Before using this information and the product it supports, be sure to read the general information under "Notices" on page 91.

This edition applies to version 1, release 13, modification 0 of IBM z/OS (product number 5694-A01) and to all subsequent releases and modifications until otherwise indicated in new editions.

This edition replaces GY27-7619-10.

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About This Document

This document is intended for system programmers who must report and resolve failures in DFSMSrmm. It contains information to help you:

- Obtain information to diagnose DFSMSrmm problems
- Resolve problems you encounter while running DFSMSrmm
- Use the Problem Determination Aid (PDA) facility
- Build keyword strings that describe DFSMSrmm failures as precisely as possible
- Search IBM Software Support databases to determine:
  - Whether an authorized program analysis report (APAR) already exists for the problem
  - Whether a solution for the problem is available

You can contact the IBM Support Center to perform the search for you or to help you:

- Develop a more effective keyword string
- Gather additional failure-related information
- Submit adequate information with an APAR, if necessary

For information about accessibility features of z/OS, for users who have a physical disability, see Appendix E, “Accessibility,” on page 87.

Required product knowledge

To use this document effectively, you should be familiar with:

- IBM® support and how it is structured
- Basic dump analysis
- Diagnostic techniques

Referenced documents

These documents have additional information about DFSMSrmm:

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>z/OS DFSMSrmm Application Programming Interface</td>
<td>SC26-7403</td>
</tr>
<tr>
<td>z/OS DFSMSrmm Managing and Using Removable Media</td>
<td>SC26-7404</td>
</tr>
<tr>
<td>z/OS DFSMSrmm Implementation and Customization Guide</td>
<td>SC26-7405</td>
</tr>
<tr>
<td>z/OS DFSMSrmm Reporting</td>
<td>SC26-7406</td>
</tr>
</tbody>
</table>

This document refers to the following publications:

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>EREP User’s Guide</td>
<td>GC35-0151</td>
</tr>
<tr>
<td>z/OS DFSMSdfp Diagnosis</td>
<td>GY27-7618</td>
</tr>
<tr>
<td>z/OS DFSMSHsm Diagnosis</td>
<td>GC52-1083</td>
</tr>
<tr>
<td>z/OS ISPF Messages and Codes</td>
<td>SC34-4815</td>
</tr>
</tbody>
</table>
Accessing z/OS DFSMS information on the Internet

In addition to making softcopy information available on CD-ROM, IBM provides access to z/OS softcopy information on the Internet. To view, search, and print z/OS information, go to the z/OS Internet Library:

http://www.ibm.com/systems/z/os/zos/bkserv/

The z/OS Basic Skills Information Center

The z/OS Basic Skills Information Center is a Web-based information resource intended to help users learn the basic concepts of z/OS, the operating system that runs most of the IBM mainframe computers in use today. The Information Center is designed to introduce a new generation of Information Technology professionals to basic concepts and help them prepare for a career as a z/OS professional, such as a z/OS system programmer.

Specifically, the z/OS Basic Skills Information Center is intended to achieve the following objectives:

- Provide basic education and information about z/OS without charge
- Shorten the time it takes for people to become productive on the mainframe
- Make it easier for new people to learn z/OS.

To access the z/OS Basic Skills Information Center, open your Web browser to the following Web site, which is available to all users (no login required):

http://publib.boulder.ibm.com/infocenter/zos/basics/index.jsp

Notational conventions

This section explains the notational conventions used in this document.

How to read syntax diagrams

Throughout this library, diagrams are used to illustrate the programming syntax. Keyword parameters are parameters that follow the positional parameters. Unless
otherwise stated, keyword parameters can be coded in any order. The following list tells you how to interpret the syntax diagrams:

• Read the diagrams from left-to-right, top-to-bottom, following the main path line. Each diagram begins on the left with double arrowheads and ends on the right with two arrowheads facing each other.

• If a diagram is longer than one line, each line to be continued ends with a single arrowhead and the next line begins with a single arrowhead.

• Required keywords and values appear on the main path line. You must code required keywords and values.

• Optional keywords and values appear below the main path line. You can choose not to code optional keywords and values.

• An arrow returning to the left above a group of keywords or values means more than one can be selected, or a single one can be repeated.
A word in all uppercase is a keyword or value you must spell exactly as shown. In this example, you must code `KEYWORD`.

If a keyword or value can be abbreviated, the abbreviation is discussed in the text associated with the syntax diagram.

If a diagram shows a character that is not alphanumeric (such as parentheses, periods, commas, and equal signs), you must code the character as part of the syntax. In this example, you must code `KEYWORD=(001,0.001)`.

If a diagram shows a blank space, you must code the blank space as part of the syntax. In this example, you must code `KEYWORD=(001 FIXED)`.

Default keywords and values appear above the main path line. If you omit the keyword or value entirely, the default is used.

A word in all lowercase italics is a variable. Where you see a variable in the syntax, you must replace it with one of its allowable names or values, as defined in the text.

Notes:
1. An example of a syntax note.
2. References to syntax notes appear as numbers enclosed in parentheses above the line. Do not code the parentheses or the number.
3. Some diagrams contain syntax fragments, which serve to break up diagrams that are too long, too complex, or too repetitious. Syntax fragment names are in mixed case and are shown in the diagram and in the heading of the fragment. The fragment is placed below the main diagram.
Syntax Fragment:

```
1ST_KEYWORD,2ND_KEYWORD,3RD_KEYWORD
```

The following is an example of a syntax diagram.

```
>> DELETEOWNER owner_ID newowner
```

Notes:

1. Must be specified if the owner owns one or more volumes.

The possible valid versions of the RMM DELETEOWNER command are:

- `RMM DELETEOWNER owner`
- `RMM DO owner`
- `RMM DELETEOWNER owner NEWOWNER(new_owner)`
- `RMM DO owner NEWOWNER(new_owner)`

How to abbreviate commands and operands

The TSO abbreviation convention applies for all DFSMSrmm commands and operands. The TSO abbreviation convention requires you to specify as much of the command name or operand as is necessary to distinguish it from the other command names or operands.

Some DFSMSrmm keyword operands allow unique abbreviations. All unique abbreviations are shown in the command syntax diagrams.

How to use continuation characters

The symbol `-` is used as the continuation character in this document. You can use either `-` or `+`.

- `-` Do not ignore leading blanks on the continuation statement
- `+` Ignore leading blanks on the continuation statement

Delimiters

When you type a command, you must separate the command name from the first operand by one or more blanks. You must separate operands by one or more blanks or a comma. Do not use a semicolon as a delimiter because any character you enter after a semicolon is ignored.

Character sets

To code job control statements, use characters from the character sets in Table 1. Table 2 on page xiv lists the special characters that have syntactical functions in job control statements.
### Table 1. Character sets

<table>
<thead>
<tr>
<th>Character Set</th>
<th>Contents</th>
<th>Capital A through Z 0 through 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alphanumeric</td>
<td>Alphabetic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Numeric</td>
<td></td>
</tr>
<tr>
<td>National</td>
<td>“At” sign</td>
<td>@ (Characters that can be $ represented by hexadecimal # values X'7C’, X'5B’, and X'7B’)</td>
</tr>
<tr>
<td>(See note)</td>
<td>Dollar sign</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pound sign</td>
<td></td>
</tr>
<tr>
<td>Special</td>
<td>Comma</td>
<td>,</td>
</tr>
<tr>
<td></td>
<td>Period</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>Slash</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td>Apostrophe</td>
<td>’</td>
</tr>
<tr>
<td></td>
<td>Left parenthesis</td>
<td>(</td>
</tr>
<tr>
<td></td>
<td>Right parenthesis</td>
<td>)</td>
</tr>
<tr>
<td></td>
<td>Asterisk</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>Ampersand</td>
<td>&amp;</td>
</tr>
<tr>
<td></td>
<td>Plus sign</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Hyphen</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Equal sign</td>
<td>=</td>
</tr>
<tr>
<td></td>
<td>Blank</td>
<td></td>
</tr>
<tr>
<td>EBCDIC text</td>
<td>EBCDIC printable character set</td>
<td>Characters that can be represented by hexadecimal X'40' through X'FE'</td>
</tr>
</tbody>
</table>

**Note:** The system recognizes the following hexadecimal representations of the U.S. National characters; @ as X'7C'; $ as X'5B'; and # as X'7B'. In countries other than the U.S., the U.S. National characters represented on terminal keyboards might generate a different hexadecimal representation and cause an error. For example, in some countries the $ character may generate a X'4A'.

### Table 2. Special characters used in syntax

<table>
<thead>
<tr>
<th>Character</th>
<th>Syntactical Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>,</td>
<td>To separate parameters and subparameters</td>
</tr>
<tr>
<td>=</td>
<td>To separate a keyword from its value, for example, BURST=YES</td>
</tr>
<tr>
<td>( b )</td>
<td>To enclose subparameter list or the member name of a PDS or PDSE</td>
</tr>
<tr>
<td>&amp;</td>
<td>To identify a symbolic parameter, for example, &amp;LIB</td>
</tr>
<tr>
<td>&amp;&amp;</td>
<td>To identify a temporary data set name, for example, &amp;&amp;TEMPDS, and, to identify an in-stream or sysout data set name, for example, &amp;&amp;PAYOUT</td>
</tr>
<tr>
<td>.</td>
<td>To separate parts of a qualified data set name, for example, A.B.C., or parts of certain parameters or subparameters, for example, nodename.userid</td>
</tr>
<tr>
<td>*</td>
<td>To refer to an earlier statement, for example, OUTPUT=<em>name, or, in certain statements, to indicate special functions: //label CNTL * //ddname DD * RESTART=</em> on the JOB statement</td>
</tr>
<tr>
<td></td>
<td>To enclose specified parameter values which contain special characters</td>
</tr>
<tr>
<td>(blank)</td>
<td>To delimit fields</td>
</tr>
</tbody>
</table>
How to send your comments to IBM

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   Attention: MHVRCFS Reader Comments
   Department H6MA, Building 707
   2455 South Road
   Poughkeepsie, NY 12601-5400
   U.S.A.
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   From the United States and Canada: 1+845+432-9405
   From all other countries: Your international access code +1+845+432-9405

Include the following information:
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• Your email address
• Your telephone or fax number
• The publication title and order number:
  z/OS V1R13.0 DFSMSrmm Diagnosis Guide
  GY27-7619-11
• The topic and page number related to your comment
• The text of your comment.

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IBM or any other organizations will only use the personal information that you supply to contact you about the issues that you submit.

If you have a technical problem

Do not use the feedback methods listed above. Instead, do one of the following:
• Contact your IBM service representative
• Call IBM technical support
• Visit the IBM support portal at http://www.ibm.com/systems/z/support/
Summary of Changes

This document contains terminology, maintenance, and editorial changes. Technical changes or additions to the text and illustrations are indicated by a vertical line to the left of the change.

You may notice changes in the style and structure of some content in this document—for example, headings that use uppercase for the first letter of initial words only, and procedures that have a different look and format. The changes are ongoing improvements to the consistency and retrievability of information in our documents.

Summary of Changes for GY27-7619-11 z/OS Version 1 Release 13

This document contains information previously presented in z/OS Version 1 Release 12 DFSMSrmm Diagnosis Guide (GY27-7619-10).

The following section summarizes the changes to that information.

Changed Information

The following information was changed in this edition:

- The examples in Chapter 5, “Building a Keyword String,” on page 43 have been updated with current FMIDs.
- “When You Run Out of Scratch Volumes” on page 17 has been updated to reflect changes in the retention methods.
- “User Completion Codes” on page 66 has been updated to add U0030.

Summary of Changes for GY27-7619-10 z/OS Version 1 Release 12

This document contains information previously presented in z/OS Version 1 Release 11 DFSMSrmm Diagnosis Guide (GY27-7619-09).

The following section summarizes the changes to that information.

Changed Information

The following information was changed in this edition:

- “Formatting PDA Data with the DFSMSShsm ARCPRPDO (PDA Trace Formatter) Program” on page 33 has been updated with a new example in Figure 22 on page 35.
- The examples in Chapter 5, “Building a Keyword String,” on page 43 have been updated with current FMIDs.
- Appendix C, “DFSMSrmm System and User Completion Codes,” on page 65

The "Readers' Comments - We'd Like to Hear from You" section at the back of this publication has been replaced with a new section, "How to send your comments to IBM" on page xv. The hardcopy mail-in form has been replaced with a page that provides information appropriate for submitting readers comments to IBM.
Summary of Changes for GY27-7619-09 z/OS Version 1 Release 11

This document contains information previously presented in z/OS Version 1 Release 10 DFSMSrmm Diagnosis Guide (GY27-7619-08).

The following section summarizes the changes to that information.

Changed Information

The following information was changed in this edition:
- Help panel EDGHT010 in Figure 3 on page 2 has been updated.
- Figure 22 on page 35 has been updated with a new example.
- The examples in Chapter 5, “Building a Keyword String,” on page 43 have been updated with current FMIDs.

Summary of Changes for GY27-7619-08 z/OS Version 1 Release 10

This document contains information previously presented in z/OS Version 1 Release 9 DFSMSrmm Diagnosis Guide (GY27-7619-07).

The following section summarizes the changes to that information.

New Information

The following information is new in this edition:
- “Using the Apache Tomcat Logger” on page 13 has been added.
- A new task to perform has been added in “When Inventory Management Fails” on page 16.
- “When There is Not Enough Available Storage to List All the Volumes with the DFSMSrmm Web Service” on page 26 has been updated with new Tomcat information.
- “When the DFSMSrmm Tomcat Web Service Does Not Respond” on page 28 has been added.
- “When an SMI-S Client Cannot Correctly Process Entries of Tape Libraries from the DFSMSrmm CIM Agent” on page 30 has been added.
- The following DFSMSrmm user completion codes have been added to “User Completion Codes” on page 66:
  - U0900
  - U1603
  - U2224

Changed Information

The following information was changed in this edition:
- Figure 3 on page 2 has been updated.
- A step has been updated in “When You Run Out of Scratch Volumes” on page 17.
- Table 3 on page 21 has been updated.
- “When There is Not Enough Available Storage to List All the Volumes” on page 25 has been updated.
- “When There is Not Enough Available Storage to List All the Volumes with the DFSMSrmm Web Service” on page 26 has been updated with information for Tomcat web servers.
• Chapter 7, “Contacting the IBM Software Support Center,” on page 59 has an updated step.
Chapter 1. Obtaining Diagnostic Information

DFSMSrmm is a z/OS® feature. This topic helps you obtain information to diagnose DFSMSrmm problems as described in the topics.

- “How the DFSMSrmm ISPF Dialog Provides Help When Errors Occur” on page 2
- “Obtaining TRACE Command Output” on page 6
- “Capturing Log Data to Diagnose Errors” on page 8
- “Obtaining Dumps to Help You Analyze and Diagnose Problems” on page 10
- “Using Messages and Codes to Diagnose DFSMSrmm Errors” on page 12
- “Checking for Output in the DFSMSrmm Web Service Log” on page 13

How the DFSMSrmm ISPF Dialog Provides Help When Errors Occur

When an error occurs while you are using the DFSMSrmm Interactive System Productivity Facility (ISPF) dialog, a short message describing the error appears at the top right corner of the current panel, as shown in Figure 1.

![Panel Help Scroll](image)

Figure 1. How a Short Message Appears on an ISPF Panel

Press PF1 or enter the HELP command. DFSMSrmm displays a long message that provides additional information describing the error as shown in Figure 2.

![Panel Help Scroll](image)

Figure 2. How a Long Message Appears on an ISPF Panel

If you need more information about the error, press PF1 or enter the HELP command. DFSMSrmm displays the dialog help panel associated with the currently displayed dialog panel, as shown in Figure 3 on page 2.

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While you are in the DFSMSrmm ISPF dialog, you might see ISPF messages that begin with prefixes ISP or ISR. Refer to z/OS ISPF Messages and Codes for information about the ISPF error.

Obtaining TRACE Command Output

When reporting problems to the IBM Support Center, you might be asked to provide trace output for all or part of the DFSMSrmm ISPF dialog. With tracing on, you see the REXX procedure statements as they are processed and the RMM TSO subcommands that the DFSMSrmm ISPF dialog is building. Use the trace output to help determine if the error occurred within the REXX procedure or as a result of an error in the RMM TSO subcommand issued by the DFSMSrmm ISPF dialog.

You can trace the processing of a DFSMSrmm function by using the TRACE command as described in Figure 4 on page 3. You specify the TRACE command by coding it in the DFSMSrmm ISPF dialog. You can use ALL to request both function and EXEC tracing. Specify DATASET to trace DFSMSrmm data set related processing. You can trace the processing of the RMMISPF EXEC by using the TRACE command with an EXEC name suffix. See Appendix B, "DFSMSrmm Trace Command Suffixes," on page 63 for a list of EXEC name suffixes you can use with the trace command.
Figure 4 shows the TRACE command and the keywords you can use with the command.

Figure 4. TRACE Command Syntax Diagram

TRACE  Use with any operand to turn tracing on. Use it without an operand to display the active trace options.
OFF   This turns tracing off.

You can use OFF with a keyword or suffix to selectively turn off tracing. The trace command function keywords describe DFSMSrmm functions. You can specify any of the following: CONTROL, DATASET, OWNER, PRODUCT, RACK, VOLUME, and VRS. To turn off tracing for a DFSMSrmm EXEC, use a suffix.

ALL   This traces all DFSMSrmm function and DFSMSrmm EXEC processing.
CONTROL To trace LISTCONTROL information about DFSMSrmm installation options.
DATASET To trace data set related processing within DFSMSrmm.
OWNER   To trace owner information related processing within DFSMSrmm.
PRODUCT To trace product information related processing within DFSMSrmm.
RACK   To trace rack number or bin number related processing within DFSMSrmm.
VOLUME To trace volume related processing within DFSMSrmm.
VRS   To trace vital record specification related processing within DFSMSrmm.
suffix Specify a suffix which is a DFSMSrmm EXEC name without the EDGR prefix. Suffix can be up to four alphanumeric characters.

Related Reading: For a list of DFSMSrmm EXECs and the suffixes you can use with the TRACE command, see Appendix B, “DFSMSrmm Trace Command Suffixes,” on page 63.
Ways in Which You can Activate Tracing

You can activate tracing when you are starting the DFSMSrmm ISPF dialog using the RMMISPF EXEC or while you are in the DFSMSrmm ISPF dialog.

Activating Tracing When You Are Starting the DFSMSrmm ISPF Dialog

You can use any of the TRACE command operands described in "Obtaining TRACE Command Output" on page 2 to trace processing of the RMMISPF EXEC. When you start the DFSMSrmm ISPF dialog, enter the TRACE command as shown in Figure 5.

Tracing from within the DFSMSrmm ISPF Dialog

You can activate tracing when you are in the DFSMSrmm ISPF dialog from the command line of any DFSMSrmm ISPF dialog panel. Enter the TRACE command as shown in Figure 6.

Setting Specific TRACE Options Within the DFSMSrmm ISPF Dialog

To obtain a trace of all activities for volumes, enter the TRACE command with the VOLUME option as shown in Figure 7 on page 5.
You can use multiple operands to activate tracing for more than one function or EXEC. For example, Figure 8 shows how you can trace:

- All data set activities
- Volume activities
- A DFSMSrmm EXEC named EDGRPDIS
- Owner activities

Displaying TRACE Options

To display active TRACE options, enter the TRACE command as shown in Figure 8.

Figure 9. Requesting a Display of Active TRACE Options

Figure 10 on page 6 shows the items traced by the command TRACE DATASET VOLUME PDIS OWNER.

- EDGRD* - All data set related processing
- EDGRT* - All volume related processing
- EDGRPDIS - The EDGRPDIS EXEC
- EDGROWNR - All owner related processing
Capturing Log Data to Diagnose Errors

ISPF adds entries to the ISPF log to record when certain functions are called and when TSO commands are issued. You can use information in the ISPF log to diagnose errors in DFSMSrmm.

If the ISPF log is empty, your user profile is not set for logging error data, inter-module trace data, or trace-point trace data. Use the ISPF PARMS application to change your log defaults. Then attempt to re-create the failure.

Steps for Using the TRACE Command and the ISPF Log to Diagnose Errors

This sample procedure describes how to use the TRACE command and the ISPF log to diagnose an error that occurred while DFSMSrmm was processing a volume search request.

1. Ensure that ISPF is logging data by following these steps.
   a. In the ISPF Primary Option Menu, go to Settings.
   b. Click the Log/List action bar to display several choices.
   c. Select Log Data set defaults.
   d. Set the size of the LOG data set’s primary and secondary pages to be 1 or greater. This ensures that you will run with an ISPF log data set.
   e. Exit ISPF.

2. Start DFSMSrmm by using the RMMISPF EXEC. Enter %RMMISPF at the TSO ready prompt.

Figure 10. Sample Trace Settings

DFSMSrmm Current TRACE settings:
EDGRD*
EDGRT*
EDGRPDIS
EDGRWNR
***
3. DFSMSrmm displays the DFSMSrmm primary option menu as shown in Figure 11. Enter the command TRACE VOLUME on the ISPF command line.

4. You know you are done when you see trace messages displayed on your terminal as your request is processing, as shown in Figure 12. Inspect the return codes and reason codes that are displayed, as well as the REXX error messages that are issued when the error occurred, to help you determine the cause of the error.

Steps for Saving the Contents of the Log Data Set

When your request has been processed, use the sample procedure to save the contents of the ISPF log data set for problem determination.

1. After you have entered the ISPF dialog, enter 0 from the Option line on the ISPF Primary Option Menu. The ISPF Settings panel appears.
2. Use the Log/List action bar on the ISPF Settings panel to display several choices.
3. Select 1 to display the Log Data Set Defaults panel.
4. Select 4 (Keep data set and allocate new data set) option on the Log Data Set Defaults panel.
5. You can then save or rename the ISPF LOG data set you have created.
Result: Figure 13 shows an ISPF LOG with DFSMSrmm data.

Keep the ISPF LOG and trace output containing return and reason codes and messages. Refer to this information when contacting your IBM Support Center.

**Obtaining Dumps to Help You Analyze and Diagnose Problems**

This topic describes how to obtain dumps for various situations and use them to diagnose problems in DFSMSrmm.

For information on dump documentation and analysis, refer to:

<table>
<thead>
<tr>
<th>Publication Title</th>
<th>Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>z/OS MVS Diagnosis: Tools and Service Aids</td>
<td>GA22-7589</td>
</tr>
<tr>
<td>z/OS MVS IPCS Commands</td>
<td>SA22-7594</td>
</tr>
<tr>
<td>z/OS MVS IPCS User’s Guide</td>
<td>SA22-7596</td>
</tr>
</tbody>
</table>

**Obtaining Abend Dumps for a DFSMSrmm Utility Error**

If an abend occurs when you are running a DFSMSrmm utility, obtain a dump to help with problem determination. To capture pertinent information, include a SYSUDUMP DD statement in your JCL. For example, this JCL statement routes the dump output to the SYSOUT class specified on the JOB statement:

```
//SYSUDUMP DD SYSOUT=*
```

**Obtaining Abend Dumps for a DFSMSrmm ISPF Dialog Error**

If an abend occurs while you are running the DFSMSrmm ISPF dialog, you can obtain further diagnostic information using these techniques:

- Run with write-to-programmer message turned on in your TSO/E profile. This allows you to see the message identifier and an online symptom dump for error messages issued from components other than the DFSMSrmm ISPF dialog.

  To run with write-to-programmer message turned on in your TSO/E profile, issue the command:

  ```
  TSO PROFILE WTPMSG
  ```

  To turn off the write-to-programmer message in your TSO/E profile, issue the command:

  ```
  TSO PROFILE NOWTPMSG
  ```

- Allocate a SYSUDUMP data set on TSO before invoking the DFSMSrmm ISPF dialog. For example, to dump to a new data set called UDUMP, specify:

  ```
  ALLOC DD(SYSUDUMP) DS(UDUMP) MOD SPACE(5,5) CYLINDERS CATALOG
  ```

**Obtaining Dumps to Analyze DFSMSrmm Waits or Loops**

If the problem you encounter is with a specific user, obtain a supervisor call (SVC) dump of both the user and the DFSMSrmm address spaces.
Finding the Module Name in a Dump

You can use a dump to identify the name of the module in control when a failure occurred.

1. Find the program status word (PSW) in the dump. The instruction address is the last 31 bits of the PSW. In Figure 14, the last 31 bits of the PSW, 000085C4, are the instruction address.

2. Obtain the abend address by subtracting the instruction length code (ILC) from the instruction address.

3. Go to the abend address and scan backward until you find the module name in the comment section or eyecatcher of the dump. The module name is EDG name where EDG is the DFSMSrmm identifier and name is the module name suffix. In Figure 15, the module name is EDGAUD.

If your dump is in one of the system dump data sets, display the titles of the dump data sets to find the dump number.

1. Enter the system command:
   DISPLAY DUMP,TITLE

2. Then enter the system command:
   DISPLAY DUMP,ERRDATA,DSN=xx

where xx is the dump number to display this output as shown in Figure 16 on page 10.
3. Inspect the title to obtain the module name, CSECT name, PSW, and, in some cases the offset.

You can also use IPCS output to obtain the module and offset. In Figure 17, the module name is EDGBKUP and the offset is +0560.

Figure 16. Sample Dump Output

CPU STATUS:
PSW=078C2000 84FD2830 (RUNNING IN PRIMARY, KEY 8, AMODE 31, DAT ON)
DISABLED FOR PER
ASID(X'0407') 04FD2830.  EDGBKUP+0560 IN EXTENDED CSA
ASCB1031 AT FBB380, JOB(DFRMM), FOR THE HOME ASID
ASXB1031 AT 8FE038 FOR THE HOME ASID. NO BLOCK IS DISPATCHED
HOME ASID: 0407 PRIMARY ASID: 0407 SECONDARY ASID: 0407

Figure 17. Sample IPCS Output

Using Messages and Codes to Diagnose DFSMSrmm Errors

DFSMSrmm can issue several types of messages when a problem occurs. Other system components also issue messages that can help you diagnose a problem affecting DFSMSrmm. For example, if you encounter errors while opening a data set, you might see messages with the prefixes IEC or ICH, depending on the component detecting the error, as well as a DFSMSrmm message informing you that the open request failed.

See Appendix C, “DFSMSrmm System and User Completion Codes,” on page 65 for system completion codes and user completion codes issued during DFSMSrmm processing.
DFSMSrmm Message Format

The DFSMSrmm error message is displayed using this format:

EDGcnnnx

where:
- EDG is the DFSMSrmm identifier.
- c is an alphanumeric identifier assigned to a component of DFSMSrmm. The message component identifiers are assigned as follows:

<table>
<thead>
<tr>
<th>C value</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Subsystem initialization</td>
</tr>
<tr>
<td>1</td>
<td>Subsystem interface</td>
</tr>
<tr>
<td>2</td>
<td>Subsystem main task</td>
</tr>
<tr>
<td>3</td>
<td>TSO subcommands</td>
</tr>
<tr>
<td>4</td>
<td>Open/Close/End-of-Volume exits</td>
</tr>
<tr>
<td>5</td>
<td>Report programs</td>
</tr>
<tr>
<td>6</td>
<td>Batch programs and utilities</td>
</tr>
<tr>
<td>7</td>
<td>Conversion programs</td>
</tr>
<tr>
<td>8</td>
<td>DFSMShsm interface</td>
</tr>
<tr>
<td>9</td>
<td>Common routines, such as PARSE</td>
</tr>
</tbody>
</table>

- nnn is a 3 digit message number.
- x indicates the severity of the error. x can be:

<table>
<thead>
<tr>
<th>Severity Identifier</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td><strong>Action</strong>: The operator must perform a specific action.</td>
</tr>
<tr>
<td>D</td>
<td><strong>Decision</strong>: The operator must choose between alternatives.</td>
</tr>
<tr>
<td>E</td>
<td><strong>Eventual action</strong>: The operator must perform an action when time is available.</td>
</tr>
<tr>
<td>I</td>
<td><strong>Informational</strong>: No operator action required. Information for the system programmer.</td>
</tr>
<tr>
<td>S</td>
<td><strong>Severe error</strong>: Information for a system programmer.</td>
</tr>
<tr>
<td>W</td>
<td><strong>Warning</strong>: The system enters a wait state until the operator performs a required action.</td>
</tr>
</tbody>
</table>

Example: This is an example of a message issued by DFSMSrmm.

EDG0103D DFSMSrmm SUBSYSTEM INTERFACE IS INACTIVE - ENTER "IGNORE", "CANCEL" OR "RETRY"

Explanation: During initialization, the subsystem interface was not activated. The operator can reply to ignore the message and continue without tape mount validation and recording, cancel the DFSMSrmm subsystem, or retry subsystem interface initialization.

System action: If the reply is "IGNORE", DFSMSrmm initialization continues. No automatic recording or validation of tapes is performed, but RMM TSO subcommands and other subsystem functions operate. If the reply is "CANCEL", DFSMSrmm ends and no DFSMSrmm subsystem functions are operable. If the reply is "RETRY", subsystem interface initialization is retried.

Operator response: Reply as directed by the installation documentation or the system programmer.

System programmer response: Determine the cause of the initialization failure. Tape volume security and integrity
might be compromised if tape volumes are mounted without DFSMSrmm being active.

**Message Types**

There are several types of messages you can receive that can help you to identify a problem. Check each of these types of messages.

- **Batch messages**
  These messages are in the batch job's SYSMSG output at the beginning of the message file which is produced by the system each time a job is initiated.

- **Batch utility messages**
  These are DFSMSrmm messages that have been directed to a DFSMSrmm message file such as the SYSPRINT or MESSAGE data set.

  **Related Reading:** For information on which message file you should check for diagnostic information, see [z/OS DFSMSrmm Implementation and Customization Guide](#).

- **Console messages**
  These messages are seen on a console by an operator or a terminal user. These are also recorded in the SYSLOG file.

- **DFSMSrmm ISPF dialog messages**
  These messages are issued by ISPF from the DFSMSrmm ISPF dialog and are displayed as short or long messages.
  The DFSMSrmm ISPF dialog message is displayed using this format.

  \[ \text{EDG}fdin \]

  where:
  - EDG is the DFSMSrmm identifier.
  - f is a character selected by DFSMSrmm.
  - id is an ISPF message member identifier.
  - n is a numeric suffix from 0 to 9.

- **SYSLOG messages**
  These are a history of the messages directed to consoles or to the logs on the system for problem determination. The SYSLOG is a data set maintained by the job entry subsystem that can be closed, spooled for printing, or archived as necessary. You can view the SYSLOG online, using a product like Spool Display and Search Facility (SDSF).

---

**Checking for Output in the DFSMSrmm Web Service Log**

If a command issued via the DFSMSrmm Web service results in an error, the formatted error information is returned to you in the returned XML stream. If the DFSMSrmm Web service cannot return the XML stream, the information is written in the file system file, /usr/RmmJApiLogfile. You see this file on your system only if there is a problem with the DFSMSrmm Web service returning the output in an XML stream.

If the DFSMSrmm Web service is found and accessed correctly, but still does not return data, check file, /usr/RmmJApiLogfile, to determine the problem. See Chapter 2, “Eliminating Common Sources of Error,” on page 15 for additional information.
Using the Apache Tomcat Logger

The Apache Tomcat web server has a built-in logger facility. Depending on the log-level, informations, warnings, and errors are logged into a file in the Tomcat installation directory:

$CATALINA_HOME/logs/catalina.YYYY-MM-DD.log


Using the DFSMSrmm CIM logger

The DFSMSrmm CIM logger is a fully-controllable logging facility that uses the Jakarta log4j package. This logger logs events during a CIM request based on your specified severity level. The severity levels are:

- DEBUG
- INFO
- WARNING
- ERROR
- FATAL

The DFSMSrmm CIM logger is designed so that all incoming entries are appended to the log file, even if the CIM provider is stopped and restarted, and no previous entries are overwritten. Also, the DFSMSrmm CIM logger creates a backup file whenever the log file exceeds the limit specified by the keyword, log4j.appender.R.MaxFileSize.

All logger settings for the DFSMSrmm CIM provider are found in the configuration file, rmmlog.properties.

The keywords to use with the DFSMSrmm CIM logger are:

`log4j.rootCategory = threshold level, R`

Specifies the severity level of events that should be logged. Events with a severity level equal to or greater (more severe) than this threshold are logged. Events with a severity level less than this threshold are not logged.

- DEBUG
  This is the lowest logging level. If this is selected, the complete path is logged.

- INFO
  This is the default. If this is selected, successful operations are logged, such as the DFSMSrmm CIM provider is initialized.

- WARNING
  If this is selected, recoverable malfunctions are logged, such as the DFSMSrmm Web service is offline.

- ERROR
  If this is selected, real errors are logged, such as timeout situations from the DFSMSrmm Web service or XML validation errors.

- FATAL
  If this is selected, fatal errors are logged, such as well-formedness errors of the XML response, or if DFSMSrmm terminates with an error message suffix of ‘S’.
R refers to the DFSMSrmm CIM logger name and is referenced in the configuration file. Do not change this.

```log4j.appender.R.File = rmmcim.log
```

Specifies the name of the DFSMSrmm CIM logger file. In this example, `rmmcim.log` is the DFSMSrmm CIM logger name that is located in the project root directory.

```log4j.appender.R = org.apache.log4j.RollingFileAppender
```

This is the default. Logging is done into a file. All incoming entries are appended to the log file, even if the DFSMSrmm CIM provider is stopped and restarted. No previous entries are overwritten. Backup files of this log are created when the defined size is exceeded (see the `log4j.appender.R.MaxFileSize` keyword).

```log4j.appender.R.MaxFileSize = 500KB
```

Specifies the file size threshold before a backup file is created. The backup file is automatically named as the log file, but with the suffix `.1` added. A second backup file is created when the log file exceeds the limit again. Now, the first backup file created is renamed to `xyz.2`, and the second backup file is named, `xyz.1`. Backup files are created as often as specified in the `log4j.appender.R.MaxBackupIndex` keyword.

```log4j.appender.R.MaxBackupIndex = 9
```

Specifies the number of backup files to be created. In this example, the `log4j.appender.R.MaxBackupIndex` keyword equals 9. This means that the 10th attempt for a backup file results in discarding of the 9th backup file (oldest).

At the end of the configuration file, line formatting is defined.

```log4j.appender.R.layout=org.apache.log4j.PatternLayout
log4j.appender.R.layout.ConversionPattern=%d [%-25F:%5L %-20M] %-5p - %m%n
```

These two settings specify the line format for each log entry. You can use the current setting, however, you can also change it to meet your needs. The current format looks like this:

```
<----- Timestamp ------>[<------ File Name ------>]:Line#:<---- Method Name ----->]<Level>- Log Message
```

Do not to confuse the log file, `rmmcim.log`, with the logger configuration file, `rmmlog.properties`, when you delete the log file to start from scratch. The log file, `rmmcim.log`, can be deleted any time and is always rebuilt at the next CIM-provider request. Deletion of the configuration file, `rmmlog.properties`, results in an error.

For additional information on the features and capabilities of the log4j package, go to: [http://logging.apache.org/log4j/docs/documentation.html](http://logging.apache.org/log4j/docs/documentation.html)
Chapter 2. Eliminating Common Sources of Error

This topic provides suggestions to help you eliminate common sources of error you might encounter while using DFSMSrmm.

- “When You Want to Remove Virtual Volumes And VTS Library is No Longer Available”
- “When DFSMSrmm Messages Do Not Appear”
- “When Inventory Management Fails’ on page 16
- “When Response Time is Too Long” on page 16
- “When You Run Out of Scratch Volumes” on page 17
- “When Volumes Expire Prematurely” on page 21
- “When Volumes Move to the Wrong Storage Location” on page 21
- “When Volumes Do Not Move to Storage Locations’ on page 23
- “When You Lose a Volume” on page 23
- “When Users Are Not Notified Automatically” on page 24
- “When Errors Occur in the DFSMSrmm Control Data Set’ on page 24
- “When There is Not Enough Available Storage to List All the Volumes” on page 25
- “When There is Not Enough Available Storage to List All the Volumes with the DFSMSrmm Web Service’ on page 26
- “When the DFSMSrmm WebSphere Web Service Does Not Respond” on page 27
- “When the DFSMSrmm Tomcat Web Service Does Not Respond” on page 28
- “When The DFSMSrmm CIM Provider Does Not Return Output” on page 29
- “When an SMI-S Client Cannot Correctly Process Entries of Tape Libraries from the DFSMSrmm CIM Agent” on page 30
- “When Common System Abends Occur” on page 31

If you cannot resolve a problem, see Chapter 5, “Building a Keyword String,” on page 43 for instructions on building a keyword string that you can use to search the IBM Software Support database.

When You Want to Remove Virtual Volumes And VTS Library is No Longer Available

When you want to delete the DFSMSrmm entries for logical volumes that have been deleted from the TCDB, or the VTS library is no longer available, use the NOEJECT operand. Using the NOEJECT operand leaves the library and TCDB alone and only deletes the volume record from the DFSMSrmm control data set. If you attempt to delete the entries with RMM DV FORCE, you receive a message that the VOLCAT could not be updated.

```
RMM DV xxxxxx FORCE NOEJECT
```

Figure 18. Using the NOEJECT operand

Note: If you do not specify NOEJECT, the DELETEVOLUME commands fails because the volume is no longer defined in the TCDB.

When DFSMSrmm Messages Do Not Appear

If you have customized the DFSMSrmm messages table, check the message table to make sure that your changes do not prevent messages from being issued.

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Related Reading: For information about customizing messages to help you determine where an error might have occurred, see the z/OS DFSMSrmm Implementation and Customization Guide.

When Inventory Management Fails

If you are experiencing problems during inventory management, you can perform one of these tasks:

- Determine if the data sets used by inventory management are Resource Access Control Facility (RACF, a component of the Security Server for z/OS) protected. If so, ensure that the RACF user ID that runs inventory management has the authority to write to the data sets.

- Preallocate data sets as described in the z/OS DFSMSrmm Implementation and Customization Guide before you use the inventory management functions. For example, if you want to obtain an extract report and retain messages issued during inventory management, you must preallocate a REPTEXT file and a MESSAGE file, used in the sample JCL for EDGHSKP in Figure 19 EDGJHKPA Sample JCL for Allocating the Data Sets Required for Inventory Management is a DFSMSrmm sample provided in SAMPLIB and can be used as an example to preallocate a REPTEXT file and a MESSAGE file.

```
//HSKP EXEC PGM=EDGHSKP,PARM='RPTEXT'
//SYSPRINT DD SYSOUT=*  
//MESSAGE DD DSN=DFSMSRMM.MESSAGE.DATASET,DISP=SHR  
//REPTEXT DD DSN=DFSMSRMM.EXTRACT.DATASET,DISP=SHR
```

Figure 19. Sample JCL for EDGHSKP

- Check the system log for error messages when the job message log or DFSMSrmm MESSAGE file does not contain enough information to identify the error. Because DFSMSrmm inventory management runs in the DFSMSrmm subsystem address space, error messages might have been written to the system log.

- Check if you are using the OPTION command operands: VRSDROP, VRSMIN, VRSRETAIN, or EXPDITDROP with the action of FAIL. If so, inventory management processing stops, if the appropriate limit was triggered. The EDG2310I message and other messages in the DFSMSrmm MESSAGE file will show details in this case.

When Response Time is Too Long

If you experience long DFSMSrmm command response time when DFSMSrmm is performing a search, check the MAXHOLD operand in PARMLIB member EDGRMMxx. The MAXHOLD operand defines the number of records the subsystem scans while holding a reserve on the DFSMSrmm control data set.

Recommendation: Use the default MAXHOLD value described in z/OS DFSMSrmm Implementation and Customization Guide.

It might take DFSMSrmm longer to respond when you issue DFSMSrmm subcommands if DFSMSrmm inventory management is in process, or if the DFSMSrmm control data set is being backed up. You can minimize impact on your users by scheduling inventory management processing during non-peak hours.
When You Run Out of Scratch Volumes

If you are running out of scratch volumes, you can perform any of these tasks to solve the problem:

- Check the default retention period and other retention periods set for volumes. If it is too high, change the retention period to make volumes available for reuse sooner. Check your vital record specifications to make sure that the retention policies you have defined are acceptable. Change your retention policies as needed.

- DFSMSrmm does not make volumes available until you have confirmed that release actions have taken place. If the release actions are not confirmed, DFSMSrmm does not process volumes.

Create a list of all volumes that are pending release by issuing this RMM SEARCHVOLUME subcommand.

```
RMM SEARCHVOLUME VOLUME(*) LIMIT(*) STATUS(RELEASE) OWNER(*) ACTION(INIT, ERASE, REPLACE, NOTIFY)
```

Perform the release actions as required and confirm to DFSMSrmm that the actions have taken place. If the NOTIFY action is outstanding that action must be confirmed before any others can be processed. Volumes that have no pending release actions or just the SCRATCH release action can be released in a single run of expiration processing.

Do not confirm the SCRATCH release action unless the volumes are in a VLPOLL with the AUTOSCRATCH(NO) attribute, otherwise TCDB, catalog and RACF updates will be skipped by DFSMSrmm.

- Check that volumes residing in system-managed tape libraries are returning to scratch status in a timely manner. "Changing Actions for Volumes in System-Managed Tape Libraries" on page 21 provides information about returning volumes in system-managed tape libraries to scratch status.

- Confirm that volumes were returned from loan locations. DFSMSrmm does not automatically manage the movement of these volumes. Use the DFSMSrmm ISPF dialog or the RMM CHANGEVOLUME TSO subcommand to clear the LOANLOCATION field. Use the RMM SEARCHVOLUME TSO subcommand with the LOANLOC operand to create a list of volumes in loan locations.

- List your vital record specifications, using the DFSMSrmm ISPF dialog or the RMM LISTVRS TSO subcommand, and delete any unnecessary vital record specifications.

- Check your installation's requirements for scratch volumes. Add more volumes, if needed, to your inventory to satisfy the demand.

- To quickly return a subset of volumes to scratch status you can use the EXPROC SYIN command with the EXPROC parameter of the EDGHSKP utility. For example, if a particular library is low on scratch volumes, you can run EXPROC just for volumes in that location.

Obtaining Volume Information

To determine if a volume has returned to scratch status, obtain volume information using the DFSMSrmm ISPF dialog or DFSMSrmm TSO subcommands. For example, to request information for the encrypted volume with serial number JJC024, issue the command:

```
RMM LISTVOLUME JJC024 ALL
```

Figure 20 on page 18 shows the type of volume information that DFSMSrmm displays.
Checking Volume Status

Check the Status field in the volume information as shown in Figure 20. If the Status field is scratch, then DFSMSrmm has released the volume and returned it to scratch status.
Checking Volume Availability
Check the Availability field as shown in Figure 20 on page 18.

If Availability Field is Blank:

- Check when the DFSMSrmm EDGHSKP inventory management utility was last run. For volumes managed by the VRSEL retention method, DFSMSrmm does not mark a volume pending release if the last change date is more recent than the time of the last VRSEL processing. The last change date might have changed for one of these reasons.
  - The volume is used or updated outside of EDGHSKP processing
  - A move is confirmed since the last VRSEL processing

- Check the volume expiration date, the volume retention method, and if you have specified that DFSMSrmm should ignore the expiration date for the volume. Look at the volume Action on Release: Expiry date ignore setting. If the expiration date is not ignored based on the retention policies you defined, DFSMSrmm keeps the volume until the expiration date is reached, even though the volume is no longer covered by a vital record specification.

  The default expiration date set by DFSMSrmm is the creation date plus the EDGRMMxx PARMLIB member RETPD value. You can override the default by using the RMM CHANGEVOLUME subcommand with the EXPDT or RETPD operands.

  A very common error occurs when you are using expiration dates that have special meaning. Examples of these dates include EXPDT=99000 and EXPDT=98001. DFSMSrmm requires the use of the DFSMSrmm EDG_EXIT100 exit to clear the expiration date field in the JFCB (JFCBXPDT) and assign a vital record specification management value for these dates. With the DFSMSrmm EDG_EXIT100 exit, the volume expiration date is set to the creation date plus the EDGRMMxx parmlib member RETPD operand value. If EDG_EXIT100 does not clear JFCBXPDT, the EXPDT date is passed to DFSMSrmm. DFSMSrmm translates EXPDT=99000 to an expiration date of 1999/000, which causes DFSMSrmm to consider the volume to be already expired. The same result occurs if EXPDT=98001 is used. To avoid premature expiration of volumes, check the EDG_EXIT100 exit to ensure that it correctly clears the expiration date field. If you did not intend to use an expiration date that has a special meaning, use the RMM CHANGEVOLUME subcommand to specify the correct expiration date.

  When the RETAINBY(SET) option is used for VRSEL managed volumes, a volume that is not VRS retained and whose volume expiration date has been reached can be retained because another volume in the set is still required to be retained.

  You can use the DFSMSrmm dialog to view the vital record status for volumes and data sets. Volume search results lists include ‘VRS’ in the status column and set retention state in the ‘S R’ column. Data set search results lists show the vital record state in the ‘V R’ column. Select/display the data set details to view the matching VRS information and the VRS retention date. Move the cursor to the ‘VRS name’ and press enter to see a list of the VRSes, enabling you to look at the matching VRS details. You can also use the RMM LISTDATASET command or the Vital Records Retention Report produced by EDGHSKP VRSEL processing to determine which data set and vital record specification are involved.

Related Reading: For information on the EDGUX100 exit, see [z/OS DFSMSrmm Implementation and Customization Guide](#).
If the Value Vital Record is Displayed in the Availability Field: The volume has not been returned to scratch because a data set on the volume is still retained by a vital record specification. A volume with multiple data sets can be covered by more than one vital record specification.

If the Value Pending Release is Displayed in the Availability Field:
1. Check the Actions pending field for any actions marked Y. DFSMSrmm cannot return the volume to scratch status until all other release actions have been completed.
2. Check the Store Information Intransit field. If Intransit is Y, the volume is moving from one location to another. The volume must return to a library location or its home location before DFSMSrmm can return the volume to scratch status.
3. Use the RMM CHANGEVOLUME CONFIRMMOVE command when the pending volume move has been completed.
4. Run DFSMSrmm inventory management to complete the volume's move to its home location.

If Intransit is N, the destination field is blank and the volume is in a library location or its home location, then the volume should return to scratch during the next EDGHSKP EXPROC processing.

If Intransit is N, and the volume that is in an automated tape library dataserver and has a destination to a location outside the automated tape library dataserver, you can either cancel the move, or eject the volume and confirm the movement.

If the volume is system-managed, DFSMSrmm will not change the status of the volume from master to scratch if the update to the TCDB fails. The system running inventory management processing must have access to the TCDB. Check for error messages in the DFSMSrmm MESSAGE file.

If your installation uses the DFSMSrmm EDG_EXIT200 exit, check this exit because it could prevent the volume from returning to scratch. You can determine whether there is any active exit for EDG_EXIT200 by checking the messages in the MESSAGE file.

If the Value Open is Displayed in the Availability Field: When the volume retention method is VRSEL, a data set on the volume might have been open during vital record processing. DFSMSrmm retains the volume under the OPEN vital record specification or to a vital record specification that matches the data set name mask. The data set might have been open because a job was in progress or it was left open because the job failed.

For information on determining the status of the volume, see "If the Value Vital Record is Displayed in the Availability Field" and "If Availability Field is Blank" on page 19.

If the Value On Loan is Displayed in the Availability Field: The volume is in a loan location and cannot be returned to scratch status until it returns to its home location.
Changing Actions for Volumes in System-Managed Tape Libraries

DFSMSrmm allows you to return volumes to scratch status in any library location or in the volume’s home location, as long as the volumes are not to be moved. If you have volumes that are in a system-managed tape library that are marked to be moved, you can return the volume to scratch status without moving the volume. For these volumes that reside in a system-managed tape library, cancel the move.

1. To identify volumes in a system-managed tape library that must be moved before returning to scratch status, issue the command:
   
   ```
   RMM SEARCHVOLUME VOLUME(*) LIMIT(*) LOCATION(ATL1) -
   STATUS(RELEASE) DESTINATION(*) OWNER(*)
   ```

2. To cancel the volume move and change the home location, issue the command:

   ```
   RMM CHANGEVOLUME volser LOCATION(ATL1)
   ```

3. Run expiration processing to return the volumes to scratch status. You cannot return volumes in loan locations directly to scratch.

**Related Reading:** For information about returning volumes to scratch status, see [z/OS DFSMSrmm Implementation and Customization Guide](#).

When Volumes Expire Prematurely

If your volumes are expiring and being returned to scratch status sooner than you expect, perform these tasks.

- Ensure that the default retention period is not too low.
- Ensure that vital record specifications are correctly specified and that you have defined all necessary ones.
- List the data sets and the vital record specifications that DFSMSrmm matches to the data sets.

**Recommendation:** You might have to define additional vital record specifications with more specific data set names to ensure that the volumes are correctly retained.

Create an ACTIVITY report using the EDGHSKP utility to determine why a data set is not retained by a vital record specification. If you cannot resolve the problem after checking the retention period and vital record specifications, run the EDGAUD utility to produce a report on the history of volume movement.

**Related Reading:** For information about the ACTIVITY report and how to obtain an audit trail report using EDGAUD, see [z/OS DFSMSrmm Reporting](#).

When Volumes Move to the Wrong Storage Location

Use Table 3 to determine why DFSMSrmm applied a vital record specification to a data set.

<table>
<thead>
<tr>
<th>Order (OLD) (NEW)</th>
<th>Description</th>
<th>Command Example</th>
</tr>
</thead>
</table>
| 1 1              | A reserved name, ABEND, DELETED, or OPEN, matches a data set before any other data set mask. | ```
RMM ADDVRS DSNAMES('ABEND') -
LASTREFERENCEDAYS COUNT(1)
RMM ADDVRS DSNAMES('OPEN') -
LASTREFERENCEDAYS COUNT(2)``` |
<table>
<thead>
<tr>
<th>Order (OLD) (NEW)</th>
<th>Description</th>
<th>Command Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 7</td>
<td>A management class name matches the management class value after ABEND, DELETED, or OPEN and before any other data set mask. The management class value is set using the RMM EDGUX100 installation exit and matches management calls names set using ACS routines.</td>
<td>RMM ADDVRS DSNAME('M99000') WHILECATALOG</td>
</tr>
<tr>
<td>3 2</td>
<td>A fully qualified data set name matches a data set name before any mask containing %, ¬, or *.</td>
<td>RMM ADDVRS DSNAME('PRITCHAR.BACKUP.DATA')</td>
</tr>
<tr>
<td>4 3</td>
<td>Any data set name mask that includes a % or a ¬ matches a data set name before masks containing an *, % and ¬ are treated equally.</td>
<td>RMM ADDVRS DSNAME('PRITCHAR.%.DATA') RMM ADDVRS DSNAME('PRITCHAR.¬.DATA')</td>
</tr>
<tr>
<td>5 4</td>
<td>Any data set name mask that includes single *'s preceded or followed by any character is the next best match.</td>
<td>RMM ADDVRS DSNAME('PRITCHAR.¬.DATA')</td>
</tr>
<tr>
<td>6 5</td>
<td>Any data set name mask that includes an * is the next best match.</td>
<td>RMM ADDVRS DSNAME('PRITCHAR.*.DATA')</td>
</tr>
<tr>
<td>7 6</td>
<td>A data set name mask that includes ** anywhere in the mask is the next best match. When matching the data set mask to the data set name, the mask where the non-generic characters occur earlier in the mask is most specific.</td>
<td>RMM ADDVRS DSNAME('PRITCHAR.<strong>') RMM ADDVRS DSNAME('</strong>.PRITCHAR') RMM ADDVRS DSNAME('*.**')</td>
</tr>
<tr>
<td>8 8</td>
<td>A vital record specification management value set by using the DFSMSrmm EDGUX100 exit.</td>
<td>RMM ADDVRS DSNAME('D99000') WHILECATALOG</td>
</tr>
<tr>
<td>9 9</td>
<td>A data set name mask of ** indicates the policy applies to all data sets not managed by any other vital record specification.</td>
<td>RMM ADDVRS DSNAME('**')</td>
</tr>
</tbody>
</table>

If volumes are moving to the wrong storage location, check the vital record specifications that you have defined. For example, if you expected volumes to move to the LOCAL storage location, but DFSMSrmm moves them to the REMOTE storage location, check these conditions:

- A vital record specification was defined with the wrong location. For example, LOCATION(LOCAL) is specified with the RMM ADDVRS subcommand instead of LOCATION(REMOTE).
- More than one vital record specification was defined for a volume or a data set. Use the EDGHSKP VRSEL report in the REPORT file, the DFSMSrmm ISPF dialog, or the RMM LISTDATASET subcommand to identify the vital record specification that is retaining a data set.

Possible solutions include:
- Deleting a matching vital record specification so a less specific vital record specification is used
- Changing LOCDEF priority so that one vital record specification is dominant and is used before others

To resolve any movement conflicts that arise when a volume matches more than one vital record specification, DFSMSrmm uses the location priority value. Priority values are purely relative and do not have any further significance. If there are two or more vital record specifications with conflicting move requirements that apply to a volume, DFSMSrmm uses the location priority to resolve any conflict. The lower priority numbers take precedence. For example, a volume would move to a location with a priority value 100 before moving to a location with a priority value of 200.
You can set a priority value with the PRIORITY operand of the LOCDEF command to define the relative importance of locations.

You can define the PRIORITY operand on RMM ADDVRS subcommand to override default or assigned priorities at the data set level. When you do not set a priority value, DFSMSrmm uses the priority shown in Table 4.

### Table 4. DFSMSrmm Movement Priority Default Values

<table>
<thead>
<tr>
<th>Priority Number</th>
<th>Location Name or Location Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>REMOTE DFSMSrmm built-in storage location name</td>
</tr>
<tr>
<td>200</td>
<td>DISTANT DFSMSrmm built-in storage location name</td>
</tr>
<tr>
<td>300</td>
<td>LOCAL DFSMSrmm built-in storage location</td>
</tr>
<tr>
<td>2000</td>
<td>Installation defined storage locations</td>
</tr>
<tr>
<td>4800</td>
<td>AUTO automated tape libraries</td>
</tr>
<tr>
<td>4900</td>
<td>MANUAL manual tape libraries</td>
</tr>
<tr>
<td>5000</td>
<td>SHELF location name</td>
</tr>
</tbody>
</table>

Use the RMM LISTVRS subcommand to list the details for vital record specifications that need to be changed. If volumes have already moved to incorrect locations, delete the existing vital record specification and add a vital record specification that contains the correct location information.

**Related Reading:** For information on using the RMM DELETEVRS TSO subcommand and the RMM ADDVRS TSO subcommand to make the changes, see [z/OS DFSMSrmm Managing and Using Removable Media](../z/OS%20DFSMSrmm%20Managing%20and%20Using%20Removable%20Media).

### When Volumes Do Not Move to Storage Locations

If volumes are not moving to the storage locations, follow these recommendations:

- Define vital record specifications for the data set or volume.
- Check for the LOCATION(HOME) operand value on the RMM ADDVRS subcommand. The volume is returned to a shelf location, automated tape library, or manual tape library based on the operand value.
- Use the DFSMSrmm ISPF dialog or RMM ADDRACK subcommand to add them. There could be insufficient shelf locations defined in the storage location.  
  ```  
  RMM ADDRACK * COUNT(1000) LOCATION(REMOTE)  
  ``

You can also check the inventory management MESSAGE file for messages indicating that there is a shortage of empty bins in a storage location.

### When You Lose a Volume

If you physically lose a volume or remove a volume from the DFSMSrmm control data set by using the wrong command, use the utility EDGAUD to create an audit trail report. The report shows the locations where a volume has been moved and its last known location. The report also identifies the user ID that issued a command that might have changed the status of the volume.

**Related Reading:** For information on how to obtain an audit trail report using EDGAUD, see [z/OS DFSMSrmm Reporting](../z/OS%20DFSMSrmm%20Reporting).
When Users Are Not Notified Automatically

If users are not being notified when their volumes have reached their expiration date, ensure that these tasks were completed.

- You specified NOTIFY(Y) in the EDGRMMxx PARMLIB member.
- You specified owner information that contains a valid user ID and node name, or a valid Internet e-mail address.
- If you specified an Internet e-mail address, you must have an SMTP server configured and started. The default SMTP server is SMTP on the current JES node. To configure any other SMTP server for use, refer to the ADDOWNER command for the restricted owner called 'SMTP'. This can be found in DFSMSrmm Managing and Using Removable Media.
- You specified Notify Owner as a release action.
- You are running DFSMSrmm under the JES2 or JES3 subsystem and not the master subsystem.

Related Reading: For information on how to set up notification to users, see the z/OS DFSMSrmm Implementation and Customization Guide.

When Errors Occur in the DFSMSrmm Control Data Set

If you are running multiple z/OS systems and sharing the control data set and journal, ensure that you have specified a unique SYSID for each system.

If you suspect that there is an error in the DFSMSrmm control data set, you can use the DFSMSrmm EDGUTIL utility to verify the contents of the DFSMSrmm control data set. Then use the DFSMSrmm ISPF dialog or the RMM TSO subcommands to correct the control data set. To find and correct errors in the control data set, perform these steps:

1. Run the utility EDGUTIL with the VERIFY parameter to check the contents of the control data set. For example, EDGUTIL checks to see that a volume is associated with a rack number and that the rack number exists. If the rack number does not exist, then EDGUTIL writes a message to the SYSPRINT data set.
2. Inspect the SYSPRINT data set to determine which records you need to correct.
3. Correct DFSMSrmm control data set records using the RMM TSO subcommands by deleting incorrect information and adding correct information.

Related Reading: For information on the RMM TSO subcommands, see DFSMSrmm Managing and Using Removable Media.

For example, if the EDGUTIL utility detects that a volume resides in a rack number but the rack number does not exist, you can follow these steps to correct the problem.

1. Use the RMM SEARCHDATASET subcommand with the CLIST operand to create a list of data sets.
   ```
   RMM SEARCHDATASET VOLUME(volser) CLIST('RMM LISTDATASET ')
   ```
   Save the output from the request to use when you issue the RMM ADDDATASET subcommands as described in step 5 on page 25.
2. Use the RMM DELETEMAIL subcommand to remove the volume from DFSMSrmm. Use the REMOVE operand to delete a scratch volume from the
control data set. Use the RMM DELTEVOLUME subcommand with the
FORCE operand to delete a master volume from the control data set.
You can also change volume information by using the RMM
CHANGEVOLUME FORCE command. To use the FORCE operand, you must
have CONTROL access to STGADMIN.EDG.MASTER security resource and
UPDATE access to STGADMIN.EDG.FORCE security resource.
3. Before adding the volume to DFSMSrmm, use the RMM ADDRACK
subcommand to add the rack number.
4. Use the RMM ADDVOLUME subcommand to add the volume to the
DFSMSrmm control data set with the correct rack number.
5. If the volume had any data sets on it, you should issue one RMM
ADDDATASET subcommand for each data set.

If you still have a problem with your control data set, report the problem and all
the messages produced by EDGUTIL to the IBM Support Center.

You can also restore your DFSMSrmm control data set with a backup copy of the
control data set and journal.

Related Reading: Before attempting the restore, see z/OS DFSMSrmm
Implementation and Customization Guide.

When There is Not Enough Available Storage to List All the Volumes

When you request information using the DFSMSrmm commands using REXX
EXECs or using the DFSMSrmm ISPF dialog, there might not be enough storage
available to list all the volumes that match your criteria. This problem can occur
when you use any SEARCH command, but is most likely to occur when you use
the RMM SEARCHVOLUME subcommand.

For example, if you want to obtain information about all the volumes in MASTER
status for any owner, issue this command to obtain a list of volumes:
RMM SEARCHVOLUME VOLUME(*) LIMIT(*) STATUS(MASTER) OWNER(*)
You can also use the SEARCHVOLUME dialog to obtain the information. If you issued the request using the DFSMSrmm ISPF dialog, DFSMSrmm issues the message:
"More volumes may exist".

When you press PF1 for more help, DFSMSrmm issues the message:
"There is not enough storage available to list all the volumes".

In this example, DFSMSrmm cannot list all the volumes and issues return code 4 and reason code 10 due to a TSO restriction resulting from the use of storage below 16 MB. The actual number of records that DFSMSrmm returns is dependent on the amount of storage that is available to TSO for storing REXX variables and maintaining the index of variables. You can use the VARSTORAGE(HIGH) option of the TSO PROFILE to enable TSO to use storage above 16MB. Although this option does allow more storage to be used, and DFSMSrmm does still attempt to handle out-of-storage conditions, when you issue the RMM SEARCH subcommands and very large lists are required, you may encounter various storage related problems. For additional information about the TSO PROFILE VARSTORAGE option, see [z/OS TSO/E Command Reference](#).

If you experience this situation, you can issue RMM SEARCH requests using the CONTINUE operand with the LIMIT operand set to a number that keeps the number of returned resources within the storage restriction. After you issue the first request, issue another request to obtain the next set of resources using the returned continue information, staying within the storage limits. For example, you can obtain the next range by noting the continue information returned. Then issue a new SEARCH request, specifying CONTINUE(continue_information).

For the first command specify you want to continue:
```
RMM SEARCHVOLUME VOLUME(*) CONTINUE STATUS(MASTER) OWNER(*)
```

then note the continue_information and issue the next command:
```
RMM SEARCHVOLUME VOLUME(*) CONTINUE(continue_information) STATUS(MASTER) OWNER(*)
```

Repeat this until all volumes are returned.

**Related Reading:** For information about using the RMM TSO subcommands and the DFSMSrmm ISPF dialog, see [z/OS DFSMSrmm Managing and Using Removable Media](#).

---

### When There is Not Enough Available Storage to List All the Volumes with the DFSMSrmm Web Service

Your storage limit depends on your environment. If you exceed the storage capabilities of your environment, you see an OutOfMemory Exception. The amount of data returned by the DFSMSrmm Web service is limited to one Megabyte (1MB). This is the default. If this storage limit is reached, you see this information in the returned XML stream:

```
<INFO>
<RTNC>4</RTNC>
<RSNC>10</RSNC>
<MSGT>EDG3921I INSUFFICIENT STORAGE FOR SEARCH PROCESSING </MSGT>
</INFO>
```

If you reach this storage limit, you can either:
• Change the issued command to return less data. For example, issue `sv owner(a*)` instead of `sv owner(*)`.
• Raise the storage limit, if your environment allows it. To do this, set the system property, RMM_XML_MAX_SIZE, to overwrite the default of 1MB.

For Websphere:

The system property, RMM_XML_MAX_SIZE, is defined in the Java Virtual Machine (JVM) settings on your Websphere Application Server. In WebSphere Application Server for z/OS, Version 5.0.2, the JVM settings are found under Servers -> Application Servers -> your server name -> Process Definition -> Servant -> Java Virtual Machine -> Custom Properties. Enter the name, RMM_XML_MAX_SIZE, and the value, 2000000, to set the limit to 2 MB. If you are running a different version of WebSphere Application Server for z/OS and cannot find the JVM settings, use the Help function to determine the procedure to change your server's JVM settings.

For Tomcat:

To change the variable RMM_XML_MAX_SIZE to 2MB in a Tomcat environment, issue this before Tomcat is started:

```bash
export JAVA_OPTS='-D RMM_XML_MAX_SIZE=2000000'
```

When the DFSMSrmm WebSphere Web Service Does Not Respond

If your client application does not receive valid DFSMSrmm data from the DFSMSrmm Web service, do these steps:
• Ensure that the DFSMSrmm Web service is correctly installed and started on your WebSphere Application Server (WAS).
• Ensure that the correct TCP/IP address for your WebSphere Application Server is specified in your client application.
• Check that your application can communicate with the DFSMSrmm Web service using the debug method available in the DFSMSrmm Web service. To do this, add this method to your client code:

```java
public synchronized java.lang.String runCommandXml() throws Exception {
    String targetObjectURI = "urn:RmmJApi";
    String SOAPActionURI = "";
    if(getURL() == null) {
        throw new SOAPException(Constants.FAULT_CODE_CLIENT,
            "A URL must be specified via RmmJApiProxy.setEndPoint(URL)." );
    }
    call.setMethodName("runCommandXml");
    call.setEncodingStyleURI( Constants.NS_URI_SOAP_ENC );
    call.setTargetObjectURI(targetObjectURI);
    Vector params = new Vector();
    call.setParams(params);
    Response resp = call.invoke( getURL(), SOAPActionURI);
    if (resp.generatedFault()) {
        Fault fault = resp.getFault();
        call.setFullTargetObjectURI( targetObjectURI );
        throw new SOAPException( fault.getFaultCode(), fault.getFaultString() );
    } else {
    }
}
```
Parameter refValue = resp.getReturnValue();
return ((java.lang.String)refValue.getValue());
}

Now, you can call the method, runCommandXml(), without passing a command string.
If the DFSMSrmm Web service is found, the current date and time is returned in string format. If you do not get a response, the DFSMSrmm Web service is not available at the specified TCP/IP address.

- If you can communicate with the DFSMSrmm Web service, but you cannot receive DFSMSrmm data, ensure that the Java part of the DFSMSrmm Web service finds the C++ DLL, which is needed to access DFSMSrmm. To do this, use the debug method available in the DFSMSrmm Web service by adding this method to your client code:

public synchronized int returnInt() throws Exception
{
    String targetObjectURI = "urn:RmmJApi";
    String SOAPActionURI = "";

    if(getURL() == null)
    {
        throw new SOAPException(Constants.FAULT_CODE_CLIENT, "A URL must be specified via RmmJApiProxy.setEndPoint(URL).");
    }

    call.setMethodName("returnInt");
    call.setEncodingStyleURI(Constants.NS_URI_SOAP_ENC);
    call.setTargetObjectURI(targetObjectURI);
    Vector params = new Vector();
    call.setParams(params);
    Response resp = call.invoke(getURL(), SOAPActionURI);

    if (resp.generatedFault())
    {
        Fault fault = resp.getFault();
        call.setFullTargetObjectURI(targetObjectURI);
        throw new SOAPException(fault.getFaultCode(), fault.getFaultString());
    }
    else
    {
        Parameter refValue = resp.getReturnValue();
        return ((java.lang.Integer)refValue.getValue()).intValue();
    }
}

Now, you can call the method, returnInt(). If the C++ DLL is found, the current release level is returned as an integer (currently '110').
If you do not get this response, the DFSMSrmm Web service has not found the required C++ DLL. To correct this, do these steps:
- Ensure that the part, EDGXHCLL, is available in the dataset, SYS1.SIEALNKE.
- Ensure that the required link is installed in the WebSphere Application Server library path. If the link is not there, you must create it. To create the link, state "ln -e EDGXHCLL libEDGXHCLL.so" in the WebSphere Application Server library path.

When the DFSMSrmm Tomcat Web Service Does Not Respond

When the DFSMSrmm Tomcat web service does not respond:
• Ensure the environmental variable CATALINA_HOME is set to the Tomcat installation directory.
• Ensure the web service is properly deployed to the Tomcat installation directory: $CATALINA_HOME/webapps. After the first start of the service, the sub-directory $CATALINA_HOME/webapps/RmmWebService must have been created.
• The server must be started. You can check this by opening its start page (http://tomcat_domain_name:8080) in your browser. If it's not yet started, invoke: $CATALINA_HOME/bin/startup.sh from the OMVS shell.
• Ensure you have implemented one of the security schemes, as described in the Tomcat readme file:

/usr/lpp/dfsms/rmm/rmmtc.txt

You will get an "Unauthorized" message, if you attempt to issue methods against the web service with unauthorized user credentials. To access the "Tomcat Manager" page from your browser, you need to setup a "manager" role. The userid, that requests that page, must be mapped to this role.
• The TSO userid, from where the Tomcat server is started, must have appropriate RMM authorizations, set in SAF/RACF, in order to get data from RMM.
• To test the network connectivity, without requesting data from RMM, you can use the Java sample client in debug mode (-d option). Please refer to the web service readme file:

/usr/lpp/dfsms/rmm/rrmwebs.txt

to see how to invoke the sample client in debug mode.
• Ensure this external link is set somewhere in the LIBPATH:

ln -e EDGXHCLL libEDGXHCLL.so

---

**When The DFSMSrmm CIM Provider Does Not Return Output**

If you request DFSMSrmm data from a CIM client and no data is returned, check these items:
• If message BPXP015I HFS PROGRAM /bin/printenv IS NOT MARKED PROGRAM CONTROLLED appears on your z/OS console, set the program control flag ON by issuing this command from the OMVS shell:

extattr +p /bin/printenv

If the CIM provider uses the DFSMSrmm Web service API:
• Ensure that the DFSMSrmm Web service is up and running. Having the DFSMSrmm Web service up and running is required in order for the DFSMSrmm CIM provider to work.
• If the DFSMSrmm CIM provider does not show data, start a DFSMSrmm Web service client. Collect data from the DFSMSrmm Web service client to ensure that the underlying DFSMSrmm Web service is working correctly.
• When using the WebSphere Application server, ensure that the DFSMSrmm Web service default user ID has the sufficient RACF authorizations needed to access DFSMSrmm.
• When using Tomcat, ensure that the user credentials, provided in rmmcust.properties as TOMCAT_USER_NAME and TOMCAT_USER_PASSWORD, are set correctly and authorized to use the Tomcat server (see Tomcat readme file rmmtc.txt).
• If the DFSMSrmm Web service is working correctly, open the options file, rmmcust.properties, and check these settings:
  – Timeout value. Ensure that the timeout value is not too low. A slow network connection or a large data request can cause the DFSMSrmm Web service to time-out. For example, the WEB_SERVICE_TIMEOUT = 10000 setting allows 10 seconds (10 000 milliseconds) to wait.
  – If your DFSMSrmm Web service destination URLs are stored in the option file, WEB_SERVICE_REGISTRY = FILE, ensure that your WEB_SERVICE_LOCATIONS points to valid URLs for your Web servers. Ensure that this line is not commented out (// at the beginning of the line).
  – If your DFSMSrmm Web service is published in a UDDI, WEB_SERVICE_REGISTRY = UDDI, ensure that the UDDI registry URLs are correct for UDDI_INQUIRY_URL. The Web services need to be published to the registry, and the registry must be up and running. The UDDI search string, UDDI_SEARCH_STRING, must match the published names of your Web services. The names must start with that string and are case-sensitive.
  – Ensure that the operands, as specified in the appropriate instance of class IBMrmm_SearchOperands, do not limit your search requests. For example, defining the instance IBMrmm_SearchOperands, Resource="IBMrmm_PhysicalVolume" Operands="Owner(*) Volume(A*) Limit(100)", limits a subsequent search of IBMrmm_PhysicalVolume objects to those that start with an "A" in their volser.
  – If the data is behind a firewall, make sure that you have logged in before connecting the DFSMSrmm Web service.
  – Finally, open the DFSMSrmm CIM provider log, rmmcim.log, for additional information. See “Using the DFSMSrmm CIM logger” on page 13 for additional information on working with the DFSMSrmm CIM logger.

If the CIM provider uses the direct HLL API (WEB_SERVICE_REGISTRY = NONE):
• Ensure that this symbolic link is set within the $LIBPATH of OMVS:
  ln -s EDGXHCLL 11/EDGXHCLL.so
• Ensure rmmjapi.jar is added to your CLASSPATH variable.

Refer to rmmcim.txt for additional troubleshooting hints. You might also want to start the CIM server with tracing ON to obtain more debugging information. See the CIM server documentation on how to enable the trace mode.

---

When an SMI-S Client Cannot Correctly Process Entries of Tape Libraries from the DFSMSrmm CIM Agent

If you request either DFSMSrmm tape libraries or their contents from a SMI-S CIM client and no data is returned, check these items:
• SLP registration should be initiated. While building the OpenPegasus package on your own, ensure the PEGASUS_ENABLE_SLP environment variable is set to true. On z/OS, the following console message should accompany the start of cimserver:
  CFZ00001: PGS18204: SLP Registration Initiated

Both on z/OS and Linux, you can issue the following command within z/OS USS to enquire the configuration status of SLP registration:
  cimconfig -g slp -c
If the answer is false, issue the following command:

cimconfig -p -s slp=true

and restart the CIM server.

- Log file rmmcim.log should not contain any error messages reporting incorrect requests to the DFSMSrmm CIM agent. If any messages occur, correct the error on the client side. For example, if the format of the compound key for Tag attribute of IBMRMM_Location class is violated, then the following message is issued:

EDGC0031I: Key 'Tag' is not of the required format "LocationName+LocationType+CdsID"

Displaying the messages obtained from CIM server on the CIM client side simplifies the tracking of the requests processed.

- If errors occur in communication between clients and OpenPegasus CIMOM, the analysis of the errors is outside DFSMSrmm capability. Before using a client, check out if the client has any limitations on exploiting OpenPegasus.

---

**When Common System Abends Occur**

There are abends or performance problems not caused by failures in DFSMSrmm. For example, your batch job might end abnormally because of system errors beyond your control. Abends can also result from using inadequate or incorrect storage parameters. See your system programmer for assistance in diagnosing these errors.

This topic lists abends you might encounter when running DFSMSrmm, and suggests ways of correcting the problem. Not every possible problem can be listed, but the list includes those most commonly reported to IBM personnel.

These are common system abend codes that might appear when abends result from errors in storage parameters.

- **106** Sufficient storage was unavailable to load a module. Ensure that the value for REGION is sufficient.

- **804** The amount of storage requested exceeded that available. Ensure that the value for REGION is sufficient.

- **878** The amount of storage requested exceeded that available. Ensure that the value for REGION is sufficient.

- **80A** This abend occurs when a DFSMSrmm job requires more storage than has been allocated. Ensure that the value for REGION is sufficient.

- **D37** An output data set is specified with insufficient primary SPACE allocation and no secondary allocation. If this abend occurs during inventory management for the temporary data set allocated with the *ddname* SRTINOUT, the DFSMSrmm control data set control record might be incorrect. Run the EDGUTIL utility with the VERIFY parameter to check the consistency of the control data set and control record. Increase the primary allocation or include a value for secondary allocation.

- **E37** An output data set is allocated on a primary volume that has either insufficient storage or excessive fragmentation, and no secondary volume is specified. Allocate the data set on a volume with more space or perform space management on the primary volume.
Chapter 3. Diagnosing Errors Using the Problem Determination Aid Facility

During DFSMSrmm processing, the problem determination aid (PDA) facility gathers diagnostic information about DFSMSrmm’s processing, stores this information in a circular file within storage, and periodically writes it to a circular file on DASD.

A circular file appends data until full; then, starting at the beginning of the file, subsequent incoming data overwrites the data already there. The circular DASD file consists of two data sets, EDGPDOX and EDGPDOY. EDGPDOX is the active data set.

Related Reading: For detailed information on using the problem determination aid or calculating the PDA log data set sizes, refer to z/OS DFSMSrmm Implementation and Customization Guide.

There are several reasons why you will at times want to collect and save PDA trace data. These reasons are most common:

- A trace showing DFSMSrmm’s operating history can pinpoint the activity at the time the problem first occurs. This information can be helpful because the time difference between when a problem first occurs and when it is first detected.
- A trace can locate points of contention when two separate tasks conflict with one another.
- A trace can help you to determine if a suspected DFSMSrmm problem really exists, or if it is an operational error.
- You can use traces to supplement dumps when you contact your IBM support group.

Two very useful functions can help you to extract the exact information you need from the PDA files. By using either or both of the ISPF browse function and DFSMShsm ARCPRPDO (PDA trace formatter) program, you might be able to solve your problem without assistance from IBM support.

Viewing PDA Data with the ISPF Browse Function

Use the ISPF browse function to perform these tasks:

- Browse large amounts of raw data
- Prepare IDCAMS (access method services) print output
- Look at PDA trace data within a dump

Formatting PDA Data with the DFSMShsm ARCPRPDO (PDA Trace Formatter) Program

The DFSMShsm ARCPRPDO trace formatter facility takes the raw trace data and organizes, reduces, and prints user-selected trace information. This is especially useful when you need specific data. You are authorized to use ARCPRPDO even if you are not licensed to use DFSMShsm.

Related Reading: For details about ARCPRPDO, see z/OS DFSMShsm Diagnosis.
Use the trace formatter facility to perform these tasks:
- Translate trace records into a readable format
- Edit raw trace data
- Select records based on your specific criteria

The ARCPRPDO (PDA trace formatter) program has a number of options that can assist you in collecting data from the DFSMSrmm log data sets EDGPDOY, EDGPDOX, or a copy of either. To process the most recent PDA log entries, issue the command:

```
F DFRMM,PDALOG=SWAP
```

Then process the data that was placed in the EDGPDOY data set.

You can browse EDGPDOX while DFSMSrmm is running (disposition of the data set must be in shared mode).

If you need to format EDGPDOX while DFSMSrmm is running, turn PDA tracing off with the MODIFY command:

```
F DFRMM,PDA=OFF
```

Format the data in EDGPDOX with ARCPRPDO or copy the data for later processing, and then restore PDA tracing by issuing the MODIFY command

```
F DFRMM,PDA=ON
```

The formatter can be used to collect and print data based on your criteria.

**Example:** The sample job shown in Figure 21 prints and formats trace records for CSECTs EDGCMIIX and EDGQMGR as shown in Figure 22 on page 35.

```
//STEP0001 EXEC PGM=ARCPRPDO
//SYSPRINT DD SYSOUT=*
//ARCMSG DD SYSOUT=*
//ARCPDO DD DSN=UID..HOSTID..RMMPDOY,DISP=SHR
//ARCPRTN DD SYSOUT=*
//SYSIN DD *
COMPACT
FORMAT
MODULE(CMIX,QMGR)
```

*Figure 21. JCL for Printing and Formatting Trace Records*
In Figure 22:

AS/TCB value
The “D1” in “D19E68” in the first (CMIX) trace record indicates that this trace record is from a JOB. The “00” in “009BC1” in the second (QMGR) trace record indicates that this trace record is from the RMM address space. Other possible values include “E2”, for STC, and “E3”, for the TSU address space.

ASID/JOB=
shows the two-byte ASID (“002D”) and the eight-character job name “D1D6C2D5C1D4 C5F1” (JOBNAME1).

Related Reading: For additional information on options and examples, see z/OS DFSMSHsm Diagnosis.

Specifying Formatting Options
The trace formatting options tell ARCPRPDO what to do with the collected data. All the formatting options are optional. The formatting options are:

- COMPACT
- COPY
- FORMAT
- NOPRINT

COPY
This option routes trace data that matches your selection criteria to the data set specified for your ARCOUT DD. This new data set may now act as the raw data for subsequent search runs.

COMPACT
This option formats the trace entries into single-line output, if possible. The compact option is the default option and does not need to be specified.

FORMAT
This option formats each trace keyword on a separate line. The keyword itself is printed at the start of each line.

NOPRINT
This option prevents any selected records from being written to the ARCPRD DD. NOPRINT is intended to be used with the copy
option. An ARCPRINT DD statement is still required when you select the NOPRINT option, as it contains messages and other information.
Specifying Selection Options

Use these selection options to define and narrow your trace data search for DFSMSrmm. You specify the options using JCL as shown in Figure 23 on page 39.

```
END(date,time)
LOGIC(up_to_10_logic_types)
MODULE(up_to_10_module_names)
SCAN(data)
START(date,time)
TCB(up_to_10_tcb_addresses)
```

**END** *(date,time)*

END is specified as *yyddd,hhmnnss* and selects records until the date, and optionally time, are reached. A comma separates the date and time. The end date must be the same as, or after, the start date. If the start and end dates are the same, the end time must be the same as, or after, the start time. If the END option is not specified, the default end date is 99366. If an end time is not specified, the default is 235959.

With both START and END options:
- *yy* Must be a number from 00 through 99
- *ddd* Must be a number from 001 through 366
- *hh* Must be a number from 00 though 23
- *mm* Must be a number from 00 through 59
- *ss* Must be a number from 00 through 59

**LOGIC**(up_to_10_logic_types)

The LOGIC option looks at the logic fields of the trace entries and selects only those that match one of the logic types you select. You can specify up to 10 logic types in this option. Each type must contain four characters, with each type separated by a comma in the case of multiple entries. Three especially useful ones are MESG, TIME, and ENTR. Logic types are displayed under the LOGIC column in the trace output display.

**MODULE**(up_to_10_module_names)

The MODULE option selects all trace records that have been requested by the module you specify. For example, if you specify MODULE(MAIN), all the trace records requested by EDGMAIN are selected. You can specify up to ten module names for this option. Each name can contain up to five characters, with each name separated by a comma. Whenever you specify a module name of less than five characters, DFSMSrmm pads the name to equal five characters.

**Example:** The module name DFSMSrmm traces actually starts on the fourth character of the true name as illustrated in this example.

```
ACTUAL MODULE NAME = EDGMAIN
TRACED MODULE NAME = MAIN
```
**SCAN**(data)
The SCAN option selects records that contain any reference to data you specify in the data field. The data can match parameters, such as data set names or a key to a data set record. When you specify SCAN(DSN), for example, you get all of the DSN records plus any other records where the DSN has been traced as another type of parameter.

**START**(date,time)
START is specified as `yyddd,hhmmss` and allows you to select records for output starting from the specified date until the end of the data, or until an end date is reached, as specified by the END option. `yyddd` is in Julian date format. You can also specify a start time separated from the date by a comma. If the START option is not specified, the default start date is 00001. If a start time in not specified, the default is 000000.

**TCB**(up_to_10_tcb_addresses)
The TCB option selects records that match any of the TCB addresses you select. Up to 10 TCB addresses can be specified in this option. The TCB addresses are identified under the AS/TCB column in the trace output display.

Each address must contain six characters, and each address must be separated by a comma. Actually, only bytes two and three of the actual TCB address are used in the trace address field, and these are placed in byte positions one and two.

Example: Byte zero of the TCB trace entry is used for address space identification. X'00' is used for the DFSMSrmm primary address space, as illustrated in this example.

```
ACTUAL TCB ADDRESS = 00F823C0
TRACED TCB ADDRESS = xxF823 (xx is an address space identifier)
```

**Recommendations for Using PDA Formatter**
Use these techniques to collect data from trace data sets.

- Use COMPACT LOGIC(MESG) options to get an initial sense of the messages issued at the time of the error. This action can help you to locate TCB or module information for subsequent searches. Logic types are listed in the output display under the LOGIC column.

- Use FORMAT TCB(tcb_address) for task-specific errors such as migration or backup.

- Use COMPACT SCAN(dsn) with the actual data set name for errors related to single data set processing, such as a missing data set.

- Use FORMAT START(date, time) END(date, time) for deadlocks or problems involving multiple processing units.

- Use COMPACT MODULE(module_name) for EDG0200I or EDG0208I errors, abends, or related problems.

**Copying PDA Trace Data Sets to Tape**
The JCL examples in this topic show how to copy certain data sets onto a tape so that they can be submitted to IBM as Authorized Program Analysis Report (APAR) documentation. The tapes that you use for this purpose must be standard label tapes. Because of numerous variations in hardware and software, these JCL jobs are shown only as examples; they might not work in all environments. Replace the data set names, relative file numbers, tape volume serial number, and unit types that are consistent with your naming conventions.
When you create your JCL, do not use the high-level qualifiers SYS1, RMM, or DFRMM in the data set names specified in the SYSUT2 DD cards because these are reserved names in the system where your tape is read.

**Recommendation:** Use the APAR number as the high-level qualifier, followed by a qualifier that describes the content of the data set.

**Example:** Figure 23 shows the JCL for copying the PDA trace data set to tape.

```plaintext
//PDACOPY JOB MSGCLASS=A
//S1 EXEC PGM=IEBGENER
//SYSPRINT DD SYSOUT=A
//SYSIN DD DUMMY
//SYSUT1 DD DSN=RMM.PDOY,DISP=SHR
//SYSUT2 DD DSN=OY99999.PDOY,LABEL=(1,SL),VOL=SER=TAPE01,
// DISP=(NEW,KEEP),UNIT=TAPE
```

*Figure 23. Copying PDA Trace Data Set to Tape*

**Example:** Frequently, only several minutes or an hour of the PDA trace is required. To reduce the amount of data to be copied, use the DFSMSrmm trace formatter program, ARCPRPDO, to copy all trace entries that were created during the time span of interest. Figure 24 shows an example to copy the trace records created from Julian date 92.277 at 23:50:05 (5 seconds and 50 minutes past 11 p.m.) through 92.278 at 00:10:00 (10 minutes past midnight). Also, if the required time span is included in several PDA data sets, the data sets can be concatenated in chronological order in the JCL.

```plaintext
//PDACOPY JOB MSGCLASS=A
//S1 EXEC PGM=ARCPRPDO
//ARCMSG DD SYSOUT=*  //ARCPRINT DD SYSOUT=*  //ARCPDO DD DSN=RMM.PDOY,DISP=SHR  //ARCOUT DD DSN=OY99999.PDOY,LABEL=(1,SL),VOL=SER=TAPE01,
// DISP=(NEW,KEEP),UNIT=TAPE  //SYSIN DD *
COPY NOPRINT  
START(92277,235005)  
END(92278,001000)
```

*Figure 24. Copying Trace Records from Multiple PDA Data Sets*
Chapter 4. Using the DFSMSrmm IPCS Verb Exit Routine

You can invoke the DFSMSrmm IPCS verb exit routine by using the IPCS VERBEXIT subcommand to obtain diagnostic information. The DFSMSrmm verb exit routine dumps or interprets most DFSMSrmm control blocks including VSAM and buffer-related information. Full DFSMSrmm diagnostic information is available only when an SVC dump includes the DFSMSrmm address space. If the dump does not include the DFSMSrmm address space, the DFSMSrmm verb exit routine interprets only limited information.

Related Reading: See z/OS MVS IPCS Commands for more information about using IPCS.

DFSMSrmm IPCS Verb Exit EXEC Parameters

The DFSMSrmm IPCS Verb exit routine supports these EXEC parameters:

HELP Specify to produce the help information available in the verb exit.

MINOPT Specify to produce minimum information which includes startup information. No information about any requests is produced.

The DFSMSrmm IPCS verb exit routine can be used to override IPCS session parameters like PRINT and TERMINAL. You can override the session parameters by appending them to the IPCS VERBEXIT subcommand.

PRINT | NOPRINT Specify to control the production of the IPCSPRNT PRINT file.

TERMINAL | NOTERMINAL Specify to control the production of the IPCS terminal output.

Example: Use this subcommand to request minimum IPCS output that is displayed at the terminal and is also printed.

**VERBX RMMDATA 'MINOPT' TERM PRINT**

*Figure 25. Invoking the DFSMSrmm RMMDATA Verb Exit Routine*
Chapter 5. Building a Keyword String

This topic provides you with the tasks you need to build a keyword string. A keyword describes a part of a failure. You use a completed keyword string to search the IBM Software Support database for a possible resolution to the failure. When you perform a software database search or contact the IBM Support Center for help, identify the failure using all keywords that apply. See Appendix A, "Keyword Worksheet," on page 61 for a worksheet you can use to document problem related information including the keyword string.

The tasks you perform are described in these topics.
- "Finding the Component Identification Keyword" on page 44
- "Finding the Release Level" on page 44
- "Determining the Type-of-Failure" on page 45
- "Building Keywords for Module-related Errors" on page 54
- "Building Modifier Keyword Strings" on page 55

These keywords are required for every keyword string you build:
- Component identification
- Release level
- Type-of-failure

These keywords are optional. However, you should include them in your keyword string whenever possible:
- Module keyword or control section (CSECT)
- Modifier keywords
  - Function (when possible)
  - Subfunction (if applicable)
  - Other significant failure-related modifiers

Each keyword you add makes the search argument more specific. The more precise the keyword string, the more selective the search, yielding fewer matches in the Software Support database. If you do not find a similar problem in the database, you can broaden the scope of the search by deleting keywords, beginning at the end of the string.

Here is a sample completed keyword string for an abend:

Sample keyword string

5695DF186 RD10 ABEND001 EDGRDSN

where:
5695DF186 Is the component keyword.
RD10 Is the release level keyword.
ABEND001 Is the type-of-failure keyword with the abend code appended.
EDGRDSN Is the module keyword.
Finding the Component Identification Keyword

The DFSMSrmm component identifier is the first keyword in the search argument. The number identifies DFSMSrmm within the IBM Software Support database.

1. The component identification keyword is nine characters long. For DFSMSrmm, the keyword is 5695DF186.

<table>
<thead>
<tr>
<th>Keyword string so far</th>
</tr>
</thead>
<tbody>
<tr>
<td>5695DF186</td>
</tr>
</tbody>
</table>

2. Continue with "Finding the Release Level" to determine the current release level keyword for DFSMSrmm.

Finding the Release Level

The release level keyword, used with the component identification keyword, narrows the search. The release level keyword consists of the prefix R, followed by the last three characters of the Function Modification Identifier (FMID) indicated at the start of a module. The FMID used in these examples is the DFSMS V1R13 DFSMSrmm FMID HDZ1D10. The Kanji FMID is JDZ1D1K.

1. Use one of these techniques to obtain the DFSMSrmm release level keyword:
   - Find the FMID that identifies a release of DFSMSrmm listed in the z/OS Program Directory that is shipped with the product tape.
   - Use SMP/E to obtain the release level keyword:
     a. List the consolidated software inventory, using these SMP/E control statements. Be sure to include the period at the end of the control statements.
        
        SET BDY (tgtzone).
        LIST MOD (name) XREF.
     b. In the NAME column of the consolidated software inventory, locate the name of the module causing the problem.
     c. In the entry for the module, find the FMID field. Append the three low-order digits in the FMID field to the keyword prefix R.
   - Locate the module in the dump by scanning the comment or eyecatcher portion in the address range that is associated with the failure-related module. The first part of the module contains the components:
     - Copyright statement
     - Module name
     - FMID
     - Service level, which is the program temporary fix (PTF) number or Authorized Program Analysis Report (APAR) number of the module

In the copyright area, find the FMID field. Append the three low order digits in the FMID field to the keyword prefix R.
2. Add the release level to your keyword string:

<table>
<thead>
<tr>
<th>Keyword string so far</th>
</tr>
</thead>
<tbody>
<tr>
<td>5695DF186 RD10</td>
</tr>
</tbody>
</table>

3. Continue with “Determining the Type-of-Failure” to determine the type of failure.

---

**Determining the Type-of-Failure**

The type-of-failure keyword is used to identify an external symptom of a failure. This is a required keyword. Use Table 5 to determine the type-of-failure keyword that best describes your problem.

**Table 5. Type-of-failure Keywords**

<table>
<thead>
<tr>
<th>Keyword</th>
<th>Description</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abend</td>
<td>Abnormal termination indicated by:</td>
<td>Go to “Building an Abend Keyword”</td>
</tr>
<tr>
<td></td>
<td>• An ISPF abend panel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• A system message identifying an abend</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• SYS1.LOGREC messages</td>
<td></td>
</tr>
<tr>
<td>Wait/Loop</td>
<td>Program unexpectedly suspended:</td>
<td>Go to “Building Keywords for Wait/Loop Problems” on page 49</td>
</tr>
<tr>
<td></td>
<td>• No program response</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Repeating messages</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Repeating sequence of DFSMSrmm ISPF panels</td>
<td></td>
</tr>
<tr>
<td>Message</td>
<td>Error indicated by:</td>
<td>Go to “Developing the Message Keyword” on page 51</td>
</tr>
<tr>
<td></td>
<td>• System message</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• DFSMSrmm ISPF dialog message</td>
<td></td>
</tr>
<tr>
<td>Incorrect Output</td>
<td>Error indicated by:</td>
<td>Go to “Developing Keywords for Incorrect Output” on page 52</td>
</tr>
<tr>
<td></td>
<td>• Incorrect or missing output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Incorrect DFSMSrmm ISPF panel flow or information</td>
<td></td>
</tr>
<tr>
<td>Performance</td>
<td>Performance is less than what is expected</td>
<td>Go to “Defining Keywords for Performance Problems” on page 53</td>
</tr>
<tr>
<td>Documentation</td>
<td>Incorrect or incomplete documentation</td>
<td>Go to “Forming Keywords for Documentation Problems” on page 53</td>
</tr>
</tbody>
</table>

---

**Building an Abend Keyword**

This topic describes how to build an abend keyword for an abend occurring while you are using the DFSMSrmm ISPF dialog, or when you are running DFSMSrmm outside the dialog by using the RMM TSO subcommands.

You can identify an abend using any one of these methods:

- A program’s printed system output
- A system message’s text
- An ISPF abend panel
- A TSO message identifying an abend condition
- A SYS1.LOGREC record
Also, when DFSMSrmm abnormally ends, the system produces one or more of these outputs:
- DFSMSrmm ISPF dialog abend panel
- SVC Dump
- SYSABEND, SYSMDUMP, or SYSUDUMP

This topic explains how to gather the information to add to your keyword string as follows:
- For the DFSMSrmm ISPF dialog:
  - ABENDXX (required)
  - RC (optional)
- For the rest of DFSMSrmm:
  - ABENDXX (required)
  - MODULE (optional)
  - OFFSET (optional)

**DFSMSrmm ISPF Dialog Abends**

This topic describes how to build the abend keyword using information from an ISPF abend panel or a TSO message.

**ISPF Abend Panel**

Figure 26 shows a sample ISPF abend panel, which is displayed when an abend occurs in ISPF or in the DFSMSrmm ISPF dialog.

![Figure 26. Sample ISPF Abend Panel](image-url)
When an ISPF abend panel appears, follow these steps to build the abend keyword:

1. Record the abend code in this format:
   \[
   \text{ABEND}nnn
   \]
   where:
   \[
   nnn \quad \text{Is the task abend code.}
   \]
   For example, if the ISPF abend panel contains information as shown in “ISPF Abend Panel” on page 46:
   Task ABEND code 0C1
   your keyword string would look like this:
   
   \[
   \text{Keyword string so far}
   \]
   5695DF186 RD10 ABEND0C1

2. If a return code accompanies the message, include the return code in your keyword string as a modifier keyword. Append the code to the keyword prefix RC. For example, if the return code is 04, your keyword string would look like this:

   \[
   \text{Keyword string so far}
   \]
   5695DF186 RD10 ABEND0C1 RC4

3. Go to “Building Keywords for Module-related Errors” on page 54 to build the next keyword in the string. Otherwise, continue to “TSO Messages.”

**TSO Messages**

When the DFSMSrmm ISPF dialog ends abnormally and ISPF is in TEST/TRACE mode, the system issues a TSO message to indicate the failure. This is not a DFSMSrmm ISPF dialog message. Figure 27 shows a sample TSO message that identifies an abend condition:

\[
*\text{SPF SUBTASK ABEND}*
\]
\[
*\text{ISPF ENDED DUE TO ERROR}*
\]
\[
*\text{READY}*
\]

Figure 27. Sample TSO Abend Message
A plus sign at the end of the message indicates that additional information is available. Enter a question mark for more information about the error. The question mark must be the next command entered from the terminal, or the supplemental information is lost. Figure 28 shows the additional of information that appears when the plus sign is present at the end of the message.

Figure 28. Sample TSO Abend Message Additional Information

1. Record the abend code in this format:
   ABENDnnn
   where:
   nnn    Is the program interruption code related to the abend message.
   For example, if the abend occurred because of a protection exception, your keyword string would look like this:

   System Abend Code 0C4 Reason Code 0004

   Figure 28. Sample TSO Abend Message Additional Information

   1. Record the abend code in this format:
      ABENDnnn
      where:
      nnn    Is the program interruption code related to the abend message.
      For example, if the abend occurred because of a protection exception, your keyword string would look like this:

      System Abend Code 0C4 Reason Code 0004

      Figure 28. Sample TSO Abend Message Additional Information

   2. Go to “Building Keywords for Module-related Errors” on page 54 to build the next keyword.

Building Keywords for DFSMSrmm Abends Outside the DFSMSrmm ISPF Dialog

Use this topic when you suspect that an abend has occurred somewhere other than the DFSMSrmm ISPF dialog.

Follow these steps to build the abend keyword:

1. Obtain a system dump.
   • Use the SUMDUMP printed from the SYS1.DUMPxx data set.
   • Obtain a system storage dump that contains the Link Pack Area (LPA), the nucleus and the user's program. Determine the system abend code by using either the symptom dump summary information in the system job log or the system storage dump.
2. Record the abend code in this format:

   ABENDnnn

   where:

   nnn  Is the program interrupt code.

   For example, if the abend output contains this:

   Program interrupt code 00000001

   your keyword string would look like this:

   

   **Keyword string so far**

   5695DF186 RD10 ABEND0C1

3. Record the module name that appears in the abend output, along with the offsets indicated. Record the offset using this format:

   OFFSETX'nnnn'

   where:

   nnnn  Is 1 to 4 hex digits containing no leading zeros.

   For example, if the abend output contains information as shown in Figure 29, add the module name EDGINERS and offset X'1400' to the keyword string:

   

   **Completed keyword string**

   5695DF186 RD10 ABEND0C7 EDGINERS OFFSET X'1400'


**Building Keywords for Wait/Loop Problems**

Use this topic to develop the WAIT or LOOP keyword in your keyword string. These conditions are symptoms of a wait or loop:

- Suspended activity while waiting for some condition to be satisfied
- Endless instruction loop
- Repeating messages
- Repeating sequence of panels
- No system response
- System abends
In DFSMSrmm, no program response indicates a wait condition. For example, a DFSMSrmm ISPF dialog panel might remain on the screen indefinitely after you have requested processing.

**Recommendations:** If you think that DFSMSrmm is not responding because it is processing a large amount of data, check these conditions:

- Ensure the MAXHOLD value has been correctly entered. You use the MAXHOLD value to specify the number of records the subsystem scans while holding a reserve on the DFSMSrmm control data set. If you use a large MAXHOLD number, the subsystem could hold a reserve of the control data set for a long time which impacts performance.

- Limit the number of list entries when you request a search by making your selection criteria more specific.

You can view the ISPF log to check for symptoms of a module loop if you are in the DFSMSrmm ISPF dialog. In your DFSMSrmm ISPF dialog user profile, specify that you want the DFSMSrmm ISPF dialog to record inter-module trace data.

This topic explains how to gather the information you need to add to your keyword string:

- For DFSMSrmm ISPF dialog:
  WAIT/LOOP (required)

- For the rest of the DFSMSrmm components:
  WAIT/LOOP (required)
  MODULE (optional)
  OFFSET (optional)

If you have obtained a dump, you can locate this information:

1. Find the program status word (PSW) in the dump as shown in Figure 30.

   ![Figure 30. Finding the PSW in the SYSUDUMP](image)

2. Check whether the WAIT state bit (bit 14) of the PSW is on or off. In Figure 31, the WAIT state bit is off.

   ![Figure 31. Identifying a Wait State](image)

3. Determine which keyword you should use, LOOP or WAIT. If the WAIT state bit is off, use the keyword LOOP.

   **Keyword string so far**
   
   5695DF186 RD10 LOOP

   If you have identified the failure as a wait condition, use WAIT as your type-of-failure keyword:
Developing the Message Keyword

This topic explains how to develop the message keyword in your keyword string. A message can indicate these types of failures:

- A program or operation failure
- Missing data or incorrect data
- A data failure (catalog, user data)

You can add the message number and associated return and reason codes to your keyword string as follows:

- MSGXXXXXXX (required)
- RC (optional for return code)
- RC (optional for reason code)

To develop the message keyword for your keyword string, follow these steps:

1. Use MSG as your type-of-failure keyword, followed by the message identifier. For example, if the message identifier is EDG6646I, your keyword string would look like this:

   | Keyword string so far           |
   | 5695DF186 RD10 MSGEDG6646I     |

2. If the message has a return code and reason code associated with it, append the return code to the keyword prefix RC and the reason code to the prefix RC. For example, if the return code is 12 and the reason code is 183, your keyword string would look like this:

   | Completed keyword string       |
   | 5695DF186 RD10 MSGEDG6646I RC12 RC183 |

Developing Keywords for Incorrect Output

Use this topic to develop the INCORROUT keyword when any of these conditions occur:
- Expected output is not produced
- Output is different than expected
- Output should not be generated
- DFSMSrmm ISPF dialog panel information or flow is erroneous

This topic explains how to gather the information you need in order to add to your keyword string:
- INCORROUT (required)
- MSG (optional)

Incorrect output can be the result of an earlier failure. This can be difficult to analyze because the component affected might not be the one that caused the problem. Review previous messages, abend codes, console logs, or other program responses. They might indicate the source of the failure.

Accumulate as much of this information as possible. The information can help you isolate or resolve your problem, and the IBM Support Center will request this information if you need to provide trap or trace information:
- When did you first notice the problem?
- How did you identify the problem?
- Were any system changes or maintenance recently applied, for example, a new device, software product, APAR, or PTF?
- Does the problem occur with a specific data set or device, at a particular time of day, or with any other unique condition?
- Does the problem occur in batch or TSO mode?
- Is the problem continuous or intermittent?
- Can you re-create the problem?

Before reporting a DFSMSrmm ISPF dialog panel problem, be sure that the incorrect output is not the result of a customized panel or message. If the panel was customized, retry the operation using the IBM-supplied copy. If the failure still occurs, continue with these steps.

To build the incorrect output keyword, perform these steps:
1. Use INCORROUT for your type-of-failure keyword.

```
Keyword string so far
5695DF186 RD10 INCORROUT
```

2. If a message accompanied the failure, append the message identifier to the prefix MSG, and add that keyword to the keyword string. For example:

```
Keyword string so far
5695DF186 RD10 INCORROUT MSGEDG7017I
```

3. For problems related to the DFSMSrmm ISPF dialog go to “Building Modifier Keyword Strings” on page 55. Otherwise, go to Chapter 6, “Searching the IBM Software Support Database,” on page 57.
Defining Keywords for Performance Problems

Performance is largely determined by a combination of throughput, response time, and availability. This topic helps you to define the performance keyword when you suspect that a DFSMSrmm component is causing poor system performance. It explains how to gather the information for all components to add to your keyword string:

PERFM (required).

Many performance problems are related to system tuning. Modifications to your system or its environment can also affect system performance.

Use the performance keyword only when you cannot correct the performance problem by system tuning.

1. Record this information:
   - Actual performance
   - Expected performance
   - Source of the expected performance criteria, and the order number and page number of the source document

2. Use PERFM as your type-of-failure keyword. Your keyword string would look like this:

   **Keyword string so far**

   5695DF186 RD10 PERFM

3. For problems related to the DFSMSrmm ISPF dialog, go to "Building Modifier Keyword Strings" on page 55. Otherwise, go to Chapter 6, "Searching the IBM Software Support Database," on page 57.

Forming Keywords for Documentation Problems

Use this topic when you encounter incorrect or missing information in a DFSMSrmm publication.

This topic explains how to gather the information for all components to add to your keyword string:

- DOC (required)
  - Document Number (optional)
  - Message Number (optional)

For a minor publication error, submit a Reader's Comment Form from the back of the publication in error. If the error is serious and of general concern to other users:

1. Record the document page in error. You should describe the error and the problem it caused.

2. Use DOC as your type-of-failure keyword, followed by the order number of the publication. Omit the hyphen and level number.

   For example, if the order number is SC26-7333-00, your keyword string would look like this:

   **Keyword string so far**

   5695DF186 RD10 DOC SC267333
3. For documentation problems related to a message, append the message identifier to the keyword prefix **MSG**, and add it to the keyword string as a modifier keyword.

   For example, if the message is EDG5306E, your keyword string would look like this:

<table>
<thead>
<tr>
<th>Keyword string so far</th>
</tr>
</thead>
<tbody>
<tr>
<td>5695DF186 RD10 DOC SC267333 MSGEDG5306E</td>
</tr>
</tbody>
</table>

4. For problems related to the DFSMSrmm ISPF dialog, go to “Building Modifier Keyword Strings” on page 55. Otherwise, go to Chapter 6, “Searching the IBM Software Support Database,” on page 57.

---

**Building Keywords for Module-related Errors**

Use this topic to build the module keyword for your keyword string. The module keyword identifies the failure-related control section (CSECT). A load module has one or more individually replaceable CSECTs.

The CSECT name describes the area of suspected failure more precisely than does the load module name. However, you can specify either or both names to vary the keyword string when you search the IBM Software Support database.

If ABEND is the type of failure, follow one of these procedures to find the module name.

### Using the ISPF Log to Find the Module Name

If the problem is in the DFSMSrmm ISPF dialog, use the ISPF log to determine the failing module name by performing these steps:

1. Examine the ISPF log to locate an entry that indicates the abend.
2. If the entry contains a module name, for example EDGRDDIS, record the module name for your module keyword and continue with “Building Modifier Keyword Strings” on page 55. Your keyword string would look like this:

<table>
<thead>
<tr>
<th>Keyword string so far</th>
</tr>
</thead>
<tbody>
<tr>
<td>5695DF186 RD10 ABEND0C1 EDGRDDIS</td>
</tr>
</tbody>
</table>

   If you cannot determine the module name from the ISPF log, continue with “Building Modifier Keyword Strings” on page 55.

### Finding the Failing Module Name for an Abend Type-of-Failure

To find the failing module name for an abend type-of-failure, perform these steps:

1. If the system issued a message identifying an abend condition, the module name might appear in the message text. If it does, use the entire module name as the module keyword. Go to “Building Modifier Keyword Strings” on page 55.
2. If an environmental error record editing and printing program (EREP) software record exists for the failure, use it to identify the failing module name and offset information. Give the entire module name as the module keyword. Go to “Building Modifier Keyword Strings” on page 55. See [EREP User’s Guide](#) for information about EREP software records.
3. Scan the dump as shown in Figure 32 for the failing module name.

![Figure 32. Sample Dump Containing a Module Name](image)

4. Use the entire module name as the module keyword. In Figure 32, the module name is EDGINERS.

5. Use Interactive Problem Control System (IPCS) to format any dumps written as described in Chapter 4, “Using the DFSMSrmm IPCS Verb Exit Routine,” on page 41.


7. Go to “Building Modifier Keyword Strings.”

**Building Keywords for Wait and Loop Types-of-Failure**

To obtain a system dump that includes the system trace table, perform these steps:

1. Use the system trace table to get the name of the module. If the problem is a loop, you might need a generalized trace facility (GTF) trace.

2. Go to “Building Modifier Keyword Strings.”

**Building Keywords for Message Types-of-Failure**

If the message was issued at the wrong time or under the wrong conditions, specify the name of the detecting module as the module keyword.

Go to “Building Modifier Keyword Strings.”

**Building Modifier Keyword Strings**

Use this topic to help you build modifier keywords to add to your keyword string. The modifier keywords are optional, but can help restrict the scope of a software database search to a manageable number of matches. You can specify modifier keywords in any order.

You can often identify the failing function when you determine the type of failure. You might find a failure-related general register or a control block that contains incorrect data every time the failure occurs. You can identify the probable failing component from a failure-related indication, such as a message or unique abend code. Select a modifier keyword that describes a failure-related function from Table 7 on page 85.

1. Examine the list of function modifier keywords to see if any modifier keywords describe an aspect of the failure. Add appropriate modifier keywords to your keyword string.
2. For incorrect output or performance types of failure, the system might not provide enough information to identify a failure-related module. If, however, you can identify a failure-related function or other modifier, use it as the modifier keyword.

3. After completing your keyword string, go to Chapter 6, “Searching the IBM Software Support Database,” on page 57 for information on searching the IBM Software Support Database.

4. If you cannot relate an ISPF log entry to the failure (incorrect output, wait or loop type of failures), choose the appropriate modifier keyword from Table 7 on page 85. For example, if the failure is related to a problem with the DFSMSrmm control data set, add CDS to your keyword string.

   Completed keyword string

   5695DF186 RD10 CDS

   You might also find it helpful to use the HIPER/Y or P/E keywords in your keyword string. Use HIPER/Y when you want to search for all HIPER APARs that are high impact or pervasive APARs. Use P/E in your keyword string when you want to search for all P/E APARs. You can also add a data range in your keyword string to narrow the search based on the date. This example shows a keyword string example that will display HIPER DFSMSrmm 1.13.0 APARs that closed between October 1, 2011 and a current date in January 2012.

   HIPER/Y 5695DF186 RD10 CL11/10/.-CL12/01/.

5. Go to Chapter 6, “Searching the IBM Software Support Database,” on page 57.
Chapter 6. Searching the IBM Software Support Database

You are now ready to search the IBM Software Support database, using the keyword string you compiled earlier as a search argument:

1. Search the IBM Software Support database by using a search tool, such as Info Access, or by calling the IBM Support Center for help.
   The IBM Support Center might have the correction if the problem has been reported before. This correction could be a PTF, an APAR fix, or a bypass of the problem.

2. If you find a set of APAR closing descriptions in the IBM Software Support database, compare them with your problem.

3. If you find an APAR that matches your problem, apply the PTF, the APAR fix, or the bypass described in the APAR to correct your problem.

4. If you cannot find an appropriate APAR, try varying your search argument. For example:
   • Drop one keyword at a time, starting at the end of your keyword string.
   • If your type-of-failure keyword is LOOP, WAIT, or PERFM, try searching with one or two of the other three keywords. Sometimes what seems like a WAIT state might actually be a loop or a performance problem.
   • Try dropping the release level keyword from your keyword string. The problem might have been reported for an earlier release.
   • If more than one type-of-failure keyword applies (for example, an abend and a message both occur), try all combinations of those keywords.

5. If you were unable to find the solution to your problem, see Chapter 7, "Contacting the IBM Software Support Center,” on page 59.
Chapter 7. Contacting the IBM Software Support Center

If you need to contact the IBM Software Support Center for help, you should supply this information:
- Customer number
- Processor number (type, model, serial)
- Component ID (DFSMSrmm)
- Current release level
- Current service level (list of APARs and PTFs applied)
- The keyword string or strings that you have built

If you need to submit an APAR, the IBM Software Support Center will give you assistance in completing it. The IBM Software Support Center will ask you to describe your DFSMSrmm environment. Include applicable items from this list:
- JCL listings
- Storage dump (at time of failure)
- Link-edit map
- Console printout
- Other relevant supporting material

DFSMSrmm includes the EDGIPDA utility that is provided for IBM Software Support problem determination use only.

When you submit any of the requested documentation on tape, write it on a standard label tape. Also provide a hardcopy of the DCB information for each data set and the JCL used to create the tape.

Here is some additional information you can provide to help in problem determination:

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problems with the DFSMSrmm Web service</td>
<td>Check to see if the file, /usr/RmmJApiLogfile, is available on your system. If yes, be prepared to send it to IBM.</td>
</tr>
<tr>
<td>CIM provider returns no data</td>
<td>To have sufficient log entries available for problem diagnosis, set the logging level to INFO (log4j.rootCategory = INFO, R within rmmlog.properties), and rerun the CIM-provider request. Be prepared to send the log file, rmmcim.log, to IBM.</td>
</tr>
<tr>
<td>Volume record not updated</td>
<td>• Was the volume being read or written? • Was the volume defined through the DFSMSrmm ISPF dialog or TSO subcommands? • Which file on the tape was not updated?</td>
</tr>
<tr>
<td>Problems with one of the DFSMSrmm SEARCH commands</td>
<td>• What search parameters did you specify? • Were you using the DFSMSrmm ISPF dialog or TSO subcommands?</td>
</tr>
<tr>
<td>Problems with conversion</td>
<td>Be prepared to send all the files used in the conversion.</td>
</tr>
<tr>
<td>EDGUTIL VERIFY produces errors</td>
<td>Send a list of all the messages produced by EDGUTIL.</td>
</tr>
<tr>
<td>Abends that occur in batch jobs</td>
<td>Rerun the job with a SYSUDUMP DD statement and send the dump output.</td>
</tr>
<tr>
<td>Problems encountered in the DFSMSrmm ISPF dialog</td>
<td>Provide the panel ID where the message appeared. You can obtain the panel ID by issuing the ISPF PANELID command and the message ID by issuing the ISPF MSGID command.</td>
</tr>
</tbody>
</table>

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Appendix A. Keyword Worksheet

DATE: ____________________  TIME: ________________  IBM PROBLEM NUMBER: ____________________

Problem Description (including symptoms not described by keywords)

IBM Licensed Program Information

PRODUCT NAME: ____________________  FMID: ____________________
Modification: ____________________  Feature: ____________________  Order Number: ____________________  PUT Tape Level: ____________________

Base z/OS System Information

NAME: ____________________  FMID: ____________________  PUT Tape Level: ____________________

Keywords

TYPE-OF-FAILURE: ____________________  COMPONENT ID: ____________________
Module Name: ____________________  Modifiers: ____________________
Release Level: ____________________

Search Arguments Used

Information Provided by IBM Support Center
Appendix B. DFSMSrmm Trace Command Suffixes

Table 6 lists the trace command suffixes that you can specify to obtain information while you are in the DFSMSrmm ISPF dialog.

<table>
<thead>
<tr>
<th>To Trace</th>
<th>Specify Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input verification functions</td>
<td>ADDQ</td>
</tr>
<tr>
<td>All control functions</td>
<td>CNTL</td>
</tr>
<tr>
<td>Dataset, adding functions</td>
<td>DADD</td>
</tr>
<tr>
<td>Date functions</td>
<td>DATE</td>
</tr>
<tr>
<td>Dataset, changing functions</td>
<td>DCHA</td>
</tr>
<tr>
<td>Dataset, deleting functions</td>
<td>DDEL</td>
</tr>
<tr>
<td>Dataset, listing functions</td>
<td>DDIS</td>
</tr>
<tr>
<td>Dataset, searching</td>
<td>DSCH</td>
</tr>
<tr>
<td>All dataset functions</td>
<td>DSN</td>
</tr>
<tr>
<td>Exit functions</td>
<td>EXIT</td>
</tr>
<tr>
<td>Report definition and tool criteria management functions</td>
<td>GCON</td>
</tr>
<tr>
<td>ICETOOL Report Generator functions</td>
<td>GICE</td>
</tr>
<tr>
<td>Report definition functions</td>
<td>GRD</td>
</tr>
<tr>
<td>Report management functions</td>
<td>GREP</td>
</tr>
<tr>
<td>Report tool functions</td>
<td>GRT</td>
</tr>
<tr>
<td>Report type functions</td>
<td>GRTD</td>
</tr>
<tr>
<td>Access functions</td>
<td>ISPF</td>
</tr>
<tr>
<td>Search results line command processing</td>
<td>LCMD</td>
</tr>
<tr>
<td>Option functions</td>
<td>OPT</td>
</tr>
<tr>
<td>All owner functions</td>
<td>OWNR</td>
</tr>
<tr>
<td>Product, adding functions</td>
<td>PADD</td>
</tr>
<tr>
<td>Product, volume adding functions</td>
<td>PADV</td>
</tr>
<tr>
<td>Product, changing functions</td>
<td>PCHA</td>
</tr>
<tr>
<td>Product, deleting functions</td>
<td>PDEL</td>
</tr>
<tr>
<td>Product, listing functions</td>
<td>PDIS</td>
</tr>
<tr>
<td>Product, volume deleting functions</td>
<td>PDLV</td>
</tr>
<tr>
<td>All product functions</td>
<td>PP</td>
</tr>
<tr>
<td>Product, searching functions</td>
<td>PSCH</td>
</tr>
<tr>
<td>All rack and bin functions</td>
<td>RACK</td>
</tr>
<tr>
<td>Rack and bin, adding functions</td>
<td>RADD</td>
</tr>
<tr>
<td>Rack and bin, deleting functions</td>
<td>RDEL</td>
</tr>
<tr>
<td>Rack and bin, listing functions</td>
<td>RDIS</td>
</tr>
<tr>
<td>Rack and bin, searching functions</td>
<td>RSCH</td>
</tr>
<tr>
<td>To Trace</td>
<td>Specify Suffix</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Save functions</td>
<td>SAVE</td>
</tr>
<tr>
<td>Volume, adding functions</td>
<td>TADD</td>
</tr>
<tr>
<td>Volume, changing functions</td>
<td>TCHA</td>
</tr>
<tr>
<td>Volume, confirmation functions</td>
<td>TCON</td>
</tr>
<tr>
<td>Volume, listing functions</td>
<td>TDIS</td>
</tr>
<tr>
<td>Duplicate volume processing</td>
<td>TDUP</td>
</tr>
<tr>
<td>Volume, releasing functions</td>
<td>TREL</td>
</tr>
<tr>
<td>Volume, requesting functions</td>
<td>TREQ</td>
</tr>
<tr>
<td>Volume, searching functions</td>
<td>TSCH</td>
</tr>
<tr>
<td>Select primary command</td>
<td>TSEL</td>
</tr>
<tr>
<td>All volume functions</td>
<td>TVOL</td>
</tr>
<tr>
<td>VRS, adding functions</td>
<td>VADD</td>
</tr>
<tr>
<td>VRS, changing functions</td>
<td>VCHA</td>
</tr>
<tr>
<td>VRS, deleting functions</td>
<td>VDEL</td>
</tr>
<tr>
<td>VRS, listing functions</td>
<td>VDIS</td>
</tr>
<tr>
<td>All VRS functions</td>
<td>VRS</td>
</tr>
<tr>
<td>VRS, searching functions</td>
<td>VSCH</td>
</tr>
</tbody>
</table>
Appendix C. DFSMSrmm System and User Completion Codes

System Completion Codes

These are the system completion codes issued during DFSMSrmm processing.

F13

Explanation: At OPEN time for tape data sets, DFSMSrmm fails to update the DFSMSrmm control data set with information about tape usage or the operator mounted a volume that is not acceptable to DFSMSrmm. DFSMSrmm issues an error message describing the reason why the volume cannot be used.

DFSMSrmm issues this code for one of these reasons:

- An error occurred performing I/O to the DFSMSrmm control data set and the operator replied CANCEL to message EDG4001D.
- The DFSMSrmm journal file is locked and the operator replied CANCEL to message EDG4000D.
- The DFSMSrmm subsystem is not active and the operator replied CANCEL to message EDG4012D.
- The current volume was not acceptable to DFSMSrmm and DFSMSrmm could find no other acceptable volume.

If DFSMSrmm returns a reason code or user completion code, this is an indication that a DFSMSrmm subsystem routine failed.

Module: EDGOCEOV, EDGOCEXT, EDGOECM

System action: The current OPEN request fails because no volume is available to satisfy the request.

Operator response: None.

Programmer response: When DFSMSrmm issues message EDG4000D or EDG4001D, refer to the suggested actions for the messages. When DFSMSrmm issues message EDG4012D, ensure that the DFRMM procedure is active and specify the correct volume and tape data set information for specific tape mount request.

F14

Explanation: DFSMSrmm fails to update the DFSMSrmm control data set with information about tape usage because the DFSMSrmm subsystem is not active. DFSMSrmm issues an error message to describe the problem. If a reason code or user completion code is provided, this is an indication that the DFSMSrmm subsystem routine failed.

Module: EDGOCEOV, EDGOCEXT

System action: The CLOSE or End-Of-Volume processing fails. Processing depends on the application error recovery processing.

Operator response: Refer to the action described for the associated error message.

System programmer response: Refer to the action described for the associated error message.

F37

Explanation: An error occurred during validation of a tape volume, or during updating of the DFSMSrmm control data set. DFSMSrmm issues an error message describing the error. DFSMSrmm issues F37 at End-Of-Volume, when validating the new volume for a multivolume tape data set or when recording the use of the previous volume.

DFSMSrmm issues F37 for one of these reasons:

- An error occurred performing I/O to the DFSMSrmm control data set and the operator replied CANCEL to message EDG4001D.
- The DFSMSrmm journal file is locked and the operator replied CANCEL to message EDG4000D.
- The DFSMSrmm subsystem is not active and the operator replied CANCEL to message EDG4012D.
- The current volume was not acceptable to DFSMSrmm and DFSMSrmm could find no other acceptable volume.

If a reason code or user completion code is provided, this indicates that the DFSMSrmm subsystem routine failed. DFSMSrmm issues this code because either the DFSMSrmm subsystem is not active and the operator replied CANCEL to message EDG4012D or because the current volume was not acceptable to DFSMSrmm and DFSMSrmm could find no other acceptable volume.

Module: EDGOCEOV, EDGOECM

System action: The current EOV request fails.

Operator response: None.

Programmer response: When DFSMSrmm issues message EDG4000D or EDG4001D, refer to the suggested actions for the messages. When DFSMSrmm issues message EDG4012D, ensure that the DFRMM procedure is active and specify the correct volume and tape data set information for specific tape mount requests. If a tape volume is rejected because it
violates DFSMSrmm tape usage rules, correct your JCL and rerun the job.

User Completion Codes

These are the user completion codes issued during DFSMSrmm processing.

---

U0001
Explanation: An error occurred performing I/O to the DFSMSrmm control data set during a GET DIRECT request.
Module: EDGMTSO, EDGSOCE
System action: Processing fails.
Operator response: None
Programmer response: Report this error to the system programmer.
System programmer response: A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

---

U0002
Explanation: An error occurred performing I/O to the DFSMSrmm control data set during a GET DIRECT request.
Module: EDGSOCE
System action: Processing fails.
Operator response: None
Programmer response: Report this error to the system programmer.
System programmer response: A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

---

U0003
Explanation: An error occurred performing I/O to the DFSMSrmm control data set during a GET KEY GREATER THAN request.
Module: EDGMTSO
System action: Processing fails.
Operator response: None
Programmer response: Report this error to the system programmer.
System programmer response: A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

---

U0004
Explanation: An error occurred performing I/O to the

---

U0005
Explanation: An error occurred performing I/O to the DFSMSrmm control data set during a request to gain exclusive use of the control data set.
Module: EDGMTSO, EDGSOCE
System action: Processing fails.
Operator response: None
Programmer response: Report this error to the system programmer.
System programmer response: An associated error message is issued with details of the error. Refer to that message for corrective actions.

---

U0006
Explanation: An error occurred performing I/O to the DFSMSrmm control data set during a LOGICAL ADD request.
Module: EDGMTSO, EDGSOCE
System action: Processing fails.
Operator response: None
Programmer response: Report this error to the system programmer.
System programmer response: A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

---

U0007
Explanation: An error occurred performing I/O to the
DFSMSrmm control data set during a CHANGE request.

**Module:** EDGMTSO, EDGSOCE

**System action:** Processing fails.

**Operator response:** None

**Programmer response:** Report this error to the system programmer.

**System programmer response:** A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

---

**U0008**

**Explanation:** An error occurred performing I/O to the DFSMSrmm control data set during a LOGICAL DELETE request.

**Module:** EDGMTSO, EDGSOCE

**System action:** Processing fails.

**Operator response:** None

**Programmer response:** Report this error to the system programmer.

**System programmer response:** A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

---

**U0009**

**Explanation:** An error occurred performing I/O to the DFSMSrmm control data set during a SEARCH request.

**Module:** EDGMTSO

**System action:** Processing fails.

**Operator response:** None

**Programmer response:** Report this error to the system programmer.

**System programmer response:** A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

---

**U0010**

**Explanation:** An error occurred performing I/O to the DFSMSrmm control data set during a SEARCH NEXT request.

**Module:** EDGMTSO

**System action:** Processing fails.

**Operator response:** None

**Programmer response:** Report this error to the system programmer.

**System programmer response:** DFSMSrmm issues an error message describing the error. Refer to that message for corrective actions.

---

**U0011**

**Explanation:** An error occurred processing OWNER information in the DFSMSrmm control data set.

**Module:** EDGMTSO

**System action:** Processing fails.

**Operator response:** None

**Programmer response:** Report this error to the system programmer.

**System programmer response:** A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

---

**U0012**

**Explanation:** An error occurred processing PRODUCT information in the DFSMSrmm control data set.

**Module:** EDGMTSO

**System action:** Processing fails.

**Operator response:** None

**Programmer response:** Report this error to the system programmer.

**System programmer response:** A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

---

**U0013**

**Explanation:** An error occurred performing I/O to the DFSMSrmm control data set during a request to release exclusive use of the control data set.

**Module:** EDGMTSO

**System action:** The current processing fails.

**Operator response:** None

**Programmer response:** Report this error to the system programmer.

**System programmer response:** A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.
U0014

**Explanation:** A search request specifying a generic name fails.

**Module:** EDGMTSO

**System action:** The current request fails. The reason code is the return code from an internal DFSMSrmm service routine.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

U0015

**Explanation:** A volume is being added or changed and information about it should be in the volume catalog. The DFSMSrmm request to retrieve information from the volume catalog has failed.

**Module:** EDGMTSO

**System action:** The current request fails.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

U0016

**Explanation:** A volume is being added or changed that has outstanding actions or moves against it. DFSMSrmm was unable to update the control data set with the specified actions.

**Module:** EDGMTSO

**System action:** The current request fails.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

U0093

**Explanation:** An error occurred in TPUT handling while parsing parameters.

**Module:** EDGPARS

**System action:** The current parse request fails.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

U0100

**Explanation:** An error occurred establishing a recovery environment for a DFSMSrmm program. At the time of the abend, Register 15 contains the ESTAE macro return code.

**Module:** EDGINERS, EDGPARM

**System action:** Processing ends.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

U0100

**Explanation:** An error occurred performing RACROUTE RACHECK.

**Module:** EDGRACF

**System action:** Processing ends.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

U0100

**Explanation:** During subsystem interface initialization, a system function failed to complete successfully.

**Module:** EDGSSI

**System action:** Initialization stops. The reason code is the return code from the system function that failed.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.
U01nn

Explanation: The DFSMSrmm subsystem encounters an error and cannot recover. DFSMSrmm issues an error message to describe the failure. \( nn \) in the completion code is the code returned from the failing service routine used.

Module: EDGQMGR

System action: The DFSMSrmm subsystem stops.

Operator response: Report this error to the system programmer.

System programmer response: Determine the cause of the error and correct it if possible. If the error cannot be corrected, report this error to the IBM Support Center.

U0101

Explanation: The DFSMSrmm subsystem inventory management processing encounters an error and cannot continue. A request to perform I/O to the DFSMSrmm control data set has failed. The abend reason code is the return code from the DFSMSrmm I/O request.

Module: EDGMHKP

System action: The DFSMSrmm inventory management request fails.

Operator response: Report this error to the system programmer.

System programmer response: Determine the cause of the error and correct it if possible. If the error cannot be corrected, report this error to the IBM Support Center.

U0110

Explanation: An error occurred performing a RACROUTE RACDEF-DELETE.

Module: EDGRACF

System action: Processing ends.

Operator response: Report this error to the system programmer.

System programmer response: Report this error to the IBM Support Center.

U0111

Explanation: An error occurred performing a RACROUTE RACDEF-DELETE when a related delete had already been successful.

Module: EDGRACF

System action: Processing ends.

Operator response: Report this error to the system programmer.

System programmer response: If recovery is not possible, report this error to the IBM Support Center.

U0120

Explanation: An error occurred performing a RACROUTE RACDEF-ADDVOL.

Module: EDGRACF

System action: Processing ends.

Operator response: Report this error to the system programmer.

System programmer response: Report this error to the IBM Support Center.

U0124

Explanation: An error occurred when attaching the DFSMSrmm subtasks. The completion code is accompanied by a reason code, which is the return code from the ATTACH macro.

Module: EDGAMGR

System action: The DFSMSrmm subsystem stops.

Operator response: Report this error to the system programmer.

System programmer response: If recovery is not possible, report this error to the IBM Support Center.

U0125

Explanation: An error occurred while checking the device type of the data set allocated during inventory management. The completion code is accompanied by a reason code, which is the return code from the DEVTYPE macro.

Module: EDGAMGR

System action: The DFSMSrmm subsystem stops.

Operator response: Report the error to the system programmer.

System programmer response: If recovery is not possible, report this error to the IBM Support Center.

U0126

Module: EDGAMGR

Explanation: An error occurred when deallocating the data set allocated during inventory management. The completion code is accompanied by a reason code, which is the return code from SVC 99.

System action: The DFSMSrmm subsystem stops.

Operator response: Report the error to the system programmer.

System programmer response: If recovery is not possible, report this error to the IBM Support Center.
possible, report this error to the IBM Support Center.

U0130
Explanation: An error occurred performing a RACROUTE RACDEF-DEFINE.
Module: EDGRACF
System action: Processing ends.
Operator response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

U0150
Explanation: An error occurred performing a RACROUTE RACXTRT - EXTRACT.
Module: EDGRACF
System action: Processing ends.
Operator response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

U0160
Explanation: An error occurred performing an ICHEINTY DELETE ACCESS LIST.
Module: EDGRACF
System action: Processing ends.
Operator response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

U0170
Explanation: An error occurred performing a RACROUTE RACXTRT - REPLACE.
Module: EDGRACF
System action: Processing ends.
Operator response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

U0180
Explanation: A logic error occurred in DFSMSrmm RACF processing.
Module: EDGRACF
System action: The DFSMSrmm subsystem stops.

System action: Processing ends.
Operator response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

U0200
Explanation: An error occurred performing a RACROUTE RACHECK.
Module: EDGRACF
System action: Processing ends.
Operator response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

U0200
Explanation: The DEVTYPE macro returned an unacceptable return code when checking for the PARMLIB DD.
Module: EDG Parm
System action: Processing ends.
Operator response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

U0200
Explanation: During subsystem interface initialization, a system function failed to complete successfully.
Module: EDGSSI
System action: Initialization stops. The reason code is the return code from the system function that failed.
Operator response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

U02nn
Explanation: The DFSMSrmm subsystem encounters an error and cannot recover. DFSMSrmm issues an error message to describe the failure. nn in the completion code is the code returned from the failing service routine used.
Module: EDGQMGR
System action: The DFSMSrmm subsystem stops.
Operator response:  Report this error to the system programmer.

System programmer response:  Determine the cause of the error and correct it if possible. If it is not possible to correct the error, contact the IBM Support Center.

U0220
Explanation:  An error occurred performing a RACROUTE RACDEF - ADDVOL.
Module:  EDGRACF
System action:  Processing ends.
Operator response:  Report this error to the system programmer.
System programmer response:  Report this error to the IBM Support Center.

U0230
Explanation:  An error occurred performing a RACROUTE RACDEF - DEFINE.
Module:  EDGRACF
System action:  Processing ends.
Operator response:  Report this error to the system programmer.
System programmer response:  Report this error to the IBM Support Center.

U0300
Explanation:  An error occurred performing a RACROUTE RACHECK.
Module:  EDGRACF
System action:  Processing ends.
Operator response:  Report this error to the system programmer.
System programmer response:  Report this error to the IBM Support Center.

U0300
Explanation:  During subsystem interface initialization, DFSMSrmm could not issue a message. The DFSMSrmm message processing routine returned an error indication.
Module:  EDGSSSI
System action:  Initialization stops. The reason code is the return code from the DFSMSrmm message routine that failed. An error message is issued by the message routine.
Operator response:  Report this error to the system programmer.
System programmer response:  Report this error to the IBM Support Center.

U03nn
Explanation:  The DFSMSrmm subsystem encounters an error and cannot recover. DFSMSrmm issues an error message to describe the failure. nn in the completion code is the code returned from the failing service routine used.
Module:  EDGQMGR
System action:  The DFSMSrmm subsystem stops.
Operator response:  Report this error to the system programmer.
System programmer response:  Determine the cause of the error and correct it if possible. If it is not possible to correct the error, contact the IBM Support Center.

U0301
Explanation:  An error occurred while issuing a message to the TSO terminal.
Module:  EDGTSO
System action:  Processing ends.
Operator response:  Report this error to the system programmer.
System programmer response:  Report this error to the IBM Support Center.

U0302
Explanation:  The DFSMSrmm subsystem issued an unexpected return code and reason code.
Module:  EDGTSO
System action:  Processing ends.
Operator response:  Report this error to the system programmer.
System programmer response:  Report this error to the IBM Support Center.

Appendix C. DFSMSrmm System and User Completion Codes  71
U0303
Explanation: An error occurred while using the TSO service routine IKJCT441 to set the variable that contains the command failure reason code.
Module: EDGTSO
System action: Processing ends.
Programmer response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

U0304
Explanation: An error occurred while using the TSO service routine IKJCT441 to set the variable that contains the command error information message text.
Module: EDGTSO
System action: Processing ends.
Programmer response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

U0305
Explanation: An error occurred determining the validity of an SMS location or DFSMS Storage Group.
Module: EDGTSO
System action: Processing ends. The system writes a dump.
Programmer response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

U0306
Explanation: An error occurred determining if the SMS subsystem was active.
Module: EDGTSO
System action: Processing ends. The system writes a dump.
Programmer response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

U0307
Explanation: An error occurred during CLIST processing.
Module: EDGTSOCL
System action: Processing ends. The system writes a dump.
Programmer response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

U0350
Explanation: An error occurred performing a RACROUTE RACXTRT - EXTRACT.
Module: EDGRACF
System action: Processing ends.
Operator response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

U0360
Explanation: An error occurred performing an ICHEINTY DELETE ACCESS LIST.
Module: EDGRACF
System action: Processing ends.
Operator response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

U0370
Explanation: An error occurred performing a RACROUTE RACXTRT - REPLACE.
Module: EDGRACF
System action: Processing ends.
Operator response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

U0380
Explanation: An error occurred performing a RACROUTE DEFINE for a tape data set. DFSMSrmm tried to create the first entry in the TVTOC for a tape volume. TAPEVOL class and TAPEDSN option are in...
use and neither ADSP nor PROTECT=YES is specified in the JCL.

**Module:** EDGRACF

**System action:** Processing ends.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

---

**U0400**

**Explanation:** An error occurred performing a RACROUTE RACHECK.

**Module:** EDGRACF

**System action:** Processing ends.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

---

**U0400**

**Explanation:** An attempt to obtain the Job File Control Block (JFCB) for the PARMLIB DD failed.

**Module:** EDGPARM

**System action:** Processing ends.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

---

**U04nn**

**Explanation:** The DFSMSrmm subsystem encounters an error and cannot recover. DFSMSrmm issues an error message to describe the failure. nn in the completion code is the code returned from the failing service routine used.

**Module:** EDGQMGR

**System action:** The DFSMSrmm subsystem stops.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Determine the cause of the error and correct it if possible. If it is not possible to correct the error, report this error to the IBM Support Center.

---

**U0410**

**Explanation:** An error occurred performing a RACROUTE RACDEF - DELETE.

**Module:** EDGRACF

**System action:** Processing ends.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

---

**U0500**

**Explanation:** An error occurred performing a catalog LOCATE request.

**Module:** EDGRACF

**System action:** Processing ends.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

---

**U0500**

**Explanation:** DFSMSrmm failed to open the data set referred to by the PARMLIB DD.

**Module:** EDGPARM

**System action:** Processing ends.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

---

**U0520**

**Explanation:** An error occurred performing a catalog ALTER request.

**Module:** EDGRACF

**System action:** Processing ends.
Operator response: Report this error to the system programmer.

System programmer response: Report this error to the IBM Support Center.

__________________________
U0600
Explanation: The DFSMSrmm subsystem did not find the parmlib member to be used for the PARMLIB DD.
Module: EDGPARM
System action: Processing ends.
Operator response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

__________________________
U0630
Explanation: A processing error has occurred in DFSMSrmm EDGPARM. An internal error has occurred. The reason code in register 15 uniquely identifies the error.
Module: EDGPARM, EDGBKUP
System action: The current processing fails.
Operator response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center. You need the completion code and reason code, and any system dump that has been created.

__________________________
U0640
Explanation: A processing error has occurred in DFSMSrmm EDGINERS. An internal processing error has occurred. The reason code in register 15 uniquely identifies the error.
Module: EDGINERS
System action: The current processing fails.
Operator response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center. You need the completion code and reason code, and any system dump that has been created.

__________________________
U0650
Explanation: An error occurred determining if the SMS subsystem was active. You have tried to use the VOLCAT processing option for the EDGUTIL utility and SMS must be active if that option is used.
Module: EDGUTIL

__________________________
System action: Processing ends. The system writes a dump.
Programmer response: Report this error to the system programmer.

__________________________
System programmer response: Report this error to the IBM Support Center.

__________________________
U0651
Explanation: An error occurred determining if a volume location name is valid on the current system. You are using the VOLCAT processing option for the EDGUTIL utility and for each volume that is in a system-managed tape library. DFSMSrmm validates the location name prior to checking that the DFSMSrmm location name value matches that recorded in the volume catalog.
Module: EDGUTIL
System action: Processing ends. The system writes a dump.
Operator response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center. You need the completion code and reason code, and any system dump that has been created.

__________________________
U0652
Explanation: The utility, EDGUTIL, failed to add a message to the SYSPRINT file.
Module: EDGUTIL
System action: Processing ends.
Operator response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

__________________________
U0653
Explanation: An error occurred releasing a control data set record.
Module: EDGUTIL
System action: Processing fails. The system writes a dump.
Operator response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.
U0654

**Explanation:** An error occurred updating the control data set control record.

**Module:** EDGUTIL

**System action:** Processing fails. The system writes a dump.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

U0655

**Explanation:** An error occurred sorting data set records.

**Module:** EDGBKUP or EDGUTIL

**System action:** Processing fails. The system writes a dump.

**Operator response:** Report the error to the system programmer.

**System programmer response:** Correct the error that caused the SORT program to fail. Use the //SORTDIAG DD statement to trigger sort messages to the //SYSOUT file. These DD statements must be added to the job step executing the EDGBKUP or EDGUTIL utility.

If the failure is not sort related, report the problem to the IBM Support Center. Provide the system dump written as a result of the ABEND U0655.

U0656

**Explanation:** An error occurred locating the UCB address of the control data set.

**Module:** EDGBKUP, EDGMAIN, EDGUTIL

**System action:** IEFDDSRV processing has failed. The system writes a dump.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

U0657

**Explanation:** EDGUTIL detected an invalid VRS record type.

**Module:** EDGUTIL

**System action:** The current request fails, and EDGUTIL ends.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

U0658

**Explanation:** An internal error occurred in the DFSMSrmm utility EDGUTIL.

**Module:** EDGUTIL

**System action:** The current request fails, and EDGUTIL ends.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

U0659

**Explanation:** Library communication failed.

**Module:** EDGUTIL

**System action:** The current request fails, and EDGUTIL ends. An explanatory message, EDG6847E, is issued to the SYSPRINT file.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

U0660

**Explanation:** Filter processing failed.

**Module:** EDGUTIL

**System action:** The current request fails, and EDGUTIL ends. An explanatory message, EDG6848E, is issued to the SYSPRINT file.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

U0661

**Explanation:** An error occurred locating the TIOT address of the JOURNAL file.

**Module:** EDGBKUP. The GETDSAB return code is included in Register 15.

**System action:** GETDSAB processing has failed. The system writes a dump.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

Appendix C. DFSMSrmm System and User Completion Codes
U0662
Explanation: An error occurred in dynamic allocation of a temporary data set. The reason code is the return code from the DYNALLOC macro.
Module: EDGBKUP
System action: DFSMSrmm writes a dump and recovery processing begins.
Operator response: Report this error to the system programmer.
System programmer response: Review the return codes from DYNALLOC and take appropriate actions.

U0700
Explanation: The DFSMSrmm subsystem could not issue a message because of an error in the message processing routine.
Module: EDGPARM
System action: DFSMSrmm issues a WTO message and subsystem processing ends.
Operator response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

U0800
Explanation: An error occurred during LOCDEF validation.
Module: EDGPARM
System action: Processing ends. The system writes a dump.
Operator response: Report this error to the system programmer.
System programmer response: Report this error to the IBM Support Center.

U0801
Explanation: An error occurred in dynamic allocation of a temporary data set. The reason code is the return code from the DYNALLOC macro.
Module: EDGCNVRP
System action: DFSMSrmm writes a dump and recovery processing begins.
Operator response: Report this error to the system programmer.
System programmer response: Review the return codes from DYNALLOC and take appropriate actions.

U0802
Explanation: An error occurred obtaining information from the Job File Control Block (JFCB) of a temporary data set. The reason code is the return code from the RDJFCB macro.
Module: EDGCNVRP
System action: DFSMSrmm writes a dump and recovery processing begins.
Operator response: Report this error to the system programmer.
System programmer response: Review the return codes from RDJFCB and take appropriate actions.

U0803
Explanation: An error occurred in dynamic allocation of a temporary data set when attempting to deallocate the data set. The reason code is the return code from the DYNALLOC macro.
Module: EDGCNVRP
System action: DFSMSrmm writes a dump and recovery processing begins.
Operator response: Report this error to the system programmer.
System programmer response: Review the return codes from DYNALLOC and take appropriate actions.

U0804
Explanation: DFSMSrmm is processing a request to call a DFSMSrmm installation exit. An internal error has occurred. The reason code in register 15 uniquely identifies the error.
Module: EDGCMIX
System action: The current processing fails.
Operator response: Report this error to the system programmer.
System programmer response: Report the error to the IBM Support Center. You need the completion code and reason code, and any system dump that has been created.

U0810
Explanation: An error occurred processing a request from an OAM installation exit. The error is a result of processing in DFSMSrmm, not in the data passed to EDGLCSUX.
Module: EDGLCSUX
System action: Processing ends. The system writes a dump.
Programmer response: Report this error to the system programmer.

System programmer response: Report this error to the IBM Support Center.

---

U0811

Explanation: An error occurred processing a request from an OAM installation exit. The error is an unexpected Register 15 value on return from a subsystem request.

Module: EDGLCSUX

System action: Processing ends. The system writes a dump.

Programmer response: Report this error to the system programmer.

System programmer response: Report this error to the IBM Support Center.

---

U0812

Explanation: An error occurred processing a request from an OAM installation exit. The error is an unexpected Register 0 value on return from a subsystem request.

Module: EDGLCSUX

System action: Processing ends. The system writes a dump.

Programmer response: Report this error to the system programmer.

System programmer response: Report this error to the IBM Support Center.

---

U0813

Explanation: An error occurred processing a request from an OAM installation exit. The error is an unexpected return code from the DFSMSrmm common message routine.

Module: EDGLCSUX

System action: Processing ends. The system writes a dump.

Programmer response: Report this error to the system programmer.

System programmer response: Report this error to the IBM Support Center.

---

U0841

Explanation: An error occurred processing a request from an OAM installation exit. The error is an unexpected return code from the IDENTIFY macro.

Module: EDGLCSUX

System action: Processing ends. The system writes a dump.

Operator response: Report this error to the system programmer.

System programmer response: Report this error to the IBM Support Center.

---

U0842

Explanation: An error occurred processing a request from an OAM installation exit. The error is an unexpected return code from the ATTACH macro.

Module: EDGLCSUX

System action: Processing ends. The system writes a dump.

Operator response: Report this error to the system programmer.

System programmer response: Report this error to the IBM Support Center.

---

U0862

Explanation: An error occurred processing a request from an OAM installation exit. The error is an unexpected return code from the DETACH macro.

Module: EDGLCSUX

System action: Processing ends. The system writes a dump.

Operator response: Report this error to the system programmer.

System programmer response: Report this error to the IBM Support Center.

---

U0879

Explanation: An error occurred processing a request from an OAM installation exit. The error is an unexpected return code from the STATUS macro.

Module: EDGLCSUX

System action: Processing ends. The system writes a dump.

Operator response: Report this error to the system programmer.

System programmer response: Report this error to the IBM Support Center.

---

U0900

Explanation: DFSMSrmm is processing PRITITION or OPENRULE information. An internal error has occurred.

Module: EDGPARM
**System action:** The current parmlib processing fails.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

---

**U0901**

**Explanation:** The message EDG9001E was not found in the DFSMSrmm message table. EDG9001E is required to issue information for an error in message processing. The number of the message that was issued at the time of the abend is in Register 0.

**Module:** EDGCMMSG

**System action:** The current message processing fails. Each DFSMSrmm task schedules error recovery processing that can involve stopping the subsystem if the error is severe.

**Operator response:** Report this error to the system programmer.

**System programmer response:** This error is probably an error in EDGMTAB, the DFSMSrmm message table. Ensure that any updates to EDGMTAB have been made correctly.

---

**U0950**

**Explanation:** An attempt to issue a message by the DFSMSrmm subsystem failed because of an error in the message processing routine. The associated message is either EDG2050I or EDG2051I.

**Module:** EDGLOCV

**System action:** Processing ends.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

---

**U0998**

**Explanation:** An attempt to release control of the DFSMSrmm control data set failed. Previous error messages explain the error that was encountered.

**System action:** The DFSMSrmm error recovery routines are run. The most probable result is that the DFSMSrmm subsystem will shut down until the error can be corrected.

**Module:** EDGMFIO

**Operator response:** Report this error to the system programmer.

**System programmer response:** Correct the error and restart the DFSMSrmm subsystem. To correct the error, refer to the explanations and actions for the messages that have been issued.

---

**U0999**

**Explanation:** This code can be issued by both EDGVRECR and EDGDFHSM.

**Module:** EDGVRECR

**System action:** The current VRSEL inventory management requests fails.

**Operator response:** None.

**System programmer response:** The volume being returned to DFSMSrmm from DFSMShsm might not have been correctly processed. If necessary, use the DFSMSrmm ISPF dialog or RMM TSO subcommand to correctly process information about the volume.

---

**U1000**

**Explanation:** An error occurred in cross memory communication from the DFSMSrmm subsystem. DFSMSrmm could not issue a message because of an error in the DFSMSrmm message routine.

**Module:** EDGSXMC

**System action:** Processing continues

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

---

**U10nn**

**Explanation:** An error occurred in STACK processing while parsing parameters for a request to set up an output file for the terminal. nn in the completion code is the return code from IKJSTCK.

**Module:** EDGPARS
**System action**: The current parse request fails.

**Operator response**: Report this error to the system programmer.

**System programmer response**: Report this error to the IBM Support Center.

---

**U1097**

**Explanation**: An internal VSAM control block error was detected during DFSMSrmm VSAM buffer processing.

**Module**: EDGMVSM

---

**System action**: The current request fails.

**Operator response**: Report this error to the system programmer.

**System programmer response**: Save any dumps written as a result of the abend. Report this error to the IBM Support Center. If the problem persists, restart the DFSMSrmm procedure to attempt recovery.

---

**U11nn**

**Explanation**: An error occurred in STACK processing while parsing parameters for a request to close all input and output files used during parsing. *nn* in the completion code is the return code from IKJSTCK.

**Module**: EDGPARS

---

**System action**: The current parse request fails.

**Operator response**: Report this error to the system programmer.

**System programmer response**: Report this error to the IBM Support Center.

---

**U12nn**

**Explanation**: An error occurred in STACK processing while parsing parameters when opening the PARMLIB member. *nn* in the completion code is the return code from IKJSTCK.

**Module**: EDGPARS

---

**System action**: The current parse request fails.

**Operator response**: Report this error to the system programmer.

**System programmer response**: Report this error to the IBM Support Center.

---

**U13nn**

**Explanation**: An error occurred in STACK processing while parsing parameters when opening the PARMLIB sequential file. *nn* in the completion code is the return code from IKJSTCK.

**Module**: EDGPARS

---

**System action**: The current parse request fails.

**Operator response**: Report this error to the system programmer.

**System programmer response**: Report this error to the IBM Support Center.

---

**U14nn**

**Explanation**: An error occurred in GETLINE processing while parsing parameters. *nn* in the completion code is the return code from GETLINE.

**Module**: EDGPARS

---

**System action**: The current parse request fails.

**Operator response**: Report this error to the system programmer.

**System programmer response**: Report this error to the IBM Support Center.

---

**U15nn**

**Explanation**: An error occurred in PUTLINE processing while parsing parameters. *nn* in the completion code is the return code from PUTLINE.

**Module**: EDGPARS

---

**System action**: The current parse request fails.

**Operator response**: Report this error to the system programmer.

**System programmer response**: Report this error to the IBM Support Center.

---

**U1600**

**Explanation**: DFSMSrmm is processing a call to the installation exit, EDGUX100. The volume currently being opened should not be controlled by DFSMSrmm. DFSMSrmm checks that the request is valid, but some part of the validity checking process fails.

**Module**: EDGIX100

---

**System action**: The current open request fails.

**Operator response**: Report this error to the system programmer.

**System programmer response**: Report this error to the IBM Support Center.

---

**U1601**

**Explanation**: DFSMSrmm is processing a call to the installation exit, EDGUX100. Prior to calling the installation exit, DFSMSrmm tries to retrieve existing information it has for the mounted or requested...
...
• Location and library name validation failed with a return code greater than 8. DFSMSrmm also issues message EDG2222E to the MESSAGE file.

**System action:** The current VRSEL inventory management requests fails.

**Module:** EDGVRECM

**Operator response:** None.

**System programmer response:** If the problem occurred performing a sort, correct the error that caused the SORT program to fail. Use the //SORTDIAG DD statement to trigger sort messages to the //SYSOUT file. These DD statements must be added to the DFRMM started procedure.

If the failure occurred during location and library name validation, follow the actions described for message EDG2222E. If the problem cannot be resolved by following the message actions, report the problem to the IBM Support Center. Provide the system dump written as a result of the ABEND U2201.

**U2220**

**Explanation:** An error is encountered dynamically allocating a required file. DFSMSrmm issues message EDG2223E which contains the DYNALLOC return and reason code. Message EDG2223E is found in the message data set.

**System action:** The current VRSEL inventory management requests fails.

**Module:** EDGVRECI

**Programmer response:** Follow the actions identified for EDG2223E. For an explanation of the DYNALLOC codes, refer to [z/OS MVS Programming: Authorized Assembler Services Guide](#).

**Operator response:** None.

**U2222**

**Explanation:** An internal error occurred in DFSMSrmm.

**System action:** The current requests fails.

**Module:** EDGVRECI

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

**U2223**

**Explanation:** Vital record processing has ended early via the F DFRMM,CANCEL operator command.

**Module:** EDGVRECI

**System action:** The current VRSEL inventory management request fails. An explanatory message, EDG2319I, is issued to the MESSAGE file. DFSMSrmm detects the abend. Expiration processing and any other requested inventory management functions end.

**Operator response:** None.

**System programmer response:** None.

**U2224**

**Explanation:** An internal error related to partitioning or openrule entries has occurred.

**Module:** EDGSUSE

**System action:** The current OPEN/CLOSE/EOV or OAM request fails.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.

**U2410**

**Explanation:** An unexpected return code was received while performing I/O to the control data set. The subtask is unable to continue processing.

**Module:** EDGMUPD

**System action:** An explanatory message, EDG2440I, is issued. DFSMSrmm detects the abend and the system writes an SVC dump. Expiration processing and any other requested inventory management functions end.

**Operator response:** Report this error to the system programmer.

**System programmer response:** If you are unable to resolve the problem using the available diagnostic information, report this error to the IBM Support Center.

**U2420**

**Module:** EDGMUPD

**Explanation:** An unexpected return code was received from the installation exit common processing routine.

**System action:** DFSMSrmm detects the abend and writes an SVC dump. Expiration processing and any other requested inventory management functions end.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Report this error to the IBM Support Center.
**U2430**

**Explanation:** An unexpected return code was received performing a function for a volume in a volume catalog. The subtask is unable to continue processing.

**Module:** EDGMUPD

**System action:** An explanatory message, number EDG2433I, is issued. DFSMSrmm detects the abend and writes an SVC dump. Expiration processing and any other requested inventory management functions end.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Refer to the actions for message EDG2433I.

---

**U2440**

**Explanation:** An unexpected return code was received while updating action status information for a volume in the DFSMSrmm control data set. The subtask is unable to continue processing.

**Module:** EDGMUPD

**System action:** An explanatory message, one of EDG2430I, EDG2431I, or EDG2432I is issued. DFSMSrmm detects the abend and writes an SVC dump. Expiration processing and any other requested inventory management functions end.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Refer to the actions for any accompanying message. If reporting the problem to the IBM Support Center, have available the summary dump information.

---

**U2450**

**Explanation:** An unexpected return code was received while validating software level, location name for a volume, or obtaining volume information from the volume catalog. The subtask is unable to continue processing.

**Module:** EDGMUPD

**System action:** An explanatory message, number EDG2441I, is issued. DFSMSrmm detects the abend and writes an SVC dump. Expiration processing and any other requested inventory management functions end.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Refer to the actions for message EDG2441I.

---

**U2460**

**Explanation:** An unexpected return code was received while performing storage location management processing. The subtask is unable to continue processing.

**Module:** EDGMUPD

**System action:** DFSMSrmm issues message EDG2442E. DFSMSrmm detects the abend and writes an SVC dump. Storage location management processing and any other requested inventory management functions end.

**Operator response:** Report this error to the system programmer.

**System programmer response:** Refer to the actions for message EDG2442E.

---

**U2603**

**Explanation:** An unexpected return code was received from the external sort. The subtask is unable to continue processing.

**Module:** EDGXRP TX

**System action:** DFSMSrmm detects the abnormal end (abend) and writes an SVC dump. All inventory management functions end.

**Operator response:** None.

**Programmer response:** Correct the error that caused the SORT program to fail and resubmit the job. If the problem occurs again, report this error to the system programmer.

**System programmer response:** When your external SORT program is DFSORT, use the SORTDIAG DD statement to trigger sort messages to the SYSOUT file. These DD statements must be added to the DFRMM started procedure and should be coded as follows:

```
//SORTDIAG DD DUMMY
//SYSOUT DD SYSOUT=* *
```


To resolve the problem, change DFSORT options using the DFSPARM DD statement. Refer to [z/OS DFSORT Application Programming Guide](https://www.ibm.com/support/knowledgecenter/POWER9/sphprz_9.1.0/com.ibm.zos.zphr/apg/apg_10000899.html) for details about DFSORT options and how to use the DFSPARM DD. If the problem can not be resolved and no other diagnostic information is available to resolve the problem, report the error to the IBM Support Center.
U3000  
**Explanation:** A DFSMSrmm OPEN/CLOSE/EOV routine was invoked for an undetermined OPEN/CLOSE/EOV exit.  
**Module:** EDGOCEXT or EDGOCEOV  
**System action:** Processing fails.  
**Operator response:** None  
**Programmer response:** Report this error to the system programmer.  
**System programmer response:** A logic error occurred during OPEN/CLOSE/EOV processing. Report this error to the IBM Support Center.

U3001  
**Explanation:** A DFSMSrmm OPEN/CLOSE/EOV routine was invoked for an undetermined OPEN/CLOSE/EOV exit.  
**Module:** EDGOCEOV  
**System action:** The current request fails.  
**Operator response:** None.  
**Programmer response:** Report this error to the system programmer.  
**System programmer response:** A logic error occurred during OPEN/CLOSE/EOV processing. Report this error to the IBM Support Center.

U3002  
**Explanation:** DFSMSrmm returned an unsupported return code value to the module for label anomaly processing.  
**Module:** EDGOCEOV  
**System action:** The current request fails.  
**Operator response:** None.  
**Programmer response:** Report this error to the system programmer.  
**System programmer response:** A logic error occurred during OPEN/CLOSE/EOV processing. Report this error to the IBM Support Center.

U3003  
**Explanation:** DFSMSrmm returned an unsupported return code value to the module for file validation processing.  
**Module:** EDGOCEOV  
**System action:** The current request fails.  
**Operator response:** None.  
**Programmer response:** Report this error to the system programmer.  
**System programmer response:** A logic error occurred during OPEN/CLOSE/EOV processing. Report this error to the IBM Support Center.

U3004  
**Explanation:** An error occurred during O/C/EOV processing.  
**Module:** EDGOCEOV  
**System action:** The current request fails.  
**Operator response:** None.  
**Programmer response:** Report this error to the system programmer.  
**System programmer response:** A logic error occurred during OPEN/CLOSE/EOV processing. Report this error to the IBM Support Center.

U3005  
**Explanation:** DFSMSrmm does not support the request.  
**Module:** EDGOCEOV  
**System action:** The current request fails.  
**Operator response:** None.  
**Programmer response:** Report this error to the system programmer.  
**System programmer response:** A logic error occurred during OPEN/CLOSE/EOV processing. Report this error to the IBM Support Center.

U3006  
**Explanation:** DFSMSrmm issues a message but message processing fails. DFSMSrmm returns the return code and reason code from the message processing routine in register 2 and register 3.  
**Module:** EDGOCEXT  
**System action:** DFSMSrmm writes a system dump and fails the current request.  
**Operator response:** None.  
**Programmer response:** Report this error to the system programmer.  
**System programmer response:** A logic error occurred during OPEN/CLOSE/EOV processing. Report this error to the IBM Support Center.
Appendix D. Modifier Keywords

Use this topic to help you build modifier keywords to add to your keyword string. The modifier keywords are optional, but can help restrict the scope of a software database search to a manageable number of matches. You can specify modifier keywords in any order. Select a modifier keyword that describes a failure-related function from Table 7.

Table 7. Function Modifier Keywords

<table>
<thead>
<tr>
<th>Keyword</th>
<th>Failing Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>API</td>
<td>DFSMSrmm application programming interface</td>
</tr>
<tr>
<td>AUDIT</td>
<td>Audit function of EDGAUD</td>
</tr>
<tr>
<td>BACKUP</td>
<td>Control data set backup performed by the DFSMSrmm EDGBKUP utility</td>
</tr>
<tr>
<td>CATSINCH</td>
<td>Catalog synchronize</td>
</tr>
<tr>
<td>CATSINCHVERIFY</td>
<td>Catalog synchronize verify processing performed by the DFSMSrmm inventory management EDGHSKP utility</td>
</tr>
<tr>
<td>CDS</td>
<td>DFSMSrmm control data set</td>
</tr>
<tr>
<td>DIALOG</td>
<td>DFSMSrmm dialog</td>
</tr>
<tr>
<td>DSTORE</td>
<td>Storage location management processing performed by the DFSMSrmm inventory management EDGHSKP utility</td>
</tr>
<tr>
<td>DSTOREBYLOC</td>
<td>Storage location management processing only for defined locations</td>
</tr>
<tr>
<td>DUPVOL</td>
<td>Duplicate volume support</td>
</tr>
<tr>
<td>EDGTVEXT</td>
<td>DFSMSHsm interface</td>
</tr>
<tr>
<td>EXPROC</td>
<td>Expiration processing performed by the DFSMSrmm inventory management EDGHSKP utility</td>
</tr>
<tr>
<td>EXTENDEDBIN</td>
<td>Extended bin support</td>
</tr>
<tr>
<td>EXTRACT</td>
<td>Report extract data set</td>
</tr>
<tr>
<td>HSKPBACKUP</td>
<td>Control data set backup performed by the DFSMSrmm inventory management EDGHSKP utility</td>
</tr>
<tr>
<td>INERSEASE</td>
<td>Erase function of EDGINERS</td>
</tr>
<tr>
<td>INERSINIT</td>
<td>Initialize function of EDGINERS</td>
</tr>
<tr>
<td>INSEQUENCE</td>
<td>Assigning volumes to bins in sequence during storage location management processing</td>
</tr>
<tr>
<td>JOURNAL</td>
<td>DFSMSrmm journal data set</td>
</tr>
<tr>
<td>MOVEBY</td>
<td>Moving volumes by set or volume</td>
</tr>
<tr>
<td>REASSIGN</td>
<td>Reassign locations and bins for moving volumes during storage location management processing</td>
</tr>
<tr>
<td>Keyword</td>
<td>Failing Function</td>
</tr>
<tr>
<td>------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>REPORTGENERATOR</td>
<td>Report Generator functions</td>
</tr>
<tr>
<td>RETAINBY</td>
<td>Retaining volumes by set or volume</td>
</tr>
<tr>
<td>REUSEBIN</td>
<td>Reusing bins when a volume move is started or after the volume move is confirmed</td>
</tr>
<tr>
<td>RPTEXT</td>
<td>Report extract creation performed by the DFSMSrmm inventory management EDGHSKP utility</td>
</tr>
<tr>
<td>SECURE</td>
<td>Security report function of EDGAUD</td>
</tr>
<tr>
<td>SMSTAPE</td>
<td>Audit of system-managed volumes performed by the DFSMSrmm EDGUTIL utility</td>
</tr>
<tr>
<td>TSOCOMMAND</td>
<td>DFSMSrmm TSO commands</td>
</tr>
<tr>
<td>UTILCHANGE</td>
<td>Change function of EDGUTIL</td>
</tr>
<tr>
<td>UTILCREATE</td>
<td>Create function of EDGUTIL</td>
</tr>
<tr>
<td>UTILMEND</td>
<td>Mend function of EDGUTIL</td>
</tr>
<tr>
<td>UTILVERIFY</td>
<td>Verify function of EDGUTIL</td>
</tr>
<tr>
<td>VRSEL</td>
<td>Vital record processing by EDGHSKP</td>
</tr>
<tr>
<td>VRSELNEW</td>
<td>VRS enhancements</td>
</tr>
<tr>
<td>VRSELVERIFY</td>
<td>Vital record VERIFY processing by EDGHSKP</td>
</tr>
<tr>
<td>VTS</td>
<td>DFSMSrmm virtual tape server support</td>
</tr>
</tbody>
</table>
Appendix E. Accessibility

Publications for this product are offered in Adobe Portable Document Format (PDF) and should be compliant with accessibility standards. If you experience difficulties when using PDF files, you may view the information through the z/OS Internet Library website or the z/OS Information Center. If you continue to experience problems, send an email to mhvrncfs@us.ibm.com or write to:

IBM Corporation
Attention: MHVRNCFS Reader Comments
Department H6MA, Building 707
2455 South Road
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USA

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, z/OS TSO/E User’s Guide and z/OS ISPF User’s Guide Vol I 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.

z/OS information

z/OS information is accessible using screen readers with the BookServer or Library Server versions of z/OS books in the Internet library at:

http://www.ibm.com/systems/z/os/zos/bkserv/

One exception is command syntax that is published in railroad track format, which is accessible using screen readers with the Information Center, as described in "Dotted decimal syntax diagrams."

Dotted decimal syntax diagrams

Syntax diagrams are provided in dotted decimal format for users accessing the Information Center using a screen reader. In dotted decimal format, each syntax element is written on a separate line. If two or more syntax elements are always
present together (or always absent together), they can appear on the same line, because they can be considered as a single compound syntax element.

Each line starts with a dotted decimal number; for example, 3 or 3.1 or 3.1.1. To hear these numbers correctly, make sure that your screen reader is set to read out punctuation. All the syntax elements that have the same dotted decimal number (for example, all the syntax elements that have the number 3.1) are mutually exclusive alternatives. If you hear the lines 3.1 USERID and 3.1 SYSTEMID, you know that your syntax can include either USERID or SYSTEMID, but not both.

The dotted decimal numbering level denotes the level of nesting. For example, if a syntax element with dotted decimal number 3 is followed by a series of syntax elements with dotted decimal number 3.1, all the syntax elements numbered 3.1 are subordinate to the syntax element numbered 3.

Certain words and symbols are used next to the dotted decimal numbers to add information about the syntax elements. Occasionally, these words and symbols might occur at the beginning of the element itself. For ease of identification, if the word or symbol is a part of the syntax element, it is preceded by the backslash (\) character. The * symbol can be used next to a dotted decimal number to indicate that the syntax element repeats. For example, syntax element *FILE with dotted decimal number 3 is given the format 3 \* FILE. Format 3* FILE indicates that syntax element FILE repeats. Format 3* \* FILE indicates that syntax element * FILE repeats.

Characters such as commas, which are used to separate a string of syntax elements, are shown in the syntax just before the items they separate. These characters can appear on the same line as each item, or on a separate line with the same dotted decimal number as the relevant items. The line can also show another symbol giving information about the syntax elements. For example, the lines 5.1*, 5.1 LASTRUN, and 5.1 DELETE mean that if you use more than one of the LASTRUN and DELETE syntax elements, the elements must be separated by a comma. If no separator is given, assume that you use a blank to separate each syntax element.

If a syntax element is preceded by the % symbol, this indicates a reference that is defined elsewhere. The string following the % symbol is the name of a syntax fragment rather than a literal. For example, the line 2.1 %OP1 means that you should refer to separate syntax fragment OP1.

The following words and symbols are used next to the dotted decimal numbers:

- ? means an optional syntax element. A dotted decimal number followed by the ? symbol indicates that all the syntax elements with a corresponding dotted decimal number, and any subordinate syntax elements, are optional. If there is only one syntax element with a dotted decimal number, the ? symbol is displayed on the same line as the syntax element, (for example 5? NOTIFY). If there is more than one syntax element with a dotted decimal number, the ? symbol is displayed on a line by itself, followed by the syntax elements that are optional. For example, if you hear the lines 5 ?, 5 NOTIFY, and 5 UPDATE, you know that syntax elements NOTIFY and UPDATE are optional; that is, you can choose one or none of them. The ? symbol is equivalent to a bypass line in a railroad diagram.

- ! means a default syntax element. A dotted decimal number followed by the ! symbol and a syntax element indicate that the syntax element is the default option for all syntax elements that share the same dotted decimal number. Only
one of the syntax elements that share the same dotted decimal number can
 specify a ! symbol. For example, if you hear the lines 2? FILE, 2.1! (KEEP), and
 2.1 (DELETE), you know that (KEEP) is the default option for the FILE keyword.
 In this example, if you include the FILE keyword but do not specify an option,
 default option KEEP will be applied. A default option also applies to the next
 higher dotted decimal number. In this example, if the FILE keyword is omitted,
 default FILE(KEEP) is used. However, if you hear the lines 2? FILE, 2.1, 2.1.1!
 (KEEP), and 2.1.1 (DELETE), the default option KEEP only applies to the next
 higher dotted decimal number, 2.1 (which does not have an associated
 keyword), and does not apply to 2? FILE. Nothing is used if the keyword FILE
 is omitted.

• * means a syntax element that can be repeated 0 or more times. A dotted
decimal number followed by the * symbol indicates that this syntax element can
 be used zero or more times; that is, it is optional and can be repeated. For
 example, if you hear the line 5.1* data area, you know that you can include one
 data area, more than one data area, or no data area. If you hear the lines 3*, 3
 HOST, and 3 STATE, you know that you can include HOST, STATE, both
 together, or nothing.

Notes:
1. If a dotted decimal number has an asterisk (*) next to it and there is only one
    item with that dotted decimal number, you can repeat that same item more
    than once.
2. If a dotted decimal number has an asterisk next to it and several items have
    that dotted decimal number, you can use more than one item from the list,
    but you cannot use the items more than once each. In the previous example,
    you could write HOST STATE, but you could not write HOST HOST.
3. The * symbol is equivalent to a loop-back line in a railroad syntax diagram.

• + means a syntax element that must be included one or more times. A dotted
decimal number followed by the + symbol indicates that this syntax element
 must be included one or more times; that is, it must be included at least once
 and can be repeated. For example, if you hear the line 6.1+ data area, you must
 include at least one data area. If you hear the lines 2+, 2 HOST, and 2 STATE,
 you know that you must include HOST, STATE, or both. Similar to the * symbol,
 the + symbol can only repeat a particular item if it is the only item with that
 dotted decimal number. The + symbol, like the * symbol, is equivalent to a
 loop-back line in a railroad syntax diagram.
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Programming interface information

This publication documents information that is not intended to be used as Programming Interfaces of DFSMSrmm.

Policy for unsupported hardware

Various z/OS elements, such as DFSMS, HCD, JES2, JES3, and MVS, contain code that supports specific hardware servers or devices. In some cases, this device-related element support remains in the product even after the hardware devices pass their announced End of Service date. z/OS may continue to service element code; however, it will not provide service related to unsupported hardware devices. Software problems related to these devices will not be accepted for service, and current service activity will cease if a problem is determined to be associated with out-of-support devices. In such cases, fixes will not be issued.

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