z/OS

# JES2 Migration

GA22-7538-00

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**Note**

Before using this information and the product it supports, be sure to read the general information under Appendix C, “Notices” on page C-1.

**First Edition, March 2001**

This edition applies to Version 1 Release 1 of z/OS (5694-A01) and to all subsequent releases and modifications until otherwise indicated in new editions.

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# About This Book

This book provides information to assist Job Entry Subsystem 2 (JES2) users in migrating to z/OS Version 1 Release 1 JES2.

This book is intended as a high-level overview for use by experienced system programmers responsible for migrating to z/OS Version 1 Release 1 JES2 from earlier releases of JES2. It is divided into two logical sections:

- Chapters 1 and 2 give clear technical descriptions of the enhancements provided by each release of JES2.
- Following chapters, beginning with Chapter 3, describe the migration actions that customers **must** take to ensure an orderly transition to a new level of JES2.

## Who Should Use This Book

Readers of this book should have an in-depth knowledge of the configuration and procedures of the current installation as well as the target installation.

The system programmer reading this book might need to inform other users (operators, application programmers, other system programmers) about the migration actions they need to take for their migration.

This book works best when considered as a companion book to other books:

- Read *z/OS Planning for Installation* to develop an installation plan.
- Use the documentation shipped with your order to install the system.
- Use books such as *z/OS JES2 Initialization and Tuning Guide* and *z/OS JES2 Initialization and Tuning Reference* to activate new JES2 functions.

## How to Use This Book

In this book, the following abbreviations indicate the JES2 component:

*Figure 0-1. JES2 Release Abbreviations*

| Abbreviation | Release Title |
|---|---|
| JES2 OS/390 V1R1 | OS/390 JES2 Version 1 Release 1 |
| JES2 OS/390 V1R3 | OS/390 JES2 Version 1 Release 3 |
| JES2 OS/390 V2R4 | OS/390 JES2 Version 2 Release 4 |
| JES2 OS/390 V2R5 | OS/390 JES2 Version 2 Release 5 |
| JES2 OS/390 V2R7 | OS/390 JES2 Version 2 Release 7 |
| JES2 OS/390 V2R8 | OS/390 JES2 Version 2 Release 8 |
| JES2 OS/390 V2R10 | OS/390 JES2 Version 2 Release 10 |
| JES2 z/OS V1R1 | z/OS JES2 Version 1 Release 1 |

To **learn about the release** of JES2 that you are installing, read the following chapters:

- Chapter 2, Migration Roadmap summarizes compatible and incompatible additions, changes, and deletions for each JES2 release in terms of the following categories:
  - Initialization
  - Installation Modfications
  - Operations
  - Applications
  - Problem Determination and Diagnosis
  - Accounting
  - Migration Actions

  Each category for the JES2 release references that section in the Release Overview where specific changes are explained. A **compatible** change does not require action to ensure that functions available before converting to the new release remain available. An **incompatible** change may require changes to installation-written modifications, operating procedures, or installation policy to ensure the continued availability of existing functions. Guidance and reference information about how to implement and use new functions or functions that are compatible with the previous release are discussed in other books in the JES2 library. Information about how to implement and use new functions that may be incompatible with the previous release is located in the "overview chapters" and the "migration actions" chapters that follow.

  To **determine which migration actions you need to take,** select the chapter that applies to your migration path, which begins with Chapter 3. Look for the “migration actions” that your installation must take. Some of the migration actions are required for all installations “passing through” that release. Other migration actions are required only if you are using a function (such as an exit) that has changed.

  Read **one** of the following chapters:
  - Chapter 9, Migration Actions: JES2 OS/390 V1R1 to JES2 z/OS V1R1.
  - Chapter 8, Migration Actions: JES2 OS/390 V1R3 to JES2 z/OS V1R1.
  - Chapter 7, Migration Actions: JES2 OS/390 V2R4 to JES2 z/OS V1R1.
  - Chapter 6, Migration Actions: JES2 OS/390 V2R5 to JES2 z/OS V1R1.
  - Chapter 5, Migration Actions: JES2 OS/390 V2R7 to JES2 z/OS V1R1.
  - Chapter 4, Migration Actions: JES2 OS/390 V2R8 to JES2 z/OS V1R1.

The following appendices also are provided:

- Appendix A, Sample Exits lists sample exits for JES2.
- Appendix B, Split/New/Deleted/Resequenced Parts for JES2 lists modules that have changed in each release.
- Appendix C, Notices lists the notices.
- Chapter 10, Version Summary Tables summarizes the new, changed, and deleted interfaces for JES2 releases starting with OS/390 JES2 Version 1 Release 1. The chapter provides charts for changes to initialization statements, commands, macros, mapping macros, and installation exits.

## Where to Find More Information

The following table lists books that are referenced in this book.

| Title | Order Number |
|---|---|
| *MVS/ESA SP V4 JES2 Conversion Notebook* | GC23-0081 |
| *MVS/ESA SP V5 JES2 Migration Notebook* | GC28-1437 |
| *OS/390 JES2 Conversion Notebook* | GC28-1797 |

Most licensed books were declassified in OS/390 V2R4 and are now included on the z/OS Online Library Collection. The remaining licensed books appear in unencrypted BookManager softcopy and PDF form on the z/OS Licensed Product Library.

## Accessing licensed books on the Web

z/OS licensed documentation in PDF format is available on the Internet at the IBM Resource Link Web site at:

`http://www.ibm.com/servers/resourcelink`

Licensed books are available only to customers with a z/OS license. Access to these books requires an IBM Resource Link Web userid and password, and a key code. With your z/OS order you received a memo that includes this key code.

To obtain your IBM Resource Link Web userid and password log on to:

`http://www.ibm.com/servers/resourcelink`

To register for access to the z/OS licensed books:

1. Log on to Resource Link using your Resource Link userid and password.
2. Click on **User Profiles** located on the left-hand navigation bar.
3. Click on **Access Profile.**
4. Click on **Request Access to Licensed books.**
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If you supplied the correct key code you will receive confirmation that your request is being processed. After your request is processed you will receive an e-mail confirmation.

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To access the licensed books:

1. Log on to Resource Link using your Resource Link userid and password.
2. Click on **Library**.
3. Click on **zSeries**.
4. Click on **Software**.
5. Click on **z/OS**.

6. Access the licensed book by selecting the appropriate element.

## Using LookAt to look up message explanations

LookAt is an online facility that allows you to look up explanations for z/OS messages and system abends.

Using LookAt to find information is faster than a conventional search because LookAt goes directly to the explanation.

LookAt can be accessed from the Internet or from a TSO command line.

You can use LookAt on the Internet at:

`http://www.ibm.com/servers/eserver/zseries/zos/bkserv/lookat/lookat.html`

To use LookAt as a TSO command, LookAt must be installed on your host system. You can obtain the LookAt code for TSO from the LookAt Web site by clicking on **News and Help** or from the *z/OS Collection*, SK3T-4269.

To find a message explanation from a TSO command line, simply enter: **lookat** *message-id* as in the following example:

```
lookat iec192i
```

This results in direct access to the message explanation for message IEC192I.

To find a message explanation from the LookAt Web site, simply enter the message ID. You can select the release if needed.

**Note:** Some messages have information in more than one book. For example, IEC192I has routing and descriptor codes listed in *z/OS MVS Routing and Descriptor Codes*. For such messages, LookAt prompts you to choose which book to open.

## Additional Information

Additional information about z/OS elements can be found in the following books.

| Title | Order Number | Description |
|---|---|---|
| *z/OS Introduction and Release Guide* | GA22-7502 | Describes the contents and benefits of z/OS as well as the planned packaging and delivery of this new product. |
| *z/OS Planning for Installation* | GA22-7504 | Contains information that lets users:<br>• Understand the content of z/OS<br>• Plan to get z/OS up and running<br>• Install the code<br>• Take the appropriate migration actions<br>• Test the z/OS system |
| *z/OS Information Roadmap* | SA22-7500 | Describes the information associated with z/OS including z/OS books and books for the participating elements. |

| Title | Order Number | Description |
|---|---|---|
| *z/OS Summary of Message Changes* | *SA22-7505* | Describes the changes to messages for individual elements of z/OS.<br>**Note:** This book is provided in softcopy only on the message bookshelf of the z/OS collection kit. |

## Determining If a Publication Is Current

As needed, IBM updates its publications with new and changed information. For a given publication, updates to the hardcopy and associated BookManager softcopy are usually available at the same time. Sometimes, however, the updates to hardcopy and softcopy are available at different times. Here's how to determine if you are looking at the most current copy of a publication:

1. At the end of a publication's order number there is a dash followed by two digits, often referred to as the dash level. A publication with a higher dash level is more current than one with a lower dash level. For example, in the publication order number GC28-1747-07, the dash level 07 means that the publication is more current than previous levels, such as 05 or 04.
2. If a hardcopy publication and a softcopy publication have the same dash level, it is possible that the softcopy publication is more current than the hardcopy publication. Check the dates shown in the Summary of Changes. The softcopy publication might have a more recently dated Summary of Changes than the hardcopy publication.
3. To compare softcopy publications, you can check the last two characters of the publication's filename (also called the book name). The higher the number, the more recent the publication. Also, next to the publication titles in the CD-ROM booklet and the readme files, there is an asterisk that indicates whether a publication is new or changed.

# Chapter 1. Migration Overview

Your plan for migrating to the new level of JES2 should include information from a variety of sources. These sources of information describe topics such as coexistence, service, hardware and software requirements, installation and migration procedures, and interface changes.

The following documentation, which is supplied with your product order, provides information about installing your z/OS system. In addition to specific information about JES2, this documentation contains information about all of the z/OS elements.

- *z/OS Planning for Installation*

  This book describes the installation requirements for z/OS at a system and element level. It includes hardware, software, and service requirements for both the driving and target systems. It also describes any coexistence considerations and actions.

- *z/OS Program Directory*

  This document, which is provided with your z/OS product order, leads you through the specific installation steps for JES2 and the other z/OS elements.

- *ServerPac Installing Your Order*

  This is the order-customized, installation book for using the ServerPac Installation method. Be sure to review “Appendix A. Product Information,” which describes data sets supplied, jobs or procedures that have been completed for you, and product status. IBM may have run jobs or made updates to PARMLIB or other system control data sets. These updates could affect your migration.

Within this book, you can find information about the specific updates and considerations that apply to this release of JES2.

Also, z/OS Version 1 Release 1 allows the coexistence of various releases of OS/390 JES2 with z/OS. This gives you flexibility as you migrate systems in a multisystem configuration. Up to "four" consecutive releases can coexist. The following table enumerates this coexistenc. The release shown in column 1 is the highest OS/390 release running a multisystem configuration. The JES2 component of z/OS Version 1 Release 1 is functionally equivalent to OS/390 Version 2 Release 10 JES2. This migration publication is written at the level where all JES2 migration paths culiminate at this level **(z/OS V1R1 & OS/390 V2R10)**. as the target.

*Figure 1-1. Coexistent Supported Releases*

| Release | Coexistent Release (s) |
|---|---|
| V1R1 | V1R1 |
| V1R2 | V1R2, V1R1 |
| V1R3 | V1R3, V1R2, V1R1 |
| V2R4 | V2R4, V1R3, V1R2, V1R1 |
| V2R5 | V2R5, V2R4, V1R3, V1R2 |
| V2R6 | V2R6, V2R5, V2R4, V1R3, V1R2 (*) |
| V2R7 | V2R7, V2R6, V2R5, V2R4 |
| V2R8 | V2R8, V2R7, V2R6, V2R5 |
| V2R9 | V2R9, V2R8, V2R7, V2R6 |
| V2R10 | V2R10, V2R9, V2R8, V2R7, V2R6 (**) |
| z/OS | V1R1 (z/OS V1R1 & OS/390 V2R10) (***), V2R9, V2R8, V2R7, V2R6 (**) |

**Note:**

* Coexistence of OS/390 R2 with OS/390 R6 supported as a special provision

** Coexistence of OS/390 R6 with OS/390 R10 supported as a special provision

*** (z/OS V1R1 & OS/390 V2R10) treated as one coexistent level

JES2 z/OS V1R1 is the abbreviation for (z/OS V1R1 & OS/390 V2R10) in this publication.

z/OS allows the JES2 element of the system to be separately staged. Differing levels of JES2 can coexist with the JES2 release provided with z/OS. This publication provides the details you need to migrate from such a coexisting release to JES2 z/OS V1R1.

*Figure 1-2. Publication Layout*

| Topic | Page |
|---|---|
| Chapter 2, Migration Roadmap | 2-1 |
| This section identifies the JES2 releases and itemizes the content of each release. Specific content descriptions of each release is referenced in the "release overview" section of the publication. These release overviews help you to assess each JES2 release with respect to your current level of JES2.<br><br>The migration path you choose is defined as your current JES2 release and the target JES2 release you choose to migrate to. A "Migration Actions" section of each JES2 product roadmap references the migration path description in this publication that applies. For example, if your present JES2 level is Version 1 Release 3 and you are reading this z/OS JES2 Version 1 Release 1 level of the publication, you are planning a migration from Version 1 Release 3 to JES2 z/OS V1R1. This migration path defines how you use this publication:<br><br>• Read “JES2 z/OS V1R1 Summary” on page 2-1, which references “JES2 z/OS V1R1 Overview” on page 3-1 and Chapter 8, “Migration Actions: JES2 OS/390 V1R3 to JES2 z/OS V1R1” on page 8-1.<br>• Read “JES2 z/OS V1R1 Overview” on page 3-1, which describes the changes to JES2 for (z/OS V1R1 & OS/390 V2R10).<br>• Read Chapter 8, “Migration Actions: JES2 OS/390 V1R3 to JES2 z/OS V1R1” on page 8-1, which specifically describes the migration actions you'll need to consider when you do the migration to JES2 z/OS V1R1. | |
| Chapter 3, Release Overviews | 3-1 |
| This chapter describes the specific updates that were made to JES2 for each release and provides an overview of the changes, a description of any migration and coexistence tasks that may be considered, and where you can find more detailed information. | |
| Chapter 10, Version Summary Tables | 10-1 |
| This chapter provides a summary of the changes that are made to JES2 user and programming interfaces. | |

## Terms You Need to Know

This section describes some terms you may need to know as you use this book.

**Base Release** The JES2 release you are currently running.

**Target Release** The JES2 release you are choosing to migrate to.

**Compatible Change** A compatible change does not require action to ensure that functions available before converting to the new release remain available.

**Incompatible Change** An incompatible change may require changes to installation-written modifications, operating procedures, or installation policy to ensure the continued availability of existing functions.

**Migration** Activities that relate to the installation of a new version or release of a program to replace an earlier level. Completion of these activities ensures that the applications and resources on your system will function correctly at the new level.

**Coexistence** Two or more systems at different levels (for example, software, service or operational levels) that share resources. Coexistence includes the ability of a system to respond in the following ways to a new function that was introduced on another

| | |
|---|---|
| | system with which it shares resources: ignore a new function, terminate gracefully, support a new function. The following are examples of multisystem configurations in which resource sharing can occur:<br>• A single system running multiple LPARs<br>• A single processor that is time-sliced to run different levels of the system (for example, during different times of the day)<br>• Two or more systems running separate processors<br>• A Parallel Sysplex configuration (also includes a basic sysplex) |
| **Multi-Access Spool (MAS)** | Multiple systems sharing the JES2 input, job, and output queues. |
| **Member of MAS** | A JES2 instance of a MVS system. |

## Developing a Migration Strategy

The recommended steps for migrating to a new release of JES2 are:

1. Become familiar with the supporting migration and installation documentation for the target release.

   You should determine what updates are needed for products that are supplied by IBM, system libraries, and non-IBM products. Review *z/OS Planning for Installation* and *z/OS Introduction and Release Guide* for information about JES2 and other z/OS elements.

2. Develop a migration plan for your installation.

   When planning to migrate to a new release of JES2, you must consider high-level support requirements, such as machine and programming restrictions, migration paths, program compatibility, and MAS considerations.

3. Obtain and install any required program temporary fixes (PTFs) or updated versions of the operating system to all members of the MAS to ensure functional compatibility and coexistence.

   It is important that all those PTFs required on all OTHER members of the MAS be installed "before" a member with the new JES2 release is run in the MAS.

   Call the IBM Software Support Center to obtain the preventive service planning (PSP) upgrade for JES2, which provides the most current information about PTFs for JES2. Check RETAIN again just before testing JES2. For information about how to request the PSP upgrade, refer to z/OS Program Directory. Although z/OS Program Directory contains a list of the required PTFs, the most current information is available from the IBM Software Support Center.

4. Install the product using z/OS Program Directory or *ServerPac Installing Your Order* documentation.

5. Contact programmers who are responsible for updating applications at your installation.

   Verify that your installation's applications will continue to run, and, if necessary, make changes to ensure compatibility with the new release.

6. Use the new release before initializing major new function.
7. If necessary, customize the new function for your installation.
8. Exercise the new functions now available on this member.
9. Repeat steps #4 thru #8 on the other members of the MAS.

## Reviewing changes to JES2 processing

As you define your installation's migration plan, consider how the new and changed JES2 support might affect the following areas of JES2 processing. In Chapter 3, “Release Overviews” on page 3-1, you should review the specific release overview that is the target of your migration path. Then review the “Migration Actions” sections for your migration path to determine how, or if, the support affects the tasks that are performed at your installation.

**Initialization**
You must be aware of how changes introduced by a new product release can affect JES2 initialization. Changes in initialization can affect real and virtual storage requirements, performance, security, and integrity, as well as automatic command processing and networking.

**Installation Modifications**
To meet the specific requirements of your installation, you can customize JES2 functions to take advantage of new support after the product is installed. For example, you can tailor JES2 through the use of installation exit routines, class descriptor table (CDT) entries, or options to improve performance. This book lists changes to JES2 that might require your installation to tailor the product, either to ensure that JES2 runs as before or to accommodate new security controls that your installation may need.

**Application development**
Application development programmers must be aware of new functions introduced in a new release of JES2. To ensure that existing programs run as before, your application programmers need to know about any changes in data areas and processing requirements. This book provides an overview of the changes that might affect existing application programs.

**Operations**
The new JES2 release might introduce changes to its operating characteristics, such as changed commands, new or changed messages, or in the methods of implementing new functions. This book identifies those changes for which you should provide user education before running this release of the product.

**Problem Determination and Diagnosis**
Each release of JES2 introduces changes that affect the way you perform problem determination and diagnose problems. Some of these changes include new traces and logs, modified and new messages, and other diagnositic information that you would need in solving and fixing system problems.

## Reviewing changes to JES2 interfaces

When defining your installation's migration plan, also consider that JES2 interfaces may also be affected by the new or changed functions that are introduced in this release. These interfaces include:

- Initialization Statements
- Commands

- Installation Exits
- Macros
- Mapping Macros
- SSI Function Codes
- Messages
- Panels
- SMF Records
- SYS1.SAMPLIB members
- Utilities

Chapter 10, “Version Summary Tables” on page 10-1 provides a summary of the changes that affect these interfaces for the release. Chapter 2, “Migration Roadmap” on page 2-1 provides a "roadmap" for your migration. This roadmap itemizes the changes to each release of JES2, references more specific overviews of that release, and references specific migration actions you'll need to consider when migrating from your base release to the target release represented by this publication.

## Common Migration Activities

General migration actions for JES2 include examining areas of processing in JES2 that involve:

- Initialization statements and processing
- Operations and commands
- Customization and exits
- Macros
- Applications
- Problem determination and diagnosis
- Installation modifications

## Release Migrations

Migration to the JES2 component of z/OS is identical to the migration and coexistence policy established with OS/390 Version 2 Release 10 JES2, which is based on the current coexistence policy of four consecutive releases. When you migrate from JES2 z/OS V1R1 (or from any subsequent release), the release you migrate to is required to be within "four" consecutive releases to be fully supported. That is, migration forward and backward should be made within "four" consecutive releases. This applies to release migrations for:

- Single system configurations
- Individual systems within a multisystem configuration
- Cases where a simultaneous IPL is used to migrate all systems in a multisystem configuration at the same time.

You should take this into account to ensure that you are appropriately positioned for future software migrations. Since each release can normally be ordered for only a six month window, it is very important that you order the required releases while they are available.

## Coexistence

z/OS give you optimum compatibility and flexibility as you migrate systems in a multisystem configuration by allowing up to "four" consecutive releases to coexist. Coexistence considerations apply to JES2 multisystem configuration in which there is resource sharing. This includes nonParallel Sysplex and Parallel Sysplex multisystem configurations.

Coexistence allows systems within a multisystem configuration to be upgraded to a new release level of the operating system one system at a time. This is contingent on the fact that the release you are migrating to is within three releases of the lowest release running in your multisystem configuration (for a total of up to "four" consecutive releases). "Four" releases is the general migration and coexistence policy that you should assume for future z/OS releases, except where special provisions have been provided.

This publication treats OS/390 Version 2 Release 10 and z/OS Version 1 Release 1 as a single coexistence level, rather than two coexistence levels. This is due to the unique characteristics of z/OS Version 1 Release 1 and z/OS Version 1 Release 1 Upgrade Package for OS/390 Version 2 Release 10, which can be installed on OS/390 Version 2 Release 10.

**Note:** This special treatment only applies to OS/390 Version 2 Release 10 and z/OS Version 1 Release 1. This upgraded package, referred to in this publication as (z/OS V1R1 & OS/390 V2R10) or z/OS Version 1 Release 1, is thus the target of all migration paths described in this publication.

This means that in addition to the provision for coexistence support between OS/390 Version 2 Release 6 and OS/390 Version 2 Release 10, OS/390 Version 2 Release 6 can coexist with z/OS Version 1 Release 1. A summary of this coexistence is as follows:

- z/OS Version 1 Release 1 JES2 can coexist with the following releases
  - OS/390 R6
  - OS/390 R7
  - OS/390 R8-R9 (both are functionally equivalent)
  - OS/390 R10 - z/OS Version 1 Release 1 (both are funtionally equivalent)

## Service

The following PTFs are required for prior levels of JES2 to run with z/OS Version 1 Release 1 JES2 in a multi-access spool (MAS) configuration.

*Figure 1-3. Migration PTFs*

| JES2 Release | Required PTF(s) |
|---|---|
| JES2 V2R6 | UW53872, UW58022, UW69010 |
| JES2 V2R7 | UW69011 |
| JES2 V2R8 | UW69012 |

## Year 2000 Support for JES2

JES2 is an element of z/OS and is Year 2000 ready. When used in accordance with its associated documentation, JES2 is capable of correctly processing, providing, and/or receiving data within and between the twentieth and twenty-first centuries, provided that all products (for example, server, software, and firmware) used with JES2 properly exchange accurate data with it.

For more information about Year 2000 support, refer to *The Year 2000 and 2-Digit Dates: Guide*, GC28-1251.

# Chapter 2. Migration Roadmap

This section describes the migration paths that are supported by the current release of JES2. It also provides references to release-specific information for your present release and your target release. Migration paths for JES2 are as follows:

- OS/390 JES2 Version 2 Release 8 to JES2 z/OS V1R1
- OS/390 JES2 Version 2 Release 7 to JES2 z/OS V1R1
- OS/390 JES2 Version 2 Release 5 to JES2 z/OS V1R1
- OS/390 JES2 Version 2 Release 4 to JES2 z/OS V1R1
- OS/390 JES2 Version 1 Release 3 to JES2 z/OS V1R1
- OS/390 JES2 Version 1 Release 1 to JES2 z/OS V1R1

What follows is a summary of each release, references to the release overview, and reference to migration actions that will take you from your base release to the target release (JES2 z/OS V1R1) that reperesents the highest release level for this publication.

**Note to Users**

This section is designed to show the migration paths that are supported to the current release of JES2. For each release, this section also summarizes the main functional items. Functional items are grouped into the following categories:

- Initialization
- Installation Modifications
- Operations
- Applications
- Problem Determination and Diagnosis
- Accounting
- Migration Actions

The "Migration Actions" category is a reference to a specific chapter in this publication that describes the appropriate actions that are needed to migrate to the target release of JES2.

## JES2 z/OS V1R1 Summary

This section describes additions, changes, and deletions to JES2 z/OS V1R1.

*Figure 2-1. JES2 z/OS V1R1 Release Summary*

| Migration Topic | Page |
|---|---|
| **Initialization** | |
| $ACTIVATE | 3-1 |
| SPOOLDEF FENCE= Changes | 3-2 |
| TPDEF SNABUF Changes | 3-4 |
| TRACEDEF PAGES= Changes | 3-4 |
| BLOB Size | 3-3 |
| SPOOLDEF TGBPERVL= Dropped | 3-2 |
| ZAPJOB Initialization Statement | 3-4 |
| **Installation Modfications** | |
| Exit 11 and Exit 12 | 3-3 |
| New and Changed Macros | 3-3 |
| **Operations** | |
| Spool Affinity | 3-2 |
| $HASP834 Deleted | 3-4 |
| $ZAPJOB Command | 3-4 |
| **Applications** | |
| Spool Data Set Browse Documented | 3-5 |
| Active DCTs | 3-5 |
| **Problem Determination and Diagnosis** | |
| Multi-System Dumps | 3-5 |
| **Accounting** | |
| None | |
| **Migration Actions** | |
| Not Applicable | |

# JES2 OS/390 Version 2 Release 8 Summary

This section describes additions, changes, and deletions to JES2 introduced by OS/390 JES2 Release 8.

*Figure 2-2. JES2 OS/390 V2R8 Release Summary*

| Migration Topic | Page |
|---|---|
| **Initialization** | |
| None | |
| **Installation Modfications** | |
| CF System Managed Rebuild Support | 3-5 |
| **Operations** | |
| None | |
| **Applications** | |
| None | |
| **Problem Determination and Diagnosis** | |
| Message HASP069 - Updated | 3-5 |
| Message HASP263 - Updated | 3-5 |
| Message HASP292 - Updated | 3-6 |
| Message HASP538 - Updated | 3-6 |
| JES2 Dispatcher Rolling Trace - New | 3-6 |
| **Accounting** | |
| None | |
| **Migration Actions** | |
| Chapter 4, Migration Actions: JES2 OS/390 V2R8 to JES2 z/OS V1R1 | 4-1 |

## JES2 OS/390 Version 2 Release 7 Summary

This section describes additions, changes, and deletions to JES2 introduced by OS/390 JES2 Release 7.

*Figure 2-3 (Page 1 of 2). JES2 OS/390 V2R7 Release Summary*

| Migration Topic | Page |
|---|---|
| **Initialization** | |
| None | |
| **Installation Modfications** | |
| Changes to Exit 8 | 3-6 |
| Changes to Exit 25 | 3-6 |
| Changes to Exit 46 and Exit 47 for NJE Network Processing | 3-7 |
| Fiber Channel Support | 3-7 |
| Checkpoint Performance | 3-7 |
| **Operations** | |
| Changes that Affect JES2 Operations | 3-8 |
| **Applications** | |
| None | |

*Figure 2-3 (Page 2 of 2). JES2 OS/390 V2R7 Release Summary*

| Migration Topic | Page |
|---|---|
| **Problem Determination and Diagnosis** | |
| New Record for Trace ID 17 | 3-8 |
| $DPCE Command - Additional Diagnostic Information | 3-8 |
| Message HASP291 Enhanced | 3-8 |
| Message HASP064 - New Message | 3-8 |
| $CBIO Services - Additional Error Recording | 3-9 |
| **Accounting** | |
| None | |
| **Migration Actions** | |
| Chapter 5, Migration Actions: JES2 OS/390 V2R7 to JES2 z/OS V1R1 | 5-1 |

## JES2 OS/390 Version 2 Release 5 Summary

This section describes additions, changes, and deletions to JES2 introduced by OS/390 JES2 Release 5.

*Figure 2-4. JES2 OS/390 V2R5 Release Summary*

| Migration Topic | Page |
|---|---|
| **Initialization** | |
| None | |
| **Installation Modfications** | |
| None | |
| **Operations** | |
| None | |
| **Applications** | |
| JES2-Provided Client Print Services | 3-9 |
| **Problem Determination and Diagnosis** | |
| None | |
| **Accounting** | |
| None | |
| **Migration Actions** | |
| Chapter 6, Migration Actions: JES2 OS/390 V2R5 to JES2 z/OS V1R1 | 6-1 |

## JES2 OS/390 Version 2 Release 4 Summary

This section describes additions, changes, and deletions to JES2 introduced by OS/390 JES2 Release 4.

*Figure 2-5. JES2 OS/390 V2R4 Release Summary*

| Migration Topic | Page |
|---|---|
| **Initialization** | |
| Constraint Relief | 3-9 |
| **Installation Modfications** | |
| New Service Routines for Updating JQEs and CATs | 3-11 |
| New Exit (Exit 49) To Allow Job Workload Selection | 3-11 |
| Enhancements to $SCAN Macro and Related Macros | 3-11 |
| **Operations** | |
| Filtering for Working with Jobs | 3-9 |
| WLM Batch Support | 3-10 |
| Job Class Limits | 3-10 |
| Job Class Attributes are Now MAS Wide | 3-10 |
| Maximum Return Code Returned When Job Ends | 3-10 |
| **Applications** | |
| Enhancement to Extended Status SSI Function Call (Code 80) | 3-11 |
| **Problem Determination and Diagnosis** | |
| Changes to JES2 Can Affect IPCS Users | 3-11 |
| Changes to $HASP097 | 3-12 |
| **Accounting** | |
| None | |
| **Migration Actions** | |
| Chapter 7, Migration Actions: JES2 OS/390 V2R4 to JES2 z/OS V1R1 | 7-1 |

## JES2 OS/390 Version 1 Release 3 Summary

The summaries for JES2 describe additions, changes, and deletions in the following areas.

*Figure 2-6 (Page 1 of 2). JES2 OS/390 V1R3 Release Summary*

| Migration Topic | Page |
|---|---|
| **Initialization** | |
| Job Support | 3-14 |
| **Installation Modfications** | |
| JES FSS Interface Example | 3-12 |
| SYSOUT Application Program Interface Enhancements | 3-13 |
| Job Support | 3-14 |

*Figure 2-6 (Page 2 of 2). JES2 OS/390 V1R3 Release Summary*

| Migration Topic | Page |
|---|---|
| **Operations** | |
| Job Support | 3-14 |
| Changed Input Service Processing | 3-16 |
| Changed NJE Network Processing | 3-16 |
| **Applications** | |
| JES FSS Interface Example | 3-12 |
| **Problem Determination and Diagnosis** | |
| Trace Information Enhancements | 3-19 |
| Additional Time Stamp Messages in Job Log | 3-19 |
| **Accounting** | |
| Job Support | 3-14 |
| **Migration Actions** | |
| Chapter 8, Migration Actions: JES2 OS/390 V1R3 to JES2 z/OS V1R1 | 8-1 |

## JES2 OS/390 Version 1 Release 1 Summary

The summaries for JES2 describe additions, changes, and deletions in the following areas.

*Figure 2-7 (Page 1 of 2). JES2 OS/390 V1R1 Release Summary*

| Migration Topic | Page |
|---|---|
| **Initialization** | |
| JES2 Library Restructure | 3-17 |
| Four Digit Dates | 3-17 |
| **Installation Modfications** | |
| None | |
| **Operations** | |
| Enhancements for Cancelling a Job | 3-17 |
| Deleting DESTIDs | 3-17 |
| Spool Offload Enhancements | 3-18 |
| Enhancements to Work Selection Using Job Names | 3-18 |
| **Applications** | |
| None | |
| **Problem Determination and Diagnosis** | |
| Trace Information Enhancements | 3-19 |
| Additional Time Stamp Messages in Job Log | 3-19 |
| **Accounting** | |
| None | |

*Figure 2-7 (Page 2 of 2). JES2 OS/390 V1R1 Release Summary*

| Migration Topic | Page |
|---|---|
| **Migration Actions** | |
| Chapter 9, Migration Actions: JES2 OS/390 V1R1 to JES2 z/OS V1R1 | 9-1 |

# Chapter 3. Release Overviews

For descriptions of the functional enhancements provided by recent JES2 releases, read the following:



For each release the functional enhancements are listed, then summarized. The summaries can help you in your planning. For example, after reading about a new or changed function, you may choose to exploit that function if your installation can benefit from its use.

The summaries briefly describe changes made in each release. Where appropriate, each summary briefly explains the purpose of the affected function, how the function worked in the previous release, how the function has changed, and how to determine the significance of the change to your installation.

Some of the summaries in this chapter may require certain actions on the part of the installation to achieve or maintain full function. Specific migration instructions are provided in the remaining chapters of this book.

## JES2 z/OS V1R1 Overview

### $ACTIVATE

You must be in "Release 4 mode" to run JES2 z/OS V1R1 since support for "Pre-release 4 mode" has been dropped. Support for the $ACTIVATE command is no longer needed since only one checkpoint mode is currently supported.

### Spool Performance Improvements

JES2 SPOOL management was enhanced in this release to improve the performance of placing data on SPOOL. In prior releases, SPOOL management was performed using fencing to control how many volumes a job can use and the SPOOLDEF TGBPERVL= parameter to control the amount of SPOOL space available for use by jobs.

The default fencing option provided by JES2 could impact performance. Implementing a set of exits to allow installations to define a fencing policy was not a viable option for some installations. These problems were addressed by providing a new fencing option and a new function, SPOOL affinity.

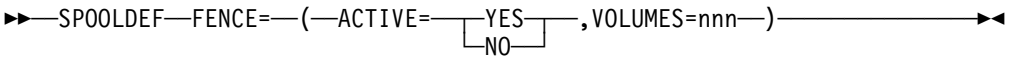
This release also deleted the TGBPERVL= operand on SPOOLDEF. Instead of trying to describe how to set an external to manage availability of SPOOL space, JES2 will now manage this to provide maximum availability of SPOOL space for jobs writing to SPOOL.

Changes to JES2 external and internal processing that enable spool performance improvements as follows:

- SPOOLDEF FENCE= changes
- Setting the BLOB size
- Dropping use of SPOOLDEF TGBPERVL=
- The new $T SPOOL(nnnn) command

## SPOOLDEF FENCE= Changes

The FENCE= keyword parameter on the SPOOLDEF initialization statement is changed as follows:




**ACTIVE=**
specifies if any fencing is active.

**VOLUMES=**
specifies the number of volumes a job is fenced to.

When you specify

```
SPOOLDEF....FENCE=(ACTIVE=YES,VOLUMES=1).....
```

you get the same function as in the previous JES2 release when you specified FENCE=YES. FENCE=YES will be permitted for compatibility and converted to ACTIVE=YES and VOLUMES=1. This specification of SPOOLDEF FENCE= is honored on $T SPOOLDEF and on cold start.

## SPOOLDEF TGBPERVL= Dropped

Using the keyword parameter, TGBPERVL= on the SPOOLDEF initialization statement has been dropped.

## Spool Affinity

New with this release, JES2 implemented a form of spool fencing that associates MAS members with particular spool volumes. Each spool volume has masks of systems that can allocate space on that volume. This function is called SPOOL affinity.

The $T SPOOL(nnnn) command was added to implement spool affinity. This command allows the installation to assign its systems to spool volumes. This command has one valid keyword operand, SYSAFF=. SYSAFF function similar to SYSAFF on the $TINTRDR command. The value you specify for SYSAFF= on the $TSPOOL(nnnn) command is also added to the output produced by the $D SPOOL command.

**Note:** There is no equivalent initialization statement that corresponds to the $T SPOOL(nnnn) command.

Also, the $S SPOOL command supports the SYSAFF= parameter. The $S SPOOL command is old but specifying the SYSAFF= parameter on this command is new.

### BLOB Size

JES2 implements a form of spool fencing that associates MAS members with particular spool volumes. Each spool volume has masks of systems that can allocate space on that volume. This mask limits the entries that can be placed in the BLOB for that system. Since all track group allocations are made from the BLOB, jobs are limited to the spool volumes associated with a system. If all spool volumes that are associated with a system become full, spool space starts to be allocated from any spool volume that has space. (The assignment of systems to a spool volume is accomplished through the $T SPOOL command.)

In previous releases, the size of the BLOB was determined by the TGBPERVL= keyword multiplied by the number of volumes that had space (with a max of 253 entries per system). The introduction of SPOOL affinity made this method of calculating BLOB size more complicated. To simplify setting up JES2, the size of the BLOB will be calculated internally by JES2. The algorithm will fill all 253 entries in the BLOB as long as the total amount of SPOOL space in all the BLOBs is less than 80% of all available SPOOL space. When the size of the BLOB starts to exceed 80% of the available SPOOL space, then the system will reduce the size of the BLOB so that only 80% of the available space is in the BLOB.

Also, as part of this change, the SPOOL status messages (from a $DSPOOL command) will now consider any SPOOL space in a BLOB as not in use. In previous releases, all space that was in a BLOB was considered in use (even though no jobs are using that space). This will be noticeable in small systems with a small amount of space allocated to SPOOL. These systems will see a lower SPOOL utilization with this release of JES2 as compared to earlier releases.

### Exit 11 and Exit 12

Even with the new SPOOL management functions, the use of the "SPOOLs allowed mask" for a job continues as in previous releases. However, these exits may need to be updated if your installation decides to implement any of the new functions in this release. In particular a new set of SPOOL masks have been created to reflect the new SPOOL affinity functions. JES2 exits 11 and 12 allow an installation to implement their own type of spool fencing. Each bit in the mask continue to represent one Spool volume. A bit being on means that space can be allocated from the corresponding volume.  Exits 11 and 12 can still manipulate the spools allowed mask and assign spool space based on their particular criteria.

## New and Changed Macros

$#TJEV macro can be used in exits to find out why output is not printing.

## Performance Enhancements

Additionally, JES2 is upgrade with the following performance enhancements:

- TPDEF SNABUF=SIZE= changes
- TRACEDEF PAGES= changes
- Improved CKPT scan

### TPDEF SNABUF Changes

To improve SNA performance and better align with other networking products, JES2 has increased the SNA buffer size from a maximum of 3840 to 32512. This is a change to the TPDEF SNABUF=SIZE= keywords.

### TRACEDEF PAGES= Changes

The default for TRACEDEF PAGE= is changed from 2 to 9. For compatibility with other releases of JES2, specification of 1-8 are converted automatically to 9.

### Improved $#GET/$#POST Processing

The $#GET service is used by devices (and SAPI) to select SYSOUT for processing. The service scans the output queues looking for the best output element that matches the criteria specified by the device. This scan can consume a large amount of resources dependent on the amount of SYSOUT queued to a particular class. The $#POST service is used by processes that add work to the the output queues; this wakes up devices that are waiting for work. Once a device is posted that new work exists, the device calls $#GET to find the work in the output queue.

In previous releases, there was no communication between the $#POST and the $#GET (except for the actual posting). New in this release, $#POST will pass to $#GET the address of the new output element. $#GET can keep track of 1 element passed by $#POST. It can also keep track of the fact that there is no output in the queue for a particular device.

With this support, when output is created for a device that is idle (started with nothing to print), it can select that output without ever scanning the output queue. When finished, it can go idle knowing that there is no new work to do. This greatly reduces the overhead associated with sending work to a devices that generally goes idle between jobs.

## Other Items

### ZAPJOB Initialization Statement

The ZAPJOB initialization statement is used to remove all traces of a job structure from the JES2 job queue. This statement is intended for situations where a job cannot be removed using normal JES2 commands or by a JES2 restart.

### $ZAPJOB Command

$ZAPJOB removes all traces of a job structure from the JES2 job queue. You must ensure that the job and any output it may have created is not active in any JES2 process or active on a device. Zapping a job that is active can lead to ABENDs and the loss of a PCE until JES2 is restarted.

$HASP250 has been updated to indicate that a job has been zapped.

### $HASP834 Deleted

$HASP834 message has been deleted.

### Active DCTs

Active DCTs are now chained out of the HCT ($NJEADCT, $OFFADCT, $LCLADCT).

### Spool Data Set Browse Documented

The application interface to use the SPOOL Data Set Browse function has been simplified to not require access to internal JES2 data areas. This will enable more applications to take advantage of this interface. Complete documentation for this interface has been included in an appendix of the *z/OS JES2 Initialization and Tuning Guide*.

### Multi-System Dumps

To aid in first failure data capture, OS/390 Version 2 Release 10 JES2 generates JES2 dumps on all members of a MAS when certain JES2 work queue errors occur. This is referred to as a "multi-system dump." Since multiple dump data sets are created for these errors, procedures need to be put in place to ensure that all dumps for an error (even though they appear to be duplicates) are retained for problem analysis.

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## OS/390 JES2 Version 2 Release 8 Overview

## CF System Managed Rebuild Support

JES2 checkpoint management has been improved with the CF System Managed Rebuild Support. JES2 now supports a SETXCF START REBUILD command for checkpoints that are on a coupling facility. With Release 8, all XES requests are now subtasked to prevent line timeouts and function interruptions.

## Message HASP069 - Updated

Two new reasons for issuing this message are the SLIP and Installation requests.

HASO069 JES2 SYSTEM DUMP SUPPRESSED BY DUMP ANALYSIS ELIMINATION“
SLIP“
INSTALLATION REQUEST“

## Message HASP263 - Updated

A new form of Message HASP263 has been provided to indicate that a CF auto rebuild is in progress. The new form is:

HASP263 WAITING FOR ACCESS TO JES2 CHECKPOINT.
STRUCTURE REBUILD IN PROGRESS

The previous forms of this message still exist and have not changed. The reason for issuing this message has not changed (cannot obtain the checkpoint lock and LOCKOUT has expired). The new text indicates the reason the lock cannot be obtained in a system managed CF auto rebuild.

## Message HASP292 - Updated

The time interval for this message has changed from 30 seconds to the current value of MASDEF LOCKOUT. The new optional text explains that the delay was caused by a system managed CF auto rebuild.

HASP292 MEMBER memb-name -- JES2 WAITING FOR RESPONSE FROM
COUPLING FACILITY DURING CHECKPOINT READ/WRT/FORMAT/IO
ON STRUCTURE strname
(STRUCTURE REBUILD IN PROGRESS)

## Message HASP538 - Updated

The IXCQUERY return code and reason code are new. See *MVS Sysplex Services Reference* for an explanation of these codes.

HASP538 THE STRUCTURE SPECIFIED BY STRNAMEstrname FOR
file DOES NOT EXIST. PLEASE VERIFY THAT THE VALUE
IS CORRECT.
IXCQUERY RC=xxxxxxxx RSN=xxxxxxxx

## JES2 Dispatcher Rolling Trace - New

A new CTRACE is provided that is similar to the JOE and JQE CTRACSs. This CTRACE has a subtype of DISP and 2 types of entries (dispatch and $WAIT). The dispatch entry contains the PCE address and type, the $POST reason, the address to be given control (R15), ASC mode, PSW key, and the amount of time the PCE $WAITed. The $WAIT entry includes the PCE address and type, $WAIT parm list, ASC mode, PSW key, and run time statistics (CPU time, wall clock time, I/O count, $CKPT count, $QSUSE indicator).

---

# OS/390 JES2 Version 2 Release 7 Overview

This section describes additions, changes, and deletions to JES2 introduced by OS/390 JES2 Release 7.

## Changes that Affect JES2 Installation Modifications

The following summarizes additions, changes, and deletions that affect JES2 installation modifications in OS/390 Release 7 JES2.

### Changes to Exit 8

Exit 8 can now receive control for control block I/O ($CBIO) calls from the FSS address space.A new bit was added to the XPL to identify that this $CBIO was done for an FSS printer.

### Changes to Exit 25

The $BUFIO and $BUFCK services in HASPFSSM have been deleted. The functions are now provided by the $CBIO service. TYPE=WAIT was added to $CBIO to support the functions that were previously provided by $BUFCK.

## Changes to Exit 46 and Exit 47 for NJE Network Processing

- RCCS Headers

  Exit 46 and Exit 47 will be invoked for an additional type of header (RCCS header) in OS/390 Release 7. If you have exit 46 and/or exit 47 installed on your system, you should examine your exit(s) to determine if a change is needed. If you modeled your exit 46 after the sample exit 46 shipped with the product (HASX46A), you should take note that the logic in the sample exit has changed to accomodate the additional type of header that can now be processed by this exit.

  Since exit 46 is now invoked to process RCCS headers, you can now remove, modify, or add an RCCS header to the jobstream before it is transmitted into the NJE network. Exit 47 now allows you to process the RCCS header when it is received from the network.

  **Compatibility:** This support only introduces an incompatible change for those installations that have exit 46 or exit 47 logic that does not accomodate the additional type of header.

- Exit 47 Input Parameter List Changes

  A JQE address is passed to Exit 47 in field X047JQE. However, this address may be the address of a working copy of the JQE. Examine the X047IND field for X047BJQE; if the X047BJQE flag is on, then X047JQE contains the address of a working copy of the JQE. In this case, the address contained in X047JQE **cannot** be used as input to any services that expect the addresss of a real JQE (for example $DOGJQE).

## Fiber Channel Support

JES2 I/O processing for spool and checkpoint has been updated to take advantage of the changes made in FICON (Fiber channels).

## Checkpoint Performance

JES2 checkpoint performance has been improved by reducing the number of I/O to the checkpoint data sets under certain conditions. These changes include:

- Elimination of a Read to CKPT2 during checkpoint locking operations (READ1) if at least one checkpoint is on a coupling facility.
- Reduction of the number of writes to CKPT2 when checkpoint is in duplex mode.

As a result of these changes, the specifications for MASDEF HOLD= and DORMANCY= may need adjusting. In particular, if you have HOLD=0 specified in duplex mode, then prior to this change, the actual hold time was limited by the time it took to write to CKPT2. Now, a significant number of those writes have been eliminated and your actual hold time may become too short and cause thrashing.

If you are in duplex mode and have some members which specify DUPLEX=OFF, you may want to reconsider this specification. With Release 7, the CKPT2 data set is only written once every 10 writes to the CKPT1 data set. One of the reasons to specify DUPLEX=OFF was to reduce the I/O's to CKPT2. The combination of the two may cause an unacceptable amount of time to elapse before CKPT2 is written. If the only reason DUPLEX=OFF was specified was to reduce the number of I/O's to CKPT2, then with Release 7, all members should specify DUPLEX=ON.

## Changes that Affect JES2 Operations

The processing for ended PCEs has been updated. When a non-required PCE abends a dump is taken and JES2 ends the PCE. The operator is no longer queried by the HASP070 message as to whether recovery is to be attempted. In addition, the HASP068 message has been updated to inform the operator of how many PCEs of the specified type remain.

## Changes that Affect Problem Determination and Diagnosis

The following summarizes additions, changes, and deletions that affect problem determination and diagnosis in OS/390 Release 7 JES2.

### New Record for Trace ID 17

Trace ID 17 has been updated to contain new measurements (total PCE wait time, number of $CKPTs issued, MVS wait time, $QSUSE time) that JES2 gathers during different phases of checkpoint processing. A new record 3 has been added to the READ2, PRIMARY WRITE, IMMEDIATE WRITE and FINAL WRITE checkpoint cycles that contains these measurements. If you use a program that analyses Trace ID 17 records, it may need to be updated to incorporate this support.

### $DPCE Command - Additional Diagnostic Information

The $DPCE command is enhanced to provide the following additional diagnostic information:

- Ended PCE counts - $DPCE,ENDED>0 displays the PCE types that have ended.
- Active PCE counts - $PDCE,ACTIVE>0 displays the PCE types that have active work.
- Detailed PCE information - $PCDE (CNVT) displays current detailed information for each converter PCE. This information includes: where the PCE is waiting and what it is waiting for, active and outstanding I/O counts, the exit the PCE is in, the current job the PCE is processing, the time the PCE waited, and whether the PCE has ended.

### Message HASP291 Enhanced

Message HASP291 is enhanced in this release to include information from the MVS IEDB. This information includes the IOS completion code and the full device sense data. Two completion codes are presented because IOS combines a multiple of its completion codes into one for use by EXCP callers. In some cases, the IOS completion code will more accurately describe the error.

### Message HASP064 - New Message

The old I/O error message, HASP094, was incomplete and difficult to read. A new message, HASP064, is added to this release to provide additional data in a format that is easier to understand. The HASP064 message displays the same information as the HASP094 message, but in a format similar to the HASP291 message. In addition, data from the MVS IEDB is added to the HASP064 message and includes the IOS completion code and the device sense data. Two completion codes are presented because IOS combines a multiple of its completion codes into one for use by EXCP callers. In some cases, the IOS completion code will more accurately describe the error. Also included is the failing MTTR/BBCCHHR.

### $CBIO Services - Additional Error Recording

Additional error recording is added for the $CBIO services in the USER environment. CBIO errors will now generate a SYMREC similar to the one generated in the main task for control block I/O errors. In addition, the JES2 trace ID 3, previously from the FSS environment $BUFIO service, is moved to the USER environment $CBIO service. These changes provide additional data to help diagnose errors with SPOOL control blocks.

## OS/390 JES2 Version 2 Release 5 Overview

## JES2-Provided Client Print Services

JES2 element of OS/390 Version 2 Release 5 provides client print services by allowing applications such as the IBM OS/390 Print Server to allocate space on JES2 spool for print jobs submitted from workstations in the TCP/IP network.

Print jobs that use print services can take advantage of traditional JES2 print services. These include work selection and work balancing across logical printer groups, use of JES2 default SYSOUT attributes, SYSOUT processing progress and monitoring, and SYSOUT cancelling, holding, and releasing.

JES2 provides these client print services in a manner compatible with its standard operational characteristcs. For example, client print services can:

- Query their jobs to determine status, as does the JES2 operator
- Set jobs priorities consistent with JES2 priority values, and validate that a job can print on JES2 queues
- Use the SYSOUT application programming interface (SAPI) added to the JES2 element of OS/390 Version 1 Release 3.

## OS/390 JES2 Version 2 Release 4 Overview

## Constraint Relief

Many maximums for devices have been increased:

- The maximum number of remotes and lines has been increased from 9999 to 32767.
- The maximum number of LOGONs (interface for SNA supported RJE and NJE) is increased from 2 to 999.
- The maximum number of printers is increased from 9999 to 32767.
- The maximum number of nodes has been increased from 9999 to 32767.

## Filtering for Working with Jobs

Many job-related commands such as $D J, $T J, $P J, and so forth, have more extensive filtering keywords and capabilities. A new set of commands for displaying and controlling output via the $D OJ, $T OJ, $C OJ, $P OJ, and so forth, has also been added to provide more powerful and more granular capabilities.

## WLM Batch Support

JES2 supports Work Load Manager (WLM) batch management beginning in OS/390 R4. To enable this support:

- Many more operator commands have been changed to use $SCAN.
- There are now two types of batch initiators: JES2 managed initiators, which are controlled with $SI, $PI, $DI, $ZI, $DI commands; and the initiators that are entirely controlled by WLM.
- There are now two sets of preexecution queues: The classic existing job class queues and the new service class queues.

WLM control of batch work is enabled by changing the mode of a JES2 job class (on a job class by job class basis) to MODE=WLM. When that is done, no job in that JES2 job class will be selected by classic JES2 initiators. Instead WLM will be informed of the jobs waiting execution and will start and stop WLM controlled initiators based the current backlog of work.

WLM control of batch work can be disabled by changing the mode of a JES2 job class back to MODE=JES.

## Job Class Limits

The maximum number of jobs running in a particular JES2 job class can be controlled via operator command. This control applies whether the job class is managed by WLM or not. The maximum is MAS wide, that is, if the maximum jobs that can run in class A is 5, then that limits the number of jobs executing in A to 5 across all members in the MAS.

## Job Class Attributes are Now MAS Wide

The attributes of each job class (whether WLM managed or not) are checkpointed. All members of the MAS use the same definition and settings. This implies the following:

- Job class limits are the same across the MAS.
- Converter parameter information is uniform across the MAS.
- SMF settings that are based on job class are uniform across the MAS.
- OUTDISP defaults are uniform across the MAS.
- MODE is uniform across the MAS.

## Maximum Return Code Returned When Job Ends

The maximum return code (RC) or abend code is collected when a job ends execution. This information is supplied on an expanded HASP165 (NOTIFY message) and is available via a $DJ command and also via the extended status SSI (80).

## New Service Routines for Updating JQEs and CATs

Release 4 has introduced $DOGxxx macros (Deliver Or Get) that installation exits must use when updating JQEs or CATs.

- $DOGJQE is used to gain and release control of a JQE.

  Most exits which need to manipulate JQEs can do so with two kinds of calls:

  – $DOGJQE ACTION=(FETCH,UPDATE),JQE=xxx

    Use the data area returned in R0 and map it via the JQE dsect.

  – $DOGJQE ACTION=RETURN,CBADDR=xxxx

    Return the data area obtained in the FETCH call specifying its address in the CBADDR keyword.

- $DOGCAT is used for controlling CATs.

  Use ACTION=FETCH to obtain a locked copy of the CAT and ACTION=RETURN to return the locked CAT.

## New Exit (Exit 49) To Allow Job Workload Selection

A new exit (exit 49) can be installed by installations to allow job workload selection of pre-execution jobs based on criteria unique to the installation.

## Enhancements to $SCAN Macro and Related Macros

The $SCAN macro, and related macros like $SCAND and $SCANTAB, have additional support for displaying and filtering based on the new and existing job characteristics.

## Enhancement to Extended Status SSI Function Call (Code 80)

The extended status SSI function call (SSI function code 80), provides additional information, such as the service class and scheduling environment of a job. For more information, see *z/OS MVS Using the Subsystem Interface*.

## Changes to JES2 Can Affect IPCS Users

**Attention!**

- You must be proactive to install JES2 IPCS.
- Make sure JES2 IPCS support works before you experience an emergency.
- Make sure you have JES2 IPCS support for all JES2 and MVS releases in production.

- For normal operation, add SHASPARM to the PARMLIB concatenation and let IPCS find the SMP/E-maintained copy of JES2's IPCS parms in the usual way.
- When reading JES2 dumps for one level of the system from another level of the system:

  1. STEPLIB to MIGLIB on the system the dump was taken on, if the OS/390 MVS BCP levels differ between that system and the system on which the dump will be examined using IPCS. (See Notes 1 and 3.)

2. STEPLIB to SHASMIG on the system the dump was taken on, if the JES2 levels differ between that system and the system on which the dump will be examined using IPCS. (See Notes 1 and 3.)
3. Concatenate the SMP/E-maintained PARMLIB data set to IPCSPARM if the OS/390 MVS BCP levels differ between the system the dump was taken on and the system on which the dump will be examined using IPCS. (See Notes 2 and 3.)
4. Concatenate the SMP/E-maintained SHASPARM data set to IPCSPARM if the JES2 levels differ between the system the dump was taken on and the system on which the dump will be examined using IPCS. (See Notes 2 and 3.)

**Notes:**

1. The order in which MIGLIB and SHASMIG are concatenated is not important when both are required. However, if one or both are needed, and there are other data sets in the concatenation, they should be the first two data sets allocated to STEPLIB.
2. The order in which PARMLIB and SHASPARM are concatenated is not important when both are required. However, if one or both are needed, and there are other data sets in the concatenation, they should be the first data sets allocated to IPCSPARM.
3. If dump analysis leads into data structures for other elements or products, you might need to add more data sets to the STEPLIB and IPCSPARM concatenations to complete the diagnosis. Refer to the appropriate product publications for information about establishing the correct IPCS environments for diagnosing other elements and products.

For more information, see *z/OS JES2 Diagnosis*.

## Changes to $HASP097

JES2 now issues message $HASP097 with LNExxxx instead of LINExxxx because 5 digits are allowed for a line specification. In order to accomodate the additional digit the term "LINE" was shortened to "LNE".

# OS/390 JES2 Version 1 Release 3 Overview

## JES FSS Interface Example

Beginning with this release, JES2 provides installations with a Functional Subsystem (FSS) Interface example as a working illustration of how you might implement Functional Subsystem Interface (FSI) functions. This example is meant as a starting point for applications programmers to develop their own FSS applications, which can include functions such as driving output devices (for example, plotters and microfiche writers) or other devices.

This FSS interface example is provided in SYS1.SAMPLIB and consists of several members. For more information about the FSS interface example, see *z/OS MVS Using the Functional Subsystem Interface*.

**Compatibility:** This is a compatible change.

## SYSOUT Application Program Interface Enhancements

JES controls all SYSOUT processing. SYSOUT is system-produced output; that is, all output produced by, or for, a job. This output includes system messages that must be printed, as well as data sets requested by the user that must be printed or punched. After a job finishes, JES analyzes the characteristics of the job's output in terms of its output class and device setup requirements. JES then groups data sets with similar characteristics. JES queues the output for print or punch processing.

Process SYSOUT (PSO) is one of the devices that can process the output on the queues. The PSO interface allows applications to view output on the JES spool data sets before a device prints the output, allowing the end user to eliminate any unwanted output.

**New for OS/390 Release 3 JES2:** Beginning with this release, SYSOUT application program interface is an enhanced implementation of PSO support provided by JES, and it includes:

- Support for multiple PSO “sessions” between a single address space and its supporting JES. This support is independent of MVS tasking structures.
- Support for SWBs (scheduler work blocks) similar to the support for FSS's.

A new process SYSOUT data sets call, SSI function code 79, allows a user-supplied program to access JES SYSOUT data sets independently from the normal print or network functions that JES provides, so that the characteristics of the SYSOUT data sets can be retrieved or updated.

Servers (such as TCP/IP) need to know which SYSOUT classes have the “hold” characteristic so they can supply a default MSGCLASS for work that they submit on behalf of their clients. JES2 is further enhanced to supply a string of these classes through the SSI 54 function.

This SSI function code has been updated with the following new returned keyword strings:

- SAPI='YES' indicates that SYSOUT application program interface is supported.
- SAPI_CHARS='NO'- indicates that selection by characters is not supported.
- SAPI_MOD_SELECT='NO'- indicates that selection by modification id is not supported.
- WTR_SYSOUT_CLASS='classes' - indicates the SYSOUT class for which non-held output is placed on the writer queue.
- TSO_SYSOUT_CLASS='classes' - indicates the SYSOUT class for which held output is placed on the HOLD queue.

**Compatibility:** This is a compatible change.

No functions of this support affect migration; the current PSO processing is still supported. The current PSO processing and SYSOUT application program interface processing can coexist in the same environment.

## Job Support

Beginning with this release, APAR OW20844 provides an increase in the maximum allowable value from 32767 to 65534 for job numbers.

**Compatibility:** This is a compatible change, however applications that rely on job number fields should be aware of the following changes:

- The maximum number of JQEs in the system is increased to 65534. Halfword fields containing the number of JQEs should be treated as **unsigned** (16-bit) halfwords. The most commonly used fields affected are $JQEFREC and $MAXJOBS.

  The equated value $MAXJQES is now set to 65534.

- The number of entries in the job index table (JIX) should be taken from the field JNTJBMAX. The equate $MAXJBNO is no longer valid for this purpose.

- JES2 job number fields that are half words should be treated as **unsigned** halfwords. The maximum value in those fields has been increased to 65535 from 32767. The following commonly used fields are among those affected.

  ```
  CHKJOBNO            JQEINJNO
  DASJOBNO            JQEJOBNO
  FAXBCJP             NHSJOBNO
  HDBJOBNO            OCTJOBNO
  IOTJOBNO            PSOJOBNO
  JCTJOBNO            SJBJOBNO
  JCTINJNO            SWBJOBNO
  JIBJOBNO            TTEJOBNO
  ```

  The equated value $MAXJBNO is now set to 65534.

- EBCDIC job identifiers, JOBnnnnn, STCnnnnn, and TSUnnnnn, can now contain a numerical value up to 65535. Applications that obtain and use job identifiers in messages or control blocks need to be aware of this new maximum value. Commonly used JES2 job identifier fields include:

  ```
  JCTJOBID            JIBJOBID
  RIDJOBID            SJBJOBID
  ```

  Job identifiers, in many cases, are propogated to non-JES2 control blocks. Commonly used fields include:

  - **WQEOJBID** in IHAWQE
  - **JSABJBID** in IAZJSAB
  - **RPLRBAR** in the RPL (on ENDREQ for an internal reader)

  The format of the data set names of JES2 spool data sets are:

  **`userid.jobname.jobid.dskey.dsname.`**

  The `jobid` portion of this data set name is affected by this support.

  **Note:** For compatibility purposes, JES2 also recognizes job identifiers in the format Jnnnnnnn, Snnnnnnn, and Tnnnnnnn.

- Several SMF records contain job numbers or job identifiers. Applications that examine these records should be aware of the new maximum value. SMF fields which contain this information include:

```
SMF6JBID          SMF26NJB
SMF24JID          SMF30JNM
SMF24CJD          SMF57JID
SMF26JNM          SMF26CJD
SMF26JID
```

- JES2 can now set a value up to 65534 in the NJE halfword fields NJHGJID, NJHOOJNO, and NMRFJID. Note that other NJE products may also currently set values up to 65535 in these fields.

  JES2 also sets the job number in the NJE fullword fields NJHGJNO, NJHOOJBN, and NMRFJNO. The maximum value for these fields is 4294967295.

- The following halfword fields are changed to fullword fields and are renamed:

| Old Name | New Name |
|---|---|
| DCTJNOLO | DCTJNUML |
| DCTJNOHI | DCTJNUMH |

  The valid range for these fields is 1-2147483647.

- The equate $MAXJOES (the maximum number of JOEs) no longer exists; use JOTMXJOE.

- Job list commands can now specify job numbers up to 65534. Commands affected include:

```
$A                $P
$C                $R,J=,
$D                $T
$E                $Tdevice,RANGE=
$G                $TNUM,BASE=,
$H                $TJOBDEF,RANGE=
$L                $TO
```

  Note that for job list commands, a range value of 1-* can be used to represent 1-$MAXJBNO, regardless of whether the equated value is set to 32767 or 65534.

## Year 2000 Support for JES2

JES2 is an element of OS/390. Beginning with OS/390 Version 1 Release 2, OS/390 is certified as a Year 2000–ready operating system by the Information Technology Association of America (ITAA). Follow-on releases are also Year 2000 ready. However because there was no JES2 element update to OS/390 V1R2, Year 2000 support for JES2 became available in OS/390 V1R3.

Previous products, such as OS/390 Version 1 Release 2 JES2, and all releases of MVS/ESA SP V5 JES2, are Year 2000 ready with maintenance applied. Previous products that are not Year 2000 ready will not be marketed after December 31, 1997.

For JES2, the following changes were made to ensure Year 2000 readiness:

- The following messages, which previously used a 2-digit year field, now use a 4-digit year field:

- HASP088

- HASP588
- HASP589

### 4-Digit-Year Format

Automation needs to be changed to adopt the 4-digit-year format, if necessary.

- Control blocks contain 4-digit year.
- Modules are able to handle 4-digit year.
- Command options now include a 4-digit year.
- The automatic command processor now supports the transition to the year 2000.

For further information on Year 2000 Support, see Year2000 and 2-Digit Dates: Guide GC28-1251.

For information about migrating to OS/390, see z/OS Planning for Installation.

## Changed Input Service Processing

The determination of LRECL/RECFM of SYSIN data sets has changed. The LRECL of a SYSIN dataset is now determined based on the length of the longest record of the SYSIN data. The previous method used the length of the DD * or DD DATA statements to determine the LRECL. Jobs that have SYSIN data with JCL DD * or DD DATA statements will be affected by this new method of determining LRECL. This may alter the way jobs are sent across NJE nodes. See “Changed NJE Network Processing” for more information.

**Compatibility:** This introduces no incompatible changes for jobs that are already functioning correctly. It may, however, remove the requirement that LRECL be specified on the DD * or DD DATA statement for some jobs.

## Changed NJE Network Processing

The transmission of NJE jobs that contain SYSIN data has been modified (starting in OS/390 Release 3) to comply with NJE protocol rules regarding the transmission of RCCS (Record Control Characteristics Section) headers, espically when instream (SYSIN) data is processed. The RCCS header identifies changes in LRECL (logical record length) and/or RECFM (record format) in the jobstream.

Prior to OS/390 Release 3, JES2 did not transmit the required RCCS header for certain jobs. JES2 now sends the required RCCS header for jobs with the following characteristics:

- The job is to be executed on another node via the /*XMIT JECL statement.
- The transmitted job has instream data.
- At least one SYSIN data set is not LRECL=80, RECFM=Fixed. In this case, an RCCS header will be placed after the job header and before the first data record (JOB card).

**Compatibility:** This support exposes an error for installations that transmit jobs with instream data to down-level pre-OS/390 Release 3 JES2 nodes for execution via the /*XMIT JECL statement, when the instream data is not RECFM=F, LRECL=80.

In addition, the required RCCS header to the jobstream may cause down-level receiving JES2 nodes to issue the $HASP110 — ILLEGAL JOB CARD message.

In order to avoid receiving the $HASP110 message, you should apply APAR OW13643 to the receiving node(s).

As an alternative, if you are running OS/390 Release 7, you could code an exit 46 routine. This exit allows the installation to determine whether or not this particular RCCS header is to be transmitted into the network, based on your knowledge of the maintenance level at the receiving node(s) of your installation. In release prior to OS/390 Release 7, this function was added (in exit 70) via APAR OW31889.

# OS/390 JES2 Version 1 Release 1 Overview

## JES2 Library Restructure

The names of the JES2 libraries have been changed to conform to OS/390 standards. JES2 macros are now maintained in a separate library from source code.

IBM recommends that data sets be named: SYS1.*dddef-name*.

## Four Digit Dates

JES2 supports 4-digit data in readiness for dates after December 31, 1999. In particular, JES2 will now display the date in messages $HASP588 and $HASP589 as *mmddyyyy*.

**Compatibility:** This is a compatible change. Refer to *z/OS JES2 Messages* for a description of these messages.

## Operational Enhancements

The following summarizes additions, changes, and deletions that affect JES2 operations in OS/390 Release 1 JES2.

### Enhancements for Cancelling a Job

Beginning with this release, you can use the $C job, $C TSU, and $C STC commands to immediately cancel a job, TSU, or STC that is waiting for conversion or in conversion processing.

### Deleting DESTIDs

In previous releases, users could not nullify or delete a DESTID, if the DESTID was created in error (for example, if a DESTID was defined incorrectly), or no longer needed. Also, a DESTID could be defined with a name that was also used to define a node (on the NAME= parameter of the NODE statement).

**New for OS/390 Release 1 JES2:** Beginning with this release, a new command, $DEL DESTID allows users to delete a DESTID.

## Spool Offload Enhancements

Beginning with this release, JES2 has made many enhancements related to spool offload. These enhancements include:

- A new parameter OFFS=YES|NO on the $T job and $T O commands which allows you to specifies the offload device(s) on which jobs can be offloaded.
- Two new OFFLOAD parameters

  **ARCHIVE=ONE|ALL**
  Specifies which offload devices JES2 prevents from reselecting jobs (with a disposition of DISP=KEEP or DISP=HOLD) for offload. If you specify ONE, JES2 prevents a specific offload device from reselecting a job with DISP=KEEP or DISP=HOLD once it was offloaded by that device; ALL prevents **all** offload devices from reselecting a job with DISP=KEEP or DISP=HOLD once it is offloaded by any device.

  **VALIDATE=YES|NO**
  Determines the action JES2 takes if it determines that the first record of the offload data set is not LRECL=80. You may choose to have JES2 drain the offload device and issue $HASP595 OFFLOAD*n* ERROR READING FIRST RECORD - DRAINING OFFLOAD DEVICE, or for JES2 to continue to read from the offload data set, but skip to the next job header. JES2 will then issue $HASP595 OFFLOAD*n* ERROR READING FIRST RECORD - SKIPPING FOR JOB HEADER so that the offload device continues to read from the offload data set and pass the records to the appropriate receiver(s). The receiver(s) will discard all records until it encounters a job header at which time it continues to process jobs normally.

Because you can now continue reading from a spool offload data set even if JES2 encounters an error while reading a record (using the VALIDATE= parameter on the OFFLOAD statement), IBM recommends you update your installation procedures to note that you can complete the reload processing using VALIDATE=NO.

**Compatibility:** This is a compatible change. For more information about using these new parameters, refer to *z/OS JES2 Initialization and Tuning Reference* and *z/OS JES2 Commands*.

## Enhancements to Work Selection Using Job Names

Beginning with this release, if you include JOBname in the WS list, JES2 will gather all output for a job and attempt to process that output consecutively. The JOBNAME= parameter for a particular device determines what job name JES2 selects once JES2 has processed all output that matches the current job name.

JES2 processes the output depending on whether JOBname= is specified before or after the slash in the WS= list, and whether JOBNAME= is specified using wildcards (also referred to as generics), For more information about using JOBNAME in the WS= list, refer to *z/OS JES2 Initialization and Tuning Reference*.

The following summarizes additions, changes, and deletions that affect problem determination and diagnosis in OS/390 Release 1 JES2.

## Trace Information Enhancements

Beginning with this release, additional diagnostic information is available for NCC records through TRACE IDs 21 through 24. Also, you can now enable these traces through the LINE and NODE statements.

**Compatibility:** This is a compatible change in JES2. Refer to *z/OS JES2 Diagnosis* for information about these traces.

## Additional Time Stamp Messages in Job Log

In previous releases, it was difficult to follow the flow of information in the JES2 job log for extremely long running jobs (one that may run for days) because there was no way to determine what day a message about the job was issued.

**New for OS/390 Release 1 JES2:** Beginning with this release, additional date lines are provided in the JES2 job log for jobs that span more than one day.

If your installation uses a program that scans the job log, be aware of these additional time stamps.

**Compatibility:** This is a compatible change in JES2. Refer to *z/OS JES2 Initialization and Tuning Guide* for information.

# Chapter 4. Migration Actions: JES2 OS/390 V2R8 to JES2 z/OS V1R1

## Customization

## New and Changed Installation Exits

### Installation Exits 11 and 12

Installation exits 11 and 12 are unaffected if you use no new functions in z/OS V1R1 JES2. However, if you turn on spool affinity or set fencing to more than one volume, then your current exits 11 and 12 are affected.

***Migration Actions:*** Review the documentation for exits 11 and 12 in *z/OS JES2 Installation Exits*. Before activating SPOOL affinity, ensure that the correct available SPOOL masks are used to determine what volumes to add to a job in these exits.

Your installation uses spool partitioning if `FENCE=ACTIVE=YES` is specified on the SPOOLDEF initialization statement. Spool affinity is used if any spool volume has something other than SYSAFF=ANY displayed for it.

### Installation Exits 0, 19, 24

The HASPINIT load module and the initialization PCE have been moved above the 16M line. This may impact installation exits called during initialization processing (such as exits 0, 19 and 24). If your exit switches to AMODE 24 to invoke DFP modules, then this code will no longer be able to access the initialization PCE (and in particular the save area in the PCE).

***Migration Actions:*** Review all exits for code that switches to AMODE 24 ($AMODE 24 macro invocations). Verify that the switch to 24 bit mode is still required. If it is required and you are in an exit that gets control during initialization, ensure that the code running in AMODE 24 does not access the initialization PCE.

Also, examine all uses of DFP macros, such as GET and PUT. If these macros were hand coded (instead of using the IBM-supplied macro) changes might be necessary. The DFP macros were changed to support 31 bit addressable callers.

## Initialization

## Checkpoint Data Sets

z/OS V1R1 JES2 no longer supports pre-release 4 checkpoints. JES2 can only read checkpoints that are in Release 4 mode. A Release 4 checkpoint is one that has been written by JES2 Release 4 or later after a $ACTIVATE command has been executed. To determine the checkpoint mode of your current checkpoint data set issue a $D ACTIVATE command. Since JES2 cannot read a checkpoint that is in pre-release 4 mode, it cannot coexist in a MAS with a pre-release 4 level of JES2 or nor can it participate in a MAS that has not been $ACTIVATE'd.

### Migration Actions

- If you have used $ACTIVATE, then no additional actions are needed. z/OS V1R1 JES2 can coexist with your existing systems or warm start using your existing checkpoint data set.
- If you have not used $ACTIVATE, you must do so before you can add a z/OS V1R1 JES2 system to your MAS or before performing a warm start of a z/OS V1R1 JES2 system using your existing checkpoint data set.

## SPOOLDEF FENCE= Changes

The FENCE= keyword parameter on the SPOOLDEF initialization statement is changed to allow you to specify fencing along with the number of spool volumes to be used.

When you specify

```
SPOOLDEF....FENCE=(ACTIVE=YES,VOLUMES=1).....
```

you get the same function as in the previous JES2 release when you specified FENCE=YES. . This specification of SPOOLDEF FENCE= is honored on $T SPOOLDEF and on cold start.

### Migration Actions

SPOOLDEF FENCE=YES is still permitted for compatibility and is converted to ACTIVE=YES and VOLUMES=1.

## SPOOLDEF TGBPERVL= Dropped

JES2 processing now controls the amount of SPOOL space cached for job writing data to SPOOL (the BLOB). In previous releases, this was controlled by the TGBPERVL parameter on SPOOLDEF. TGBPERVL= is no longer supported. In the initialization stream, this keyword is ignored (no error is returned). If used in a $TSPOOLDEF command, it will generate an error. In addition the HASP834 message that indicated TGBPERVL was set too high, has been deleted.

### Migration Actions

Delete references to TGBPERVL from your initialization decks and any operator commands or automation scripts. Any automated action associated with the HASP834 message should be examined and potentially eliminated.

## SPOOL Utilization

As part of automatically setting the size of the SPOOL cache (the BLOB), JES2 processing increased the amount of SPOOL space that traditionally was marked as allocated. In most installations, this change would not be noticeable. However, in certain smaller installations (such as test systems) the total SPOOL space that is available may be allocated to the BLOB. This makes determining the true SPOOL utilization much more difficult. To compensate for this, JES2 now considers SPOOL space in the BLOB as available rather than as allocated (as it had in previous releases). In small installations, with limited SPOOL space, this could decrease total SPOOL utilization. Also, multiple MAS members at different JES2 levels may report different SPOOL utilizations.

### Migration Actions

If you have a limited amount of SPOOL space, you may have set your SPOOLDEF TGSPACE=WARN= value high knowing that when that level was reached, you still have the space in the BLOB that can be used before SPOOL volumes are full. You should re-evaluate your settings of TGSPACE=WARN= to account for the changes in how SPOOL utilization has changes.

Also, be aware that SPOOL utilization may differ between MAS members of different release levels. This is normal. The smaller the number of track groups in the system, the greater the difference. However, the situation where the HASP355 message (SPOOL VOLUMES ARE FULL) is issued remains unchanged even in z/OS V1R1 JES2.

## TPDEF SNABUF Changes

To improve SNA performance and better align with other networking products, JES2 has increased the SNA buffer size from a maximum of 3840 to 32512. This is a change to the TPDEF SNABUF=SIZE= keywords.

### Migration Actions

Your VTAM network definitions should be evaluated.

## TRACEDEF PAGES= Changes

The default for TRACEDEF PAGE= is changed from 2 to 9. For compatibility with other releases of JES2, specification of 1-8 are converted automatically to 9.

### Migration Actions

For compatibility with other releases of JES2, specification of 1-8 for TRACEDEF PAGES, are converted automatically to 9. No migration actions are necessary, but you should evaluate your use of extended CSA space. If your current TRACEDEF initialization statements accepts the old default of PAGES=2, this will be converted to 9. For TABLES=100, you'll get 900 pages of buffers. Your setting for TABWARN= on the TRACEDEF initialization statements should also be evaluated.

## ZAPJOB Initialization Statement

The ZAPJOB initialization statement is new and is used to remove all traces of a job structure from the JES2 job queue. This statement is intended for situations where a job cannot be removed using normal JES2 commands or by a JES2 restart.

### Migration Actions

You should be careful when using this statement. Zapping a job that is active can lead to ABENDs and the loss of a PCE that might require a JES2 restart.

---

# Operations

## $ACTIVATE

Before warm starting z/OS V1R1 JES2, ensure a $ACTIVATE has been performed. To do this, issue a $D ACTIVATE command.

## $SJ Command

In migrating from JES2 OS/390 V2R4 to JES2 z/OS V1R1, the behavior of the $SJ command changes if you have not installed the PTF to fix APAR OW38962.

- Prior to OW38962, the $SJ command only considered members of the JES2 MAS that were eligible to run a job, but only if (1) the member of the MAS did NOT have a member draining situation (such as, when a $P is entered) and (2) the member did NOT have an initiator draining situation (such as, when a $P XEQ is entered).
- After the fix to APAR OW38962 is installed, members of the MAS that are in a member draining situation are still NOT considered. JES2 ignores the initiator draining situation, but only on the MAS member where the $SJ command is entered.

To illustrate this change in processing, suppose there are three members active in the JES2 MAS: SY1, SY2, and SY3. Furthermore, suppose that a $P XEQ is issued on SY1 and SY2, but NOT on SY3. In this situation, when a $SJ command is issued on SY3, SY3 is the only member that the job can run on, and then only if the affinity and SCHENV status permits it to run. If the $SJ command is issued on SY2, then both SY2 and SY3 are considered for running the job.

## $T SPOOL(nnnn) Command

$T SPOOL(nnnn) is a new JES2 command. This commands allows the installation to assign its systems to spool volumes. This command has one valid keyword operand, SYSAFF=. The SYSAFF= keyword has a similar function SYSAFF on the $TINTRDR command. The value you specify for SYSAFF= on the $TSPOOL(nnnn) command is also added to the output produced by the $D SPOOL command.

### Migration Actions

A new RACF authorization profile is required for the $T SPOOL command. The profile is `JESx.MODIFY.SPOOL` with `ACCESS=CONTROL`.

## $ZAPJOB Command

$ZAPJOB removes all traces of a job structure from the JES2 job queue. You must ensure that the job and any output it may have created is not active in any JES2 process or active on a device. Zapping a job that is active can lead to ABENDs and the loss of a PCE until JES2 is restarted.

There is nothing to stop entering a $ZAPJOB command in the JES2 initialization stream, however, IBM Recommends that the ZAPJOB initialization statement be used instead. A ZAPJOB command in the initialization stream will run after warm start processing completes whereas a ZAPJOB initialization statement will be processed before warm start processing begins, before verifying the job queue.

$HASP250 now indicates when a job has been zapped.

### Migration Actions

A new RACF authorization profile is required for the $ZAPJOB command. The profile is `JESx.ZAP.JOB` with `ACCESS=CONTROL`.

$HASP250 has been changed to add that a job has been zapped.

## $HASP834 Deleted

$HASP834 message has been deleted.

### Migration Actions

Examine your installations message automation. There is no replacement for $HASP834.

---

## Application Development

There are no application development migration actions.

---

## Problem Determination and Diagnosis

## Dumping all Members of the MAS

z/OS V1R1 JES2 dumps all members of the MAS when certain JES2 work queue errors occur. This is referred to as "multi-system dumps".

### Migration Actions

You need to make sure you have the procedures in place to collect all the dumps from all the systems.

---

## JES2 Installation Modifications

## Active DCTs

Active DCTs are now chained out of the HCT ($NJEADCT, $OFFADCT, $LCLADCT).

**Note:** If an error occurs in the DCT chain, a SYSOUT device may not be selected for work. Such might be the case when $S command is issued. JES2 rebuilds this chain should errors occur.

### Migration Actions

Installations that manipulate DCTs need to be aware of these changes.

# Chapter 5. Migration Actions: JES2 OS/390 V2R7 to JES2 z/OS V1R1

## Customization

## New and Changed Installation Exits

### Installation Exits 11 and 12

Installation exits 11 and 12 are unaffected if you use no new functions in z/OS V1R1 JES2. However, if you turn on spool affinity or set fencing to more than one volume, then your current exits 11 and 12 are affected.

***Migration Actions:*** Review the documentation for exits 11 and 12 in *z/OS JES2 Installation Exits*. Before activating SPOOL affinity, ensure that the correct available SPOOL masks are used to determine what volumes to add to a job in these exits.

Your installation uses spool partitioning if `FENCE=ACTIVE=YES` is specified on the SPOOLDEF initialization statement. Spool affinity is used if any spool volume has something other than SYSAFF=ANY displayed for it.

### Installation Exits 0, 19, 24

The HASPINIT load module and the initialization PCE have been moved above the 16M line. This may impact installation exits called during initialization processing (such as exits 0, 19 and 24). If your exit switches to AMODE 24 to invoke DFP modules, then this code will no longer be able to access the initialization PCE (and in particular the save area in the PCE).

***Migration Actions:*** Review all exits for code that switches to AMODE 24 ($AMODE 24 macro invocations). Verify that the switch to 24 bit mode is still required. If it is required and you are in an exit that gets control during initialization, ensure that the code running in AMODE 24 does not access the initialization PCE.

Also, examine all uses of DFP macros, such as GET and PUT. If these macros were hand coded (instead of using the IBM-supplied macro) changes might be necessary. The DFP macros were changed to support 31 bit addressable callers.

## Initialization

## PTF for APAR OW36796

If you are migrating from OS/390 JES2 Release 3, 4, 5, or 7, without PTF OW36796 applied, then ensure that you have not tried to change NJEDEF OWNNODE on a warmstart and replied "Y" to message HASP441 to continue initialization. If you have, then contact IBM service prior to installing z/OS V1R1 JES2.

To determine if you have attempted to change OWNNODE on a warm start, examine the syslogs from the most recent restart of JES2 for each member of your MAS. Look for the following sequence of messages:

```
HASP442  INITIALIZATION STATEMENTS CONFLICTING WITH
              SAVED VALUES

HASP496  NJEDEF OWNNODE=xx CANNOT BE CHANGED FROM SAVED
              VALUE OF yy

HASP441  REPLY 'Y' TO TO CONTINUE INITIALIZATION OR
              'N' TO TERMINATE IN RESPONSE TOOOO HASP442
```

You should contact IBM service if you find the above messages in your log and a reply of "Y" was given to message HASP441. If you do not find these messages with a reply of "Y", then no migration action is required.

## Checkpoint Data Sets

z/OS V1R1 JES2 no longer supports pre-release 4 checkpoints. JES2 can only read checkpoints that are in Release 4 mode. A Release 4 checkpoint is one that has been written by JES2 Release 4 or later after a $ACTIVATE command has been executed. To determine the checkpoint mode of your current checkpoint data set issue a $D ACTIVATE command. Since JES2 cannot read a checkpoint that is in pre-release 4 mode, it cannot coexist in a MAS with a pre-release 4 level of JES2 or nor can it participate in a MAS that has not been $ACTIVATE'd.

### Migration Actions

- If you have used $ACTIVATE, then no additional actions are needed. z/OS V1R1 JES2 can coexist with your existing systems or warm start using your existing checkpoint data set.
- If you have not used $ACTIVATE, you must do so before you can add a z/OS V1R1 JES2 system to your MAS or before performing a warm start of a z/OS V1R1 JES2 system using your existing checkpoint data set.

## SPOOLDEF FENCE= Changes

The FENCE= keyword parameter on the SPOOLDEF initialization statement is changed to allow you to specify fencing along with the number of spool volumes to be used.

When you specify

```
SPOOLDEF....FENCE=(ACTIVE=YES,VOLUMES=1).....
```

you get the same function as in the previous JES2 release when you specified FENCE=YES. . This specification of SPOOLDEF FENCE= is honored on $T SPOOLDEF and on cold start.

### Migration Actions

SPOOLDEF FENCE=YES is still permitted for compatibility and is converted to ACTIVE=YES and VOLUMES=1.

## SPOOLDEF TGBPERVL= Dropped

JES2 processing now controls the amount of SPOOL space cached for job writing data to SPOOL (the BLOB). In previous releases, this was controlled by the TGBPERVL parameter on SPOOLDEF. TGBPERVL= is no longer supported. In the initialization stream, this keyword is ignored (no error is returned). If used in a $TSPOOLDEF command, it will generate an error. In addition the HASP834 message that indicated TGBPERVL was set too high, has been deleted.

### Migration Actions

Delete references to TGBPERVL from your initialization decks and any operator commands or automation scripts. Any automated action associated with the HASP834 message should be examined and potentially eliminated.

## SPOOL Utilization

As part of automatically setting the size of the SPOOL cache (the BLOB), JES2 processing increased the amount of SPOOL space that traditionally was marked as allocated. In most installations, this change would not be noticeable. However, in certain smaller installations (such as test systems) the total SPOOL space that is available may be allocated to the BLOB. This makes determining the true SPOOL utilization much more difficult. To compensate for this, JES2 now considers SPOOL space in the BLOB as available rather than as allocated (as it had in previous releases). In small installations, with limited SPOOL space, this could decrease total SPOOL utilization. Also, multiple MAS members at different JES2 levels may report different SPOOL utilizations.

### Migration Actions

If you have a limited amount of SPOOL space, you may have set your SPOOLDEF TGSPACE=WARN= value high knowing that when that level was reached, you still have the space in the BLOB that can be used before SPOOL volumes are full. You should re-evaluate your settings of TGSPACE=WARN= to account for the changes in how SPOOL utilization has changes.

Also, be aware that SPOOL utilization may differ between MAS members of different release levels. This is normal. The smaller the number of track groups in the system, the greater the difference. However, the situation where the HASP355 message (SPOOL VOLUMES ARE FULL) is issued remains unchanged even in z/OS V1R1 JES2.

## TPDEF SNABUF Changes

To improve SNA performance and better align with other networking products, JES2 has increased the SNA buffer size from a maximum of 3840 to 32512. This is a change to the TPDEF SNABUF=SIZE= keywords.

### Migration Actions

Your VTAM network definitions should be evaluated.

## TRACEDEF PAGES= Changes

The default for TRACEDEF PAGE= is changed from 2 to 9. For compatibility with other releases of JES2, specification of 1-8 are converted automatically to 9.

### Migration Actions

For compatibility with other releases of JES2, specification of 1-8 for TRACEDEF PAGES, are converted automatically to 9. No migration actions are necessary, but you should evaluate your use of extended CSA space. If your current TRACEDEF initialization statements accepts the old default of PAGES=2, this will be converted to 9. For TABLES=100, you'll get 900 pages of buffers. Your setting for TABWARN= on the TRACEDEF initialization statements should also be evaluated.

## ZAPJOB Initialization Statement

The ZAPJOB initialization statement is new and is used to remove all traces of a job structure from the JES2 job queue. This statement is intended for situations where a job cannot be removed using normal JES2 commands or by a JES2 restart.

### Migration Actions

You should be careful when using this statement. Zapping a job that is active can lead to ABENDs and the loss of a PCE that might require a JES2 restart.

---

# Operations

## $ACTIVATE

Before warm starting z/OS V1R1 JES2, ensure a $ACTIVATE has been performed. To do this, issue a $D ACTIVATE command.

## $SJ Command

In migrating from JES2 OS/390 V2R4 to JES2 z/OS V1R1, the behavior of the $SJ command changes if you have not installed the PTF to fix APAR OW38962.

- Prior to OW38962, the $SJ command only considered members of the JES2 MAS that were eligible to run a job, but only if (1) the member of the MAS did NOT have a member draining situation (such as, when a $P is entered) and (2) the member did NOT have an initiator draining situation (such as, when a $P XEQ is entered).
- After the fix to APAR OW38962 is installed, members of the MAS that are in a member draining situation are still NOT considered. JES2 ignores the initiator draining situation, but only on the MAS member where the $SJ command is entered.

To illustrate this change in processing, suppose there are three members active in the JES2 MAS: SY1, SY2, and SY3. Furthermore, suppose that a $P XEQ is issued on SY1 and SY2, but NOT on SY3. In this situation, when a $SJ command is issued on SY3, SY3 is the only member that the job can run on, and then only if the affinity and SCHENV status permits it to run. If the $SJ command is issued on SY2, then both SY2 and SY3 are considered for running the job.

## $T SPOOL(nnnn) Command

$T SPOOL(nnnn) is a new JES2 command. This commands allows the installation to assign its systems to spool volumes. This command has one valid keyword operand, SYSAFF=. The SYSAFF= keyword has a similar function SYSAFF on the $TINTRDR command. The value you specify for SYSAFF= on the $TSPOOL(nnnn) command is also added to the output produced by the $D SPOOL command.

### Migration Actions

A new RACF authorization profile is required for the $T SPOOL command. The profile is `JESx.MODIFY.SPOOL` with `ACCESS=CONTROL`.

## $ZAPJOB Command

$ZAPJOB removes all traces of a job structure from the JES2 job queue. You must ensure that the job and any output it may have created is not active in any JES2 process or active on a device. Zapping a job that is active can lead to ABENDs and the loss of a PCE until JES2 is restarted.

There is nothing to stop entering a $ZAPJOB command in the JES2 initialization stream, however, IBM Recommends that the ZAPJOB initialization statement be used instead. A ZAPJOB command in the initialization stream will run after warm start processing completes whereas a ZAPJOB initialization statement will be processed before warm start processing begins, before verifying the job queue.

$HASP250 now indicates when a job has been zapped.

### Migration Actions

A new RACF authorization profile is required for the $ZAPJOB command. The profile is `JESx.ZAP.JOB` with `ACCESS=CONTROL`.

$HASP250 has been changed to add that a job has been zapped.

## $HASP834 Deleted

$HASP834 message has been deleted.

### Migration Actions

Examine your installations message automation. There is no replacement for $HASP834.

# Application Development

There are no application development migration actions.

# Problem Determination and Diagnosis

## Provide for JES2 IPCS Support

**Attention!**

- You must be proactive to install JES2 IPCS.
- Make sure JES2 IPCS support works before you experience an emergency. For more information about setting up JES2 IPCS support, see *z/OS JES2 Diagnosis*.
- Make sure you have JES2 IPCS support for all combinations of JES2 and MVS releases in production.

- When JES2 dumps are being diagnosed on the same level of the system as the system on which the dumps were taken, do the following:
  - Ensure that SHASPARM is specified in the PARMLIB concatenation.
  - Ensure that SHASMIG is specified in the STEPLIB concatenation.
  - Ensure that SHASPNL0 is specified in the ISPPLIB concatenation.

  This ensures that IPCS can find the SMP/E-maintained copy of JES2 data.
- If the JES2 levels differ between the system on which the dump was taken and the system on which the dump will be examined using IPCS, but the level of MVS is the same, do the following:
  - Add an IPCSPARM DD statement to your logon proc and specify the SHASPARM library that corresponds to the JES2 level in the dump in the first position in the IPCSPARM DD concatenation. Also, specify your PARMLIB data set plus any other data sets containing IPCS parameters that you normally need when using IPCS.
  - Specify the SHASMIG library that corresponds to the JES2 level in the dump in the first position in the STEPLIB concatenation.
  - Specify the SHASPNL0 library that corresponds to the JES2 level in the dump in the first position in the ISPPLIB concatenation.
- If both the JES2 and system levels differ between the system on which the dump was taken and the system on which the dump will be examined using IPCS, do the following:
  - Add an IPCSPARM DD statement to your logon proc and specify the SHASPARM library that corresponds to the JES2 level in the dump in the first position in the IPCSPARM DD concatenation. Also, specify the PARMLIB data set plus any other data sets containing IPCS parameters that correspond to the system level in the dump.
  - Specify the SHASMIG and MIGLIB libraries that correspond to the system in the dump in the first and second positions in the STEPLIB concatenation.
  - Specify the SHASPNL0 and SBLSPNL0 libraries that correspond to the system in the dump in the first position in the ISPPLIB concatenation.

Note that IPCS requires libraries in addition to the libraries that JES2 uses. You may need to make other concatenations. For more information, see *z/OS MVS IPCS Customization*.

If dump analysis leads into data structures for other elements or products, you might need to add more data sets to the concatenations to complete the diagnosis. Refer to the appropriate product publications for information about establishing the correct IPCS environments for diagnosing other elements and products.

## Dumping all Members of the MAS

z/OS V1R1 JES2 dumps all members of the MAS when certain JES2 work queue errors occur. This is referred to as "multi-system dumps".

### Migration Actions

You need to make sure you have the procedures in place to collect all the dumps from all the systems.

---

# JES2 Installation Modifications

## Active DCTs

Active DCTs are now chained out of the HCT ($NJEADCT, $OFFADCT, $LCLADCT).

**Note:** If an error occurs in the DCT chain, a SYSOUT device may not be selected for work. Such might be the case when $S command is issued. JES2 rebuilds this chain should errors occur.

### Migration Actions

Installations that manipulate DCTs need to be aware of these changes.

# Chapter 6. Migration Actions: JES2 OS/390 V2R5 to JES2 z/OS V1R1

## Customization

## New and Changed Installation Exits

| Exit | Explanation | Migration Action |
|---|---|---|
| Exit 8 | This exit can now receive control for control block I/O (CBIO) calls from the FSS address space. A new bit was added to the XPL to identify that this $CBIO was done for an FSS printer. | Check new bit if you want to ignore calls for the FSS printer. |
| Exit 25 | The $BUFIO and $BUFCK services in HASPFSSM have been deleted. These services are now provided by the $CBIO service. TYPE=WAIT was added to $CBIO to support the functions that were previously provided by $BUFCK. | If you were using $BUFIO or $BUFCK services, now use $CBIO. |
| Exit 46 | Exit 46 will now be invoked to process RCCS headers. | Insure that your exit 46 routine is coded to accomodate RCCS headers, espically if you have patterned your exit 46 routine after the sample exit 46 routine (HASX46A) shipped with the product. See the sample exit 46 routine shipped with OS/390 Rlease 7 for an example of how to write code to accomodate RCCS headers. |
| Exit 47 | Exit 47 will now be invoked to process RCCS headers. | Insure that your exit 47 routine is coded to accomodate RCCS headers. |
| Exit 47 | Exit 47 will not always be passed the address of a real JQE. | Test indicator X047IND for setting X047BJQE. If on, X047JQE contains the address of a working copy of the JQE, not of a real JQE. Do not use this address as input to any services that expect the address of a real JQE (for example, $DOGJQE). |
| Exit 70 | Exit 70 function (added by APAR OW32040) is now moved to Exit 46. | If the NJE receivers in your network are still down-level, then either move your exit 70 function to exit 46, or change the statements in your INIT deck to invoke your exit 70 routine as exit 46. |

### Installation Exits 11 and 12

Installation exits 11 and 12 are unaffected if you use no new functions in z/OS V1R1 JES2. However, if you turn on spool affinity or set fencing to more than one volume, then your current exits 11 and 12 are affected.

***Migration Actions:*** Review the documentation for exits 11 and 12 in *z/OS JES2 Installation Exits*. Before activating SPOOL affinity, ensure that the correct available SPOOL masks are used to determine what volumes to add to a job in these exits.

Your installation uses spool partitioning if FENCE=ACTIVE=YES is specified on the SPOOLDEF initialization statement. Spool affinity is used if any spool volume has something other than SYSAFF=ANY displayed for it.

### Installation Exits 0, 19, 24

The HASPINIT load module and the initialization PCE have been moved above the 16M line. This may impact installation exits called during initialization processing (such as exits 0, 19 and 24). If your exit switches to AMODE 24 to invoke DFP modules, then this code will no longer be able to access the initialization PCE (and in particular the save area in the PCE).

***Migration Actions:*** Review all exits for code that switches to AMODE 24 ($AMODE 24 macro invocations). Verify that the switch to 24 bit mode is still required. If it is required and you are in an exit that gets control during initialization, ensure that the code running in AMODE 24 does not access the initialization PCE.

Also, examine all uses of DFP macros, such as GET and PUT. If these macros were hand coded (instead of using the IBM-supplied macro) changes might be necessary. The DFP macros were changed to support 31 bit addressable callers.

## New and Changed Macros

### $DOGCAT

The $DOGCAT macro provides an interface to find the address of a CAT. It is also recommended that the CAT obtained using $DOGCAT be used for finding queue heads rather than $JQHEADS.

***Migration Action:*** Use $DOGCAT wherever your code has used $CATABLE to compute the address of a CAT. Use the CAT found via $DOGCAT to access the job queue head for the class.

### $DOGJQE

The $DOGJQE macro provides an interface to construct an artificial JQE. An artificial JQE is constructed in a temporary work area and is composed of the real JQE, a JQE extension (new in this release) and fields copied from an internal area (also new).

You need to be aware of the types of JQE/JQAs that JES2 provides to your exit, since JES2 processes these JQE/JQAs in differing ways. The types are:

- A real JQE. Your exit receives a read or update mode JQE/JQA.
- A read-mode JQA. Your exit receives an artificial JQE that is a temporary block of storage. This storage contains:
  - Almost the same information as the real JQE.
  - Information from the JQX (new in Version 2 Release 4).
  - Information from BERTs (another checkpointed area).
- An update-mode JQA. Your exit receives an artificial JQE that is a temporary block of storage. This storage is similar to the read-mode JQA. JES2 ensures the integrity of this JQA and manages the storage each JQA occupies.

- A work area containing a prototype JQE. In certain circumstances, your exit may be passed the address of a work area that contains a working copy of a JQE. See Exit 47 for more information about this.

***Migration Action:*** Use $DOGJQE services rather than $CKPT if your exit modifies JQEs.

Ensure that your exit calls TIMECLOC via:

```
$CALL   TIMECLOC,PARM=JQE,PARM0=0
```

if the hold status of the JQE is changed or if the system affinity of the JQE is changed.

Exits normally want to use JQEs in read mode (data is extracted or pointed to when calling service routines) or in write mode (data in the JQE is modified). JES2 exit writers need to take the following actions when using a particular JQE/JQA as the JQE= keyword value on the $DOGJQE macro:

- If the JQE is needed only to access data and that data is within the bounds of the original real JQE, then only the address of the real JQE is needed. Regardless of what IBM has provided as the JQE address, use the following action to get the address of the real JQE:

  ```
  $DOGJQE ACTION=GETJQEADDR,CBADDR=jqe
  ```

- If the JQE is needed only to access data and that data is beyond the bounds of the original real JQE (that is, it is stored in fields where the first three characters of the field name are other than JQE), then a read mode JQA is needed. Regardless of what IBM has provided as the JQE address, use the following action to get the address of a read mode JQA. The address of the read mode is passed back (in R0).

  ```
  $DOGJQE ACTION=(FETCH,READ),JQE=jqe
  ```

- When you are finished, use the following action to free the memory used for the JQA (x is the address returned from the first $DOGJQE call):

  ```
  $DOGJQE ACTION=RETURN,CBADDR=x
  ```

- If the JQE is needed in write mode (the fields to be changed are either within the bounds or not within the bounds of the original JQE), use the following action to get the address of an update mode JQE, regardless of what IBM has provided as the JQE address. The address of the JQA is passed back (in R0). Make all changes to fields in the update mode JQA.

  ```
  $DOGJQE ACTION=(FETCH,UPDATE),JQE=jqe
  ```

- When you are finished, use the following action to free the memory used for JQA (x is the address from the first $DOGJQE call) and to ensure that the changes in the JQA get propagated to the real JQE, the JQX, and the BERT area.

  ```
  $DOGJQE ACTION=RETURN,CBADDR=x
  ```

When your exit returns a JQE/JQA to the JES2 systems through these actions, certain errors can occur if JES2 determines that what your exit has returned is not consistent with what JES2 knows to exist. JES2 uses the $ERROR macro and issues the following errors:

- DJ1- non-IBM code returned an IBM JQE/JQA that violates the consistency checks of JES2.
- DJ2- IBM code returned a non-IBM JQE/JQA that violates the consistency checks of JES2.

**Notes:**

1. You are encouraged to disregard the kind of JQE/JQA passed to your exit and always do the following:
   - To obtain the address of the real JQE (for example, your exit wants to compute the offset of the JQE), use:

     ```
     $DOGJQE ACTION=GETJQEADDR
     ```

   - To obtain the address of a read mode JQE/JQA (for example, your exit wants to examine the MAXCC field), use:

     ```
     $DOGJQE ACTION=(FETCH,READ)
     ```

   - To obtain the address of an update mode JQE/JQA (for example, your exit wants to change the SYSAFF, PRIORITY or MAXCC), use:

     ```
     $DOGJQE ACTION=(FETCH,UPDATE)
     ```

2. If you are writing exit 47, do not use $DOGJQE to access a JQE/JQA.

## $DVIDBLD

In prior releases, the name associated with a device could be obtained directly from DCTDEVN. Now, some devices that have a device number greater than 9999 will have a name in DCTDEVN that is not consistent with the name normally displayed for a device. Use the $DVIDBLD macro to obtain a device name suitable for use in messages or other displays. The name returned from $DVIDBLD could be up to 10 characters long.

***Migration Action:*** Review any exit that references DCTDEVN and if the field is being displayed, consider using $DVIDBLD to display a more consistent name for the device.

## $QJQE

The $QJQE macro is used to traverse JQE queues. It has changed to always return the address of an artificial JQE.

***Migration Action:*** If you need the address of a real JQE, for example, to compute the address of a real JQE offset, use the $DOGJQE ACTION=GETJQEADDR service to return the address of a real JQE.

## $QGET

$QGET has been changed to return the address of an artificial JQE.

***Migration Action:*** To return the memory for an artificial JQE, use one of the following: $DOGJQE ACTION=RETURN, $QMOD, or $QPUT.

### $DILBERT

The $DILBERT macro provides an interface to delay operations upon an artificial JQE if that JQE is locked.

***Migration Action:*** If it is necessary to get an artificial JQE in update mode and your code cannot afford to $WAIT for the JQE to become unlocked, then use the $DILBERT macro to automatically defer the action until it is.

### $#BLD

The $#BLD macro is used to create a JOE. One of its inputs is a JQE address. In prior releases, the JQE was passed as an offset. Starting in Release 4, the JQE is passed as an address, and the address passed is the address of a real JQE.

***Migration Action:*** Ensure any uses of $#BLD use the JQE address rather than the offset.

### $PAIR

If the installation defines their own table pairs (either in line or in the UCT or MCT) they must be defined using the $PAIR macro.

## Initialization

## Checkpoint Performance

JES2 checkpoint performance has been improved by reducing the number of I/O to the checkpoint data sets under certain conditions. These changes include:

- Elimination of a Read to CKPT2 during checkpoint locking operations (READ1) if at least one checkpoint is on a coupling facility.
- Reduction of the number of writes to CKPT2 when checkpoint is in duplex mode.

### Migration Actions

As a result of these changes, the specifications for MASDEF HOLD= and DORMANCY= may need adjusting. In particular, if you have HOLD=0 specified in duplex mode, then prior to this change, the actual hold time was limited by the time it took to write to CKPT2. Now, a significant number of those writes have been eliminated and your actual hold time may become too short and cause thrashing.

If you are in duplex mode and have some members which specify DUPLEX=OFF, you may want to reconsider this specification. As of Release 7, the CKPT2 data set is only written once every 10 writes to the CKPT1 data set. One of the reasons to specify DUPLEX=OFF was to reduce the I/O's to CKPT2. The combination of the two may cause an unacceptable amount of time to elapse before CKPT2 is written. If the only reason DUPLEX=OFF was specified was to reduce the number of I/O's to CKPT2, then as with Release 7, all members should specify DUPLEX=ON.

## PTF for APAR OW36796

If you are migrating from OS/390 JES2 Release 3, 4, 5, or 7, without PTF for APAR OW36796 applied, then ensure that you have not tried to change NJEDEF OWNNODE on a warmstart and replied "Y" to message HASP441 to continue initialization. If you have, then contact IBM service prior to installing z/OS V1R1 JES2.

To determine if you have attempted to change OWNNODE on a warm start, examine the syslogs from the most recent restart of JES2 for each member of your MAS. Look for the following sequence of messages:

```
HASP442  INITIALIZATION STATEMENTS CONFLICTING WITH
              SAVED VALUES

HASP496  NJEDEF OWNNODE=xx CANNOT BE CHANGED FROM SAVED
              VALUE OF yy

HASP441  REPLY 'Y' TO TO CONTINUE INITIALIZATION OR
              'N' TO TERMINATE IN RESPONSE TO HASP442
```

You should contact IBM service if you find the above messages in your log and a reply of "Y" was given to message HASP441. If you do not find these messages with a reply of "Y", then no migration action is required.

## Checkpoint Data Sets

z/OS V1R1 JES2 no longer supports pre-release 4 checkpoints. JES2 can only read checkpoints that are in Release 4 mode. A Release 4 checkpoint is one that has been written by JES2 Release 4 or later after a $ACTIVATE command has been executed. To determine the checkpoint mode of your current checkpoint data set issue a $D ACTIVATE command. Since JES2 cannot read a checkpoint that is in pre-release 4 mode, it cannot coexist in a MAS with a pre-release 4 level of JES2 or nor can it participate in a MAS that has not been $ACTIVATE'd.

### Migration Actions

- If you have used $ACTIVATE, then no additional actions are needed. z/OS V1R1 JES2 can coexist with your existing systems or warm start using your existing checkpoint data set.
- If you have not used $ACTIVATE, you must do so before you can add a z/OS V1R1 JES2 system to your MAS or before performing a warm start of a z/OS V1R1 JES2 system using your existing checkpoint data set.

## SPOOLDEF FENCE= Changes

The FENCE= keyword parameter on the SPOOLDEF initialization statement is changed to allow you to specify fencing along with the number of spool volumes to be used.

When you specify

```
SPOOLDEF....FENCE=(ACTIVE=YES,VOLUMES=1).....
```

you get the same function as in the previous JES2 release when you specified FENCE=YES. . This specification of SPOOLDEF FENCE= is honored on $T SPOOLDEF and on cold start.

### Migration Actions

SPOOLDEF FENCE=YES is still permitted for compatibility and is converted to ACTIVE=YES and VOLUMES=1.

## SPOOLDEF TGBPERVL= Dropped

JES2 processing now controls the amount of SPOOL space cached for job writing data to SPOOL (the BLOB). In previous releases, this was controlled by the TGBPERVL parameter on SPOOLDEF. TGBPERVL= is no longer supported. In the initialization stream, this keyword is ignored (no error is returned). If used in a $TSPOOLDEF command, it will generate an error. In addition the HASP834 message that indicated TGBPERVL was set too high, has been deleted.

### Migration Actions

Delete references to TGBPERVL from your initialization decks and any operator commands or automation scripts. Any automated action associated with the HASP834 message should be examined and potentially eliminated.

## SPOOL Utilization

As part of automatically setting the size of the SPOOL cache (the BLOB), JES2 processing increased the amount of SPOOL space that traditionally was marked as allocated. In most installations, this change would not be noticeable. However, in certain smaller installations (such as test systems) the total SPOOL space that is available may be allocated to the BLOB. This makes determining the true SPOOL utilization much more difficult. To compensate for this, JES2 now considers SPOOL space in the BLOB as available rather than as allocated (as it had in previous releases). In small installations, with limited SPOOL space, this could decrease total SPOOL utilization. Also, multiple MAS members at different JES2 levels may report different SPOOL utilizations.

### Migration Actions

If you have a limited amount of SPOOL space, you may have set your SPOOLDEF TGSPACE=WARN= value high knowing that when that level was reached, you still have the space in the BLOB that can be used before SPOOL volumes are full. You should re-evaluate your settings of TGSPACE=WARN= to account for the changes in how SPOOL utilization has changes.

Also, be aware that SPOOL utilization may differ between MAS members of different release levels. This is normal. The smaller the number of track groups in the system, the greater the difference. However, the situation where the HASP355 message (SPOOL VOLUMES ARE FULL) is issued remains unchanged even in z/OS V1R1 JES2.

## TPDEF SNABUF Changes

To improve SNA performance and better align with other networking products, JES2 has increased the SNA buffer size from a maximum of 3840 to 32512. This is a change to the TPDEF SNABUF=SIZE= keywords.

### Migration Actions

Your VTAM network definitions should be evaluated.

## TRACEDEF PAGES= Changes

The default for TRACEDEF PAGE= is changed from 2 to 9. For compatibility with other releases of JES2, specification of 1-8 are converted automatically to 9.

### Migration Actions

For compatibility with other releases of JES2, specification of 1-8 for TRACEDEF PAGES, are converted automatically to 9. No migration actions are necessary, but you should evaluate your use of extended CSA space. If your current TRACEDEF initialization statements accepts the old default of PAGES=2, this will be converted to 9. For TABLES=100, you'll get 900 pages of buffers. Your setting for TABWARN= on the TRACEDEF initialization statements should also be evaluated.

## ZAPJOB Initialization Statement

The ZAPJOB initialization statement is new and is used to remove all traces of a job structure from the JES2 job queue. This statement is intended for situations where a job cannot be removed using normal JES2 commands or by a JES2 restart.

### Migration Actions

You should be careful when using this statement. Zapping a job that is active can lead to ABENDs and the loss of a PCE that might require a JES2 restart.

---

# Operations

## $ACTIVATE

Before warm starting z/OS V1R1 JES2, ensure a $ACTIVATE has been performed. To do this, issue a $D ACTIVATE command.

## $SJ Command

In migrating from JES2 OS/390 V2R4 to JES2 z/OS V1R1, the behavior of the $SJ command changes if you have not installed the PTF to fix APAR OW38962.

- Prior to OW38962, the $SJ command only considered members of the JES2 MAS that were eligible to run a job, but only if (1) the member of the MAS did NOT have a member draining situation (such as, when a $P is entered) and (2) the member did NOT have an initiator draining situation (such as, when a $P XEQ is entered).
- After the fix to APAR OW38962 is installed, members of the MAS that are in a member draining situation are still NOT considered. JES2 ignores the initiator draining situation, but only on the MAS member where the $SJ command is entered.

To illustrate this change in processing, suppose there are three members active in the JES2 MAS: SY1, SY2, and SY3. Furthermore, suppose that a $P XEQ is issued on SY1 and SY2, but NOT on SY3. In this situation, when a $SJ command is issued on SY3, SY3 is the only member that the job can run on, and then only if

the affinity and SCHENV status permits it to run. If the $SJ command is issued on SY2, then both SY2 and SY3 are considered for running the job.

## $T SPOOL(nnnn) Command

$T SPOOL(nnnn) is a new JES2 command. This commands allows the installation to assign its systems to spool volumes. This command has one valid keyword operand, SYSAFF=. The SYSAFF= keyword has a similar function SYSAFF on the $TINTRDR command. The value you specify for SYSAFF= on the $TSPOOL(nnnn) command is also added to the output produced by the $D SPOOL command.

### Migration Actions

A new RACF authorization profile is required for the $T SPOOL command. The profile is `JESx.MODIFY.SPOOL` with `ACCESS=CONTROL`.

## $ZAPJOB Command

$ZAPJOB removes all traces of a job structure from the JES2 job queue. You must ensure that the job and any output it may have created is not active in any JES2 process or active on a device. Zapping a job that is active can lead to ABENDs and the loss of a PCE until JES2 is restarted.

There is nothing to stop entering a $ZAPJOB command in the JES2 initialization stream, however, IBM Recommends that the ZAPJOB initialization statement be used instead. A ZAPJOB command in the initialization stream will run after warm start processing completes whereas a ZAPJOB initialization statement will be processed before warm start processing begins, before verifying the job queue.

$HASP250 now indicates when a job has been zapped.

### Migration Actions

A new RACF authorization profile is required for the $ZAPJOB command. The profile is `JESx.ZAP.JOB` with `ACCESS=CONTROL`.

$HASP250 has been changed to add that a job has been zapped.

## $HASP834 Deleted

$HASP834 message has been deleted.

### Migration Actions

Examine your installations message automation. There is no replacement for $HASP834.

# Application Development

There are no application development migration actions.

# Problem Determination and Diagnosis

## Provide for JES2 IPCS Support

**Attention!**

- You must be proactive to install JES2 IPCS.
- Make sure JES2 IPCS support works before you experience an emergency. For more information about setting up JES2 IPCS support, see *z/OS JES2 Diagnosis*.
- Make sure you have JES2 IPCS support for all combinations of JES2 and MVS releases in production.

- When JES2 dumps are being diagnosed on the same level of the system as the system on which the dumps were taken, do the following:
  - Ensure that SHASPARM is specified in the PARMLIB concatenation.
  - Ensure that SHASMIG is specified in the STEPLIB concatenation.
  - Ensure that SHASPNL0 is specified in the ISPPLIB concatenation.

  This ensures that IPCS can find the SMP/E-maintained copy of JES2 data.
- If the JES2 levels differ between the system on which the dump was taken and the system on which the dump will be examined using IPCS, but the level of MVS is the same, do the following:
  - Add an IPCSPARM DD statement to your logon proc, and specify the SHASPARM library that corresponds to the JES2 level in the dump in the first position in the IPCSPARM DD concatenation. Also specify your PARMLIB data set, plus any other data sets containing IPCS parameters that you normally need when using IPCS.
  - Specify the SHASMIG library that corresponds to the JES2 level in the dump in the first position in the STEPLIB concatenation.
  - Specify the SHASPNL0 library that corresponds to the JES2 level in the dump in the first position in the ISPPLIB concatenation.
- If both the JES2 and system levels differ between the system on which the dump was taken and the system on which the dump will be examined using IPCS, do the following:
  - Add an IPCSPARM DD statement to your logon proc, and specify the SHASPARM library that corresponds to the JES2 level in the dump in the first position in the IPCSPARM DD concatenation. Also specify the PARMLIB data set, plus any other data sets containing IPCS parameters that correspond to the system level in the dump.
  - Specify the SHASMIG and MIGLIB libraries that correspond to the system in the dump in the first and second positions in the STEPLIB concatenation.
  - Specify the SHASPNL0 and SBLSPNL0 libraries that correspond to the system in the dump in the first position in the ISPPLIB concatenation.

Note that IPCS requires libraries in addition to the libraries that JES2 uses. You may need to make other concatenations. For more information, see *z/OS MVS IPCS Customization*.

If dump analysis leads into data structures for other elements or products, you might need to add more data sets to the concatenations to complete the diagnosis. Refer to the appropriate product publications for information about establishing the correct IPCS environments for diagnosing other elements and products.

## New Record for Trace ID 17

Trace ID 17 has been updated to contain new measurements (total PCE wait time, number of $CKPTs issued, MVS wait time, $QSUSE time) that JES2 gathers during different phases of checkpoint processing. A new record 3 has been added to the READ2, PRIMARY WRITE, IMMEDIATE WRITE and FINAL WRITE checkpoint cycles that contains these measurements.

### Migration Actions

If you use a program that analyses Trace ID 17 records, it may need to be updated to incorporate this support.

## $DPCE Command

The $DPCE command is enhanced to provide the following additional diagnostic information:

- Ended PCE counts - $DPCE,ENDED>0 displays the PCE types that have ended.
- Active PCE counts - $PDCE,ACTIVE>0 displays the PCE types that have active work.
- Detailed PCE information - $PCDE (CNVT) displays current detailed information for each converter PCE. This information includes: where the PCE is waiting and what it is waiting for, active and outstanding I/O counts, the exit the PCE is in, the current job the PCE is processing, the time the PCE waited, and whether the PCE has ended.

### Migration Actions

Be aware of the additional diagnostic information provided by the $DPCE command.

## Message HASP291

Message HASP291 is enhanced in this release to include information from the MVS IEDB. This information includes the IOS completion code and the full device sense data. Two completion codes are presented because IOS combines a multiple of its completion codes into one for use by EXCP callers. In some cases, the IOS completion code will more accurately describe the error.

### Migration Actions

Be aware of the additional diagnostic information provided by the HASP291 message.

## Message HASP064

The old I/O error message, HASP094, was incomplete and difficult to read. A new message, HASP064, is added to this release to provide additional data in a format that is easier to understand. The HASP064 message displays the same information as the HASP094 message, but in a format similar to the HASP291 message. In addition, data from the MVS IEDB is added to the HASP064 message and includes the IOS completion code and the device sense data. Two completion codes are presented because IOS combines a multiple of its completion codes into one for use by EXCP callers. In some cases, the IOS completion code will more accurately describe the error. Also included is the failing MTTR/BBCCHHR.

### Migration Actions

Be aware of the format and diagnostic information provided by the HASP064 message.

## $CBIO Services - Additional Error Recording

Additional error recording is added for the $CBIO services in the USER environment. CBIO errors will now generate a SYMREC similar to the one generated in the main task for control block I/O errors. In addition, the JES2 trace ID 3, previously from the FSS environment $BUFIO service, is moved to the USER environment $CBIO service. These changes provide additional data to help diagnose errors with SPOOL control blocks.

### Migration Actions

Be aware of the additional error recording provided by $CBIO services.

## Dumping all Members of the MAS

z/OS V1R1 JES2 dumps all members of the MAS when certain JES2 work queue errors occur. This is referred to as "multi-system dumps".

### Migration Actions

You need to make sure you have the procedures in place to collect all the dumps from all the systems.

---

# JES2 Installation Modifications

## Fiber Channel Support (FICON)

JES2 I/O processing for spool and checkpoint has been updated to take advantage of the changes made in FICON (Fiber channels).

### Migration Actions

Be aware of the updates to JES2 I/O processing for spool and checkpoint in respect to FICON.

## Active DCTs

Active DCTs are now chained out of the HCT ($NJEADCT, $OFFADCT, $LCLADCT).

**Note:** If an error occurs in the DCT chain, a SYSOUT device may not be selected for work. Such might be the case when $S command is issued. JES2 rebuilds this chain should errors occur.

### Migration Actions

Installations that manipulate DCTs need to be aware of these changes.

# Chapter 7. Migration Actions: JES2 OS/390 V2R4 to JES2 z/OS V1R1

## Customization

## New and Changed Installation Exits

| Exit | Explanation | Migration Action |
|---|---|---|
| Exit 8 | This exit can now receive control for control block I/O (CBIO) calls from the FSS address space. A new bit was added to the XPL to identify that this $CBIO was done for an FSS printer. | Check new bit if you want to ignore calls for the FSS printer. |
| Exit 25 | The $BUFIO and $BUFCK services in HASPFSSM have been deleted. These services are now provided by the $CBIO service. TYPE=WAIT was added to $CBIO to support the functions that were previously provided by $BUFCK. | If you were using $BUFIO or $BUFCK services, now use $CBIO. |
| Exit 46 | Exit 46 will now be invoked to process RCCS headers. | Insure that your exit 46 routine is coded to accomodate RCCS headers, espically if you have patterned your exit 46 routine after the sample exit 46 routine (HASX46A) shipped with the product. See the sample exit 46 routine shipped with OS/390 Rlease 7 for an example of how to write code to accomodate RCCS headers. |
| Exit 47 | Exit 47 will now be invoked to process RCCS headers. | Insure that your exit 47 routine is coded to accomodate RCCS headers. |
| Exit 47 | Exit 47 will not always be passed the address of a real JQE. | Test indicator X047IND for setting X047BJQE. If on, X047JQE contains the address of a working copy of the JQE, not of a real JQE. Do not use this address as input to any services that expect the address of a real JQE (for example, $DOGJQE). |
| Exit 70 | Exit 70 function (added by APAR OW32040) is now moved to Exit 46. | If the NJE receivers in your network are still down-level, then either move your exit 70 function to exit 46, or change the statements in your INIT deck to invoke your exit 70 routine as exit 46. |

### Installation Exits 11 and 12

Installation exits 11 and 12 are unaffected if you use no new functions in z/OS V1R1 JES2. However, if you turn on spool affinity or set fencing to more than one volume, then your current exits 11 and 12 are affected.

***Migration Actions:*** Review the documentation for exits 11 and 12 in *z/OS JES2 Installation Exits*. Before activating SPOOL affinity, ensure that the correct available SPOOL masks are used to determine what volumes to add to a job in these exits.

Your installation uses spool partitioning if FENCE=ACTIVE=YES is specified on the SPOOLDEF initialization statement. Spool affinity is used if any spool volume has something other than SYSAFF=ANY displayed for it.

### Installation Exits 0, 19, 24

The HASPINIT load module and the initialization PCE have been moved above the 16M line. This may impact installation exits called during initialization processing (such as exits 0, 19 and 24). If your exit switches to AMODE 24 to invoke DFP modules, then this code will no longer be able to access the initialization PCE (and in particular the save area in the PCE).

***Migration Actions:*** Review all exits for code that switches to AMODE 24 ($AMODE 24 macro invocations). Verify that the switch to 24 bit mode is still required. If it is required and you are in an exit that gets control during initialization, ensure that the code running in AMODE 24 does not access the initialization PCE.

Also, examine all uses of DFP macros, such as GET and PUT. If these macros were hand coded (instead of using the IBM-supplied macro) changes might be necessary. The DFP macros were changed to support 31 bit addressable callers.

## New and Changed Macros

### $DOGCAT

The $DOGCAT macro provides an interface to find the address of a CAT. It is also recommended that the CAT obtained using $DOGCAT be used for finding queue heads rather than $JQHEADS.

***Migration Action:*** Use $DOGCAT wherever your code has used $CATABLE to compute the address of a CAT. Use the CAT found via $DOGCAT to access the job queue head for the class.

### $DOGJQE

The $DOGJQE macro provides an interface to construct an artificial JQE. An artificial JQE is constructed in a temporary work area and is composed of the real JQE, a JQE extension (new in this release) and fields copied from an internal area (also new).

You need to be aware of the types of JQE/JQAs that JES2 provides to your exit, since JES2 processes these JQE/JQAs in differing ways. The types are:

- A real JQE. Your exit receives a read or update mode JQE/JQA.
- A read-mode JQA. Your exit receives an artificial JQE that is a temporary block of storage. This storage contains:
  - Almost the same information as the real JQE.
  - Information from the JQX (new in Version 2 Release 4).
  - Information from BERTs (another checkpointed area).
- An update-mode JQA. Your exit receives an artificial JQE that is a temporary block of storage. This storage is similar to the read-mode JQA. JES2 ensures the integrity of this JQA and manages the storage each JQA occupies.

- A work area containing a prototype JQE. In certain circumstances, your exit may be passed the address of a work area that contains a working copy of a JQE. See Exit 47 for more information about this.

***Migration Action:*** Use $DOGJQE services rather than $CKPT if your exit modifies JQEs.

Ensure that your exit calls TIMECLOC via:

```
$CALL   TIMECLOC,PARM=JQE,PARM0=0
```

if the hold status of the JQE is changed or if the system affinity of the JQE is changed.

Exits normally want to use JQEs in read mode (data is extracted or pointed to when calling service routines) or in write mode (data in the JQE is modified). JES2 exit writers need to take the following actions when using a particular JQE/JQA as the JQE= keyword value on the $DOGJQE macro:

- If the JQE is needed only to access data and that data is within the bounds of the original real JQE, then only the address of the real JQE is needed. Regardless of what IBM has provided as the JQE address, use the following action to get the address of the real JQE:

  ```
  $DOGJQE ACTION=GETJQEADDR,CBADDR=jqe
  ```

- If the JQE is needed only to access data and that data is beyond the bounds of the original real JQE (that is, it is stored in fields where the first three characters of the field name are other than JQE), then a read mode JQA is needed. Regardless of what IBM has provided as the JQE address, use the following action to get the address of a read mode JQA. The address of the read mode is passed back (in R0).

  ```
  $DOGJQE ACTION=(FETCH,READ),JQE=jqe
  ```

- When you are finished, use the following action to free the memory used for the JQA (x is the address returned from the first $DOGJQE call):

  ```
  $DOGJQE ACTION=RETURN,CBADDR=x
  ```

- If the JQE is needed in write mode (the fields to be changed are either within the bounds or not within the bounds of the original JQE), use the following action to get the address of an update mode JQE, regardless of what IBM has provided as the JQE address. The address of the JQA is passed back (in R0). Make all changes to fields in the update mode JQA.

  ```
  $DOGJQE ACTION=(FETCH,UPDATE),JQE=jqe
  ```

- When you are finished, use the following action to free the memory used for JQA (x is the address from the first $DOGJQE call) and to ensure that the changes in the JQA get propagated to the real JQE, the JQX, and the BERT area.

  ```
  $DOGJQE ACTION=RETURN,CBADDR=x
  ```

When your exit returns a JQE/JQA to the JES2 systems through these actions, certain errors can occur if JES2 determines that what your exit has returned is not consistent with what JES2 knows to exist. JES2 uses the $ERROR macro and issues the following errors:

- DJ1- non-IBM code returned an IBM JQE/JQA that violates the consistency checks of JES2.
- DJ2- IBM code returned a non-IBM JQE/JQA that violates the consistency checks of JES2.

**Notes:**

1. You are encouraged to disregard the kind of JQE/JQA passed to your exit and always do the following:
   - To obtain the address of the real JQE (for example, your exit wants to compute the offset of the JQE), use:

     ```
     $DOGJQE ACTION=GETJQEADDR
     ```

   - To obtain the address of a read mode JQE/JQA (for example, your exit wants to examine the MAXCC field), use:

     ```
     $DOGJQE ACTION=(FETCH,READ)
     ```

   - To obtain the address of an update mode JQE/JQA (for example, your exit wants to change the SYSAFF, PRIORITY or MAXCC), use:

     ```
     $DOGJQE ACTION=(FETCH,UPDATE)
     ```

2. If you are writing exit 47, do not use $DOGJQE to access a JQE/JQA.

## $DVIDBLD

In prior releases, the name associated with a device could be obtained directly from DCTDEVN. Now, some devices that have a device number greater than 9999 will have a name in DCTDEVN that is not consistent with the name normally displayed for a device. Use the $DVIDBLD macro to obtain a device name suitable for use in messages or other displays. The name returned from $DVIDBLD could be up to 10 characters long.

***Migration Action:*** Review any exit that references DCTDEVN and if the field is being displayed, consider using $DVIDBLD to display a more consistent name for the device.

## $QJQE

The $QJQE macro is used to traverse JQE queues. It has changed to always return the address of an artificial JQE.

***Migration Action:*** If you need the address of a real JQE, for example, to compute the address of a real JQE offset, use the $DOGJQE ACTION=GETJQEADDR service to return the address of a real JQE.

## $QGET

$QGET has been changed to return the address of an artificial JQE.

***Migration Action:*** To return the memory for an artificial JQE, use one of the following: $DOGJQE ACTION=RETURN, $QMOD, or $QPUT.

### $DILBERT

The $DILBERT macro provides an interface to delay operations upon an artificial JQE if that JQE is locked.

***Migration Action:*** If it is necessary to get an artificial JQE in update mode and your code cannot afford to $WAIT for the JQE to become unlocked, then use the $DILBERT macro to automatically defer the action until it is.

### $#BLD

The $#BLD macro is used to create a JOE. One of its inputs is a JQE address. In prior releases, the JQE was passed as an offset. Starting in Release 4, the JQE is passed as an address, and the address passed is the address of a real JQE.

***Migration Action:*** Ensure any uses of $#BLD use the JQE address rather than the offset.

### $PAIR

If the installation defines their own table pairs (either in line or in the UCT or MCT) they must be defined using the $PAIR macro.

## Initialization

## Release 4 Mode Compared with Pre-Release 4 Mode

Beginning with Release 4 there are two modes of operation. There is a compatibility mode that allows pre-release 4 levels of JES2 (back to SP 5.1.0) to coexist in a MAS with Release 4 or higher. The other mode is Release 4 mode. When in compatibility mode, certain data areas in the checkpoint data set do not exist. This implies that certain functions are not enabled. Functions that are not enabled in pre-release 4 mode include:

- WLM managed job classes
- Single system image JOBCLASS support
- Job completion code tracking
- Greater than 9999 remotes
- Scheduling environments
- Job transmitter limits
- RMF reporting of pre-execution job delays
- Start job command ($S Job)
- Age filtering on job level commands (for example, $D J, $T J)
- ENF 58 signals indicating that a job status change occurred-ENF_Q_JOB_CHANGE.

When Release 4 or higher is warm started with a checkpoint data set that was used by a pre-release 4 JES2, it starts in pre-release 4 mode. When Release 4 or higher is cold started, it always initializes in Release 4 mode.

### Migration Actions

When migrating to JES2 Release 5, you need to be aware of the mode that JES2 is operating in. If you install JES2 Release 5 with a cold start, then you will be in Release 4 mode. If you are currently running a JES2 MAS with any members at a level lower than OS/390 JES2 Release 4, then you will be in pre-release 4 mode. If all members in your JES2 MAS are running OS/390 JES2 Release 4 or higher, issue a $D ACTIVATE command to determine the mode. Once all members of a MAS have migrated to JES2 Release 4 or higher, issue the $ACTIVATE command on one of the members to activate the Release 4 mode.

**Take note!**

Once the Release 4 mode has been activated, it is possible to undo the effects of the $ACTIVATE command via a JES2 cold start at a prior release level, or by using the UNACT start option during a JES2 all-member warm or all-member hot start.

## Running Lower Releases of JES2 with z/OS JES2 in the Same MAS

To ease migration, z/OS JES2 installations can run with some members at lower levels of JES2 (lower levels of OS/390 JES2).

### Migration Actions

However, in order to do so, you must install appropriate service on your JES2 releases. For specific service information, see the information on JES2 coexistence in *z/OS Planning for Installation*.

## Growth in Size of Checkpoint Data Set

When the $ACTIVATE command is issued, the checkpoint data set grows significantly larger. Adequately determining the size of your checkpoint data set is critical to JES2's ability to initialize. The checkpoint data set should be large enough for future expansion. Note that the $ACTIVATE command will fail if the checkpoint data set is not large enough.

### Migration Actions

Allocate more space for the checkpoint data set. For specific information on determining the size of your checkpoint data set, see *z/OS JES2 Initialization and Tuning Guide*.

## JES2 Data Set Naming Conventions

In OS/390 JES2 Release 4 or Release 5, the middle-level qualifier of the JES2 libraries is V2R5M0. This is a change from OS/390 JES2 Release 1, which used V1R1M0, OS/390 JES2 Release 3, which used V1R3M0, and from OS/390 JES2 Release 4 which used V2R4M0. The use of the different middle-level qualifiers enables multiple levels of JES to coexist at your installation.

### Migration Actions

If you plan to use only the level of JES2 provided with z/OS, not the previous JES2 releases, and you migrate JES2 at the same time as the other elements in z/OS, then you can use stable data set names (no middle-level qualifier) or data set names with stable middle-level qualifiers. In either case, you will want to run the HASIDLFN job to delete the old FMIDs.

If you want to keep multiple levels of JES2, then you *must* use unique data set names. IBM recommends that you use the suggested naming structure. In this case you don't run HASIDLFN.

## XCF Group Name Restrictions for Release 3 or Higher

JES2 Release 3 restricts the use of the name, SYSJES, as a XCF groupname on the MASDEF intialization statement and as a nodename on the NODE(xxxxxxx) initialization statement. SYSJES is an IBM reserved name and may not be used.

### Migration Actions

When coding the XCF group name on the XCFGRPNM parameter of the MASDEF statement, the name should follow the XCF naming conventions. To avoid using the names IBM uses for its XCF groups, do not begin group names with letters A through I or the character string SYS. Also, do not use the name UNDESIG, which is reserved for use by the system programmer in your installation.

## Checkpoint Performance

JES2 checkpoint performance has been improved by reducing the number of I/O to the checkpoint data sets under certain conditions. These changes include:

- Elimination of a Read to CKPT2 during checkpoint locking operations (READ1) if at least one checkpoint is on a coupling facility.
- Reduction of the number of writes to CKPT2 when checkpoint is in duplex mode.

### Migration Actions

As a result of these changes, the specifications for MASDEF HOLD= and DORMANCY= may need adjusting. In particular, if you have HOLD=0 specified in duplex mode, then prior to this change, the actual hold time was limited by the time it took to write to CKPT2. Now, a significant number of those writes have been eliminated and your actual hold time may become too short and cause thrashing.

If you are in duplex mode and have some members which specify DUPLEX=OFF, you may want to reconsider this specification. As of Release 7, the CKPT2 data set is only written once every 10 writes to the CKPT1 data set. One of the reasons to specify DUPLEX=OFF was to reduce the I/O's to CKPT2. The combination of the two may cause an unacceptable amount of time to elapse before CKPT2 is written. If the only reason DUPLEX=OFF was specified was to reduce the number of I/O's to CKPT2, then as with Release 7, all members should specify DUPLEX=ON.

## PTF for APAR OW36796

If you are migrating from OS/390 JES2 Release 3, 4, 5, or 7, without PTF for APAR OW36796 applied, then ensure that you have not tried to change NJEDEF OWNNODE on a warmstart and replied "Y" to message HASP441 to continue initialization. If you have, then contact IBM service prior to installing z/OS V1R1 JES2.

To determine if you have attempted to change OWNNODE on a warm start, examine the syslogs from the most recent restart of JES2 for each member of your MAS. Look for the following sequence of messages:

```
HASP442  INITIALIZATION STATEMENTS CONFLICTING WITH
              SAVED VALUES

HASP496  NJEDEF OWNNODE=xx CANNOT BE CHANGED FROM SAVED
              VALUE OF yy

HASP441  REPLY 'Y' TO TO CONTINUE INITIALIZATION OR
              'N' TO TERMINATE IN RESPONSE TOOOO HASP442
```

You should contact IBM service if you find the above messages in your log and a reply of "Y" was given to message HASP441. If you do not find these messages with a reply of "Y", then no migration action is required.

## Checkpoint Data Sets

z/OS V1R1 JES2 no longer supports pre-release 4 checkpoints. JES2 can only read checkpoints that are in Release 4 mode. A Release 4 checkpoint is one that has been written by JES2 Release 4 or later after a $ACTIVATE command has been executed. To determine the checkpoint mode of your current checkpoint data set issue a $D ACTIVATE command. Since JES2 cannot read a checkpoint that is in pre-release 4 mode, it cannot coexist in a MAS with a pre-release 4 level of JES2 or nor can it participate in a MAS that has not been $ACTIVATE'd.

### Migration Actions

- If you have used $ACTIVATE, then no additional actions are needed. z/OS V1R1 JES2 can coexist with your existing systems or warm start using your existing checkpoint data set.
- If you have not used $ACTIVATE, you must do so before you can add a z/OS V1R1 JES2 system to your MAS or before performing a warm start of a z/OS V1R1 JES2 system using your existing checkpoint data set.

## SPOOLDEF FENCE= Changes

The FENCE= keyword parameter on the SPOOLDEF initialization statement is changed to allow you to specify fencing along with the number of spool volumes to be used.

When you specify

```
SPOOLDEF....FENCE=(ACTIVE=YES,VOLUMES=1).....
```

you get the same function as in the previous JES2 release when you specified FENCE=YES. . This specification of SPOOLDEF FENCE= is honored on $T SPOOLDEF and on cold start.

### Migration Actions

SPOOLDEF FENCE=YES is still permitted for compatibility and is converted to ACTIVE=YES and VOLUMES=1.

## SPOOLDEF TGBPERVL= Dropped

JES2 processing now controls the amount of SPOOL space cached for job writing data to SPOOL (the BLOB). In previous releases, this was controlled by the TGBPERVL parameter on SPOOLDEF. TGBPERVL= is no longer supported. In the initialization stream, this keyword is ignored (no error is returned). If used in a $TSPOOLDEF command, it will generate an error. In addition the HASP834 message that indicated TGBPERVL was set too high, has been deleted.

### Migration Actions

Delete references to TGBPERVL from your initialization decks and any operator commands or automation scripts. Any automated action associated with the HASP834 message should be examined and potentially eliminated.

## SPOOL Utilization

As part of automatically setting the size of the SPOOL cache (the BLOB), JES2 processing increased the amount of SPOOL space that traditionally was marked as allocated. In most installations, this change would not be noticeable. However, in certain smaller installations (such as test systems) the total SPOOL space that is available may be allocated to the BLOB. This makes determining the true SPOOL utilization much more difficult. To compensate for this, JES2 now considers SPOOL space in the BLOB as available rather than as allocated (as it had in previous releases). In small installations, with limited SPOOL space, this could decrease total SPOOL utilization. Also, multiple MAS members at different JES2 levels may report different SPOOL utilizations.

### Migration Actions

If you have a limited amount of SPOOL space, you may have set your SPOOLDEF TGSPACE=WARN= value high knowing that when that level was reached, you still have the space in the BLOB that can be used before SPOOL volumes are full. You should re-evaluate your settings of TGSPACE=WARN= to account for the changes in how SPOOL utilization has changes.

Also, be aware that SPOOL utilization may differ between MAS members of different release levels. This is normal. The smaller the number of track groups in the system, the greater the difference. However, the situation where the HASP355 message (SPOOL VOLUMES ARE FULL) is issued remains unchanged even in z/OS V1R1 JES2.

## TPDEF SNABUF Changes

To improve SNA performance and better align with other networking products, JES2 has increased the SNA buffer size from a maximum of 3840 to 32512. This is a change to the TPDEF SNABUF=SIZE= keywords.

### Migration Actions

Your VTAM network definitions should be evaluated.

## TRACEDEF PAGES= Changes

The default for TRACEDEF PAGE= is changed from 2 to 9. For compatibility with other releases of JES2, specification of 1-8 are converted automatically to 9.

### Migration Actions

For compatibility with other releases of JES2, specification of 1-8 for TRACEDEF PAGES, are converted automatically to 9. No migration actions are necessary, but you should evaluate your use of extended CSA space. If your current TRACEDEF initialization statements accepts the old default of PAGES=2, this will be converted to 9. For TABLES=100, you'll get 900 pages of buffers. Your setting for TABWARN= on the TRACEDEF initialization statements should also be evaluated.

## ZAPJOB Initialization Statement

The ZAPJOB initialization statement is new and is used to remove all traces of a job structure from the JES2 job queue. This statement is intended for situations where a job cannot be removed using normal JES2 commands or by a JES2 restart.

### Migration Actions

You should be careful when using this statement. Zapping a job that is active can lead to ABENDs and the loss of a PCE that might require a JES2 restart.

---

# Application Development

There are no application development migration actions.

---

# Operations

## $ACTIVATE

Before warm starting z/OS V1R1 JES2, ensure a $ACTIVATE has been performed. To do this, issue a $D ACTIVATE command.

## $SJ Command

In migrating from JES2 OS/390 V2R4 to JES2 z/OS V1R1, the behavior of the $SJ command changes if you have not installed the PTF to fix APAR OW38962.

- Prior to OW38962, the $SJ command only considered members of the JES2 MAS that were eligible to run a job, but only if (1) the member of the MAS did NOT have a member draining situation (such as, when a $P is entered) and (2) the member did NOT have an initiator draining situation (such as, when a $P XEQ is entered).
- After the fix to APAR OW38962 is installed, members of the MAS that are in a member draining situation are still NOT considered. JES2 ignores the initiator draining situation, but only on the MAS member where the $SJ command is entered.

To illustrate this change in processing, suppose there are three members active in the JES2 MAS: SY1, SY2, and SY3. Furthermore, suppose that a $P XEQ is issued on SY1 and SY2, but NOT on SY3. In this situation, when a $SJ command is issued on SY3, SY3 is the only member that the job can run on, and then only if the affinity and SCHENV status permits it to run. If the $SJ command is issued on SY2, then both SY2 and SY3 are considered for running the job.

## $T SPOOL(nnnn) Command

$T SPOOL(nnnn) is a new JES2 command. This commands allows the installation to assign its systems to spool volumes. This command has one valid keyword operand, SYSAFF=. The SYSAFF= keyword has a similar function SYSAFF on the $TINTRDR command. The value you specify for SYSAFF= on the $TSPOOL(nnnn) command is also added to the output produced by the $D SPOOL command.

### Migration Actions

A new RACF authorization profile is required for the $T SPOOL command. The profile is `JESx.MODIFY.SPOOL` with `ACCESS=CONTROL`.

## $ZAPJOB Command

$ZAPJOB removes all traces of a job structure from the JES2 job queue. You must ensure that the job and any output it may have created is not active in any JES2 process or active on a device. Zapping a job that is active can lead to ABENDs and the loss of a PCE until JES2 is restarted.

There is nothing to stop entering a $ZAPJOB command in the JES2 initialization stream, however, IBM Recommends that the ZAPJOB initialization statement be used instead. A ZAPJOB command in the initialization stream will run after warm start processing completes whereas a ZAPJOB initialization statement will be processed before warm start processing begins, before verifying the job queue.

$HASP250 now indicates when a job has been zapped.

### Migration Actions

A new RACF authorization profile is required for the $ZAPJOB command. The profile is `JESx.ZAP.JOB` with `ACCESS=CONTROL`.

$HASP250 has been changed to add that a job has been zapped.

## $HASP834 Deleted

$HASP834 message has been deleted.

### Migration Actions

Examine your installations message automation. There is no replacement for $HASP834.

# Problem Determination and Diagnosis

## Provide for JES2 IPCS Support

**Attention!**

- You must be proactive to install JES2 IPCS.
- Make sure JES2 IPCS support works before you experience an emergency. For more information about setting up JES2 IPCS support, see *z/OS JES2 Diagnosis*.
- Make sure you have JES2 IPCS support for all combinations of JES2 and MVS releases in production.

- When JES2 dumps are being diagnosed on the same level of the system as the system on which the dumps were taken, do the following:
  - Ensure that SHASPARM is specified in the PARMLIB concatenation.
  - Ensure that SHASMIG is specified in the STEPLIB concatenation.
  - Ensure that SHASPNL0 is specified in the ISPPLIB concatenation.

  This ensures that IPCS can find the SMP/E-maintained copy of JES2 data.
- If the JES2 levels differ between the system on which the dump was taken and the system on which the dump will be examined using IPCS, but the level of MVS is the same, do the following:
  - Add an IPCSPARM DD statement to your logon proc, and specify the SHASPARM library that corresponds to the JES2 level in the dump in the first position in the IPCSPARM DD concatenation. Also specify your PARMLIB data set, plus any other data sets containing IPCS parameters that you normally need when using IPCS.
  - Specify the SHASMIG library that corresponds to the JES2 level in the dump in the first position in the STEPLIB concatenation.
  - Specify the SHASPNL0 library that corresponds to the JES2 level in the dump in the first position in the ISPPLIB concatenation.
- If both the JES2 and system levels differ between the system on which the dump was taken and the system on which the dump will be examined using IPCS, do the following:
  - Add an IPCSPARM DD statement to your logon proc, and specify the SHASPARM library that corresponds to the JES2 level in the dump in the first position in the IPCSPARM DD concatenation. Also specify the PARMLIB data set, plus any other data sets containing IPCS parameters that correspond to the system level in the dump.
  - Specify the SHASMIG and MIGLIB libraries that correspond to the system in the dump in the first and second positions in the STEPLIB concatenation.
  - Specify the SHASPNL0 and SBLSPNL0 libraries that correspond to the system in the dump in the first position in the ISPPLIB concatenation.

Note that IPCS requires libraries in addition to the libraries that JES2 uses. You may need to make other concatenations. For more information, see *z/OS MVS IPCS Customization*.

If dump analysis leads into data structures for other elements or products, you might need to add more data sets to the concatenations to complete the diagnosis. Refer to the appropriate product publications for information about establishing the correct IPCS environments for diagnosing other elements and products.

## New Record for Trace ID 17

Trace ID 17 has been updated to contain new measurements (total PCE wait time, number of $CKPTs issued, MVS wait time, $QSUSE time) that JES2 gathers during different phases of checkpoint processing. A new record 3 has been added to the READ2, PRIMARY WRITE, IMMEDIATE WRITE and FINAL WRITE checkpoint cycles that contains these measurements.

### Migration Actions

If you use a program that analyses Trace ID 17 records, it may need to be updated to incorporate this support.

## $DPCE Command

The $DPCE command is enhanced to provide the following additional diagnostic information:

- Ended PCE counts - $DPCE,ENDED>0 displays the PCE types that have ended.
- Active PCE counts - $PDCE,ACTIVE>0 displays the PCE types that have active work.
- Detailed PCE information - $PCDE (CNVT) displays current detailed information for each converter PCE. This information includes: where the PCE is waiting and what it is waiting for, active and outstanding I/O counts, the exit the PCE is in, the current job the PCE is processing, the time the PCE waited, and whether the PCE has ended.

### Migration Actions

Be aware of the additional diagnostic information provided by the $DPCE command.

## Message HASP291

Message HASP291 is enhanced in this release to include information from the MVS IEDB. This information includes the IOS completion code and the full device sense data. Two completion codes are presented because IOS combines a multiple of its completion codes into one for use by EXCP callers. In some cases, the IOS completion code will more accurately describe the error.

### Migration Actions

Be aware of the additional diagnostic information provided by the HASP291 message.

## Message HASP064

The old I/O error message, HASP094, was incomplete and difficult to read. A new message, HASP064, is added to this release to provide additional data in a format that is easier to understand. The HASP064 message displays the same information as the HASP094 message but in a format similar to the HASP291 message. In addition, data from the MVS IEDB is added to the HASP064 message and includes

the IOS completion code and the device sense data. Two completion codes are presented because IOS combines a multiple of its completion codes into one for use by EXCP callers. In some cases, the IOS completion code will more accurately describe the error. Also included is the failing MTTR/BBCCHHR.

### Migration Actions

Be aware of the format and diagnostic information provided by the HASP064 message.

## $CBIO Services - Additional Error Recording

Additional error recording is added for the $CBIO services in the USER environment. CBIO errors will now generate a SYMREC similar to the one generated in the main task for control block I/O errors. In addition, the JES2 trace ID 3, previously from the FSS environment $BUFIO service, is moved to the USER environment $CBIO service. These changes provide additional data to help diagnose errors with SPOOL control blocks.

### Migration Actions

Be aware of the additional error recording provided by $CBIO services.

## Dumping all Members of the MAS

z/OS V1R1 JES2 dumps all members of the MAS when certain JES2 work queue errors occur. This is referred to as "multi-system dumps".

### Migration Actions

You need to make sure you have the procedures in place to collect all the dumps from all the systems.

---

# JES2 Installation Modifications

## Fiber Channel Support (FICON)

JES2 I/O processing for spool and checkpoint has been updated to take advantage of the changes made in FICON (Fiber channels).

### Migration Actions

Be aware of the updates to JES2 I/O processing for spool and checkpoint in respect to FICON.

## Active DCTs

Active DCTs are now chained out of the HCT ($NJEADCT, $OFFADCT, $LCLADCT).

**Note:** If an error occurs in the DCT chain, a SYSOUT device may not be selected for work. Such might be the case when $S command is issued. JES2 rebuilds this chain should errors occur.

## Migration Actions

Installations that manipulate DCTs need to be aware of these changes.

# Chapter 8. Migration Actions: JES2 OS/390 V1R3 to JES2 z/OS V1R1

**Attention!**

You cannot migrate from this release of JES2 to JES2 z/OS V1R1 without a cold start. For options, see page 8-11.

## Customization

## New and Changed Installation Exits

| Exit | Explanation | Migration Action |
|---|---|---|
| All Exits | In prior releases, updating JQEs merely consisted of obtaining the address of the JQE, changing some fields and doing a $CKPT of the JQE.<br>Now access to the JQE for updating must be done through the $DOGJQE service. | All exits which modify JQEs should use the $DOGJQE macro to gain control of and release JQEs. |
| All Exits | PCEJQE can have the address of a real JQE (as prior releases did), or the address of an artificial JQE. An artificial JQE is constructed in a temporary work area and is composed of the real JQE, a JQE extension (new) and fields copied from an internal area (also new). | Exits should not assume that the address of the JQE in PCEJQE points to something in the checkpointed jobqueue and in particular should not use $JOBQPTR to compute JQE offsets. If necessary to get the JQE offset, first use $DOGJQE ACTION=GETJQEADDR. |
| All Exits | In prior releases, accessing the CAT (Class Attribute Table) was done via $CATABLE (a field in the HCT).<br>Now access to the CAT should be done via the $DOGCAT macro. | Update code which obtains the address of a CAT to use the $DOGCAT macro. |
| All Exits | In prior releases, the $QJQE macro returned the address of a JQE. Now the address returned is that of an artificial JQE. An artificial JQE is constructed in a temporary work area and is composed of the real JQE, a JQE extension (new) and fields copied from an internal area (also new). | Use $DOGJQE ACTION=GETJQEADDR if it is necessary to obtain the address of the real JQE. |
| All Exits | In prior releases, $QMOD and $QPUT expected the address of a JQE to be passed.<br>These services now expect the address of an artificial JQE if the JQE is currently on or is about to be placed on either a converter queue ($XEQ) or a class queue. | Use the $DOGJQE service to get the address of an artificial JQE before using the services. |

| Exit | Explanation | Migration Action |
|---|---|---|
| All Exits | Time spent in hold or awaiting resources or affinities was not tracked in prior releases.<br>These times are now tracked and the timers need to be updated if a job has not yet been executed ($XEQ bit on in JQETYPE) and its status is changed to held or released or if its affinity is changed. | Exits which hold or release a job which has not yet been executed must $CALL service routine TIMECLOC passing the address of the artificial JQE in register 1 and passing zero in register 0. The artificial JQE is obtained via the $DOGJQE service. |
| All Exits | In prior releases, job numbers were limited to 32767.<br>JES2 now support job numbers up to 65534 (not, as one might expect, 65535). | Do not use halfword instructions (LH, STH) to manipulate job numbers. Instead use ICM and STCM. |
| All Exits | Device names in DCTDEVN have changed if the line number (NJE devices) or the remote number (RJE devices) exceeds 9999. In that case device names change in the following fashion:<br>• Sysout Transmitter: LnnnnnTn<br>• Sysout Receiver: LnnnnnVn<br>• Job Transmitter: LnnnnnXn<br>• Job Receiver: LnnnnnRn<br>• RJE Printer: RnnnnnPn<br>• RJE Punch: RnnnnnUn<br>• RJE Reader: RnnnnnRn<br>• RJE Console: RnnnnnCN | If exit logic is using the old form of names for comparison purposes, change the exit if there are more than 9999 lines or more than 9999 remotes. |
| All Exits | There were significant changes to JES2 control blocks in prior Releases. | Examine exits carefully to ensure that they work with Release 5 control blocks. Severe errors will occur otherwise. |
| Exit 5 | JQEs which need to be updated should be manipulated only after obtaining an artificial JQE via $DOGJQE. An artificial JQE is constructed in a temporary work area and is composed of the real JQE, a JQE extension (new) and fields copied from an internal area (also new). | If you use exit 5 to change JQEs, be sure to use $DOGJQE ACTION=(FETCH,UPDATE) followed by the JQE changes and then $DOGJQE ACTION=RETURN. |

| Exit | Explanation | Migration Action |
|---|---|---|
| Exit 5 | New command syntax has been introduced. There is a sample exit 5 provided with HASIASM which converts old syntax commands to new syntax. | If your installation does not currently have an exit 5, and if you do not specify EXIT(5) STATUS=DISABLE in your JES2 initialization deck, a normal installation of JES2 sets up IBM-supplied code in exit 5 to convert almost all commands issued in the old form into the new form.<br>If you have an existing exit 5 whose function you wish to retain, then you can:<br>• Combine your module and IBM's module.<br>• Use the EXIT(5) ROUTINE statement to specify the order in which the modules are invoked. For example. if you already have an EXIT5 statement and it looks like the following:<br>`EXIT5 ROUTINE=(myrtn1,myrtn2,),ENABLE`<br>then modify it so that it looks like:<br>`EXIT5 ROUTINE=(R4CMDS,myrtn1,myrtn2,),ENABLE` |
| Exit 5 | JQEs awaiting execution are threaded onto two queues, the normal JES2 job class queue and the new WLM service class queue. | If your exit needs to look at jobs in the order they appear on the WLM service class queue, then use the $DOGWSCQ macro to access the head of the queue. |
| Exit 8 | This exit can now receive control for control block I/O (CBIO) calls from the FSS address space. A new bit was added to the XPL to identify that this $CBIO was done for an FSS printer. | Check new bit if you want to ignore calls for the FSS printer. |
| Exit 14 | Exit 14 is not called for WLM initiators. | If your exit 14 depends upon being called for all jobs beginning execution, consider moving the logic to the new exit 49. |
| Exit 14 | Exit 49 is not called if exit 14 finds a job. | To have both exits called, add a $EXIT 49 call (with a pointer to an appropriate XPL) in your exit 14 code. |
| Exit 14 | The scheduling environment needs to be taken into account when determining if a job being selected for execution is truly eligible. | Use $SETAFF macro to determine if the affinity field JQASCHAF has the local member in its mask. Use the same logic for JQASCHAF as is done for JQESAF.<br>**Note:** IBM recommends that installations move to exit 49 to avoid the need to duplicate JES2 logic in exit 14. |
| Exit 14 | Added test needed for JQE rejection. | Do not select JQEs for execution in exit 14 which are WLM managed. JQX1WLM bit on in JQXFLAG1 means that the JQE is WLM managed. |
| Exit 16 | The format of the $HASP165 message text has changed | If your exit 16 is depending upon the format of the $HASP165 message, reexamine your logic. |
| Exit 25 | The $BUFIO and $BUFCK services in HASPFSSM have been deleted. These services are now provided by the $CBIO service. TYPE=WAIT was added to $CBIO to support the functions that were previously provided by $BUFCK. | If you were using $BUFIO or $BUFCK services, now use $CBIO. |

| Exit | Explanation | Migration Action |
|---|---|---|
| Exit 32 | Message $HASP373 has a format change if the initiator is a WLM initiator. Byte 0 of the XPL has two new indicator values; 20 is WLM initiator; 24 is WLM initiator running a job selected via $SJ command. | Change your exit if you are coding a replacement for $HASP373 to take into account that the initiator might be a WLM initiator. |
| Exit 34 | Exit 34 allows you to receive control during unallocation of subsystem interface data sets and internal readers. | Be aware that data set type 16 can be used for either PSO or SYSOUT application program interface. |
| Exit 46 | Exit 46 will now be invoked to process RCCS headers. | Insure that your exit 46 routine is coded to accomodate RCCS headers, espically if you have patterned your exit 46 routine after the sample exit 46 routine (HASX46A) shipped with the product. See the sample exit 46 routine shipped with OS/390 Release 7 for an example of how to write code to accomodate RCCS headers. |
| Exit 47 | Exit 47 will now be invoked to process RCCS headers. | Insure that your exit 47 routine is coded to accomodate RCCS headers. |
| Exit 47 | Exit 47 will not always be passed the address of a real JQE. | Test indicator X047IND for setting X047BJQE. If on, X047JQE contains the address of a working copy of the JQE, not of a real JQE. Do not use this address as input to any services that expect the address of a real JQE (for example, $DOGJQE). |
| Exit 49 | Exit 49 is a new exit that allows you to provide an algorithm to accept or not accept a job whenever JES2 work selection has located a job. This includes work selected for JES2 and workload management (WLM) initiators. | Be aware that your exit runs in the JES2 main task operating environment and is called from the $QGET routine in module HASPJQS. For more information on customizing your JES2 system with this exit, see *z/OS JES2 Installation Exits*. |
| Exit 70 | Exit 70 function (added by APAR OW32040) is now moved to Exit 46. | If the NJE receivers in your network are still down-level, then either move your exit 70 function to exit 46, or change the statements in your INIT deck to invoke your exit 70 routine as exit 46. |

## Installation Exits 11 and 12

Installation exits 11 and 12 are unaffected if you use no new functions in z/OS V1R1 JES2. However, if you turn on spool affinity or set fencing to more than one volume, then your current exits 11 and 12 are affected.

***Migration Actions:*** Review the documentation for exits 11 and 12 in *z/OS JES2 Installation Exits*. Before activating SPOOL affinity, ensure that the correct available SPOOL masks are used to determine what volumes to add to a job in these exits.

Your installation uses spool partitioning if `FENCE=ACTIVE=YES` is specified on the SPOOLDEF initialization statement. Spool affinity is used if any spool volume has something other than SYSAFF=ANY displayed for it.

### Installation Exits 0, 19, 24

The HASPINIT load module and the initialization PCE have been moved above the 16M line. This may impact installation exits called during initialization processing (such as exits 0, 19 and 24). If your exit switches to AMODE 24 to invoke DFP modules, then this code will no longer be able to access the initialization PCE (and in particular the save area in the PCE).

***Migration Actions:*** Review all exits for code that switches to AMODE 24 ($AMODE 24 macro invocations). Verify that the switch to 24 bit mode is still required. If it is required and you are in an exit that gets control during initialization, ensure that the code running in AMODE 24 does not access the initialization PCE.

Also, examine all uses of DFP macros, such as GET and PUT. If these macros were hand coded (instead of using the IBM-supplied macro) changes might be necessary. The DFP macros were changed to support 31 bit addressable callers.

## New and Changed Macros

### $DOGCAT

The $DOGCAT macro provides an interface to find the address of a CAT. It is also recommended that the CAT obtained using $DOGCAT be used for finding queue heads rather than $JQHEADS.

***Migration Action:*** Use $DOGCAT wherever your code has used $CATABLE to compute the address of a CAT. Use the CAT found via $DOGCAT to access the job queue head for the class.

### $DOGJQE

The $DOGJQE macro provides an interface to construct an artificial JQE. An artificial JQE is constructed in a temporary work area and is composed of the real JQE, a JQE extension (new in this release) and fields copied from an internal area (also new).

You need to be aware of the types of JQE/JQAs that JES2 provides to your exit, since JES2 processes these JQE/JQAs in differing ways. The types are:

- A real JQE. Your exit receives a read or update mode JQE/JQA.
- A read-mode JQA. Your exit receives an artificial JQE that is a temporary block of storage. This storage contains:
  - Almost the same information as the real JQE.
  - Information from the JQX (new in Version 2 Release 4).
  - Information from BERTs (another checkpointed area).
- An update-mode JQA. Your exit receives an artificial JQE that is a temporary block of storage. This storage is similar to the read-mode JQA. JES2 ensures the integrity of this JQA and manages the storage each JQA occupies.
- A work area containing a prototype JQE. In certain circumstances, your exit may be passed the address of a work area that contains a working copy of a JQE. See Exit 47 for more information about this.

***Migration Action:*** Use $DOGJQE services rather than $CKPT if your exit modifies JQEs.

Ensure that your exit calls TIMECLOC via:

```
$CALL   TIMECLOC,PARM=JQE,PARM0=0
```

if the hold status of the JQE is changed or if the system affinity of the JQE is changed.

Exits normally want to use JQEs in read mode (data is extracted or pointed to when calling service routines) or in write mode (data in the JQE is modified). JES2 exit writers need to take the following actions when using a particular JQE/JQA as the JQE= keyword value on the $DOGJQE macro:

- If the JQE is needed only to access data and that data is within the bounds of the original real JQE, then only the address of the real JQE is needed. Regardless of what IBM has provided as the JQE address, use the following action to get the address of the real JQE:

  ```
  $DOGJQE ACTION=GETJQEADDR,CBADDR=jqe
  ```

- If the JQE is needed only to access data and that data is beyond the bounds of the original real JQE (that is, it is stored in fields where the first three characters of the field name are other than JQE), then a read mode JQA is needed. Regardless of what IBM has provided as the JQE address, use the following action to get the address of a read mode JQA. The address of the read mode is passed back (in R0).

  ```
  $DOGJQE ACTION=(FETCH,READ),JQE=jqe
  ```

- When you are finished, use the following action to free the memory used for the JQA (x is the address returned from the first $DOGJQE call):

  ```
  $DOGJQE ACTION=RETURN,CBADDR=x
  ```

- If the JQE is needed in write mode (the fields to be changed are either within the bounds or not within the bounds of the original JQE), use the following action to get the address of an update mode JQE, regardless of what IBM has provided as the JQE address. The address of the JQA is passed back (in R0). Make all changes to fields in the update mode JQA.

  ```
  $DOGJQE ACTION=(FETCH,UPDATE),JQE=jqe
  ```

- When you are finished, use the following action to free the memory used for JQA (x is the address from the first $DOGJQE call) and to ensure that the changes in the JQA get propagated to the real JQE, the JQX, and the BERT area.

  ```
  $DOGJQE ACTION=RETURN,CBADDR=x
  ```

When your exit returns a JQE/JQA to the JES2 systems through these actions, certain errors can occur if JES2 determines that what your exit has returned is not consistent with what JES2 knows to exist. JES2 uses the $ERROR macro and issues the following errors:

- DJ1- non-IBM code returned an IBM JQE/JQA that violates the consistency checks of JES2.
- DJ2- IBM code returned a non-IBM JQE/JQA that violates the consistency checks of JES2.

**Notes:**

1. You are encouraged to disregard the kind of JQE/JQA passed to your exit and always do the following:
   - To obtain the address of the real JQE (for example, your exit wants to compute the offset of the JQE), use:

     ```
     $DOGJQE ACTION=GETJQEADDR
     ```

   - To obtain the address of a read mode JQE/JQA (for example, your exit wants to examine the MAXCC field), use:

     ```
     $DOGJQE ACTION=(FETCH,READ)
     ```

   - To obtain the address of an update mode JQE/JQA (for example, your exit wants to change the SYSAFF, PRIORITY or MAXCC), use:

     ```
     $DOGJQE ACTION=(FETCH,UPDATE)
     ```

2. If you are writing exit 47, do not use $DOGJQE to access a JQE/JQA.

## $DVIDBLD

In prior releases, the name associated with a device could be obtained directly from DCTDEVN. Now, some devices that have a device number greater than 9999 will have a name in DCTDEVN that is not consistent with the name normally displayed for a device. Use the $DVIDBLD macro to obtain a device name suitable for use in messages or other displays. The name returned from $DVIDBLD could be up to 10 characters long.

***Migration Action:*** Review any exit that references DCTDEVN and if the field is being displayed, consider using $DVIDBLD to display a more consistent name for the device.

## $QJQE

The $QJQE macro is used to traverse JQE queues. It has changed to always return the address of an artificial JQE.

***Migration Action:*** If you need the address of a real JQE, for example, to compute the address of a real JQE offset, use the $DOGJQE ACTION=GETJQEADDR service to return the address of a real JQE.

## $QGET

$QGET has been changed to return the address of an artificial JQE.

***Migration Action:*** To return the memory for an artificial JQE, use one of the following: $DOGJQE ACTION=RETURN, $QMOD, or $QPUT.

## $DILBERT

The $DILBERT macro provides an interface to delay operations upon an artificial JQE if that JQE is locked.

***Migration Action:*** If it is necessary to get an artificial JQE in update mode and your code cannot afford to $WAIT for the JQE to become unlocked, then use the $DILBERT macro to automatically defer the action until it is.

### $#BLD

The $#BLD macro is used to create a JOE. One of its inputs is a JQE address. In prior releases, the JQE was passed as an offset. Starting in Release 4, the JQE is passed as an address, and the address passed is the address of a real JQE.

***Migration Action:*** Ensure any uses of $#BLD use the JQE address rather than the offset.

### $PAIR

If the installation defines their own table pairs (either in line or in the UCT or MCT) they must be defined using the $PAIR macro.

---

# Initialization

## Single System Image JOBCLASS Statements

The JES2 JOBCLASS initialization statements now affect every member of the MAS. The initial values are set from the system that cold starts. Once set, the JOBCLASS parameters can only be changed via operator command or on a cold start. Values specified in the initialization deck are ignored on all subsequent warm starts.

### Migration Actions

Be aware of how the JOBCLASS statements now work. If the parameters need to be changed, use operator commands (or SDSF) to set them. IBM recommends that the initialization decks also be updated so that the correct values for JOBCLASS are used in the event a cold start is required.

## Changed Syntax for JOBCLASS Statement

JES2 no longer considers the subscript for JOBCLASS(subscript) to be a single character. Therefore, you cannot specify a subscript range such as JOBCLASS(B-K) as you might have in prior releases. The following examples are valid:

```
JOBCLASS(A)
JOBCLASS(*)
JOBCLASS(?)
JOBCLASS(STC)
JOBCLASS(A,B,C,D,E,F,G,H,I,J,K)
```

### Migration Actions

You must change any JES initialization statements that include subscript ranges.

For example, if you have JOBCLASS(A-9), change it to:

```
JOBCLASS(*)
```

which includes JOBCLASS(STC) and JOBCLASS(TSU), or

```
JOBCLASS(?)
```

which affects only single-character job classes.

If you have JOBCLASS(A-K), specify:

```
JOBCLASS(A,B,C,D,E,F,G,H,I,J,K)
```

## STCCLASS and TSUCLASS Statements Replaced

The STCCLASS and TSUCLASS initialization statements have been replaced by the JOBCLASS(STC) and JOBCLASS(TSU) statements. The old format statements are still honored for compatibility. However, an initialization statement that specifies JOBCLASS(*) will now affect STC and TSU job classes.

### Migration Actions

Review your initialization deck to determine if you have any JOBCLASS(*) statements. If so, determine if the settings JOBCLASS(STC) and JOBCLASS(TSU) are desired. If not, add appropriate statements to reset the STC and TSU job classes.

Also ensure that there are not JOBCLASS statements with ranges. If there are, replace them with individual JOBCLASS statements.

## JES2 Data Set Naming Conventions

In OS/390 JES2 Release 4 or Release 5, the middle-level qualifier of the JES2 libraries is V2R5M0. This is a change from OS/390 JES2 Release 1, which used V1R1M0, OS/390 JES2 Release 3, which used V1R3M0 and from OS/390 JES2 Release 4 which used V2R4M0. The use of the different middle-level qualifiers enables multiple levels of JES to coexist at your installation.

### Migration Actions

If you plan to use only the level of JES2 provided with z/OS, not the previous JES2 releases, and you migrate JES2 at the same time as the other elements in z/OS, then you can use stable data set names (no middle-level qualifier) or data set names with stable middle-level qualifiers. In either case, you will want to run the HASIDLFN job to delete the old FMIDs.

If you want to keep multiple levels of JES2, then you *must* use unique data set names. IBM recommends that you use the suggested naming structure. In this case you don't run HASIDLFN.

## Expanded Job Number Range

JES2 now supports job numbers up to 65534 (not, as one might expect, 65535). If you set your job number range (JOBDEF RANGE=) above 32767 or the number of jobs on your system (JOBDEF JOBNUM=) above 32767, JES2 will start assigning jobs numbers above 32767. However some vendor products or user exits may not support job numbers above 32767. If a problem is discovered, you can prevent JES2 from assigning job numbers above 32767 by setting the upper bound of JOBDEF RANGE to 32767 and setting JOBDEF RASSIGN=NO.

### Migration Actions

Review the documentation associated with APAR OW20844 for a description of how the increased job number range affects user exits. Be aware of how to use the JOBDEF RASSIGN keyword to prevent jobs from being assigned outside JOBDEF RANGE.

## XCF Group Name Restrictions for Release 3 or Higher

JES2 Release 3 restricts the use of the name, SYSJES, as a XCF groupname on the MASDEF intialization statement and as a nodename on the NODE(xxxxxxx) initialization statement. SYSJES is an IBM reserved name and may not be used.

### Migration Actions

When coding the XCF group name on the XCFGRPNM parameter of the MASDEF statement, the name should follow the XCF naming conventions. To avoid using the names IBM uses for its XCF groups, do not begin group names with letters A through I or the character string SYS. Also, do not use the name UNDESIG, which is reserved for use by the system programmer in your installation.

## Checkpoint Performance

JES2 checkpoint performance has been improved by reducing the number of I/O to the checkpoint data sets under certain conditions. These changes include:

- Elimination of a Read to CKPT2 during checkpoint locking operations (READ1) if at least one checkpoint is on a coupling facility.
- Reduction of the number of writes to CKPT2 when checkpoint is in duplex mode.

### Migration Actions

As a result of these changes, the specifications for MASDEF HOLD= and DORMANCY= may need adjusting. In particular, if you have HOLD=0 specified in duplex mode, then prior to this change, the actual hold time was limited by the time it took to write to CKPT2. Now, a significant number of those writes have been eliminated and your actual hold time may become too short and cause thrashing.

If you are in duplex mode and have some members which specify DUPLEX=OFF, you may want to reconsider this specification. As of Release 7, the CKPT2 data set is only written once every 10 writes to the CKPT1 data set. One of the reasons to specify DUPLEX=OFF was to reduce the I/O's to CKPT2. The combination of the two may cause an unacceptable amount of time to elapse before CKPT2 is written. If the only reason DUPLEX=OFF was specified was to reduce the number of I/O's to CKPT2, then as with Release 7, all members should specify DUPLEX=ON.

## PTF for APAR OW36796

If you are migrating from OS/390 JES2 Release 3, 4, 5, or 7, without PTF for APAR OW36796 applied, then ensure that you have not tried to change NJEDEF OWNNODE on a warmstart and replied "Y" to message HASP441 to continue initialization. If you have, then contact IBM service prior to installing z/OS V1R1 JES2.

To determine if you have attempted to change OWNNODE on a warm start, examine the syslogs from the most recent restart of JES2 for each member of your MAS. Look for the following sequence of messages:

```
HASP442  INITIALIZATION STATEMENTS CONFLICTING WITH
              SAVED VALUES

HASP496  NJEDEF OWNNODE=xx CANNOT BE CHANGED FROM SAVED
              VALUE OF yy

HASP441  REPLY 'Y' TO TO CONTINUE INITIALIZATION OR
              'N' TO TERMINATE IN RESPONSE TOOOO HASP442
```

You should contact IBM service if you find the above messages in your log and a reply of "Y" was given to message HASP441. If you do not find these messages with a reply of "Y", then no migration action is required.

## Checkpoint Data Sets

z/OS V1R1 JES2 no longer supports pre-release 4 checkpoints. JES2 can only read checkpoints that are in Release 4 mode. A Release 4 checkpoint is one that has been written by JES2 Release 4 or later after a $ACTIVATE command has been executed. Since JES2 cannot read a checkpoint that is in pre-release 4 mode, it cannot coexist in a MAS with a pre-release 4 level of JES2 nor can it warm start from a pre-release 4 checkpoint.

### Migration Actions

The only direct migration path to z/OS V1R1 JES2 is through the use of SPOOL offload, followed by a cold start of z/OS V1R1 JES2, and then a SPOOL reload. An alternative migration path would be to first migrate to a HJE6604 or higher release level of JES2, perform the $ACTIVATE at that level, and then migrate to z/OS V1R1 JES2. If you attempt to start z/OS V1R1 JES2 with a pre-release 4 checkpoint data set, the HASP446 message will result.

## SPOOLDEF FENCE= Changes

The FENCE= keyword parameter on the SPOOLDEF initialization statement is changed to allow you to specify fencing along with the number of spool volumes to be used.

When you specify

```
SPOOLDEF....FENCE=(ACTIVE=YES,VOLUMES=1).....
```

you get the same function as in the previous JES2 release when you specified FENCE=YES. . This specification of SPOOLDEF FENCE= is honored on $T SPOOLDEF and on cold start.

### Migration Actions

SPOOLDEF FENCE=YES is still permitted for compatibility and is converted to ACTIVE=YES and VOLUMES=1.

## SPOOLDEF TGBPERVL= Dropped

JES2 processing now controls the amount of SPOOL space cached for job writing data to SPOOL (the BLOB). In previous releases, this was controlled by the TGBPERVL parameter on SPOOLDEF. TGBPERVL= is no longer supported. In the initialization stream, this keyword is ignored (no error is returned). If used in a $TSPOOLDEF command, it will generate an error. In addition the HASP834 message that indicated TGBPERVL was set too high, has been deleted.

### Migration Actions:

Delete references to TGBPERVL from your initialization decks and any operator commands or automation scripts. Any automated action associated with the HASP834 message should be examined and potentially eliminated.

## SPOOL Utilization

As part of automatically setting the size of the SPOOL cache (the BLOB), JES2 processing increased the amount of SPOOL space that traditionally was marked as allocated. In most installations, this change would not be noticeable. However, in certain smaller installations (such as test systems) the total SPOOL space that is available may be allocated to the BLOB. This makes determining the true SPOOL utilization much more difficult. To compensate for this, JES2 now considers SPOOL space in the BLOB as available rather than as allocated (as it had in previous releases). In small installations, with limited SPOOL space, this could decrease total SPOOL utilization. Also, multiple MAS members at different JES2 levels may report different SPOOL utilizations.

### Migration Actions

If you have a limited amount of SPOOL space, you may have set your SPOOLDEF TGSPACE=WARN= value high knowing that when that level was reached, you still have the space in the BLOB that can be used before SPOOL volumes are full. You should re-evaluate your settings of TGSPACE=WARN= to account for the changes in how SPOOL utilization has changes.

Also, be aware that SPOOL utilization may differ between MAS members of different release levels. This is normal. The smaller the number of track groups in the system, the greater the difference. However, the situation where the HASP355 message (SPOOL VOLUMES ARE FULL) is issued remains unchanged even in z/OS V1R1 JES2.

## TPDEF SNABUF Changes

To improve SNA performance and better align with other networking products, JES2 has increased the SNA buffer size from a maximum of 3840 to 32512. This is a change to the TPDEF SNABUF=SIZE= keywords.

### Migration Actions

Your VTAM network definitions should be evaluated.

## TRACEDEF PAGES= Changes

The default for TRACEDEF PAGE= is changed from 2 to 9. For compatibility with other releases of JES2, specification of 1-8 are converted automatically to 9.

### Migration Actions

For compatibility with other releases of JES2, specification of 1-8 for TRACEDEF PAGES, are converted automatically to 9. No migration actions are necessary, but you should evaluate your use of extended CSA space. If your current TRACEDEF initialization statements accepts the old default of PAGES=2, this will be converted to 9. For TABLES=100, you'll get 900 pages of buffers. Your setting for TABWARN= on the TRACEDEF initialization statements should also be evaluated.

## ZAPJOB Initialization Statement

The ZAPJOB initialization statement is new and is used to remove all traces of a job structure from the JES2 job queue. This statement is intended for situations where a job cannot be removed using normal JES2 commands or by a JES2 restart.

### Migration Actions

You should be careful when using this statement. Zapping a job that is active can lead to ABENDs and the loss of a PCE that might require a JES2 restart.

# Operations

## JES2 Command Changes

**Attention!**

Customer requirements have requested that JES2 provide more powerful filtering capabilities for job-related commands.

These requirements were satisfied in OS/390 JES2 Release 4. However, these changes have introduced incompatible changes to JES2 command syntax. Also, the format of messages has changed and the message responses have been assigned new IDs.

To ease migration, IBM supplies a sample exit 5 routine that can be used to translate the old syntax to the new syntax.

For a complete description of command changes over multiple JES releases, see “Summary of Changed Commands” on page 10-6. If installed as shipped by IBM, the code in exit 5 was provided in Release 4 that handles almost all of the changes in command syntax, if an operator happens to issue the old form of the command. If an operator issues the old form of a command, the IBM-supplied code in exit 5 will issue an informational message. IBM does not plan to update the IBM-supplied sample Exit 5 code in future releases.

The following table shows the changes from Release 3 to Release 4.

*Figure 8-1 (Page 1 of 2). Comparison of Release 3 and Release 4 JES2 Commands*

| **Release 3** | **Starting with Release 4** |
|---|---|
| $D 'FRED',... | $D JOBQ'FRED',CMDAUTH=*,... |
| $T 'FRED',... | $T JOBQ'FRED',... |
| **Note:** Changes are similar for $A, $C, $E, $H, $L, $O, $P, $T, $TO. | |
| $D J1,2,... | $D J(1,2),... |
| **Note:** J can be J, JOB, S, STC, T, TSU.<br>Changes are similar for $A, $C, $E, $H, $L, $O, $P, $TO. | |
| $D J1-2,J3-4,... | $D J(1-2,3-4)... |
| **Note:** Changes are similar for $A, $C, $E, $H, $L, $O, $P, $TO. | |
| $L Jnnn,ALL | $D O Jnnn |

*Figure 8-1 (Page 2 of 2). Comparison of Release 3 and Release 4 JES2 Commands*

| Release 3 | Starting with Release 4 |
|---|---|
| $L Jnnn,H | $D O Jnnn,HELD |
| $L Jnnn,READY | $D O Jnnn,READY |
| $L Jnnn,OUTGRP=xxx | $D O Jnnn,OUTGRP=xxx |
| $C Jnnn,OUTGRP=xxx | $C O Jnnn,OUTGRP=xxx |
| $P Jnnn,OUTGRP=xxx | $P O Jnnn,OUTGRP=xxx unless Q= is a valid job queue (XEQ, PPU, etc.) |
| $P Jnnn,Q=x | $P O Jnnn,Q=x |
| $v Jnnnn,A=lDAYS=lHours= | $v Jnnnn,A>lDays>lHours> |
| $T Jnnnn,S=sid1,sid2,... | $T Jnnnn,S=(sid1,sid2,...) |
| $D SPL,JOBS=nn | $D JOBQ,SPOOL=PERCENT>=nn |
| $D SPL,V=xxxxxx,JOBS=nn | $D JOBQ,SPOOL=(VOLUME=xxxxxx,PERCENT>=nn) |
| $S SPL,V=xxxxxx,... | $S SPL(xxxxxx),... |
| $v Ixx | $v I(xx) |
| $v Ixx-yy | $v I(xx) |
| **Note:** Where v is one of the command verbs D, P, S, T, or Z. This command processed a named range of initiators. You must now issue these commands as separate commands. | |
| $v Jxxxx,Txxxx... | $v JOBQ(xxxx,xxxx) |
| **Note:** Where v is one of the command verbs A, C, E, H, L, O, P, T, TO. This command processed a list of JOBs, TSO users, and STCs. You must now issue these commands either as multiple commands ($v Jxxxx... and $v Txxxx....) or use $v JOBQ(xxxx,xxxx). The JOBQ version has slightly different function (does not check job type). | |
| $T Ixx,class-list | $T I(xx),C=class-list |
| $H Q,ALL | $T JOBCLASS(*),QHELD=Y |
| $H Q,C=xyz | $T JOBCLASS(x,y,z),QHELD=Y |
| $A Q,ALL | $T JOBCLASS(*),QHELD=N |
| $A Q,C=xyz | $T JOBCLASS(x,y,z),QHELD=N |
| $P Q,ALL,... | $P O JOBQ,READY,... |
| $P Q,Q=xyz,... | $P O JOBQ,READY,Q=XYZ,... |
| $P Q,R=RC1-RC2 /*ROUTE CODE RANGE*/ | $P O JOBQ,READY,R>=RC1,R<=RC2 |
| **Note:** The above command ($P Q,R=RC1-RC2) is not translated by sample exit 5. | |
| $O Q,ALL,... | $O JOBQ,/R=LOCAL.*,... |
| $O Q,Q=xyz,... | $O JOBQ,/R=LOCAL.*,/Q=xyz,... |
| $T ALL,sid1,sid2,... | $T JOBQ(*),/S=(sid1),S=(sid2...) |
| $LSYS | $DMEMBER |
| $ESYS, sid | $EMEMBER(sid) |
| $ESYS, Reset=sid | $ECKPTLOCK, HELDBY=sid |
| $TSYS, IND=Y/N | $TMEMBER(local), IND=Y/N |

### Migration Actions

Update operations procedures, and hold training sessions to help operators learn the new command syntax.

Incorporate the IBM-supplied code for exit 5 to handle command syntax.

For complete information, see the description of exit 5 in *z/OS JES2 Installation Exits*.

## JES2 Command Syntax Now Shown in Railroad Tracks

The syntax diagram for each initialization statement has been redrawn into railroad track format. Each syntax diagram is more complete and many of the syntax diagrams for initialization statements now document two choices of parameter specification.

A new section of *z/OS JES2 Commands* describes how to interpret railroad track style of syntax diagrams for initialization statements.

### Migration Actions

Update production procedures, and hold training sessions, to inform operators of how to interpret the new command syntax diagrams.

## JES2 Message Changes

Many JES2 messages have changed. For example:

- Message $HASP050 has a new type, BERT. This is a MAS resource and may need to be added to automation monitoring.
- Message $HASP605 ($D I command) is replaced by message $HASP892.
- Message $HASP630 ($D SPOOL command) is sometimes replaced by message $HASP893.
- Message $HASP608 is replaced by message $HASP890. Message $HASP890 displays more information than $HASP608.
- Before Release 4, $L J5,H displayed a $HASP686 message for every output group associated with job 5. After Release 4, it displays the $HASP891 message (once), which includes a count of the number of held output groups in each class. For the equivalent function of $L J5,H, issue the $DO J5,HELD command.

For complete information about changed messages, see *z/OS JES2 Messages*.

## Ownership of Output from RJE/NJE

An RJE workstation or NJE node could issue commands that affect output only if the workstation or node owned the output. In prior releases, a workstation or a node only owned output if the CMDAUTH= matched the workstation or node of origin. With Release 4, an additional check was introduced to see if the output routing matches the workstation or node routing. If so, the output is considered owned by the workstation or node.

### Migration Actions

Be aware that commands from NJE nodes and RJE workstations can now affect output that is routed to them in addition to output that was traditionally owned by them. This may change the number of elements returned in display commands and the number affected by other output commands.

## $T SPOOL(nnnn) Command

$T SPOOL(nnnn) is a new JES2 command. This commands allows the installation to assign its systems to spool volumes. This command has one valid keyword operand, SYSAFF=. The SYSAFF= keyword has a similar function SYSAFF on the $TINTRDR command. The value you specify for SYSAFF= on the $TSPOOL(nnnn) command is also added to the output produced by the $D SPOOL command.

### Migration Actions

A new RACF authorization profile is required for the $T SPOOL command. The profile is `JESx.MODIFY.SPOOL` with `ACCESS=CONTROL`.

## $ZAPJOB Command

$ZAPJOB removes all traces of a job structure from the JES2 job queue. You must ensure that the job and any output it may have created is not active in any JES2 process or active on a device. Zapping a job that is active can lead to ABENDs and the loss of a PCE until JES2 is restarted.

There is nothing to stop entering a $ZAPJOB command in the JES2 initialization stream, however, IBM Recommends that the ZAPJOB initialization statement be used instead. A ZAPJOB command in the initialization stream will run after warm start processing completes whereas a ZAPJOB initialization statement will be processed before warm start processing begins, before verifying the job queue.

$HASP250 now indicates when a job has been zapped.

### Migration Actions

A new RACF authorization profile is required for the $ZAPJOB command. The profile is `JESx.ZAP.JOB` with `ACCESS=CONTROL`.

$HASP250 has been changed to add that a job has been zapped.

## $HASP834 Deleted

$HASP834 message has been deleted.

### Migration Actions

Examine your installations message automation. There is no replacement for $HASP834.

---

# Application Development

## Dynamic Increase of Checkpointed Data

Beginning with Release 4, most variable size sections of the JES2 checkpoint data set can expand via an operator command. This can have an impact on the design of applications that either access the JES2 checkpoint or build data structures based on the size of a particular section. With previous levels of JES2, an application could assume that the number of JOBs, maximum number of SPOOL volumes, or number of output elements would not change without an IPL. As a result, static data structures may have been built based on the the current specifications. These applications may no longer work after a $T operator command updates one of these values.

### Migration Actions

Review any application that interacts with JES2. Look for tables based on the number of jobs JES2 supports. Look for applications that build DEBs that access the JES2 SPOOL based on the current maximum number of SPOOL volumes.

# Problem Determination and Diagnosis

## Provide for JES2 IPCS Support

**Attention!**

- You must be proactive to install JES2 IPCS.
- Make sure JES2 IPCS support works before you experience an emergency. For more information about setting up JES2 IPCS support, see *z/OS JES2 Diagnosis*.
- Make sure you have JES2 IPCS support for all combinations of JES2 and MVS releases in production.

- When JES2 dumps are being diagnosed on the same level of the system as the system on which the dumps were taken, do the following:
  - Ensure that SHASPARM is specified in the PARMLIB concatenation.
  - Ensure that SHASMIG is specified in the STEPLIB concatenation.
  - Ensure that SHASPNL0 is specified in the ISPPLIB concatenation.

  This ensures that IPCS can find the SMP/E-maintained copy of JES2 data.
- If the JES2 levels differ between the system on which the dump was taken and the system on which the dump will be examined using IPCS, but the level of MVS is the same, do the following:
  - Add an IPCSPARM DD statement to your logon proc, and specify the SHASPARM library that corresponds to the JES2 level in the dump in the first position in the IPCSPARM DD concatenation. Also specify your PARMLIB data set, plus any other data sets containing IPCS parameters that you normally need when using IPCS.
  - Specify the SHASMIG library that corresponds to the JES2 level in the dump in the first position in the STEPLIB concatenation.
  - Specify the SHASPNL0 library that corresponds to the JES2 level in the dump in the first position in the ISPPLIB concatenation.

- If both the JES2 and system levels differ between the system on which the dump was taken and the system on which the dump will be examined using IPCS, do the following:
  - Add an IPCSPARM DD statement to your logon proc, and specify the SHASPARM library that corresponds to the JES2 level in the dump in the first position in the IPCSPARM DD concatenation. Also specify the PARMLIB data set, plus any other data sets containing IPCS parameters that correspond to the system level in the dump.
  - Specify the SHASMIG and MIGLIB libraries that correspond to the system in the dump in the first and second positions in the STEPLIB concatenation.
  - Specify the SHASPNL0 and SBLSPNL0 libraries that correspond to the system in the dump in the first position in the ISPPLIB concatenation.

Note that IPCS requires libraries in addition to the libraries that JES2 uses. You may need to make other concatenations. For more information, see *z/OS MVS IPCS Customization*.

If dump analysis leads into data structures for other elements or products, you might need to add more data sets to the concatenations to complete the diagnosis. Refer to the appropriate product publications for information about establishing the correct IPCS environments for diagnosing other elements and products.

## New Support for Artificial JQEs

Beginning with Release 4, JES2 IPCS support displays data related to artificial JQEs, such as JQX fields, and fields from the BERT data area.

### Migration Actions

When you are using the CBFORMAT IPCS subcommand, new information will be displayed. For details, see

- *z/OS JES2 Diagnosis*
- *z/OS JES2 Data Areas, Vol 1 $ALINDEX-$EVT*
- *z/OS JES2 Data Areas, Vol 2 $FCLWORK-$OUTWORK*
- *z/OS JES2 Data Areas, Vol 3 $PADDR-$XRQ*

## New Record for Trace ID 17

Trace ID 17 has been updated to contain new measurements (total PCE wait time, number of $CKPTs issued, MVS wait time, $QSUSE time) that JES2 gathers during different phases of checkpoint processing. A new record 3 has been added to the READ2, PRIMARY WRITE, IMMEDIATE WRITE and FINAL WRITE checkpoint cycles that contains these measurements.

### Migration Actions

If you use a program that analyses Trace ID 17 records, it may need to be updated to incorporate this support.

## $DPCE Command

The $DPCE command is enhanced to provide the following additional diagnostic information:

- Ended PCE counts - $DPCE,ENDED>0 displays the PCE types that have ended.
- Active PCE counts - $PDCE,ACTIVE>0 displays the PCE types that have active work.
- Detailed PCE information - $PCDE (CNVT) displays current detailed information for each converter PCE. This information includes: where the PCE is waiting and what it is waiting for, active and outstanding I/O counts, the exit the PCE is in, the current job the PCE is processing, the time the PCE waited, and whether the PCE has ended.

### Migration Actions

Be aware of the additional diagnostic information provided by the $DPCE command.

## Message HASP291

Message HASP291 is enhanced in this release to include information from the MVS IEDB. This information includes the IOS completion code and the full device sense data. Two completion codes are presented because IOS combines a multiple of its completion codes into one for use by EXCP callers. In some cases, the IOS completion code will more accurately describe the error.

### Migration Actions

Be aware of the additional diagnostic information provided by the HASP291 message.

## Message HASP064

The old I/O error message, HASP094, was incomplete and difficult to read. A new message, HASP064, is added to this release to provide additional data in a format that is easier to understand. The HASP064 message displays the same information as the HASP094 message but in a format similar to the HASP291 message. In addition, data from the MVS IEDB is added to the HASP064 message and includes the IOS completion code and the device sense data. Two completion codes are presented because IOS combines a multiple of its completion codes into one for use by EXCP callers. In some cases, the IOS completion code will more accurately describe the error. Also included is the failing MTTR/BBCCHHR.

### Migration Actions

Be aware of the format and diagnostic information provided by the HASP064 message.

## $CBIO Services - Additional Error Recording

Additional error recording is added for the $CBIO services in the USER environment. CBIO errors will now generate a SYMREC similar to the one generated in the main task for control block I/O errors. In addition, the JES2 trace ID 3, previously from the FSS environment $BUFIO service, is moved to the USER environment $CBIO service. These changes provide additional data to help diagnose errors with SPOOL control blocks.

### Migration Actions

Be aware of the additional error recording provided by $CBIO services.

## Dumping all Members of the MAS

z/OS V1R1 JES2 dumps all members of the MAS when certain JES2 work queue errors occur. This is referred to as "multi-system dumps".

### Migration Actions

You need to make sure you have the procedures in place to collect all the dumps from all the systems.

---

# JES2 Installation Modifications

## Fiber Channel Support (FICON)

JES2 I/O processing for spool and checkpoint has been updated to take advantage of the changes made in FICON (Fiber channels).

### Migration Actions

Be aware of the updates to JES2 I/O processing for spool and checkpoint in respect to FICON.

## Active DCTs

Active DCTs are now chained out of the HCT ($NJEADCT, $OFFADCT, $LCLADCT).

**Note:** If an error occurs in the DCT chain, a SYSOUT device may not be selected for work. Such might be the case when $S command is issued. JES2 rebuilds this chain should errors occur.

### Migration Actions

Installations that manipulate DCTs need to be aware of these changes.

# Chapter 9. Migration Actions: JES2 OS/390 V1R1 to JES2 z/OS V1R1

**Attention!**

You cannot migrate from this release of JES2 to JES2 z/OS V1R1 without a cold start. For options, see page 9-10.

## Customization

## New and Changed Installation Exits

| Exit | Explanation | Migration Action |
|---|---|---|
| All Exits | In prior releases, updating JQEs merely consisted of obtaining the address of the JQE, changing some fields and doing a $CKPT of the JQE.<br>Now access to the JQE for updating must be done through the $DOGJQE service. | All exits which modify JQEs should use the $DOGJQE macro to gain control of and release JQEs. |
| All Exits | PCEJQE can have the address of a real JQE (as prior releases did), or the address of an artificial JQE. An artificial JQE is constructed in a temporary work area and is composed of the real JQE, a JQE extension (new) and fields copied from an internal area (also new). | Exits should not assume that the address of the JQE in PCEJQE points to something in the checkpointed jobqueue and in particular should not use $JOBQPTR to compute JQE offsets. If necessary to get the JQE offset, first use $DOGJQE ACTION=GETJQEADDR. |
| All Exits | In prior releases, accessing the CAT (Class Attribute Table) was done via $CATABLE (a field in the HCT).<br>Now access to the CAT should be done via the $DOGCAT macro. | Update code which obtains the address of a CAT to use the $DOGCAT macro. |
| All Exits | In prior releases, the $QJQE macro returned the address of a JQE. Now the address returned is that of an artificial JQE. An artificial JQE is constructed in a temporary work area and is composed of the real JQE, a JQE extension (new) and fields copied from an internal area (also new). | Use $DOGJQE ACTION=GETJQEADDR if it is necessary to obtain the address of the real JQE. |
| All Exits | In prior releases, $QMOD and $QPUT expected the address of a JQE to be passed.<br>These services now expect the address of an artificial JQE if the JQE is currently on or is about to be placed on either a converter queue ($XEQ) or a class queue. | Use the $DOGJQE service to get the address of an artificial JQE before using the services. |

| Exit | Explanation | Migration Action |
|---|---|---|
| All Exits | Time spent in hold or awaiting resources or affinities was not tracked in prior releases.<br>These times are now tracked and the timers need to be updated if a job has not yet been executed ($XEQ bit on in JQETYPE) and its status is changed to held or released or if its affinity is changed. | Exits which hold or release a job which has not yet been executed must $CALL service routine TIMECLOC passing the address of the artificial JQE in register 1 and passing zero in register 0. The artificial JQE is obtained via the $DOGJQE service. |
| All Exits | In prior releases, job numbers were limited to 32767.<br>JES2 now support job numbers up to 65534 (not, as one might expect, 65535). | Do not use halfword instructions (LH, STH) to manipulate job numbers. Instead use ICM and STCM. |
| All Exits | Device names in DCTDEVN have changed if the line number (NJE devices) or the remote number (RJE devices) exceeds 9999. In that case device names change in the following fashion:<br>• Sysout Transmitter: LnnnnnTn<br>• Sysout Receiver: LnnnnnVn<br>• Job Transmitter: LnnnnnXn<br>• Job Receiver: LnnnnnRn<br>• RJE Printer: RnnnnnPn<br>• RJE Punch: RnnnnnUn<br>• RJE Reader: RnnnnnRn<br>• RJE Console: RnnnnnCN | If exit logic is using the old form of names for comparison purposes, change the exit if there are more than 9999 lines or more than 9999 remotes. |
| All Exits | There were significant changes to JES2 control blocks in prior Releases. | Examine exits carefully to ensure that they work with Release 5 control blocks. Severe errors will occur otherwise. |
| Exit 5 | JQEs which need to be updated should be manipulated only after obtaining an artificial JQE via $DOGJQE. An artificial JQE is constructed in a temporary work area and is composed of the real JQE, a JQE extension (new) and fields copied from an internal area (also new). | If you use exit 5 to change JQEs, be sure to use $DOGJQE ACTION=(FETCH,UPDATE) followed by the JQE changes and then $DOGJQE ACTION=RETURN. |

| Exit | Explanation | Migration Action |
|---|---|---|
| Exit 5 | New command syntax has been introduced. There is a sample exit 5 provided with HASIASM which converts old syntax commands to new syntax. | If your installation does not currently have an exit 5, and if you do not specify EXIT(5) STATUS=DISABLE in your JES2 initialization deck, a normal installation of JES2 sets up IBM-supplied code in exit 5 to convert almost all commands issued in the old form into the new form.<br>If you have an existing exit 5 whose function you wish to retain, then you can:<br>• Combine your module and IBM's module.<br>• Use the EXIT(5) ROUTINE statement to specify the order in which the modules are invoked. For example. if you already have an EXIT5 statement and it looks like the following:<br>`EXIT5 ROUTINE=(myrtn1,myrtn2,),ENABLE`<br>then modify it so that it looks like:<br>`EXIT5 ROUTINE=(R4CMDS,myrtn1,myrtn2,),ENABLE` |
| Exit 5 | JQEs awaiting execution are threaded onto two queues, the normal JES2 job class queue and the new WLM service class queue. | If your exit needs to look at jobs in the order they appear on the WLM service class queue, then use the $DOGWSCQ macro to access the head of the queue. |
| Exit 8 | This exit can now receive control for control block I/O (CBIO) calls from the FSS address space. A new bit was added to the XPL to identify that this $CBIO was done for an FSS printer. | Check new bit if you want to ignore calls for the FSS printer. |
| Exit 14 | Exit 14 is not called for WLM initiators. | If your exit 14 depends upon being called for all jobs beginning execution, consider moving the logic to the new exit 49. |
| Exit 14 | Exit 49 is not called if exit 14 finds a job. | To have both exits called, add a $EXIT 49 call (with a pointer to an appropriate XPL) in your exit 14 code. |
| Exit 14 | The scheduling environment needs to be taken into account when determining if a job being selected for execution is truly eligible. | Use $SETAFF macro to determine if the affinity field JQASCHAF has the local member in its mask. Use the same logic for JQASCHAF as is done for JQESAF.<br>**Note:** IBM recommends that installations move to exit 49 to avoid the need to duplicate JES2 logic in exit 14. |
| Exit 14 | Added test needed for JQE rejection. | Do not select JQEs for execution in exit 14 which are WLM managed. JQX1WLM bit on in JQXFLAG1 means that the JQE is WLM managed. |
| Exit 16 | The format of the $HASP165 message text has changed | If your exit 16 is depending upon the format of the $HASP165 message, reexamine your logic. |
| Exit 25 | The $BUFIO and $BUFCK services in HASPFSSM have been deleted. These services are now provided by the $CBIO service. TYPE=WAIT was added to $CBIO to support the functions that were previously provided by $BUFCK. | If you were using $BUFIO or $BUFCK services, now use $CBIO. |
| Exit 31 | Exit 31 allows you to receive control during allocation of subsystem interface data sets and internal readers. | Be aware that data set type 16 can be used for either PSO or SYSOUT application program interface. |

| Exit | Explanation | Migration Action |
|---|---|---|
| Exit 32 | Message $HASP373 has a format change if the initiator is a WLM initiator. Byte 0 of the XPL has two new indicator values; 20 is WLM initiator; 24 is WLM initiator running a job selected via $SJ command. | Change your exit if you are coding a replacement for $HASP373 to take into account that the initiator might be a WLM initiator. |
| Exit 34 | Exit 34 allows you to receive control during unallocation of subsystem interface data sets and internal readers. | Be aware that data set type 16 can be used for either PSO or SYSOUT application program interface. |
| Exit 46 | Exit 46 will now be invoked to process RCCS headers. | Insure that your exit 46 routine is coded to accomodate RCCS headers, espically if you have patterned your exit 46 routine after the sample exit 46 routine (HASX46A) shipped with the product. See the sample exit 46 routine shipped with OS/390 Release 7 for an example of how to write code to accomodate RCCS headers. |
| Exit 47 | Exit 47 will now be invoked to process RCCS headers. | Insure that your exit 47 routine is coded to accomodate RCCS headers. |
| Exit 47 | Exit 47 will not always be passed the address of a real JQE. | Test indicator X047IND for setting X047BJQE. If on, X047JQE contains the address of a working copy of the JQE, not of a real JQE. Do not use this address as input to any services that expect the address of a real JQE (for example, $DOGJQE). |
| Exit 49 | Exit 49 is a new exit that allows you to provide an algorithm to accept or not accept a job whenever JES2 work selection has located a job. This includes work selected for JES2 and workload management (WLM) initiators. | Be aware that your exit runs in the JES2 main task operating environment and is called from the $QGET routine in module HASPJQS. For more information on customizing your JES2 system with this exit, see *z/OS JES2 Installation Exits*. |
| Exit 70 | Exit 70 function (added by APAR OW32040) is now moved to Exit 46. | If the NJE receivers in your network are still down-level, then either move your exit 70 function to exit 46, or change the statements in your INIT deck to invoke your exit 70 routine as exit 46. |

## Installation Exits 11 and 12

Installation exits 11 and 12 are unaffected if you use no new functions in z/OS V1R1 JES2. However, if you turn on spool affinity or set fencing to more than one volume, then your current exits 11 and 12 are affected.

***Migration Actions:*** Review the documentation for exits 11 and 12 in *z/OS JES2 Installation Exits*. Before activating SPOOL affinity, ensure that the correct available SPOOL masks are used to determine what volumes to add to a job in these exits.

Your installation uses spool partitioning if `FENCE=ACTIVE=YES` is specified on the SPOOLDEF initialization statement. Spool affinity is used if any spool volume has something other than SYSAFF=ANY displayed for it.

### Installation Exits 0, 19, 24

The HASPINIT load module and the initialization PCE have been moved above the 16M line. This may impact installation exits called during initialization processing (such as exits 0, 19 and 24). If your exit switches to AMODE 24 to invoke DFP modules, then this code will no longer be able to access the initialization PCE (and in particular the save area in the PCE).

***Migration Actions:*** Review all exits for code that switches to AMODE 24 ($AMODE 24 macro invocations). Verify that the switch to 24 bit mode is still required. If it is required and you are in an exit that gets control during initialization, ensure that the code running in AMODE 24 does not access the initialization PCE.

Also, examine all uses of DFP macros, such as GET and PUT. If these macros were hand coded (instead of using the IBM-supplied macro) changes might be necessary. The DFP macros were changed to support 31 bit addressable callers.

## New and Changed Macros

### $DOGCAT

The $DOGCAT macro provides an interface to find the address of a CAT. It is also recommended that the CAT obtained using $DOGCAT be used for finding queue heads rather than $JQHEADS.

***Migration Action:*** Use $DOGCAT wherever your code has used $CATABLE to compute the address of a CAT. Use the CAT found via $DOGCAT to access the job queue head for the class.

### $DOGJQE

The $DOGJQE macro provides an interface to construct an artificial JQE. An artificial JQE is constructed in a temporary work area and is composed of the real JQE, a JQE extension (new in this release) and fields copied from an internal area (also new).

You need to be aware of the types of JQE/JQAs that JES2 provides to your exit, since JES2 processes these JQE/JQAs in differing ways. The types are:

- A real JQE. Your exit receives a read or update mode JQE/JQA.
- A read-mode JQA. Your exit receives an artificial JQE that is a temporary block of storage. This storage contains:
  - Almost the same information as the real JQE.
  - Information from the JQX (new in Version 2 Release 4).
  - Information from BERTs (another checkpointed area).
- An update-mode JQA. Your exit receives an artificial JQE that is a temporary block of storage. This storage is similar to the read-mode JQA. JES2 ensures the integrity of this JQA and manages the storage each JQA occupies.
- A work area containing a prototype JQE. In certain circumstances, your exit may be passed the address of a work area that contains a working copy of a JQE. See Exit 47 for more information about this.

***Migration Action:*** Use $DOGJQE services rather than $CKPT if your exit modifies JQEs.

Ensure that your exit calls TIMECLOC via:

```
$CALL   TIMECLOC,PARM=JQE,PARM0=0
```

if the hold status of the JQE is changed or if the system affinity of the JQE is changed.

Exits normally want to use JQEs in read mode (data is extracted or pointed to when calling service routines) or in write mode (data in the JQE is modified). JES2 exit writers need to take the following actions when using a particular JQE/JQA as the JQE= keyword value on the $DOGJQE macro:

- If the JQE is needed only to access data and that data is within the bounds of the original real JQE, then only the address of the real JQE is needed. Regardless of what IBM has provided as the JQE address, use the following action to get the address of the real JQE:

  ```
  $DOGJQE ACTION=GETJQEADDR,CBADDR=jqe
  ```

- If the JQE is needed only to access data and that data is beyond the bounds of the original real JQE (that is, it is stored in fields where the first three characters of the field name are other than JQE), then a read mode JQA is needed. Regardless of what IBM has provided as the JQE address, use the following action to get the address of a read mode JQA. The address of the read mode is passed back (in R0).

  ```
  $DOGJQE ACTION=(FETCH,READ),JQE=jqe
  ```

- When you are finished, use the following action to free the memory used for the JQA (x is the address returned from the first $DOGJQE call):

  ```
  $DOGJQE ACTION=RETURN,CBADDR=x
  ```

- If the JQE is needed in write mode (the fields to be changed are either within the bounds or not within the bounds of the original JQE), use the following action to get the address of an update mode JQE, regardless of what IBM has provided as the JQE address. The address of the JQA is passed back (in R0). Make all changes to fields in the update mode JQA.

  ```
  $DOGJQE ACTION=(FETCH,UPDATE),JQE=jqe
  ```

- When you are finished, use the following action to free the memory used for JQA (x is the address from the first $DOGJQE call) and to ensure that the changes in the JQA get propagated to the real JQE, the JQX, and the BERT area.

  ```
  $DOGJQE ACTION=RETURN,CBADDR=x
  ```

When your exit returns a JQE/JQA to the JES2 systems through these actions, certain errors can occur if JES2 determines that what your exit has returned is not consistent with what JES2 knows to exist. JES2 uses the $ERROR macro and issues the following errors:

- DJ1- non-IBM code returned an IBM JQE/JQA that violates the consistency checks of JES2.
- DJ2- IBM code returned a non-IBM JQE/JQA that violates the consistency checks of JES2.

**Notes:**

1. You are encouraged to disregard the kind of JQE/JQA passed to your exit and always do the following:
   - To obtain the address of the real JQE (for example, your exit wants to compute the offset of the JQE), use:

     ```
     $DOGJQE ACTION=GETJQEADDR
     ```

   - To obtain the address of a read mode JQE/JQA (for example, your exit wants to examine the MAXCC field), use:

     ```
     $DOGJQE ACTION=(FETCH,READ)
     ```

   - To obtain the address of an update mode JQE/JQA (for example, your exit wants to change the SYSAFF, PRIORITY or MAXCC), use:

     ```
     $DOGJQE ACTION=(FETCH,UPDATE)
     ```

2. If you are writing exit 47, do not use $DOGJQE to access a JQE/JQA.

## $DVIDBLD

In prior releases, the name associated with a device could be obtained directly from DCTDEVN. Now, some devices that have a device number greater than 9999 will have a name in DCTDEVN that is not consistent with the name normally displayed for a device. Use the $DVIDBLD macro to obtain a device name suitable for use in messages or other displays. The name returned from $DVIDBLD could be up to 10 characters long.

***Migration Action:*** Review any exit that references DCTDEVN and if the field is being displayed, consider using $DVIDBLD to display a more consistent name for the device.

## $QJQE

The $QJQE macro is used to traverse JQE queues. It has changed to always return the address of an artificial JQE.

***Migration Action:*** If you need the address of a real JQE, for example, to compute the address of a real JQE offset, use the $DOGJQE ACTION=GETJQEADDR service to return the address of a real JQE.

## $QGET

$QGET has been changed to return the address of an artificial JQE.

***Migration Action:*** To return the memory for an artificial JQE, use one of the following: $DOGJQE ACTION=RETURN, $QMOD, or $QPUT.

## $DILBERT

The $DILBERT macro provides an interface to delay operations upon an artificial JQE if that JQE is locked.

***Migration Action:*** If it is necessary to get an artificial JQE in update mode and your code cannot afford to $WAIT for the JQE to become unlocked, then use the $DILBERT macro to automatically defer the action until it is.

### $#BLD

The $#BLD macro is used to create a JOE. One of its inputs is a JQE address. In prior releases, the JQE was passed as an offset. Starting in Release 4, the JQE is passed as an address, and the address passed is the address of a real JQE.

***Migration Action:*** Ensure any uses of $#BLD use the JQE address rather than the offset.

### $PAIR

If the installation defines their own table pairs (either in line or in the UCT or MCT) they must be defined using the $PAIR macro.

## Changed NJE Network Processing

Starting with OS/390 Release 3, changes in input service processing of SYSIN data may cause down-level JES2 receiving nodes to issue the $HASP110 — ILLEGAL JOB CARD message for certain jobs.

### Migration Actions

Apply APAR OW13643 to all JES2 receivers that issue the $HASP110 message under the conditions specified by APAR OW13643. If this is not possible, then code an Exit 46 routine that will bypass sending the RCCS header to nodes that don't have APAR OW13643 applied.

---

# Initialization

## Single System Image JOBCLASS Statements

The JES2 JOBCLASS initialization statements now affect every member of the MAS. The initial values are set from the system that cold starts. Once set, the JOBCLASS parameters can only be changed via operator command or on a cold start. Values specified in the initialization deck are ignored on all subsequent warm starts.

### Migration Actions

Be aware of how the JOBCLASS statements now work. If the parameters need to be changed, use operator commands (or SDSF) to set them. IBM recommends that the initialization decks also be updated so that the correct values for JOBCLASS are used in the event a cold start is required.

## Changed Syntax for JOBCLASS Statement

JES2 no longer considers the subscript for JOBCLASS(subscript) to be a single character. Therefore, you cannot specify a subscript range such as JOBCLASS(B-K) as you might have in prior releases. The following examples are valid:

```
JOBCLASS(A)
JOBCLASS(*)
JOBCLASS(?)
JOBCLASS(STC)
JOBCLASS(A,B,C,D,E,F,G,H,I,J,K)
```

### Migration Actions

You must change any JES initialization statements that include subscript ranges.

For example, if you have JOBCLASS(A-9), change it to:

```
JOBCLASS(*)
```

which includes JOBCLASS(STC) and JOBCLASS(TSU), or

```
JOBCLASS(?)
```

which affects only single-character job classes.

If you have JOBCLASS(A-K), specify:

```
JOBCLASS(A,B,C,D,E,F,G,H,I,J,K)
```

## STCCLASS and TSUCLASS Statements Replaced

The STCCLASS and TSUCLASS initialization statements have been replaced by the JOBCLASS(STC) and JOBCLASS(TSU) statements. The old format statements are still honored for compatibility. However, an initialization statement that specifies JOBCLASS(*) will now affect STC and TSU job classes.

### Migration Actions

Review your initialization deck to determine if you have any JOBCLASS(*) statements. If so, determine if the settings JOBCLASS(STC) and JOBCLASS(TSU) are desired. If not, add appropriate statements to reset the STC and TSU job classes.

Also ensure that there are not JOBCLASS statements with ranges. If there are, replace them with individual JOBCLASS statements.

## JES2 Data Set Naming Conventions

In OS/390 JES2 Release 4 or Release 5, the middle-level qualifier of the JES2 libraries is V2R5M0. This is a change from OS/390 JES2 Release 1, which used V1R1M0, OS/390 JES2 Release 3, which used V1R3M0 and from OS/390 JES2 Release 4 which used V2R4M0. The use of the different middle-level qualifiers enables multiple levels of JES to coexist at your installation.

### Migration Actions

If you plan to use only the level of JES2 provided with z/OS, not the previous JES2 releases, and you migrate JES2 at the same time as the other elements in z/OS, then you can use stable data set names (no middle-level qualifier) or data set names with stable middle-level qualifiers. In either case, you will want to run the HASIDLFN job to delete the old FMIDs.

If you want to keep multiple levels of JES2, then you *must* use unique data set names. IBM recommends that you use the suggested naming structure. In this case you don't run HASIDLFN.

## Expanded Job Number Range

JES2 now supports job numbers up to 65534 (not, as one might expect, 65535). If you set your job number range (JOBDEF RANGE=) above 32767 or the number of jobs on your system (JOBDEF JOBNUM=) above 32767, JES2 will start assigning jobs numbers above 32767. However some vendor products or user exits may not support job numbers above 32767. If a problem is discovered, you can prevent JES2 from assigning job numbers above 32767 by setting the upper bound of JOBDEF RANGE to 32767 and setting JOBDEF RASSIGN=NO.

### Migration Actions

Review the documentation associated with APAR OW20844 for a description of how the increased job number range affects user exits. Be aware of how to use the JOBDEF RASSIGN keyword to prevent jobs from being assigned outside JOBDEF RANGE.

## XCF Group Name Restrictions for Release 3 or Higher

JES2 Release 3 restricts the use of the name, SYSXXXXX, as a XCF groupname on the MASDEF intialization statement and as a nodename on the NODE(xxxxxxx) initialization statement. SYSXXXXX is an IBM reserved name and may not be used.

### Migration Actions

When coding the XCF group name on the XCFGRPNM parameter of the MASDEF statement, the name should follow the XCF naming conventions. To avoid using the names IBM uses for its XCF groups, do not begin group names with letters A through I or the character string SYS. Also, do not use the name UNDESIG, which is reserved for use by the system programmer in your installation.

## Checkpoint Performance

JES2 checkpoint performance has been improved by reducing the number of I/O to the checkpoint data sets under certain conditions. These changes include:

- Elimination of a Read to CKPT2 during checkpoint locking operations (READ1) if at least one checkpoint is on a coupling facility.
- Reduction of the number of writes to CKPT2 when checkpoint is in duplex mode.

### Migration Actions

As a result of these changes, the specifications for MASDEF HOLD= and DORMANCY= may need adjusting. In particular, if you have HOLD=0 specified in duplex mode, then prior to this change, the actual hold time was limited by the time it took to write to CKPT2. Now, a significant number of those writes have been eliminated and your actual hold time may become too short and cause thrashing.

If you are in duplex mode and have some members which specify DUPLEX=OFF, you may want to reconsider this specification. As of Release 7, the CKPT2 data set is only written once every 10 writes to the CKPT1 data set. One of the reasons to specify DUPLEX=OFF was to reduce the I/O's to CKPT2. The combination of the two may cause an unacceptable amount of time to elapse before CKPT2 is written. If the only reason DUPLEX=OFF was specified was to reduce the number of I/O's to CKPT2, then as with Release 7, all members should specify DUPLEX=ON.

## Checkpoint Data Sets

z/OS V1R1 JES2 no longer supports pre-release 4 checkpoints. JES2 can only read checkpoints that are in Release 4 mode. A Release 4 checkpoint is one that has been written by JES2 Release 4 or later after a $ACTIVATE command has been executed. Since JES2 cannot read a checkpoint that is in pre-release 4 mode, it cannot coexist in a MAS with a pre-release 4 level of JES2 nor can it warm start from a pre-release 4 checkpoint.

### Migration Actions

The only direct migration path to z/OS V1R1 JES2 is through the use of SPOOL offload, followed by a cold start of z/OS V1R1 JES2, and then a SPOOL reload. An alternative migration path would be to first migrate to a HJE6604 or higher release level of JES2, perform the $ACTIVATE at that level, and then migrate to z/OS V1R1 JES2. If you attempt to start z/OS V1R1 JES2 with a pre-release 4 checkpoint data set, the HASP446 message will result.

## SPOOLDEF FENCE= Changes

The FENCE= keyword parameter on the SPOOLDEF initialization statement is changed to allow you to specify fencing along with the number of spool volumes to be used.

When you specify

```
SPOOLDEF....FENCE=(ACTIVE=YES,VOLUMES=1).....
```

you get the same function as in the previous JES2 release when you specified FENCE=YES. . This specification of SPOOLDEF FENCE= is honored on $T SPOOLDEF and on cold start.

### Migration Actions

SPOOLDEF FENCE=YES is still permitted for compatibility and is converted to ACTIVE=YES and VOLUMES=1.

## SPOOLDEF TGBPERVL= Dropped

JES2 processing now controls the amount of SPOOL space cached for job writing data to SPOOL (the BLOB). In previous releases, this was controlled by the TGBPERVL parameter on SPOOLDEF. TGBPERVL= is no longer supported. In the initialization stream, this keyword is ignored (no error is returned). If used in a $TSPOOLDEF command, it will generate an error. In addition the HASP834 message that indicated TGBPERVL was set too high, has been deleted.

### Migration Actions:

Delete references to TGBPERVL from your initialization decks and any operator commands or automation scripts. Any automated action associated with the HASP834 message should be examined and potentially eliminated.

## SPOOL Utilization

As part of automatically setting the size of the SPOOL cache (the BLOB), JES2 processing increased the amount of SPOOL space that traditionally was marked as allocated. In most installations, this change would not be noticeable. However, in certain smaller installations (such as test systems) the total SPOOL space that is available may be allocated to the BLOB. This makes determining the true SPOOL utilization much more difficult. To compensate for this, JES2 now considers SPOOL

space in the BLOB as available rather than as allocated (as it had in previous releases). In small installations, with limited SPOOL space, this could decrease total SPOOL utilization. Also, multiple MAS members at different JES2 levels may report different SPOOL utilizations.

### Migration Actions

If you have a limited amount of SPOOL space, you may have set your SPOOLDEF TGSPACE=WARN= value high knowing that when that level was reached, you still have the space in the BLOB that can be used before SPOOL volumes are full. You should re-evaluate your settings of TGSPACE=WARN= to account for the changes in how SPOOL utilization has changes.

Also, be aware that SPOOL utilization may differ between MAS members of different release levels. This is normal. The smaller the number of track groups in the system, the greater the difference. However, the situation where the HASP355 message (SPOOL VOLUMES ARE FULL) is issued remains unchanged even in z/OS V1R1 JES2.

## TPDEF SNABUF Changes

To improve SNA performance and better align with other networking products, JES2 has increased the SNA buffer size from a maximum of 3840 to 32512. This is a change to the TPDEF SNABUF=SIZE= keywords.

### Migration Actions

Your VTAM network definitions should be evaluated.

## TRACEDEF PAGES= Changes

The default for TRACEDEF PAGE= is changed from 2 to 9. For compatibility with other releases of JES2, specification of 1-8 are converted automatically to 9.

### Migration Actions

For compatibility with other releases of JES2, specification of 1-8 for TRACEDEF PAGES, are converted automatically to 9. No migration actions are necessary, but you should evaluate your use of extended CSA space. If your current TRACEDEF initialization statements accepts the old default of PAGES=2, this will be converted to 9. For TABLES=100, you'll get 900 pages of buffers. Your setting for TABWARN= on the TRACEDEF initialization statements should also be evaluated.

## ZAPJOB Initialization Statement

The ZAPJOB initialization statement is new and is used to remove all traces of a job structure from the JES2 job queue. This statement is intended for situations where a job cannot be removed using normal JES2 commands or by a JES2 restart.

### Migration Actions

You should be careful when using this statement. Zapping a job that is active can lead to ABENDs and the loss of a PCE that might require a JES2 restart.

# Operations

## JES2 Command Changes

**Attention!**

Customer requirements have requested that JES2 provide more powerful filtering capabilities for job-related commands.

These requirements were satisfied in Release 4. However, The changes have introduced incompatible changes to JES2 command syntax. Also, the format of messages has changed and the message responses have been assigned new IDs.

To ease migration, IBM supplies a sample exit 5 routine that can be used to translate the old syntax to the new syntax.

For a complete description of command changes over multiple JES releases, see “Summary of Changed Commands” on page 10-6. If installed as shipped by IBM, the code in exit 5 was provided in Release 4 handles almost all of the changes in command syntax, if an operator happens to issue the old form of the command. If an operator issues the old form of a command, the IBM-supplied code in exit 5 will issue an informational message. IBM does not plan to update the IBM-supplied sample Exit 5 code in future releases.

The following table shows the changes from Release 3 to Release 4.

*Figure 9-1 (Page 1 of 2). Comparison of Release 3 and Release 4 JES2 commands*

| **Release 3** | **Starting with Release 4** |
|---|---|
| $D 'FRED',... | $D JOBQ'FRED',CMDAUTH=*,... |
| $T 'FRED',... | $T JOBQ'FRED',... |
| **Note:** Changes are similar for $A, $C, $E, $H, $L, $O, $P, $T, $TO. | |
| $D J1,2,... | $D J(1,2),... |
| **Note:** J can be J, JOB, S, STC, T, TSU.<br>Changes are similar for $A, $C, $E, $H, $L, $O, $P, $TO. | |
| $D J1-2,J3-4,... | $D J(1-2,3-4)... |
| **Note:** Changes are similar for $A, $C, $E, $H, $L, $O, $P, $TO. | |
| $L Jnnn,ALL | $D O Jnnn |
| $L Jnnn,H | $D O Jnnn,HELD |
| $L Jnnn,READY | $D O Jnnn,READY |
| $L Jnnn,OUTGRP=xxx | $D O Jnnn,OUTGRP=xxx |
| $C Jnnn,OUTGRP=xxx | $C O Jnnn,OUTGRP=xxx |
| $P Jnnn,OUTGRP=xxx | $P O Jnnn,OUTGRP=xxx unless Q= is a valid job queue (XEQ, PPU, etc.) |
| $P Jnnn,Q=x | $P O Jnnn,Q=x |
| $v Jnnnn,A=\|DAYS=\|Hours= | $v Jnnnn,A>\|Days>\|Hours> |

| *Figure 9-1 (Page 2 of 2). Comparison of Release 3 and Release 4 JES2 commands* | |
|---|---|
| **Release 3** | **Starting with Release 4** |
| $T Jnnnn,S=sid1,sid2,... | $T Jnnnn,S=(sid1,sid2,...) |
| $D SPL,JOBS=nn | $D JOBQ,SPOOL=PERCENT>=nn |
| $D SPL,V=xxxxxx,JOBS=nn | $D JOBQ,SPOOL=(VOLUME=xxxxxx,PERCENT>=nn) |
| $S SPL,V=xxxxxx,... | $S SPL(xxxxxx),... |
| $v Ixx | $v I(xx) |
| $v Ixx-yy | $v I(xx) |
| **Note:** Where v is one of the command verbs D, P, S, T, or Z. This command processed a named range of initiators. You must now issue these commands as separate commands. | |
| $v Jxxxx,Txxxx... | $v JOBQ(xxxx,xxxx) |
| **Note:** Where v is one of the command verbs A, C, E, H, L, O, P, T, TO. This command processed a list of JOBs, TSO users, and STCs. You must now issue these commands either as multiple commands ($v Jxxxx... and $v Txxxx....) or use $v JOBQ(xxxx,xxxx). The JOBQ version has slightly different function (does not check job type). | |
| $T Ixx,class-list | $T I(xx),C=class-list |
| $H Q,ALL | $T JOBCLASS(*),QHELD=Y |
| $H Q,C=xyz | $T JOBCLASS(x,y,z),QHELD=Y |
| $A Q,ALL | $T JOBCLASS(*),QHELD=N |
| $A Q,C=xyz | $T JOBCLASS(x,y,z),QHELD=N |
| $P Q,ALL,... | $P O JOBQ,READY,... |
| $P Q,Q=xyz,... | $P O JOBQ,READY,Q=XYZ,... |
| $O Q,ALL,... | $O JOBQ,/R=LOCAL.*,... |
| $O Q,Q=xyz,... | $O JOBQ,/R=LOCAL.*,/Q=xyz,... |
| $T ALL,sid1,sid2,... | $T JOBQ(*),/S=(sid1),S=(sid2...) |
| $LSYS | $DMEMBER |
| $ESYS, sid | $EMEMBER(sid) |
| $ESYS, Reset=sid | $ECKPTLOCK, HELDBY=sid |
| $TSYS, IND=Y/N | $TMEMBER(local), IND=Y/N |

## Migration Actions

Update operations procedures, and hold training sessions to help operators learn the new command syntax.

Incorporate the IBM-supplied code for exit 5 to handle command syntax.

For complete information, see the description of exit 5 in *z/OS JES2 Installation Exits*.

## JES2 Command Syntax Now Shown in Railroad Tracks

The syntax diagram for each initialization statement has been redrawn into railroad track format. Each syntax diagram is more complete and many of the syntax diagrams for initialization statements now document two choices of parameter specification.

A new section of *z/OS JES2 Commands* describes how to interpret railroad track style of syntax diagrams for initialization statements.

### Migration Actions

Update production procedures, and hold training sessions, to inform operators of how to interpret the new command syntax diagrams.

## JES2 Message Changes

Many JES2 messages have changed. For example:

- Message $HASP050 has a new type, BERT. This is a MAS resource and may need to be added to automation monitoring.
- Message $HASP605 ($D I command) is replaced by message $HASP892.
- Message $HASP630 ($D SPOOL command) is sometimes replaced by message $HASP893.
- Message $HASP608 is replaced by message $HASP890. Message $HASP890 displays more information than $HASP608.
- Before Release 4, $L J5,H displayed a $HASP686 message for every output group associated with job 5. After Release 4, it displays the $HASP891 message (once), which includes a count of the number of held output groups in each class. For the equivalent function of $L J5,H, issue the $DO J5,HELD command.

For complete information about changed messages, see *z/OS JES2 Messages*.

## Ownership of Output from RJE/NJE

An RJE workstation or NJE node could issue commands that affect output only if the workstation or node owned the output. In prior releases, a workstation or a node only owned output if the CMDAUTH= matched the workstation or node of origin. With Release 4, an additional check was introduced to see if the output routing matches the workstation or node routing. If so, the output is considered owned by the workstation or node.

### Migration Actions

Be aware that commands from NJE nodes and RJE workstations can now affect output that is routed to them in addition to output that was traditionally owned by them. This may change the number of elements returned in display commands and the number affected by other output commands.

## $T SPOOL(nnnn) Command

$T SPOOL(nnnn) is a new JES2 command. This commands allows the installation to assign its systems to spool volumes. This command has one valid keyword operand, SYSAFF=. The SYSAFF= keyword has a similar function SYSAFF on the $TINTRDR command. The value you specify for SYSAFF= on the $TSPOOL(nnnn) command is also added to the output produced by the $D SPOOL command.

### Migration Actions

A new RACF authorization profile is required for the $T SPOOL command. The profile is `JESx.MODIFY.SPOOL` with `ACCESS=CONTROL`.

## $ZAPJOB Command

$ZAPJOB removes all traces of a job structure from the JES2 job queue. You must ensure that the job and any output it may have created is not active in any JES2 process or active on a device. Zapping a job that is active can lead to ABENDs and the loss of a PCE until JES2 is restarted.

There is nothing to stop entering a $ZAPJOB command in the JES2 initialization stream, however, IBM Recommends that the ZAPJOB initialization statement be used instead. A ZAPJOB command in the initialization stream will run after warm start processing completes whereas a ZAPJOB initialization statement will be processed before warm start processing begins, before verifying the job queue.

$HASP250 now indicates when a job has been zapped.

### Migration Actions

A new RACF authorization profile is required for the $ZAPJOB command. The profile is `JESx.ZAP.JOB` with `ACCESS=CONTROL`.

$HASP250 has been changed to add that a job has been zapped.

## $HASP834 Deleted

$HASP834 message has been deleted.

### Migration Actions

Examine your installations message automation. There is no replacement for $HASP834.

---

# Application Development

## Dynamic Increase of Checkpointed Data

Beginning with Release 4, most variable size sections of the JES2 checkpoint data set can expand via an operator command. This can have an impact on the design of applications that either access the JES2 checkpoint or build data structures based on the size of a particular section. With previous levels of JES2, an application could assume that the number of JOBs, maximum number of SPOOL volumes, or number of output elements would not change without an IPL. As a result, static data structures may have been built based on the the current specifications. These applications may no longer work after a $T operator command updates one of these values.

### Migration Actions

Review any application that interacts with JES2. Look for tables based on the number of jobs JES2 supports. Look for applications that build DEBs that access the JES2 SPOOL based on the current maximum number of SPOOL volumes.

## Problem Determination and Diagnosis

## Provide for JES2 IPCS Support

**Attention!**

- You must be proactive to install JES2 IPCS.
- Make sure you have JES2 IPCS support for all combinations of JES2 and MVS releases in production.

- When JES2 dumps are being diagnosed on the same level of the system as the system on which the dumps were taken, do the following:
  - Ensure that SHASPARM is specified in the PARMLIB concatenation.
  - Ensure that SHASMIG is specified in the STEPLIB concatenation.
  - Ensure that SHASPNL0 is specified in the ISPPLIB concatenation.

  This ensures that IPCS can find the SMP/E-maintained copy of JES2 data.
- If the JES2 levels differ between the system on which the dump was taken and the system on which the dump will be examined using IPCS, but the level of MVS is the same, do the following:
  - Add an IPCSPARM DD statement to your logon proc, and specify the SHASPARM library that corresponds to the JES2 level in the dump in the first position in the IPCSPARM DD concatenation. Also specify your PARMLIB data set, plus any other data sets containing IPCS parameters that you normally need when using IPCS.
  - Specify the SHASMIG library that corresponds to the JES2 level in the dump in the first position in the STEPLIB concatenation.
  - Specify the SHASPNL0 library that corresponds to the JES2 level in the dump in the first position in the ISPPLIB concatenation.
- If both the JES2 and system levels differ between the system on which the dump was taken and the system on which the dump will be examined using IPCS, do the following:
  - Add an IPCSPARM DD statement to your logon proc, and specify the SHASPARM library that corresponds to the JES2 level in the dump in the first position in the IPCSPARM DD concatenation. Also specify the PARMLIB data set, plus any other data sets containing IPCS parameters that correspond to the system level in the dump.
  - Specify the SHASMIG and MIGLIB libraries that correspond to the system in the dump in the first and second positions in the STEPLIB concatenation.
  - Specify the SHASPNL0 and SBLSPNL0 libraries that correspond to the system in the dump in the first position in the ISPPLIB concatenation.

Note that IPCS requires libraries in addition to the libraries that JES2 uses. You may need to make other concatenations. For more information, see *z/OS MVS IPCS Customization*.

If dump analysis leads into data structures for other elements or products, you might need to add more data sets to the concatenations to complete the diagnosis. Refer to the appropriate product publications for information about establishing the correct IPCS environments for diagnosing other elements and products.

## New Support for Artificial JQEs

With Release 4, JES2 IPCS support displays data related to artificial JQEs, such as JQX fields, and fields from the BERT data area.

### Migration Action

When you are using the CBFORMAT IPCS subcommand, new information will be displayed. For details, see

- *z/OS JES2 Diagnosis*
- *z/OS JES2 Data Areas, Vol 1 $ALINDEX-$EVT*
- *z/OS JES2 Data Areas, Vol 2 $FCLWORK-$OUTWORK*
- *z/OS JES2 Data Areas, Vol 3 $PADDR-$XRQ*

## New Record for Trace ID 17

Trace ID 17 has been updated to contain new measurements (total PCE wait time, number of $CKPTs issued, MVS wait time, $QSUSE time) that JES2 gathers during different phases of checkpoint processing. A new record 3 has been added to the READ2, PRIMARY WRITE, IMMEDIATE WRITE and FINAL WRITE checkpoint cycles that contains these measurements.

### Migration Actions

If you use a program that analyses Trace ID 17 records, it may need to be updated to incorporate this support.

## $DPCE Command

The $DPCE command is enhanced to provide the following additional diagnostic information:

- Ended PCE counts - $DPCE,ENDED>0 displays the PCE types that have ended.
- Active PCE counts - $PDCE,ACTIVE>0 displays the PCE types that have active work.
- Detailed PCE information - $PCDE (CNVT) displays current detailed information for each converter PCE. This information includes: where the PCE is waiting and what it is waiting for, active and outstanding I/O counts, the exit the PCE is in, the current job the PCE is processing, the time the PCE waited, and whether the PCE has ended.

### Migration Actions

Be aware of the additional diagnostic information provided by the $DPCE command.

## Message HASP291

Message HASP291 is enhanced in this release to include information from the MVS IEDB. This information includes the IOS completion code and the full device sense data. Two completion codes are presented because IOS combines a multiple of its completion codes into one for use by EXCP callers. In some cases, the IOS completion code will more accurately describe the error.

### Migration Actions

Be aware of the additional diagnostic information provided by the HASP291 message.

## Message HASP064

The old I/O error message, HASP094, was incomplete and difficult to read. A new message, HASP064, is added to this release to provide additional data in a format that is easier to understand. The HASP064 message displays the same information as the HASP094 message but in a format similar to the HASP291 message. In addition, data from the MVS IEDB is added to the HASP064 message and includes the IOS completion code and the device sense data. Two completion codes are presented because IOS combines a multiple of its completion codes into one for use by EXCP callers. In some cases, the IOS completion code will more accurately describe the error. Also included is the failing MTTR/BBCCHHR.

### Migration Actions

Be aware of the format and diagnostic information provided by the HASP064 message.

## $CBIO Services - Additional Error Recording

Additional error recording is added for the $CBIO services in the USER environment. CBIO errors will now generate a SYMREC similar to the one generated in the main task for control block I/O errors. In addition, the JES2 trace ID 3, previously from the FSS environment $BUFIO service, is moved to the USER environment $CBIO service. These changes provide additional data to help diagnose errors with SPOOL control blocks.

### Migration Actions

Be aware of the additional error recording provided by $CBIO services.

## Dumping all Members of the MAS

z/OS V1R1 JES2 dumps all members of the MAS when certain JES2 work queue errors occur. This is referred to as "multi-system dumps".

### Migration Actions

You need to make sure you have the procedures in place to collect all the dumps from all the systems.

---

# JES2 Installation Modifications

## Fiber Channel Support (FICON)

JES2 I/O processing for spool and checkpoint has been updated to take advantage of the changes made in FICON (Fiber channels).

### Migration Actions

Be aware of the updates to JES2 I/O processing for spool and checkpoint in respect to FICON.

## Active DCTs

Active DCTs are now chained out of the HCT ($NJEADCT, $OFFADCT, $LCLADCT).

**Note:** If an error occurs in the DCT chain, a SYSOUT device may not be selected for work. Such might be the case when $S command is issued. JES2 rebuilds this chain should errors occur.

### Migration Actions

Installations that manipulate DCTs need to be aware of these changes.

# Chapter 10. Version Summary Tables

This chapter provides an overview of z/OS JES2 changes. It summarizes interfaces that are new, changed, or deleted for JES2 z/OS V1R1.

The following tables describe what was added, deleted, or enhanced in each release for which migration to JES2 z/OS V1R1 applies.

## Summary of Changed Initialization Statements

The following table describes changes to the JES2 initialization statements for each version/release. See *z/OS JES2 Initialization and Tuning Reference* for additional information.

| Initialization Statement | Release | Short Description of Change |
|---|---|---|
| All initialization statements | OS/390 Release 4 | Changed parameters:<br>• The maximum value for the LINE and NODE parameters is increased to 32767. |
| BUFDEF | OS/390 Release 7 | Changed function:<br>• Formula's to calculate BELOWBUF (below the line) and EXTBUF (above the line) limits have been modified. |
| CKPTSPACE | OS/390 Release 4 | New parameter:<br>• Defines how much additional space is available for expanding the JES2 checkpoint record. |
| CONDEF | OS/390 Release 4 | Changed parameters:<br>• The maximum value for parameters AUTOCMD, BUFNUM, and CMDNUM is increased to 32767. |
| CONNECT | OS/390 Release 4 | Changed parameters:<br>The maximum value for parameters NODEA and NODEB is increased to 32767. |
| D LOADMOD | OS/390 Release 7 | New parameter:<br>• TABles displays any DYNAMIC tables which are defined in this module, along with the type of table. |
| D MODULE | OS/390 Release 7 | New parameter:<br>• TABles displays any DYNAMIC tables which are defined in this module, along with the type of table. |
| | APAR OW41855 (integrated in z/OS V1R1) | New parameter:<br>• LASTPTF= allows you to display the last PTF applied to a module. |
| D OPTsdef | OS/390 Release 7 | New parameter:<br>• UNACTIVATE displays whether or not the UNACTIVATE START PARM was specified. |

| Initialization Statement | Release | Short Description of Change |
|---|---|---|
| DEBUG | OS/390 Release 1 | New parameter:<br>• SYMREC allows system programmers to be notified through message $HASP805 that an error occurred and further information is available in the logrec data set. |
| | APAR OW20235 (JES2 SP4.2; integrated in OS/390 Release 4) | New parameter:<br>• SECURITY=YES allows JES2 to cause RACF to log information related to the $HASP185 message when the output selection is denied for authorization failures or when RACF is running in WARN mode. |
| | OS/390 Release 7 | New parameter:<br>• BERT specifies whether (Yes) or not (No) JES2 provides error code $BR3 to inform the operator that a data error has been detected in a chain of BERTs. |
| DESTDEF | OS/390 Release 4 | Changed parameter:<br>• The maximum value for the LOCALNUM parameter is increased to 32767.<br>• Remote destinations of the form R0xxxxxx are interpreted as userids when you specify RDEST=User or when xxxxxx is greater than 32767. If xxxxxx is between 9999 and 32767 and you specify RDEST=Remote, the "0" is truncated. |
| INTRDR | OS/390 Release 1 | New parameter:<br>• HONORLIM indicates whether data sets sent to the internal reader are to be counted toward the byte limit for a job. |
| JOBCLASS | OS/390 Release 4 | Change in scope<br>• The JOBCLASS statement has MAS-wide scope.<br>Change in minimum action to modify<br>• All parameters specified on the JOBCLASS(v) initialization statement have a "minimum action to modify" either through a cold start or by issuing the $T JOBCLASS command.<br>New parameters:<br>• MODE= specifies whether jobs are to be run under JES-controlled or WLM-controlled initiators.<br>• XEQCOUNT= specifies the maximum number of jobs that can execute concurrently in a class.<br>• JOBCLASS(STC) and JOBCLASS(TSU) replace STCCLASS and TSUCLASS, respectively.<br>• Ranges of job classes such as JOBCLASS(A-Z) are no longer allowed; JOBCLASS(*) includes STC and TSU. |
| JOBDEF | OS/390 Release 3 | New parameter:<br>• DUPL_JOB= specifies whether or not batch jobs with the same name, in the same MAS, should execute at the same time. |
| | OS/390 Release 7 | New parameter:<br>• CNVT_ENQ= specifies how the system should process jobs that request JCLLIB data sets that are already enqueued at job conversion. |
| L(nnnn).ST(n) | OS/390 Release 3 | Changed parameter:<br>• WS - The maximum number of work selection criteria you can specify has been increased to 19. |
| | OS/390 Release 4 | Changed parameters:<br>• The number of lines possible when specifying L(nnnnn).ST(n) is increased to 32767.<br>• You use the $T L(nnnnn).ST(n) in a corresponding way to modify the settings for this initialization statement. |

| Initialization Statement | Release | Short Description of Change |
|---|---|---|
| L(nnnn).JT(n) | OS/390 Release 4 | Changed parameters:<br>• The number of lines possible when specifying L(nnnnn).JT(n) is increased to 32767.<br>New parameters:<br>• WS - specifies the work selection criteria for this device.<br>• LIMIT - specifies the limits (in records) for SYSOUT data sets that the SYSOUT transmitter will select. This number applies to the total lines of |
| LINE | OS/390 Release 4 | Changed parameters:<br>• The number of lines possible when specifying LINE for both BSC and SNA is increased to 32767. |
| LOGON | OS/390 Release 4 | Increased Number of Logons<br>• The number of application logons allowed on the LOGON(nnn) initialization statement is increased to 999. |
| MASDEF | OS/390 Release 7 | Changed parameter:<br>• RESTART specifies whether (Yes) or not (No) a JES2 MAS member can make the jobs on a failed member eligible for restart. |
| NJEDEF | OS/390 Release 4 | Increased Number of Lines and Nodes<br>• The maximum value for parameters LINENUM, NODENUM, and OWNNODE is increased to 32767. |
| NODE | OS/390 Release 4 | Increased Number of Lines and Nodes<br>• LINE - the maximum value is increased to 32767.<br>• NODE - the maximum value is increased to 32767.<br>New parameter:<br>LOGON specifies the number of the logon DCT to be used in communication with this node. |
| OFF(n).JR | OS/390 Release 1 | Changed parameters:<br>• You can now specify wildcards on the following parameters:<br>– CREATOR<br>– JOBNAME |
| | z/OS V1R1 | New parameter:<br>• SCHENV= allows you to select work to reload based on scheduling environment.<br>• SRVCLASS= allows you to select work to reload based on service class. |
| OFF(n).JT | OS/390 Release 1 | Changed parameters:<br>• You can now specify wildcards on the following parameters:<br>– CREATOR<br>– JOBNAME |
| OFF(n).SR | OS/390 Release 1 | Changed parameters:<br>• You can now specify wildcards on the following parameters:<br>– CREATOR<br>– FORMS<br>– JOBNAME<br>– PRMODE<br>– ROUTECDE<br>– WRITER |

| Initialization Statement | Release | Short Description of Change |
|---|---|---|
| OFF(n).ST | OS/390 Release 1 | Changed parameters:<br>• You can now specify wildcards on the following parameters:<br>– CREATOR<br>– FORMS<br>– JOBNAME<br>– PRMODE<br>– ROUTECDE<br>– WRITER |
| OFFLOAD | OS/390 Release 1 | New parameter:<br>• VALIDATE specifies whether or not JES2 should validate the logical record length of the first record read from an offload data set.<br>• ARCHIVE specifies whether or not JES2 should prevent an offload device from reselecting a job when the job disposition is KEEP or HOLD. |
| PRT | OS/390 Release 1 | Changed parameters:<br>• You can now specify wildcards on the following parameters:<br>– CREATOR<br>– FORMS<br>– JOBNAME<br>– PRMODE<br>– ROUTECDE<br>– WRITER |
| | OS/390 Release 4 | Increased Number of Printers<br>• The maximum number of printers that can be specified on PRT(nnnnn) is increased to 32767.<br>• This maximum also applies to specifying FSS printers. |
| PUN | OS/390 Release 1 | Changed parameters:<br>• You can now specify wildcards on the following parameters:<br>– CREATOR<br>– FORMS<br>– JOBNAME<br>– PRMODE<br>– ROUTECDE<br>– WRITER |
| R(nnnn).PR(m) | OS/390 Release 1 | Changed parameters:<br>• You can now specify wildcards on the following parameters:<br>– CREATOR<br>– FORMS<br>– JOBNAME<br>– PRMODE<br>– ROUTECDE<br>– WRITER |
| | OS/390 Release 4 | Increased Remote Number<br>The maximum value of the first subscript (remote number) R(nnnnn).PR(nn) is increased to 32767. |

| Initialization Statement | Release | Short Description of Change |
|---|---|---|
| R(nnnn).PU(m) | OS/390 Release 1 | Changed parameters:<br>• You can now specify wildcards on the following parameters:<br>– CREATOR<br>– FORMS<br>– JOBNAME<br>– PRMODE<br>– ROUTECDE<br>– WRITER |
| | OS/390 Release 4 | Increased Remote Number<br>• The maximum value of the first subscript (remote number) that can be specified on R(nnnnn).PU(nn) is increased to 32767. |
| R(nnnn).RD(m) | OS/390 Release 4 | Changed parameter:<br>• The maximum value of the first subscript (remote number) that can be specified on R(nnnn).PU(m) is increased to 32767. |
| REDIRECT(n) | OS/390 Release 4 | Increased Number of Remotes<br>The maximum number of remotes that can be specified on RMT(nnnnn) is increased to 32767. |
| SPOOLDEF | OS/390 Release 8 | Changed parameter:<br>• The TGBPERVL parameter is set to 255 or whatever will fit based on the number of spool volumes |
| | z/OS V1R1 | Changed parameters:<br>• The FENCE= keyword parameter is changed in how you indicate fencing and includes a VOLUMES= keyword as follows:<br>`SPOOLDEF.....FENCE=(ACTIVE=YES\|NO,VOLUMES=nnnn).....`<br>Obsoleted parameter:<br>• TGBPERVL should no longer be used; its need is superseded by code that automatically balances the SPOOL cache (BLOB) size. |
| STCCLASS | OS/390 Release 4 | Statement deleted. Replaced by JOBCLASS(STC). |
| TPDEF | OS/390 Release 3 | New parameter:<br>• SESSION= is replaced by a new parameter, SESSIONS=, which allows you to get, free or freeze an Interface Control Element (ICE).<br>Obsoleted parameter:<br>• SESSION= is replaced by a new parameter, SESSIONS=. |
| | OS/390 Release 4 | Changed parameters:<br>The maximum value for parameters RMTNUM and SESSIONS is increased to 32767. |
| | OS/390 Release 7 | Changed parameters:<br>The EXTBUF= and BELOWBUF= parameters have been changed to SNABUF= and BSCBUF= respectively. EXTBUF= and BELOWBUF= names are obsolete; however, the names have been retained as aliases for compatibility. |
| | z/OS V1R1 | Changed parameters:<br>The maximum value for parameter SNABUF=(SIZE=) is increased to 32512. |
| TRACE | OS/390 Release 3 | Changed parameter:<br>• TRACE(n) can specify new trace IDs 28 and 29 to trace SYSOUT application program interface functions. |
| TRACEDEF | z/OS V1R1 | Changed parameter:<br>• PAGES= minimum value is increased from 1 to 9. |

| Initialization Statement | Release | Short Description of Change |
|---|---|---|
| TSUCLASS | OS/390 Release 4 | Statement deleted. Replaced by JOBCLASS(TSU). |
| ZAPJOB | z/OS V1R1 | New initialization statement.<br>• Used to remove all traces of a job structure from the JES2 job queue. This statement is intended for situations where a job cannot be removed using normal JES2 commands or by a JES2 restart. |

## Summary of Changed Commands

The following table describes changes to the JES2 operator commands for each version/release. See *z/OS JES2 Commands* for additional information.

| Command | Release | Short Description of Change |
|---|---|---|
| All JES2 commands | OS/390 Release 4 | New Syntax Descriptions<br>• All JES2 commands have been described using the "railroad track" form of syntax diagram. |
| Many JES2 commands | OS/390 Release 4 | Maximum number of devices increased:<br>• The maximum number of remotes and lines has been increased from 9999 to 32767.<br>• The maximum number of LOGONs (interface for SNA supported RJE and NJE) is increased from 2 to 999.<br>• The maximum number of printers is increased from 9999 to 32767.<br>• The maximum number of nodes has been increased from 9999 to 32767. |
| $A Job | OS/390 Release 4 | New parameters:<br>• AgelDAys<days \| AgelDAys>days - Specifies the age of affected jobs in days.<br>• CMDauth - Only jobs that can be affected from the specified remote(s) or node(s) will be released.<br>• Hours - Specifies the age of affected jobs in hours.<br>• Queue - Jobs on the specified queue are released.<br>• REBUILD - Jobs on the rebuild queue are released.<br>• SPOOL - Jobs with specific SPOOL characteristics are released.<br>• TYPE - Indicates whether batch jobs (JOB), started tasks (STC), or time-sharing users (TSU) are released.<br>• XEQNODE - Only jobs which are detained to execute at the specific node, or which have already executed in the specific node, are to be released.<br>Replaced parameter:<br>• 'jobname'. $A 'jobname' is replaced by $AJOBQ 'jobname'.<br>Changed syntax:<br>• If multiple job numbers or ranges are specified, they must be specified as a parenthesized subscript. |
| $A Q | OS/390 Release 4 | Replaced command: $A Q is replaced by $T JOBCLASS,QHELD=NO. |

| Command | Release | Short Description of Change |
|---|---|---|
| $ACTIVATE | OS/390 Release 4 | New Command<br>• Activates new functions at the current release of JES |
| | OS/390 Release 7 | Changed function:<br>• $ACTIVATE expands the JES2 checkpoint to enable functions. Once the checkpoint has been expanded and the new function enabled, it is now possible to undo the effects of the $ACTIVATE command with a JES2 cold start at a prior release level, or by using the UNACTIVATE start option during a JES2 all-member restart. |
| | z/OS V1R1 | Deleted Function<br>• Inactive function. Activation of function is assumed to have occurred from prior JES2 release (Release 4 through Release 8) |
| $ADD APPL | OS/390 Release 4 | New parameter:<br>• LOGON - specifies the number (1-999) of the local LOGON DCT to be used when specifying connections to the application. |
| $ADD LINE(nnnnn) | OS/390 Release 4 | New Command:<br>• Dynamically adds a networking/remote line. |
| $ADD LOGON(nn) | OS/390 Release 4 | New Command:<br>• Dynamically adds remote logons. |
| $ADD PRT(nnnnn) | OS/390 Release 1 | Changed parameters:<br>• UNIT - Allows you to specify a null value rather than a device number.<br>Changed function:<br>• The change in the work selection process affects the output of this command. |
| | OS/390 Release 3 | Changed parameters:<br>• WS - The maximum number of work selection criteria you can specify has been increased to 19. |
| | OS/390 Release 4 | Changed parameters:<br>• RANGE parameter has been updated to support J1-65534.<br>• Routecde Ummmm range has been updated to support 1-32767.<br>• LOCAL\|ANYLOCAL Rnnnn has been updated to support 1-32767. |
| $ADD RMT(nnnn) | OS/390 Release 4 | New parameter:<br>• LOGON - specifies the number (1-999) of the local LOGON DCT which should be used when specifying connections to the application. |
| $B PRT | OS/390 Release 1 | Changed parameter:<br>• PAGES - you can now specify up to 99,999,999 pages to be backspaced. |

| Command | Release | Short Description of Change |
|---|---|---|
| $C job | OS/390 Release 4 | New parameters:<br>• Age\|DAys<days \| Age\|DAys>days - Specifies the age of affected jobs in days.<br>• CMDauth - Only jobs that can be affected from the specified remote(s) or node(s) will be cancelled.<br>• Hours - Specifies the age of affected jobs in hours.<br>• Queue - Jobs on the specified queue are cancelled.<br>• REBUILD - Jobs on the rebuild queue are cancelled.<br>• SPOOL - Jobs with specific SPOOL characteristics are cancelled.<br>• TYPE - Indicates whether batch jobs (JOB), started tasks (STC), or time-sharing users (TSU) are cancelled.<br>• XEQNODE - Only jobs which are detained to execute at the specific node, or which have already executed in the specific node, are to be cancelled.<br>**Note:** The OUTGrp and ALL parameters can be specified in the $C O JOB command.<br>Replaced parameters:<br>• $C OUTGRP and $C ALL are replaced by the $C O command.<br>• 'jobname'. $C 'jobname' is replaced by $CJOBQ 'jobname'.<br>Changed syntax:<br>• If multiple job numbers or ranges are specified, they must be specified as a parenthesized subscript. |
| $C O JOB | OS/390 Release 4 | New command:<br>• Cancels specific output groups or individual job output elements created by a job. |
| | OS/390 Release 7 | Changed function:<br>• For the Dest\|Routecde=dest parameter, greater than (> or >=) and less than (< or <=) filters may be used in conjunction to support route code ranges. |
| $D ACTIVATE | Release 4 | New command:<br>• Displays the current status of functions activated by the $ACTIVATE command. |
| $D APPL | OS/390 Release 1 | Changed parameter:<br>• The STATUS parameter now provides additional status information. |
| | OS/390 Release 4 | New parameter:<br>• LOGON |
| $D CKPTSPACE | OS/390 Release 4 | New command:<br>• Displays information about the amount of space in the checkpoint. |
| $D CONNECT | OS/390 Release 1 | Changed parameter:<br>• The STATUS parameter now provides additional status information. |
| $D F | OS/390 Release 1 | Changed parameters:<br>• You can now specify wildcards on the R= parameter. |

| Command | Release | Short Description of Change |
|---|---|---|
| $D I | OS/390 Release 4 | New parameters:<br>• ACTCLASS - Displays the job class of the job being actively processed by the initiator.<br>• ASID - Displays the ASID of the address space in which the initiator is running.<br>• Class - Displays the list of classes associated with the initiator.<br>• INELigible_ class - Displays classes which are associated with the initiator but ineligible to select work.<br>• JOBID - Displays the job id of the job active on this initiator.<br>• JOBNAME - Displays the job name of the job active on this initiator.<br>• STATUS - Displays the current state of the initiator.<br>• STC - Displays the job id of the initiator STC. |
| $D INTRDR | OS/390 Release 4 | New parameters:<br>• Auth, BATCH, Class, DCBATTR, Hold, HONORlim, PRTYINC, PRTYLIM, RDINUM, Sysaff, TRace.. |
| $D Job | OS/390 Release 4 | New parameters:<br>• AgelDAys<days l AgelDAys>days - Specifies the age of affected jobs in days.<br>• ARM_element - Displays whether the job is registered with the Automatic Restart Management (ARM).<br>• CANCEL - Display jobs that have been cancelled.<br>• CARDS - Displays the number of input cards associated with the job.<br>• CC - Displays the completion information associated with the job.<br>• Class - Displays the class associated with the job.<br>• CMDauth - Only jobs that can be affected from the specified remote(s) or node(s) will be displayed.<br>• DELAY - Displays reasons why a pre-execution job will not enter execution.<br>• HOLD - Displays the hold status of a job.<br>• Hours - Specifies the age of the affected jobs in hours.<br>• INITASID - For initiator jobs, displays the address space identifier (ASID) associated with the initiator.<br>• OFFS - Displays offload device numbers on which the job has been archived.<br>• Priority - Displays the priority of the job.<br>• PURGE - Indicates whether jobs pending purge processing should be displayed.<br>• Queue - Only jobs on the specified queue are displayed.<br>• REBUILD - Jobs on the rebuild queue are displayed (Yes) or not displayed (No).<br>• SCHENV - Displays the scheduling environment associated with the job<br>• SCHENV_AFF - Displays the JES2 MAS members on which the scheduling environment for this job is available.<br>• SECLABEL - Displays the security label associated with the job.<br>• SPOOL - Only jobs with specific SPOOL characteristics are to be displayed.<br>• SRVCLASS - Displays the service class of the job.<br>• Sysaff - Displays the job's system affinity.<br>• TYPE - Indicates whether only batch jobs (JOB), started tasks (STC), or time-sharing users(TSU) are displayed.<br>• USERID - Displays the userid associated with the job.<br>• XEQNode - Only jobs which are destined to execute at the specified node, or which have already executed at the specific node, are to be displayed.<br>Replaced parameters:<br>• 'jobname'. $D 'jobname' is replaced by $DJOBQ 'jobname'.<br>Changed syntax:<br>• If multiple job numbers or ranges are specified, they must be specified as a parenthesized subscript. |

| Command | Release | Short Description of Change |
|---|---|---|
| $D JOBCLASS | OS/390 Release 4 | New parameters:<br>• MODE - Indicates whether jobs in this class are to be run under JES-mode or WLM-mode initiators.<br>• NAME - Specifies a job class name to be used in selecting jobs from the job class.<br>• XEQCOUNT - Displays the current number of jobs that are executing, or the maximum number of jobs that can execute concurrently in the class.<br>Changed meaning:<br>• JOBCLASS(*) includes JOBCLASS(STC) and JOBCLASS(TSU) |
| $D JOBDEF | OS/390 Release 7 | New parameter:<br>• CNVT_ENQ - Displays the status of the JCLLIB data set. |
| $D LINE(nnnn) | OS/390 Release 1 | Changed parameter:<br>• The STATUS parameter now provides additional status information. |
| $D L(nnnn).JT(n) | OS/390 Release 4 | New parameters:<br>• LIMIT - Displays the limits (in card images) for jobs that the job transmitter will select.<br>• WS - Displays the work selection criteria for this line job transmitter |
| $D LOADMOD | OS/390 Release 7 | New parameter:<br>• TABles - Displays any DYNAMIC tables which are defined in this module, along with the type of table. |
| $D MASDEF | OS/390 Release 7 | New parameter:<br>• RESTART - Displays whether (Yes) or not (No) a JES2 MAS member in a sysplex can make the jobs associated with a JES2 member that resided on a failed MVS member in the same sysplex eligible for restart. |
| $D MEMBER | OS/390 Release 1 | New parameter:<br>• VERSION= displays the version of the JES2 release that is running on a member. |
| | APAR OW20844; integrated into OS/390 Release 4 | New parameter:<br>• BOSS - Displays the JES2 WLM representative for the MAS on this MVS image |
| | OS/390 Release 4 | New parameters:<br>• COMMAND - Specifies that any commands ($P or $PXEQ) which have been issued on this member should be listed.<br>• SLEVEL - Specifies that the service level number of the member is to be displayed.<br>• SSNAME - Displays the subsystem name used by this member. |
| $D MODULE | OS/390 Release 7 | New parameter:<br>• TABles - Displays any DYNAMIC tables which are defined in this module, along with the type of table. |
| | OW41855 (incorporated in z/OS V1R1) | New parameter:<br>• LASTPTF= allows you to display the last PTF applied to a module. |
| $D NODE | OS/390 Release 1 | Changed parameter:<br>• The STATUS parameter now provides additional status information. |
| | OS/390 Release 4 | New and changed parameters:<br>• LOGON - specifies the number (1-999) of the local LOGON DCT which should be used when specifying connections to the application. |
| $D OPTSDEF | OS/390 Release 7 | New parameter:<br>• UNACTivate - displays whether or not the UNACTivate START parm was specified. |

| Command | Release | Short Description of Change |
|---|---|---|
| $D O Job | OS/390 Release 4 | New Command:<br>• Displays the output characteristics of specified output groups or individual job output elements (JOEs). |
| | OS/390 Release 7 | Changed function:<br>• For the Dest\|Routecde=dest parameter, greater than (> or >=) and less than (< or <=) filters may be used in conjunction to support route code ranges. |
| $D PATH | OS/390 Release 1 | Changed parameter:<br>• The STATUS parameter now provides additional status information. |
| $D PCE | OS/390 Release 3 | Changed parameter:<br>• A new PCE processor type, SPI, has been added. |
| | OS/390 Release 4 | Changed parameter:<br>• Processor types BERTLOCK and ENF have been added. |
| | OS/390 Release 7 | Enhanced function:<br>• This command now supports filters, and displays new data such as ended PCE counts, $ACTIVE counts, and individual PCE details. |
| $D PRT(nnnnn) | OS/390 Release 4 | New parameter:<br>• STATUS is a new parameter. |
| $D R(nnnnn).PR(m) | OS/390 Release 4 | New parameter:<br>• STATUS is a new parameter.<br>Deleted parameters:<br>• CCTL, CMPCT, COMPACT, EJECT, FCBLOAD, LRECL |
| $D RDI | OS/390 Release 4 | New parameters:<br>• Auth - Displays whether (YES) or not (NO) the indicated reader has the specified authority to issue commands to the internal reader.<br>• Class - Displays the default execution class (A-Z,0-9) for all jobs entered at this internal reader that do not have a job class specified on the JOB statement.<br>• HOLD - Displays whether (YES) or not (NO) all jobs read by the specified are held after JCL conversion.<br>• MSGclass\|Q - Displays the default message class assigned to jobs entered at thi internal reader that do not have a MSGCLASS specified on the JOB statement.<br>• PRTDEST - Displays the default destination for the print output from all jobs that are read by the internal reader and that do not have a /*ROUTE statement or DEST parameter.<br>• PUNDEST - Displays the default destination for the punch output from all jobs that are read by the internal reader and that do not have a /*ROUTE statement or DEST parameter.<br>• Sysaff - Displays the default affinities assigned to jobs read by the internal reader. |
| $D RECVOPTS | OS/390 Release 4 | New parameters:<br>• $D RECVOPTS includes new parameters, COUNT and INTERVAL. You still use this command to display the current RECVOPTS settings for types of errors. |

| Command | Release | Short Description of Change |
|---|---|---|
| $D SPOOL | OS/390 Release 4 | New parameters:<br>• AWAITING - Lists any spool volumes whose unavailability is preventing the spool volume from draining.<br>• COMMAND - Displays any commands which are outstanding on the spool volume.<br>• PERCENT - Displays the percentage of spool volume that is utilized.<br>• STATUS - Displays the status of the spool volume.<br>• TGINUSE - Displays the number of track groups in use the spool volume.<br>• TGNUM - Displays the total number of track groups (either in use or free) on the spool volume.<br>• TRKPERTGB - Displays the number of tracks in each track group on the spool volume.<br>• UNITDATA - Displays extended information about the spool volume.<br>Replaced parameter:<br>• $D SPOOL,JOBS is replaced by $D JOBQ,SPOOL. |
| $D SPOOLDEF | OS/390 Release 4 | New parameters:<br>• TGSPACE=PERCENT is a new parameter. |
| | z/OS V1R1 | New and changed parameters:<br>• FENCE=(VOLUMES= and ACTIVE=) are displayed. |
| $D STCCLASS | OS/390 Release 4 | Replaced parameter:<br>• $D STCCLASS is replaced by $D JOBCLASS(STC). |
| $D TPDEF | OS/390 Release 3 | New parameter:<br>• SESSIONS= allows you to display specifications set for VTAM sessions. |
| | OS/390 Release 7 | Changed parameters:<br>• The EXTBUF= and BELOWBUF= parameters have been changed to SNABUF= and BSCBUF= respectively. EXTBUF= and BELOWBUF= names are obsolete; however, the names have been retained as aliases for compatibility. |
| $D TSUCLASS | OS/390 Release 4 | Replaced parameter:<br>• $D TSUCLASS is replaced by $D JOBCLASS(TSU). |
| $E job | OS/390 Release 4 | New parameters:<br>• AgelDAys<days \| AgelDAys>days - Specifies the age of affected jobs in days.<br>• CMDauth - Only jobs that can be affected from the specified remote(s) or node(s) will be restarted.<br>• Hours - Specifies the age of affected jobs in hours.<br>• REBUILD - Jobs on the rebuild queue are restarted.<br>• SPOOL - Jobs with specific SPOOL characteristics are restarted.<br>Replaced parameters:<br>• 'jobname'. $E 'jobname' is replaced by $EJOBQ 'jobname'.<br>Changed syntax:<br>• If multiple job numbers or ranges are specified, they must be specified as a parenthesized subscript. |
| | OS/390 Release 7 | New parameter:<br>• Cancel - Indicates that the job is to be cancelled and held prior to execution. This operand is equivalent to specying a $H and $C command, in addition to the $E command. |

| Command | Release | Short Description of Change |
|---|---|---|
| $E MEMBER | OS/390 Release 4 | New parameters:<br>• SLEVEL Specifies that only members at the specified service level are restarted.<br>• STATUS - Specifies that the current status of the member is to be restarted.<br>• SYSNAME - Specifies the system name of the MVS image of the member is restarted.<br>• VERSION - Indicates the version of the JES2 release that is running on this member. |
| $F PRTnnnnn and $F Rnnnnn.PRm | OS/390 Release 1 | Changed parameter:<br>• PAGES - you can now specify up to 99,999,999 pages to be advanced. |
| $H Job | OS/390 Release 4 | New parameters:<br>• AgeIDAys<days I AgeIDAys>days - Specifies the age of affected jobs in days.<br>• CMDauth - Only jobs that can be affected from the specified remote(s) or node(s) will be held.<br>• Hours - Specifies the age of affected jobs in hours.<br>• Queue - Jobs on the specified queue are held.<br>• REBUILD - Jobs on the rebuild queue are held.<br>• SPOOL - Jobs with specific SPOOL characteristics are held.<br>• TYPE - Indicates whether batch jobs (JOB), started tasks (STC), or time-sharing users (TSU) are held.<br>• XEQNODE - Only jobs which are detained to execute at the specific node, or which have already executed in the specific node, are to be held.<br>Replaced parameters:<br>• 'jobname'. $H 'jobname' is replaced by $HJOBQ 'jobname'.<br>Changed syntax:<br>• If multiple job numbers or ranges are specified, they must be specified as a parenthesized subscript. |
| $H Q | OS/390 Release 4 | Replaced command: $H Q is replaced by $TJOBCLASS,QHELD=Y. |
| $L job | OS/390 Release 4 | New parameters:<br>• CMDauth - Only jobs that can be affected from the specified remote(s) or node(s) will be displayed.<br>• Held - The $HASP891 message displays all the held job output elements for the specified job(s).<br>• Ready - The $HASP891 message displays all the ready job output elements for the specified job(s).<br>Replaced parameters:<br>• $L OUTGRP and $L ALL are replaced by the $D O Job command.<br>• 'jobname'. $L 'jobname' is replaced by $LJOBQ 'jobname'.<br>Changed syntax:<br>• If multiple job numbers or ranges are specified, they must be specified as a parenthesized subscript. |

| Command | Release | Short Description of Change |
|---|---|---|
| $O Job | OS/390 Release 4 | New parameters:<br>• Age\|DAys<days \| Age\|DAys>days - Specifies the age of affected output in days.<br>• CMDauth - Only output that can be affected from the specified remote(s) or node(s) will be released.<br>• Hours - Specifies the age of the affected output in hours.<br>• REBUILD - Output on the rebuild queue is released/cancelled (Yes) or not released/cancelled (No).<br>Replaced parameters:<br>• 'jobname'. $O 'jobname' is replaced by $OJOBQ 'jobname'.<br>Changed syntax:<br>• If multiple job numbers or ranges are specified, they must be specified as a parenthesized subscript. |
| | OS/390 Release 7 | Changed function:<br>• For the Dest\|Routecde=dest parameter, greater than (> or >=) and less than (< or <=) filters may be used in conjunction to support route code ranges. |
| $O Q | OS/390 Release 4 | Command replaced by $O JOBQ. |
| $P I | OS/390 Release 4 | New parameters:<br>• ASID - Specifies the ASID of the initiator to be stopped.<br>• STATUS - Displays the current state of the initiator.<br>• STC - Specifies the job id of the initiator to be stopped.<br>Changed parameters:<br>• Ranges of named initiators are no longer allowed. |
| $P Job | OS/390 Release 4 | New parameters:<br>• Age\|DAys<days \| Age\|DAys>days - Specifies the age of affected jobs in days.<br>• CMDauth - Only jobs that can be affected from the specified remote(s) or node(s) will be purged.<br>• Hours - Specifies the age of affected jobs in hours.<br>• Queue - Jobs on the specified queue are to be.<br>• REBUILD - Jobs on the rebuild queue are to be.<br>• SPOOL - Jobs with specific SPOOL characteristics are to be.<br>• TYPE - Indicates whether batch jobs (JOB), started tasks (STC), or time-sharing users (TSU) are to be.<br>• XEQNODE - Only jobs which are detained to execute at the specific node, or which have already executed in the specific node, are to be purged.<br>Changed parameter:<br>• Q= works differently. For previous function, use $P O Job,Q.<br>Replaced parameter:<br>• 'jobname'. $P 'jobname' is replaced by $PJOBQ 'jobname'.<br>Changed syntax:<br>• If multiple job numbers or ranges are specified, they must be specified as a parenthesized subscript. |
| $P Q | OS/390 Release 1 | Changed parameters:<br>• You can now specify wildcards on the R= parameter. |
| | OS/390 Release 4 | $P Q is replaced by $P O Job. |
| $P XEQ | OS/390 Release 4 | New command:<br>• Prevents JES2 and WLM-controlled initiators from selecting work. |

| Command | Release | Short Description of Change |
|---|---|---|
| $P O Job | OS/390 Release 4 | New Command:<br>• Cancels a job's output and removes all traces of the output from the system. |
| | OS/390 Release 7 | Changed function:<br>• For the Dest\|Routecde=dest parameter, greater than (> or >=) and less than (< or <=) filters may be used in conjunction to support route code ranges. |
| $R | OS/390 Release 1 | Changed parameters:<br>• You can now specify wildcards on the R= parameter. |
| $S I | OS/390 Release 4 | New parameters:<br>• ASID - The initiator associated with the specific address space to be started.<br>• STATUS - Initiator on the specified state are to be started.<br>• STC - The initiator associated with the specific STC that is to be started.<br>Changed parameters:<br>• Ranges of named initiators are no longer allowed. |
| $S Job | OS/390 Release 4 | New command:<br>• Forces a job into execution. |
| | z/OS V1R1 | Changed Command:<br>• Modifies selection of jobs to run on a MAS member based on each memeber's "draining state" and "initiator draining state". |
| $S SPOOL | OS/390 Release 4 | Replaced parameter:<br>• V= parameter is deleted. To start a volume, specify the volume as a subscript as in $SSPL(volser). |
| | z/OS V1R1 | New Parameter:<br>• The SYSAFF= parameter specifies the number of volumes to be used in spool fencing. |
| $S XEQ | OS/390 Release 4 | New command:<br>• Allows JES2 and WLM-controlled initiators to select work. |
| $T APPL | OS/390 Release 4 | New parameter:<br>• LOGON specifies the number (1-999) of the local LOGON DCT which should be used when specifying connections to the application. |
| $T CKPTSPACE | OS/390 Release 4 | New Command:<br>• Sets the checkpoint space. |
| $T DEBUG | OS/390 Release 7 | New parameter:<br>• BERT specifies whether (Yes) or not (No) JES2 provides error code $BR3 to inform the operator that a data error has been detected in a chain of BERTs. |
| $T INIT | OS/390 Release 4 | Changed parameters:<br>• C - class-list syntax is now required.<br>• Ranges of named initiators are no longer allowed.<br>New parameters:<br>• Name - The EBCDIC name associated with the initiator.<br>• STATUS - Only initiators in the specified state will be modified.<br>• STC - The initiator associated with the specific STC that is modified. |

| Command | Release | Short Description of Change |
|---|---|---|
| $T INTRDR | OS/390 Release 1 | New parameter:<br>• HONORLIM indicates whether data sets sent to the internal reader are to be counted toward the byte limit for a job. |
| | OS/390 Release 4 | New parameter:<br>• DCBATTR |
| $T Job | OS/390 Release 1 | New parameter:<br>• OFFS - specifies the offload devices on which jobs can be offloaded. |
| | OS/390 Release 4 | New parameters:<br>• AgeIDAys<days I AgeIDAys>days - Specifies the age of affected jobs in days.<br>• CMDauth - Only jobs that can be affected from the specified remote(s) or node(s) will be modified.<br>• Hours - Specifies the age of affected jobs in hours.<br>• HOLD - Only jobs with the specified hold attributes are modified.<br>• Queue - Jobs on the specified queue are modified.<br>• REBUILD - Jobs on the rebuild queue are modified.<br>• SECLABEL - Only jobs with the specified security label are modified.<br>• SPOOL - Jobs with specific SPOOL characteristics are to be modified.<br>• SRVCLASS - Modifies the service class of the job.<br>• Sysaff - Modifies the job's system affinity.<br>• TYPE - Indicates whether batch jobs (JOB), started tasks (STC), or time-sharing users (TSU) are modified.<br>• USERID - Only jobs associated with a specified userid are modified.<br>• XEQNODE - Only jobs which are detained to execute at the specific node, or which have already executed in the specific node, are to be modified.<br>Replaced parameter:<br>• 'jobname'. $T 'jobname' is replaced by $TJOBQ 'jobname'.<br>Changed syntax:<br>• If multiple job numbers or ranges are specified, they must be specified as a parenthesized subscript. |
| | OW38962 (incorporated in z/OS V1R1) | New parameter:<br>• SCHENV - specifies to modify the scheduling environment for a job. |

| Command | Release | Short Description of Change |
|---|---|---|
| $T JOBCLASS | OS/390 Release 4 | New parameters:<br>• ACCT - Specifies whether an account number is required (Yes) or not required (No).<br>• AUTH - Specifies the MVS operator command groups that are to be executed.<br>• BLP - Specifies whether the bypass label processing parameter in the label field of a DD statement is to be ignored (NO) or processed (YES).<br>• COMMAND - Specifies the disposition of commands read from the input stream.<br>• CONDPURG - Specifies whether (Yes) or not (No) system data sets (such as JESMS and SYSMSG) in this job class are to be conditionally purged.<br>• HOLD - Specifies that jobs in the job class are held (Yes) or queued (No).<br>• IEFUJP - Specifies whether (Yes) or not (No) the IEFUJP exit is taken when a started task is purged.<br>• IEFUSO - Specifies whether (Yes) or not (No) the IEFUSO installation exit is taken when the SYSOUT limit is reached for a started task in this job class.<br>• JOURNAL - Specifies whether (Yes) or not (No) job-related information is to be saved in a job journal.<br>• LOG - Specifies whether (Yes) or not (No) the JES2 job log is printed for started tasks.<br>• MODE - Indicates whether jobs in this class are to be run under JES-mode or WLM-mode initiators.<br>• MSGCLASS - Specifies the message class (A-Z,0-9) for started tasks or time-sharing users.<br>• MSGLEVEL - Specifies a message level value for use when the MSGLEVEL= parameter is not specified on a JOB statement.<br>• OUTPUT - Specifies whether or not SYSOUT data is to be written for started tasks.<br>• PERFORM - Specifies the default performance-group number (0-999) for started tasks.<br>• PGMRNAME - Specifies whether a programmer name is required (Yes) or not required (No) on a JCL JOB statement.<br>• PROCLIB - Specifies the default procedure library number (00-99) which is to be used for started tasks.<br>• REGION - Specifies the default for the region size assigned to each job step.<br>• RESTART - Specifies whether (Yes) or not (No) JES2 is to requeue for execution any job of this job class that had been executing before the IPL of the system was repeated and a JES2 warm start was performed.<br>• SCAN - Specifies that the jobs in this job class are to be queued for output processing immediately after JCL conversion (Yes) or queued as usual (No).<br>• SWA - Specifies that all eligible schedule work area (SWA) control blocks created for started task will be placed above/below 16 megabytes in virtual storage.<br>• TIME - Specifies the default for the maximum time that each job step can run.<br>• TYPE6 - Specifies whether (Yes) or not (No) JES2 produces type 6 SMF records for started tasks.<br>• TYPE26 - Specifies whether (Yes) or not (No) JES2 produces type 26 (job summary) SMF records for started tasks.<br>• XEQCount - Specifies the maximum number of jobs executed in the MAS. |

| Command | Release | Short Description of Change |
|---|---|---|
| $T JOBDEF | OS/390 Release 3 | New parameter:<br>• DUPL_JOB - specifies whether or not JES2 is allowed to concurrently execute batch jobs with the same name in the same MAS. |
| | APAR OW20844; integrated into OS/390 Release 4 | New parameters:<br>• JOBNUM - specifies the maximum number (10-65534) of jobs that can be in the JES2 job queue at any time.<br>• RASSIGN - specifies whether job numbers outside of the RANGE= range can be used when jobs are received from NJE or spool reload. |
| | OS/390 Release 4 | New parameters:<br>• AgelDAys<days \| AgelDAys>days - Specifies the age of affected jobs in days.<br>• CMDauth - Only jobs that can be affected from the specified remote(s) or node(s) will be modified.<br>• Hours - Specifies the age of affected jobs in hours.<br>• HOLD - Only jobs with the specified hold attributes are modified.<br>• Queue - Jobs on the specified queue are modified.<br>• REBUILD - Jobs on the rebuild queue are modified.<br>• SECLABEL - Only jobs with the specified security label are modified.<br>• SPOOL - Jobs with specific SPOOL characteristics are to be modified.<br>• SRVCLASS - Modifies the service class of the job.<br>• Sysaff - Modifies the job's system affinity.<br>• TYPE - Indicates whether batch jobs (JOB), started tasks (STC), or time-sharing users (TSU) are modified.<br>• USERID - Only jobs associated with a specified userid are modified.<br>• XEQNODE - Only jobs which are detained to execute at the specific node, or which have already executed in the specific node, are to be modified. |
| | OS/390 Release 7 | New parameters:<br>• CNVT_ENQ - specifies if the converter should WAIT for the unavailable data sets to become available or FAIL (with a JCL error) a job that requests an unavailable JCLLIB data set. |
| | OW38962 (incorporated in z/OS V1R1) | New parameter:<br>• SCHENV specifies the default scheduling environment. |
| $T L(nnnnn).JT | OS/390 Release 4 | New parameters:<br>• WS<br>• LIMIT |
| $T L(nnnnn).ST | OS/390 Release 3 | Changed parameter:<br>• WS - The maximum number of work selection criteria you can specify has been increased to 19. |
| $T MEMBER | OS/390 Release 4 | New parameters:<br>• SLEVEL - Only members with the specified service level are modified.<br>• STATUS - Specifies that the current status of the member is displayed<br>• SYSNAME - Specifies that the system name of the MVS image of the member is displayed.<br>• VERSION - Indicates the version of the JES2 release that is running on this member. |
| $T NODE(nnnnn) | OS/390 Release 4 | New parameter:<br>• LOGON - specifies the number (1-999) of the local LOGON DCT which should be used when specifying connections to the application. |
| $T O Job | OS/390 Release 1 | New parameter:<br>• OFFS - specifies the offload devices on which jobs can be offloaded. |

| Command | Release | Short Description of Change |
|---|---|---|
| $T O Job (continued) | OS/390 Release 4 | New Parameters:<br>• Age\|DAys<days \| Age\|DAys>days - Specifies the age of affected output in days.<br>• ALL - JES2 modifies all job output elements belonging to the specified job.<br>• BURST - Specifies whether the printed output is to be burst into separate sheets (Yes) or to be in continuous, fanfold mode (No).<br>• C\|FCB - Identifier for the data set forms control or carriage specifications.<br>• Dest\|Routecde - The destination assigned to the job output element(s).<br>• FLASH\|O Overlay name (FLASH).<br>• Forms - Identifier for the print or punch forms.<br>• HOLD - This operand explicitly sets the operator HOLD type.<br>• HOLDRC Only output groups with the specified hold reason code are modified.<br>• Hours - Specifies the age of affected output in hours.<br>• NDISP - Indicates what the new output disposition should be for the specified job's output.<br>• OUTDISP - Indicates that you wish to modify the output for the specified job that matches this current disposition.<br>• OUTGRP - The job output element(s) that are modified.<br>• PAGEs - Only jobs with the specified number of pages of output are modified.<br>• PRMODE - The process mode for the job output element(s).<br>• READY - Only ready output groups are modified.<br>• REBUILD - Output on the rebuild queue is to be set (Yes) or not set (No).<br>• RECords - Only output groups with the specified number of records are modified.<br>• RELEASE - Explicitly clears one or more HOLD types.<br>• SECLABEL - Set the security label associated with the job.<br>• TSOavail - Only output which is (Yes) or is not (No) eligible for the TSO OUTPUT command is modified.<br>• USERID - Only output groups associated with the specific userid are to be modified.<br>Replaced parameter:<br>• 'jobname'. $T O 'jobname' is replaced by $TOJOBQ 'jobname'.<br>Changed syntax:<br>• If multiple job numbers or ranges are specified, they must be specified as a parenthesized subscript. |
| | OS/390 Release 7 | Changed function:<br>• For the Dest\|Routecde=dest parameter, greater than (> or >=) and less than (< or <=) filters may be used in conjunction to support route code ranges. |
| $T OFF(n).Jx | OS/390 Release 1 | Changed parameters:<br>• You can now specify wildcards on the following parameters:<br>– CREATOR<br>– JOBNAME |
| | OS/390 Release 3 | Changed parameter:<br>• WS - The maximum number of work selection criteria you can specify has been increased to 19. |

| Command | Release | Short Description of Change |
|---|---|---|
| $T OFF(n).SR | z/OS V1R1 | Added parameters:<br>• You can now specify the following parameters:<br>– CREATOR<br>– FORMS<br>– JOBNAME<br>– PRMODE<br>– ROUTECDE<br>– WRITER |
| $T OFF(n).Sx | OS/390 Release 1 | Changed parameters:<br>• You can now specify wildcards on the following parameters:<br>– CREATOR<br>– FORMS<br>– JOBNAME<br>– PRMODE<br>– ROUTECDE<br>– WRITER |
| | OS/390 Release 3 | Changed parameter:<br>• WS - The maximum number of work selection criteria you can specify has been increased to 19. |
| $T OFFLOAD | OS/390 Release 1 | New parameter:<br>• VALIDATE - specifies whether or not JES2 should validate the logical record length of the first record read from an offload data set.<br>• ARCHIVE - specifies whether or not JES2 should prevent an offload device from reselecting a job when the job disposition is KEEP or HOLD. |
| $T PCE | OS/390 Release 3 | Changed parameter:<br>• A new PCE processor type, SPI, has been added. |
| | OS/390 Release 4 | Changed parameter:<br>• Processor types BERTLOCK and ENF have been added. |
| | OS/390 Release 7 | Enhanced function:<br>• This command now supports filters, and displays new data such as ended PCE counts, $ACTIVE counts, and individual PCE details. |
| $T PRTnnnnn and $T Rnnnnn.PRm (continued) | OS/390 Release 1 | Changed parameters:<br>• You can now specify wildcards on the following parameters:<br>– CREATOR<br>– FORMS<br>– JOBNAME<br>– PRMODE<br>– ROUTECDE<br>– WRITER<br>• UNIT - Allows you to specify a null value rather than a device number. |
| | OS/390 Release 3 | Changed parameter:<br>• WS - The maximum number of work selection criteria you can specify has been increased to 19. |
| $T PUNnnnnn and $T Rnnnnn.PUm | OS/390 Release 1 | Changed parameters:<br>• You can now specify wildcards on the following parameters:<br>– CREATOR<br>– FORMS<br>– JOBNAME<br>– PRMODE<br>– ROUTECDE<br>– WRITER |

| Command | Release | Short Description of Change |
|---|---|---|
| $T PUNnnnnn and $T Rnnnnn.PUm (continued) | OS/390 Release 3 | Changed parameter:<br>• WS - The maximum number of work selection criteria you can specify has been increased to 19. |
| $T RMT(nnnnn) | OS/390 Release 4 | New parameter:<br>• LOGON specifies the number (1-999) of the local LOGON DCT which should be used when specifying connections to the application. |
| $T SPOOL(nnnn) | z/OS V1R1 | New Command:<br>• The SYSAFF= parameter specifies the number of volumes to be used in spool fencing. |
| $T SPOOLDEF | z/OS V1R1 | Dropped parameter:<br>• TGBPERVL is no longer valid. Use will cause an error message. |
| $T STCCLASS | OS/390 Release 4 | Replaced command:<br>• $T STCCLASS is replaced by $T JOBCLASS(STC). |
| $T TPDEF | OS/390 Release 3 | New parameter:<br>• SESSIONS= allows you to define specifications to LIMIT total number of VTAM sessions, and set a WARN thresold percentage of the maximum number of VTAM sessions. |
| | OS/390 Release 7 | Changed parameters:<br>• The EXTBUF= and BELOWBUF= parameters have been changed to SNABUF= and BSCBUF= respectively. EXTBUF= and BELOWBUF= names are obsolete; however, the names have been retained as aliases for compatibility. |
| | z/OS V1R1 | Changed parameters:<br>• The SNABUF=(SIZE=) parameter value has a maximum value of 8. |
| $T TSUCLASS | OS/390 Release 4 | Replaced command:<br>• $T TSUCLASS is replaced by $T JOBCLASS(TSU). |
| $Z I | OS/390 Release 4 | New parameters:<br>• ASID- Specifies the ASID of the initiator to be halted.<br>• STATUS- Displays information about JES2-managed devices.<br>• STC- Specifies the job id of the initiator to be halted.<br>Changed parameters:<br>• Ranges of named initiators are no longer allowed. |
| $ZAPJOB | z/OS V1R1 | • The ZAPJOB initialization statement is new and is used to remove all traces of a job structure from the JES2 job queue. This statement is intended for situations where a job cannot be removed using normal JES2 commands or by a JES2 restart. |

## Summary of Changes to Messages

**Note to the Reader**

In previous editions, this section listed new, changed, and deleted messages. This was intended to help migrate automated operations. Because *z/OS JES2 Messages* provides a detailed list of changes to messages in its Summary of Changes, this book will no longer describe changes to messages. Instead, see the Summary of Changes section in *z/OS JES2 Messages*.

## Summary of Changed Installation Exits

The following table describes changes to the JES2 installation exits for each version/release. See *z/OS JES2 Installation Exits* for additional information.

| Exit | Release | Short Description of Change |
|---|---|---|
| All Exits | Release 4 | • CATs no longer reside in the JES2 private area. Use the $DOGCAT service to reference the Class Attribute Table.<br>• The device name for remote and line sub-devices has changed for remotes and lines above 9999. Use $DVIDBLD to obtain the full device name.<br>• JQEs may be locked. The $DOGJQE service should be used for all JQE modifications. |
| | All | In addition to the specific changes above, you must reassemble all installation exits to prevent problems with incompatible macro changes. Also see the Summary of Changed Macros table for changes to executable macros used in installation exits. |
| Exit 8 | OS/390 Release 7 | Function change:<br>• This Exit can now receive control for control block I/O ($CBIO) calls from the FSS address space. |
| Exit 11 | z/OS V1R1 | Function changes:<br>• Installation exit 11 is unaffected if you use no new functions in z/OS Version 1 Release 1 JES2. However, if you turn on spool affinity to increase the number of spool volumes used in fencing, then exit 11 is affected. |
| Exit 12 | z/OS V1R1 | Function changes:<br>• Installation exit 12 is unaffected if you use no new functions in z/OS Version 1 Release 1 JES2. However, if you turn on spool affinity to increase the number of spool volumes used in fencing, then exit 12 is affected. |
| Exit 14 | OS/390 Release 4 | Changed scope: Starting in OS/390 Release 4, this exit does not get control when workload management (WLM) selects jobs. Use exit 49 before using WLM-mode job classes. |
| Exit 20 | OS/390 Release 7 | Function changes:<br>• Register contents were modified. Register 1 was added, which contains the address of a parameter list mapped by $XPL. |
| Exit 25 | OS/390 Release 7 | Function changes:<br>• $BUFIO and $BUFCK services in HASPFSSM have been deleted. |
| Exit 46 | OS/390 Release 7 | Function change:<br>• Exit will now be invoked for NJE RCCS headers. |
| Exit 47 | OS/390 Release 7 | Function change:<br>• Exit will now be invoked for NJE RCCS headers. |
| Exit 49 | OS/390 Release 4 | New installation exit.<br>• Exit 49 - Job Queue Work Select - QGOT is a new exit that allows you to provide an algorithm to accept or not accept a job whenever JES2 work selection has located a pre-execution job for a device. |

## Summary of Changed Macros for Installation Exits

The following table describes changes to the JES2 macros used in installation exits. See *z/OS JES2 Macros* for additional information.

| Macro for Installation Exits | Release | Short Description of Change |
|---|---|---|
| $$POST | OS/390 Release 7 | Changed parameter:<br>• XMITJOB resource added to TYPE=. A JES2 job queue element (JQE) has been placed on the $XMIT queue to be transmitted to another node. |
| $#ADD | OS/390 Release 1 | New parameter:<br>• RELATED specifies the label of the associated $#REM request when you update a characteristics JOE. |
| $#BLD | OS/390 Release 4 | Changed macro.<br>• Passes a JQE address, not a JQE offset. |
| $#DISPRO | OS/390 Release 5 | New parameter:<br>• IOT=Address I/O table for a specific spin JOE<br>• PQE=Print Queue element address for a specific spin JOE<br>• ENF=Specifies whether a ENF 58 signal should be generated Default=NO |
| $#GET | OS/390 Release 3 | New parameters:<br>• WSP= specifies an address (R2-R12 or label of field containing the work selection parameter list (WSP) address) to be loaded into R1.<br>• SAF= specifies whether JES2 should do a SAF check (YES or NO).<br>• COUNT= specifies that JES2 should just count pages/lines/JOEs which match the selection criteria (if YES).<br>Changed parameters:<br>• DCT= is mutually exclusive with WSP=.<br>• TYPE=NET now requires you also specify DCT=.<br>• KEEPIOT=YES is mutually exclusive with SAF=NO. |
| $#PUT | OS/390 Release 5 | New Keywords:<br>• IOT=Address I/O table for a specific spin JOE<br>• PQE=Print Queue element address for a specific spin JOE<br>• ENF=Specifies whether a ENF 58 signal should be generated Default is NO |
| $#JWEL | OS/390 Release 3 | New macro.<br>• This macro provides the following services:<br>– Add service. Use the JOE address and device number provided to queue a JWEL.<br>– Search service. Use the JOE address and device number provided to determine if there is a JWEL already queued with the given device number.<br>– Purge service. Use the JOE address to purge all JWELs associated with the JOE.<br>– Attach/Detach - allows resources to be allocated and unallocated. |
| $#REM | OS/390 Release 1 | New parameters:<br>• RELATED specifies the label of the associated $#ADD request when you update a characteristics JOE.<br>• KEEPJQE specifies whether or not the caller needs the JQE after $#REM processing completes. |
| $#REP | OS/390 Release 3 | New macro.<br>• Replace work JOE - allows you to remove a work JOE whose address is provided through the REMJOE keyword. |
| $#TJEV | z/OS V1R1 | New macro.<br>• $#TJEV macro can be used in exits to find out why output is not printing. |

| Macro for Installation Exits | Release | Short Description of Change |
|---|---|---|
| $ALESERV | OS/390 Release 3 | New macro.<br>• This macro adds and deletes ALETs as well as maintains a list of ALETs for JES2 owned spaces. |
| $ARMODE | OS/390 Release 3 | New parameter:<br>• SYSSTATE - Used to determine if the MVS SYSSTATE macro should be issued. |
| $BERTTAB | OS/390 Release 7 | New macro:<br>• Maps and generates Block Extention Reuse Tables (BERT) entries. |
| $BUFIO | OS/390 Release 7 | Deleted macro:<br>• Macro made obsolete by $CBIO. |
| $BUFCK | OS/390 Release 7 | Deleted macro:<br>• Macro made obsolete by $CBIO. |
| $CALL | OS/390 Release 3 | New parameter:<br>• LINK1= specifies the register to be used as the first operand (that is, R1) on the BASR (branch and save registers) assembler instruction.<br>• LINK2= specifies the register to be used as the second operand (that is, R2) on the LINKAGE instruction.<br>• LINKAGE= specifies which instruction to use for the actual call.<br>• PARM0= specifies a parameter value that is to be passed to the called subroutine through register 0.<br>• PARMC= specifies the assembler comment that JES2 passes to the decoding routine when processing the PARM= or PARM1= value.<br>• PARM0C= specifies the assembler comment that JES2 passes to the decoding routine when processing the PARM0= value. |
| $CBIO | OS/390 Release 7 | New parameter:<br>• TYPE=WAIT waits for the completion of a $CBIO request that specified WAIT=NO. |
| $CKPT | OS/390 Release 5 | Changed macro:<br>• Exits can no longer code $CKPT ID=JQE |
| $CPOOL | OS/390 Release 3 | New parameter:<br>• FPROT= specifies whether or not the data space is to be fetch protected.<br>• HASXB= specifies the address or register that contains the address of the address space extension block (HASXB).<br>• KEY= specifies the storage key to be assigned to this subpool.<br>• LOC= specifies the location of virtual and real storage for the cell pool.<br>• OWNER= specifies the owner of the data space.<br>• SCOPE= specifies the scope of accessibility of the data space. |
| | OS/390 Release 7 | Changed parameters:<br>• LOC=CSABELOW<br>• LOC=BELOW,ANY<br>• LOC=CSABELOW,ANY |
| $DCTTAB | OS/390 Release 7 | New parameter:<br>• TABLE=DYNAMIC specifies that this is a dynamic table. |
| $DEST | OS/390 Release 3 | New parameter:<br>• OKRET specifies a location to which control is returned if the specified destination is valid. |
| | OS/390 Release 5 | Changed macro:<br>• Additional values can be specified for IPFORM= |

| Macro for Installation Exits | Release | Short Description of Change |
|---|---|---|
| $DILBERT | OS/390 Release 4 | New macro.<br>• Do It Later BERT Services - specifies a routine to gain control when JES2 releases the the block extension reuse table (BERT) lock for a specific job. |
| | OS/390 Release 7 | New parameter:<br>• POST=resource<br>• ALLOWDUP=YES\|NO<br>• PACE=NO\|YES<br>• ERRET=label\|Rn<br>• OKRET=label\|Rn<br>Changed parameters:<br>• PARM0 |
| $DOGBERT | OS/390 Release 7 | New macro.<br>• Copies data from the Block Extention Reuse Tables (BERT) portion of the checkpoint into local storage or returns that data to the checkpoint. |
| $DOGCAT | OS/390 Release 4 | New macro.<br>• Deliver or Get CAT (Class Attribute Table) - either returns a copy of the class attribute table (CAT) in a work area or returns the CAT to the checkpoint. |
| $DOGJQE | OS/390 Release 4 | New macro.<br>• JES2 Deliver or Get JQE - requests that JES2 build or return an artificial JQE. |
| | OS/390 Release 7 | New parameter:<br>• POST indicates whether the return of a locked JQA should force a post of all processors potentially waiting for that JQA. |
| $DOGWSCQ | OS/390 Release 4 | New macro.<br>• Deliver or Get Workload Management (WLM) Service Class - invokes the Workload Manager Service Class (WSC) processing services to allow you to manipulate WLM service such as: get a copy of The WSC from the checkpoint or remove the WSC from the checkpoint. |
| | OS/390 Release 7 | Changed parameters:<br>• ACTION=(FETCH,CREATE) |
| $DSPSERV | OS/390 Release 3 | New parameter:<br>• DSB= specifies either the address of the data set block for the data space to be processed or where to put the data space.<br>• FLAGS= specifies a byte containing flags for FPROT=, OWNER=, and SCOPE= values for the data space.<br>• SCOPE= specifies the scope of accessibility of the data space.<br>• START= specifies the beginning address in the data space of an area to be released.<br>Changed functions:<br>• The following parameters have changed return codes:<br>– ALET<br>– BLOCK<br>– ERRET<br>– FPROT<br>– KEY<br>– NAME<br>– ORIGIN<br>– OUTNAME<br>– OWNER<br>– RELATED<br>– STOKEN<br>• EXTEND and RELEASE function calls have been added. |

| Macro for Installation Exits | Release | Short Description of Change |
|---|---|---|
| $DTETAB | OS/390 Release 1 | New Parameter:<br>• REQD specifies whether or not a subtask is essential to system operation. |
| | OS/390 Release 7 | New parameter:<br>• TABLE=DYNAMIC specifies that this is a dynamic table. |
| $DVIDBLD | OS/390 Release 4 | New macro.<br>• Build a Device Name from a Device Identifier - converts a binary device identifier (devid) into a character device name |
| $ENVIRON | OS/390 Release 3 | New macro.<br>• This macro sets the assembly environment for a JES2 module. |
| $EXCP | OS/390 Release 1 | New Parameter:<br>• CBTYPE specifies the type of JES2 control block that contains the IOB. |
| $FREMAIN | OS/390 Release 7 | New parameter:<br>• WAIT=YES\|NO |
| $GETBUF | OS/390 Release 7 | New parameter:<br>• TYPE=EXTHASP states that a control block buffer is to be constructed. |
| $GETCEL | OS/390 Release 3 | New parameter:<br>• OKRET= specifies the address of a routine that is to obtain control if the CSA cell can be obtained. |
| $GETMAIN | OS/390 Release 7 | Changed parameter:<br>• LOC=BELOW,ANY |
| $GETABLE | OS/390 Release 7 | New parameter:<br>• $PAIR=table-pair<br>Changed parameters:<br>• TABLE=BERT<br>• TABLE=WSR<br>• TABLE=SCAN |
| $JBIDBLD | OS/390 Release 3 | Changed parameters:<br>• JOBNUM - can now be specified as either a register containing the address of the halfword job number field or the name of a halfword field containing the binary job number.<br>• JOBTYPE - can now be specified as either the register containing the address of the job type flag byte or the name of a field containing the job type flag byte. |
| $#JOE | OS/390 Release 5 | New parameter:<br>• DSERV=specifies the address of the checkpoint version of the DSERV control block |
| $MODCHK | OS/390 Release 7 | New parameter:<br>• TEST=TABLES resolves any dynamic tables in the module. |
| $MODULE | OS/390 Release 7 | Changed parameter:<br>• $JIBX DSECTID deleted. |
| PCETAB | OS/390 Release 7 | Changed parameter:<br>• TABLE=DYNAMIC |
| $POST | OS/390 Release 7 | Changed parameter:<br>• XMITJOB resource added to TYPE=. A JES2 job queue element (JQE) has been placed on the $XMIT queue to be transmitted to another node. |

| Macro for Installation Exits | Release | Short Description of Change |
|---|---|---|
| $QLOC | OS/390 Release 3 | Changed macro:<br>• This macro uses a new invocation format.<br>• DSERV= specifies the address of the job information service token list of the checkpoint version that JES2 will search when attempting to locate the JQE.<br>• FOUND= specifies a location to which control is returned if the specified job number is in the JES2 job queue.<br>• NOTFOUND= specifies a location to which control is returned if the specified job number is not in the JES2 job queue. |
| $QJQE | OS/390 Release 3 | New macro.<br>• This macro generates inline code to find a particular JQE queue head. The queue head can be in the HCT or in a checkpoint version. |
| | OS/390 Release 4 | Changed function:<br>• Returns an artificial JQE (as returned by $DOGJQE). |
| $RETURN | OS/390 Release 3 | New parameter:<br>• RETREG= specifies a register used to save the return address.<br>Changed functions:<br>• The way access registers are saved has changed.<br>Obsoleted parameter:<br>• TRACE= is no longer a valid parameter for $RETURN. Use the TRACE= parameter on the $SAVE macro to control tracing. |
| $SAVE | OS/390 Release 3 | Changed functions:<br>• The way access registers are saved has changed.<br>• The TRACE= parameter controls tracing for both the $SAVE and $RETURN macros. |
| $SCAN | OS/390 Release 4 | New parameter:<br>• LONG |
| $SCAND | OS/390 Release 4 | New parameter:<br>• CONV |
| $SCANDIA | OS/390 Release 4 | New macro.<br>• This macro issues a diagnostic message during scan processing (that is, in the HASPSCAN environment). |
| $SCANTAB | OS/390 Release 7 | New parameter:<br>• TABLE=DYNAMIC specifies that this is a dynamic table.<br>Changed parameters:<br>• table-name,ADDR<br>• table-name,VCON |

| Macro for Installation Exits | Release | Short Description of Change |
|---|---|---|
| $SCANTAB | OS/390 Release 4 | New parameters:<br>• CLEANUP<br>• COMPMSG<br>• DELTEXT<br>• DISPALL<br>• RELATED<br>• SSOPT<br>Changed parameters:<br>• CONV - CONV=LONG, CONV=(FLAG,LIST)<br>• CB - PRESCAN<br>• FILTER - optional parameters ALWAYS, EQ, NEQ, GTLT, NODELIM, VORDER, NOVORDER<br>• NAME - no longer to 8 characters<br>• CALLERS - new callers added.<br>• NOCB - specifies the action to take if the lookup for a control block results in a control block adddress of 0. |
| $SUBIT | OS/390 Release 5 | New Keyword<br>• FREESQD=YES - indicates that a SDQ should be obtained by $SUBIT and freed when the subtask is complete. The ECB in the SQD will never be posted. |
| $TIDTAB | OS/390 Release 7 | New parameter:<br>• TABLE=DYNAMIC specifies that this is a dynamic table. |
| $VERIFY | OS/390 Release 5 | New parameter:<br>• MTTR=specifies a track address (MTTR) to be compared aganist the MTTR of the control block being verified. |
| $VERTAB | OS/390 Release 5 | New parameter:<br>• MTTRFLD=specifies the offset of the field containing a MTTR to be verified |
| $WSSETUP | OS/390 Release 3 | Changed parameter:<br>• DEVADDR can be specified for the address of the WSP, DCT or PIT. |
| $WAIT | OS/390 Release 3 | Changed function:<br>• This macro now supports callers in AR mode. |
| | OS/390 Release 7 | Changed parameters:<br>• XMITJOB resource added to TYPE=. A JES2 job queue element (JQE) has been placed on the $XMIT queue to be transmitted to another node. |
| $WSTAB | OS/390 Release 3 | Keyword parameter:<br>• RTN= specifies the name of the routine used to check the comparison field against the device field. |
| | OS/390 Release 7 | New parameter:<br>• TABLE=DYNAMIC specifies that this is a dynamic table. |

## Summary of Changed Mapping Macros

The following table lists intended mapping macros that are new, changed, or deleted. For a summary of new, changed and deleted mapping macros, see the following:

- *z/OS JES2 Data Areas, Vol 1 $ALINDEX-$EVT*
- *z/OS JES2 Data Areas, Vol 2 $FCLWORK-$OUTWORK*

- *z/OS JES2 Data Areas, Vol 3 $PADDR-$XRQ*

| Mapping Macro | Release | New/Changed/Deleted |
|---|---|---|
| $ALINDEX | OS/390 Release 3 | New |
| $APT | OS/390 Release 4 | Changed |
| $BERT | OS/390 Release 4 | New |
| | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $BERTTAB | OS/390 Release 4 | New |
| | OS/390 Release 7 | Changed |
| $BLDMSGL | OS/390 Release 4 | Changed |
| $BUFFER | OS/390 Release 4 | Changed |
| | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $CADDR | OS/390 Release 4 | Changed |
| | OS/390 Release 5 | Changed |
| | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $CAT | OS/390 Release 4 | Changed |
| | z/OS V1R1 | Changed |
| $CATBERT | OS/390 Release 4 | New |
| | z/OS V1R1 | Changed |
| $CCW | z/OS V1R1 | New |
| $CIRWORK | OS/390 Release 4 | Changed |
| | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $CK | OS/390 Release 4 | Changed |
| | OS/390 Release 7 | Changed |
| | OS/390 Release 8 | Changed |
| | z/OS V1R1 | Changed |
| $CKGPAR | OS/390 Release 4 | Changed |
| | OS/390 Release 7 | Changed |
| | OS/390 Release 8 | Changed |
| $CKPRECV | OS/390 Release 7 | Changed |
| | OS/390 Release 8 | Changed |
| $CKPWORK | OS/390 Release 7 | Changed |
| | OS/390 Release 8 | Changed |
| | z/OS V1R1 | Changed |
| $CKW | OS/390 Release 4 | Changed |
| | OS/390 Release 7 | Changed |
| | OS/390 Release 8 | Changed |

| Mapping Macro | Release | New/Changed/Deleted |
|---|---|---|
| $CNVWORK | z/OS V1R1 | Changed |
| $COMWORK | OS/390 Release 4 | Changed |
| | z/OS V1R1 | Changed |
| $CPINDEX | OS/390 Release 4 | Changed |
| | OS/390 Release 7 | Changed |
| $CTOKEN | z/OS V1R1 | New |
| $CTW | OS/390 Release 4 | Changed |
| | OS/390 Release 7 | Changed |
| | OS/390 Release 8 | Changed |
| $CVCB | OS/390 Release 4 | New |
| | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $DAS | z/OS V1R1 | Changed |
| $DCT | OS/390 Release 5 | Changed |
| | z/OS V1R1 | Changed |
| $DCTTAB | OS/390 Release 4 | Changed |
| $DILWORK | OS/390 Release 4 | New |
| | OS/390 Release 7 | Changed |
| $DSB | OS/390 Release 4 | Changed |
| $DTEACCT | OS/390 Release 5 | Changed |
| $DTECKVR | OS/390 Release 4 | Changed |
| $DTECNV | z/OS V1R1 | New |
| $DTRCKCF | OS/390 Release 8 | New |
| $DTEOFF | OS/390 Release 7 | Changed |
| $DTESPL | OS/390 Release 7 | Changed |
| $DWA | OS/390 Release 4 | New |
| | OS/390 Release 7 | Changed |
| $ENFWORK | OS/390 Release 4 | New |
| $ERA | z/OS V1R1 | New |
| $ERPL | z/OS V1R1 | New |
| $EVT | OS/390 Release 4 | New |
| $FSACB | OS/390 Release 5 | Changed |
| | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $FSSCB | OS/390 Release 4 | Changed |
| | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $FSSWORK | z/OS V1R1 | New |
| $GTW | z/OS V1R1 | New |

| Mapping Macro | Release | New/Changed/Deleted |
|---|---|---|
| $HASPEQU | OS/390 Release 4 | Changed |
| | OS/390 Release 5 | Changed |
| | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $HASPGBL | OS/390 Release 5 | Changed |
| | z/OS V1R1 | Changed |
| $HASXB | OS/390 Release 7 | Changed |
| $HCCT | OS/390 Release 4 | Changed |
| | OS/390 Release 5 | Changed |
| | OS/390 Release 8 | Changed |
| | z/OS V1R1 | Changed |
| $HCT | OS/390 Release 4 | Changed |
| | OS/390 Release 7 | Changed |
| | OS/390 Release 8 | Changed |
| | z/OS V1R1 | Changed |
| $HFCT | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $ICE | OS/390 Release 5 | Changed |
| | OS/390 Release 7 | Changed |
| $INIWARM | OS/390 Release 4 | Changed |
| | OS/390 Release 7 | Changed |
| $IOT | OS/390 Release 4 | Changed |
| $IPCSWRK | OS/390 Release 4 | Changed |
| $JCT | OS/390 Release 4 | Changed |
| | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $JCTX | OS/390 Release 5 | Changed |
| $JIB | OS/390 Release 4 | Changed |
| | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $JIBX | OS/390 Release 7 | Deleted |
| $JNT | OS/390 Release 1 | Changed |
| $JOE | OS/390 Release 4 | Changed |
| | S/390 Release 5 | Changed |
| | z/OS V1R1 | Changed |
| $JOT | OS/390 Release 4 | Changed |
| $JQE | OS/390 Release 4 | Changed |
| | OS/390 Release 5 | Changed |
| | z/OS V1R1 | Changed |

| Mapping Macro | Release | New/Changed/Deleted |
|---|---|---|
| $KAWA | z/OS V1R1 | Changed |
| $MCT | OS/390 Release 4 | Changed |
| | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $MIT | z/OS V1R1 | Changed |
| $MLMWORK | OS/390 Release 5 | Changed |
| | OS/390 Release 7 | Changed |
| $MODMAP | OS/390 Release 4 | Changed |
| $MTQH | OS/390 Release 4 | Changed |
| $NHD | OS/390 Release 4 | Changed |
| | z/OS V1R1 | Changed |
| $NIT | OS/390 Release 4 | Changed |
| $NJTWORK | OS/390 Release 4 | Changed |
| | OS/390 Release 7 | Changed |
| $NSRWORK | OS/390 Release 4 | Changed |
| | z/OS V1R1 | Changed |
| $NSTWORK | OS/390 Release 4 | Changed |
| $OCT | OS/390 Release 1 | Changed |
| $ODPARM | OS/390 Release 4 | Changed |
| $PADDR | OS/390 Release 4 | Changed |
| | OS/390 Release 5 | Changed |
| | OS/390 Release 7 | Changed |
| | OS/390 Release 8 | Changed |
| | z/OS V1R1 | Changed |
| $PARMLST | OS/390 Release 4 | Changed |
| | OS/390 Release 5 | Changed |
| | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $PCE | OS/390 Release 4 | Changed |
| | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $PDDB | OS/390 Release 4 | Changed |
| | OS/390 Release 5 | Changed |
| $PERFCB | OS/390 Release 7 | Changed |
| | OS/390 Release 8 | Changed |
| $PPPWORK | OS/390 Release 5 | Changed |
| $PQE | OS/390 Release 5 | Changed |

| Mapping Macro | Release | New/Changed/Deleted |
|---|---|---|
| $PREBERT | OS/390 Release 4 | New |
| | OS/390 Release 5 | Changed |
| | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $PRGWORK | OS/390 Release 4 | Changed |
| $PSO | OS/390 Release 5 | Changed |
| $PSOWORK | JES2 SP4.3 | Changed |
| | OS/390 Release 5 | Changed |
| $PSV | OS/390 Release 7 | Changed |
| $QSE | OS/390 Release 4 | Changed |
| | OS/390 Release 7 | Changed |
| $RAT | OS/390 Release 4 | Changed |
| | OS/390 Release 7 | Changed |
| $RCPWORK | OS/390 Release 4 | Changed |
| $RDRWORK | OS/390 Release 4 | Changed |
| | z/OS V1R1 | Changed |
| $RESWORK | OS/390 Release 4 | Changed |
| | z/OS V1R1 | Changed |
| $RGRPLST | OS/390 Release 10 | New |
| $ROTT | OS/390 Release 4 | Changed |
| | OS/390 Release 8 | Changed |
| $SAPID | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $SBWA | OS/390 Release 3 | Changed |
| $SCANTAB | OS/390 Release 5 | Changed |
| $SCANWA | OS/390 Release 4 | Changed |
| | OS/390 Release 5 | Changed |
| | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $SCAT | OS/390 Release 4 | New |
| $SCID | OS/390 Release 4 | Changed |
| $SDB | OS/390 Release 7 | Changed |
| $SJB | OS/390 Release 4 | Changed |
| | OS/390 Release 5 | Changed |
| | OS/390 Release 8 | Changed |
| | z/OS V1R1 | Changed |
| $SJIOB | OS/390 Release 5 | Changed |
| | OS/390 Release 7 | Changed |

| Mapping Macro | Release | New/Changed/Deleted |
|---|---|---|
| $SJXB | OS/390 Release 4 | Changed |
| | OS/390 Release 8 | Changed |
| | z/OS V1R1 | Changed |
| $SPIWORK | z/OS V1R1 | New |
| $SPMWORK | OS/390 Release 5 | Changed |
| $SPNWORK | OS/390 Release 4 | Changed |
| $SPUD | OS/390 Release 4 | Changed |
| | OS/390 Release 7 | Changed |
| $SQD | OS/390 Release 5 | Changed |
| $SWR | OS/390 Release 5 | Changed |
| $SWBIT | OS/390 Release 1 | Changed |
| $SXADDR | OS/390 Release 4 | New |
| | OS/390 Release 5 | Changed |
| | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $S35D | OS/390 Release 1 | New |
| $SYMCB | OS/390 Release 7 | Changed |
| $TGB | OS/390 Release 7 | Changed |
| $TOT | z/OS V1R1 | New |
| $TRCA | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $TRE | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $TRX | z/OS V1R1 | Changed |
| $UPL | z/OS V1R1 | New |
| $USERCBS | OS/390 Release 1 | Changed |
| $WARMWRK | OS/390 Release 5 | Changed |
| $WLMD | OS/390 Release 4 | New |
| | z/OS V1R1 | Changed |
| $WSA | z/OS V1R1 | Changed |
| $WSC | OS/390 Release 4 | New |
| $WSP | OS/390 Release 3 | New |
| | OS/390 Release 5 | Changed |
| | OS/390 Release 7 | Changed |
| | z/OS V1R1 | Changed |
| $XEQWORK | OS/390 Release 7 | Changed |
| $XMAS | OS/390 Release 7 | Changed |

| Mapping Macro | Release | New/Changed/Deleted |
|---|---|---|
| $XPL | OS/390 Release 4 | Changed |
| | OS/390 Release 7 | Changed |
| | OS/390 Release 7 | Changed |
| $XREQ | z/OS V1R1 | New |
| $ZIP | z/OS V1R1 | New |

## Summary of Changed SSI Function Codes

The following tables identify all JES2 changes made to the SSI function codes as a result OS/390 JES2 releases. See *z/OS MVS Using the Subsystem Interface* for a complete explanation of SSI function codes.

*Figure 10-1. Changes to SSI Function Codes for OS/390 Version 2 Release 4 JES2*

| Code | Short Description of Change |
|---|---|
| 80 | SSI function call 80 provides additional information, such as the service class and scheduling environment for a job. |

*Figure 10-2. Changes to SSI Function Codes for OS/390 Version 2 Release 3 JES2*

| Code | Short Description of Change |
|---|---|
| 54 | Updated new returned keyword strings: SAPI=YES, SAPI_CHARS=NO, SAPI_MOD_SELECT=NO, WTR_SYSOUT_CLASS=classes, and TSO_SYSOUT_CLASS=classes. =NO, WTR_SYSOUT_CLASSection by the subsystem |
| 79 | New process SYSOUT data set call allows a user-supplied program to access JES SYSOUT data sets independently from the normal print or network functions that JES provides, so that the characteristics of the SYSOUT data sets can be retrieved or updated. |
| 80 | The extended status call (SSI function code 80) allows a user-supplied program to obtain detailed information about jobs and SYSOUT in the JES queue. |

# Appendix A. Sample Exits

## Sample Exit Modules (unnumbered)

| | |
|---|---|
| **HASXHUBA** | Routines for sample exit HASXOCA |
| **HASXJEA** | Exit 28 and exit 25 routines |
| **HASXOCA** | Exit 30 and 33 routines |
| **HASXJECL** | Exits 1, 4, 46, 47 to show $JCTX services |
| **HASPXJ00** | Sample table pairs macros (for use by HASX00B) |
| **HASPXITO** | Pre-Initialization exit (used with module HASPXJ00) |
| **HASXDNYT** | Sample dynamic table pairs |

## Sample Exit Modules (numbered)

| | |
|---|---|
| **HASX00A** | Pre-initialization exit (creates user scan tables in $MCT) |
| **HASX00B** | Pre-initialization exit (initializes $UCT) |
| **HASX01A** | Separator page exit (old-style) |
| **HASX01B** | New-style (JES2 Ver. 4) separator page exit |
| **HASX02A** | JOB card scan exit |
| **HASX04A** | JCL card scan exit |
| **HASX05A** | Command pre-scan exit |
| **HASX05C** | Convert Pre-HJE6604 format commands |
| **HASX06A** | Converter/interpreter text scan exit |
| **HASX06B** | Routine that uses the $CALL XINTKEY subroutine |
| **HASX07A** | JES2 control block I/O exit (JES2 environment) |
| **HASX08A** | JES2 control block I/O exit (user environment) |
| **HASX09B** | Job output excession exit |
| **HASX10A** | $WTO exit |
| **HASX13A** | NetMail Receive Exit |
| **HASX15A** | Dataset separator page exit |
| **HASX23A** | FSS job separator page exit |
| **HASX24A** | Post-initialization exit |
| **HASX27A** | PCE Attach/Detach exit |
| | Exit 28 - Job termination - see HASXJEA |
| **HASX29A** | End of memory exit |
| | Exit 30 - Data set open - see HASXOCA |
| **HASX31A** | Data set allocation exit |
| **HASX32A** | Job selection exit |
| | Exit 33 - Data set close - see HASXOCA |
| **HASX34A** | Data set unallocation exit |
| | Exit 35 - End-of-task - see HASXJEA |
| **HASX36A** | Pre-SAF exit |
| **HASX37A** | Post-SAF exit |
| **HASX38A** | TSO receive (security failures - 3.1.3 only) |
| **HASX38B** | TSO receive (security failures) |
| **HASX39A** | SYSOUT receive (security failures) |
| **HASX40A** | JOE build exit |
| **HASX41A** | Output grouping exit |
| **HASX42A** | Notify message exit |

| | |
|---|---|
| **HASX43A** | APPC TP selection/termination |
| **HASX44A** | Converter (main task) exit |
| **HASX45A** | SJF services exit |
| **HASX46A** | NJE header transmission exit |
| **HASX47A** | NJE header receive exit |
| **HASX48A** | Data set unallocation exit |
| **HASX255A** | User-defined exit invoked by HASX003A |

# Appendix B. Split/New/Deleted/Resequenced Parts for JES2

## Split/New/Deleted/Resequenced Parts for HJE7703 (z/OS Version 1 Release 1 JES2)

New parts in z/OS V1R1:

- HASMJNT
- HASMJWEL
- HASMPRE
- HASMTQE

## Split/New/Deleted/Resequenced Parts for HJE6608 (OS/390 Release 8 JES2)

New parts in Release 8:

- $DTECKCR
- HASPCKCR

Parts resequenced in Release 8:

- $CADDR
- $CALLP
- $CKGPAR
- $CKPWORK
- $CKW
- $CSVLIST
- $DTE
- $END
- $HASPEQU
- $HCCT
- $HCT
- $JCAN
- $MODULE
- $OFFSTBL
- $PARMLST
- $RDRWORK
- $WAIT
- HASCDSOC
- HASCENF
- HASCHAM
- HASCJBTR
- HASCPOOL
- HASCSIRQ
- HASCSISC
- HASCSRJB
- HASIBLD
- HASMCADR
- HASMITAB
- HASMRDW
- HASPCFAL

- HASPCFLE
- HASPCFR2
- HASPCKDS
- HASPCKPT
- HASPCNVT
- HASPCOMM
- HASPDOC
- HASPFSSM
- HASPIRDA
- HASPIRMA
- HASPJQS
- HASPMGS
- HASPNJT
- HASPNSR
- HASPNUC
- HASPPRPU
- HASPRAS
- HASPRDR
- HASPRTAM
- HASPSERV
- HASPSXDV
- HASPSXIT
- HASPTERM
- HASPTRAK
- HASPWARM
- HASPXEQ
- HASX01A
- HASX46A

## Split/New/Deleted/Resequenced Parts for HJE6607 (OS/390 Release 7 JES2)

New parts in Release 7:

- $PAIR
- $PUTABLE
- $RETABLE
- HASXDYNT

Parts resequenced in Release 7:

- $BUFFER
- $ENTRY
- $GETMAIN
- $PADDR
- $PARMLST
- HASCDSS
- HASCLINK
- HASCSRDS
- HASCSRIC
- HASMICE
- HASMPADR
- HASMPREB
- HASPCKDS

- HASPCKPT
- HASPCOMM
- HASPCSV
- HASPDOC
- HASPIRDA
- HASPJQS
- HASPMSG
- HASPNJT
- HASPNPM
- HASPNUC
- HASPPSO
- HASPRAS
- HASPRTAM
- HASPSCAN
- HASPSNA
- HASPSPOL
- HASPSXDV
- HASPSXIT
- HASPSXOT
- HASPTABS
- HASPTERM
- HASPTRAK
- HASPXEQ

Parts deleted in Release 7:

- HASCUBES
- HASCUBFR
- HASCUBRM
- $BUFIO
- $BUFCK
- $JIBX
- HASMJIBX

## Split/New/Deleted/Resequenced Parts for HJE6605 (OS/390 Release 5 JES2)

New parts in Release 5:

- HASMFTEX
- HASMIPSV
- HASMPERF
- HASMWTLB
- HASMXECB

Parts resequenced in Release 5:

- HASCDASL
- HASCHAM
- HASCPOOL
- HASCSAPI
- HASCSIRQ
- HASCSISC
- HASCSJFS
- HASCSRDS

- HASCSRJB
- HASMFMTM
- HASMICE
- HASMPADR
- HASMPCE9
- HASPARM
- HASPCKPT
- HASPCNVS
- HASPCNVT
- HASPCOMM
- HASPFSSM
- HASPMSG
- HASPHOPE
- HASPIRA
- HASPIRPL
- HASPJOS
- HASPJQS
- HASPMSG
- HASPNET
- HASPNUC
- HASPPRPU
- HASPPSO
- HASPRDR
- HASPRTAM
- HASPSCAN
- HASPSERV
- HASPSNA
- HASCSRJB
- HASPSPIN
- HASPSPOL
- HASPSTAB
- HASPSUBS
- HASPSXDV
- HASPSXIT
- HASPSXJB
- HASPTERM
- HASPTRAK
- HASPWARM
- HASPXCF
- HASPXEQ

## Split/New/Deleted/Resequenced Parts for HJE6604 (OS/390 Release 4 JES2)

New parts in Release 4:

- HASCENF
- HASMBERT
- HASMBRTG
- HASMCATB
- HASMCVCB
- HASMDWA
- HASMEVT
- HASMKIT

- HASMPCEA
- HASMPREB
- HASMSPUD
- HASMSXAD
- HASMWLMD
- HASMWSC
- HASPSXJB

Parts resequenced in Release 4:

- HASMFMTM
- HASPSCAN
- HASPSTAB

## Split/New/Deleted/Resequenced Parts for HJE6603 (OS/390 Release 3 JES2)

New parts in Release 3:

- HASCSAPI
- HASCSISC
- HASCSRAX
- HASMSAPD
- HASMWSP
- HASPSASR

Parts resequenced in Release 3:

- HASCSJFS

## Split/New/Deleted/Resequenced Parts for HJE6601 (OS/390 Release 1 JES2)

There are no changes for OS/390 Release 1 JES2.

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This glossary defines technical terms and abbreviations used in JES2 documentation. If you do not find the term you are looking for, refer to the index of the appropriate JES2 manual or view *IBM Glossary of Computing Terms*, available from:

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## A

**ACB**. Access control block

**ACF**. Advanced communication function

**address space**. The complete range of addresses available to a program. See also *virtual address space*.

**affinity**. The condition under which one or more members of a JES2 multi-access spool configuration may be designated as qualified to execute certain jobs.

**AFP**. Advanced function printing

**all-member warm start**. A JES2 member restart of the first member in a multi-access spool (MAS) configuration. Either the JES2 member previously ended without error or there must be an IPL of the MVS system.

**allocate**. To assign a resource for use in performing a specific task.

**APAR**. Authorized program analysis report

**APPC**. Advanced Program-to-Program Communication.

**APT**. Application table

**artificial JQE**. An artificial JQE consists of the base JQE, the JQX, and additional fields defined in the JQA.

**automatic restart**. A restart that takes place during the current run, that is, without resubmitting the job. An automatic restart can occur within a job step or at the beginning of a job step. Contrast with *deferred restart*. See also *checkpoint restart*.

**automatic volume recognition (AVR)**. A feature that allows the operator to mount labeled volumes on available I/O devices before the volumes are needed by a job step.

**AVR**. Automatic volume recognition

## B

**background**. (1) In multiprogramming, the environment in which low-priority programs are executed. (2) Under TSO/E the environment in which jobs submitted through the SUBMIT command or SYSIN are executed. One job step at a time is assigned to a region of central storage, and it remains in central storage to completion. Contrast with *foreground*.

**background job**. (1) A low-priority job, usually a batched or non-interactive job. (2) Under TSO, a job entered through the SUBMIT command or through SYSIN. Contrast with *foreground job*.

**BAL**. Basic assembler language

**batch processing**. (1) *Pertaining to the technique of executing a set of computer programs such that each is completed before the next program of the set is started. (2) *Pertaining to the sequential input of computer programs or data. (3) *Loosely, the serial execution of computer programs. (4) Under TSO, the processing of one job step in a region, so called because jobs are submitted in a group or batch.

**baud**. (1) A unit of signaling speed equal to the number of discrete conditions or signal events per second. For example, one baud equals one-half dot cycle per second in Morse code, one bit per second in a train of binary signals, and one 3-bit value per second in a train of signals each of which can assume one of eight different states. (2) In asynchronous transmission, the unit of modulation rate corresponding to one unit interval per second; that is, if the duration of the unit interval is 20 milliseconds, the modulation rate is 50 baud.

**binary synchronous communication (BSC)**. Communication using binary synchronous transmission.

**binary synchronous transmission**. Data transmission in which synchronization of characters is controlled by timing signals generated at the sending and receiving stations.

**bind**. In SNA products, a request to activate a session between two logical units.

**broadcast data set**. Under TSO, a system data set containing messages and notices from the system operator, administrators, and other users. Its contents are displayed to each terminal user when he logs on the system, unless suppressed by the user.

**BSAM**. Basic sequential access method

**BSC**. Binary synchronous communication

**BSCA**. Binary synchronous communication adapter

**burst**. *To separate continuous-form paper into discrete sheets.

# C

**cataloged data set**. A data set that is represented in an index or hierarchy of indexes that provide the means for locating it.

**cataloged procedure**. A set of job control statements that has been placed in a library and that can be retrieved by name.

**CCW**. Channel command word

**central storage**. (1) In System/390 virtual storage systems, the storage of a System/390 computing system from which the central processing unit can directly obtain instructions and data, and to which it can directly return results. (Formerly referred to as “real storage”.) (2) Synonymous with *processor storage*.

**centralized control**. Control in which all the primary station functions of the data link are centralized in one data station. Contrast with *independent control*.

**CES**. Connection event sequence

**chain printer**. An impact printer that has a revolving chain with links that carry the type slugs.

**change log**. Area of the checkpoint data set that contains the specific control blocks changed by the last member of the multi-access spool configuration to own the checkpoint data set.

**channel-to-channel (CTC)**. A method of connecting two computing devices.

**channel-to-channel (CTC) adapter**. A device for connecting two channels on the same processor or on different processors.

**checkpoint**. (1) *A place in a routine where a check, or a recording of data for restart purposes, is performed. (2) A point at which information about the status of a job and the system can be recorded so that the job step can be later started. (3) To record information about the status of a job and the system for restart purposes.

**checkpoint data set**. A data set in which information about the status of a job and the system can be recorded so that the job step can be restarted later.

**checkpoint reconfiguration**. A process used by JES2 to dynamically redefine checkpoint data set specifications for a JES2 MAS.

**checkpoint reconfiguration dialog**. An interactive form of a JES2 checkpoint reconfiguration where the operator directs the reconfiguration process with replies to a series of WTOR messages.

**checkpoint restart**. The process of resuming a job at a checkpoint within the job step that caused abnormal termination. The restart may be automatic or deferred, where deferred restart involves resubmitting the job. See also *automatic restart; deferred restart*. Contrast with *step restart*.

**checkpoint write**. Any write to the checkpoint data set. A general term for the primary, intermediate, and final writes that update any checkpoint data set.

**checkpoint/restart facility**. (1) A facility for restarting execution of a program at some point other than at the beginning, after the program was terminated due to a program or system failure. A restart can begin at a checkpoint or from the beginning of a job step, and uses checkpoint records to reinitialize the system. (2) Under TCAM, a facility that records the status of the teleprocessing network at designated intervals or following certain events. Following system failure, the system can be restarted and continue without loss of messages.

**checkpointing**. Preserving processing information during a program's operation that allows such processing to be restarted and duplicated.

**CKPT1**. The checkpoint data set designed as the one on which the reserve is acquired. In a DUAL mode configuration, CKPT1 is one of the alternately used primary data sets from which JES2 reads and writes the checkpoint. In a DUPLEX mode configuration, CKPT1 is the primary checkpoint data set.

**CKPT2**. In a DUAL mode configuration, CKPT2 is one of the alternately-used checkpoint data sets from which JES2 reads and writes the checkpoint. In a DUPLEX mode configuration, CKPT2 is the back-up copy (generally down-level) of the primary checkpoint data set (CKPT1) which can be used to replace CKPT1 if necessary. CKPT2 is formatted the same as CKPT1.

(Previously CKPT2 was the DUPLEX checkpoint data set).

**CLPA**. Common link pack area

**CMB**. Console message buffer

**CMS**. Cross memory services

**cold start**. A JES2 member start that initializes data areas and accounting information in central storage and the job and output queues.

**communication line**. Any physical link, such as a wire or telephone circuit, for connecting geographically dispersed computer systems.

**complex**. The maximum set of hardware and software resources that support one or more images of a single operating system.

**configuration**. The arrangement of a computer system or network as defined by the nature, number, and chief characteristics of its functional units.

**connection event sequence**. A clock value that indicates the time a connection took place or was broken. This is copied to NCC records and used by the path manager to determine the “most current” record when keeping track of NJE connections.

**console**. Any device from which operators can enter commands or receive messages. For JES2, the same device from which an operator also enters MVS base control program commands.

**control statements**. Statements placed into an input stream to identify special JES2 processing options for jobs.

**CSA**. Common service area

**CSECT**. Control section

**CTC**. Channel-to-channel adapter

# D

**DASD**. Direct access storage device

**data integrity point**. The generic name given to the point in the 3800 model 3 printing process at which the data is known to be secure. (Also called the stacker.)

**data set forwarding**. The dynamic replacement of the checkpoint data set specifications (data set name and volume) with new specifications.

**data set separator pages**. Those pages of printed output that delimit data sets.

**DCT**. Device control table

**deallocate**. To release a resource that is assigned to a specific task.

**dedicated**. Pertaining to the assignment of a system resource - a device, a program, or a whole system - to an application or purpose.

**deferred restart**. A restart performed by the system when a user resubmits a job. The operator submits the restart deck to the system through a system input reader. See also *checkpoint restart*. Contrast with *automatic restart*.

**dependent job control (DJC)**. A method of handling multiple jobs that must be run in a specific order because of job dependencies.

**despooling**. The process of reading records off the spool into central storage. During the despooling process, the physical track addresses of the spool records are determined.

**destination**. A combination of a node name and one of the following: a userid, a remote printer or punch, a special local printer, or LOCAL (the default if only a node name is specified).

**destination identifier (destid)**. The 8-character subscript on the DESTID(jxxxxxxx) initialization statement or command that corresponds to a combination of a first-level destination and a second-level destination that determines where data should be sent in a JES2 installation. A destid can be either a symbolic destination or an explicit destination.

**destination node**. Node to which data is sent.

**device partitioning**. A pool of devices (called a fence) to be used exclusively by a set of jobs in a specific job class allowing an installation to tailor its device usage to its anticipated workload.

**direct access storage device (DASD)**. A device in which the access time is effectively independent of the location of the data.

**DJC**. Dependent job control.

**DUAL mode**. A checkpointing mode that provides the alternate use of two primary checkpoint data sets (CKPT1 and CKPT2). The data sets are referred to as the to-be-read-from and to-be-written-to data sets.

**dump**. A report showing the contents of storage. Dumps are typically produced following program failures, for use as diagnostic aids.

**DUPLEX mode**. A checkpointing mode that provides the continuous use of only one checkpoint data set. A

second (backup) data set is defined, but it is written to less frequently than the primary.

**dynamic allocation**. Assignment of system resources to a program at the time the program is executed rather than at the time it is loaded into central storage.

**dynamic connection**. A connection created via sign-on or NCC record sent from another node Synonymous with *non-static connection*.

**dynamic table**. An installation-defined table that is used to extend, modify, or delete the JES2 default processing specifications. See also *table pair*.

# E

**EBCDIC**. Extended binary coded decimal interchange code

**ECSA**. Extended common service area

**EM**. End of media

**end of block (EOB)**. A code that marks the end of a block of data.

**end-of-file mark (EOF)**. A code that signals that the last record of a file has been read.

**EOB**. End of block

**EOF**. End of file

**EPVT**. Extended private storage area

**execution node**. The JES2 network job entry node upon which a job is to be executed.

**exit points**. The place in the code where a routine (exit) receives control from the system.

**explicit destination**. A destination identifier of the form Nnnnn, Rmmmm, RMmmmm, RMTmmmm, NnnnnRmmmm or Unnnn. See also *destination identifier* and *symbolic destination*.

**extended binary coded decimal interchange code (EBCDIC)**. A set of 256 characters, each represented by 8 bits.

**external writer**. A program that supports the ability to write SYSOUT data in ways and to devices not supported by the job entry subsystem.

# F

**facility**. (1) A feature of an operating system, designed to service a particular purpose, for example, the checkpoint/restart facility. (2) A measure of how easy it is to use a data processing system. Together with system performance, a major factor on which the total productivity of an installation depends. (3) Anything used or available for use in furnishing communication service. Commonly, a general term for communications paths.

**FCB**. Forms control buffer

**final write**. A write of the same information as the intermediate write done at the end of the checkpoint cycle. See also *intermediate write*.

**first-level destination**. The nodal portion of a destination (the node to which the data goes).

**foreground**. (1) in multiprogramming, the environment in which high-priority programs are executed. (2) Under TSO, the environment in which programs are swapped in and out of central storage to allow CPU time to be shared among terminal users. All command processor programs execute in the foreground. Contrast with *background*.

**foreground job**. (1) A high-priority job, usually a real-time job. (2) A teleprocessing or graphic display job that has an indefinite running time during which communication is established with one or more users at local or remote terminals. (3) Under TSO, any job executing in a swapped region of central storage, such as a command processor or a terminal user's program. Contrast with *background job*.

**forms control buffer (FCB)**. A buffer that is used to store vertical formatting information for printing; each position corresponding to a line on the form.

**forwarding**. The dynamic replacement of the checkpoint data set specifications (data set name and volume) with new specifications.

**FSA**. Functional subsystem application

**FSA startup**. That part of system initialization when the FSA is loaded into the functional subsystem address space and begins initializing itself.

**FSI**. Functional subsystem interface

**FSI connect**. The FSI communication service which establishes communication between JES2 and the FSA or functional subsystem.

**FSI disconnect**. The FSI communication service which severs the communication between JES2 and the FSA or functional subsystem.

**FSI services**. A collection of services available to users (JES2) of the FSI. These services comprise communication services, data set services, and control services.

**FSS**. Functional subsystem

**full-function mode**. The state that permits a printer to produce page-mode output.

**functional subsystem (FSS)**. An address space uniquely identified as performing a specific function related to the JES. For JES2, an example of an FSS is the Print Services Facility program that operates the 3800 Model 3 and 3820 printers.

**functional subsystem application (FSA)**. The functional application program managed by the functional subsystem.

**functional subsystem interface (FSI)**. The interface through which JES2 or JES3 communicate with the functional subsystem.

**functional subsystem startup**. That process part of system initialization when the functional subsystem address space is created.

# G

**global command**. A command that is recognized and honored by any node in a JES2 network.

**global processor**. In JES3, the processor that controls job scheduling and device allocation for a complex of processors.

**GMT**. Greenwich mean time.

**Greenwich mean time (GMT)**. The mean solar time of the meridian of Greenwich used as the prime basis of standard time throughout the world. See also *TOD clock*.

# H

**handshaking**. Exchange of predetermined signals when a connection is established between two data set devices.

**HASP**. Houston automatic spooling priority. A computer program that provides supplementary job management, data management, and task management functions, such as: control of job flow, ordering of tasks, and spooling. See also *JES2*.

**HASP table**. See *JES2 table.*

**HCT**. HASP communication table

**host processor**. (1) *In a network, the processing unit in which resides the access method for that network. (2) In an SNA network, the processing unit that contains a system services control point (SSCP).

**host system**. *The data processing system to which a network is connected and with which the system can communicate.

**host-id**. The unique 10-digit CPU identification made up of the 6-digit CPU serial number followed by a 4-digit model number.

**hot start**. A JES2 member restart performed when a member ends abnormally and the MVS system is not re-IPLed.

# I

**I/O**. input/output

**IBM-defined exit**. The point in source code where IBM has added an exit point where an installation routine can receive control from the operating system. Contrast with *installation-defined exit*.

**impact printer**. *A printer in which printing results from mechanical impacts.

**independent control**. In JES2, the process by which each processor in a complex controls its own job input, scheduling, and job output. Contrast with *centralized control*.

**independent mode**. A means of isolating a processor for testing purposes. A processor so designated will only process jobs that are both routed to it and are themselves designated to execute on a processor in independent mode.

**initial program load (IPL)**. The initialization procedure that causes an operating system to commence operation.

**initialization data set**. The data set that contains the initialization statements and their parameters that controls the initialization and ultimate processing of JES2.

**initialization parameter**. An installation-specified parameter that controls the initialization and ultimate operation of JES2.

**initialization statement**. An installation-specified statement that controls the initialization and ultimate operation of JES2.

**initiating task**. The job management task that controls the selection of a job and the preparation of the steps of that job for execution.

**initiator**. That part of an operating system that reads and processes operation control language statements from the system input device.

**initiator/terminator**. The job scheduler function that selects jobs and job steps to be executed, allocates input/output devices for them, places them under task control, and at completion of the job, supplies control information for writing job output on a system output unit.

**input service processing**. In JES2, the process of performing the following for each job: reading the input data, building the system input data set, and building control table entries.

**input stream control**. Synonymous with *JES2 reader*.

**installation-defined exit**. The point in source code where an installation adds an exit point where an installation routine can receive control from the operating system. Contrast with *IBM-defined exit*.

**interface**. Hardware, software, or both, that links systems, programs, or devices.

**intermediate write**. In DUAL mode, the write of the change log records containing the control blocks that have been updated since the last checkpoint write. In DUPLEX mode (or DUAL mode where the change log overflows the first track) the checkpoint write of the 4K records.

**internal reader**. A facility that transfers jobs to JES.

**interrupt**. (1) *To stop a process in such a way that it can be resumed. (2) In data transmission, to take an action at a receiving station that causes the transmitting station to terminate a transmission.

**IOT**. input/output table

**IPL**. initial program load

**IPS**. Installation performance specification

# J

**JCL**. Job control language

**JCT**. Job control table

**JES2**. Job entry subsystem 2. An MVS subsystem that receives jobs into the system, converts them to internal format, selects them for execution, processes their output, and purges them from the system. In an installation with more than one processor, each processor's JES2 subsystem independently controls job input, scheduling, and output processing.

**JES2 reader**. In MVS, the part of the job entry subsystem that controls the input stream and its associated job control statements. Synonymous with *input stream control*.

**JES2 table**. A JES2-defined table that is used to specify the default characteristics of many of its initialization parameters, commands, and other externals. See also *table pair*.

**JES2 writer**. In MVS, the part of the job entry subsystem that controls the output of specified data sets. Synonymous with *output stream control*.

**JES3**. Job entry subsystem 3. An MVS subsystem that receives jobs into the system, converts them to internal format, selects them for execution, processes their output, and purges them from the system. In an installation with multiple processors (a JES3 complex), one processor's JES3 subsystem exercises centralized control over the other processors and distributes jobs to them through use of a common job queue.

**JIX**. Job queue index

**JMR**. Job management record

**job**. A unit of work for an operating system. Jobs are defined by JCL statements.

**job class**. Any one of a number of job categories that can be defined. With the classification of jobs and direction of initiator/terminators to initiate specific classes of jobs, it is possible to control the mixture of jobs that are performed concurrently.

**job control language (JCL)**. A programming language used to code job control statements.

**job control language (JCL) statements**. Statements placed into an input stream to define work to be done, methods to be used, and the resources needed.

**job control statement**. *A statement in a job that is used in identifying the job or describing its requirements to the operating system.

**job entry subsystem (JES)**. An MVS facility that receives jobs into the system and processes output data produced by the jobs. See also *JES2* and *JES3*.

**job entry subsystem 2**. See *JES2*.

**job entry subsystem 3**. See *JES3*.

**job output element (JOE)**. Information that describes a unit of work for the output processor and represents that unit of work for queuing purposes.

**job priority**. A value assigned to a job that is used as a measure of the job's relative importance while the job contends with other jobs for system resources.

**job queue element (JQE)**. A control block that represents an element of work for the system (job) and is moved from queue to queue as that work moves through each successive stage of JES2 processing.

**job separator page data area (JSPA)**. A data area that contains job-level information for a data set. This information is used to generate job header, job trailer or data set header pages. The JSPA can be used by an installation-defined JES2 exit routine to duplicate the information currently in the JES2 separator page exit routine.

**job separator pages**. Those pages of printed output that delimit jobs.

**JOE**. Job output element

**JOT**. Job output table

# K

**keyword**. A part of a command operand that consists of a specific character string (such as DSNAME=).

**keyword parameter**. A parameter that consists of a keyword, followed by one or more values. Contrast with *positional parameter*. See also *parameter*.

# L

**label**. (1) *One or more characters used to identify a statement or an item of data in a computer program. (2) An identification record for a tape or disk file.

**line mode**. A type of data with format controls that only allow a printer to format data as a line.

**line-mode data**. A type of data that is formatted on a physical page by a printer only as a single line.

**LMT**. Load module table

**local devices**. Those devices that are directly attached to the operating system without the need for transmission facilities.

**local processing environment**. The collection of devices all of which are locally attached. That is, they are connected without the need for transmission facilities.

**local system queue area (LSQA)**. In MVS, one or more segments associated with each virtual storage region that contain job-related system control blocks.

**locally attached**. A manner of device connection without the need for transmission facilities.

**logical unit (LU)**. The combination of programming and hardware of a teleprocessing subsystem that functions like a terminal to VTAM.

**logoff**. (1) The procedure by which a user ends a terminal session. (2) In VTAM, a request that a terminal be disconnected from a VTAM application program.

**logon**. (1) The procedure by which a user begins a terminal session. (2) In VTAM, a request that a terminal be connected to a VTAM application program.

**loop**. A situation in which an instruction or a group of instructions execute repeatedly.

**LPA**. Link pack area

**LRECL**. Logical record length

**LSQA**. Local system queue area

**LU**. Logical unit

# M

**machine check interruption**. An interruption that occurs as a result of an equipment malfunction or error.

**MAS**. See *multi-access spool configuration*.

**MCS**. Multiple console support

**member**. A JES2 instance of a MVS system

**message**. For communication lines, a combination of characters and symbols transmitted from one point to another. See also *operator message*.

**MIT**. Module information table

**MLU**. Multiple logical unit

**multi-access spool complex**. See *multi-access spool configuration*.

**multi-access spool configuration**. Multiple systems sharing the JES2 input, job and output queues (via a checkpoint data set or coupling facility) .

**multi-access spool multiprocessing**. Two or more computing systems interconnected by an I/O channel-to-channel adapter. The CPs can be different types and have their own unique configurations.

**multiple console support (MCS)**. A feature of MVS that permits selective message routing to up to 32 operator's consoles.

**Multiple Virtual Storage (MVS)**. An operating system that manages resources and work flow while jobs are running.

**multiprocessing**. (1) *Pertaining to the simultaneous execution of two or more computer programs or sequences of instructions by a computer network. (2) *Loosely, parallel processing. (3) Simultaneous execution of two or more sequences of instructions by a multiprocessor.

**multiprocessing system**. A computing system employing two or more interconnected processing units to execute programs simultaneously.

**multiprocessor**. (1) A computer employing two or more processing units under integrated control. (2) A system consisting of two or more CPs (or ALUs, or processors) that can communicate without manual intervention.

**MVS**. Multiple virtual storage.

# N

**NACT**. Network account table

**NAT**. The nodes attached table, which is an internal JES2 control block containing information about each pair of nodes connected, or recently disconnected.

**NCC record**. The network connection and control records.

**NCP**. Network control program

**NCP/VS**. Network control program/VS

**NDH**. Network data set header

**network**. For JES2, two or more systems and the connections over which jobs and data are distributed to the systems. The other systems can be non-JES2 systems with compatible networking facilities. Connections can be established through communications paths using SNA or BSC protocols.

**network job entry (NJE)**. A JES2 facility that provides for the passing of selected jobs, system output data, operator commands, and messages between communicating job entry subsystems connected by binary-synchronous communication lines, channel-to-channel adapters, and shared queues.

**Network Job Entry (NJE) facility**. In JES2, a facility which provides for the transmission of selected jobs, operator commands, messages, SYSOUT data, and accounting information between communicating job entry nodes that are connected in a network either by binary synchronous communication (BSC) lines channel-to-channel (CTC) adapters, or by System Network Architecture (SNA).

**Network Job Entry facility**. In JES2, a facility which provides for the transmission of selected jobs, operator commands, messages, SYSOUT data, and accounting information between communicating job entry nodes that are connected in a network either by binary synchronous communication (BSC) lines or by channel-to-channel (CTC) adapters.

**network operator**. (1) The person responsible for controlling the operation of a telecommunication network. (2) A VTAM application program authorized to issue network operator commands.

**NIP**. Nucleus initialization program.

**NIT**. The node information table, which is an internal JES2 control block containing information about each NJE node.

**NJE**. Network job entry

**NJH**. Network job header

**node**. (1) One of the systems in a network of systems connected by communication lines or CTC adapters. (2) In VTAM, an addressable point in a telecommunication system defined by a symbolic name. (3) In JES2 NJE, one or more job entry subsystems sharing a common job queue.

**node name**. An 8-character alphameric name which represents a node to other parts of the NJE network.

**non-impact printer**. *A printer in which printing is not the result of mechanical impacts; for example, thermal printers, electrostatic printers, photographic printers.

**non-static connection**. A connection created via sign-on or NCC record sent from another node Synonymous with *dynamic connection*.

**nonpageable dynamic area**. *In MVS, an area of virtual storage whose virtual addresses are identical to real addresses; it is used for programs or parts of

programs that are not to be paged during execution. Synonymous with *V=R dynamic area*.

**nonpageable region**. In MVS, a subdivision of the nonpageable dynamic area that is allocated to a job step or system task that is not to be paged during execution. In a nonpageable region, each virtual address is identical to its real address. Synonymous with *V=R region*.

**nucleus**. That portion of a control program that always remains in central storage.

**nucleus initialization program (NIP)**. The MVS component that initializes the resident control program.

# O

**offload**. Moving jobs and work off the work queues to remove them from contention for system resources, or off spool to free up system work space.

**operand**. (1) *That which is operated upon. An operand is usually identified by an address part of an instruction. (2) Information entered with a command name to define the data on which a command processor operates and to control the execution of the command processor.

**operator commands**. Statements that system operators may use to get information, alter operations, initiate new operations, or end operations.

**operator message**. A message from an operating system directing the operator to perform a specific function, such as mounting a tape reel; or informing the operator of specific conditions within the system, such as an error condition.

**operator orientation point**. The generic name given to the point in the 3800 model 3 printing process at which the data becomes visible to the operator, and is therefore the point at which all operator commands are directed. Synonymous with *transfer station*.

**output group**. A set of a job's output data sets that share output characteristics, such as class, destination, and external writer.

**output stream control**. Synonymous with *JES2 writer*.

**output writer**. A part of the job scheduler that transcribes specified output data sets onto a system output device independently of the program that produced the data sets.

**overlays**. A collection of predefined data such as lines, shading, text, boxes, or logos, that can be merged with the variable data on a page while printing.

# P

**page**. (1) In virtual storage systems, a fixed-length block of instructions, data, or both, that can be transferred between central storage and external page storage. (2) To transfer instructions, data, or both, between central storage and external page storage. (3) The unit of output from a 3800-3 running with full function capability or 3820 printer.

**page data set**. In System/390 virtual storage systems, a data set in external page storage in which pages are stored.

**page fault**. In System/390 virtual storage systems, a program interruption that occurs when a page that is marked “not in central storage” is referred to by an active page.

**page mode**. The mode of operation in which the 3800 Printing Subsystem can accept a page of data from a host processor to be printed on an all-points-addressable output medium.

**page-mode data**. A type of data that can be formatted anywhere on a physical page. This data requires specialized processing such as provided by the Print Services Facility for the 3800-3 and 3820 printers.

**page-mode environment checkpointing**. That process which preserves the information necessary to resume page-mode printing.

**page-mode printer**. A printer (such as the 3800 model 3 and 3820) that can print page-mode data.

**pageable region**. In MVS, a subdivision of the pageable dynamic area that is allocated to a job step or a system task that can be paged during execution. Synonymous with *V=V region*.

**paging**. In System/390 virtual storage systems, the process of transferring pages between central storage and external page storage.

**paging device**. In System/390 virtual storage systems, a direct access storage device on which pages (and possibly other data) are stored.

**parameter**. (1) *A variable that is given a constant value for a specific purpose or process. (2) See *keyword parameter, positional parameter*.

**password**. A unique string of characters that a program, computer operator, or user must supply to meet security requirements for gaining access to data.

**patch**. *To modify a routine in a rough or expedient way.

**path**. In VTAM, the intervening nodes and lines connected a terminal and an application program in the host CPU.

**path manager**. The part of JES2 that controls NJE sign-on, sign-off, keeps track of all other nodes and connections in the network, and determines the best path to reach those nodes. (JES2 is unique among other NJE subsystems in keeping track of the network topology through NCC records.)

**PCE**. Processor control element

**PDDB**. Peripheral data definition block

**PEP**. Partitioned emulator program

**physical unit (PU)**. (1) The control unit or cluster controller of an SNA terminal. (2) The part of the control unit or cluster controller that fulfills the role of a physical unit as defined by systems network architecture (SNA).

**PLPA**. Pageable link pack area

**poly-JES**. Concurrent operation of multiple copies of JES2 on a single MVS system to allow an installation to separate its primary production system(s) and test system(s).

**positional parameter**. A parameter that must appear in a specified location, relative to other parameters. Contrast with *keyword parameter*. See also *parameter*.

**PPL**. Purge parameter list

**PRE**. Processor recovery element

**primary write**. The write of the 4K records to the down-level checkpoint data set to make it current.

**Print Services Facility**. The program (code) that operates the 3800 model 3 and 3820 printers. The Print Services Facility operates as a functional subsystem.

**priority aging**. A function of JES2 by which the longer a job waits to be selected for processing, the greater become its chances of being selected to run.

**private connection**. A connection known only to the two nodes making the connection.

**process mode**. The mode in which SYSOUT data exists and is to be processed by a JES output device. There are two IBM-defined process modes: line mode and page mode.

**processor storage**. See *central storage*.

**program temporary fix (PTF)**. A temporary solution or bypass for a problem diagnosed by IBM as the result of a defect in a current unaltered release of the program.

**protocols**. Rules for using communication lines. Protocols can identify the direction of data flow, where data begins and ends, how much data is being transmitted, and whether data or control information is being sent.

**PSF**. Print Services Facility

**PTF**. Program temporary fix

**PU**. Physical unit.

# Q

**QSE**. Shared queue element

**queue**. A line or list formed by items in a system waiting for processing.

**quick start**. A JES2 member restart in an existing multi-access spool (MAS) configuration. The JES2 member previously ended without error.

**quiescing**. *The process of bringing a device or a system to a halt by rejection of new requests for work.

# R

**RACF**. Resource Access Control Facility

**read 1**. A read of the first track of a checkpoint data set. Usually performed as the initial I/O operation to a checkpoint data set.

**read 2**. A read of the 4K page data records and any change log records not contained on the first track from a checkpoint data set. Usually performed after a READ 1 as the second checkpoint I/O operation in a checkpoint cycle.

**reader**. A program that reads jobs from an input device or data base file and places them on the job queue.

**real address**. In virtual storage systems, the address of a location in central storage.

**real storage**. See *central storage*.

**remote**. RMT

**remote job entry (RJE)**. Submission of job control statements and data from a remote terminal, causing the jobs described to be scheduled and executed as though encountered in the input stream.

**remote station**. *Data terminal equipment for communicating with a data processing system from a location that is time, space, or electrically distant.

**remote terminal**. An input/output control unit and one or more input/output devices attached to a system through a data link.

**remote terminal access method (RTAM)**. A facility that controls operations between the job entry subsystem (JES2) and remote terminals.

**remote workstation**. (1) *Data terminal equipment for communicating with a data processing system from a location that is time, space, or electrically distant. Synonymous with *remote station*. (2) A workstation that is connected to a system by means of data transmission facilities.

**RJE**. Remote job entry

**RMS**. Recovery management support

**RMT**. Remote

**RMT generation**. Generation of remote workstations for remote job entry.

**routing**. (1) The assignment of the communications path by which a message or telephone call will reach its destination. (2) In NJE, the path, as determined by NJE or explicitly by the operator, that a job or SYSOUT data set will take to reach its destination.

**routing code**. A code assigned to an operator message and used, in systems with multiple console support (MCS), to route the message to the proper console.

**RPL**. Request parameter list

**RPS**. Rotational position sensing

**RTAM**. Remote terminal access method

**RTP**. Remote terminal program

# S

**SAF**. Security authorization facility

**SAM**. Sequential access method

**SDLC**. Synchronous data link control

**SDSB**. Spool data set browse

**second-level destination**. Specifies a remote workstation, special local route code, userid, or LOCAL or ANYLOCAL (for data not associated with a specific routing).

**secondary console**. In a system with multiple consoles, any console except the master console. The secondary console handles one or more assigned functions on the multiple console system.

**security classification**. (1) An installation-defined level of security printed on the separator pages of printed output. (2) In RACF, the use of security categories, a security level, or both, to impose additional access controls on sensitive resources. An alternative way to provide security classifications it to use security labels.

**segments**. A collection of composed text and images, prepared before formatting and included in a document when it is printed.

**session**. (1) The period of time during which a user of a terminal can communicate with an interactive system; usually, the elapsed time from when a terminal is logged on to the system until it is logged off the system. (2) The period of time during which programs or devices can communicate with each other. (3) In VTAM, the period of time during which a node is connected to an application program.

**setup**. The preparation of a computing system to perform a job or job step. Setup is usually performed by an operator and often involves performing routine functions, such as mounting tape reels and loading card decks.

**shared broadcasting**. The two TSO data sets SYS1.UADS (TSO user definition) and SYS1.BRODCAST (TSO message transmission definition) are shared by all systems in the multi-access spool (MAS) complex.

**simultaneous peripheral operations online (spool)**. The reading and writing of input and output streams on auxiliary storage devices, concurrently while a job is running, in a format convenient for later processing or output operations.

**single-member warm start**. A JES2 member restart of a new member in an existing multi-access spool (MAS) configuration. The JES2 member previously ended abnormally. Before the restart can occur, there must be an IPL of the MVS system.

**single-processor complex**. A processing environment in which only one processor (computer) accesses the spool and comprises the entire node.

**SMF**. System management facilities

**SNA**. Systems Network Architecture

**special local**. A routing in the form Unnnn, where ‘nnnn’ signifies a numeric value in the range of

1–32767. Usually, installations use this routing to specify local printers and punches.

**spin data set**. A data set that is deallocated (available for printing) when it is closed. Spin off data set support is provided for output data sets just prior to the termination of the job that created the data set.

**spool**. Simultaneous peripheral operations online.

**spooled data set**. A data set written on an auxiliary storage device and managed by JES.

**spooled data set browse (SDSB)**. An application that allows a program to read spool data sets.

**spooling**. The reading and writing of input and output streams on auxiliary storage devices, concurrently with job execution, in a format convenient for later processing or output operations.

**SQA**. System queue area

**SRM**. System resources manager

**static connection**. A connection (also called "predefined connection" in earlier releases) between two nodes created by either a JES2 initialization or an operator command.

**STC**. Started task control

**step restart**. A restart that begins at the beginning of a job step. The restart may be automatic or deferred, where deferral involves resubmitting the job. Contrast with *checkpoint restart*.

**subnet**. Subset of a NJE network identified by an eight-character 'SUBNET' name on the JES2 NODE initialization statement. The grouping of nodes into "SubNets" is based on the assumption that if you have access to any node in the subnet, you have access to them all.

**subsystem**. A secondary or subordinate system, usually capable of operating independently of, or asynchronously with, a controlling system.

**SVC**. Supervisor call instruction

**SVC interruption**. An interruption caused by the execution of a supervisor call instruction, causing control to be passed to the supervisor.

**SWA**. Scheduler work area

**swap data set**. A data set dedicated to the swapping operation.

**swapping**. An MVS paging operation that writes the active pages of a job to auxiliary storage and reads pages of another job from auxiliary storage into central storage.

**symbol**. (1) *A representation of something by reason of relationship, association, or convention. (2) In MVS, a group of 1 to 8 characters, including alphanumeric characters and the three characters: #, @, $. The symbol begins with either an alphabetic character or one of the three characters (#,@,$).

**symbolic address**. *An address expressed in symbols convenient to the computer programmer.

**symbolic destination**. A destination identifier specifying a symbolic name that represents a JES2 destination. See also *destination identifier* and *explicit destination*.

**synchronous data link control (SDLC)**. A discipline for managing synchronous, transparent, serial-by-bit information transfer over a communication channel. Transmission exchanges may be duplex or half-duplex over switched or nonswitched data links. The communication channel configuration may be point-to-point, multipoint, or loop.

**syntax**. (1) *The structure of expressions in a language. (2) The rules governing the structure of a language.

**SYSIN**. A system input stream; also, the name used as the data definition name of a data set in the input stream.

**SYSLOG**. System log

**SYSOUT**. A system output stream; also, an indicator used in data definition statements to signify that a data set is to be written on a system output unit.

**sysplex**. A set of MVS systems communicating and cooperating with each other through certain multisystem hardware components and software services to process customer workloads.

**system affinity**. See *affinity*.

**system control programming**. IBM-supplied programming that is fundamental to the operation and maintenance of the system. It serves as an interface with program products and user programs and is available without additional charge.

**system management facilities (SMF)**. An MVS component that provides the means for gathering and recording information that can be used to evaluate system usage.

**system output writer**. A job scheduler function that transcribes specified output data sets onto a system

output unit, independently of the program that produced the data sets.

**system queue area (SQA)**. In MVS, an area of virtual storage reserved for system-related control blocks.

**system services control point**. *In SNA, the focal point within an SNA network for managing the configuration, coordinating network operator and problem determination requests, and providing directory support and other session services for end users of the network.

**systems network architecture (SNA)**. The total description of the logical structure, formats, protocols, and operational sequences for transmitting information units through a communication system.

# T

**table pair**. A set of JES2-defined, USER-defined, and dynamic tables that an installation can use to modify JES2 processing.

**TCAM**. Telecommunications access method.

**telecommunications access method (TCAM)**. A method used to transfer data between central storage and remote or local terminals. Application programs use either GET and PUT or READ and WRITE macro instructions to request the transfer of data, which is performed by a message control program. The message control program synchronizes the transfer, thus eliminating delays for terminal/output operations.

**teleprocessing**. The processing of data that is received from or sent to remote locations by way of telecommunication lines.

**terminal**. A device, usually equipped with a keyboard and some kind of display, capable of sending and receiving information over a communication channel.

**text transparency**. A provision that allows BSC to send and receive messages containing any or all of the 256 character combinations in EBCDIC, including transmission control characters. Transmission control characters sent in a message are treated as data unless they are preceded by the data link escape (DLE) control character.

**TGB**. Track group block

**TGBE**. Track group block entry

**tightly-coupled multiprocessing**. Two computing systems operating simultaneously under one control program while sharing resources.

**Time Sharing Option Extensions (TSO/E)**. A licensed program that is based on the Time Sharing Option (TSO). It allows MVS users to interactively share computer time and resources.

**time tolerance**. The difference between the TOD clocks on two adjacent nodes, beyond which the path manager will not allow a session to be established.

**time-of-day clock**. See *TOD clock*.

**TOD**. Time-of-day

**TOD clock**. A timing device that counts units of time based on the starting point of 00 hours, 00 minutes, and 00 seconds on January 1, 1900. Time-of-day (TOD) information is used, for example, to monitor computer operations and events.

**token**. Specifically defined for JES2 checkpoint processing as a checkpoint identifier that is used to determine checkpoint I/O status.

**trace**. (1) The record of a series of events. (2) To record a series of a events as they occur. (3) A report showing data relevant to a particular point in the processing of a program. Traces are typically produced for analysis of program performance, but they can also be valuable diagnostic aids.

**tracing routine**. *A routine that provides a historical record of specified events in the execution of a program.

**traffic**. In data communication, the quantity of data transmitted past a particular point in a path.

**train printer**. A printer in which the type slugs are assembled in a train that moves along a track. Contrast with *chain printer*.

**transfer station**. The point in the 3800 model 3 printing process at which the data set becomes visible to the operator, and is therefore the point at which all operator commands are directed. Synonymous with *operator orientation point*.

**TSO**. Time-sharing option. See *Time Sharing Option Extensions (TSO/E)*.

**TSO/E**. Time Sharing Option Extensions

**TSU**. Time-sharing user

**TTE**. Trace table entry

**type font**. In printing, a set of type that is of a particular size and style (for example, 10-point century school book).

# U

**UCB**. Unit control block

**UCS**. Universal character set.

**unallocate**. See *deallocate*.

**unit**. (1) *A device having a special function. (2) A basic element.

**unit address**. The address of a particular device, specified at the time a system is installed; for example, 191 or 293.

**universal character set (UCS)**. A printer feature that permits the use of a variety of character arrays.

**user identification (USERID)**. A 1-8 character symbol identifying a system user.

**user table**. An installation-defined table that is used to extend, modify, or delete the JES2 default processing specifications. See also *table pair*.

**USERID**. User identification.

# V

**V=R dynamic area**. Synonymous with *nonpageable dynamic area*.

**V=R region**. Synonymous with *nonpageable region*.

**V=V region**. Synonymous with *pageable region*.

**VIO**. virtual input/output

**virtual address space**. In virtual storage systems, the virtual storage assigned to a job, terminal user, or system task. See also *address space*.

**Virtual Telecommunications Access Method (VTAM)**. A set of programs that control communication between terminals and application programs running under MVS.

**VTAM**. Virtual Telecommunications Access Method.

# W

**warm start**. A general term for a JES2 member restart. See also *hot start; quick start; single-member warm start; all-member warm start*.

**writer**. See *output writer*.

**WTO**. Write-to-operator

**WTOR**. Write-to-operator with reply

# X

**XFER**. Transfer

**XIT**. Exit information table

**XRT**. Exit routine table

# Numerics

**3800 compatibility mode**. Operating the 3800 model 3 printer as a 3800 Model 1 printer.

**3800 model 3 startup**. That process part of system initialization when the 3800 model 3 printer is initializing.

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## Special Characters



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