you have already created a printer definition, no changes are required.

Typically, you create one printer definition for each printer. However, when creating printer definitions to be used just with the Print Interface subsystem, you can simplify administration by creating only one printer definition for all printers that share the same attributes. If you create one printer definition for printing to several printers, the job submitter must specify the JCL parameters that are required to direct the output to the desired printer:

- If you create one PSF printer definition for all printers controlled by PSF, the job submitter must specify the JCL parameters that correspond to the JES work-selection criteria for that printer. For example, the output class and destination name.

**Example:** This example shows the DD and OUTPUT statements that can be used to direct output to a specific PSF printer using a printer definition named `anyafpprinter`:
• If you create one IP PrintWay printer definition for all printers that use the LPR protocol, the job submitter must specify the printer’s host name or IP address and print queue name.

**Example:** This example shows the DD and OUTPUT statements that can be used to direct output to a specific printer using a printer definition named `anypsprinter`:

```plaintext
//JOB2 JOB ...
//STEP1 EXEC PGM=USERA
//OUTDS1 OUTPUT DEST='IP:PRINTER1.XYZ.COM',PRTQUEUE='queue'
//DD1 DD SUBSYS=(AOP1,'anypsprinter'),OUTPUT=(*.OUTDS1)
```

• If you create one IP PrintWay printer definition for all printers that use the direct sockets protocol, the job submitter must specify the printer’s host name or IP address and port number on the OUTPUT JCL statement.

**Example:** This example shows the DD and OUTPUT statements that can be used to direct output to a specific printer using a printer definition named `anynetprinter`:

```plaintext
//JOB2 JOB ...
//STEP1 EXEC PGM=USERA
//OUTDS1 OUTPUT DEST='IP:PRINTER2.XYZ.COM',PORTNO='2501'
//DD1 DD SUBSYS=(AOP1,'anynetprinter'),OUTPUT=(*.OUTDS1)
```

**Guideline:** Create one printer definition for each printer so that users can use all job submission methods to print on the printer, including those job submission methods that do not permit the job submitter to specify the JES output class, destination name, or IP address. For example, the `lp` command does not let you specify the JES output class or destination name. And, when the IP PrintWay basic mode `resubmit for filtering` option is used, the printer’s host name or IP address cannot be specified on the OUTPUT JCL statement.

When the Print Interface subsystem is used, JES always assigns each data set to a separate JES output group. This is true even if the data set would otherwise be in the same JES output group as other data sets in the job step. Therefore, if the printer is controlled by IP PrintWay, these results occur:

• Data sets in the same job step might not print together or might not print in the original order.
• Data sets in the same job step are always sent in separate emails.
• If you currently add a separator page before the first data set in a JES output group, that separator page now prints before each data set.

**Related task:** Create a default Infoprint Server printer definition, as described in “Creating the Infoprint Server default printer definition” on page 96.

**Procedure for specifying attributes**

When you create a printer definition to be used with the Print Interface subsystem, the fields in these sections of the printer definition have special considerations:

• **Main section:**
  - **Printer definition name** field: To use the Print Interface subsystem, the job submitter must specify the printer definition name in either the SUBSYS or FSSDATA JCL parameter. This name is case-sensitive. Therefore, the job submitter must enter it exactly as you specify it in the printer definition.
- Use DEST, CLASS, and FORMS for IP PrintWay printer selection field: The Print Interface subsystem ignores this field. The job submitter must specify the name of the printer definition. If none is specified, the Infoprint Server default printer definition is used. For information, see "Creating the Infoprint Server default printer definition" on page 96.

- Allocation section: The job submitter can specify JCL parameters and job attributes that correspond to all of the attributes in this section of the printer definition. Therefore, these attributes are not required. The JCL parameters and job attributes specified during job submission override the attributes specified in the printer definition.

  Guideline: Even though the job submitter can specify these same attributes in JCL parameters, specify default values for required JCL parameters, for example:
  - In a PSF printer definition, if the JES output class and destination name are JES work-selection criteria for the printer, specify the CLASS and DEST fields. If you do, the job submitter can omit the CLASS and DEST parameters on the OUTPUT JCL statement.
  - In an IP PrintWay printer definition, if the JES output class is the JES work-selection criteria for IP PrintWay, specify the CLASS field. If you do, the job submitter can omit the CLASS parameter on the OUTPUT JCL statement.

- Processing section:
  - Filter field: Specify transform filters. For information, see Chapter 13, “Planning printer definitions for transforms,” on page 213.
  - Resubmit for filtering field: IP PrintWay ignores this field because the Print Interface subsystem has already transformed the data.

  Guideline: If you run IP PrintWay basic mode, select this field so that IP PrintWay can transform data sets.

  - Maximum document size field: If the transformed data written to the sysout data set exceeds the number of bytes specified in this field, the Print Interface subsystem does not allocate any data sets in the job step and returns a JCL error.

  - Maximum copies and xxxx-supported fields: The Print Interface subsystem validates that values in the corresponding JCL parameters and job attributes are supported. If not, the Print Interface subsystem does not allocate any data sets in the job step and returns a JCL error. For more information, see "Validating that documents can print as requested” on page 78.

- NetSpool Options section: NetSpool does not use the Print Interface subsystem. Therefore, the Print Interface subsystem ignores attributes specified in this section.

- NetSpool End-of-File section: NetSpool does not use the Print Interface subsystem. Therefore, the Print Interface subsystem ignores attributes specified in this section.

- IP PrintWay Options section: The Dataset grouping field does not apply because JES assigns each data set to a different JES output group.

- Protocol section: You must fill in the required fields. However, the DEST=IP:, PRTQUEUE, and PORTNO parameters on the OUTPUT JCL statement override the printer’s host name or IP address, print queue name, and port number.

Example 1. A PSF printer definition
These ISPF panels show a printer definition that can be used for printing to a PSF-controlled printer using the Print Interface subsystem. Only a portion of some ISPF panels are shown.
PSF Printer Definition

Printer definition name . myafpprinter
Description . _______________________________________________________ (extend)
Location . . Building 003 (extend)

Section Component name Custom values
Allocation => _________________ => *
Processing => _________________ => *
NetSpool options => _________________ => __
NetSpool end-of-file => _________________ => __
NetSpool LU name . ________ LU classes . _ _ _ _ _ _ _ _ _ _ _ _ (extend)

Allocation

Printer definition name . myafpprinter
Spool allocation values:
CLASS . . . F GROUPID . . ________
DEST . . . PRT003 LINECT . . ________

Processing

Printer definition name . myafpprinter
Supported data formats and associated filters:

Data format: Filter:
/ Line data __________________________________________________ (extend)
7 MO:DCA-P __________________________________________________ (extend)
7 PostScript ps2afp.dll %filter-options -r 300 (extend)
7 Text __________________________________________________ (extend)
7 PCL pcl2afp.dll -c letter_300 %filter-options (extend)
7 PDF ps2afp.dll %filter-options -r 300 (extend)
7 SAP sap2afp.dll %filter-options -r 300 (extend)
7 XML __________________________________________________ (extend)
7 TIFF __________________________________________________ (extend)
7 JPEG __________________________________________________ (extend)
7 Other __________________________________________________ (extend)

Maximum document size . __________
Maximum copies . . . ______
Forms supported . . . / Simplex / Duplex / Tumble
Duplex supported. . . / Simplex / Duplex / Tumble
Print-error reporting supported . / Character / Position

Result: A job submitter can use these JCL statements to print a PostScript document on this printer:

//JOB1 JOB ...
//STEP1 EXEC PGM=USERA
//OUTDS1 OUTPUT FORMDEF=MYFDEF,USERLIB=MYLIB
//DD1 DD SUBSYS=(AOP1,'myafpprinter', 'filter-options="-a io1"'),
// DSNAME=&MYDATA,OUTPUT=>.OUTDS1

1. The Print Interface subsystem accepts line data, AFP data, PCL data, PostScript data, PDF data, SAP data, and XML data. It calls the associated transform if a
filter is specified. It passes any transform options, such as the -a option, that were specified in the filter-options attribute in the SUBSYS JCL parameter to the transform.

2. The Print Interface subsystem allocates a sysout data set on the JES spool with output class F, destination name PRT003, and data set name MYDATA. JES defaults apply for other output parameters that are not specified in the JCL or in the Allocation section of the printer definition. For example, the JES default form name is used.

3. The Print Interface subsystem writes the transformed data to the sysout data set.

4. The PSF printer that prints data sets in class F with destination name PRT003 selects the data set from the JES spool and prints it, using form definition F1MYFDEF in library MYLIB to format the data.

Example 2. An IP PrintWay printer definition
These ISPF panels show a printer definition that can be used for printing to an IP PrintWay-controlled printer that accepts PCL data using the Print Interface subsystem. Only a portion of some ISPF panels are shown.
Result: A job submitter can use these JCL statements to print AFP data to the printer:

`//JOB1 JOB ...
//STEP1 EXEC PGM=USERA
//OUTDS1 OUTPUT FORMDEF=MYFDEF,USERLIB=MYLIB
//DD1 DD SUBSYS=(AOP1,'mypclprinter'),DSNAME=&&MYDATA,
//   OUTPUT=*.OUTDS1`

1. The Print Interface subsystem accepts text data, line data, AFP data, or PCL data and calls the associated transform. The AFP to PCL transform uses form definition F1MYFDEF in library MYLIB to format the data.

2. The subsystem allocates a sysout data set on the JES spool in JES output class P with data set name MYDATA. JES defaults are used for output parameters that are not specified in the JCL or in the Allocation section of the printer definition.

3. If IP PrintWay is customized to select data sets in output class P, IP PrintWay selects the data set from the JES spool and sends the data to the printer whose address is specified in printer definition `mypclprinter`. 
Creating the Infoprint Server default printer definition

The default Infoprint Server printer definition is used in these situations:

- **lp command**: When the job submitter does not specify a printer definition on the `lp` command and the PRINTER and LPDEST environment variables are not set
- **Print Interface subsystem**: When the printer definition is omitted in the SUBSYS parameter on the DD JCL statement and the FSSDATA parameter is not specified on the OUTPUT JCL statement

You can use any printer definition that you have already created as the default printer definition. However, you must specify the name of the default printer definition on the Infoprint Server Configuration panel. By default, the name of the default printer definition is `lp1`.

### Procedure for specifying the name of the default printer definition

To specify the name of the default printer definition:
1. On the Infoprint Server Printer Inventory Manager panel, select **7 Configure**.
2. On the Configuration panel, specify the name in the **Default printer** field.

### Example

This ISPF panel shows how to specify the name of the default printer definition.

```plaintext
Configuration

Printer Inventory:
  Configuration file . /etc/Printsrv/aopd.conf
  NLS path . . . . /usr/lpp/Printsrv/En_US/%N
  Language . . . . En_US
  Default printer. . . default-printer
```

### Results:

- The `lp` command uses the printer definition named `default-printer` if the job submitter does not specify a printer definition name and the PRINTER and LPDEST variables are not set.
- The Print Interface subsystem uses the printer definition named `default-printer` if the job submitter does not specify a printer definition name.
Chapter 11. Planning printer and printer pool definitions for NetSpool

Before you can use NetSpool to print VTAM application data, you must specify fields (attributes) that NetSpool uses in the printer definition. Table 51 on page 458 summarizes the attributes that NetSpool uses and indicates whether each attribute is required or optional. If a printer definition does not already exist for the printer or email destination, you must create one. If a printer definition already exists, edit it and specify the attributes that NetSpool uses.

You can configure printer definitions for use by NetSpool before or after starting the NetSpool program. If NetSpool is already started, NetSpool automatically starts the printer LU when you save the printer definition, provided that the printer LU is assigned to one of the LU classes that NetSpool has started. If the printer LU is not active in VTAM, NetSpool automatically starts it when the printer LU becomes active.

If you change printer attributes in an existing printer definition while a VTAM session with the printer LU is active, in most cases NetSpool uses the changed values when it allocate the next output data set on the JES spool. However, changes to the LU class and end-of-file rules are related to the VTAM session and do not take effect with the next data set. For information, see “Grouping NetSpool printer LUs into LU classes” on page 98 and “Specifying how NetSpool determines end-of-file” on page 116.

In addition to configuring the printer definition for use by NetSpool, you must also define the NetSpool printer LU name to VTAM. If NetSpool is already started, define the printer LU to VTAM before configuring the printer definition, because NetSpool attempts to start the printer LU as soon as the printer definition is saved in the Printer Inventory. For information, see Chapter 15, “Defining NetSpool printer LUs to VTAM,” on page 227.

Table 18 lists the tasks related to NetSpool and refers to the topic that describes how to do each task.

Table 18. Administrative tasks for NetSpool

<table>
<thead>
<tr>
<th>Task</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specifying the NetSpool printer LU name</td>
<td>98</td>
</tr>
<tr>
<td>Grouping NetSpool printer LUs into LU classes</td>
<td>98</td>
</tr>
<tr>
<td>Specifying JES allocation parameters</td>
<td>99</td>
</tr>
<tr>
<td>Converting SCS and 3270 data streams to line data streams</td>
<td>102</td>
</tr>
<tr>
<td>Converting SCS and 3270 data streams to PCL data streams</td>
<td>105</td>
</tr>
<tr>
<td>Selecting no data stream conversion</td>
<td>112</td>
</tr>
<tr>
<td>Specifying a default user ID and job attribute prefix</td>
<td>113</td>
</tr>
<tr>
<td>Selecting a font</td>
<td>114</td>
</tr>
<tr>
<td>Specifying how NetSpool determines end-of-file</td>
<td>116</td>
</tr>
<tr>
<td>Broadcasting data using multiple printer definitions</td>
<td>120</td>
</tr>
<tr>
<td>Validating that documents can print as requested</td>
<td>122</td>
</tr>
</tbody>
</table>
Table 18. Administrative tasks for NetSpool (continued)

<table>
<thead>
<tr>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using an installation-provided filter</td>
</tr>
<tr>
<td>Mapping output bin and input tray names to numbers for an AFP printer</td>
</tr>
</tbody>
</table>

Note: For detailed information about each attribute (including the values you can specify, restrictions, and examples), use the online help for each field on the ISPF panels.

Specifying the NetSpool printer LU name

In each printer definition, you must specify the NetSpool printer logical unit (LU) name that you want to associate with the printer. NetSpool uses this name to establish a session with VTAM applications. This name is the VTAM secondary LU (SLU) name and must match the name in the ACB parameter of the APPL statement. For information about how to select NetSpool printer LU names and how to create APPL statements, see Chapter 15, “Defining NetSpool printer LUs to VTAM,” on page 227.

Each printer LU name in the Printer Inventory must be unique. That is, you cannot specify the same LU name in more than one printer definition. If you need to associate more than one NetSpool printer LU name with the same printer, you must create additional printer definitions for that printer. These printer definitions can be identical except for the printer definition name and the NetSpool LU name.

If the printer LU name is in one of the LU classes that NetSpool has started, NetSpool automatically attempts to start a VTAM session with the printer. If the printer LU is not yet active in VTAM, NetSpool automatically starts the printer when the printer LU becomes active. If the printer LU name is not in one of the started LU classes, the operator must use the NetSpool ADD command to add it. For information, see “Starting NetSpool printer LUs” on page 16.

Guideline: Do not change the LU name in a printer definition while a VTAM session with the printer is active.

Procedure for specifying attributes

To specify the NetSpool printer LU name, specify this attribute on the first ISPF panel displayed for the printer definition:

- **LU Name** field: Specify the LU name.

“Main ISPF panel for an IP PrintWay printer definition” on page 465 shows the ISPF panel that you use to specify LU name. Use the online help for the ISPF panel and the help for each field on the panel for more information.

Grouping NetSpool printer LUs into LU classes

NetSpool lets you group NetSpool printer LUs into logical-unit classes. A class is identified by a number from 1 to 64.

You might want to group logical printers into classes for these reasons:
• To start classes of logical printers at different times. For example, you might want to process requests for one class of printers during the day and process requests for another class of printers during the night.
• To spread processing of different classes of logical printers over different address spaces. You might want to do this if you have a large number of logical printers.

The NetSpool startup procedure identifies which LU classes NetSpool is to start. After NetSpool is started, the operator can dynamically start and stop individual logical printers that are in different classes from those specified when NetSpool was started. For information about the NetSpool startup procedure, see z/OS Infoprint Server Customization. For information about how to start printers in other classes, see Chapter 2, “Starting and stopping the NetSpool task and NetSpool LUs,” on page 13.

Each NetSpool printer LU can belong to one or more LU classes. If you assign a printer LU to more than one class, NetSpool starts that printer LU when you start any one of the classes. For example, if you assign a printer LU to classes 1 and 2, NetSpool starts the printer LU if either class 1 or class 2 is specified in the NetSpool startup procedure.

Grouping NetSpool LUs into classes is optional. If you do not specify an LU class, NetSpool assigns the printer LU to class 1. When you start NetSpool, start class 1 and NetSpool starts all printer LUs defined in the Printer Inventory.

You can change the LU class for a printer definition. If you change the LU class after NetSpool has started the printer LU, NetSpool takes these actions:
• If the new LU class is one of the classes that NetSpool has started, NetSpool automatically attempts to start the printer LU.
• If the new LU class is not in one of the started LU classes, NetSpool stops the printer LU after the VTAM application ends the session.

**Procedure for specifying attributes**

On the first ISPF panel for the printer definition, specify:
• **LU Classes** field: Specify one or more LU classes, each class represented by a number (1 – 64).

“Main ISPF panel for an IP PrintWay printer definition” on page 465 shows the ISPF panel that you use to specify LU classes.

**Specifying JES allocation parameters**

You must specify attributes in the Allocation section of a printer definition to tell NetSpool how to allocate output data sets on the JES spool. For example, you can specify the JES output class or destination name.

Each attribute in the Allocation section of a printer definition corresponds to a parameter that you can specify on an OUTPUT JCL statement. “Allocation attributes and corresponding OUTPUT or DD statement parameters” on page 453 lists fields in the Allocation section and the corresponding OUTPUT JCL parameters. For a full explanation of each JCL parameter, see z/OS MVS JCL Reference. The ISPF online help for each field summarizes the meaning of each field.
Some of the attributes apply only if the printer is a PSF printer or the printer definition specifies a transform. For information about the fields that apply when you use a transform, see the documentation for the transform.

Print Interface also uses the attributes in the Allocation section to allocate data sets on the JES spool. In most cases, the same attributes are suitable for both NetSpool and Print Interface. If you need to specify unique attributes for NetSpool, you must create two separate printer definitions for the same printer.

Procedure for specifying attributes
On the Allocation panel, specify:

- **Spool allocation values** heading: The fields under this heading correspond to the OUTPUT JCL parameters that JES can use to direct output data sets from the JES spool to IP PrintWay, a PSF printer, or another JES functional subsystem application (FSA):
  - In a PSF printer definition, specify the JES work-selection criteria defined for the PSF printer FSA. For example, if the JES work-selection criteria are class E and destination BLDG5, specify E in the **CLASS** field and BLDG5 in the **DEST** field.
  - In an IP PrintWay basic mode printer definition, specify the JES work-selection criteria defined for the IP PrintWay basic mode FSA. For example, if the work-selection criterion is class P, specify P in the **CLASS** field.
  - In an IP PrintWay extended mode printer definition, specify the job-selection criteria defined in the IP PrintWay extended mode job selection rule. For example, if the job-selection criterion is class P, specify P in the **CLASS** field.

  **Tip:** JES work-selection criteria are defined in the JES3 DEVICE statement and the JES2 **PRInnnn** statement.

- Specify other fields that transforms, PSF, or IP PrintWay use:
  - If your installation uses the transforms, specify fields that the transforms use. For information about these fields, see the documentation for the transform.
  - In an IP PrintWay printer definition, specify fields that IP PrintWay uses. For information about these fields, see “Specifying allocation parameters for IP PrintWay” on page 166.
  - In a PSF printer definition, specify fields that correspond to the JCL parameters that PSF uses. For information about these JCL parameters, see [PSF for z/OS: User's Guide](#).

  **Tip:** If you need to specify the same allocation attributes in more than one printer definition, specify the attributes in an Allocation component. Then, include that component in each printer definition to which the component applies.

Example
This ISPF panel shows how to specify an output class and destination in the Allocation section of a printer definition.
NetSpool allocates output data sets in JES output class E and with destination name BLDG5. The FSA defined to JES with work-selection criteria of class E and destination BLDG5 selects the output data set for printing.
Converting SCS and 3270 data streams to line data streams

In each printer definition, you can select a NetSpool formatting option. The formatting option controls how NetSpool formats the data streams created by your VTAM applications. You can select one of these formatting options:

- Convert to line (default)
- Convert to PCL
- None

To convert data streams to line data or to PCL format, a separate transform product is not required.

This section describes the **Convert to line** formatting option. When you select the **Convert to line** option, NetSpool converts SCS data streams (on VTAM LU type 1 sessions) and 3270 data streams (on VTAM LU type 0 and type 3 sessions) to line data streams.

You can select the **Convert to line** option for a wide range of printers, including:

- Line printers controlled by JES
  - Line printers that natively accept line data streams.
- AFP printers controlled by PSF
  - AFP printers do not natively accept line data streams. However, PSF can convert line data streams to Intelligent Printer Data Streams (IPDS), which AFP printers accept.
- Network printers controlled by IP PrintWay
  - Network printers do not natively accept line data streams. However, IP PrintWay can convert line data streams to ASCII text data streams, which most network printers accept. If you install the separately priced AFP to PCL, AFP to PDF, or AFP to PostScript transform, NetSpool can convert line data streams to PCL, PDF, or PostScript data streams.

**Tip:** The NetSpool **Convert to PCL** formatting option is also suitable for most network printers. When NetSpool converts input data streams to PCL data streams, it can support more of the formatting options in the original data streams, such as print density and line density, than when it converts to line data streams.

When you select the **Convert to line** option, NetSpool converts the printable data, SCS controls, and 3270 controls in the input data stream to line data with ANSI carriage-control characters. Carriage-control characters control line spacing and skipping operations. NetSpool supports most of the SCS and 3270 controls in the input data stream that are associated with printing. However, NetSpool ignores those SCS and 3270 controls for which no equivalent support exists in line data. NetSpool writes the line data to the JES spool in variable-length, blocked records, with a maximum record size of 4092 bytes.

To fill in the fields in the printer definition that are related to NetSpool formatting, you should understand these functions that NetSpool provides when you select the **Convert to line** option:

- **Page formatting**: NetSpool formats data into lines and pages before writing it to the JES spool. The page formatting is different for SCS and 3270 input data streams.
- **SCS data streams**: NetSpool uses the SCS Set Horizontal Format (SHF) and SCS Set Vertical Format (SVF) controls in the input data stream to format data into
lines and pages. The SHF and SVF controls specify page-formatting values such as line length, page length, margins, and tabs. The SHF and SVF controls take effect immediately and remain in effect until either the next SHF or SVF control or until NetSpool establishes another VTAM session with the printer.

If the SCS data stream does not contain SHF and SVF controls, NetSpool uses default values. In each printer definition, you can specify the default values that NetSpool is to use for the line length, page length, margins, and tabs.

**3270 data streams**: NetSpool uses the 3270 Write Control Characters (WCCs) in the input data stream to format data into lines and pages. To change page-formatting values for 3270 data, the application programmer must change the WCCs generated by the VTAM application that creates the 3270 data. NetSpool does not use the SCS default page-formatting values specified in the printer definition when it formats 3270 data.

**DBCS support**: NetSpool supports these SCS and 3270 controls and orders, which identify double-byte character set (DBCS) strings:
- Shift Out and Shift In
- Set Attribute, with the Character Set attribute

In addition, NetSpool supports these 3270 orders, which identify DBCS strings:
- Start Field Extended with the Character Set attribute
- Modify Field with the Character Set attribute

In place of these controls and orders, NetSpool inserts Shift Out and Shift In line-data controls where necessary in the line-data output. When you print DBCS data on printers controlled by PSF, you must select the PSF S0SI2 option to prevent printing unwanted blanks.

For tables that describe how NetSpool converts SCS and 3270 data streams to line data streams, see [z/OS InfoPrint Server Customization](#).

### Procedure for specifying attributes

To convert SCS and 3270 data streams to line data streams:

1. On the NetSpool Options panel, select the Convert to line formatting option.

2. (Optional) On the Processing panel, specify these default page-formatting values, which NetSpool uses for input SCS data streams only:
   - **Line length** field: Specify the maximum number of columns on each line. This is the default value for the SCS maximum presentation position (MPP) value. Allowed values are 1-255. The default value is 80.
   - **Page length** field: Specify the maximum number of lines per page. This is the default value for the SCS maximum presentation line (MPL) value. Allowed values are 1-255. The default value is 1, which means that NetSpool does not control the number of lines that are placed on a page. The VTAM application controls the number of lines per page.
   - **Margins: Left** field: Specify the column number at which you want data to start on each line. This is the default value for the SCS left margin (LM) value. Allowed values are 1-255. The default value is 1.
   - **Margins: Right** field: Specify the column number at which you want data to end on each line. This is the default value for the SCS right margin (RM) value. Allowed values are 1-255. The default value is 80.
   - **Margins: Top** field: Specify the line number of the first line on each page. This is the default value for the SCS top margin (TM) value. Allowed values are 1-255. The default value is 1.
- **Margins: Bottom** field: Specify the line number of the last line of data on each page. This is the default value for the SCS bottom margin (BM) value. Allowed values are 1-255. The default value is 1 (no bottom margin).

  If you specify a value of 1, NetSpool does not insert form feeds when the input data stream spaces past the bottom margin. However, NetSpool does insert form feeds when an explicit form feed or a Select Vertical Channel command occurs in the input data.

- **Tabs: Horizontal** field: Specify horizontal tabs. This is the default value for the SCS horizontal tab (HT) value. Allowed values are 0-255. The default is no horizontal tabs. The input data stream can add additional tab positions but cannot remove default tabs set in this field.

  NetSpool always sets the first tab to the left margin value. Therefore, do not specify it. NetSpool ignores a value of 0. In this example, NetSpool sets horizontal tabs at columns 6, 15, 50, 75, and 100.

  SCS Conversion:
  
<table>
<thead>
<tr>
<th>Margins: Top</th>
<th>Bottom</th>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horizontal</td>
<td>15</td>
<td>50</td>
<td>75</td>
</tr>
</tbody>
</table>

- **Tabs: Vertical** field: Specify vertical tabs. This is the default value for the SCS vertical tab (VT) value. Allowed values are 0-255. The default is no vertical tabs.

  NetSpool always sets the first tab to the top margin value. Therefore, do not specify it. NetSpool ignores a tab value of 0. NetSpool uses the first eleven tabs as line numbers for Select Vertical Channel 2 through 12. In this example, NetSpool sets:
  - Vertical tabs at lines 6, 20, 40, and 50
  - Vertical channels are set: CH01=6, CH02=20, CH04=40, CH05=50

  These vertical channels are not set: CH03, CH06 through CH12.

  SCS Conversion:
  
<table>
<thead>
<tr>
<th>Margins: Top</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical</td>
<td>20</td>
</tr>
</tbody>
</table>

3. (Optional) If you want to send the data in PDF format in an email, specify the AFP to PDF transform in the **Filter** field.

4. If the printer is controlled by PSF and you print DBCS output, on the Allocation panel, specify:

   - **PRMODE** field: Specify **SOSI2**.
   - **Character sets** field: Specify a single-byte font and a double-byte font.

**Tip:** If you need to specify the same fields in more than one printer definition, specify the fields in components. Then, include those components in each printer definition to which the components apply.

**Examples**

These examples show how to fill in the ISPF panels to convert SCS and 3270 input data streams to line data streams.
Example 1. Converting SCS data streams to line data streams: This ISPF panel shows how to request that NetSpool convert input data streams from VTAM applications to line data streams.

```
NetSpool Options

Printer definition name . myprinter  
Formatting . . . 2  1. None  2. Convert to line  3. Convert to PCL  
Record size . .  
RECFM . . . . 1. VB  2. VBA  3. VBM  
```

This ISPF panel shows how to specify default page-formatting values for SCS data streams.

```
Processing  

SCS Conversion:  
Margins: Top . . 6  Bottom . . 61  Left . . 3  Right . . 75  
Line length . . . 80  Page length . . . 80  
Tabs: Vertical . . . (extend)  
Homeional . . . (extend)  
```

Example 2. Converting 3270 data streams to line data streams: This ISPF panel shows how to request that NetSpool convert input data streams from your VTAM applications to line data streams.

```
NetSpool Options

Printer definition name . myprinter  
Formatting . . . 2  1. None  2. Convert to line  3. Convert to PCL  
Record size . .  
RECFM . . . . 1. VB  2. VBA  3. VBM  
```

Converting SCS and 3270 data streams to PCL data streams

In each printer definition, you can select a NetSpool formatting option. The formatting option controls how NetSpool formats the data streams created by your VTAM applications. You can select one of these formatting options:

- Convert to line (default)
- Convert to PCL
- None

To convert data streams to line data or to PCL format, a separate transform product is not required.

This section describes the Convert to PCL formatting option. When you select the Convert to PCL option, NetSpool converts SCS data streams (on VTAM LU type 1 sessions) and 3270 data streams (on VTAM LU type 0 or type 3 sessions) to Printer Control Language (PCL) 5 data streams.
You can select **Convert to PCL** for printers controlled by IP PrintWay that accept PCL data streams. When you select this option, IP PrintWay automatically transmits PCL data streams created by NetSpool to the printer without additional page formatting.

Most printers that accept PCL data streams can also accept text data streams. Therefore, for these printers you can select either the NetSpool **Convert to PCL** or the **Convert to line** formatting option. The **Convert to PCL** option provides these additional functions:

- For SCS data streams, NetSpool can support this additional print control functions in the input data stream, thereby providing better print fidelity:
  - Line-density and print-density
  - Page orientation
  - Paper-source and output-bin
  - Job-separation
  - Duplex

When you select the **Convert to line** option, NetSpool cannot fulfill these requests in the input data stream due to limitations in line data.

- For SCS data streams, NetSpool can automatically change the orientation of the page between portrait and landscape on a page by page basis. NetSpool can also reduce print output, if necessary, to make the data fit on the line or page.

- For both SCS and 3270 data streams, NetSpool lets you specify the line density, print density, and page orientation for each printer in the printer definition. This means that you do not need to set these values at the printer's control panel or specify the PCL commands in the IP PrintWay **Document header** field.

The **Convert to PCL** option is not suitable, however, in these printing situations. Therefore, in these situations, instead select the **Convert to line** option:

- The printer is controlled by JES or PSF. JES and PSF do not accept PCL data.
- Your VTAM applications generate DBCS data. NetSpool cannot support DBCS data when you select the **Convert to PCL** option.
- You want to use a form definition and page definition to format your data and print it on a PCL printer. In this case, select the NetSpool **Convert to line** option and also use the AFP to PCL transform to convert line data streams created by NetSpool to PCL data streams.

When you select the **Convert to PCL** option, NetSpool converts EBCDIC data, SCS controls, and 3270 controls in the input data stream to ASCII data and PCL commands. NetSpool supports most of the SCS and 3270 controls in the input data stream that are associated with printing. NetSpool ignores those SCS and 3270 controls for which no equivalent PCL commands exist. NetSpool writes PCL data streams to the JES spool in variable-length, blocked format, with a maximum record size of 32752 bytes.

To fill in the fields in the printer definition that are related to NetSpool formatting, you should understand these functions that NetSpool provides when you select the **Convert to PCL** option:

- **EBCDIC to ASCII conversion**: NetSpool converts data from EBCDIC to ASCII before writing it to the JES spool. To convert data to ASCII, NetSpool converts data from an EBCDIC code page (also called the **document code page**) to an ASCII code page (also called the **printer code page**) using the IBM **iconv** utility. For most printing situations, the default document and printer code pages that NetSpool uses are suitable. However, in each printer definition, you can specify different document and printer code pages.
• **Page formatting**: NetSpool formats data into lines and pages before writing it to the JES spool. The page formatting is different for SCS and 3270 input data streams.

**SCS data streams**: NetSpool uses SCS Set Horizontal Format (SHF) and SCS Set Vertical Format (SVF) controls to format data into lines and pages. The SHF and SVF controls specify page-formatting values such as line length, page length, margins, and tabs. The SHF and SVF controls take effect immediately and remain in effect until either the next SHF or SVF control or until NetSpool starts writing a new output data set to the JES spool.

If the SCS data stream does not contain SHF and SVF controls, NetSpool uses default values. In each printer definition, you can specify the default values that NetSpool is to use for the line length, page length, margins, and tabs.

**3270 data streams**: NetSpool uses page-formatting values in the 3270 Write Control Characters (WCCs) in the 3270 data stream to format data into lines and pages. To change page-formatting values for 3270 data, the application programmer must change the WCCs generated by the VTAM application that creates the 3270 data. For 3270 data streams, NetSpool does not use any of the default page-formatting values for line length, page length, margins, and tabs that you specify in the printer definition.

• **Print density, line density, and page orientation**: NetSpool can generate PCL commands to set the print density (characters per inch), line density (lines per inch), and page orientation (portrait or landscape). NetSpool processing differs for SCS and 3270 data streams.

  - **SCS data streams**: NetSpool converts the SCS Set Print Density (SPD) and SCS Set Line Density (SLD) controls in the input data stream to corresponding PCL commands. In each printer definition, you can specify the default print density and line density that NetSpool is to use when the SCS data stream does not contain SPD and SLD controls. The SCS data stream does not contain orientation controls. However, in each printer definition, you can specify the page orientation that NetSpool is to use. Also, you can request that NetSpool automatically determine the appropriate orientation of each page, as described below.

  - **3270 data streams**: 3270 data streams do not contain print density, line density, and page orientation information. In each printer definition, you can specify the print density, line density, and page orientation that NetSpool is to use.

For both SCS and 3270 data streams, if you do not specify density or orientation values in the printer definition, the values set at the printer's control panel are used unless the density and orientation are specified in another location. Density and orientation can be specified in several places. If they are specified in more than one place, the first value in this list is used. For example, a value specified in the SCS data stream overrides all other values.

1. SCS controls that occur in the input SCS data stream, including any PCL commands and SCS controls added by the NetSpool Transparent Data exit
2. PCL commands or SCS controls added by the NetSpool Beginning of File exit
3. Density and orientation values you specify in the printer definition under the **NetSpool PCL Conversion** heading
4. PCL commands you specify in the IP PrintWay **Document header** field in the printer definition
5. PCL commands added by the IP PrintWay Begin Data Set exit
6. The default value set at the printer's control panel

• **Automatic page orientation (SCS data streams only):**
When you select the automatic page orientation option in the printer definition, NetSpool automatically determines the appropriate orientation (portrait or landscape) of each page based on the line length and page length of that page. If necessary, NetSpool reduces the size of the print (the font size) and increases the line density so that data fit on a line.

NetSpool uses the line and page lengths specified in SCS controls and in the Print density, Line density, Line length, and Page length fields to determine the appropriate page orientation for each page. If the line length is greater than the page length, NetSpool sets the orientation to landscape. Otherwise, it sets the orientation to portrait. When NetSpool sets the orientation to landscape, if the Line length field (or the MPP in the SCS SHF control) is greater than 106, NetSpool sets the print density to 15 characters per inch and the line density to 8 lines per inch.

For more information, see:
- z/OS Infoprint Server User’s Guide for tables that describe how NetSpool converts SCS and 3270 data streams to PCL data streams
- z/OS Infoprint Server Customization for information about NetSpool exits

**Procedure for specifying attributes**

To request that NetSpool convert SCS and 3270 data streams to PCL data streams:

1. On the NetSpool Options panel, select the Convert to PCL formatting option.

2. (Optional) On the Processing panel, specify code pages for EBCDIC to ASCII conversion:
   - **Document code page** field: Leave this field blank or specify the name of an EBCDIC code page supported by IBM. If you leave this field blank, the default code page is the EBCDIC code page specified in the `ebcdic-codepage` attribute in the Infoprint Server configuration file (`aopd.conf`) or in the system configuration definition. If the attribute is not specified, NetSpool uses code page IBM-1047.
   - **Printer code page** field: Specify the name of an ASCII code page that is supported by IBM. The ISPF panels automatically display the ASCII code page that is specified in the `ascii-codepage` attribute in the Infoprint Server configuration file (`aopd.conf`) or in the system configuration definition. If no code page is specified in the printer definition, NetSpool uses code page IBM-850.

   **Guidelines:**
   a. For most printing situations, you do not need to modify the code pages in the printer definition. The initial values in the printer definition are generally suitable.
   b. If you plan to use this printer definition with Print Interface as well as with NetSpool, leave the **Document code page** field blank and specify a code page in the **Printer code page** field. For information about how Print Interface uses these fields, see “Converting data from EBCDIC to ASCII or ASCII to EBCDIC” on page 88.
   c. You can specify any code pages supported by IBM. For valid code page names, see z/OS XL C/C++ Programming Guide.
   d. If you specify a custom code page, make sure that conversion tables exist to convert between these code pages:
• The code pages in the **Document code page** and **Printer code page** fields.

• The code page for the z/OS locale and the custom code page.

For information about how to create conversion tables, see information about code set conversion utilities in *z/OS XL C/C++ Programming Guide*.

### 3. (Optional) On the Processing panel, specify these default page-formatting values, which NetSpool uses for input SCS data streams only:

- **Line length** field: Specify the maximum number of columns on each line. This is the default value for the SCS maximum presentation position (MPP) value. Allowed values are 1-255. The default value is 80.

- **Page length** field: Specify the maximum number of lines per page. This is the default value for the SCS maximum presentation line (MPL) value. Allowed values are 1-255. The default value is 1, which means that NetSpool does not control the number of lines that are placed on a page. The VTAM application controls the number of lines per page.

- **Margins: Left** field: Specify the column number at which you want data to start on each line. This is the default value for the SCS left margin (LM) value. Allowed values are 1-255. The default value is 1.

- **Margins: Right** field: Specify the column number at which you want data to end on each line. This is the default value for the SCS right margin (RM) value. Allowed values are 1-255. The default value is 80.

- **Margins: Top** field: Specify the line number of the first line on each page. This is the default value for the SCS top margin (TM) value. Allowed values are 1-255. The default value is 1.

- **Margins: Bottom** field: Specify the line number of the last line of data on each page. This is the default value for the SCS bottom margin (BM) value. Allowed values are 1-255. The default value is 1 (no bottom margin).

  If you specify a value of 1, NetSpool does not insert form feeds when the input data stream spaces past the bottom margin. However, NetSpool does insert form feeds when an explicit form feed or a Select Vertical Channel command occurs in the input data.

- **Tabs: Horizontal** field: Specify horizontal tabs. This is the default value for the SCS horizontal tab (HT) value. Allowed values are 0-255. The default is no horizontal tabs. The input data stream can add additional tab positions but cannot remove default tabs set in this field.

  NetSpool always sets the first tab to the left margin value. Therefore, do not specify it. NetSpool ignores a value of 0. In this example, NetSpool sets horizontal tabs at columns 6, 15, 50, 75, and 100.

  **SCS Conversion:**
  
  ```plaintext
  Margins: Top ... 6  Bottom ... 6  Left ... 6  Right ...
  Tabs: Vertical ... (extend)
  Horizontal ... 15  50  75  100  (extend)
  ```

- **Tabs: Vertical** field: Specify vertical tabs. This is the default value for the SCS vertical tab (VT) value. Allowed values are 0-255. The default is no vertical tabs.

  NetSpool always sets the first tab to the top margin value. Therefore, do not specify it. NetSpool ignores a tab value of 0. NetSpool uses the first eleven tabs as line numbers for Select Vertical Channel 2 through 12. In this example, NetSpool sets:

  - Vertical tabs at lines 6, 20, 40, and 50
– Vertical channels are set: CH01=6, CH02=20, CH04=40, CH05=50
These vertical channels are not set: CH03, CH06 through CH12.

SCS Conversion:
Margins: Top . . . 6
Tabs: Vertical . . 20 0 40 50 (extend)

4. (Optional) On the Processing panel, specify these PCL conversion values:
   • **Print density** field: Specify the number of characters per inch. Valid values are 1-255. The default is the PCL Pitch command or Horizontal Motion Index command specified in the **Document header** field or, if none is specified, the value set on the printer's control panel.
   • **Line density** field: Specify the number of lines per inch. Valid values are 1-72. The default is the PCL Line Spacing command or Vertical Motion Index command specified in the **Document header** field or, if none is specified, the value set on the printer's control panel.
   • **Orientation** field: Select one of these options. **None** is the default.
     – **None**: NetSpool does not specify the PCL page orientation. The PCL Logical Page Orientation command specified in the IP PrintWay **Document header** field or the orientation set at the printer is used.
     – **Portrait**: Lines are printed parallel to the paper's short edge.
     – **Landscape**: Lines are printed parallel to the paper's long edge.
   • **SCS automatic page orientation** field: Select this field if you want NetSpool to automatically determine the orientation (portrait or landscape) of each page. NetSpool ignores this field for 3270 data streams.

   **Guideline**: If you select this field, also specify values in the **Print density**, **Line density**, **Line length**, and **Page length** fields.

5. On the IP PrintWay Options panel:
   • Select any IP PrintWay formatting option, because IP PrintWay ignores the IP PrintWay **Formatting** field if NetSpool has already converted data to PCL.
   • (Optional) Specify PCL commands in the **Document header** and **Document trailer** fields.

   **Guidelines**:
   a. You might want to select a font in the **Document header** field. For more information, see "Selecting a font" on page 114.
   b. If you specify PCL commands in the **Document header** field, (1) specify PCL and PJL reset commands before any other PCL commands in the **Document header** field and also (2) specify PCL and PJL reset commands in the **Document trailer** field. This is because NetSpool does not reset the printer to its original status when you specify your own PCL commands in the **Document header** field.

   Specify these PCL 5 commands to reset the printer to its original status:

   ```
   Document header . . <ESC>%-12345X<ESC>E (extend)
   / Translate document header
   Document trailer . . <ESC>E<ESC>%-12345X (extend)
   / Translate document trailer
   ```
Command | Meaning
---|---
<ESC>%-12345X | Resets the printer and enters PJL mode.
<ESC>E | Resets the printer.

You can also choose to leave the Document header field and Document trailer fields blank. If you leave these fields blank, NetSpool automatically generates the necessary PCL commands to reset the printer to its original status both before and after each data set.

**Tip:** If you need to specify the same fields in more than one printer definition, specify the fields in components. Then, include those components in each printer definition to which the components apply.

**Examples**

These examples show how to fill in the ISPF panels for SCS and 3270 input data streams.

**Example 1. Converting SCS data streams to PCL data streams:** This ISPF panel shows how to request that NetSpool convert the input data stream to PCL format.

NetSpool Options

- **Printer definition name:** myprinter
- **Formatting:** 3. Convert to PCL
  - **Record size:**
  - **RECFM:**
    - 1. VB
    - 2. VBA
    - 3. VBM

This ISPF panel shows how to specify code pages and other formatting values.

Processing

- **Document code page:**
- **Printer code page:** ISO8859-1
- **SCS Conversion:**
  - **Margins:** Top..6 Bottom..61 Left..3 Right..75
  - **Line length:** 80
  - **Page length:** 66
  - **Tabs:**
    - Vertical.
    - Horizontal.
  - **NetSpool PCL Conversion:**
    - **Print density:** 10
    - **Orientation:** 1. None 2. Portrait 3. Landscape
    - / SCS automatic page orientation

**Example 2. Converting 3270 data streams to PCL data streams:** These ISPF panels show how to request that NetSpool convert input data streams to PCL data streams.
Selecting no data stream conversion

In each printer definition, you can select a NetSpool formatting option. The formatting option controls how NetSpool formats the data streams created by your VTAM applications. You can select one of these formatting options:
- Convert to line (default)
- Convert to PCL
- None

This section describes the **None** formatting option. When you select the **None** option, NetSpool does not inspect or convert the input data streams. Instead, NetSpool writes input data streams unchanged to the JES spool.

You can select the **None** option when your VTAM applications create output data that the printer can accept without change. For example, if you have VTAM applications that generate ASCII PCL or PostScript data.

When you select the **None** option, NetSpool writes data to the JES spool in variable-length, blocked records, with a maximum record size of 32752. You can select a different record format and change the maximum record size in the printer definition.

When you select the **None** option, NetSpool does not call any exits.

**Procedure for specifying attributes**

To request that NetSpool not convert the input data stream:

1. On the NetSpool Options panel, specify these fields:
   - **Formatting** field: Select the **None** option.
• **Maximum record size** field: (Optional) Specify the maximum size of the variable-length records. Allowed values are 1-32752. The default value is 32752.

• **RECFM** field: Select one of these record formats:
  – VB: variable blocked (default)
  – VBA: variable blocked with ANSI carriage controls
  – VBM: variable blocked with machine carriage controls

2. If the printer is controlled by IP PrintWay, on the IP PrintWay Options panel, specify:

• **Formatting** field: Select **None** if you do not want IP PrintWay to convert data to ASCII or do any page formatting.

---

**Tip:** If you need to specify the same fields in more than one printer definition, specify the fields in components. Then, include those components in each printer definition to which the components apply.

**Example**

This ISPF panel shows how to request no NetSpool formatting and also specify the record size and record format of the output data set.

<table>
<thead>
<tr>
<th>NetSpool Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formatting: None</td>
</tr>
<tr>
<td>Record size: 80</td>
</tr>
<tr>
<td>RECFM: VB</td>
</tr>
<tr>
<td>Default owner:</td>
</tr>
<tr>
<td>Embedded attributes prefix:</td>
</tr>
</tbody>
</table>

---

**Specifying a default user ID and job attribute prefix**

To specify the default owner of printed output, or to identify job attributes embedded in print data, you can specify these fields in each printer definition:

• **Default owner:**

  The default Infoprint Server job owner for the associated LU if the print data does not specify an owner. The job owner is used for output data sets created for this NetSpool LU. In addition:
  – The Infoprint Server job owner can help you find jobs using Infoprint Central.
  – The job owner in this field is also used as the JES job name if no other owner or job name is specified in the print data.
  – The job owner specified in this field is not used as the JES job owner. The JES job owner is always the ID of the user who started the Infoprint Server daemons.

  If this field is blank, the default job owner is the ID of the user who started the NetSpool daemon *aopnetd*.

• **Embedded attributes prefix:**

  The prefix that identifies job attributes embedded in the print data. For information about how to embed job attributes in VTAM application print data, see [z/OS Infoprint Server User’s Guide](#). NetSpool uses the embedded job attributes when it allocates an output data set on the spool.
If this field is blank, NetSpool does not use job attributes specified in the print data. If this field contains a value, print jobs that do not contain embedded job attributes are not affected.

Tip: Do not use embedded job attributes if you specify the Timer end-of-file rule. Results can be unpredictable.

**Procedure for specifying attributes**

On the NetSpool Options panel, specify these fields:

- **Default owner** field: Specify a combination of 1-8 letters (a-z, A-Z), numbers (0-9), and special characters (# $ @). The first character cannot be a number. Blanks and other special characters are not allowed. Lowercase letters are converted to uppercase.

- **Embedded attributes prefix** field: Enter either character data or hexadecimal data:
  - To enter character data, enter 1-12 letters, numbers, or special characters. Character data is case-sensitive.
  - To enter hexadecimal data, enter 1-12 bytes of data. Enclose the data in single quotation marks, prefixed with the letter x.

**Example**

This ISPF panel shows how to specify a default owner and an embedded attribute prefix.

NetSpool Options

Formatting . . . . 1. None 2. Convert to line 3. Convert to PCL
Record size . . _____ 1. V 2. VA 3. VM
DEFM . . . . . . ___ 1. VB 2. VBA 3. VBM
Default owner . . smith
Embedded attributes prefix . . <<ibmjobattr

**Selecting a font**

NetSpool assumes a fixed-pitch font when it formats data. Therefore, you should use a fixed-pitch font to print the data so you can maintain the correct alignment of characters. If you select the Convert to PCL formatting option, you should use a fixed-pitch, scalable font to print the data.

If the printer’s default font is not suitable, you can specify a font using one of these methods. The method you use depends on whether the printer is controlled by IP PrintWay or PSF:

- **Printers that PSF controls:** Name the font in the Character sets field on the Allocation panel of the printer definition.

- **Printers that IP PrintWay controls:** You can specify a font in one of these places:
  - Specify PCL commands to select the font in the IP PrintWay Document header field in the printer definition. IP PrintWay sends the PCL commands in this field to the printer. Therefore, this font is used to print all data sets transmitted to the printer, not only data sets created by NetSpool.
  - Specify PCL commands to select the font in the NetSpool Beginning of File exit. This font is used to print all data sets created by NetSpool.
– Name the font in the Character sets field on the Allocation panel of the printer definition. Use this method if you (1) use the AFP to PCL or AFP to PostScript transform or (2) print to a remote system running PSF, such as Ricoh InfoPrint Manager or Ricoh ProcessDirector V3.0 or later. Otherwise, the font you specify in this field is ignored.

Guidelines:
1. If a fixed-pitch font is not suitable for all of your print jobs, you could set up more than one printer definition for the same printer. Then, specify a fixed-pitch font in the printer definition that NetSpool uses.
2. If you are using PSF printers, consider specifying the chars attribute in embedded job attributes.
4. If you use the AFP to PCL or the AFP to PostScript transform, do not specify a PCL command in the NetSpool Beginning of File exit because the AFP to PCL and AFP to PostScript transforms cannot interpret PCL commands.
5. If you select the SCS automatic page orientation field, specify the size of the font in the Line density and Print density fields instead of in a PCL command so that NetSpool can accurately determine the appropriate page orientation. This is because NetSpool cannot detect the size of a font specified in a PCL command or in the Character sets field.

Procedure for specifying attributes

To fill in ISPF panels to specify a fixed-pitch font:

• If the printer is controlled by PSF, name the font in the Character sets field on the Allocation panel.
• If the printer is controlled by IP PrintWay, and IP PrintWay uses the AFP to PCL transform or the AFP to PostScript transform for line data, name the font in the Character sets field on the Allocation panel.
• If the printer is controlled by IP PrintWay, and IP PrintWay does not use a transform for line data, specify PCL commands to select the font in the Document header field on the IP PrintWay Options panel. Also, be sure to reset the printer to its original state in the Document trailer field.

Tip: If you need to specify the same fields in more than one printer definition, specify the fields in components. Then, include those components in each printer definition to which the components apply.

Examples

Example 1. Specifying a fixed-pitch font for a printer controlled by PSF: This example shows how to fill in the ISPF panels to specify a fixed-pitch font for a printer controlled by PSF. Also, use this example if the printer definition is controlled by IP PrintWay and IP PrintWay uses the AFP to PCL or the AFP to PostScript transform.
In this example, PSF, the AFP to PCL transform, and the AFP to PostScript transform use the Gothic Text Latin1, fixed-pitch, font. The pitch is 10 characters per inch.

Example 2. Specifying a fixed-pitch font for a printer controlled by IP PrintWay: This example shows how to fill in the ISPF panels to specify PCL commands to select a fixed-pitch font to print the data and then reset the printer to its default settings.

The PCL commands in the Document header field reset the printer to its default settings and then select the fixed-pitch Letter Gothic font. The PCL commands shown mean:

<table>
<thead>
<tr>
<th>Command</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;ESC&gt;%-12345X</td>
<td>Reset the printer and enter PJL mode.</td>
</tr>
<tr>
<td>&lt;ESC&gt;E</td>
<td>Reset the printer.</td>
</tr>
<tr>
<td>&lt;ESC&gt;(8U</td>
<td>Select the Roman-8 symbol set.</td>
</tr>
<tr>
<td>&lt;ESC&gt;(s0p10h0s3b4102T</td>
<td>Set fixed spacing (0p), 10 characters per inch (10h),</td>
</tr>
<tr>
<td></td>
<td>upright style (0s), bold weight (3b), and Letter Gothic typeface (4102T).</td>
</tr>
</tbody>
</table>

Notes:
1. The last letter of each command is a capital letter to denote the end of the command.
2. When you select the NetSpool Convert to PCL formatting option, the value in the Print density field overrides the number of characters per inch set in the Document header field.

Specifying how NetSpool determines end-of-file

To guarantee that data that belongs together actually gets printed in the correct order, NetSpool writes data that belongs together to a single output data set on the JES spool. For printing in the SNA network, the concept of a data set is not needed because an application starting a session with a printer gains exclusive control of that printer for the duration of the session. In contrast, when printing in a JES
environment, the sending application is not guaranteed exclusive control of the
printer. Between two successive data sets from one application, data sets from
other applications might print. If the first attempt to print a data set fails, and a
later retry succeeds, two successive data sets from the same application could even
be printed in reverse order.

To create an output data set, NetSpool must determine where one data set should
end and the next one should begin. You specify the rules that NetSpool uses to
make this determination. You can specify different rules for different combinations
of VTAM primary logical unit (PLU) names and LU types. The PLU name
identifies the VTAM application that sends data to NetSpool.

The rules generally use information found in the input data stream to determine
when to end the current output data set. VTAM request unit (RU) chaining
information can be used, a string in the input data stream can be used, or even a
timer can be used. Work with the application programmers in your installation to
determine the appropriate end-of-file rules for each printer definition.

Note: If you edit end-of-file rules in a printer definition while VTAM sessions with
the printer LU are active, you must restart the active sessions from your
VTAM application, such as CICS and IMS, to pick up the changes.

End-of-file rules

Print data for a logical printer is received as a stream of VTAM request units
(RUs). The SNA architecture defines two groupings of RUs that are of interest:
- A *chain* consists of one or more RUs.
- A *bracket* consists of all of the RUs in one or more related chains.

From an SNA-theory point of view, the use of brackets is the most logical way to
determine data-set boundaries. Using this technique, a request marked BB (Begin
Bracket) indicates the start of a new data set, and the end of a chain marked EB
(End Bracket) marks the end of the data set. This is the default end-of-file rule that
NetSpool uses unless you change it. It is called the *end-of-bracket* rule.

The end-of-bracket rule works with both CICS and IMS LU type 1 sessions, with
CICS LU type 3 sessions, and with other applications able to control the use of the
BB and EB bracket bits. However, for some applications, the end-of-bracket rule
does not work well, as indicated by these examples:

1. In a CICS application with an LU type 0 session:
   - BB is sent on the session's first request.
   - No EB is sent at the end of the transaction.
   - Result: The output for the entire session is treated as one data set, causing a
     potentially long delay in printing.

2. In an IMS application with a non-SNA 3270 printer:
   - Each line of output is sent as a separate chain marked BB, EB.
   - Result: Each line is treated as a separate data set, causing unnecessary
     overhead and increasing the chances of data sets from other applications
     intruding.

NetSpool lets you specify five end-of-file rules. NetSpool uses only one of these
rules for any one session:
• **End-of-bracket (default):** NetSpool ends the data set when the RU chain is marked EB (End Bracket) and starts a new data set when a request unit (RU) is marked BB (Begin Bracket).

• **End-of-session:** NetSpool ends the data set at the end of the VTAM session for this printer definition.

• **End-of-chain:** NetSpool ends the data set at the end of a chain.

• **String:** NetSpool ends the data set when the last RU in a chain contains a specified string of data. You can also specify whether NetSpool is to keep or delete the specified string of data in the output data set.

• **Timer:** NetSpool ends the data set when the time interval specified in either the **Timeout idle interval** field or the **Busy interval** field expires and NetSpool has received the last RU in the chain.

  The **Timeout idle interval** field specifies the amount of time NetSpool waits for input data before printing the data already received. If NetSpool does not receive any input data during this time and a reasonable stopping point has been reached (end of an RU chain), NetSpool closes the output data set so it can be printed.

  The **Busy interval** field specifies the amount of time for which NetSpool receives data without printing it. After this time interval expires, NetSpool closes the output data set when a reasonable stopping point is reached (end of an RU chain and the top of a new page).

  Use the timer method only when none of the other end-of-file rules makes sense because:

  – The use of timers to detect data-set boundaries is an inexact method. Tuning is required to choose the best timer values, and even then the results are inexact.

  – Under each of the other end-of-file rules, exact data-set boundaries can be determined directly from the received print data requests.

These rules apply when you select the **Timer** option:

– Specify this option only for LU types 0 and 3.

– Do not select this option when you select the **None** formatting option or when you use the **Embedded attributes prefix** field on the NetSpool Options panel.

**Delete form-feed option**

When you specify an end-of-file rule, you can also specify whether you want NetSpool to delete form-feed controls that occur in the input data stream before writing the output data set on the JES spool. Deleting form-feed controls lets you remove blank pages that might print before or after the data. You can specify which form-feed controls NetSpool is to delete:

• **Leading form-feed controls:** NetSpool deletes the form-feed control at the beginning of the output data set.

• **Trailing form-feed controls:** NetSpool deletes the form-feed control at the end of the output data set.

• **Both leading and trailing form-feed controls:** NetSpool deletes the form-feed control both at the beginning and the end of the output data set.

These considerations apply when you delete trailing form-feed controls:

• For LU type 1 sessions, the form-feed control in the last RU is deleted. If the end-of-session rule is selected, form-feed controls at the end of a data set are not deleted.
• For LU types 0 and 3 sessions, the form-feed control in the page built by the last
RU chain is deleted. However, for LU type 3, if the end-of-bracket rule is
selected and the RU that ends the bracket is a null single element chain, the
form-feed control from the prior chain is deleted.

Procedure for specifying attributes

You only need to specify an end-of-file rule and a form-feed option if the defaults
are not suitable. By default, NetSpool uses the end-of-bracket rule to determine
end of file and does not delete any form-feed controls.

In the NetSpool End-of-File section of the printer definition, you can specify either
default rules or specific rules for different primary logical unit (PLU) names:

• A default rule can apply either to all LU types (LU type 0, LU type 1, and LU
type 3) or to a specific LU type. NetSpool uses a default rule only if you do not
specify another rule for the PLU name and LU type being processed.

• A rule for a specific PLU name or PLU name pattern can apply either to all LU
types (LU type 0, LU type 1, and LU type 3) or to a specific LU type. The order
in which you type the PLU names on the ISPF panel can be important because
NetSpool uses the first rule that applies to the PLU name and LU type being
processed.

A PLU pattern must contain these characters:

  - At least one letter or number.
  - Either asterisks (*) or question marks (?) but not both:
    - An asterisk represents any number of characters at the start or end of a
      PLU name. Do not type an asterisk in the middle of a pattern.
    - A question mark represents exactly one character. Type a question mark
      anywhere in the pattern.

For example, these are valid name patterns: IMS*, ??XYZ???

Although you can specify more than one end-of-file rule in the NetSpool
End-of-File section, NetSpool uses only one rule for each VTAM session.

Tip: If the same end-of-file rules and form-feed options are used by more than one
NetSpool printer LU, specify the attributes in an NetSpool End-of-File
component. Then, include that component in the printer definitions for the
NetSpool printer LUs to which the rules apply.

Example

These two ISPF panels show how to specify an end-of-file rule in the NetSpool
End-of-File section of a printer definition.

On the NetSpool End-of-File Rules panel, you must indicate whether you want to
specify a default end-of-file rule or an end-of-rule for a specific PLU name or
PLU name pattern. In this example, a PLU name pattern, IMS*, is specified. This
means that NetSpool uses the end-of-file rule that you specify on the next panel
for all PLU names that start with IMS. Because option 5 is selected, the end-of-file
rule that you specify on the next panel applies to all LU types with the PLU name
pattern, including types 0, 1, and 3.
The NetSpool End of File Rule panel is displayed when you press the Enter key on the first panel. On this panel you must select the end-of-file rule. In this example, these options are selected:

- **String** option: When NetSpool finds X'FF' in the input data stream, NetSpool ends the data set on the JES spool and starts a new one.
- **Keep** option: NetSpool writes X'FF' to the output data set.
- **Delete form feed** option 1: NetSpool does not delete any form-feed controls in the output data set.

NetSpool lets users broadcast the same data to multiple printers or email destinations at the same time. NetSpool formats the data one time and allocates separate output data sets on the JES spool for each printer or email destination.

To broadcast data, you must create three types of objects in the Printer Inventory:

1. A printer definition for each destination. The destination can be a printer or an email address list. If you have already created a printer definition for the destination, you do not need to create a new one.
2. A NetSpool End-of-File component that contains the end-of-file rules that NetSpool should use. If you want to use the default end-of-file rule (end-of-bracket), you do not need to create a component.
3. A printer pool definition. In this definition, specify the printer LU name that VTAM applications use as the secondary LU name when printing to this pool of printers or email destinations. Also select these:
   - The printer definitions that you created in step 1.
   - (Optional) The NetSpool End-of-File component that you created in step 2.
   - (Optional) The default owner of printed output.
   - (Optional) The identifier for job attributes embedded in print data.
The printer definition that you list first in the printer pool definition must specify the attributes that NetSpool uses to format data. NetSpool formats the data only once and writes the same data in each data set it allocates on the JES spool.

Procedure for specifying attributes

In the printer definitions that you plan to list in the printer pool definition, specify:

- **NetSpool LU name** field: Specify this field only if your VTAM applications need to print directly to this printer definition. Leave this field blank if you want to list this printer in the printer pool definition. Instead, specify the secondary LU name that your VTAM applications use in the **LU name** field in the printer pool definition.

- On the Allocation panel, specify the fields required to allocate output data sets on the JES spool. For more information, see “Specifying JES allocation parameters” on page 99.

In one of the printer definitions, specify these attributes if the default values are not appropriate. List this printer definition first in the printer pool definition.

- On the Processing panel:
  - All fields under the **SCS Conversion** heading.
  - All fields under the **NetSpool PCL Conversion** heading.

- On the NetSpool Options panel: All fields. The **Default owner** and the **Embedded attributes prefix** fields are optional (for more information, see “Specifying a default user ID and job attribute prefix” on page 113).

- On the Allocation panel: **HOLD** field. NetSpool uses this field only in the first printer definition listed in the printer pool definition.

In the printer pool definition on the Printer Pool panel, specify these fields:

- **Pool name**: Specify a name for the printer pool definition. This name can be the same as the NetSpool printer LU name.

- **LU name**: Specify the NetSpool printer LU name. For more information, see “Specifying the NetSpool printer LU name” on page 98.

- **Description**: (Optional) Specify a description to help you manage your printer pool definitions.

- **LU classes**: Specify the LU classes for the printer LU name if the default is not appropriate. For more information, see “Grouping NetSpool printer LUs into LU classes” on page 98.

- **NetSpool end-of-file component**: Specify the name of a component if the default end-of-file rule is not appropriate. For more information, see “Specifying how NetSpool determines end-of-file” on page 116.

- **Default owner**: (Optional) Specify the default owner of printed output. For more information, see “Specifying a default user ID and job attribute prefix” on page 113.

- **Embedded attributes prefix**: (Optional) Specify the identifier for job attributes embedded in print data. For more information, see “Specifying a default user ID and job attribute prefix” on page 113.

- **Printer definition names**: Select the printer definitions to which you want to broadcast data from a list that you can display. (Place your cursor on this field and press Enter.)

Tip: First select the printer definition in which you specified the attributes that you want NetSpool to use when formatting the data.
Example
This ISPF panel shows how to create a printer pool definition.

<table>
<thead>
<tr>
<th>Printer Pool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pool name . . ludept01</td>
</tr>
<tr>
<td>LU name . . LUEDPT01</td>
</tr>
<tr>
<td>Description . AT department 001 printers (extend)</td>
</tr>
<tr>
<td>LU classes . . 2 __ __ __ __ __ (extend)</td>
</tr>
<tr>
<td>NetSpool end-of-file component . . eof1 (list)</td>
</tr>
<tr>
<td>Default owner . . . . . . smith</td>
</tr>
<tr>
<td>Embedded attributes prefix . . . &lt;&lt;ibmjobattr</td>
</tr>
<tr>
<td>Printer definition names . . printer1 printer2 (list)</td>
</tr>
</tbody>
</table>

When a VTAM application prints to LU name LUEDPT01, NetSpool uses the end-of-file rules specified in NetSpool end-of-file component named eof1 and the formats the input data stream using attributes specified in printer definition printer1. NetSpool uses the attributes in the Allocation sections of printer definitions named printer1 and printer2 to create two output data sets on the JES spool.

Validating that documents can print as requested

Before accepting a print request, NetSpool can validate that the data can print as requested on the printer. If NetSpool determines that a document cannot print, NetSpool rejects the print request with a message and does not allocate a data set on the JES spool.

Table 19 lists the fields in a printer definition that NetSpool uses to validate that the print request can print on the printer. The third column in the table indicates the job attribute that the VTAM application can specify in the embedded job attributes to request a print function.

Table 19. Printer definition fields used for validation in NetSpool

<table>
<thead>
<tr>
<th>Field name</th>
<th>Meaning</th>
<th>Job attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data format</td>
<td>Data formats the printer supports. For more information, see “Data formats” on page 78.</td>
<td>document-format If not specified, NetSpool detects the data format.</td>
</tr>
<tr>
<td>Duplexes supported</td>
<td>Duplexing supported by the printer (simplex, duplex, and tumble)</td>
<td>duplex</td>
</tr>
<tr>
<td>Forms supported</td>
<td>Forms names allowed</td>
<td>forms</td>
</tr>
<tr>
<td>Maximum copies</td>
<td>Maximum number of copies allowed</td>
<td>copies</td>
</tr>
<tr>
<td>Maximum document size</td>
<td>Maximum size of document (in bytes) allowed. This number does not include copies.</td>
<td>None. NetSpool determines the document size.</td>
</tr>
<tr>
<td>Print-error reporting supported</td>
<td>Types of error-reporting supported by the printer (invalid-character and print-positioning errors)</td>
<td>print-error-reporting</td>
</tr>
</tbody>
</table>
Table 19. Printer definition fields used for validation in NetSpool (continued)

<table>
<thead>
<tr>
<th>Field name</th>
<th>Meaning</th>
<th>Job attribute</th>
</tr>
</thead>
</table>

Note: NetSpool does not inspect options specified in the form definition used to print the job during validation. For example, if the form definition specifies five copies, NetSpool does not use this copy count to determine whether the print request exceeds the copy limit.

Procedure for specifying attributes

On the Processing panel, specify the fields listed in Table 19 on page 122. In the Data format field, be sure to select these data formats, depending on the option you select in the Formatting field on the NetSpool Options panel:

- If you select the Convert to line option, select Line data.
- If you select the Convert to PCL option, select PCL.
- If you select the None option, select Other.

Tip: Select all data formats for no data stream validation. (This is the default.)

Example

This ISPF panel shows how to specify the valid data formats for a printer that can print PostScript, text, and PCL data. Notice that Line data is selected even though the printer does not accept line data. You must select Line data because the NetSpool Convert to line option is selected in the Formatting field. IP PrintWay automatically converts line data to text data before sending it to the printer. Only a portion of the panel is shown.

Using an installation-provided filter

For each type of data format, you can specify the name of an associated filter. A filter is a program that can inspect and modify data. When you specify the name of a filter for a supported data format in a printer definition, the filter is called when the data format is detected. NetSpool can call the associated filter (a filter is called
only once for each data set) after it converts the input SCS or 3270 data to either line or PCL data, and before it writes the data to an output data set on the JES spool.

Your installation can write its own filter program, either a DLL filter or a UNIX filter. For information about how to write a filter, see z/OS Infoprint Server Customization.

**Procedure for specifying attributes**

On the Processing panel, specify:

- **Data format** field: Select the data format of the input document that your filter applies to.
- **Filter** field: Specify the name of the filter followed by the options that you want to provide as command line arguments to the filter.
  - If the filter is a DLL filter, type the absolute pathname unless the filter is in a directory named in the LIBPATH environment variable.
  - If the filter is a UNIX filter, type `spawn` before the filter name. Type the absolute pathname of the filter unless the filter is in a directory named in the PATH environment variable.

**Example**

This ISPF panel shows how to specify a UNIX filter written by your installation for line data. Only a portion of the ISPF panel is shown.

```
Processing
Data format: Filter:
/ Line data spawn /usr/mylib/my_unix_filter -a option operand (extend)
- MD:BCA-P __________________________________________________ (extend)
- PostScript __________________________________________________ (extend)
- Text __________________________________________________ (extend)
- PCL __________________________________________________ (extend)
- PDF __________________________________________________ (extend)
- SAP __________________________________________________ (extend)
- XML __________________________________________________ (extend)
- TIFF __________________________________________________ (extend)
- JPEG __________________________________________________ (extend)
- Other __________________________________________________ (extend)
```

If the input data stream contains line data, NetSpool calls the `my_unix_filter` filter to transform line data. The option and operand that follow the filter name are passed to the filter.

**Mapping output bin and input tray names to numbers for an AFP printer**

The *input tray* is the tray on the printer that serves as the paper source. The *output bin* is a bin on the printer where printed jobs are delivered. The *input-tray* and *output-bin* job attributes let users specify a tray name, such as 3-hole and a bin name, such as staple.

If you define input tray or output bin names in a printer definition, a job submitter or VTAM application can use those names in the *input-tray* or *output-bin* job attribute. If you do not define any tray or bin names, Print Interface and NetSpool
ignore the input-tray or output-bin job attribute. If, however, you define some tray or bin names, Print Interface and NetSpool reject a print request that specifies an undefined tray or bin name in the job attribute.

When you define input tray names, you must map the names to the numbers that an AFP printer uses for paper-source identification. When you define output bin names, you must map the names to the bin numbers that an AFP printer uses for output-bin identification. For tray and bin numbers that the printer uses, see your printer documentation.

Tip: Whether or not you define input tray or output bin names in a printer definition, a job submitter can specify the tray and bin number directly using the input-tray-number and output-bin-number job attributes or the INTRAY and OUTBIN JCL parameters. The job submitter can specify any tray and bin numbers. You do not need to specify the numbers in the printer definition.

Procedure for specifying attributes

On the Processing panel, specify:

- **Input tray name** and **Number** fields: Specify a name and the tray number used by the AFP printer.
- **Output bin name** and **Number** fields: Specify a name and the bin number used by the printer.

Example

This ISPF panel shows how to map input tray names and output bin names to numbers in the Processing section of a PSF printer definition. Only a portion of the ISPF panel is shown.

<table>
<thead>
<tr>
<th>Input tray name</th>
<th>Number</th>
<th>Output bin name</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>top</td>
<td>1</td>
<td>staple</td>
<td>4</td>
</tr>
<tr>
<td>bottom</td>
<td>2</td>
<td>side</td>
<td>2</td>
</tr>
<tr>
<td>envelope</td>
<td>65</td>
<td>top</td>
<td>1</td>
</tr>
<tr>
<td>manual</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-hole</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If a user specifies the **input-tray=envelope** job attribute, Print Interface and NetSpool allocate the output data set on the JES spool with tray number 65. If the printer is an AFP printer, PSF uses tray number 65 when communicating with the printer.

If a user specifies the **output-bin=staple** attribute on the `lp` command, Print Interface and NetSpool allocate the output data set with bin number 4. If the printer is an AFP printer, PSF uses bin number 4 when communicating with the printer.
Chapter 12. Planning printer definitions for IP PrintWay

Before using IP PrintWay to send print output to remote printers and email destinations, you must create printer definitions. Typically, you should create one printer definition for each printer and one for each email destination. In the printer definition, you specify the printer’s address or the recipients’ email addresses. However, depending on the job submission method used and the type of printer, job submitters can sometimes specify a printer’s address or email addresses during job submission in job attributes and JCL parameters. If so, you might be able to create one printer definition for a group of printers that share the same attributes, and another printer definition for all email destinations.

Guideline: Create at least one printer definition for each printer for these reasons:

- Some job submission methods (for example, the LPR command) do not support specification of job attributes or JCL parameters.
- Job submitters cannot specify the printer’s address if the printer uses the IPP or VTAM protocol.
- Infoprint Central cannot display information about idle IP PrintWay printers when a printer definition does not exist for that printer.

In the printer definition, you also can specify attributes that IP PrintWay uses to format data in the output data set and transmit data sets to the printer. Table 52 on page 460 summarizes the printer attributes that IP PrintWay uses and indicates whether the attributes are required or optional.

After you create printer definitions and specify attributes used by IP PrintWay, job submitters can print from batch applications using JCL. However, before job submitters can print from VTAM applications using NetSpool or from local and remote systems using Print Interface, you might need to specify additional attributes in the printer definition. For information about these attributes, see Chapter 11, “Planning printer and printer pool definitions for NetSpool,” on page 97 and Chapter 10, “Planning printer definitions for Print Interface,” on page 75.

You can create and edit IP PrintWay printer definitions before starting IP PrintWay or while IP PrintWay is running. If you create or edit a printer definition while IP PrintWay is running, IP PrintWay uses the new attributes the next time IP PrintWay selects a data set from the JES spool that uses the printer definition. IP PrintWay extended mode also uses the new attributes the next time it retries printing a data set that failed to print.

IP PrintWay basic mode and IP PrintWay extended mode use the same printer definitions. However, when you move from IP PrintWay basic mode to IP PrintWay extended mode, you might need to make some changes. For information, see “Comparing printer definitions for IP PrintWay basic mode and extended mode” on page 129.

Table 20 on page 128 lists the tasks related to IP PrintWay and refers to the topic that describes how to do each task. Some of the tasks apply only to the indicated IP PrintWay transmission protocol. Notice that some tasks apply only to IP PrintWay extended mode or IP PrintWay basic mode. The title of each task indicates, in parenthesis, to which mode the task applies. If no mode is indicated in the title, the task applies to both modes.
Table 20. Administration tasks for IP PrintWay

<table>
<thead>
<tr>
<th>Task</th>
<th>Task applies to protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LPR</td>
</tr>
<tr>
<td></td>
<td>Direct sockets</td>
</tr>
<tr>
<td></td>
<td>IPP</td>
</tr>
<tr>
<td></td>
<td>VTAM</td>
</tr>
<tr>
<td></td>
<td>Email</td>
</tr>
<tr>
<td></td>
<td>See page</td>
</tr>
<tr>
<td>Comparing printer definitions for IP PrintWay basic mode and extended mode</td>
<td>Yes</td>
</tr>
<tr>
<td>Selecting the LPR protocol</td>
<td>Yes</td>
</tr>
<tr>
<td>Selecting the direct sockets protocol</td>
<td>No</td>
</tr>
<tr>
<td>Selecting the IPP protocol</td>
<td>No</td>
</tr>
<tr>
<td>Selecting the VTAM protocol</td>
<td>No</td>
</tr>
<tr>
<td>Selecting the email protocol</td>
<td>No</td>
</tr>
<tr>
<td>Specifying a printer definition name, description, and location</td>
<td>Yes</td>
</tr>
<tr>
<td>Using DEST, CLASS, and FORMS to select a printer definition</td>
<td>Yes</td>
</tr>
<tr>
<td>Setting up operator security for the printer (extended mode)</td>
<td>Yes</td>
</tr>
<tr>
<td>Specifying allocation parameters for IP PrintWay</td>
<td>Yes</td>
</tr>
<tr>
<td>Handling unsuccessful data transmissions</td>
<td>Yes</td>
</tr>
<tr>
<td>Retaining data sets on the JES spool</td>
<td>Yes</td>
</tr>
<tr>
<td>Tracking the number of printed pages (extended mode)</td>
<td>No</td>
</tr>
<tr>
<td>Converting between EBCDIC and ASCII (extended mode)</td>
<td>Yes</td>
</tr>
<tr>
<td>Converting between EBCDIC and ASCII (basic mode)</td>
<td>Yes</td>
</tr>
<tr>
<td>Converting line data to a text data stream</td>
<td>Yes</td>
</tr>
<tr>
<td>Using an FCB to format data</td>
<td>Yes</td>
</tr>
<tr>
<td>Transmitting multiple data sets in a JES output group</td>
<td>Yes</td>
</tr>
<tr>
<td>Sending commands to the printer</td>
<td>Yes</td>
</tr>
<tr>
<td>Validating that data sets can print as requested</td>
<td>Yes</td>
</tr>
<tr>
<td>Printing with Ricoh InfoPrint Manager or Ricoh ProcessDirector</td>
<td>No</td>
</tr>
<tr>
<td>Creating an IP PrintWay default printer definition</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Table 20. Administration tasks for IP PrintWay (continued)

<table>
<thead>
<tr>
<th>Task</th>
<th>Task applies to protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LPR</td>
</tr>
<tr>
<td>Creating components for the PRTOPTNS JCL parameter</td>
<td>Yes</td>
</tr>
<tr>
<td>Using an installation-provided filter</td>
<td>Yes</td>
</tr>
<tr>
<td>Converting line data to an SCS or DSC/DSE data stream (basic mode)</td>
<td>No</td>
</tr>
<tr>
<td>Resubmitting documents to Print Interface for filtering (basic mode)</td>
<td>Yes</td>
</tr>
<tr>
<td>Printing data without formatting (basic mode)</td>
<td>Yes</td>
</tr>
<tr>
<td>Formatting for PostScript landscape orientation (basic mode)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Note: For detailed information about each field, (such as values you can specify, restrictions, and examples), use the online help for each field on the Infoprint Server ISPF panels.

### Comparing printer definitions for IP PrintWay basic mode and extended mode

IP PrintWay basic mode and extended mode can use the same printer definitions. However, some fields in printer definitions apply only to IP PrintWay basic mode, and some fields apply only to IP PrintWay extended mode.

Most installations do not need to change printer definitions when they migrate from IP PrintWay basic mode to IP PrintWay extended mode. However, you should review this section to see if changes are required.

### IP PrintWay extended mode fields

Table 21 on page 130 lists the fields in printer definitions (and the corresponding printer attributes) that apply only to IP PrintWay extended mode. IP PrintWay basic mode ignores these fields. Table 21 on page 130 describes the changes you might want to make in printer definitions when you migrate to extended mode.
### Table 21. Printer definition fields that apply only to IP PrintWay extended mode

<table>
<thead>
<tr>
<th>ISPF panel field (attribute)</th>
<th>Description</th>
<th>Change required to printer definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic dataset grouping</td>
<td>If this field is selected, IP PrintWay extended mode transmits all the data sets in the same JES output group to a printer in one transmission, or sends the data sets in the same email. This is an efficient method of transmitting data sets to a printer. However, it might not be suitable for some older printers. This field, if selected, overrides the option selected in the Dataset grouping field. For more information, see <a href="#">Transmitting multiple data sets in a JES output group</a> on page 185.</td>
<td>Select this field for more efficient printing if your printer supports it.</td>
</tr>
<tr>
<td>Embedded headers</td>
<td>If this field is selected, IP PrintWay extended mode examines line-data documents for an email header. If a header is found, it sends the email to the recipients in the header.</td>
<td>Select this field if any line-data documents can contain email headers.</td>
</tr>
<tr>
<td>Form feed</td>
<td>This field specifies the form-feed controls to add to text data to indicate the start of a new page.</td>
<td>Specify this field if the printer or print server requires form-feed characters other than X'0D0C' (carriage-return and form-feed controls).</td>
</tr>
<tr>
<td>Inline message</td>
<td>This field specifies an optional message that IP PrintWay extended mode includes in the beginning of each email.</td>
<td>Specify the message text if you want to include a standard greeting or introductory paragraph.</td>
</tr>
<tr>
<td>Inline text and line data</td>
<td>If this field is selected, IP PrintWay extended mode includes text and line-data documents inline in the body of the email instead of in attachments.</td>
<td>Specify this field if you want text and line data included inline in the email.</td>
</tr>
<tr>
<td>Operator security profile</td>
<td>This field contains the name of a RACF profile that your security administrator defines. The RACF profile controls who can display information about and do actions on the printer using Infoprint Central. For more information, see <a href="#">Setting up operator security for the printer (extended mode)</a> on page 164.</td>
<td>Specify the name of the RACF profile for the printer if you use Infoprint Central.</td>
</tr>
<tr>
<td>Record pages printed for accounting</td>
<td>If this field is selected, IP PrintWay extended mode records the number of printed pages in the SMF type 6 record. For more information, see <a href="#">Tracking the number of printed pages (extended mode)</a> on page 174.</td>
<td>Select this field for more accurate accounting information. The printer must support PJL and the direct sockets printing protocol.</td>
</tr>
<tr>
<td>Restart printing after last successful page</td>
<td>If this field is selected, IP PrintWay extended mode tells the printer to restart printing after the last page that the printer reported printed successfully. For more information, see <a href="#">Tracking the number of printed pages (extended mode)</a> on page 174.</td>
<td>Select this field to save paper and printing costs when IP PrintWay retries printing. The printer must support PJL and the direct sockets printing protocol.</td>
</tr>
</tbody>
</table>
**IP PrintWay basic mode fields**

Table 22 lists the fields (and corresponding attributes) that apply only to IP PrintWay basic mode. IP PrintWay extended mode ignores these fields. Table 22 describes the changes you might need to make in printer definitions that specify these fields when you migrate to extended mode.

**Tip:** To find all printer definitions that contain an attribute you want to change, use the Printer Inventory Definition Utility (PIDU) program. See “list—list names of objects” on page 279.

---

**Table 22. Printer definition fields that apply only to IP PrintWay basic mode**

<table>
<thead>
<tr>
<th>ISPF panel field (attribute)</th>
<th>Description</th>
<th>Change required to printer definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double-byte translate table (db-translate-table)</td>
<td>IP PrintWay extended mode does not use single-byte or double-byte TCP/IP translate tables specified in these fields to translate data between EBCDIC and ASCII. IP PrintWay extended mode uses only the <code>iconv</code> utility to translate data between code pages.</td>
<td>You might need to specify the desired ASCII code page in the <strong>Printer code page</strong> field. For information, see “Converting between EBCDIC and ASCII (extended mode)” on page 179.</td>
</tr>
<tr>
<td>SOSI mode (printway-sosi-mode)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Translation dataset qualifier (translation-dataset-qualifier)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Formatting (printway-formatting) | IP PrintWay extended mode ignores these formatting options:  
  - **None:** IP PrintWay detects the data format and only formats data sets that contain line data.  
  - **Use FCB:** IP PrintWay uses the FCB if one is specified in the FCB JCL parameter. | None. |
| PostScript header (printway-postscript) | IP PrintWay extended mode ignores this field and does not add any PostScript headers. | If a printer definition currently specifies these options:  
  - **Landscape** or **Always landscape:** Specify printer commands for landscape printing in the **Document header** field. See “Specifying printer commands for landscape printing” on page 189.  
  - **Add:** Specify the AFP to PostScript transform in the **Filter** field. |
| Resubmit for filtering (resubmit-for-filtering) | IP PrintWay extended mode ignores this field because it transforms data streams by calling the transforms directly, without resubmitting the data sets to Print Interface. | None. |

---

**IP PrintWay basic mode and extended mode fields**

Table 23 on page 132 lists the fields (and corresponding attributes) that IP PrintWay basic mode and extended mode support in different ways. Table 23 on page 132 describes the changes you might need to make in printer definitions that specify these fields when you migrate to extended mode.
**Tip:** To find all printer definitions that contain an attribute you want to change, use the Printer Inventory Definition Utility (PIDU) program. See "list—list names of objects" on page 279.

<table>
<thead>
<tr>
<th>ISPF panel field (attribute)</th>
<th>Description</th>
<th>Action required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data format (document-formats-supported)</td>
<td>This field lets you specify the types of data formats that the printer accepts or that can be transformed to a format the printer accepts. IP PrintWay extended mode validates that the format of the input data stream is one of the supported types. This field also applies to IP PrintWay basic mode, but only when the Resubmit for filtering option is selected. For more information, see &quot;Validating that data sets can print as requested&quot; on page 191.</td>
<td>Select all the data formats that IP PrintWay should accept.</td>
</tr>
<tr>
<td>Duplex supported (duplexes-supported)</td>
<td>This field specifies whether the printer can print in duplex. IP PrintWay extended mode validates that the printer supports the duplexing option specified in the DUPLEX parameter on the OUTPUT JCL statement. This field also applies to IP PrintWay basic mode, but only when the Resubmit for filtering option is selected. For more information, see &quot;Validating that data sets can print as requested&quot; on page 191.</td>
<td>Select all the duplex options that IP PrintWay should accept.</td>
</tr>
</tbody>
</table>
| Line termination (line-termination)  | The default line-termination controls for IP PrintWay extended mode are different from those in basic mode. The defaults, in EBCDIC, are: IP PrintWay basic mode:  
  - LPR, direct sockets, IPP: X'25'(line-feed)  
  - VTAM, email: X'0D15'(carriage-return, new-line)  
  IP PrintWay extended mode:  
  - LPR (ASCII printer code page), direct sockets, IPP: X'0D15'  
  - LPR (EBCDIC printer code page): X'0D25'  
  - VTAM, email: X'0D15'  
  In addition, IP PrintWay extended mode uses the printer code page (Printer code page field) to translate the line-termination controls from EBCDIC to ASCII, while IP PrintWay basic mode uses a hard-coded translate table. If the Line termination field contains 0025 or 25 and the Printer code page field contains ISO8859-1, leave the Line termination field blank so that IP PrintWay extended mode uses the default value. This is because code page ISO8859-1 translates EBCDIC X'25' to ASCII X'85', which can cause data to not print correctly. |
Table 23. Printer definition fields that have special considerations for IP PrintWay extended mode (continued)

<table>
<thead>
<tr>
<th>ISPF panel field (attribute)</th>
<th>Description</th>
<th>Action required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location (location)</td>
<td>This field lets you specify the location of the printer. This field is especially useful when you run IP PrintWay extended mode because Infoprint Central users can find printers to work with by specifying the printer location. For more information, see &quot;Specifying a printer definition name, description, and location&quot; on page 160.</td>
<td>Specify the location of the printer.</td>
</tr>
<tr>
<td>Response timeout (response-timeout)</td>
<td>This field specifies how long IP PrintWay waits for a response from the printer before resending data to the printer if retries are requested. You might want to specify a higher timeout value in this field when you run IP PrintWay extended mode. This is because a higher timeout value gives the operator more time to correct a printer problem, and IP PrintWay extended mode can print to other printers while it waits for a response from a printer. The IP PrintWay basic mode FSA cannot print to other printers while it waits for a response from one printer, so you should typically specify a lower timeout value when you run IP PrintWay basic mode. For more information, see &quot;Handling unsuccessful data transmissions&quot; on page 167.</td>
<td>Specify a higher timeout value when you run IP PrintWay extended mode.</td>
</tr>
</tbody>
</table>

Selecting the LPR protocol

In an IP PrintWay printer definition, you can select the transmission protocol that IP PrintWay uses to transmit output data sets from the JES spool to the printer, print server, or email destination. IP PrintWay supports these transmission protocols: LPR, direct sockets, IPP, VTAM, and email.

Select the IP PrintWay LPR protocol if you want IP PrintWay to transmit data sets to the printer or print server using the TCP/IP LPR protocol defined by RFC 1179. When IP PrintWay uses this protocol, an LPD that adheres to RFC 1179 must be running in the remote printer or print server.

When you select the LPR protocol, IP PrintWay transmits data to the LPD at the host name or IP address and print queue name that you specify in the printer definition. A job submitter can override the IP address and print queue name specified in the printer definition by specifying the host name or IP address on the OUTPUT JCL statement or in an Infoprint Server job attribute.

Because some job submitters can specify the printer's host name or IP address, you can create one printer definition for several printers that share the same attributes. To use this printer definition, the job submitter must specify the name of the printer definition, the printer's host name or IP address, and the printer's print queue name on the OUTPUT JCL statement or in an Infoprint Server job attribute. If the job submitter does not specify the name of the printer definition on an OUTPUT JCL statement, IP PrintWay uses printer attributes specified in the default
IP PrintWay printer definition described in "Creating an IP PrintWay default printer definition" on page 195. For more information about job submission, see z/OS Infoprint Server User's Guide.

When you select the LPR protocol, IP PrintWay also transmits a control file for each data set to the LPD. In the printer definition, you can specify whether you want IP PrintWay to transmit the control file before or after the data set. IP PrintWay converts some attributes that you specify in the printer definition to control codes in this control file. In addition, in the printer definition, you can specify any other control codes that the LPD accepts.

By default, IP PrintWay prints multiple copies of a data set by transmitting the data set to the printer multiple times. Some LPDs, however, can print multiple copies when IP PrintWay transmits the data set to the printer only one time. If your printer supports printing multiple copies of the same data set, you can select the Optimize copies option in the printer definition to improve performance. To determine if your printer supports printing multiple copies of the same data set, select the Optimize copies field and submit a print request with multiple copies. If your printer prints only one copy, deselect this option.

Related customization tasks: These IP PrintWay customization tasks are related to the LPR protocol. For information about how to do these tasks and other customization tasks related to the LPR protocol, see z/OS Infoprint Server Customization.

- Customize the TCP/IP component of z/OS Communications Server.
- IP PrintWay extended mode writes temporary data sets to the /var/Printsrv/printway directory. If necessary, increase the amount of space available to this directory.
- IP PrintWay basic mode writes temporary files to hiperspace. If necessary, increase the amount of available hiperspace in the IP PrintWay FSS definition.

Procedure for specifying attributes

1. On the Choose a Definition Type and Protocol panel, select IP PrintWay LPR. If you copy a printer definition, select an IP PrintWay printer definition that uses the LPR protocol.

2. On the LPR Protocol panel, specify these fields:
   - **IP address**: Specify the host name or IP address of the printer or print server. If another printer definition refers to this printer, use the same uppercase and lowercase letters when you type the host name. If you run IP PrintWay extended mode, the IP address can be in dotted-decimal or colon-hexadecimal format. If you run IP PrintWay basic mode, the IP address can be in dotted-decimal format, but not in colon-hexadecimal format.
     - **Limitation**: IP PrintWay basic mode does not support IPv6. Only IP PrintWay extended mode supports it.
     - **Tip**: If you run IP PrintWay extended mode and specify a host name, define the host name in the domain name server (DNS) before you save the printer definition. If you create the DNS entry after you save the printer definition, Infoprint Central cannot display the printer for this printer definition until someone submits a print job to the printer definition or until you modify an attribute in the printer definition.
• **Print queue name**: Specify the name of the print queue in the printer or print server. To determine the correct queue name, see the documentation for the network interface card, the printer, or the print server.

  **Tip**: Some common queue names are:
  – TEXT and RAW are queue names used for some Ricoh printers, most HP printers, and most Lexmark printers. Specify the RAW queue for formatted text data, PCL data, and PostScript data.
  – TEXT and PASS are queue names used for some Ricoh printers. Specify the PASS queue for formatted text data, PCL data, and PostScript data.

Formatted text data must contain a carriage return and line feed controls at the end of each line. If you specify RAW or PASS and you run IP PrintWay basic mode, also specify 0D25 in the **Line termination** field. This causes IP PrintWay basic mode to add carriage return and line feed controls at the end of each line. IP PrintWay extended mode adds carriage return and either line feed or new line controls at the end of each line by default.

• **Mode**: Select one of these options:
  – **Control file last**: IP PrintWay transmits the control file after the data file. All LPDs that adhere to RFC 1179 support this mode (default).
  – **Control file first**: IP PrintWay transmits the control file before the data file. Not all LPDs support this mode. However, this mode lets some LPDs print data as it is received and print larger files.
  – **Stream**: IP PrintWay transmits the control file before the data file. The remote LPD must support the RECEIVE CONTROL FILE FIRST and RECEIVE DATA FILE WITH UNSPECIFIED LENGTH commands. Select this mode for IBM network stations.
  – **Remote PSF**: IP PrintWay transmits files to Ricoh InfoPrint Manager or to Ricoh ProcessDirector. For more information about this option, see “Printing with Ricoh InfoPrint Manager or Ricoh ProcessDirector” on page 193.

• **Optimize copies**: Select this field if the printer’s LPD can print multiple copies of the same data set.

• **Restrict ports**: Select this field to restrict the z/OS ports that IP PrintWay uses to the range of 721 to 731. Select this option if the printer’s LPD requires that IP PrintWay restrict itself to ports in this range. When you do not select the **Restrict Ports** field, IP PrintWay can use any free port. This increases the probability of finding an available port.

• **Print banner page, Banner class, Banner job name, Filename, Indent, Owner, Print function, Title, and Width**: (Optional) Specify values that IP PrintWay transmits to the printer in the LPD control file. For a description of these fields and the default values, see the ISPF online help panels.

  **Tip**: Although IP PrintWay transmits these values to the LPD, the LPD might not support them. For example, the LPD might not support printing a banner page or indenting data.

• **User options**: (Optional) Specify control codes that are supported by the LPD. IP PrintWay adds these control codes to the end of the LPD control file.

3. On the IP PrintWay Options panel, specify these fields:
Automatic dataset grouping (extended mode) or Dataset grouping: Select how you want IP PrintWay to transmit data sets that are in the same JES output group. For information, see “Transmitting multiple data sets in a JES output group” on page 185.

Tip: When you run IP PrintWay extended mode, select the Automatic dataset grouping (extended mode) field. Automatic data set grouping is the most efficient method of transmitting data sets to the printer. Also, it makes sure that data sets in the same output group print together.

Document header or Document trailer: You might need to specify a command to force the printer to start each copy on a new sheet of paper. For more information, see “Sending commands to the printer” on page 187.

Example
These ISPF panels show how to specify the LPR protocol in a printer definition.

Tip: This example shows only some of the ISPF panels that comprise a printer definition. For a complete printer definition that is suitable for the LPR protocol, see Appendix D, “Sample IP PrintWay printer definitions,” on page 493.

The Choose a Definition Type and Protocol panel lets you select the protocol type when you use the Add function to create a printer definition.

```
Choose a Definition Type and Protocol
Option ==> 1
  Type Protocol
1  IP PrintWay LPR
2  IP PrintWay direct sockets
3  IP PrintWay IPP
4  IP PrintWay VTAM
5  IP PrintWay email
6  PSF
7  General
```

To display this LPR Protocol panel, press Enter on the Custom values field for the Protocol section on the main panel for the printer definition.
LPR Protocol

Printer definition name: myprinter
Operator security profile

Printer IP address: printer1.boulder
Print queue name: RAM

LPR Processing Options:
Mode: 2. Control file last
       3. Stream
       4. Remote PSF

Optimize copies
Restrict ports
Print banner page
Banner class: Department 001, Building 003
Banner job name
Filename
Indent
Owner
Print function
Title
Width
User options

Results:

- IP PrintWay uses the LPR protocol to transmit data sets to print queue text at IP address printer1.boulder. Because the Restrict ports field is not selected, IP PrintWay lets TCP/IP select any available port on the z/OS system to transmit data.
- Because Control file last is selected in the Mode field, IP PrintWay transmits the control file to the LPD after the data file.
- IP PrintWay also transmits the text specified in the Banner class field to the LPD in the control file for printing on a banner page, a page that prints before the data set. However, the banner prints only if the LPD can print banner pages.

To display this IP PrintWay Options panel, press Enter on the Custom values field for the IP PrintWay Options section on the main panel for the printer definition:

Result: IP PrintWay sends all data sets in the same JES output group to the printer in the same transmission:

- IP PrintWay extended mode uses the Automatic dataset grouping field. IP PrintWay extended mode uses the Dataset grouping field only if the Automatic dataset grouping field is not selected.
- IP PrintWay basic mode uses the Concatenate job option of the Dataset grouping field.
Selecting the direct sockets protocol

In an IP PrintWay printer definition, you can select the transmission protocol that IP PrintWay uses to transmit output data sets from the JES spool to the printer, print server, or email destination. IP PrintWay supports these transmission protocols: LPR, direct sockets, IPP, VTAM, and email.

Select the IP PrintWay direct sockets protocol if you want IP PrintWay to use the TCP/IP direct sockets printing protocol to transmit data sets directly to a designated port on a printer or print server. When you select this protocol, the printer or print server must support direct sockets printing.

Tips:
• Some printers support the direct sockets printing protocol as well as other protocols, such as the LPR protocol. For large data sets, the direct sockets printing protocol can provide better performance. However, you might want to select the LPR protocol to take advantage of the formatting options that IP PrintWay can specify in the LPD control file. For example, printing a banner page.
• When you select the direct sockets protocol, IP PrintWay extended mode can record the number of printed pages in the SMF type 6 record and can restart printing after the last page that printed successfully. For information, see “Tracking the number of printed pages (extended mode)” on page 174.

When you select the direct sockets protocol, IP PrintWay transmits data to the printer or print server at the IP address (or host name) and port number that you specify in the printer definition. A job submitter can override the IP address and port number specified in the printer definition by specifying the IP address in the DEST=IP: parameter and the port number in the PORTNO parameter on the OUTPUT JCL statement.

Because the job submitter can override the IP address and port number, you can create one printer definition for several printers that share the same attributes. To use this printer definition, the job submitter must specify the name of the printer definition, the IP address, and the port number on the OUTPUT JCL statement. If the job submitter does not specify the name of the printer definition on the OUTPUT JCL statement, IP PrintWay uses printer attributes specified in the default IP PrintWay printer definition described in “Creating an IP PrintWay default printer definition” on page 195. For more information about job submission, see z/OS Infoprint Server User’s Guide.

IP PrintWay prints multiple copies by transmitting the data set to the printer the requested number of times. This is because the direct sockets printing protocol cannot print multiple copies of a single data set.

Related customization tasks: These IP PrintWay customization tasks are related to the direct sockets protocol. For information about how to do these tasks and other customization tasks related to the direct sockets protocol, see z/OS Infoprint Server Customization.
• Customize the TCP/IP component of z/OS Communications Server.
• When more than one copy is requested, IP PrintWay extended mode writes temporary files to the /var/Printsrv/printway directory. If necessary, increase the amount of space available to this directory.
When you specify a value in the **Maximum document size** field, or select the **Delete form feed** option, IP PrintWay basic mode writes temporary files to hiperspace. If necessary, increase the amount of available hiperspace in the IP PrintWay FSS definition.

**Procedure for specifying attributes**

1. Add a new printer definition. On the Choose a Definition Type and Protocol panel, select **IP PrintWay direct sockets**. If you copy a printer definition, select an IP PrintWay printer definition that uses the direct sockets protocol.

2. On the Direct Sockets Protocol panel, specify these fields:
   - **IP address**: Specify the host name or IP address of the printer or print server. If another printer definition refers to this printer, use the same uppercase and lowercase letters when you type the host name. If you run IP PrintWay extended mode, the IP address can be in dotted-decimal or colon-hexadecimal format. If you run IP PrintWay basic mode, the IP address can be in dotted-decimal format, but not in colon-hexadecimal format.
     
     **Limitation**: IP PrintWay basic mode does not support IPv6. Only IP PrintWay extended mode supports it.
     
     **Tip**: If you run IP PrintWay extended mode and specify a host name, define the host name in the domain name server (DNS) before you save the printer definition. If you create the DNS entry after you save the printer definition, Infoprint Central cannot display the printer for this printer definition until someone submits a print job to the printer definition or until you modify an attribute in the printer definition.
   - **Port number**: Specify the port number at which the printer or print server supports printing. To determine the correct port number, see the documentation for the network interface card or printer.
     
     **Tip**: Some common port numbers are:
     - Port 9100, which is used by some Ricoh printers, most HP printers, and most Lexmark printers.
     - Port 2501, which is used by some Ricoh printers.
   - (Optional) **Record pages printed for accounting**: IP PrintWay extended mode records the number of printed pages in the SMF type 6 record. For more information, see "Tracking the number of printed pages (extended mode)" on page 174.
   - (Optional) **Restart printing after last successful page**: IP PrintWay extended mode restarts printing after the last page in the print job that printed successfully. For more information, see "Tracking the number of printed pages (extended mode)" on page 174.

**Example**

These ISPF panels show how to specify the direct sockets protocol in a printer definition.

When you use the Add function to create a new printer definition, the Choose a Definition Type and Protocol panel lets you select the protocol type.
To display this Direct Sockets Protocol panel, press Enter on the Custom values field for the Protocol section on the main panel for the printer definition.

**Result:** IP PrintWay uses the direct sockets protocol to transmit data sets to port number 2501 at IP address 99.999.123.456. IP PrintWay transmits only a data file, without a control file.

**Selecting the IPP protocol**

In an IP PrintWay printer definition, you can select the transmission protocol that IP PrintWay uses to transmit output data sets from the JES spool to the printer, print server, or email destination. IP PrintWay supports these transmission protocols: LPR, direct sockets, IPP, VTAM, and email.

Select the IP PrintWay IPP (Internet Printing Protocol) protocol if you want IP PrintWay to transmit data sets over the Internet to the printer. When you select the IPP protocol, an IPP server must be running in the remote printer or host system.

IP PrintWay transmits the print data stream to the IPP server at the URL that you specify in the printer definition. A job submitter cannot override the URL when submitting a print job. This means that you must create one printer definition for each printer.

Along with the data, IP PrintWay also transmits a control file containing these IPP job attributes:

- copies
- document-name
- job-name
- requesting-user-name
- sides

The IPP server running in the printer or print server processes the IPP job attributes that IP PrintWay sends with each print request. The IPP server ignores any IPP job attributes that it does not support. For example, some IPP servers do
not support the copies and sides attributes, so the output might not print as requested. If the IPP server ignores one or more of the IPP job attributes for a print job, a message in the IP PrintWay message log indicates which job attributes were ignored.

Limitations: When you select the IPP protocol, IP PrintWay does not support:
- Concatenate job option of the Dataset grouping field
- Automatic dataset grouping field

Related customization tasks: These IP PrintWay customization tasks are related to the IPP protocol. For information about how to do these tasks and other customization tasks related to the IPP protocol, see z/OS Infoprint Server Customization.

- If you did not install Infoprint Server files in default directories, specify the directories in the STDENV data set in the IP PrintWay startup procedure.
- Customize the TCP/IP component of z/OS Communications Server.
- When more than one copy is requested, IP PrintWay extended mode writes temporary files to the /var/Printsrv/printway directory. If necessary, increase the amount of space available to this directory.
- When you specify a value in the Maximum document size field or select the Delete form feed option, IP PrintWay basic mode writes temporary files to hiperspace. If necessary, increase the amount of available hiperspace in the IP PrintWay FSS definition.

Procedure for specifying attributes

1. Add a new printer definition. On the Choose a Definition Type and Protocol panel, select IP PrintWay IPP. If you copy a printer definition, select an IP PrintWay printer definition that uses the IPP protocol.

2. On the IPP Protocol panel, specify these fields:
   - URL: Specify the uniform resource locator (URL) of the IPP server. Consult your IPP printer or IPP print server documentation for the format of the URL to use. The format of the URL depends on the implementation of the IPP printer or print server and varies among printer manufacturers.

Example

These ISPF panels show how to specify the IPP protocol in a printer definition.

When you use the Add function to create a printer definition, the Choose a Definition Type and Protocol panel lets you select the protocol type.
To display this IPP Protocol panel, press Enter on the Custom values field for the Protocol section on the main panel for the printer definition.

<table>
<thead>
<tr>
<th>IPP Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printer definition name: myprinter</td>
</tr>
<tr>
<td>Operator security profile: ...</td>
</tr>
<tr>
<td>URL: <a href="http://mprinter.xyz.com:631">http://mprinter.xyz.com:631</a> (extend)</td>
</tr>
</tbody>
</table>

**Result:** IP PrintWay uses the IPP protocol to transmit data sets to an IPP server at URL http://mprinter.xyz.com:631.

### Selecting the VTAM protocol

In an IP PrintWay printer definition, you can select the transmission protocol that IP PrintWay uses to transmit output data sets from the JES spool to the printer, print server, or email destination. IP PrintWay supports these transmission protocols: LPR, direct sockets, IPP, VTAM, and email.

Select the IP PrintWay VTAM protocol if you want IP PrintWay to transmit data sets to a VTAM-controlled printer. The printer must be defined to VTAM as LU type 0, 1, or 3.

IP PrintWay transmits data sets to the VTAM LU name that you specify in the printer definition. A job submitter cannot specify the LU name of the printer when submitting a print job. Therefore, you must create a printer definition for each VTAM-controlled printer.

Depending on the VTAM LU type, IP PrintWay can convert line data to either the SNA Character String (SCS) or the Data Stream Compatible/Data Stream Extended (DSC/DSE) data stream. This table summarizes the supported LU types and data streams:

<table>
<thead>
<tr>
<th>LU type</th>
<th>Data stream</th>
</tr>
</thead>
<tbody>
<tr>
<td>LU type 0</td>
<td>DSC/DSE</td>
</tr>
<tr>
<td>LU type 1</td>
<td>SCS</td>
</tr>
<tr>
<td>LU type 3</td>
<td>DSC/DSE</td>
</tr>
</tbody>
</table>

IP PrintWay can also transmit data sets to VTAM-controlled printers without changing the data. This support means that you can print data that is already in the format required by your VTAM-controlled printers. For example, you can print PCL data to VTAM-controlled printers that accept PCL data. As an option, IP PrintWay can transmit the unchanged data as transparent data. This support lets you transmit data through an SNA gateway that requires that data be preceded by transparent data controls. Typically, the SNA gateway removes the transparent data controls before transmitting the data to the printer. For each printer, you can specify the transparent data character that the SNA gateway expects in the transparent data controls. IP PrintWay does not transmit these types of data as transparent data:

- Printer commands specified in the **Document header** and **Document trailer** fields
- Data added by the IP PrintWay Begin Data Set and End Data Set exits
Limitations: When you select the VTAM protocol, IP PrintWay does not support:
  • Double-byte character set (DBCS) data
  • Printing more than one copy of a data set (IP PrintWay basic mode)
  • For LU1 devices, String Control Byte compression (SCB) or compaction
  • \textbf{Dataset grouping} and \textbf{Automatic dataset grouping} fields
  • Translate only option of the Formatting field

Related customization tasks: These IP PrintWay customization tasks are related to the VTAM protocol. For information about how to do these tasks and other customization tasks related to the VTAM protocol, see \textit{z/OS Infoprint Server Customization}.
  • Install Infoprint Coaxial Printer Support V2 for z/OS (5655-N62). For installation instructions, see the Program Directory for the product.
  • Create a VTAM APPL definition for IP PrintWay (extended mode), or create a VTAM APPL definition for each IP PrintWay FSS (basic mode).

Creating VTAM resource definitions for VTAM-controlled printers

You must create these VTAM resource definitions in addition to the VTAM APPL definition for the IP PrintWay FSS:
  • A VTAM logon mode entry definition for each device type. See \textit{VTAM logon mode definitions}.
  • A VTAM resource definition for each printer. See \textit{VTAM resource definitions for printers} on page 144.
  • VTAM cross-domain definitions. These definitions might be required if the VTAM printer resource definitions are owned by another VTAM domain.

For complete information about how to create these VTAM resource definitions, see \textit{z/OS Communications Server: SNA Resource Definition Reference}.

VTAM logon mode definitions

A VTAM logon mode definition defines the VTAM session parameters. IP PrintWay does not require any special parameters in the VTAM logon mode definition. Therefore, you can use any existing LU0, LU1, and LU3 logon mode definition that is suitable for the type of printer attachment used by the printer. In a VTAM cross-domain system, the logon mode definition must be available to the VTAM domain that owns the printer logical unit.

Entries supplied by IBM in the default logon mode table, ISTINCLM, that would be suitable are:

```
**********************************************************************
* * DSILGMD LOGMODE TABLE FOR BSC,LOCAL,SDLC 3275,3277,3278,3279 * *
* MODEL 2 OR 12, 24 X 80 SCREEN. MAY BE USED TO RUN * *
* MODELS 3, 4, 5, 2C OR 3C AS MODEL 2 * *
* ALSO FOR 3284, 3286, 3287, 3288, 3289 Printers * *
* THROUGH A 3271, 3272, 3274, 3275, OR 3276 CONTROLLER * *
**********************************************************************

DSILGMD MODEENT LOGMODE=DSILGMD,FMPROF=X'02',TSRPROF=X'02', *
PRIPROT=X'71',SECPROT=X'40',COMPRON=X'2000', *
RUSIZES=X'0000',PSERVIC=X'00000000000000002000',*
APPNCOS=#CONNECT

**********************************************************************
* * PRINTER WITH SNA CHARACTER SET * *
```
VTAM resource definitions for printers

A VTAM resource definition is required for each printer. Some sample VTAM resource definitions are:

* Non-SNA, LUTYPE=0
  P001 LOCAL CUADDR=nnn, TERM=nnnn, DLOGMOD=DSILGMOD
* SNA, LUTYPE=1
  P002 LU LOCADDR=nnn, DLOGMOD=SCS
  P003 LU LOCADDR=nnn, DLOGMOD=DSC4K

**Tip:** The DLOGMOD parameter names an entry in the VTAM logmode table. You can also specify the logmode entry name in the Printer logmode field of the printer definition.

**Procedure for specifying attributes**

1. Add a printer definition. On the Choose a Definition Type and Protocol panel, select **IP PrintWay VTAM**. When you select the VTAM protocol, a value that is suitable for the VTAM protocol is automatically displayed in this field:
   - **Printer code page:** The EBCDIC code page specified in the `ebcdic-codepage` attribute in the Infoprint Server configuration file (`aopd.conf`) or in the system configuration definition is displayed.
   Instead of adding a new printer definition, you can either copy or change the protocol in an existing printer definition:
   - If you copy a printer definition, select an IP PrintWay printer definition that uses the VTAM protocol.
   - If you change the protocol type of an existing printer definition using the `X` function on the List Printer Definition panel, also edit this field on the Processing panel:
     - **Printer code page:** Specify an EBCDIC code page (such as IBM-1047) because most VTAM-controlled printers expect EBCDIC data.

2. On the VTAM Protocol panel, specify these fields:
   - **Printer LU name:** Specify the VTAM network name of the printer. This name must match the name of the VTAM resource definition. For example, the name of the VTAM LU statement or the VTAM LOCAL statement. This field is required.
   - **Printer logmode:** (Optional) Specify the name of an entry in the VTAM logon mode table. The default is the name specified in the DLOGMOD parameter of the VTAM resource definition statement for the printer.
• **Checkpoint pages**: (Optional) Specify the number of pages (0 - 25) between data-set checkpoints. IP PrintWay requests a definitive response from the printer after the specified number of pages. If a printer error or printer intervention situation occurs, IP PrintWay resends all pages that were sent after the last definitive response from the printer. This makes sure that no data is lost. However, duplicate pages, up to the specified checkpoint number, might be printed.

If a printer error or intervention situation persists after IP PrintWay resends pages from the last data-set checkpoint, IP PrintWay resends all data from the beginning if retries are requested. In this case, more duplicate pages might be printed.

A value of 0 means that IP PrintWay takes no checkpoints. If an error occurs, IP PrintWay retransmits the entire data set if you have requested retries for the printer.

If you request frequent checkpoints, printer performance might be adversely affected. If you request less frequent checkpoints, more duplicate pages might be printed. The default value is 5 pages.

• **Send as transparent data**: (Optional) Select this field to send data to the printer as transparent data. IP PrintWay precedes transparent data with a transparent data control that contains a 1-byte transparent data character and a 1-byte length field.

  **Tip**: When you select the **Send as transparent data** field, IP PrintWay always processes data as if the IP PrintWay **None** formatting option were selected. Therefore, if you select this field, it is not necessary to also select the **None** option on the IP PrintWay Options panel.

3. (Optional) On the Processing panel and the IP PrintWay Options panel, specify these fields that control how IP PrintWay formats data for the printer:

• **Transparent data char**: (Optional) If you select the **Send as transparent data** field, specify the transparent data character that you want IP PrintWay to use in the transparent data control. The default character is X’35’.

• If you do not select the **Send as transparent data** field, see “SCS page-formatting attributes” on page 199 and “Using an FCB to format data” on page 183 for information about the fields that control how IP PrintWay creates SCS and DSC/3270 data streams.

---

**Example**

These ISPF panels show how to specify the VTAM protocol in a printer definition.

**Tip**: This example shows only some of the ISPF panels that comprise a printer definition. For a complete printer definition that is suitable for the VTAM protocol, see Appendix D, “Sample IP PrintWay printer definitions,” on page 493.

Use the Add function to create a printer definition. On the Choose a Definition Type and Protocol panel, select the protocol type:
Choose a Definition Type and Protocol

<table>
<thead>
<tr>
<th>Option</th>
<th>Type</th>
<th>Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IP PrintWay</td>
<td>LPR</td>
</tr>
<tr>
<td>2</td>
<td>IP PrintWay</td>
<td>direct sockets</td>
</tr>
<tr>
<td>3</td>
<td>IP PrintWay</td>
<td>IPP</td>
</tr>
<tr>
<td>4</td>
<td>IP PrintWay</td>
<td>VTAM</td>
</tr>
<tr>
<td>5</td>
<td>IP PrintWay</td>
<td>email</td>
</tr>
<tr>
<td>6</td>
<td>PSF</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>General</td>
<td></td>
</tr>
</tbody>
</table>

To display this VTAM Protocol panel, press Enter on the Custom values field for the Protocol section on the main panel of the printer definition.

VTAM Protocol

Printer definition name . myprinter
Operator security profile
Printer LU name . . P002
VTAM Processing Options:
  - Printer logmode ... SCS
  - Checkpoint pages ... 5
  _ Send as transparent data

Results:
- IP PrintWay uses the VTAM protocol to transmit data sets to the printer with VTAM LU name P002.
- IP PrintWay uses the VTAM logon-mode entry named SCS and requests a definitive response from the printer every 5 pages.

Selecting the email protocol

In an IP PrintWay printer definition, you can select the transmission protocol that IP PrintWay uses to transmit output data sets from the JES spool to the printer, print server, or email destination. IP PrintWay supports these transmission protocols: LPR, direct sockets, IPP, VTAM, and email.

Select the IP PrintWay email protocol if you want IP PrintWay to transmit data sets to one or more email addresses over the Internet using the z/OS UNIX sendmail function that z/OS Communications Server provides.

IP PrintWay transmits emails to the email addresses that you specify in the printer definition. Some job submitters can override the email addresses during job submission. You can set up just one printer definition for the email protocol because the job submitter can specify the email addresses. You must specify a default email address in this printer definition.

IP PrintWay provides these functions when you select the email protocol:
- IP PrintWay can send an output data set to one or more primary and secondary email addresses at the same time.
You can specify email addresses or the name of an alias that is defined to sendmail. Sendmail expands alias names into one or more real email addresses. For information about how to define aliases, see “Defining aliases to z/OS UNIX sendmail” on page 151.

You can specify the email address or alias name that recipients of the email can reply to.

IP PrintWay basic mode sends all documents as email attachments. IP PrintWay extended mode can include text and line-data documents inline in the body of an email. To request this function, select the Inline text and line data field in the printer definition.

IP PrintWay can send data sets that are in the same JES output group in the same email. To request this function, select the Concatenate job option in the Dataset grouping field or the Automatic dataset grouping (extended mode) field.

IP PrintWay can transform the input data from one format to another before creating the attachment. For example, if your installation has installed an AFP to PDF transform, you can transform line-data or AFP data to PDF format. For information about how to request a transform, see Chapter 13, “Planning printer definitions for transforms,” on page 213.

Depending on the method used to submit jobs, some job submitters can customize the subject of the email. For those situations in which the job submitter cannot specify a subject, you can specify a default subject line in the printer definition. For example, when you print VTAM application data (such as CICS data) through NetSpool, the job submitter cannot customize the subject line unless the VTAM application embeds the title-text job attribute in the print data.

When you print VTAM application data (such as CICS data) through NetSpool, you can print data and also send it to a set of email addresses at the same time. To do this, create a printer pool definition and in the pool definition list the printer definition that specifies the email addresses and also the printer definition for the printer itself. For more information, see “Broadcasting data using multiple printer definitions” on page 120.

IP PrintWay extended mode can send emails to the recipients specified in an email header in line-data documents. To select this function, select the Embedded headers field. For the format of the email header, see z/OS Infoprint Server User’s Guide.

IP PrintWay extended mode can include a message in the beginning of emails. To select this function, specify the Inline message field.

Table 24 shows how IP PrintWay constructs an email.

<table>
<thead>
<tr>
<th>For this email field:</th>
<th>IP PrintWay uses this value:</th>
<th>For example:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date and time</td>
<td>Current® date and time</td>
<td>12/22/2004 12:00:00 AM</td>
</tr>
<tr>
<td>Primary recipients</td>
<td>Email addresses and sendmail alias names specified in the:</td>
<td>To: <a href="mailto:toname@xyz.com">toname@xyz.com</a>, dept01list</td>
</tr>
<tr>
<td></td>
<td>1. To field in the email header in a line-data document (extended mode only)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. XTPIPADR field of the IP PrintWay Routing exit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. MAILTO JCL parameter or mail-to-addresses job attribute</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. To addresses field in printer definition</td>
<td></td>
</tr>
</tbody>
</table>
Table 24. Fields in an email (continued)

<table>
<thead>
<tr>
<th>For this email field:</th>
<th>IP PrintWay uses this value:</th>
<th>For example:</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Blind copy (bcc)” recipients</td>
<td>Email addresses and sendmail alias names specified in the:</td>
<td>bcc: <a href="mailto:bccname@xyz.com">bccname@xyz.com</a>, dept01list</td>
</tr>
<tr>
<td></td>
<td>1. <strong>Bcc</strong> field in the email header in a line-data document (extended mode only)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. MAILBCC JCL parameter or <strong>mail-bcc-addresses</strong> job attribute</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. <strong>BCC addresses</strong> field in printer definition</td>
<td></td>
</tr>
<tr>
<td>“Copy (cc)” recipients</td>
<td>Email addresses and sendmail alias names specified in the:</td>
<td>cc: <a href="mailto:copynname@xyz.com">copynname@xyz.com</a>, dept01list</td>
</tr>
<tr>
<td></td>
<td>1. <strong>Cc</strong> field in the email header in a line-data document (extended mode only)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. MAILCC JCL parameter or <strong>mail-cc-addresses</strong> job attribute</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. <strong>CC addresses</strong> field in printer definition</td>
<td></td>
</tr>
<tr>
<td>Sender</td>
<td>User ID of job creator@domain of z/OS system. For print requests processed by NetSpool, the user ID can be specified in the <strong>owner</strong> job attribute or in the <strong>Default owner</strong> field of the printer definition. Also, an optional descriptive name specified in the:</td>
<td>From: USER1@SYSTEM1 or From: John Q. Sender <a href="mailto:USER1@SYSTEM1">USER1@SYSTEM1</a></td>
</tr>
<tr>
<td></td>
<td>1. <strong>From</strong> field in the email header in a line-data document (extended mode only)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. MAILFROM JCL parameter or <strong>mail-from-name</strong> job attribute</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. <strong>From name</strong> field in printer definition</td>
<td></td>
</tr>
<tr>
<td>Reply address</td>
<td>Email address specified in the:</td>
<td>Reply To: <a href="mailto:myname@xyz.com">myname@xyz.com</a></td>
</tr>
<tr>
<td></td>
<td>1. <strong>Reply-to</strong> field in the email header in a line-data document (extended mode only)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. REPLYTO JCL parameter or <strong>mail-reply-address</strong> job attribute</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. <strong>Reply address</strong> field in printer definition</td>
<td></td>
</tr>
<tr>
<td>Subject</td>
<td>Text specified in the:</td>
<td>Subject: Annual Report for XYZ Corporation</td>
</tr>
<tr>
<td></td>
<td>1. <strong>Subject</strong> field in the email header in a line-data document (extended mode only)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. TITLE JCL parameter, <strong>title-text</strong> job attribute, or TITLE parameter of the LPR command</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. <strong>Title</strong> field in printer definition</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If no title is specified, either the job name or the fully qualified data set name is used. (See Note 1 below.)</td>
<td></td>
</tr>
</tbody>
</table>
Table 24. Fields in an email (continued)

<table>
<thead>
<tr>
<th>For this email field</th>
<th>IP PrintWay uses this value</th>
<th>For example:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of attachment</td>
<td>1. Text specified in the MAILFILE JCL parameter or <code>mail-file-name</code> job attribute</td>
<td>February 2004 sales report.txt, MYFILE.txt, MYFILE.afp, MYFILE.pdf</td>
</tr>
<tr>
<td></td>
<td>2. If Print Interface processes the print request, the text specified in the <code>sysout-dataset-name</code> job attribute, or the last 8 characters of the file name</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. If NetSpool processes the print request, the text specified in the <code>sysout-dataset-name</code> job attribute, or the LU name of the VTAM application that submitted the print request (primary LU)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. If the print job is submitted with JCL, the last qualifier of the data set name on the JES spool, or the job name</td>
<td></td>
</tr>
</tbody>
</table>

IP PrintWay attaches a suffix to the file name that designates the document format. (See Note 2 below.)

Notes:

1. In these situations, Infoprint Server generates the job name. In all other cases, the job name is the name of the batch job.
   - If NetSpool processes the print request, the job name is the name specified in the `sysout-job-name` job attribute, the owner name specified in the `owner` job attribute or in the printer definition, or the member name of the NetSpool startup procedure.
   - If Print Interface, except for the subsystem, processes the print request, the job name is the name specified in the `sysout-job-name` job attribute or the user ID of the person who submitted the print request.

2. Considerations for the name of the file attachment:
   - A # in the file name means that the original file name contains a character that JES does not allow in a data set name. For example, if the original file name is `myfile.print`, this field contains `le#print`.
   - These suffixes designate the document format:

<table>
<thead>
<tr>
<th>Suffix</th>
<th>Document format</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>afp</code></td>
<td>Advanced Function Presentation (also known as MO:DCA-P)</td>
</tr>
<tr>
<td><code>jpg</code></td>
<td>Joint Photographic Experts Group file information format (JFIF)</td>
</tr>
<tr>
<td><code>pcl</code></td>
<td>Hewlett Packard Printer Control Language</td>
</tr>
<tr>
<td><code>pdf</code></td>
<td>Adobe Portable Document Format</td>
</tr>
<tr>
<td><code>ps</code></td>
<td>Adobe PostScript</td>
</tr>
<tr>
<td><code>sap</code></td>
<td>SAP R/3 Output Text Format (OTF) or ABAP</td>
</tr>
<tr>
<td><code>tif</code></td>
<td>Tagged image file format</td>
</tr>
<tr>
<td><code>txt</code></td>
<td>Text</td>
</tr>
<tr>
<td><code>octet-stream</code></td>
<td>Unrecognized format</td>
</tr>
</tbody>
</table>

   - Tip: [Table 25 on page 150](#) shows the environment variables and configuration attributes that the administrator can set to control the suffixes that IP PrintWay appends to the file names. IP PrintWay extended mode uses configuration attributes instead of environment variables when dynamic configuration is enabled.
Table 25. Environment variables and configuration attributes for email suffixes

<table>
<thead>
<tr>
<th>Environment variable</th>
<th>Configuration attribute</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOP_MAIL_PRESERVE_SUFFIXES</td>
<td>mail-preserve-suffixes</td>
<td>A list of suffixes that IP PrintWay preserves in file names specified in the MAILFILE JCL parameter or in the mail-file-name job attribute. If the file name ends with one of the suffixes in this list, IP PrintWay does not append another suffix to the file name.</td>
</tr>
<tr>
<td>AOP_MAIL_DO_NOT_ADD_SUFFIX</td>
<td>mail-do-not-add-suffixes</td>
<td>Indicates whether IP PrintWay appends a suffix to file names specified in the MAILFILE JCL parameter or the mail-file-name job attribute.</td>
</tr>
</tbody>
</table>

For information about these environment variables and configuration attributes, see [z/OS Infoprint Server Customization](#).

3. IP PrintWay uses the values in a document email header only if the Embedded headers field is selected in the printer definition or the mail-embedded-headers job attribute is specified.

Limitations:

- In some situations, the sender field of the email does not contain the email address of the individual who sent the email. Therefore, job submitters should specify the reply address in the mail-reply-address attribute. If job submitters cannot specify attributes, you can specify the reply address in the Reply address field in the printer definition.
- In these cases, the recipient should not reply to the sender:
  - If NetSpool processed the print request and no owner is specified in either the owner job attribute or in the printer definition, the sender is the ID of the user who started the Infoprint Server daemons and the domain is the domain of the system on which sendmail is running.
  - If Print Interface processed the print request and the job was submitted from a remote system, the sender is the name of the user on the remote system. However, the domain name is the domain of the system on which sendmail is running, so in most cases, this would not be a valid z/OS email address.
- IP PrintWay cannot always determine whether an email was successfully sent to a recipient. This is because sendmail does not report an error to IP PrintWay when mail could not be delivered to an email address on a remote system. In this case, sendmail returns the undeliverable email to owner of the sendmail alias. If the email address is specified directly in the printer definition, or if no alias owner is defined, sendmail returns undeliverable email to the user ID associated with the IP PrintWay startup procedure (basic mode) or the ID of the user who started the Infoprint Server daemons. For more information about sendmail messages, see "Viewing z/OS UNIX sendmail messages" on page 59.
- IP PrintWay ignores the number of requested copies and always sends only one data set to an email address.
- IP PrintWay cannot add PostScript headers to data sets with line data. If you want to email line data as a PostScript document, use the AFP to PostScript transform to convert line data to PostScript format.
Related customization tasks: These IP PrintWay customization tasks are related to
the email protocol. For information about how to do these tasks and other
customization tasks related to the email protocol, see [z/OS Infoprint Server
Customization]

- Configure the z/OS UNIX sendmail component of z/OS Communications
  Server.
- If you did not install Infoprint Server files and z/OS UNIX sendmail in default
directories, specify the directories in either the AOPMAILER environment
  variable or the mail-path-name configuration attribute. For information, see [z/OS
  Infoprint Server Customization]
- Customize the TCP/IP component of z/OS Communications Server.
- When you specify a value in the Maximum document size field or select the
  Delete form feed option, IP PrintWay basic mode writes temporary files to
  hiperspace. If necessary, increase the amount of available hiperspace in the IP
  PrintWay FSS definition.

Defining aliases to z/OS UNIX sendmail

You can define an alias name to sendmail to represent one or more real email
addresses. Sendmail expands alias names into email addresses when it sends an
email. After you define an alias to sendmail, you can specify the alias name in a
printer definition. You might want to define an alias for a mailing list that you
need to specify in more than one printer definition or that is longer than the
number of characters you can specify in a printer definition.

This is a summary of the steps you need to do to define an alias to sendmail. For
more complete information, see [z/OS Communications Server: IP Configuration Guide]

1. In the sendmail aliases file, /etc/mail/aliases, specify the alias name and either
   the real email addresses or the name of a file in which you specify the real
   addresses. To edit the aliases file, you must have an effective UID of 0.

2. Run the sendmail newaliases command so that sendmail recognizes the new
   aliases.

3. (Optional) Create a file in which you specify the real email addresses for the
   alias. This file must be readable by everyone but writeable only by the owner.
   All directories in its path must be readable by everyone, executable by
   everyone, and writeable only by the owner.

For example, to define two aliases, dept123 and dept456:

1. Switch to an effective UID of 0:
   
   su

   To use the z/OS UNIX su command, you must be permitted to the
   BPX.SUPERUSER profile in the FACILITY class in RACF.
   Then, edit the sendmail aliases file using your preferred editor, for example:
   
   oedit /etc/mail/aliases

   Add these lines to define the email addresses for alias dept123 and the name of
   a file that contains the email addresses for alias dept456:
# Define an alias and the list of addresses.
depth123: user1@xyz.com,user2@xyz.com,user3@xyz.com

# Define an alias and the file that contains the list.
depth456: "include:/u/myuserid/dept456.list"

2. Update sendmail so that it recognizes the new aliases:
/usr/sbin/newaliases

3. Create file /u/myuserid/dept456.list using your preferred editor, for example:
oedit /u/myuserid/dept456.list

In this file, specify the email addresses for alias DEPT456:
user1@xyz.com,user2@xyz.com,user3@xyz.com,user4@xyz.com,
user5@xyz.com

Change the permissions of the file:
chmod 755 /u/myuserid/dept456.list

Change the permissions of the directory:
chmod 755 /u/myuserid

For more information about the z/OS UNIX commands used in this example, see
z/OS UNIX System Services Command Reference.

Viewing email attachments

This table summarizes how email recipients can view email attachments created by
IP PrintWay.

The mail servers on AIX systems and on most UNIX systems, including z/OS
UNIX, let users view data that is in text format. Other data formats such as PDF or
PostScript cannot be viewed.

<table>
<thead>
<tr>
<th>For this data format:</th>
<th>Use this viewer:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text</td>
<td>Any text editor such as Windows Notepad.</td>
</tr>
<tr>
<td>AFP</td>
<td>The AFP Viewer plug-in for Windows, which you can download from the IBM website at <a href="http://www.ibm.com">http://www.ibm.com</a>. On the IBM website, search for “AFP Viewer”.</td>
</tr>
<tr>
<td>PDF</td>
<td>The Adobe Acrobat Reader, which you can download from the Adobe website. To view PDF data created by the AFP to PDF transform, you might need to customize Acrobat Reader.</td>
</tr>
<tr>
<td>PostScript</td>
<td>A Ghostscript viewer, such as GSview.</td>
</tr>
</tbody>
</table>

Procedure for specifying attributes

You can either create a new printer definition for an email destination or modify
an existing printer definition for a printer.

Creating a new email printer definition

Do these steps to create a new printer definition for an email destination. These steps describe fields that have special considerations for the email protocol. You might also need to specify other fields in the printer definition to use all the functions that Infoprint Server provides.

1. Use the Infoprint Server ISPF panels to add a new printer definition. On the Choose a Definition Type and Protocol panel, select IP PrintWay email.
2. On the Email Protocol panel, specify the **To addresses** field and any of these other fields:

- **To addresses**: The email addresses or alias names of the recipients of the email. You can specify 1-32 email addresses (to add more entries, put your cursor on “more” and press Enter). Each email address can be 1-60 characters. An address that the job submitter specifies overrides this value.

- **CC addresses**: The email addresses or alias names of the “copy (cc)” recipients of the email. A cc means that other recipients of the email can see the cc recipient listed. You can specify 1-32 email addresses (to add more entries, put your cursor on “more” and press Enter). Each email address can be 1-60 characters. An address that the job submitter specifies overrides this value.

- **BCC addresses**: The email addresses or alias names of the “blind copy (bcc)” recipients of the email. A bcc means that other recipients of the email do not see the bcc recipient listed. You can specify 1-32 email addresses (to add more entries, put your cursor on “more” and press Enter). Each email address can be 1-60 characters. An address that the job submitter specifies overrides this value.

- **From name**: The descriptive name or other identifier of the sender of the email. You can specify one name. It can be 1-60 characters, including blanks. IP PrintWay always includes **userid@domainname** to identify the sender. The user ID of the job submitter is **userid**. The domain name where Infoprint Server is running is **domainname**. For example: JOHN@SYSTEM1.

- **Reply address**: The email address or alias name that recipients of the email can reply to. You can specify one email address. It can be 1-60 characters. An address that the job submitter specifies overrides this value. If you do not specify this field, most email programs use the sender’s email address, which is **userid@domainname**. The user ID of the job submitter is **userid**. The domain name where Infoprint Server is running is **domainname**.

- **Embedded headers**: If any line-data documents contain email headers, select the **Embedded headers** field. When this field is selected, IP PrintWay looks for an email header in each document with line-data format. If a header is found, IP PrintWay sends the email to the recipients specified in the header. If no line-data documents contain email headers, deselect this field for improved performance.

- **Inline text and line data**: Select this field if you want to include text data and line-data inline in the body of the email instead of in attachments.

- **Inline message**: Specify an optional message to include in the beginning of each email.

Each email address or alias name should be in this format:

```
username [@domainname]
```

- **username**
  - The name of the recipient or the name of an alias defined to sendmail.

- **@domainname**
  - The domain name of the target system. If you omit **@domainname**, the domain name of the system on which sendmail is running is used. If you specify an alias, omit **@domainname**.

3. On the Allocation panel, specify these fields:

- **Spool allocation values**: Specify either the job-selection values that are specified in the IP PrintWay job selection rule (extended mode) or the
work-selection values specified in the JES FSA definition (basic mode). For example, if the job-selection value for IP PrintWay is class E, specify E in the CLASS field.

- **Title**: (Optional) Specify a default subject for the email. You can specify up to 60 characters, including blanks and any other printable characters. A job submitter can override this value.
  
  If you run IP PrintWay basic mode, this field applies only to documents that NetSpool or Print Interface processes.

4. On the Processing panel, specify these fields:
- **Filter**: (Optional) Specify any transforms you want to use. For example, you might want to specify the AFP to PDF transform for the Line data and MO:DCA-P data formats to create PDF documents. If you run IP PrintWay basic mode and specify a transform, also select the **Resubmit for filtering** option.
- **Printer code page**: Specify one of these code pages:
  
  - Any ASCII code page: IP PrintWay converts EBCDIC data from the document code page (default is IBM-1047) to the specified ASCII code page.
  
  - EBCDIC code page IBM-1047: Sendmail converts EBCDIC data from code page IBM-1047 to the ASCII code page configured for sendmail.

  **Tips**:
  
  - The only EBCDIC code page you should specify is IBM-1047. This is because sendmail can only convert data from code page IBM-1047 to an ASCII code page.
  
  - If the code page for the locale on the z/OS system where Infoprint Server is running is not IBM-1047, specify an ASCII code page instead of an EBCDIC code page.
  
  - Specify a code page that the **iconv** utility supports, or specify a custom ASCII code page. For code page names that **iconv** supports, see [z/OS XL C/C++ Programming Guide](#).
  
  - If you specify a custom code page, make sure that conversion tables exist to convert between the custom code page and these code pages:

    - The code page in the **Document code page** field
    - The code page for the z/OS locale

  For information about how to create conversion tables, see information about code set conversion utilities in [z/OS XL C/C++ Programming Guide](#).

5. On the NetSpool Options panel, if your installation prints from VTAM applications such as CICS and IMS, select the **Convert to line** formatting option. NetSpool can transform line data to PDF data if you specify the AFP to PDF transform on the Processing panel. Or, IP PrintWay can convert the line data to text data. Both PDF and text data can be viewed in an email attachment. Do not select the **Convert to PCL** formatting option because PCL data cannot be easily viewed.

6. On the IP PrintWay Options panel:
- Select how you want IP PrintWay to handle data sets that are in the same JES output group. Select one of these values in the **Dataset grouping** field:
– **Concatenate job**: All data sets are sent in the same email to the address specified for the first data set in the output group.

– **None or Job**: Each data set is sent in a separate email. IP PrintWay extended mode sends each email to the address specified for the first data set in the output group unless the `AOP_MAIL_USE_FIRST_ADDRESS=NO` environment variable or the `mail-use-first-address=no` attribute is set. If `AOP_MAIL_USE_FIRST_ADDRESS=NO` or `mail-use-first-address=no`, IP PrintWay extended mode sends each email to the address or addresses specified for the data set in the email header, in a job attribute, or in a JCL parameter.

**Tips:**

– IP PrintWay extended mode: The **Automatic dataset grouping** field provides the same function as the Concatenate job option.

– These fields apply only for data sets that JES assigns to the same output group. For example, when Print Interface and NetSpool allocate data sets on the JES spool, JES assigns each data set to a separate output group. For more information, see "Transmitting multiple data sets in a JES output group" on page 185.

• Leave the **Retry time** and **Retry limit** fields blank. Retries are not suggested for the email protocol. For more information about these fields, see "Handling unsuccessful data transmissions" on page 167.

---

**Modifying a printer definition**

To modify a printer definition that currently represents a printer to send data to an email destination instead:

1. Use the InfoPrint Server ISPF panels to list the printer definition you want to modify. On the List Printer Definition panel, use the X function. On the Choose a Definition Type and Protocol panel, select **IP PrintWay email**.

2. On the Email Protocol panel, specify the **To addresses** field and any of these other fields:

   - **To addresses**: The email addresses or alias names of the recipients of the email. You can specify 1-32 email addresses (to add more entries, put your cursor on “more” and press Enter). Each email address can be 1-60 characters. An address that the job submitter specifies overrides this value.

   - **CC addresses**: The email addresses or alias names of the “copy (cc)” recipients of the email. A cc means that other recipients of the email can see the cc recipient listed. You can specify 1-32 email addresses (to add more entries, put your cursor on “more” and press Enter). Each email address can be 1-60 characters. An address that the job submitter specifies overrides this value.

   - **BCC addresses**: The email addresses or alias names of the “blind copy (bcc)” recipients of the email. A bcc means that other recipients of the email do not see the bcc recipient listed. You can specify 1-32 email addresses (to add more entries, put your cursor on “more” and press Enter). Each email address can be 1-60 characters. An address that the job submitter specifies overrides this value.

   - **From name**: The descriptive name or other identifier of the sender of the email. You can specify one name. It can be 1-60 characters, including blanks. IP PrintWay always includes `userid@domainname` to identify the sender. The
The user ID of the job submitter is `userid`. The domain name where Infoprint Server is running is `domainname`. For example: `JOHN@SYSTEM1`.

- **Reply address**: The email address or alias name that recipients of the email can reply to. You can specify one email address. It can be 1-60 characters. An address that the job submitter specifies overrides this value. If you do not specify this field, most email programs use the sender’s email address, which is `userid@domainname`. The user ID of the job submitter is `userid`. The domain name where Infoprint Server is running is `domainname`.

- **Embedded headers**: If any line-data documents contain email headers, select the **Embedded headers** field. When this field is selected, IP PrintWay looks for an email header in each document with line-data format. If a header is found, IP PrintWay sends the email to the recipients specified in the header. If no line-data documents contain email headers, deselect this field for improved performance.

- **Inline text and line data**: Select this field if you want to include text documents and line-data documents inline in the body of the email instead of in attachments.

- **Inline message**: Specify an optional message to include in the beginning of each email.

Each email address or alias name should be in this format:

`username[@domainname]`

- `username`: The name of the recipient or the name of an alias defined to sendmail.
- `@domainname`: The domain name of the target system. If you omit `@domainname`, the domain name of the system on which sendmail is running is used. If you specify an alias, omit `@domainname`.

3. On the Allocation panel, specify these fields:

- **Spool allocation values**: Change these fields to specify either the job-selection values that are specified in the IP PrintWay job selection rule (extended mode) or the work-selection values specified in the JES FSA definition (basic mode). For example, if the job-selection value for IP PrintWay is class E, specify E in the **CLASS** field. If the printer definition currently represents an IP PrintWay-controlled printer, no changes are required.

- **Title**: (Optional) Specify a default subject for the email. You can specify up to 60 characters, including blanks and any other printable characters. A title specified by the job submitter overrides this value. If you run IP PrintWay basic mode, this field applies only to documents that NetSpool or Print Interface processes.

4. On the Processing panel, specify these fields:

- **Printer code page**: Specify an ASCII code page or EBCDIC code page IBM-1047.

- **Print page header**: Deselect this field if you do not want a page header on each page of the email attachment.

- **PostScript header**: Remove any selected options so that IP PrintWay does not attempt to add a PostScript header.
Filter: (Optional) Specify transforms. For example, you might want to specify the AFP to PDF transform for the Line data and MO:DCA-P data formats to create PDF documents. If you run IP PrintWay basic mode and specify a transform, also select the Resubmit for filtering option.

Remove filter lpd_compat.so if it is specified for the Text data format.

5. On the NetSpool Options panel, if your installation prints from VTAM applications such as CICS and IMS, select the Convert to line formatting option. NetSpool can transform line data to PDF data if you specify the AFP to PDF transform on the Processing panel. Or, IP PrintWay can convert the line data to text data. Both PDF and text data can be viewed in an email attachment. Do not select the Convert to PCL formatting option because PCL data cannot be easily viewed.

6. On the IP PrintWay Options panel:

- Select how you want IP PrintWay to handle data sets that are in the same JES output group. Select one of these values in the Dataset grouping field:
  - Concatenate job: Each data is sent in the same email to the address specified for the first data set in the output group.
  - None or Job: Each data set is sent in a separate email. IP PrintWay extended mode sends each email to the address specified for the first data set in the output group unless the AOP_MAIL_USE_FIRST_ADDRESS =NO environment variable or the mail-use-first-address=no attribute is set. If AOP_MAIL_USE_FIRST_ADDRESS=NO or mail-use-first-address=no, IP PrintWay extended mode sends each email to the address or addresses specified for the data set in the email header, in a job attribute, or in a JCL parameter.

Tips:
- IP PrintWay extended mode: The Automatic dataset grouping field provides the same function as the Concatenate job option.
- These fields apply only for data sets that JES assigns to the same output group. For example, when Print Interface and NetSpool allocate data sets on the JES spool, JES assigns each data set to a separate output group. For more information, see "Transmitting multiple data sets in a JES output group" on page 185.
- Blank out any values specified in the Retry time and Retry limit fields. Retries are not suggested for the email protocol. For more information about these fields, see "Handling unsuccessful data transmissions" on page 167.
- Blank out any values specified in the Document header and Document trailer fields. Printer commands might be displayed as unrecognizable text when the email attachment is viewed.

Testing the printer definition
To verify that you have typed the email addresses correctly in the printer definition and in the sendmail alias file, submit a job from the local system with the Ip command. For example, if your printer definition is named deptmail, enter this command on the z/OS UNIX command line:

```
Ip -d deptmail myfile
```
1. IP PrintWay writes a message to indicate that sendmail successfully accepted the email request. Sendmail verifies that alias names and recipient names for users on the local system are correctly specified. However, an error might occur later when sendmail attempts to send an email to a remote system.

2. If emails were sent successfully to the remote systems, you should receive no sendmail error messages. To check for sendmail error messages:
   a. If you specified an owner for a sendmail alias name, see if any mail is returned to the owner's user ID.
   b. See if any mail is returned to the user associated with the IP PrintWay startup procedure. Sendmail returns error messages to this user ID if no other owner is specified for a sendmail alias name or if the email address is specified directly in the printer definition. This user ID is AOPSTC if your installation used the user ID that is suggested in z/OS Infoprint Server Customization.

   To check for mail, run the z/OS UNIX mail or mailx command. For more information about this command, see z/OS UNIX System Services Command Reference.

   You might need to wait several days before sendmail returns a message to you when it cannot send an email to a remote system. How long you need to wait depends in part on how long it takes the remote system to notify sendmail that an email is undeliverable and in part on how your installation has customized sendmail. For more information about customizing sendmail timeout values, see z/OS Infoprint Server Customization.

Example
These ISPF panels show how to create a printer definition named deptmail, select the email protocol, and fill in fields that are specific to the email protocol.

Tip: This example shows only some of the ISPF panels and fields that comprise a printer definition. For a complete printer definition that is suitable for the email protocol, see Appendix D, “Sample IP PrintWay printer definitions,” on page 493.

Use the Add function of the Infoprint Server ISPF panels to create a printer definition. On the Choose a Definition Type and Protocol panel, select the email protocol:

Choose a Definition Type and Protocol
Option ===> 5

<table>
<thead>
<tr>
<th>Type</th>
<th>Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 IP PrintWay</td>
<td>LPR</td>
</tr>
<tr>
<td>2 IP PrintWay</td>
<td>direct sockets</td>
</tr>
<tr>
<td>3 IP PrintWay</td>
<td>IPP</td>
</tr>
<tr>
<td>4 IP PrintWay</td>
<td>VTAM</td>
</tr>
<tr>
<td>5 IP PrintWay</td>
<td>email</td>
</tr>
<tr>
<td>6 PSF</td>
<td></td>
</tr>
<tr>
<td>7 General</td>
<td></td>
</tr>
</tbody>
</table>

To display this Email Protocol panel, press Enter on the Custom values field for the Protocol section on the main panel for the printer definition:
Email Protocol

Printer definition name . deptmail

To addresses . . . toname@xyz.com,dept123,dept456 (more)
CC addresses . . . copyname@xyz.com (more)
BCC addresses . . . (more)
From name . . . John Q. Sender
Reply address . johnsender@xyz.com

IP PrintWay extended mode

- Embedded headers
- Inline text and line data
- Inline message . Greetings:<LF><LF>The sales report is attached.<LF> (extend)

Results:

- Emails are sent to: toname@xyz.com and the addresses represented by aliases dept123 and dept456.
- A copy of the email is sent to: copyname@xyz.com.
- The email includes this description of the sender: John Q. Sender.
- Most email programs that recipients use send replies back to this address: johnsender@xyz.com.
- All documents are sent as attachments.
- The text in the Inline message field is included in the beginning of each email.

To display this Allocation panel, press Enter on the Custom values field for the Allocation section on the main panel for the printer definition:

Allocation

Printer definition name . deptmail

Values for Separator Pages:

Address . . . (extend)
Building . . .
Department .
Name . . .
Room . . .
Title . . . Annual Report for XYZ Corporation

Result: For data sets that IP PrintWay extended mode, NetSpool, or Print Interface processes, the email subject is Annual Report for XYZ Corporation unless the job submitter specifies another title.

To display this IP PrintWay Options panel, press Enter on the Custom values field for the IP PrintWay Options section on the main panel for the printer definition:
Specifying a printer definition name, description, and location

You must assign each printer definition a name, which job submitters can use to print to IP PrintWay printers. In addition, you can specify a description of the printer and the printer's location. Although the description and location are optional, they can help users find printers and printer definitions.

**Printer definition name:** A job submitter can specify the printer definition name in the FSSDATA JCL parameter, the SUBSYS JCL parameter, in the `-d` parameter of the `lp` command, and as the print queue name in the LPR command. For more information about how to specify the printer definition name, see [z/OS Infoprint Server User’s Guide](#). Follow these guidelines:

- Select a name that is unique for all printer definitions and printer pool definitions in the Printer Inventory.
- The name is case-sensitive. If job submitters use the incorrect case, Infoprint Server cannot find the printer definition and reports an error. To avoid errors, use all lowercase or all uppercase letters.
- Batch job submitters can specify the DEST, CLASS, and FORMS parameters instead of the printer definition name on the OUTPUT JCL statement to direct output to IP PrintWay printers. Therefore, consider specifying the DEST value as the printer definition name. For more information, see "Using DEST, CLASS, and FORMS to select a printer definition" on page 161.
- Infoprint Central users can specify the printer definition name to find printers, print jobs, and printer definitions. Users can specify the exact name or only the first few characters of the name. Therefore, you might want to use a naming pattern that lets users find multiple printers and printer definitions more easily.

**Description:** The description is used for information purposes only. For example, you could specify the model number of the printer in the Description field. However, it is also a search criterion on the Infoprint Server ISPF panels. The description is case-sensitive. Therefore, to make searching easier, consider using all lowercase or uppercase letters.

**Location:** The location is used for information purposes only. For example, the information in the Location field could help Infoprint Central users direct service personnel to the printer if it requires service. However, it is also a search criterion on the Infoprint Server ISPF panels and in Infoprint Central. Follow these guidelines:
The location is case-sensitive. Infoprint Central can do case-sensitive or case-insensitive searches. However, ISPF panels only do case-sensitive searches. Therefore, to make searching easier, consider using all lowercase or uppercase letters.

Infoprint Central users can specify the exact location information or only the first few characters of the location. Therefore, use a format that lets users find printers and printer definitions more easily. For example, if you use this format, Infoprint Central users can find all printers in the (1) city, (2) city/building, or (3) city/building/office:

Location: . . . mycity/mybuilding/myoffice

If more than one printer definition exists for the same IP PrintWay printer, specify the same location in all printer definitions so that Infoprint Central can find the printer.

Tip: To see if more than one printer definition exists for a printer, on the Select Printer Definitions ISPF panel, specify the host name or dotted decimal address of the printer in the IP address field. A list of all printer definitions for the printer is returned.

Procedure for specifying attributes

On the IP PrintWay Printer Definition panel, specify these fields:

- **Printer definition name**: Specify a 1–17 character name, including any letters, numbers, or special characters except for blanks.
- **Description**: Specify a 1–256 character description, including any letters, numbers, special characters, and blanks.
- **Location**: Specify a 1–256 character location, including any letters, numbers, special characters, and blanks.

Example

This ISPF screen shows how to specify the name of the printer definition, a description of the printer, and the printer's location.

<table>
<thead>
<tr>
<th>IP PrintWay Printer Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printer definition name . myprinter</td>
</tr>
<tr>
<td>Description . INFOPRINT 1312 (extend)</td>
</tr>
<tr>
<td>Location . . . DENVER/B003/A1-03 (extend)</td>
</tr>
</tbody>
</table>

Using DEST, CLASS, and FORMS to select a printer definition

A z/OS job submitter can specify the printer definition that IP PrintWay is to use on the DD or OUTPUT JCL statement in one of these JCL parameters:

- **FSSDATA parameter**: The job submitter can specify the name of the printer definition in the printer subparameter of the FSSDATA parameter on the OUTPUT JCL statement. The name of the printer definition is case-sensitive and must exactly match the name in the Printer Inventory.

  Tip: Job submitters can specify the FSSDATA parameter with IP PrintWay basic mode and IP PrintWay extended mode, even though IP PrintWay extended mode is not implemented as a JES functional subsystem (FSS).

- **SUBSYS parameter**: When using the Print Interface subsystem, the job submitter must specify the name of the printer definition in the second subparameter of
the SUBSYS parameter on the DD statement. The destination, class, and form name are not used to select the printer definition.

- **DEST, CLASS, and FORMS parameters**: The job submitter can specify values that match the ones specified in the DEST, CLASS, and FORMS fields of the printer definition except when the Print Interface subsystem is used. The job submitter can specify the destination, class, and form name on either the DD or OUTPUT JCL statement. If the job submitter does not specify a value for the DEST, CLASS, or FORMS parameters, the default value assigned by JES must match the corresponding value, if any, specified in the printer definition.

To enable printer selection with the DEST, CLASS, and FORMS JCL parameters, you must select the **Use DEST, CLASS, and FORMS for IP PrintWay printer selection** option. You must also specify a unique combination of DEST, CLASS, and FORMS values in each printer definition in which you select this option. You do not need to specify all three DEST, CLASS, and FORMS values in each printer definition.

To select a printer definition, the job submitter specifies the same DEST, CLASS, and FORMS values on the OUTPUT JCL statement that you specified in the printer definition. For example, if you create the printer definitions shown in this table:

<table>
<thead>
<tr>
<th>Printer definition name</th>
<th>DEST field</th>
<th>CLASS field</th>
<th>FORMS field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dept#4</td>
<td>D004</td>
<td>P</td>
<td>Not specified</td>
</tr>
<tr>
<td>Dept#5</td>
<td>D005</td>
<td>P</td>
<td>Not specified</td>
</tr>
<tr>
<td>Manager#5</td>
<td>D005</td>
<td>P</td>
<td>MANAGER</td>
</tr>
</tbody>
</table>

Then, to select one of these printer definitions, the job submitter can specify these parameters on the OUTPUT JCL statement:

- To select Dept#4 printer, specify one of these OUTPUT statements:
  - `//OUT1 OUTPUT DEST=D004,CLASS=P`
    - The FORMS parameter can contain any value.
  - `//OUT2 OUTPUT FSSDATA='printer=Dept#4'`
- To select Dept#5 printer, specify one of these OUTPUT statements:
  - `//OUT3 OUTPUT DEST=D005,CLASS=P`
    - The FORMS parameter can contain any value except for MANAGER.
  - `//OUT4 OUTPUT FSSDATA='printer=Dept#5'`
- To select Manager#5 printer, specify one of these OUTPUT statements:
  - `//OUT5 OUTPUT DEST=D005,CLASS=P,FORMS=MANAGER`
  - `//OUT6 OUTPUT FSSDATA='printer=Manager#5'`

### Hierarchy of printer selection

If the OUTPUT JCL statement specifies DEST, CLASS, and FORMS values that match more than one printer definition, IP PrintWay selects the printer definition with the best match, using this hierarchy:

1. The printer definition with matching DEST, CLASS, and FORMS values.
2. The printer definition with matching DEST and CLASS values, but with no matching FORMS value.
3. The printer definition with matching DEST and FORMS values, but with no matching CLASS value.
4. The printer definition with matching CLASS and FORMS values, but with no matching DEST value.
5. The printer definition with matching DEST value, but with no matching CLASS and FORMS values.
6. The printer definition with matching CLASS value, but with no matching DEST and FORMS values.
7. The printer definition with matching FORMS value, but with no matching DEST and CLASS values.

This example illustrates the hierarchy of printer selection that IP PrintWay uses. If you create the printer definitions shown in this table:

<table>
<thead>
<tr>
<th>Printer definition name</th>
<th>DEST field</th>
<th>CLASS field</th>
<th>FORMS field</th>
</tr>
</thead>
<tbody>
<tr>
<td>MyDefault</td>
<td>Not specified</td>
<td>P</td>
<td>Not specified</td>
</tr>
<tr>
<td>Dept#5</td>
<td>D005</td>
<td>P</td>
<td>Not specified</td>
</tr>
<tr>
<td>Manager#5</td>
<td>D005</td>
<td>P</td>
<td>MANAGER</td>
</tr>
</tbody>
</table>

IP PrintWay selects printer definitions:

- If the OUTPUT JCL statement specifies CLASS=P (with any value for DEST except D005 and any value for FORMS except MANAGER), IP PrintWay selects printer definition MyDefault. The MyDefault printer definition is the only printer definition that matches these JCL values.
- If the OUTPUT JCL statement specifies DEST=D005 and CLASS=P (with any value for FORMS except MANAGER), IP PrintWay selects printer definition Dept#5. IP PrintWay uses the selection hierarchy to select printer definition Dept#5 instead of MyDefault, which also matches the JCL values.
- If the OUTPUT JCL statement specifies DEST=D005, CLASS=P, and FORMS=MANAGER, IP PrintWay selects printer definition Manager#5. IP PrintWay uses the selection hierarchy to select printer definition Manager#5 instead of MyDefault or Dept#5, which also match the JCL values.

**Procedure for specifying attributes**

To enable printer selection with the DEST, CLASS, or FORMS JCL parameters, specify these attributes in the printer definition:

1. On the first ISPF panel for the printer definition, specify this field:
   - **Use DEST, CLASS, and FORMS for IP PrintWay printer selection**: Select this field.

2. On the Allocation panel, specify these fields:
   - **CLASS**: Specify a class. Leave this field blank if you do not want IP PrintWay to match the value in the CLASS JCL parameter.
   - **DEST**: Specify a destination. Leave this field blank if you want do not want IP PrintWay to match the value in the DEST JCL parameter.
   - **FORMS**: Specify a forms name. Leave this field blank if you do not want IP PrintWay to match the value in the FORMS JCL parameter.

The values in the DEST, CLASS, and FORMS fields, together, must be unique in each printer definition in which the **Use DEST, CLASS, and FORMS for IP PrintWay printer selection** option is selected. For example, if you specify DEST PRT5 and CLASS P in one printer definition, you cannot specify DEST PRT5 and CLASS P in another printer definition.
Example
This ISPF panel shows how to request that IP PrintWay use the DEST, CLASS, and FORMS JCL parameters to select this printer definition.

This ISPF panel shows how to specify the DEST, CLASS, and FORMS values that IP PrintWay uses to select this printer definition. In this example, all three values are filled in. However, you can omit one or two of the values. Only a portion of the ISPF panel is shown.

Setting up operator security for the printer (extended mode)

If your security administrator created a RACF profile to control who can use Infoprint Central to display information about and do actions on the printer, specify the name of this RACF profile in the printer definition. If you specify the name of a RACF profile, only Infoprint Central users permitted to the profile can display information about and do actions on this printer. If you do not specify the name of a RACF profile, or if the profile name is not defined to RACF, any Infoprint Central user can display information about and do actions on the printer.

This task does not apply when you use IP PrintWay basic mode because Infoprint Central lets users work only with printers controlled by IP PrintWay extended mode, not basic mode.

Rule: If more than one printer definition exists for an IP PrintWay printer, specify the same RACF profile in all printer definitions for the printer. To find all the printer definitions for a printer that uses either the LPR or direct sockets protocol,
on the Select Printer Definitions ISPF panel, specify the host name or dotted decimal address of the printer in the **IP address** field.

**Tips:**
1. You can specify the name of the profile before it is defined to RACF. If you specify a profile name that is not defined to RACF, Infoprint Central proceeds as if the user has the required access to the profile.
2. If the same RACF profile applies to a group of IP PrintWay and PSF printers, specify the same profile name in the IP PrintWay printer definitions and PSF FSA definitions for all the printers in the group.
3. To specify the same operator security profile in a group of IP PrintWay printer definitions, create a Protocol component with the name of the RACF profile, and include that Protocol component in the printer definitions for all the printers in the group. Creating a component makes it easier to change the name of the RACF profile if necessary.
4. You can use the Infoprint Server ISPF panels or the Printer Inventory Definition Utility (PIDU) to specify the RACF profile name. If you want to specify the same RACF profile in many IP PrintWay printer definitions, it is easier to use the PIDU program. See “Example 2. Using PIDU to specify the profile name.”

**Related information:** For information about how to define RACF profiles in the PRINTSRV class to protect IP PrintWay printers, see [z/OS Infoprint Server](https://www.ibm.com/support/knowledgecenter/SG2479_7.1.0/com.ibm.infoprint.topic.printsrv.htm) Customization.

**Procedure for specifying attributes**

On the LPR Protocol panel, the Direct Sockets Protocol panel, or the IPP Protocol panel, specify this field:

- **Operator security profile:** Specify the name of the RACF resource profile in the PRINTSRV class.

**Example 1. Using ISPF panels to specify the profile name**

This ISPF screen shows how to specify the name of the RACF profile in a printer definition that uses the LPR protocol.

```
LPR Protocol

    Printer definition name . myprinter
    Operator security profile . PRINTERS.DENVER

    Printer IP address . myprinter.xyzcorp.denver (extend)
    Print queue name . RAW (extend)
```

**Example 2. Using PIDU to specify the profile name**

These commands show how to specify the name of the same RACF profile in all IP PrintWay printer definitions that do not already contain a profile name.

1. Enter these commands as one command on the z/OS UNIX command line:

   ```
   pidu -qc "list printer where printer-type=ip-printway and operator-security-profile=null;" | awk'{print "modify printer " $1 " operator-security-profile = \"PRINTERS.DENVER\":\";"}'> /tmp/defs
   ```
The list command lists the names of all IP PrintWay printer definitions with no value in the operator-security-profile attribute. These names are piped to the awk program, which writes modify commands to modify the printer definitions to file /tmp/defs.

2. Inspect the /tmp/defs file to make sure the modify commands are acceptable.

3. Enter this command to update the Printer Inventory:
   
   `pidu < /tmp/defs`

---

### Specifying allocation parameters for IP PrintWay

This section describes the fields in the Allocation section of a printer definition that you might need to set if you use IP PrintWay. Values in the Allocation section apply to these documents:

- All documents that Print Interface and NetSpool allocate on the JES spool
- All documents that IP PrintWay extended mode processes

Job attributes and JCL parameters override values specified in the Allocation section of the printer definition. For example, the title-text job attribute and the TITLE JCL parameter override the value specified in the Title field on the Allocation panel.

Also, IP PrintWay uses the CLASS, DEST, and FORMS fields on the Allocation panel to select the printer definition to use. For information, see "Using DEST, CLASS, and FORMS to select a printer definition" on page 161.

### Procedure for specifying attributes

On the Allocation panel, specify these fields:

- **Spool allocation values** heading:
  Specify the JES job-selection values for IP PrintWay:
  
  - If you run IP PrintWay extended mode, specify the same job-selection values that are specified in the IP PrintWay job selection rule. For example, if the job selection rule specifies class P, specify P in the CLASS field.
  
  - If you run IP PrintWay basic mode, specify the same work-selection values that are specified in the JES definition for the IP PrintWay FSA. For example, if the JES definition specifies class P and destination PRT001, specify P in the CLASS field and PRT001 in the DEST field.

  Also, specify:
  
  - **FCB**: Specify the name of the forms control buffer (FCB) you want IP PrintWay to use. For information, see "Using an FCB to format data" on page 183.

  
  - **CLASS, DEST, and FORMS**: Specify the class, destination, and forms IP PrintWay uses to select this printer definition. For information, see "Using DEST, CLASS, and FORMS to select a printer definition" on page 161.

- **Values for separator pages** heading:
  
  - **Address, Building, Department, Name, Room, Title**: Specify the values that IP PrintWay exits (for example, the Begin Data Set) can print on separator pages. For information about IP PrintWay exits, see "z/OS Infoprint Server Customization".

  
  - **Title**: Specify the subject line for emails (email protocol), or the title passed to LPDs (LPR protocol). You can specify up to 60 characters, including blanks and any other printable characters.

- **Other values** heading:
- **Notify**: Specify up to four user IDs that IP PrintWay notifies when a data set has been successfully or unsuccessfully transmitted, or when IP PrintWay deletes the data set from the JES spool.

- **Copies**: Specify the number of copies to be printed. Allowed values are 1 to 32640. The default value is 1.

  **Guidelines**:
  - VTAM protocol: This field does not apply when you run IP PrintWay basic mode. Only one copy prints.
  - Email protocol: This field does not apply. Only one copy is sent.
  - IPP protocol: Some IPP printers do not support the copies IPP job attribute. In this case, only one copy prints.
  - LPR protocol: If only one copy prints, deselect the Optimize copies field.
  - If a copy does not start on a separate page, specify printer commands to start a new page. For information, see “Specifying printer commands to print on a new sheet of paper” on page 189.
  - This field does not apply to output data sets that z/OS batch jobs create because JES sets a default of one copy.

- **Duplex**: Specify the type of duplexing.

  **Guidelines**:
  - LPR, direct-sockets, VTAM, email protocols: This field does not apply.
  - IPP Protocol: The IPP server must support the sides IPP job attribute. If it does not, the printer's default is used.

---

### Handling unsuccessful data transmissions

IP PrintWay can retry unsuccessful data transmissions to a printer. Typically, a data transmission is unsuccessful because one of these types of errors has occurred:

- **Connection error**
  
  IP PrintWay cannot connect to the printer in the time period specified in the printer definition. This type of error occurs before IP PrintWay sends any data to the printer. It can occur if the printer is powered off or a network problem exists.

- **Response error**
  
  The printer reports an error, or IP PrintWay does not receive a response from the printer in the time period specified in the printer definition. This type of error occurs when IP PrintWay sends data to the printer. It can occur because the printer is offline or the printer requires operator intervention. For example, the printer might be out of paper, or it might have a paper jam. Or, it can occur because the printer takes a long time to respond.

If an error (such as a connection or response error) occurs, you can request that IP PrintWay retry the operation.

- After a connection error, IP PrintWay tries to connect to the printer again.
- After a response error, IP PrintWay resends data to the printer from the beginning of the print job.

When the printer becomes ready after a response error, the printer prints any data that IP PrintWay sent before the response error and is still in the printer's buffer. Then it prints data that IP PrintWay resent.

If you run IP PrintWay extended mode and use the direct sockets protocol, you can direct IP PrintWay to tell the printer where to restart printing after a response error. IP PrintWay can tell the printer to restart printing from the last
page that the printer indicated printed successfully or from the beginning of the print job. For information, see "Tracking the number of printed pages (extended mode)" on page 174.

**Tip:** Whenever IP PrintWay resends data, the printer might print duplicate pages. To prevent duplicate pages, consider specifying a high response timeout value especially if you run IP PrintWay extended mode. See the description of the **Response timeout** field in "Setting timeout values."

If an error persists after IP PrintWay completes the retries, or if no retries are requested, IP PrintWay can retain the failed print job on the JES spool so that the operator can release the print job to print after the problem is corrected. For information, see "Retaining data sets on the JES spool" on page 172.

### Setting timeout values

To change the default timeout values, set these fields in the printer definition:

- **Connection timeout:** The maximum amount of time that IP PrintWay waits while attempting to connect to the printer. If the printer is turned on and the network is operational, IP PrintWay connects to the printer in a few seconds. However, if the printer is powered off, IP PrintWay waits for the connection timeout period.

  While waiting to connect to the printer:
  - The IP PrintWay basic mode FSA cannot process any other print jobs.
  - However, other IP PrintWay basic mode FSAs can process other print jobs.
  - IP PrintWay extended mode can process other print jobs.

  **Guidelines:**
  - The default value of 30 seconds is suitable for most printers.
  - Do not specify a low connection timeout value because IP PrintWay might not be able to connect to the printer in the specified time due to network traffic.
  - Increase the connection timeout value if IP PrintWay reports a timeout error when the printer is turned on. (IP PrintWay writes a message with TCP/IP ERRNO of 60).
  - IP PrintWay basic mode: Do not specify a high connection timeout value because the IP PrintWay basic mode FSA cannot process any other print jobs during this period.

- **Response timeout:** The maximum amount of time that IP PrintWay waits for a response from a printer after sending data to it. When the response timeout value expires, IP PrintWay either resends data (if retries are requested) or fails the print job.

  If a printer is ready and its buffer is not full, most printers respond to IP PrintWay immediately. However, if a printer requires operator intervention (for example, the printer is out of paper), most printers do not respond until the printer becomes ready. In addition, if you select one of the PJL options in the printer definition (see "Tracking the number of printed pages (extended mode)" on page 174), most printers do not respond until the printer finishes printing the document.

  While waiting for a response from the printer:
  - The IP PrintWay basic mode FSA cannot process any other print jobs.
  - However, other IP PrintWay basic mode FSAs can process other print jobs.
  - IP PrintWay extended mode can process other print jobs.
The default response timeout value is 10 minutes. The maximum value you can specify is 31 days, which is the maximum time that TCP/IP allows IP PrintWay to wait for a response.

Guidelines:

- Do not set the response timeout value too low, especially if you print large documents on printers that have small buffers or that print slowly. For example, a response timeout value of 30 seconds might cause IP PrintWay to retry the transmission before the printer has finished printing its buffer.

- A high response timeout value gives an operator more time to correct a problem before IP PrintWay resends data to the printer (if retries are requested) or fails the print job. For example, you might want to specify a response timeout value of 3 days if your printers are unattended over a long weekend.

- IP PrintWay extended mode: If you select one of the PJL options in the printer definition (see “Tracking the number of printed pages (extended mode)” on page 174), most printers respond only after the printer has finished printing the document. Therefore, the response timeout value should be long enough to allow the largest documents to finish printing.

- IP PrintWay extended mode: A high response timeout value does not affect printing to other printers. However, if you specify a high response timeout value for many printers, IP PrintWay can exceed the maximum number of MVS tasks that IP PrintWay extended mode (aopoutd daemon) can have active at one time. This can happen if IP PrintWay waits for responses from many printers at the same time.

If you see the following message, which indicates that you are close to exceeding the maximum number of MVS tasks, ask your system administrator to increase the maximum number of MVS tasks in the AOPOUTD_MAXTHREADTASKS environment variable or the aopoutd-max-thread-tasks configuration attribute. For example, you might increase the number to 250.

BPXI0401 PROCESS LIMIT MAXTHREADTASKS HAS REACHED 85% OF ITS CURRENT CAPACITY OF 200 FOR PID=nnnnnn IN JOB AOPOUTD.

For information about AOPOUTD_MAXTHREADTASKS and aopoutd-max-thread-tasks, see z/OS Infoprint Server Customization.

Tip: The LIMMSG statement in the BPXPRMxx member of SYS1.PARMLIB controls whether z/OS UNIX issues message BPXI040I. The default is that z/OS UNIX does not issue BPXI040I messages. You can change the LIMMSG value dynamically using the SETOMVS command.

- IP PrintWay basic mode: If you want to specify a high response timeout value, ask your system administrator to define an IP PrintWay FSA to JES that selects print jobs for this one printer only. If an IP PrintWay FSA selects print jobs for several printers, when one printer with a high response timeout value does not respond for a long time, printing to the other printers can be delayed until the operator corrects the problem and the printer becomes ready.

- Email protocol: IP PrintWay ignores this field.

- VTAM protocol: If the printer is waiting for intervention, Infoprint Central cannot delete a print job until the printer responds or the response timeout value expires. Therefore, if you set a high response timeout value, the operator might not be able to delete the current print job in a timely manner.
Setting retry values

To request retries, set these fields in the printer definition:

- **Retry limit**: The number of times that IP PrintWay retries a connection or data transmission. By default, IP PrintWay does not do any retries.

  If you request at least 1 retry, IP PrintWay automatically retries the transmission one time immediately after the transmission fails. This automatic retry is in addition to the retries you request. The automatic retry permits the print job to be transmitted when a transmission problem is short-lived. For example, after receiving a print job, some printers do not become ready to receive another print job for one or two seconds.

  The RETRYL parameter on an OUTPUT JCL statement overrides this value.

**Guidelines:**

- Specify a retry limit greater than 0 because some printer errors are short-lived.

- When you send data to an email destination, do not request retries. This is because errors that z/OS UNIX sendmail reports to IP PrintWay are typically not short-lived and because IP PrintWay would resend emails to the entire list of email addresses, not just to the email address in error.

- **Retry time**: The amount of time between each retry. By default, IP PrintWay retries immediately.

  Between retries, IP PrintWay basic mode and extended mode continue to select and process other print jobs from the JES spool and transmit them to other printers and print queues. To maintain the correct order of transmission, however, IP PrintWay does not attempt to transmit other print jobs to this printer until it has completed all retries.

  The RETRYT parameter on an OUTPUT JCL statement overrides this value.

This table shows how IP PrintWay retries transmissions when you specify different retry limits and retry times in the printer definition:

<table>
<thead>
<tr>
<th>Retry limit</th>
<th>Retry time</th>
<th>IP PrintWay action</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 or blank</td>
<td>Any value</td>
<td>IP PrintWay does not retry the transmission.</td>
</tr>
<tr>
<td>&gt;0</td>
<td>0 or blank</td>
<td>IP PrintWay retries the transmission automatically one time right after the original transmission fails. Then IP PrintWay retries for the specified number of times at the specified interval. If retry time is blank, IP PrintWay retries approximately every second.</td>
</tr>
</tbody>
</table>

Procedure for specifying attributes

On the IP PrintWay Options panel, specify these fields:

- **Connection timeout**: Specify the maximum number of seconds that IP PrintWay is to wait for TCP/IP or VTAM to connect to the printer. Allowed values are 5 - 180. The default value is 30 seconds.

- **Response timeout**: Specify the maximum number of seconds that IP PrintWay is to wait for a response from the printer before attempting any retries. Allowed values are 0 - 2678400. The maximum value is 2678400 seconds (31 days). The default value is 600 seconds (10 minutes).

- **Retry limit**: Specify the number of retries you want IP PrintWay to attempt. Allowed values are 0 – 32767.
• **Retry time:** Specify the time IP PrintWay is to wait between each retry. Allowed values are 0 seconds – 9999 hours, 59 minutes and 59 seconds.

**Example 1. Setting timeout and retry values (basic mode)**
This ISPF panel shows how to specify timeout and retry values that are suitable for IP PrintWay basic mode. Only a portion of the ISPF panel is shown.

```
IP PrintWay Options
......
Retry time . . . . 0000:10:00
Retry limit . . . . 3
Connection timeout . 30
Response timeout . 60
......
```

**Results:**
1. IP PrintWay attempts to connect to the printer. If the connection is not established in 30 seconds (connection timeout), IP PrintWay attempts to connect again immediately (automatic retry).
2. After 10 minutes (retry time), IP PrintWay attempts to connect to the printer again. IP PrintWay retries the connection 3 times (retry limit). The maximum number of connection attempts is 5 (original + automatic + retry limit).
3. After IP PrintWay connects to the printer, it sends the print job to the printer. It waits up to 60 seconds (response timeout) for a response from the printer.
4. If the printer does not respond in 60 seconds, IP PrintWay waits up to 10 minutes (retry time) for a response. If the printer becomes ready during the 10 minutes, IP PrintWay resumes sending the print job to the printer.
5. After the 10 minutes, IP PrintWay resends the print job to the printer up to 3 times (retry limit) and waits up to 10 minutes each time for a response.
6. If the transmission is unsuccessful after all retries, IP PrintWay retains the print job on the JES spool if retention is requested. Otherwise, it deletes the print job from the JES spool.

In this example:
• The maximum time that IP PrintWay basic mode waits to connect to the printer is:
  
  30 seconds + 30 seconds + 3(10 minutes + 30 seconds) = 32 minutes, 30 seconds
• The maximum time that IP PrintWay basic mode waits for a response from the printer is:
  
  60 seconds + 3(10 minutes + 60 seconds) = 34 minutes

**Example 2. Setting timeout and retry values (extended mode)**
This ISPF panel shows how to specify timeout and retry values that are suitable for IP PrintWay extended mode. Only a portion of the ISPF panels are shown.
Results:

1. IP PrintWay attempts to connect to the printer. If the connection is not established in 30 seconds (connection timeout), IP PrintWay attempts to connect again immediately (automatic retry).

2. After 10 minutes (retry time), IP PrintWay attempts to connect to the printer again. IP PrintWay retries the connection 3 times (retry limit). The maximum number of connection attempts is 5 (original + automatic + retry limit).

3. When the connection is established, IP PrintWay sends the print job to the printer. It waits up to 259200 seconds (response timeout of 3 days) for a response from the printer.

4. If the printer does not respond in 259200 seconds, IP PrintWay waits for 10 minutes (retry time). If the printer becomes ready during the 10 minutes, IP PrintWay resumes sending the print job to the printer.

5. After the 10 minutes, IP PrintWay resends the print job to the printer up to 3 times (retry limit) and waits up to 10 minutes each time for a response.

6. If the transmission is unsuccessful after all retries, IP PrintWay retains the print job on the JES spool if retention is requested. Otherwise, it deletes the print job from the JES spool.

In this example:

- The maximum time that IP PrintWay extended mode waits to connect to the printer is:
  
  \[30 \text{ seconds} + 30 \text{ seconds} + 3(10 \text{ minutes} + 30 \text{ seconds}) = 32 \text{ minutes, 30 seconds}\]

- The maximum time that IP PrintWay extended mode waits for a response from the printer is:
  
  \[259200 \text{ seconds} + 3(10 \text{ minutes} + 259200 \text{ seconds}) = 10 \text{ days, 30 minutes}\]

Retaining data sets on the JES spool

IP PrintWay can retain data sets on the JES spool for a specified period of time after the data sets have completed processing. Although retaining data sets on the JES spool uses spool space, it lets you retransmit data sets that have not printed correctly or have not been successfully sent to the email destination. When the retention period for data sets expires, IP PrintWay deletes them from the JES spool.

When IP PrintWay retains data sets on the JES spool:

- If you run IP PrintWay basic mode, retained data sets remain selected by IP PrintWay.
- If you run IP PrintWay extended mode, all retained data sets are released to JES. They are either in the held state (JES2) or in the keep state (JES3).
The operator can work with retained data sets:

- If you run IP PrintWay basic mode, the operator can use the Infoprint Server ISPF panels to move data sets to different printers, reset them, hold them, or delete them. For information, see Chapter 4, “Using the IP PrintWay transmission queue (basic mode),” on page 27.

  If the operator resets a data set, IP PrintWay basic mode restarts printing it from the beginning of the data set.

  If the operator holds a data set, the data set is held until the operator resets or deletes the data set. IP PrintWay basic mode does not delete it automatically when its retention period expires.

- If you run IP PrintWay extended mode, the operator can use Infoprint Central or JES commands to move print jobs to different printers, release them, hold them, or delete them. For information, see Chapter 6, “Using Infoprint Central,” on page 39 and “Using JES commands and SDSF to work with output data sets” on page 50. (In some cases, you must use Infoprint Central, instead of JES commands, to move print jobs to different printers.)

  If the operator releases a print job, IP PrintWay extended mode restarts printing either from the beginning of the first data set in the print job or after the last page that printed successfully. For more information, see “Tracking the number of printed pages (extended mode)” on page 174.

  If the operator holds a print job, all data sets in that print job are held until the operator releases or deletes the print job. IP PrintWay extended mode does not delete the print job automatically when its retain time expires.

You can specify these fields in the printer definition to control retention:

- **Retention period: Successful**: The period of time IP PrintWay retains all data sets that have been successfully transmitted.

- **Retention period: Failure**: The period of time IP PrintWay retains all data sets that were not successfully transmitted after all requested retries have been attempted. If a failed data set is part of a JES output group (print job), IP PrintWay retains all data sets in the print job.

**Guidelines:**

- IP PrintWay basic mode: Do not retain successful data sets, and retain failed data sets for as short a time as possible because a system abend (abend code 878) can occur when an IP PrintWay FSS retains a very high number of data sets on the JES spool. Or, migrate to IP PrintWay extended mode.

- IP PrintWay extended mode: You can specify longer retention times because a system abend does not occur when you retain a large number of data sets on the JES spool.

IP PrintWay considers a print job to be **successful** when IP PrintWay finishes processing the print job without error. Table 28 on page 174 summarizes when IP PrintWay considers a print job to be successful for each transmission protocol.
Table 28. IP PrintWay successful print jobs

<table>
<thead>
<tr>
<th>For this protocol:</th>
<th>IP PrintWay considers print jobs successful when:</th>
</tr>
</thead>
</table>
| Direct sockets     | • A PJL option is selected: The printer finishes printing all documents in the print job.  
|                    | • A PJL option is not selected: The printer or print server receives all documents in the print job. However, printing might fail later.  
| Email              | z/OS UNIX sendmail accepts the mail request. However, transmission of the mail to remote recipients might fail later. |
| IPP, LPR, VTAM     | The printer or print server receives all documents in the print job. However, printing might fail later. |

Procedure for specifying attributes

On the IP PrintWay Options panel, specify these fields:

- **Retention period: Successful:** Specify the amount of time IP PrintWay is to retain successfully transmitted data sets. Specify a time period from 0 seconds to 9999 hours, 59 minutes and 59 seconds.

- **Retention period: Failure:** Specify the amount of time IP PrintWay is to retain data sets whose transmission failed. Specify a time period from 0 seconds to 9999 hours, 59 minutes and 59 seconds.

To request that IP PrintWay retain data sets on the JES spool forever, specify FOREVER in either field. In this case, however, the operator must delete data sets from the JES spool when they are no longer required.

Example

This ISPF panel shows how to specify a retention period for data sets whose transmission fails. Only a portion of the ISPF panel is shown.

```
IP PrintWay Options

Retention period:
  Successful . . . 0000:00:00
  Failure . . 0024:00:00

```

Result: IP PrintWay retains data sets that could not be transmitted on the JES spool for 24 hours.

Tracking the number of printed pages (extended mode)

IP PrintWay extended mode can track the number of pages that print on printers that support Hewlett Packard (HP) Printer Job Language (PJL). This function is available only for printers that use the direct-sockets printing protocol.

To track the number of printed pages, select one or both of these PJL options in the printer definition:
- **Record pages printed for accounting**: If this option is selected, IP PrintWay records the number of printed pages in the SMF type 6 record, in field SMF6PGE. This provides you with more accurate accounting information.

- **Restart printing after last successful page**: If this option is selected, IP PrintWay tells the printer to restart printing after the last page that the printer reported printed successfully. This option reduces the number of duplicate pages that print, especially when large documents are printed. This option applies when IP PrintWay restarts printing after an error occurs and when the operator releases a retained print job that has partially printed.

  If this option is not selected, IP PrintWay restarts printing from the beginning of the print job.

When you select either of these PJL options, IP PrintWay provides these additional functions:

- When the operator cancels a print job from the printer console, IP PrintWay detects that the print job has been canceled and does not retry the transmission.
- IP PrintWay waits until print jobs have finished printed before considering them successful and deleting them from the JES spool. If a failure occurs during printing, IP PrintWay retains the failed print jobs on the JES spool (if retention is requested).
- IP PrintWay writes a message with the number of pages that printed in the print job. The number of pages is the same as the number in the SMF type 6 record. The operator can use Infoprint Central to view this message in the log for the Infoprint Server print job.

**Tip:** If you select one of the PJL options, you might need to increase the response timeout value (**Response timeout** field) in the printer definition. This is because most printers respond only after the document finishes printing. Therefore, the response timeout value should be long enough to allow the largest documents to finish printing. For more information, see "Handling unsuccessful data transmissions" on page 167.

**Performance:** If you select one of the PJL options:

- Printer throughput can be slower in these situations:
  - You print more than one copy of a document.
  - You print multiple documents in one print job.

  The affect on printer throughput can vary for different printers.

- Printer throughput is not affected when you print one document at a time. That is, it takes the same amount of time to print the same one document. However, IP PrintWay writes its completion message (AOP3613I The print job was completed successfully) at a later time:
  - If you select a PJL option, IP PrintWay writes this message when the printer indicates it has finished printing the document.
  - If you do not select a PJL option, IP PrintWay writes this message when the printer indicates it has received the document in its buffer.

**Job name:** The job name that IP PrintWay extended mode sends to the PJL printer has this format:

AOP dsname copy timestamp

AOP

Indicates that IP PrintWay sent the file to the printer.
dsname
The z/OS JES sysout data set name of the file. Usually this name includes
system name, user ID, job name, job ID, data set ID, and the short data set
name (or ?).

copy
The number of the copy. For example, 1 means the first copy.
timestamp
Date and time in the country locale. The timestamp is truncated if the full job
name would exceed the 80 characters allowed in a PJL job name.

Sample job names are:
AOP SYS1.USER1.MYJOB.STC18767.D0000103.TEST 1 08/27/10 12:39:37 PM
AOP SYS1.USER2.MYJOB.JOB18869.D0000101.? 1 08/27/10 12:44:33 PM

Printing scenarios
These scenarios describe various situations and indicate how many pages print and
the page count that IP PrintWay records in the SMF type 6 record. The number of
pages that print and the SMF page count depend on where IP PrintWay extended
mode tells the printer to restart printing.

**IP PrintWay does not resend a print job to the printer**
IP PrintWay sends a 200 page print job to the printer. The printer prints without
error. If the printer runs out of paper or has a paper jam while it is printing, the
printer operator fixes the problem before the IP PrintWay response timeout value expires. Table 29 shows how many pages print and the page count in the SMF type 6 record (field SMF6PGE).

Table 29. Pages printed when no error occurs

<table>
<thead>
<tr>
<th>When printing restarts at this point</th>
<th>Total pages printed</th>
<th>Page count in SMF record</th>
</tr>
</thead>
<tbody>
<tr>
<td>After last successful page</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Beginning of print job</td>
<td>200</td>
<td>200</td>
</tr>
</tbody>
</table>

**IP PrintWay resends a print job to the printer**
IP PrintWay sends a 200 page print job to the printer. After printing 175 pages, the
printer runs out of paper. The printer has 25 pages stored in its buffer that have
not printed yet. The IP PrintWay response timeout value expires before the
operator adds paper. IP PrintWay resends the print job to the printer and tells the
printer where to restart printing. Table 30 shows how many pages print and the
page count in the SMF type 6 record (field SMF6PGE).

Table 30. Pages printed when IP PrintWay retries a print job

<table>
<thead>
<tr>
<th>When printing restarts at this point</th>
<th>Pages printed before retry</th>
<th>Pages printed when printer is ready</th>
<th>Total pages printed</th>
<th>Page count in SMF record</th>
</tr>
</thead>
<tbody>
<tr>
<td>After last successful page</td>
<td>1-175</td>
<td>176-200 (in buffer) 176-200</td>
<td>225</td>
<td>200</td>
</tr>
<tr>
<td>Beginning of print job</td>
<td>1-175</td>
<td>176-200 (in buffer) 1-200</td>
<td>400</td>
<td>375</td>
</tr>
</tbody>
</table>

**IP PrintWay resends a failed print job to the printer**
IP PrintWay sends a 200 page print job to the printer. After printing 175 pages, the
printer runs out of paper. The printer has 25 pages stored in its buffer that have
not printed yet. IP PrintWay finishes all retries before the printer becomes ready. IP PrintWay retains the print job on the spool. When the operator releases the print job, IP PrintWay resends the print job and tells the printer where to restart printing. Table 31 shows how many pages print and the page count in the SMF type 6 record (field SMF6PGE).

Table 31. Pages printed when IP PrintWay prints a failed print job

<table>
<thead>
<tr>
<th>When printing restarts at this point</th>
<th>Pages printed before failure</th>
<th>Pages printed when printer is ready</th>
<th>Pages printed when operator releases job</th>
<th>Total pages printed</th>
<th>Page count in SMF record</th>
</tr>
</thead>
<tbody>
<tr>
<td>After last successful page</td>
<td>1-175</td>
<td>176-200 (in buffer)</td>
<td>225</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beginning of print job</td>
<td>1-175</td>
<td>176-200 (in buffer)</td>
<td>1-200</td>
<td>400</td>
<td>375</td>
</tr>
</tbody>
</table>

**Note:** IP PrintWay writes two SMF records for each document. It writes one record when it retains the print job on the JES spool, and it writes another record when it prints the print job again. The SMF6DCI field in each record indicates whether the document finished printing.

**Requirements**

The requirements are:

- The printer must support the direct sockets printing protocol.
- The printer must support these PJL commands as described in HP documentation:
  - USTATUS DEVICE
  - USTATUS JOB
  - USTATUS PAGE
  If the printer does not support these PJL commands, IP PrintWay extended mode writes a warning or error message to the common message log.
- Documents must not already contain a PJL JOB command. If a document contains a PJL JOB command, IP PrintWay extended mode writes an error message to the common message log (AOP3859E) and does not process the print job.

**Tips:**

- To determine whether a printer supports PJL, contact the printer manufacturer. However, some printers that support PJL do not support PJL commands as described in HP documentation. To determine whether a printer supports PJL, select a PJL option in the printer definition and submit a print job. Look in the Infoprint Server common message log for one of these messages:
  - AOP3858E The printer requires intervention or does not support PJL.
  - AOP3856E The printer does not support the PJL USTATUS JOB command.
  - AOP3854W The printer does not support the PJL USTATUS PAGE command.
  - AOP3855W The printer does not support the PJL USTATUS DEVICE command.
  - AOP3857W The printer does not return information after each page prints.

You can use Infoprint Central to look for these messages in the log for the Infoprint Server print job.

See also “Limitations” for a list of printers that do not supported the PJL commands.
If you use an AFP to PCL or the AFP to PostScript transform, customize the transform to not add PJL commands. For information, see the documentation for the transform.

For information about how to change the protocol of an existing printer definition to the direct sockets protocol, see "Changing the type of a printer definition or the IP PrintWay protocol type" on page 239.

Limitations

The limitations are:

- If the operator holds or moves a print job that is printing, when the operator releases the print job, IP PrintWay tells the printer to start printing from the beginning of the print job.
- If the operator stops IP PrintWay while some print jobs are printing, when you start IP PrintWay, IP PrintWay tells the printer to starts printing from the beginning of the print jobs.
- If a network problem occurs while the printer is printing a print job, IP PrintWay might not be able to determine the number of pages that have printed. Therefore, additional duplicate pages might be printed.
- The PJL enhancements are not fully supported if IP PrintWay runs on multiple systems in a sysplex. This is because if an error occurs after some pages have printed, and IP PrintWay retries the print job on another system in the sysplex, IP PrintWay cannot determine how many pages have already printed. In this situation, IP PrintWay tells the printer to start printing from the beginning of the print job, and the page count in the SMF type 6 record includes only the pages that printed during the last retry.
- These older printers, and printers that use the same controller, support the PJL commands but do not return correct page information for each document. Therefore, the page count in the SMF type 6 record will be inaccurate, and some pages might not print if IP PrintWay resends data after an error. IP PrintWay does not write a warning or error message when a PJL option is selected for these printers.
  - InfoPrint 21
  - InfoPrint 70
  - InfoPrint 70 Plus
  - InfoPrint 2060ES
  - InfoPrint 2075ES
  - InfoPrint 2085
  - InfoPrint 2090ES
  - InfoPrint 2105
  - InfoPrint 2105ES

Procedure for specifying attributes

On the Direct Sockets Printing Protocol panel, specify these fields:

- **Record pages printed for accounting**: IP PrintWay extended mode records the number of printed pages in the SMF type 6 record.
- **Restart printing after last successful page**: IP PrintWay extended mode restarts printing after an error from the last page in the print job that printed successfully.
Example
This ISPF panel shows how to select both PJL options. The printer in this example supports the direct-sockets printing protocol. Only a portion of the ISPF panel is shown.

Direct Sockets Protocol

Printer Job Language (PJL) options:
/ Record pages printed for accounting
/ Restart printing after last successful page

Converting between EBCDIC and ASCII (extended mode)

This section applies to IP PrintWay extended mode. If you run IP PrintWay basic mode, see "Converting between EBCDIC and ASCII (basic mode)" on page 201.

IP PrintWay extended mode can convert line and text data from EBCDIC to ASCII, or from ASCII to EBCDIC, before transmitting data sets to the printer. You specify in the printer definition whether you want IP PrintWay to convert data.

Tip: IP PrintWay does not convert data between EBCDIC and ASCII if Print Interface has allocated the data set on the JES spool or if NetSpool has converted the data stream to any format other than line data. In these cases, Print Interface or NetSpool has already converted data to the printer code page.

IP PrintWay extended mode uses the `iconv` utility to convert data between EBCDIC and ASCII. The `iconv` utility converts data from one code page to another, from the code page used to create the document to the code page used by the printer. For more information about the `iconv` utility, see z/OS XL C/C++ Programming Guide. Print Interface and NetSpool also use `iconv` to convert data from EBCDIC to ASCII.

Procedure for specifying attributes

To use the `iconv` utility to convert data from the document code page to the printer code page:

- On the Processing panel of the printer definition, specify these fields:
  - **Document code page**: Leave this field blank or specify the name of a code page supported by IBM. If you leave this field blank, the default code page is the EBCDIC code page specified in the `ebcdic-codepage` attribute in the Infoprint Server configuration file (`aopd.conf`) or in the system configuration definition. If no code page is specified, IP PrintWay extended mode uses code page IBM-1047.
  - **Printer code page**: Specify the name of either an ASCII code page (such as ISO8859-1) or an EBCDIC code page (such as IBM-1047) that is supported by IBM. For code page names, see z/OS XL C/C++ Programming Guide. If you leave this field blank, IP PrintWay uses a default code page that is appropriate for the protocol:
    - Email protocol: IBM-1047 (an EBCDIC code page)
    - LPR, direct sockets, or IPP protocol: IBM-850 (an ASCII code page)
If you use the ISPF panels to create an IP PrintWay printer definition, the default ASCII or EBCDIC code page specified in the Infoprint Server configuration file (aopd.conf) or in the system configuration definition is initially displayed in the printer definition:

- Email protocol: Default EBCDIC code page
- LPR, direct sockets, or IPP protocol: Default ASCII code page
- VTAM protocol: Default EBCDIC code page

**Guidelines:**

- For most printing situations, you do not need to modify the code pages in the printer definition. The initial values in the printer definition are generally suitable. However, when you create a printer definition for the email protocol, if the code page that is initially displayed in the **Printer code page** field is not IBM-1047, you must specify a suitable ASCII code page instead. For more information, see “Creating a new email printer definition” on page 152.

- If you plan to use this printer definition with Print Interface as well as with IP PrintWay, leave the **Document code page** field blank and specify a code page in the **Printer code page** field. For information about how Print Interface uses these fields, see “Converting data from EBCDIC to ASCII or ASCII to EBCDIC” on page 88.


- If you specify a custom code page, make sure that conversion tables exist to convert between these code pages:
  - The code pages in the **Document code page** and **Printer code page** field.
  - The code page for the z/OS locale and the custom code page.


---

**Converting line data to a text data stream**

IP PrintWay automatically converts line data into text data except in these situations:

- Print Interface already formatted line data into text data.
- You specify a filter in the **Filter** field for the **Line data** format.
- You select the **Remote PSF** option in the **Mode** field.
- You select the VTAM protocol.
- IP PrintWay basic mode: You select the **None** option in the **Formatting** field.
- IP PrintWay extended mode: IP PrintWay detects that the data set does not contain line data.

You can specify these fields in the printer definition to control how IP PrintWay converts line data into text data:

- **Carriage control type**: An indication of whether to use the carriage-control characters that are present in the data set to format data. By default, IP PrintWay automatically determines whether a data set contains carriage controls and uses carriage controls if they are present.

**Tip**: For most printing applications, do not select any value in this field. The IP PrintWay default is suitable for most applications, regardless of whether carriage controls are present or not.
• **Delete form feed:** An indication of whether to delete form-feed controls from the beginning and end of data sets. By default, IP PrintWay does not delete any form-feed controls.

  **Tip:** You might need to delete form-feed controls if your applications insert form-feed controls that result in blank pages being printed at the beginning or end of data sets.

• **Form feed:** The form-feed controls, specified in EBCDIC, that the printer or print server requires. IP PrintWay extended mode converts the form-feed controls to ASCII and adds them to text data to indicate the start of a new page. The default form-feed controls are: X'0D0C' (carriage-return and form-feed). IP PrintWay basic mode ignores this field.

• **Line termination:** The line-termination controls, specified in EBCDIC, that the printer or print server requires. IP PrintWay converts the line-termination controls to ASCII and adds them to text data to indicate the end of a line. The default line-termination controls are:

  - IP PrintWay basic mode:
    - LPR, direct sockets, IPP, and email protocols: X'25' (line-feed)
    - VTAM protocol: X'0D15' (carriage-return and new-line)
  - IP PrintWay extended mode:
    - LPR (with an ASCII printer code page), direct sockets, IPP, and email protocols: X'0D15' (carriage-return and new-line)
    - LPR protocol (with an EBCDIC printer code page): X'0D25' (carriage-return and line-feed)
    - VTAM protocol: X'0D15' (carriage-return and new-line)

  **Tips:**
  - IP PrintWay extended mode: If the **Printer code page** field contains ISO8859-1, leave the **Line termination** field blank. If you need to specify 25 or 0D25, specify a printer code page that translates EBCDIC X'25' to ASCII X'0A’’, such as code page IBM-850.
  - IP PrintWay basic mode: Consider specifying 0D25 in the **Line termination** field. This value is more suitable for many ASCII printers than the IP PrintWay default line-termination control of X'25'.

• **Omit line termination at EOF:** An indication of whether to omit the line-termination controls that IP PrintWay adds at the end of each document that contains ANSI carriage controls. IP PrintWay does not add any line-termination controls at the end of documents for the IPP, VTAM, and email protocols, so this field does not apply to these protocols.

  **Tips:**
  - Some printers require line-termination controls at the end of documents so data for the next document starts printing at the beginning of the line.
  - Line-termination controls added at the end of documents can cause a printing problem when an application adds transparent data to the end of a document.

• **Transparent data char:** The transparent-data control used in the input data. IP PrintWay transmits data after the transparent-data control without converting it from EBCDIC to ASCII. However, IP PrintWay does not transmit the transparent data control and the 1-byte length field after the control. The default transparent data control is X'35'.

IP PrintWay uses the ANSI or machine carriage controls in the input data stream to format data. IP PrintWay supports the print no space, space 1 line, space 2 lines, and space 3 lines carriage controls. If FCB processing is enabled, IP PrintWay also
supports skip-to-channel carriage controls. For more information about how to enable FCB processing in the printer definition, see "Using an FCB to format data" on page 183.

For data sets without carriage controls, you can specify these fields in the printer definition to control how IP PrintWay formats data into pages:

- **Pagination**: An indication of whether IP PrintWay formats line data without carriage controls into pages. By default, pagination is selected.
- **Margins**: Top and **Margins**: Bottom: Number of blank lines to leave in the top and bottom margins. The default is no margins.
- **Page height**: Number of lines to print on a page. The default is 58 lines.
- **Print page header**: An indication of whether to insert a header at the top of each page. The 3-line header contains the fully qualified data set name and a page number, followed by two blank lines.

### Procedure for specifying attributes

To format data, specify these attributes in the printer definition.

- On the Processing panel, specify these fields:
  - **Pagination**
  - **Margins**: Top and **Margins**: Bottom
  - **Page height**
  - **Print page header**
- On the IP PrintWay Options panel, specify these fields:
  - **Formatting** (basic mode)
  - **Line termination**
  - **Transparent data char**
  - **Form feed** (extended mode)
  - **Delete form feed**
  - **Omit line termination at EOF**

### Example

These ISPF panels show how to specify formatting options for IP PrintWay. The fields shown on the Processing panel apply only for data sets that do not contain carriage-control characters. Only a portion of the panel is shown.
Using an FCB to format data

IP PrintWay can use a forms control buffer (FCB) to format line data when IP PrintWay creates a text, SCS, or DSC data stream:
- IP PrintWay extended mode uses an FCB if an FCB is specified.
- IP PrintWay basic mode uses an FCB if an FCB is specified and you select the Use FCB option in the printer definition.

An FCB can be specified in several locations. If an FCB is specified in more than one location, IP PrintWay uses this hierarchy for selecting the FCB:
1. The FCB specified in the FCB parameter of the OUTPUT JCL statement or in the forms-control-buffer job attribute.
2. The FCB specified in the Forms control buffer field of the printer definition (on the Allocation panel).
   - IP PrintWay uses the FCB specified in the printer definition when one of these conditions is met:
     - IP PrintWay extended mode processes the data set
     - NetSpool allocates the data set on the JES spool
     - Print Interface allocates the data set on the JES spool and the VTAM protocol is selected
3. The FCB defined to JES as the default FCB (IP PrintWay basic mode only).

The specified FCB must reside in the SYS1.IMAGELIB library. IP PrintWay prefixes the specified FCB name when it searches for the FCB in SYS1.IMAGELIB, depending on the transmission protocol selected in the printer definition:
- For the VTAM protocol, IP PrintWay prefixes the FCB name with FCB2 to create the member name. If the FCB cannot be located with the FCB2 prefix, the FCB request is ignored and default values are used. The default values are skip-to-channel 1 line 1.
- For other protocols, IP PrintWay prefixes the FCB name with FCB4 to create the member name. If this member is not found in SYS1.IMAGELIB, PrintWay uses prefix FCB2, and if it is not found, PrintWay uses prefix FCB3. If no members are found, IP PrintWay writes a message stating that the member does not exist in SYS1.IMAGELIB, and it retains the data set if retention is requested for failed data sets.
If the input data stream contains carriage controls, IP PrintWay honors skip-to-channel carriage controls in the input data, in addition to carriage controls for print no space, space 1 line, space 2 lines, and space 3 lines. If the input data does not contain carriage controls, IP PrintWay either ignores the FCB or reports an error, depending on the transmission protocol selected in the printer definition:

- For the VTAM protocol, IP PrintWay does not use the FCB.
- For other protocols, IP PrintWay reports an error.

Table 32 summarizes the FCB functions that IP PrintWay supports. IP PrintWay supports different FCB functions depending on the type of output data stream that IP PrintWay creates. For example, the DSC/DSE data stream does not support specification of the number of lines per inch.

Table 32. FCB functions supported by IP PrintWay

<table>
<thead>
<tr>
<th>FCB function</th>
<th>Output data stream</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Text¹</td>
</tr>
<tr>
<td>Number of lines per page</td>
<td>Yes</td>
</tr>
<tr>
<td>Number of lines per inch</td>
<td>No</td>
</tr>
<tr>
<td>Channel codes</td>
<td>Yes</td>
</tr>
<tr>
<td>Left margin (indexing)</td>
<td>No</td>
</tr>
<tr>
<td>Skip a line</td>
<td>Yes</td>
</tr>
</tbody>
</table>

1. IP PrintWay can create a text data stream when you select the LPR, direct sockets, IPP, or email protocol.
2. IP PrintWay can create an output SCS or DSC/DSE data stream when you select the VTAM protocol.

Tip: IP PrintWay does not format data sets that Print Interface allocates on the JES spool unless the VTAM protocol is selected.

JES3 notes for IP PrintWay basic mode:

1. JES3 passes the FCB parameter specified on an OUTPUT JCL statement to IP PrintWay basic mode only if FCB is specified as a JES3 work-selection criterion for the PrintWay basic mode FSA.
2. JES3 provides a default FCB to IP PrintWay basic mode unless you specify the PDEFAULT=FCB parameter in the JES initialization statement for the IP PrintWay basic mode FSA.
3. For information about how to configure JES3 initialization statements for IP PrintWay basic mode, see z/OS Infoprint Server Customization.

Procedure for specifying attributes

To format data sets using an FCB, specify these fields in the printer definition:

- (Basic mode) On the IP PrintWay Options panel, specify this field:
  - **Formatting**: Select **Use FCB**.

When you select **Use FCB** in the **Formatting** field, IP PrintWay basic mode uses the FCB only if an FCB is specified for the data set. If no FCB is specified, IP PrintWay does standard formatting. Therefore, you can select **Use FCB** even if some data sets do not use an FCB. In a JES3 environment, however, you might want to configure the IP PrintWay basic mode FSA so that JES3 does not pass a default FCB name to IP PrintWay.
IP PrintWay extended mode ignores this field. It always uses the FCB if one is specified for a data set.

- (Optional) On the Allocation panel, specify the name of a default FCB in the FCB field.

**Example**

This ISPF panel shows how to request that IP PrintWay basic mode use the FCB, if one is specified, to format the data. Only a portion of the ISPF panel is shown.

```
IP PrintWay Options
...
Basic Mode Formatting:
...
  Formatting........4 1. None 2. Standard
                 3. Translate only 4. Use FCB
```

---

**Transmitting multiple data sets in a JES output group**

IP PrintWay lets you control how it transmits data sets that are in the same JES output group to a printer or to an email destination. You can request that IP PrintWay transmit each data set individually in a separate transmission or email, or together in one transmission or email. Transmitting data sets in the same transmission makes sure that data sets from other print requests do not print between the data sets in the JES output group.

A JES output group consists of output data sets created in the same batch job that have the same OUTPUT JCL parameters, such as the same CLASS, DEST, FORMS, and TITLE parameters. For more information about how JES places output data sets into output groups, see [z/OS JES2 Initialization and Tuning Guide](https://www.ibm.com/docs/en/zos/x13?topic=initialization-tuning) or [z/OS JES3 Initialization and Tuning Guide](https://www.ibm.com/docs/en/zos/x16?topic=initialization-tuning).

You can specify these fields and options in the printer definition to control the transmission of data sets in the same JES output group:

**Automatic dataset grouping (extended mode) field**

Select this field if you want IP PrintWay extended mode to transmit all the data sets to a printer in the same transmission or send all the data sets in the same email (each data set is a separate attachment). This is an efficient method of transmitting data sets that makes sure the data sets print together. Most printers start printing each data set on a new sheet of paper.

If more than one copy is requested, data sets print in the order IP PrintWay receives them from JES. For example, if you request 2 copies of data set A and 3 copies of data set B, data sets print in this order: data set A, data set A, data set B, data set B, data set B.

**Tips:**

- Some older printers do not support this type of transmission. These printers might not start each data set on a new sheet of paper, or they might print an extra blank page between data sets. If this case, you can (1) specify a printer command to start a new sheet in the Document Header field or (2) deselect this option and select the Job option or the Concatenate job option in the Dataset grouping field instead.

- IP PrintWay basic mode ignores this field and instead uses the option selected in the Dataset grouping field.
If you select this field, IP PrintWay extended mode ignores the option selected in the **Dataset grouping** field.

**Concatenate job option – Dataset grouping field**

Select this option if you want IP PrintWay to combine all the data sets into a single transmission called a *concatenation* and transmit them to a printer in the same transmission or send all the data sets in the same email (each data set is a separate attachment). This is an efficient method of transmitting data that makes sure the data sets print together. IP PrintWay inserts form feeds between data sets so that, in most cases, each data set starts printing on a new page.

If more than one copy is requested, the data sets print in the order in which IP PrintWay concatenated them. However, the number of copies requested for the first data set applies to all data sets. For example, if you print 2 copies of data set A and 3 copies of data set B, 2 copies of each data set print in this order: data set A, data set B, data set A, data set B.

**Tips:**

- Some printers might start printing data sets on the back side of a sheet in duplex mode. In this case, you can (1) select the **Automatic dataset grouping (extended mode)** field, (2) select the **Job option**, or (3) specify a printer command to start a new sheet in the **Document header** field.
- IP PrintWay basic mode: If you select the **Resubmit for filtering** field, data sets might start printing on the same page as the previous data set in the concatenation. Also, when you select the **Resubmit for filtering** field, all the data sets in the output group must have the same type of carriage controls and the same data format.
- If you print copies, do not select this option because the correct number of copies might not print. The number of copies requested for the first data set in the concatenation applies to all data sets in the concatenation. The number of copies requested for the second and subsequent data sets is ignored.

**Job option – Dataset grouping field**

Select this option if you want IP PrintWay to transmit the data sets to a printer as individual data sets as soon as each data set is ready to print, or send each data set in a separate email.

If you print to a print server, each data set arrives and is stored as a separate file at the print server. Therefore, the data sets can be individually managed on the remote print spool.

If more than one copy is requested, the data sets print in the order that IP PrintWay receives them from JES. For example, when you print 2 copies of data set A and 3 copies of data set B, data sets print in this order: data set A, data set A, data set B, data set B, data set B.

**None option – Dataset grouping field**

Select this option if you want IP PrintWay basic mode to transmit the data sets to a printer as individual data sets as soon as each data set is ready to print, or send each data set in a separate email.

If more than one copy is requested, the data sets print in the order that IP PrintWay receives them from JES. For example, when you print 2 copies of data set A and 3 copies of data set B, data sets print in this order: data set A, data set A, data set B, data set B, data set B.
Tip: This option does not apply to IP PrintWay extended mode. If you select it, IP PrintWay extended mode uses the Job option instead.

Limitations:
- If Print Interface or NetSpool allocates a data set on the JES spool, JES places each data set in a separate output group even when the job submitter submits multiple data sets with the same Ip command or in the same job step using the Print Interface subsystem. Therefore, IP PrintWay cannot group data sets. The Automatic dataset grouping and Dataset grouping fields do not apply.
- When it uses the VTAM protocol, IP PrintWay always transmits each data set in a separate transmission. The Automatic dataset grouping and Dataset grouping fields do not apply.
- When it uses the IPP protocol, IP PrintWay supports only the Job and None options in the Dataset grouping field. The Automatic dataset grouping field does not apply.

Procedure for specifying attributes
To specify how IP PrintWay transmits data sets in the same JES output group, specify one of these fields on the IP PrintWay Options panel:
- Automatic dataset grouping (extended mode)
- Dataset grouping: Select None, Job, or Concatenate job. The default is Job.

Example
This ISPF panel shows how to request that IP PrintWay transmit all the data sets in the same JES output group to the printer in the same transmission or send the data sets in the same email:
- IP PrintWay extended mode uses the Automatic dataset grouping field.
- IP PrintWay basic mode uses the Dataset grouping field.

Only a portion of the ISPF panel is shown.

```
IPA PrintWay Options

/* Automatic dataset grouping (extended mode)*/
Dataset grouping. . . | 1. None 2. Job 3. Concatenate job

```

Sending commands to the printer
In the printer definition, you can specify printer commands that IP PrintWay sends to the printer. Printer commands are sometimes called printer setup strings. You can specify printer commands in these fields:
- Document header: IP PrintWay sends the printer commands specified in this field to the printer at the beginning of each document. For example, you could specify PCL commands to select a font or request landscape printing.
- Document trailer: IP PrintWay sends the printer commands specified in this field to the printer at the end of each document. For example, you could specify a PCL command to reset the printer to its default state.

IP PrintWay sends the document header to the printer after it sends any separator page that the Begin Data Set exit adds, and it sends the document trailer before it sends any separator page that the End Data Set exit adds. The order is:
For example, if you specify commands for landscape printing in the Document header field, the separator page that the Begin Data Set exit adds does not print in the landscape orientation. To print the separator page in the landscape orientation, the Begin Data Set exit must add printer commands for landscape printing before the separator page data.

You can also specify a document header and document trailer in the IP PrintWay Begin Data Set exit (in the ANFUEXTP control block). The document header and document trailer the exit specifies in the ANFUEXTP control block override the document header and trailer specified in the printer definition. The Begin Data Set exit lets you specify a different document header and trailer for each document. For information about the Begin Data Set exit, see z/OS Infoprint Server Customization.

You can specify printer commands in either EBCDIC or ASCII representation, and you can request that IP PrintWay convert the printer commands to the printer's code page (either an EBCDIC or ASCII code page) before transmitting them to the printer. For example, if the printer accepts ASCII data, you can enter the printer commands in EBCDIC in the printer definition and request that IP PrintWay convert them to ASCII before transmission. For information about how IP PrintWay converts data between EBCDIC and ASCII, see "Converting between EBCDIC and ASCII (extended mode)" on page 179.

When you enter data in EBCDIC in the printer definition, you can use these special values, which IP PrintWay converts to the indicated EBCDIC hexadecimal values. If you use these special values, use EBCDIC representation for the rest of the printer commands as well:

<table>
<thead>
<tr>
<th>Value</th>
<th>Hex (EBCDIC)</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;FF&gt;</td>
<td>0C</td>
<td>Form feed</td>
</tr>
<tr>
<td>&lt;CR&gt;</td>
<td>0D</td>
<td>Carriage return</td>
</tr>
<tr>
<td>&lt;LF&gt;</td>
<td>25</td>
<td>Line feed</td>
</tr>
<tr>
<td>&lt;ESC&gt;</td>
<td>27</td>
<td>Escape</td>
</tr>
<tr>
<td>&lt;SP&gt;</td>
<td>40</td>
<td>Space</td>
</tr>
</tbody>
</table>

**Tip:** To print the euro on a euro-capable printer, you might need to load the 9N symbol set into the printer. You can select the 9N symbol set on the printer panel, or you can specify this PCL command in the Document header field to load the 9N symbol set: `<ESC>(9N`

### Specifying SCS controls for VTAM-controlled printers

When you print on VTAM-controlled SCS printers, you can specify SCS controls in the Document header and Document trailer fields. For example, if your printer supports the Page Presentation Media (PPM) control, you can specify the PPM control in the Document header field to adjust the paper drawer, duplex option, and other media-related characteristics. In the Document trailer field, you can reset...
the printer to its original state. Consult the documentation for your printer to
determine which SCS controls your printer supports.

IP PrintWay automatically generates SCS controls in the SCS data stream that it
sends to the printer. Therefore, if you specify these same controls in the Document
header field, the printer ignores them. The SCS controls that IP PrintWay generates
in the SCS data stream are:

- SLD (Set Line Density)
- SPD (Set Print Density)
- SHF (Set Horizontal Format)
- SVF (Set Vertical Format)

Although you cannot specify the SHF and SVF controls in the Document header
field, you can specify the SHF maximum presentation position (MPP) and the SVF
maximum page length (MPL) in the printer definition. For more information, see
“SCS page-formating attributes” on page 199.

**Specifying printer commands to print on a new sheet of paper**

In these cases, you might need to specify printer commands to print data sets on
new sheets of paper:

- When you print multiple copies, some printers print the next copy on the back
  side of the sheet of paper, or even on the same side as the previous copy.
  To determine if your printer prints each copy on a new sheet of paper, print
  multiple copies of a data set that is less than one page in length.
- When you select the direct sockets protocol and print multiple data sets in the
  same output group, sometimes the second and subsequent data sets in the
  output group print on the back side of the sheet of paper, or even on the same
  side as the previous data set. This can occur when you select the Concatenate
  job option in the Dataset grouping field.

To force printing on a new sheet of paper, specify one of these printer commands,
depending on the type of data typically printed on the printer. For most printers,
specify the command in the Document trailer field. However, for other printers,
you might need to specify the printer command in the Document header field or
in both fields:

- For PostScript data streams, specify the PJL Universal Exit Language (UEL)
  command:
    `<ESC>5-12345X`
- For non-PostScript data streams, specify the PCL Select Front command:
  `<ESC>&a1G`

**Notes:**

1. Some printers that accept PCL commands might not accept the PJL UEL
   command.
2. Do not specify these commands for VTAM-controlled printers.

**Specifying printer commands for landscape printing**

To print documents in the landscape orientation on a printer that can print PCL
data, specify these printer commands in the Document header field:

`<ESC>E<ESC>&12A<ESC>&110<ESC>&18D<ESC>&11E<ESC>&166F<ESC>(s12H`

<table>
<thead>
<tr>
<th>Command</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;ESC&gt;E</code></td>
<td>Reset the printer</td>
</tr>
</tbody>
</table>
<ESC>&l2A  Set paper size to letter (the “l” is a lowercase L)
<ESC>&l1O  Set orientation to landscape (the “O” is a capital letter O)
<ESC>&l8D  Set lines per inch to 8
<ESC>&l1E  Set top margin to 1 line
<ESC>&l66F  Set number of print lines to 66
<ESC>(s12H  Set font pitch to 12 characters per inch

Procedure for specifying attributes

On the IP PrintWay Options panel, specify these fields:

- **Document header**: Specify printer commands to be sent to the printer at the beginning of each data set and each copy of a data set.
- **Translate document header**: Select this field if the value needs to be converted to the code page the printer accepts. For example, select this field if the Document header field is in EBCDIC representation and the printer accepts ASCII data.
- **Document trailer**: Specify printer commands to be sent to the printer at the end of each data set and each copy of a data set.
- **Translate document trailer**: Select this field if the value needs to be converted to the code page the printer accepts. For example, select this field if the Document trailer field is in EBCDIC representation and the printer accepts ASCII data.

**Tip**: If you need to specify the same printer commands in more than one printer definition, specify them in an IP PrintWay Options component. Then, include that component in each printer definition to which the values apply.

**Example**

This ISPF panel shows how to specify PCL commands in a document header and trailer for a PCL printer. Only a portion of the ISPF panel is shown.

```
IP PrintWay Options

Document header . . <ESC>E<ESC>&l2A<ESC>&l1O<ESC>&l8D<ESC>&l1E<ESC>&l66F<ESC>(s12H
/ Translate document header
Document trailer . . <ESC>E
/ Translate document trailer
```

**Tip**: Place your cursor on Extend and press Enter to enter the entire document header value.

```
Command ==>
```

```
Document header
<ESC>E<ESC>&l2A<ESC>&l1O<ESC>&l8D<ESC>&l1E<ESC>&l66F<ESC>(s12H

```

**Result**: IP PrintWay sends the instructions in the **Document header** field to the printer. The PCL commands in the **Document header** field mean:
Command | Meaning
---|---
<ESC>E | Reset the printer
<ESC>&l2A | Set paper size to letter (the “l” is a lowercase L)
<ESC>&l1O | Set orientation to landscape (the “O” is a capital letter O)
<ESC>&l8D | Set lines per inch to 8
<ESC>&l1E | Set top margin to 1 line
<ESC>&l66F | Set number of print lines to 66
<ESC>(s12H | Set font pitch to 12 characters per inch

The <ESC>E in the Document trailer field resets the printer.

The Translate document header and Translate document trailer fields are selected so that IP PrintWay translates the data from EBCDIC to ASCII before transmission to the printer.

### Validating that data sets can print as requested

Before transmitting a data set to the printer, IP PrintWay uses information you provide in the printer definition to validate that the data set can print as requested on the printer. For example, IP PrintWay can validate that the data set does not exceed a size limit. You might want to specify limits because the printer itself has certain limitations, such as a small buffer that cannot receive large data sets, or you might want to specify limits for other reasons, such as you want to prevent job submitters from printing large data sets on slow printers.

Table 33 lists the fields in a printer definition that IP PrintWay uses to validate that a data set can print on the printer. The third column in the table indicates the JCL parameter that the job submitter specifies to request the print function, and the fourth column indicates the action IP PrintWay takes if the validation fails.

<table>
<thead>
<tr>
<th>Field name</th>
<th>Meaning</th>
<th>JCL parameter</th>
<th>IP PrintWay action if validation fails</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data format*</td>
<td>Input data formats the printer supports.</td>
<td>None. IP PrintWay determines the data format.</td>
<td>IP PrintWay does not transmit the data set to the printer.*</td>
</tr>
<tr>
<td>Duplexes supported</td>
<td>Duplexing supported by the printer (simplex, duplex, and tumble)</td>
<td>DUPLEX</td>
<td>IP PrintWay does not transmit the data set to the printer.*</td>
</tr>
</tbody>
</table>

*Table 33 lists the fields in a printer definition that IP PrintWay uses to validate that a data set can print on the printer. The third column in the table indicates the JCL parameter that the job submitter specifies to request the print function, and the fourth column indicates the action IP PrintWay takes if the validation fails.

Chapter 12. Planning printer definitions for IP PrintWay 191
Table 33. Printer definition fields used for validation in IP PrintWay (continued)

<table>
<thead>
<tr>
<th>Field name</th>
<th>Meaning</th>
<th>JCL parameter</th>
<th>IP PrintWay action if validation fails</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum document size²</td>
<td>Maximum size (in bytes) allowed for all data sets (documents) in the output group (print job). If you run IP PrintWay basic mode, this number includes the size of all copies.³</td>
<td>None. IP PrintWay determines the document size.</td>
<td>If the output group contains only one data set, or if IP PrintWay is transmitting the data sets in a concatenation, IP PrintWay does not transmit any documents in the output group to the printer. Otherwise, IP PrintWay sends documents to the printer until the maximum size is reached and then does not transmit any more data sets in the output group.⁵ When you use the resubmit for filtering option in IP PrintWay basic mode, if the output from a transform exceeds the maximum document size, Print Interface writes an error message and does not write the output from the transform to the JES spool. IP PrintWay considers the document to have completed successfully.</td>
</tr>
<tr>
<td>Maximum copies³</td>
<td>Maximum number of copies allowed.⁴</td>
<td>COPIES</td>
<td>IP PrintWay transmits the number of copies allowed.</td>
</tr>
</tbody>
</table>

Notes:

1. IP PrintWay basic mode does not validate the data format.
2. If you select the VTAM protocol in the printer definition, IP PrintWay does not limit the size of data sets that can print.
3. IP PrintWay ignores the Maximum copies field if the protocol does not support copies. For example, the email protocol and the VTAM protocol (IP PrintWay basic mode) do not support copies.
4. The number of copies specified in the form definition is not included when the number of copies or the size of a data set is calculated.
5. IP PrintWay retains the failed data sets on the JES spool if a retention period for failed transmissions is specified.

Print Interface and NetSpool also use these fields to validate that print requests can print as requested. If Print Interface or NetSpool determine that a data set cannot print, no output data set is allocated on the JES spool.

**Procedure for specifying attributes**

(Optional) On the Processing panel, specify these fields:

- **Data format**: (extended mode) Specify all the input data formats that the printer supports. Select all fields if you do not want IP PrintWay to validate the input data format.
- **Duplexes supported**: Select all the types of duplexing the printer supports. Select all options if you do not want IP PrintWay to validate duplexing.
- **Maximum document size**: Specify the maximum number of bytes in a print job to send to the printer. Allowed values are 1-2147483646. Leave this field blank if you do not want IP PrintWay to limit the size.
• **Maximum copies:** Specify the maximum number of copies of the same data set that can be printed. Allowed values are 1-32640. Leave this field blank if you do not want IP PrintWay to limit the number of copies.

**Example**
This ISPF panel shows how to specify the data formats the printer accepts, and also limit the document size and number of copies. Only a portion of the ISPF panel is shown.

```plaintext
Processing
.
Data format: Filter:
/ Line data ___________________________________________________ (extend)
` M0:DCAP ___________________________________________________ (extend)
/ PostScript ____________________________________________________ (extend)
/ Text aopfiltr.so ____________________________________________ (extend)
/ PCL ________________________________________________________ (extend)
/ PDF ________________________________________________________ (extend)
/ SAP ________________________________________________________ (extend)
/ XML ________________________________________________________ (extend)
/ TIFF ________________________________________________________ (extend)
/ JPEG ______________________________________________________ (extend)
/ Other ______________________________________________________ (extend)
.
Maximum document size . 1000000
Maximum copies........ 100
.
Duplex supported..../ Simplex _ Duplex _ Tumble
.
```

**Printing with Ricoh InfoPrint Manager or Ricoh ProcessDirector**

IP PrintWay can use the LPR protocol to send data sets to these Ricoh products:
• Ricoh InfoPrint Manager for AIX or Windows
• Ricoh ProcessDirector for AIX, Linux, or Windows, V3.0 and later

When processing a file for Ricoh InfoPrint Manager or Ricoh ProcessDirector, IP PrintWay does not convert the input data from EBCDIC to ASCII and does not format it. However, IP PrintWay does add a record length field to each record as the Ricoh products require.

In addition, IP PrintWay sends AFP options, such as the name of the form definition in the LPD control file. IP PrintWay prefixes each option with `-o`. For a list of the `-o` option, see Appendix C, “Ricoh InfoPrint Manager and Ricoh ProcessDirector options,” on page 489.

To create `-o` options, IP PrintWay uses values specified in DD and OUTPUT JCL statements or in Infoprint Server job attributes. For example, if the job submitter specifies the FORMDEF parameter on the OUTPUT JCL statement, IP PrintWay creates the `-of` option in the LPD control file. For some JCL parameters, such as the CLASS and FORMS parameters, keep in mind that JES sets default values.

You can specify one additional `-o` option in the **User options** field, which IP PrintWay adds to the LPD control file. To specify more than one option, you must use the Printer Inventory Definition Utility (PIDU) and specify the `server-user-options` attribute. For more information, see “server-user-options” on page 443.
Tip: The -o options that IP PrintWay creates using values specified in the DD and OUTPUT JCL parameters override the same -o options specified in the User options field (or server-user-options attribute).

### Procedure for specifying attributes

On the Protocol panel, specify these fields:

- **Mode**: Select the Remote PSF option.
- **IP address**: Specify the host name or IP address of the system where Ricoh InfoPrint Manager or Ricoh ProcessDirector is running. You can specify the IP address in dotted-decimal or colon-hexadecimal format.
- **Print queue name**: Specify the name of the remote print queue.
- **User options**: (Optional) Specify one additional option for Ricoh InfoPrint Manager or Ricoh ProcessDirector. This field is case-sensitive. For example, you can specify:
  
  `-ooverlay=01MYLOGO`

(Optional) On the Allocation panel, you can specify these fields. IP PrintWay transmits these values to Ricoh InfoPrint Manager or Ricoh ProcessDirector if no other value is specified during job submission. If you run IP PrintWay basic mode, the values on the Allocation panel apply only to documents that Print Interface or NetSpool processes.

- **Spool allocation values**:
  - CLASS
  - DEST
  - FORMS
  - FCB
  - PRMODE
  - UCS

- **Resource related values**:
  - Form definition
  - Character sets
  - Input tray
  - Output bin
  - Page definition
  - Image shift

- **Error reporting values**: Print error reporting

- **Other values**:
  - Copies
  - Duplex
  - Table reference characters

Tip: When you select the Remote PSF option, IP PrintWay basic mode ignores the Formatting field in the IP PrintWay section. IP PrintWay basic mode processes data sets as if you had selected the None formatting option.
Creating an IP PrintWay default printer definition

If a job submitter specifies the printer IP address on an OUTPUT JCL statement (in the DEST=IP: parameter), but does not specify a printer definition name in the FSSDATA parameter, IP PrintWay can use values specified in its default printer definition. The name of the IP PrintWay default printer definition is DFLTNTRY.

In the IP PrintWay default printer definition, you can specify default values that IP PrintWay uses if any of these OUTPUT JCL parameters are not specified on the OUTPUT JCL statement:
- RETAINF and RETAINS
- RETRYL and RETRYT
- PRTOPTNS

Infoprint Server creates a default printer definition if one does not already exist. If you want to use different default values, you can edit the default printer definition.

The default printer definition that Infoprint Server creates specifies these default values:

<table>
<thead>
<tr>
<th>JCL Parameter</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>RETAINS</td>
<td>0; IP PrintWay does not retain data sets on the JES spool after transmission is successful.</td>
</tr>
<tr>
<td>RETAINF</td>
<td>0; IP PrintWay does not retain data sets on the JES spool after transmission fails.</td>
</tr>
<tr>
<td>RETRYL</td>
<td>0; IP PrintWay does not retry unsuccessful transmissions.</td>
</tr>
<tr>
<td>RETRYT</td>
<td>0; IP PrintWay does not wait between each retry.</td>
</tr>
<tr>
<td>PRTOPTNS</td>
<td>IP PrintWay uses default values for all printer definition fields. For information about default values, see the ISPF field help.</td>
</tr>
</tbody>
</table>

Procedure for specifying attributes

In the IP PrintWay default printer definition, you can specify any attributes that apply to IP PrintWay. These attributes have special considerations:

1. On the main ISPF panel for the printer definition, specify these fields:
   - **Printer definition name**: The name must be DFLTNTRY (uppercase).
   - **Use DEST, CLASS, and FORMS for IP PrintWay printer selection**: Do not select this field.

2. On the Processing panel:
   - Do not select the **Resubmit for filtering** field. If you select this field, IP PrintWay basic mode ignores the IP address that the job submitter specifies in the DEST=IP: parameter of the OUTPUT JCL statement and transmits the data set to the IP address specified in the printer definition. The **Resubmit for filtering** field does not apply to IP PrintWay extended mode.

3. On the Protocol panel:
• **Printer IP address, Print queue name, Port number**: Leave these fields blank because IP PrintWay always uses the IP address and print-queue name or port number specified on the OUTPUT JCL statement. IP PrintWay uses either the LPR or direct sockets protocol, depending on which JCL parameters are specified on the OUTPUT JCL statement. IP PrintWay uses the LPR protocol if the PRDQUEUE parameter is specified, and uses the direct sockets protocol if the PORTNO parameter is specified.

---

**Creating components for the PRTOPTNS JCL parameter**

In the PRTOPTNS parameter of the OUTPUT JCL statement, a job submitter can specify the name of a set of components that contain IP PrintWay printing options. IP PrintWay uses the printing options in these components instead of the options that are specified in the printer definition that IP PrintWay uses to print the data set.

You need to create components for use with the PRTOPTNS JCL parameter only if job submitters want to print with different printing options from those specified in the printer definition. One situation where users might want to specify different printing options is when you have not created a printer definition for the printer and IP PrintWay uses options in the default printer definition. (IP PrintWay uses options in the default printer definition when the job submitter specifies the DEST=IP: JCL parameter and omits the FSSDATA=printer JCL parameter.)

You can specify IP PrintWay options in three types of components:

- Processing
- IP PrintWay Options
- Protocol

When the job submitter names a set of components in the PRTOPTNS JCL parameter, IP PrintWay uses only a subset of all the options that might be specified in the named components. IP PrintWay ignores the other options in the components. ["Procedure for specifying attributes"] identifies the fields that contain the options that IP PrintWay uses from the components.

**Procedure for specifying attributes**

**Rules:**

- Use the same name for the Processing, IP PrintWay Options, and Protocol components.
- Because the PRTOPTNS parameter lets a job submitter specify a maximum of 16 characters, limit the component name to 16 characters.
- Create at least one Processing, IP PrintWay Options, or Protocol component. If a component does not exist, IP PrintWay uses default values for the printing options in the missing component.

To create a set of components for the PRTOPTNS parameter:

1. In the Processing component, specify any of these fields (leave a field blank if you want IP PrintWay to use the default value):
   - **Double-byte translation table**
   - **Margins: Top** and **Margins: Bottom**
   - **Maximum document size**
   - **Page height**
   - **Pagination**
2. In the IP PrintWay Options component, specify any of these fields (leave a field blank if you want IP PrintWay to use the default value):
   - Automatic dataset grouping
   - Carriage control type
   - Dataset grouping
   - Delete form feed
   - Exits: Begin data set
   - Exits: End data set
   - Exits: Record
   - Formatting
   - Line termination
   - Omit line termination at EOF
   - PostScript header
   - Transparent data char

3. In the Protocol component, specify any of these fields (leave a field blank if you want IP PrintWay to use the default value):
   - Banner class
   - Filename
   - Indent
   - Mode
   - Owner
   - Print banner page
   - Print function
   - Record pages printed for accounting
   - Restart printing after last successful page
   - Restrict ports
   - Title
   - User Options
   - Width

   **Tip:** If you specify a value for any field that is not in this list, IP PrintWay ignores the value and, instead, uses the value in the printer definition.

**Example**

Assume that you have created a Processing component, an IP PrintWay Options component, and a Protocol component named **PWoptions**. To use IP PrintWay options in these components, the job submitter can specify the PRTOSPTNS parameter in an OUTPUT JCL statement, as shown:

```
//OUT1 OUTPUT PRTOSPTNS='PWoptions' ...
```

The component name is case-sensitive. Therefore, if the name contains special characters or lowercase characters, the job submitter must enclose the name in quotation marks.
Using an installation-provided filter

For each type of data format, you can specify the name of an associated filter. A filter is a program that can inspect and modify data. When you specify the name of a filter for a supported data format in a printer definition, the filter is called when the data format is detected. IP PrintWay can call the associated filter (a filter is called only once for each data set):

- IP PrintWay extended mode calls the filter before it transmits the data set to the printer.
- IP PrintWay basic mode uses the filter only if you also select the Resubmit for filtering field. IP PrintWay basic mode resubmits the data to Print Interface, which calls the associated filter program.

Your installation can write its own filter program, either a DLL filter or a UNIX filter. For information about how to write a filter, see z/OS Infoprint Server Customization.

Procedure for specifying attributes

On the Processing panel, specify:

- **Data format** field: Select the data format of the input document that your filter applies to.
- **Filter** field: Specify the name of the filter followed by the options that you want to provide as command line arguments to the filter.
  - If the filter is a DLL filter, type the absolute pathname unless the filter is in a directory named in the LIBPATH environment variable.
  - If the filter is a UNIX filter, type `spawn` before the filter name. Type the absolute pathname of the filter unless the filter is in a directory named in the PATH environment variable.
- **Resubmit for filtering** field: Select this field if you run IP PrintWay basic mode. For more information about this field, see “Resubmitting documents to Print Interface for filtering (basic mode)” on page 204. Selecting this field can adversely impact system performance.

Example

This ISPF panel shows how to specify a UNIX filter written by your installation for line data. Only a portion of the ISPF panel is shown.
If the input data stream contains line data, IP PrintWay calls the `my_unix_filter` filter to transform line data. The option and operand that follow the filter name are passed to the filter.

---

### Converting line data to an SCS or DSC/DSE data stream (basic mode)

When you select the VTAM protocol in the printer definition, IP PrintWay basic mode automatically converts line data into either SCS or DSC/DSE format except when `None` is selected in the IP PrintWay basic mode `Formatting` field.

IP PrintWay uses the ANSI or machine carriage controls in the input data stream to format data. IP PrintWay supports the print no space, space 1 line, space 2 lines, and space 3 lines carriage controls. If FCB processing is enabled, IP PrintWay also supports skip-to-channel 1-9, A, B and C (1-12) carriage controls. For more information about how to enable FCB processing in the printer definition, see "Using an FCB to format data" on page 183.

### SCS page-formatting attributes

You can specify SCS page-formatting attributes in the printer definition. You can specify top and bottom margins, left and right margins, the maximum line length, and the maximum page length. The left margin and maximum page length specified in the printer definition are used only if the FCB does not specify other values. These SCS page-formatting attributes are used to generate the SCS Set Horizontal Format (SHF) and Set Vertical Format (SVF) commands.

You cannot set the line density (lines per inch) or the print density (characters per inch) in the printer definition. IP PrintWay sets the line density to the lines per inch specified in the FCB. If FCB processing is not enabled or if no FCB is present, IP PrintWay uses 6 lines per inch. IP PrintWay sets the print density based on the table reference characters (TRCs) in the input data stream, as shown in Table 34. If no TRCs are present, IP PrintWay uses the character density set on the printer's panel.

#### Table 34. How table reference characters determine the characters per inch

<table>
<thead>
<tr>
<th>Table reference character</th>
<th>Print density characters per inch (CPI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10 CPI</td>
</tr>
<tr>
<td>1</td>
<td>12 CPI</td>
</tr>
<tr>
<td>2</td>
<td>15 CPI</td>
</tr>
<tr>
<td>3</td>
<td>16.6 or 17.1 CPI (depends on printer)</td>
</tr>
</tbody>
</table>

IP PrintWay does not support SCS controls, such as the X'35' transparent data control, that are embedded in line data. The transparent data control and any other unrecognized characters are converted to blank characters.

### Procedure for specifying attributes

1. (Optional) On the Processing panel of the printer definition for an SCS printer, specify these fields, which are displayed under the SCS Conversion heading:
   - **Margins: Top**: The number of the first line of data on a page. The default is no top margin.
   - **Margins: Bottom**: The number of the line at which the bottom margin starts on a page. The default is no bottom margin.
- **Margins: Left**: The column number at which the left margin starts on a page. If FCB processing is enabled and the FCB specifies a left margin, the FCB value is used instead. The default is column 1.
- **Margins: Right**: The column number at which the right margin starts on a page. The default is no right margin.
- **Line length**: The number of columns to place on one line, including the left and right margins. This value is the SHF Maximum Presentation Position (MPP). The default is the printer default set on the printer panel.
- **Page length**: The number of lines to place on a page, including the top and bottom margins. This value is the SVF Maximum Page Length (MPL). If FCB processing is enabled and the FCB specifies a page size, the FCB value is used instead. The default is the printer default set on the printer panel.

2. (Optional) On the IP PrintWay Options panel, specify these fields:

- **Formatting**: Select either the Standard or Use FCB option. The default is Standard. The Translate-only option is equivalent to the Standard option for the VTAM protocol.
- **Line termination**: Specify the line-termination controls (in EBCDIC) required by the printer. The default is the carriage-return and new-line (CRNL) controls, 0D15 in EBCDIC.
- **Delete form feed**: Specify whether you want IP PrintWay to delete form-feed controls from the beginning and end of data sets. Consider deleting form-feed controls if your applications insert form-feed controls that result in blank pages printed at the beginning or end of data sets. By default, IP PrintWay does not delete any form-feed controls.

Other fields under the Formatting heading do not apply when you select the VTAM protocol.

**Example**

These ISPF panels show how to specify formatting values. The values on the Processing panel apply only when IP PrintWay converts line data into SCS format. Only a portion of the ISPF panels are shown.

```
Processing

SCS Conversion:
Margins: Top . . 6  Bottom . 62  Left . 11  Right . 71
Line length . . 50  Page length . 56
Tabs: Vertical .
Horizontal . . . (extend)
```

**Results:**

- 66 lines are printed on a page. The top and bottom margins contain 5 blank lines. The left and right margins contain 10 blank spaces. However, if the FCB for the data set specifies a left margin and page size value, the FCB values are used instead of the left margin and page length value shown in this example.
- IP PrintWay does not use the Tabs fields shown on the Processing panel. Only NetSpool uses these fields when converting SCS data streams to line data streams or PCL data streams.
IP PrintWay Options

Formatting:
- Transparent data char: 35
- Form feed: \000C (extended mode)
  - Automatic dataset grouping (extended mode)
- Dataset grouping: 1. None 2. Job 3. Concatenate job
- Line termination: \0D15
  - Omit line termination at EOF

Basic Mode Formatting:
- Formatting: 1. None 2. Standard 3. Translate only 4. Use FCB

Results: IP PrintWay:
- Adds \0D15 (CRNL) to the end of each line. This is the default.
- Deletes any trailing form feed controls.
- Uses the FCB if one is provided to format the data.

Converting between EBCDIC and ASCII (basic mode)

This section applies to IP PrintWay basic mode. If you run IP PrintWay extended mode, see “Converting between EBCDIC and ASCII (extended mode)” on page 179.

IP PrintWay basic mode can convert line and text data from EBCDIC to ASCII or from ASCII to EBCDIC before transmitting a data set to the remote printer. You specify in the printer definition whether you want IP PrintWay basic mode to convert data and also the conversion method you want IP PrintWay basic mode to use.

Tip: IP PrintWay basic mode does not convert data between EBCDIC and ASCII if Print Interface has allocated the data set on the JES spool or if NetSpool has converted the data stream to any format other than line data. In these cases, Print Interface or NetSpool has already converted data to the printer code page.

IP PrintWay basic mode can use one of these methods to convert data between EBCDIC and ASCII:
- **iconv** utility (default method)
  The **iconv** utility converts data from one code page to another, from the code page used to create the document to the code page used by the printer. For more information about the **iconv** utility, see the z/OS XL C/C++ Programming Guide. Print Interface and NetSpool also uses **iconv** to convert data from EBCDIC to ASCII. IBM suggests using **iconv** because you can specify attributes in the printer definition that are suitable for both Print Interface and IP PrintWay. By default, IP PrintWay uses this method.
- **TCP/IP translation tables**
  For compatibility with previous releases, you can request that IP PrintWay use either the standard TCP/IP translation table supplied by IBM or a customized TCP/IP translate table created using the CONVXLAT program. For information...
about using translation tables and the CONVXLAT program, see \textit{z/OS Communications Server: IP Configuration Reference}.

Notes:
1. IBM suggests that you do not use TCP/IP translation tables because if you specify the attributes required for IP PrintWay to use the TCP/IP translation tables, you must create a separate printer definition if you want to use Print Interface to print on the same printer.
2. When you select the VTAM protocol, do not use the standard TCP/IP translation table because the standard translation table converts data from EBCDIC to ASCII.
3. When you select the VTAM protocol, IP PrintWay does not support DBCS translation tables.

Procedure for specifying attributes
The procedure you use depends on how you want IP PrintWay to convert data between EBCDIC and ASCII.

Using \texttt{iconv} to convert data between code pages
To use the \texttt{iconv} utility to convert data from the document code page to the printer code page:

- In the IP PrintWay FSS definition, specify the source code page in the Document code page field. If no code page is specified, the default is IBM-1047.
- In the IP PrintWay Options section of the printer definition, select Standard, Use FCB, or Translate only in the Formatting field. Standard is the default.
- On the Processing panel of the printer definition, specify these fields:
  - Document code page: Leave this field blank. IP PrintWay uses the document code page you specified in the FSS definition.
  - Printer code page: Specify the name of either an ASCII code page (such as ISO8859-1) or an EBCDIC code page (such as IBM-1047) that is supported by IBM. For code page names, see \textit{z/OS XL C/C++ Programming Guide}.

If you leave this field blank, the default action depends on the protocol selected in the printer definition:
  - VTAM or email protocol: IP PrintWay does not convert data from one code page to another.
  - LPR, direct sockets, or IPP protocol: IP PrintWay uses IBM-850 as the printer code page.

If you use the ISPF panels to create an IP PrintWay printer definition, the panel, by default, displays either the default ASCII or the default EBCDIC code page that is specified in the Infoprint Server configuration file (\texttt{aopd.conf}) or in the system configuration definition, depending on the protocol selected in the printer definition:
  - VTAM or email protocol: The EBCDIC code page is displayed.
  - LPR, direct sockets, or IPP protocol: The ASCII code page is displayed.

- Leave the Translation data set qualifier field blank.
- Leave the Double-byte translate table fields blank.

Using the standard TCP/IP translation table
To use the standard TCP/IP translation table to convert from EBCDIC to ASCII:

- In the IP PrintWay FSS definition, select the Old-style translation field. You do not need to select this field if you select a double-byte option in the Double-byte translate table field.
On the IP PrintWay Options panel of the printer definition, in the Formatting field: Select Standard, Use FCB, or Translate only. Standard is the default.

On the Processing panel, specify these fields:
- Document code page: Leave this field blank.
- Printer code page: Leave this field blank.

Tip: When you leave this field blank, Print Interface does not translate data from one code page to another, for example from EBCDIC to ASCII. Therefore, your output might not print correctly. If you have a problem printing documents using Print Interface, create a second printer definition for this printer, and specify a printer code page or use the default ASCII code page that is displayed in this field when you use the ISPF panels to create an IP PrintWay printer definition.
- Translation data set qualifier: Leave this field blank.
- Double-byte translate table: To print DBCS data, select a double-byte option.

Using a customized or a DBCS TCP/IP translation table
To use a customized TCP/IP translation table or a DBCS TCP/IP translation table to convert data between EBCDIC and ASCII:
- On the IP PrintWay Options panel in the Formatting field: Select either Standard, Use FCB, or Translate only option. Standard is the default.
- On the Processing panel, specify these fields:
  - Printer code page: Leave this field blank.

Tip: When you leave this field blank, Print Interface does not translate data from one code page to another, for example from EBCDIC to ASCII. Therefore, your output might not print correctly. If you have a problem printing documents using Print Interface, create a second printer definition for this printer, and specify a printer code page or use the default ASCII code page that is displayed in this field when you use the ISPF panels to create an IP PrintWay printer definition.
- Translation data set qualifier: Specify the name of the table.
- Double-byte translate table: To print DBCS data, select a double-byte option.

Search order for TCP/IP translation tables
IP PrintWay uses this search order to find a customized TCP/IP translation table:
1. xlate_name.language_name
2. tcpip_hlq,xlate_name.language_name
3. tcpip_hlq.STANDARD.language_name

xlate_name The name in the Translation data set qualifier field
tcp_hlq The TCP/IP high-level qualifier, TCPIP by default
language_name For single-byte data streams, language_name is TCPXLBIN. For double-byte data stream, language_name depends on the value selected in the Double-byte translate table field. For example, if you specify the SChinese option, language_name is TCPSCBIN.

IP PrintWay uses this search order to find a standard TCP/IP translation table:
1. tcpip_hlq.LPR.language_name
2. tcpip_hlq.STANDARD.language_name
tcp_hlq Specifies the TCP/IP high-level qualifier, TCPIP by default.
language_name For single-byte data streams, language_name is TCPXLBIN. For
double-byte data stream, language_name depends on the value selected in the Double-byte translate table field. For example, if you specify the SCHINESE option, language_name is TCPSCBIN.

Resubmitting documents to Print Interface for filtering (basic mode)

The IP PrintWay basic mode resubmit for filtering option lets you transform data in any output data set that IP PrintWay selects from the JES spool. For example, this option lets you use these AFP data transforms which IBM transform products provide:

- The AFP to PCL transform, which lets you print AFP and line-data documents to PCL printers
- The AFP to PostScript transform, which lets you print AFP and line-data documents to PostScript printers
- The AFP to PDF transform, which lets you create PDF output for viewing and printing from a workstation

IP PrintWay extended mode transforms data without resubmitting data sets to Print Interface, so the resubmit for filtering option does not apply. IP PrintWay extended mode ignores the Resubmit for filtering field if it is selected.

Figure 5 shows the processing that occurs when you select the Resubmit for filtering field in a printer definition.

![Diagram showing the processing when resubmit for filtering option is selected]

1. IP PrintWay basic mode selects a data set from the JES spool. It selects the printer definition to use based on the parameters specified on the OUTPUT JCL statement. (The job submittor can specify either the FSSDATA parameter or the
DEST, CLASS, and FORMS parameters to select the printer definition.) IP PrintWay detects that the data set has not already been processed by Print Interface.

2. Because the **Resubmit for filtering** field is selected in the printer definition, IP PrintWay basic mode transmits the data set and its JCL parameters to Print Interface.

3. Print Interface validates that the printer supports the data format and the print options requested in the JCL parameters. Print Interface calls the transform filter (if any) associated with the input data format and writes the transformed data to a second output data set on the JES spool.

4. IP PrintWay basic mode selects the second output data set from the JES spool. If Print Interface has called a data transform, IP PrintWay transmits the data, unchanged, to the printer. Otherwise, IP PrintWay does the formatting specified in the printer definition.

5. IP PrintWay transmits the data to the remote printer.

Steps 2, 3, and 4 are done only when the **Resubmit for filtering** field is selected.

**Note:** The processing shown in Figure 5 on page 204 results in two data sets allocated on the JES spool. Therefore, do not select this option unless necessary because system performance can be adversely affected.

These considerations apply when IP PrintWay basic mode resubmits a data set to Print Interface for filtering:

- IP PrintWay writes two accounting records for the same data, one for the first data set transmitted to Print Interface (see step 2) and another for the second data set transmitted to the printer (see step 5). Your system programmer can write an IP PrintWay SMF exit routine to suppress one of the SMF records. For more information about the SMF accounting record, see Chapter 18, "Using accounting information in SMF type 6 records," on page 449.

- IP PrintWay retains both data sets on the JES spool if you specify a retention period in the **Retention period** fields. Retention periods specified at job submission (for example, on an OUTPUT JCL statement) apply only to the first data set allocated on the JES spool.

- The Print Interface LPD must listen at port 515.

- Job submitters cannot specify the printer's IP address, print queue name, or port number on the OUTPUT JCL statement or in an Infoprint Server job attribute. IP PrintWay ignores these values if specified at job submission and, instead, uses the values in the printer definition.

- Do not select the **Resubmit for filtering** field in the IP PrintWay default printer definition.

- JES always assigns each data set that Print Interface allocates on the JES spool to a separate JES output group. This is true even if the data set was originally in the same JES output group as other data sets when IP PrintWay first selected it from the JES spool. Therefore, when you select the **Resubmit for filtering** field, IP PrintWay cannot transmit data sets in the original JES output group together to the printer or send them in the same email. These results occur:
  - Data sets in the same original JES output group might not print together or might not print in the original order, even if the **Job** or **Concatenate job** option is selected in the Dataset grouping field. This result is especially likely if your installation has customized the Infoprint Server Transform Manager so that it can transform more than one data set at the same time. When you...
transform more than one data set at the same time, small data sets are transformed more quickly and then IP PrintWay can transmit them to the printer before larger data sets.

- Data sets in the same original JES output group are always sent in separate emails, even if the Concatenate job option is selected in the Dataset grouping field.
- If your installation adds a separator page only before the first data set in a JES output group, that separator page prints before each data set.
  - The second sysout data set, which Print Interface allocates on the JES spool, contains the same job name, job ID, and last qualifier of the data set name as the original sysout data set on the JES spool. Therefore, the operator can use these values to find the job submitter’s data set on the JES spool.

For information about how to write IP PrintWay exit routines and configure the Print Interface LPD, see z/OS Infoprint Server Customization.

Procedure for specifying attributes

On the Processing panel, specify these fields:

- **Resubmit for filtering**: Select this field to enable the IP PrintWay basic mode transform function.
- **Data Format and Filter**:
  - Select the data format and specify the associated filter program to transform the data.
  - (Optional) Specify other fields used by the filters. For information about the fields to specify, see Chapter 13, “Planning printer definitions for transforms,” on page 213.
- **Validation fields**: (Optional) Specify fields that Print Interface uses to validate the print request, such as the Duplex supported field. For information about these fields, see “Validating that documents can print as requested” on page 78. By default, Print Interface does not do validation.

On the Allocation panel, specify the JES allocation parameters that Print Interface uses when it allocates data sets on the JES spool after filtering. For information about these fields, see “Specifying JES allocation parameters” on page 75. For example, be sure to specify values for the JES work-selection parameters, such as CLASS, that IP PrintWay uses to select data sets from the JES spool. (For more information about JES work-selection parameters, see z/OS Infoprint Server Customization.) In some cases, the values the job submitter specified on the OUTPUT JCL statement override the corresponding values you specify in the Allocation panel. Table 35 shows the OUTPUT JCL statement parameters that override the values on the Allocation panel.

Table 35. OUTPUT JCL statements that override allocation values when resubmit for filtering option is selected

<table>
<thead>
<tr>
<th>OUTPUT parameters</th>
<th>Printer definition fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADDRESS, BUILDING, DEPT, NAME, ROOM, TITLE</td>
<td>Address, Building, Department, Name, Room, Title</td>
</tr>
<tr>
<td>DATAACK</td>
<td>Print error reporting</td>
</tr>
<tr>
<td>DUPLEX</td>
<td>Duplex</td>
</tr>
<tr>
<td>CHAR$^1$</td>
<td>Character sets</td>
</tr>
<tr>
<td>COPIES$^2$</td>
<td>Copies</td>
</tr>
<tr>
<td>FORMDEF</td>
<td>Form definition</td>
</tr>
</tbody>
</table>


Table 35. OUTPUT JCL statements that override allocation values when resubmit for filtering option is selected (continued)

<table>
<thead>
<tr>
<th>OUTPUT parameters</th>
<th>Printer definition fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORMS</td>
<td>FORMS</td>
</tr>
<tr>
<td>INTRAY, OUTBIN</td>
<td>Input tray, Output bin</td>
</tr>
<tr>
<td>OFFSETXB, OFFSETXF</td>
<td>Image shift x-direction back/front</td>
</tr>
<tr>
<td>OFFSETYB, OFFSETYF</td>
<td>Image shift y-direction back/front</td>
</tr>
<tr>
<td>OVERLAYB, OVERLAYF</td>
<td>Overlay back/front</td>
</tr>
<tr>
<td>PAGEDEF</td>
<td>Page definition</td>
</tr>
<tr>
<td>PRMODE</td>
<td>PRMODE</td>
</tr>
<tr>
<td>TRC</td>
<td>Table reference characters</td>
</tr>
<tr>
<td>USERLIB</td>
<td>Resource library</td>
</tr>
</tbody>
</table>

1. If the CHARS parameter is not specified, the value in the UCS JCL parameter is used.
2. The COPIES parameter can also be specified on the DD JCL statement.
3. The form name can also be specified in the SYSOUT parameter on the DD statement.
4. If PAGEDEF parameter is not specified, the value in the FCB JCL parameter is used.

Example

This ISPF panel shows how to request that all line data and AFP data be transformed to PCL data using the `afpxpcl.dll` filter. Only a portion of the ISPF panel is shown.

```
... Supported data formats and associated filters:
Data format: Filter:
/ Line data afpxpcl.dll (extend)
7 MO:DCA-P afpxpcl.dll (extend)
- PostScript (extend)
/ Text aopfiltr.so (extend)
7 PCL (extend)
- PDF (extend)
- SAP (extend)
- XML (extend)
- TIFF (extend)
- JPEG (extend)
- Other (extend)
/ Resubmit for filtering
... Maximum document size . ________
Maximum copies . . . . . . . . . .
Forms supported . . . . . . . . . .
Duplex supported . . . . . Simplex / Duplex / Tumble ______
Print-error reporting supported . . Character / Position
```

This ISPF panel shows how to specify the JES allocation values that Print Interface uses when it allocates the data set on the JES spool.

Chapter 12. Planning printer definitions for IP PrintWay  207
**Result:** Print Interface allocates data sets on the JES spool with CLASS=E and DEST=BLDG5. Print Interface uses the FORMS value specified by the job submitter on the OUTPUT JCL statement instead of std, which is specified in the FORMS field. For information about other JCL values that override values specified on this panel, see Table 35 on page 206.
Printing data without formatting (basic mode)

If you run IP PrintWay basic mode and your batch applications create output that contains ASCII text data, PCL data, PDF data, or AFP data, you must request in the printer definition that IP PrintWay basic mode transmit the data sets to the printer or email destination without formatting the data. To do this, select the IP PrintWay none formatting option in the printer definition.

Tip: IP PrintWay extended mode detects the data stream and automatically sends data other than line data to the printer without formatting.

In some situations, even though IP PrintWay basic mode does not format the data, it might be necessary to translate the data stream to either ASCII or EBCDIC, depending on the requirements of the destination. In this situation, select the Translate only formatting option in the printer definition.

Select the IP PrintWay basic mode none formatting option when your batch applications create:
- ASCII text, PCL, or PDF data to be printed on an ASCII printer
- AFP, PCL, or PDF data to be sent to an email destination
- PCL data to be printed on a VTAM-controlled PCL printer

Select the IP PrintWay basic mode Translate only formatting option when your batch applications create:
- ASCII text data to be mailed to an email destination

In these situations, IP PrintWay can automatically determine that it should transmit the data stream unchanged to the printer. Therefore, in these cases, it ignores the IP PrintWay formatting option selected in the printer definition and automatically processes data sets as if the none formatting option were selected:
- The data stream contains a PostScript header.
- Print Interface converted the data stream to a format suitable for its destination.
- The Remote PSF option is selected on the LPR Protocol panel.
- NetSpool converted the data stream to a PCL data stream (the Convert to PCL option is selected on the NetSpool Options panel).
- The data is to be sent to a VTAM-controlled printer as transparent data (the Send as transparent field is selected on the VTAM Protocol panel).

Procedure for specifying attributes

On the IP PrintWay Options panel, specify these fields:

- **Formatting**: Select None or Translate only.
  
  When you select the None or Translate only formatting option, IP PrintWay ignores these fields:
  - Processing panel: All fields under the IP PrintWay Line-to-Text Conversion and SCS Conversion headings
  - IP PrintWay Options panel: All fields under the Formatting and Basic Mode Formatting headings (except for the Formatting field)
  - (Optional) Specify other fields such as Document header and Document trailer.

Example

This ISPF panel shows how to request that IP PrintWay not translate or format data. Only a portion of the ISPF panel is shown.
Formatting for PostScript landscape orientation (basic mode)

IP PrintWay basic mode can format non-PostScript data sets in the landscape orientation for printing on a PostScript printer. To request landscape orientation, you can select a landscape option in the PostScript header field.

IP PrintWay extended mode ignores the PostScript header field. For information about how to print in landscape orientation when you run IP PrintWay extended mode, see “Specifying printer commands for landscape printing” on page 189.

Note: IP PrintWay does not format data if Print Interface has allocated the data set on the JES spool or if NetSpool has converted the data stream to any format other than line data. In these cases, Print Interface or NetSpool formats the data. Therefore, the PostScript header field does not apply to these data sets.

If you select one of the landscape options in the PostScript header field, IP PrintWay basic mode sends this PostScript program to the printer before sending data. This program intercepts the data, formats it, and prints it. This PostScript program does not work if the data to be printed is already PostScript data.

```plaintext
614 25 translate 90 rotate .88 .76 scale
/n 1 def
/fs 10 def
/ls 11.2 def
/l1 ls 2 mul def
/l2 ls 3 mul def
/t 740 fs sub def
/y t def /ff t def /os 20 def
/s 512 string def
/Courier-Bold findfont
/fs scalefont setfont
/p {n {copypage} repeat erasepage} def
/i {%stdin} (r) file def
/i/c i read not {p stop} if def
/c 26 eq {p stop} if
/x 20 def
/y c 43 eq {y /x os def}
c 32 eq {y ls sub}
c 48 eq {y l1 sub}
c 45 eq {y l2 sub}
c 49 eq {ff} {y} ifelse
ifelse) ifelse) ifelse) ifelse def
/ff 0 def
y 65 le {p /y t def} if x y moveto
/os i s readline not {p stop} if dup show
length 0 eq {20} {20.72} ifelse def } loop
```

Limitations:
• If you select a landscape option, do not use the same printer definition to print PostScript data sets from a batch application. If you do, an error occurs.
• Do not select a landscape option when you select the email protocol.
• If you select a landscape option, do not specify printer commands in the Document header and Document trailer fields.

Procedure for specifying attributes
On the IP PrintWay Options panel, specify these fields:
• Formatting: Select the Standard option.
• PostScript header: Select the Landscape option.
Chapter 13. Planning printer definitions for transforms

Table 36 lists the transform products that you can use with Infoprint Server, the transforms that each product provides, and where you can find more information about the transforms and how to customize them.

**Table 36. Transforms that work with Infoprint Server**

<table>
<thead>
<tr>
<th>Transform product</th>
<th>Transform</th>
<th>For information, see:</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM Infoprint Transforms to AFP for z/OS (5655-N60)</td>
<td>PCL to AFP, PDF to AFP, PostScript to AFP, SAP to AFP</td>
<td>IBM Infoprint Transforms to AFP for z/OS</td>
</tr>
<tr>
<td>IBM Print Transform from AFP to PCL for Infoprint Server for z/OS (5655-TF2)</td>
<td>AFP to PCL</td>
<td>IBM Print Transforms from AFP for Infoprint Server for z/OS</td>
</tr>
<tr>
<td>IBM Print Transform from AFP to PDF for Infoprint Server for z/OS (5655-TF1)</td>
<td>AFP to PDF</td>
<td>IBM Print Transforms from AFP for Infoprint Server for z/OS</td>
</tr>
<tr>
<td>IBM Print Transform from AFP to PostScript for Infoprint Server for z/OS (5655-TF3)</td>
<td>AFP to PostScript</td>
<td>IBM Print Transforms from AFP for Infoprint Server for z/OS</td>
</tr>
<tr>
<td>IBM Infoprint XT for z/OS (5655-O15)</td>
<td>Xerox to AFP</td>
<td>IBM Infoprint XT for z/OS</td>
</tr>
<tr>
<td>Ricoh InfoPrint Transform Manager for Linux</td>
<td>AFP to PDF, GIF to AFP, JPEG to AFP, PCL to AFP, PDF to AFP, PostScript to AFP, TIFF to AFP</td>
<td>InfoPrint Transform Manager for Linux</td>
</tr>
<tr>
<td>Ricoh InfoPrint Manager for AIX</td>
<td>PCL to AFP, PDF to AFP, PostScript to AFP</td>
<td>InfoPrint Manager for AIX: Procedures</td>
</tr>
<tr>
<td>Ricoh InfoPrint Manager for Windows</td>
<td>PCL to AFP, PDF to AFP, PostScript to AFP</td>
<td>InfoPrint Manager for Windows: Procedures</td>
</tr>
</tbody>
</table>

The topics in this section describe how to direct Infoprint Server to automatically call an Infoprint transform before writing documents to the JES spool or sending them to the printer.

**Using transform filters**

To transform data automatically, you specify a transform *filter* in the printer definition. A transform filter is a program that transforms the input data to another data format.

You can specify a different filter for each input data format that Infoprint Server supports: line data, JPEG, MO:DCA-P, PCL, PDF, PostScript, SAP, TIFF, XML, text,
and other. After Infoprint Server detects the input data format of a document, it calls the transform filter that you associated with that data format.

Table 37 lists the transform products and the name of the transform filters that you can associate in the printer definition with different data formats.

Table 37. Infoprint transforms, filter names, and data formats

<table>
<thead>
<tr>
<th>Transform product</th>
<th>Transform</th>
<th>Transform filter</th>
<th>Data formats</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM Print Transform from AFP to PCL for Infoprint Server for z/OS</td>
<td>AFP to PCL</td>
<td>afpxpcl.dll</td>
<td>Line data MOD:CA-P XML</td>
</tr>
<tr>
<td>IBM Print Transform from AFP to PDF for Infoprint Server for z/OS</td>
<td>AFP to PDF</td>
<td>afpxpdf.dll</td>
<td>Line data MOD:CA-P XML</td>
</tr>
<tr>
<td>IBM Print Transform from AFP to PostScript for Infoprint Server for z/OS</td>
<td>AFP to PostScript</td>
<td>afpxps.dll</td>
<td>Line data MOD:CA-P XML</td>
</tr>
<tr>
<td>IBM Infoprint Transforms to AFP for z/OS</td>
<td>PCL to AFP</td>
<td>pcl2afp.dll</td>
<td>PCL</td>
</tr>
<tr>
<td></td>
<td>PDF to AFP</td>
<td>ps2afp.dll</td>
<td>PDF</td>
</tr>
<tr>
<td></td>
<td>PostScript to AFP</td>
<td>ps2afp.dll</td>
<td>PostScript</td>
</tr>
<tr>
<td></td>
<td>SAP to AFP</td>
<td>sap2afp.dll</td>
<td>SAP</td>
</tr>
<tr>
<td>IBM Infoprint XT for z/OS</td>
<td>Xerox to AFP</td>
<td>x2afp.dll</td>
<td>Other</td>
</tr>
<tr>
<td>Ricoh InfoPrint Transform Manager for Linux</td>
<td>AFP to PDF</td>
<td>aoprxf.so</td>
<td>Line data MOD:CA-P</td>
</tr>
<tr>
<td></td>
<td>GIF to AFP</td>
<td>aoprxf.so</td>
<td>Other</td>
</tr>
<tr>
<td></td>
<td>PCL to AFP</td>
<td>aoprxf.so</td>
<td>PCL</td>
</tr>
<tr>
<td></td>
<td>JPEG to AFP</td>
<td>aoprxf.so</td>
<td>JPEG</td>
</tr>
<tr>
<td></td>
<td>PDF to AFP</td>
<td>aoprxf.so</td>
<td>PDF</td>
</tr>
<tr>
<td></td>
<td>PostScript to AFP</td>
<td>aoprxf.so</td>
<td>PostScript</td>
</tr>
<tr>
<td></td>
<td>TIFF to AFP</td>
<td>aoprxf.so</td>
<td>TIFF</td>
</tr>
<tr>
<td>Ricoh InfoPrint Manager for AIX and Windows</td>
<td>PCL to AFP</td>
<td>aoprfm.dll</td>
<td>PCL</td>
</tr>
<tr>
<td></td>
<td>PDF to AFP</td>
<td>aoprfm.dll</td>
<td>PDF</td>
</tr>
<tr>
<td></td>
<td>PostScript to AFP</td>
<td>aoprfm.dll</td>
<td>PostScript</td>
</tr>
</tbody>
</table>

Notes:
1. The ps2afp.dll filter transforms both PDF and PostScript data to AFP format.
2. Infoprint Server provides filters aoprxf.so and aoprfm.dll. The separate transform products provide the other transform filters.

A filter can accept options, which control processing of the transform. Table 38 summarizes the options that you can specify for each transform filter.

Table 38. Transform filter options

<table>
<thead>
<tr>
<th>Filter</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>aoprxf.so</td>
<td>[%filter-options] [%xf-options] [-xf &quot;transformattributes&quot;]... [option ...]</td>
</tr>
</tbody>
</table>
Filter options for the aoprform.dll filter

You can specify these filter options for the aoprform.dll filter:

%filter-options

Causes any options that a job submitter specified in the filter-options job attribute to be passed directly to the transform.

You can type %filter-options in any position relative to other filter options. If you specify any options to the right of %filter-options, those options override the same options that were specified in the filter-options job attribute, with the exception of any options that are cumulative.

-a imagetype

The type of AFP data stream image that the transform generates for each page in the PCL, PostScript, or PDF file. Valid values are:

- fs45
  IOCA color FS45 images. Specify this value for color printers such as the InfoPrint Color 1454 or 1464 printer. Specify this value only for the PostScript and PDF data formats.

- im1
  IM1 image. This type of image is not compressed.

- io1
  IOCA image. This type of image is not compressed.

- io1-g4
  Compressed Image Object Content Architecture (IOCA) image in Modified Telecommunication Standardization Sector (TSS) T.6 G4 Facsimile Coding Scheme (G4 MMR) format. This is the suggested output type because it takes up less space on the hard disk, and it prints faster.

  Tips:
  1. Some older AFP printers do not support printing with an image type of io1-g4. For these printers, specify an image type of io1-mmr because it is the compressed image type supported by these printers. This image type results in faster printing than uncompressed image types.
  2. TSS was formerly the International Telegraph and Telephone Consultative Committee (CCITT).

- io1-mmr
  Compressed IOCA image in Modified Modified Read (MMR) format.

-1 length

This option is passed directly to the Ricoh InfoPrint Manager transform daemon. For the values you can specify, see the ps2afp or pcl2afp command description in InfoPrint Manager: Reference.

-P

The TCP/IP port number on the AIX or Windows system at which the transform daemon is receiving data. Consult the AIX or Windows administrator for the correct value to specify. If you omit this option, the default port for the type of input data is used. Valid values are:

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
</table>
The default port number for the PostScript and PDF data formats.

The default port number for the PCL data format.

Any valid port number greater than or equal to 924 at which the transform daemon is receiving data.

-p pagerange
This option is passed directly to the Ricoh InfoPrint Manager transform daemon. For the values you can specify, see the ps2afp or pcl2afp command description in InfoPrint Manager: Reference.

-q transformattributes
When you select the FS45 image output (-a fs45), you can specify these transform attributes and values. For a detailed description of these attributes and values, see InfoPrint Manager: Reference.

color-profile={euroscale | none | swop}
Specifies the color profile that the transform is to use. The default value is none. You can also specify these synonyms:

<table>
<thead>
<tr>
<th>Value</th>
<th>Synonym</th>
</tr>
</thead>
<tbody>
<tr>
<td>euroscale</td>
<td>Euroscale</td>
</tr>
<tr>
<td>swop</td>
<td>SWOP</td>
</tr>
</tbody>
</table>

color-rendering-intent={relative | perceptual}
Specifies how the transform is to process shades that the color printer cannot reproduce exactly. The default value is relative.

color-toner-saver={ no | yes}
Specifies whether the transform is to reduce the amount of color toner used by the printer. The default value is no. You can also specify these synonyms:

<table>
<thead>
<tr>
<th>Value</th>
<th>Synonym</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>false</td>
</tr>
<tr>
<td>yes</td>
<td>true</td>
</tr>
</tbody>
</table>

presentation-object-container-extraction-mode={ignore | inline}
Specifies how the transform generates presentation object container resources in the output stream. The default value is ignore.

Rules:
- Specify attributes in this format: attribute=value.
- If you specify more than one attribute, separate the attributes with a space.
- Do not abbreviate the attribute names and values.
- Use the exact uppercase and lowercase letters for the attribute and values.
- If the -q value contains spaces, enclose the entire value in single or double quotation marks.
- You can specify the -q option multiple times. If you specify the same attribute multiple times, the last value specified for the attribute is used.

-r resolution
This option is passed directly to the Ricoh InfoPrint Manager transform daemon. For the values you can specify, see the ps2afp or pcl2afp command description in InfoPrint Manager: Reference.
-t outputtype
Determines the type of output to generate.
Valid values are:

**document**
Printable document. This is the default value.

**overlay**
Graphic image that can be printed on each page of a printable document.

**pagesegment**
Graphic image that can be embedded in a printable document.

Tip: When you generate overlays or page segments from multiple-page documents, the user might want to use the -g or -p option to select pages. Otherwise, one overlay or page segment is created for each page of the input file.

-w width
This option is passed directly to the Ricoh InfoPrint Manager transform daemon. For the values you can specify, see the ps2afp or pcl2afp command description in InfoPrint Manager: Reference.

-x xoffset
This option is passed directly to the Ricoh InfoPrint Manager transform daemon. For the values you can specify, see the ps2afp or pcl2afp command description in InfoPrint Manager: Reference.

-y yoffset
This option is passed directly to the Ricoh InfoPrint Manager transform daemon. For the values you can specify, see the ps2afp or pcl2afp command description in InfoPrint Manager: Reference.

ipaddress
The host name or dotted-decimal address of the AIX or Windows system on which the transform daemon is running. This is a required option. For example, 9.99.9.23 or AIX4.

Tip: Ricoh InfoPrint Manager transforms, by default, create 32K records. To limit the maximum AFP record length to 8K bytes, the InfoPrint Manager administrator must add this statement to the InfoPrint Manager configuration file for the transform (for example, configuration file ps2afpd.cfg):

pragma=AFPDSRECORDLENGTH=8000

**Filter options for the aoprxf.so filter**
You can specify these filter options for the aoprxf.so filter:

`%filter-options`
Causes any option that a job submitter specified in the `filter-options` job attribute to be passed directly to the transform.

You can type `%filter-options` in any position relative to other filter options. If you specify any options to the right of `%filter-options`, those options override the same options that were specified in the `filter-options` job attribute, with the exception of any options that are cumulative. If an option is cumulative, the transform applies all occurrences of the option.
%xf-options
Causes transform attributes that a job submitter specified in the xf-options job attribute to be used.

You can type %xf-options in any position relative to -xf option. If you specify the -xf option to the right of %xf-options, the transform attributes specified in the -xf option override the transform attributes that were specified in the xf-options job attribute.

-xf "transform attributes"
In this option, you can specify one or more of these transform attributes:

- fail-on-datastream-error=yes | no
- output-format=pdf | modca-p
- trailer-error-page=yes | no
- transform-id=transform_ID

For a description of these transform attributes see z/OS Infoprint Server User’s Guide.

Rules:
- Specify attributes in this format: attribute=value.
- If you specify more than one attribute, separate the attributes with a space.
- You can abbreviate the attribute names and values.
- Use the exact uppercase and lowercase letters for the attribute and values.
- If the value contains any spaces, enclose the entire value in single or double quotation marks.
- You can specify the -xf option multiple times. If you specify the same attribute multiple times, the last value specified for the attribute is used.

Examples:
aoprx.so -xf "fail-on-datastream-error = yes"
aoprx.so -xf "fail-on-datastream-error=yes trailer-error-page=no"
aoprx.so -xf fail-on-datastream-error=yes -xf trailer-error-page=no

option
Any option that the transform accepts. Separate multiple options with a space. For information about the options, see the documentation for the transform.

Tips:
- InfoPrint Server does not check the syntax of these options. It passes them directly to the transform.
- Some of the InfoPrint Transform Manager for Linux transform options are different from the transform options you can specify with IBM transforms. For example, the InfoPrint Transform Manager for Linux -a option, which specifies the type of IOCA image to create, accepts different values. Also, the InfoPrint Transform Manager for Linux transforms use different abbreviations for millimeters (m), inches (i), and pels (pels).

Examples:
ps2afp.dll -l 297mm -w 210mm -r 240 -a io1-g4
aoprx.so -l 297m -w 210m -r 240 -a IO1_G4
The InfoPrint Transform Manager for Linux transforms, by default, create AFP records that are 32K bytes in length. To set the maximum number of bytes in a record to 8K, specify this `-pragma` option:

```
x-f -pragma afpdsrecordlength=8000
```

To create 8K records, you must specify 8000, which is actually less than 8K. This is because the length of the actual AFP records is greater than the value specified in the `-pragma` option.

**Filter options for other transform filters**

You can specify these filter options for transform filters `pcl2afp.dll`, `ps2afp.dll`, `sap2afp.dll`, `afpxpcl.dll`, `afpxps.dll`, `afpxpdf.dll`, and `x2afp.dll`.

`%filter-options`

Causes any options that a job submittter specified in the `filter-options` job attribute to be passed directly to the transform.

You can type `%filter-options` in any position relative to other filter options. If you specify transform options to the right of `%filter-options`, those options override the same options that were specified in the `filter-options` job attribute, with the exception of any options that are cumulative. If an option is cumulative, the transform applies all occurrences of the option.

`option`

Any option that the transform accepts. Separate multiple options with a space. For information about the transform options, see:

- [IBM Print Transforms from AFP for Infoprint Server for z/OS](https://www.ibm.com)  
- [IBM Infoprint Transforms to AFP for z/OS](https://www.ibm.com)  
- [IBM Infoprint XT for z/OS](https://www.ibm.com)

**Tip**: Infoprint Server does not check the syntax of these options. It passes them directly to the transform.

**Procedure for specifying attributes**

On the Processing panel, specify these fields:

- **Data format** field: Select the formats of the input documents to which the filter applies. For information about which data formats to select for each filter, see Table 37 on page 214.
- **Filter** field: Specify the name of the filter followed by any filter options. Type the absolute pathname if the filter is not in a directory named in the LIBPATH environment variable specified in the `aopstart` EXEC and the `/etc/profile` file.
- **Resubmit for filtering** field: Select this field if you run IP PrintWay basic mode and want to transform documents submitted from batch applications. This field does not apply to IP PrintWay extended mode. For more information about this field, see “Resubmitting documents to Print Interface for filtering (basic mode)” on page 204.

**Note**: If several printers support the same data formats, consider creating a Processing component in which you select the data formats and specify any associated filters. Then include this component in the printer definitions for all printers that support the same data formats. However, make sure that you do not specify any values in the **Data format** and **Filter** fields in the printer definition itself because the values that you specify in the printer definition completely override all values that are specified in the same fields in the Processing component.
Example 1. Specifying the aoprxf.so filter for transforms to AFP

This ISPF panel shows how to specify the `aoprxf.so` filter to use transforms to AFP that InfoPrint Transform Manager for Linux provides. Only a portion of the Processing panel is shown.

```
Processing
...
Supported data formats and associated filters:
Data format: Filter:
... Line data ____________________________________________ (extend)
... MO:DCA-P ____________________________________________ (extend)
7 PostScript aoprxf.so -a FS45 -l 297m -w 210m -r 240 %filter-optio (extend)
7 Text ____________________________________________________ (extend)
7 PCL aoprxf.so -a 101 G4 -l 297m -w 210m -r 240 %filter-opt (extend)
7 PDF aoprxf.so -a FS45 -l 297m -w 210m -r 240 %filter-optio (extend)
... SAP ____________________________________________________ (extend)
7 XML ____________________________________________________ (extend)
7 TIFF aoprxf.so -a FS45 -l 297m -w 210m -r 240 %filter-optio (extend)
7 JPEG aoprxf.so -a FS45 -l 297m -w 210m -r 240 %filter-optio (extend)
... Other ____________________________________________________ (extend)
... Resubmit for filtering
...
```

Tip: To enter more characters than can fit on the line, move the cursor to “extend” and press Enter. On the Extended Field panel, type all the characters. Do not end a line that continues to the next line with a blank character. Be sure to press Enter and check your text before you exit the Extended Field panel.

```
---------------------------- Extended Field ---------------------
PostScript Filter
aoprxf.so -a FS45 -l 297m -w 210m -r 240 %filter-options %xf-options ____________________________________________ (extend)
```

Explanation of fields:

- The selected data formats are suitable for AFP printers that PSF controls:
  - `Line data`, `MO:DCA-P`, and `XML` are selected because PSF can accept these data formats. No filter is required.
  - `Text` is selected because InfoPrint Server automatically converts text data into line data when the printer definition is a PSF printer definition. No filter is required.
  - `PostScript`, `PCL`, `PDF`, `TIFF`, and `JPEG` are selected because InfoPrint Transform Manager for Linux transforms can transform these data formats to AFP format.
- The `-a`, `-l`, `-r`, and `-w` options are passed directly to InfoPrint Transform Manager for Linux.
- `%filter-options` causes the transforms to use any transform options that the job submitter specifies in the `filter-options` job attribute. Because `%filter-options` is specified to the right of the transform options (`-a`, `-l`, `-r`, `-w`), the job submitter can override these transform options.
- `%xf-options` causes the transforms to use any transform attributes, such as `trailer-error-page`, that the job submitter specifies in the `xf-options` job attribute.

- **Resubmit for filtering** is not selected because this field does not apply to a PSF printer definition. However, you should select this field in an IP PrintWay printer definition if you run IP PrintWay basic mode.

**Example 2. Specifying the aoprxf.so filter for the AFP to PDF transform**

This ISPF panel shows how to specify the `aoprxf.so` filter to use the AFP to PDF transform that InfoPrint Transform Manager for Linux provides. Only a portion of the Processing panel is shown.

```
Processing
::
Supported data formats and associated filters:
Data format: Filter:

<table>
<thead>
<tr>
<th>Data format</th>
<th>Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line data</td>
<td>____________________________________________________________________</td>
</tr>
<tr>
<td>MO:DCA-P</td>
<td>aoprxf.so %filter-options %xf-options -xf output-format=pdf</td>
</tr>
<tr>
<td>PostScript</td>
<td>____________________________________________________________________</td>
</tr>
<tr>
<td>Text</td>
<td>____________________________________________________________________</td>
</tr>
<tr>
<td>PCL</td>
<td>____________________________________________________________________</td>
</tr>
<tr>
<td>PDF</td>
<td>____________________________________________________________________</td>
</tr>
<tr>
<td>SAP</td>
<td>____________________________________________________________________</td>
</tr>
<tr>
<td>XML</td>
<td>____________________________________________________________________</td>
</tr>
<tr>
<td>TIFF</td>
<td>____________________________________________________________________</td>
</tr>
<tr>
<td>JPEG</td>
<td>____________________________________________________________________</td>
</tr>
<tr>
<td>Other</td>
<td>____________________________________________________________________</td>
</tr>
<tr>
<td></td>
<td>/ Resubmit for filtering</td>
</tr>
</tbody>
</table>

Tip: To enter more characters than can fit on the line, move the cursor to “extend” and press Enter. On the Extended Field panel, type all the characters. Do not end a line that continues to the next line with a blank character. Be sure to press Enter and check your text before you exit the Extended Field panel.

```

Explanation of fields:
- The selected data formats are suitable for a printer or email destination that accepts PDF format:
  - **MO:DCA-P** is selected because the AFP to PDF transform can transform MO:DCA-P data to PDF format. The AFP to PDF transform that InfoPrint Transform Manager for Linux provides cannot transform line data; therefore, the **Line data** format is not selected.
  - **PDF** is selected. No filter is specified because documents in PDF format do not need to be transformed.
- `%filter-options` causes the transform to use any transform options that the job submitter specifies in the **filter-options** job attribute.
• \%xf-options causes the transform to use any transform attributes that the job submitter specifies in the xf-options job attribute.

• The -xf option specifies PDF as the output format. This option is required to use the AFP to PDF transform.

• Resubmit for filtering is selected. Select this field if you run IP PrintWay basic mode. IP PrintWay extended mode ignores this field.

Example 3. Specifying the aoprform.dll filter
This ISPF panel shows how to specify the aoprform.dll transform filter to use transforms that InfoPrint Transform Manager for Linux provides. Only a portion of the Processing panel is shown.

```
Processing
Printer definition name . myprinter

Supported Data Formats and Associated Filters:
Data format: Filter:
/ Line data ______________________________________________________ (extend)
/ MO:DCA-P ______________________________________________________ (extend)
/ PostScript aoprform.dll %filter-options -r 300 sys4 (extend)
/ Text ______________________________________________________ (extend)
/ PCL aoprform.dll %filter-options -r 300 sys4 (extend)
/ PDF aoprform.dll %filter-options -r 300 sys4 (extend)
/ SAP ______________________________________________________ (extend)
/ XML ______________________________________________________ (extend)
/ TIFF ______________________________________________________ (extend)
/ JPEG ______________________________________________________ (extend)
/ Other ______________________________________________________ (extend)

   Resubmit for filtering
```

Explanation of fields:
• The selected data formats are suitable for AFP printers that PSF controls:
  – Line data, MO:DCA-P, and XML are selected because PSF can accept these data formats. No filter is required.
  – Text is selected because Infoprint Server automatically converts text data into line data when the printer definition is a PSF printer definition. No filter is required.
  – PostScript, PCL, and PDF are selected because Ricoh InfoPrint Manager transforms can transform these data formats to AFP format.
• \%filter-options causes the transforms to use any options that the job submitter specifies in the filter-options job attribute. Because \%filter-options is specified to the left of the -r transform option, the job submitter cannot override this option.
• The -r option specifies the resolution of the output. This option is passed to the Ricoh InfoPrint Manager transform daemon.
• sys4 causes the aoprform.dll filter to pass the data to be transformed to the system with host name sys4.
• Resubmit for filtering is not selected because this field does not apply to a PSF printer definition. However, you should select this field in an IP PrintWay printer definition if you run IP PrintWay basic mode.
Chapter 14. Planning PSF FSS and FSA definitions

PSF FSS and FSA definitions in the Printer Inventory contain configuration information that PSF for z/OS or the AFP Download plus feature of PSF can use. In addition, PSF FSA definitions contain information that Infoprint Central uses.

Tip: In Infoprint Central, a “PSF printer” can refer to an AFP printer or to an AFP Download Plus sender.

You can create these definitions in the Printer Inventory:
• An FSS definition for each PSF functional subsystem (FSS)
• An FSA definition for each PSF functional subsystem application (FSA)

You must create PSF FSS and FSA definitions in these cases:
• You want to specify PSF configuration information in the Printer Inventory
• You want to use Infoprint Central to work with PSF printers

These topics describe how to specify information in PSF FSA definitions that Infoprint Central uses. For information about how to specify PSF configuration information, see:
• PSF for z/OS: Customization
• PSF for z/OS: AFP Download Plus

Tip: If you want to submit print requests through Print Interface or NetSpool, you must also create printer definitions in the Printer Inventory. If you do not plan to submit print jobs using Print Interface or NetSpool, it is not necessary to create printer definitions.

Specifying the FSA name, description, and location

You must specify the FSA name. In addition, you can specify a description and a location for the PSF printer or AFP Download Plus receiver.

FSA name: The FSA name must match the FSA name in the JES initialization statement.

Description: The description is a search criterion on the Infoprint Server ISPF panels. To make searching easier, consider using all lowercase or uppercase letters because the ISPF panels can only do case-sensitive searches.

Location: The location is a search criterion on the Infoprint Server ISPF panels and in Infoprint Central. The location can also help Infoprint Central users direct service personnel to the printer if it requires service. Follow these guidelines:
• Infoprint Central can do case-sensitive or case-insensitive searches. However, ISPF panels only do case-sensitive searches. Therefore, to make searching easier, consider using all lowercase or uppercase letters.
• Infoprint Central users can specify location information to find a PSF printer. They can specify either the exact location information or the first few characters of the location. Therefore, use a format that lets users find printers more easily. For example, if you use this format, Infoprint Central users can find all printers in the (1) city, (2) city/building, or (3) city/building/office:
Procedure for specifying attributes

On the PSF FSA panel, specify these fields:

- **FSA name**: Specify the same FSA name as specified in the JES initialization statement for the FSA.
- **Description**: Specify a 1 – 256 character description, including any letters, numbers, special characters, and blanks.
- **Location**: Specify a 1 – 256 character location, including any letters, numbers, special characters, and blanks.

**Example**

This ISPF screen shows how to specify the FSA name, a description of the printer, and the printer's location.

```
PSF FSA, TCP/IP

FSA Name . PRT001
Description . INFOPRINT 2000 (extend)
Location . DENVER/B003/A1-03 (extend)
```

Setting up operator security for the printer

If your security administrator created a RACF profile to control who is authorized to use Infoprint Central to display information about and do actions on the PSF printer, specify the name of this RACF profile in the FSA definition.

**Tips**:

1. You can specify the name of the profile before it is defined to RACF. If you specify a profile name that is not defined to RACF, Infoprint Central proceeds as if the user has the required access to the profile.
2. If the same RACF profile applies to a group of IP PrintWay and PSF printers, specify the same profile name in the PSF FSA definitions and IP PrintWay printer definitions for all the printers in the group.
3. You can use the Infoprint Server ISPF panels or the Printer Inventory Definition Utility (PIDU) to specify the RACF profile name. If you want to specify the same RACF profile in many PSF FSA printer definitions, it is easier to use the PIDU program. See "Example 2. Using PIDU to specify the profile name" on page 225.

**Related information**: For information about how to define RACF profiles in the PRINTSRV class to protect PSF printers, see z/OS Infoprint Server Customization.

Procedure for specifying attributes

On the PSF FSA panel, specify this field:

- **Operator security profile**: Specify the name of the RACF resource profile in the PRINTSRV class.

**Example 1. Using ISPF panels to specify the profile name**

This ISPF screen shows how to specify the name of the RACF profile on a PSF FSA panel:
### Example 2. Using PIDU to specify the profile name

This example shows how to specify the name of a RACF profile in all PSF FSA definitions for TCP/IP-attached printers that do not already have a profile.

1. Enter these commands as one command on the z/OS UNIX command line:

   ```bash
   pidu -q "list fsa where fsa-type=psf-tcpip and operator-security-profile=null;" | awk '{print "modify fsa " $1 " operator-security-profile="PRINTERS.DENVER";"}' > /tmp/defs
   ``

   The `list` command lists the names of all PSF FSA definitions for TCP/IP-attached printers with no value in the `operator-security-profile` attribute. These names are piped to the `awk` program, which writes `modify` commands to modify the `operator-security-profile` attribute.

2. Inspect the `/tmp/defs` file to make sure the `modify` commands are acceptable.

3. Enter this command to update the Printer Inventory:

   ```bash
   pidu < /tmp/defs
   ```
Chapter 15. Defining NetSpool printer LUs to VTAM

To define a NetSpool printer LU to VTAM, do these tasks:
- Select NetSpool printer LU names.
- Create VTAM APPL statements for each NetSpool LU name.
- Define resources in VTAM applications.

In addition to defining the NetSpool LU names to VTAM, you must specify the NetSpool LU names in the printer definitions for the target printers. In the printer definitions, you also specify other printer attributes used by NetSpool. For information, see Chapter 11, “Planning printer and printer pool definitions for NetSpool,” on page 97.

Selecting NetSpool printer LU names

Each installation determines how many NetSpool printer logical units (LUs) to define. A sample configuration might be to define one NetSpool printer LU to replace each SNA-network printer in your installation. Alternatively, you could define a greater or fewer number of NetSpool logical printers than you have SNA-network printers.

Each NetSpool printer LU is identified with a 1 to 8 character alphanumeric name. You specify this LU name in the printer definitions and in the application-program LU name you use to define the NetSpool printer LU to VTAM.

When you name logical printers, you can do one of these without changing the primary LU (PLU) resource definitions of your VTAM applications:
- Assign NetSpool logical-printer names that are the same as the printer names currently defined in the resource definitions of the VTAM applications. For example, if the printer LU name used by a VTAM application is IMSPR001, the NetSpool LU name could be IMSPR001.
- Assign NetSpool logical-printer names that are different from the printer names used by the VTAM application. You might want to do this to make the NetSpool LU names more meaningful to your operators. For example, if the printer LU name used by your VTAM application is IMSPR001, the NetSpool LU name could be LUPRT001.

You map the old and new names to each other in the VTAM APPL statements that define the logical printers to VTAM, as described in the ACBNAME parameter in "Creating APPL statements for NetSpool printer LUs" on page 228.

In either of these two cases, because only one set of VTAM definitions with the same names can be known to VTAM at a time, you must do one of these:
- Remove the VTAM LU statements for the SNA-network printers.
- Deactivate the major node containing the VTAM LU statements before activating the logical-printer LUs with the same name.

This means that other VTAM applications cannot communicate with the SNA-network printers at the same time NetSpool is running.

Note: If other VTAM applications still need to communicate with the SNA-network printers at the same time NetSpool is running, you must assign new PLU names in the resource definitions of the VTAM applications.
using NetSpool. Use the new printer names as the NetSpool logical-printer names and also as the application-program LU names when you define the logical printers to VTAM.

Naming considerations for IMS/CICS users of telnet

In IMS or CICS subsystems, applications receive communication services from terminal-management functions of subsystems. Thus, the IMS programmer thinks of a device as an LTERM, and the CICS programmer thinks of a device as a TCTTE entry.

Many IMS and CICS applications have algorithms that derive LTERM or TCTTE names for printers by doing some hashing technique on the input LTERM or TCTTE names. If NetSpool is used with Telnet, this creates problems because Telnet assigns the input LU name (and thereby the LTERM or TCTTE name) arbitrarily from a pool of LU names. If this type of algorithm is in use in your installation, and you are using Telnet, IBM suggests that you use the IP-LU mapping feature of Telnet. This feature enables you to specify the input LU name rather than having it randomly selected from a pool. This would, in turn, permit the application to select the LU name for the printer. See the LUMAP statement described in [z/OS Communications Server: IP Configuration Reference](https://www.ibm.com/docs/en/zos?topic=configuration-reference).

Creating APPL statements for NetSpool printer LUs

NetSpool runs as a VTAM application program, maintaining separate LU-LU sessions for each NetSpool printer LU. Each LU-LU session is between:

- A primary LU, which is the VTAM application that initiates the VTAM session and sends print requests
- A secondary LU, which is the NetSpool printer LU

You must create a VTAM APPL definition statement in the SYS1.VTAMLST data set for each NetSpool printer LU. Create the APPL statement in a new or existing application major node definition. Figure 6 shows two sample APPL statements under a major node named NETSPOOL.

```
NETSPOOL VBUILD TYPE=APPL
LUPRT001 APPL MODETAB=ISTINCLM,DLOGMOD=S3270,EAS=1,SESSLIM=YES
IMSPR002 APPL ACBNAME=LUPRT002,MODETAB=ISTINCLM,DLOGMOD=SCS,EAS=1,SESSLIM=YES
```

*Figure 6. Sample APPL statements for NetSpool LUs*

The parameters on the APPL statement are:

- **statement-name**
  
  Specifies the secondary LU name used by VTAM applications to establish a VTAM session. If this name does not match the NetSpool LU name specified in the printer definition, the ACBNAME parameter must match the LU name in the printer definition. Specify one to eight alphanumeric characters. In this example, the names are: LUPRT001 and IMSPR002.

- **ACBNAME=lu-name**
  
  Specifies the NetSpool LU name. This name must match the LU name specified in the printer definition.

  This parameter is optional. If you omit it, the default is the name specified as the *statement-name*. 
If the LU name in the printer definition matches the *statement-name*, IBM suggests that you omit the ACBNAME parameter and let it default, as shown in the first APPL statement in Figure 6 on page 228.

If the LU name in the printer definition does not match the name in *statement-name*, which is the secondary LU name, you must specify the same LU name as in the printer definition in this parameter, as shown in the second APPL statement in Figure 6 on page 228.

**MODETAB=table-name**
Specifies the name of a VTAM logon mode table to be used to associate each logon mode entry-name with a set of session parameters. If not specified, the default name is ISTINCLM.

**DLOGMOD=entry-name**
Specifies the name of an entry in the VTAM logon mode table that contains session parameters to be used when the primary LU does not provide other parameters. If this entry is used to establish the session parameters, this entry must specify correct LU type, FM profile, and TS profile parameters, as shown in Table 39 on page 230. If not specified, the default is the first entry in the VTAM logon mode table specified in the MODETAB parameter.

**Note:** The *entry-name* must be in the VTAM logon mode table named in the MODETAB parameter or in the default table named ISTINCLM.

**EAS=1**
Specifies the number of active sessions for this printer. Always specify 1.

**SESSLIM=YES**
Specify YES to allow VTAM to queue pending sessions for the secondary LU, if the secondary LU already has an active session with another primary LU.

**PARSESS=NO**
Specifies that multiple sessions are not allowed. PARSER=NO is the default, so it is not shown in the example.

**Note:** Do not code any APPC-related keywords.

For more information about the APPL statement, see [z/OS Communications Server: SNA Resource Definition Reference](https://www.ibm.com/support/knowledgecenter/SSLTBW_A/pf/zos_sna_ref_appl).

If the APPL statement name or the ACBNAME name is the same as the LU name of an SNA-network printer, either remove the LU definitions for the SNA-network printers or deactivate the major node containing those LU statements.

---

**Defining resources for VTAM applications**

The resource definitions for your VTAM applications, such as CICS or IMS, must comply with these requirements:

- A printer defined in the resource definition must contain a network name that matches the APPL statement name.
- The session parameters (BIND parameters) established for the printer must be valid, as shown in Table 39 on page 230.
- If you are using CICS, you must specify QUERY=NO on the TYPETERM macro for the printers.
For information about defining resources, see the IMS or CICS information related to resource definitions.

### Specifying correct BIND parameters

The VTAM BIND request that the VTAM application, the primary LU, sends to establish a session with a NetSpool printer LU, the secondary LU, must result in correct BIND parameters. That is:

- The LU type must be consistent with the type of print data to be sent during the session.
- The FM Profile and TS Profile values must be valid for that LU type.
- The presentation space must not exceed the maximum size.

Table 39 shows the valid combinations of the BIND parameters.

**Table 39. VTAM BIND parameter requirements**

<table>
<thead>
<tr>
<th>Data type</th>
<th>LU type</th>
<th>FM profile</th>
<th>TS profile</th>
<th>Presentation space</th>
</tr>
</thead>
<tbody>
<tr>
<td>3270 data</td>
<td>LU 0</td>
<td>2</td>
<td>2</td>
<td>Maximum is 16384 bytes</td>
</tr>
<tr>
<td>3270 data</td>
<td>LU 3</td>
<td>3</td>
<td>3</td>
<td>Maximum is 16384 bytes</td>
</tr>
<tr>
<td>SNA character string (SCS) data</td>
<td>LU 1</td>
<td>3 or 4</td>
<td>3 or 4</td>
<td></td>
</tr>
</tbody>
</table>

VTAM applications that establish sessions with NetSpool printer LUs can either use the BIND parameters in the logon mode table entry referred to in the APPL statement for the NetSpool printer LU, or the applications can override the BIND parameters, using their own resource definitions. In either case, the BIND parameters must be correct.

In most cases, CICS and IMS subsystems override the BIND parameters associated with the NetSpool printer LU with BIND parameters that are consistent with the type of data in the print requests. However, in one case, when an IMS application sends a BIND request, and the NetSpool printer LU logical printer is defined in IMS as a non-SNA 3270 device, IMS uses the BIND parameters specified for the NetSpool printer LU, without any changes. Therefore, in this instance, the BIND parameters for the NetSpool printer LU must be correct for a 3270 data stream, as shown in Table 39.
Chapter 16. Using ISPF panels to manage the Printer Inventory

These topics describe how to use Infoprint Server ISPF panels to manage entries in the Printer Inventory. You can use ISPF panels to add, list, browse, copy, edit, and delete printer definitions, components, printer pool definitions, FSA definitions, FSS definitions, and job selection rules.

You can also use the Printer Inventory Definition Utility (PIDU) to manage entries in the Printer Inventory. The PIDU program can be useful for creating a large number of entries in the Printer Inventory. Also, you can use the PIDU program to create a backup copy of the Printer Inventory (see the export command). For information, see Chapter 17, “Using the PIDU program to manage the Printer Inventory,” on page 253.

For examples of some of the Infoprint Server ISPF panels, see Appendix B, “ISPF panels,” on page 465.

When the Printer Inventory Manager is started, it creates the Printer Inventory files if they do not already exist in directory /var/Printsrv or in the directory specified in the base-directory statement of the Infoprint Server configuration file (aopd.conf). To view the Printer Inventory files, use either the Infoprint Server ISPF panels or the PIDU program.

Starting the ISPF session and configuring the panels

Before using the Infoprint Server ISPF panels, Infoprint Server must be started. The Printer Inventory Manager daemon, aopd, must be active.

To use the Infoprint Server ISPF panels, you must have access to one or more of these RACF resource profiles:

- **AOP.ADMINISTRATOR** profile in the PRINTSRV class:
  - READ access lets you browse any object in the Printer Inventory.
  - UPDATE access lets you add, edit, and delete any objects in the Printer Inventory except for the system configuration definition.

- **AOP.CONFIGURATION** profile in the PRINTSRV class:
  - READ access lets you browse the system configuration definition.
  - UPDATE access lets you edit the system configuration definition.

If the AOP(CONFIGURATION profile does not exist, READ access to the AOP.ADMINISTRATOR profile lets you browse the system configuration definition and UPDATE access to the AOP.ADMINISTRATOR profile lets you edit the system configuration definition.

- **AOPADMIN** profile in the FACILITY class:
  - If the AOP.ADMINISTRATOR profile does not exist, READ access to the AOPADMIN profile lets you browse, add, edit, and delete any object in the Printer Inventory except for the system configuration definition.
  - If the AOP.ADMINISTRATOR and AOPCONFIGURATION profiles do not exist, READ access to the AOPADMIN profile lets you browse, add, edit, and delete any object in the Printer Inventory.
For information about how to set up security for the Printer Inventory, see z/OS Infoprint Server Customization.

Displaying Infoprint Server panels in Japanese

The ISPF panels are available in English and Japanese. To view Japanese panels:

- Define the code page to your 3270 emulator as IBM-939.
- When you start ISPF, enter: ISPF Japanese.
- Define the terminal type as 3270KN on the ISPF Settings panel.

Customizing CUA attributes for ISPF fields

Before you start using the Infoprint Server panels, you might want to customize your CUA (common user access) settings for ISPF fields. When you customize CUA settings, values that are specified in components can be displayed in a different color from other values on the panels. This lets you quickly distinguish between values that are specified in components and custom values (that is, values specified in a printer definition itself) on those ISPF panels that display both types of values.

To customize your ISPF CUA settings:

1. On the ISPF Settings panel, select Colors from the action bar and then select CUA attributes.

2. Change an attribute, such as color, for Choice Entry fields so that it is different from the attribute for Normal Entry fields. Values from components are displayed with the attributes selected for Choice Entry fields, while other values are displayed with the attributes selected for the Normal Entry fields.

Displaying the main Infoprint Server panel

To display the main Infoprint Server panel:

1. On the ISPF Primary panel, select the System tools option.

2. On the z/OS System Programmer Primary Option panel, select the Infoprint Server option. The first panel is called the Infoprint Server Printer Inventory Manager panel. If the z/OS System Programmer Primary Option panel does not contain the Infoprint Server option, ask your system programmer to customize your ISPF environment, as described in z/OS Infoprint Server Customization.

3. Before you use the panels for the first time, check the panel configuration. On the Infoprint Server Printer Inventory Manager panel, select 7 ISPF and press Enter.

4. On the Infoprint Server: ISPF Panel Configuration panel, fill in the fields to configure your panels. Your system programmer can change the default values that appear on this panel in file AOPINIT, as described in z/OS Infoprint Server Customization. Use the ISPF online help for information about each field. To save the new settings and exit the panel, press the END function key.
Defining an Infoprint Server default printer definition

You can specify the name of a printer definition to be used as the default printer by the `lp` and `lpstat` commands and by the Print Interface subsystem. The default name is `lp1`.

The `PRINTER` and `LPDEST` environment variables override the default printer definition name for the `lp` command.

To specify a default printer definition:

1. On the Infoprint Server Printer Inventory Manager panel, select 7 Configure and press Enter.

2. On the Configuration panel, fill in the Default printer field and press the END function key.

3. Add a printer definition with that name. For information, see "Adding a printer definition" on page 234.

Managing the system configuration definition

This section describes how to use the Infoprint Server ISPF panels to manage the system configuration definition. The system configuration definition is optional. Infoprint Server automatically creates it when you enable dynamic configuration. Administrators can use ISPF panels to browse or edit the definition.

For information about dynamic configuration, see z/OS Infoprint Server Customization.

Browsing the system configuration definition

To browse the system configuration definition:

1. On the Infoprint Server Printer Inventory Manager ISPF panel, select 8 System and press Enter. Option 8 is visible only if dynamic configuration is enabled. If you have authority to browse the system configuration definition, but not edit it, the Infoprint Server System Configuration panel is displayed in Browse mode.

2. On the Infoprint Server System Configuration panel:
   a. To display help information about each field, place the cursor on the value area of the field and press the HELP function key.
   b. To return to the previous panel, press the END function key.

Editing the system configuration definition

To edit the system configuration definition:

1. On the Infoprint Server Printer Inventory Manager ISPF panel, select 8 System and press Enter. Option 8 is visible only if dynamic configuration is enabled. If
you have authority to edit the system configuration definition, the Infoprint Server System Configuration panel is displayed in Edit mode. Otherwise, the panel is displayed in Browse mode.

2. On the Infoprint Server System Configuration panel:
   a. Fill in any of the editable fields on the panel. To display help information about each field, place the cursor on the value area of the field and press the HELP function key.
   b. (Optional) To validate the fields before you save the panel, press Enter.
   c. Save the changes to the system configuration definition. Do one of these:
      - To save the changes but keep the panel on the screen, type SAVE on the command line and press Enter.
      - To save the changes and exit the panel, press the END function key.
      - To exit the panel without saving the changes, type CANCEL on the command line and press Enter.

Changes to the system configuration definition take effect as soon as you save them with a few exceptions. The help information for each field says whether you need to restart any Infoprint Server daemons before the change can take effect.

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**Managing printer definitions**

This section describes how to use the Infoprint Server ISPF panels to manage printer definitions. For information about how to specify attributes in a printer definition for the components of Infoprint Server that you plan to use, see:

- Chapter 10, “Planning printer definitions for Print Interface,” on page 75
- Chapter 11, “Planning printer and printer pool definitions for NetSpool,” on page 97
- Chapter 12, “Planning printer definitions for IP PrintWay,” on page 127
- Chapter 13, “Planning printer definitions for transforms,” on page 213

**Adding a printer definition**

You can add a printer definition as described in this section.

**Tip:** It is more efficient to add a printer definition by copying an existing printer definition of the same type. For information, see "Copying a printer definition" on page 237.

To add a printer definition:

1. On the Infoprint Server Printer Inventory Manager panel, select 1 Add and press Enter.

2. On the Choose a Definition Type and Protocol panel, select the type of printer definition and press Enter. Types are: IP PrintWay, PSF, and General. If the type is IP PrintWay, also select the type of transmission protocol (LPR, direct sockets, IPP, VTAM, or email). Depending on selected type and protocol, different ISPF panels are displayed. For information about the types of printer definitions, see "Selecting the type of printer definition" on page 63.
3. On the IP PrintWay Printer Definition panel, the PSF Printer Definition panel, or the General Printer Definition panel:

   a. Fill in the printer definition name and other fields on this panel. To display online help information about how to use components and how to specify custom values, place the cursor on the command line and press the HELP function key. To display help information about each field, place the cursor on the input area of the field and press the HELP function key.

   To fill in the fields for each section of the printer definition (for example, the Allocation section), you can do one of these:

      • Select a component that contains the attributes you want. To do this, place the cursor on the Component Name field for the section and press Enter. On the Component List panel, select the component name from the list and press Enter. If a component doesn’t exist, create the component on the Component List panel.

      Note: Before you can save a printer definition that includes a component, all included components must exist in the Printer Inventory.

      • Fill in the fields in each section directly in this printer definition. To do this, place the cursor on the Custom Values field for the section and press Enter. On the next panel, fill in the fields and press the END function key to return to the Printer Definition panel. The fields you fill in are not saved in the inventory until you press the END function key from the Printer Definition panel.

      • Select a component, but also specify some fields directly in the printer definition. To do this, first select a component and then place the cursor on the Custom Values field and press Enter. On the next panel, the values specified in the component are displayed in blue. If you specify a different value for a field, this value overrides the value in the component.

      For a list of the required and optional fields for NetSpool, IP PrintWay, and Print Interface, see table Appendix A, “Printer attribute tables,” on page 453.

      From this panel, you can also create and manage all of the components for the different sections of the printer definition. To do this, place the cursor on the Component Name field for the section and press Enter. For more information, see “Managing components” on page 240.

   b. If you want to validate the fields before you save the printer definition, press Enter.

   c. To save the new definition but keep the panel on the screen, type SAVE on the command line and press Enter.

      Tip: Type SAVE on the command line to easily add more than one printer definition of the same type.

   d. To save the new definition and exit the panel, press the END function key.

Adding multiple printer definitions

To add more than one printer definition of the same type (IP PrintWay, PSF, or General) at the same time:
1. Follow the instructions described in “Adding a printer definition” on page 234 or “Copying a printer definition” on page 237, and fill in the fields for the first printer definition.

2. To save the printer definition, type SAVE on the command line and press Enter. The printer definition panel remains on your screen. You can type SAVE from any of the printer definition panels.

3. Fill in the fields for the second printer definition. Specify a new printer definition name and change any other values.

   **Tip:** You do not need to return to the main printer definition panel to change the name of the printer definition. Specify the new name in the Printer definition name field that is displayed at the top of each printer definition panel.

4. Type SAVE on the command line to save the second printer definition, and repeat these steps.

   **Tip:** You can also use the Printer Inventory Definition Utility (PIDU) program to add many printer definitions at one time. First use the ISPF panels to create one printer definition of the desired type and protocol. Then use the PIDU export command to generate a PIDU create command for that printer definition. Replicate and edit the create command to create other printer definitions. For detailed information and examples, see Chapter 17, “Using the PIDU program to manage the Printer Inventory,” on page 253.

### Listing printer definitions

You must display a list of printer definitions before you can browse, copy, edit, delete, or change the type of a printer definition. You can list all printer definitions, or you can select the printer definitions you want to list.

#### Listing all printer definitions

To display a list of all printer definitions:

1. On the Infoprint Server Printer Inventory Manager panel, select 2 List and press Enter.

2. On the Printer Definition List panel, you can type one of the actions to do the other functions described in this section. Press the END function key to exit the list. Press Enter at any time to obtain a current list.

#### Listing selected printer definitions

You can select printer definitions based on one or more of these criteria. Printer definitions are listed if they meet all of the criteria you specify.

- Name of the printer definition
- Type of printer definition: IP PrintWay, PSF, or General
- Type of data formats the printer supports
- Location of the printer
- Destination associated with the printer definition
To display a list of selected printer definitions:

1. On the Infoprint Server Printer Inventory Manager panel, select **3 Select** and press Enter.

2. On the Select Printer Definitions panel, type values in one or more fields to specify selection criteria and press Enter. The online help for each field tells you how to use an * or ? to represent one or more variable characters.

3. On the Printer Definition List panel, you can type an action in front of one or more printer definitions and press Enter. Press Enter at any time to obtain a current list.

4. Press the END function key to exit the list.

**Tip:** To list all printer definitions that use a particular component, see “Listing printer definitions that include a component” on page 241.

**Browsing a printer definition**

When you browse a printer definition, you can view fields but you cannot change any of them. To browse the printer definition:

1. List the printer definition that you want to browse, as described in “Listing printer definitions” on page 236.

2. On the Printer Definition List panel, type **B** in the **A** column in front of the printer definition you want to browse and press Enter.

3. On the Printer Definition panel:
   a. To view a component that is named in the printer definition, place the cursor on the component name and press Enter.
   b. To view all of the attributes for this printer definition, including the attributes specified in the component (if one is named in the **Component Name** field, place the cursor on the **Custom Values** field and press Enter.
   c. To return to the Printer Definition List panel, press the END function key.

**Copying a printer definition**

To add a new printer definition, you can copy an existing definition and modify fields in the definition as necessary. To make sure that the correct fields are displayed on the ISPF panels, be sure to copy the same type of printer definition (IP PrintWay, PSF, or General) as the one you want to add. If the printer definition
is an IP PrintWay printer definition, also be sure to copy a printer definition that uses the same protocol (LPR, direct sockets, IPP, VTAM, or email) as the one you want to add.

When you copy a printer definition, you can change any field. However, you must change the **Printer Name** field.

To copy a printer definition:

1. List the printer definition you want to copy, as described in “Listing printer definitions” on page 236.

2. On the Printer Definition List panel, type **C** in the **A** column in front of the printer definition you want to copy and press Enter.

3. On the Printer Definition panel:
   a. Change the **Printer Name** field and any other field. To validate the fields, press Enter.
   b. To save the new printer definition, but maintain the panel on the screen, type **SAVE** on the command line and press Enter. You can now add additional printer definitions. To save the new definition and return to the Printer Definition List panel, press the END function key.

   **Tip:** Type **SAVE** on the command line to easily add more than one printer definition of the same type.
   c. To save the new definition and exit the panel, press the END function key.

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**Editing a printer definition**

When you edit a printer definition, you can edit any field. Changes you make generally take effect for the next data set that NetSpool and Print Interface allocate on the JES spool and the next data set that IP PrintWay selects from the JES spool. Changes you make to a printer definition do not affect data sets in the process of being allocated on the JES spool or data sets retained on the JES spool after successful or failed transmission.

Changes to the NetSpool end-of-file rules and NetSpool LU class, however, are related to the VTAM session and do not take effect for the next data set allocated on the JES spool. For information about when changes to these fields take effect, see “Specifying how NetSpool determines end-of-file” on page 116 and “Grouping NetSpool printer LUs into LU classes” on page 98.

If you change the name of a printer definition, the name is automatically changed in any printer pool definition that lists the printer definition.

**Tip:** To change the protocol type in an IP PrintWay printer definition, see “Changing the type of a printer definition or the IP PrintWay protocol type” on page 239.

To edit a printer definition:

1. List the printer definition you want to edit, as described in “Listing printer definitions” on page 236.
2. On the Printer Definition List panel, type E in the A column in front of the printer definition whose fields you want to edit, and press Enter.

3. On the Printer Definition panel:
   a. Change any field on the panels. To validate the fields, press Enter.
   b. To save the printer definition but maintain the panel on the screen, type SAVE on the command line and press Enter. To save the printer definition and return to the Printer Definition List panel, press the END function key.

Deleting a printer definition

When you delete a printer definition, the printer definition is removed from the Printer Inventory. If a printer pool definition contains the printer definition, the printer definition is automatically removed from the printer pool definition. To delete a printer definition:

1. List the printer definition you want to delete, as described in “Listing printer definitions” on page 236.

2. On the Printer Definition List panel, type D in the A column in front of the printer definition you want to delete and press Enter.

3. On the Confirm Delete panel, press Enter to delete the printer definition. Press the END function key to cancel the delete request.

Changing the type of a printer definition or the IP PrintWay protocol type

Do these steps to change the type of the printer definition or to change the type of protocol that IP PrintWay uses to transmit data to the printer. The printer definition types are: IP PrintWay, PSF, or General. The IP PrintWay protocol types are: LPR, direct sockets, IPP, VTAM, and email.

1. List the printer definition you want to change, as described in “Listing printer definitions” on page 236.

2. On the Printer Definition List panel, type X in the A column in front of the printer definition you want to change and press Enter.

3. On the Choose a Definition Type and Protocol panel, select the printer definition type and the protocol type. Press Enter.

4. If you selected an IP PrintWay type, the Protocol panel is displayed. On the Protocol panel, specify the required fields for the type of protocol and save the printer definition. Before you save the printer definition, make sure that these fields are correct on the Processing panel:
• **Printer code page**: For the LPR, direct sockets, and IPP protocols, specify an ASCII code page. For the VTAM and email protocols, specify an EBCDIC code page.

• **Filter** field for the **Text** data format: For the LPR, direct sockets, and IPP protocols, specify either the `aopfiltr.so` or `lpd_compat.so` filter. For the VTAM and email protocols, do not specify either of these filters.

5. If you selected either PSF or General type, the Printer Definition List panel is displayed. If you need to edit any fields in the printer definition, type `E` in the `A` column in front of the printer definition. If you changed the type from IP PrintWay to either PSF or General, make sure that these fields are correct on the Processing panel:
   - **Printer code page**: Specify an EBCDIC code page.
   - **Filter** field for the **Text** data format: Do not specify the `aopfiltr.so` filter.

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**Testing a printer definition**

The ISPF panels check the validity of many of the values you specify in the fields of a printer definition. However, to check the validity of all fields (for example, to verify the IP address of the remote printer) print a file to the printer named in the printer definition. If IP PrintWay finds an error, it sends a message to the IP PrintWay message log. If NetSpool finds an error, it sends a message to the NetSpool message log if one exists.

If you have configured data transforms, print data of each format to the printer definition.

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**Managing components**

This section describes how to use Infoprint Server ISPF panels to manage components. A component contains attributes that are common to several printer definitions. You can define one or more components for each section of a printer definition, such as the Allocation section and the Processing section. For more information about components and when you might want to create them, see “Including components in printer definitions” on page 68.

For information about how to customize your ISPF settings so that values that you specify in components are displayed in different colors on ISPF panels, see “Customizing CUA attributes for ISPF fields” on page 232.

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**Listing components**

You must obtain a list of components before you can add, copy, edit, rename, or delete a component. To obtain a list of components:

1. Add, edit, or copy any printer definition, as described in “Adding a printer definition” on page 234, “Copying a printer definition” on page 237 or “Editing a printer definition” on page 238.

2. On the Printer Definition panel:
   a. If you are adding a printer definition, specify a printer definition name.
   b. Place the cursor on the **Component Name** field for one section of the printer definition, for example, the Allocation section, and press Enter.
3. The Component List panel displays all of the components for the section. On this panel, you can type an action in the A column to do the other functions described in this section. Press the END function key to return to the Printer Definition panel.

4. Type CANCEL on the command line of the Printer Definition panel, unless you want to add, edit, or copy the printer definition.

Adding a component

You can add a component of a printer definition as described in this section.

Tip: It is more efficient to add a component by copying an existing component of the same type. For information, see "Copying a component" on page 242.

To add a component:

1. List the components for the section of the printer definition, for example, the Allocation section, as described in "Listing components" on page 240.

2. On the Component List panel, type add on the command line and press Enter.

3. On the next panel:
   a. Type a component name in the Component name field. The components for the same section must have unique names. However, components for different sections can have the same name. For example, an Allocation component and a Processing component can have the same name.
   b. Specify any other attributes. You can leave blank the fields that you want to specify in the printer definitions that include this component. In the printer definitions that include the component, you can override any attributes specified in the component and you can specify attributes that are left blank in the component. To validate the fields, press Enter.
   c. To save the new component but keep the panel on the screen, type SAVE on the command line and press Enter. To save the new component and return to the Component List panel, press the END function key.

   Tip: Type SAVE on the command line to easily add more than one component of the same type.
   d. To save the new component and exit the panel, press the END function key.

Listing printer definitions that include a component

To list the printer definitions that include a particular component:

1. List the components for the section of the printer definition, as described in "Listing components" on page 240.
2. On the Component List panel, type P in the A column in front of the component name and press Enter.

3. The Printer Definition List panel displays a list of printer definitions that include the component. On this panel, you can add, edit, browse, copy, those printer definitions. Press the END function key to return to the Component List panel.

Browsing a component

When you browse a component, you can view fields but you cannot change any of them. To browse any component:

1. List the components for the section of the printer definition as described in “Listing components” on page 240.

2. On the Component List panel, type B in the Action column next to the components you want to browse and press Enter.

3. The next panel displays the component. Press the END function key to return to the Component List panel.

Copying a component

You can add a new component by copying an existing component to a new component and changing the name and any other fields. Because the components for each section of a printer definition, for example the Allocation section, contain different fields, be sure to copy the correct type of component.

To copy a component:

1. List the components for the section of the printer definition as described in “Listing components” on page 240.

2. On the Component List panel, type C in the A column in front of the component you want to copy and press Enter.

3. On the next panel:
   a. Change the Component Name field and any other field. To validate the fields, press Enter.
   b. To save the new component, but keep the panel on the screen, type SAVE on the command line and press Enter. To save the new definition and return to the Component List panel, press the END function key.

   Tip: Type SAVE on the command line to easily add more than one component of the same type.

   c. To save the new component and exit the panel, press the END function key.
Editing a component
When you edit a component, you can edit any field. The changes you make take effect for all printer definitions that include that component. Therefore, before editing a component, you might want to list the printer definitions that include the component.

If you change the name of a component, the component name is automatically changed in all printer definitions and printer pool definitions that include that component.

To edit a component:
1. List the components for the section of the printer definition as described in “Listing components” on page 240.
2. On the Component List panel, type E in the A column in front of the components you want to edit and press Enter.
3. On the next panel:
   a. Change any field on the panels. To validate the fields, press Enter.
   b. To save the component, but keep the panel on the screen, type SAVE on the command line and press Enter. To save the component and return to the Component List panel, press the END function key.
   c. To save the component and exit the panel, press the END function key.

Renaming a component
To rename a component and also change the component name in all printer definitions and printer pool definitions that include the component:
1. List the components for the section of the printer definition as described in “Listing components” on page 240.
2. On the Component List panel, type R in the A column in front of the component you want to rename and press Enter.
3. On the Enter the New Component Name panel, type the new name and press Enter. Press the END function key to cancel the rename request.

Deleting a component
You can delete a component only if no printer definitions or printer pool definitions include that component. You can use the procedure described in “Listing printer definitions that include a component” on page 241 to determine whether any printer definition include the component to be deleted.

To delete a component:
1. List components as described in “Listing components” on page 240.
Managing printer pool definitions

This section describes how to use the Infoprint Server ISPF panels to manage printer pool definitions. A printer pool definition is used by NetSpool to broadcast data to several printer definitions. For more information about printer pool definitions and when you might want to create them, see “Planning printer pool definitions” on page 71.

Adding a printer pool definition

You can add a printer pool definition as described in this section.

Before you add a printer pool definition, create the printer definitions for the printers in the pool, if necessary.

To add a printer pool definition:

1. On the Infoprint Server Printer Inventory Manager panel, select 4 Other Definitions and press Enter.

2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select 7 Add and press Enter.

3. On the Printer Pool panel:
   a. To display online help information about how to use the panel, place the cursor on the command line and press the HELP function key. To display help information about each field, place the cursor on the input area of each field and press the HELP function key.
   b. Fill in the LU name field and the Printer definition names fields. To select printer definitions one at a time from a list, place the cursor on the word list and press Enter.
      If a printer definition does not exist, you can create it from the list panel. Before you can save a printer pool definition, all printer definitions listed in the printer pool definition must exist in the Printer Inventory.
      The order in which printer definition names are listed is significant. NetSpool uses formatting attributes in the printer definition that you list first.
   c. Other fields on the Printer Pool panel are optional. For more information about which fields to specify in printer pool definitions, see “Broadcasting data using multiple printer definitions” on page 120.
   d. To validate the fields before you save the printer pool definition, press Enter.
   e. To save the new definition but keep the panel on the screen, type SAVE on the command line and press Enter.
   f. To save the new definition and exit the panel, press the END function key.
Listing printer pool definitions

You must display a list of printer pool definitions before you can browse, copy, edit, or delete a printer pool definition. You can list all printer pool definitions, or you can select the printer pool definitions you want to list.

**Listing all printer pool definitions**

To display a list of all printer pool definitions:

1. On the Infoprint Server Printer Inventory Manager panel, select **4 Other Definitions** and press Enter.

2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select **8 List** and press Enter.

3. On the Pool List panel, you can type one of the actions to do the other functions described in this section. Press the END function key to exit the list. Press Enter at any time to obtain a current list.

**Listing selected printer pool definitions**

You can select printer pool definitions based on one or more of these criteria. Printer pool definitions are listed if they meet all of the criteria you specify.

- Name of the printer pool definition
- NetSpool logical-unit (LU) name
- Description of the printer pool definition
- LU class
- NetSpool End-of-File component name
- Names of printer definitions in the pool

To display a list of selected printer pool definitions:

1. On the Infoprint Server Printer Inventory Manager panel, select **4 Other Definitions** and press Enter.

2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select **9 Select** and press Enter.

3. On the Select Pool panel, type values in one or more fields to specify selection criteria and press Enter. The online help for each field tells you how to use an * or ? to represent one or more variable characters.

4. On the Pool List panel, you can type an action in front of one or more printer definitions and press Enter. Press Enter at any time to obtain a current list.

5. Press the END function key to exit the list.
Browsing, copying, editing, and deleting a printer pool definition

To browse, copy, edit, or delete the printer pool definition:

1. List the printer definition that you want to work with, as described in “Listing printer pool definitions” on page 245.

2. On the Pool List panel, type B, C, E, or D in the A column in front of the printer pool definition you want to work with and press Enter.

3. To return to the Pool List panel, press the END function key.

Managing FSS definitions

This section describes how to use the Infoprint Server ISPF panels to manage FSS (functional subsystem) definitions. For more information about FSS definitions and when you might want to create them, see “Planning FSS definitions” on page 71.

Adding an FSS definition

You can add an FSS definition as described in this section.

Tip: It is more efficient to add an FSS definition by copying an existing FSS definition of the same type. For information, see “Browsing, copying, editing, and deleting an FSS definition” on page 248.

To add an FSS definition:

1. On the Infoprint Server Printer Inventory Manager panel, select 4 Other Definitions and press Enter.

2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select 4 Add.

3. On the Choose an FSS type to add panel, select the type of FSS definition and press Enter. Types are: IP PrintWay and PSF. Depending on the type you select, different ISPF panels are displayed.

4. On the IP PrintWay FSS panel or the PSF FSS panel:
   a. Fill in the FSS name and other fields on this panel. The FSS name must match the name of the FSS as defined to JES. To display online help information, place the cursor on the command line and press the HELP function key. To display help information about each field, place the cursor on the input area of the field and press the HELP function key.
   b. To validate the fields before you save the FSS definition, press Enter.
   c. To save the new definition but keep the panel on the screen, type SAVE on the command line and press Enter.

   Tip: Type SAVE on the command line to easily add more than one FSS definition of the same type.
To save the new definition and exit the panel, press the END function key.

Tip: If you have already created some FSS definitions, you can add a new FSS definition by typing A in the A column on the FSS Definition List panel. For more information, see “Listing FSS definitions.”

Listing FSS definitions
You must display a list of FSS definitions before you can browse, copy, edit, or delete an FSS definition. You can list all FSS definitions, or you can select the FSS definitions you want to list.

Listing all FSS definitions
To display a list of all FSS definitions:
1. On the Infoprint Server Printer Inventory Manager panel, select 4 Other Definitions and press Enter.
2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select 5 List and press Enter.
3. On the FSS List panel, you can type one of the actions to do the other functions described in this section. Press the END function key to exit the list. Press Enter at any time to obtain a current list.

Listing selected FSS definitions
You can select FSS definitions to list based on one or more of these criteria. FSS definitions are listed if they meet all of the criteria you specify.
- FSS name
- Description of the FSS definition
- Type of FSS definition: IP PrintWay or PSF

To display a list of selected FSS definitions:
1. On the Infoprint Server Printer Inventory Manager panel, select 4 Other Definitions and press Enter.
2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select 6 Select and press Enter.
3. On the FSS Select panel, type values in one or more fields to specify selection criteria and press Enter. The online help for each field tells you how to use an * or ? to represent one or more variable characters.
4. On the FSS List panel, you can type an action in front of one or more printer definitions and press Enter. Press Enter at any time to obtain a current list.
5. Press the END function key to exit the list.
Browsing, copying, editing, and deleting an FSS definition

To browse, copy, edit, or delete a FSS definition:

1. List the FSS definition that you want to work with, as described in "Listing FSS definitions" on page 247.

2. On the FSS List panel, type B, C, E, or D in the A column in front of the FSS definition you want to work with and press Enter.

3. To return to the FSS List panel, press the END function key.

Managing FSA definitions

This section describes how to use the Infoprint Server ISPF panels to manage FSA (functional subsystem application) definitions. For more information about FSA definitions and when you might want to create them, see "Planning FSA definitions" on page 73.

Adding an FSA definition

You can add an FSA definition as described in this section.

Tip: It is more efficient to add an FSA definition by copying an existing FSA definition of the same type. For information, see "Browsing, copying, editing, and deleting an FSA definition" on page 250.

To add an FSA definition:

1. On the Infoprint Server Printer Inventory Manager panel, select 4 Other Definitions and press Enter.

2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select 1 Add.

3. On the Choose an FSA type to add panel, select the type of FSA definition and press Enter. Types are: IP PrintWay, PSF channel, PSF SNA, PSF TCP/IP, and AFP Download Plus. Depending on the type you select, different ISPF panels are displayed.

4. On the IP PrintWay FSA panel or the PSF FSA panel:
   a. Fill in the FSA name and other fields on this panel. The FSA name must match the name of the FSA as defined to JES. To display online help information, place the cursor on the command line and press the HELP function key. To display help information about each field, place the cursor on the input area of the field and press the HELP function key.
   b. To validate the fields before you save the FSA definition, press Enter.
   c. To save the new definition but keep the panel on the screen, type SAVE on the command line and press Enter.

   Tip: Type SAVE on the command line to easily add more than one FSA definition of the same type.
d. To save the new definition and exit the panel, press the END function key.

Tip: If you have already created some FSA definitions, you can add a new FSA definition by typing A in the A column on the FSA Definition List panel. For more information, see “Listing FSA definitions.”

Listing FSA definitions
You must display a list of FSA definitions before you can browse, copy, edit, or delete an FSA definition. You can list all FSA definitions, or you can select the FSA definitions you want to list.

Listing all FSA definitions
To display a list of all FSA definitions:
1. On the Infoprint Server Printer Inventory Manager panel, select 4 Other Definitions and press Enter.

2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select 2 List and press Enter.

3. On the FSA List panel, you can type one of the actions to do the other functions described in this section. Press the END function key to exit the list. Press Enter at any time to obtain a current list.

Listing selected FSA definitions
You can select FSA definitions to list based on one or more of these criteria. FSA definitions are listed if they meet all of the criteria you specify.
- FSA name
- Description of the FSA definition
- Type of FSA definition: IP PrintWay, PSF channel, PSF SNA, PSF TCP/IP, or PSF AFP Download Plus.

To display a list of selected FSA definitions:
1. On the Infoprint Server Printer Inventory Manager panel, select 4 Other Definitions and press Enter.

2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select 3 Select and press Enter.

3. On the FSA Select panel, type values in one or more fields to specify selection criteria and press Enter. The online help for each field tells you how to use an * or ? to represent one or more variable characters.

4. On the FSA List panel, you can type an action in front of one or more printer definitions and press Enter. Press Enter at any time to obtain a current list.

5. Press the END function key to exit the list.
Browsing, copying, editing, and deleting an FSA definition

To browse, copy, edit, or delete a FSA definition:

1. List the FSA definition that you want to work with, as described in "Listing FSS definitions" on page 247.

2. On the FSA List panel, type B, C, E, or D in the A column in front of the FSA definition you want to work with and press Enter.

3. To return to the FSA List panel, press the END function key.

Note: When you edit values in an FSA definition, you need to restart the IP PrintWay FSA or PSF printer for your changes to take effect.

Managing job selection rules

This section describes how to use the Infoprint Server ISPF panels to manage job selection rules. Job selection rules apply only to IP PrintWay extended mode.

For detailed information about how to set up and use job selection rules, see z/OS Infoprint Server Customization.

Adding a job selection rule

You can add a job selection rule as described in this section.

Tip: It is more efficient to add a job selection rule by copying an existing job selection rule. For information, see "Browsing, copying, editing, and deleting a job selection rule" on page 251.

To add a job selection rule:

1. On the Infoprint Server Printer Inventory Manager panel, select 4 Other Definitions and press Enter.

2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select 10 Add.

3. On the Job Selection Rule panel:
   a. Fill in the Rule name and other fields on this panel. To display online help information, place the cursor on the command line and press the HELP function key. To display help information about each field, place the cursor on the input area of the field and press the HELP function key.
   b. To validate the fields before you save the job selection rule, press Enter.
   c. To save the new job selection rule but keep the panel on the screen, type SAVE on the command line and press Enter.

   Tip: Type SAVE on the command line to easily add more than one job selection rule.
d. To save the new job selection rule and exit the panel, press the END function key.

Tip: If you have already created some job selection rules, you can add a new job selection rule by typing A in the A column on the Job Selection Rule List panel. For more information, see “Listing job selection rules.”

Listing job selection rules
You must display a list of job selection rules before you can browse, copy, edit, or delete a job selection rule.

To display a list of all job selection rules:
1. On the Infoprint Server Printer Inventory Manager panel, select 4 Other Definitions and press Enter.
2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select 11 List and press Enter.
3. On the Job Selection Rule List panel, you can type one of the actions to do the other functions described in this section. Press the END function key to exit the list. Press Enter at any time to obtain a current list.

Browsing, copying, editing, and deleting a job selection rule
To browse, copy, edit, or delete a job selection rule:
1. List the job selection rule that you want to work with, as described in “Listing job selection rules.”
2. On the Job Selection Rule List panel, type B, C, E, or D in the A column in front of the job selection rule you want to work with and press Enter.
3. To return to the Job Selection Rule List panel, press the END function key.
Chapter 17. Using the PIDU program to manage the Printer Inventory

These topics describe how to use the Printer Inventory Definition Utility (PIDU) program to manage objects in the Printer Inventory. Inventory objects include printer definitions, printer pool definitions, components, FSS definitions, FSA definitions, and job selection rules.

The PIDU program is useful for creating and editing many objects at the same time. Also, it lets you do some functions that you cannot do with Infoprint Server ISPF panels. For example, you can export or dump objects in the Printer Inventory to a file, and you can do more powerful searches of the Printer Inventory.

Running the PIDU program

Before running the PIDU program, Infoprint Server must be started. The Printer Inventory Manager daemon, aopd, must be active.

To run the PIDU program, you must have a UID of 0 or be a member of the AOPADMIN group. In addition, you must have access to one or more of these RACF resource profiles:
- AOP.ADMINISTRATOR profile in the PRINTSRV class:
  - READ access lets you display, dump, export, or list any object in the Printer Inventory.
  - UPDATE access lets you create, delete, force-create, modify, or rename any object except for the system configuration definition.

If the AOP.ADMINISTRATOR profile does not exist, READ access to the AOPADMIN profile in the FACILITY class lets you do the functions.
- AOP.CONFIGURATION profile in the PRINTSRV class:
  - READ access lets you display, dump, export, or list the system configuration definition.
  - UPDATE access lets you force-create or modify the system configuration definition.

If the AOPCONFIGURATION profile does not exist, UPDATE access to the AOPADMIN profile in the FACILITY class lets you do all functions.

For information about how to establish security for the Printer Inventory, see z/OS Infoprint Server Customization.

You can run the PIDU program in two ways:
- From the z/OS UNIX shell using the pidu command. See "Running the PIDU program using the pidu command" on page 254.
- As a batch job. See "Running the PIDU program as a batch job" on page 257.
Running the PIDU program using the pidu command

Format
pidu [-qv] [-c "command; ..."]... [filename]...

Description
The pidu command lets you specify one or more of the PIDU commands shown in Table 40 on page 258 to manage objects in the Printer Inventory. You can specify PIDU commands in the -c option or in a file. The pidu command writes a report of errors to standard error (stderr) and writes informational messages and command output to standard output (stdout).

Options
-\c 'command; ...'
-\c "command; ...

Specifies one or more PIDU commands. Enclose the commands in single or double quotation marks, and end each statement with a semicolon. If a command contains a value that requires single quotation marks, such as a hexadecimal value, enclose the commands in double quotation marks. You can repeat the -c option.

If you do not specify the -c option or the name of a file, pidu reads the commands from standard input (stdin), which can be either keyboard data or output from another command.

You can specify these PIDU commands:
• create
• delete
• display
• display-fully
• dump
• export
• force-create
• list
• modify
• rename

For detailed information about these commands, see "PIDU commands" on page 258.

-q
Suppresses informational messages that the pidu command writes to stdout.

-v
Writes the name of the Printer Inventory to stderr. Also provides additional informational messages.

Operands
filename
The name of a UNIX file or sequential MVS data set that contains the commands. You can repeat this option.

If the data set is an MVS data set, specify // before the file name. If you specify a fully-qualified data set name, also enclose the data set name in single quotation marks and specify a backslash before each single quotation mark. For example, if the output file is named USERID.MYFILE, enter:

//\'USERID.MYFILE\'
If you want your TSO user ID prefixed to the data set name, specify:
//MYFILE

To specify commands from stdin, omit the file name and the -c option.

Usage notes
- You can specify PIDU commands interactively from your keyboard. For an example, see "Entering PIDU commands interactively."
- When you specify PIDU commands in a UNIX file (such as a z/FS file) or an MVS data set:
  - Start comments with a pound sign (#).
  - Include blank lines if desired.
  - You can specify the PIDU command names, attribute names, and attribute values on separate lines.
  - In a UNIX file, an attribute value can span lines provided that all lines other than the last line end with a backslash. Be sure that no blank characters are present after the backslash. For example:
    attribute1 = 'A very, very, very long \
    value'
  - In an MVS data set, the entire attribute value must be on one line. To specify a very long attribute value, allocate a data set that has a logical record length of 255 (LRECL=255) and a variable blocked record format (RECFM=VB). Then specify the entire value on one line. For example:
    attribute1 = 'A very, very, very long value'

Examples -- pidu

Entering PIDU commands interactively: To enter one or more PIDU commands interactively from your keyboard:

1. On the z/OS UNIX command line, type pidu and press Enter.

2. Type a PIDU command and press Enter. For example, to create a printer definition, type:

   ```
   create printer lp1 description="Default printer"
   location="Printer room" printer-type=ip-printway dcf-routing=yes
   destination=LP1 printer-ip-address=printer1.boulder luname=LUPRT001
   lu-classes={2} include-allocation=printway
   include-processing = pcl_printer include-printway-options=pcl_land_17cpi
   include-netspool-eof-rules=bracket include-netspool-options=pcl
   include-protocol=lpr_options ;
   ```
   For an explanation of this `create` command, see "Creating an IP PrintWay printer definition for a PCL printer with LPR protocol" on page 266.

3. After the command is processed, type another command and press Enter. For example, to display the attributes of the printer definition just created, enter:
   ```
   display printer lp1;
   ```
4. After the command is processed, use **Ctrl-D** or type **exit** to end the **pidu** command.

**Specifying PIDU commands on the command line:** To specify two PIDU list commands with the **-c** option, enter:

```bash
pidu -c "list printer; list printer-pool;"
```

**Specifying PIDU commands in a file:** To specify a UNIX file named **pidu.commands** that contains PIDU commands, enter:

```bash
pidu pidu.commands
```

To specify a fully-qualified MVS data set named **MARY.PIDU.CMDS**, enter:

```bash
pidu //\'MARY.PIDU.CMDS\'
```

To prefix your TSO user ID to the data set name, enter:

```bash
pidu //PI.DU.CMDS
```

File **pidu.commands** (or data set **PIDU.CMDS**) contains the PIDU commands. For example:

```plaintext
create printer lp1 description="Default printer"
location="Printer room" printer-type=ip-printway dcf-routing = yes destination=LP1
printer-ip-address=printer1.boulder 1uname = LUPRT001 lu-classes={ 2 }
include-allocation=printway include-processing=pcl_printer
include-printway-options=pcl_land_17cpi include-netspool-options=pcl
include-netspool-eof-rules=bracket include-protocol=lpr_options 
list printer;       # List all printer definitions
```

**Specifying PIDU commands with hexadecimal values:** To specify a PIDU create command containing the line-termination attribute, enter:

```bash
pidu -c "create printer lp2 line-termination=X'0D25';"
```

**Environment variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AOPCONF</strong></td>
<td>Names the Infoprint Server configuration file. The file named in this variable takes precedence over the user-specific configuration file (<strong>$HOME/.aopconf</strong>) and the system default configuration file (<strong>/etc/Printsrv/aopd.conf</strong>).</td>
</tr>
<tr>
<td><strong>LIBPATH</strong></td>
<td>The path used to locate dynamic link libraries (DLL).</td>
</tr>
<tr>
<td><strong>NLSPATH</strong></td>
<td>Lists the directory where the Infoprint Server message catalogs are located.</td>
</tr>
<tr>
<td><strong>PATH</strong></td>
<td>Lists the directory where the Infoprint Server executables are located.</td>
</tr>
</tbody>
</table>

**Files**

- **$HOME/.aopconf**
  Contains the user-specific Infoprint Server configuration file. This file takes precedence over **/etc/Printsrv/aopd.conf**.

- **/etc/Printsrv/aopd.conf**
  The default Infoprint Server configuration file.

**Exit values**

<table>
<thead>
<tr>
<th>Exit Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>The PIDU commands were done successfully.</td>
</tr>
</tbody>
</table>
An error occurred that prevented one or more PIDU commands from being done successfully.

Running the PIDU program as a batch job
You can run the PIDU program as a batch job from TSO by using the AOPBATCH or BPXBATCH program. This section describes how to use the AOPBATCH program because the AOPBATCH program sets default environment variables that the PIDU program requires.

Using AOPBATCH to run the PIDU program
You can invoke AOPBATCH in JCL with this EXEC statement:
```
//stepname EXEC PGM=AOPBATCH,PARM='pidu [-v] [-q]
```

- **-q** Suppresses informational messages that the `pidu` command writes to the output data set named in the STDOUT DD statement.

- **-v** Writes the name of the Printer Inventory to the output data set named in the STDERR DD statement. Also provides additional informational messages.

You can specify these DD statements:

- **STDENV**
  Specifies environment variables used by the PIDU program. You can specify the environment variables either in-stream or in a UNIX file or MVS data set. For the environment variables used by the PIDU program, see ["Environment variables" on page 256](#). When you use AOPBATCH, you need to specify the PATH, LIBPATH, and NLSPATH environment variables only if your installation did not install Infoprint Server files in the default directories. Specify the AOPCONF environment variable if the Infoprint Server configuration file is not in `/etc/Printsrv/aopd.conf` or in `$HOME/.aopconf`. Specify the environment variables in the format `variable = value`.

- **STDERR**
  Specifies a SYSOUT data set, a UNIX file, or an MVS data set. The PIDU program writes error messages to this file or data set.

- **STDIN**
  Specifies PIDU commands in-stream or names a UNIX file or MVS data set that contains the commands.

  **Tip:** If any attribute value is greater than 80 characters, you cannot specify the PIDU commands in-stream because an attribute value cannot span lines and the SYSIN DD * statement lets you specify a maximum of 80 characters on one line. Instead, specify the PIDU commands in an MVS data set that has a logical record length (LRECL) of 255 and a variable blocked (VB) blocksize (BLKSIZE).

- **STDOUT**
  Specifies a SYSOUT data set, a UNIX file, or an MVS data set. The PIDU program writes its output and informational messages to this file or data set.

IBM provides sample JCL in the AOPPIDU member of SYS1.SAMPLIB for running the PIDU program using the AOPBATCH utility. [Figure 7 on page 258](#) shows member AOPPIDU.
PIDU commands

As input to the PIDU program, you must specify one or more PIDU commands. Table 40 summarizes the PIDU commands, the function of each command, and where to find more information about the command.

<table>
<thead>
<tr>
<th>PIDU command</th>
<th>Function of command</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>create</td>
<td>Create a new object.</td>
<td>261</td>
</tr>
<tr>
<td>delete</td>
<td>Delete an object.</td>
<td>275</td>
</tr>
<tr>
<td>display</td>
<td>Display the attributes of an object.</td>
<td>275</td>
</tr>
</tbody>
</table>

Example: This example lists all printer definitions and printer pool definitions, and specifies environment variables in-stream in the JCL:

```
//AOPPIDU JOB ,'pidu'
//*
//PIDU EXEC PGM=AOPBATCH,PARM='pidu'
//*
//STDIN DD DSN=hlq.INVDEFS,DISP=SHR
//*
//STDOUT DD SYSOUT=*  
//STDERR DD SYSOUT=*  
//*
//STDENV may point to a dataset containing environment variables.
//** Built-in values will work for the default installation.
//** STDENV DD DSN=environment,DISP=SHR
```

Figure 7. Sample JCL for running the PIDU program as a batch job — SYS1.SAMPLIB(AOPPIDU)

Tip: If your installation installed Infoprint Server files in default directories, you can omit the STDENV DD statement.

Using BPXBATCH to run the PIDU program

If you use the BPXBATCH utility program to run the pidu command, you must always set the PATH, LIBPATH, and NLSPATH environment variables, even if your installation installed Infoprint Server files in default locations. Specify the AOPCONF environment variable if the Infoprint Server configuration file is not in /etc/Printsrv/aopd.conf or in $HOME/.aopconf. For information about these environment variables, see "Environment variables” on page 256.

For information about the BPXBATCH utility program, see z/OS UNIX System Services Command Reference.
Table 40. Summary of PIDU commands (continued)

<table>
<thead>
<tr>
<th>PIDU command</th>
<th>Function of command</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>display-fully</td>
<td>Display the attributes of a printer definition plus the attributes of any components that the printer definition includes.</td>
<td>276</td>
</tr>
<tr>
<td>dump</td>
<td>Dump all objects.</td>
<td>277</td>
</tr>
<tr>
<td>export</td>
<td>Generate create or force-create commands for all objects or only objects that meet certain criteria.</td>
<td>278</td>
</tr>
<tr>
<td>force-create</td>
<td>Create an object or replace an object of the same name if it already exists in the same object class.</td>
<td>261</td>
</tr>
<tr>
<td>list</td>
<td>List all objects or only objects that meet certain criteria.</td>
<td>279</td>
</tr>
<tr>
<td>modify</td>
<td>Modify attributes of an object.</td>
<td>281</td>
</tr>
<tr>
<td>rename</td>
<td>Rename an object.</td>
<td>283</td>
</tr>
</tbody>
</table>

The following considerations apply when you use these **pidu** commands to work with the system configuration definition:

- **create**: This command is not allowed because Infoprint Server creates the system configuration definition automatically when it starts.
- **delete**: This command is not allowed because the system configuration definition is required.
- **export**: This command exports the system configuration definition only if dynamic configuration is enabled.
- **force-create**: This command replaces the system configuration definition only if dynamic configuration is enabled.
- **modify**: This command modifies the system configuration attributes only if dynamic configuration is enabled.
- **rename**: This command is not allowed because the system configuration definition must be named “aopd.conf”.

**Tip**: To abbreviate command names, use enough characters to make the command name unique. For example, you can abbreviate **display** as **di**.

### PIDU object classes

Most PIDU commands require that you identify the **object class** of the object in the Printer Inventory that you want to work with. Table 41 summarizes how the PIDU program classifies objects in the Printer Inventory.

Table 41. Classes of objects used by the PIDU program

<table>
<thead>
<tr>
<th>Object class</th>
<th>Description of object</th>
</tr>
</thead>
<tbody>
<tr>
<td>allocation</td>
<td>An Allocation component</td>
</tr>
<tr>
<td>configuration</td>
<td>The system configuration definition</td>
</tr>
<tr>
<td>fsa</td>
<td>An FSA definition</td>
</tr>
<tr>
<td>job-selection-rule</td>
<td>A job selection definition</td>
</tr>
<tr>
<td>netspool-eof-rules</td>
<td>A NetSpool End-of-File component</td>
</tr>
<tr>
<td>netspool-options</td>
<td>A NetSpool Options component</td>
</tr>
</tbody>
</table>
Where predicate

Two of the PIDU commands, export and list, let you construct a where predicate to select the objects you want to export or list. In the where predicate, you can specify one or more conditions.

The where predicate has this format:

where condition [and | or condition]...

A condition has this format:

[not] attribute operator value

not
Indicates that the evaluation of the condition is to be reversed.

attribute
Specifies the name of a single-valued attribute that is valid for the object class. Note that multi-valued attributes are not supported.

You can specify any attribute that is valid for the object class. You can also specify the attribute name to limit definitions by name.

For a list of the valid attributes, see “Attribute listing” on page 285.

operator
Specifies one of the operators shown in Table 42.

value
Specifies the value of the attribute. All values are case-sensitive. Therefore, be sure to type the same uppercase and lowercase letters as are stored in the Printer Inventory. The special value null means that an attribute is not specified.

If you use the match operator, you must specify a regular expression as defined in “Regular Expressions” in z/OS UNIX System Services Command Reference.

If the value contains special characters (such as *, {, } - >), enclose the value in quotation marks.

Table 42 summarizes the operators that you can use when you construct a condition. Some operators are valid only for certain types of attribute values, as indicated in the table. For example, you can use the match operator only for attributes that accept strings values.

Table 42. Operators for attributes

<table>
<thead>
<tr>
<th>Operator</th>
<th>Operation</th>
<th>String values</th>
<th>Fixed values</th>
<th>Integer values</th>
</tr>
</thead>
<tbody>
<tr>
<td>=</td>
<td>Equal</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
### Commands

**Table 42. Operators for attributes (continued)**

<table>
<thead>
<tr>
<th>Operator</th>
<th>Operation</th>
<th>String values</th>
<th>Fixed values</th>
<th>Integer values</th>
</tr>
</thead>
<tbody>
<tr>
<td>!=</td>
<td>Not equal</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>&gt;</td>
<td>Match a value greater than the specified value</td>
<td>Yes¹</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>&lt;</td>
<td>Match a value less than the specified value</td>
<td>Yes¹</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>&lt;=</td>
<td>Match a value less than or equal to the specified value</td>
<td>Yes¹</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>&gt;=</td>
<td>Match a value greater than or equal to the specified value</td>
<td>Yes¹</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>match</td>
<td>Match the specified regular expression</td>
<td>Yes¹</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

1. A string value is evaluated using binary collation.

To specify an expression with multiple conditions, separate the conditions with one of these operators:

- **and** The expression is true only if both conditions are true.
- **or** The expression is true if either condition is true.

Multiple conditions are evaluated using an order of precedence, with **and** conditions evaluated before **or** conditions. You can override the order by using parentheses. Expressions in parentheses are evaluated first.

**Tip:** For examples of the **where** predicate, see:
- "export—export objects to a file" on page 278
- "list—list names of objects" on page 279

### create and force-create—create an object

**Format**

create objectclass name [attribute = value]... ;

force-create objectclass name [attribute = value]... ;

**Description**

The **create** command creates an object in the Printer Inventory. The object must not already exist in the Printer Inventory.

The **force-create** command does the same function as the **create** command except that if an object of the same name already exists in the same object class, it is replaced.

You cannot use the **create** command to create the system configuration definition in the **configuration** class because Infoprint Server automatically creates this definition when Infoprint Server starts. However, if dynamic configuration is enabled, you can use the **force-create** command to replace all attributes in the system configuration definition.
create and force-create

## Operands

- **objectclass**
  The class of the object that you want to create. For a list of the object classes, see Table 41 on page 259.

  You can specify the **configuration** class on a **force-create** command but not on a **create** command.

- **name**
  A name to identify the object. Objects in the same object class cannot have the same name. Also, a printer pool definition (**printer-pool** object class) cannot have the same name as a printer definition (**printer** object class).

  When you create a printer definition, printer-pool definition, job selection rule, or component, specify any combination of 1-17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . = /). Blank characters are not allowed. In an IP PrintWay printer definition, use name DFLTNRTRY to designate the IP PrintWay default printer definition. The name is case-sensitive.

  When you create an FSS or FSA definition, this name must match the name used to define the FSA or FSS to JES. Specify a valid combination of 1-8 letters, numbers, and national characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. Lowercase letters are converted to uppercase.

  If the name contains special characters, enclose the name in single or double quotation marks.

  **Tip:** On a **force-create** command to replace the system configuration definition, specify **aopd.conf** as the name.

- **attribute = value**
  One or more attributes and values. Separate attributes with spaces. For the valid attributes for each object class, see "Attribute listing" on page 285.

## Usage notes

- A printer definition can include one or more components. For example, a printer definition can include one Allocation component and one Processing component. When a printer definition includes a component, the attributes specified for the component apply to the printer definition as well. To include a component, use the `include-object` attributes, such as `include-allocation` and `include-processing`.

- When you create a printer definition and include components, you can override any attribute that is specified in a component. To do this, specify the same attribute on the **create** statement for the printer definition. The attribute you specify on the **create** statement applies only to the printer definition. The value of the attribute in the component is not changed.

  **Tip:** If an attribute is specified in a printer definition, and you later change the value for that attribute in an included component, the value in the printer definition remains unchanged.

- You must create components before you create any printer definitions that include these components.

- You must create printer definitions before you create any printer pool definitions that list these printer definitions.
create and force-create

- To help you specify a valid create statement, first use the ISPF panels to create the object in the Printer Inventory and then use the PIDU display or export command to list the attributes for the object.
- If you repeat the same attribute in a create statement, the PIDU program uses the last specification.

Examples -- create and force-create
You can find additional examples of PIDU commands in the file/usr/lpp/Printsrv/samples/sample.pidl

All of these examples also apply to the force-create command.

Creating an allocation component: This example creates an Allocation component named printway. This Allocation component might be included in all printer definitions for printers to be managed by the same IP PrintWay basic mode FSA.

```
pidu -c 'create allocation printway
description="JES allocation values for IP PrintWay"
output-class=K ;'
```

The attributes set in this component are:

- **description**: This attribute describes the component.
- **output-class**: This attribute specifies the output class that is the JES work-selection criterion for the IP PrintWay basic mode FSA. In this example, the output class is K. NetSpool and Print Interface will allocate output data sets on the JES spool in class K.

Creating a processing component for PCL printers: This example creates a Processing component named pcl_printer that contains attributes suitable for printers that can print PCL files:

```
pidu -c 'create processing pcl_printer
description = "Generic PCL options"
printer-codepage = ISO8859-1
document-formats-supported = { text pcl modca-p line-data }
filters = { text -> aopfiltr.so modca-p -> "afpxpcl.dll -c us" line-data -> "afpxpcl.dll -c us" }
pcl-print-density = 10
pcl-line-density = 6 ;'
```

The attributes set in this component are:

- **description**: This attribute describes the component.
- **printer-codepage**: This attribute specifies ASCII code page ISO8859-1. Specify an ASCII code page so that Print Interface converts EBCDIC data to ASCII before writing data to the JES spool. NetSpool also converts data to this code page when the netspool-formatting=convert-to-pcl attribute is specified in the printer definition.
- **document-formats-supported**: This attribute specifies that the printer accepts text, PCL, MO:DCA-P, and line data. The printer accepts MOD:CA-P and line data because a transform is associated with this data format in the filters attribute.
- **filters**: This attribute requests that Print Interface use these filters:
  - **aopfiltr.so** filter for text data. IBM suggests that you specify this filter for text data. **aopfiltr.so** is provided with InfoPrint Server. For information about this filter, see "Using the aopfiltr.so filter" on page 81
  - **afpxpcl.dll** filter for MOD:CA-P (AFP) data and line data. This filter transforms AFP and line data to PCL data.
create and force-create

- **pcl-print-density**: This attribute specifies the number of characters per inch to be printed on a line. NetSpool uses this value when the `netspool-formatting=convert-to-pcl` attribute is also specified in the printer definition.

- **pcl-line-density**: This attribute specifies the number of lines per inch to be printed on a page. NetSpool uses this value when the `netspool-formatting=convert-to-pcl` attribute is also specified in the printer definition.

Creating a processing component for AFP printers: This example creates a Processing component named `afp_printer` that contains attributes suitable for printing on AFP printers:

```
pidu -c 'create processing afp_printer
   description = "AFP options"
   printer-codepage = IBM-1047
   document-formats-supported = [ modca-p line-data text pcl postscript pdf]
   filters = [ pcl -> "pcl2afp.dll %filter-options"
              postscript -> "ps2afp.dll %filter-options"
              pdf -> "ps2afp.dll %filter-options" ]; '
```

The attributes set in this component are:

- **description**: This attribute describes the component.

- **printer-codepage**: This attribute specifies EBCDIC code page IBM-1047. Specify an EBCDIC code page so that Print Interface converts ASCII data to EBCDIC before writing data to the JES spool.

- **document-formats-supported**: This attribute specifies that the printer accepts MO:DCA-P, line data, text, PCL, PostScript, and PDF data.

- **filters**: This attribute requests that Infoprint Server use the `pcl2afp.dll` filter to transform PCL data to AFP format (MO:DCA-P) and the `ps2afp.dll` filter to transform both PostScript and PDF data to AFP format.

Creating an IP PrintWay options component: This example creates an IP PrintWay Options component named `pcl_land_17cpi` that contains attributes suitable for printing in the landscape orientation on PCL printers and for retaining data sets on the JES spool that IP PrintWay cannot transmit to the remote printer:

```
pidu -c 'create printway-options pcl_land_17cpi
   description = "PCL landscape 17 cpi"
   retry-limit = 5
   retry-time = 5:00
   failure-retention-period = forever
   document-header = "<esc>E<esc>&l10<esc>(s17H"
   document-trailer = "<esc>E" ; '
```

The attributes set in this component are:

- **description**: This attribute describes the component.

- **retry-limit**: This attribute specifies that IP PrintWay is to retry unsuccessful transmissions up to 5 times before considering the transmission to have failed.

- **retry-time**: This attribute specifies that IP PrintWay is to retry unsuccessful transmissions every 5 minutes. IP PrintWay also automatically retries an unsuccessful transmission right after the first transmission fails.

- **failure-retention-period**: This attribute specifies that IP PrintWay retain the output data set on the JES spool if the transmission fails.

- **document-header**: This attribute specifies printer commands for printing in the landscape direction. IP PrintWay translates the instructions to ASCII and transmits them to the printer before the data.
create and force-create

- **document-trailer**: This attribute specifies printer commands to reset the printer to its original state. IP PrintWay translates the instructions to ASCII and transmits them to the printer after the data.

**Creating a NetSpool options component for PCL printers**: This example creates a NetSpool Options component named pcl. The attributes in this component request that NetSpool convert data to PCL before writing it to the JES spool.

```bash
pidu -c 'create netspool-options pcl
description = "Convert to PCL"
    netspool-formatting = convert-to-pcl ; '
```

The attributes set in this component are:
- **description**: This attribute describes the component.
- **netspool-formatting**: This attribute requests that NetSpool convert data to PCL before writing it to the JES spool.

**Creating a NetSpool options component to print binary data**: This example creates a NetSpool Options component named binary. The attributes in this component request that NetSpool not convert or format data before writing it to the JES spool.

```bash
pidu -c 'create netspool-options binary
description = "No formatting; 80 byte records"
    netspool-formatting = none
    maximum-record-size = 80
    recfm = vba ; '
```

The attributes set in this component are:
- **description**: This attribute describes the component.
- **netspool-formatting**: This attribute specifies that NetSpool not format data before writing it to the JES spool.
- **maximum-record-size**: This attribute specifies that NetSpool write a maximum record size of 80 bytes.
- **recfm**: This attribute specifies that NetSpool use a record format of VBA.

**Creating a NetSpool end-of-file component**: This example creates a NetSpool End-of-File component named bracket. The attributes in this component tell NetSpool to use the end-of-bracket rule to determine when to close the output data set on the JES spool, and also request that NetSpool delete form feed controls that occur at the end of the output data set.

```bash
pidu -c 'create netspool-eof-rules bracket
description="Bracket rule; delete trailing form feeds"
    eof-rules= {
        default= { all -> { eof-method=end-bracket delete-form-feed=trailing} }
    } ; '
```

The attributes set in this component are:
- **description**: This attribute describes the component.
- **eof-rules**: This attribute specifies the start of the end-of-file rules.
- **default**: This attribute defines default end-of-file rules that apply to all LU types.
- **eof-method**: This attribute requests that NetSpool use the end-of-bracket rule.
- **delete-form-feed**: This attribute requests that NetSpool delete form feed controls at the end of the output data set.
Creating a protocol component for LPR protocol: This example creates a Protocol component named lpr_options that contains attributes suitable for transmitting data sets using IP PrintWay and the LPR to LPD protocol.

```
pidu -c 'create protocol lpr_options
   description = "LPR To PASS queue"
   protocol-type = lpr
   print-queue-name = PASS ; '
```

The attributes set in this component are:
- **description**: This attribute describes the component.
- **protocol-type**: This attribute requests the LPR to LPD protocol.
- **print-queue-name**: This attribute specifies the name of the PASS print queue on the target printer.

Creating an IP PrintWay printer definition for a PCL printer with LPR protocol: This example creates a printer definition named lp1 for a printer managed by IP PrintWay. IP PrintWay uses the LPR to LPD TCP/IP protocol to transmit data to the remote printer or print server.

```
pidu -c 'create printer lp1
   description = "Default printer"
   location = "Printer room"
   printer-type = ip-printway
   dcf-routing = yes
   destination = LP1
   printer-ip-address = printer1.boulder
   luname = LUPRT001
   lu-classes = { 2 }
   default-owner = smith
   embedded-attributes-prefix = "<<ibmjobattr"
   operator-security-profile = "DENVER.001"
   include-allocation = printway
   include-processing = pcl_printer
   include-printway-options = pcl_land_17cpi
   include-netspool-options = pcl
   include-netspool-eof-rules = bracket
   include-protocol = lpr_options ; '
```

Users can access this printer definition in these ways:
- Local and remote can users use lp1 as the name of the destination, print queue, or printer definition.
- IPP clients can use one of these URIs:
  - ipp://host/servlet/IPPServlet/lp1
  - http://host:631/servlet/IPPServlet/lp1

The host name or IP address of the z/OS system is host.
- JCL users can specify either (1) FSSDATA='printer=lp1' or (2) CLASS=K and DEST=LP1 on an OUTPUT JCL statement. JCL users can also use the AOPPRINT procedure, specifying lp1 as the printer name.
- VTAM applications use NetSpool printer LU name LUPRT001.

The attributes set in this printer definition are:
- **description**: This attribute describes the printer definition.
- **location**: This attribute describes the location of the printer.
- **printer-type**: This attribute specifies that IP PrintWay manages the printer.
- **dcf-routing**: This attribute specifies that users can select this printer using the DEST, CLASS and FORMS parameters on an OUTPUT JCL statement. In this
example, the DEST value is specified in the destination attribute, the CLASS value is specified in the included Allocation component named printway, and the FORMS value is not specified.

- **destination**: This attribute specifies that Print Interface and NetSpool allocate output data sets on the JES spool with a DEST value of LP1. Because dcf-routing=yes, IP PrintWay selects this printer definition when the OUTPUT JCL statement contains a DEST value of LP1 and a CLASS value of K.

- **printer-ip-address**: This attribute specifies the IP address of the remote printer or print system.

- **luname**: This attribute specifies the NetSpool printer LU name.

- **lu-classes**: This attribute assigns the NetSpool printer LU name to LU class 2.

- **default-owner**: This attribute specifies the default Infoprint Server job owner for data sets that NetSpool spools for the associated logical unit (LU) if embedded job attributes in the print data do not specify an owner.

- **embedded-attributes-prefix**: This attribute specifies, for data sets that NetSpool spools, the prefix that identifies job attributes embedded in the print data.

- **operator-security-profile**: This attribute controls who can work with this printer using Infoprint Central.

- **include-object**: These attributes include components in the printer definition. All attributes specified in the named components apply to this printer definition. You must create components printway, pcl_printer, pcl_land_17cpi, pcl, bracket, and lpr_options.

### Creating an IP PrintWay printer definition for a PCL printer with IPP protocol:

This example creates a printer definition named lab_printer for a remote printer to which IP PrintWay transmits data. IP PrintWay uses Internet Printing Protocol (IPP) to transmit data to an IPP server running on the remote printer or print server.

```c
pidu -c 'create printer lab_printer
description = "IPP printer in 004 lab"
location = "Lab printer room - building 004"
printer-type = ip-printway
dcf-routing = yes
destination = LAB
luname = LUPRT003
lu-classes = {2}
default-owner = smith
embedded-attributes-prefix = "<<ibmjobattr"
operator-security-profile = "DENVER.001"
protocol-type = ipp
printer-uri = "ipp://myprinter.xyz.com"
include-allocation = printway
include-processing = pcl_printer
include-printway-options = pcl_land_17cpi
include-netspool-options = pcl
include-netspool-eof-rules = bracket ; '
```

Users can access this printer definition in these ways:

- Local and remote users can use lab_printer as the name of the destination, print queue, or printer definition.
- IPP clients can use one of these URIs:
  - ipp://host/servlet/IPPServlet/lab_printer
  - http://host:631/servlet/IPPServlet/lab_printer

The host name or IP address of the z/OS system is host.
JCL users can specify either (1) FSSDATA='printer=lab_printer' or (2) CLASS=K and DEST=LAB on an OUTPUT JCL statement. JCL users can also use the AOPPRINT procedure, specifying lab_printer as the printer name.

VTAM applications use NetSpool printer LU name LUPRT003.

The attributes set in this printer definition are:

- **description**: This attribute describes the printer definition.
- **location**: This attribute describes the location of the printer.
- **printer-type**: This attribute specifies that IP PrintWay manages the printer.
- **dcf-routing**: This attribute specifies that users can select this printer using the DEST, CLASS, and FORMS parameters on an OUTPUT JCL statement. In this example, the DEST value is specified in the destination attribute, the CLASS value is specified in the Allocation component named printway, and the FORMS value is not specified.
- **destination**: This attribute specifies that NetSpool and Print Interface allocate output data sets on the JES spool with a DEST value of LAB. Because dcf-routing=yes, IP PrintWay selects this printer definition when the OUTPUT JCL statement contains a DEST value of LAB and a CLASS value of K.
- **luname**: This attribute specifies the NetSpool printer LU name.
- **lu-classes**: This attribute assigns the NetSpool printer LU name to LU class 2.
- **default-owner**: This attribute specifies the default Infoprint Server job owner for data sets that NetSpool spools for the associated logical unit (LU) if embedded job attributes in the print data do not specify an owner.
- **embedded-attributes-prefix**: This attribute specifies, for data sets that NetSpool spools, the prefix that identifies job attributes embedded in the print data.
- **operator-security-profile**: This attribute controls who can work with this printer using Infoprint Central.
- **protocol-type**: This attribute requests that IP PrintWay use Internet Printing Protocol (IPP) to transmit data to the printer.
- **printer-uri**: This attribute specifies the Uniform Resource Identifier (URI) of the remote printer.
- **include-object**: These attributes include components in the printer definition. All attributes specified in the named components apply to this printer definition. The named components were created in previous examples.

**Creating an IP PrintWay printer definition for an SCS printer with VTAM protocol:** This example creates a printer definition named scs_printer for a remote printer to which IP PrintWay transmits data. IP PrintWay uses VTAM to transmit data to the SCS printer.

```
pidu -c create printer scs_printer
   description = "SCS printer"
   location = "Building 005"
   printer-type = ip-printway
   printer-codepage = IBM-1047
   dcf-routing = yes
   destination = scsprt
   operator-security-profile = "DENVER.001"
   protocol-type = vtam
   printer-luname = p001
   printer-logmode = scs
   vtam-checkpoint-pages = 10
   printway-formatting = use-fcb
   scpu-top-margin = 6
   scpu-bottom-margin = 62
   scpu-left-margin = 11
```
Users can access this printer definition in these ways:

- Local and remote users can use `scs_printer` as the name of the destination, print queue, or printer definition.
- IPP clients can use one of these URIs:
  - `ipp://host/servlet/IPPServlet/scs_printer`
  - `http://host:631/servlet/IPPServlet/scs_printer`

The host name or IP address of the z/OS system on which Infoprint Server is running is `host`.
- JCL users can specify either (1) `FSSDATA='printer=scs_printer'` or (2) `CLASS=K` and `DEST=SCSPRT` on an OUTPUT JCL statement. JCL users can also use the AOPPRINT procedure, specifying `scs_printer` as the printer name.

The attributes set in this printer definition are:

- `description`: This attribute describes the printer definition.
- `location`: This attribute describes the location of the printer.
- `printer-codepage`: This attribute specifies EBCDIC code page IBM-1047. Specify an EBCDIC code page so that Print Interface and IP PrintWay convert ASCII data to EBCDIC. Most SCS printers accept EBCDIC data.
- `printer-type`: This attribute specifies that IP PrintWay manages the printer.
- `dcf-routing`: This attribute specifies that users can use the DEST, CLASS, and FORMS parameters on an OUTPUT JCL statement to select this printer definition. In this example, the DEST value is specified in the `destination` attribute, the CLASS value is specified in the Allocation component named `printway`, and the FORMS value is not specified.
- `destination`: This attribute specifies that Print Interface allocate output data sets on the JES spool with a DEST value of SCSPRT. Because the `dcf-routing=yes` attribute is specified, IP PrintWay uses this printer definition for all data sets on the JES spool with a DEST value of SCSPRT and a CLASS value of K.
- `operator-security-profile`: This attribute controls who can work with this printer using Infoprint Central.
- `protocol-type`: This attribute requests that IP PrintWay use VTAM to transmit data to the printer.
- `printer-luname`: This attribute specifies the name of the remote SCS printer as defined to VTAM.
- `vtam-checkpoint-pages`: This attribute specifies that IP PrintWay will request a definitive response from the printer every 10 pages.
- `printway-formatting`: This attribute specifies that the FCB, if specified, is used to create the SCS data stream.
- `scs-xxxx`: These attributes specify formatting values.
- `include-allocation`: This attribute includes the previously defined allocation component named `printway`. See "Creating an allocation component" on page 263.

Creating an IP PrintWay printer definition for the email protocol: This example creates a printer definition named `deptmail` and selects the email protocol.
create and force-create

pidu -c 'create printer deptmail
  description = "Email destination"
  location = "Departments 01 and 02"
  printer-type = ip-printway
  printer-codepage = IBM-1047
  dcf-routing = yes
  destination = DEPTMAIL
  protocol-type = email
  title-text = "My default email title"
  mail-bcc-addresses = {"user2@xyz.com" dept01list}
  mail-cc-addresses = {"user3@xyz.com" dept02list}
  mail-from-name = "John Q. Sender"
  mail-reply-address = {"mysecretary@xyz.com"}
  mail-to-addresses = {"user1@xyz.com" dept03list}
  lname = DEPTMAIL
  lu-classes={ 1 }
  default-owner = smith
  embedded-attributes-prefix = "<<ibmjobattr"
  printway-formatting = use-fcb
  print-page-header = no
  dataset-grouping = concatenate-job
  include-allocation = printway ; '

Users can access this printer definition in these ways:

- Local and remote users can use deptmail as the name of the destination, print queue, or printer definition.
- IPP clients can use one of these URIs:
  - ipp://host/servlet/IPPServlet/deptmail
  - http://host:631/servlet/IPPServlet/deptmail

  The host name or IP address of the z/OS system is host.
- JCL users can specify either (1) FSSDATA='printer=deptmail' or (2) CLASS=K and DEST=DEPTMAIL on an OUTPUT JCL statement. Users of the AOPPRINT procedure specify deptmail as the printer name.

The attributes set in this printer definition are:

- **description**: This attribute describes the printer definition.
- **location**: This attribute describes the email destination.
- **printer-type**: This attribute specifies IP PrintWay.
- **printer-codepage**: This attribute specifies EBCDIC code page IBM-1047. Specify an EBCDIC code page so that Print Interface and IP PrintWay convert ASCII text data to EBCDIC.
- **dcf-routing**: This attribute specifies that job submitters can use the DEST, CLASS, and FORMS parameters on an OUTPUT JCL statement to select this printer definition. In this example, the DEST value is specified in the destination attribute, the CLASS value is specified in the Allocation component named printway, and the FORMS value is not specified.
- **destination**: This attribute specifies that Print Interface and NetSpool allocate output data sets on the JES spool with a DEST value of DEPTMAIL. Because the dcf-routing-eyes attribute is specified, IP PrintWay uses this printer definition for all data sets on the JES spool with a DEST value of DEPTMAIL and a CLASS value of K.
- **protocol-type**: This attribute requests that IP PrintWay use the email protocol.
- **title-text**: This attribute specifies a default subject for emails.
create and force-create

- **mail-bcc-addresses**: This attribute specifies the email addresses of the “blind copy (bcc)” recipients of the email. A bcc means that other recipients of the email do not see the bcc recipient listed. One email address and one z/OS UNIX sendmail alias name are specified.

- **mail-cc-addresses**: This attribute specifies the email addresses of the “copy (cc)” recipients of the email. A cc means that other recipients of the email can see the cc recipient listed. One email address and one z/OS UNIX sendmail alias name are specified.

- **mail-from-name**: This attribute specifies the descriptive name or other identifier of the sender of the email.

- **mail-reply-address**: This attribute specifies the email address that recipients of the email can reply to. If this attribute is omitted, most email programs use the sender’s email address. The default is `userid@domainname`. The user ID of the job submitter is `userid`. The domain name where Infoprint Server is running is `domainname`.

- **mail-to-addresses**: This attribute specifies the email addresses of the recipients of the email. One email address and one z/OS UNIX sendmail alias name are specified.

- **luname**: This attribute specifies the NetSpool printer LU name.

- **lu-classes**: This attribute assigns the NetSpool printer LU name to LU class 1.

- **default-owner**: This attribute specifies the default Infoprint Server job owner for data sets that NetSpool spools for the associated logical unit (LU) if embedded job attributes in the print data do not specify an owner.

- **embedded-attributes-prefix**: This attribute specifies, for data sets that NetSpool spools, the prefix that identifies job attributes embedded in the print data.

- **printway-formatting**: This attribute specifies IP PrintWay use the FCB, if one is specified, to format line data.

- **print-page-header**: This attribute causes IP PrintWay not to add a page header when it formats line data.

- **dataset-grouping**: This attribute requests that data sets that are in the same JES output group be sent as attachments in the same email.

- **include-allocation**: This attribute includes the previously defined Allocation component named printway. See “Creating an allocation component” on page 263.

Creating a PSF printer definition: This example creates a printer definition named `prt2` for an AFP printer controlled by PSF:

```plaintext
pdu -c 'create printer prt2
   description = "Dept 002 printer"
   location = "Building 002 printer room"
   printer-type = psf-mvs
   destination = DEPT002
   output-class = J
   luname = LUPRT002
   lu-classes = { 2 }
   default-owner = smith
   embedded-attributes-prefix = "<<ibmjobattr"
   include-processing = afp_printer
   include-netspool-eof-rules = bracket ;'
```

Users can access this printer definition in these ways:

- Local and remote users can use `prt2` as the name of the destination, print queue, or printer definition.
- IPP clients can use one of these URIs:
The host name or IP address of the z/OS system is host.

- JCL users can use the AOPPRINT procedure to access this printer definition, specifying prt2 as the printer name. For information about the AOPPRINT procedure, see [z/OS Infoprint Server User’s Guide](#).
- VTAM applications can use NetSpool printer LU name LUPRT002.

The attributes set in this printer definition are:

- **description**: This attribute describes the printer definition.
- **location**: This attribute describes the location of the printer.
- **printer-type**: This attribute specifies that PSF manages the printer.
- **output-class**: This attribute specifies the output class that is the JES work-selection criterion for the PSF printer FSA. In this example, the output class is J. NetSpool and Print Interface will allocate output data sets on the JES spool in class J.
- **luname**: This attribute specifies the NetSpool printer LU name.
- **lu-classes**: This attribute assigns the NetSpool printer LU name to LU class 2.
- **default-owner**: This attribute specifies the default Infoprint Server job owner for data sets that NetSpool spools for the associated logical unit (LU) if embedded job attributes in the print data do not specify an owner.
- **embedded-attributes-prefix**: This attribute specifies, for data sets that NetSpool spools, the prefix that identifies job attributes embedded in the print data.
- **include-object**: These attributes include components in the printer definition. All attributes specified in the named components apply to this printer definition. The named components were created in previous examples.

**Creating a general printer definition:** This example creates a printer definition named fred for a printer that is not controlled by IP PrintWay or by PSF:

```
pidu -c 'create printer fred
description = "Fred Jones"
location = "Office A-11"
printer-type = general
general-spooling-mode = line
destination = FRED ;'
```

Users can access this printer definition in these ways:

- Local and remote users use **fred** as the name of the destination, print queue, or printer definition.
- IPP clients use one of these URIs:
  - ipp://host/servlet/IPPServlet/fred
  - http://host:631/servlet/IPPServlet/fred

The host name or IP address of the z/OS system is host.

- JCL users can use the AOPPRINT procedure to access this printer definition, specifying **fred** as the printer name. For information about the AOPPRINT procedure, see [z/OS Infoprint Server User’s Guide](#).

**Tip:** This example does not specify the **luname** attribute. Therefore, VTAM applications cannot print to this printer definition.

The attributes set in this printer definition are:

- **description**: This attribute describes the printer definition.
create and force-create

- location: This attribute describes the location of the printer.
- printer-type: This attribute specifies General.
- general-spooling-mode: This attribute tells Print Interface to write data to the output data set on the JES spool in record format.
- destination: This attribute specifies the destination name that is the JES work-selection criterion for the printer. NetSpool and Print Interface allocate output data sets on the JES spool with destination name FRED.

Creating a printer pool definition: This example creates a printer pool definition named DEPT004. NetSpool creates a separate output data set on the JES spool for each printer definition in the printer pool definition.

To print to printer definitions p1, p2, and p3, VTAM applications use NetSpool printer LU name LU4.

```
pi -c 'create printer-pool DEPT004
   description = "All printers in dept 004"
   luname = LU4
   lu-classes = { 1 2 }
   default-owner = smith
   embedded-attributes-prefix = "<ibmjobattr"
   include-netspool-eof-rules = bracket
   printer-names = { p1 p2 p3 } ; '
```

The attributes set in this printer definition are:
- description: This attribute describes the printer definition.
- luname: This attribute specifies the NetSpool printer LU name LU4.
- lu-classes: This attribute assigns the NetSpool printer LU to LU classes 1 and 2.
- default-owner: This attribute specifies the default Infoprint Server job owner for data sets that NetSpool spools for the associated logical unit (LU) if embedded job attributes in the print data do not specify an owner.
- embedded-attributes-prefix: This attribute specifies, for data sets that NetSpool spools, the prefix that identifies job attributes embedded in the print data.
- include-netspool-eof-rules: This attribute includes the NetSpool End-of-File Rules component named bracket. You must also create this component.
- printer-names: This attribute lists the names of the printer definitions in the pool. You must create printer definitions named p1, p2, and p3.

Creating an IP PrintWay FSS definition: This example creates an FSS definition for an IP PrintWay functional subsystem (FSS) named PRINTWAY. The name of this definition (PRINTWAY) must match the name used to define the FSS to JES. An IP PrintWay FSS definition is optional. Create one only if you want to change the default values that IP PrintWay uses.

```
pi -c 'create printway-fss PRINTWAY
   trace-mode = internal ; '
```

The trace-mode attribute turns internal tracing on for the IP PrintWay FSS and all functional subsystem applications (FSAs) in this FSS.

Creating an IP PrintWay FSA definition: This example creates an FSA definition for an IP PrintWay functional subsystem application (FSA) named PRT123. The name of the FSA definition (PRT123) must match the name used to define the FSA to JES. An IP PrintWay FSA definition is optional. Create one only if you want to change default values that IP PrintWay uses.
create and force-create

```
pidu -c 'create fsa PRT123
    fsa-type = ip-printway
    trace-mode = full ; '
```

The attributes set in this printer definition are:

- **fsa-type**: This attribute tells the ISPF panels to display this definition as an IP PrintWay FSA definition.
- **trace-mode**: This attribute requests a full trace for this FSA.

**Creating a PSF FSS definition**: This example creates an FSS definition for a PSF functional subsystem (FSS) named PSFFSS. Your system programmer must also define an FSS named PSFFSS to JES.

```
pidu -c 'create psf-fss PSFFSS
tcpip-job-name = TCPIP ; '
```

**Creating a PSF FSA definition**: This example creates an FSA definition for a PSF functional subsystem application (FSA) named PRT3. Your system programmer must also define an FSA named PRT3 to JES.

```
pidu -c 'create fsa PRT3
    fsa-type = psf-tcpip
    form-definition = A10110
    location = "Bldg 3"
    operator-security-profile = "DENVER.001"
    page-definition = A08682
    printer-ip-address = 9.99.12.33 ; '
```

The attributes set in this printer definition are:

- **fsa-type**: This attribute tells the ISPF panels to display this definition as a PSF FSA definition for a TCP/IP-connected printer.
- **form-definition**: This attribute names the default form definition for the printer.
- **location**: This attribute describes the location of the printer.
- **operator-security-profile**: This attribute controls who can work with this printer using Infoprint Central.
- **page-definition**: This attribute names the default page definition for the printer.
- **printer-ip-address**: This attribute identifies the IP address of the target printer.

**Creating a job selection rule**: This example creates a job selection rule named Class-N. IP PrintWay extended mode uses the job selection rules to determine which print jobs to select from the JES spool for printing. You must create at least one job selection rule for IP PrintWay to select print jobs. You can create as many job selection rules as you need. The attributes of the print job must match all of the values in a rule to be selected.

```
pidu -c 'create job-selection-rule Class-N
    job-selection-status = enabled
    output-class-list = \{N\}
    description = "Select overnight print jobs in Class N" ; '
```

The attributes set in this job selection rule are:

- **job-selection-status**: This attribute specifies that IP PrintWay uses the job selection rule to determine which print jobs to select from the JES spool for printing.
- **output-class-list**: This attribute specifies that IP PrintWay selects only print jobs in the specified JES output class.
- **description**: This attribute describes the job selection rule.
delete—delete an object

Format
delete objectclass name ;

Description
The delete command deletes an object from the Printer Inventory.

You cannot delete the system configuration definition in the configuration class. The system configuration definition is a required object.

Operands

objectclass
The class of the object that you want to delete. For a list of the object classes, see Table 41 on page 259.

You cannot specify the configuration class.

name
The name of the object. Names are case-sensitive, so be sure to use the correct uppercase and lowercase letters. Enclose the name in single or double quotation marks if the name contains special characters.

Usage notes

- You cannot delete a component that is included in one or more printer definitions. You must first modify the printer definitions to remove the component names. You can use the PIDU list command to list all printer definitions that include a component and the PIDU modify command to modify the printer definitions.

- If you delete a printer definition that is listed in a printer pool definition, that printer definition is removed from the list of printers in the printer pool definition.

Examples -- delete

Deleting a component: This example deletes the NetSpool Options component named binary. This example also shows the list command that you should use before you delete the component to make sure that no printer definitions include that component.

```
pidu -c 'list printer where include-netspool-options=binary ;'
```

```
pidu -c 'delete netspool-options binary ;'
```

Deleting an FSA definition: This example deletes the FSA definition named FSA1:

```
pidu -c 'delete fsa FSA1 ;'
```

display—show attributes of an object

Format
display objectclass name ;

Description
The display command lists the attributes for an object in the Printer Inventory. This command writes the attributes to stdout. The attributes are displayed in the format required by the create command.
Operands

objectclass The class of the object to display. For a list of the object classes, see Table 41 on page 259.

name The name of the object. Names are case-sensitive, so be sure to use the correct uppercase and lowercase letters. Enclose the name in single or double quotation marks if the name contains special characters.

Tip: To display the system configuration definition, specify aopd.conf as the name.

Usage notes

- The display command does not list attributes that are specified in any components that are included in a printer definition. If a printer definition includes components, use the display-fully command.
- The display command might not list attributes that you have set to default values. This is because, to save space in the Printer Inventory, the Infoprint Server ISPF panels do not generally store attributes with default values.

Examples -- display

Displaying a printer definition: This example displays attributes for the lp1 printer definition. It does not display attributes for the components that are included in the lp1 printer definition.

    pidu -c 'display printer lp1 ;'

Displaying an FSA definition: This example displays attributes for the FSA1 FSA definition:

    pidu -c 'display fsa FSA1 ;'

Displaying the system configuration definition: This example displays attributes in the aopd.conf system configuration definition:

    pidu -c 'display configuration aopd.conf ;'

display-fully—show attributes of a printer definition plus included components

Format

display-fully printer name ;

Description

The display-fully command lists the attributes for a printer definition in the Printer Inventory plus the attributes of any components that the printer definition includes, such as an Allocation component or a Processing component. This command writes the attributes to stdout.

Operands

printer The class of the object that you want to display. The only valid object class is printer.

name The name of the printer definition. Names are case-sensitive, so be sure to use the correct uppercase and lowercase letters. Enclose the name in single or double quotation marks if the name contains special characters.
Usage notes

- If the same attribute is defined in a printer definition and a component, the value in the printer definition overrides the value in the component.
- The **display-fully** command might not list attributes that are set to default values. This is because, to save space in the Printer Inventory, the Infoprint Server ISPF panels do not generally store attributes with default values.

Examples -- **display-fully**

Displaying all attributes for a printer definition and its components: This example displays all attributes for the **lp1** printer definition. It also displays all attributes for the components that are included in the **lp1** printer definition.

```
pidu -c 'display-fully printer lp1 ;'
```

dump—dump the Printer Inventory to a file

**Format**

dump  *filename* ;

**Description**

The **dump** command writes the contents of the Printer Inventory to the named file. Your IBM service representative might ask you to use the **dump** command to assist IBM in diagnosing problems in the Printer Inventory.

**Operands**

*filename*

The name of the output file, which can be a UNIX file or an MVS data set. The output file does not need to exist. However, if the file already exists, the contents are overwritten.

If the data set is an MVS data set, specify \ before the file name. If you specify a fully-qualified data set name, also enclose the data set name in single quotation marks and specify a backslash before each single quotation mark. For example, if the output file is named **USERID.MYFILE**, enter:

```
//'

If you want your TSO user ID prefixed to the data set name, specify:

```
//MYFILE
```

**Usage notes**

- If you allocate an MVS data set for the output file, IBM suggests that you use **RECFM=VB** and **LRECL=8192**. However, other values might be suitable as well.
- To write the contents of the Printer Inventory to a file in a more readable format, or to back up the Printer Inventory, use the **export** command.

**Examples -- dump**

This example writes the contents of the Printer Inventory to file named **inventory.dump**:

```
pidu -c 'dump inventory.dump ;'
```

This example writes the contents of the Printer Inventory to an MVS data set named **USER1.INVENT.DUMP**:

```
pidu -c "dump //\'USER1.INVENT.DUMP\' ;"
```
export—export objects to a file

Format

export filename [objectclass [where condition [and|or condition]... ] ];

Description

The export command can export all objects that an administrator can create in the Printer Inventory. If dynamic configuration is enabled, it also exports the system configuration definition. The export command can also export only selected objects that meet the conditions specified on the command. The export command does not export print job information that is stored in the Printer Inventory.

You can use the export command to back up or create a copy of the Printer Inventory. You can use the statements in the output file as input to the PIDU program to restore the Printer Inventory or to create the Printer Inventory on another system.

The export command writes a create statement for each exported object to an output file. However, it creates a force-create statement for the system configuration definition because the create command is not valid for the system configuration definition.

The output file does not need to exist. If the file already exists, the file is replaced.

Tip: Use the export command to back up the Printer Inventory while Infoprint Server is running. Do not use ordinary copy commands to create a backup copy while Infoprint Server is running because the copy might contain inconsistent data. For more information about how to schedule regular backups of the Printer Inventory and how to restore the Printer Inventory, see z/OS Infoprint Server Customization.

Operands

filename The name of the output file, which can be a UNIX file or an MVS data set.

If the data set is an MVS data set, specify // before the file name. If you specify a fully-qualified data set name, also enclose the data set name in single quotation marks and specify a backslash before each single quotation mark. For example, if the output data set is named USERID.MYFILE, enter:

```
//
```

If you want your TSO user ID prefixed to the data set name, specify:

```
//MYFILE
```

objectclass The class of the objects that you want to export. For a list of the object classes, see Table 41 on page 259. If you omit this operand, all objects are exported.

where condition [and|or condition]...

One or more conditions, which can limit the objects that are exported. Only objects that are in the specified object class and that meet the conditions are exported. If you omit the where predicate, all objects in the specified object class are exported.
For information about how to specify conditions, see “Where predicate” on page 260.

Usage notes

- If you allocate an MVS data set for the output file, IBM suggests that you use RECFM=VB and LRECL=8192. However, other values might be suitable as well.
- The export command might not export attributes that you have set to default values. This is because, to save space in the Printer Inventory, the Infoprint Server ISPF panels do not generally store attributes with default values.

Examples -- export

Exporting all objects in the Printer Inventory:

- This example exports all objects in the Printer Inventory to UNIX file inventory.export:
  
  pidu -c 'export inventory.export ;'

- This example exports all objects in the Printer Inventory to MVS data set USER1.INVENT.EXPORT:
  
  pidu -c "export //"USER1.INVENT.EXPORT" ;"

Exporting all or selected printer definitions:

- This example exports all printer definitions in the Printer Inventory to UNIX file printers.export:
  
  pidu -c 'export printers.export printer ;'

- This example exports all printer definitions that contain attribute output-class = K, either in the printer definition or in an included component, to file classk.export:
  
  pidu -c 'export classk.export printer where output-class=K ;'

Exporting selected FSA definitions: This example exports selected FSA definitions in the Printer Inventory to UNIX file psfsa.export. The where predicate specifies that only FSA definitions used by PSF be exported.

pidu -c 'export psfsa.export fsa
  where fsa-type=psf-tcpip or fsa-type=psf-channel or fsa-type=psf-sna
  or fsa-type=afp-download-plus ;'

Exporting the system configuration definition: This example exports the system configuration definition in the Printer Inventory to UNIX file configuration.export.

pidu -c 'export configuration.export configuration ;'

list—list names of objects

Format

list objectclass [where condition [and|or condition]... ] ;

Description

The list command lists the names of all objects in a specified object class or only objects that meet certain criteria.

Operands

objectclass The class of the objects that you want to list. For a list of the object classes, see Table 41 on page 259

where condition [and|or condition...] Conditions that can limit the objects that are listed. Only objects
that meet the conditions are listed. If you omit the where predicate, all objects in the specified object class are listed.

For information about how to specify a condition, see "Where predicate" on page 260.

Usage notes
You can use the list command in combination with the modify command to list all or selected objects in an object class and then modify one or more attributes. For an example, see "Listing and modifying printer definitions" on page 282.

Examples -- list

Listing printer definitions:
- This example lists all IP PrintWay printer definitions:
  pidu -c 'list printer where printer-type=ip-printway ; '
- This example lists all PSF printer definitions:
  pidu -c 'list printer where printer-type=psf-mvs ; '
- This example lists printer definitions that include the Protocol component named lpr_options:
  pidu -c 'list printer where include-protocol=lpr_options ; '
- This example lists printer definitions that specify an LU name in the luname attribute. That is, the value of the luname attribute is not a null value.
  pidu -c 'list printer where not luname=null ; '
- This example lists IP PrintWay printer definitions that do not include a Protocol component. That is, the value of the include-protocol attribute is a null value.
  pidu -c 'list printer where printer-type=ip-printway and include-protocol=null;' 
- This example lists printer definitions whose names start with prt:
  pidu -c 'list printer where name match "^prt" ; '
- This example lists printer definitions that contain attribute output-class=K either in the printer definition or in an included component:
  pidu -c 'list printer where output-class=K ; '
- This example lists printer definitions that have a printer type of ip-printway and also have either output class X or Y. The parentheses cause the or expression to be evaluated first.
  pidu -c 'list printer where printer-type=ip-printway and (output-class = X or output-class = Y) ; '

Listing printer pool definitions: This example lists all printer pool definitions in the Printer Inventory:
  pidu -c 'list printer-pool ; '

Listing components: This example lists all components in the Printer Inventory:
  pidu -c 'list allocation ; list netspool-eof-rules ; list netspool-options ; '
  pidu -c 'list printway-options ; list processing ; list protocol ; '

Listing FSS definitions:
- This example lists all IP PrintWay FSS definitions:
  pidu -c 'list printway-fss ; '
- This example lists all PSF FSS definitions:
  pidu -c 'list psf-fss ; '
Listing FSA definitions:

- This example lists all FSA definitions in the Printer Inventory:
  `pidu -c 'list fsa ; '`
- This example lists all IP PrintWay FSA definitions:
  `pidu -c 'list fsa where fsa-type=ip-printway ; '`
- This example lists all PSF FSA definitions:
  `pidu -c 'list fsa where fsa-type=psf-channel or fsa-type=psf-sna or fsa-type=psf-tcpip or fsa-type=afp-download-plus ; '`

modify—change attributes of an object

Format
modify objectclass name [attribute = value]... ;

Description
The modify command modifies attributes for an object in the Printer Inventory. The object must already exist in the Printer Inventory.

Changes you make to attributes for a printer definition or component generally take effect for the next data set that NetSpool and Print Interface allocate on the JES spool and the next data set that IP PrintWay selects from the JES spool. Changes to NetSpool end-of-file rules or to the NetSpool LU class (attribute lu-classes), however, are related to the VTAM session and do not take effect for the next data set allocated on the JES spool. For information about when changes to these fields take effect, see “Specifying how NetSpool determines end-of-file” on page 116 and “Grouping NetSpool printer LUs into LU classes” on page 98.

Changes you make to a printer definition or component do not affect data sets that IP PrintWay has retained on the JES spool after successful or failed transmission.

Changes you make to attributes for an FSA definition take effect only when you restart the IP PrintWay or PSF FSA. Changes you make to attributes for an FSS definition take effect when you restart the FSS.

You can modify attributes in the system configuration definition only if dynamic configuration is enabled. With a few exceptions, the new and changed attributes in the system configuration definition take effect when you run the PIDU command. If you change certain attributes, however, you must stop and restart the daemons that use the attribute before the change can take effect.

Operands

objectclass The class of the object that you want to modify. For a list of the object classes, see Table 41 on page 259.

name The name of the object. Names are case-sensitive, so be sure to use the correct uppercase and lowercase letters. Enclose the name in single or double quotation marks if the name contains special characters.

Tip: To modify the system configuration definition, specify `aopd.conf` as the name.

attribute = value One or more attributes and values. Separate attributes with spaces. For the valid attributes for each object class, see “Attribute listing” on page 285.
modify

Usage notes

- To remove an attribute, type `null` as the value for the attribute. For a description of the `null` value, see "Default values" on page 284.
- If you modify an attribute in a component, the modified attribute applies to all printer definitions that include the component unless the attribute is also specified for the printer definition itself. In this case, the printer definition retains its attribute value.
- If you repeat the same attribute in a `modify` statement, the PIDU program uses the last specification.
- You can use the `list` command with the `modify` command to modify all or selected objects in an object class. For an example, see "Listing and modifying printer definitions."

Examples -- modify

Modifying an allocation component: This example modifies the Allocation component named printway. The modified attribute (output-class) applies to all printer definitions that include this component unless the output-class attribute is specified for the printer definition itself.

```
pidu -c 'modify allocation printway output-class=L ;'
```

Modifying a printer definition: This example changes the protocol used by IP PrintWay in the printer definition named lab_printer. (For the `create` statement for this printer definition, see "Creating an IP PrintWay printer definition for a PCL printer with IPP protocol" on page 267.)

```
pidu -c 'modify printer lab_printer
   protocol-type = lpr
   printer-uri = null
   printer-ip-address = printer2.boulder
   print-queue-name = TEXT ;'
```

The attributes modified in this printer definition are:

- `protocol-type`: The new protocol is the LPR protocol.
- `printer-uri`: This attribute is removed because the URI is not used for the LPR protocol.
- `printer-ip-address`: This attribute specifies the host name of the remote printer. It is required for the LPR protocol.
- `print-queue-name`: This attribute specifies the print queue name on the remote printer. It is required for the LPR protocol.

Modifying the system configuration definition: This example specifies the name of a log stream defined to the MVS system logger in the system configuration definition, which is named aoqd.conf:

```
pidu -c 'modify configuration aoqd.conf logstream-name = AOP.MSG ;'
```

Listing and modifying printer definitions: This example, entered as one command on the z/OS UNIX command line, lists selected printer definitions and changes an attribute in those printer definitions. This example uses these PIDU commands and the `awk` command:

1. The PIDU `list` command lists the names of all printer definitions with `output-class`=K.
2. These names are input to the `awk` program, which writes PIDU `modify` commands to modify the `output-class` attribute. For information about the `awk` program, see z/OS UNIX System Services Command Reference.
3. The output from the awk program is input to the pidu command:

```bash
pidu -qc "list printer where output-class = K ; " |
  awk '{ print "modify printer "$1 " output-class = \"B\";" }' |
  pidu
```

rename—rename an object

**Format**

rename objectclass name newname ;

**Description**

The `rename` command renames an object in the Printer Inventory.

If you rename a component, this command automatically renames the component in all printer definitions that include the component. If you rename a printer definition, this command automatically renames the printer definitions in all printer pool definitions that list the printer definition.

You cannot rename the system configuration definition in the `configuration` class.

**Operands**

- `objectclass` The class of the object that you want to rename. For a list of the object classes, see Table 41 on page 259. You cannot specify the `configuration` class.

- `name` The name of the object. Names are case-sensitive, so be sure to use the correct uppercase and lowercase letters. Enclose the name in single or double quotation marks if the name contains special characters.

- `newname` The new name to identify the object. This name must be a unique name for the class of object in the Printer Inventory.

  When you create a printer definition, printer-pool definition, job selection rule, or component, specify any combination of 1-17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . = /). Blank characters are not allowed. In an IP PrintWay printer definition, use name DFLTNTRY to designate the IP PrintWay default printer definition. The name is case-sensitive.

  When you create an FSS or FSA definition, this name must match the name used to define the FSA or FSS to JES. Specify a valid combination of 1-8 letters, numbers, and special characters (# $ @). The first character cannot be numeric. Lowercase letters are converted to uppercase.

  If the name contains special characters, enclose the name in single or double quotation marks.

**Example -- rename**

This example renames the printer definition named lab_printer to new name jim:

```bash
pidu -c 'rename printer lab_printer jim ;'
```
Attributes

**Attribute characteristics**

This section describes these characteristics of the attributes that you can specify in PIDU commands:
- Valid abbreviations for attribute names and values
- Default values for attributes
- Single-valued and multi-valued attributes
- Types of values: integers, strings, and fixed values

**Abbreviations**

The attributes listed in this section show attribute names and values in their complete form. Often, you can abbreviate attribute names and values by using the first letter of each word in the name or value. For example, you can use the abbreviation `d-f-s` for the `document-formats-supported` attribute. You can use `po` for the `postscript` value, and specify the attribute and value pair as `d-f-s={po}`.

Sometimes specifying only the first letter in each word is ambiguous. For example, `c` might stand for `class` or `copies`. Here, specify enough of the name so that it is unique, as in `cl` or `co`. If the values are ambiguous, the PIDU program rejects the command with an error message.

**Default values**

When you create an object and omit an attribute, no value is assigned to that attribute in the Printer Inventory. For attributes that have no value, Infoprint Server takes a default action, which is described in the heading “Default value”.

If you do specify a value for an attribute and later want to remove the attribute so that Infoprint Server does the default action, use the `modify` command and specify `null` as the attribute value.

For example, to remove the value for the `notify` attribute, you could specify:

```
notify = null
```

**Single-valued and multi-valued attributes**

Specify attributes in this format, with or without spaces on either side of the equal sign:

```
attribute=value
attribute = value
```

Attributes can be either single-valued or multi-valued.

**Single-valued attributes**: Single-valued attributes accept only one value. For single-valued attributes, the syntax is:

```
attribute = value
attribute = "value with spaces"
```

**Multi-valued attributes**: Multi-valued attributes accept one or more values separated with spaces and enclosed in braces. Multi-valued attributes can contain a list of values or a value-map.

- A list assigns one or more values to the attribute. The syntax is:
  ```
  attribute = (value1 value2 value3)
  ```
  For example: `printer-names={(printer1 printer2 printer3)`
- A value-map assigns one value to another. The syntax is:
Attributes

\[ \text{attribute} = \{\text{value1} \rightarrow \text{value2} \text{ value3} \rightarrow \text{value4}\} \]

For example: filters={pcl -> pcl2afp.dll pdf -> pdf2afp.dll}

Types of values

You can specify these types of values:

- Integer values
- String values
- Fixed values, also known as enumerated values

Integer values

Some attributes accept integer values. You can specify integer values in either decimal or hexadecimal format. Begin a hexadecimal value with 0 (zero) followed by the letter x. After the 0x, type any number (0-9) or a letter (A-F or a-f). Lowercase letters are equivalent to uppercase letters. The display command always displays the decimal equivalent of hexadecimal values.

For example, these integer values are equivalent:

dump-code = 0x09600c00
dump-code = 157289480

String values

Some attributes accept a string of printable characters. Enclose a string value in double or single quotation marks if it includes blanks or special characters (such as #, (,), or $). For example:

description = "My printer"

Most string values are stored in the Printer Inventory with the same uppercase and lowercase letters that you type when you specify the value. However, in some cases, lowercase letters are converted to uppercase letters. For example, the value you enter for the output-class attribute is converted to uppercase because JES accepts only uppercase letters for the JES output class.

Fixed values (enumerated values)

Some attributes accept one or more keywords as values. These keywords are called fixed values. The pidu command calls these values enumerated values. Fixed values are case-sensitive. Always use lowercase characters when typing fixed values. For example, you can specify these fixed values for the printer-type attribute:

printer-type=ip-printway
printer-type=psf-mvs
printer-type=general

Attribute listing

This section describes the attributes that you can use when you create or modify objects in the Printer Inventory. The attributes for each object class are listed alphabetically in the section for that object class. Table 43 summarizes the object classes and where you can find the list of valid attributes for that object class.

Table 43. Object classes

<table>
<thead>
<tr>
<th>Object class</th>
<th>See page</th>
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<tbody>
<tr>
<td>allocation</td>
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<tr>
<td>configuration</td>
<td>324</td>
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<tr>
<td>fsa</td>
<td>339</td>
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<td>job-selection-rule</td>
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### Attributes

Table 43. Object classes (continued)

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<td>printway-fss</td>
<td>387</td>
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<tr>
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Table 44 lists the attributes in alphabetical order. It shows what object classes each attribute applies to and where to find information about the attribute.

Table 44. Attributes and valid object classes

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<th>Object class</th>
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### Attributes

**Table 44. Attributes and valid object classes (continued)**

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### Attributes

**Table 44. Attributes and valid object classes (continued)**

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### Attributes

**Table 44. Attributes and valid object classes (continued)**

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## Attributes

Table 44. Attributes and valid object classes (continued)

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### Attributes

*Table 44. Attributes and valid object classes (continued)*

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<tr>
<td></td>
<td>protocol</td>
<td>442</td>
</tr>
<tr>
<td>printer-management-mode</td>
<td>fsa</td>
<td>361</td>
</tr>
<tr>
<td>printer-names</td>
<td>printer-pool</td>
<td>387</td>
</tr>
<tr>
<td>printer-release-interval</td>
<td>fsa</td>
<td>362</td>
</tr>
<tr>
<td>printer-release-mode</td>
<td>fsa</td>
<td>362</td>
</tr>
<tr>
<td>printer-type</td>
<td>printer</td>
<td>384</td>
</tr>
<tr>
<td>printer-uri</td>
<td>printer</td>
<td>442</td>
</tr>
<tr>
<td></td>
<td>protocol</td>
<td>442</td>
</tr>
<tr>
<td>printway-bottom-margin</td>
<td>printer</td>
<td>419</td>
</tr>
<tr>
<td></td>
<td>processing</td>
<td>419</td>
</tr>
<tr>
<td>printway-formatting</td>
<td>printer</td>
<td>401</td>
</tr>
<tr>
<td></td>
<td>printway-options</td>
<td>401</td>
</tr>
<tr>
<td>printway-page-height</td>
<td>printer</td>
<td>419</td>
</tr>
<tr>
<td></td>
<td>processing</td>
<td>419</td>
</tr>
<tr>
<td>printway-pagination</td>
<td>printer</td>
<td>419</td>
</tr>
<tr>
<td></td>
<td>processing</td>
<td>419</td>
</tr>
<tr>
<td>printway-postscript</td>
<td>printer</td>
<td>402</td>
</tr>
<tr>
<td></td>
<td>printway-options</td>
<td>402</td>
</tr>
<tr>
<td>printway-sosi-mode</td>
<td>printer</td>
<td>420</td>
</tr>
<tr>
<td></td>
<td>processing</td>
<td>420</td>
</tr>
<tr>
<td>Attribute</td>
<td>Object class</td>
<td>See page</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>----------------</td>
<td>----------</td>
</tr>
<tr>
<td>printway-top-margin</td>
<td>printer</td>
<td>420</td>
</tr>
<tr>
<td></td>
<td>processing</td>
<td>420</td>
</tr>
<tr>
<td>process-mode</td>
<td>allocation</td>
<td>317</td>
</tr>
<tr>
<td></td>
<td>printer</td>
<td>317</td>
</tr>
<tr>
<td>protocol-type</td>
<td>printer</td>
<td>443</td>
</tr>
<tr>
<td></td>
<td>protocol</td>
<td>443</td>
</tr>
<tr>
<td>prune-double-byte-fonts</td>
<td>fsa</td>
<td>362</td>
</tr>
<tr>
<td>prune-single-byte-fonts</td>
<td>fsa</td>
<td>362</td>
</tr>
<tr>
<td>psf-send-default-character</td>
<td>fsa</td>
<td>362</td>
</tr>
<tr>
<td>recfm</td>
<td>netspool-options</td>
<td>379</td>
</tr>
<tr>
<td></td>
<td>printer</td>
<td>379</td>
</tr>
<tr>
<td>record-exit</td>
<td>printer</td>
<td>402</td>
</tr>
<tr>
<td></td>
<td>printway-options</td>
<td>402</td>
</tr>
<tr>
<td>recover-from-font-not-found</td>
<td>fsa</td>
<td>363</td>
</tr>
<tr>
<td>release-ds-when-repositioning</td>
<td>fsa</td>
<td>363</td>
</tr>
<tr>
<td>report-line-mode-conversion-paper-length-errors</td>
<td>fsa</td>
<td>363</td>
</tr>
<tr>
<td>resolution</td>
<td>allocation</td>
<td>318</td>
</tr>
<tr>
<td></td>
<td>fsa</td>
<td>363</td>
</tr>
<tr>
<td></td>
<td>printer</td>
<td>318</td>
</tr>
<tr>
<td>resource-directories</td>
<td>allocation</td>
<td>318</td>
</tr>
<tr>
<td></td>
<td>printer</td>
<td>318</td>
</tr>
<tr>
<td>resource-library</td>
<td>allocation</td>
<td>318</td>
</tr>
<tr>
<td></td>
<td>printer</td>
<td>318</td>
</tr>
<tr>
<td>response-timeout</td>
<td>fsa</td>
<td>364</td>
</tr>
<tr>
<td></td>
<td>printer</td>
<td>403</td>
</tr>
<tr>
<td></td>
<td>printway-options</td>
<td>403</td>
</tr>
<tr>
<td>restrict-printable-area</td>
<td>allocation</td>
<td>319</td>
</tr>
<tr>
<td></td>
<td>fsa</td>
<td>364</td>
</tr>
<tr>
<td></td>
<td>printer</td>
<td>319</td>
</tr>
<tr>
<td>resubmit-for-filtering</td>
<td>printer</td>
<td>421</td>
</tr>
<tr>
<td></td>
<td>processing</td>
<td>421</td>
</tr>
<tr>
<td>retained-fonts</td>
<td>fsa</td>
<td>364</td>
</tr>
<tr>
<td>retained-form-definitions</td>
<td>fsa</td>
<td>364</td>
</tr>
<tr>
<td>retained-object-containers</td>
<td>fsa</td>
<td>365</td>
</tr>
<tr>
<td>retained-page-definitions</td>
<td>fsa</td>
<td>365</td>
</tr>
<tr>
<td>retained-page-segments</td>
<td>fsa</td>
<td>365</td>
</tr>
<tr>
<td>retry-limit</td>
<td>printer</td>
<td>404</td>
</tr>
<tr>
<td></td>
<td>printway-options</td>
<td>404</td>
</tr>
</tbody>
</table>
### Attributes

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Object class</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>retry-time</td>
<td>printer</td>
<td>404</td>
</tr>
<tr>
<td></td>
<td>printway-options</td>
<td>404</td>
</tr>
<tr>
<td>room-text</td>
<td>allocation</td>
<td>319</td>
</tr>
<tr>
<td></td>
<td>printer</td>
<td>319</td>
</tr>
<tr>
<td>save-afp-statistics</td>
<td>allocation</td>
<td>320</td>
</tr>
<tr>
<td></td>
<td>printer</td>
<td>320</td>
</tr>
<tr>
<td>scs-automatic-page-orientation</td>
<td>printer</td>
<td>421</td>
</tr>
<tr>
<td></td>
<td>processing</td>
<td>421</td>
</tr>
<tr>
<td>scs-bottom-margin</td>
<td>printer</td>
<td>422</td>
</tr>
<tr>
<td></td>
<td>processing</td>
<td>422</td>
</tr>
<tr>
<td>scs-horizontal-tabs</td>
<td>printer</td>
<td>422</td>
</tr>
<tr>
<td></td>
<td>processing</td>
<td>422</td>
</tr>
<tr>
<td>scs-left-margin</td>
<td>printer</td>
<td>423</td>
</tr>
<tr>
<td></td>
<td>processing</td>
<td>423</td>
</tr>
<tr>
<td>scs-maximum-line-length</td>
<td>printer</td>
<td>423</td>
</tr>
<tr>
<td></td>
<td>processing</td>
<td>423</td>
</tr>
<tr>
<td>scs-maximum-page-length</td>
<td>printer</td>
<td>424</td>
</tr>
<tr>
<td></td>
<td>processing</td>
<td>424</td>
</tr>
<tr>
<td>scs-right-margin</td>
<td>printer</td>
<td>424</td>
</tr>
<tr>
<td></td>
<td>processing</td>
<td>424</td>
</tr>
<tr>
<td>scs-top-margin</td>
<td>printer</td>
<td>425</td>
</tr>
<tr>
<td></td>
<td>processing</td>
<td>425</td>
</tr>
<tr>
<td>scs-vertical-tabs</td>
<td>printer</td>
<td>425</td>
</tr>
<tr>
<td></td>
<td>processing</td>
<td>425</td>
</tr>
<tr>
<td>secure-transmission</td>
<td>fsa</td>
<td>366</td>
</tr>
<tr>
<td>select-work-from-hold-queue</td>
<td>configuration</td>
<td>337</td>
</tr>
<tr>
<td>send-messages-on-failure</td>
<td>fsa</td>
<td>366</td>
</tr>
<tr>
<td>send-messages-to-sysout</td>
<td>fsa</td>
<td>366</td>
</tr>
<tr>
<td>send-separator-pages</td>
<td>fsa</td>
<td>366</td>
</tr>
<tr>
<td>server-user-options</td>
<td>printer</td>
<td>443</td>
</tr>
<tr>
<td></td>
<td>protocol</td>
<td>443</td>
</tr>
<tr>
<td>set-3800-dataset-header-origin</td>
<td>fsa</td>
<td>367</td>
</tr>
<tr>
<td>set-3800-dataset-origin</td>
<td>fsa</td>
<td>367</td>
</tr>
<tr>
<td>set-3800-job-header-origin</td>
<td>fsa</td>
<td>367</td>
</tr>
<tr>
<td>set-3800-job-trailer-origin</td>
<td>fsa</td>
<td>367</td>
</tr>
<tr>
<td>set-3800-messages-origin</td>
<td>fsa</td>
<td>367</td>
</tr>
<tr>
<td>smf-recording</td>
<td>configuration</td>
<td>337</td>
</tr>
<tr>
<td>snmp-community</td>
<td>configuration</td>
<td>338</td>
</tr>
<tr>
<td>snmp-reporting</td>
<td>fsa</td>
<td>368</td>
</tr>
</tbody>
</table>
### Attributes

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Object class</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>successful-retention-period</td>
<td>printer</td>
<td>404</td>
</tr>
<tr>
<td>suppress-copy-marks</td>
<td>fsa</td>
<td>368</td>
</tr>
<tr>
<td>suppress-post-unix-filter-formatting</td>
<td>configuration</td>
<td>338</td>
</tr>
<tr>
<td>table-reference-characters</td>
<td>allocation</td>
<td>320</td>
</tr>
<tr>
<td></td>
<td>printer</td>
<td>320</td>
</tr>
<tr>
<td>tcpip-job-name</td>
<td>printway-fss</td>
<td>391</td>
</tr>
<tr>
<td></td>
<td>psf-fss</td>
<td>446</td>
</tr>
<tr>
<td>title-text</td>
<td>allocation</td>
<td>321</td>
</tr>
<tr>
<td></td>
<td>printer</td>
<td>321</td>
</tr>
<tr>
<td>trace-mode</td>
<td>fsa</td>
<td>368</td>
</tr>
<tr>
<td></td>
<td>printway-fss</td>
<td>391</td>
</tr>
<tr>
<td>trace-prompt</td>
<td>printway-fss</td>
<td>392</td>
</tr>
<tr>
<td></td>
<td>psf-fss</td>
<td>446</td>
</tr>
<tr>
<td>trace-table-size</td>
<td>fsa</td>
<td>369</td>
</tr>
<tr>
<td></td>
<td>printway-fss</td>
<td>392</td>
</tr>
<tr>
<td></td>
<td>psf-fss</td>
<td>447</td>
</tr>
<tr>
<td>trailer-transform-error-page</td>
<td>printer</td>
<td>426</td>
</tr>
<tr>
<td></td>
<td>processing</td>
<td>426</td>
</tr>
<tr>
<td>translate-document-header</td>
<td>printer</td>
<td>405</td>
</tr>
<tr>
<td></td>
<td>printway-options</td>
<td>405</td>
</tr>
<tr>
<td>translate-document-trailer</td>
<td>printer</td>
<td>405</td>
</tr>
<tr>
<td></td>
<td>printway-options</td>
<td>405</td>
</tr>
<tr>
<td>translation-dataset-qualifier</td>
<td>printer</td>
<td>426</td>
</tr>
<tr>
<td></td>
<td>processing</td>
<td>426</td>
</tr>
<tr>
<td>transmit-recovery-pages</td>
<td>fsa</td>
<td>369</td>
</tr>
<tr>
<td>transparent-data-character</td>
<td>printer</td>
<td>406</td>
</tr>
<tr>
<td></td>
<td>printway-options</td>
<td>406</td>
</tr>
<tr>
<td>unicode-enabled</td>
<td>psf-fss</td>
<td>447</td>
</tr>
<tr>
<td>universal-character-set</td>
<td>allocation</td>
<td>321</td>
</tr>
<tr>
<td></td>
<td>printer</td>
<td>321</td>
</tr>
<tr>
<td>upper-page-limit</td>
<td>job-selection-rule</td>
<td>375</td>
</tr>
<tr>
<td>upper-record-limit</td>
<td>job-selection-rule</td>
<td>375</td>
</tr>
<tr>
<td>use-line-mode-migration-linect</td>
<td>fsa</td>
<td>369</td>
</tr>
<tr>
<td>userdata</td>
<td>allocation</td>
<td>321</td>
</tr>
<tr>
<td></td>
<td>printer</td>
<td>321</td>
</tr>
<tr>
<td>vtam-checkpoint-pages</td>
<td>printer</td>
<td>444</td>
</tr>
<tr>
<td></td>
<td>protocol</td>
<td>444</td>
</tr>
<tr>
<td>vtam-send-as-transparent</td>
<td>protocol</td>
<td>444</td>
</tr>
</tbody>
</table>
### Attributes for the allocation object class

This section lists the attributes that are valid when you create Allocation components, which are in object class `allocation`. These attributes are also valid for the `printer` object class.

#### Required attributes

No attributes are required. However, if you plan to use Print Interface or NetSpool, you must specify the attributes that correspond to the JES work-selection criteria defined for the program (PSF or IP PrintWay) that you want to process the output data sets from the JES spool.

#### address-text

This multi-valued, list attribute specifies the address that is printed on the separator pages for a data set.

**ISPF field name:** Address

**Allowed values:** You can enter 1–4 values. Each value is a combination of 1–60 letters (a–z, A–Z), numbers (0–9), blanks, and special characters (such as: @ $ #, * - /). If a value contains blanks or special characters, enclose it in double quotation marks. If you specify more than one value, separate the values with spaces and enclose the list of values in braces. For example:

```
address-text={"6300 Diagonal Hwy," "Boulder, CO" 80301}
```

This example uses three values, corresponding to three address lines.

**Default value:** None.

**Usage guidelines:**

- Whether the text specified by this attribute is printed depends on how the system administrator configures the separator sheet.
- IP PrintWay sends this attribute to the remote printer if the value of the `lpr-mode` attribute is `to-remote-psf`.
- This attribute is equivalent to the ADDRESS parameter of the OUTPUT JCL statement.

####AFP-parameters

This single-valued attribute specifies the name of a data set that contains AFP Download Plus parameters. If the data set is a partitioned data set, also specify the name of the member that contains the parameters, as shown in the example.
allocation and printer

**ISPF field name:** AFP parameters

**Allowed values:** A valid data set name, with an optional member name. For example:

`USER.AFPPARMS`

`USER.PDS(AFPPARMS)`

**Default value:** None.

**Usage guidelines:**
- The data set must exist and be cataloged.
- This attribute is equivalent to the AFPPARMS parameter of the OUTPUT JCL statement.
- For more information about AFP Download Plus, see [PSF for z/OS: AFP Download Plus](#).

**building-text**

This **single-valued** attribute specifies the building location that is printed on the separator pages for a data set.

**ISPF field name:** Building

**Allowed values:** You can enter a combination of 1–60 letters (a–z, A–Z), numbers (0–9), blanks, and special characters (such as: @ $ #,*-/ ). If the value contains blanks or special characters, enclose it in double quotation marks. For example: `building-text="Building 003"`  

**Default value:** No default value.

**Usage guidelines:**
- Whether the text specified by this attribute is printed depends on how the system administrator configures the separator sheet.
- IP PrintWay sends this attribute to the remote printer if the value of the `lpr-mode` attribute is `to-remote-psf`.
- This attribute is equivalent to the BUILDING parameter of the OUTPUT JCL statement.

**burster-trimmer-stacker**

This **single-valued** attribute indicates whether forms printed on a printer equipped with a burster-trimmer-stacker are left in continuous fanfold or are separated, trimmed, and stacked in single sheets.

**ISPF field name:** BURST

**Allowed values:** You can enter one of these fixed values:

- `yes` The forms are burst, trimmed, and stacked.
- `no` The forms are left in continuous fanfold.

**Default value:** The installation default determines if the forms are burst, trimmed, and stacked.

**Usage guidelines:**
- This attribute does not apply to IP PrintWay printer definitions.
This attribute is equivalent to the BURST parameter of the OUTPUT and DD JCL statements.

chars
This multi-valued, list attribute specifies the names of the coded fonts that are used to print a data set on a printer.

ISPF field name: Character sets

Allowed values: You can enter 1–4 coded font names. Each name is a combination of 1–4 letters (a–z, A–Z), numbers (0–9), and special characters (# $ @). Blanks and other special characters are not allowed. If a value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

For valid coded font names, see z/OS Migration from z/OS V1R10 and z/OS V1R11 to z/OS V2R1. Omit the X0 or XZ prefix from the coded font name.

If you specify more than one value, separate the values with spaces and enclose the list of values in braces. For example:
chars={60DB 60D8}

Default value: The font specified in the page definition is used. If the page definition does not specify a font:
• The transforms use the default font in the transform configuration file. If no font is specified, the transforms use font X060D9.
• PSF uses its default font.

Usage guidelines:
• This attribute applies to documents printed on an AFP printer.
• Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
• Some coded fonts have 6-character names, not counting the prefix. For the 4-character alternate coded font name, see IBM AFP Fonts: Font Summary for AFP Font Collection.
• PSF and the transforms use this attribute only if the page definition used to print the job does not specify fonts. If you specify fonts with this attribute and the page definition also specifies fonts, PSF and the transforms use the fonts that are named in the page definition. PSF, however, uses the font in this attribute if the default page definition is used.
• If you specify more than one coded font with the chars attribute, the job must contain either shift-out-shift-in (SOSI) codes or table reference characters (TRCs) to use coded fonts other than the first one. IBM suggests that you do not mix SOSI codes and TRCs.
  − If the job contains TRCs, you must specify the table-reference-characters attribute value as true. PSF and the transforms use the TRC characters to select the corresponding coded font specified with the chars attribute.
  − If the job contains SOSI codes, PSF and the transforms use the first coded font specified with the chars attribute as the single-byte font and the second coded font as the double-byte font.

For more information about using multiple coded fonts, see AFP: Programming Guide and Line Data Reference and PSF for z/OS: User’s Guide.
allocation and printer

- IP PrintWay sends this attribute to the remote printer if the value of the `lpr-mode` attribute is `to-remote-psf`.
- This attribute is equivalent to the CHARS parameter of the OUTPUT and DD JCL statements.

**checkpoint-pages**
This single-valued attribute specifies the number of pages you want between checkpoints that PSF takes while processing a data set.

- **ISPF field name:** Checkpoint pages
- **Allowed values:** You can enter an integer from 1 to 32767.
- **Default value:** JES uses your system default. If no system default exists, PSF does not record checkpoints.
- **Usage guidelines:**
  - If you specify a value for this attribute and for `checkpoint-seconds`, JES determines which value to use.
  - This attribute does not apply to IP PrintWay printer definitions.
  - This attribute is equivalent to the CKPTPAGE parameter of the OUTPUT JCL statement.

**checkpoint-seconds**
This single-valued attribute specifies the number of seconds you want between checkpoints that PSF takes while processing a data set.

- **ISPF field name:** Checkpoint seconds
- **Allowed values:** You can enter an integer from 1 to 32767.
- **Default value:** JES uses your system default. If no system default exists, PSF does not record checkpoints.
- **Usage guidelines:**
  - If you specify a value for this attribute and for `checkpoint-pages`, JES determines which value to use.
  - This attribute does not apply to IP PrintWay printer definitions.
  - This attribute is equivalent to the CKPTSEC parameter of the OUTPUT JCL statement.

**color-map**
This single-valued attribute specifies the name of the object container for the color mapping table resource that PSF uses to print a data set containing color translation information. This attribute is only used when sending output to a printer that supports color mapping table resources.

- **ISPF field name:** Color map
- **Allowed values:** You can enter a combination of 1–8 letters (a–z, A–Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.
Default value: If a color map is not specified for the data set or for the printer, PSF uses an internal color mapping table.

Usage guidelines:
- This attribute does not apply to IP PrintWay printer definitions.
- This attribute is equivalent to the COLORMAP parameter of the OUTPUT JCL statement.
- Use a prefix of M1 for color mapping table resources.

**com-setup-member**
This single-valued attribute specifies the name of the object container for the microfilm setup resource that PSF uses to print data on a microfilm device. This attribute is only used when sending output to a microfilm device.

**ISPF field name:** Com setup member

**Allowed values:** You can enter a combination of 1–8 letters (a–z, A–Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks.

Default value: No default value.

Usage guidelines:
- Use a prefix of H1 for microfilm setup resources.
- This attribute does not apply to IP PrintWay printer definitions.
- This attribute is equivalent to the COMSETUP parameter of the OUTPUT JCL statement.

**copies**
This single-valued attribute specifies the number of collated copies you want to print.

**ISPF field name:** Copies

**Allowed values:** You can enter an integer from 1 to 32640.

Default value: 1

Usage guidelines:
- This attribute does not apply to the email protocol. Only one copy is sent.
- If you run IP PrintWay basic mode, this attribute does not apply to the VTAM protocol. Only one copy prints.
- Some Internet Printing Protocol (IPP) printers do not support the copies IPP job attribute. In this case, only one copy prints.
- PSF sends the entire document to the printer the specified number of times.
- PSF ignores this attribute if you specify one or more values for the copy-group attribute.
- This attribute is similar to the COPIES parameter of the OUTPUT and DD JCL statements.

**copy-group**
This multi-valued, list attribute specifies the number of copies of each page of the data set you want printed consecutively before the next page is printed. You can
allocation and printer

enter 1–8 copy groups. The data set is sent to the printer once for each copy group. The total number of copies equals the sum of the copy groups.

**ISPF field name:** Copy group

**Allowed values:** You can enter 1–8 integers, each from 1 to 255. If you specify more than one value, separate the values with spaces and enclose the list of values in braces.

**Example:**

```
copy-group={1 3 2}
```

When a data set containing three pages is printed:

- Copy group 1 prints one copy of each page.
- Copy group 2 prints three copies of each page.
- Copy group 3 prints two copies of each page.

**Default value:** No default values.

**Usage guidelines:**

- Each individual copy group or the sum of all copy groups cannot be greater than 255.
- When a copy group is specified, the copies attribute is ignored.
- This attribute does not apply to IP PrintWay printer definitions.
- This attribute is similar to the COPIES parameter of the OUTPUT and DD JCL statements.

---

department-text

This **single-valued** attribute specifies the department identifier that is printed on the separator pages for a data set.

**ISPF field name:** Department

**Allowed values:** You can enter a combination of 1–60 letters (a–z, A–Z), numbers (0–9), blanks, and special characters (such as: @ $ # * /). If the value contains blanks or special characters, enclose it in double quotation marks. For example:

```
department-text="Payroll Dept."
```

**Default value:** No default value.

**Usage guidelines:**

- Whether the text specified by this attribute is printed depends on how the system administrator configures the separator sheet.
- IP PrintWay sends this attribute to the remote printer if the value of the lpr-mode attribute is to-remote-psf.
- This attribute is equivalent to the DEPT parameter of the OUTPUT JCL statement.

---

description

This **single-valued** attribute describes the printer definition. This attribute is not required. However, the description can help users select a printer.

**ISPF field name:** Description
**allocation and printer**

**Allowed values:** You can enter a combination of 1–256 letters (a–z, A–Z), numbers (0–9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose it in double quotation marks. For example:

\[\text{description}="4019 \text{ LaserPrinter P539}\].

**Default value:** No default value.

**destination**

This **single-valued** attribute specifies a destination name for output data sets.

**ISPF field name:** DEST

**Allowed values:** You can enter a combination of 1–8 letters (a–z, A–Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

**Default value:** JES determines the value.

**Usage guidelines:**
- If you also specify the **jes-node** attribute, it becomes part of the DEST parameter for allocation: \[\text{DEST}=\text{jes-node}.\text{dest}\].
- When you specify **dcf-routing =yes**, IP PrintWay uses this value, if specified, for printer selection. For more information, see the **dcf-routing** attribute in "Attributes for the printer object class" on page 379.
- This attribute is equivalent to the DEST parameter of the OUTPUT JCL statement.

**duplex**

This **single-valued** attribute indicates whether printing is done on both sides of the sheet and if so, how.

**ISPF field name:** Duplex

**Allowed values:** You can enter one of these fixed values:

- **no** Prints on the front side of the paper only.
- **yes** Prints on both sides of the paper so the top edge of side 1 is the top edge of side 2.
- **tumble** Prints on both sides of the paper but tumbles the print so the top edge of side 1 is the bottom edge of side 2.

**Default value:** The value in the form definition or the internal copy group is used.

**Usage guidelines:**
- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- If IP PrintWay transmits the data set to a remote printer, the document is printed on both sides only if the line printer daemon (LPD) or the IPP server for the target printer supports duplex printing.
- IP PrintWay sends this attribute to the remote printer if **lpr-mode=to-remote-psf**.
allocation and printer

- This attribute is equivalent to the DUPLEX parameter of the OUTPUT JCL statement.

**error-disposition**
This single-valued attribute indicates the disposition of a data set when PSF terminates the data set because an error occurs during printing.

**ISPF field name:** Error disposition

**Allowed values:** You can enter one of these fixed values:
- **default** Take the standard PSF action.
- **hold** Hold the data set on the JES spool until it is released by the system operator.
- **quit** Release the data set to JES. JES handles the data set based on the value of the normal-output-disposition attribute.

**Default value:** default

**Usage guidelines:**
- This attribute does not apply to IP PrintWay printer definitions.
- This attribute is equivalent to the PRTERROR parameter of the OUTPUT JCL statement.

**flash-count**
This single-valued attribute specifies the number of copies on which the forms flash (specified by the flash-name attribute) is to be printed, beginning with the first copy printed. A forms flash is a 3800 printer hardware frame that prints a photographic negative on selected forms.

**ISPF field name:** FLASH count

**Allowed values:** You can enter an integer from 0 to 255.

**Default value:** 255

**Usage guidelines:** This attribute is similar to the FLASH parameter of the OUTPUT and DD JCL statements.

**flash-name**
This single-valued attribute specifies the name of the forms flash used to print a data set. A forms flash is a 3800 printer hardware frame that prints a photographic negative on selected forms. PSF ignores this attribute for all printers but the 3800 printer. The number specified by the flash-count attribute determines how many copies of the data set are printed with the forms flash.

**ISPF field name:** FLASH name

**Allowed values:** You can enter a combination of 1–4 letters (a–z, A–Z), numbers (0–9), and special characters (# $ @). Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

**Default value:** No default value.
**form-definition**
This **single-valued** attribute specifies the name of the form definition that defines how a data set is printed.

**ISPF field name:** Form definition

**Allowed values:** You can enter a combination of 1–8 letters (a–z, A–Z), numbers (0–9), and special characters (# $ @). Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

You can specify the form definition name with or without the F1 prefix. However, if the name of the form definition, without the F1 prefix, starts with F1, specify the full name. For example, F1F1USER.

**Default value:** PSF and the transforms use the first inline form definition. If none exists:
- PSF uses the installation-defined default form definition.
- The transforms use the default form definition in the transform configuration file, `aopxfd.conf`. If a default form definition is not specified in the file, the transforms use F1CP0110.

**Usage guidelines:**
- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- To correctly print documents that contain an inline form definition when using the AFP Printer Driver for Windows, do not specify a value for this attribute.
- If the job submitter specifies a form definition, it overrides the form definition in this attribute.
- IP PrintWay sends this attribute to the remote printer if the value of the `lpr-mode` attribute is `to-remote-psf`.
- This attribute is equivalent to the FORMDEF parameter of the OUTPUT JCL statement.

**forms**
This **single-valued** attribute specifies the name of the form on which data sets are printed.

**ISPF field name:** FORMS

**Allowed values:** You can enter a combination of 1–8 letters (a–z, A–Z), numbers (0–9), and special characters (# $ @). Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

**Default value:** JES determines the default value.

**Usage guidelines:**
- If the job submitter specifies a form name, it overrides the form name in this attribute.
allocation and printer

- When you specify `dcf-routing = yes`, IP PrintWay uses this value, if specified, for printer selection. For more information, see the `dcf-routing` attribute in “Attributes for the printer object class” on page 379.
- This attribute is equivalent to the FORMS parameter of the OUTPUT JCL statement.

forms-control-buffer
This single-valued attribute specifies the name of the forms control buffer (FCB) a printer uses to control the vertical format when printing a data set.

ISPF field name: FCB

Allowed values: You can enter a combination of 1–4 letters (a–z, A–Z), numbers (0–9), and special characters (# $ @). Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

Default value: JES determines the default value.

Usage guidelines:
- IP PrintWay basic mode: If this is an IP PrintWay printer definition, also specify `printway-formatting=use-fcb` so that IP PrintWay basic mode uses the forms control buffer.
- This attribute is equivalent to the FCB parameter of the OUTPUT and DD JCL statements.

group-identifier
This single-valued attribute specifies the name that JES assigns to the output group for the data set. JES always assigns each data set that NetSpool and Print Interface allocate on the JES spool to a separate JES output group even though you specify a name in this attribute.

ISPF field name: GROUPID

Allowed values: You can enter a combination of 1–8 letters (a–z, A–Z) or numbers (0–9). Blanks and special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

Default value: No default value.

Usage guidelines: This attribute is equivalent to the GROUPID parameter of the OUTPUT JCL statement.

hold
This single-valued attribute indicates the disposition of output data sets that Print Interface or NetSpool allocates on the JES spool.

ISPF field name: HOLD

Allowed values: You can enter one of these fixed values:

- **yes or true**: Hold the data set until it is released by the system operator. Then print the data set and purge it.
- **no or false**: In JES2, use the value specified in the `normal-output-disposition` attribute. In JES3, print the data set and then purge it.
Default value: The JES default is no.

Usage guidelines: This attribute is equivalent to the HOLD parameter of the DD JCL statement.

**input-tray-number**

This single-valued attribute specifies a number that identifies the paper source used to print a data set. To determine the tray numbers that your printer supports, see its documentation.

ISPF field name: Input tray

Allowed values: You can enter an integer from 1 to 255.

Default value: The default is the number in the form definition or the printer's default paper source.

Usage guidelines:
- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- The transforms map this tray number to the tray number of the PCL or PostScript printer, using tray-mapping values specified in the transform configuration file, aopxfd.conf.
- IP PrintWay sends this attribute to the remote printer if the value of the lpr-mode attribute is to-remote-psf.
- The input tray that a job submitter specifies overrides this attribute.
- This attribute is equivalent to the INTRAY parameter of the OUTPUT JCL statement.

**jes-form-length**

This single-valued attribute indicates the paper length in inches or centimeters. This field is used to change the paper length of the physical paper at the printer without reconfiguring the printer. The value must contain at least one digit and an abbreviation for inches or centimeters.

ISPF field name: JES form length

Allowed values: You can enter a value in the format \(nn.mmmuu\):

- \(nn\): A number from 0 to 99. You must specify at least one digit to the left of the decimal point.
- \(mmm\): A number from 0 to 999. The decimal point and the digits after it are optional.
- \(uu\): One of these fixed values:
  - **in**: Inches
  - **cm**: Centimeters

Examples:

- jes-form-length=9.5in
- jes-form-length=12.345cm
- jes-form-length=2in
- jes-form-length=0.5cm
allocation and printer

**Default value:** JES uses the printer’s default paper length.

**Usage guidelines:** This attribute is equivalent to the FORMLEN parameter of the OUTPUT JCL statement.

### jes-maximum-line-count

This **single-valued** attribute specifies the maximum number of lines printed on each output page.

**ISPF field name:** LINECT

**Allowed values:** You can enter an integer from 0 to 255.

**Default value:** JES determines the default.

**Usage guidelines:** This attribute is equivalent to the LINCT parameter of the OUTPUT JCL statement.

### jes-node

This **single-valued** attribute specifies the name of the destination node to which JES sends the data sets. This node is used with the value of the **destination** attribute as part of the JCL DEST parameter: DEST=jesnode.dest.

**ISPF field name:** JES node

**Allowed values:** You can enter a combination of 1–8 letters (a–z, A–Z), numbers (0–9), and special characters (# $ @). Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

**Default value:** JES uses the node from which the job was submitted.

**Usage guidelines:** This attribute is similar to the DEST=nodename.name parameter of the OUTPUT JCL statement.

### jes-priority

This **single-valued** attribute specifies a number that determines the order in which a data set is placed in the print queue. A data set with a higher number has a higher priority and is printed sooner.

**ISPF field name:** PRTY

**Allowed values:** You can enter an integer from 0 to 255.

**Default value:** JES determines the default.

**Usage guidelines:**

- If the job submitter specifies a priority, it overrides the priority in this attribute.
- This attribute is equivalent to the PRTY parameter of the OUTPUT JCL statement.
- JES might override or ignore this attribute, depending on how JES is configured in your installation.

### jes-threshold

This **single-valued** attribute specifies a number that indicates the maximum size allowed for a data set to print it as one unit of work. The size is calculated as the
number of records in a data set multiplied by the number of copies requested. When this size exceeds the **jes-threshold** value, the data set is printed as two units of work.

**ISPF field name:** THRESHLD

**Allowed values:** You can enter an integer from 1 to 99999999.

**Default value:** JES uses the installation default specified at initialization.

**Usage guidelines:** This attribute is equivalent to the THRESHLD parameter of the OUTPUT JCL statement.

**jes-writer**

This **single-valued** attribute specifies the name of an external writer that processes the data sets. An external writer is an IBM- or installation-written program.

**ISPF field name:** WRITER

**Allowed values:** You can enter a combination of 1–8 letters (a–z, A–Z), numbers (0–9) and special characters (# $ @). Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

**Default value:** No default value.

**Usage guidelines:** This attribute is equivalent to the WRITER parameter of the OUTPUT JCL statement.

**label-data-pages**

This **single-valued** attribute indicates whether the security label is printed on each page of printed output. The security label represents a security level and categories defined to RACF. The security label is determined by the SECLABEL parameter of the JOB JCL statement.

**ISPF field name:** Label data pages

**Allowed values:** You can enter one of these fixed values:

- **yes** The security label determined by SECLABEL is printed.
- **no** The security label is not printed.

**Default value:** PSF sets the default based on whether PSFML is active.

**Usage guidelines:**
- This attribute does not apply to IP PrintWay printer definitions.
- This attribute is equivalent to the DPAGELBL parameter of the OUTPUT JCL statement.

**name**

This **single-valued** attribute specifies the name of the component.

**Note:** This is a **non-settable** attribute. Do not specify the name attribute on the PIDU **create**, **force-create**, or **modify** command. Instead, specify the name as an operand on the command. However, you can specify the name attribute when you construct a condition for the **where** predicate on the **list** and **export** commands.
allocation and printer

**ISPF field name:** Component Name

**Allowed values:** Any combination of 1–17 letters (a–z, A–Z), numbers (0–9), and special characters (such as $ @ . - /=). Blank characters are not allowed. If the value contains special characters, enclose it in double quotation marks.

**Default value:** None.

**name-text**

This single-valued attribute specifies the requestor name that is printed on the separator pages for a data set.

**ISPF field name:** Name

**Allowed values:** You can enter a combination of 1–60 letters (a–z, A–Z), numbers (0–9), blanks, and special characters (such as: @ $# , * /). If the value contains blanks or special characters, enclose it in double quotation marks. For example: `name-text="R. Roper"`

**Default value:** No default value.

**Usage guidelines:**
- Whether the text specified by this attribute is printed depends on how the system administrator configures the separator sheet.
- IP PrintWay sends this attribute to the remote printer if the value of the `lpr-mode` attribute is `to-remote-psf`.
- This attribute is equivalent to the NAME parameter of the OUTPUT JCL statement.

**normal-output-disposition**

This single-valued attribute indicates the normal output disposition of sysout data sets that Print Interface or NetSpool allocate on the JES spool.

**ISPF field name:** OUTDISP

**Allowed values:** You can enter one of these fixed values:
- **write** Print the data set, then purge it.
- **hold** Hold the data set until released, then print the data set and purge it.
- **keep** Print the data set, then hold it until it is released.
- **leave** Hold the data set until released, then print the data set and hold it until it is released.
- **purge** Delete the data set without printing (not suggested).

**Default value:** JES2 uses the installation default for normal disposition for the sysout class of the data set.

**Usage guidelines:**
- IP PrintWay ignores the `keep` and `leave` options. IP PrintWay always deletes data sets after printing them or sending them to an email destination unless the job submitter or printer definition specifies a retention period. See "failure-retention-period" on page 398 and "successful-retention-period" on page 404.
Do not select the purge option because JES deletes the data sets from the JES spool before they are printed.

This attribute is similar to the OUTDISP parameter of the OUTPUT JCL statement.

This attribute applies only to JES2. JES3 ignores it.

JES2 ignores this attribute if hold=yes.

notify
This multi-valued, list attribute specifies the user IDs you want notified when the print jobs are completed. The notification sent to the specified user IDs indicates whether the print job completed successfully.

**ISPFF field name:** NOTIFY... at node

**Allowed values:** You can enter 1–4 values in the format node.userid:

- **node** The node associated with the user ID. Specify from 1–8 alphanumeric or national ($, #, @) characters. Lowercase letters are converted to uppercase. If you do not specify a node, the node from which the job was submitted is used.

- **userid** The user ID. Specify from 1–8 alphanumeric or national ($, #, @) characters. The first character must be alphabetic or national. Lowercase letters are converted to uppercase.

If you specify more than one value, separate the values with spaces and enclose the list of values in braces. For example:

```
notify={boulder.martha charlie}
```

**Default value:** If you do not specify at least one user ID, no notification is sent. If you specify a user ID without a node, the node from which the job was submitted is used.

**Usage guidelines:**
- This attribute is equivalent to the NOTIFY parameter of the OUTPUT JCL statement.

output-bin-number
This single-valued attribute identifies the output bin a printer uses. To determine the bin numbers that your printer supports, see its documentation.

**ISPFF field name:** Output bin

**Allowed values:** You can enter an integer from 1 to 65535.

**Default value:** The default is the output bin number in the form definition or the printer’s default output bin.

**Usage guidelines:**
- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- IP PrintWay sends this attribute to the remote printer if the value of the lpr-mode attribute is to-remote-psf.
- The output bin that a job submitter specifies overrides this attribute.
allocation and printer

- This attribute is equivalent to the OUTBIN parameter of the OUTPUT JCL statement.

output-class
This single-valued attribute specifies a JES output class for output data sets.

ISPF field name: CLASS

Allowed values: You can enter a letter (a–z, A–Z) or number (0–9). Special characters are not allowed. Lowercase letters are converted to uppercase.

Default value: JES determines the default value.

Usage guidelines:
- When you specify dcf-routing = yes, IP PrintWay uses this value, if specified, for printer selection. For more information, see the dcf-routing attribute in “Attributes for the printer object class” on page 379.
- This attribute is equivalent to the CLASS parameter of the OUTPUT JCL statement.

overlay-back
This single-valued attribute specifies the name of the predefined data (lines, shading, text, boxes, or logos) that PSF and the transforms print on the back side of a page when the data set is duplexed.

ISPF field name: Overlay back

Allowed values: You can enter a combination of 1–8 letters (a–z, A–Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

Default value: No default value.

Usage guidelines:
- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- IP PrintWay sends this attribute to the remote printer if the value of the lpr-mode attribute is to-remote-psf.
- This overlay prints in addition to any overlay that the form definition specifies.
- If the job submitter specifies a back overlay, it overrides this overlay.
- This attribute is equivalent to the OVERLAYB parameter of the OUTPUT JCL statement.
- Use a prefix of O1 for overlay resources.

overlay-front
This single-valued attribute specifies the name of the predefined data (lines, shading, text, boxes, or logos) that PSF and transforms print on the front side of a page.

ISPF field name: Overlay front
**Allowed values:** You can enter a combination of 1–8 letters (a–z, A–Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

**Default value:** No default value.

**Usage guidelines:**
- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- IP PrintWay sends this attribute to the remote printer if the value of the `lpr-mode` attribute is `to-remote-psf`.
- This overlay prints in addition to any overlay that the form definition specifies.
- If the job submitter specifies a front overlay, it overrides this overlay.
- This attribute is equivalent to the OVERLAYF parameter of the OUTPUT JCL statement.
- Use a prefix of O1 for overlay resources.

**page-definition**

This single-valued attribute specifies the name of the page definition that defines how a data set is printed.

**ISPF field name:** Page definition

**Allowed values:** You can enter a combination of 1–8 letters (a–z, A–Z), numbers (0–9), and special characters (# $ @). Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

You can specify the page definition name with or without the P1 prefix. However, if the name of the page definition, without the P1 prefix, starts with P1, specify the full name. For example, P1P1USER.

**Default value:** PSF and the transforms use the first inline page definition. If none exists:
- PSF uses the installation-defined default page definition.
- The transforms use the default page definition in the transform configuration file, `aopxfd.conf`. If a default page definition is not specified in the file, the transforms use P1P08682.

**Usage guidelines:**
- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- IP PrintWay sends this attribute to the remote printer if the value of the `lpr-mode` attribute is `to-remote-psf`.
- If the job submitter specifies a page definition, it overrides the page definition in this attribute.
- This attribute is equivalent to the PAGEDEF parameter of the OUTPUT JCL statement.
print-error-messages
This single-valued attribute indicates whether all message groups generated in the processing of a data set are printed or saved in a file:
• If PSF prints the data set on the z/OS system, the messages are printed at the end of the data set.
• If PSF sends the data set to an AFP Download Plus receiver to print on another system, PSF saves the messages in a file on the z/OS system.

ISPF field name:  Print error messages

Allowed values:  You can enter one of these fixed values:
yes  PSF prints or saves all error messages until an error occurs that ends processing.
no  PSF does not print or save error messages unless an error occurs that ends processing. If that happens, only the message group describing the last error is printed or saved.

Default value:  The default value for the PSF printer or for the AFP Download Plus sender.

Usage guidelines:
• This attribute does not apply to IP PrintWay printer definitions.
• This attribute is similar to the PIMSG parameter of the OUTPUT JCL statement.

print-error-messages-maximum
This single-valued attribute specifies the maximum number of message groups that PSF generates when the value of the print-error-messages attribute is yes. When the maximum number is reached, PSF stops processing the data set and deletes it from the JES spool.

ISPF field name:  Maximum messages

Allowed values:  You can enter an integer from 0 to 999. A value of 0 means the data set is processed until it completes or an error occurs that ends processing of the data set.

Default value:  16

Usage guidelines:
• This attribute does not apply to IP PrintWay printer definitions.
• This attribute is similar to the PIMSG parameter of the OUTPUT JCL statement.

print-error-reporting
This single-valued attribute indicates whether the printer reports character and position errors. Character errors are caused by trying to use a code point that is not assigned to a character in a font. Position errors are caused by trying to print outside the printable area.

ISPF field name:  Print error reporting

Allowed values:  You can enter one of these fixed values:
none  Do not report any character or position errors.
all  Report all character and position errors.
allocation and printer

character
Report only character errors.

position
Report only position errors.

Default value: none

Usage guidelines:
• If you enter all, character, or position, it must be one of the values of the
print-error-reporting-supported attribute of the Processing component of the
printer definition.
• Products that transform AFP documents can support this attribute. For
information, see the documentation for the transform.
• This attribute is similar to the DATACK parameter of the OUTPUT JCL
statement.

process-mode
This single-valued attribute specifies the processing mode for printing a data set.

ISPF field name: PRMODE

Allowed values: You can enter a combination of 1–8 letters (a–z, A–Z) or numbers
(0–9). Blanks and special characters are not allowed. These fixed values have
special meaning:

LINE The data set is scheduled to a line-mode printer.
PAGE The data set is scheduled to a page-mode printer.
SOSI1 In a line-mode data set containing both single-byte and
double-byte characters, PSF converts each shift-out, shift-in code to
a blank and a Set Coded Font Local text control.
SOSI2 In a line-mode data set containing both single-byte and
double-byte characters, PSF converts each shift-out, shift-in code to
a Set Coded Font Local text control.
SOSI3 In a line-mode data set containing both single-byte and
double-byte characters, PSF converts each shift-out code to a Set
Coded Font Local text control and two blanks. It converts each
shift-out code to a Set Coded Font Local text control.
SOSI4 When double-byte character set (DBCS) text is converted from
ASCII to EBCDIC, PSF skips each shift-out, shift-in code and does
not count the code when calculating offsets for the print data set.

Default value: JES determines the default.

Usage guidelines:
• This attribute applies to documents printed on an AFP printer.
• Products that transform AFP documents can support this attribute. For
information, see the documentation for the transform.
• IP PrintWay sends this attribute to the remote printer if the value of the
lpr-mode attribute is to-remote-psf.
• For the shift-out, shift-in process to work correctly, either the chars attribute or
the page definition used to print the job must specify two coded fonts. The first
must be a single-byte font, and the second must be a double-byte font.
• If the job submitter specifies a shift-in/shift-out value, it overrides this attribute.
• Do not mix SOSI codes and TRCs in the same job.
allocation and printer

- This attribute is equivalent to the PRMODE parameter of the OUTPUT JCL statement.

**resolution**
This single-valued attribute indicates the resolution at which the output was formatted. PSF uses this value to choose the correct resolution system library that has previously been defined by the system programmer.

**ISPF field name:** Resolution

**Allowed values:** You can enter one of these fixed values:
- **240** The data set was formatted with resources at 240 pels per inch.
- **300** The data set was formatted with resources at 300 pels per inch.

**Default value:** The system default library is used.

**Usage guidelines:** This attribute does not apply to IP PrintWay printer definitions.

**resource-directories**
This multi-valued, list attribute specifies the directories that contain TrueType and OpenType fonts that PSF uses to process data sets. PSF searches these directories before searching system-defined resource directories. PSF searches the directories in the order that you specify them.

**ISPF field name:** Resource directories

**Allowed values:** You can enter 1–8 valid directory names. Each directory name can be up to 255 characters. The first character must be a slash. If the value contains special characters other than slashes or periods, enclose it in double quotation marks.

If you specify more than one value, separate the values with spaces and enclose the list of values in braces. For example:

```
resource-directories={/u/myserid/truetype /u/myuserid/opentype}
```

**Default value:** PSF determines the resource directories.

**Usage guidelines:**
- If the job submitter specifies resource directories, those directories override this attribute.
- PSF V4R4 and earlier must be enabled for Unicode.
- This attribute is equivalent to the USERPATH parameter of the OUTPUT JCL statement.

**resource-library**
This multi-valued, list attribute specifies the names of user libraries that contain the AFP resources PSF and the AFP to PCL, AFP to PDF, or AFP to PostScript transform use to process data sets. The specified libraries are searched before any other resource libraries defined to PSF or to the transforms. The resources contained in the libraries include fonts, page segments, overlays, page definitions, and form definitions. For PSF to search the specified libraries for page definitions or form definitions, you or the job submitter must specify a value for the page-definition or form-definition attribute.
ISPF field name: Resource library

Allowed values: You can enter 1–8 valid library names. If the value contains special characters other than periods, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

If you specify more than one value, separate the values with spaces and enclose the list of values in braces. For example:
resource-library={font.library overlay.library}

Default value: None.

Usage guidelines:
- All resource libraries must exist and be cataloged.
- The job submitter must be authorized to read the libraries.
- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- IP PrintWay sends this attribute to the remote printer if the value of the lpr-mode attribute is to-remote-psf.
- If the job submitter specifies a user library, it overrides this attribute.
- This attribute is equivalent to the USERLIB parameter of the OUTPUT JCL statement.

restrict-printable-area
This single-valued attribute indicates whether an area on each page of printed output is reserved for the security label. When an area is reserved for a security label, the printed output is shifted on each page. You cannot print data in the reserved area.

ISPF field name: Restrict printable area

Allowed values: You can enter one of these fixed values:
- yes An area on each page is reserved for the security label.
- no An area is not reserved for the security label.

Default value: PSF sets the default based on whether PSFMPL is active.

Usage guidelines:
- This attribute does not apply to IP PrintWay printer definitions.
- This attribute is equivalent to the SYSAREA parameter of the OUTPUT JCL statement.

room-text
This single-valued attribute specifies the room name that is printed on the separator pages for a data set.

ISPF field name: Room

Allowed values: You can enter a combination of 1–60 letters (a–z, A–Z), numbers (0–9), blanks, and special characters (such as: @ $ # , * / ). If the value contains blanks or special characters, enclose it in double quotation marks.

Default value: No default value.
**Usage guidelines:**
- Whether the text specified by this attribute is printed depends on how the system administrator configures the separator sheet.
- IP PrintWay sends this attribute to the remote printer if the value of the `lpr-mode` attribute is `to-remote-psf`.
- This attribute is equivalent to the ROOM parameter of the OUTPUT JCL statement.

**save-afp-statistics**
This **single-valued** attribute indicates whether you want PSF to generate an AFP Statistics (AFPSTATS) report. An AFPSTATS report gives you detailed information about the data set, such as where resources were found and what significant events happened.

**ISPF field name:** Save AFP statistics

**Allowed values:** You can enter one of these fixed values:
- **yes** An AFPSTATS report is generated.
- **no** An AFPSTATS report is not generated.

**Default value:** An AFPSTATS report is not generated.

**Usage guidelines:**
- This attribute is equivalent to the AFPSTATS parameter of the OUTPUT JCL statement.

**table-reference-characters**
This **single-valued** attribute indicates whether data sets printed on this printer contain table-reference characters (TRCs). A TRC selects a font character set named by the `chars` attribute or the page definition used to print the job. A TRC is the first character of each line in the data set unless the first character is a carriage control character. In that case, the TRC is the second character.

**ISPF field name:** Table reference characters

**Allowed values:** You can enter one of these fixed values:
- **yes** or **true** Data sets contain TRCs.
- **no** or **false** Data sets do not contain TRCs.

**Default value:** no

**Usage guidelines:**
- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- If the value of this attribute is **yes** and the page definition does not specify fonts, you must specify fonts with the `chars` attribute.
- If the data set contains TRCs and the value of this attribute is **no**, your printed output will not be correct. PSF and the transforms will interpret the TRCs as text characters.
- Do not mix SOSI codes and TRCs in the same job.
allocation and printer

- IP PrintWay sends this attribute to the remote printer if the value of the lpr-mode attribute is to-remote-psf.
- This attribute is equivalent to the TRC parameter of the OUTPUT JCL statement.

title-text
This single-valued attribute specifies the description of the output that can be printed on the separator pages for a data set. IP PrintWay also sends it to the printer's LPD for printing on a separator page generated by the printer's LPD. It also is the subject of emails when the job submitter does not specify another title.

ISPF field name: TITLE

Allowed values: You can enter a combination of 1–60 letters (a–z, A–Z), numbers (0–9), blanks, and special characters (such as: @ $ # , * - /). If the value contains blanks or special characters, enclose it in double quotation marks. For example:

```
title-text="Annual Report"
```

Default value: No default value.

Usage guidelines:
- Whether the text specified by this attribute is printed depends on how the administrator configures the separator sheet or how the LPD is implemented.
- IP PrintWay sends this attribute to the remote printer if the value of the lpr-mode attribute is to-remote-psf.
- This attribute is equivalent to the TITLE parameter of the OUTPUT JCL statement.

universal-character-set
This single-valued attribute specifies a code for the universal character set (UCS) a printer uses to print data sets.

ISPF field name: UCS

Allowed values: You can enter a combination of 1–4 letters (a–z, A–Z), numbers (0–9), and special characters (# $ @). Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

Default value: JES determines the default.

Usage guidelines: This attribute is equivalent to the UCS parameter of the OUTPUT and DD JCL statements.

userdata
This multi-valued, list attribute specifies installation-defined information for the user.

ISPF field name: USERDATA

Allowed values: You can enter 1–16 values. Each value is a combination of 1–60 letters (a–z, A–Z), numbers (0–9), blanks, and special characters (such as: @ $ # , * - /). If a value contains blanks or special characters, enclose it in double quotation marks. If you specify more than one value, separate the values with spaces and enclose the list of values in braces. For example:

```
userdata={UserValue "LocalKey=Installation Data" "Installation Data"}
```
**Default value:** No default value.

**Usage guidelines:** This attribute is equivalent to the USERDATA parameter of the OUTPUT JCL statement.

**x-image-shift-back**
This single-valued attribute specifies a decimal number that indicates how much the logical page is shifted horizontally on the back side of each physical page.

**ISPF field name:** Image shift x-direction back

**Allowed values:** You can enter a number from 000.000 to 999.999, followed by the units. No blank spaces are allowed. These units are valid:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN</td>
<td>Inches</td>
</tr>
<tr>
<td>CM</td>
<td>Centimeters</td>
</tr>
<tr>
<td>MM</td>
<td>Millimeters (default unit)</td>
</tr>
<tr>
<td>PELS</td>
<td>Picture elements (1/240 inch)</td>
</tr>
<tr>
<td>POINTS</td>
<td>Points (1/72 inch)</td>
</tr>
</tbody>
</table>

For example, you can enter these values:

- `x-image-shift-back=25.4`
- `x-image-shift-back=2.54CM`
- `x-image-shift-back=11IN`
- `x-image-shift-back=240PELS`
- `x-image-shift-back=72POINTS`

**Default value:** The default is the number in the form definition. The default unit is millimeters.

**Usage guidelines:**
- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- IP PrintWay sends this attribute to the remote printer if the value of the `lpr-mode` attribute is `to-remote-psf`.
- The number that a job submitter specifies overrides this attribute.
- This attribute is similar to the OFFSETXB parameter of the OUTPUT JCL statement.

**x-image-shift-front**
This single-valued attribute specifies a decimal number that indicates how much the logical page is shifted horizontally on the front side of each physical page.

**ISPF field name:** Image shift x-direction front

**Allowed values:** You can enter a number from 000.000 to 999.999, followed by the unit. For information about allowed units, see "x-image-shift-back."

**Default value:** The default is the number in the form definition. The default unit is millimeters.
Usage guidelines:
- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- IP PrintWay sends this attribute to the remote printer if the value of the lpr-mode attribute is to-remote-psf.
- The number that a job submitter specifies overrides this attribute.
- This attribute is similar to the OFFSETXF parameter of the OUTPUT JCL statement.

**y-image-shift-back**
This single-valued attribute specifies a decimal number that indicates how much the logical page is shifted vertically on the back side of each physical page.

**ISPF field name:** Image shift y-direction back

**Allowed values:** You can enter a number from 000.000 to 999.999, followed by the unit. For information about allowed units, see “x-image-shift-back” on page 322

**Default value:** The default is the number in the form definition.

Usage guidelines:
- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- IP PrintWay sends this attribute to the remote printer if the value of the lpr-mode attribute is to-remote-psf.
- The number that a job submitter specifies overrides this attribute.
- This attribute is similar to the OFFSETYB parameter of the OUTPUT JCL statement.

**y-image-shift-front**
This single-valued attribute specifies a decimal number that indicates how much the logical page is shifted vertically on the front side of each physical page.

**ISPF field name:** Image shift y-direction front

**Allowed values:** You can enter a number from 000.000 to 999.999, followed by the unit. For information about allowed units, see “x-image-shift-back” on page 322

**Default value:** The default is the number in the form definition. The default unit is millimeters.

Usage guidelines:
- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- IP PrintWay sends this attribute to the remote printer if the value of the lpr-mode attribute is to-remote-psf.
- The number that a job submitter specifies overrides this attribute.
- This attribute is similar to the OFFSETYF parameter of the OUTPUT JCL statement.
Attributes for the configuration object class

This section lists the attributes that are valid in the system configuration definition, which is in object class configuration.

Infoprint Server automatically creates the system configuration definition in the configuration class. You cannot create or delete it. If dynamic configuration is enabled, you can use the PIDU modify command to modify attributes in the system configuration definition.

The name of the system configuration definition is always aopd.conf. You cannot rename it.

If you add or modify an attribute in the system configuration definition, with a few exceptions, the new value takes effect immediately or when Infoprint Server processes the next print job; you do not need to restart Infoprint Server. For information about whether you need to restart any Infoprint Server daemons, see the description of each attribute.

For information about how to enable dynamic configuration, see z/OS Infoprint Server Customization.

Required attributes

The configuration-version attribute is the only required attribute.

allow-all-characters-in-line-data

This single-valued attribute indicates whether Infoprint Server considers all characters in data, including unprintable characters, to be line data.

Note: For more information about this attribute, see z/OS Infoprint Server Customization.

ISPF field name: Allow all characters in line data

Allowed values: You can specify one of these fixed values:

yes Infoprint Server accepts all characters in data, including unprintable characters, as line data.

no If line data contains unprintable characters, Infoprint Server does not consider the data to be line data.

Default value: no

Usage guidelines:

• If a job submitter specifies the data format with the document-format attribute, Infoprint Server ignores this field.

• If you change this attribute, you do not need to restart Infoprint Server.

• This attribute does not apply to IP PrintWay basic mode.

aophinvd-max-thread-tasks

This single-valued attribute specifies the MAXTHREADTASKS limit for the Historical Inventory daemon, aophinvd. The MAXTHREADTASKS limit is the maximum number of MVS tasks that a single process (daemon) can have concurrently active.
configuration

Note: For more information about this attribute, see \textit{z/OS Infoprint Server Customization}.

**ISPF field name:** Other

**Allowed values:** A number from 0 to 65535.

**Default value:** 200

**Usage guidelines:** If you change this attribute, stop all Infoprint Server daemons and restart Infoprint Server.

**aopipppd-max-thread-tasks**

This \textit{single-valued} attribute specifies the \text{T}MAXTHREADTASKS limit for the Internet Printing Protocol (IPP) daemon, \textit{aopipppdxp}. The MAXTHREADTASKS limit is the maximum number of MVS tasks that a single process (daemon) can have concurrently active.

Note: For more information about this attribute, see \textit{z/OS Infoprint Server Customization}.

**ISPF field name:** Other

**Allowed values:** A number from 0 to 65535.

**Default value:** 200

**Usage guidelines:** If you change this attribute, stop \textit{aopipppdxp} and restart Infoprint Server.

**aoplpd-max-thread-tasks**

This \textit{single-valued} attribute specifies the \text{T}MAXTHREADTASKS limit for the Infoprint Server LPD, \textit{aoplpd}. The MAXTHREADTASKS limit is the maximum number of MVS tasks that a single process (daemon) can have concurrently active.

Note: For more information about this attribute, see \textit{z/OS Infoprint Server Customization}.

**ISPF field name:** Other

**Allowed values:** A number from 0 to 65535.

**Default value:** 200

**Usage guidelines:** If you change this attribute, stop \textit{aoplpd} and restart Infoprint Server.

**aopnetd-max-thread-tasks**

This \textit{single-valued} attribute specifies the \text{T}MAXTHREADTASKS limit for the NetSpool daemon, \textit{aopnetd}. The MAXTHREADTASKS limit is the maximum number of MVS tasks that a single process (daemon) can have concurrently active.

Note: For more information about this attribute, see \textit{z/OS Infoprint Server Customization}.

**ISPF field name:** Other
**aopoutd-max-thread-tasks**

This single-valued attribute specifies the MAXTHREADTASKS limit for the IP PrintWay extended mode daemon **aopoutd**. The MAXTHREADTASKS limit is the maximum number of MVS tasks that a single process (daemon) can have concurrently active.

**Note:** For more information about this attribute see [z/OS Infoprint Server Customization](#).

**Configuration**

Allowed values: A number from 0 to 65535.

Default value: 200

Usage guidelines: If you change this attribute, stop **aopnetd** and restart Infoprint Server.

**aopsdbd-max-thread-tasks**

This single-valued attribute specifies the MAXTHREADTASKS limit for the search database daemon, **aopsdbd**. The MAXTHREADTASKS limit is the maximum number of MVS tasks that a single process (daemon) can have concurrently active.

**Note:** For more information about this attribute see [z/OS Infoprint Server Customization](#).

**Configuration**

Allowed values: A number from 0 to 65535.

Default value: 200

Usage guidelines: If you change this attribute, stop all Infoprint Server daemons and restart Infoprint Server.

**aopsdbd-max-thread-tasks**

This single-valued attribute specifies the MAXTHREADTASKS limit for the Print Interface subsystem daemon, **aopsdbd**. The MAXTHREADTASKS limit is the maximum number of MVS tasks that a single process (daemon) can have concurrently active.

**Note:** For more information about this attribute see [z/OS Infoprint Server Customization](#).

**Configuration**

Allowed values: A number from 0 to 65535.

Default value: 200
**Usage guidelines:** If you change this attribute, stop `aopsubd` and restart Infoprint Server.

**aopssid-max-thread-tasks**
This *single-valued* attribute specifies the MAXTHREADTASKS limit for the Infoprint Central daemon, `aopssid`. The MAXTHREADTASKS limit is the maximum number of MVS tasks that a single process (daemon) can have concurrently active.

**Note:** For more information about this attribute, see z/OS Infoprint Server Customization.

**ISPF field name:** Other

**Allowed values:** A number from 0 to 65535.

**Default value:** 200

**Usage guidelines:** If you change this attribute, stop `aopssid` and restart Infoprint Server.

**aopwsmd-max-thread-tasks**
This *single-valued* attribute specifies the MAXTHREADTASKS limit for the IP PrintWay extended mode daemon `aopwsmd`. The MAXTHREADTASKS limit is the maximum number of MVS tasks that a single process (daemon) can have concurrently active.

**Note:** For more information about this attribute, see z/OS Infoprint Server Customization.

**ISPF field name:** Other

**Allowed values:** A number from 0 to 65535.

**Default value:** 200

**Usage guidelines:** If you change this attribute, stop `aopwsmd` and restart Infoprint Server.

**applid**
This *single-valued* attribute specifies the name of the application program that IP PrintWay extended mode uses to establish a VTAM session with VTAM-controlled printers.

**Note:** For more information about this attribute, see z/OS Infoprint Server Customization.

**ISPF field name:** APPL ID

**Allowed values:** This name must match the name of the APPL statement defined to VTAM in the SYS1.VTAMLST data set.

**Default value:** None.

**Usage guidelines:**
- If you change this attribute, you do not need to restart Infoprint Server.
This attribute does not apply to IP PrintWay basic mode. If you run IP PrintWay basic mode, specify the equivalent APPLID environment variable in the IP PrintWay basic mode startup procedure.

**ascii-codepage**
This single-valued attribute specifies the name of the Infoprint Server default ASCII code page. You can specify an IBM-supplied or custom ASCII code page.

*Note:* For more information about this attribute see [z/OS Infoprint Server Customization](#).

**ISPF field name:** ASCII

**Allowed values:** A combination of 1-16 letters, numbers, and special characters. Blanks are not allowed.

**Default value:** ISO8859-1

**Usage guidelines:** If you change this attribute, you do not need to restart Infoprint Server.

**blank-truncation-classes**
This single-valued attribute specifies the JES output classes for which IP PrintWay extended mode removes trailing blank characters. If a data set is allocated in one of the listed classes, and the data set contains either line data or text data, IP PrintWay removes any blank characters that occur at the end of each record or line.

*Note:* For more information about this attribute see [z/OS Infoprint Server Customization](#).

**ISPF field name:** Blank truncation classes

**Allowed values:** One to 36 one-character letters or numbers, or an asterisk (*) which indicates all JES output classes. Lowercase letters are converted to uppercase. For example:

```
blank-truncation-classes = ABC123
```

**Default value:** None.

**Usage guidelines:**
- This attribute can slow performance and cause IP PrintWay to use more system resources.
- If you change this attribute, you do not need to restart Infoprint Server.

**configuration-version**
This single-valued attribute is the version number of the system configuration definition.

**ISPF field name:** This attribute is not displayed on the ISPF panel.

**Allowed values:** The only allowed value is v1.

**Default value:** None.

**Usage guidelines:** When Infoprint Server creates the system configuration definition, it sets this attribute to the correct version level. Do not specify this attribute.
**console-name**

This **single-valued** attribute specifies the name of the extended multiple console support (MCS) console that Infoprint Central uses to send commands to the z/OS system.

**Note:** For more information about this attribute, see [z/OS Infoprint Server Customization](#).

**ISPF field name:**  Extended MCS console name

**Allowed values:**  A combination of 2-8 letters, numbers, and national characters ($, #, and @). The first character cannot be numeric, and blanks are not allowed.

**Default value:**  The default console name is the Printer Inventory name followed by the last four characters of the system name. For example: AOP1DEV1

**Usage guidelines:**
- Do not use the reserved names: HC, INSTREAM, INTERNAL, OPERLOG, SYSIOSRS, SYSLOG, UNKNOWN.
- If the `start-daemons = ssid` attribute is specified in the Infoprint Server configuration file (`aopd.conf`), the console name must be unique among all active and inactive console names on all systems in a sysplex. To display all consoles, use this MVS command: DISPLAY EMCS,ST=L
- If you change the console name while the Infoprint Central daemon (`aopssid`) is running, stop the `aopssid` daemon and restart Infoprint Server.

**ebcdic-codepage**

This **single-valued** attribute specifies the name of the Infoprint Server default EBCDIC code page. You can specify an IBM-supplied or custom EBCDIC code page.

**Note:** For more information about this attribute, see [z/OS Infoprint Server Customization](#).

**ISPF field name:**  EBCDIC

**Allowed values:**  A combination of 1-16 letters, numbers, and special characters. Blanks are not allowed.

**Default value:**  IBM-1047

**Usage guidelines:**  If you change this attribute, you do not need to restart Infoprint Server.

**hardcopy-messages**

This **single-valued** attribute specifies the additional messages that you want Infoprint Server to send to the hardcopy log.

**Note:** For more information about this attribute, see [z/OS Infoprint Server Customization](#).

**ISPF field name:**  Send messages to hardcopy log

**Allowed values:**  You can specify one of these fixed values:
configuration

all Send all eligible messages to the hardcopy log.
list Send only the additional messages listed in the hardcopy-message-list attribute to the hardcopy log.
none Send no additional messages, except console messages, to the hardcopy log.

Default value: none

Usage guidelines: If you change this attribute, you do not need to restart Infoprint Server.

hardcopy-message-list
This multi-valued, list attribute specifies the messages to send to the hardcopy log when the hardcopy-messages = list attribute is specified.

Note: For more information about this attribute see z/OS Infoprint Server Customization.

ISPF field name: Message list for hardcopy log

Allowed values: You can specify 1-72 message IDs. Each message ID can be a combination of 7-8 letters (a-z, A-Z) and numbers (0-9); the last character must be the severity code (E, I, S, T, or W). You can use uppercase characters, lowercase characters, or both. If you specify more than one message ID, separate them with spaces and enclose the list in braces. For example:
hardcopy-message-list = {AOP3614I AOP3803E}

Default value: None.

Usage guidelines:
• You do not need to specify messages that Infoprint Server sends to the console, such as those with the API prefix, because they are automatically sent to the hardcopy log.
• If your installation uses the MPFLSTxx PARMLIB member for message automation, you might want to specify the same message IDs in MPFLSTxx.
• If you change this attribute, you do not need to restart Infoprint Server.

ignore-dcf-routing-errors
This single-valued attribute indicates whether IP PrintWay extended mode writes an error message when it cannot find a printer definition in the Printer Inventory that matches the specified DEST, CLASS, and FORMS JCL parameters.

Note: For more information about this attribute see z/OS Infoprint Server Customization.

ISPF field name: Ignore DEST, CLASS, FORMS routing errors

Allowed values: You can specify one of these fixed values:

yes IP PrintWay ignores CLASS, DEST, and FORMS routing errors and does not write an error message.

no IP PrintWay writes error message AOP3201E when it cannot find a printer definition that matches the DEST, CLASS, and FORMS parameters. IP PrintWay also saves information about the print job in the Printer Inventory.
Default value: no

Usage guidelines:
-Specify yes to conserve storage and processing resources if IP PrintWay writes message AOP3201E numerous times in the common message log. Keep in mind that without the message, it might be difficult to determine why IP PrintWay did not process a print job.
-If you change this attribute, you do not need to restart Infoprint Server.
-This attribute does not apply to IP PrintWay basic mode.

**ipp-port-number**
This single-valued attribute specifies the number of the port at which the Infoprint Server Internet Printing Protocol (IPP) Server waits for print requests.

**Note:** For more information about this attribute, see z/OS Infoprint Server Customization.

**ISPF field name:** IPP port number

**Allowed values:** A number from 1 to 65535.

Default value: 631, a well-known port for communication between IPP clients and servers.

Usage guidelines:
- Make sure that the port is not used by any other service on the same TCP/IP stack.
- If you change this attribute, you do not need to restart Infoprint Server.

**job-prefix**
This single-valued attribute specifies the prefix of the job IDs for output data sets that Infoprint Server creates on the JES spool. For example, if the prefix is PS, the job ID might be PS001234.

**Note:** For more information about this attribute, see z/OS Infoprint Server Customization.

**ISPF field name:** Job ID prefix

**Allowed values:** A combination of two letters, numbers, and national characters ($, #, and @). The first character cannot be numeric.

Default value: PS

Usage guidelines: If you change this attribute, you do not need to restart Infoprint Server.

**log-retention**
This single-valued attribute specifies the number of days worth of messages that Infoprint Central displays for print jobs and printers, and the number of days for which Infoprint Central displays print jobs after they are removed from the JES spool.

In addition, if you do not use the MVS system logger (logstream-name attribute is not specified), the value in this attribute is the number of days worth of messages...
configuration

that Infoprint Server retains in the common message log. If you use the MVS system logger, the retention period for the system logger log stream is used instead.

Note: For more information about this attribute, see z/OS Infoprint Server Customization.

**ISPF field name:** Log retention period (days)

**Allowed values:** A number from 0 to 59.

**Default value:** 1

**Usage guidelines:**
- Specify a value greater than 0, or use the default value of 1 day, if either of these conditions apply:
  - You do not use the MVS system logger for Infoprint Server messages
  - You use Infoprint Central to work with print jobs and printers
- Make sure that the file system mounted at the /var or /var/Printsrv mount point has enough space to contain information about print jobs for the number of days specified in this attribute. If you do not use the MVS system logger, also make sure that there is enough space for messages.
- If you change this attribute, you do not need to restart Infoprint Server.
- If PSF for z/OS, V4R4, writes messages in the common message log and you change the number of days to 0 or from 0, you must restart the PSF functional subsystem (FSS) for the change to take effect.

**logstream-name**

This single-valued attribute specifies the name of a log stream that is defined to the MVS system logger for Infoprint Server messages.

Note: For more information about this attribute, see z/OS Infoprint Server Customization.

**ISPF field name:** Log stream name

**Allowed values:** A 1-26 character log stream name consisting of one or more qualifiers. Each qualifier can contain a combination of 1-8 letters (a-z, A-Z), numbers (0-9), and national characters ($, #, and @). The first character of each qualifier cannot be a number. Each qualifier must be separated by a period. Lowercase letters are converted to uppercase. For example:

logstream-name = AOP.MSG

**Default value:** If this attribute is not specified, Infoprint Server does not use the system logger for messages. It writes messages in the /var/Printsrv file system instead.

**Usage guidelines:**
- To view messages that Infoprint Server writes either in the specified log stream or in a z/OS file system, use the aoplogu command. For information, see “Viewing messages in the common message log” on page 53.
- If you change this attribute, you do not need to restart Infoprint Server.
lpd-port-number
This single-valued attribute specifies the number of the port at which the Infoprint Server line printer daemon (LPD) waits for print requests.

Note: For more information about this attribute see z/OS Infoprint Server Customization.

ISPF field name: LPD port number

Allowed values: A number from 1 to 65535.

Default value: 515, a well-known port for communication between LPDs and line printer requesters (LPRs).

Usage guidelines:
• Make sure that the port is not used by any other service on the same TCP/IP stack.
• The port number must not be reserved in the hlq.PROFILE.TCPIP data set.
• If you specify a port other than 515, some limitations exist.
• Users specify this port number when they configure the Infoprint Port Monitor for Windows.
• If you change this attribute, you do not need to restart Infoprint Server.

mail-do-not-add-suffixes
This single-valued attribute indicates whether IP PrintWay extended mode appends a suffix to file names specified in the MAILFILE JCL parameter or the mail-file-name job attribute.

Note: For more information about this attribute see z/OS Infoprint Server Customization.

ISPF field name: Do not add suffixes to files

Allowed values: You can specify one of these fixed values:

yes IP PrintWay does not append suffixes to the file names.

no IP PrintWay appends one of these suffixes to file names for the data formats it recognizes: afp, jpg, pcl, pdf, ps, sap, tif, txt, or octet-stream (for unrecognized data formats).

Default value: no

Usage guidelines:
• If mail-do-not-add-suffixes=yes, IP PrintWay ignores the mail-preserve-suffixes attribute.
• If you change this attribute, you do not need to restart Infoprint Server.
• This attribute does not apply to IP PrintWay basic mode. If you run basic mode, specify the equivalent AOP_DO_NOT_ADD_SUFFIX environment variable in the IP PrintWay basic mode startup procedure.

mail-preserve-suffixes
This single-valued attribute specifies the suffixes that IP PrintWay extended mode preserves in file names specified in the MAILFILE JCL parameter or in the mail-file-name job attribute. IP PrintWay does not append another suffix to file names with preserved suffixes.
**ISPF field name:** Preserve suffixes

**Allowed values:** A list of 1-50 suffixes. Each suffix can contain 1-10 characters and must start with a period. If you specify more than one suffix, separate the suffixes with spaces and enclose the entire value in single or double quotation marks. For example:

```sh
gmail-preserve-suffixes = ".123 .xls .doc"
```

**Default value:** None.

**Usage guidelines:**
- If `mail-do-not-add-suffixes=yes`, IP PrintWay ignores the `mail-preserve-suffixes` attribute.
- If you change this attribute, you do not need to restart Infoprint Server.
- This attribute does not apply to IP PrintWay basic mode. If you run basic mode, specify the equivalent `AOP_MAIL_PRESERVE_SUFFIXES` environment variable in the IP PrintWay basic mode startup procedure.

**mail-use-first-address**

This **single-valued** attribute indicates whether IP PrintWay extended mode sends each document to the email address or addresses specified for the first document in the print job. This attribute applies only when the print job contains more than one document.

**Note:** For more information about this attribute, see `z/OS Infoprint Server Customization`.

**ISPF field name:** Send email to address of first document

**Allowed values:** You can specify one of these fixed values:

- **yes** IP PrintWay sends each document to the email addresses specified for the first document in the print job. This is the default.
- **no** IP PrintWay sends each document to the email addresses specified for that document.

**Default value:** yes

**Usage guidelines:**
- When the printer definition specifies a concatenation option, IP PrintWay always uses one email to send all documents in a print job to the email address or addresses that are specified for the first document in the print job whether or not this attribute is specified.
- If you change this attribute, you do not need to restart Infoprint Server.
- This attribute does not apply to IP PrintWay basic mode.

**mailer-options**

This **single-valued** attribute specifies options for the `z/OS UNIX sendmail` command. IP PrintWay extended mode specifies these options in addition to the `-i` option when it sends emails.
**Configuration**

**Note:** For more information about this attribute, see [z/OS Infoprint Server](#) Customization.

**ISPF field name:** Application options

**Allowed values:** Valid sendmail options. If you specify more than one option, separate the options with spaces and enclose the entire value in single or double quotation marks. For example:

```
mailer-options = -Am
```

**Default value:** None.

**Usage guidelines:**
- If you change this attribute, you do not need to restart Infoprint Server.
- This attribute does not apply to IP PrintWay basic mode. If you run IP PrintWay basic mode, specify the equivalent AOPMAILER_OPTIONS environment variable in the IP PrintWay basic mode startup procedure.

**mailer-path-name**

This **single-valued** attribute specifies the full path name of the z/OS UNIX sendmail command that IP PrintWay extended mode uses to send output to email destinations. The path name is case-sensitive.

**Note:** For more information about this attribute, see [z/OS Infoprint Server](#) Customization.

**ISPF field name:** Application path

**Allowed values:** A valid path name. The path name must start with a slash (/).

**Default value:** /bin/sendmail

**Usage guidelines:**
- If you change this attribute, you do not need to restart Infoprint Server.
- This attribute does not apply to IP PrintWay basic mode. If you run IP PrintWay basic mode, specify the equivalent AOPMAILER environment variable in the IP PrintWay basic mode startup procedure.

**max-historical-inventory-size**

This **single-valued** attribute specifies the maximum size in megabytes (MBs) of the Historical Inventory in the `/var/Printsrv/hinv` directory. The Historical Inventory contains information about print jobs and documents that are no longer on the JES spool. When the maximum size is reached, Infoprint Server overwrites the oldest historical information.

**Note:** For more information about this attribute, see [z/OS Infoprint Server](#) Customization.

**ISPF field name:** Maximum Historical Inventory size

**Allowed values:** A number from 0 to 99999. A value of 0 means that Infoprint Server does not limit the size of the Historical Inventory. However, the number of days specified in the log-retention attribute limits the amount of information in the Historical Inventory.

**Default value:** 10
**max-thread-tasks**

This **single-valued** attribute specifies the \texttt{MAXTHREADTASKS} limit for these Infoprint Server daemons: `aopinhvd`, `aopippdxpd`, `aopnetd`, `aopoutd`, `aopsdbd`, `aopssid`, `aopsubd`, and `aopwsmd`. The \texttt{MAXTHREADTASKS} limit is the maximum number of MVS tasks that a single process (daemon) can have concurrently active.

**Usage guidelines:** If you change this attribute, you do not need to restart Infoprint Server.

**Note:** For more information about this attribute see \texttt{z/OS Infoprint Server Customization}.

**ISPF field name:** Other

**Allowed values:** A number from 0 to 65535.

**Default value:** 200

**Usage guidelines:** If you change this attribute, stop all Infoprint Server daemons and restart Infoprint Server.

**name**

This **single-valued** attribute specifies the name of the system configuration definition. The name of the system configuration definition is always `aopd.conf`. You cannot change it.

**Note:** This is a **non-settable** attribute. Do not specify the `name` attribute on the PIDU `force-create` or `modify` command. Instead, specify the name as an operand on the command. However, you can specify the `name` attribute when you construct a condition for the `where` predicate on the `list` and `export` commands.

**ISPF field name:** This attribute is not displayed on the ISPF panel.

**Allowed values:** `aopd.conf`

**Default value:** None.

**netspool-use-fixed-jobid**

This **single-valued** attribute whether NetSpool assigns the same job ID to all output data sets that it creates on the JES spool.

**Note:** For more information about this attribute see \texttt{z/OS Infoprint Server Customization}.

**ISPF field name:** Other

**Allowed values:** You can specify one of these fixed values:

- **yes** NetSpool assigns the same job ID to all output data sets. The job ID is the value specified in the job-prefix attribute, which defaults to PS, followed by 000000. For example, PS000000.

- **no** NetSpool assigns a unique job ID to each data set.

**Default value:** no
**Usage guidelines:** If you change this attribute while NetSpool is running, stop the NetSpool daemon (`aopnetd`) and restart Infoprint Server.

**netspool-use-unaltered-jobid**
This **single-valued** attribute indicates whether NetSpool assigns a job ID to output data sets that it creates on the JES spool.

**Note:** For more information about this attribute see [z/OS Infoprint Server Customization](#).

**ISPF field name:** Other

**Allowed values:** You can specify one of these fixed values:

- **yes** NetSpool does not assign a job ID to the output data sets. The job ID for each data set is the same as the job ID of the `aopnetd` daemon.
- **no** NetSpool assigns a job ID to each data set.

**Default value:** no

**Usage guidelines:** If you change this attribute while NetSpool is running, stop the NetSpool daemon (`aopnetd`) and restart Infoprint Server.

**select-work-from-hold-queue**
This **single-valued** attribute indicates whether IP PrintWay extended mode selects new held output groups from the JES spool.

**Note:** For more information about this attribute see [z/OS Infoprint Server Customization](#).

**ISPF field name:** Select work from hold queue

**Allowed values:** You can specify one of these fixed values:

- **yes** IP PrintWay selects new held output groups from the JES spool. This lets you use Infoprint Central to move the held output groups to different IP PrintWay printers before releasing them.
- **no** IP PrintWay does not select new held output groups from the JES spool. This lets you use JES or SDSF commands to release individual data sets in an output group for printing.

**Default value:** yes

**Usage guidelines:**
- If you change this attribute while IP PrintWay is running, stop the IP PrintWay daemons (`aopoutd` and `aopwsmd`) and restart Infoprint Server.
- This attribute does not apply to IP PrintWay basic mode.

**smf-recording**
This **single-valued** attribute indicates whether IP PrintWay extended mode writes System Management Facilities (SMF) type 6 records for data sets that it sends to a printer or email destination. SMF type 6 records contain accounting information.

**Note:** For more information about this attribute see [z/OS Infoprint Server Customization](#).
**Write SMF records**

**ISPF field name:** Write SMF records

**Allowed values:** You can specify one of these fixed values:

- **yes** IP PrintWay writes SMF type 6 records.
- **no** IP PrintWay does not write SMF type 6 records.

**Default value:** yes

**Usage guidelines:**
- If you change this attribute, you do not need to restart Infoprint Server.
- This attribute does not apply to IP PrintWay basic mode.

**snmp-community**

This single-valued attribute specifies the name assigned to the Simple Network Management Protocol (SNMP) community for making SNMP requests to the z/OS system.

**Note:** For more information about this attribute see z/OS Infoprint Server Customization.

**Community name**

**ISPF field name:** Community name

**Allowed values:** A combination of 1-32 uppercase or lowercase letters, numbers, and special characters. This value is case-sensitive.

**Default value:** public

**Usage guidelines:**
- This name must exactly match the community name provided to the z/OS SNMP agent and also the community name defined to the SNMP manager.
- The z/OS agent and the SNMP manager might restrict the length of the community name or the allowed characters.
- This attribute applies only if you use the Infoprint Server SNMP subagent.
- If you change this attribute while the Infoprint Server SNMP subagent daemon (aopsnmpd) is running, stop aopsnmpd and restart Infoprint Server.

**suppress-post-unix-filter-formatting**

This single-valued attribute indicates whether IP PrintWay extended mode formats line and text data after a UNIX filter processes it.

**Note:** For more information about this attribute see z/OS Infoprint Server Customization.

**Suppress formatting after UNIX filter**

**ISPF field name:** Suppress formatting after UNIX filter

**Allowed values:** You can specify one of these fixed values:

- **yes** IP PrintWay does not format line and text data after a UNIX filter processes it.
- **no** IP PrintWay always formats line and text data after a UNIX filter processes it. For example, IP PrintWay processes carriage control characters and transparent data characters, and converts the data from the document code page to the printer code page.
Default value: no

Usage guidelines:
- Specify yes if you use a UNIX filter that calls an AFP transform to convert line data to PCL, PDF, or PostScript format.
- If you change this attribute, you do not need to restart Infoprint Server.
- This attribute does not apply to IP PrintWay basic mode.

Attributes for the fsa object class

This topic lists attributes that are valid when you create FSA definitions, which are in object class fsa. You can create FSA definitions for PSF (or the AFP Download Plus feature of PSF) or IP PrintWay basic mode.

Tip: In this topic, PSF refers to PSF for z/OS, the AFP Download Plus feature of PSF, or both.

When you create an FSA definition for PSF, all attributes are valid. However, only a subset of the attributes apply for each type of FSA: PSF channel, PSF TCP/IP, PSF SNA, and PSF AFP Download Plus. For information about which attributes PSF uses, see:
- PSF for z/OS: Customization
- PSF for z/OS: AFP Download Plus

When you create an FSA definition for IP PrintWay basic mode, only these attributes are valid:
- description
- fsa-type
- trace-mode

Required attributes

For Infoprint Server to display the correct ISPF panel for an FSA definition, you must specify the fsa-type attribute. In addition, PSF requires these attributes:
- applid (when fsa-type=psf-sna)
- form-definition
- luname (when fsa-type=psf-sna)
- page-definition
- printer-ip-address (when fsa-type=psf-tcip or fsa-type=afp-download-plus)

IP PrintWay does not require any attributes in an FSA definition.

Acknowledgement-level

This single-valued attribute specifies whether PSF requests an acknowledgement every sheet or every page.

ISPF field name: Acknowledgement level

Allowed values: You can enter one of these fixed values:
- page An acknowledgement is requested for every page that is printed (default).
- sheet An acknowledgement is requested for every sheet that is printed.
afpdp-dataset-grouping
This single-valued attribute indicates whether output data sets in the same job are
grouped together when sending them to the AFP Download Plus receiver.

ISPF field name: Data set grouping

Allowed values: You can enter one of these fixed values:
yes PSF groups output data sets into jobs. The AFP Download Plus receiver
prints the data sets in the same job in sequence with one set of separator
pages for the job.
no PSF does not group output data sets into jobs (default). The AFP
Download Plus receiver treats each data set as a separate job.

afpdp-working-directory
This single-valued attribute specifies the name of the UNIX directory that AFP
Download Plus uses as its working directory.

ISPF field name: Working directory

Allowed values: You can enter a directory name of up to 255 characters. PSF adds
the beginning and ending forward slashes if they are missing from the directory
name. If the value contains special characters other than slashes or periods, enclose
the value in double quotation marks. This attribute is case-sensitive.

Default value: PSF uses directory /var/psf/.

Usage guidelines: The directory must exist before you start AFP Download Plus.

applid
This single-valued attribute specifies the name of the VTAM application-program
node for an FSA when PSF is printing to an SNA-attached printer in
defered-printing mode.

ISPF field name: Applid

Allowed values: You can enter a valid combination of 1–8 letters (a-z, A-Z),
numbers (0–9), and special characters (# $ @). The first character cannot be
numeric. Blanks and other special characters are not allowed. If a value contains
special characters, enclose the value in quotation marks.

blank-compression
This single-valued attribute specifies whether PSF compresses blanks in line data.
Blank compression is a data-compression function in PSF that reduces the amount
of data sent through the attachment. PSF compresses blanks in line data that
contains more than five contiguous blanks.

ISPF field name: Blank compression

Allowed values: You can enter one of these fixed values:
yes PSF compresses blanks.
no PSF does not compress blanks (default).

Usage guidelines: Blank compression for host-connected, channel-attached
printers most likely does not improve data transmission.
**capture-inline-resources**
This single-valued attribute specifies whether PSF tells a connected DPF to capture and store inline resources.

**ISPF field name:** Capture inline resources

**Allowed values:** You can enter one of these fixed values:

- **yes** DPF captures inline resources.
- **no** DPF does not capture inline resources (default).

**channel-buffer-count**
This single-valued attribute specifies the number of 32 KB (32768 bytes) buffers that are needed for processing jobs on a channel-attached printer.

**ISPF field name:** Channel buffer count

**Allowed values:** You can enter an integer from 1 to 10000. This value is multiplied by 32 KB (32768 bytes) to determine the total amount of reserved storage.

**chars**
This multi-valued, list attribute specifies the names of the coded fonts that are used to print a data set on a printer.

**ISPF field name:** Character sets

**Allowed values:** You can enter 1–4 coded font names. Each name can be any combination of 1–4 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase. For valid coded font names, see IBM AFP Fonts: Font Summary for AFP Font Collection.

If you specify more than one value, separate the values by spaces and enclose the list of values in braces. For example:
chars={GT12 GB12 GI12}

**close-libraries-when-idle**
This single-valued attribute specifies whether PSF closes the resource libraries when there is no print activity for 60 seconds.

**ISPF field name:** Close libraries when idle

**Allowed values:** You can enter one of these fixed values:

- **yes** PSF closes resource libraries.
- **no** PSF does not close resource libraries (default).

**Usage guidelines:** Closing the resource libraries causes the operating system to free the fixed storage below the 16 MB line that is required for I/O to the resource libraries. However, this function adds the overhead of closing and reopening the libraries between print activity.
**color-map**

This **single-valued** attribute specifies the name of the object container for the color mapping table resource that PSF uses to print a data set containing color translation information. This attribute is only used when the printer supports color mapping table resources.

**ISPF field name:** Color map

**Allowed values:** You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

**Default value:** If a color map is not specified for the print job or printer, PSF uses an internal color mapping table.

**com-setup-member**

This **single-valued** attribute specifies the name of the object container for the microfilm setup resource that PSF uses to print data on a microfilm device. This attribute is only used when sending output to a microfilm device.

**ISPF field name:** Com setup member

**Allowed values:** You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks.

**compression**

This **single-valued** attribute indicates whether PSF compresses data before sending it to the AFP Download Plus receiver.

**ISPF field name:** Compression

**Allowed values:** You can enter one of these fixed values:

- lzw: PSF uses the LZW compression algorithm to compress data.
- none: PSF does not compress data (default).

**consolidate-im1-images**

This **single-valued** attribute specifies whether PSF consolidates a multiple-celled IM1 image into a single Image Object Content Architecture (IOCA) image.

**ISPF field name:** Consolidate IM1 images

**Allowed values:** You can enter one of these fixed values:

- yes: PSF consolidates a multiple-celled IM1 image into a single IOCA image.
- no: PSF converts a multiple-celled IM1 image to multiple IOCA images (default).

**cse-check-fit**

This **single-valued** attribute specifies how PSF checks the pages for cut-sheet emulation (CSE) mode.

**ISPF field name:** Check CSE fit
Allowed values: You can enter one of these fixed values:

no  PSF does not check to see whether the page fits 2 up on the sheet (default).
first  PSF only checks the first page printed for a new copy group to see if it fits 2 up on the sheet.
all  PSF checks front side of all pages to see if they fit 2 up on the sheet.

**cse-orientation**
This single-valued attribute specifies whether PSF generates portrait or landscape pages for printing in cut-sheet emulation (CSE) mode.

**ISPF field name:** CSE orientation

Allowed values: You can enter one of these fixed values:

portrait  PSF generates portrait pages (default).
landscape  PSF generates landscape pages.

**cse-preserve-page-position**
This single-valued attribute indicates whether PSF preserves page placement when it repositions because of error recovery or an operator command. This attribute applies only when PSF is printing in cut-sheet emulation (CSE) mode.

If you specify yes, you must also specify cse-sheet-eject=yes.

**ISPF field name:** CSE preserve page position

Allowed values: You can enter one of these fixed values:

yes  Page placement is preserved.
no  Page placement is not preserved (default).

**cse-sheet-eject**
This single-valued attribute indicates whether PSF starts printing each data set and each copy of a data set on a new sheet of paper when PSF is printing in cut-sheet emulation (CSE) mode.

**ISPF field name:** CSE sheet eject

Allowed values: You can enter one of these fixed values:

yes  PSF starts printing on a new sheet. PSF also starts printing on a new sheet whenever it does offset stacking. For example, when the form definition requests separation for a new copy group.
no  PSF starts printing on the next sheet or, in N_UP printing, on the next front-side partition. The next front-side partition might occur on the same sheet. This is the default.

**default-process-mode**
This single-valued attribute specifies the default processing mode PSF uses to print data sets containing both single-byte and double-byte fonts.

**ISPF field name:** Default process mode

Allowed values: PSF ignores all values but these fixed values:
Each shift-out, shift-in code is converted to a blank and a Set Coded Font Local text control (default).

Each shift-out, shift-in code is converted to a Set Coded Font Local text control.

The shift-out code is converted to a Set Coded Font Local text control. The shift-in code is converted to a Set Coded Font Local text control and two blanks.

Each shift-out, shift-in code is skipped and not counted when calculating offsets for the print data set. SOSI 4 is used when double-byte character set (DBCS) text is converted from ASCII to EBCDIC.

description
This single-valued attribute describes the FSA definition. The description can help you select an FSA definition from a list.

ISPF field name: Description

Allowed values: You can enter any combination of 1–256 letters (a-z, A-Z), numbers (0–9), blanks, and special characters (such as # $ @ != / - ). If the value contains blanks or special characters, enclose the value in quotation marks.

direct-download
This single-valued attribute indicates whether PSF sends MO:DCA-P data directly to the AFP Download Plus receiver without first storing the data in a temporary file on the z/OS system.

ISPF field name: Direct download

Allowed values: You can enter one of these fixed values:

none PSF does not send MO:DCA-P data directly to the AFP Download Plus receiver (default).

modca-p PSF sends MO:DCA-P data directly to the AFP Download Plus receiver.

Usage guidelines:
• The modca-p value can improve performance.
• If direct-download=modca-p, the AFP Download Plus receiver must support the direct download method of receiving MO:DCA-P data.
• This attribute applies to PSF V4R4 or later. Earlier releases ignore it.

disconnect-action
This single-valued attribute specifies the action that PSF takes when the time specified by the printer-disconnect-interval attribute expires and no output is available from JES. This attribute is only for SNA-attached and TCP/IP-attached printers.

ISPF field name: Disconnect action

Allowed values: You can enter one of these fixed values:

stop PSF stops the printer FSA, which can then be restarted only by an operator command.

redrive PSF redrives the printer FSA according to the value specified by the printer-management-mode attribute (default).
**display-afpdp-status**
This *single-valued* attribute specifies whether PSF displays the processing and transmission status of AFP Download Plus on the console.

**ISPF field name:** Display status

**Allowed values:** You can enter one of these fixed values:

- **yes** PSF displays the status.
- **no** PSF does not display the status (default).

**Usage guidelines:** This attribute applies to PSF V4R4 or later. Earlier releases ignore it.

**dump-code**
This *single-valued* attribute specifies a PSF reason code or a restartable abend reason code that causes a conditional dump of the PSF address space when the reason code occurs.

**ISPF field name:** Dump: Code

**Allowed values:** You can enter an integer from 0 to 2147483647 or a 7–8 character hexadecimal value. A PSF reason code is an 8-character hexadecimal value. An abend reason code is a 7-character hexadecimal value. The first three characters are always ABD. When you enter a hexadecimal value (which is suggested), you can enter the hexadecimal characters only or the hexadecimal characters with a prefix of 0x. For example, enter the dump-code attribute in one of these ways:

- `dump-code=09600c00`
- `dump-code=0x09600c00`
- `dump-code=157289480`

**dump-message-id**
This *single-valued* attribute specifies a PSF message that causes a conditional dump of the PSF address space when the message occurs.

**ISPF field name:** Dump: Message ID

**Allowed values:** You can enter a value in the format `APSnnnt`:

- **nnnn** Three to four digit message number
- **t** One of these type codes:
  - **A** Message requiring operator action
  - **I** Information message

**eject-to-front-facing**
This *single-valued* attribute specifies whether PSF is to tell your continuous-forms printer to do an eject to front facing before the job-header page, before the start of a new document, or both.

**ISPF field name:** Eject to front facing

**Allowed values:** You can enter one of these fixed values:

- **none** Eject to front facing is not done (default).
- **job** Eject to front facing is done before the job-header page.
document  Eject to front facing is done between documents in a data set.
both    Eject to front facing is done before the job-header page and between documents.

end-sna-conversation
This single-valued attribute specifies whether PSF ends the SNA LU1 conversation between print jobs while maintaining the SNA session with the printer when the NPRO timer expires or after no job is available for one minute and the last page printed has been stacked.

ISPF field name:  End SNA conversation

Allowed values:  You can enter one of these fixed values:
yes    PSF ends the SNA LU1 conversation with the printer.
no     PSF maintains the SNA LU1 conversation between print jobs (default).

error-disposition-supported
This single-valued attribute specifies whether PSF honors the error disposition requested for a data set when PSF ends a data set because an error occurs during processing.

ISPF field name:  Error disposition supported

Allowed values:  You can enter one of these fixed values:
yes    PSF honors the requested error disposition.
no     PSF does not honor the requested error disposition (default).

failure-action
This single-valued attribute specifies the PSF action after a printer failure, an SNA session failure, or a TCP/IP network failure.

ISPF field name:  Failure action

Allowed values:  You can enter one of these fixed values:
stop    PSF must be restarted by an operator command.
connect  PSF establishes a connection or waits for the printer (default).

form-definition
This single-valued attribute specifies the name of the default form definition that defines how a data set is printed. This attribute is required; however, if the job submitter specifies a form definition, it overrides the form definition in this attribute.

ISPF field name:  Form definition

Allowed values:  You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

You can specify the form definition name with or without the F1 prefix. However, if the name of the form definition, without the F1 prefix, starts with F1, specify the full name. For example, F1F1USER.
**fsa**

**fsa-trace-dsname**
This single-valued attribute specifies the data set to which PSF directs an FSA trace when `trace-mode=full`, `trace-mode=ipds`, `trace-mode=limit`, or `trace-mode=sync`.

**ISPF field name:** FSA trace dsname

**Allowed values:** You can enter a valid data set name that is allocated before the PSF FSA is started.

**fsa-type**
This single-valued attribute specifies the type of FSA.

**Allowed values:** You can enter one of these fixed values:

- **afp-download-plus**
  An FSA for the AFP Download Plus feature of PSF.

- **ip-printway**
  An FSA for IP PrintWay basic mode.

- **psf-channel**
  An FSA for a channel-attached printer controlled by PSF.

- **psf-sna**
  An FSA for an SNA-attached printer controlled by PSF.

- **psf-tcip**
  An FSA for a TCP/IP-attached printer controlled by PSF.

**global-overlay**
This single-valued attribute specifies the member name of a medium overlay that the printer places on every sheet of output, including separator pages and message pages.

**ISPF field name:** Overlay

**Allowed values:** You can enter a combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

**goca-box-supported**
This single-valued attribute indicates whether the printer supports Graphics Object Content Architecture (GOCA) Box drawing orders.

**ISPF field name:** GOCA Box orders

**Allowed values:** You can enter one of these fixed values:

- **yes**
  The printer supports the orders.

- **no**
  The printer does not support the orders (default).

**Usage guidelines:** This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

**goca-fractional-line-supported**
This single-valued attribute indicates whether the printer supports Graphics Object Content Architecture (GOCA) Set Fractional Line Width drawing orders.

**ISPF field name:** GOCA Set Fractional Line Width orders

**Allowed values:** You can enter one of these fixed values:
**goca-process-color-supported**
This single-valued attribute indicates whether the printer supports Graphics Object Content Architecture (GOCA) Set Process Color drawing orders.

**ISPF field name**: GOCA Set Process Color orders

**Allowed values**: You can enter one of these fixed values:
- **yes** The printer supports the orders.
- **no** The printer does not support the orders (default).

**Usage guidelines**: This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

**highlight-communications-failure-message**
This single-valued attribute specifies whether PSF highlights the message that it writes to the z/OS console when a communications failure occurs with the printer (message APS6501A). Highlighting the communications failure message can help you detect a problem that requires attention because the message remains on the console until the operator deletes it. This attribute applies to TCP/IP-attached printers.

**ISPF field name**: Highlight communications failure message

**Allowed values**: You can enter one of these fixed values:
- **yes** PSF highlights the communications failure message.
- **no** PSF does not highlight the communications failure message (default).

**image-output-format**
This single-valued attribute indicates the format that PSF uses for all image data that it sends to the AFP Download Plus receiver.

**ISPF field name**: Image output format

**Allowed values**: You can enter one of these fixed values:
- **ioca** Image data is in uncompressed Image Object Content Architecture (IOCA) format (default).
- **unchanged** Image data is in the same format as in the input document.

**Usage guidelines**: This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

**inhibit-recovery**
This single-valued attribute indicates whether PSF inhibits error recovery for a job so that data is only resent to the printer if it has not already printed.

**ISPF field name**: Inhibit recovery
Allowed values: You can enter one of these fixed values:

- **yes**  Error recovery is inhibited and data is only resent if it has not printed.
- **no**   Recovery is not inhibited and data is resent from the point of the error (default).

**inline-bcoca-objects**
This single-valued attribute indicates whether PSF includes Bar Code Object Content Architecture (BCOCA) objects inline with the documents it sends to the AFP Download Plus receiver.

**ISPF field name:** Bar code objects (BCOCA)

Allowed values: You can enter one of these fixed values:

- **yes**   PSF includes BCOCA objects inline (default).
- **no**    PSF does not include BCOCA objects inline.

**inline-color-management-resources**
This single-valued attribute indicates whether PSF includes color management resources (CMRs) inline with the documents it sends to the AFP Download Plus receiver.

**ISPF field name:** Color management resources

Allowed values: You can enter one of these fixed values:

- **all** PSF includes all CMRs that are on the sending system. If you specify this value, transmission time is longer because CMRs can be quite large. Specify this value if the receiving system does not contain CMRs.
- **generic** PSF includes all generic CMRs and all CMRs that the data stream references. Specify this value if any documents use CMRs that are not on the receiving system. Device-specific CMRs must reside on the receiving system or in the printer. This value is the default.
- **none** PSF does not include any CMRs inline. Specify this value if the CMRs reside on the receiving system.

**inline-foca-objects**
This single-valued attribute indicates whether PSF includes Font Object Content Architecture (FOCA) objects inline with the documents it sends to the AFP Download Plus receiver.

**ISPF field name:** Font objects (FOCA)

Allowed values: You can enter one of these fixed values:

- **yes**   PSF includes FOCA objects inline (default).
- **no**    PSF does not include FOCA objects inline.

**inline-form-definitions**
This single-valued attribute indicates whether PSF includes form definitions inline with the documents it sends to the AFP Download Plus receiver.

**ISPF field name:** Form definitions
Allowed values: You can enter one of these fixed values:

yes  PSF includes form definitions inline (default).
no   PSF does not include form definitions inline.

**inline-goca-objects**
This single-valued attribute indicates whether PSF includes Graphics Object Content Architecture (GOCA) objects inline with the documents it sends to the AFP Download Plus receiver.

**ISPF field name:** Graphics objects (GOCA)

**Allowed values:** You can enter one of these fixed values:

yes  PSF includes GOCA objects inline (default).
no   PSF does not include GOCA objects inline.

**inline-ioca-objects**
This single-valued attribute indicates whether PSF includes Image Object Content Architecture (IOCA) objects inline with the documents it sends to the AFP Download Plus receiver.

**ISPF field name:** Image objects (IOCA)

**Allowed values:** You can enter one of these fixed values:

yes  PSF includes IOCA objects inline (default).
no   PSF does not include IOCA objects inline.

**inline-object-containers**
This single-valued attribute indicates whether PSF includes object containers inline with the documents it sends to the AFP Download Plus receiver.

**ISPF field name:** Object containers

**Allowed values:** You can enter one of these fixed values:

yes  PSF includes object containers inline (default).
no   PSF does not include object containers inline.

**inline-overlays**
This single-valued attribute indicates whether PSF includes overlays inline with the documents it sends to the AFP Download Plus receiver.

**ISPF field name:** Overlays

**Allowed values:** You can enter one of these fixed values:

yes  PSF includes overlays inline (default).
no   PSF does not include overlays inline.

**inline-page-segments**
This single-valued attribute indicates whether PSF includes page segments inline with the documents it sends to the AFP Download Plus receiver.

**ISPF field name:** Page segments
Allowed values: You can enter one of these fixed values:

**yes**    PSF includes page segments inline (default).

**no**    PSF does not include page segments inline.

**inline-ptoca-objects**

This **single-valued** attribute indicates whether PSF includes Presentation Text Object Content Architecture (PTOCA) objects inline with the documents it sends to the AFP Download Plus receiver.

**ISPF field name:** Presentation text objects (PTOCA)

**Allowed values:** You can enter one of these fixed values:

**yes**    PSF includes PTOCA objects inline (default).

**no**    PSF does not include PTOCA objects inline.

**Usage guidelines:** This attribute applies to PSF V4R4 or later. Earlier releases ignore it.

**inline-truetype-fonts**

This **single-valued** attribute indicates whether PSF includes TrueType and OpenType fonts inline with the documents it sends to the AFP Download Plus receiver.

**ISPF field name:** TrueType fonts

**Allowed values:** You can enter one of these fixed values:

**yes**    PSF includes TrueType and OpenType fonts fonts inline (default).

**no**    PSF does not include TrueType and OpenType fonts fonts inline.

**input-tray-substitutions**

This **multi-valued, value-map** attribute associates one input tray number with two substitute tray numbers: one tray number for jobs that print on a single side of the paper and another tray number for jobs that print on both sides of the paper.

**ISPF field name:** Input Tray Substitutions

**Allowed values:** One to four sets of values in the format: `input_tray -> {simplex_tray duplex_tray}`:

- **input_tray**   An integer from 1–255 that identifies the tray specified for the job in the INTRAY JCL parameter, the input-tray-number job attribute, or the form definition PSF uses to print the job.

- **simplex_tray**   An integer from 1–255 that identifies the tray PSF is to use for jobs printed on a single side of the paper.

- **duplex_tray**   An integer from 1–255 that identifies the tray PSF is to use for jobs printed on both sides of the paper.

To determine the tray numbers for your printer, see the printer documentation.

Enclose the entire values in braces. For example:

```
input-tray-substitutions = { 1 ->{1 3} 2 -> {2 4} }
```

In this example:
When the job submitter specifies tray 1, PSF uses tray 1 for jobs that print on a single side of the paper and tray 3 for jobs that print on both sides of the paper.

When the job submitter specifies tray 2, PSF uses tray 2 for jobs that print on a single side of the paper and tray 4 for jobs that print on both sides of the paper.

**Default value:** PSF does not use substitute tray numbers.

**Usage guidelines:** Specify this attribute when the same side-sensitive or edge-sensitive paper is loaded in different trays in two different directions. That is, in one direction for printing on a single side of the paper and in another direction for printing on both sides of the paper.

### interrupt-message-page

This single-valued attribute specifies whether the interrupt message page that PSF inserts in your printed output is printed.

**ISPF field name:** Interrupt message page

**Allowed values:** You can enter one of these fixed values:

- **print** An interrupt message page is printed (default).
- **suppress** An interrupt message page is not printed.

### interrupt-message-page-copies

This single-valued attribute specifies the number of copies PSF produces of the interrupt message page when the mark-interrupt-message-page attribute is specified.

**ISPF field name:** Interrupt message page: Copies

**Allowed values:** You can enter an integer from 1 (default) to 10.

### ioca-replicate-trim-supported

This single-valued attribute indicates whether the printer supports the Image Object Content Architecture (IOCA) Replicate and Trim function.

**ISPF field name:** IOCA replicate and trim function

**Allowed values:** You can enter one of these fixed values:

- **yes** The printer supports the function.
- **no** The printer does not support the function (default).

**Usage guidelines:** This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

### issue-intervention-messages

This single-valued attribute specifies whether PSF displays intervention messages on the z/OS system console. An intervention message means that a printer has a physical problem, such as a paper jam or an open paper tray. After an operator fixes the problem, the printer starts printing again. This attribute applies to SNA-attached and TCP/IP-attached printers.

**ISPF field name:** Issue intervention messages

**Allowed values:** You can enter one of these fixed values:
yes Intervention messages are displayed.
no Intervention messages are not displayed.

Default value: Intervention messages are not displayed.

**issue-setup-messages**

This single-valued attribute specifies the setup parameters for which JES should display setup messages on the z/OS system console when an SNA-attached or TCP/IP-attached printer is initialized and at the start of any job that specifies a change in a setup parameter from what is active for the printer.

ISPF field name: Issue setup messages

Allowed values: You can enter one of these fixed values:

- none Do not display setup messages (default).
- burst Display setup messages for the BURST setup parameter.
- forms Display setup messages for the FORMS setup parameter.
- all Display setup messages for both BURST and FORMS setup parameters.

**label-data-pages**

This single-valued attribute specifies whether the security label is printed on each page of printed output. The security label is determined by the SECLABEL parameter of the JOB JCL statement.

ISPF field name: Label data pages

Allowed values: You can enter one of these fixed values:

- yes The security label determined by SECLABEL is printed.
- no The security label is not printed.

Default value: If this attribute is not specified, PSF sets the value to yes if PSFMPL is active (default) or to no if PSFMPL is not active. For more information, see [PSF for z/OS: Security Guide](#).

**label-separator-pages**

This single-valued attribute specifies whether the security label is printed on a separator page. The security label is determined by the SECLABEL parameter of the JOB JCL statement.

ISPF field name: Label separator pages

Allowed values: You can enter one of these fixed values:

- yes The security label determined by SECLABEL is printed.
- no The security label is not printed.

Default value: If this attribute is not specified, PSF sets the value to yes if PSFMPL is active (default) or to no if PSFMPL is not active. For more information, see [PSF for z/OS: Security Guide](#).

**location**

This single-valued attribute lets you specify the location of the printer or the AFP Download Plus receiver. The location can help users find printers or AFP Download Plus receivers.
**ISPF field name:** Location

**Allowed values:** Any combination of 1–256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ != / -). If a value contains blanks or special characters, enclose the value in quotation marks.

**Default value:** None.

**Usage guidelines:** If you use the same format to specify the location in all FSA definitions (for example: Bldg 3/Col 2), users can find all printers or AFP Download Plus receivers with similar locations, such as all printers in building 3.

**logmode**

This **single-valued** attribute specifies the name of the VTAM logon-mode table entry, which defines the session parameters for an SNA-attached printer.

**ISPF field name:** Logmode

**Allowed values:** You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

**luname**

This **single-valued** attribute specifies the unique, logical-unit name of an SNA-attached printer.

**ISPF field name:** LU name

**Allowed values:** You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

**map-to-outline-fonts**

This **single-valued** attribute specifies whether PSF maps fonts to outline fonts.

**ISPF field name:** Map to outline fonts

**Allowed values:** You can enter one of these fixed values:

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>PSF uses system and user mapping tables to map fonts to corresponding outline fonts.</td>
</tr>
<tr>
<td>no</td>
<td>PSF does not map fonts to outline fonts (default).</td>
</tr>
</tbody>
</table>

**Usage guidelines:** Specify **map-to-outline-fonts=**yes if your printer supports outline fonts, you have existing applications that use raster fonts, and you want to use outline fonts without changing the applications.

**mark-interrupt-message-page**

This **single-valued** attribute specifies whether PSF marks the interrupt message page with form marks.

**ISPF field name:** Interrupt message page: Mark page
Allowed values: You can enter one of these fixed values:

- **yes**  PSF marks the interrupt message page with form marks.
- **no**   PSF does not mark the interrupt message page (default).

### mcf-name
This single-valued attribute specifies how PSF builds the Map Coded Font (MCF) Format 2 structured field in the data it sends to the AFP Download Plus receiver.

**ISPF field name:** Map Coded Font (MCF) Format 2 Name

**Allowed values:** You can enter one of these fixed values:

- **coded-font**  PSF uses the name of the coded font to build the MCF structured field. Specify this value for documents that contain double-byte character set (DBCS) fonts.
- **codepage-character-set**  PSF uses the names of the code page and character set to build the MCF structured field (default).

**Usage guidelines:** This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

### message-count-before-dump
This single-valued attribute specifies the number of times the message specified by the dump-message-id attribute is sent before PSF produces a conditional dump.

**ISPF field name:** Dump: Count

**Allowed values:** You can enter an integer from 1 (default) to 99.

### name
This single-valued attribute specifies the name of the FSA. This name must be a unique name in the Printer Inventory and it must match the name on the JES initialization statement.

**Note:** This is a non-settable attribute. Do not specify the name attribute on the PIDU create, force-create, or modify command. Instead, specify the name as an operand on the command. However, you can specify the name attribute when you construct a condition for the where predicate on the list and export commands.

**ISPF field name:** FSA name

**Allowed values:** None.

### no-response-action
This single-valued attribute specifies what action PSF takes when the time specified by the response-timeout attribute expires and a response has not been received from the printer or from the AFP Download Plus receiver.

**ISPF field name:** No response action

**Allowed values:** You can enter one of these fixed values:

- **notify-jes**  PSF notifies JES that an expected response was not received (default).
notify-user  PSF sends a message to the user ID specified by the no-response-notify attribute and to JES indicating that an expected response was not received.

notify-operator  PSF sends a message to the system operator and to JES indicating that an expected response was not received.

terminate  PSF stops the printer FSA or the AFP Download Plus FSA. The system operator must issue a command to restart the FSA. The active data set is restarted from the last checkpoint.

Usage guidelines: This attribute applies to AFP Download Plus V4R4 or later. Earlier releases ignore it.

no-response-notify  This single-valued attribute specifies the user ID to which PSF sends a message when an expected response is not received from the printer or from the AFP Download Plus receiver before time expires. This attribute is used when no-response-action=notify-user.

ISPF field name: No response action: Notify

Allowed values: Specify the value in the format node.userid:

node  The node associated with the user ID. Specify from 1–8 alphanumeric or national ($, #, @) characters. Lowercase letters are converted to uppercase.

userid  The user ID. Specify from 1–8 alphanumeric or national ($, #, @) characters. The first character must be alphabetic or national. Lowercase letters are converted to uppercase.

Usage guidelines: This attribute applies to AFP Download Plus V4R4 or later. Earlier releases ignore it.

offset-interrupt-message-page  This single-valued attribute specifies whether offset stacking is required for the interrupt message page.

ISPF field name: Interrupt message page: Offset page

Allowed values: You can enter one of these fixed values:

yes  The printed output is offset stacked, beginning at the interrupt message page.

no  No offset stacking is done for the interrupt message page (default).

offset-stacking  This single-valued attribute controls when PSF does offset stacking. You can use offset stacking to separate printed output on cut-sheet printers and on continuous-forms printers that support offset stacking.

ISPF field name: Offset stacking

Allowed values: You can enter one of these fixed values:
dataset
PSF does offset stacking at the start of a new data set or copy of a data set.

job
PSF does offset stacking at the start of a new job.

none
PSF does not do offset stacking.

Usage guidelines:
• This attribute lets you control offset stacking separately from copy marking. If you select a value in this attribute for a printer that supports offset stacking, the COPYMARK parameter (in the JES initialization statement) and the suppress-copy-marks attribute control only copy marking and not offset stacking.
• If you do not specify this attribute, the COPYMARK parameter and the suppress-copy-marks attribute control both copy marking and offset stacking.
• PSF uses the value in this attribute for all jobs unless you override the value in a PSF Exit 7 Begin Data Set (BDS) call.

oid-format-supported
This single-valued attribute indicates whether the printer supports the Object Identifier (OID) format for TrueType and OpenType fonts.

ISPF field name: Object identifier (OID) format

Allowed values: You can enter one of these fixed values:

yes The printer supports the OID format.
no The printer does not support the OID format (default).

Usage guidelines: This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

operator-security-profile
This single-valued attribute specifies the name of the RACF resource profile in the PRINTSRV class that controls who can work with this PSF printer or AFP Download Plus sender using Infoprint Central.

ISPF field name: Operator security profile

Allowed values: A combination of letters, numbers, and special characters except for commas, semicolons, parentheses, and blanks. If the value contains special characters, enclose it in single or double quotation marks. Lowercase letters are converted to uppercase. Do not start names with AOP. For example:

operator-security-profile = "DENVER.001"

Usage guidelines:
• To authorize users to a group of printers, specify the same profile name in the PSF FSA definitions and IP PrintWay printer definitions for all the printers in the group.
• If you have defined profiles in the OPERCMDS class that protect operator commands, users must have the appropriate level of access to those profiles to work with the printer. This is true whether or not you specify a profile in this attribute.
• For information about the PRINTSRV class, see [OS Infoprint Server Customization]
override-3800-default-font

This single-valued attribute specifies whether PSF tells the 3800 to replace the hardware default font with the first font in the current font list.

**ISPF field name:** 3800 compatibility: Override default font

**Allowed values:** You can enter one of these fixed values:

- **yes**: PSF lets the printer replace the hardware default font.
- **no**: The printer uses the hardware default font (default).

page-accounting-supported

This single-valued attribute indicates whether PSF sends information, such as the number of pages and sheets in a data set, to the AFP Download Plus receiver. The AFP Download Plus receiver can use the information to provide more accurate accounting information.

**ISPF field name:** Page accounting supported

**Allowed values:** You can enter one of these fixed values:

- **yes**: PSF sends accounting information to the AFP Download Plus receiver.
- **no**: PSF does not send accounting information (default).

**Usage guidelines:** Select this option if the AFP Download Plus receiver supports the `-opagecount` and `-osheetcount` parameters.

page-definition

This single-valued attribute specifies the name of the default page definition that defines how a data set is printed. This attribute is required; however, if the job submitter specifies a page definition, it overrides the page definition in this attribute.

**ISPF field name:** Page definition

**Allowed values:** You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

You can specify the page definition name with or without the P1 prefix. However, if the name of the page definition, without the P1 prefix, starts with P1, specify the full name. For example, P1P1USER.

paper-length

This single-valued attribute specifies the length of the paper that is loaded in the printer. The 3800 Line-Mode Conversion and Line-Mode Migration functions in AFP Download Plus can use this value to format line data.

**ISPF field name:** Paper length

**Allowed values:** A value in the format `nnnn.mmmuu`:

- **nnnn**: A number from 0 to 9999. You must specify at least one digit to the left of the decimal point.
A number from 0 to 999. The decimal point and the digits after it are optional.

One of these fixed values:

- **IN**: Inches
- **CM**: Centimeters
- **MM**: Millimeters
- **PELS**: Picture elements (1/240 inch)
- **POINTS**: Points (1/72 inch)

The default is 14IN.

**Usage guidelines:**

- If you specify the unit as PELS or POINTS, specify the value as a whole number with no decimal point.
- This attribute applies to PSF V4R4 or later. Earlier releases ignore it.

**paper-width**

This **single-valued** attribute specifies the width of the paper that is loaded in the printer. The 3800 Line-Mode Conversion and Line-Mode Migration functions in AFP Download Plus can use this value to format line data.

**ISPF field name:** Paper width

**Allowed values:** A value in the format `nnnn.mmmuu`:

- **nnnn**: A number from 0 to 9999. You must specify at least one digit to the left of the decimal point.
- **mmm**: A number from 0 to 999. The decimal point and the digits after it are optional.

One of these fixed values:

- **IN**: Inches
- **CM**: Centimeters
- **MM**: Millimeters
- **PELS**: Picture elements (1/240 inch)
- **POINTS**: Points (1/72 inch)

The default is 13.2IN.

**Usage guidelines:**

- If you specify the unit as PELS or POINTS, specify the value as a whole number with no decimal point.
- This attribute applies to PSF V4R4 or later. Earlier releases ignore it.

**port-number**

This **single-valued** attribute specifies the port number with which PSF is to establish a connection to a TCP/IP-attached printer or to an AFP Download Plus receiver. The value in this attribute must match the TCP/IP port number in the printer or the AFP Download Plus receiver.

**ISPF field name:** Port number
**fssa**

**Allowed values:** You can enter an integer from 1 to 65535. The default is 5001.

**print-error-messages**

This **single-valued** attribute specifies whether PSF should print error messages at the end of a data set. If `fssa-type=afp-download-plus`, PSF saves all messages in a file on the z/OS system instead of printing them.

**ISPF field name:** Print error messages

**Allowed values:** You can enter one of these fixed values:

- **yes** PSF prints or saves error messages until an error occurs that ends processing (default).
- **no** PSF does not print or save error messages unless an error occurs that ends processing. If that happens, only the message group describing the last error is printed or saved.

**print-error-messages-maximum**

This **single-valued** attribute specifies the maximum number of message groups that PSF generates when `print-error-messages=yes`. When the maximum number is reached, PSF stops processing the data set and deletes it from the JES spool.

**ISPF field name:** Print error messages: Maximum messages

**Allowed values:** You can enter an integer from 0 to 999. A value of 0 means the data set is processed until it completes or an error occurs that ends processing of the data set. The default is 16.

**print-error-reporting**

This **single-valued** attribute specifies whether the printer reports character and position errors to PSF. Character errors are caused by trying to use a code point that is not assigned to a character in a font. Position errors are caused by trying to print outside the printable area.

**ISPF field name:** Print error reporting

**Allowed values:** You can enter one of these fixed values:

- **none** Do not report any character or position errors (default).
- **all** Report all character and position errors.
- **character** Report only character errors.
- **position** Report only position errors.

**printer-acquire-interval**

This **single-valued** attribute specifies the number of seconds between the time PSF releases a printer and when PSF tries to acquire it again. This attribute is only used when `printer-release-mode=time`.

**ISPF field name:** Acquire interval

**Allowed values:** You can enter an integer from 0 (default) to 86400.

**printer-connect-interval**

This **single-valued** attribute specifies the number of seconds during which PSF attempts to connect to a printer or to an AFP Download Plus receiver. When the connect interval expires and the connection is not complete, PSF ends the FSA.
**ISPF field name:** Connect interval

**Allowed values:** You can enter an integer from 0 to 86400. 0 means PSF attempts to connect for an unlimited time.

**Default value:** For channel-attached and SNA-attached printers, if this attribute is not specified blank, PSF attempts to connect for an unlimited time. For TCP/IP-attached printers and for AFP Download Plus receivers, PSF attempts to connect for 600 seconds (10 minutes).

**printer-disconnect-interval**
This single-valued attribute specifies the number of seconds until PSF ends the session with an SNA-attached or TCP/IP-attached printer.

**ISPF field name:** Disconnect interval

**Allowed values:** You can enter an integer from 0 (default) to 86400.

**printer-ip-address**
This single-valued attribute specifies the Internet Protocol (IP) address or host name of the TCP/IP-attached printer or the AFP Download Plus receiver.

**ISPF field name:** Printer IP address

**Allowed values:** Specify a valid IP address or host name. You can specify the IP address in dotted-decimal or colon-hexadecimal format. Blanks are not allowed. If the value contains special characters, enclose it in quotation marks. Examples of printer IP addresses are:

- printer-ip-address = 9.99.176.133
- printer-ip-address = pr009.net.xyz.com
- printer-ip-address = PRT009
- printer-ip-address = 2001:0db8:85a3:0000:0000:8a2e:0370:7334

**Usage guidelines:** If you specify a colon-hexadecimal IP address:
- PSF V4R4 or later is required.
- You can omit leading zeroes in each hexadecimal value.
- You can omit one sequence of repeat zero values.
- You can specify the last two hexadecimal values in dotted-decimal notation.

**printer-management-mode**
This single-valued attribute specifies how PSF controls an SNA-attached or TCP/IP-attached printer in deferred-printing mode.

**ISPF field name:** Management mode

**Allowed values:** You can enter one of these fixed values:
- **immediate**: PSF starts a communication session with the printer immediately and then looks for output available on the JES spool.
- **dialin**: PSF starts a session with the printer when the switched line is connected.
- **outavail**: PSF starts a communication session with the printer only when output is available on the JES spool (default).
printer-release-interval
This single-valued attribute specifies the number of seconds after which PSF responds to a request to release a printer in the method specified by the printer-release-mode attribute.

ISPF field name: Release interval

Allowed values: You can enter an integer from 0 (default) to 86400.

printer-release-mode
This single-valued attribute specifies how PSF is to respond to a request to release the printer.

ISPF field name: Release mode

Allowed values: You can enter one of these fixed values:
idle PSF releases the printer when a request to release has been received and the time specified by the printer-release-interval attribute has expired with no output on the spool for the printer.
time PSF starts the timer for the release interval when a release request is received, even when there is more output on the spool.
one PSF does not release the printer (default).

prune-double-byte-fonts
This single-valued attribute specifies whether PSF prunes double-byte raster fonts to reduce the amount of font data sent to the printer.

ISPF field name: Prune double-byte fonts

Allowed values: You can enter one of these fixed values:
yes PSF prunes double-byte raster fonts (default).
no PSF does not prune double-byte fonts.

prune-single-byte-fonts
This single-valued attribute specifies whether PSF prunes single-byte raster fonts to reduce the amount of font data sent to the printer.

ISPF field name: Prune single-byte fonts

Allowed values: You can enter one of these fixed values:
yes PSF prunes single-byte raster fonts (default).
no PSF does not prune single-byte fonts.

psf-send-default-character
This single-valued attribute specifies whether PSF passes the default character information to the printer by fully populating the outline single-byte code page.

ISPF field name: Send default character

Allowed values: You can enter one of these fixed values:
yes PSF passes the default character information to the printer.
no PSF does not pass the default character information to the printer (default).
**recover-from-font-not-found**

This *single-valued* attribute specifies whether PSF should make sure the outline font derived from the mapped font exists before proceeding.

**ISPF field name:** Recover from font not found

**Allowed values:** You can enter one of these fixed values:

- **yes** PSF should do library queries to make sure the mapped font exists before loading it.
- **no** PSF does not need to make sure that the mapped font exists (default).

**Usage guidelines:**

- Specify `recover-from-font-not-found=yes` if your printer supports outline fonts, you have requested that PSF map to outline fonts, and you do not want pages in your job ended because the outline font identified through the mapped font did not exist on the host.
- When you specify `recover-from-font-not-found=yes`, the performance of PSF is degraded because of additional library queries for every mapped font resource.

**release-ds-when-repositioning**

This *single-valued* attribute specifies whether PSF should release data sets to JES when PSF repositions.

**ISPF field name:** Release data set when repositioning

**Allowed values:** You can enter one of these fixed values:

- **yes** PSF releases the data sets when repositioning. The data sets might be reselected in a different order.
- **no** PSF retains data sets during repositioning (default).

**report-line-mode-conversion-paper-length-errors**

This *single-valued* attribute indicates whether the 3800 Line-Mode Conversion function in AFP Download Plus reports an error when the paper length in the FCB does not match the value in the `paper-length` attribute.

**ISPF field name:** Report Line-Mode Conversion paper length errors

**Allowed values:** You can enter one of these fixed values:

- **yes** The Line-Mode Conversion function reports an error. It puts the print job on the hold queue and issues message APS973I.
- **no** The Line-Mode Conversion function does not report an error. It uses the value in the `paper-length` attribute (default).

**Usage guidelines:** This attribute applies to PSF V4R4 or later. Earlier releases ignore it.

**resolution**

This *single-valued* attribute specifies the resolution at which the output was formatted. PSF uses this value to choose the associated resolution system library that has previously been defined by the system programmer.

**ISPF field name:** Resolution
Allowed values: You can enter one of these fixed values:

240 The data was formatted with resources at 240 pels per inch.
300 The data was formatted with resources at 300 pels per inch.

Default value: PSF uses the default system library.

Usage guidelines: The resolution in this attribute is used for all jobs unless the Exit 7 BDSC call overrides it.

response-timeout
This single-valued attribute specifies maximum number of seconds PSF waits for a response from the printer or from the AFP Download Plus receiver.

ISPF field name: Response timeout

Allowed values: You can enter an integer from 0 (default) to 86400.

Usage guidelines: This attribute applies to AFP Download Plus V4R4 or later. Earlier releases ignore it.

restrict-printable-area
This single-valued attribute specifies whether an area on each page of printed output is reserved for the security label.

ISPF field name: Restrict printable area

Allowed values: You can enter one of these fixed values:

yes An area on each page is reserved for the security label.
no An area is not reserved for the security label.

Default value: If this attribute is not specified, PSF sets the value to yes if PSFMPL is active (default) or to no if PSFMPL is not active. For more information, see [PSF for z/OS: Security Guide](#).

retained-fonts
This single-valued attribute specifies the maximum number of fonts that PSF retains in printer storage between print jobs.

ISPF field name: Retained fonts

Allowed values: You can enter a value from 0 to 32767. The default value depends on the type of printer and the amount of storage available in the printer.

Usage guidelines:
- When PSF retains fonts, PSF does not need to reload the same fonts for subsequent jobs. However, retaining fonts requires additional printer storage.
- This value overrides the reasonable resource loading value (RRLV) for fonts that you can specify in the PSF Exit 7 initialization call.
- For information about RRLVs, see [PSF for z/OS: Customization](#).

retained-form-definitions
This single-valued attribute specifies the maximum number of form definitions that PSF retains in virtual storage between print jobs.

ISPF field name: Retained form definitions
Allowed values: You can enter a value from 0 to 32767. The default value is 6.

Usage guidelines:

• When PSF retains form definitions, PSF does not need to reload the same form definitions for subsequent jobs. However, retaining form definitions requires additional virtual storage.
• This value overrides the reasonable resource loading value (RRLV) for form definitions that you can specify in the PSF Exit 7 initialization call.
• For information about RRLVs, see [PSF for z/OS: Customization](#).

retained-object-containers

This **single-valued** attribute specifies the maximum number of object containers that PSF retains in printer storage between print jobs.

**ISPF field name:** Retained object containers

**Allowed values:** You can enter a value from 0 to 32767.

**Default value:** The default value is 0 for 3800 and 3820 printers. The default value is 200 for all other printers.

**Usage guidelines:**

• When PSF retains object containers, PSF does not need to reload the same object containers for subsequent jobs. However, retaining object containers requires additional virtual storage.
• This value overrides the reasonable resource loading value (RRLV) for object containers that you can specify in the PSF Exit 7 initialization call.
• For information about RRLVs, see [PSF for z/OS: Customization](#).

retained-page-definitions

This **single-valued** attribute specifies the maximum number of page definitions that PSF retains in virtual storage between print jobs.

**ISPF field name:** Retained page definitions

**Allowed values:** You can enter a value from 0 to 32767. The default value is 6.

**Usage guidelines:**

• When PSF retains page definitions, PSF does not need to reload the same page definitions for subsequent jobs. However, retaining page definitions requires additional virtual storage.
• This value overrides the reasonable resource loading value (RRLV) for page definitions that you can specify in the PSF Exit 7 initialization call.
• For information about RRLVs, see [PSF for z/OS: Customization](#).

retained-page-segments

This **single-valued** attribute specifies the maximum number of page segments that PSF retains in printer storage between print jobs.

**ISPF field name:** Retained page segments

**Allowed values:** You can enter a value from 0 (default) to 32767.

**Usage guidelines:**


• When PSF retains page segments, PSF does not need to reload the same page segments for subsequent jobs. However, retaining page segments requires additional printer storage.

• This value overrides the reasonable resource loading value (RRLV) for page segments that you can specify in the PSF Exit 7 initialization call.

• For information about RRLVs, see [PSF for z/OS: Customization](#).

**secure-transmission**

This single-valued attribute indicates whether PSF encodes data before sending it to the AFP Download Plus receiver.

**ISPF field name:** Secure transmission

**Allowed values:** You can enter one of these fixed values:

- **yes**  PSF encodes data (default).
- **no**   PSF does not encode data.

**send-messages-on-failure**

This single-valued attribute indicates whether PSF sends all messages to the AFP Download Plus receiver when it cannot send an output data set because of an error or because the operator canceled processing of the data set. The receiver can print the messages to help diagnose errors detected on the sending system, such as data stream errors.

**ISPF field name:** Send messages on failure

**Allowed values:** You can enter one of these fixed values:

- **all**  PSF sends all messages to the receiver in a message data set in MO:DCA-P format (default).
- **generic-only**  PSF sends a generic message in line data format to the receiver to indicate that the output data was not sent.

**send-messages-to-sysout**

This single-valued attribute specifies whether PSF sends a message data set to a SYSOUT data set for redirection to another CLASS or DEST for viewing or printing.

**ISPF field name:** Send msgs to SYSOUT

**Allowed values:** You can enter one of these fixed values:

- **yes**  PSF sends the message data set to a SYSOUT data set.
- **no**   PSF does not send the message data set to a SYSOUT data set.

**send-separator-pages**

This single-valued attribute indicates whether PSF sends the job and data set separator pages for each output data set to the AFP Download Plus receiver.

**ISPF field name:** Send separator pages

**Allowed values:** You can enter one of these fixed values:

- **yes**  PSF sends separator pages to the receiver.
no  PSF does not send separator pages to the receiver (default).

set-3800-dataset-header-origin
This single-valued attribute specifies whether PSF sets the data set header media origin on continuous-forms printers to the top left corner.

**ISPF field name:** Set media origin to 3800 origin for: Data set header

**Allowed values:** You can enter one of these fixed values:

- **yes**  PSF sets the data set header media origin to the top left corner.
- **no**  PSF does not set the data set header media origin to the top left corner (default).

set-3800-dataset-origin
This single-valued attribute specifies whether PSF sets the data set media origin on continuous-forms printers to the top left corner.

**ISPF field name:** Set media origin to 3800 origin for: Data set

**Allowed values:** You can enter one of these fixed values:

- **yes**  PSF sets the data set media origin to the top left corner.
- **no**  PSF does not set the data set media origin to the top left corner (default).

set-3800-job-header-origin
This single-valued attribute specifies whether PSF sets the job header media origin on continuous-forms printers to the top left corner.

**ISPF field name:** Set media origin to 3800 origin for: Job header

**Allowed values:** You can enter one of these fixed values:

- **yes**  PSF sets the job header media origin to the top left corner.
- **no**  PSF does not set the job header media origin to the top left corner (default).

set-3800-job-trailer-origin
This single-valued attribute specifies whether PSF sets the job trailer media origin on continuous-forms printers to the top left corner.

**ISPF field name:** Set media origin to 3800 origin for: Job trailer

**Allowed values:** You can enter one of these fixed values:

- **yes**  PSF sets the job trailer media origin to the top left corner.
- **no**  PSF does not set the job trailer media origin to the top left corner (default).

set-3800-messages-origin
This single-valued attribute specifies whether PSF sets the message data set media origin on continuous-forms printers to the top left corner.

**ISPF field name:** Set media origin to 3800 origin for: Message data set

**Allowed values:** You can enter one of these fixed values:

- **yes**  PSF sets the message data set media origin to the top left corner.
no  PSF does not set the message data set media origin to the top left corner (default).

**snmp-reporting**
This **single-valued** attribute specifies whether PSF supplies printer status information to the z/OS Simple Network Management Protocol (SNMP) agent.

**ISPF field name:**  SNMP reporting

**Allowed values:**  You can enter one of these fixed values:

- **yes**  SNMP reporting is done (default when Infoprint Central is customized).
- **no**  SNMP reporting is not done (default).

**suppress-copy-marks**
This **single-valued** attribute specifies whether PSF should not print copy marks or do offset stacking. This attribute overrides the COPYMARK parameter of the JES initialization statement for the printer.

**ISPF field name:**  Suppress copy marks

**Allowed values:**  You can enter one of these fixed values:

- **yes**  Copy marks are not printed and offset stacking is not done.
- **no**  Copy marks are printed and offset stacking is done if requested in the COPYMARK parameter (default).

**Usage guidelines:**  If you specify ** suppress-copy-marks**=**yes** and also specify any value in the **offset-stacking** attribute, PSF suppresses only the printing of copy marks, while the **offset-stacking** attribute controls when PSF does offset stacking.

**trace-mode**
This **single-valued** attribute specifies the type of tracing that is started during FSA initialization. If the FSA has already started, a new trace mode takes effect the next time the FSA starts.

**ISPF field name:**  Trace mode

**Allowed values:**  You can enter one of these fixed values:

- **none**  PSF: No tracing is started during PSF initialization.
  
  **IP PrintWay:**  The tracing mode in the IP PrintWay FSS definition is used for the FSA (default).

- **internal**  PSF: An internal trace is started (default).
  
  **IP PrintWay:**  Only internal tracing is started.

- **ipds**  PSF: An external trace containing only IPDS data is started. An internal trace is also started.
  
  **IP PrintWay:**  IP PrintWay ignores this value.

- **limit**  PSF: An external trace like the full trace is started. However, information in some data buffers is truncated. An internal trace is also started.
  
  **IP PrintWay:**  IP PrintWay ignores this value.
An FSA SYNC external trace is started. An internal trace is also started.

**IP PrintWay:** IP PrintWay ignores this value.

- **no-printing**
  - PSF: PSF ignores this value and starts only an internal trace.
  - **IP PrintWay:** Internal and external tracing is started, without tracing of record processing. Input records and TCP/IP commands are not traced.

- **full**
  - PSF and **IP PrintWay:** An FSA full external trace is started. An internal trace is also started.

**Usage guidelines for IP PrintWay only:**
- If you specify **full** or **no-printing**, you must start a GTF trace before starting the FSA.
- You can use the MODIFY operator command to stop the trace or to start tracing after an FSA has started.
- You might not want to start a full trace during peak processor usage.

**trace-table-size**
This **single-valued** attribute specifies a number that indicates how many 4 KB pages of storage are allocated for the FSA trace table.

**ISPF field name:** Trace table size

**Allowed values:** You can enter an integer from 1 to 999. The default is 32.

**transmit-recovery-pages**
This **single-valued** attribute specifies how often PSF synchronizes with the AFP Download Plus receiver to determine if the transmitted data has been received and, if necessary, retransmit data from the recovery point. The recovery point is the last time that PSF successfully synchronized with the AFP Download receiver.

**ISPF field name:** Recovery pages

**Allowed values:** A value from 0 to 65535; the default is 1000. When 0 is specified, PSF does not synchronize the transmitted data with the receiver until the end of a file.

**Usage guidelines:** This attribute applies to PSF V4R4 or later. Earlier releases ignore it.

**use-line-mode-migration-linect**
This **single-valued** attribute indicates whether the PSF Line-Mode Migration function uses the number of lines specified in the LINECT parameter when the LINECT value is smaller than the number of lines specified in the FCB.

**ISPF field name:** Use Line-Mode Migration LINECT

**Allowed values:** You can enter one of these fixed values:
- **yes** The Line-Mode Migration function uses the LINECT parameter.
- **no** The Line-Mode Migration function does not use the LINECT parameter. It uses the FCB value (default).
Usage guidelines:
• If the LINECT value is larger than the FCB value, the Line-Mode Migration function uses the FCB value whether or not this attribute is specified.
• This attribute applies to PSF V4R4 or later. Earlier releases ignore it.

Attributes for the job selection rule object class
This section lists attributes that are valid when you create job selection rules, which are in object class job-selection-rule. This class applies only to IP PrintWay extended mode.

IP PrintWay extended mode uses the job selection rules to determine which output data sets (also called print jobs) to select from the JES spool for printing. You must create at least one job selection rule for IP PrintWay to select print jobs. You can create as many job selection rules as you need. The attributes of the print job must match all of the values in a rule to be selected.

Required attributes
All attributes are optional. If you do not specify any attributes, IP PrintWay extended mode selects all output data sets.

creator-userid
This single-valued attribute specifies the user ID of the person who submitted the print job.

If you also specify another attribute that is used for selecting print jobs, the print jobs must match the values in all attributes to be selected. This attribute applies only to IP PrintWay extended mode.

Specify this attribute only to select print jobs that a z/OS user ID owns. Print jobs that a z/OS user ID owns are those submitted using JCL, the lp command, or the AOPPRINT JCL procedure. You cannot use this attribute to select other print jobs—for example, print jobs submitted from remote systems that Print Interface allocated on the JES spool or print jobs that NetSpool allocated on the JES spool. This is because the owner name associated with NetSpool and most Print Interface print jobs is stored separately from the user name that JES records for print jobs. IP PrintWay selects only print jobs that this user ID submitted.

ISPF field name: Creator

Allowed values: Any combination of 1-8 letters (a-z, A-Z), numbers (0-9), and certain special characters (# $ @ * ?). The first character cannot be a number. Blanks and other special characters are not allowed. You can enter one or more asterisks in any position in the ID to represent zero or more unknown characters. You can enter one or more question marks in any position in the ID to represent one unknown character. If the value contains special characters, enclose it in single or double quotation marks. Lowercase letters are converted to uppercase. For example:

creator-userid = "userid#1"

Default value: None.

description
This single-valued attribute specifies the description of a job selection rule. This attribute applies only to IP PrintWay extended mode.
job selection rule

**ISPF field name:** Description

**Allowed values:** Any combination of 1-256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / - ). If the value contains blanks or special characters, enclose it in single or double quotation marks. For example:

description = "Select overnight print jobs in Class-N"

**Default value:** None.

**dest-ip-address**
This single-valued attribute specifies whether IP PrintWay selects print jobs that specify an IP address in the DEST=IP: parameter on the OUTPUT JCL statement.

If you also specify another attribute that is used for selecting print jobs, the print jobs must match the values in all attributes to be selected. This attribute applies only to IP PrintWay extended mode.

**Tip:** Print jobs that Infoprint Server creates on the JES spool do not specify an IP address.

**ISPF field name:** DEST IP address

**Allowed values:** You can enter one of these fixed values:
- **include** Select only print jobs that specify an IP address.
- **exclude** Do not select any print jobs that specify an IP address.
- **ignore** Select any print jobs, regardless of whether they specify an IP address (default).

**destination-pattern**
This single-valued attribute lets you specify that IP PrintWay selects only print jobs with this destination name.

If you also specify another attribute that is used for selecting print jobs, the print jobs must match the values in all attributes to be selected. This attribute applies only to IP PrintWay extended mode.

**ISPF field name:** DEST

**Allowed values:** Any combination of 1-8 letters (a-z, A-Z), numbers (0-9), and certain special characters (# $ @ * ? ). Blanks and other special characters are not allowed. You can enter one or more asterisks in any position in the name to represent zero or more unknown characters. You can enter one or more question marks in any position in the name to represent one unknown character. If the value contains special characters, enclose it in single or double quotation marks. Lowercase letters are converted to uppercase. For example:

destination-pattern = "8003*"

In JES2, R*, RM*, RMT*, U*, and N* do not match print jobs with a JES route code of remote, special local, local, anylocal, or NJE. Also, do not specify an asterisk for destinations that JES DESTID initialization statements define.

**Default value:** None.
job selection rule

forms-list
This multi-valued, list attribute lets you specify that IP PrintWay selects only print jobs with one of these form names.

If you also specify another attribute that is used for selecting print jobs, the print jobs must match the values in all attributes to be selected. This attribute applies only to IP PrintWay extended mode.

ISPF field name: FORMS

Allowed values: You can specify 1-8 forms names. Each forms name can be any combination of 1-8 letters (a-z, A-Z), numbers (0-9), and certain special characters (# $ @ * ?). Blanks and other special characters are not allowed. You can enter one or more asterisks in any position in the name to represent zero or more unknown characters. You can enter one or more question marks in any position in the name to represent one unknown character. If the value contains special characters, enclose it in single or double quotation marks. If you specify more than one forms name, separate them with spaces and enclose the list in braces. Lowercase letters are converted to uppercase. For example:

forms-list = {ACCT4010 "ST*D"}

Default value: None.

jes-writer-pattern
This single-valued attribute specifies the external writer, which is an IBM- or installation-written program. IP PrintWay selects only print jobs with this writer name.

If you also specify another attribute that is used for selecting print jobs, the print jobs must match the values in all attributes to be selected. This attribute applies only to IP PrintWay extended mode.

ISPF field name: WRITER

Allowed values: Any combination of 1-8 letters (a-z, A-Z), numbers (0-9), and certain special characters (# $ @ * ?). Blanks and other special characters are not allowed. You can enter one or more asterisks in any position in the name to represent zero or more unknown characters. You can enter one or more question marks in any position in the name to represent one unknown character. If the value contains special characters, enclose it in single or double quotation marks. Lowercase letters are converted to uppercase. For example:

jes-writer-pattern = "EXTWTR*"

Default value: None.

job-selection-status
This single-valued attribute specifies whether IP PrintWay uses the job selection rule to determine which print jobs to select from the JES spool for printing. This attribute applies only to IP PrintWay extended mode.

Allowed values: You can enter one of these fixed values:

enabled IP PrintWay uses the job selection rule (default).
disabled IP PrintWay does not use the job selection rule.
**job selection rule**

**lower-page-limit**
This single-valued attribute specifies the lower limit for the total number of pages in all AFP documents (data sets) in a print job (output group). The total pages must be equal to or greater than the lower limit.

If you also specify another attribute that is used for selecting print jobs, the print jobs must match the values in all attributes to be selected. This attribute applies only to IP PrintWay extended mode.

**ISPF field name:** Page limit: Lower

**Allowed values:** A number from 0 to 2147483647.

**Default value:** None.

**Usage guidelines:**
- If you specify this attribute and do not specify the upper-page-limit attribute, the upper limit is 2147483647.
- If you do not specify this attribute and do not specify upper-page-limit, IP PrintWay extended mode does not select print jobs based on the number of pages.
- JES calculates the number of pages in a print job.
- If you run JES3 for V1R12 or V1R11, do not specify this attribute.

**lower-record-limit**
This single-valued attribute specifies the lower limit for the total number of records in all non-AFP documents (data sets) in a print job (output group). The total records must be equal to or greater than the lower limit.

If you also specify another attribute that is used for selecting print jobs, the print jobs must match the values in all attributes to be selected. This attribute applies only to IP PrintWay extended mode.

**ISPF field name:** Record limit: Lower

**Allowed values:** A number from 0 to 2147483647.

**Default value:** None.

**Usage guidelines:**
- If you specify this attribute and do not specify the upper-record-limit attribute, the upper limit is 2147483647.
- If you do not specify this attribute and do not specify upper-record-limit, IP PrintWay extended mode does not select print jobs based on the number of records.
- JES calculates the number of records in a print job.
- Depending on the program that creates the print job, a record is not always equivalent to one printed line. For example, Print Interface creates records that can contain up to 32K bytes of data.
- If you run JES3 for V1R12 or V1R11, do not specify this attribute.

**name**
This single-valued attribute specifies the name of a job selection rule. This attribute applies only to IP PrintWay extended mode.
job selection rule

Note: This is a *non-settable* attribute. Do not specify the *name* attribute on the 
PIDU create, force-create, or modify command. Instead, specify the name as 
an operand on the command. However, you can specify the *name* attribute 
when you construct a condition for the *where* predicate on the list and 
export commands.

**ISPF field name:** Rule name

**Allowed values:** Any combination of 1-17 letters (a-z, A-Z), numbers (0-9), and 
special characters (such as # $ @ ! = / - ). Blanks are not allowed. If the value 
contains special characters, enclose it in single or double quotation marks. For 
example:

\[
\text{name} = "\text{Class-N}"
\]

**Default value:** None.

**operator-security-profile**

This *single-valued* attribute specifies the name of the RACF resource profile in the 
PRINTSRV class that controls who can work with this job selection rule using 
z/OS Infoprint Central. This attribute applies only to IP PrintWay extended mode.

**Tips:**
1. You can specify the same operator security profile in all job selection rules.
2. For information about the PRINTSRV class, see [z/OS Infoprint Server Customization](#).

**ISPF field name:** Operator security profile

**Allowed values:** A combination of letters, numbers, and special characters except 
for commas, semicolons, parentheses, and blanks. If the value contains special 
characters, enclose it in single or double quotation marks. Lowercase letters are 
converted to uppercase. Do not start names with AOP. For example:

\[
\text{operator-security-profile} = "\text{DENVER.001}"
\]

**Default value:** None.

**output-class-list**

This *multi-valued, list* attribute lets you specify that IP PrintWay selects only print 
jobs in one of these JES output classes.

If you also specify another attribute that is used for selecting print jobs, the print 
jobs must match the values in all attributes to be selected. This attribute applies 
only to IP PrintWay extended mode.

**ISPF field name:** CLASS

**Allowed values:** You can specify 1-36 output classes. Each output class can be a 
letter (a-z, A-Z) or a number (0-9). Blanks and special characters are not allowed. If 
you specify more than one output class, separate them with spaces and enclose the 
list in braces. For example:

\[
\text{output-class-list} = \{\text{A J 8}\}
\]

**Default value:** None.
**job selection rule**

**upper-page-limit**
This single-valued attribute specifies the upper limit for the total number of pages in all AFP documents (data sets) in a print job (output group). The total pages must be equal to or less than the upper limit.

If you also specify another attribute that is used for selecting print jobs, the print jobs must match the values in all attributes to be selected. This attribute applies only to IP PrintWay extended mode.

**ISPF field name:** Page limit: Upper

**Allowed values:** A number from 0 to 2147483647.

**Default value:** None.

**Usage guidelines:**
- If you specify this attribute and do not specify the lower-page-limit attribute, the lower limit is 0.
- If you do not specify this attribute and do not specify lower-page-limit, IP PrintWay extended mode does not select print jobs based on the number of pages.
- JES calculates the number of pages in a print job.

**upper-record-limit**
This single-valued attribute specifies the upper limit for the total number of records in all non-AFP documents (data sets) in a print job (output group). The total records must be equal to or less than the upper limit.

If you also specify another attribute that is used for selecting print jobs, the print jobs must match the values in all attributes to be selected. This attribute applies only to IP PrintWay extended mode.

**ISPF field name:** Record limit: Upper

**Allowed values:** A number from 0 to 2147483647.

**Default value:** None.

**Usage guidelines:**
- If you specify this attribute and do not specify the lower-record-limit attribute, the lower limit is 0.
- If you do not specify this attribute and do not specify lower-record-limit, IP PrintWay extended mode does not select print jobs based on the number of records.
- JES calculates the number of records in a print job.
- Depending on the program that creates the print job, a record is not always equivalent to one printed line. For example, Print Interface creates records that can contain up to 32K bytes of data.

**Attributes for the netspool-eof-rules object class**
This section lists two of the attributes that are valid when you create NetSpool End-of-File components, which are in object class netspool-eof-rules. These attributes are also valid for the printer object class.
**netspool-eof-rules and printer**

Due to the complexity of the other attributes that are valid for the `netspool-eof-rules` object class, these attributes are not described here. IBM suggests that you use the Infoprint Server ISPF panels to specify end-of-file rules.

**Required attributes**

All attributes are optional.

**description**

This *single-valued* attribute specifies a description for the component. The description can help you select the correct component from a list.

**ISPF field name:** Description

**Allowed values:** Any combination of 1-256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ != / - ). If the value contains blanks or special characters, enclose it in single or double quotation marks.

**Default value:** None.

**name**

This *single-valued* attribute specifies the name of the component.

**Note:** This is a *non-settable* attribute. Do not specify `name` on the PIDU `create`, `force-create`, or `modify` command. Instead, specify the name as an operand on the command. However, you can specify this attribute when you construct a condition for the `where` predicate on the `list` and `export` commands.

**ISPF field name:** Component Name

**Allowed values:** Any combination of 1-17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . = / ). Blank characters are not allowed.

**Default value:** None.

**Attributes for the netspool-options object class**

This section lists attributes that are valid when you create NetSpool Options components, which are in object class `netspool-options`. These attributes are also valid for the `printer` object class.

**Required attributes**

All attributes are optional.

**default-owner**

This *single-valued* attribute specifies the default Infoprint Server job owner for the associated logical unit (LU) if the print data does not specify an owner. The job owner is used for output data sets created for this NetSpool LU.

**ISPF field name:** Default owner

**Allowed values:** A combination of 1-8 letters (a-z, A-Z), numbers (0-9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If the value contains special characters, enclose it in single or double quotation marks. Lowercase letters are converted to uppercase.
**netspool-options and printer**

**Default value:** NetSpool uses the ID of the user who started the Infoprint Server daemons as the default job owner.

**Usage guidelines:**
- The Infoprint Server job owner helps you find jobs using Infoprint Central.
- The job owner in this attribute is also used as the JES job name if no other owner or job name is specified in the print data.
- The job owner specified in this field is not used as the JES job owner. The JES job owner is always the ID of the user who started the Infoprint Server daemons.

**description**
This **single-valued** attribute specifies a description for the component. The description can help you select the correct component from a list.

**ISPF field name:** Description

**Allowed values:** Any combination of 1-256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose it in single or double quotation marks.

**Default value:** None.

**embedded-attributes-prefix**
This **single-valued** attribute specifies the prefix that identifies job attributes embedded in the print data. For information about how to embed job attributes in VTAM application print data, see [z/OS Infoprint Server User’s Guide](#). NetSpool uses the embedded job attributes when it allocates an output data set on the spool.

**ISPF field name:** Embedded attributes prefix

**Allowed values:** A 1-12 character string (1-12 bytes of data if specified in hexadecimal format). To enter a hexadecimal value, begin the value with the letter x and enclose the value in single or double quotation marks.

**Example:** `embedded-attributes-prefix = "<<ibmjobattr"`

**Default value:** None. If you do not specify this attribute, NetSpool does not use job attributes specified in the print data.

**maximum-record-size**
This **single-valued** attribute specifies the maximum record size for the variable-length records that NetSpool writes to the output data set when `netspool-formatting=none`.

**ISPF field name:** Maximum record size

**Allowed values:** An integer from 1 to 32752.

**Default value:** NetSpool uses 32752 as the maximum record size.

**Usage guidelines:**
- If the length of the data in the input Request Unit (RU) is less than this value, NetSpool writes one record.
- If the length of the data in the input RU is greater than this value, NetSpool writes multiple records.
netspool-options and printer

- If `netspool-formatting=convert-to-line` (default) or `netspool-formatting=convert-to-pcl`, do not specify this attribute.

name
This single-valued attribute contains the name of the component.

Note: This is a non-settable attribute. Do not specify the name attribute on the PIDU create, force-create, or modify command. Instead, specify the name as an operand on the command. However, you can specify the name attribute when you construct a condition for the where predicate on the list and export commands.

ISPF field name: Component Name

Allowed values: Any combination of 1-17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blank characters are not allowed.

Default value: None.

netspool-formatting
This single-valued attribute specifies the type of formatting that NetSpool does before writing the input data to an output data set on the JES spool.

ISPF field name: Formatting

Allowed values: You can enter one of these fixed values:

- `none` NetSpool writes the input data without change to the output data set. NetSpool uses values specified in these attributes:
  - `maximum-record-size`
  - `recfm`
  NetSpool does not call any exits.

- `convert-to-line`
  NetSpool converts SNA character stream (SCS) and 3270 data streams into line data streams. As an option, specify these attributes in the processing object class, which NetSpool uses during conversion:
  - `scs-bottom-margin`
  - `scs-horizontal-tabs`
  - `scs-left-margin`
  - `scs-maximum-line-length`
  - `scs-maximum-page-length`
  - `scs-right-margin`
  - `scs-top-margin`
  - `scs-vertical-tabs`
  Synonym: standard

- `convert-to-pcl`
  NetSpool converts SNA character stream (SCS) and 3270 data streams into PCL data streams. As an option, specify these attributes in the processing object class, which NetSpool uses during conversion:
  - `pcl-line-density`
  - `pcl-orientation`
  - `pcl-print-density`
  - `scs-automatic-page-orientation`
**netspool-options and printer**

- `scs-bottom-margin`
- `scs-horizontal-tabs`
- `scs-left-margin`
- `scs-maximum-line-length`
- `scs-maximum-page-length`
- `scs-right-margin`
- `scs-top-margin`
- `scs-vertical-tabs`

**Default value:** convert-to-line

**Usage guidelines:** If you specify `netspool-formatting=none`, do not specify the `busy-interval` or `idle-interval` attributes.

**recfm**

This **single-valued** attribute specifies the record format (RECFM) for the output data sets that NetSpool writes to the JES spool when `netspool-formatting=none`.

**ISPF field name:** Recfm

**Allowed values:** You can enter one of these fixed values:

- `vb` Variable length, blocked records
- `vba` Variable length, blocked records, with ANSI carriage control characters
- `vbm` Variable length, blocked records, with machine carriage control characters

**Default value:** NetSpool writes variable length, blocked records.

**Usage guidelines:** If `netspool-formatting=convert-to-line` (default) or `netspool-formatting=convert-to-pcl`, do not specify this attribute. NetSpool ignores it if specified.

**Attributes for the printer object class**

This section lists the attributes that are valid when you create printer definitions, which are in object class `printer`. In addition to these attributes, you can also specify attributes that are valid for the object classes listed in [Table 45](#). Some object classes listed in the table are valid only for certain printer types, as defined by the `printer-type` attribute.

**Table 45. Object classes whose attributes are valid for printer object class**

<table>
<thead>
<tr>
<th>Object class</th>
<th>Valid for printer type</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>allocation</td>
<td>All types</td>
<td>[290]</td>
</tr>
<tr>
<td>netspool-eof-rules</td>
<td>All types</td>
<td>[376]</td>
</tr>
<tr>
<td>netspool-options</td>
<td>All types</td>
<td>[376]</td>
</tr>
<tr>
<td>printway-options</td>
<td>general, ip-printway</td>
<td>[392]</td>
</tr>
<tr>
<td>processing</td>
<td>All types</td>
<td>[406]</td>
</tr>
<tr>
<td>protocol</td>
<td>ip-printway</td>
<td>[427]</td>
</tr>
</tbody>
</table>

**Required attributes**

For Infoprint Server to display the correct ISPF panels for a printer definition, you must specify the `printer-type` attribute.
NetSpool requires the luname attribute.

Also, see the list of attributes for the other object classes whose attributes are valid for the printer object class. Table 45 on page 379 summarizes these object classes. These object classes identify other required attributes.

**dcf-routing**

This single-valued attribute specifies whether job submitters can use the DEST, CLASS, and FORMS JCL parameters to select this printer definition. For more information, see “Using DEST, CLASS, and FORMS to select a printer definition” on page 161.

**ISPF field name:** Use DEST, CLASS, and FORMS for IP PrintWay printer selection

**Allowed values:** You can enter one of these fixed values:

- **yes** The DEST, CLASS, and FORMS parameters can be used to select this printer definition.
- **no** The DEST, CLASS, and FORMS cannot be used to select this printer definition.

**Default value:** IP PrintWay does not let job submitters select this printer using the DEST, CLASS, and FORMS parameters.

**Usage guidelines:**

- This attribute applies only for IP PrintWay printer definitions (printer-type = ip-printway).
- If you select yes, you must also specify a value for one or more of these attributes: output-class, destination, or forms. If you omit one of these attributes, IP PrintWay does not use the corresponding JCL parameter for printer selection. The values for the output-class, destination, and forms attributes must, together, be unique in all printer definitions with dcf-routing = yes.
- Set this attribute to yes if you are migrating IP PrintWay routing entries and want to continue to use DEST, CLASS, and FORMS as selection criteria.
- Regardless of the value of this attribute, a job submitter can specify a printer name on an OUTPUT JCL statement to select this printer definition (in the FSSDATA parameter).

**description**

This single-valued attribute specifies a description for the printer definition. The description can help users select a printer definition.

**ISPF field name:** Description

**Allowed values:** Any combination of 1-256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose it in single or double quotation marks.

**Default value:** None.

**general-spooling-mode**

This single-valued attribute indicates how Print Interface writes the input data to the output data set on the JES spool when printer-type=general. Select a value that is suitable for the printer. spooling-mode is an alias for this attribute.
ISPF field name: Spooling mode

Allowed values: You can enter one of these fixed values:

- **line**: Print Interface writes the data in records. This value is suitable for JES and AFP printers.
- **stream**: Print Interface writes the data as a data stream, with control characters to indicate the end of lines. This value is suitable for ASCII printers.

Default value: **line**

Usage guidelines: This attribute applies only for General printer definitions (printer-type=general). It is ignored if printer-type=psf-mvs or printer-type=ip-printway.

include-allocation
This single-valued attribute specifies the name of the Allocation component to be included in this printer definition. An Allocation component is an object in object-class allocation.

ISPF field name: Component name

Allowed values: Any combination of 1-17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . = /). Blanks are not allowed. If the value contains special characters, enclose it in single or double quotation marks.

Default value: No Allocation component is included in the printer definition.

Usage guidelines: All attributes specified in this component apply to the printer definition. To override an attribute from the component, specify the attribute on the create or modify command for the printer definition.

include-netspool-eof-rules
This single-valued attribute specifies the name of a NetSpool End-of-File component to be included in this printer definition. A NetSpool End-of-File component is an object in object-class netspool-eof-rules.

ISPF field name: Component name

Allowed values: Any combination of 1-17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . = /). Blanks are not allowed. If the value contains special characters, enclose it in single or double quotation marks.

Default value: No NetSpool End-of-File component is included in the printer definition.

Usage guidelines: All attributes specified in this component apply to the printer definition. To override an attribute from the component, specify the attribute on the create or modify command for the printer definition.

include-netspool-options
This single-valued attribute specifies the name of a NetSpool Options component to be included in this printer definition. A NetSpool Options component is an object in object-class netspool-options.

ISPF field name: Component name
**Allowed values:** Any combination of 1-17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blanks are not allowed. If the value contains special characters, enclose it in single or double quotation marks.

**Default value:** No NetSpool Options component is included in the printer definition.

**Usage guidelines:** All attributes specified in this component apply to the printer definition. To override an attribute from the component, specify the attribute on the `create` or `modify` command for the printer definition.

### include-printway-options

This **single-valued** attribute specifies the name of an IP PrintWay Options component to be included in this printer definition. An IP PrintWay Options component is an object in object-class `printway-options`.

**ISPF field name:** Component name

**Allowed values:** Any combination of 1-17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blanks are not allowed. If the value contains special characters, enclose it in single or double quotation marks.

**Default value:** No IP PrintWay Options component is included in the printer definition.

**Usage guidelines:**

- All attributes specified in this component apply to the printer definition. To override an attribute from the component, specify the attribute on the `create` or `modify` command for the printer definition.
- This attribute applies only to IP PrintWay and General printer definitions (`printer-type=ip-printway` and `printer-type=general`).

### include-processing

This **single-valued** attribute specifies the name of a Processing component to be included in this printer definition. A Processing component is an object in object-class `processing`.

**ISPF field name:** Component name

**Allowed values:** Any combination of 1-17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blanks are not allowed. If the value contains special characters, enclose it in single or double quotation marks.

**Default value:** No Processing component is included in the printer definition.

**Usage guidelines:** All attributes specified in this component apply to the printer definition. To override an attribute from the component, specify the attribute on the `create` or `modify` command for the printer definition.

### include-protocol

This **single-valued** attribute specifies the name of a Protocol component to be included in this printer definition. A Protocol component is an object in object-class `protocol`.

**ISPF field name:** Component name
**Located in:** Chapter 17. Using the PIDU program to manage the Printer Inventory

---

### Printer

**Allowed values:** Any combination of 1-17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blanks are not allowed. If the value contains special characters, enclose it in single or double quotation marks.

**Default value:** No Protocol component is included in the printer definition.

**Usage guidelines:**
- All attributes specified in this component apply to the printer definition. To override an attribute from the component, specify the attribute on the create or modify command for the printer definition.
- This attribute applies only to IP PrintWay printer definitions (printer-type=ip-printway).

### Location

This **single-valued** attribute lets you specify the location of the printer. The location can help users select and find printers.

**ISPF field name:** Location

**Allowed values:** Any combination of 1-256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = /). If a value contains blanks or special characters, enclose the value in quotation marks.

**Default value:** None.

**Usage guidelines:**
- If you use the same format to specify the location in all printer definitions (for example: Bldg 3/Col 2), you can find all printer definitions with similar locations, such as all printers in Bldg 3.
- If more than one printer definition exists for the same IP PrintWay printer, specify the same location in all printer definitions for the printer so Infoprint Central can find the printer.

### Lu-classes

This **multi-valued, list** attribute identifies from one to sixty-four logical-unit (LU) classes for this NetSpool LU. If you specify more than one class, the NetSpool LU is assigned to all of the specified classes.

**ISPF field name:** LU classes

**Allowed values:** An integer from 1 to 64. You can specify a list of up to 64 classes. If you specify more than one LU class, separate the LU classes by spaces and surround the list of LU classes with braces. For example:

```
lu-classes={1 4 64}
```

**Default value:** {1}

**Usage guidelines:** When NetSpool starts, it starts LUs according to LU class. Therefore, specify the same LU class for all NetSpool LUs that you want to start at the same time.

### Luname

This **single-valued** attribute specifies the logical unit (LU) name that NetSpool uses to identify this printer. This name must be a unique LU name in the Printer Inventory.
**ISPF field name:** NetSpool LU name

**Allowed values:** A combination of 1-8 letters (a-z, A-Z), numbers (0-9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If the value contains special characters, enclose it in single or double quotation marks. Lowercase letters are converted to uppercase.

**Default value:** None.

**Usage guidelines:**
- This attribute is required for NetSpool to start a session with this printer.
- The name must match the LU name specified in the ACBNAME field of the VTAM APPL definition statement.

**name**
This **single-valued** attribute specifies the name of the printer definition.

**Note:** This is a **non-settable** attribute. Do not specify the name attribute on the PIDU create, force-create, or modify command. Instead, specify the name as an operand on the command. However, you can specify the name attribute when you construct a condition for the where predicate on the list and export commands.

**ISPF field name:** Printer Definition Name

**Allowed values:** Any combination of 1-17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # . * = /). Blank characters are not allowed.

**Default value:** None.

**printer-type**
This **single-valued** attribute specifies the type of printer definition.

**ISPF field name:** None.

**Allowed values:** You can enter one of these fixed values:

- **general** A printer definition for printers that are neither IP PrintWay nor PSF types.
- **ip-printway** A printer definition for remote printers in your TCP/IP or SNA network to which IP PrintWay transmits data.
- **psf-mvs** A printer definition for AFP printers controlled by PSF.

**Default value:** The Infoprint Server ISPF panels display the printer definition as a General printer definition. Print Interface writes data to the output data set on the JES spool in records (general-spooling-mode=line).

**Attributes for the printer-pool object class**
This section lists attributes that are valid when you create printer pool definitions, which are in object class **printer-pool**.

**Required attributes**
NetSpool requires these attributes:
- lu-classes
All other attributes are optional.

**default-owner**
This single-valued attribute specifies the default Infoprint Server job owner for the associated logical unit (LU) if the print data does not specify an owner. The job owner is used for output data sets created for this NetSpool LU.

**ISPF field name:** Default owner

**Allowed values:** A combination of 1-8 letters (a-z, A-Z), numbers (0-9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If the value contains special characters, enclose it in single or double quotation marks. Lowercase letters are converted to uppercase.

**Default value:** NetSpool uses the ID of the user who started the Infoprint Server daemons as the default job owner.

**Usage guidelines:**
- The Infoprint Server job owner helps you find jobs using Infoprint Central.
- The job owner in this attribute is also used as the JES job name if no other owner or job name is specified in the print data.
- The job owner specified in this field is not used as the JES job owner. The JES job owner is always the ID of the user who started the Infoprint Server daemons.

**description**
This single-valued attribute specifies a description for the printer definition. The description can help users select a printer definition.

**ISPF field name:** Description

**Allowed values:** Any combination of 1-256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose it in single or double quotation marks.

**Default value:** None.

**embedded-attributes-prefix**
This single-valued attribute specifies the prefix that identifies job attributes embedded in the print data. For information about how to embed job attributes in VTAM application print data, see [z/OS Infoprint Server User’s Guide](https://www.ibm.com/support/docview/z/os/infoprint-server-guide). NetSpool uses the embedded job attributes when it allocates an output data set on the spool.

**ISPF field name:** Embedded attributes prefix

**Allowed values:** A 1-12 character string (1-12 bytes of data if specified in hexadecimal format). To enter a hexadecimal value, begin the value with the letter x and enclose the value in single or double quotation marks.

**Example:** embedded-attributes-prefix = "<ibmjobattr"
Default value: None. If you do not specify this attribute, NetSpool does not use job attributes specified in the print data.

**include-netspool-eof-rules**

This *single-valued* attribute specifies the name of a NetSpool End-of-File component to be included in this printer pool definition. A NetSpool End-of-File component is an object in object-class *netspool-eof-rules*.

**ISPF field name:** NetSpool end-of-file component

**Allowed values:** Any combination of 1-17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . = / ). Blanks are not allowed. If the value contains special characters, enclose it in single or double quotation marks. Be sure to specify the correct uppercase and lowercase letters.

Default value: No NetSpool End-of-File component is included in the printer definition.

**Usage guidelines:** All attributes specified in this component apply to the printer pool definition.

**lu-classes**

This *multi-valued, list* attribute identifies from one to sixty-four logical-unit (LU) classes for this NetSpool LU. If you specify more than one class, the NetSpool LU is assigned to all of the specified classes.

**ISPF field name:** LU classes

**Allowed values:** A number from 1 to 64. You can specify a list of up to 64 classes. If you specify more than one LU class, separate the LU classes with spaces and enclose the list in braces. For example:

```
lu-classes={1 4 64}
```

Default value: None.

**Usage guidelines:**

- NetSpool requires this attribute.
- When NetSpool starts, it starts LUs according to LU class. Therefore, specify the same LU class for all NetSpool LUs that you want to start at the same time.

**luname**

This *single-valued* attribute specifies the logical unit (LU) name that NetSpool uses to identify this printer pool definition. This name must be a unique LU name in the Printer Inventory.

**ISPF field name:** LU name

**Allowed values:** A combination of 1-8 letters (a-z, A-Z), numbers (0-9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If the value contains special characters, enclose it in single or double quotation marks. Lowercase letters are converted to uppercase.

Default value: None.
printer-pool

Usage guidelines:
- NetSpool requires this attribute to start a session with this printer.
- This name must match the LU name specified in the ACBNAME field of the VTAM APPL definition statement.

name
This single-valued attribute specifies the name of the printer pool definition.

Note: This is a non-settable attribute. Do not specify the name attribute on the PIDU create, force-create, or modify command. Instead, specify the name as an operand on the command. However, you can specify the name attribute when you construct a condition for the where predicate on the list and export commands.

ISPF field name: Pool Name

Allowed values: Any combination of 1-17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blank characters are not allowed.

Default value: None.

printer-names
This multi-valued list attribute specifies the names of one or more printer definitions. The printer definitions must exist in the Printer Inventory. NetSpool creates an output data set on the JES spool for each printer definition.

ISPF field name: Printer definition names

Allowed values: A list of one or more printer definition names. Separate the names with spaces and enclose the list of names with braces. For example:
printer-names={name1 name2 name3}

Default value: None.

Usage guidelines:
- NetSpool requires this attribute.
- NetSpool uses these attributes defined for the first printer definition in the list. NetSpool ignores these attributes defined in subsequent printer definitions:
  - netspool-formatting, maximum-record-size, recfm
  - scs-left-margin, scs-right-margin, scs-top-margin, scs-bottom-margin
  - scs-maximum-line-length, scs-maximum-page-length
  - horizontal-tab, vertical-tab

Attributes for the printway-fss object class
This section lists attributes that are valid when you create IP PrintWay FSS definitions, which are in object class printway-fss. FSS definitions do not apply to IP PrintWay extended mode.

Required attributes
All attributes are optional.

applid
This single-valued attribute specifies the application program ID that IP PrintWay uses to establish a VTAM session with a printer. This ID must match the name of
an APPL statement defined to VTAM. This field is required if the VTAM protocol type is selected in any printer definition used by this IP PrintWay FSA.

**ISPF field name:** Applid

**Allowed values:** A valid combination of 1-8 letters, numbers, and national characters (# $ @). The first character cannot be numeric. Lowercase characters are converted to uppercase.

**Default value:** None.

**Usage guidelines:** You must install Coaxial Printer Support V2 for z/OS and define the APPL statement to VTAM before you specify this attribute and restart the IP PrintWay FSS. Otherwise, IP PrintWay abends.

**concatenation-separators**

This single-valued attribute controls when IP PrintWay sends records to the printer that the Begin Data Set exit or the End Data Set exit adds. This attribute applies only when the `dataset-grouping=concatenate-job` attribute is specified in the printer definition.

**ISPF field name:** None

**Allowed values:** You can enter one of these fixed values:

- **document**
  
  IP PrintWay sends the records that the Begin Data Set adds at the beginning of each document in the print job. It sends the records that the End Data Set adds at the end of each document in the print job. This lets the exits add different records for each document in the same print job. For example, the exits might add records that contain different printer commands (such as PCL commands). However, if the exits add text for separator pages, extra separator pages can print before and after each copy of a document.

- **job**
  
  IP PrintWay sends the records that the Begin Data Set adds at the beginning of the first document in the print job. It sends the records that the End Data Set exit adds at the end of the last document in the print job. If the exit adds text for separator pages, extra separator pages do not print before and after each copy of a document.

**Default value:** job

**Usage guidelines:**

- Specify `concatenation-separators=document` only if the Begin Data Set exit or the End Data Set exit adds printer commands (such as PCL commands) in records and the exits add different printer commands for different documents within the same print job. You should recode these exits to specify the same printer commands in the document header and document trailer fields in the ANFUEXTP control block in the Begin Data Set exit so that extra separator pages do not print. For information about how to specify printer commands in the Begin Data Set exit, see [[OS Infoprint Server Customization]].

- After you recode the Begin Data Set and End Data Set exits to specify printer commands in the document header and document trailer fields in the ANFUEXTP control block, either remove this attribute or specify the `concatenation-separators=job` attribute.
**IP PrintWay extended mode** always sends the records that the Begin Data Set exit adds at the beginning of the first document in the print job. It sends the records that the End Data Set exit adds at the end of the last document in the print job. This function is equivalent to the IP PrintWay basic mode function when you specify the `concatenation-separators=job` attribute.

You cannot use the ISPF panels to specify this attribute. You must use the z/OS UNIX `pidu` command:

- To create a new IP PrintWay FSS definition and specify this attribute, enter this command:
  ```
  pidu -c "create printway-fss fssname concatenation-separators=document;"
  ```
- To modify an existing IP PrintWay FSS definition to specify this attribute, enter this command:
  ```
  pidu -c "modify printway-fss fssname concatenation-separators=document;"
  ```
- To delete this attribute from the FSS definition, enter this command:
  ```
  pidu -c "modify printway-fss fssname concatenation-separators=null;"
  ```

In these examples, `fssname` is the name of the IP PrintWay FSS as defined to JES. For information about how to specify the name of the IP PrintWay FSS definition, see [z/OS InfoPrint Server Customization](https://www.ibm.com). 

**default-document-codepage**

This **single-valued** attribute specifies the name of a default EBCDIC code page to use as the source code page when IP PrintWay translates data from EBCDIC to ASCII.

**ISPF field name:** Document code page

**Allowed values:** A valid code page name. An example of a valid code page is:

```
default-document-codepage = IBM-037
```

**Default value:** IP PrintWay uses code page IBM-1047.

**Usage guidelines:**

- If the printer definition used to print the job contains a code page in the `document-codepage` attribute, that code page overrides this value.
- For code page names, see [z/OS XL C/C++ Programming Guide](https://www.ibm.com).
- If you change this value, you must restart the FSS to pick up the new value.

**description**

This **single-valued** attribute specifies a description for the FSA definition. The description can help you select the FSA definition from a list.

**ISPF field name:** Description

**Allowed values:** Any combination of 1-256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose it in single or double quotation marks.

**Default value:** None.

**maximum-hiperspace-blocks**

This **single-valued** attribute specifies the maximum number of 4 KB blocks that each functional subsystem application (FSA) in this FSS can use in hiperspace. The number you specify can affect system performance and also can limit the size of the data sets the FSA can process.
ISPF field name: Hiperspace blocks

Allowed values: An integer from 1-524288.

Default value: Each IP PrintWay FSA uses 8,000 4 KB blocks, which is 32 megabytes.

Usage guidelines:
- If a data set requires a larger amount of hiperspace, IP PrintWay records an error and retains the data set on the JES spool if a retention period is specified for failed transmissions in the failure-retention-period attribute for the printer definition used to process the data set.
- If you change this value, you must restart the FSS to pick up the new value.

name
This single-valued attribute specifies the name of the FSA definition.

Note: This is a non-settable attribute. Do not specify the name attribute on the PIDU create, force-create, or modify command. Instead, specify the name as an operand on the command. However, you can specify the name attribute when you construct a condition for the where predicate on the list and export commands.

ISPF field name: FSA Name

Allowed values: Any combination of 1-8 letters (A-Z), numbers (0-9), and national characters ($#@). Blank characters are not allowed. The first character cannot be a number. Lowercase letters are converted to uppercase.

Default value: None.

national-language
This single-valued attribute specifies the language that IP PrintWay uses for messages.

ISPF field name: National language

Allowed values: You can enter one of these fixed values:
us-english IP PrintWay uses English message table ANFMTENU.
ja-japanese IP PrintWay uses Japanese message table ANFMTJPN.

Default value: Each IP PrintWay FSA uses English messages.

Usage guidelines: If you change this value, you must restart the FSS to pick up the new value.

old-style-translation
This single-valued attribute indicates whether IP PrintWay uses the standard TCP/IP translate table to convert data from EBCDIC to ASCII when no code pages or TCP/IP translation tables are specified in the printer definition. For more information, see “Usage Guidelines”.

ISPF field name: Old-style translation

Allowed values: You can enter one of these fixed values:
IP PrintWay uses the standard TCP/IP translate table, STANDARD.TCPXLBIN, to convert data if no code pages and translation tables are specified in the printer definition.

IP PrintWay takes the default action. See “Default Value”.

**Default value:** IP PrintWay uses code pages and the `iconv` utility to convert data. The source code page is specified in the `default-document-codepage` attribute. The target code page is IBM-850.

**Usage guidelines:**
- IP PrintWay ignores this attribute under either of these conditions:
  - The printer definition specifies a code page in either the `document-codepage` or `printer-codepage` attribute. In this case, IP PrintWay uses the `iconv` utility and the specified code pages to convert data.
  - The printer definition specifies a TCP/IP translation table in the `translation-dataset-qualifier` or `db-translate-table` attributes. In this case, IP PrintWay uses the specified translate table instead.
- If you change this value, you must restart the FSS to pick up the new value.

**tcpip-job-name**
This single-valued attribute specifies the name of the TCP/IP startup procedure. If you have changed the name of the TCP/IP startup procedure, specify the new name in this attribute.

**ISPF field name:** TCP/IP job name

**Allowed values:** A valid job name. Lowercase letters are converted to uppercase.

**Default value:** If you do not specify this attribute, the IP PrintWay FSA uses the name specified in `TCPJOBNAME` statement in the `TCPJOBNAME` data set. If the `TCPJOBNAME` statement is not specified, IP PrintWay uses `TCP` as the name of the TCP/IP startup procedure. For more information, see [z/OS Infoprint Server Customization](https://www.ibm.com/support/docview.wss?uid=swg21358839).

**Usage guidelines:** If you change this value, you must restart the FSS to pick up the new value.

**trace-mode**
This single-valued attribute specifies the type of IP PrintWay tracing for the FSS, and the default tracing mode for all functional subsystem applications (FSAs) in the FSS. Tracing starts when the FSS and FSAs starts. The trace mode specified in each FSA definition overrides this tracing mode for that FSA.

**ISPF field name:** Trace mode

**Allowed values:** You can enter one of these fixed values:

- **full**  
  Full internal and external tracing.

- **internal**  
  Internal tracing only.

- **no-printing**  
  Internal and external tracing, without tracing of record processing. That is, IP PrintWay does not trace input records and TCP/IP commands.

- **none**  
  No tracing.
Default value: No tracing.

Usage guidelines:
- The internal trace mode can assist IBM in diagnosing problems. IBM suggests that you specify this tracing mode.
- If you specify full or no-printing, you must start a GTF trace before starting the FSS.
- You can use the MODIFY operator command to stop the trace or to start tracing after an FSS or FSA is started.
- Do not start a full trace during peak processor usage.
- You must restart the FSS to pick up a changed value.

trace-prompt
This single-valued attribute indicates whether the operator is prompted each time the FSS starts. If this option is selected, IP PrintWay sends message ANFM020A to the operator when the FSS starts. Prompting lets the operator start tracing all functional subsystem applications (FSAs) before the FSA starts processing any data sets.

ISPF field name: Trace prompt

Allowed values: You can enter one of these fixed values:
  yes The operator is prompted when the FSS starts.
  no The operator is not prompted.

Default value: The operator is not prompted.

Usage guidelines: If you change this value, you must restart the FSS to pick up the new value.

trace-table-size
This single-valued attribute specifies the number of 4 KB pages of storage to allocate for each internal functional subsystem application (FSA) trace table. The storage for the trace tables is allocated above the 16 MB line.

ISPF field name: Trace table size

Allowed values: An integer from 1-999.

Default value: IP PrintWay uses 32 (128 KB) as the trace table size.

Usage guidelines:
- Storage is allocated for the tables only when internal tracing is active.
- If you change this value, you must restart the FSS to pick up the new value.

Attributes for the printway-options object class
This section lists attributes that are valid when you create IP PrintWay Options components, which are in object class printway-options. These attributes are also valid for the printer object class.

Required attributes
All attributes are optional.
**automatic-dataset-grouping**
This single-valued attribute indicates whether IP PrintWay extended mode automatically groups data sets that are in the same JES output group. Automatic grouping means that IP PrintWay sends all the data sets to a printer in the same transmission, and sends all the data sets in the same email.

**ISPF field name:** Automatic dataset grouping

**Allowed values:** You can enter one of these fixed values:
- **yes** IP PrintWay automatically groups data sets and ignores the dataset-grouping attribute.
- **no** IP PrintWay groups data sets according to the value selected in the dataset-grouping attribute.

**Default value:** IP PrintWay groups data sets according to the value selected in the dataset-grouping attribute.

**Usage guidelines:**
- IBM suggests specifying this attribute so that data sets print together, with each data set starting on a new sheet of paper. However, some printers do not support this type of transmission and do not start each data set on a new sheet. In this case, either specify a command to force a new sheet in the Document header field, or do not specify this attribute.
- This attribute does not apply when you select the IPP or VTAM protocol. For these protocols, IP PrintWay transmits each data set in a separate transmission.
- IP PrintWay basic mode ignores this attribute.

**begin-dataset-exit**
This single-valued attribute specifies the name of an IP PrintWay Begin Data Set exit routine. IP PrintWay calls this exit before processing any records in a data set. In this exit you can add one or more records to the beginning of the data set and you can change IP PrintWay options.

**ISPF field name:** Begin dataset exit

**Allowed values:** The name of your exit routine. You can enter a valid combination of 1-8 letters (a-z, A-Z), numbers (0-9), and national characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains national characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase. For example:

```
begin-dataset-exit = ANFUXBD1
```

**Default value:** IP PrintWay does not call an exit routine before each data set.

**Usage guidelines:** The exit routine must be in an APF-authorized library identified either in the STEPLIB statement in the IP PrintWay startup procedure (IP PrintWay basic mode), in the STEPLIB environment variable (IP PrintWay extended mode), or in a library concatenated to LNKLST.

**carriage-control-type**
This single-valued attribute indicates the type of carriage control characters in the data sets. Specify this attribute only if you want IP PrintWay to do special processing of carriage control characters.

**ISPF field name:** Carriage control type
**printway-options and printer**

**Allowed values:** You can enter one of these fixed values:

- **ansi** Interpret the first character of each record as a carriage control character.
- **machine** Interpret the first character of each record as a carriage control character.
- **none** Do not interpret the first character of each record as a carriage control character. Specify this value if you want to print all carriage control characters as data.

**Default value:** IP PrintWay automatically determines the type of carriage controls in each data set.

**Usage guidelines:**
- Do not specify **ansi** or **machine** when printing PostScript data sets.
- IP PrintWay processing is currently the same for **ansi** and **machine**.
- IP PrintWay ignores this attribute under any of these conditions:
  - The data set was placed on the spool by Print Interface.
  - The **printway-formatting** attribute contains a value other than **standard**.
  - **protocol-type=vtam**.
  - NetSpool converted the data to PCL format.

**connection-timeout**

This **single-valued** attribute specifies the maximum number of seconds that IP PrintWay waits for TCP/IP or SNA to return an error if it cannot connect to the printer. If the connection timeout value expires before the connection can be established, IP PrintWay attempts to connect to the printer again if retries are requested.

**ISPF field name:** Connection timeout

**Allowed values:** An integer from 5-180.

**Default value:** IP PrintWay waits 30 seconds.

**Usage guidelines:**
- The default value of 30 seconds is suitable for most printers.
- Do not set the timeout value too low because IP PrintWay might not be able to connect to the printer in the specified number of seconds due to network traffic.
- If you run IP PrintWay basic mode, do not set the timeout value too high because the IP PrintWay FSA does not process or print any other data sets while it waits to connect to the printer.
- Specify a higher connection timeout value if the timeout value expires before IP PrintWay can connect to the printer when the printer is turned on. IP PrintWay writes an error message when the connection timeout value expires.
- IP PrintWay ignores this value when **protocol-type=email**.

**dataset-grouping**

This **single-valued** attribute indicates how IP PrintWay groups data sets that are in the same JES output group (job) when it sends them to a printer or email destination.

**ISPF field name:** Dataset grouping
printway-options and printer

Allowed values: You can enter one of these fixed values:

concatenate-job
Sends data sets to a printer in the same transmission, and sends data sets as attachments in the same email. Specify this value to make sure that data sets print together. However, some printers might start printing on the back side of the paper. In addition, the correct number of copies might not print. The number of copies requested for the first data set in the concatenation applies to all data sets in the concatenation. The number of copies requested for the second and subsequent data sets in the concatenation is ignored.

This value does not apply when protocol-type=ipp.

job
Sends data sets to a printer at the same time but not in the same transmission, and sends data sets in separate emails. Specify this value if you want a high probability that data sets print together, but you want to avoid the printing problems that can occur if you select the concatenate-job option. You must specify either dataset-grouping=concatenate-job or automatic-dataset-grouping=yes (extended mode only) to make sure that data sets print together.

none
Sends each data set to a printer in a separate transmission as soon as the data set is processed, and sends data sets in separate emails. Specify this value to manage each data set separately on the remote system. This value does not apply to IP PrintWay extended mode, which instead uses the job value.

Default value: IP PrintWay sends data sets to a printer at the same time but not in the same transmission, and sends data sets in separate emails (job option).

Usage guidelines:

• IP PrintWay extended mode: The automatic-dataset-grouping attribute overrides this attribute.

• IP PrintWay extended mode: If you specify dataset-grouping=no or dataset-grouping=job (default), IP PrintWay extended mode sends each email in the output group to the address specified for the first data set in the output group unless the AOP_USE_FIRST_ADDRESS =NO environment variable or the mail-use-first-address=no attribute is set. If AOP_MAIL_USE_FIRST_ADDRESS=NO or mail-use-first-address=no, IP PrintWay extended mode sends each email to the address or addresses specified for the data set in the email header, in a job attribute, or in a JCL parameter.

• This attribute does not apply when you select the VTAM protocol. For this protocol, IP PrintWay transmits each data set in a separate transmission.

• The concatenate-job value does not apply when you select the IPP protocol.

• This attribute does not apply to data sets that Print Interface and NetSpool allocate on the JES spool because JES assigns each data set to a separate output group. It also does not apply to print jobs that are resubmitted to Print Interface for filtering.

• Data sets in the same JES output group must share the same values for certain parameters on the OUTPUT JCL statement. Therefore, if users do not specify exactly the same values for certain OUTPUT parameters, JES assigns the output data sets to separate output groups. For information about how JES groups output data sets, see z/OS JES2 Initialization and Tuning Guide or z/OS JES3 Initialization and Tuning Guide.
**delete-form-feed**

This **single-valued** attribute indicates the type of form-feed controls that IP PrintWay is to delete from data sets.

**ISPF field name:** Delete form feed

**Allowed values:** You can enter one of these fixed values:

- **none**  
  Do not delete any form-feed controls.

- **leading**  
  Delete form-feed controls at the beginning of each data set.

- **trailing**  
  Delete form-feed controls at the end of each data set.

- **both**  
  Delete form-feed controls at the beginning and end of each data set.

**Default value:** IP PrintWay does not delete form feeds.

**Usage guidelines:**
- This attribute lets you remove blank pages that are printed at the beginning or end of data sets.
- IP PrintWay ignores this attribute under any of these conditions:
  - For protocols other than VTAM, the data set was placed on the spool by Print Interface.
  - `printway-formatting=none`.
  - NetSpool converted the data to PCL format.

**description**

This **single-valued** attribute specifies a description for the component. The description can help you select the correct component from a list.

**ISPF field name:** Description

**Allowed values:** Any combination of 1-256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / - ). If the value contains blanks or special characters, enclose it in single or double quotation marks.

**Default value:** None.

**document-header**

This **single-valued** attribute specifies printer-specific data that IP PrintWay includes at the beginning of the document and sends to the remote printer or print server. For example, you might specify printer commands to change the printer default font.

**ISPF field name:** Document header

**Allowed values:** A combination of 1-292 letters, numbers, blanks, and special characters. You can also specify these special values, which IP PrintWay converts to EBCDIC hex values:

<table>
<thead>
<tr>
<th>Value</th>
<th>Hex (EBCDIC)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;FF&gt;</td>
<td>0C</td>
<td>Form feed</td>
</tr>
<tr>
<td>&lt;CR&gt;</td>
<td>0D</td>
<td>Carriage return</td>
</tr>
<tr>
<td>&lt;LF&gt;</td>
<td>25</td>
<td>Line feed</td>
</tr>
<tr>
<td>&lt;ESC&gt;</td>
<td>27</td>
<td>Escape</td>
</tr>
<tr>
<td>&lt;SP&gt;</td>
<td>40</td>
<td>Space</td>
</tr>
</tbody>
</table>
If you specify these special values, use EBCDIC representation for the rest of the value and specify `translate-document-header=yes` (default) if the printer accepts ASCII data. If the value contains blanks or special characters, enclose it in single or double quotation marks. For example:

```
document-header="\e\&l10\e\{s17H"
```

To enter a value in hexadecimal format, prefix the value with the letter `x` and enclose the value in single quotation marks. For example, this example specifies the same value in ASCII representation, in hexadecimal format. Because the value is in ASCII, also specify `translate-document-header=no` if the printer accepts ASCII data. For example:

```
document-header=x'1B451B266C31301B2873313748'
```

**Default value:** IP PrintWay does not include any data at the beginning of a document.

**document-trailer**
This single-valued attribute specifies printer-specific data that IP PrintWay includes at the end of the document and sends to the remote printer or print server. For example, if the `document-header` attribute modifies the printer configuration, you might specify this attribute to restore the default printer configuration.

**ISPF field name:** Document trailer

**Allowed values:** A combination of 1-292 letters, numbers, blanks, and special characters. You can also specify these special values, which IP PrintWay converts to EBCDIC hex values:

<table>
<thead>
<tr>
<th>Value</th>
<th>Hex (EBCDIC)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;FF&gt;</td>
<td>0C</td>
<td>Form feed</td>
</tr>
<tr>
<td>&lt;CR&gt;</td>
<td>0D</td>
<td>Carriage return</td>
</tr>
<tr>
<td>&lt;LF&gt;</td>
<td>25</td>
<td>Line feed</td>
</tr>
<tr>
<td>&lt;ESC&gt;</td>
<td>27</td>
<td>Escape</td>
</tr>
<tr>
<td>&lt;SP&gt;</td>
<td>40</td>
<td>Space</td>
</tr>
</tbody>
</table>

If you specify these special values, use EBCDIC representation for the rest of the value and specify `translate-document-trailer=yes` (default) if the printer accepts ASCII data. If the value contains blanks or special characters, enclose it in single or double quotation marks.

For example:

```
document-trailer="\e"
```

To enter a value in hexadecimal format, prefix the value with the letter `x` and enclose the value in single quotation marks. This example specifies the same value in ASCII representation, in hexadecimal format. Because the value is in ASCII, also specify `translate-document-trailer=no` if the printer accepts ASCII data. For example:

```
document-trailer=x'1B45'
```

**Default value:** IP PrintWay does not include any data at the end of a document.
**end-dataset-exit**
This **single-valued** attribute specifies the name of an IP PrintWay End Data Set exit routine. IP PrintWay calls the exit you specify after processing all records in a data set. In this exit you can add one or more records to the end of the data set. You can also inspect IP PrintWay options, but you cannot change them.

**ISPF field name:** End dataset exit

**Allowed values:** The name of your exit routine. You can enter a valid combination of 1-8 letters (a-z, A-Z), numbers (0-9), and national characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains national characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase. For example:

```
end-dataset-exit = ANFUXED1
```

**Default value:** IP PrintWay does not call an exit routine after each data set.

**Usage guidelines:** The exit routine must be in an APF-authorized library identified either in the STEPLIB statement in the IP PrintWay startup procedure (IP PrintWay basic mode), in the STEPLIB environment variable (IP PrintWay extended mode), or in a library concatenated to LNKLST.

**failure-retention-period**
This **single-valued** attribute specifies the amount of time IP PrintWay retains data sets on the JES spool after all retry transmission attempts to the remote printer or print server have failed.

**ISPF field name:** Retention period: Failure

**Allowed values:** You can specify the fixed value FOREVER, or a time value in this format: **hh:mm:ss**:

- **hh**h indicates the hours (0000-9999)
- **mm** indicates the minutes (00-59)
- **ss** indicates the seconds (00-59)
- FOREVER means retain data sets forever on the JES spool.

Example values:

```
failure-retention-period = 12:15:10 (12 hours, 15 minutes, 10 seconds)
failure-retention-period = 5:12 (5 minutes, 12 seconds)
failure-retention-period = 5 (5 seconds)
failure-retention-period = FOREVER
```

**Default value:** IP PrintWay does not retain data sets on the JES spool.

**Usage guidelines:**
- The job submitter can override this value.
- If you run IP PrintWay basic mode, specify as short a retention time as possible because a system abend (abend code 878) can occur when an IP PrintWay FSS retains a very high number of data sets on the JES spool.
- If you run IP PrintWay extended mode and specify either **page-accounting=yes** or **page-restart=yes**, IP PrintWay retains the data set if it does not finish printing successfully.
This single-valued attribute specifies the form-feed controls that the printer or print server requires. When it converts line data to text format, IP PrintWay extended mode adds the form-feed controls to the data stream to indicate the start of a new page.

**ISPF field name:** Form feed

**Allowed values:** A 1-4 character string (2-8 characters if specified in hexadecimal format) that is the EBCDIC representation of the controls. To enter a hexadecimal value, begin the value with the letter x and enclose the value in single quotation marks.

If you also specify the delete-form-feed attribute, specify only these hexadecimal values:

- X'0C' (form-feed control)
- X'0D' (carriage-return control)
- X'25' (line-feed control) or X'15' (new-line control)
- X'40' (blank)

If you specify a different value, IP PrintWay might not delete all leading or trailing form-feed controls.

This example specifies the form-feed control:

```
form-feed=X'0C'
```

**Default value:** X'0D0C' (carriage-return and form-feed controls)

**Usage guidelines:**

- IP PrintWay basic mode ignores this field.
- IP PrintWay extended mode ignores this field for the VTAM protocol; it always uses the default form-feed controls.
- IP PrintWay extended mode converts the form-feed controls to the printer code page, typically an ASCII code page.

This single-valued attribute specifies the end-of-line controls required by the printer. IP PrintWay translates the controls to ASCII, if necessary, and adds them to the end of each line.

**ISPF field name:** Line termination

**Allowed values:** A 1-4 character string (2-8 characters if specified in hexadecimal format) that is the EBCDIC representation of the end-of-line control that IP PrintWay adds at the end of a line. To enter a hexadecimal value, begin the value with the letter x and enclose the value in single quotation marks.

This example specifies the carriage-return (CR) and line-feed controls:

```
line-termination=X'0025'
```

This example specifies a PIDU create command containing the line-termination attribute:

```
pidu -c "create printer lp2 line-termination=X'0025';"
```

**Default value:** IP PrintWay basic mode:
printway-options and printer

- LPR, direct sockets, IPP, and email protocols: X'25' (line-feed)
- VTAM protocol: X'0D15' (carriage-return and new-line)

IP PrintWay extended mode:
- LPR (with an ASCII printer code page), direct sockets, IPP, and email protocols: X'0D15' (carriage-return and new-line)
- LPR protocol (with an EBCDIC printer code page): X'0D25' (carriage-return and line-feed)
- VTAM protocol: X'0D15' (carriage-return and new-line)

Usage guidelines:
- IP PrintWay extended mode: If you specify printer code page ISO8859-1 (printer-codepage=ISO8859-1), omit the line-termination attribute so that IP PrintWay uses the default value. However, if you need to specify a line-termination value of X'25' or X'0D25', also specify an ASCII printer code page that translates EBCDIC X'25' to ASCII X'0A', such as IBM-850.
- IP PrintWay basic mode: Consider specifying a line-termination value of X'0D25'. This value is more suitable for many ASCII printers than the IP PrintWay default line-termination control of X'25'.
- IP PrintWay basic mode ignores this attribute under any of these conditions:
  - For protocols other than VTAM, Print Interface allocated the data set on the JES spool.
  - printway-formatting=none.
  - NetSpool converted the data to PCL format.

name
This single-valued attribute specifies the name of the component.

Note: This is a non-settable attribute. Do not specify the name attribute on the PIDU create, force-create, or modify command. Instead, specify the name as an operand on the command. However, you can specify the name attribute when you construct a condition for the where predicate on the list and export commands.

ISPF field name: Component Name

Allowed values: Any combination of 1-17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . * = /). Blank characters are not allowed.

Default value: None.

omit-line-termination-at-eof
This single-valued attribute indicates whether IP PrintWay is to omit the LF (line feed) control (or other control specified in the line-termination attribute) at the end of each document.

ISPF field name: Omit line termination at EOF

Allowed values: You can enter one of these fixed values:

- yes IP PrintWay omits the line termination control at the end of each document.
- no IP PrintWay includes the line termination control at the end of each document.
**printway-options and printer**

**Default value:** IP PrintWay includes the line termination control at the end of each document.

**Usage guidelines:**
- Specify yes if a line termination control at the end of a document causes printing problems. For example, printing problems can occur when applications add transparent data to the end of data.
- Specify no (default) if your printer requires a line termination control at the end of the document to print data in the next document correctly.
- IP PrintWay ignores this attribute under any of these conditions:
  - The data set was placed on the spool by Print Interface.
  - `printway-formatting=none`.
  - `protocol-type=email`.
  - `protocol-type=ipp`.
  - `protocol-type=vtam`.
  - NetSpool converted the data to PCL format.

**printway-formatting**
This **single-valued** attribute specifies the type of translation and formatting that IP PrintWay basic mode does before transmitting data sets to the remote system.

**ISPF field name:** Formatting

**Allowed values:** You can enter one of these fixed values:

- **none** IP PrintWay does not translate or format data. Select this value to print binary data, such as AFP or PCL data.
- **standard** IP PrintWay translates data to ASCII or EBCDIC, adds line-termination controls, and formats data into pages. For the VTAM protocol, IP PrintWay converts line data to SCS or DSC/DSE format.
- **translate-only** IP PrintWay translates data to ASCII or EBCDIC and adds line-termination controls. However, it does not format data into pages. For the VTAM protocol, this option is equivalent to **standard**.
- **use-fcb** IP PrintWay takes the same action as for **standard** except that if an FCB is specified for the data set or as a JES default, IP PrintWay formats using the FCB.

**Default value:** IP PrintWay does standard processing except under the conditions described in "Usage guidelines."

**Usage guidelines:**
- This attribute does not apply to IP PrintWay extended mode.
- Under these conditions, IP PrintWay uses the **none** value and ignores any other values:
  - `vtam-send-as-transparent=yes`.
  - `to-remote-psf=yes`.
  - NetSpool converted the data to PCL format.
  - For protocols other than VTAM, Print Interface processed the data set.
**printway-options and printer**

**printway-postscript**
This **single-valued** attribute specifies the type of PostScript header that IP PrintWay basic mode adds to the beginning of each data set.

**ISPF field name:** Formatting

**Allowed values:** You can enter one of these fixed values:

- **add-header** IP PrintWay adds PostScript header %!
- **always-landscape** IP PrintWay takes the same action as for landscape. However, IP PrintWay also adds the landscape header to data sets that already have a PostScript header.
- **landscape** IP PrintWay adds a PostScript header for printing in the landscape direction (lines parallel to the long edge of the paper) to data sets that do not already have PostScript headers.
- **ignore-header** IP PrintWay ignores the PostScript header on data sets and processes all data sets as non-PostScript data sets.

**Default value:** IP PrintWay does not add PostScript headers. However, IP PrintWay processes data sets that already contain a PostScript header (%!) as PostScript data sets.

**Usage guidelines:**
- This attribute does not apply to IP PrintWay extended mode.
- If you specify landscape or always-landscape, also specify printway-formatting=standard (default).
- If you specify add, IP PrintWay ignores the printway-formatting attribute.
- Do not specify landscape if any data sets already have PostScript headers.
- IP PrintWay ignores this attribute under any of these conditions:
  - The data set was placed on the spool by Print Interface.
  - printway-formatting=none.
  - protocol-type=vtam.
  - NetSpool converted the data to PCL format.
- If protocol-type=email, do not specify this attribute.

**record-exit**
This **single-valued** attribute specifies the name of the IP PrintWay Record exit routine. IP PrintWay calls this exit for each record in a data set. In a Record exit you can add one or more records, replace a record, or delete a record. You can also inspect IP PrintWay options, but you cannot change them.

**ISPF field name:** Record exit

**Allowed values:** The name of your exit routine. You can enter a valid combination of 1-8 letters (a-z, A-Z), numbers (0-9), and national characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains national characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase. For example:

```
record-exit = ANFUXRC1
```

**Default value:** IP PrintWay does not call an exit routine for each record in a data set.
**Usage guidelines:** The exit routine must be in an APF-authorized library identified either in the STEPLIB statement in the IP PrintWay startup procedure (IP PrintWay basic mode), in the STEPLIB environment variable (IP PrintWay extended mode), or in a library concatenated to LNKLST.

**response-timeout**
This single-valued attribute specifies the number of seconds that IP PrintWay waits for a response from the remote printer or print server before reporting an error. After an error occurs, IP PrintWay attempts to send the data again if retries are requested.

**ISPF field name:** Response timeout

**Allowed values:** An integer from 0-2678400.

**Default value:** IP PrintWay waits 600 seconds (10 minutes) for a response.

**Usage guidelines:**
- Do not set the response timeout value too low, especially if you print large documents on printers that have small buffers or that print slowly. For example, a response timeout value of 30 seconds might cause IP PrintWay to retry the transmission before the printer has finished printing its buffer.
- A high response timeout value gives an operator more time to correct a problem before IP PrintWay resends data to the printer (if retries are requested) or fails the print job. For example, you might want to specify a response timeout value of 3 days if your printers are unattended over a long weekend.
- **IP PrintWay extended mode:** If you select one of the PJL options in the printer definition (see "Tracking the number of printed pages (extended mode)" on page 174), most printers respond only after the printer has finished printing the document. Therefore, the response timeout value should be long enough to allow the largest documents to finish printing.
- **IP PrintWay extended mode:** A high response timeout value does not affect printing to other printers. However, if you specify a high response timeout value for many printers, IP PrintWay can exceed the maximum number of MVS tasks that IP PrintWay extended mode (aopoutd daemon) can have active at one time. This can happen if IP PrintWay waits for responses from many printers at the same time.

If you see the following message, which indicates that you are close to exceeding the maximum number of MVS tasks, ask your system administrator to increase the maximum number of MVS tasks in the APOOUTD_MAXTHREADTASKS environment variable or aopoutd-max-thread-tasks configuration attribute. For example, you might increase the number to 250.

BPX10401 PROCESS LIMIT MAXTHREADTASKS HAS REACHED 85% OF ITS CURRENT CAPACITY OF 200 FOR PID=nnnnnn IN JOB APOOUTD.

For information about APOOUTD_MAXTHREADTASKS and aopoutd-max-thread-tasks, see [z/OS Infoprint Server Customization](#).

- **IP PrintWay basic mode:** If you want to specify a high response timeout value, ask your system administrator to define an IP PrintWay FSA to JES that selects print jobs for this one printer only. If an IP PrintWay FSA selects print jobs for several printers, when one printer with a high response timeout value does not respond for a long time, printing to the other printers can be delayed until the operator corrects the problem and the printer becomes ready.
- **Email protocol:** IP PrintWay ignores this field.
**printway-options and printer**

- **VTAM protocol**: If the printer is waiting for intervention, Infoprint Central cannot delete a print job until the printer responds or the response timeout value expires. Therefore, if you set a high response timeout value, the operator might not be able to delete the current print job in a timely manner.

**retry-limit**

This single-valued attribute specifies the number of times that IP PrintWay retries an unsuccessful transmission.

**ISPF field name**: Retry limit

**Allowed values**: An integer from 0-32767.

**Default value**: IP PrintWay does not retry the transmission.

**Usage guidelines**:
- For information about how the retry-time and retry-limit attributes work together, see “Handling unsuccessful data transmissions” on page 167.
- When protocol-type=email, do not specify the retry-limit and retry-time attributes.

**retry-time**

This single-valued attribute specifies the amount of time IP PrintWay waits between retries of a transmission. For example, when the retry time is 1 minute, IP PrintWay retries every minute, up to the number of retries in the retry-limit attribute.

**ISPF field name**: Retry time

**Allowed values**: A value in this time format: hhhh:mm:ss:

- **hhhh** indicates hours (0000-9999)
- **mm** indicates minutes (00-59)
- **ss** indicates seconds (00-59)

For example:

- retry-time = 1:00:00 (1 hour, 0 minutes, 0 seconds)
- retry-time = 5:30 (5 minutes, 30 seconds)
- retry-time = 5 (5 seconds)

**Default value**: IP PrintWay does not wait between retries.

**Usage guidelines**:
- For information about how the retry-time and retry-limit attributes work together, see “Handling unsuccessful data transmissions” on page 167.
- When protocol-type=email, do not specify the retry-limit and retry-time attributes.

**successful-retention-period**

This single-valued attribute specifies the amount of time IP PrintWay retains data sets on the JES spool after successful transmission.

**ISPF field name**: Retention period: Successful

**Allowed values**: You can specify the fixed value FOREVER, or a time value in this format: hhhh:mm:ss:
**printway-options and printer**

hhhh indicates the hours (0000-9999)

mm indicates the minutes (00-59)

ss indicates the seconds (00-59)

FOREVER means retain data sets forever on the JES spool.

For example:

successful-retention-period = 12:15:10 (12 hours, 15 minutes, 10 seconds)

successful-retention-period = 5:12 (5 minutes, 12 seconds)

successful-retention-period = 5 (5 seconds)

successful-retention-period = FOREVER

**Default value:** IP PrintWay does not retain data sets on the JES spool.

**Usage guidelines:**

- The job submitter can override this value.
- If you run IP PrintWay basic mode, do not retain successful data sets because a system abend (abend code 878) can occur when an FSS retains a very high number of data sets on the JES spool.
- If you run IP PrintWay extended mode and specify either `page-accounting=yes` or `page-restart=yes`, IP PrintWay makes sure that the data set has printed successfully before the transmission is considered successful.
- If `protocol-type=email`, the transmission is considered successful when z/OS UNIX sendmail accepts the email request. The transmission to remote recipients might fail later.

**translate-document-header**

This *single-valued* attribute indicates whether IP PrintWay must translate the string in the `document-header` attribute to the code page required by the printer before sending it to the remote printer or print server.

**ISPF field name:** Translate document header

**Allowed values:** You can enter one of these fixed values:

- **yes** IP PrintWay translates the document header to the code page required by the printer. Select this value if, for example, you specify a document header in EBCDIC representation and the printer accepts ASCII data.

- **no** IP PrintWay does not translate the document header.

**Default value:** IP PrintWay translates the string to the code page required by the printer.

**translate-document-trailer**

This *single-valued* attribute indicates whether IP PrintWay must translate the string in the `document-trailer` attribute to the code page required by the printer before sending it to the remote printer or print server.

**ISPF field name:** Translate document trailer

**Allowed values:** You can enter one of these fixed values:

- **yes** IP PrintWay translates the document trailer to the code page required by the printer. Select this value if, for example, you specify a document trailer in EBCDIC representation and the printer accepts ASCII data.

- **no** IP PrintWay translates the document trailer to the code page required by the printer.
Default value: IP PrintWay translates the string to the code page required by the printer.

**transparent-data-character**
This single-valued attribute specifies the character that designates transparent data in the input or output data stream.

**ISPF field name:** Transparent data char

**Allowed values:** A 1-character string (1-2 characters if specified in hexadecimal format). To enter a hexadecimal value, begin the value with the letter x and enclose the value in single quotation marks.

This example specifies the transparent data character:
transparent-data-character=X'FB'

This example specifies a PIDU create command containing the transparent-data-character attribute:
pidu -c "create printer lp2 transparent-data-character=X'FB';"

Default value: IP PrintWay uses X'35' as the transparent data character.

**Usage guidelines:**
- For protocols other than VTAM, this character designates transparent data in the input data stream. IP PrintWay removes transparent data controls and does not translate the transparent data that follows the controls to ASCII.
- For the VTAM protocol, if vtam-send-as-transparent=yes, IP PrintWay uses this character to designate transparent data in the output data stream.
- IP PrintWay ignores this attribute under any of these conditions unless vtam-send-as-transparent=yes:
  - The data set was placed on the spool by Print Interface.
  - printway-formatting=none.
  - protocol-type=vtam.
  - NetSpool converted the data to PCL format.

**Attributes for the processing object class**
This section lists attributes that are valid when you create Processing components, which are in object class processing. These attributes are also valid for the printer object class.

**Required attributes**
No attributes are required. However, you might need to specify the printer-codepage attribute for some data formats to print correctly.

**db-translate-table**
This single-valued attribute specifies the name of the translation table IP PrintWay basic mode uses to convert double-byte character set (DBCS) data from EBCDIC to ASCII.

**ISPF field name:** Double-byte translate table

**Allowed values:** You can enter one of these fixed values, depending on the language:

<table>
<thead>
<tr>
<th>Language</th>
<th>Allowed values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Default value: IP PrintWay uses code pages to convert data to ASCII.

Usage guidelines:
- This attribute does not apply to IP PrintWay extended mode.
- If either `document-codepage` or `printer-codepage` is specified, IP PrintWay uses the code pages to convert data and ignores this attribute.
- IP PrintWay transmits the data without converting it to ASCII when the value is `ibmkanji`.
- The binary table data sets that the translation tables come from are:
  - TCPCHBIN (`big5`, `tchinese`)
  - TCPHGBIN (`hangeul`, `ksc5601`)
  - TCPKJBIN (`euckanji`, `jis78kj`, `jis83kj`, `sjiskanji`)
  - TCPSCBIN (`schinese`)
- For `jis78kj` and `jis83kj`, IP PrintWay uses these shift-in escape sequences and ignores the value in the `printway-sosi-mode` attribute:
  - `ascii`: ESC(B
  - `jisroman`: ESC(J
- IP PrintWay ignores this attribute when `protocol-type=vtam` or `protocol-type=email`.

description
This single-valued attribute specifies a description for the component. The description can help you select the correct component from a list.

ISPF field name: Description

Allowed values: Any combination of 1-256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose it in single or double quotation marks.

Default value: None.

document-codepage
This single-valued attribute specifies the code page used to create documents submitted to this printer definition. Infoprint Server uses this code page as the source when converting documents from ASCII to EBCDIC or from EBCDIC to ASCII.

ISPF field name: Document code page

Allowed values: A valid code page name. For example:

```
document-codepage = ISO8859-1
```

Default value: Print Interface determines the default. If the print request was submitted from:
- The local z/OS system, Print Interface uses the code page for the z/OS locale, usually an EBCDIC code page.
• A remote system, Print Interface uses the ASCII code page specified in the Infoprint Server configuration file (aopd.conf) or in the system configuration definition. If none is specified, it uses code page ISO8859-1.

NetSpool uses the EBCDIC code page specified in the Infoprint Server configuration file (aopd.conf) in the system configuration definition. If not is specified, NetSpool uses code page IBM-1047.

IP PrintWay:
• Basic mode uses the code page in the default-document-codepage attribute in the printway-fss object class or, if not specified, code page IBM-1047.
• Extended mode uses the EBCDIC code page specified in the Infoprint Server configuration file (aopd.conf) or in the system configuration definition. If not is specified, it uses code page IBM-1047.

Usage guidelines:
• In most cases, the default value is suitable. One exception is when you need to print ASCII documents submitted with the lp command. In this case, specify an ASCII code page either in this attribute or on the lp command.
• For code page names, see z/OS XL C/C++ Programming Guide.
• If you specify a custom code page, make sure that conversion tables exist to convert between these code pages:
  – The code pages in the document-codepage and printer-codepage attributes.
  – The code page for the z/OS locale and the custom code page.

  For information about how to create conversion tables, see information about code set conversion utilities in z/OS XL C/C++ Programming Guide.
• IP PrintWay basic mode: If neither document-codepage nor printer-codepage is specified and old-style-translation=yes, IP PrintWay basic mode uses the standard TCP/IP translation table.
• NetSpool converts data between code pages only if netspool-formatting=convert-to-pcl in the netspool-options object class. Otherwise, NetSpool ignores this attribute.

**document-formats-supported**
This multi-valued, list attribute indicates which data formats a printer supports. Print Interface, NetSpool, and IP PrintWay extended mode reject a print job with a data format that is not supported.

**ISPF field name:** Data format

**Allowed values:** Enter one or more of these fixed values:

- **jpeg**  Joint Photographic Experts Group file format (JFIF).
- **line-data**  Character data. Data is stored in records and can have carriage-control and table-reference characters.
- **modca-p**  Ricoh Mixed Object Document Content Architecture for Presentation.
- **pcl**  Hewlett Packard Printer Control Language.
- **pdf**  Adobe Portable Document Format.
- **postscript**  Adobe PostScript.
- **sap**  SAP output text format (OTF) or ABAP format.
text  Character data. Data can contain LF, CR, HT, VT, and FF control characters only.
tiff  Tagged image file format.
xml  Extensible Markup Language, which includes Extensible Stylesheet Language formatting objects (XSL-FO).
other  All data formats that are not one of the other types, such as the Xerox data format.

For example:
document-formats-supported = {line-data modca-p text};

Default value:  Print Interface, NetSpool, and IP PrintWay extended mode accept all data formats in the print request.

Usage guidelines:  In a PSF printer definition, specify line-data, modca-p, and text. You can also specify other data formats in this attribute. For example, if your installation uses a PCL to AFP transform, also specify pcl in this attribute.

duplexes-supported
This multi-valued, list attribute indicates whether the printer can print on one or two sides of the paper. Print Interface, NetSpool, and IP PrintWay extended mode reject a print job that requests an option in the duplex job attribute or the DUPLEX parameter of the OUTPUT JCL statement that the printer does not support.

ISPF field name:  Duplexes supported

Allowed values:  Enter one or more of these fixed values:
no  The printer can print on one side of the paper.
yes  The printer can print on both sides of the paper so the top edge of side 1 is the top edge of side 2.
tumble  The printer can print on both sides of the paper but tumbles the print so the top edge of side 1 is the bottom edge of side 2.

The printer in this example can print on one or two sides of the paper but cannot tumble the output:
duplexes-supported = {no yes};

Default value:  If this attribute is not specified, Print Interface, NetSpool, and IP PrintWay extended mode accept all values in the duplex job attribute.

Usage guidelines:  This attribute does not apply to duplexing requested in a form definition.

fail-on-transform-error
This single-valued attribute indicates whether transforms fail when data stream errors or warnings occur. Warnings can indicate degraded output.

ISPF field name:  Fail on error

Allowed values:  Enter one of these fixed values:
error  The transform fails when an error occurs and does not create an output document. However, the transform continues if warnings occur.
processing and printer

- **no** The transform continues processing when a warning or error occurs and creates an output document.
- **warning** The transform fails when a warning or error occurs and does not create an output document.

**Default value:**
1. The value in the AOP_FAIL_ON_ERROR environment variable for the transform class.
2. no

**Usage guidelines:** For information about whether a transform supports this attribute, see the documentation for the transform.

**filters**
This **multi-valued, value-map** attribute associates data formats with a filter program for the data format. Print Interface and NetSpool invoke the specified filter before writing data to the output data set. IP PrintWay extended mode invokes the specified filter before sending data to the printer. To filter batch jobs submitted directly to IP PrintWay basic mode, specify the `resubmit-for-filtering` attribute.

**ISPF field name:** Filters

**Allowed values:** One or more value pairs in the format: `dataformat -> filterpath [options]`:

- **dataformat** Specifies the format of the input data. Enter one of these fixed values:
  - **jpeg** Joint Photographic Experts Group file format (JFIF).
  - **line-data** Bytes map to characters. Data is stored in records with carriage-control and table-reference characters.
  - **modca-p** Ricoh Mixed Object Document Content Architecture for Presentation.
  - **pcl** Hewlett Packard Printer Control Language.
  - **pdf** Adobe Portable Document Format.
  - **postscript** Adobe PostScript.
  - **sap** SAP output text format (OTF) or ABAP format.
  - **text** Bytes map to characters. Only contains LF, CR, HT, VT, and FF control characters.
  - **tiff** Tagged image file format.
  - **xml** Extensible Markup Language, which includes Extensible Stylesheet Language formatting objects (XSL-FO).
  - **other** All data formats that are not one of the other types, such as the Xerox data format.

- **filterpath [options]** Specifies the path name of the filter, followed by filter options. For information about:
  - Filter `aopfiltr.so`, see "Using the aopfiltr.so filter" on page 81.
Filter `lpd_compat.so`, see "Using the LPD compatibility filter" on page 82.

Filters `aoprxf.so`, `aoprform.dll`, see Chapter 13, "Planning printer definitions for transforms," on page 213.

Filters that transform products provide, see the documentation for the transform product.

Rules:

- Specify the full path name unless the filter is in a directory named either in the LIBPATH (for DLL filters) or PATH (for UNIX filters) environment variable specified in the `aopstart` EXEC and in the `/etc/profile` file.
- For a UNIX filter, type `spawn` before the path name.
- If the path name contains special characters (such as `/`), or if you specify filter options, enclose the path name and options in single or double quotation marks.

You can specify one or more value pairs. Enclose the value pairs with braces. Some examples are:

```plaintext
filters = {text -> aopfiltr.so}
filters = {pcl -> "pcl2afp.dll %filter-options" pdf -> "ps2afp.dll %filter-options"}
filters = {text -> "spawn /usr/mylib/mfilter myoption1 myoption2"}
```

Default value: Infoprint Server does not use any filter.

forms-supported

This multi-valued, list attribute specifies the names of the forms the printer supports. Print Interface and NetSpool reject a print job that requests a forms name in the forms attribute that the printer does not support.

ISPF field name: Forms supported

Allowed values: Any combination of 1-8 letters (a-z, A-Z), numbers (0-9), and special characters (# $ @). Blanks and other special characters are not allowed. Lowercase letters are converted to uppercase. If you specify more than one forms name, separate the forms names with spaces and enclose the list in braces. For example:

```plaintext
forms-supported = {STANDARD FORM0001}
```

Default value: Print Interface and NetSpool accept any forms name in the forms job attribute.

Usage guidelines: If forms is a JES work-selection criterion, specify the same form names that are defined to JES.

input-tray-map

This multi-valued, value-map attribute associates input tray names with input tray numbers. Infoprint Server can reject a print job that requests an input tray in the input-tray job attribute that the printer does not support.

ISPF field name: Input tray name

Allowed values: One or more value pairs in the format: `name -> number`.

name A name that can be used by a job submitter in the input-tray job attribute. Specify from 1-16 letters, numbers, and special characters.
processing and printer

(such as # $ @ -). If the value contains blanks or special characters, enclose the value in single or double quotation marks.

**number**

An integer from 1-255 that identifies the paper source. To determine the tray numbers for your printer, see the printer documentation. These names are usually assigned to these numbers:

<table>
<thead>
<tr>
<th>Name</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>alternate or top</td>
<td>1</td>
</tr>
<tr>
<td>bottom</td>
<td>2</td>
</tr>
<tr>
<td>envelope</td>
<td>65</td>
</tr>
<tr>
<td>manual</td>
<td>100</td>
</tr>
</tbody>
</table>

Enclose the values with braces. For example:

input-tray-map = {top -> 1 bottom -> 2}

**Default value:** No tray names are associated with numbers. If a job submitter specifies the `input-tray` job attribute, it is ignored.

**maximum-copies**

This **single-valued** attribute specifies the maximum number of copies that Infoprint Server allows to be printed.

**ISPF field name:** Maximum copies  

**Allowed values:** An integer from 1-32640.

**Default value:** No limit to the number of copies.

**Usage guidelines:**

- The number of copies specified in a form definition or on a TCP/IP command, such as the LPR command, are not included in this value.
- IP PrintWay ignores this attribute when **protocol-type=email** because only one copy is sent to the email destination.
- IP PrintWay basic mode ignores this attribute when **protocol-type=vtam** because only one copy is printed.

**maximum-document-size**

This **single-valued** attribute specifies the maximum number of bytes that Infoprint Server allows for all documents in a print job (output group), including copies for IP PrintWay basic mode. You can use this attribute to limit the size of documents that users can send to a printer.

**ISPF field name:** Maximum document size  

**Allowed values:** An integer from 1-2147483646. Omit this attribute if you want no size limit.

**Default value:** Infoprint Server does not limit the size of print jobs.

**Usage guidelines:** IP PrintWay basic mode ignores this attribute when **protocol-type=vtam**.

**name**

This **single-valued** attribute specifies the name of the component.
Note: This is a non-settable attribute. Do not specify the name attribute on the PIDU create, force-create, or modify command. Instead, specify the name as an operand on the command. However, you can specify the name attribute when you construct a condition for the where predicate on the list and export commands.

ISPF field name: Component Name

Allowed values: Any combination of 1-17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $@- /). Blank characters are not allowed.

Default value: None.

output-bin-map
This multi-valued, value-map attribute associates output bin names with output bin numbers. Infoprint Server can reject print jobs that request an output bin in the output-bin job attribute that the printer does not support.

ISPF field name: Output bin name

Allowed values: One or more value pairs in the format: name -> number:

name A name that can be used by a job submitter in the output-bin job attribute. Specify from 1-16 letters, numbers, and special characters (such as # $ @ -). If the value contains blanks or special characters, enclose the value in single or double quotation marks.

number An integer from 1-65535 that identifies the output bin on the printer. To determine the bin numbers for your printer, see the printer documentation.

Enclose the values with braces. For example:
output-bin-map = {bottom -> 1 side -> 2}

Default value: No bin names are associated with numbers. If a job submitter specifies the output-bin job attribute, it is ignored.

pcl-line-density
This single-valued attribute specifies the number of lines per inch to be printed on a page when NetSpool converts SNA character string (SCS) and 3270 data streams to PCL data streams. NetSpool uses this value only when the SCS data stream does not specify the line density. NetSpool always uses this value for 3270 data streams.

ISPF field name: NetSpool PCL Conversion: Line density

Allowed values: An integer from 1-72.

Default value: The PCL Line Spacing or Vertical Motion Index command specified in the document-header attribute is used. If these commands are not specified, the line density set on the printer’s control panel is used.

Usage guidelines:
- NetSpool uses this attribute only when netspool-formatting=convert-to-pcl. Otherwise, this attribute is ignored.
- If scs-automatic-page-orientation=yes, you should specify a value in this attribute.
**processing and printer**

**pcl-orientation**
This *single-valued* attribute specifies the orientation of each page when NetSpool converts SNA character string (SCS) and 3270 data streams to PCL data streams.

**ISPF field name:** NetSpool PCL Conversion: Orientation

**Allowed values:** You can enter one of these fixed values:

- **landscape** Lines print parallel to the paper’s long edge.
- **none** NetSpool does not specify a page orientation in the PCL data stream. The PCL Logical Page Orientation command specified in the *document-header* attribute or, if not specified, the orientation set on the printer’s control panel is used.
- **portrait** Lines print parallel to the paper’s short edge.

**Default value:** NetSpool does not specify a page orientation in the PCL data stream. The PCL Logical Page Orientation command specified in the *document-header* attribute is used. If this command is not specified, the orientation set at the printer’s control panel is used.

**Usage guidelines:**
- NetSpool uses this attribute only when *netspool-formatting=convert-to-pcl*. Otherwise, this attribute is ignored.
- If *scs-automatic-page-orientation=yes*, NetSpool can override the value in this attribute and change the orientation of a page.

**pcl-print-density**
This *single-valued* attribute specifies the number of characters per inch to be printed on a line when NetSpool converts SNA character string (SCS) and 3270 data streams to PCL data streams. NetSpool uses this value only when the SCS data stream does not specify the print density. NetSpool always uses this value for 3270 data streams.

**ISPF field name:** NetSpool PCL Conversion: Print density

**Allowed values:** An integer from 1-255.

**Default value:** The PCL Pitch or Horizontal Motion Index command specified in the *document-header* attribute is used. If these PCL commands are not specified, the print density set on the printer’s control panel is used.

**Usage guidelines:**
- NetSpool uses this attribute only when *netspool-formatting=convert-to-pcl*. Otherwise, this attribute is ignored.
- If *scs-automatic-page-orientation=yes*, you should specify a value in this attribute.

**pdf-encryption-level**
This *single-valued* attribute specifies the level of encryption used to encrypt PDF documents. A high level of encryption provides enhanced security. However, some users might not be able to open PDF documents that use a high level of encryption.

**ISPF field name:** Encryption level
Allowed values: You can enter one of these fixed values:

bits40 A low level of encryption (a 40-bit encryption key) is used. Select this value if you email PDF documents to countries that do not use 128-bit encryption, or for users with Adobe Acrobat Reader 3.0 - 4.x.

bits128 A high level of encryption (a 128-bit encryption key) is used. Select this value for sensitive PDF documents.

Default value: bits128

Usage guidelines:

- IBM AFP to PDF transforms support this attribute. For information, see the documentation for the transform.
- The job submitter can override this value.

pdf-owner-identifier

This single-valued attribute specifies the identifier of the owner of an encrypted PDF document. The owner identifier is associated with a password that is stored in a separate database. An owner password is required to restrict actions with the pdf-protect attribute.

ISPF field name: Owner identifier

Allowed values: You can enter a text string of 1-256 characters. You can enter any combination of letters, numbers, blanks, and special characters that the AFP to PDF transform's Password exit allows. This text string might be case-sensitive, depending on the Password exit. If the text string you specify contains blanks or special characters (such as @ $ & ( ) > < l ' " #), enclose the text string in single or double quotation marks. For example:

```
pdf-owner-identifier='Nurse-Lee@hospital.com'
```

If the string contains double quotation marks, enclose the string in single quotation marks.

Default value: None.

Usage guidelines:

- IBM AFP to PDF transforms support this attribute. For information, see the documentation for the transform.
- The transform encrypts a PDF document when you specify a user identifier, an owner identifier, or both. Encrypting a PDF document protects it from unauthorized access.
- In most cases, the user and owner identifiers should be different because the user and owner passwords must be different.
- The job submitter can override this value.

pdf-protect

This multi-valued attribute specifies one or more actions that users cannot do on encrypted PDF documents.

ISPF field name: Protected actions
Allowed values: You can enter one or more fixed values to restrict actions. If you specify more than one value, separate the values with spaces and enclose the list of values in braces {}. For example:

```
-j "pdf-protect=all"
-j "pdf-protect={copy update}"  
```

<table>
<thead>
<tr>
<th>Value</th>
<th>Actions users cannot do:</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>• All actions (copy, print, update)</td>
</tr>
</tbody>
</table>
| copy  | • Copy or extract content to another document  
|       | • Extract content for accessibility |
| print | • Print at low resolution (150 dpi)  
|       | • Print at high resolution |
| update| • Change the document  
|       | • Assemble the document (insert, delete, rotate pages)  
|       | • Add comments  
|       | • Fill in form fields or sign  
|       | • Create template pages |

Default value: No actions are protected.

Usage guidelines:
- IBM AFP to PDF transforms support this attribute. For information, see the documentation for the transform.
- The job submitter can override this value.

**pdf-user-identifier**

This **single-valued** attribute specifies the identifier of the user of an encrypted PDF document. The user identifier is associated with a password that is stored in a separate database. The user enters the user password when opening the encrypted PDF document.

ISPF field name: User identifier

Allowed values: You can enter a text string of 1-256 characters. You can enter any combination of letters, numbers, blanks, and special characters that the AFP to PDF transform’s Password exit allows. This text string might be case-sensitive, depending on the Password exit. If the text string you specify contains blanks or special characters (such as @ $ & ( ) > < ' " #), enclose the text string in single or double quotation marks. For example:

```
pdf-user-identifier='Dr-Smith@hospital.com'
```

If the string contains double quotation marks, enclose the string in single quotation marks.

Default value: None. Any user can open the PDF document without a password.

Usage guidelines:
- IBM AFP to PDF transforms support this attribute. For information, see the documentation for the transform.
- The transform encrypts a PDF document when you specify a user identifier, an owner identifier, or both. Encrypting a PDF document protects it from unauthorized access.
- In most cases, the user and owner identifiers should be different because the user and owner passwords must be different.
The job submitter can override this value.

**print-error-reporting-supported**

This **multi-valued**, list attribute specifies the types of errors a printer can report. Print Interface and NetSpool reject print jobs that request error reporting in the **print-error-reporting** attribute that the printer does not support.

**ISPF field name:** Print-error reporting supported

**Allowed values:** Enter one or more of these fixed values:

- **all**: The printer can report both print-positioning and invalid-character errors.
- **character**: The printer can report invalid-character errors and suppress reporting of print-positioning errors.
- **none**: The printer can suppress reporting of both print-positioning and invalid-character errors.
- **position**: The printer can report print-positioning errors and suppress reporting of print-positioning errors.

If you specify more than one value, separate the values with spaces and enclose the list in braces. For example:

```plaintext
print-error-reporting-supported = {none character}
```

**Default value:** Print Interface and NetSpool accept all values in the **print-error-reporting** job attribute.

**print-page-header**

This **single-valued** attribute indicates whether IP PrintWay adds a header at the top of each page when formatting data into pages. The header prints on three lines at the top of each page.

**ISPF field name:** Print page header

**Allowed values:** You can enter one of these fixed values:

- **yes**: IP PrintWay adds a header.
- **no**: IP PrintWay does not add a header.

**Default value:** IP PrintWay adds a page header.

**Usage guidelines:**

- IP PrintWay ignores this attribute under any of these conditions:
  - The data set contains carriage control characters. IP PrintWay always uses the carriage control characters to format pages and does not add a page header.
  - Line data was converted to another format such as PCL, PostScript, PDF, SCS, or DSC format.
  - Print Interface converted the line data into text data.
  - The data set contains a PostScript header.
  - `printway-pagination=suppress`.
  - `printway-formatting=none` or `printway-formatting=translate-only`.
- If `protocol-type=email`, specify `print-page-header=no` if you do not want a header added to the email text.
**printer-codepage**

This **single-valued** attribute specifies the code page used by the printer. Infoprint Server uses this code page as the target when converting line and text data between ASCII and EBCDIC.

**ISPF field name:** Printer code page

**Allowed values:** A valid code page name. Examples of valid code pages are:

- `printer-codepage = ISO8859-1`
- `printer-codepage = IBM-500`

**Default value:** If this attribute is not specified, the default action and code page differs for each component of Infoprint Server:

- **Print Interface** does not convert data between code pages.
- **NetSpool** uses the IBM-850 (ASCII) code page.
- **IP PrintWay basic mode:**
  - Email or VTAM protocol: IP PrintWay does not convert data between code pages.
  - LPR, direct sockets, or IPP protocol: IP PrintWay uses the IBM-850 (ASCII) code page.
- **IP PrintWay extended mode:**
  - Email or VTAM protocol: IP PrintWay uses the IBM-1047 (EBCDIC) code page.
  - LPR, direct sockets, or IPP protocol: IP PrintWay uses the IBM-850 (ASCII) code page.

**Usage guidelines:**

- If Print Interface uses this printer definition, you should specify this attribute. If you do not specify a code page, Print Interface does not convert data, so some documents processed by Print Interface might not print correctly.
- For code page names, see [z/OS XL C/C++ Programming Guide](#).
- If you specify a custom code page, make sure that conversion tables exist to convert between these code pages:
  - The code pages in the **document-codepage** and **printer-codepage** attributes.
  - The code page for the z/OS locale and the custom code page.

For information about how to create conversion tables, see information about code set conversion utilities in [z/OS XL C/C++ Programming Guide](#).

- In an **IP PrintWay** printer definition for an ASCII printer, specify an ASCII code page such as ISO8859-1.
- In a **PSF** printer definition, or in an **IP PrintWay** printer definition with `protocol-type=vtam`, specify an EBCDIC code page such IBM-1047.
- In an **IP PrintWay** printer definition for the email protocol, specify one of these:
  - Any ASCII code page: IP PrintWay converts EBCDIC data from the document code page (default is IBM-1047) to the specified ASCII code page.
  - EBCDIC code page IBM-1047: Sendmail converts EBCDIC data from code page IBM-1047 to an ASCII code page. However, if the code page for the locale on the z/OS system where Infoprint Server is running is not IBM-1047, specify an ASCII code page instead of an EBCDIC code page.
- **IP PrintWay basic mode:** If neither **document-codepage** nor **printer-codepage** is specified and **old-style-translation=yes**, IP PrintWay basic mode uses the standard TCP/IP translation table.
• NetSpool converts data between code pages only if `netspool-formatting=convert-to-pcl` in the `netspool-options` object class. Otherwise, NetSpool ignores this attribute.

**printway-bottom-margin**
This single-valued attribute specifies the number of blank lines to leave in the bottom margin. IP PrintWay uses this value when formatting data into pages.

*ISPF field name:* IP PrintWay pagination: Margins: Bottom

*Allowed values:* An integer from 0 - 255.

*Default value:* IP PrintWay does not leave a bottom margin.

*Usage guidelines:* IP PrintWay ignores this attribute under any of these conditions:
• The data set contains carriage control characters.
• Line data was converted to another format such as PCL, PostScript, PDF, SCS, or DSC format.
• The data set was placed on the spool by Print Interface.
• The data set contains a PostScript header.
• `printway-formatting=none` or `printway-formatting=translate-only`.
• `printway-pagination=supress`.
• NetSpool converted the data to PCL format.

**printway-page-height**
This single-valued attribute specifies the number of lines to place on a page. This number includes any blank lines in the top and bottom margins, lines for the optional page header, and data lines. IP PrintWay uses this attribute when formatting data into pages.

*ISPF field name:* IP PrintWay pagination: Page height

*Allowed values:* An integer from 0 - 255.

*Default value:* IP PrintWay uses 58 lines as the page length.

*Usage guidelines:* IP PrintWay ignores this attribute under any of these conditions:
• The data set contains carriage control characters.
• Line data was converted to another format such as PCL, PostScript, PDF, SCS, or DSC format.
• Print Interface converted line data into text data.
• The data set contains a PostScript header.
• `printway-formatting=none` or `printway-formatting=translate-only`.
• `printway-pagination=supress`.
• NetSpool converted the data to PCL format.

**printway-pagination**
This single-valued attribute indicates whether IP PrintWay formats data into pages. When formatting data, IP PrintWay can add a header to each page and leave blank lines for top and bottom margins.

*ISPF field name:* IP PrintWay pagination

*Allowed values:* You can enter one of these fixed values:
• `allow` IP PrintWay formats data into pages if possible.
IP PrintWay does *not* format data into pages.

**Default value:** IP PrintWay formats data into pages.

**Usage guidelines:**
- If you specify `allow` (default), you can also specify these attributes:
  - `printway-top-margin`
  - `printway-bottom-margin`
  - `printway-page-height`
  - `print-page-header`
- IP PrintWay ignores this attribute under any of these conditions:
  - Line data was converted to another format such as PCL, PostScript, PDF, SCS, or DSC format.
  - Print Interface converted line data into text data.
  - NetSpool converted the data to PCL format.
  - The data set contains carriage control characters.
  - The data set contains a PostScript header.
  - `printway-formatting=none` or `printway-formatting=translate-only`.

### printway-sosi-mode

This **single-valued** attribute specifies a value that indicates the shift-out shift-in (SOSI) mode that IP PrintWay basic mode uses to delimit double-byte character set (DBCS) data in the ASCII data stream.

**ISPF field name:** SOSI mode

**Allowed values:** You can enter one of these fixed values:
- **ascii** IP PrintWay translates each EBCDIC SOSI character to an ASCII SOSI character (X’0E’ to X’1E’ or X’0F’ to X’1F’).
- **ebcdic** IP PrintWay leaves the EBCDIC SOSI characters unchanged and delimits DBCS data with the EBCDIC SOSI characters.
- **none** IP PrintWay removes the SOSI characters and does not delimit DBCS data.
- **space** IP PrintWay translates each EBCDIC SOSI character to an ASCII space character (X’20’).

**Default value:** IP PrintWay removes SOSI characters and does not delimit DBCS data.

**Usage guidelines:** This attribute does not apply when:
- IP PrintWay extended mode processes the data stream.
- `db-translate-table = jis78kj-ascii, jis78kj-jisroman, jis83kj-ascii, jis83kj-jisroman, or ibmkanji`. For more information, see the `db-translate-table`.
- `protocol-type=vtam`.

### printway-top-margin

This **single-valued** attribute specifies the number of blank lines to leave in the top margin. IP PrintWay uses this value when formatting data into pages.

**ISPF field name:** IP PrintWay pagination: Margins: Top

**Allowed values:** An integer from 0 - 255.

**Default value:** IP PrintWay does not leave a top margin.
**Usage guidelines:** IP PrintWay ignores this attribute under any of these conditions:
- Line data was converted to another format such as PCL, PostScript, PDF, SCS, or DSC format.
- Print Interface converted line data into text data.
- NetSpool converted the data to PCL format.
- The data set contains carriage control characters.
- The data set contains a PostScript header.
- `printway-formatting=none` or `printway-formatting=translate-only`.
- `printway-pagination=suppress`.

**resubmit-for-filtering**
This single-valued attribute indicates whether a filter in the `filters` attribute is to be used for data sets submitted as batch jobs to IP PrintWay basic mode. When `resubmit-for-filtering=yes`, IP PrintWay resubmits batch data sets to Print Interface. Print Interface calls the filter (if any) associated with the input data format and then writes the data to a new output data set on the JES spool for subsequent processing by IP PrintWay.

**ISPF field name:** Resubmit for filtering

**Allowed values:** You can enter one of these fixed values:
- **yes** At least one filter in the `filters` attribute applies to batch data sets.
- **no** No filters apply to batch data sets.

**Default value:** no

**Usage guidelines:**
- This attribute does not apply to IP PrintWay extended mode.
- For optimum system performance, specify **yes** only when needed:
  - Specify **yes** if you also specify a transform filter, such as `afpxpcl.dll`, in the `filters` attribute.
  - Do not specify **yes** if the only filter specified is `aopfiltr.so`.
- This attribute has meaning only for IP PrintWay printer definitions. It is ignored for PSF and General printer definitions.

**scs-automatic-page-orientation**
This single-valued attribute indicates whether NetSpool is to automatically determine the orientation (portrait or landscape) of each page based on the line length and page length of that page. If necessary, NetSpool also reduces the size of the print (the font size) and increases the line density so that data fits on a line. NetSpool uses this attribute only when it converts SCS character string (SCS) data streams to PCL data streams.

**ISPF field name:** NetSpool PCL Conversion: SCS automatic page orientation

**Allowed values:** Enter one of these fixed values:
- **no** NetSpool does not automatically determine the page orientation.
- **yes** NetSpool automatically determines the page orientation if possible. If NetSpool cannot determine the page density and line density, it uses the orientation specified in the `pcl-orientation` attribute.

**Default value:** NetSpool does not automatically determine the page orientation.
**Usage guidelines:**

- NetSpool uses this attribute only when it converts SCS data streams and only when `netspool-formatting=convert-to-pcl`. Otherwise, this attribute is ignored.
- If `scs-automatic-page-orientation=yes`, you should specify values in these attributes:
  - `pcl-print-density`
  - `pcl-line-density`
  - `scs-maximum-line-length`
  - `scs-maximum-page-length`

  NetSpool uses the line and page lengths specified in SCS controls and in the `pcl-print-density`, `pcl-line-density`, `scs-maximum-line-length`, and `scs-maximum-page-length` attributes to determine the page orientation of each page. If the line length is greater than the page length, NetSpool sets the orientation to landscape. Otherwise, it sets the orientation to portrait. When NetSpool sets the orientation to landscape, if the `maximum-line-length` attribute (or the MPP in the SCS SHF control) is greater than 106, NetSpool sets the print density to 15 characters per inch and the line density to 8 lines per inch.

**scs-bottom-margin**

This single-valued attribute specifies the number of the line at which data ends on each page. NetSpool uses this value when it converts SNA character string (SCS) data streams to either line data streams or PCL data streams. IP PrintWay uses this value when it converts line data streams to SCS data streams.

**ISPF field name:** SCS Conversion: Margins: Bottom

**Allowed values:** An integer from 1-255. The number must be equal to or greater than the value in the `scs-top-margin` attribute. It must be equal to or less than the value in the `scs-maximum-page-length` attribute.

In this example, the data ends on line 61. Because the page has 66 lines, the bottom margin has 5 blank lines:

`scs-bottom-margin = 61  scs-maximum-page-length=66`

**Default value:** No bottom margin. NetSpool uses the current maximum presentation line (MPL) value.

**Usage guidelines:**

- A Set Horizontal Format (SHF) command in the SCS input data stream overrides this value.
- When `scs-bottom-margin=1`, NetSpool does not insert form feeds when the application spaces past the bottom margin. However, NetSpool does insert form feeds when an explicit form feed or a Select Vertical Channel command occurs in the input data.
- NetSpool ignores this attribute if `netspool-formatting = none`.
- IP PrintWay ignores this attribute if `printway-formatting=none` or `vtam-send-as-transparent=yes`.

**scs-horizontal-tabs**

This multi-valued, list attribute specifies the column numbers of the default horizontal tab settings. NetSpool uses this value when it converts SNA character string (SCS) data streams to either line data streams or PCL data streams. NetSpool always sets the first tab to the left margin value. You do not need to specify it. NetSpool ignores a value of 0.

**ISPF field name:** SCS Conversion: Horizontal tabs
Allowed values: An integer from 0 - 255. A number greater than zero must be equal to or between the values in the scs-left-margin and scs-right-margin attributes.

In this example, horizontal tabs are set at columns 6, 25, 50, 75, and 100.

\[ \text{scs-horizontal-tabs} = \{25\ 50\ 75\ 100\} \]
\[ \text{scs-left-margin} = 6 \]

Default value: NetSpool uses tab value 0.

Usage guidelines:
- A Set Horizontal Format (SHF) command in the SCS input data stream overrides this value.
- The input data stream can add additional tab positions but cannot remove default tabs set in this attribute.
- NetSpool ignores this attribute if netspool-formatting = none.

scs-left-margin

This single-valued attribute specifies the number of the first column of data on each page. NetSpool uses this value when it converts SNA character string (SCS) data streams to either line data streams or PCL data streams. IP PrintWay uses this value when it converts line data streams to SCS data streams.

ISPF field name: SCS Conversion: Margins: Left

Allowed values: An integer from 1-255. The number must be equal to or less than the value in the scs-maximum-line-length attribute.

In this example, the left margin has 3 blank columns:

\[ \text{scs-left-margin} = 4 \]

Default value: No left margin.

Usage guidelines:
- A Set Horizontal Format (SHF) command in the SCS input data stream overrides this value.
- NetSpool ignores this attribute if netspool-formatting = none.
- IP PrintWay ignores this attribute if printway-formatting=none or vtam-send-as-transparent=yes.
- When IP PrintWay converts line data to SCS data, the left margin value in the FCB, if specified, overrides this value.

scs-maximum-line-length

This single-valued attribute specifies the number of columns to place on one line. This number includes the left and right margins. NetSpool uses this value when it converts SNA character string (SCS) data streams to either line data streams or PCL data streams. IP PrintWay uses this value when it converts line data streams to SCS data streams.

ISPF field name: SCS Conversion: Line length

Allowed values: An integer from 1-255.

Default value: NetSpool uses column number 80 as the default. IP PrintWay uses the printer's default value set on the printer's panel.
**usage guidelines:**

- A Set Horizontal Format (SHF) command in the SCS input data stream overrides this value.
- NetSpool uses this value as the default maximum presentation position (MPP) value.
- NetSpool ignores this attribute if **netspool-formatting = none**.
- IP PrintWay ignores this attribute if **printway-formatting=none** or **vtam-send-as-transparent=yes**.

**scs-maximum-page-length**

This **single-valued** attribute specifies the number of lines to place on a page. This number includes any blank lines in the top and bottom margins and data lines. NetSpool uses this value when it converts SNA character string (SCS) data streams to either line data streams or PCL data streams. IP PrintWay uses this value when it converts line data streams to SCS data streams.

**ISPF field name:** SCS Conversion: Page length

**Allowed values:** An integer from 1-255.

**Default value:** NetSpool uses 1 as the default. IP PrintWay uses the printer’s default set on the printer panel.

**Usage guidelines:**

- A Set Vertical Format (SVF) command in the SCS input data stream overrides this value.
- NetSpool uses this value as the default SCS maximum presentation line (MPL) value.
- NetSpool ignores this attribute if **netspool-formatting = none**.
- IP PrintWay ignores this attribute if **printway-formatting=none** or **vtam-send-as-transparent=yes**.
- When IP PrintWay converts line data to SCS data, the page size value in the FCB, if specified, overrides this value.

**scs-right-margin**

This **single-valued** attribute specifies the column number at which the right margin starts on each page. NetSpool uses this value when it converts SNA character string (SCS) data streams to either line data streams or PCL data streams. IP PrintWay uses this value when it converts line data streams to SCS data streams.

**ISPF field name:** SCS Conversion: Margins: Right

**Allowed values:** An integer from 1-255. The number must be equal to or less than the value in the **scs-maximum-line-length** attribute.

In this example, the right margin is at column 76. Because the line length is 80, the right margin has 5 blank columns:

```
scs-right-margin = 76  scs-maximum-line-length=80
```

**Default value:** NetSpool uses 80 as the default value. IP PrintWay does not leave a right margin.

**Usage guidelines:**

- A Set Horizontal Format (SHF) command in the SCS input data stream overrides this value.
- NetSpool ignores this attribute if **netspool-formatting = none**.
• IP PrintWay ignores this attribute if printway-formatting=none or vtam-send-as-transparent=yes.

**scs-top-margin**
This single-valued attribute specifies the number of the first line of data on each page. NetSpool uses this value when it converts SNA character string (SCS) data streams to either line data streams or PCL data streams. IP PrintWay uses this value when it converts line data streams to SCS data streams.

**ISPF field name:** SCS Conversion: Margins: Top

**Allowed values:** An integer from 1-255. The number must be less than or equal to the value specified in the scs-maximum-page-length attribute. In this example, NetSpool leaves 5 blank lines in the top margin:

\[ \text{scs-top-margin} = 6 \]

**Default value:** No top margin.

**Usage guidelines:**
• NetSpool also uses this value as the line number for Select Vertical Channel 1.
• A Set Vertical Format (SVF) SCS command in the input data stream overrides this value.
• NetSpool ignores this attribute if netspool-formatting = none.
• IP PrintWay ignores this attribute if printway-formatting=none or vtam-send-as-transparent=yes.

**scs-vertical-tabs**
This multi-valued, list attribute specifies the line numbers of the default vertical tab settings. NetSpool uses these values when it converts SNA character string (SCS) data streams to either line data streams or PCL data streams. The first tab is always set to the top margin value. Do not specify it. A tab value of 0 is ignored. The first eleven tabs are also used as line numbers for Select Vertical Channel 2 through 12.

**ISPF field name:** SCS Conversion: Vertical tabs

**Allowed values:** An integer from 0 - 255. A number greater than zero must be equal to or between the values in the scs-top-margin and scs-bottom-margin attributes.

In this example, vertical tabs are set at lines 6, 20, 40, and 50. These vertical channels are set: CH01=6, CH02=20, CH04=40, CH05=50. These vertical channels are not set: CH03, CH06 through CH12.

\[ \text{scs-vertical-tabs} = \{20\ 0\ 40\ 50\} \text{ scs-top-margin} = 6 \]

**Default value:** NetSpool uses tab value 0.

**Usage guidelines:**
• A Set Vertical Format (SVF) SCS command in the input data stream overrides this value.
• The input data stream can add additional tab positions but cannot remove default tabs set in this attribute.
• NetSpool ignores this attribute if netspool-formatting = none.
**trailer-transform-error-page**

This **single-valued** attribute indicates whether transforms write messages for data stream errors and warnings to a trailer page. The trailer page is the last page in the output document. Warnings can indicate degraded output.

**ISPF field name:** Trailer error page

**Allowed values:** Enter one of these fixed values:

- **error**  
  The transform writes error messages, but not warning messages, to a trailer page. This option does not apply when the `fail-on-transform-error=error` or `fail-on-transform-error=warning` because no output document is created when an error occurs.

- **no**  
  The transform does not write messages to a trailer page.

- **warning**  
  The transform writes error and warning messages to a trailer page. This option does not apply when `fail-on-transform-error=warning` because no output document is created when an error or warning occurs.

**Default value:**
1. The value of the AOP_TRAILER_ERROR_PAGE environment variable for the transform class.
2. **warning**

**Usage guidelines:** For information about whether a transform supports this attribute, see the documentation for the transform.

**translation-dataset-qualification**

This **single-valued** attribute specifies the name of the TCP/IP translation table that IP PrintWay basic mode uses to convert single-byte character set (SBCS) data from EBCDIC to ASCII. This translation table name is used with both single-byte data and double-byte data to determine the high-level qualifier of the translation table data set. Specify this attribute only if you have created a custom TCP/IP translate table.

**ISPF field name:** Translation dataset qualifier

**Allowed values:** A valid translation table name.

**Default value:** See Usage Guidelines.

**Usage guidelines:**
- This attribute does not apply to IP PrintWay extended mode.
- If either the **document-codepage** or **printer-codepage** attribute is specified, IP PrintWay uses the code pages to convert data and ignores this attribute.
- If this attribute, the **db-translate-table** attribute, the **document-codepage**, and the **printer-codepage** attribute are not specified, IP PrintWay uses default code pages to convert data. However, you can specify the **old-style-translation** attribute in the FSS definition to force IP PrintWay to use the standard TCP/IP translate table, STANDARD.TCPXLBIN, to convert data.
- IP PrintWay ignores this attribute when **protocol-type=vtam** or **protocol-type=email**.
Attributes for the protocol object class

This section lists attributes that are valid when you create Protocol components, which are in object class protocol. These attributes are also valid for the printer object class.

Required attributes

Table 46 summarizes the attributes that are required and optional when you create a printer definition. The required and optional attributes depend on the value you select for the protocol-type attribute. You can specify attributes either in the printer definition or in an included Protocol component.

Note: When you create a Protocol component, no attributes are required. When you create a default IP PrintWay printer definition, no attributes are required.

Table 46. Required protocol attributes

<table>
<thead>
<tr>
<th>Value of protocol-type attribute</th>
<th>Required attributes</th>
<th>Optional attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct-sockets</td>
<td>printer-ip-address, port-number</td>
<td>description, operator-security-profile, page-accounting, page-restart</td>
</tr>
<tr>
<td>ipp</td>
<td>printer-uri</td>
<td>description, operator-security-profile</td>
</tr>
<tr>
<td>lpr</td>
<td>printer-ip-address, print-queue-name</td>
<td>description, lpr-xxxxx, operator-security-profile, owner, server-user-options</td>
</tr>
<tr>
<td>email</td>
<td>mail-to-addresses</td>
<td>description, mail-bcc-addresses, mail-cc-addresses, mail-embedded-headers, mail-inline-text, mail-inline-message, mail-from-name, mail-reply-address</td>
</tr>
</tbody>
</table>

description

This single-valued attribute specifies a description for the component. The description can help you select the correct component from a list.

ISPF field name: Description

Allowed values: Any combination of 1-256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose it in single or double quotation marks.

Default value: None.

lpr-banner-class

This single-valued attribute specifies the class name that IP PrintWay passes to the remote LPD for printing on a banner page, a page the LPD can print before the document.
**Banner class**

**ISPF field name:** Banner class

**Allowed values:** A combination of 1-31 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as @$# , * /). If the value contains blanks or special characters, enclose it in single or double quotation marks.

**Default value:** IP PrintWay passes the name of the z/OS system to the LPD.

**Usage guidelines:**
- The implementation and configuration of the remote LPD determine how this value is used.
- IP PrintWay uses this value only when it uses the LPR transmission protocol and
  `lpr-print-banner=yes`.

**Banner job name**

This single-valued attribute specifies the job name that IP PrintWay passes to the remote LPD for printing on a banner page, a page the LPD can print before the document.

**ISPF field name:** Banner job name

**Allowed values:** A combination of 1-99 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as @$# , * /). If the value contains blanks or special characters, enclose it in single or double quotation marks.

Specify `%sysout-job-name` to pass the z/OS job name instead of the z/OS fully qualified data set name to the LPD. (See [“Default value”](#) for information about when IP PrintWay passes the fully qualified data set name to the LPD.) For example:

```
lpr-banner-job-name="%sysout-job-name"
```

**Default value:** IP PrintWay passes one of these values to the LPD:
1. The value specified in the `sysout-dataset-name` job attribute.
2. One of these values:
   - IP PrintWay extended mode: The file name of documents submitted from remote systems, with the AOPPRINT JCL procedure, or with the `lp` command.
   - IP PrintWay extended mode: The VTAM LU name of the application that submitted the print request to NetSpool.
   - IP PrintWay basic mode and extended modes: The z/OS fully qualified data set name in this format:
     `system_name.user_ID.job_name.job_ID.dset_ID.short_dset_name`

**Usage guidelines:**
- The implementation and configuration of the remote LPD determine how this value is used.
- IP PrintWay uses this value only if it uses the LPR transmission protocol and
  `lpr-print-banner=yes`.

**Filename**

This single-valued attribute specifies the file name that IP PrintWay passes to the remote LPD.

**ISPF field name:** Filename
**Allowed values:** A combination of 1-31 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as @ $ # , * - /). If the value contains blanks or special characters, enclose it in single or double quotation marks.

**Default value:** One of these values:
- IP PrintWay extended mode: The file name of documents submitted from remote systems, with the AOPPRINT JCL procedure, or with the `lp` command.
- IP PrintWay extended mode: The VTAM LU name of the application that submitted the print request to NetSpool.
- IP PrintWay basic mode and extended modes: The z/OS fully qualified data set name in this format:
  system_name.user_ID.job_name.job_ID.dset_ID.short_dset_name

**Usage guidelines:**
- The implementation and configuration of the remote LPD determine how this value is used.
- IP PrintWay uses this value only if it uses the LPR transmission protocol.
- IP PrintWay passes this value to the LPD only if `lpr-print-function=p`.

**lpr-indent**
This single-valued attribute specifies the number of columns that the remote LPD indents the output it generates.

**ISPF field name:** Indent

**Allowed values:** An integer from 1-2147483646.

**Default value:** IP PrintWay does not pass a value to the LPD, so output is not indented.

**Usage guidelines:**
- The implementation and configuration of the remote LPD determine how this value is used.
- IP PrintWay uses this value only if it uses the LPR transmission protocol.

**lpr-mode**
This single-valued attribute specifies the mode that IP PrintWay uses when transmitting data to a remote LPD.

**ISPF field name:** Mode

**Allowed values:** You can enter one of these fixed values:

**control-file-first**
IP PrintWay transmits the control file before the data file. Not all LPDs support this mode. However, this mode lets some LPDs print data as it is received and print larger files.

**control-file-last**
IP PrintWay transmits the control file after the data file. All LPDs that adhere to RFC 1179 support this mode.

**streaming**
IP PrintWay transmits the control file before the data file. The remote LPD must support the RECEIVE CONTROL FILE FIRST
and RECEIVE DATA FILE WITH UNSPECIFIED LENGTH commands. Specify this value if the target system is an IBM network station.

to-remote-psf

IP PrintWay transmits files to Ricoh InfoPrint Manager or to Ricoh ProcessDirector. IP PrintWay:

- Adds a record length field to each record.
- Creates -o parameters in the control file. -o parameters contain AFP values specified by the job submitter, such as duplex option.
- Does not format or translate the data file to ASCII. (IP PrintWay ignores the printway-formatting attribute.)
- Transmits the control file after the data file.

Default value: IP PrintWay transmits the control file after the data file.

lpr-optimize-copies

This single-valued attribute indicates how IP PrintWay is to transmit documents when the job submitter requests multiple copies.

ISPF field name: Optimize copies

Allowed values: You can enter one of these fixed values:

- yes: IP PrintWay transmits the document to the LPD only one time. IP PrintWay tells the LPD how many copies to print in the LPD control file.
- no: IP PrintWay transmits the document to the LPD multiple times, one time for each copy.

Default value: IP PrintWay does not optimize the transmission of copies.

Usage guidelines:
- Select this field to improve performance, but only if the printer’s LPD supports printing multiple copies of one file.
- When lpr-mode=to-remote-psf, IP PrintWay ignores this attribute and transmits documents only one time because PSF supports printing multiple copies of one file.
- IP PrintWay uses this value only if it uses the LPR transmission protocol.

lpr-print-banner

This single-valued attribute indicates whether the remote LPD is to print a banner page. When lpr-print-banner=yes, IP PrintWay sends information for printing on the banner page to the LPD. A banner page is a page the LPD can print before the document.

ISPF field name: Print banner page

Allowed values: You can enter one of these fixed values:

- yes: The LPD prints a banner page.
- no: The LPD does not print a banner page.

Default value: The LPD prints a banner page.
Usage guidelines:
• The implementation and configuration of the remote LPD determine how this value is used.
• IP PrintWay uses this value only if it uses the LPR transmission protocol.

lpr-print-function
This single-valued attribute specifies a code that tells the remote LPD what type of data formatting to do.

ISPF field name: Print function

Allowed values: An upper or lowercase letter. These codes usually mean:

<table>
<thead>
<tr>
<th>Code</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>f</td>
<td>Print as a sequence of lines.</td>
</tr>
<tr>
<td>l</td>
<td>Print leaving control characters.</td>
</tr>
<tr>
<td>p</td>
<td>Print with pagination.</td>
</tr>
<tr>
<td>r</td>
<td>Print interpreting the first column as FORTRAN (ANSI) carriage control characters. Supported characters are 1, 0, +, -, and blank.</td>
</tr>
</tbody>
</table>

Default value: IP PrintWay passes code f to the remote LPD.

Usage guidelines:
• Some LPDs require that you specify code l for data that is not to be formatted or that includes transparent data.
• The implementation and configuration of the remote LPD determine how this value is used.
• IP PrintWay uses this value only if it uses the LPR transmission protocol.

lpr-restrict-ports
This single-valued attribute indicates whether IP PrintWay must use a z/OS port in the range of 721 to 731 when communicating with the remote LPD. Specify restrict-ports=yes when the remote LPD enforces this port restriction.

ISPF field name: Restrict ports

Allowed values: You can enter one of these fixed values:

<table>
<thead>
<tr>
<th>yes</th>
<th>The z/OS port must be in the range of 721 to 731.</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Any z/OS port can be used.</td>
</tr>
</tbody>
</table>

Default value: IP PrintWay uses any z/OS port.

Usage guidelines:
• When restrict-ports=no, IP PrintWay can use any free port. This increases the probability of finding an available port.
• IP PrintWay uses this value only if it uses the LPR transmission protocol.

lpr-title
This single-valued attribute specifies a document title that IP PrintWay passes to the remote LPD.

ISPF field name: Title
**protocol and printer**

**Allowed values:** A combination of 1-79 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as @ $ # , * - /). If the value contains blanks or special characters, enclose it in single or double quotation marks.

**Default value:**
1. A title specified by the job submitter.
2. One of these values:
   - IP PrintWay extended mode: The file name of documents submitted from remote systems, with the AOPPRINT JCL procedure, or with the `lp` command.
   - IP PrintWay extended mode: The VTAM LU name of the application that submitted the print request to NetSpool.
   - IP PrintWay basic mode and extended modes: The z/OS fully qualified data set name in this format:
     
     \[ \text{system	extunderscore name}\.\text{user	extunderscore ID}\.\text{job	extunderscore name}\.\text{job	extunderscore ID}\.\text{dset	extunderscore ID}\.\text{short	extunderscore dset	extunderscore name} \]

**Usage guidelines:**
- The implementation and configuration of the remote LPD determine how this value is used.
- IP PrintWay uses this value only if it uses the LPR transmission protocol.
- A title specified by the job submitter overrides the value specified in this attribute.

**lpr-width**

This **single-valued** attribute specifies the maximum number of columns that the remote LPD puts on a line.

**ISPF field name:** Width

**Allowed values:** An integer from 1-2147483646.

**Default value:** IP PrintWay does not pass a width value to the LPD.

**Usage guidelines:**
- The implementation and configuration of the remote LPD determine how this value is used.
- IP PrintWay uses this value only if it uses the LPR transmission protocol.

**mail-bcc-addresses**

This **multi-valued** attribute specifies the email addresses of the “blind copy (bcc)” recipients of an email. A bcc means that other recipients of the email do not see the bcc recipient listed. You can also specify one or more alias names that are defined to z/OS UNIX sendmail. An alias name represents one or more real email addresses. This attribute pertains only to printer definitions with **protocol-type=email**. It is optional for these printer definitions.

**ISPF field name:** BCC addresses

**Allowed values:** You can specify 1-32 email addresses. If you specify more than one value, separate the values with spaces and enclose the list of values in braces `{}`. Each email address can be 1-60 characters. Blanks are not allowed in an email address. If the email address contains special characters (such as @ $ & ( ) > < | ' " #), enclose the entire email address in single or double quotation marks. If the email address contains the special character @, enclose the value in braces even if
there is only one value. If the email address contains double quotation marks, enclose the entire address in single quotation marks. Each address or alias name should be in this format:

```
username[@domainname]
```

### username

The name of the recipient or an alias name that is defined to z/OS UNIX sendmail.

### @domainname

The domain name of the target system. If you omit @domainname, sendmail uses the name of the system on which sendmail is running. If you specify an alias, omit @domainname.

For example:

```
mail-bcc-addresses = {"user2@xyz.com" dept01list}
mail-bcc-addresses = {"user2@xyz.com"}
```

**Default value:** None.

**Usage guidelines:**
- Infoprint Server does not verify that the value is in the correct format.
- An address that the job submitter specifies overrides this value.

### mail-cc-addresses

This **multi-valued** attribute specifies the email addresses of the “copy (cc)” recipients of an email. A cc means that other recipients of the email can see the cc recipient listed. You can also specify one or more alias names that are defined to z/OS UNIX sendmail. An alias name represents one or more real email addresses. This attribute pertains only to printer definitions with **protocol-type=email**. It is optional for these printer definitions.

**ISPF field name:** CC addresses

**Allowed values:** You can specify 1-32 email addresses. If you specify more than one value, separate the values with spaces and enclose the list of values in braces {}. Each email address can be 1-60 characters. Blanks are not allowed in an email address. If the email address contains special characters (such as @ $ & ( ) > < \ ' " #), enclose the entire email address in single or double quotation marks. If the email address contains the special character @, enclose the value in braces even if there is only one value. If the email address contains double quotation marks, enclose the entire address in single quotation marks. Each address or alias name should be in this format:

```
username[@domainname]
```

### username

The name of the recipient or an alias name that is defined to z/OS UNIX sendmail.

### @domainname

The domain name of the target system. If you omit @domainname, sendmail uses the name of the system on which sendmail is running. If you specify an alias, omit @domainname.

For example:

```
mail-cc-addresses = {"user3@xyz.com" dept02list}
mail-cc-addresses = {"user3@xyz.com"}
```
Default value: None.

Usage guidelines:
- Infoprint Server does not verify that the value is in the correct format.
- An address that the job submitter specifies overrides this value.

**mail-embedded-headers**
This single-valued attribute indicates whether line-data documents can contain email headers. This attribute pertains only to printer definitions with protocol-type=email. It is optional for these printer definitions.

ISPF field name: Embedded headers

Allowed values: You can enter one of these fixed values:

- **yes**: IP PrintWay extended mode looks for an email header in the first 32 records of all line-data documents. If a header is found, it sends the email to the addresses in the header and with the subject specified in the header. If no header is found, it sends the email to the addresses specified on the OUTPUT JCL statement, in job attributes, or in the printer definition.

- **no**: IP PrintWay extended mode does not look for email headers.

Default value: IP PrintWay does not look for an email headers.

Usage guidelines:
- IP PrintWay extended mode does not look for email headers in documents with other formats (such as, text, PCL, and PDF).
- If you print VTAM application data that contains email headers, specify netspool-formatting=convert-to-line (default).
- An address or subject in the email header overrides the address and title specified on the OUTPUT JCL statement, in job attributes, and in the printer definition.
- For the format of email headers, see z/OS Infoprint Server User’s Guide.
- IP PrintWay basic mode ignores this attribute. It does not look for email headers in line-data documents.

**mail-from-name**
This single-valued attribute specifies the descriptive name or other identifier of the sender of an email. This attribute pertains only to printer definitions with protocol-type=email. It is optional for these printer definitions.

ISPF field name: From name

Allowed values: A combination of 1-60 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as @ $ & ( ) > < ! ' " #). If the name contains blanks or special characters, enclose the entire name in single or double quotation marks. If the name contains double quotation marks, enclose the entire name in single quotation marks.

IP PrintWay always includes userid@domainname to identify the sender. The user ID of the job submitter is userid. The domain name where Infoprint Server is running is domainname. For example: JOHN@SYSTEM.

For example, this specification:

```
mail-from-name = "John Q. Sender"
```
Puts this information in the email:
From: John Q. Sender <JOHN@SYSTEM1>

**Tip:** To specify the email address that recipients of an email can reply to, use the `mail-reply-address` attribute.

**Default value:** None.

**Usage guidelines:**
- Infoprint Server does not verify that the value is in the correct format.
- A name that the job submitter specifies overrides this value.

**mail-inline-message**

This single-valued attribute specifies data that IP PrintWay extended mode includes inline at the beginning of each email. For example, you can specify a standard greeting and text. This attribute pertains only to printer definitions with `protocol-type=email`. It is optional for these printer definitions.

**ISPF field name:** Inline message

**Allowed values:** Up to 292 letters, numbers, blanks, and special characters. If the message contains blanks or special characters, enclose the entire message in single or double quotation marks. You can include control values, such as:

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;LF&gt;</td>
<td>New line</td>
</tr>
<tr>
<td>&lt;SP&gt;</td>
<td>Blank character</td>
</tr>
</tbody>
</table>

Email programs can interpret control values in different ways.

**Tip:** Infoprint Server converts each blank in the message to <SP>. If the message exceeds 292 characters, it is truncated.

**Examples:**
"Greetings:<LF><LF>The monthly sales report is attached.<LF>"  
"Greetings:<LF><LF>The<SP>monthly<SP>sales<SP>report<SP>is<SP>attached.<LF>"

This is the message in the email:

```
Greetings:

The monthly sales report is attached.
[If you include a document in the body of the email, text starts here.]
```

**Default value:** No inline message is included in the body of the email.

**Usage guidelines:**
- IP PrintWay basic mode ignores this attribute.

**mail-inline-text**

This single-valued attribute indicates whether data in text and line-data documents is included inline in the body of the email. This attribute pertains only to printer definitions with `protocol-type=email`. It is optional for these printer definitions.
**protocol and printer**

**ISPF field name:** Inline text and line data

**Allowed values:** You can enter one of these fixed values:

- **yes** Text and line data is included inline.
- **no** Text and line data is not included inline. All documents are sent as attachments.

**Default value:** Text and line data is not included inline. All documents are sent as attachments.

**Usage guidelines:**
- Documents in a format other than line data or text (such as, AFP and PDF documents) are always sent as attachments.
- Line data documents transformed to another format (such as, PDF) are always sent as attachments.
- If you print VTAM application data and want to include data inline, specify `netspool-formatting=line` (default).
- You can separate data from more than one document in an email with a blank line or other text. For a blank line, specify `<LF>` in the `document-trailer` attribute.
- IP PrintWay basic mode ignores this attribute. It sends text and line data documents as attachments.

**mail-reply-address**

This **single-valued** attribute specifies the email address that recipients of an email can reply to. You can also specify an alias name that is defined to z/OS UNIX sendmail. An alias name represents one or more real email addresses. This attribute pertains only to printer definitions with `protocol-type=email`. It is optional for these printer definitions.

**ISPF field name:** Reply address

**Allowed values:** A combination of 1-60 letters (a-z, A-Z), numbers (0-9), and special characters (such as @ $ & ( ) > < | ` #). Blanks are not allowed in an email address. If the email address contains special characters, enclose the entire name in single or double quotation marks. If the name contains double quotation marks, enclose the entire name in single quotation marks. If the email address contains the special character @, enclose the value in braces. The name should be in this format:

```
username[@domainname]
```

**username**

The name portion of the address, or an alias name that is defined to z/OS UNIX sendmail.

**@domainname**

The domain portion of the target system. If you omit `@domainname`, sendmail uses the name of the system on which sendmail is running.

For example:
```
mail-reply-address = {"mysecretary@xyz.com"}
```

**Default value:** None. However, most email programs use the sender's email address. The default is `userid@domainname`. The user ID of the job submitter is `userid`. The domain name where Infoprint Server is running is `domainname`. 
Usage guidelines:
- Infoprint Server does not verify that the value is in the correct format.
- An address that the job submitter specifies overrides this value.

**mail-to-addresses**
This **multi-valued** attribute specifies the email addresses of the recipients of an email. You can also specify one or more alias names that are defined to z/OS UNIX sendmail. An alias name represents one or more real email addresses. This attribute pertains only to printer definitions with **protocol-type=email**. It is required for these printer definitions. The job submitter can override the email addresses during job submission. You can set up just one printer definition for the email protocol because the job submitter can specify the email addresses. You must specify a default email address in this printer definition.

**ISPF field name**: Email addresses

**Allowed values**: You can specify 1-32 email addresses. If you specify more than one value, separate the values with spaces and enclose the list of values in braces {}. Each email address can be 1-60 characters. Blanks are not allowed in an email address. If the email address contains special characters (such as @ $ & ( ) > < | ' " #), enclose the entire email address in single or double quotation marks. If the email address contains the special character @, enclose the value in braces even if there is only one value. If the email address contains double quotation marks, enclose the entire address in single quotation marks.

Each email address or alias name should be in this format:

```
username[domainname]
```

- **username**
  The name of the recipient or an alias name that is defined to z/OS UNIX sendmail.

- **domainname**
  The domain name of the target system. If you omit **domainname**, sendmail uses the name of the system on which sendmail is running. If you specify an alias, omit **domainname**.

For example:

```
mail-to-addresses = {"user1@xyz.com" dept03list}
mail-to-addresses = {"user1@xyz.com"}
```

**Default value**: None.

**Usage guidelines**:
- Infoprint Server does not verify that the value is in the correct format.
- An address that the job submitter specifies overrides this value.

**name**
This **single-valued** attribute specifies the name of the component.

**Note**: This is a **non-settable** attribute. Do not specify the **name** attribute on the PIDU **create**, **force-create**, or **modify** command. Instead, specify the name as an operand on the command. However, you can specify the **name** attribute when you construct a condition for the **where** predicate on the **list** and **export** commands.
**ISPF field name:** Component Name

**Allowed values:** Any combination of 1-17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # . - = / ). Blanks are not allowed.

**Default value:** None.

**operator-security-profile**

This single-valued attribute specifies the name of the RACF resource profile in the PRINTSRV class that controls who can work with this printer using Infoprint Central. This attribute applies only to IP PrintWay extended mode.

**ISPF field name:** Operator security profile

**Allowed values:** A combination of letters, numbers, and special characters except for commas, semicolons, parentheses, and blanks. If the value contains special characters, enclose it in single or double quotation marks. Lowercase letters are converted to uppercase. Do not start names with AOP. For example:

```
operator-security-profile = "DENVER.001"
```

**Default value:** None.

**Usage guidelines:**

- To authorize users to a group of printers, specify the same profile name in the IP PrintWay printer definitions and PSF FSA definitions for all printers in the group.
- If more than one printer definition exists for a printer, specify the same profile name in each printer definition.
- If the profile name is not defined to RACF, or if you omit this attribute, anyone can work with this printer.
- This attribute does not apply to IP PrintWay basic mode or when you select the email protocol.
- For information about the PRINTSRV class, see [z/OS Infoprint Server Customization](#).

**owner**

This single-valued attribute specifies the owner name that IP PrintWay passes to the remote LPD for printing on the banner page, a page printed before the document.

**ISPF field name:** Owner

**Allowed values:** A combination of 1-31 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as: @ $ # , * - / ). If the value contains blanks or special characters, enclose it in single or double quotation marks.

**Default value:** IP PrintWay passes the user ID for the print job to the LPD.

**Usage guidelines:**

- The implementation and configuration of the remote LPD determine how this value is used.
- IP PrintWay uses this value only if it uses the LPR transmission protocol and lpr-print-banner=yes.
**page-accounting**

This **single-valued** attribute indicates whether IP PrintWay extended mode records the number of printed pages in the SMF type 6 accounting record (in field SMF6PGE) for each document.

**ISPF field name:** Record pages printed for accounting

**Allowed values:** You can enter one of these fixed values:
- **yes** IP PrintWay extended mode records the number of printed pages in the SMF record.
- **no** IP PrintWay extended mode does not record the number of printed pages in the SMF record.

**Default value:** IP PrintWay does not record the number of printed pages.

**Usage guidelines:**
- Specify **yes** only if the printer supports HP’s Printer Job Language (PJL).
- Specify this attribute if the printer supports PJL so that you get more accurate accounting information.
- If you specify this attribute or the **page-restart=yes** attribute, IP PrintWay extended mode also supports the cancel function from the printer’s console.
- IP PrintWay extended mode uses this attribute only if **protocol-type=direct-sockets**. For other protocols, it ignores this attribute and does not record the number of printed pages in the SMF record.
- IP PrintWay basic mode always ignores this attribute. It does not record the number of printed pages in the SMF record.
- Documents cannot contain PJL JOB commands. If you use a transform, you might need to customize the transform so that it does not add PJL commands. For information, see [z/OS InfoPrint Server Customization](#).

**page-restart**

This **single-valued** attribute indicates where IP PrintWay extended mode tells the printer to start printing again after an error occurs. It can tell the printer to start printing from the beginning of the print job or after the last page that the printer reported printed successfully.

**ISPF field name:** Restart printing after last successful page

**Allowed values:** You can enter one of these fixed values:
- **yes** IP PrintWay extended mode tells the printer to start printing after the last page that the printer reported printed successfully.
- **no** IP PrintWay extended mode tells the printer to start printing from the beginning of the print job.

**Default value:** IP PrintWay extended mode tells the printer to start printing from the beginning of the print job.

**Usage guidelines:**
- Specify **yes** only if the printer supports HP’s Printer Job Language (PJL).
- Specify **yes** if you send large documents to the printer. This can save paper and printing costs.
**protocol and printer**

- To prevent duplicate pages, set a high value in the `response-timeout` attribute to give the operator time to add paper or fix a jam.
- If you specify this attribute or the `page-accounting=yes` attribute, IP PrintWay extended mode also supports the cancel function from the printer’s console.
- IP PrintWay extended mode uses this attribute only if `protocol-type=direct-sockets`. For other protocols, it ignores this attribute and always restarts printing from the beginning of the print job.
- IP PrintWay basic mode ignores this attribute. Printing always restarts from the beginning of the print job.
- Documents cannot contain PJL JOB commands. If you use a transform, you might need to customize it to not add PJL commands. For information, see z/OS Infoprint Server Customization.

**port-number**

This single-valued attribute specifies the port number of the remote printer or print server.

**ISPF field name:** Port number

**Allowed values:** Specify the port number (1–65545) that is configured in the printer.

**Default value:** None.

**Usage guidelines:**
- This attribute is required if you create a printer definition and `protocol-type=direct-sockets`. For other protocol types, IP PrintWay ignores this attribute.
- A port number specified by the job submitter overrides this attribute.
- To determine the correct port number, see the documentation for the network interface card or printer. Some typical port numbers are:
  - Port 9100 is used by some Ricoh printers, most HP printers, and most Lexmark printers.
  - Port 2501 is used by some Ricoh printers.
- In the IP PrintWay default printer definition named DFLTNTRY, omit this attribute because IP PrintWay uses the port number specified on the OUTPUT JCL statement.

**print-queue-name**

This single-valued attribute specifies the name of the print queue in the remote printer or print server. Specify this attribute if you specify the LPR protocol in the `protocol-type` attribute.

**ISPF field name:** Print queue name

**Allowed values:** A combination of 1-255 letters (a-z, A-Z), numbers (0-9), and special characters (such as # $ @ ! = / -). Blanks are not allowed. The print queue name is case-sensitive on some remote systems, so be sure to use the correct uppercase and lowercase letters. Examples of print queue names are:

```
print-queue-name = TEXT
print-queue-name = PASS
print-queue-name = RAW
```

**Default value:** None.
**protocol and printer**

**Usage guidelines:**
- This attribute is required if you create a printer definition and `protocol-type=lpr`. For other protocol types, IP PrintWay ignores this attribute.
- A print queue name specified by the job submitter overrides this value.
- To determine the print queue name, see the documentation for the network interface card, the printer, or the print server. Some common queue names are:
  - TEXT and RAW are used for some Ricoh printers, most HP printers, and most Lexmark printers. Specify the RAW queue for formatted text data, PCL data, and PostScript data.
  - TEXT and PASS are used for some Ricoh printers. Specify the PASS queue for text data that contains a carriage return at the end of each line, PCL data, and PostScript data.
  - If you specify the PASS or RAW queues and you run IP PrintWay basic mode, also specify 0D25 in the **Line termination** field. This causes IP PrintWay basic mode to add a carriage return at the end of each line when it converts line data to text data. IP PrintWay extended mode adds a carriage return at the end of each line by default.
- In the IP PrintWay default printer definition named DFLTNTRY, omit this attribute because IP PrintWay uses the print queue name specified on the OUTPUT JCL statement.

**printer-ip-address**
This **single-valued** attribute specifies the Internet Protocol (IP) address or host name of the remote printer or print server.

**ISPF field name:** Printer IP address

**Allowed values:** Specify a valid IP address or host name. You can specify the IP address in dotted-decimal or colon-hexadecimal format. Blanks are not allowed. If the value contains special characters, enclose it in quotation marks. Examples of printer IP addresses are:

```
printer-ip-address = 9.99.176.133  
printer-ip-address = prt009.net.xyz.com  
printer-ip-address = PRT009  
printer-ip-address = 2001:0db8:85a3:0000:0000:8a2e:0370:7334
```

**Default value:** None.

**Usage guidelines:**
- If you specify a colon-hexadecimal IP address:
  - IP PrintWay extended mode is required.
  - You can omit leading zeroes in each hexadecimal value.
  - You can omit one sequence of repeat zero values.
  - You can specify the last two hexadecimal values in dotted-decimal notation.
- If you run IP PrintWay extended mode and specify a host name, define the host name in the domain name server (DNS) before you save the printer definition. If the DNS entry is created after you save the printer definition, Infoprint Central cannot display the printer for this printer definition until someone submits a print job to the printer definition or until you modify an attribute in the printer definition.
- An IP address specified by the job submitter overrides this attribute.
- If another printer definition refers to this printer, use the same uppercase and lowercase letters when you type the host name.
This attribute is required when you create a printer definition and specify either lpr or direct-sockets in the protocol-type attribute. For other protocol types, IP PrintWay ignores this attribute.

In the IP PrintWay default printer definition named DFLTNTRY, you can omit this attribute because the job submitter must specify an IP address.

**printer-logmode**
This single-valued attribute specifies the name of an entry in the VTAM logon-mode table, which defines the session parameters for a printer.

**ISPF field name:** Printer logmode

**Allowed values:** You can enter a valid combination of 1–8 letters, numbers, and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

**Default value:** The name specified in the DLOGMOD parameter of the VTAM resource definition statement for the printer.

**Usage guidelines:**
- IP PrintWay uses this value only if protocol-type=vtam.

**printer-luname**
This single-valued attribute specifies the VTAM network name of the printer. This name must match the name of the VTAM resource definition for the printer. For example, the VTAM LU or LOCAL definition. LU type 0 (DSC/DSE), LU type 1 (SCS) and LU type 3 (DSC/DSE) printers are supported.

**ISPF field name:** Printer luname

**Allowed values:** You can enter a valid combination of 1–8 letters, numbers, and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

**Default value:** None.

**Usage guidelines:**
- This attribute is required if you create a printer definition and protocol-type=vtam. For other protocol types, IP PrintWay ignores this attribute.

**printer-uri**
This single-valued attribute specifies the Uniform Resource Identifier (URI) of the remote Internet Printing Protocol (IPP) server running either in a printer or host system. This attribute is required if you create a printer definition and protocol-type=ipp.

**ISPF field name:** URL

**Allowed values:** A combination of letters, numbers, and special characters, as defined by RFC 2396. Blanks are not allowed. If the value contains special characters, enclose it in quotation marks. Examples of URIs are:
- `printer-uri="ipp://myprinter.xyz.com"`
- `printer-uri="http://myprinter.xyz.com:631"`
**protocol and printer**

**Default value:** None.

**Usage guidelines:**
- For URIs prefixed with **ipp**, the default port is 631.
- For IP PrintWay basic mode: If you specify this URI in another printer definition, use the same uppercase and lowercase letters in each printer definition.

**protocol-type**

This **single-valued** attribute specifies the transmission protocol you want IP PrintWay to use to transmit data sets to the remote system.

**ISPF field name:** Protocol

**Allowed values:** You can enter one of these fixed values:

- **direct-sockets**
  - TCP/IP socket to socket protocol.
- **email**
  - TCP/IP Simple Mail Transfer Protocol (SMTP).
- **ipp**
  - Internet Printing Protocol (IPP). An IPP server must be running in the remote printer or server.
- **lpr**
  - TCP/IP line printer (LPR) to line printer daemon (LPD) protocol. An LPD must be running in the remote printer or print server and listening at port 515.
- **vtam**
  - Virtual Telecommunications Access Method (VTAM). The printer must be a VTAM LU type 0 (DSC/DSE), LU type 1 (SCS), or LU type 3 (DSC/DSE).

**Default value:** lpr

**Usage guidelines:**
- If you specify **direct-sockets**, also specify the **printer-ip-address** and **port-number** attributes.
- If you specify **email**, also specify the **mail-to-addresses** attribute.
- If you specify **ipp**, also specify the **printer-uri** attribute.
- If you specify **lpr**, also specify the **printer-ip-address** and **print-queue-name** attributes.
- If you specify **vtam**, also specify the **printer-luname** attribute.

**server-user-options**

This **single-valued** attribute specifies information that IP PrintWay sends to the remote LPD. You can specify options that the remote LPD supports but that IP PrintWay does not automatically generate.

**ISPF field name:** User options

**Allowed values:** A combination of 1-255 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as @ $ # , * /). If the value contains blanks or special characters, enclose it in single or double quotation marks.

**Default value:** None.
**Usage guidelines:**

- Most LPD servers require each `-o` option to end with a line-feed character (ASCII X'0A'). IP PrintWay automatically adds a line-feed character to the end of the value that you specify for this attribute. However, to specify more than one `-o` option using this attribute, you must separate them with a line-feed character. Because IP PrintWay converts the entire attribute value from EBCDIC to ASCII, you must specify an EBCDIC line-feed character (X'25'). For example: `server-user-options="-oformdef=F1STND01\x25-oti=TitleInfo"`. You must use a PIDU command to specify this value because it contains a hexadecimal character. You cannot use the ISPF panels to specify a hexadecimal character for this attribute. The ISPF panels display this hexadecimal character as an unprintable character (dot).

- IP PrintWay ignores this attribute when it uses the direct sockets, IPP, or VTAM transmission protocol.

**vtam-checkpoint-pages**

This `single-valued` attribute specifies the number of pages between data-set checkpoints. IP PrintWay requests a definitive response from the printer after the specified number of pages. If a printer error or printer intervention situation occurs, IP PrintWay resends all pages that were sent after the last definitive response from the printer. This makes sure that no data is lost. However, duplicate pages, up to the number specified in this attribute, might be printed.

If a printer error or intervention situation persists after IP PrintWay resends pages from the last data-set checkpoint, IP PrintWay resends all data from the beginning (without using the checkpoint) if retries are requested. In this case, more duplicate pages might be printed.

**ISPF field name:** Checkpoint pages

**Allowed values:** An integer from 0 - 25.

**Default value:** IP PrintWay uses 5.

**Usage guidelines:**

- 0 means that IP PrintWay takes no checkpoints. If 0 is specified and an error occurs, IP PrintWay retransmits the entire data set if you requested retries in the printer definition. For information about how to specify retries, see the `retry-limit` and `retry-time` attributes.

- This attribute is used only if `protocol-type=vtam`. For other protocol types, IP PrintWay ignores this attribute.

- If you request too frequent checkpoints, printer performance can be adversely affected.

- If you request infrequent checkpoints, more duplicate pages might be printed.

**vtam-send-as-transparent**

This `single-valued` attribute indicates that IP PrintWay sends output data to the printer as transparent data. IP PrintWay precedes data with transparent data controls but does not convert data to SCS or DSC/DSE format.

**Allowed values:** You can enter one of these fixed values:

- `yes` IP PrintWay transmits data as transparent data.
- `no` IP PrintWay does not transmit data as transparent data.
Default value: IP PrintWay does not transmit data as transparent data.

Usage guidelines:

- IP PrintWay uses this attribute only if protocol-type=vtam. For other protocols, IP PrintWay ignores this attribute.
- Specify vtam-send-as-transparent=yes if data is already in a format that the printer accepts and if the SNA gateway requires that data be sent as transparent data.
- You can specify the character that IP PrintWay uses in the transparent data controls in the transparent-data-character attribute.
- IP PrintWay does not transmit these types of data as transparent data:
  - Data specified in the document-header and document-trailer attributes
  - Data added by the IP PrintWay Begin Data Set and End Data Set exits
- When vtam-send-as-transparent=yes, IP PrintWay ignores the printway-formatting attribute and processes data as if printway-formatting=none.

Attributes for the psf-fss object class

This section lists attributes that are valid when you create PSF FSS definitions, which are in object class psf-fss.

Tip: In this section, PSF refers to PSF for z/OS, the AFP Download Plus feature of PSF, or both.

Note: If you change the value for an attribute, you must restart the PSF FSS to pick up the new value.

Required attributes

All attributes are optional.

description

This single-valued attribute describes the FSS definition. The description can help you select the FSS definition from a list.

ISPF field name: Description

Allowed values: Any combination of 1–256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose the value in quotation marks.

Default value: None.

log-messages

This single-valued attribute specifies whether PSF V4R4 or later writes messages for print jobs and printers in the Infoprint Server common message log.

ISPF field name: Log messages

Allowed values: You can enter one of these fixed values:

- yes PSF writes messages in the common message log.
- no PSF does not write messages in the common message log.

Default value: no
Usage guidelines: If you change this attribute while PSF V4R4 is running, you must restart the PSF functional subsystem (FSS) for the change to take effect.

name
This single-valued attribute specifies the name of the FSS definition. This name must be a unique FSS definition name in the Printer Inventory and must match the name on the JES FSS definition statement.

Note: This is a non-settable attribute. Do not specify the name attribute on the PIDU create, force-create, or modify command. Instead, specify the name as an operand on the command. However, you can specify the name attribute when you construct a condition for the where predicate on the list and export commands.

ISPF field name: FSS name

Allowed values: None.

Default value: None.

nst-trace-dsname
This single-valued attribute specifies the name of the data set that PSF directs a notify subtask (NST) trace to. This name must be different than the data set name PSF directs an FSA external trace to. For complete details about this attribute, see PSF for z/OS: Diagnosis.

ISPF field name: NST trace dsname

Allowed values: You can enter a valid data set name.

Default value: None.

Usage guidelines: An NST trace is recorded only if an FSA internal or external trace of the page printing writer (PPWTR) component is also active for that FSA.

tcpip-job-name
This single-valued attribute specifies the name of the TCP/IP startup procedure. If you have changed the name of the TCP/IP startup procedure, specify the new name for this attribute. For complete details about this attribute, see PSF for z/OS: Diagnosis.

ISPF field name: TCP/IP job name

Allowed values: You can enter a valid job name. The letters you type are converted to uppercase.

Default value: TCPIP

trace-prompt
This single-valued attribute specifies whether the operator is prompted with message APS620A each time the FSS starts. Prompting lets the operator start tracing all FSAs before the FSA starts processing any data sets. For complete details about this attribute, see PSF for z/OS: Diagnosis.

ISPF field name: Trace prompt

Allowed values: You can enter one of these fixed values:
**psf-fss**

- **yes** The operator is prompted when the FSS starts.
- **no** The operator is not prompted.

**Default value:** no

**trace-table-size**

This **single-valued** attribute specifies a number that indicates how many 4 KB pages of storage are allocated for the PSF FSA trace table. This allocation occurs only if the **trace-mode** attribute is **internal**, **ipds**, **limit**, **full**, or **sync**. For complete details about this attribute, see [PSF for z/OS: Diagnosis](#).

**ISPF field name:** Trace table size

**Allowed values:** You can enter an integer from 1 to 999.

**Default value:** 32

**unicode-enabled**

This **single-valued** attribute specifies whether PSF is Unicode-enabled. When PSF is Unicode-enabled, you can use:

- Resources that reside in path libraries (also called **resource directories**), such as TrueType fonts, OpenType fonts, color management resources, and data object resources
- QR bar codes with SOSI data

**ISPF field name:** Unicode enabled

**Allowed values:** You can enter one of these fixed values:

- **yes** PSF is Unicode-enabled.
- **no** PSF is not Unicode-enabled.

**Default value:** no
Chapter 18. Using accounting information in SMF type 6 records

IP PrintWay and PSF write SMF type 6 records for data sets that Infoprint Server processes. For the formats of the SMF type 6 records that IP PrintWay and PSF write, see *z/OS MVS System Management Facilities (SMF)*. This section provides additional information that can help you interpret these SMF type 6 records.

Interpreting the job name, job ID, and user ID fields in the SMF type 6 record

Table 47 describes the contents of the SMF6JBN (job name), SMF6JBID (job ID), and SMF6USID (user ID) fields in the SMF type 6 record. The contents of these fields varies depending on how the print request was submitted to Infoprint Server and whether IP PrintWay or PSF writes the record. However, the contents are the same whether IP PrintWay basic mode or IP PrintWay extended mode writes the record.

Table 47. Contents of fields SMF6JBN, SMF6JBID, and SMF6USID in SMF type 6 record

<table>
<thead>
<tr>
<th>If the print request was submitted in this way:</th>
<th>These SMF type 6 fields contain:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SMF6JBN</strong></td>
<td><strong>SMF6JBID</strong></td>
</tr>
<tr>
<td>z/OS UNIX lp command or AOPPRINT JCL procedure.</td>
<td>The value in the optional sysout-job-name job attribute. If not specified, the z/OS user ID of the job submitter.</td>
</tr>
<tr>
<td>Batch job, including batch jobs that use the Print Interface subsystem or IP PrintWay basic mode resubmit for filtering function.</td>
<td>The name of the batch job.</td>
</tr>
<tr>
<td>Print command or application on a remote system. Print commands include <strong>enq</strong>, <strong>LPR</strong>, and <strong>print</strong>. Applications include the Infoprint Port Monitor, SAP R/3, and the Windows SMB protocol.</td>
<td>The first 8 characters of the name of the remote job submitter.</td>
</tr>
<tr>
<td>VTAM applications, such as CICS and IMS applications.</td>
<td>The owner of the print job.</td>
</tr>
</tbody>
</table>
Table 47. Contents of fields SMF6JBN, SMF6JBID, and SMF6USID in SMF type 6 record (continued)

<table>
<thead>
<tr>
<th>If the print request was submitted in this way:</th>
<th>These SMF type 6 fields contain:</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMF6JBN</td>
<td>SMF6JBID</td>
</tr>
</tbody>
</table>

Notes:
1. The Infoprint Server job ID starts with the 2-character job prefix specified in the Infoprint Server configuration file (aopd.conf) or in the system configuration definition. The default prefix is PS.
2. The name of the remote job submitter in field SMF6JBN is in uppercase characters and might contain a #. A # replaces any character that JES does not allow in a job name. The name of the remote job submitter in field SMF6USID can be in uppercase and lowercase characters because the original case of the name is maintained. For print requests submitted from a Windows workstation, this is the Windows logon name. For print requests submitted with an LPR command, this is the value in the P control code in the LPD control file.
3. The owner of a print job can be specified in the owner job attribute embedded in VTAM application data or in the Default owner field in the printer definition. The owner in both the SMF6JBN and SMF6USID fields is in uppercase characters.

Related information: For information about the SMF type 6 record for IP PrintWay, see z/OS MVS System Management Facilities (SMF).

Comparing SMF type 6 records written by IP PrintWay basic mode and extended mode

IP PrintWay basic mode and IP PrintWay extended mode write SMF type 6 records in different formats. Some fields are written only by IP PrintWay basic mode, and some fields are written only by IP PrintWay extended mode.

Tip: If you run both basic mode and extended mode (on different z/OS systems), you can use the same SMF accounting program to process both SMF type 6 record formats. To determine whether the SMF record was written by IP PrintWay basic mode or extended mode, your SMF accounting routine can check the SMF6INDC field in the SMF type 6 record:
- IP PrintWay basic mode: SMF6INDC = X'01'
- IP PrintWay extended mode: SMF6INDC = X'07'

IP PrintWay basic mode fields: These fields in the SMF type 6 record contain information only if IP PrintWay basic mode writes the record. If IP PrintWay extended mode writes the record, these fields contain binary zeroes.
- SMF6IP1, SMF6IP2, SMF6IP3, SMF6IP4: The dotted-decimal IP address of the printer if IP PrintWay basic mode used the LPR or direct sockets protocol to transmit the data set to the printer.
  Tip: IP PrintWay extended mode writes the printer's IP address in field SMF6URI instead.
- SMF6OUT: This field contains the name of the IP PrintWay basic mode FSA. If you run IP PrintWay extended mode, which does not have an FSA, this field contains zeroes.

IP PrintWay extended mode fields: These fields in the SMF type 6 record contain information only if IP PrintWay extended mode writes the record. If IP PrintWay basic mode writes the SMF record, these fields (except for the SMF6FTL field) are not present.
- SMF6ACCTL: The length of the accounting information in the SMF6ACCT field.
- SMF6ACCT: Accounting information from the JOB JCL statement.
- SMF6BYTD: The total number of bytes transmitted to the printer.
Tips:
- IP PrintWay extended mode also writes the number of bytes in field SMF6BYTE. However, field SMF6BYTE contains a maximum value of 2 gigabytes. Therefore, if your installation prints documents that contain more than 2 gigabytes, your SMF accounting program should use field SMF6BYTD instead of field SMF6BYTE.
- For some printers, IP PrintWay extended mode also writes the number of pages that printed in field SMF6PGE.

• SMF6FTL: The level of the SMF record:

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>IP PrintWay basic mode wrote the record.</td>
</tr>
<tr>
<td>1</td>
<td>IP PrintWay extended mode wrote the record. Fields SMF6ACTL and SMF6ACCT are not present.</td>
</tr>
<tr>
<td>2</td>
<td>IP PrintWay extended mode wrote the record. Fields SMF6ACTL and SMF6ACCT are present.</td>
</tr>
</tbody>
</table>

• SMF6PGE: The total number of pages that actually printed, including the pages in all copies of the document. When the printer prints on both sides of a sheet of paper (duplex printing), each side is counted as one page.

Tips:
- If no pages printed, or if no page count is available, this field contains X'00'.
- To obtain a page count, you must select the Record pages printed for accounting field in the printer definition. For more information, see “Tracking the number of printed pages (extended mode)” on page 174.
- If you do not want the page count to include any duplicate pages that printed during retries, select the Restart printing after last successful page field in the printer definition. For more information, see “Tracking the number of printed pages (extended mode)” on page 174.
- If a document completes with an error, the page count includes only the pages (if any) that printed before the error occurred. Field SMF6DCI indicates that the document completed with an error.

• SMF6URIL: The length of the SMF6URI field.

• SMF6URI: The type of protocol that IP PrintWay extended mode used to transmit the data set to the printer or email destination, and the address of the printer. The contents of this field vary depending on the protocol.

Tip: The value in this field is case sensitive. The protocol type is always in lower case.

Table 48. Contents of field SMF6URI in SMF type 6 record

<table>
<thead>
<tr>
<th>When IP PrintWay uses this protocol:</th>
<th>Field SMF6URI contains:</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPR</td>
<td>lpr://hostname/queue</td>
</tr>
<tr>
<td></td>
<td>Example: lpr://myprinter.xyz.com/RAW</td>
</tr>
<tr>
<td></td>
<td>Tip: The queue name is also written in field SMF6PRTQ.</td>
</tr>
<tr>
<td>Direct sockets</td>
<td>direct_socket://hostname:port</td>
</tr>
<tr>
<td></td>
<td>Example: direct_socket://myprinter.xyz.com:9100</td>
</tr>
</tbody>
</table>
Table 48. Contents of field SMF6URI in SMF type 6 record (continued)

<table>
<thead>
<tr>
<th>When IP PrintWay uses this protocol:</th>
<th>Field SMF6URI contains:</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPP</td>
<td>The printer's URI in either http or ipp format</td>
</tr>
<tr>
<td></td>
<td>Examples:</td>
</tr>
<tr>
<td></td>
<td><a href="http://myprinter.xyz.com:631">http://myprinter.xyz.com:631</a></td>
</tr>
<tr>
<td></td>
<td>ipp://myprinter.xyz.com</td>
</tr>
<tr>
<td>Email</td>
<td>mailto:</td>
</tr>
<tr>
<td></td>
<td>Example: mailto:</td>
</tr>
<tr>
<td></td>
<td>Tip: The email address is not written in this field.</td>
</tr>
<tr>
<td>VTAM</td>
<td>vtam://luname</td>
</tr>
<tr>
<td></td>
<td>Example: vtam://P002</td>
</tr>
</tbody>
</table>


Writing an IP PrintWay SMF exit

You can write an IP PrintWay SMF exit to modify or suppress the SMF record before IP PrintWay writes it. You might want to write an SMF exit to:

- Suppress the first SMF record that IP PrintWay basic mode writes when the resubmit for filtering function is used. IP PrintWay basic mode writes one record when it sends the data set to Print Interface, and it writes another record when it sends the data set to the printer.
- Convert the value in the SMF6USID field to uppercase characters.
- Convert the value in the SMF6URI field to uppercase characters.

Related information: For information about:

- The IP PrintWay SMF exit, see [z/OS Infoprint Server Customization](http://www.ibm.com/support/docview.wss?uid=swg21344714).
### Appendix A. Printer attribute tables

**Allocation attributes and corresponding OUTPUT or DD statement parameters**

This table lists the attributes you can specify in the Allocation section of a printer definition or in an Allocation component. For each attribute, the ISPF field name is listed and the corresponding parameter on an OUTPUT or DD JCL statement. When you specify a value in a field, Print Interface and NetSpool allocate data sets on the JES spool using the OUTPUT or DD statement parameter that corresponds to the field.

**Table 49. Attributes used for job allocation and the corresponding OUTPUT parameters**

<table>
<thead>
<tr>
<th>Field name</th>
<th>OUTPUT (or DD statement) parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>ADDRESS</td>
</tr>
<tr>
<td>AFP parameters</td>
<td>AFPPARMS</td>
</tr>
<tr>
<td>Building</td>
<td>BUILDING</td>
</tr>
<tr>
<td>BURST</td>
<td>BURST</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>NO</td>
</tr>
<tr>
<td>Character sets</td>
<td>CHARS</td>
</tr>
<tr>
<td>Checkpoint pages</td>
<td>CKPTPAGE</td>
</tr>
<tr>
<td>Checkpoint seconds</td>
<td>CKPTSEC</td>
</tr>
<tr>
<td>CLASS</td>
<td>CLASS</td>
</tr>
<tr>
<td>Color map</td>
<td>COLORMAP</td>
</tr>
<tr>
<td>Com setup member</td>
<td>COMSETUP</td>
</tr>
<tr>
<td>Copies</td>
<td>COPIES nnn</td>
</tr>
<tr>
<td>Copy group</td>
<td>COPIES group-value</td>
</tr>
<tr>
<td>Department</td>
<td>DEPT</td>
</tr>
<tr>
<td>DEST</td>
<td>DEST userid</td>
</tr>
<tr>
<td>Duplex</td>
<td>DUPLEX</td>
</tr>
<tr>
<td></td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>TUMBLE</td>
</tr>
<tr>
<td>Error disposition</td>
<td>PRTERERROR</td>
</tr>
<tr>
<td></td>
<td>DEFAULT</td>
</tr>
<tr>
<td></td>
<td>HOLD</td>
</tr>
<tr>
<td></td>
<td>QUIT</td>
</tr>
<tr>
<td>FCB</td>
<td>FCB</td>
</tr>
<tr>
<td>FLASH</td>
<td>FLASH count</td>
</tr>
<tr>
<td></td>
<td>FLASH overlay-name</td>
</tr>
<tr>
<td>Form definition</td>
<td>FORMDEF</td>
</tr>
<tr>
<td>FORMS</td>
<td>FORMS</td>
</tr>
<tr>
<td>GROUP ID</td>
<td>GROUPID</td>
</tr>
</tbody>
</table>
Table 49. Attributes used for job allocation and the corresponding OUTPUT parameters (continued)

<table>
<thead>
<tr>
<th>Field name</th>
<th>OUTPUT (or DD statement) parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOLD</td>
<td>HOLD (DD statement)</td>
</tr>
<tr>
<td>Yes</td>
<td>YES</td>
</tr>
<tr>
<td>No</td>
<td>NO</td>
</tr>
<tr>
<td>Image shift</td>
<td></td>
</tr>
<tr>
<td>x-direction front</td>
<td>OFFSETXF</td>
</tr>
<tr>
<td>y-direction front</td>
<td>OFFSETYF</td>
</tr>
<tr>
<td>x-direction back</td>
<td>OFFSETXB</td>
</tr>
<tr>
<td>y-direction back</td>
<td>OFFSETYB</td>
</tr>
<tr>
<td>Input tray</td>
<td>INTRAY</td>
</tr>
<tr>
<td>JES form length</td>
<td>FORMLEN</td>
</tr>
<tr>
<td>JES node</td>
<td>DEST nodename</td>
</tr>
<tr>
<td>Label data pages</td>
<td>DPAGELBL</td>
</tr>
<tr>
<td>Yes</td>
<td>YES</td>
</tr>
<tr>
<td>No</td>
<td>NO</td>
</tr>
<tr>
<td>LINECT</td>
<td>LINECT</td>
</tr>
<tr>
<td>Name</td>
<td>NAME</td>
</tr>
<tr>
<td>Notify</td>
<td>NOTIFY userid node</td>
</tr>
<tr>
<td></td>
<td>NAME</td>
</tr>
<tr>
<td>Notify</td>
<td>NOTIFY userid node</td>
</tr>
<tr>
<td>OUTDISP</td>
<td>OUTDISP</td>
</tr>
<tr>
<td>Purge</td>
<td>PURGE</td>
</tr>
<tr>
<td>Leave</td>
<td>LEAVE</td>
</tr>
<tr>
<td>Keep</td>
<td>KEEP</td>
</tr>
<tr>
<td>Hold</td>
<td>HOLD</td>
</tr>
<tr>
<td>Write</td>
<td>WRITE</td>
</tr>
<tr>
<td>Output bin</td>
<td>OUTBIN</td>
</tr>
<tr>
<td>Overlay</td>
<td></td>
</tr>
<tr>
<td>Back</td>
<td>OVERLAYB</td>
</tr>
<tr>
<td>Front</td>
<td>OVERLAYF</td>
</tr>
<tr>
<td>Page definition</td>
<td>PAGEDEF</td>
</tr>
<tr>
<td>Print error messages</td>
<td>PIMSG</td>
</tr>
<tr>
<td>Y</td>
<td>YES</td>
</tr>
<tr>
<td>N</td>
<td>NO</td>
</tr>
<tr>
<td>Maximum messages</td>
<td>msg-count</td>
</tr>
<tr>
<td>Print error reporting</td>
<td>DATACK</td>
</tr>
<tr>
<td>None</td>
<td>BLOCK</td>
</tr>
<tr>
<td>All</td>
<td>UNBLOCK</td>
</tr>
<tr>
<td>Character</td>
<td>BLKPOS</td>
</tr>
<tr>
<td>Position</td>
<td>BLKCHAR</td>
</tr>
<tr>
<td>PRMODE</td>
<td>PRMODE</td>
</tr>
<tr>
<td>PRTY</td>
<td>PRTY</td>
</tr>
<tr>
<td>Resolution</td>
<td>RESFMT</td>
</tr>
<tr>
<td>Resource library</td>
<td>USERLIB</td>
</tr>
<tr>
<td>Restrict printable area</td>
<td>SYSAREA</td>
</tr>
<tr>
<td>Yes</td>
<td>YES</td>
</tr>
<tr>
<td>No</td>
<td>NO</td>
</tr>
<tr>
<td>Room</td>
<td>ROOM</td>
</tr>
<tr>
<td>Table reference characters</td>
<td>TRC</td>
</tr>
<tr>
<td>Field name</td>
<td>OUTPUT (or DD statement) parameter</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>THRESHOLD</td>
<td>THRESHLD</td>
</tr>
<tr>
<td>Title</td>
<td>TITLE</td>
</tr>
<tr>
<td>UCS</td>
<td>UCS</td>
</tr>
<tr>
<td>USERDATA</td>
<td>USERDATA</td>
</tr>
<tr>
<td>WRITER</td>
<td>WRITER</td>
</tr>
</tbody>
</table>

1The **copies** attribute lets you specify a maximum of 32640 copies for print requests processed by Print Interface, while the COPIES JCL parameter lets you specify a maximum of 255 copies.
Printer attributes used by Print Interface

This table lists the attributes that Print Interface uses in each section of a printer definition. For each attribute, the table lists the ISPF panel field name and whether the attribute is required or optional. Use this table to determine which printer attributes to specify when you configure a printer definition for use by Print Interface. Print Interface ignores all fields that are not listed in this table.

Table 50. Printer definition fields used by Print Interface

<table>
<thead>
<tr>
<th>Section of printer definition</th>
<th>Field name</th>
<th>Condition</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main section</td>
<td>Printer definition name</td>
<td>Required</td>
<td>This value can help a user select the correct printer.</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Optional</td>
<td>This value can help a user select the correct printer.</td>
</tr>
<tr>
<td></td>
<td>Location</td>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td>Allocation</td>
<td>Spool allocation values</td>
<td>Required</td>
<td>Specify the JES work-selection values for the program that processes output data sets on the JES spool (for example, IP PrintWay basic mode or PSF), or specify the job selection rules for IP PrintWay extended mode. For a list of all fields in the Allocation section, see Table 49 on page 453.</td>
</tr>
<tr>
<td>All other fields</td>
<td></td>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td>Processing</td>
<td>Document code page</td>
<td>Optional</td>
<td>Leave this field blank if you want Print Interface to determine the default dynamically.</td>
</tr>
<tr>
<td></td>
<td>Printer code page</td>
<td>Optional, but suggested</td>
<td>Specify an ASCII or EBCDIC code page.</td>
</tr>
<tr>
<td></td>
<td>Data format</td>
<td>Required</td>
<td>Select at least one data format.</td>
</tr>
<tr>
<td></td>
<td>Filter</td>
<td>Optional</td>
<td>IBM suggests that you specify aopfilt.so for text data in an IP PrintWay printer definition.</td>
</tr>
<tr>
<td></td>
<td>Maximum document size</td>
<td>Optional</td>
<td>If not specified, no limit is enforced for document size.</td>
</tr>
<tr>
<td></td>
<td>Maximum copies</td>
<td>Optional</td>
<td>If not specified, no limit is enforced.</td>
</tr>
<tr>
<td></td>
<td>Forms supported</td>
<td>Optional</td>
<td>If not specified, all forms are allowed.</td>
</tr>
<tr>
<td></td>
<td>Duplex supported</td>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Print-error reporting</td>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td></td>
<td>supported</td>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Input tray name,</td>
<td>Optional</td>
<td>If not specified, input-tray job attribute is not supported.</td>
</tr>
<tr>
<td></td>
<td>Number</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 50. Printer definition fields used by Print Interface (continued)

<table>
<thead>
<tr>
<th>Section of printer definition</th>
<th>Field name</th>
<th>Condition</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output bin name, Number</td>
<td>Optional</td>
<td>If not specified, <strong>output-bin</strong> job attribute is not supported.</td>
<td></td>
</tr>
</tbody>
</table>

*Note:* The above table continues from the previous page.
Printer attributes used by NetSpool

This table lists the attributes that NetSpool uses in each section of a printer definition. For each attribute, the table lists the ISPF panel field name and whether the attribute is required or optional. Use this table to determine which printer attributes to specify when you configure a printer definition for use by NetSpool. NetSpool ignores all fields that are not listed in this table.

Table 51. Printer definition fields used by NetSpool

<table>
<thead>
<tr>
<th>Section of printer definition</th>
<th>Field name</th>
<th>Condition</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main section</td>
<td>Printer definition name</td>
<td>Required</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Optional</td>
<td>NetSpool does not use this field. However, this field can help you manage your printer definitions.</td>
</tr>
<tr>
<td></td>
<td>Location</td>
<td>Optional</td>
<td>NetSpool does not use this field. However, this field can help you manage your printer definitions.</td>
</tr>
<tr>
<td></td>
<td>NetSpool LU name</td>
<td>Required</td>
<td></td>
</tr>
<tr>
<td>Allocation</td>
<td>Spool allocation values</td>
<td>Required</td>
<td>Specify the JES work-selection values for the program that processes output data sets on the JES spool (for example, IP PrintWay basic mode or PSF), or specify the job selection rules for IP PrintWay extended mode. For a list of all fields in the Allocation section, see Table 49 on page 453.</td>
</tr>
<tr>
<td>All other fields</td>
<td></td>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td>Processing</td>
<td>Document code page</td>
<td>Optional</td>
<td>Used only when formatting option is Convert to PCL.</td>
</tr>
<tr>
<td></td>
<td>Printer code page</td>
<td>Optional</td>
<td>Used only when formatting option is Convert to PCL.</td>
</tr>
<tr>
<td></td>
<td>Data format</td>
<td>Required</td>
<td>Select at least one data format.</td>
</tr>
<tr>
<td></td>
<td>Filter</td>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum document size</td>
<td>Optional</td>
<td>If not specified, no limit is enforced for document size.</td>
</tr>
<tr>
<td></td>
<td>Maximum copies</td>
<td>Optional</td>
<td>If not specified, no limit is enforced.</td>
</tr>
<tr>
<td></td>
<td>Forms supported</td>
<td>Optional</td>
<td>If not specified, all forms are allowed.</td>
</tr>
<tr>
<td></td>
<td>Duplex supported</td>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Print-error reporting</td>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td></td>
<td>input-tray name, Number</td>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td></td>
<td>output-bin name, Number</td>
<td>Optional</td>
<td></td>
</tr>
</tbody>
</table>
Table 51. Printer definition fields used by NetSpool (continued)

<table>
<thead>
<tr>
<th>Section of printer definition</th>
<th>Field name</th>
<th>Condition</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCS Conversion</td>
<td>Optional</td>
<td>Default values are:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Margins: Top</td>
<td>Margins: Top = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Margins: Bottom</td>
<td>Margins: Bottom = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Margins: Left</td>
<td>Margins: Left = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Margins: Right</td>
<td>Margins: Right = 80</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Line length</td>
<td>Line length = 80</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Page length</td>
<td>Page length = 1</td>
<td></td>
</tr>
<tr>
<td>NetSpool PCL Conversion</td>
<td>Optional</td>
<td>No default values. Used only when formatting option is Convert to PCL.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Print density</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Line density</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Orientation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SCS automatic page orientation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NetSpool Options</td>
<td>Formatting</td>
<td>Optional Default is Convert to line.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Record size</td>
<td>Optional Applies to formatting option None.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RECFM</td>
<td>Optional Applies to formatting option None.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Default owner</td>
<td>Optional Default is the ID of the user who started Infoprint Server daemons.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Embedded attributes prefix</td>
<td>Optional Default is that NetSpool does not use job attributes specified in the print data.</td>
<td></td>
</tr>
<tr>
<td>NetSpool End-of-File Rules</td>
<td>All fields</td>
<td>Optional Default rule is end-of-bracket for all PLU names and LU types.</td>
<td></td>
</tr>
</tbody>
</table>
## Printer attributes used by IP PrintWay

This table lists the attributes that IP PrintWay uses in each section or component of a printer definition. For each attribute, the table lists the ISPF panel field name and whether the attribute is required or optional. Use this table to determine which printer attributes to specify when you configure a printer definition for use by IP PrintWay. IP PrintWay ignores all fields that are not listed in this table.

**Table 52. Printer attributes for IP PrintWay**

<table>
<thead>
<tr>
<th>Section of printer definition</th>
<th>ISPF field name</th>
<th>Condition</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main section</td>
<td>Printer definition name</td>
<td>Required</td>
<td>IP PrintWay does not use this field, but this field can help you manage your printer definitions.</td>
</tr>
<tr>
<td>Description</td>
<td>Optional</td>
<td></td>
<td>IP PrintWay does not use this field, but this field can help you manage your printer definitions.</td>
</tr>
<tr>
<td>Location</td>
<td>Optional</td>
<td></td>
<td>IP PrintWay does not use this field, but this field can help you manage your printer definitions.</td>
</tr>
</tbody>
</table>

**Allocation**

- CLASS (See next column)
- DEST
- FORMS

- Values for Separator Pages: Optional. IP PrintWay exits can access the information in these fields when Print Interface or NetSpool allocates the output data set on the JES spool.
- FCB: Optional. IP PrintWay extended mode uses this field. IP PrintWay basic mode uses it only when Print Interface or NetSpool allocates the output data set on the JES spool.
- Notify: Optional. IP PrintWay extended mode uses this field. IP PrintWay basic mode uses it only when Print Interface or NetSpool allocates the output data set on the JES spool.
- Copies: Optional. IP PrintWay uses this field only when Print Interface or NetSpool allocates the output data set on the JES spool.

**Processing**

- Document code page: Optional.
- Printer code page: Optional.
- Data format: Required. Applies to IP PrintWay extended mode only. Select at least one data format.
- Filter: Optional. IBM suggests that you specify `aopfiltr.so` for text data in an IP PrintWay printer definition.
Table 52. Printer attributes for IP PrintWay (continued)

<table>
<thead>
<tr>
<th>Section of printer definition</th>
<th>ISPF field name</th>
<th>Condition</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum document size</td>
<td>Optional</td>
<td></td>
<td>If not specified, no limit is enforced for document size.</td>
</tr>
<tr>
<td>Maximum copies</td>
<td>Optional</td>
<td></td>
<td>If not specified, no limit is enforced.</td>
</tr>
<tr>
<td>Duplex supported</td>
<td>Optional</td>
<td></td>
<td>Applies to IP PrintWay extended mode only.</td>
</tr>
<tr>
<td>Resubmit for filtering</td>
<td>Optional</td>
<td></td>
<td>Applies to IP PrintWay basic mode only. If this field is selected, <strong>Data format</strong> is required, and these fields are optional: <em>Filter</em> <em>Maximum document size</em> <em>Forms supported</em> <em>Duplex supported</em> <em>Print-error reporting supported</em></td>
</tr>
<tr>
<td>SCS Conversion</td>
<td>Optional</td>
<td></td>
<td>Used only if protocol is <strong>VTAM</strong>.</td>
</tr>
<tr>
<td>IP PrintWay Line-to-Text Conversion</td>
<td>Optional</td>
<td></td>
<td>Not used if protocol is <strong>VTAM</strong>.</td>
</tr>
<tr>
<td>Pagination</td>
<td>Optional</td>
<td></td>
<td>Not used if protocol is <strong>VTAM</strong>.</td>
</tr>
<tr>
<td>Margins: Top</td>
<td>Optional</td>
<td></td>
<td>Not used if protocol is <strong>VTAM</strong>.</td>
</tr>
<tr>
<td>Margins: Bottom</td>
<td>Optional</td>
<td></td>
<td>Not used if protocol is <strong>VTAM</strong>.</td>
</tr>
<tr>
<td>Page height</td>
<td>Optional</td>
<td></td>
<td>Not used if protocol is <strong>VTAM</strong>.</td>
</tr>
<tr>
<td>Print page header</td>
<td>Optional</td>
<td></td>
<td>Not used if protocol is <strong>VTAM</strong>.</td>
</tr>
<tr>
<td>Maximum document size</td>
<td>Optional</td>
<td></td>
<td>Not used if protocol is <strong>VTAM</strong>.</td>
</tr>
<tr>
<td>Maximum copies</td>
<td>Optional</td>
<td></td>
<td>Not used if protocol is <strong>VTAM</strong>.</td>
</tr>
<tr>
<td>SOSI mode</td>
<td>Optional</td>
<td></td>
<td>Applies to IP PrintWay basic mode only. Not used if protocol is <strong>VTAM</strong>.</td>
</tr>
<tr>
<td>Translation dataset qualifier</td>
<td>Optional</td>
<td></td>
<td>Applies to IP PrintWay basic mode only. Not used if protocol is <strong>VTAM</strong>.</td>
</tr>
<tr>
<td>Double-byte translate table</td>
<td>Optional</td>
<td></td>
<td>Applies to IP PrintWay basic mode only. Not used if protocol is <strong>VTAM</strong>.</td>
</tr>
<tr>
<td>IP PrintWay Options</td>
<td>All fields</td>
<td>Optional</td>
<td>Applies to IP PrintWay basic mode only: <em>Formatting</em> <em>PostScript header</em> Applies to IP PrintWay extended mode only: <em>Automatic dataset grouping</em></td>
</tr>
<tr>
<td>Protocol</td>
<td>Protocol</td>
<td>Required</td>
<td>Displayed only in the Protocol component.</td>
</tr>
<tr>
<td>Operator security profile</td>
<td>Optional</td>
<td></td>
<td>Applies to IP PrintWay extended mode only.</td>
</tr>
<tr>
<td>Printer IP address</td>
<td>(See next column)</td>
<td>Required</td>
<td>Required if protocol is <strong>LPR</strong> or <strong>Direct sockets</strong>.</td>
</tr>
<tr>
<td>Print queue name</td>
<td>(See next column)</td>
<td>Required</td>
<td>Required if protocol is <strong>LPR</strong>.</td>
</tr>
</tbody>
</table>
Table 52. Printer attributes for IP PrintWay (continued)

<table>
<thead>
<tr>
<th>Section of printer definition</th>
<th>ISPF field name</th>
<th>Condition</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port number</td>
<td>(See next column)</td>
<td>Required if protocol is <strong>Direct sockets</strong>.</td>
<td></td>
</tr>
<tr>
<td>URL</td>
<td>(See next column)</td>
<td>Required if protocol is <strong>IPP</strong>.</td>
<td></td>
</tr>
<tr>
<td>Printer LU name</td>
<td>(See next column)</td>
<td>Required if protocol is <strong>VTAM</strong>.</td>
<td></td>
</tr>
<tr>
<td>To addresses</td>
<td>(See next column)</td>
<td>Required if protocol is <strong>Email</strong>.</td>
<td></td>
</tr>
<tr>
<td>LPR processing options</td>
<td></td>
<td>Used only if protocol is <strong>LPR</strong>.</td>
<td></td>
</tr>
<tr>
<td>Mode</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optimize copies</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restrict ports</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Print banner page</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Banner class</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Banner jobname</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filename</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indent</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Print function</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Title</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>User options</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct sockets processing options</td>
<td></td>
<td>Used only if protocol is <strong>Direct sockets</strong>.</td>
<td></td>
</tr>
<tr>
<td>Record pages printed for accounting</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restart printing after last successful page</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VTAM processing options</td>
<td></td>
<td>Used only if protocol is <strong>VTAM</strong>.</td>
<td></td>
</tr>
<tr>
<td>Printer logmode</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Checkpoint pages</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Send as transparent data</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Email processing options</td>
<td></td>
<td>Used only if protocol is <strong>Email</strong>.</td>
<td></td>
</tr>
<tr>
<td>CC addresses</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCC addresses</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>From name</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reply address</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Embedded headers</td>
<td>Optional</td>
<td>Applies to IP PrintWay extended mode only.</td>
<td></td>
</tr>
</tbody>
</table>
Table 52. Printer attributes for IP PrintWay (continued)

<table>
<thead>
<tr>
<th>Section of printer definition</th>
<th>ISPF field name</th>
<th>Condition</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inline text and line data</td>
<td>Optional</td>
<td></td>
<td>Applies to IP PrintWay extended mode only.</td>
</tr>
<tr>
<td>Inline message</td>
<td>Optional</td>
<td></td>
<td>Applies to IP PrintWay extended mode only.</td>
</tr>
</tbody>
</table>
Appendix B. ISPF panels

Infoprint Server provides ISPF panels that you can use to create and edit definitions in the Printer Inventory:

- “Main ISPF panel for an IP PrintWay printer definition” on page 466
- “Main ISPF panel for a PSF printer definition” on page 466
- “Main ISPF panel for a General printer definition” on page 466
- “ISPF panel for the Allocation section or component” on page 467
- “ISPF panel for the Processing section or component” on page 468
- “ISPF panel for the NetSpool Options section or component” on page 470
- “ISPF panel for the NetSpool End-of-File section or component” on page 471
- “ISPF panel for the IP PrintWay Options section or component” on page 472
- “ISPF panels for the Protocol section or component” on page 473
- “ISPF panel for a printer pool definition” on page 476
- “ISPF panel for an IP PrintWay job selection rule” on page 477
- “ISPF panel for an IP PrintWay FSS definition” on page 478
- “ISPF panel for an IP PrintWay FSA definition” on page 478
- “ISPF panel for a PSF FSS definition” on page 479
- “ISPF panel for a PSF FSA definition for a channel-attached printer” on page 480
- “ISPF panel for a PSF FSA definition for a TCP/IP-attached printer” on page 482
- “ISPF panel for a PSF FSA definition for an SNA-attached printer” on page 484
- “ISPF panel for a PSF FSA definition for AFP Download Plus” on page 486
- “ISPF panel for the system configuration definition” on page 488

Main ISPF panel for an IP PrintWay printer definition

This is the first ISPF panel for an IP PrintWay printer definition.

IP PrintWay Printer Definition

Printer definition name . _________________
Description . _______________________________________________________ (extend)
Location... _______________________________________________________ (extend)

<table>
<thead>
<tr>
<th>Section</th>
<th>Component name</th>
<th>Custom values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allocation</td>
<td>=&gt; ___________</td>
<td>=&gt; __</td>
</tr>
<tr>
<td>Processing</td>
<td>=&gt; ___________</td>
<td>=&gt; *</td>
</tr>
<tr>
<td>NetSpool options</td>
<td>=&gt; ___________</td>
<td>=&gt; __</td>
</tr>
<tr>
<td>NetSpool end-of-file</td>
<td>=&gt; ___________</td>
<td>=&gt; __</td>
</tr>
<tr>
<td>IP PrintWay options</td>
<td>=&gt; ___________</td>
<td>=&gt; __</td>
</tr>
<tr>
<td>Protocol</td>
<td>=&gt; ___________</td>
<td>=&gt; *</td>
</tr>
</tbody>
</table>

Use DEST, CLASS, and FORMS for IP PrintWay printer selection

NetSpool LU name . ________ LU classes . __ __ __ __ __ (extend)
Main ISPF panel for a PSF printer definition

This is the first ISPF panel for a PSF printer definition.

<table>
<thead>
<tr>
<th>PSF Printer Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printer definition name . _________________</td>
</tr>
<tr>
<td>Description . ______________________________________________________________________</td>
</tr>
<tr>
<td>Location. __________________________________________________________________________</td>
</tr>
<tr>
<td>Section (enter to list) (enter to customize)</td>
</tr>
<tr>
<td>Component name Custom values (enter to customize)</td>
</tr>
<tr>
<td>Allocation =&gt; _________________ =&gt; __</td>
</tr>
<tr>
<td>Processing =&gt; _________________ =&gt; *</td>
</tr>
<tr>
<td>NetSpool options =&gt; _________________ =&gt; __</td>
</tr>
<tr>
<td>NetSpool end-of-file =&gt; _________________ =&gt; __</td>
</tr>
<tr>
<td>NetSpool LU name . ______ LU classes . _ _ _ _ _ _ _ _ _ _ _ _ (extend)</td>
</tr>
</tbody>
</table>

Main ISPF panel for a General printer definition

This is the first ISPF panel for a General printer definition.

<table>
<thead>
<tr>
<th>General Printer Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printer definition name . _________________</td>
</tr>
<tr>
<td>Description . ________________________________________________________________________</td>
</tr>
<tr>
<td>Location. __________________________________________________________________________</td>
</tr>
<tr>
<td>Section (enter to list) (enter to customize)</td>
</tr>
<tr>
<td>Component name Custom values (enter to customize)</td>
</tr>
<tr>
<td>Allocation =&gt; _________________ =&gt; __</td>
</tr>
<tr>
<td>Processing =&gt; _________________ =&gt; *</td>
</tr>
<tr>
<td>NetSpool options =&gt; _________________ =&gt; __</td>
</tr>
<tr>
<td>NetSpool end-of-file =&gt; _________________ =&gt; __</td>
</tr>
<tr>
<td>IP PrintWay options =&gt; _________________ =&gt; __</td>
</tr>
<tr>
<td>NetSpool LU name . ______ LU classes . _ _ _ _ _ _ _ _ _ _ _ _ (extend)</td>
</tr>
<tr>
<td>Spooling mode . __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __</td>
</tr>
</tbody>
</table>
ISPF panel for the Allocation section or component

This is the ISPF panel for the Allocation section of a printer definition and for the Allocation component.

### Allocation

Spool allocation values:

- **CLASS**
- **GROUPID**
- **DEST**
- **LINECT**
- **JES node**
- **PRMODE**
- **FCB**
- **PRTY**
- **FLASH count**
- **FLASH name**
- **UCS**
- **FORMS**
- **WRITER**

**USERDATA**

**BURST**
- 1. Yes
- 2. No

**HOLD**
- 1. Yes
- 2. No

**OUTDISP**
- 1. Purge (without printing)
- 2. Leave
- 3. Keep
- 4. Hold
- 5. Write

Values for Separator Pages:

- **Address**
- **Building**
- **Department**
- **Name**
- **Room**
- **Title**

Resource Related Values:

- **Form definition**
- **Character sets**
- **Overlay front**
- **Overlay back**
- **Input tray**
- **Output bin**
- **Page definition**
- **Resource library**
- **Resource directories**

Error Reporting Values:

- **Print error reporting**
- **Error disposition**
- **Print error messages**
- **Maximum messages**

Other Values:

- **Notify**
- **Checkpoint pages**
- **Copies**
- **Copy group**
- **Color map**
- **Com setup member**
- **JES form length**
- **Resolution**
- **AFP parameters**

**Duplex**
- 1. Simplex
- 2. Duplex
- 3. Tumble

**Label data pages**
- 1. Yes
- 2. No

**Restrict printable area**
- 1. Yes
- 2. No

- **Table reference characters**
- **Save AFP statistics**

---

*Note: The table and diagram content is not transcribed accurately here. The table and diagram are meant to visually represent the ISPF panel for the Allocation section, showing various allocation parameters and values.*
This is the ISPF panel for the Processing section of a printer definition and for the Processing component.

**Processing**

Document code page: ________________
Printer code page: ________________

Supported Data Formats and Associated Filters:

**Data format:** **Filter:**
/ Line data (extend)
7 MDOCA-P (extend)
7 PostScript (extend)
7 Text (extend)
7 PCL (extend)
7 PDF (extend)
7 SAP (extend)
7 XML (extend)
7 TIFF (extend)
7 JPEG (extend)
7 Other (extend)

_ Resubmit for filtering

**Transforms to AFP:**
Fail on error . . . . 1. No 2. Error 3. Warning
Trailer error page. . . 1. No 2. Error 3. Warning

**AFP to PDF Transform Encryption:**
User identifier . _______________________________________________ (extend)
Owner identifier. _______________________________________________ (extend)
Encryption level 2 1. Low (40-bit key) 2. High (128-bit key)
Protected actions:
Restrict print. . . . . 1. Yes 2. No
Restrict copy . . . . . 1. Yes 2. No
Restrict update . . . . 1. Yes 2. No

**SCS Conversion:**
Margins: Top . . __ Bottom . . __ Left . . __ Right . . __
Line length . . __ Page length . . __
Tabs: Vertical . . __ __ __ __ __ (extend)
Horizontal . . __ __ __ __ __ (extend)

**NetSpool PCL Conversion:**
Print density . . __
Line density . . __
Orientation . . . . . 1. None 2. Portrait 3. Landscape
SCS automatic page orientation

**IP PrintWay Line-to-Text Conversion:**
/ Pagination
/ Margins: Top . . __________ Bottom . . __________
/ Page height . . 5B
/ Print page header

Maximum document size . __________
Maximum copies . . . . __________
Forms supported . . . / Simplex / Duplex / Tumble
Print-error reporting supported . / Character / Position

Input tray name: Number: (more)  Output bin name: Number: (more)
**IP PrintWay Basic Mode Attributes:**

- **SOSI mode**
  - 1. None
  - 2. ASCII
  - 3. Space
  - 4. EBCDIC

- **Translation dataset qualifier**

- **Double-byte translate table**
  1. BIG5
  2. EUCKANJI
  3. HANGEUL
  4. IBMKANJI
  5. JIS78KJ-ASCII
  6. JIS78KJ-JISROMAN
  7. JIS83KJ-ASCII
  8. JIS83KJ-JISROMAN
  9. KSC5601
  10. SCHINESE
  11. SJISKANJI
  12. TCHINESE

Appendix B. ISPF panels 469
ISPF panel for the NetSpool Options section or component

This is the ISPF panel for the NetSpool Options section of a printer definition and for the NetSpool Options component.

```
NetSpool Options

Printer definition name . _________________

Formatting . . . 2  1. None  2. Convert to Line  3. Convert to PCL
   Record size .  _____
   RECFM .  . . . 1. VB  2. VBA  3. VBM

Default owner .  _____
Embedded attributes prefix .  _________________________
```
ISPF panel for the NetSpool End-of-File section or component

This is the ISPF panel for the NetSpool End-of-File Rules section of a printer definition and for the NetSpool End-of-File Rules component.

<table>
<thead>
<tr>
<th>Option ===&gt;</th>
<th>Default rules</th>
<th>1 All LUs</th>
<th>2 LU0</th>
<th>3 LU1</th>
<th>4 LU3</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLU name</td>
<td>5 All LUs</td>
<td>6 LU0</td>
<td>7 LU1</td>
<td>8 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>9 All LUs</td>
<td>10 LU0</td>
<td>11 LU1</td>
<td>12 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>13 All LUs</td>
<td>14 LU0</td>
<td>15 LU1</td>
<td>16 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>17 All LUs</td>
<td>18 LU0</td>
<td>19 LU1</td>
<td>20 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>21 All LUs</td>
<td>22 LU0</td>
<td>23 LU1</td>
<td>24 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>25 All LUs</td>
<td>26 LU0</td>
<td>27 LU1</td>
<td>28 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>29 All LUs</td>
<td>30 LU0</td>
<td>31 LU1</td>
<td>32 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>33 All LUs</td>
<td>34 LU0</td>
<td>35 LU1</td>
<td>36 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>37 All LUs</td>
<td>38 LU0</td>
<td>39 LU1</td>
<td>40 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>41 All LUs</td>
<td>42 LU0</td>
<td>43 LU1</td>
<td>44 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>45 All LUs</td>
<td>46 LU0</td>
<td>47 LU1</td>
<td>48 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>49 All LUs</td>
<td>50 LU0</td>
<td>51 LU1</td>
<td>52 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>53 All LUs</td>
<td>54 LU0</td>
<td>55 LU1</td>
<td>56 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>57 All LUs</td>
<td>58 LU0</td>
<td>59 LU1</td>
<td>60 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>61 All LUs</td>
<td>62 LU0</td>
<td>63 LU1</td>
<td>64 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>65 All LUs</td>
<td>66 LU0</td>
<td>67 LU1</td>
<td>68 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>69 All LUs</td>
<td>70 LU0</td>
<td>71 LU1</td>
<td>72 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>73 All LUs</td>
<td>74 LU0</td>
<td>75 LU1</td>
<td>76 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>77 All LUs</td>
<td>78 LU0</td>
<td>79 LU1</td>
<td>80 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>81 All LUs</td>
<td>82 LU0</td>
<td>83 LU1</td>
<td>84 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>85 All LUs</td>
<td>86 LU0</td>
<td>87 LU1</td>
<td>88 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>89 All LUs</td>
<td>90 LU0</td>
<td>91 LU1</td>
<td>92 LU3</td>
<td></td>
</tr>
<tr>
<td>PLU name</td>
<td>93 All LUs</td>
<td>94 LU0</td>
<td>95 LU1</td>
<td>96 LU3</td>
<td></td>
</tr>
</tbody>
</table>

This is the ISPF panel for entering the end-of-file rule for a PLU name and LU type.

<table>
<thead>
<tr>
<th>Option ===&gt;</th>
<th>NetSpool End of File Rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default rules</td>
<td>1 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>5 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>9 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>13 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>17 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>21 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>25 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>29 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>33 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>37 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>41 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>45 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>49 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>53 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>57 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>61 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>65 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>69 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>73 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>77 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>81 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>85 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>89 All LUs</td>
</tr>
<tr>
<td>PLU name</td>
<td>93 All LUs</td>
</tr>
</tbody>
</table>

NetSpool End of File Rule

End of file method . _ 1. End of bracket 2. End of chain 3. End of session
4. String 5. Timer
Delete form feed . _ 1 . None 2. Leading 3. Trailing 4. Both
String . __________________________________________________________________
/ Keep
Timeout idle interval . . ______ Busy interval . . ______
This is the ISPF panel for the IP PrintWay Options section of a printer definition and the IP PrintWay Options component.

**IP PrintWay Options**

Retention period:
- Successful: __________
- Failure: __________

Retry time: __________

Retry limit: _______

Connection timeout: 30

Response timeout: 600

Exits:
- Begin data set: _______
- End data set: _______
- Record: _______

Document header: ________________________________________________ (extend)
- / Translate document header

Document trailer: ________________________________________________ (extend)
- / Translate document trailer

Formatting:
- Transparent data char: 35
- Form feed: __________
- Delete form feed: 1. None, 2. Leading, 3. Trailing, 4. Both
- Carriage control type: 1. None, 2. Machine, 3. ANSI
- Automatic dataset grouping (extended mode)
- Dataset grouping: 1. None, 2. Job, 3. Concatenate Job
- Line termination: _______
  _ Omit line termination at EOF

Basic Mode Formatting:
- Formatting: 1. None, 2. Standard, 3. Translate only, 4. Use FCB
- PostScript header: 1. Add, 2. Ignore, 3. Landscape, 4. Always landscape
ISPF panels for the Protocol section or component

These are the ISPF panels for the Protocol section of an IP PrintWay printer definition and for the Protocol component. The Protocol section in a printer definition is different for each protocol: LPR, direct sockets, Internet Printing Protocol (IPP), VTAM, and email. The ISPF panel for the Protocol component is the same for all protocols.

LPR Protocol panel

This is the ISPF panel for the LPR Protocol section of a printer definition.

```
LPR Protocol

Printer definition name . _________________
Operator security profile . . . ________________________________
Printer IP address . ___________________________________________(extend)
Print queue name . . __________________________________________(extend)

LPR Processing Options:
    Mode . . . . . . . 1. Control file first 2. Control file last
    _ Optimize copies
    _ Restrict ports
    / Print banner page
        Banner class . _________________
        Banner job name . ________________________________
    Filename . . . . _________________
    Indent . . . . __________
    Owner . . . . _________________
    Print function . f
    Title . . . . . __________________________________________(extend)
    Width . . . . __________
    User options . . __________________________________________(extend)
```

Direct Sockets Protocol panel

This is the ISPF panel for the Direct Sockets Protocol section of a printer definition.

```
Direct Sockets Protocol

Printer definition name . _________________
Operator security profile . . . ________________________________
Printer IP address . __________________________________________(extend)
Port number . . . . ______

Print Job Language (PJL) options:
    Record pages printed for accounting
    _ Restart printing after last unsuccessful page
```

IPP Protocol panel

This is the ISPF panel for the IPP Protocol section of a printer definition.
VTAM Protocol panel
This is the ISPF panel for the VTAM Protocol section of a printer definition.

Email Protocol panel
This is the ISPF panel for the Email Protocol section of a printer definition.
Protocol component

This is the ISPF panel for the Protocol component.

```
Protocol

Component name: ___________________
Description: ______________________________________________________
Operator security profile

Protocol: 1. LPR  2. IPP  3. Direct sockets  4. VTAM  5. Email
Printer IP address: ___________________ (extend)
Print queue name: ___________________ (extend)
Port number: __________
URL: ______________________________ (extend)
Printer LU name: __________
To addresses: ______________________________ (extend)

LPR Processing Options:
  - Optimize copies
  - Restrict ports
  / Print banner page
    - Banner class: ___________________ (extend)
    - Banner job name: ___________________ (extend)
Filename: __________________________
Indent: __________
Owner: ______________________________
Print function: __________
Title: ______________________________ (extend)
Width: __________
User options: ______________________________ (extend)

Direct Sockets Processing Options:

Printer Job Language (PDL) options:
  - Record pages printed for accounting
  - Restart printing after last successful page

VTAM Processing Options:
Printer logmode: __________
Checkpoint pages: __________
  - Send as transparent data

Email Processing Options:
CC addresses: ______________________________ (extend)
BCC addresses: ______________________________ (extend)
From name: ______________________________
Reply address: ______________________________

IP PrintWay Extended Mode:
  - Embedded headers
    - Inline text and line data
    - Inline message: ______________________________ (extend)
```
This is the ISPF panel for a printer pool definition.

<table>
<thead>
<tr>
<th>Label</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pool name</td>
<td>_________________</td>
</tr>
<tr>
<td>LU name</td>
<td>__________</td>
</tr>
<tr>
<td>Description</td>
<td>______________________ (extend)</td>
</tr>
<tr>
<td>LU classes</td>
<td>__ __ __ __ __        (extend)</td>
</tr>
<tr>
<td>NetSpool end-of-file component</td>
<td>__________ (list)</td>
</tr>
<tr>
<td>Default owner</td>
<td>__________</td>
</tr>
<tr>
<td>Embedded attributes prefix</td>
<td>______________________</td>
</tr>
<tr>
<td>Printer definition names</td>
<td>__________ __________ (list)</td>
</tr>
</tbody>
</table>

...
ISPF panel for an IP PrintWay job selection rule

This is the ISPF panel for an IP PrintWay extended mode job selection rule.

<table>
<thead>
<tr>
<th>Job Selection Rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rule name: __________</td>
</tr>
<tr>
<td>Description: ___________________(extend)</td>
</tr>
<tr>
<td>Operator security profile</td>
</tr>
<tr>
<td>DEST: __________</td>
</tr>
<tr>
<td>CLASS: ____________________</td>
</tr>
<tr>
<td>FORMS: ____________________</td>
</tr>
<tr>
<td>Creator: __________</td>
</tr>
<tr>
<td>WRITER: __________</td>
</tr>
<tr>
<td>DEST IP address: 3 1. Include 2. Exclude 3. Ignore</td>
</tr>
<tr>
<td>Record limit: _______ Lower ______ Upper ______</td>
</tr>
<tr>
<td>Page limit (AFP-only): Lower ______ Upper ______</td>
</tr>
</tbody>
</table>
ISPF panel for an IP PrintWay FSS definition

This is the ISPF panel for an IP PrintWay FSS definition.

ISPF panel for an IP PrintWay FSA definition

This is the ISPF panel for an IP PrintWay FSA definition.
ISPF panel for a PSF FSS definition

This is the ISPF panel for a PSF FSS definition.
ISPF panel for a PSF FSA definition for a channel-attached printer

This is the ISPF panel for a PSF FSA definition for a channel-attached printer.

<table>
<thead>
<tr>
<th>PSF FSA, Channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSA Name . .</td>
</tr>
<tr>
<td>Description . .</td>
</tr>
<tr>
<td>Location . .</td>
</tr>
<tr>
<td>Operator security profile . .</td>
</tr>
<tr>
<td>processing Information:</td>
</tr>
<tr>
<td>_ Blank compression</td>
</tr>
<tr>
<td>_ Inhibit recovery</td>
</tr>
<tr>
<td>_ SNMP reporting</td>
</tr>
<tr>
<td>_ Close libraries when idle</td>
</tr>
<tr>
<td>_ Release data set when repositioning</td>
</tr>
<tr>
<td>_ Suppress copy marks</td>
</tr>
<tr>
<td>_ CSE sheet eject</td>
</tr>
<tr>
<td>_ CSE preserve page position</td>
</tr>
<tr>
<td>_ Use Line-Mode Migration LINECT</td>
</tr>
<tr>
<td>Check CSE fit . . .</td>
</tr>
<tr>
<td>CSE orientation . . .</td>
</tr>
<tr>
<td>Offset stacking . . .</td>
</tr>
<tr>
<td>Default process mode . .</td>
</tr>
<tr>
<td>Resolution . . . . . . (240, 300)</td>
</tr>
<tr>
<td>Resources:</td>
</tr>
<tr>
<td>Form definition . .</td>
</tr>
<tr>
<td>Page definition . .</td>
</tr>
<tr>
<td>Character sets . .</td>
</tr>
<tr>
<td>Color map . . . . .</td>
</tr>
<tr>
<td>Com setup member . .</td>
</tr>
<tr>
<td>Overlay . . . . . .</td>
</tr>
<tr>
<td>/ Prune double-byte fonts</td>
</tr>
<tr>
<td>/ Prune single-byte fonts</td>
</tr>
<tr>
<td>/ Map to outline fonts</td>
</tr>
<tr>
<td>/ Recover from font not found</td>
</tr>
<tr>
<td>/ Send default character</td>
</tr>
<tr>
<td>retained Resource Counts:</td>
</tr>
<tr>
<td>Form definitions .</td>
</tr>
<tr>
<td>Page definitions .</td>
</tr>
<tr>
<td>Page segments .</td>
</tr>
<tr>
<td>Fonts . . . . . .</td>
</tr>
<tr>
<td>Object containers .</td>
</tr>
<tr>
<td>Input Tray Substitution:</td>
</tr>
<tr>
<td>Source tray: Substitute trays:</td>
</tr>
<tr>
<td>Simplex Duplex</td>
</tr>
<tr>
<td>--- ---</td>
</tr>
<tr>
<td>--- ---</td>
</tr>
<tr>
<td>--- ---</td>
</tr>
<tr>
<td>--- ---</td>
</tr>
<tr>
<td>Error Reporting Values:</td>
</tr>
<tr>
<td>_ Error disposition supported</td>
</tr>
<tr>
<td>_ Send msgs to SYSOUT</td>
</tr>
<tr>
<td>Print error messages . .</td>
</tr>
<tr>
<td>Maximum messages . .</td>
</tr>
<tr>
<td>Print error reporting . .</td>
</tr>
</tbody>
</table>
### Separator page:
- Interrupt message page
- Mark page
- Offset page
- Copies: \( (1-10) \)

### Connection:
- Connect interval: \( (0-86400 \text{ seconds}) \)
- Acknowledgement level: 1. Page 2. Sheet
- Failure action: 1. Stop 2. Wait for connect
- Channel buffer count: \( (1-10000) \)

### Printer Sharing:
- Release mode: 1. Idle 2. Time 3. None
- Release interval: \( (0-86400 \text{ seconds}) \)
- Acquire interval: \( (0-86400 \text{ seconds}) \)

### Security Labeling:
- Label data pages: 1. Yes 2. No
- Label separator pages: 1. Yes 2. No
- Restrict printable area: 1. Yes 2. No

### Debugging:
- Dump:
  - Code: \( (1-99) \)
  - Message ID: \( (1-99) \)
  - Count: 1
- Trace:
  - Trace table size: 32 (1-999)
  - FSA trace dsname: 

### 3800 Compatibility:
- Override default font
- Set media origin to 3800 origin for:
  - Data set
  - Data set header
  - Job header
  - Job trailer
  - Message data set
This is the ISPF panel for a PSF FSA definition for a TCP/IP-attached printer.

- **PSF FSA, TCP/IP**
  - **FSA Name.**
  - **Description.**
  - **Location.**
  - **Operator security profile**

- **Processing Information:**
  - Blank compression
  - Consolidate IM1 images
  - Inhibit recovery
  - SNMP reporting
  - Close libraries when idle
  - Capture inline resources
  - Release data set when repositioning
  - Suppress copy marks
  - Issue intervention messages
  - Highlight communications failure message
  - CSE sheet eject
  - CSE preserve page position
  - Use Line-Mode Migration LINECT

- **Check CSE fit:**
  - 1. No
  - 2. First
  - 3. All

- **CSE orientation:**
  - 1. Portrait
  - 2. Landscape

- **Eject to front facing:**
  - 1. None
  - 2. Job
  - 3. Document
  - 4. Both

- **Issue setup messages:**
  - 1. None
  - 2. Burst
  - 3. Forms
  - 4. All

- **Offset stacking:**
  - 1. None
  - 2. Data set
  - 3. Job

- **Default process mode.**

- **Resolution.**

- **Resources:**
  - Form definition.
  - Page definition.
  - Character sets.
  - Color map.
  - Com setup member.
  - Overlay.

- **Prune double-byte fonts**
- **Prune single-byte fonts**
- **Map to outline fonts**
- **Recover from font not found**
- **Send default character**

- **Retained Resource Counts:**
  - Form definitions.
  - Page definitions.
  - Page segments.
  - Fonts.
  - Object containers.

- **Input Tray Substitution:**
  - Source tray:
  - Substitute trays:
  - Simplex
  - Duplex

- **Error Reporting Values:**
  - Error disposition supported
  - Send msgs to SYSOUT
  - Print error messages:
    - 1. No
    - 2. Yes
  - Maximum messages:
    - 0-999
  - Print error reporting:
    - 1. NONE
    - 2. All
    - 3. Character
    - 4. Position
Separator page:
  Interrupt message page
  Mark page
  Offset page
  Copies . . (1-10)

Connection:
  Connect interval . . 600 (0-86400 seconds)
  Failure action . . 1. Stop 2. Wait for connect
  Disconnect action . 2. Stop 2. Redrive
  Disconnect interval . (0-86400)
  Management mode . 3. Immediate 2. Dial in 3. Output available
  No response action . 1. Notify JES 2. Notify user
  Notify . . . . . . 
  Response timeout ... (0-20864)
  Printer IP address...
  Port number . . 5001

Printer Sharing:
  Release mode . . 3. Idle 2. Time 3. None
  Release interval . . (0-86400 seconds)
  Acquire interval . . (0-86400 seconds)

Security Labeling:
  Label data pages . . 1. Yes 2. No
  Label separator pages . . 1. Yes 2. No
  Restrict printable area . . 1. Yes 2. No

Debugging:
  Dump:
    Code . . ______ Message ID . . ______ Count . . 1 (1-99)
  Trace:
    Trace mode . . 2. None 2. Internal 3. Sync
    4. Full 5. Limit 6. IPDS
    Trace table size . 32 (1-999)
    FSA trace dsname .

3800 Compatibility:
  Override default font
  Set media origin to 3800 origin for:
    Data set
    Data set header
    Job header
    Job trailer
    Message data set
This is the ISPF panel for a PSF FSA definition for an SNA-attached printer.
Separator page:
/ Interrupt message page
_ Mark page
_ Offset page
Copies . . __ (1-10)

Connection:
  Connect Interval . . ___ (0-86400 seconds)
  Failure action . . _ 1. Stop 2. Wait for connect
  Applid. . . . . .
  Disconnect action . 2 1. Stop 2. Redrive
  Disconnect interval . . (0-86400)
  Logmode . . . . . .
  LU name . . . . .
  Management mode . . 3 1. Immediate 2. Dial in 3. Output available
  No response action. . _ 1. Notify JES 2. Notify user
  Notify . . . . . . .
  Response timeout . . ___ (0-20864)
  End SNA conversation

Printer Sharing:
  Release mode . . 3 1. Idle 2. Time 3. None
  Release interval . . ___ (0-86400 seconds)
  Acquire interval . . ___ (0-86400 seconds)

Security Labeling:
  Label data pages . . . _ 1. Yes 2. No
  Label separator pages . . _ 1. Yes 2. No
  Restrict printable area . . _ 1. Yes 2. No

Debugging:
  Dump:
    Code . . ________ Message ID . . ________ Count .1 (1-99)
  Trace:
    Trace mode . . . . 2 1. None 2. Internal 3. Sync
                      4. Full 5. Limit 6. IPDS
    Trace table size . 32 (1-999)
    FSA trace dsname .

3800 Compatibility:
  Override default font
  Set media origin to 3800 origin for:
    _ Data set
    _ Data set header
    _ Job header
    _ Job trailer
    _ Message data set
**ISPF panel for a PSF FSA definition for AFP Download Plus**

This is the ISPF panel for a PSF FSA definition for the AFP Download Plus feature of PSF.

```
| Description: | ________________ (extend) |
| Location: | ________________ (extend) |
| Operator security profile: | ________________ (extend) |
| Processing Information: | 
| - Blank compression |
| - Consolidate IM1 images |
| - Close libraries when idle |
| - Release data set when repositioning |
| - Page accounting supported |
| - Report Line-Mode Conversion paper-length errors |
| - Use Line-Mode Migration LINECT |
| Default process mode: | ___________ |
| Paper width: | ___________ |
| Paper length: | ___________ |
| Resolution: | ___________ (240, 300) |
| Image output format: | 1. IOCA 2. Unchanged |
| Working directory: | /var/psf (extend) |
| Printer Supported Functions: | 
| - GOCA Box orders |
| - GOCA Set Fractional Line Width orders |
| - GOCA Set Process Color orders |
| - IOCA replicate and trim function |
| - Object identifier (OID) format |
| Resources: | 
| Form definition: | ___________ |
| Page definition: | ___________ |
| Character sets: | ___________ |
| Color map: | ___________ |
| Com setup member: | ___________ |
| Map to outline fonts |
| Recover from font not found |
| Resources Included Inline: | 
| - Bar code objects (BCOCA) |
| - Font objects (FOCA) |
| - Form definitions |
| - Graphics objects (GOCA) |
| - Image objects (IOCA) |
| - Object containers |
| - Overlays |
| - Page segments |
| - Presentation text objects (PTOCA) |
| - TrueType fonts |
| Color management resources: | 1. None 2. All 3. Generic |
| Error Reporting Values: | 
| - Error disposition supported |
| - Send msgs to SYSOUT |
| Print error messages: | 2. No 3. Yes |
| Maximum messages: | 0-999 |
| Print error reporting: | 1. None 2. All 3. Character 4. Position |
| Send messages on failure: | 2. All 3. Generic only |
```
**Connection:**
- Connect Interval: 600 (0-86400 seconds)
- No response action:
  1. Notify JES
  2. Notify user
  3. Notify operator
  4. Terminate
- Notify: ____________
- Response timeout: _____ (0-86400)
- IP address: ____________
- Port number: 5001

**Transmission:**
- Data set grouping
- Secure transmission
- Send separator pages
- Display status
- Compression:
  1. None
  2. LZW
- Direct download:
  1. None
  2. MO:DCA-P
- Recovery pages: T000 (0-65535)

**Debugging:**
- Dump:
  - Code: ________
  - Message ID: ________
  - Count: 1 (1-99)
- Trace:
  - Trace mode: 2
    1. None
    2. Internal
    3. Sync
    4. Full
    5. Limit
    6. IPDS
  - Trace table size: 32 (1-999)
  - FSA trace dsname: ____________

**3800 Compatibility:**
- Override default font
- Set media origin to 3800 origin for:
  - Data set
This is the ISPF panel for the Infoprint Server system configuration definition.
Appendix C. Ricoh InfoPrint Manager and Ricoh ProcessDirector options

This section describes the programming interface between z/OS Infoprint Server and these products:
- Ricoh InfoPrint Manager
- Ricoh ProcessDirector Version 3.0 or later

This interface is subject to change.

This section lists the options that IP PrintWay includes in the LPD control file when you select the Remote PSF option in the Mode field on the Protocol ISPF panel for a printer definition. For more information, see "Printing with Ricoh InfoPrint Manager or Ricoh ProcessDirector" on page 193.

The Remote PSF option is intended to be used when you use IP PrintWay to transmit EBCDIC data. Some of the options are meaningful only if the data set contains non-AFP records, and parameters are created only in that case. Of the other parameters that you can create, some are intended to be used in actual processing of the data set, and others are intended to convey information to be used for the eventual distribution of the printed output.

The full option names are described in the next list. Abbreviations that IP PrintWay uses are given in parentheses.

Some option values (such as address values) can contain embedded blanks. Because a blank is a delimiter for options in the control file, each embedded blank is replaced with X'1C'.

Options created if line-mode records exist in the data set

- **ofilformat**
  Set to "record". Indicates that the records are prefixed with length fields.

- **ochars**
  Set to the values of the CHARS or UCS parameter if specified on JCL or defaulted by JES. This value can also be specified in an Infoprint Server job attribute and in the printer definition.

- **occc**
  Set to "YES" or "NO", depending on whether the data set record format specifies carriage control. This value can also be specified in JCL, in an Infoprint Server job attribute, and in the printer definition.

- **occtype**
  If the record format specifies carriage control, set to either "a" or "m", indicating ANSI or machine carriage control. This value can also be specified in JCL, in an Infoprint Server job attribute, and in the printer definition.

- **opagedef**
  Set to the value of the PAGEDEF or FCB parameter if specified on JCL. JES can provide a default value if you run IP PrintWay basic mode. This value can also
be specified in an Infoprint Server job attribute and in the printer definition. A “P1” prefix is added to the value if necessary.

-OPRMODE
Set to the value of the PRMODE JCL parameter, only if the value is SOSI1, SOSI2, SOSI3, or SOSI4. Otherwise, this option is not created. This value can also be specified in an Infoprint Server job attribute and in the printer definition.

-OTRC
Set to “YES” or “NO”, based on the value of the TRC parameter. This value can be specified on JCL as TRC=YES, or with the DCB specification: OPTCD=J. It can also be specified in an Infoprint Server job attribute and in the printer definition.

Note: IP PrintWay extended mode uses values specified in the printer definition. However, IP PrintWay basic mode uses values specified in the printer definition only if Print Interface or NetSpool allocated the output data set on the JES spool or the Resubmit for filtering field is selected in the printer definition. Values specified by a job submitter, either on JCL or in an Infoprint Server job attribute, always override values specified in the printer definition.

---

Processing options created for all data set types

-ODATATYPE (odatat)
Set to “line” (l) if any non-AFP records exist in the data set. (AFP records are identified by the presence of a X’5A’ control byte at the beginning of the record.) Otherwise, set to “afp” (a).

-OCOPIES (ocop)
Set to the JCL COPIES transmission count. If COPIES is not specified on JCL, in a job attribute, or in the printer definition, the default is 1.

-ODATACK (odatac)
Set to the value of the DATACK parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, this option is not created.

-ODUPLEX (odu)
Set to the value of the DUPLEX parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, this option is not created.

-OINTRAY (oin)
Set to the value of the INTRAY parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, this option is not created.

-OFORMDEF (of)
Set to the value of the FORMDEF parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. This option is created even if no form definition is specified. A prefix of X’F1’ is added to the value, if necessary, unless the value is “DUMMY”.

-OOFFSETXB (ooffxb)
Set to the value of the OFFSETXB parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, this option is not created.
-OFFSETXF (ooffxf)
  Set to the value of the OFFSETXF parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, this option is not created.

-OFFSETYB (ooffyb)
  Set to the value of the OFFSETYB parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, this option is not created.

-OFFSETYF (ooffyf)
  Set to the value of the OFFSETYF parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, this option is not created.

-OUTBIN (ooutbin)
  Set to the value of the OUTBIN parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, this option is not created.

-PASSTHRU (opa)
  This option consists of these sub-options:
  
  -FORMS
    Set to the value of the FORMS parameter from JCL or the printer definition. This value can be defaulted by JES.
  
  -CLASS
    Set to the value of the CLASS parameter from JCL or the printer definition. This value can be defaulted by JES.
  
  -DESTINATION
    Set to the value of the DEST parameter from JCL or the printer definition. This value can be defaulted by JES.

Xpage-definition
  Set to the value of the PAGEDEF or FCB parameter if specified on JCL. JES can provide a default value if you run IP PrintWay basic mode. This value can also be specified in an Infoprint Server job attribute and in the printer definition. A “P1” prefix is added to the value if necessary. This parameter is created only if the data stream does not contain any line-mode records.

Note: Values from the printer definition are used if Print Interface or NetSpool allocated the output data set on the JES spool and in some other cases. Values specified by a job submitter always override values specified in the printer definition.

Informational options created for all data set types

-OJOBNAME (ojobn)
  Set to the JES job name associated with the print data set.

-USERID (ous)
  Set to the z/OS user id associated with the print data set.

-NODEID (ono)
  Set to the z/OS node id associated with the print data set.

-PROGRAMMER (opr)
  Set to the value of the programmer name from the JCL JOB statement. If not specified, this option is not created.
-OPASSTHRU (opa)
   This option can consist of this sub-option:

   -SEGMENTID
      Set to the value of the segment id of the print data set, if one exists. If it
does not exist, the SEGMENTID sub-option is not included the PASSTHRU
option.

-OADDRESS1
   Set to the value of the first address subparameter from the ADDRESS
parameter if specified on JCL. This value can also be specified in an Infoprint
Server job attribute and in the printer definition. If not specified, the
OADDRESS1 option is not created.

-OADDRESS2
   Set to the value of the second address subparameter from the ADDRESS
parameter if specified on JCL. This value can also be specified in an Infoprint
Server job attribute and in the printer definition. If not specified, the
OADDRESS2 option is not created.

-OADDRESS3
   Set to the value of the third address subparameter from the ADDRESS
parameter if specified on JCL. This value can also be specified in an Infoprint
Server job attribute and in the printer definition. If not specified, the
OADDRESS3 option is not created.

-OADDRESS4
   Set to the value of the fourth address subparameter from the ADDRESS
parameter if specified on JCL. This value can also be specified in an Infoprint
Server job attribute and in the printer definition. If not specified, the
OADDRESS4 option is not created.

-OBUILDING (obu)
   Set to the value of the BUILDING parameter if specified on JCL. This value
can also be specified in an Infoprint Server job attribute and in the printer
definition. If not specified, the OBUILDING option is not created.

-ODEPARTMENT (ode)
   Set to the value of the DEPT parameter if specified on JCL. This value can also
be specified in an Infoprint Server job attribute and in the printer definition. If not specified, the
ODEPARTMENT option is not created.

-ONAME (ona)
   Set to the value of the NAME parameter if specified on JCL. This value can also
be specified in an Infoprint Server job attribute and in the printer definition. If not specified, the
ONAME option is not created.

-OROOM (oro)
   Set to the value of the ROOM parameter on the OUTPUT JCL statement. If not
specified, set to the ROOM parameter on the JOB JCL statement. This value
can also be specified in an Infoprint Server job attribute and in the printer
definition. If no room value is specified, the OROOM option is not created.

-OTITLE (oti)
   Set to the value of the TITLE parameter if specified on JCL. This value can also
be specified in an Infoprint Server job attribute and in the printer definition. If not specified, the
OTITLE parameter is not created.
Appendix D. Sample IP PrintWay printer definitions

This information shows how to fill in Infoprint Server ISPF panels to do these tasks:

<table>
<thead>
<tr>
<th>Task</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create components for IP PrintWay printer definitions.</td>
<td>493</td>
</tr>
<tr>
<td>Create a printer definition for a printer that contains an LPD.</td>
<td>502</td>
</tr>
<tr>
<td>Create a printer definition for a printer defined to VTAM.</td>
<td>508</td>
</tr>
<tr>
<td>Create a printer definition for an email destination.</td>
<td>513</td>
</tr>
</tbody>
</table>

For information about how to navigate the Infoprint Server ISPF panels to create components and printer definitions, see these sections:
- “Managing components” on page 240
- “Managing printer definitions” on page 234

Creating components for IP PrintWay printer definitions

This section shows how to fill in ISPF panels to create these components, which are used by the sample IP PrintWay printer definitions.

- Allocation component
- Processing component
- IP PrintWay Options component

In these components, values that might be common to several printer definitions have been specified. Values in the sample components are shown in either normal or bold text:
- Normal text indicates a default value. Default values are displayed automatically in the ISPF panels.
- **Bold** text indicates a value you must explicitly specify in the component.
## Allocation component

This component assumes that the IP PrintWay extended mode job selection rule selects output data sets in JES output class K, or the IP PrintWay basic mode functional subsystem (FSA) is defined to JES with a work-selection criterion of class K. Therefore, K is specified in the **CLASS** field. For information about how to define job selection rules and IP PrintWay FSAs, see [z/OS Infoprint Server Customization](#).

### Spool allocation values:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CLASS</strong></td>
<td>K</td>
</tr>
<tr>
<td><strong>GROUPID</strong></td>
<td></td>
</tr>
<tr>
<td><strong>DEST.</strong></td>
<td>LINECT.</td>
</tr>
<tr>
<td><strong>JES node.</strong></td>
<td>PRMODE.</td>
</tr>
<tr>
<td><strong>FCB</strong></td>
<td>PRTY.</td>
</tr>
<tr>
<td><strong>FLASH count</strong></td>
<td>THRESHLD.</td>
</tr>
<tr>
<td><strong>FLASH name</strong></td>
<td>UCS.</td>
</tr>
<tr>
<td><strong>FORMS</strong></td>
<td>WRITER.</td>
</tr>
<tr>
<td><strong>USERDATA</strong></td>
<td>(extend)</td>
</tr>
<tr>
<td><strong>BURST</strong></td>
<td>1. Yes 2. No</td>
</tr>
<tr>
<td><strong>HOLD</strong></td>
<td>1. Yes 2. No</td>
</tr>
</tbody>
</table>

### Values for Separator Pages:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>(extend)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Address</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Building</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Department</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Name</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Room</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Title</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Resource Related Values:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>(extend)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Form definition</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Character sets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Overlay front</strong></td>
<td></td>
<td>Back</td>
</tr>
<tr>
<td><strong>Input tray</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Output bin</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Page definition</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Resource library</strong></td>
<td></td>
<td>(extend)</td>
</tr>
<tr>
<td><strong>Resource directories</strong></td>
<td></td>
<td>(extend)</td>
</tr>
<tr>
<td><strong>Image shift x-direction</strong></td>
<td>Front</td>
<td>Back</td>
</tr>
<tr>
<td><strong>Image shift y-direction</strong></td>
<td>Front</td>
<td>Back</td>
</tr>
</tbody>
</table>

### Error Reporting Values:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Print error reporting.</strong></td>
<td>1. None 2. All 3. Character 4. Position</td>
<td></td>
</tr>
<tr>
<td><strong>Error disposition.</strong></td>
<td>1. Default 2. Hold 3. Quit</td>
<td></td>
</tr>
<tr>
<td><strong>Print error messages.</strong></td>
<td>1. No 2. Yes</td>
<td></td>
</tr>
<tr>
<td><strong>Maximum messages.</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Other Values:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Notify</strong></td>
<td>at node</td>
<td></td>
</tr>
<tr>
<td><strong>Checkpoint pages</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Checkpoint seconds</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Copies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Copy group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Color map</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Com setup member</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>JES form length</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>AFP parameters</strong></td>
<td>1. Simplex 2. Duplex 3. Tumble</td>
<td></td>
</tr>
<tr>
<td><strong>Duplex</strong></td>
<td>1. Yes 2. No</td>
<td></td>
</tr>
<tr>
<td><strong>Label data pages</strong></td>
<td>1. Yes 2. No</td>
<td></td>
</tr>
<tr>
<td><strong>Restrict printable area</strong></td>
<td>1. Yes 2. No</td>
<td></td>
</tr>
<tr>
<td><strong>Table reference characters</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Save AFP statistics</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Processing component for PostScript and PCL printers

Component `postscript/pcl` is suitable for printers that can accept PostScript, PCL, and text data.

This component assumes that you have installed IBM Print Transform from AFP to Adobe PostScript for z/OS. If you have installed a different transform, specify the filter for the transform in the **Filter** field.

If you have not installed an AFP to PostScript or AFP to PCL transform, do not select the **MO:DCA-P** data format, do not specify a transform filter in the **Filter** field, and do not select the **Resubmit for filtering** field. The **Resubmit for filtering** field applies only to IP PrintWay basic mode.

Fields under the **SCS Conversion** and **NetSpool PCL Conversion** headings are used only when NetSpool processes input SCS data. If you do not use NetSpool, these fields are ignored.
Component name: . . . . . . postscript/pcl
Description: Data formats and code page for PostScript and PCL printers

Document code page: . . . .
Printer code page: . . . . IS08859-1

Print Interface Supported Data Formats and Associated Filters:
Data format: Filter:
/ Line data _______________________________________________________ (extend)
/ MO:DCA-P afpxps.dll -c US (extend)
/ PostScript (extend)
/ Text aopfilr.so (extend)
/ PCL (extend)
/ PDF (extend)
/ SAP (extend)
/ XML (extend)
/ TIFF (extend)
/ JPEG (extend)
/ Other (extend)

/ Resubmit for filtering

Transforms to AFP:
Fail on error . . . . 1. No 2. Error 3. Warning
Trailer error page . . 1. No 2. Error 3. Warning

AFP to PDF Transform Encryption:
User identifier . . . . . . . . . . . . (extend)
Owner identifier . . . . . . . . . . . . (extend)
Encryption level 2 1. Low (40-bit key) 2. High (128-bit key)
Protected actions:
Restrict print . . 2 1. Yes 2. No
Restrict copy . . 2 1. Yes 2. No
Restrict update . . 2 1. Yes 2. No

SCS Conversion:
Margins: Top . . 6 Bottom . . 62 Left . . 61 Right . . 71
Line length . . . . . 80
Tabs: Vertical . . . . . . . . . . . . . . . . . . (extend)
Horizontal . . . . . . . . . . . . . . . . . . (extend)

NetSpool PCL Conversion:
Print density . . . . . . . . . . . 10
Line density . . . . . . . . . . . . . . . 6
Orientation . . . . . 1. None 2. Portrait 3. Landscape
_ SCS automatic page orientation

IP PrintWay Line-to-Text Conversion:
/ Pagination
Margins: Top . . 5 Bottom . . 5
Page height . . 66
/ Print page headF

Maximum document size . . .
Maximum copies . . . . . . .
Forms supported . . . . . . . . / Simplex / Duplex / Tumble ______

Print-error reporting supported . . / Character / Position

Input tray name: Number: (more) Output bin name: Number: (more)
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOSI mode</td>
<td>1. None 2. ASCII 3. Space 4. EBCDIC</td>
</tr>
<tr>
<td>Translation dataset qualifier</td>
<td></td>
</tr>
<tr>
<td>Double-byte translate table</td>
<td>1. BIGS 2. EUCKANJI 3. HANGEUL</td>
</tr>
<tr>
<td></td>
<td>4. IBMKANJI 5. JIS78KJ-ASCII 6. JIS78KJ-JISROM</td>
</tr>
<tr>
<td></td>
<td>7. JIS83KJ-ASCII 8. JIS83KJ-JISROM</td>
</tr>
<tr>
<td></td>
<td>9. KSC5601</td>
</tr>
<tr>
<td></td>
<td>10. SCHINESE</td>
</tr>
<tr>
<td></td>
<td>11. SJISKANJI</td>
</tr>
<tr>
<td></td>
<td>12. TCHINESE</td>
</tr>
</tbody>
</table>
Processing component for VTAM-controlled printers

Processing component vtam is suitable for a VTAM-controlled printer. Because Infoprint Server can convert text and line data to either SCS or DSC/DSE format, this Processing component accepts both text and line data. Values specified under the SCS Conversion heading are used only when IP PrintWay sends SCS data to the printer. If the VTAM-controlled printer accepts the DSC/DSE data stream, instead of the SCS data stream, these values are ignored.
Component name: vtam
Description: Data formats and code page for VTAM-controlled printers

Document code page: IBM-1047
Printer code page: IBM-1047

Print Interface Supported Data Formats and Associated Filters:

<table>
<thead>
<tr>
<th>Data Format</th>
<th>Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ Line data</td>
<td>(extend)</td>
</tr>
<tr>
<td>MO:DCA-P</td>
<td>(extend)</td>
</tr>
<tr>
<td>PostScript</td>
<td>(extend)</td>
</tr>
<tr>
<td>Text</td>
<td>(extend)</td>
</tr>
<tr>
<td>PCL</td>
<td>(extend)</td>
</tr>
<tr>
<td>PDF</td>
<td>(extend)</td>
</tr>
<tr>
<td>SAP</td>
<td>(extend)</td>
</tr>
<tr>
<td>XML</td>
<td>(extend)</td>
</tr>
<tr>
<td>TIFF</td>
<td>(extend)</td>
</tr>
<tr>
<td>JPEG</td>
<td>(extend)</td>
</tr>
<tr>
<td>Other</td>
<td>(extend)</td>
</tr>
</tbody>
</table>

Resubmit for filtering

Transforms to AFP:
- Fail on error: 1. No 2. Error 3. Warning
- Trailer error page: 1. No 2. Error 3. Warning

AFP to PDF Transform Encryption:
- User identifier: (extend)
- Owner identifier: (extend)
- Encryption level: 1. Low (40-bit key) 2. High (128-bit key)
- Protected actions:
  - Restrict print: 1. Yes 2. No
  - Restrict copy: 1. Yes 2. No
  - Restrict update: 1. Yes 2. No

SCS Conversion:
- Margins: Top: 6, Bottom: 62, Left: 11, Right: 71
- Line length: 80
- Tabs: Vertical: (extend) Horizontal: (extend)

NetSpool PCL Conversion:
- Print density: __
- Line density: __
- Orientation: 1. None 2. Portrait 3. Landscape
- SCS automatic page orientation

IP PrintWay Line-to-Text Conversion:
- Pagination
  - Margins: Top: ______, Bottom: ______
  - Page height: 58
- Print page header

Maximum document size: ______
Maximum copies: 1
Forms supported: ______
Duplex supported: ______
Print-error reporting supported: ______

Input tray name: Number: (more) Output bin name: Number: (more)
<table>
<thead>
<tr>
<th>IP PrintWay Basic Mode Attributes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOSI mode:</td>
</tr>
<tr>
<td>Translation dataset qualifier:</td>
</tr>
<tr>
<td>Double-byte translate table:</td>
</tr>
<tr>
<td>1. BIG5</td>
</tr>
<tr>
<td>4. IBMKANJI</td>
</tr>
<tr>
<td>7. JIS83KJ-ASCII</td>
</tr>
<tr>
<td>10. SCHINESE</td>
</tr>
</tbody>
</table>
IP PrintWay Options component

This component changes the response timeout value, specifies a retry time and a retry limit for unsuccessful transmissions, and specifies a retain value for failed transmissions.

Tips:

- IP PrintWay extended mode: Consider specifying a higher value in the Response timeout field to give the operator more time to solve a printer problem before IP PrintWay extended mode resends data to the printer. Resending data can result in duplicate pages. A higher value is suitable for IP PrintWay extended mode because it can send data to other printers while it waits for a response from the printer. For more information, see "Handling unsuccessful data transmissions" on page 167.

- IP PrintWay basic mode: Consider specifying 0D25 in the Line termination field because the IP PrintWay basic mode default is not suitable for many ASCII printers. For more information, see "Converting line data to a text data stream" on page 180.

### IP PrintWay Options

<table>
<thead>
<tr>
<th>Component name</th>
<th>Description</th>
<th>Retain data sets that fail transmission for one day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retention period</td>
<td>Successful</td>
<td>Failure</td>
</tr>
<tr>
<td>Retry time</td>
<td>0000:10:00</td>
<td>0024:00:00</td>
</tr>
<tr>
<td>Retry limit</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Connection timeout</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Response timeout</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

**Exits:**
- Begin data set
- End data set
- Record

**Document header**

- Translate document header
- / Translate document trailer

**Formatting:**

- Transparent data char: 35
- Form feed: 0D0C (extended mode)
- Automatic dataset grouping (extended mode)
- Dataset grouping: 1. None 2. Job 3. Concatenate job
- Line termination: Omit line termination at EOF

**Basic Mode Formatting:**

- Formatting: 1. None 2. Standard 3. Translate only 4. Use FCB

Appendix D. Sample IP PrintWay printer definitions 501
Creating an IP PrintWay printer definition for the LPR protocol

This section shows how to fill in ISPF panels to create an IP PrintWay printer definition for a remote printer that contains an LPD, for example, an InfoPrint 21 printer. IP PrintWay uses the LPR protocol to transmit data to this printer. This printer definition contains values used by Print Interface, NetSpool, and IP PrintWay.

Job submitters can print on this printer by specifying `mypsprinter` as the name of the print queue or printer definition. JCL users can also print on this printer by specifying CLASS=K and DEST=MYPSPRT on an OUTPUT JCL statement. VTAM applications can print on this printer by specifying LUPRT001 as the secondary LU name.

Values on the printer definition panels are shown in either normal or bold text:
- Normal text indicates either a default value or a value that was specified in an included component. Default values and values from the component are displayed automatically in the ISPF panels.
- **Bold** text indicates a value that you must explicitly specify in the printer definition.

This panel includes the Allocation, Processing, and IP PrintWay Options components that were created in the previous examples. The asterisks next to the Allocation and Protocol sections of the printer definition indicate that one or more fields in these sections contain values that are explicitly specified in this printer definition.
### Allocation

**Printer definition name:** `myprinter`

**Spool allocation values:**
- **CLASS:** K
- **DEST.:** `myprinter`
- **JES node:** __________
- **FCB:** 8
- **FLASH count:** __________
- **FLASH name:** __________
- **FORMS:** __________
- **USERDATA:** (extend)
- **BURST:** 1. Yes 2. No
- **HOLD:** 1. Yes 2. No

**Values for Separator Pages:**
- **Address:** (extend)
- **Building:** __________
- **Department:** __________
- **Name:** __________
- **Room:** __________
- **Title:** __________

**Resource Related Values:**
- **Form definition:** __________
- **Character sets:** __________
- **Overlay front:** __________
- **Input tray:** __________
- **Output bin:** __________
- **Page definition:** __________ (extend)
- **Resource library:** __________
- **Resource directories:** (extend)
- **Image shift x-direction front:** __________
- **y-direction front:** __________

**Error Reporting Values:**
- **Print error reporting:** 1. None 2. All 3. Character 4. Position
- **Error disposition:** 1. Default 2. Hold 3. Quit
- **Print error messages:** 1. No 2. Yes
- **Maximum messages:** __________

**Other Values:**
- **Notify:** __________
- **Checkpoint pages:** __________
- **Checkpoint seconds:** __________
- **Copies:** __________
- **Copy group:** __________
- **Color map:** __________
- **Com setup member:** __________
- **JES form length:** __________
- **Resolution:** __________
- **AFP parameters:** __________
- **Duplex:** 1. Simplex 2. Duplex 3. Tumble
- **Label data pages:** 1. Yes 2. No
- **Restrict printable area:** 1. Yes 2. No
- **Table reference characters:** __________
- **Save AFP statistics:** __________
Processing

Printer definition name: mypsprinter

Document code page . . ________________
Printer code page . . ISO8859-1

Supported Data Formats and Associated Filters:
Data format: Filter:
/ Line data _______________________________________________________ (extend)
/ MO:DCA-P afpxps.dll -c US _______________________________________ (extend)
/ PostScript ______________________________________________________ (extend)
/ Text aopfiltr.so ________________________________________________ (extend)
/ PCL ________________________________________________________ (extend)
/ PDF ________________________________________________________ (extend)
/ SAP ________________________________________________________ (extend)
/ TIFF ________________________________________________________ (extend)
/ JPEG ________________________________________________________ (extend)
/ Other ________________________________________________________ (extend)

/ Resubmit for filtering

Transforms to AFP:
Fail on error . . . . . . 1. No 2. Error 3. Warning
Trailer error page . . . . 1. No 2. Error 3. Warning

AFP to PDF Transform Encryption:
User identifier . ________________________________________________ (extend)
Owner identifier. ________________________________________________ (extend)
Encryption level 2 1. Low (40-bit key) 2. High (128-bit key)
Protected actions:
Restrict print . . . . 2 1. Yes 2. No
Restrict copy . . . . 2 1. Yes 2. No
Restrict update . . . . 2 1. Yes 2. No

SCS Conversion:
Margins: Top . . 6 Bottom . 62 Left . 11 Right . 71
Line length . . 66 Page length . 66
Tabs: Vertical . . . . . . . . . . . . (extend)
Horizontal . . . . . . . . . . . . (extend)

NetSpool PCL Conversion:
Print density . . 10
Line density . . . . . 6
Orientation . . . . 1. None 2. Portrait 3. Landscape
SCS automatic page orientation

IP PrintWay Line-to-Text Conversion:
/ Pagination
/ Margins: Top . . 5 Bottom . 5
/ Page height . . . . . (extend)
/ Print page header

Maximum document size . . . . . .
Maximum copies . . . . . . . .
Forms supported . . . .
Duplex supported . . / Simplex / Duplex / Tumble
Print-error reporting supported . / Character / Position

Input tray name: Number: (more) Output bin name: Number: (more)
Note: When you first view the Processing panel, only filter aopfilt.rs.o is displayed in the Filter field for the Text data format. You must remove (space over) the name of this filter so that the filters specified in the Processing component are used. After you remove the filter name, press Enter.
NetSpool Options

Printer definition name: mypsprinter

Formatting: 1. None 2. Convert to line 3. Convert to PCL
Record size:
RECFM: 1. VB 2. VBA 3. VBM
Default owner
Embedded attributes prefix

NetSpool End-of-File Rules

Option == 1
Printer definition name: mypsprinter

<table>
<thead>
<tr>
<th>Default rules</th>
<th>1 All LUs</th>
<th>2 LU0</th>
<th>3 LU1</th>
<th>4 LU3</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLU name</td>
<td>5 A11 LUs</td>
<td>6 LU0</td>
<td>7 LU1</td>
<td>8 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>9 A11 LUs</td>
<td>10 LU0</td>
<td>11 LU1</td>
<td>12 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>13 A11 LUs</td>
<td>14 LU0</td>
<td>15 LU1</td>
<td>16 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>17 A11 LUs</td>
<td>18 LU0</td>
<td>19 LU1</td>
<td>20 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>21 A11 LUs</td>
<td>22 LU0</td>
<td>23 LU1</td>
<td>24 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>25 A11 LUs</td>
<td>26 LU0</td>
<td>27 LU1</td>
<td>28 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>29 A11 LUs</td>
<td>30 LU0</td>
<td>31 LU1</td>
<td>32 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>33 A11 LUs</td>
<td>34 LU0</td>
<td>35 LU1</td>
<td>36 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>37 A11 LUs</td>
<td>38 LU0</td>
<td>39 LU1</td>
<td>40 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>41 A11 LUs</td>
<td>42 LU0</td>
<td>43 LU1</td>
<td>44 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>45 A11 LUs</td>
<td>46 LU0</td>
<td>47 LU1</td>
<td>48 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>49 A11 LUs</td>
<td>50 LU0</td>
<td>51 LU1</td>
<td>52 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>53 A11 LUs</td>
<td>54 LU0</td>
<td>55 LU1</td>
<td>56 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>57 A11 LUs</td>
<td>58 LU0</td>
<td>59 LU1</td>
<td>60 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>61 A11 LUs</td>
<td>62 LU0</td>
<td>63 LU1</td>
<td>64 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>65 A11 LUs</td>
<td>66 LU0</td>
<td>67 LU1</td>
<td>68 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>69 A11 LUs</td>
<td>70 LU0</td>
<td>71 LU1</td>
<td>72 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>73 A11 LUs</td>
<td>74 LU0</td>
<td>75 LU1</td>
<td>76 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>77 A11 LUs</td>
<td>78 LU0</td>
<td>79 LU1</td>
<td>80 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>81 A11 LUs</td>
<td>82 LU0</td>
<td>83 LU1</td>
<td>84 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>85 A11 LUs</td>
<td>86 LU0</td>
<td>87 LU1</td>
<td>88 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>89 A11 LUs</td>
<td>90 LU0</td>
<td>91 LU1</td>
<td>92 LU3</td>
</tr>
<tr>
<td>PLU name</td>
<td>93 A11 LUs</td>
<td>94 LU0</td>
<td>95 LU1</td>
<td>96 LU3</td>
</tr>
</tbody>
</table>

NetSpool End of File Rule

Printer definition name: mypsprinter

4. String 5. Timer
String: ________________________________
/ Keep
Timeout idle interval: _____ Busy interval: _____
IP PrintWay Options

Printer definition name: **mypsprinter**

Retention period:
- Successful: **00:00:00**
- Failure: **00:24:00**

Retry time: **00:00:10**

Retry limit: **3**

Connection timeout: **30**
Response timeout: **60**

Exits:
- Begin data set: ________ End data set: ________ Record: ________

Document header: __________________________________________________________________ (extend)
/ Translate document header

Document trailer: __________________________________________________________________ (extend)
/ Translate document trailer

Formatting:
- Transparent data char: **35**
- Form feed: **0D0C** (extended mode)
- Automatic dataset grouping (extended mode)
- Dataset grouping: 1. None 2. Job 3. Concatenate job
- Line termination: ________
- Omit line termination at EOF

Basic Mode Formatting:
- Formatting: 1. None 2. Standard 3. Translate only 4. Use FCB

LPR Protocol

Printer definition name: **mypsprinter**

Operator security profile

Printer IP address: **printer1.boulder** (extend)
Print queue name: **PASS** (extend)

LPR Processing Options:
- Optimize copies
- Restrict ports
- Print banner page
- Banner class: __________________________________________________________________ (extend)
- Banner job name: __________________________________________________________________ (extend)
- Filename: __________________________________________________________________ (extend)
- Indent: __________
- Owner: __________
- Print function: f
- Title: __________________________________________________________________ (extend)
- Width: __________
- User options: __________________________________________________________________ (extend)
Creating an IP PrintWay printer definition for the VTAM protocol

This section shows how to fill in Infoprint Server ISPF panels to create a printer definition for a VTAM-controlled printer that accepts the SCS data stream, for example, an InfoPrint 40 printer. IP PrintWay uses the VTAM protocol to transmit data to this printer. This printer definition contains values used by Print Interface and IP PrintWay.

Job submitters can print on this printer by specifying **myscsprinter** as the name of the print queue or printer definition. JCL users can also print on this printer by specifying CLASS=K and DEST=MYSCSPRT on an OUTPUT JCL statement.

Values in the sample printer definitions are shown in either normal or bold text:
- Normal text indicates either a default value or a value that is specified in an included component. Default values and values from the component are displayed automatically in the ISPF panels.
- **Bold** text indicates a value that you must explicitly specify in the printer definition.

This panel includes the Allocation, Processing, and IP PrintWay Options components that were created in the previous examples. The asterisks next to the Allocation and Protocol sections of the printer definition indicate that one or more fields in these sections contain values that are explicitly specified in this printer definition.

```plaintext
IP PrintWay Printer Definition

Printer definition name . myscsprinter
Description . An SCS printer (extend)
Location. . Building 003, office E9-4 (extend)

<table>
<thead>
<tr>
<th>Section</th>
<th>Component name</th>
<th>Custom values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allocation</td>
<td>=&gt; printway</td>
<td>=&gt; *</td>
</tr>
<tr>
<td>Processing</td>
<td>=&gt; vtam</td>
<td>=&gt; _</td>
</tr>
<tr>
<td>NetSpool options</td>
<td>=&gt; __</td>
<td>=&gt; __</td>
</tr>
<tr>
<td>NetSpool end-of-file</td>
<td>=&gt; __</td>
<td>=&gt; __</td>
</tr>
<tr>
<td>IP PrintWay options</td>
<td>=&gt; retain</td>
<td>=&gt; __</td>
</tr>
<tr>
<td>Protocol</td>
<td>=&gt; __</td>
<td>=&gt; *</td>
</tr>
</tbody>
</table>

/ Use DEST, CLASS, and FORMS for IP PrintWay printer selection
NetSpool LU name . _______ LU classes . _ _ _ _ _ _ (extend)
```
Printer definition name: **myscsprinter**

**Spool allocation values:**
- **CLASS**...
- **GROUPID**...
- **DEST.**... **MYSCSPRT**
- **LINECT**...
- **JES node**...
- **PCB**... **8**
- **FCT**...
- **JES node**...
- **PRIMODE**...
- **FLASH count**...
- **FLASH name**...
- **FORMS**...
- **USERDATA**...

- **BURST**...
- **HOLD**...
- **OUTDISP**...

**Values for Separator Pages:**
- **Address**...
- **Building**...
- **Department**...
- **Name**...
- **Room**...
- **Title**...

**Resource Related Values:**
- **Form definition**...
- **Character sets**...
- **Overlay front**...
- **Input tray**...
- **Output bin**...
- **Page definition**...
- **Resource library**...
- **Resource directories**...

**Error Reporting Values:**
- **Print error reporting**...
- **Error disposition**...
- **Print error messages**...
- **Maximum messages**...

**Other Values:**
- **Notify**...
- **Checkpoint pages**...
- **Checkpoint seconds**...
- **Copies**...
- **Copy group**...
- **Color map**...
- **Com setup member**...
- **JES form length**...
- **Resolution**...
- **AFP parameters**...
- **Duplex**...
- **Label data pages**...
- **Restrict printable area**...
- **Table reference characters**...
- **Save AFP statistics**

---

**Appendix D. Sample IP PrintWay printer definitions**
Processing

Printer definition name: **mycsprinter**

Document code page: ________________

Printer code page: IBM-1047

Supported Data Formats and Associated Filters:

<table>
<thead>
<tr>
<th>Data format</th>
<th>Filter:</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ Line data</td>
<td>(extend)</td>
</tr>
<tr>
<td>MO:DCA-P</td>
<td>(extend)</td>
</tr>
<tr>
<td>PostScript</td>
<td>(extend)</td>
</tr>
<tr>
<td>/ Text</td>
<td>(extend)</td>
</tr>
<tr>
<td>PCL</td>
<td>(extend)</td>
</tr>
<tr>
<td>PDF</td>
<td>(extend)</td>
</tr>
<tr>
<td>SAP</td>
<td>(extend)</td>
</tr>
<tr>
<td>XML</td>
<td>(extend)</td>
</tr>
<tr>
<td>TIFF</td>
<td>(extend)</td>
</tr>
<tr>
<td>JPEG</td>
<td>(extend)</td>
</tr>
<tr>
<td>Other</td>
<td>(extend)</td>
</tr>
</tbody>
</table>

- Resubmit for filtering

Transforms to AFP:

Fail on error: 1. No 2. Error 3. Warning

Trailer error page: 1. No 2. Error 3. Warning

AFP to PDF Transform Encryption:

User identifier: ____________________________ (extend)

Owner identifier: ____________________________ (extend)

Encryption level: 1. Low (40-bit key) 2. High (128-bit key)

Protected actions:

- Restrict print...2 1. Yes 2. No
- Restrict copy...2 1. Yes 2. No
- Restrict update...2 1. Yes 2. No

SCS Conversion:

Margins: Top...6 Bottom...62 Left...11 Right...71

Line length...66 Page length...66

Tabs: Vertical... (extend) Horizontal... (extend)

NetSpool PCL Conversion:

Print density... Line density...

Orientation... 1. None 2. Portrait 3. Landscape

SCS automatic page orientation

IP PrintWay Line-to-Text Conversion:

Pagination

Margins: Top... Bottom...

Page height... 58

Print page header...

Maximum document size...

Maximum copies...

Forms supported...

Duplex supported...

Print-error reporting supported...

Input tray name: Number: (more) Output bin name: Number: (more)
IP PrintWay Basic Mode Attributes:

SOSI mode .......... 1. None 2. ASCII 3. Space 4. EBCDIC
Translation dataset qualifier . _______________________________
Double-byte translate table .

1. BIG5
2. EUCKANJI
3. HANGEUL
4. IBMKANJI
5. JIS78KJ-ASCII
6. JIS78KJ-JISROMAN
7. JIS83KJ-ASCII
8. JIS83KJ-JISROMAN
9. KSC5601
10. CHINESE
11. SJISKANJI
12. TCHINESE
IP PrintWay Options

Printer definition name: myscsprinter

Retention period:
  Successful: __________
  Failure: 0024:00:00
Retry time: 0000:10:00
Retry limit: 3

Connection timeout: 30
Response timeout: 60

Exits:
  Begin data set: ________
  End data set: ________
  Record: ________
Document header: ______________________________________________ (extend)
  / Translate document header
Document trailer: ______________________________________________ (extend)
  / Translate document trailer

Formatting:
  Transparent data char: 35
  Form feed: 0D0C (extended mode)
  Automatic dataset grouping (extended mode)
  Dataset grouping: 1. None 2. Job 3. Concatenate job
  Line termination: 1. None 2. Omit line termination at EOF

Basic Mode Formatting:
  Formatting: 1. None 2. Standard 3. Translate only 4. Use FCB

VTAM Protocol

Printer definition name: myscsprinter
Operator security profile
  ...

Printer LU name: P002
VTAM Processing Options:
  Printer logmode: SCS
  Checkpoint pages: 5
  _ Send as transparent data
Creating an IP PrintWay printer definition for the email protocol

This section shows how to fill in Infoprint Server ISPF panels to create a printer definition for email destinations. This printer definition contains values used by Print Interface, NetSpool, and IP PrintWay.

Job submitters can print on this printer by specifying `deptmail` as the name of the print queue or printer definition. JCL users can also print on this printer by specifying CLASS=K and DEST=DEPTMAIL on an OUTPUT JCL statement. VTAM applications can print on this printer by specifying LU01MAIL as the secondary LU name.

Values in the sample printer definitions are shown in either normal or bold text:
- Normal text indicates either a default value or a value that was specified in an included component. Default values and values from the component are displayed automatically in the ISPF panels when you create a printer definition and include the component.
- **Bold** text indicates that you must explicitly specify the value in the printer definition.

This panel includes an Allocation component that was created in a previous example in this section. The asterisks next to the Allocation, Processing, and Protocol sections of the printer definition indicate that one or more fields in these sections contain values that are explicitly specified in this printer definition.

```
IP PrintWay Printer Definition
Printer definition name . deptmail
Description . Mail list for my department (extend)
Location. . __________________________________________________(extend)

<table>
<thead>
<tr>
<th>Section</th>
<th>Component name</th>
<th>Custom values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allocation</td>
<td>printway</td>
<td>*</td>
</tr>
<tr>
<td>Processing</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>NetSpool options</td>
<td></td>
<td>___</td>
</tr>
<tr>
<td>NetSpool end-of-file</td>
<td></td>
<td>___</td>
</tr>
<tr>
<td>IP PrintWay options</td>
<td></td>
<td>___</td>
</tr>
<tr>
<td>Protocol</td>
<td></td>
<td>___</td>
</tr>
</tbody>
</table>

/ Use DEST, CLASS, and FORMS for IP PrintWay printer selection
NetSpool LU name . LU01MAIL  LU classes . _ _ _ _ _ _ (extend)
```
Printer definition name: deptmail

Spool allocation values:
- CLASS: DEPTMAIL
- DEST: DEPTMAIL
- JES node: FCB: 8
- PRM: PRTY: FCB: 8
- USERDATA (extend)
- BURST: Yes 2. No
- HOLD: Yes 2. No

Values for Separator Pages:
- Address: My default email title
- Building: (extend)
- Department: (extend)
- Name: (extend)
- Room: (extend)

Resource Related Values:
- Form definition: (extend)
- Character sets: (extend)
- Overlay front: Back: (extend)
- Input tray: (extend)
- Output bin: (extend)
- Page definition: (extend)
- Resource library: (extend)
- Resource directories: (extend)
- Image shift x-direction front: Back: (extend)
- y-direction front: Back: (extend)

Error Reporting Values:
- Print error reporting: None 2. All 3. Character 4. Position
- Print error messages: No 2. Yes
- Maximum messages: __

Other Values:
- Notify: at node: (extend)
- Checkpoint pages: (extend)
- Checkpoint seconds: (extend)
- Copies: (extend)
- Copy group: (extend)
- Color map: (extend)
- Com setup member: (extend)
- JES form length: (extend)
- Resolution: (extend)
- AFP parameters: (extend)
- Duplex: Simplex 2. Duplex 3. Tumble
- Label data pages: Yes 2. No
- Restrict printable area: Yes 2. No
- Table reference characters: (extend)
- Save AFP statistics
Processing

Printer definition name: deptmail

Document code page: IBM-1047

Printer code page: IBM-1047

Print Interface Supported Data Formats and Associated Filters:

<table>
<thead>
<tr>
<th>Data format</th>
<th>Filter:</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ Line data</td>
<td></td>
</tr>
<tr>
<td>/ MO:DCA-P</td>
<td></td>
</tr>
<tr>
<td>/ PostScript</td>
<td></td>
</tr>
<tr>
<td>/ Text</td>
<td></td>
</tr>
<tr>
<td>/ PCL</td>
<td></td>
</tr>
<tr>
<td>/ PDF</td>
<td></td>
</tr>
<tr>
<td>/ SAP</td>
<td></td>
</tr>
<tr>
<td>/ XML</td>
<td></td>
</tr>
<tr>
<td>/ TIFF</td>
<td></td>
</tr>
<tr>
<td>/ JPEG</td>
<td></td>
</tr>
<tr>
<td>/ Other</td>
<td></td>
</tr>
</tbody>
</table>

Resubmit for filtering

Transforms to AFP:

Fail on error: 1. No 2. Error 3. Warning

Trailer error page: 1. No 2. Error 3. Warning

AFP to PDF Transform Encryption:

User identifier: ____________________________ (extend)

Owner identifier: ____________________________ (extend)

Encryption level 1. Low (40-bit key) 2. High (128-bit key)

Protected actions:

Restrict print . . . 1. Yes 2. No

Restrict copy . . . 1. Yes 2. No

Restrict update . . 1. Yes 2. No

SCS Conversion:


Line length . . . . Page length . . .

Tabs: Vertical . . . . Horizontal . . . . . . . . (extend)

NetSpool PCL Conversion:

Print density . . . .

Line density . . . .

Orientation . . . 1. None 2. Portrait 3. Landscape

SCS automatic page orientation

IP PrintWay Line-to-Text Conversion:

Pagination

Margins: Top . . . . Bottom . . . .

Page height . . . . 58

Print page header

Maximum document size . . . . .

Maximum copies . . . .

Forms supported . . . .

Duplex supported . . . . 1. Simplex 2. Duplex 3. Tumble

Print-error reporting supported . . . . .

Input tray name: Number: (more) Output bin name: Number: (more)
IP PrintWay Basic Mode Attributes:

- SOSI mode: 1. None 2. ASCII 3. Space 4. EBCDIC
- Translation dataset qualifier: _______________________________
- Double-byte translate table:
  1. BIG5
  2. EUCKANJI
  3. HANGEUL
  4. IBMKANJI
  5. JIS78KJ-ASCII
  6. JIS78KJ-JISROMAN
  7. JIS83KJ-ASCII
  8. JIS83KJ-JISROMAN
  9. KSC5601
  10. SCHINESE
  11. SJISKANJI
  12. TCHINESE

NetSpool Options

Printer definition name: deptmail

- Formatting: 1. None 2. Convert to line 3. Convert to PCL
- Record size: ___________________
- RECFM: 1. V8 2. VBA 3. VBM

NetSpool End-of-File Rules

Option === 1

Default rules:

<table>
<thead>
<tr>
<th>PLU name</th>
<th>1 All LUs</th>
<th>2 LU0</th>
<th>3 LU1</th>
<th>4 LU3</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>21</td>
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<td></td>
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<tr>
<td>25</td>
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<td>29</td>
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<td>33</td>
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<td>61</td>
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<tr>
<td>69</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>73</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>77</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>81</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>85</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>89</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>93</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NetSpool End of File Rule

Printer definition name: deptmail


String: ____________________________

/ Keep

Timeout idle interval: _____   Busy interval: _____
IP PrintWay Options

Printer definition name: deptmail

Retention period:
Successful: __________ Failure: __________
Retry time: __________
Retry limit: __________

Connection timeout: 30
Response timeout: 60

Exits:
Begin data set: __________ End data set: __________ Record: __________

Document header: ______________________________________________ (extend)
/ Translate document header
Document trailer: ______________________________________________ (extend)
/ Translate document trailer

Formatting:
Transparent data char: 35
Form feed: 0D0C (extended mode)
Automatic dataset grouping (extended mode)
Line termination: __________
/ Omit line termination at EOF

Basic Mode Formatting:
Line termination: __________
Formatting: 1. None 2. Standard
3. Translate only 4. Use FCB
PostScript header: 1. Add 2. Ignore
3. Landscape 4. Always landscape

Email Protocol

Printer definition name: deptmail

To addresses: jose@xyz.com, mary@xyz.com, deptlist (more)

CC addresses: (more)
BCC addresses: (more)
From name: (more)
Reply address: (more)

IP PrintWay Extended Mode:
Embedded headers
- Inline text and line data
- Inline message
... ______________________________________________ (extend)
Appendix E. Accessibility

Accessible publications for this product are offered through the z/OS Information Center, which is available at [http://www.ibm.com/systems/z/os/zos/bkserv/](http://www.ibm.com/systems/z/os/zos/bkserv/). If you experience any accessibility problems with the z/OS Information Center, send an email to mhvrcfs@us.ibm.com or write to the following address:

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Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. The major accessibility features in z/OS enable users to:

- Use assistive technologies such as screen readers and screen magnifier software
- Operate specific or equivalent features using only the keyboard
- Customize display attributes such as color, contrast, and font size.

Using assistive technologies

Assistive technology products, such as screen readers, function with the user interfaces found in z/OS. Consult the assistive technology documentation for specific information when using such products to access z/OS interfaces.

Keyboard navigation of the user interface

Users can access z/OS user interfaces using TSO/E or ISPF. Refer to [z/OS TSO/E Primer](http://www.ibm.com/systems/z/os/zos/bkserv/) and [z/OS ISPF User’s Guide Vol I](http://www.ibm.com/systems/z/os/zos/bkserv/) for information about accessing TSO/E and ISPF interfaces. These guides describe how to use TSO/E and ISPF, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.
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Index

Special characters
_BPX_SHAREAS variable 7
_BPX_UNLIMITED_OUTPUT variable 7
_BPXK_SETIBMOPT_TRANSPORT variable 7
/etc/rc shell script, starting daemons from 2
%filter-options option 8, 215, 217, 219
%xf-options option 218

Numerics
3270 data
converting to line data, in NetSpool 102
converting to PCL, in NetSpool 105

A
abbreviations for attributes 284
ACBNAME parameter (APPL statement) 228
accessibility 519
features 519
accounting record, SMF
comparing IP PrintWay basic and extended mode records 450
format 449
job name, job D and user ID fields 449
number of pages in SMF record 174
suppressing or modifying IP PrintWay records 452
acknowledgement-level attribute 339
ADD command 16
adding
components with ISPF panels 241
FSA definition with ISPF panels 248
FSS definition with ISPF panels 246
job selection rules with ISPF panels 250
printer definition with ISPF panels 234, 235
printer LU, NetSpool 16
printer pool definitions with ISPF panels 244
address-text attribute 299
AFP data, definition 79
AFP Download Plus
afp-parameters attribute 299
FSA attributes 339
ISPF panel 486
AFP to PCL transform, specifying 213
AFP to PDF transform, specifying 213
AFP to PostScript transform, specifying 213
afp-parameters attribute 299
afdp-dataset-grouping attribute 340
afdp-working-directory attribute 340
AFPDSRECORDLENGTH parameter 217
aliases, defining to sendmail 151
allocation object class, attributes (continued)
color-map 302
com-setup-member 303
copies 303
copy-group 303
department-text 304
description 304
destination 305
duplex 305
error-disposition 306
flash-count 306
flash-name 306
form-definition 307
forms 307, 308
group-identifier 308
hold 308
input-tray-number 309
jes-form-length 309
jes-maximum-line-count 310
jes-node 310
jes-priority 310
jes-threshold 310
jes-writer 311
label-data-pages 311
name 311
name-text 312
normal-output-disposition 312
notify 313
output-bin-number 313
output-class 314
overlay-back 314
overlay-front 314
page-definition 315
print-error-messages 316
print-error-messages-maximum 316
print-error-reporting 316
process-mode 317
resolution 318
resource-directories 318
resource-library 318
restrict-printable-area 319
room-text 319
save-afp-statistics 320
table-reference-characters 320
title-text 321
userdata 321
x-image-shift-back 322
x-image-shift-front 322
y-image-shift-back 323
y-image-shift-front 323
Allocation section or component
ISPF panel for 467
JES allocation parameters, specifying 75, 99
overview 66
Spool allocation values heading, specifying fields under 76, 100
allow-all-characters-in-line-data attribute 324
AOP_ALLOW_ALL_CHARACTERS_IN_LINE_DATA variable 8
AOP_APPLID variable 8
AOP_BLANK_TRUNCATION_CLASSES variable 8
AOP_IGNORE_DCF_ROUTING_ERRORS variable 8
AOP_MAIL_DO_NOT_ADD_SUFFIX variable 8
AOP_MAIL_PREERVE_SUFFIXES variable 8
AOP_MAIL_USE_FIRST_ADDRESS variable 8
AOP_MAXTHREADTASKS variable 8
AOP_SAP2AFP_RESOURCES variable 7
AOP_SELECT_WORK_FROM_HOLD_QUEUE variable 8
AOP_SUPPRESS_POST_UNIX_FILTER_FORMATTING variable 8
AOPBATCH, using to run PIDU program 257
AOPCONF variable 7, 12, 256
aopd, Printer Inventory Manager daemon
   starting 2, 4
   stopping 3, 10
AOPDUMPON variable 6
aopfiltr.so, specifying for Print Interface 81
AOPHINVD_MAXTHREADTASKS variable 8
aophinvd-max-thread-tasks attribute 324
aophinvd, historical database daemon
   starting 2, 4
   stopping 3, 10
AOPIPPD_MAXTHREADTASKS variable 9
aopippdsp, IPP server daemon
   starting 2, 4
   stopping 3, 10
aoplogd, message log daemon
   starting 2, 4
   stopping 3, 10
aoplogu command 53
AOPLOGUS sample job 53
AOPLOGUS sample job 53
AOPLPD_MAXTHREADTASKS variable 9
aoplpd-max-thread-tasks attribute 325
aoplpd, line printer daemon
   starting 2, 4
   stopping 3, 10
AOPMAILER variable 9
AOPMAILER_OPTIONS variable 9
AOPMSG_CONF variable 7
AOPLNETD_MAXTHREADTASKS variable 9
aopnetd-max-thread-tasks attribute 325
aopnetd, NetSpool daemon
   starting 2, 4
   stopping 3, 10
AOPSUBD_MAXTHREADTASKS variable 9
aopsubd, subsystem daemon
   starting 2, 4
   stopping 3, 10
AOPSTART JCL procedure 2
aopstart command 10
AOPSTOP JCL procedure 3
AOPSAPD_CONF variable 7
AOPSTART JCL procedure 2
aopstop command 10
AOPSUPPRESS_POST_UNIX_FILTER_FORMATTING variable 8
AOPWSMD_MAXTHREADTASKS variable 9
aopwsmd-max-thread-tasks attribute 327
aopwsmd, IP PrintWay extended mode daemon
   starting 2, 4
   stopping 3, 10
AOPXFD_CONF variable 7
aopxfd, Infoprint Server Transform Manager daemon
   starting 2, 4
   stopping 10
APPC parameters (APPL statement) 229
APPL id, specifying for IP PrintWay 72
APPL statement
   statement-name parameter 228
   ACBNAME parameter 228
   APPC parameters 229
   DLOGMOD parameter 229
   EAS parameter 229
   format for NetSpool printer LU 228
   MODETAB parameter 229
   PARSESS parameter 229
   SESSLIM parameter 229
applid attribute 327, 340, 387
ASCII to EBCDIC conversion by Print Interface, specifying in
   printer definition 88
ascii-codepage attribute 328
assistive technologies 519
ASSIZEMAX parameter 5
attributes
   abbreviations 284
   allocation object class 299
   configuration object class 324
   fixed values, how to enter 285
   fsa object class 339
   integer values, how to enter 285
   job selection rule object class 370
   multi-valued 284
   netpool-eof-rules object class 375
   netpool-options object class 376
   printer object class 379
   printer-pool object class 384
   printway-fsa object class 387
   printway-options object class 392
   processing object class 406
   protocol object class 427
   psf-fsa object class 445
   resetting to default value 284
   single-valued 284
attributes (continued)
  string values, how to enter 285
  value-map 284
automatic dataset grouping 185
automatic page orientation, SCS 107
automatic-dataset-grouping attribute 393

B
backing up the Printer Inventory with the export command 278
banner page, printing with IP PrintWay 134
begin-dataset-exit attribute 393
bin output, specifying name for in printer definition 89, 124
binary data, printing in NetSpool 112
BIND parameters, valid 230
blank pages, deleting in IP PrintWay 181
blank pages, eliminating 396
blank pages, removing in NetSpool 118
blank-compression attribute 340
blank-truncation-classes attribute 328
BPXBATCH, using to run PIDU program 258
browsers, customizing for Infoprint Central 46
browsing
  components with ISPF panels 242
  FSA definitions with ISPF panels 250
  FSS definition with ISPF panels 248
  job selection rules with ISPF panels 251
  printer definition with ISPF panels 237
  printer pool definition with ISPF panels 246
  system configuration with ISPF panels 233
  transmission-queue entry, IP PrintWay 29
building-text attribute 300
burster-trimmer-stacker attribute 300

C
CANCEL command 24
capture-inline-resources attribute 341
carriage controls
  IP PrintWay basic mode support for 199
  specifying carriage control type field 180
  support for in IP PrintWay 181
carriage-control-type attribute 393
changing
  data sets, after released to JES 25
  formatting options 34
  response timeout, IP PrintWay 34
  retention periods, IP PrintWay 33
  retry limit, IP PrintWay 34
  time between retries, IP PrintWay 33
  transmission-queue entry 32
channel-buffer-count attribute 341
class, LU (continued)
  starting printer LU not in started class 16
  CLASS, specifying for IP PrintWay printer selection 163
  CLASS, using with DEST and FORMS for IP PrintWay printer selection 161
classes of objects in Printer Inventory 259
CLASSPATH variable 8
close-libraries-when-idle attribute 341
Coax Printer Support 142
code page, default for IP PrintWay 72
code pages
  default document code page for IP PrintWay basic mode 202
  default for IP PrintWay, specifying 72
  specifying for IP PrintWay basic mode 201
  specifying for IP PrintWay extended mode 179
  specifying in a printer definition 88
  color-management-resources 349
  color-map attribute 302, 342
  color-profile attribute 216
  color-rendering-intent attribute 216
  color-toner-saver attribute 216
com-setup-member attribute 303, 342
commands
  aplogu 53
  aopstart 4
  aopstop 10
  CANCEL command 24
  DISPLAY command 19, 20
  FAIL command 26
  HALT command 16
  KILL command, NetSpool 15
  LUNAME ADD command 16
  LUNAME DEL command 18
  LUNAME PURGE command 19
  PIDU command 254
  QUIT command 15
  QUIT FORCE command, NetSpool 15
  VARY command 24
common message log 53
components
  adding with ISPF panels 241
  browsing with ISPF panels 242
  copying with ISPF panels 242
  creating for PRTOPTNS parameter 196
  deleting with ISPF panels 243
  displaying values in different colors on ISPF panels 232
  editing with ISPF panels 243
  example for IP PrintWay printers 68
  example for PSF printers 70
  ISPF panel for Allocation component 467
  ISPF panel for IP PrintWay Options component 472
  ISPF panel for NetSpool End-of-File component 471
  ISPF panel for NetSpool Options component 470
  ISPF panel for Processing component 468
  ISPF panel for Protocol component 473
  listing printer definitions that include component 241
  listing with ISPF panels 240
  overview 68
  renaming with ISPF panels 243
  compression attribute 342
  concatenate job 186
  concatenation-separators attribute 388
configuration object class, attributes
  allow-all-characters-in-line-data 324
  apohinvd-max-thread-tasks 324
  aopippd-max-thread-tasks 325

Index 527
configuration object class, attributes (continued)
aoplpd-max-thread-tasks 325
aopnetd-max-thread-tasks 325
aopoutd-max-thread-tasks 326
aopsdbd-max-thread-tasks 326
aopssubd-max-thread-tasks 326
aopwsmd-max-thread-tasks 327
applid 327
ascii-codepage 328
blank-truncation-classes 328
configuration-version 328
console-name 329
ebcdic-codepage 329
hardcopy-message-list 330
hardcopy-messages 329
ignore-dcf-routing-errors 330
ipp-port-number 331
job-prefix 331
log-retention 331
logstream-name 332
lpd-port-number 332
mail-do-not-add-suffixes 333
mail-preserve-suffixes 333
mail-use-first-address 334
mailer-options 334
mailer-path-name 335
max-historical-inventory-size 335
max-thread-tasks 336
name 336
netspool-use-fixed-jobid 336
netspool-use-unaltered-jobid 337
select-work-from-hold-queue 337
smf-recording 337
snmp-community 338
suppress-post-unix-filter-formatting 338
configuration-version attribute 328
data formats, specifying 78
data set grouping 185
data set name on JES spool 49
data sets
deleting from JES spool 35
formatting options, changing 34
locating on JES spool 49
modifying, after release to JES 25
monitoring transmission 27
names on JES spool 49
rerouting on the JES spool 33
retention period, changing 33
retry limit, changing 34
time between retries, changing 33
translation options, changing 34
viewing on JES spool 50
data set grouping attribute 394
db-translate-table attribute 406
DBCS data
translation tables, using 203
dcf-routing attribute 380
doactivating a printer LU 17
default code page for IP PrintWay 72
default IP PrintWay printer definition 195
default printer for Infoprint Server, specifying in ISPF panels 96, 233
default user ID, NetSpool 113
default values for attributes 284
default-document-codepage attribute 389
default-owner attribute 376, 385
default-process-mode attribute 343
DEL operator command 18
delete command, PIDU 275
delete form feed, specifying in IP PrintWay 182
delete form feeds, specifying in IP PrintWay 181
delete-form-feed attribute 396
deleting
copies 167
copy-group attribute 303
copying
components with ISPF panels 242
FSA definition with ISPF panels 248, 250
FSS definition with ISPF panels 248
job selection rules with ISPF panels 250, 251
printer definition with ISPF panels 237
printer pool definition with ISPF panels 246
create command, PIDU 261
creating
components with ISPF panels 241
create command, PIDU 261
copies 167
create command, PIDU 261
copies field 167
copy-group attribute 303
copying
components with ISPF panels 242
FSA definition with ISPF panels 248, 250
FSS definition with ISPF panels 248
job selection rules with ISPF panels 250, 251
printer definition with ISPF panels 237
printer pool definition with ISPF panels 246
create command, PIDU 261
creating
components with ISPF panels 241
density, specifying for NetSpool conversion to PCL 107
description attribute 304
department-text attribute 304, 370, 376, 377, 380, 385, 389,
396, 407, 427, 445
description, in a PSF FSA definition 223
description, in an IP PrintWay printer definition 160
dest-ip-address attribute 371
DEST, specifying for IP PrintWay printer selection 163
DEST, using with CLASS and FORMS for IP PrintWay printer
selection 161
destination attribute 305
destination-pattern attribute 371
DFLTNTRY 195
direct sockets protocol, selecting 138, 139
direct-download attribute 344
disconnect-action attribute 344
DISPLAY command 19, 20
display command, PIDU 275
display-afdp-status attribute 345
display-fully command, PIDU 276
displaying the status of printer LUs 19, 20
DLOGMOD parameter (APPL statement) 229
document code page, default, specifying in FSS
definition 202
document code page, specifying in a printer definition 88,
179, 202
document header field 190
document header, example of PCL commands 190
document size, changing maximum size in transmission-queue
entry 34
document trailer field 190
document-codpage attribute 407
document-formats-supported attribute 408
document-header attribute 396
document-trailer attribute 397
double-byte translate table, specifying 202
double-byte translate table, used in search order 203
dump command, PIDU 277
dump-code attribute 345
dump-message-id attribute 345
duplex attribute 305
duplex field 167
duplexes supported option, specifying 78, 122, 191
duplexes-supported attribute 409
duplicate pages
   restart option 175
timeout value 169, 403

E
EAS parameter (APPL statement) 229
EBCDIC to ASCII conversion by Print Interface, specifying in
printer definition 88
ebcdic-codpage attribute 329
editing
   components with ISPF panels 243
   FSA definition with ISPF panels 248, 250
   FSS definition with ISPF panels 248
   job selection rules with ISPF panels 250, 251
   printer definition with ISPF panels 238
   printer pool definition with ISPF panels 246
   system configuration with ISPF panels 233
   transmission-queue entry, IP PrintWay 32
eject-to-front-facing attribute 345
e-mail protocol
   aliases, defining to sendmail 151
   example 158
email protocol (continued)
   fields in email 147
   limitations 150
   retrying transmissions 170
   sample ISPF panels 513
   selecting in the printer definition 146
   sendmail messages, viewing 59
tasks for 128
   embedded-attributes-prefix attribute 377, 385
   end-dataset-exit attribute 398
   end-of-bracket rule 117
   end-of-chain rule 117
   end-of-file rules, specifying 116
   end-of-session rule 117
   end-sna-conversation attribute 346
   enumeration values for attributes 285
   environment variables for aoplogu command 55
   environment variables for aopstart command 6
   environment variables for aopstop command 12
   environment variables for pidu 257
   error-disposition attribute 306
   error-disposition-supported attribute 346
   export command, PIDU 278

F
FAIL command 26
fail-on-datastream-error attribute 218
fail-on-transform-error 409
failure-action attribute 346
failure-retention-period attribute 398
FCB
   formatting, specifying 183
   filter for text data, specifying for Print Interface 81
   filter names for transforms 214
   filter options, specifying in printer definition 84
   filters attribute 410
   filters, using with IP PrintWay 198
   filters, using with IP PrintWay basic mode 204
   fixed values for attributes 285
   flash-count attribute 306
   flash-name attribute 306
   FMPROF parameter 230
   font, selecting for data formatted by NetSpool 114
   FORCE parameter (QUIT command) 15
   FORCE parameter on MODIFY command 25
   force-create command, PIDU 261
   FOREVER retention period, specifying in printer
definition 174
   form feed, specifying in IP PrintWay 181
   form feeds, deleting in IP PrintWay 181, 200
   form-definition attribute 307, 346
   form-feed attribute 399
   form-feed controls, deleting in NetSpool 118
   formatting data in IP PrintWay 184
   formatting data in NetSpool 102, 105, 112
   formatting for IP PrintWay basic mode, specifying 209
   formatting for IP PrintWay, specifying 211
   formatting option, specifying in IP PrintWay 182
   formatting options 34
   forms attribute 307
   forms supported, specifying 78, 122
   forms-control-buffer attribute 308
   forms-list attribute 372
   forms-supported attribute 411
   FORMS, specifying for IP PrintWay printer selection 163

Index 529
FORMS, using with CLASS and DEST for IP PrintWay printer selection 161
fs45 value 215
FSA definition
adding with ISPF panels 248
browsing with ISPF panels 250
deleting with ISPF panels 250
ing with ISPF panels 250
IP PrintWay configuration information 73
ISPF panel for 478
listing with ISPF panels 249
PSF 223
PSF configuration information 73
fsa object class, attributes (continued)
interrupt-message-page-copies 352
ioca-replicate-trim-supported 352
issue-intervention-messages 352
issue-setup-messages 353
label-data-pages 353
label-separator-pages 353
location 353
log-messages 445
logmode 354
luname 354
map-to-outline-fonts 354
mark-interrupt-message-page 354
mcf-name 355
message-count-before-dump 355
name 355
no-response-action 355
no-response-notify 356
nst-trace-dsname 446
offset-interrupt-message-page 356
offset-stacking 356
oid-format-supported 357
operator-security-profile 357
override-3800-default-font 358
page-accounting-supported 358
page-definition 358
paper-length 358
paper-width 359
port-number 359
print-error-messages 360
print-error-messages-maximum 360
print-error-reporting 360
printer-acquire-interval 360
printer-connect-interval 360
printer-disconnect-interval 361
printer-ip-address 361
printer-management-mode 361
printer-release-interval 362
printer-release-mode 362
prune-double-byte-fonts 362
prune-single-byte-fonts 362
psf-send-default-character 362
recover-from-font-not-found 363
release-ds-when-repositioning 363
report-line-mode-conversion-paper-length-errors 363
resolution 363
response-timeout 364
restrict-printable-area 364
retained-fonts 364
retained-form-definitions 364
retained-object-containers 365
retained-page-definitions 365
secure-transmission 366
send-messages-on-failure 366
send-messages-to-sysout 366
send-separator-pages 366
set-3800-dataset-header-origin 367
set-3800-dataset-origin 367
set-3800-job-header-origin 367
set-3800-job-trailer-origin 367
set-3800-messages-origin 367
snmp-reporting 368
suppress-copy-marks 368
tcip-job-name 446
trace-mode 368
trace-prompt 446
IP PrintWay extended mode (continued)

IP PrintWay extended mode
allocation attributes for 166
code pages, specifying for iconv 179
comparing basic mode and extended mode printer
definitions 129
converting between EBCDIC and ASCII 179
converting line data to text data 180
creating components for the PRTOPTNS JCL
parameter 196
default printer definition 195
description field in printer definition 160
DFTLNTRY 195
direct sockets protocol 138
e-mail protocol 146
formatting data with an FCB 183
IP PrintWay extended mode
IPP protocol 140
IP PrintWay FSA panel 480
IP PrintWay FSS panel 482
IP PrintWay Options panel 472
IP PrintWay printer definition panels, email protocol 513
IP PrintWay printer definition panels, LPR protocol 502
IP PrintWay printer definition panels, VTAM protocol 508
job selection rule panel 477
NetSpool End-of-File panel 471
NetSpool Options panel 470
printer pool panel 476
Processing panel 468
Protocol panel 473
PSF FSA definition panel for a channel-attached
printer 480
PSF FSA definition panel for a TCP/IP-attached
printer 482
PSF FSA definition panel for AFP Download Plus 486
PSF FSA definition panel for an SNA-attached printer 484
PSF FSA definition panel 479
PSF printer definition panel 466
starting a session 28, 231
system configuration definition panel 488
using to maintain transmission-queue entries 27
using to manage Printer Inventory 231
IP PrintWay extended mode (continued)
ISPF panels for printer definition 465
limiting the size of data transmitted 191
location field in printer definition 160
operator security profile 164
PJL options 174
planning printer definitions for 127
printer definitions 63
printer selection 161
printing to Infoprint Manager 193
retrying unsuccessful transmission 172
routing criteria 161
selecting the VTAM protocol 142
sending printer commands 187
SMF type 6 record 449
starting daemons 2, 4
starting sendmail 37
stopping daemons 3, 10
transmitting multiple data sets in a job 185
IP PrintWay extended mode
Allocation panel 467
customizing CUA attributes 232
displaying panels in different languages 232
displaying the main panel 232
displaying the Primary Menu panel 28
examples of 465
General printer definition panel 466
IP PrintWay FSA panel 478
IP PrintWay FSS panel 478
IP PrintWay Options panel 472
IP PrintWay printer definition panels, email protocol 513
IP PrintWay printer definition panels, LPR protocol 502
IP PrintWay printer definition panels, VTAM protocol 508
job selection rule panel 477
NetSpool End-of-File panel 471
NetSpool Options panel 470
printer pool panel 476
Processing panel 468
Protocol panel 473
PSF FSA definition panel for a channel-attached
printer 480
PSF FSA definition panel for a TCP/IP-attached
printer 482
PSF FSA definition panel for AFP Download Plus 486
PSF FSA definition panel for an SNA-attached printer 484
PSF FSA definition panel 479
PSF printer definition panel 466
starting a session 28, 231
system configuration definition panel 488
using to maintain transmission-queue entries 27
using to manage Printer Inventory 231
ISPF panels compared to Infoprint Central actions 46
issue-intervention-messages attribute 352
issue-setup-messages attribute 353

J
Japanese, displaying ISPF panels in 232
JAVA_HOME variable 8
JES commands compared to Infoprint Central actions 44
JES spool
deleting a data set from 35
modifying data sets on 50
names of data sets 49, 50
rerouting a data set on 33
using ISPF panels to maintain data sets on 27
viewing data sets 50
JES work-selection criteria, specifying in printer definition 75, 99
jes-form-length attribute 309
jes-maximum-line-count attribute 310
jes-node attribute 310
jes-priority attribute 310
jes-threshold attribute 310
jes-writer attribute 311
jes-writer-pattern attribute 372
JESJCL print jobs 41
JESMSG print jobs 41
JESMSGLG print jobs 41
job attribute prefix, NetSpool 113
job ID displayed by SDSF 49
job name displayed by SDSF 49
job prefix, Print Interface 49
job selection rule
adding with ISPF panels 250
browsing with ISPF panels 251
copying with ISPF panels 251
deleting with ISPF panels 251
editing with ISPF panels 251
listing with ISPF panels 251
planning 74
job selection rule object class, attributes
creator-userid 370
description 370
dest-ip-address 371
destination-pattern 371
forms-list 372
jes-writer-pattern 372
job-selection-status 372
lower-page-limit 373
lower-record-limit 373
name 373
operator-security-profile 374
output-class-list 374
upper-page-limit 375
upper-record-limit 375
job-prefix attribute 331
JPEG data, definition 79

K
keyboard
navigation 519
PF keys 519
shortcut keys 519
KILL command, NetSpool 15

Index 533
lpr-filename attribute 428
lpr-indent attribute 429
lpr-mode attribute 429
lpr-optimize-copies attribute 430
lpr-print-banner attribute 430
lpr-print-function attribute 431
lpr-restrict-ports attribute 431
lpr-title attribute 431
lpr-width attribute 432
LU class
   reasons for using 98
   specifying in printer definition 98
   starting printer LU not in started class 16
lu-classes attribute 383, 386
LU, printer
   APPL statement for 228
   BIND parameters for 230
   changing in printer definitions 99
   defining to VTAM 227
   displaying state of 19
   selecting printer LU name 227
   specifying name in printer definitions 98
   starting and stopping tasks 13
   starting with ADD command 16
LUMAP statement 228
LUNAME ADD command 16
luname attribute 354, 383, 386
LUNAME DEL operator command 18
LUNAME parameter (DISPLAY command) 20
messages
   aoplogu command used to view messages 53
   AOPLOGUS sample job 53
   common message log messages 53
   IP PrintWay basic mode messages 58
   NetSpool messages 59
   sendmail messages 59
   transform messages 59
   viewing 53
migration information xv
MO:DCA-P data, definition 79
mode for IP PrintWay, specifying 134
MODETAB parameter (APPL statement) 229
MODIFY command 14
modify command, PIDU 281
MODIFY FORCE command 25
modifying
   data sets, after released to JES 25
   formatting options 34
   response timeout, IP PrintWay 34
   retention periods, IP PrintWay 33
   retry limit, IP PrintWay 34
   time between retries, IP PrintWay 33
   translation options 34
   transmission-queue entry 32
moving output data sets to another IP PrintWay printer 51
multi-valued attribute, defined 284
multiple data sets in a job, transmitting in IP PrintWay 185

N
name 336
name attribute 311, 355, 373, 376, 378, 384, 387, 390, 400, 412, 437, 446
name of an IP PrintWay printer definition 160
name-text attribute 312
naming printer LUs 228
national-language attribute 390
navigation
   keyboard 519
NetSpool
   broadcasting data 120
   defining printer LUs to VTAM 227
   formatting type, selecting in printer definition 102, 105, 112
   JES allocation parameters, specifying 99
   operator commands 14
   printer definitions for 97
   printer pool definitions for 97
   specifying end-of-file rules for 116
   starting 13
   starting daemon 2, 4
   starting printer LUs 13
   stopping 15
   stopping daemon 3, 10
NetSpool commands compared to Infoprint Central
   actions 45
   NetSpool End-of-File section or component
      ISPF panel for 471
      overview 67
      specifying rules in 116
   NetSpool Options section or component
      ISPF panel for 470
      overview 67
      specifying attributes in 102, 105, 112, 113
   netspool-eof-rules object class, attributes
description 376

534 z/OS V2R1.0 Infoprint Server Operation and Administration
netspool-eof-rules object class, attributes *(continued)*
  name 376
  netspool-formatting attribute 378
  netspool-options object class, attributes
default-owner 376
  description 377
  embedded-attributes-prefix 377
  maximum-record-size 377
  name 378
  netspool-formatting 378
  recmf 379
  netspool-use-fixed-jobid attribute 336
  netspool-use-unaltered-jobid attribute 337
  NLSPATH variable 8, 12, 256
  no-response-action attribute 355
  no-response-notify attribute 356
  none formatting option, NetSpool 112
  normal-output-disposition attribute 312
  Notices 521
  notify attribute 313
  notify field 167
  nst-trace-dsname attribute 446
  null value, used to restore attribute to default value 284

O

object classes for PIDU program 259
offset-interrupt-message-page attribute 356
offset-stacking 356
oid-format-supported attribute 357
old-style-translation attribute 390
omit line termination at EOF, specifying in IP PrintWay 181, 182
omit-line-termination-at-eof attribute 400
omvs command 6
operating
daemons for Infoprint Server 1
IP PrintWay 23, 37
NetSpool 13
operator commands
  aopstart 4
  aopstop 10
  CANCEL command 24
  DISPLAY command 19, 20
  FAIL command 26
  HALT command 16
  KILL command, NetSpool 15
  LUNAME ADD command 16
  LUNAME DEL command 18
  LUNAME PURGE command 19
  QUIT command 15
  QUIT FORCE command, NetSpool 15
  VARY command 24
operator security profile for IP PrintWay printers 164
operator security profile for PSF printers 224
operator-security-profile attribute 357, 374, 438
optimize copies option 134
orientation, automatic 107
orientation, specifying for NetSpool conversion to PCL 107
orientation, specifying in Document header field 189
oshell command 6
osnmpd, starting 5
Other data format, definition 79
output bin, specifying name for in printer definition 89, 124
output-bin-map attribute 413
output-bin-number attribute 313
output-class attribute 314
output-class-list attribute 374
overlay-back attribute 314
overlay-front attribute 314
override-3800-default-font attribute 358
owner attribute 438
owner field displayed by SDSF 49

P

page eject, specifying in Document header field 189
page ejects, deleting in IP PrintWay 180
page header, printing 182
page height, specifying 182
page length, specifying for NetSpool 103, 109
page length, specifying for SCS printers 199
page orientation, specifying for NetSpool conversion to PCL 107
page-accounting 439
page-definition attribute 315, 358
page-restart 439
pages, tracking in IP PrintWay 174
pagination, for IP PrintWay, specifying 182
panels, ISPF
  Allocation panel 467
displaying the Primary Menu panel 28
examples of 465
  General printer definition panel 466
  IP PrintWay FSA panel 478
  IP PrintWay FSS panel 478
  IP PrintWay Options panel 472
  IP PrintWay printer definition panel 465
  IP PrintWay printer definition panels, email protocol 513
  IP PrintWay printer definition panels, LPR protocol 502
  IP PrintWay printer definition panels, VTAM protocol 508
  job selection rule panel 477
  NetSpool End-of-File panel 471
  NetSpool Options panel 470
  printer pool panel 476
  Processing panel 468
  Protocol panel 473
  PSF FSA definition panel for a channel-attached
    printer 480
  PSF FSA definition panel for a TCP/IP-attached
    printer 482
  PSF FSA definition panel for AFP Download Plus 486
  PSF FSA definition panel for an SNA-attached printer 484
  PSF FSS definition panel 479
  PSF printer definition panel 466
  starting a session 28
  system configuration definition panel 488
  using to maintain transmission-queue entries 27
paper-length attribute 358
paper-width attribute 359
PARSESS parameter (APPL statement) 229
page-accounting-supported attribute 358
PATH variable 8, 256
PDF data
  AFP to PDF transform 213
  convert from SCS, specifying in printer definition 105
definition 79
  PCL to AFP transform 213
  pcl-line-density attribute 413
  pcl-orientation attribute 414
  pcl-print-density attribute 414
  PDF data
  AFP to PDF transform 213

Index 535
Performance

checkpoint pages, VTAM protocol 145
direct sockets protocol 138
optimize copies, lpr protocol 134
PJL options, direct sockets protocol 175
resubmit for filtering 205

PIDU
attributes listing 285
authorization 253
commands, summary of 258
create command 261
delete command 275
display command 275
display-fully command 276
dump command 277
export command 278
force-create command 261
list command 279
modify command 281
object classes, summary of 259
rename command 283
running as a batch job 257
running from z/OS UNIX command line 254
sample JCL for running 258
using to manage Printer Inventory 253
PJL options, specifying for IP PrintWay 174
port-number attribute 359, 440
ports, restricting range in IP PrintWay 134
PostScript data
AFP to PostScript transform 213
PostScript to AFP transform 213
PostScript data, definition 79
PostScript header, specifying 211
PostScript landscape orientation, specifying 210
pragma statement 217
presentation-object-container-extraction-mode attribute 216
print density, set by IP PrintWay 199
print density, specifying for NetSpool conversion to PCL 107
Print Interface
ASCII to EBCDIC conversion, requesting in printer definition 88
bins and trays, specifying names in printer definition 89, 124
EBCDIC to ASCII conversion, requesting in printer definition 88
filter for LPD compatibility 82
filter for text data 81
JES allocation parameter, specifying 75
printer definitions for 75
subsystem, printer definitions for 90
validation, requesting in printer definition 78, 122, 191
Print page header field 182
print page header, specifying 182
Print Services Facility (PSF)
description 223
FSA definitions 73, 223
FSS definitions 72
ISPF panel for PSF printer definition 466
location 223
print definition
adding multiple definitions with ISPF panels 235
adding with ISPF panels 234
Allocation section overview 66
attributes in, overview 66
browsing with ISPF panels 237
changing the type with ISPF panels 239
components, including in 68
copying with ISPF panels 237
deleting with ISPF panels 239
editing with ISPF panels 238
for IP PrintWay 127
for NetSpool 97
for Print Interface 75
how many to create 64
IP PrintWay default 195
IP PrintWay Options section overview 67
ISPF panel for General printer definition 466
ISPF panel for IP PrintWay printer definition 465
ISPF panel for PSF printer definition 466
ISPF panels for IP PrintWay printer definition, email protocol 513
ISPF panels for IP PrintWay printer definition, LPR protocol 502
ISPF panels for IP PrintWay printer definition, VTAM protocol 508
listing definitions that include a component 241
listing with ISPF panels 236
NetSpool End-of-File section overview 67
NetSpool Options section overview 67
overview 62
Processing section overview 67
Protocol section overview 67
sections in 66
testing 240
types of 63
using ISPF panels to manage 231
Printer Inventory
adding a printer LU name, operator considerations 17
attributes, printer 66
backing up 278
components, planning 68
FSA definitions, planning 73
FSS definitions, planning 71, 72
migration program for 62
objects, types of 61
PrintWay basic mode (continued)
SMF type 6 record 449
starting and stopping 23
starting FSA 23
starting sendmail 37
transmitting multiple data sets in a job 185

PrintWay extended mode
allocation attributes for 166
code pages, specifying for iconv 179
comparing basic mode and extended mode printer
definitions 129
converting between EBCDIC and ASCII 179
converting line data to text data 180
creating components for the PRTOPTNS JCL
parameter 196
default printer definition 195
description field in printer definition 160
DFLTNTRY 195
direct sockets protocol 138
e-mail protocol 146
formatting data with an FCB 183
IPPF protocol 140
ISPF panel for email protocol 513
ISPF panel for LPR protocol 502
ISPF panel for VTAM protocol 508
ISPF panels for printer definition 465
limiting the size of data transmitted 191
location field in printer definition 160
LPR protocol 133
name field in printer definition 160
operator security profile 164
PJL options 174
planning printer definitions for 127
printer definitions 63
printer selection 161
printing to InfoPrint Manager 193
retaining data sets on JES spool after transmission 172
retransmitting unsuccessful transmission 167
routing criteria 161
selecting the VTAM protocol 142
sending printer commands 187
SMF type 6 record 449
starting daemons 2, 4
starting sendmail 37
stopping daemons 3, 10
transmitting multiple data sets in a job 185

printway-bottom-margin attribute 419, 420
printway-formatting attribute 401
printway-fss object class, attributes
applid 387
default-document-codepage 389
description 389
maximum-hiperspace-blocks 389
name 390
national-language 390
old-style-translation 390
tcip-job-name 391
trace-mode 391
trace-prompt 392
trace-table-size 392
printway-options object class, attributes
automatic-dataset-grouping 393
begin-dataset-exit 393
carriage-control-type 393
connection-timeout 394
dataset-grouping 394
delete-form-feed 396
Processing section or component
bins and trays, naming 89, 124
converting between EBCDIC and ASCII, specifying 88
filters, specifying 81, 82, 87, 123
ISPF panel for 468
overview 67
validation attributes, specifying 78, 122, 191
protocol object class, attributes
description 427
lpr-banner-class 427
lpr-banner-job-name 428
lpr-filename 428
lpr-indent 429
lpr-mode 429
lpr-optimize-copies 430
lpr-print-banner 430
lpr-print-function 431
lpr-restrict-ports 431
lpr-title 431
lpr-width 432
mail-bcc-addresses 432
mail-cc-addresses 433
mail-embedded-headers 434
mail-from-name 434
mail-inline-message 435
mail-inline-text 435
mail-reply-address 436
mail-to-addresses 437
name 437
operator-security-profile 438
owner 438
page-accounting 439
page-restart 439
port-number 440
print-queue-name 440
printer-ip-address 441
printer-logmode 442
printer-luname 442
printer-uri 442
protocol-type 443
server-user-options 443
vtam-checkpoint-pages 444
vtam-send-as-transparent 444
Protocol section or component
ISPF panel for 473
overview 67
protocol type
changing with ISPF panels 239
direct sockets, selecting 138
e-mail, selecting 146
IPP, selecting 140
LPR, selecting 133
VTAM, selecting 142
protocol-type attribute 443
PRTOPTNS components 196
prune-double-byte-fonts attribute 362
prune-single-byte-fonts attribute 362
PSF
description 223
FSA definitions 73, 223
FSIS definitions 72
ISPF panel for PSF printer definition 466
location 223
printer definition name 223
printer definitions 63
SMF type 6 record 449
specifying an operator security profile 224
PSF for AIX
printing to 193
psf-fss object class, attributes
description 445
name 446
psf-send-default-character attribute 362
PSP bucket xiv
PURGE operator command 19
purging IP PrintWay FSA 24
Q
QUERY parameter (TYPETERM macro) 229
QUIT command 15
QUIT FORCE command, NetSpool 15
R
RACF
authorization required to start InfoPrint Server daemons 5
authorization required to stop InfoPrint Server daemons 11
authorization required to use ISPF panels 231
authorization required to use PIDU 253
profile for IP PrintWay printers 164
profile for PSF printers 224
rcfm attribute 379
record length for InfoPrint Manager transforms 217
record-exit attribute 402
recover-from-font-not-found attribute 363
release-ds-when-repositioning attribute 363
remote PSF, specifying 194
rename command, PIDU 283
renaming a component with ISPF panels 243
report-line-mode-conversion-paper-length-errors attribute 363
rerouting a data set on the JES spool 31, 33
resetting a transmission-queue entry 31
resolution attribute 318, 363
resource-directories attribute 318
resource-library attribute 318
response-timeout attribute in IP PrintWay 167
response timeout, changing in transmission-queue entry 34
response timeout, specifying 170
response-timeout attribute 364, 403
restrict ports, specifying 134
retry interval, changing in transmission-queue entry 170
retry limit and retry time, working together 170
retry limit, changing in transmission-queue entry 33
retry limit, specifying 170
retry time, specifying 170
retry-limit attribute 404
RETAINF, specifying default for 195
retaining data sets on JES spool after transmissions in IP PrintWay 172
RETAINS, specifying default for 195
retention period, changing in a transmission-queue entry 33
retention period, specifying 174
retransmitting a transmission-queue entry 31
retry interval, changing in transmission-queue entry 33
retry limit and retry time, working together 170
retry limit, changing in transmission-queue entry 34
retry limit, specifying 170
retry time, specifying 170
retry-limit attribute 404
retry-time attribute 404
retrying unsuccessful transmissions in IP PrintWay 167, 170
RETRYL, specifying default for 195
RETRYT, specifying default for 195
Route Name field 31, 32
rout ing a data set on the JES spool 31, 33
rout ing criteria for IP PrintWay 161
rout ing criteria, selection hierarchy used by IP PrintWay 163
rout ing criteria, selection hierarchy used by IP PrintWay 162

Sample JCL for Running the PIDU Program —
SYS1.SAMPLIB(AOPPIDU) 258
SAP data
SAP to AFP transform 213
SAP data, definition 79
save-afp-statistics attribute 320
SCS automatic page orientation option 107
SCS data
converting from line data, in IP PrintWay basic mode 199
converting to line data, in NetSpool 102
converting to PCL, in NetSpool 105
csc-automatic-page-orientation attribute 421
csc-bottom-margin attribute 422
csc-horizontal-tabs attribute 422
csc-left-margin attribute 423
csc-maximum-line-length attribute 423
csc-maximum-page-length attribute 424
csc-right-margin attribute 424
csc-margin attribute 425
csc-vertical-tabs attribute 425
SDSF commands, using 50
search database daemon
starting 2, 4
stopping 3, 10
search order for TCP/IP translation tables in IP PrintWay 203
sections of a printer definition 66
secure-transmission attribute 366
select-work-from-hold-queue attribute 337
SELECTED parameter (DISPLAY command) 21
Send as transparent data field 144
send-messages-on-failure attribute 366
send-messages-to-sysout attribute 366
send-separator-pages attribute 366
sendmail 37
sendmail messages 59
separator page, printing with IP PrintWay 134
separator pages with Print Interface subsystem 91
separator pages with resubmit for filtering field 205
server-user-options attribute 443
servers, starting 24
SESSLIM parameter (APPL statement) 229
set-3800-dataset-header-origin attribute 367
set-3800-dataset-origin attribute 367
set-3800-job-header-origin attribute 367
set-3800-job-trailer-origin attribute 367
set-3800-messages-origin attribute 367
shortcut keys 519
single-valued attribute, defined 284
size of data transmitted by IP PrintWay 191
size of memory, setting 5
SMB, using with Print Interface 75
SMF type 6 record
comparing IP PrintWay basic and extended mode records 450
format 449
job name, job D and user ID fields 449
number of pages in SMF record 174
suppressing or modifying IP PrintWay records 452
smf-recording attribute 337
SMF6ACCT field 450
SMF6ACTL field 450
SMF6BYTD field 450
SMF6FTL field 451
SMF6IP1, SMF6IP2, SMF6IP3, SMF6IP4 fields 450
SMF6JBJD field 449
SMF6BN field 449
SMF6OUT field 450
SMF6PGE field 451
SMF6URI field 451
SMF6URIL field 451
SMF6USID field 449
SNMP agent, z/OS, starting 5
SNMP subagent daemon, aopsnmpd
starting 2, 4
stopping 10
snmp-community attribute 338
snmp-reporting attribute 368
SOSIS2 value 104
Spool allocation values heading, specifying fields under 76, 100
spool, names of data sets on 49
spool, viewing data sets on 50
spooling-mode attribute 380
standard TCP/IP translation table, using 202
STARTED parameter (DISPLAY command) 21
STARTED state for printer LUs 19
starting
Infoprint Server daemons 2, 4
IP PrintWay FSA 23
NetSpool task 13
printer LU 16
printer LU started by another NetSpool task 20
servers 24
TCP/IP 24
statement-name parameter (APPL statement) 228
status of an IP PrintWay printer, querying 35
status, displaying printer LUs 19, 20
STEPLIB variable 8
stopping
a printer with the MODIFY command 25
Infoprint Server daemons 3, 10
IP PrintWay FSA 24
IP PrintWay FSS 25
NetSpool 15
printer LU 17
WAITING state for printer LUs 20
storage, setting size of 5
streaming data in IP PrintWay 134
string values for attributes 285
subsystem daemon, aopsubd
starting 2, 4
stopping 3, 10
successful-retention-period attribute 404
suppress-copy-marks attribute 368
suppress-post-unix-filter-formatting attribute 338
SYS1.VTAMLST data set, defining APPL statement in 228
system configuration definition attributes 324
system configuration definition (continued)
  browsing 233
  editing 233
example of panel 488
System Display and Search Facility, using 50
System Management Facilities type 6 record
  comparing IP PrintWay basic and extended mode records 450
  format 449
  job name, job D and user ID fields 449
  number of pages in SMF record 174
  suppressing or modifying IP PrintWay records 452

T
  table-reference-characters, IP PrintWay support for 199
  table-reference-characters attribute 320
  tabs, specifying for NetSpool 103, 109
  TCP/IP
    ensuring initialization is finished 5
    name, specifying for IP PrintWay 72
    search order for translation tables 203
    standard translation table, using 72, 202
    translation tables, using in IP PrintWay basic mode 201
    using customized or DBCS translation table 203
  TCP/IP connection timeout in IP PrintWay 167
  TCP/IP protocol for IP PrintWay, selecting in printer definition 133, 138, 140
  tcpip-job-name attribute 391, 446
  Telnet considerations 228
  testing a printer definition 240
  text data, definition 79
  TIFF data, definition 79
  timeout, specifying 170
  timeout, specifying for IP PrintWay 167
  timer rule 117
  title field 166
  title-text attribute 321
  TRACE parameter (DISPLAY command) 21
  trace-mode attribute 368, 391
  trace-prompt attribute 392, 446
  trace-table-size attribute 369, 392, 447
  tracing, IP PrintWay
    specifying type for FSA 73
    specifying type for FSS 72
  tracking pages in IP PrintWay 174
  trailer-error-page attribute 218
  trailer-transform-error-page 426
  Transform Manager for Linux
    filter 214
    filter options 217
    messages 59
    stderr file, for transforms 59
  Transform Manager, Infoprint Server
    messages 59
    starting with aopstart command 4
    starting with AOPSTART JCL procedure 2
    starting with aopstop command 10
    starting with AOPSTOP JCL procedure 3
  transform-id attribute 218
  transforms
    example of printer definition 220, 221, 222
    filter names for transforms 214
    filter options for aoprform.dll filter 215
    filter options for aopxf.so filter 217
    filter options for other transform filters 219
    InfoPrint Transform Manager for Linux 214

transfers (continued)
  Infoprint Transforms to AFP for z/OS 214
  Infoprint XT Extender for z/OS 214
  IP PrintWay basic mode 204
  Print Transform from AFP to Adobe PDF for Infoprint Server for z/OS 214
  Print Transform from AFP to Adobe PostScript for Infoprint Server for z/OS 214
  Print Transform from AFP to HP PCL for Infoprint Server for z/OS 214
  requesting in printer definitions 213
  resubmit for filtering 204
  starting the Infoprint Server Transform Manager daemon 2, 4
  stopping the Infoprint Server Transform Manager daemon 3, 10
  viewing messages 59
  translate document field 190
  translate document header field 190
  translate-document-header attribute 405
  translate-document-trailer attribute 405
  translation data set qualifier, specifying 202, 203
  translation data set qualifier, used in search order 203
  translation options 34
  translation table
    standard TCP/IP, using in IP PrintWay 72
    translation-dataset-qualifier attribute 426
  transmission grouping in IP PrintWay 185
  transmission queue
    normal operation 27
    security for 27
  transmission-queue entry
    browsing 29
    deleting 35
    holding 30
    listing all 28
    listing selected 28
    modifying 32
    querying printer status 35
    resetting 31
    retreating 31
    transmit-recovery-pages attribute 369
    transmitting a data set on the JES spool 31
  Transparent data char field 144
  transparent data character, specifying in IP PrintWay 181, 182
  transparent data support in IP PrintWay 199
  transparent-data-character attribute 406
  tray, input, specifying name for in printer definition 89, 124
  TSPROF parameter 230
  TSU print jobs 41
  type of printer definition, changing with ISPF panels 239
  TYPETERM macro (CICS) 229
  TZ variable 7

U
  unicode-enabled attribute 447
  universal-character-set attribute 321
  unknown, in job name 49
  upper-page-limit attribute 375
  upper-record-limit attribute 375
  use DEST, CLASS, and FORMS for IP PrintWay printer selection 195
  Use FCB option for IP PrintWay, specifying 184
  use-line-mode-migration-linect attribute 369
  user interface
    ISPF 519

Index 541
user interface (continued)

TSO/E  519
user ports in IP PrintWay  134
userdata attribute  321

V
validation attributes for IP PrintWay, specifying in printer
definition  191
validation attributes for NetSpool, specifying in printer
definition  122
validation attributes for Print Interface, specifying in printer
definition  78
value-map, defined  284
VARY command  24
VARY command, VTAM  16, 18
VBUILD statement  228
viewing
components with ISPF panels  242
FSA definitions with ISPF panels  250
FSS definition with ISPF panels  248
job selection rules with ISPF panels  251
printer definition with ISPF panels  237
printer pool definition with ISPF panels  246
system configuration with ISPF panels  233
transmission-queue entry, IP PrintWay  29
viewing output data sets on JES spool  50
VTAM applications, printing from
APPL statement  228
BIND parameters, specifying  230
HALT commands  16
sample ISPF panels  508
VARY ACT command  16
VARY INACT command  18
VTAM printers, printing to
Coax Printer Support  142
creating VTAM resource definitions  143
element of selecting VTAM protocol  145
LOCAL statement for  144
Logmode statement for  143
LU statement for  144
SCS and DSC/DSE formatting  199
SCS commands permitted in document header  187
selecting the VTAM protocol  142
VTAM VARY ACT command  20
ttam-checkpoint-pages attribute  444
ttam-send-as-transparent  444

W
WAITING parameter (DISPLAY command)  21
WAITING state for printer LLUs  18, 20
web browsers, customizing for Infoprint Central  46
where predicate  260
work-selection criteria, specifying in printer definition  75, 99

X
x-image-shift-back attribute  322
x-image-shift-front attribute  322
XML data, definition  79
XT Extended for z/OS transform filter  214
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