z/OS

DFSMS Migration

GC26-7398-02

z/OS

DFSMS Migration

GC26-7398-02

Note!
Before using this information and the product it supports, be sure to read the “Notices” on page 311.

Third Edition, September 2002

This edition applies to Version 1 Release 3 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 you in a migration to z/OS V1R3 DFSMS. This book covers only the currently-supported migration paths. It is intended for experienced system programmers, system analysts, storage administrators, and other members of an information technology team who make resource and planning decisions regarding z/OS DFSMS elements and features.

As a reader of this book, you should have in-depth knowledge of your current DFSMS configuration and procedures. You should also have objectives defined for your target environment.

How to use this book

This book is divided into three major parts:

- Part 1, “Migration Planning”, reviews DFSMS concepts and guides you in developing a plan to upgrade to the new level of DFSMS.
- Part 2, “Migration Actions and Attributes” describes the tasks that help you position your current environment for the migration, as well as the tasks and considerations related to implementing new and enhanced functions available with this level of DFSMS.
- Part 3, “History of Interface Changes” is a summary of new and updated DFSMS interfaces that can help you in notifying user groups of the changes resulting from the migration to the new level of DFSMS.

Because this book is not a typical reference or user guide, you should spend some time becoming familiar with its format and content to understand how it can assist you with your migration effort. You can find more specific guidance on how to use this book in “Chapter 2. Preparing for Migration” on page 9.

Where to find more information

For a complete list of DFSMS books and related z/OS publications referenced by this book, see the *z/OS Information Roadmap*. You can obtain a softcopy version of this book and other DFSMS publications from sources listed here.

Source	Description
z/OS Collection	CD-ROM that includes the DFSMS library and other z/OS element libraries.
`http://www.ibm.com/servers/eservers/zseries/zos`	z/OS web site that includes the unlicensed books from DFSMS library and other z/OS element libraries.

Accessing z/OS DFSMS® books on the Internet

In addition to making softcopy books available on CD-ROM, IBM provides access to unlicensed z/OS softcopy books on the Internet. To find z/OS books on the Internet, first go to the z/OS home page: **http://www.ibm.com/servers/eservers/zseries/zos**

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Accessing messages using LookAt

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

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

You can access LookAt from the Internet at:

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

or from anywhere in z/OS where you can access a TSO command line (for example, TSO prompt, ISPF, z/OS UNIX® System Services running OMVS).

To find a message explanation on the Internet, go to the LookAt Web site and simply enter the message identifier (for example, `IAT1836` or `IAT*`). You can select a specific release to narrow your search. You can also download code from the *z/OS Collection*, SK3T-4269 and the LookAt Web site so you can access LookAt from a PalmPilot (Palm VIIx suggested).

To use LookAt as a TSO command, you must have LookAt installed on your host system. You can obtain the LookAt code for TSO from a disk on your *z/OS Collection*, SK3T-4269 or from the LookAt Web site. To obtain the code from the LookAt Web site, do the following:

1. Go to http://www.ibm.com/servers/eserver/zseries/zos/bkserv/lookat/lookat.html.
2. Click the **News** button.
3. Scroll to **Download LookAt Code for TSO and VM.**
4. Click the ftp link, which will take you to a list of operating systems. Select the appropriate operating system. Then select the appropriate release.
5. Find the **lookat.me** file and follow its detailed instructions.

To find a message explanation from a TSO command line, simply enter: **lookat** *message-id*. LookAt will display the message explanation for the message requested.

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.

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:

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  - IBMLink from Canada: STARPUBS at TORIBM
  - IBM Mail Exchange: USIB3VVD at IBMMAIL
  - Internet: starpubs@us.ibm.com

  Be sure to include the name of the book, the part number of the book, version, and product name, and if applicable, the specific location of the text you are commenting on (for example, a page number or a table number).
- Fill out one of the forms at the back of this book and return it by mail or by giving it to an IBM representative. If the form has been removed, address your comments to IBM Corporation, RCF Processing Department M86/050, 5600 Cottle Road, San Jose, California 95193-0001, U.S.A.

Summary of Changes

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

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

Summary of changes for GC26-7398-02 z/OS Version 1 Release 3

This book contains information previously presented in *z/OS Version 1 Release 1 DFSMS Migration* (GC26-7398-01).

The following sections summarize the changes to that information.

New information

This book discusses the migration paths to z/OS Version 1 Release 3 from various earlier releases. For information on the new DFSMSdfp™, DFSMSdss™, DFSMShsm™, and DFSMSrmm™ functions in z/OS V1R3, see “Chapter 5. Migration Overview for z/OS V1R3 DFSMS” on page 55.

Changed information

For information on the DFSMSdfp, DFSMSdss, DFSMShsm, and DFSMSrmm functions introduced in earlier OS/390® and z/OS releases, see the following chapters:

- “Chapter 6. Migration Overview for z/OS V1R1 and OS/390 V2R10 DFSMS” on page 107
- “Chapter 7. Migration Overview for DFSMS/MVS V1R5” on page 185
- “Chapter 8. Migration Overview for DFSMS/MVS V1R4” on page 221

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Part 1. Migration Planning

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Chapter 1. Understanding the DFSMS Environment

This chapter gives a brief overview of DFSMS and its primary functions in the z/OS operating system. For a broader discussion of DFSMS functions and features geared to the general user, see *z/OS DFSMS Introduction*.

DFSMS in the z/OS operating system

The *base elements* deliver essential operating system functions. When you order z/OS, you receive all of the base elements. IBM enables the *optional features* that you order. IBM disables the optional features that you do not order. If you decide to use an optional feature later on, notify your IBM representative who will give you instructions for enabling the feature.

DFSMS, formerly called DFSMS/MVS® as a stand-alone product, is now an exclusive element of the z/OS operating system. DFSMS comprises the following components:

DFSMSdfp, a base element of z/OS
DFSMSdss, an optional feature of z/OS
DFSMShsm, an optional feature of z/OS
DFSMSrmm, an optional feature of z/OS

Together these components make up the *DFSMS family*.

DFSMSdfp and the Base Control Program (BCP) form the foundation of the z/OS operating system where DFSMSdfp performs the essential data, storage, program, and device management functions of the system. For information on preparing to install or migrate z/OS, see *z/OS Planning for Installation*.

The other members of the DFSMS family—DFSMSdss, DFSMShsm, and DFSMSrmm—complement the functions of DFSMSdfp to provide a fully-integrated approach to data and storage management. In a system-managed storage environment, the components of DFSMS automate and centralize storage management based on the policies your installation defines for availability, performance, space, and security. With these optional features enabled, you can take full advantage of all the function DFSMS offers.

Members of the DFSMS family

This section describes the critical roles of each component in the DFSMS family.

DFSMSdfp

DFSMSdfp provides the basis for:

Storage management
DFSMSdfp includes the Interactive Storage Management Facility (ISMF), a user interface that allows you to define and maintain policies to manage your storage resources. You also can use Naviquest to define and maintain these policies in batch. These policies improve the utilization of storage devices and increase levels of service for user data, with minimal effort required from users. The Storage Management Subsystem (SMS) helps you govern these policies on the system.

Tape mount management
DFSMSdfp's Storage Management Subsystem allows you to implement

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tape mount management (TMM), a methodology for improving tape utilization and reducing tape costs. This methodology involves intercepting selected tape data set allocations through the SMS automatic class selection (ACS) process, and redirecting them to a DASD buffer. Once on DASD, these data sets can be migrated to a single tape or small set of tapes, thereby reducing the overhead associated with multiple tape mounts.

You also can use the Virtual Tape Server (VTS) instead of or with TMM to improve tape utilization. For more information on VTS, see the *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries* and the *z/OS DFSMSrmm Implementation and Customization Guide*.

Data management
DFSMSdfp helps you store and catalog information on DASD, optical, and tape devices, so that it can be quickly identified and retrieved from the system.

Device management
DFSMSdfp is involved in defining your input and output devices to the system, and in controlling the operation of those devices.

Distributed data access
Distributed data access allows all authorized systems and users in a network to exploit the powerful features of system-managed storage provided by DFSMS.

DFSMSdss

DFSMSdss is used for:

Data movement and replication
DFSMSdss lets you move or copy data between volumes of like and unlike device types. It can also copy data that has been backed up.

Space management
DFSMSdss can reduce or eliminate DASD free-space fragmentation.

Data backup and recovery
DFSMSdss provides host system backup and recovery functions at both the data set and volume levels. It also includes a stand-alone restore program that you can run without a host operating system. DFSMSdss exploits the Snapshot and FlashCopy™ Services supported by IBM RAMAC® Virtual Array and IBM Enterprise Storage Server™.

Data set and volume conversion
DFSMSdss can be used to convert your data sets and volumes to system-managed storage. It can also return your data to a non-system-managed state as part of a recovery procedure.

Data Display
DFSMSdss can be used to print the contents of VTOCs from DASD tracks.

DFSMShsm

DFSMShsm provides functions for:

Storage management
DFSMShsm uses a hierarchy of storage devices in its automatic management of data, relieving end-users from manual storage management tasks.

Space management
DFSMShsm improves DASD space utilization by keeping only active data on fast-access storage devices. It automatically frees space on user volumes by deleting eligible data sets, releasing over-allocated space, and moving low-activity data to lower-cost-per-byte devices.

Tape mount management
DFSMShsm can write multiple output data sets to a single tape, making it a useful tool for implementing tape mount management (TMM) under SMS. When you redirect tape data set allocations to DASD, DFSMShsm can move those data sets to tape, as a group, during interval migration. This greatly reduces the number of tape mounts initiated on the system. DFSMShsm uses single file format, which also improves your tape usage and search capabilities.

Availability management
DFSMShsm backs up your data—automatically or by command—to ensure availability in the event of accidental loss of data sets or physical loss of volumes. DFSMShsm also allows a storage administrator to copy backup and migration tapes. These copies can be stored on site as protection from media damage, or off site as protection from site damage. Disaster backup and recovery is also provided for user-defined groups of data sets (aggregates), so that critical applications can be restored at the same location or at an off-site location.

DFSMShsm uses DFSMSdss for data movement.

DFSMSrmm

DFSMSrmm manages your removable media resources, including tape cartridges and reels. It provides functions for:

Library Management
You can create tape libraries, or collections of tape media associated with tape drives, to balance the workload of your tape drives and operators. DFSMSrmm can be used to manage system-managed tape libraries as well as non-system-managed tape libraries and tape drives.

Shelf Management
DFSMSrmm groups information about removable media by shelves into a central on-line inventory and keeps track of the volumes residing on those shelves. DFSMSrmm can also record the shelf location for optical disks and track their vital records status.

Volume management
DFSMSrmm helps manage the movement and retention of tape volumes throughout their life cycle.

Data set management
DFSMSrmm records information about the data sets on tape volumes to validate volume and data set information and to help maintain data integrity. It can also control the retention of those data sets.

Supportive z/OS elements and features

There are a number of z/OS elements and features that complement DFSMS functions:

DFSMS Optimizer and DFSMShsm Monitor/Tuner for z/OS and MVS/ESA™—a stand-alone product

Network File System—a z/OS base element
DFSORT™—a z/OS feature
RACF®, a component of the Security Server for z/OS—a z/OS feature
CICSVR—a VSAM data set recovery utility

The relationship DFSMS has with each of these elements or features is introduced here.

DFSMS Optimizer

The DFSMS Optimizer provides analysis and simulation information for both SMS and non-SMS users. The DFSMS Optimizer can help you maximize storage use and minimize storage costs. It provides methods and facilities for you to:

- Monitor and tune DFSMShsm functions.
- Create and maintain a historical database of system and data activity.
- Perform in-depth analysis of:
  - management class policies, including simulations and cost-benefit-analysis using your storage component costs.
  - storage class policies for SMS data, with recommendations for both SMS and non-SMS data.
  - high I/O activity data sets, including recommendations for placement and simulation for cache and expanded storage.
  - storage hardware performance of subsystems and volumes including I/O rate, response time, and caching statistics.
- Fine tune an SMS configuration, by helping you:
  - understand how current SMS policies and procedures are managed.
  - determine associated costs of current data management practices.
  - simulate potential policy changes and understand the costs of those changes.
- Produce presentation-quality charts.

For more information on the DFSMS Optimizer, see the *DFSMS Optimizer User's Guide and Reference*.

Network File System

The Network File System enables the operating system to act as a file server or client to workstations, personal computers, or other authorized systems in a TCP/IP network.

Clients of the Network File System server can remotely access z/OS UNIX files as well as conventional MVS™ data sets, bringing the resources of a z/OS system—system-managed storage, high-performance storage access, file access security, and centralized data access—to client platforms.

The Network File System client allows MVS applications, including those using BSAM, QSAM, VSAM, and those running on UNIX System Services, to access remote files on a variety of platforms.

For more information on the Network File System, refer to *z/OS Network File System Customization and Operation* and *z/OS Network File System User's Guide*.

DFSORT

Data Facility Sort (DFSORT) is a highly flexible data processing tool that provides fast and efficient sorting, merging, copying, reporting, and analysis of your business information. Following are a few of the many tasks you can perform with DFSORT:

- Sort, merge, or copy files; including or excluding records, and reformatting records.
- Analyze data and produce detailed reports using the ICETOOL utility or the OUTFIL function. In addition, OUTFIL allows you to create different views of the data and different reports with a single pass over the data.
- Adapt to the sorting and merging needs of different countries using DFSORT's national language support.
- Provide correct ordering of 2-digit years and transformation of 2-digit years to 4-digit years as part of IBM's year 2000 solution.

For more information on DFSORT, its capabilities and requirements, see the *DFSORT Brochure* (GC33-4033).

RACF

RACF, a component of the Security Server for z/OS, provides resource security functions for DFSMS. For migration information related to using RACF for DFSMS commands, facilities, functions and resources, see "Secure DFSMS resources" on page 41. For more general information about RACF, refer to the *z/OS Security Server RACF General User's Guide*.

CICSVR

CICS® VSAM Recovery Version 3 Release 1 (CICSVR) recovers your lost or damaged VSAM data. CICSVR is for organizations where the availability and integrity of VSAM data is vital. For example, you can use CICSVR to perform forward recovery of VSAM data or to copy log streams. CICSVR applies the forward recovery logs to VSAM data sets after they are restored.

For more information, see the *CICSVR V3R1 Implementation Guide*.

Chapter 2. Preparing for Migration

This chapter introduces you to migration concepts, terms, and information sources and helps you develop a plan for migrating to the new level of DFSMS.

Developing a migration strategy

In developing your strategy for migrating to the new level of DFSMS, consider these steps:

1. **Become familiar with the migration and installation documentation for this release:** See "Migration and installation documentation you need to have on hand" on page 10.

   Also become familiar with the terminology used in this book and other migration books in the z/OS library. See "Terms you need to know" on page 10.

2. **Develop a migration plan for your installation:** Your plan should take into consideration changes to existing interfaces, program compatibility, cross-system coexistence, and tasks required to enable new functions. The purpose of migration information in this book is to give you what you need early in the process to help you in system and resource planning. Once you determine how each functional change might benefit your applications and users, and what the potential impact is for migration, you can stage implementation in a way that works best for your installation.

   In migrating to a new release of DFSMS, you are not expected to implement all new functions available with the product. First, ensure that your environment is stable after installing and testing the z/OS product and existing DFSMS features. Then you can start using the new DFSMS features.

3. **Contact application owners to inform them of system changes that will occur:** Verify that your installation's applications will continue to run. If necessary, make changes to ensure compatibility with the new release.

4. **Obtain and install the program temporary fixes (PTFs) required for migration and coexistence:** Contact the IBM Software Support Center to acquire the preventive service planning (PSP) upgrade for DFSMS; check this source again just before testing DFSMS to obtain any PTF updates. Although the *z/OS Planning for Installation* book contains a summary of coexistence maintenance, the most current information is available from the IBM Software Support Center.

   You can find PSP information for this release in the z/OS PSP buckets under subsets *DFSMS, DFSMSDSS, DFSMSHSM, and DFSMSRMM*.

   To look up contact numbers for the IBM Software Support Center closest to you, or to access other IBM software support services on the web, go to:

   `http://techsupport.services.ibm.com/s390/support`

5. **Install the entire z/OS product:** If you ordered the DFSMSdfp base element and DFSMSdss, DFSMShsm, or DFSMSrmm, these features are installed along with the z/OS product. Use the *z/OS Program Directory* or the *ServerPac: Using the Installation Dialog* documentation.

6. **Test the new DFSMS release:** Test your operations and applications with existing DFSMS functions before initializing major new functions.

7. **Set up, test, and enable the new functions:** Stage implementation of the functions that will benefit your installation. Use the information in "Chapter 6. Migration Overview for z/OS V1R1 and OS/390 V2R10 DFSMS" on page 107 and subsequent chapters to help you in your implementation plan.

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Terms you need to know

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

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. The following are examples of multisystem configurations in which resource sharing can occur:

- A single system running multiple logical partitions (LPARs)
- A single processor that is time-sliced to run different levels of the system, such as during different times of the day
- Two or more systems running on separate processors
- A Parallel Sysplex® or non-Parallel Sysplex configuration

Coexistence implies the ability of a system to respond to a new function that is introduced on another system with which it shares resources. When coexistence is established, a system should respond in one of the following ways: support the new function, ignore the new function, or terminate gracefully.

Fallback
A return to the prior level of a system. Fallback can be appropriate if you migrate to z/OS V1R3 and, during testing, encounter severe problems that you resolve by backing out the new release. By applying fallback PTFs to the old system before you migrate, the old system can tolerate changes that the new system made during testing.

Component
A member of the DFSMS family that consists of:
DFSMSdfp—a base element of z/OS
DFSMSdss—an optional feature of z/OS
DFSMShsm—an optional feature of z/OS
DFSMSrmm—an optional feature of z/OS

Cross-functional
Features, changes, or other characteristics that affect more than one DFSMS component.

Migration and installation documentation you need to have on hand

Although the purpose of this book is to guide you through the major steps of migration, it does not contain all the details you should know about migrating to the new level of DFSMS. As you develop your migration plan, you will need to obtain information from a variety of sources. Table 1 on page 11 describes the primary

sources of DFSMS migration and installation documentation you need for this release. These publications are shipped with your product order and are also available on the web at:

http://www.ibm.com/server/eserver/zseries/zos/installation/
http://www.ibm.com/server/eserver/zseries/zos/bkserv/

Table 1. Books containing DFSMS Migration and Installation Information

Title of publication	Scope	Description of Contents
z/OS Introduction and Release Guide	Executive summary	High-level descriptions of z/OS elements, including DFSMS, and their new functions for this release. This summary is useful for introducing release changes to application user groups.
z/OS Planning for Installation	Pre-installation migration planning	Installation requirements for z/OS at a system and element level, including the DFSMS element. It provides hardware, software, and service requirements for both the driving and target systems. It also highlights product-level coexistence considerations and actions.
z/OS DFSMS Migration	Pre-installation, post-installation migration planning	Specific updates and considerations for migrating to this release of DFSMS. Included are common pre-installation and post-installation migration actions as well migration actions directly related to new function.
z/OS Program Directory	Installation	Specific steps for installing DFSMS as part of the z/OS system.
ServerPac: Using the Installation Dialog	Installation	Order-customized instructions for using the ServerPac installation method. “Appendix A. Product Information”, describes data sets supplied, and jobs or procedures that have been completed for you. Included are customized DFSMS changes.

How to use this book for migration planning

This book is most effective when you use it with other DFSMS publications that contain planning, installation, and migration information, listed in Table 1. Within this book, migration information is organized in the following way:

“Chapter 3. Following a Migration Roadmap” on page 15
This chapter provides informational roadmaps to help keep you on course as you navigate the large amount of migration information contained in this book. To help determine which migration actions pertain to your installation, select your migration path and let the roadmap lead you to the functional details.

“Chapter 4. Migration Actions Common to DFSMS Installations” on page 29
This chapter outlines migration tasks that you must address whenever you migrate from a previous release of DFSMS, regardless of your migration path. Your migration roadmap leads you into these tasks.

Although you probably won’t need to act on every task presented, you should consider the details of each topic to determine if you must plan for changes to ensure the continued availability of existing functions.

“Chapter 5. Migration Overview for z/OS V1R3 DFSMS” on page 55 and subsequent chapters

“Chapter 5. Migration Overview for z/OS V1R3 DFSMS” on page 55 describe the functional updates that were made to DFSMS for the current release. The follow-on chapters describe functional updates introduced in previous releases, some of which you might be “passing through” as you migrate to the current release. For each functional change, these chapters provide an overview of the change, a description of any migration and coexistence tasks that should be considered, and recommendations where you can find more details in the DFSMS library or other element libraries.

As you put together your migration plan, consider how the new and changed DFSMS support might affect key areas of your information technology organization:

System customization
System programmers must know about changes to system data sets, catalogs, installation exits, and other system-wide resources.

Storage Administration
Storage administrators need to know about changes to SMS definitions, control data sets and any device support implications.

Operations
Operations staff must be told about changed commands, new or changed messages, and methods of implementing new functions.

Auditing
Auditors need to know about changes to security options, audit records, and report generation utilities.

Application development
Application developers must be told about new functions that you intend to implement. To ensure that existing programs run as before, your application programmers need to know about any changes in commands, application programming interfaces, and other processing requirements.

General use
General users of DFSMS functions need to be informed of changes to utilities, commands such as DFSMShsm end user commands, and ISMF user applications.

Automation products
Automated products help automate manual operations that would otherwise require an operator. Automated products should recognize new and changed messages.

“Part 3. History of Interface Changes”

The chapters in this part of the book provide a summary of changes for DFSMS user and programming interfaces. The summary of interface changes includes updates introduced by service since the last release of DFSMS, as well as changes that are part of new function. These interfaces include:

- Callable services
- Commands
- Data areas
- Exits
- Macros
- Messages
- Panels
- SMF Records
- SYS1.PARMLIB members
- Utilities

Interface changes are also included in the information specific to each new functional enhancement.

Chapter 3. Following a Migration Roadmap

Migrating to a new level of a complex multicomponent product can seem like a daunting task, especially if you are moving up several product releases at one time. A migration roadmap can help you navigate through the large amount of migration information relevant to your installation. This chapter provides an informational roadmap for each migration path supported by the current release of DFSMS.

Migration Path Origin	Destination	Roadmap Location
OS/390 V2R10 DFSMS **or** z/OS V1R1	z/OS V1R3 DFSMS	15
DFSMS/MVS V1R5 **or** OS/390 V2R7, V2R8, or V2R9	z/OS V1R3 DFSMS	17
DFSMS/MVS V1R4 **or** OS/390 V2R4, V2R5, or V2R6	z/OS V1R3 DFSMS	20
DFSMS/MVS V1R3 **or** earlier		Migration to DFSMS V1R3 not supported

After you determine your migration path, follow the corresponding roadmap as it leads you through the tasks to:

- Complete common migration actions for DFSMS
- Integrate new device support
- Update catalog management functions
- Implement new program management functions
- Upgrade SMS, ISMF, and NaviQuest
- Expand storage and availability management for DASD
- Expand storage and availability management for objects and tape media
- Implement new data management functions

Each part of the map directs you to other detailed migration tasks or considerations within this book.

Map for migrating from z/OS V1R1 or OS/390 V2R10 DFSMS to z/OS V1R3

z/OS V1R1 DFSMS is functionally equivalent to OS/390 V2R10 DFSMS. The method you use for installing z/OS V1R3 determines whether you must take any action as you upgrade to the new level of DFSMS.

Migrate to z/OS V1R3 using the standard ServerPac, CBPDO, or SystemPac deliverables. If you are *not* using these deliverables and you *are* reinstalling the DFSMS element, you must address migration tasks that you normally perform any time you upgrade to a new level of DFSMS. For example, if you use the object access method, you must complete specific steps to activate the OAM component of DFSMSdfp on your system. Look at “Chapter 4. Migration Actions Common to DFSMS Installations” on page 29 to ensure that you complete all common preinstallation and postinstallation actions for this migration.

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Roadmap: Migrating from z/OS V1R1 or OS/390 V2R10 to z/OS V1R3

	▲ Complete common migration actions	Procedure location
Preinstallation actions	Prepare for the new level of DFSMS support (preinstallation)	29
Postinstallation actions	Set up ISMF	31
	Complete DFSMSdfp actions	35
	Complete DFSMSdss actions	39
	Complete DFSMShsm actions	39
	Complete DFSMSrmm actions	40
	Secure DFSMS resources	41
	Provide for new device installations	45
	Convert to system-managed storage	46
	Ensure data integrity of shared system resources	48
	Ensure data integrity of shared data sets	52

	▲ Integrate new device support	Introduced in	Overview
DASD and control unit device support (DFSMSdfp, DFSMSdss, DFSMShsm)	Advanced copy services	z/OS V1R3	57
	Dynamic volume count	z/OS V1R3	66
	Large volume support	OS/390 V2R10	68

	▲ Update catalog management functions	Introduced in	Overview
Catalog management (DFSMSdfp)	Catalog customer satisfaction	z/OS V1R3	63

	▲ Expand storage and availability management for DASD	Introduced in	Overview
Data set migration/recall support (DFSMShsm)	DFSMShsm common recall queue	z/OS V1R3	91

	▲ Expand storage and availability management for objects and tape media	Introduced in	Overview
Object access method (DFSMSdfp)	OAM multiple object backup	z/OS V1R3	85
Removable media support (DFSMSrmm)	DFSMSrmm bin management enhancements	z/OS V1R3	95
	DFSMSrmm report generator	z/OS V1R3	98
	DFSMSrmm special character support	z/OS V1R3	93
	DFSMSrmm support for using storage locations as home locations	z/OS V1R3	105
	DFSMSrmm macro enhancements	z/OS V1R3	100
	DFSMSrmm ACS pooling control enhancements	z/OS V1R3	101
	DFSMSrmm reporting enhancements	z/OS V1R3	103
	DFSMSrmm TSO/E help packaging enhancement	z/OS V1R3	94

	▲ Expand storage and availability management for objects and tape media	Introduced in	Overview
Performance, usability, and diagnostic improvements (DFSMSdfp, DFSMShsm)	Capacity utilization and performance enhancements	z/OS V1R3	59

	▲ Implement new data management functions	Introduced in	Overview
VSAM (DFSMSdfp)	RLS coupling facility caching enhancements	z/OS V1R3	73
	RLS lock table CF duplexing	z/OS V1R3	75
	VSAM large real storage	z/OS V1R3	80
	VSAM striped data set enhancements	z/OS V1R3	84
Hierarchical file system (DFSMSdfp, DFSMSdss)	CONFIGHFS enhancements	z/OS V1R3	65
	DFSMSdss COPY command enhancement	z/OS V1R3	89
	DFSMSdss HFS logical copy	z/OS V1R3	90

	▲ Upgrade SMS	Introduced in	Overview
SMS (cross-functional)	SMS miscellaneous enhancements	z/OS V1R3	77
Note: SMS changes are also included in other DFSMS functional enhancements.			

Map for migrating from DFSMS/MVS V1R5 to z/OS V1R3

Following a migration path from DFSMS/MVS V1R5, which runs on OS/390 V2R7, V2R8 or V2R9, this roadmap guides you through common migration actions and major functional changes for DFSMS to bring you up-to-date on z/OS V1R3. In OS/390 V2R9 and earlier, DFSMS/MVS was a stand-alone product for OS/390. (Do not use DFSMS/MVS on z/OS systems.)

	▲ Complete common migration actions	Procedure location
Preinstallation actions	Prepare for the new level of DFSMS support (preinstallation)	29
Postinstallation actions	Set up ISMF	31
	Complete DFSMSdfp actions	35
	Complete DFSMSdss actions	39
	Complete DFSMShsm actions	39
	Complete DFSMSrmm actions	40
	Secure DFSMS resources	41
	Provide for new device installations	45
	Convert to system-managed storage	46
	Ensure data integrity of shared system resources	48
	Ensure data integrity of shared data sets	52

Roadmap: Migrating from DFSMS/MVS V1R5 to z/OS V1R3

	▲ Integrate new device support	Introduced in	Overview
DASD and control unit device support (DFSMSdfp, DFSMSdss, DFSMShsm)	Advanced copy services	z/OS V1R3	57
	Device support for IBM 2105 Enterprise Storage Server	OS/390 V2R10	109
	Dynamic volume count	z/OS V1R3	66
	Large volume support	OS/390 V2R10	68
Tape and optical device support (cross-functional)	Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x	OS/390 V2R10*	112
* This support was retrofitted to earlier releases of DFSMS. See the functional overview for information about the product releases that provide full-function support.			

	▲ Update catalog management functions	Introduced in	Overview
Catalog management (DFSMSdfp)	Catalog customer satisfaction	z/OS V1R3	63

	▲ Expand storage and availability management for DASD	Introduced in	Overview
Other volume services (DFSMSdfp, DFSMSdss)	DFSMSdss extent reduction	OS/390 V2R10	148
Data set and volume backup/recovery (DFSMShsm)	DFSMShsm data set backup enhancements	OS/390 V2R10	149
Data set migration/recall support (DFSMShsm)	DFSMShsm fast subsequent migration	OS/390 V2R10	153
	DFSMShsm common recall queue	z/OS V1R3	91
Aggregate backup/recovery (DFSMShsm)	DFSMShsm ABARS support for UTDS large tape block sizes	OS/390 V2R10	156
Performance, usability, and diagnostic improvements (DFSMShsm)	DFSMShsm multiple address spaces	OS/390 V2R10	160
	DFSMShsm tracing improvements and release identifier change	OS/390 V2R10	157

	▲ Expand storage and availability management for objects and tape media	Introduced in	Overview
Object access method (DFSMSdfp)	OAM multiple object backup	z/OS V1R3	85
Performance, usability, and diagnostic improvements (DFSMSdfp, DFSMShsm)	Capacity utilization and performance enhancements	z/OS V1R3	59
Tape system services (cross-functional)	Unit affinity support	OS/390 V2R10	139
	Manual tape library support	OS/390 V2R10*	125
	Large tape block size support	OS/390 V2R10	118

	▲ **Expand storage and availability management for objects and tape media**	**Introduced in**	**Overview**
Virtual tape server (DFSMSdfp, DFSMSrmm)	Peer-to-Peer Virtual Tape Server	OS/390 V2R10*	145
	DFSMSrmm Virtual Tape Server enhancements	OS/390 V2R10	167
Removable media support (DFSMSrmm)	DFSMSrmm system-managed tape audit support	OS/390 V2R10	171
	DFSMSrmm support for fast tape positioning	OS/390 V2R10	166
	DFSMSrmm tape processing support enhancements	OS/390 V2R10	164
	DFSMSrmm multivolume set retention and movement	OS/390 V2R10	174
	DFSMSrmm pooling and policy enhancements	OS/390 V2R10	169
	DFSMSrmm pre-ACS interface support	OS/390 V2R10	172
	DFSMSrmm program name support	OS/390 V2R10	181
	DFSMSrmm reporting	OS/390 V2R10	184
	DFSMSrmm problem determination enhancements	OS/390 V2R10	176
	DFSMSrmm TCDB processing controls	OS/390 V2R10*	182
	DFSMSrmm Tivoli OPC support	OS/390 V2R10	178
	DFSMSrmm processing for purged volumes	OS/390 V2R10*	179
	DFSMSrmm bin management enhancements	z/OS V1R3	95
	DFSMSrmm report generator	z/OS V1R3	98
	DFSMSrmm special character support	z/OS V1R3	93
	DFSMSrmm macro enhancements	z/OS V1R3	100
	DFSMSrmm ACS pooling control enhancements	z/OS V1R3	101
	DFSMSrmm reporting enhancements	z/OS V1R3	103
	DFSMSrmm TSO/E help packaging enhancement	z/OS V1R3	94
	DFSMSrmm support for using storage locations as home locations	z/OS V1R3	105
* This support was retrofitted to earlier releases of DFSMS. See the functional overview for information about the product releases that provide full-function support.			

	▲ **Implement new data management functions**	**Introduced in**	**Overview**
VSAM (DFSMSdfp)	VSAM tracing and error recording improvements	OS/390 V2R10	144
	VSAM data striping	OS/390 V2R10	141
	RLS coupling facility caching enhancements	z/OS V1R3	73
	RLS lock table CF duplexing	z/OS V1R3	75
	VSAM striped data set enhancements	z/OS V1R3	84
	VSAM large real storage	z/OS V1R3	80
Hierarchical file system (DFSMSdfp)	Non-SMS-managed HFS data set support	OS/390 V2R10	132
	CONFIGHFS enhancements	z/OS V1R3	65
	DFSMSdss HFS logical copy	z/OS V1R3	90
	DFSMSdss COPY command enhancement	z/OS V1R3	89
PDSE (DFSMSdfp)	Non-SMS-managed PDSE support	OS/390 V2R10	134

Roadmap: Migrating from DFSMS/MVS V1R5 to z/OS V1R3

	▲ Implement new data management functions	Introduced in	Overview
Data-related system services (DFSMSdfp)	Rename function for duplicate data set names	OS/390 V2R10	137

	▲ Upgrade SMS	Introduced in	Overview
SMS (cross-functional)	SMS miscellaneous enhancements	z/OS V1R3	77
Note: SMS changes are also included in other DFSMS functional enhancements.			

Map for migrating from DFSMS/MVS V1R4 to z/OS V1R3

Following a migration path from DFSMS/MVS V1R4, which runs on OS/390 V2R4, V2R5, or V2R6, this roadmap guides you through common migration actions and major functional changes for DFSMS to bring you up-to-date on z/OS V1R3. For more information on the features introduced in DFSMS/MVS V1R4, see “Chapter 8. Migration Overview for DFSMS/MVS V1R4” on page 221.

Note: Because IBM has withdrawn service for DFSMS/MVS V1R4, you should migrate all of your systems to a later release of z/OS.

	▲ Complete common migration actions	Procedure location
Preinstallation actions	Prepare for the new level of DFSMS support (preinstallation)	29
Postinstallation actions	Set up ISMF	31
	Complete DFSMSdfp actions	35
	Complete DFSMSdss actions	39
	Complete DFSMShsm actions	39
	Complete DFSMSrmm actions	40
	Secure DFSMS resources	41
	Provide for new device installations	45
	Convert to system-managed storage	46
	Ensure data integrity of shared system resources	48
	Ensure data integrity of shared data sets	52

	▲ Integrate new device support	Introduced in	Overview
DASD and control unit device support (DFSMSdfp, DFSMSdss, DFSMShsm)	DFSMSdss SnapShot support for RAMAC Virtual Array	DFSMS/MVS V1R5	206
	Device support for IBM 2105 Enterprise Storage Server	OS/390 V2R10	109
	Advanced copy services	z/OS V1R3	57
	Dynamic volume count	z/OS V1R3	66
	Large volume support	OS/390 V2R10	68
Tape and optical device support (cross-functional)	OAM device support for IBM 3995-SW4 optical drive	DFSMS/MVS V1R5	202
	Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x	OS/390 V2R10*	112

	▲ Integrate new device support	Introduced in	Overview
* This support was retrofitted to earlier releases of DFSMS. See the functional overview for information about the product releases that provide full-function support.			

	▲ Update catalog management functions	Introduced in	Overview
Catalog management (DFSMSdfp)	Catalog alias and usability improvements	DFSMS/MVS V1R5	186
	Catalog sharing enhancements for sysplex environments	DFSMS/MVS V1R5	188
	Catalog customer satisfaction	z/OS V1R3	63

	▲ Upgrade SMS, ISMF, and NaviQuest	Introduced in	Overview
SMS (cross-functional)	SMS control data set structure changes	DFSMS/MVS V1R5	197
	SMS miscellaneous enhancements	z/OS V1R3	77
ISMF and NaviQuest (DFSMSdfp)	NaviQuest batch support	DFSMS/MVS V1R5	196
Note: SMS and ISMF changes are also included in other DFSMS functional enhancements.			

	▲ Expand storage and availability management for DASD	Introduced in	Overview
SMS-managed volume support (DFSMSdfp, DFSMSdss, DFSMShsm)	DFSMSdss storage group filtering	DFSMS/MVS V1R5	207
Other volume services (DFSMSdfp, DFSMSdss)	DFSMSdss logical release support	DFSMS/MVS V1R5	206
	Extended remote copy enhancements	DFSMS/MVS V1R5	190
	DFSMSdss extent reduction	OS/390 V2R10	148
Data set and volume backup/recovery (DFSMShsm)	DFSMShsm general function and usability improvements	DFSMS/MVS V1R5	212
	DFSMShsm data set backup enhancements	OS/390 V2R10	149
Data set migration/recall support (DFSMShsm)	DFSMShsm general function and usability improvements	DFSMS/MVS V1R5	212
	DFSMShsm fast subsequent migration	OS/390 V2R10	153
	DFSMShsm common recall queue	z/OS V1R3	91
Aggregate backup/recovery (DFSMShsm)	DFSMShsm ABARS support for UTDS large tape block sizes	OS/390 V2R10	156

Roadmap: Migrating from DFSMS/MVS V1R4 to z/OS V1R3

	▲ Expand storage and availability management for DASD	Introduced in	Overview
Performance, usability, and diagnostic improvements (DFSMShsm)	DFSMShsm control data set extended addressability	DFSMS/MVS V1R5	208
	DFSMShsm GRSplex serialization	DFSMS/MVS V1R5	209
	DFSMShsm overhead reduction	DFSMS/MVS V1R5	210
	DFSMShsm secondary host promotion	DFSMS/MVS V1R5	211
	DFSMShsm general function and usability improvements	DFSMS/MVS V1R5	212
	DFSMShsm multiple address spaces	OS/390 V2R10	160
	DFSMShsm tracing improvements and release identifier change	OS/390 V2R10	157

	▲ Expand storage and availability management for objects and tape media	Introduced in	Overview
Performance, usability, and diagnostic improvements (DFSMSdfp, DFSMShsm)	Capacity utilization and performance enhancements	z/OS V1R3	59
Tape system services (cross-functional)	ISO/ANSI Version 4 tape support	DFSMS/MVS V1R5	193
	Manual tape library support	OS/390 V2R10*	125
	Unit affinity support	OS/390 V2R10	139
	Large tape block size support	OS/390 V2R10	118
Virtual tape server (DFSMSdfp, DFSMSrmm)	Virtual Tape Server import/export support	DFSMS/MVS V1R5*	200
	Peer-to-Peer Virtual Tape Server	OS/390 V2R10*	145
	DFSMSrmm Virtual Tape Server enhancements	OS/390 V2R10	167
Object access method (DFSMSdfp)	OAM operator command changes	DFSMS/MVS V1R5	202
	OAM parallel sysplex support	DFSMS/MVS V1R5	203
	OAM pseudo library concept changes	DFSMS/MVS V1R5	205
	OAM multiple object backup	z/OS V1R3	85
Removable media support (DFSMSrmm)	DFSMSrmm application programming interface	DFSMS/MVS V1R5*	214
	DFSMSrmm catalog status tracking	DFSMS/MVS V1R5	215
	DFSMSrmm disposition control	DFSMS/MVS V1R5	216
	DFSMSrmm subsystem enhancements	DFSMS/MVS V1R5	216
	DFSMSrmm TSO subcommand enhancements	DFSMS/MVS V1R5	217
	DFSMSrmm vital record specification enhancements	DFSMS/MVS V1R5*	218
	DFSMSrmm system-managed tape audit support	OS/390 V2R10	171
	DFSMSrmm support for fast tape positioning	OS/390 V2R10	166

	▲ **Expand storage and availability management for objects and tape media**	**Introduced in**	**Overview**
	DFSMSrmm tape processing support enhancements	OS/390 V2R10	164
	DFSMSrmm multivolume set retention and movement	OS/390 V2R10	174
	DFSMSrmm pooling and policy enhancements	OS/390 V2R10	169
	DFSMSrmm pre-ACS interface support	OS/390 V2R10	172
	DFSMSrmm program name support	OS/390 V2R10	181
	DFSMSrmm reporting	OS/390 V2R10	184
	DFSMSrmm problem determination enhancements	OS/390 V2R10	176
	DFSMSrmm TCDB processing controls	OS/390 V2R10*	182
	DFSMSrmm Tivoli OPC support	OS/390 V2R10	178
	DFSMSrmm processing for purged volumes	OS/390 V2R10*	179
	DFSMSrmm bin management enhancements	z/OS V1R3	95
	DFSMSrmm report generator	z/OS V1R3	98
	DFSMSrmm special character support	z/OS V1R3	93
	DFSMSrmm macro enhancements	z/OS V1R3	100
	DFSMSrmm ACS pooling control enhancements	z/OS V1R3	101
	DFSMSrmm reporting enhancements	z/OS V1R3	103
	DFSMSrmm TSO/E help packaging enhancement	z/OS V1R3	94
	DFSMSrmm support for using storage locations as home locations	z/OS V1R3	105
* This support was retrofitted to earlier releases of DFSMS. See the functional overview for information about the product releases that provide full-function support.			

Roadmap: Migrating from DFSMS/MVS V1R4 to z/OS V1R3

	▲ Implement new data management functions	Introduced in	Overview
Access method services and utilities (DFSMSdfp)	IDCAMS changes for DEFINE CLUSTER with IMBED or REPLICATE	DFSMS/MVS V1R5	192
Data-related system services (DFSMSdfp)	DEB table expansion	DFSMS/MVS V1R5	189
	Rename function for duplicate data set names	OS/390 V2R10	137
Hierarchical file system (DFSMSdfp)	Hierarchical file system performance and other enhancements	DFSMS/MVS V1R5	191
	Non-SMS-managed HFS data set support	OS/390 V2R10	132
	CONFIGHFS enhancements	z/OS V1R3	65
	DFSMSdss HFS logical copy	z/OS V1R3	90
	DFSMSdss COPY command enhancement	z/OS V1R3	89
PDSE (DFSMSdfp)	Non-SMS-managed PDSE support	OS/390 V2R10	134
VSAM (DFSMSdfp)	VSAM extended format data set enhancements	DFSMS/MVS V1R5	197
	VSAM tracing and error recording improvements	OS/390 V2R10	144
	VSAM data striping	OS/390 V2R10	141
	RLS coupling facility caching enhancements	z/OS V1R3	73
	RLS lock table CF duplexing	z/OS V1R3	75
	VSAM striped data set enhancements	z/OS V1R3	84
	VSAM large real storage	z/OS V1R3	80

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DFSMSrmm application programming interface 214
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Chapter 4. Migration Actions Common to DFSMS Installations

This chapter describes activities and changes that you must consider whenever you migrate from a previous release of DFSMS, regardless of which new functions you intend to implement. In many cases, these actions help you to maintain “business as usual” as you migrate to the new level of DFSMS.

If you are upgrading a parallel sysplex environment, you can find additional guidance on parallel sysplex migration planning, including storage management and data sharing techniques, through the *Parallel Sysplex Configuration Assistant*, on the web at:

`http://www.ibm.com/servers/s390/os390/wizards/parallel/ps_intro.html`

Summary of common migration actions

Table 2 summarizes migration actions that are common for most DFSMS users.

Table 2. Summary of common migration actions for DFSMS

Migration action:	Refer to location:
Prepare for the new level of DFSMS support (preinstallation)	29
Set up ISMF	31
Complete DFSMSdfp actions	35
Complete DFSMSdss actions	39
Complete DFSMShsm actions	39
Complete DFSMSrmm actions	40
Secure DFSMS resources	41
Provide for new device installations	45
Convert to system-managed storage	46
Ensure data integrity of shared system resources	48
Ensure data integrity of shared data sets	52

Prepare for the new level of DFSMS support (preinstallation)

The *z/OS Planning for Installation* book describes software, hardware, and coexistence dependencies for the base DFSMSdfp element as well as for the other DFSMS optional features: DFSMSdss, DFSMShsm, and DFSMSrmm. This section presents a few other preinstallation tasks that you should consider.

Migrate from pre-DFSMS/MVS V1R4 product levels

This migration guide covers only the currently-supported migration paths. You can still access migration information pertaining to coexistence with releases prior to DFSMS/MVS V1R4 by checking the *OS/390 Version 2 Release 10 DFSMS Migration*.

You can also find DFSMS sources in the OS/390 Internet Library at:

`http://www.ibm.com/servers/s390/os390/bkserv/`

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Apply coexistence maintenance

New function is not normally retrofitted to older releases of DFSMS. Coexistence maintenance, however, is usually provided to other *supported* levels of DFSMS to enable those lower-level systems to share DFSMS-owned resources with systems at the current level of DFSMS. For an introduction to the concept of coexistence in the DFSMS environment, refer to “Terms you need to know” on page 10.

Although coexistence maintenance does not give you the same function as the new product level, it enables you to perform the following tasks:

- Share control data sets among mixed levels of DFSMS.
- Switch back to a prior release, if necessary.
- Avoid unexpected errors related to new or changed function.
- Prevent possible data corruption.

Before you install the new level of DFSMS, you must apply the necessary coexistence PTFs to any system that can share resources with the target system, even if it is only during the testing phase of your migration. This is critical for single system images as well because of the serial sharing that occurs between a test and production system. Coexistence maintenance is often required to protect the integrity of your catalogs and other critical system data sets.

For example, DFSMS V1R3 offers capacity and performance enhancements for tape subsystems. OS/390 V2R10 users would apply coexistence PTFs to allow their system to share tape subsystems with DFSMS V1R3 systems. You can find coexistence maintenance and procedures discussed at the function level in “Chapter 5. Migration Overview for z/OS V1R3 DFSMS” on page 55, and in subsequent chapters.

For the most up-to-date list of coexistence APARs and PTFs, see the z/OS DFSMS PSP bucket. DFSMS coexistence maintenance is also listed, by product level, in *z/OS Planning for Installation*. This publication also describes the coexistence-fallback-migration policy set for the z/OS operating system.

Remove unsupported I/O devices

Before you install the new level of z/OS and DFSMS, you should remove any devices that are not recognized by the operating system. z/OS provides support for I/O devices from earlier MVS systems, with the exception of the following:

- IBM System/3 or 1130 operating as a JES2 remote workstation
- IBM 3850 Mass Storage System
- IBM 2305, 3330, 3333, 3340, 3344, 3350, 3350P, 3351P, and 3375 DASD
- IBM 3830 and 3880 Models 1, 4, 11, and 21 Storage Controls

Refer to “Appendix A. I/O Devices and Subsystems Supported by DFSMS” on page 303 for a list of I/O devices that are supported. If you have a question about support for a device not listed, contact your IBM representative.

If you have data stored on unsupported DASD devices, you must move the data to a supported device geometry before you migrate your system to this product release. Detach unsupported devices from the system by deleting their corresponding device definitions from the input/output definition file (IODF). See *z/OS HCD Planning* for more information.

Understand Year 2000 changes

With the beginning of the Year 2000, **VSAM catalogs and CVOLs are no longer supported**, as they are not fully compatible with 4-digit date recording. Data cataloged by these resources is no longer accessible through the standard access methods; however, you might be able to use utilities such as IEHLIST on them. If you do have VSAM catalogs and CVOLs remaining in your data center, convert them to the ICF structure before installing the new level of DFSMS.

To learn more about how DFSMS has changed messages, reporting records, data areas, and catalog information to support dates in the new millennium, refer to "Appendix B. Year 2000 support for DFSMS" on page 305.

Set up ISMF

The Interactive Storage Management Facility (ISMF) helps you control data and storage resources on your system. As an Interactive System Productivity Facility (ISPF) application, ISMF is menu-driven with fast-path access to many of its storage management functions.

ISMF is installed on your system as part of the DFSMSdfp element. After following the installation procedures you receive with the z/OS product, you need to complete the following steps to set up ISMF on your system:

1. Decide where to place the ISMF load module libraries and distribution libraries.
2. Make ISMF available to TSO/E users, either through a CLIST or JCL logon procedure.
3. Modify one or more menus to allow users to invoke ISMF.

Once you complete the steps described in this section, you can customize ISMF to meet the needs of your storage administrators and users. For more information about tailoring ISMF to your needs, refer to the *z/OS DFSMSdfp Storage Administration Reference* and *z/OS DFSMS: Using the Interactive Storage Management Facility*.

Store ISMF load module libraries

When following installation procedures in the *z/OS Program Directory*, you are given the space requirements and options for where to store your ISMF load module libraries. In deciding the placement of your libraries, you must consider the performance and access requirements of these load modules.

Library placement

The placement of your ISMF load module libraries affects the performance of your system. You should always store these load modules on high-performance DASD.

The default location for ISMF load modules is SYS1.DGTLLIB. If you want to use RACF to control access to ISMF functions, consider placing the load modules into the system link library, SYS1.LINKLIB, or into a private load library. If your ISMF load modules are placed anywhere other than SYS1.DGTLLIB, you must identify the location of these modules to the System Modification Program/Extended (SMP/E).

To make the load modules a part of SYS1.LINKLIB, do *one* of the following:

- Copy the load modules from SYS1.DGTLLIB to SYS1.LINKLIB.
- Add the name SYS1.DGTLLIB to LNKLSTnn, which is a member of SYS1.PARMLIB.

Common migration actions

- Copy the load modules from SYS1.DGTLLIB to an existing data set whose name is already in LNKLSTnn.
- Use the SMP/E DDDEF for DGTLLIB to make the target library SYS1.LINKLIB so that SMP/E APPLY processing links the ISMF load modules into SYS1.LINKLIB instead of SYS1.DGTLLIB.

If you leave the ISMF load modules in SYS1.DGTLLIB and do not include SYS1.DGTLLIB in the link list, you can add the data set name to the TSO/E logon procedure JCL, or to a new or existing CLIST, for use with TSO/E (See “Make ISMF available to TSO/E users” on page 33).

Additional placement considerations are described in *z/OS MVS System Data Set Definition*.

Library access control using RACF

You can control access to ISMF functions using Resource Access Control Facility (RACF), a security program. To use these features, you need to place your ISMF load modules into the link list.

RACF can protect the entire ISMF component, specific applications, or any of the individual ISMF line operators or commands. You decide who is authorized to perform each ISMF function, setting up an access scheme that applies to either individual users or groups of users.

In addition to controlling ISMF functions, you can use standard RACF checking to limit access to individual data sets, volumes, or catalogs. Used in conjunction with RACF control, access checking ensures that appropriate ISMF lists and functions are available to users when they are needed.

For procedures on how to restrict ISMF functions, see *z/OS DFSMSdfp Storage Administration Reference*. For more information on RACF, see the *z/OS Security Server RACF Security Administrator’s Guide*.

Allocate ISPF table libraries

Each ISMF user needs a personal partitioned data set (PDS) or partitioned data set extended (PDSE) to use as a table output library. The ISMF SAVE command stores the saved list in this PDS or PDSE using ISPF table services. Allocate this data set using a DDNAME of ISPTABL. The data set name you choose might be of this form:

```
DSN=userid.ISMF.DGTTABL
```

Place this data set name in the concatenation for the ISPF table input library (ISPTLIB) also, so that the output of the SAVE command is available for subsequent use.

An example of the JCL DD statement for the table output library:

```
//ISPTABL  DD DSN=userid.ISMF.DGTTABL,DISP=OLD
```

An example of the statements for the table input libraries:

```
//ISPTLIB  DD DSN=userid.ISMF.DGTTABL,DISP=SHR
//         DD DSN=SYS1.DGTTLIB,DISP=SHR
```

The table output library, *.ISMF.DGTTABL, has a fixed-block record format and a record length of 80. The block size must be a multiple of 80 and it must be compatible with the other data sets in the concatenation.

Make ISMF available to TSO/E users

To give TSO/E users access to ISMF libraries that contain panels and messages, or to give access to the load module library SYS1.DGTLLIB, you can set up your execution environment by modifying your TSO/E logon procedure, or by writing a CLIST. Both procedures are described in the following sections. The advantage of using a CLIST over a logon procedure is that the logon procedure is performed only at TSO/E logon time, whereas different CLISTS can be used to change data set access schemes many times within the same session.

You can also use ISPF LIBDEF to allocate the libraries (except for SYS1.DGTLLIB) dynamically as ISMF is started.

Option A: Modify TSO/E logon procedure

You can provide TSO/E users with access to a load module data set by adding DD statements to your logon procedure. Add the load module data set for ISMF to the existing DD statements for the ISPF libraries. You must specify the load module data set before the ISPF data set names in the concatenation. For an example of a concatenation including the ISMF load module data set, see Table 3. You can include other data sets as part of these concatenations.

Table 3. Example of a partial TSO/E logon procedure showing ISMF libraries

```
//ISPLLIB   DD DSN=SYS1.DFQLLIB,DISP=SHR
//          DD DSN=SYS1.DGTLLIB,DISP=SHR
//          DD DSN=SYS1.SISPLPA,DISP=SHR
//          DD DSN=SYS1.SISPLOAD,DISP=SHR
//ISPPLIB   DD DSN=SYS1.DFQPLIB,DISP=SHR
//          DD DSN=SYS1.DGTPLIB,DISP=SHR
//          DD DSN=SYS1.SEDGPENU,DISP=SHR
//          DD DSN=SYS1.SISPPENU,DISP=SHR
//ISPMLIB   DD DSN=SYS1.DFQMLIB,DISP=SHR
//          DD DSN=SYS1.DGTMLIB,DISP=SHR
//          DD DSN=SYS1.SEDGMENU,DISP=SHR
//          DD DSN=SYS1.SISPMENU,DISP=SHR
//ISPSLIB   DD DSN=SYS1.DGTSLIB,DISP=SHR
//          DD DSN=SYS1.SISPSENU,DISP=SHR
//ISPTLIB   DD DSN=SYS1.DGTTLIB,DISP=SHR
//          DD DSN=SYS1.SISPTENU,DISP=SHR
//SYSPROC   DD DSN=SYS1.DGTCLIB,DISP=SHR
//          DD DSN=SYS1.SEDGEXE1,DISP=SHR
//          DD DSN=SYS1.SISPCLIB,DISP=SHR
```

Guideline: Include the SYS1.DGTLLIB data set on the ISPLLIB DD statement only if you do not include SYS1.DGTLLIB in the link list.

Option B: Set up a CLIST

Write a CLIST as an alternative or supplement to modifying JCL logon procedures. The CLIST must consist of a series of ALLOCATE commands for each ISMF and ISPF library. Add the name of the library containing the CLIST to either the concatenation of SYSPROC or the ddname ISPCLIB. Table 4 on page 34 shows the ALLOCATE statements for each of the libraries. You can include other data sets as part of these concatenations.

Table 4. Example of a CLIST to make load module data sets available to TSO/E users

```
ALLOCATE FILE(ISPLLIB) SHARE REUSE     -
          DATASET('SYS1.DFQLLIB'       -
                  'SYS1.DGTLLIB'       -
                  'SYS1.SISPLPA'       -
                  'SYS1.SISPLOAD')
ALLOCATE FILE(ISPPLIB) SHARE REUSE     -
          DATASET('SYS1.DFQPLIB'       -
                  'SYS1.DGTPLIB'       -
                  'SYS1.SEDGPENU'       -
                  'SYS1.SISPPENU')
ALLOCATE FILE(ISPMLIB) SHARE REUSE     -
          DATASET('SYS1.DFQMLIB'       -
                  'SYS1.DGTMLIB'       -
                  'SYS1.SEDGMENU'       -
                  'SYS1.SISPMENU')
ALLOCATE FILE(ISPSLIB) SHARE REUSE     -
          DATASET('SYS1.DGTSLIB'       -
                  'SYS1.SISPSENU')
ALLOCATE FILE(ISPTLIB) SHARE REUSE     -
          DATASET('SYS1.DGTTLIB'       -
                  'SYS1.SISPTENU')
ALLOCATE FILE(SYSPROC) SHARE REUSE     -
          DATASET('SYS1.DGTCLIB'       -
                  'SYS1.SEDGEXE1'       -
                  'SYS1.SISPCLIB')
```

Modify menus to invoke ISMF

To allow users to invoke ISMF, you need to add an option on one of the following interactive menus:

- The ISPF Primary Option Menu
- The SPF Master Application Menu
- A menu of your own choosing

An example for creating an ISMF option on the ISPF Primary Option Menu is shown here. This example is based on an ISPF 4.2 system and assumes that ISR@PRIM, the member containing ISPF primary option menu and processing instructions, is already copied into SYS1.DGTPLIB.

1. Edit SYS1.DGTPLIB(ISR@PRIM) to add entries to the ')AREA SAREA39' and ')PROC' sections of the source code.
2. The ')AREA SAREA39' section lists the options the users see on the ISPF panel. Insert the option letter and text for invoking ISMF, as shown in the partial 'AREA SAREA39' section below.

```
)AREA SAREA39
 0  Settings      Terminal and user parameters
 1  View          Display source data or listings
 2  Edit          Create or change source data
 3  Utilities     Perform utility functions
 .
 .
 .
 10 SCLM          SW Configuration Library Manager
 I  ISMF          Invoke ISMF
```

3. The ')PROC' section contains the code to execute the ISPF options. Insert the code to invoke ISMF, as shown in the partial ')PROC' section below.

```
)PROC
  ...
&ZSEL = TRANS ( TRUNC (&ZCMD,'.')
  0,'PGM(ISPISM) SCRNAME(SETTINGS)'
  1,'PGM(ISRBRO) PARM(ISRBRO01) SCRNAME(VIEW)'
  2,'PGM(ISREDIT) PARM(P,ISREDM01) SCRNAME(EDIT)'
  3,'PANEL(ISRUTIL) SCRNAME(UTIL)'
  .
  .
  .
  10,'PGM(ISRSCLM) SCRNAME(SCLM) NOCHECK'
   I,'PGM(DGTFMD01) PARM(&ZCMD) NEWAPPL(DGT) NOCHECK'
```

4. Save your changes in ISR@PRIM.
5. Verify that your modified ISPF Primary Option Menu looks similar to the one shown in Figure 1. When you select option "I" from this panel, the ISMF Primary Option Menu should display.

```
  Menu  Utilities  Compilers  Options  Status  Help
 ------------------------------------------------------------------------------
                           ISPF Primary Option Menu
 Option ===>

 0  Settings      Terminal and user parameters           User ID . : L841557
 1  View          Display source data or listings        Time. . . : 12:23
 2  Edit          Create or change source data           Terminal. : 3278
 3  Utilities     Perform utility functions              Screen. . : 1
     .
     .
     .
10  SCLM        - SW Configuration Library Manager
 I  ISMF        - Invoke ISMF
     .
     .
     .


 Enter X to Terminate using log/list defaults
```

Figure 1. Example of a modified ISPF Primary Option Menu

Complete DFSMSdfp actions

Ensure that the following tasks are completed after you install the DFSMSdfp element.

Enable OAM for object and tape library support

DFSMSdfp's object access method (OAM) is not activated with the base installation because it has some unique migration procedures that you need to complete each time you upgrade to a new level of DFSMS.

If you are using OAM support for objects or tape libraries, refer to the details in the *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*, or the *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries*, especially the chapter on "Migrating, Installing, and Customizing OAM".

Provide access to program support functions and libraries

Ensure that the following program support functions and libraries are available to the applications that use them.

ISAM

Because the indexed sequential access method (ISAM) is no longer supported, it is excluded from the base DFSMSdfp installation. The ISAM component is not in SYS1.LPALIB, but in a separate library called SYS1.ISAMLPA. This enables you to include or exclude ISAM at the time you IPL the system. If you have ISAM applications that are not using the compatibility interface of VSAM, you must complete the following steps to make ISAM support available to those applications.

1. Add SYS1.ISAMLPA to the LPALSTyy member in SYS1.PARMLIB.
2. Update the IEASYSxx member to point to the updated LPALSTyy.
3. Add SYS1.ISAMLPA and its associated volume serial to the IEAAPFzz member in SYS1.PARMLIB.
4. Ensure that SYS1.ISAMLPA is cataloged in the master catalog of the target system.

All ISAM modules reside below the 16 MB line. If you have no programs that use this obsolete function, you can free storage below the 16 MB line for use by all address spaces. For more information, see *z/OS DFSMS: Using Data Sets*.

Dynamic link libraries

If your installation builds or references dynamic link libraries (DLL), you must set up the system link list to refer to the Language Environment® (LE) runtime library, or each job must include a steplib DD statement referencing this library.

CDRA and numeric conversion routines

If you plan to use the Character Data Representation Architecture (CDRA) and associated numeric conversion routines, you must activate this function by tailoring and running CDRAINIT in SYS1.SAMPLIB.

The distributed file manager (DFM) uses the Language Environment (LE) program to do CDRA conversions. If your system's link list doesn't refer to the LE runtime library, you must add the appropriate STEPLIB DD statement to DFM startup procedure SYS1.PROCLIB(DFM). You must also make the same change to SYS1.SAMPLIB(GDETPDEF) and rerun it.

Distributed file manager data agents

To enable DFM data agents, follow these steps after installing DFSMSdfp:

1. Browse the SYS1.SAMPLIB member DFMREADM for DFM data agent highlights.
2. Verify that the DFM member in SYS1.PROCLIB is correct.
3. Update SYS1.PARMLIB member DFM00. Set RESTRICT_START as appropriate for your installation.
4. Update and submit the DFMXTSOI member in SYS1.SAMPLIB to build the DFMQTSO and DFMXTSO agent procedures in SYS1.PROCLIB and the DFMQTSO executable code in SYS1.LINKLIB.
5. If your installation will write data agent routines in the C language, copy the DFMXAGNT member from SYS1.SAMPLIB to a suitable working library and use your installation's compile and linkedit JCL to build the DFMXAGNT executable code. Refer to the prologue in DFMXAGNT source for instructions concerning how to build the DFMXAGNT member in SYS1.PROCLIB.

6. If you want to install the SORT sample, update and submit the SYS1.SAMPLIB member DFMXSRTI.
7. If you want to use DFMX0001 as a generic data agent procedure, copy it to SYS1.PROCLIB.
8. To verify that the data agent is set up properly, install DFMACALL on a workstation connected to the mainframe and run the data agent routines mentioned above. Refer to the prologues in the source for the routines, or look at DFMACALL help text for more details.
9. If data agent routines can initiate long-running processes, adjust APPC message limit and timeout settings accordingly.

See “Distributed file manager data agents” on page 224 for related migration information.

Programming interface macros

DFSMS intended programming interface macros, previously known as general use and product sensitive programming macros, help you construct DFSMS program interfaces. You can find these macros in the SYS1.AMACLIB and SYS1.AMODGEN libraries. You should use the following SYSLIB concatenation to make these macros available:

- SYS1.MACLIB
- SYS1.MODGEN

For any other non-DFSMS macros distributed in SYS1.AMACLIB and SYS1.AMODGEN, if they are not grouped into general use and product sensitive macros in those libraries, you should use the following SYSLIB concatenation until that separation is complete:

- SYS1.SMPMTS
- SYS1.MACLIB
- SYS1.MODGEN

Provide for virtual storage requirements of new product support

SMS support requirements

Jobs that use system-managed data sets require more virtual storage space than equivalent jobs using non-system-managed data sets due to the additional control information SMS support requires.

If users are experiencing virtual storage abends (for example, abends 878 or 80A) suggest the following options to help circumvent the abends:

- Decrease the region size requested for the job. This makes more room available below 16 MB for required system control blocks.
- Split the job into two or more jobs.
- For JES2 systems, create a job class that places the scheduler work area above 16 MB, and have users affected specify this class in the CLASS parameter on their JOB statement. After selecting a class, use the JOBCLASS statement with the SWA=ABOVE keyword to create the class in the JES2 initialization stream. See *z/OS JES2 Initialization and Tuning Reference* for information about the JES2 initialization stream.
- For JES3 installations, use the CIPARM statement in the JES3 initialization stream to specify that the scheduler work area should be placed above 16 MB. See *z/OS JES3 Initialization and Tuning Reference* for information about the JES3 initialization stream.

- The system programmer can omit ISAM from the system if no program uses ISAM. ISAM occupies virtual storage below the 16 MB line even when it is not in use. See “ISAM” on page 36 for more information.

VSAM support requirements

If you have a VSAM program that experiences virtual storage constraint problems, use the RMODE31 parameter on the ACB, BLDVRP, and GENCB macros to request that VSAM buffers and control blocks be allocated above the 16 MB line. Specifying CB or BOTH for the RMODE parameter reduces the amount of storage used in the address space private area, which is part of 16 MB addressable storage.

PDSE support requirements

You might need to increase your system’s virtual storage limits in the extended common service area (ECSA) and in the extended system queue area (ESQA) based on the extent to which PDSEs are used in your installation.

PDSE support builds data areas and other work areas in ECSA and ESQA during IPL. Storage requirements increase as the number of PDSE members grows, or as the number of users sharing PDSE members increases. Table 5 shows the minimum storage usage after IPL and examples of how this storage grows after PDSE processing.

Table 5. Storage requirements for PDSE support

System Storage Area	Minimum Requirements	Increase for PDSE Source Data Sets (Example 1)	Increase for PDSE Program Libraries (Example 2)
ECSA	1.7 MB	3.4 MB	2.0 MB
ESQA	0.9 MB	1.2 MB	2.6 MB

Notes:

1. Example 1: When copying a 1000–member PDS to a PDSE, storage usage increases mostly in ECSA, as shown. Based on this example, approximately 1.7 MB of ECSA and 0.3 MB of ESQA is required per 1000 PDSE members connected.
2. Example 2: When copying a 1000–member program library, most of the virtual storage growth is in ESQA. Based on this example, approximately 0.3 MB of ECSA and 1.7 MB of ESQA is required per 1000 program objects connected.

As the examples demonstrate, a 1000-member source PDSE requires approximately 1.7 MB storage in ECSA and 0.3 MB in ESQA and a 1000-member PDSE program library requires 0.3 MB of ECSA and 1.7 MB of ESQA. This is in addition to the minimum 1.7 MB of ECSA and 0.9 MB of ESQA acquired during IPL. PDSEs containing more members take correspondingly more ECSA and ESQA storage.

Based on PDSE usage in your installation, you need to set a sufficiently high limit on ECSA and ESQA usage. When the ECSA or ESQA limit is exhausted, additional storage is obtained by the system in CSA and SQA instead. This could severely affect the operation of other subsystems and could require an IPL for resolution.

Consider adding 50 MB to ECSA or ESQA storage, depending on how PDSEs are used in your installation.

Address other program support changes

You might need to take some action as a result of the following changes. In most cases, your actions depend on whether you have in-house or vendor applications that use a given function or interface.

Programs using DCOLLECT

You should be aware of differences in running DCOLLECT at this level if you have hierarchical file system (HFS) data sets. Because of the changes in HFS multivolume support introduced in DFSMS/MVS V1R5, the HFS data set must be mounted, or mountable, on any system where DCOLLECT is initiated.

If the HFS data set is not mounted, DFSMS will attempt to mount it. If DFSMS cannot mount the data set because, for example, it is already mounted on another system or because UNIX system services is not started, DCOLLECT issues messages and error byte X'20' for the HFS data set. This is a processing restriction for systems below OS/390 V2R9.

For OS/390 V2R9 through z/OS V1R2, if the file system is already mounted on the sysplex, you must run DCOLLECT on the system that owns the file system. This restriction has been removed in z/OS V1R3.

Programs using the UCB device class extension

If you have a program that is dependent on the size of the UCB device class extension (DCE) for tape drives, mapped by macro IECUCBCX, you should be aware of a change in the DCE format.

The DCE has grown by 28 bytes with the addition of a new section called UCBCX3. Independent software vendors who supply Unit Information Modules (UIMs) for tapes need to change their code to account for the addition of the UCBCX3 section.

Complete DFSMSdss actions

If you are enabling DFSMSdss, ensure that the following tasks are completed.

Build the core image for stand-alone services

If you intend to use the stand-alone services provided by DFSMSdss, you must use the DFSMSdss BUILDSA function to create the stand-alone services IPL-capable core image. This must be done after DFSMSdss is installed and accepted by SMP/E. Refer to the chapter in the *z/OS DFSMSdss Storage Administration Reference* entitled "Stand-Alone Services of DFSMSdss" for details.

If you haven't done so already, you should make a backup copy of your system that can be restored by this function. See the chapter in *z/OS DFSMSdss Storage Administration Guide*, entitled "Managing Availability with DFSMSdss", specifically the section, "Backing up Volumes", for the procedure.

Complete DFSMShsm actions

If you are enabling DFSMShsm, refer to the *z/OS DFSMShsm Implementation and Customization Guide* for DFSMShsm-related actions, including the following verification procedures.

Run the installation verification procedure

The DFSMShsm *installation verification procedure* (IVP) is an optional procedure that you can use to verify that DFSMShsm is correctly installed and can be started

and stopped using a minimum of DASD resources. When SMP/E installs DFSMShsm modules on your system, it places the ARCIVPST member into SYS1.SAMPLIB. ARCIVPST is the job for the IVP.

See the setup requirements and steps for running the IVP in the *z/OS DFSMShsm Implementation and Customization Guide*.

Run the functional verification procedure

The DFSMShsm *functional verification procedure* (FVP) helps you test major DFSMShsm functions such as backup, dump, migrate, recall, recovery, and restore. You can find the job for the FVP in SYS1.SAMPLIB member ARCFVPST.

Consider using the FVP to verify processing results at the new level of DFSMS. You can run the FVP after running the DFSMShsm starter set but before running any of the jobs that adapt the starter set to your environment.

See the *z/OS DFSMShsm Implementation and Customization Guide* for information on the DFSMShsm starter set and the requirements and steps for running the FVP.

Complete DFSMSrmm actions

If you are enabling DFSMSrmm, ensure that the following tasks are completed.

Update SMS ACS routines to control volume allocations

If you enable DFSMSrmm ACS pooling control, before you IPL this level of DFSMS, you must make a preventative change in your SMS automatic class selection (ACS) routines to keep DFSMSrmm from incorrectly processing tape volumes as a result of new SMS ACS support.

Update your ACS management class (MC) and storage group (SG) routines to check if the ACS environment variable (&ACSENVIR) is set to either RMMPOOL or RMMVRS, and if it is, avoid setting an MC or SG name. You can add statements such as the following to your MC and SG routines:

```
WHEN (&ACSENVIR = 'RMMPOOL' | &ACSENVIR = 'RMMVRS')
    DO
      EXIT
    END
```

If you do not make this change, it is possible for DFSMSrmm to use a management class name or a storage group name returned by the ACS routines incorrectly. See “DFSMSrmm pooling and policy enhancements” on page 169 for more information on the functional enhancement related to these changes.

TSO/E logon default libraries

Make the DFSMSrmm panel library, tables, skeletons, messages, and REXX execs available to users.

If you are not using LIBDEF, Table 6 on page 41 shows the names of the default libraries that you can concatenate to the DD statements in the TSO/E logon procedures or a user-supplied start-up CLIST. If you are using LIBDEF, the EDGRMLIB exec allocates these default libraries to the user. If you change the names of the target libraries on your system, add the new library names to the EDGRMLIB exec. Table 6 on page 41 lists the DFSMSrmm libraries by the default target names.

The target library SYS1.SEDEXE1 has a fixed-block record format. The SYS1.DGTSLIB library and the SYS1.DGTTLIB library are shared with other DFSMS components.

Table 6. Default libraries to concatenate

DFSMSrmm data set name	DD statement	Content
SYS1.SEDGEXE1	SYSPROC (or SYSEXEC)	REXX execs
SYS1.SEDGMENU	ISPMLIB	English messages
SYS1.SEDGPENU	ISPPLIB	English panels
SYS1.DGTSLIB	ISPSLIB	Skeletons
SYS1.DGTTLIB	ISPTLIB	Tables

DFSMSrmm HELP packaging change

You no longer need to copy DFSMSrmm TSO/E help into SYS1.HELP or to concatenate the SYS1.SEDGHELP library because DFSMSrmm TSO/E help is now included in SYS1.HELP with the rest of the DFSMS product.

Secure DFSMS resources

Use the Resource Access Control Facility (RACF), or an equivalent product, to control access to DFSMS functions as well as data resources such as DASD volumes, tape volumes, and data sets.

RACF retains information about users, resources, and access authorities in profiles stored in a RACF database. *Discrete profiles* contain security information about a single data set or other type of resource. *Generic profiles* contain security information about one or more data sets or other resources that have similar characteristics and therefore require a similar level of protection. Generic profiles make it easy for you to protect multiple data sets with similar security requirements, without having to specify the requirements for each individual data set.

This section gives ideas for how you might protect specific DFSMS functions and resources on your system. For more detailed information, consult the *z/OS Security Server RACF General User's Guide*.

Protect functions for DASD cache controllers

If you have DASD cache controllers installed, or plan to install them, you must do the following tasks:

- Authorize TSO/E users to issue related IDCAMS commands

  If you want TSO/E terminal users to issue IDCAMS commands such as BINDDATA, LISTDATA, and SETCACHE, you must add these command names and associated abbreviations (BDATA, LDATA, and SETC) to the TSO authorized command list, APFCTABL. You can specify the list of authorized TSO commands in SYS1.PARMLIB member IKJTSO00. For details on adding entries to the TSO/E authorized command list, see *z/OS TSO/E Customization*.
- Update SAF/RACF profiles

  When IDCAMS processes the BINDDATA, LISTDATA, and SETCACHE commands, it uses the System Authorization Facility (SAF) to verify that the issuer has the appropriate authority to use the command or specific parameters. Issuers of these commands include TSO/E users, background jobs, and started tasks. SAF communicates with RACF, if installed, or with a user-supplied

processing routine. Table 7 indicates the RACF resources used to protect the IDCAMS commands and parameters associated with cache-controllers.

Table 7. SAF/RACF resource access required for IDCAMS commands

Command or Parameter	Resource Class	Resource Name	Access
BINDDATA	FACILITY	STGADMIN.IDC.BINDDATA	READ
LISTDATA	FACILITY	STGADMIN.IDC.LISTDATA	READ
ACCESSCODE	FACILITY	STGADMIN.IDC.LISTDATA.ACCESSCODE	READ
SETCACHE	FACILITY	STGADMIN.IDC.SETCACHE	READ
DISCARDPINNED	FACILITY	STGADMIN.IDC.SETCACHE.DISCARDPINNED	READ
PENDINGOFF	FACILITY	STGADMIN.IDC.SETCACHE.PENDINGOFF	READ
REINITIALIZE	FACILITY	STGADMIN.IDC.SETCACHE.REINITIALIZE	READ
SUBSYSTEM	FACILITY	STGADMIN.IDC.SETCACHE.SUBSYSTEM	READ
SETSECONDARY	DASDVOL	volume serial of secondary volume	ALTER
REESTABLISHDUPLEX	DASDVOL	volume serial of alternate volume	ALTER

Notes:

1. Each authorization check is performed independently. To issue a command using a protected parameter, the user must have READ access authority to the resource for the command, as well as to the resource for the parameter. For example, to issue a SETCACHE SUBSYSTEM PENDINGOFF command, a user must have READ access to all three of the following:
   - STGADMIN.IDC.SETCACHE
   - STGADMIN.IDC.SETCACHE.SUBSYSTEM
   - STGADMIN.IDC.SETCACHE.PENDINGOFF
2. Multiple resources could be protected through a single RACF generic profile, for example STGADMIN.IDC.** or STGADMIN.IDC.SETCACHE.**.
3. The DASDVOL ALTER authorization check is performed only when the volume serial of the prospective secondary, or alternate, volume differs from (is not equal to) that of the primary volume.

Protect DFSMSdfp functions

To verify access authority, SMS, DADSM, open/close/end-of-volume (EOV), checkpoint/restart, IEHMOVE, and the integrated catalog facility all automatically check data sets on DASD for RACF generic or discrete profiles. This is referred to as *RACF always-call*, because RACF is always called by these functions to verify access to a data set.

For VSAM data sets, DFSMS checks only the cluster's profile for authorization to access any of the cluster's components. Although you can have a discrete profile defined for each of the data and index components of a data set, DFSMS does not check these profiles. If the cluster does not have its own profile, you must consider the individual VSAM components unprotected.

ISMF access

You can use RACF to establish authorization levels for all ISMF functions or for individual applications, functions, line operators, and commands. A message informs users who are denied access because of insufficient authority. RACF also allows you to control the use of storage and management classes. See "Library access control using RACF" on page 32 of this book for information on protecting access to ISMF libraries, and *z/OS DFSMSdfp Storage Administration Reference* for more details on using RACF services to protect ISMF functions.

Volume and data management functions

The *erase-on-scratch* operation can be controlled by RACF options and data set profiles for non-VSAM data sets and for VSAM data sets cataloged in integrated catalogs. Erase-on-scratch prevents unauthorized access to sensitive DASD data by automatically erasing a data set when it is scratched.

The open/close/end-of-volume component uses RACF to protect tape data sets, unlabeled tapes, and tapes using bypass label processing. This support provides protection for both DASD and tape data sets under the same generic profile.

You must have RACF DASDVOL authority to use ICKDSF to format tracks, write a volume label, or create a VTOC on a volume. There is no need to have DASDVOL authority to allocate space on a volume. The system controls space on system-managed volumes by other means such as storage group definitions, ACS routines, and ISMF commands.

By defining the appropriate RACF FACILITY class profiles, you can protect certain IDCAMS commands and keywords, and catalog functions, from unauthorized use. For more information on the RACF FACILITY classes you can define, see *z/OS DFSMSdfp Storage Administration Reference*.

VSAM record-level sharing functions

Applications using the VSAM record-level sharing (RLS) commit protocol interface, such as CICS, are capable of releasing locks that protect uncommitted RLS updates. You need to restrict the use of this interface through the RACF facility class SUBSYSNM. Use the SUBSYSNM class to authorize the CICS subsystems that are allowed to use the VSAM RLS commit protocols. Read access is required.

The IDCAMS SHCDS command provides recovery functions that can also release locks protecting uncommitted RLS updates. Its functions result in the special handling of transaction backouts. Use the facility class STGADMIN.IGWSHCDS.REPAIR to protect these SHCDS functions, and ensure that the server is authorized to access them. Refer to *z/OS DFSMS Access Method Services* for further details.

Protect DFSMSdss functions

You can use RACF to protect resources that DFSMSdss operates on, such as DASD volumes, tape volumes, or data sets, against unauthorized access. You can also use RACF to limit the use of certain DFSMSdss functions to privileged users.

Data and volume access

DFSMSdss first invokes RACF to check the user's access authority to a volume. DFSMSdss uses RACF to check at the data set level only if:

- The user does not have the required volume level authority.
- The volume is not protected.
- DFSMSdss cannot determine the protection status of the volume.

When a data set is protected by RACF, DFSMSdss ignores the data set password.

When copying or restoring data, DFSMSdss ensures that users have sufficient authority to create or overlay the target data sets. In addition, DFSMSdss tries to protect the target data sets with the same RACF protection as the source data sets.

DFSMSdss also supports the DASD erase-on-scratch attributes defined in the RACF profile of the data set.

DFSMSdss commands and keywords

By defining the appropriate RACF FACILITY class profile, you can protect certain DFSMSdss commands and keywords against unauthorized use. DFSMSdss invokes RACF checking to ensure that users have sufficient authority to perform the function. For more information on the FACILITY class profiles used by DFSMSdss, see *z/OS DFSMSdss Storage Administration Guide*.

Protect DFSMShsm functions

Securing DFSMShsm-owned and managed data sets and volumes ensures that unauthorized users cannot access these resources while they are under DFSMShsm's control.

Data set access

DFSMShsm calls the system authorization facility (SAF) to check for authorization when a data set is accessed. With a RACF profile defined, the data is protected from access under the data set name and also under the name that DFSMShsm assigns to the data set when it is placed in DFSMShsm-owned storage. DFSMShsm also honors password protection; however, SMS does not accept passwords for system-managed data sets.

Tape access

RACF can also protect your DFSMShsm-owned tapes. If you are using a tape management product, you might need to use expiration date protection for your tapes.

Before you can reuse a tape that is returning to the global scratch pool, you must remove its RACF protection. DFSMShsm does this for tapes it has added to the RACF tape volume resource, but it cannot remove the protection for tapes that have been added to the RACF tape volume resource by the RACF administrator.

DFSMShsm cannot remove password protection; only a user with storage administrator authority can do this after the password-protected tapes are returned to the global scratch pool.

DFSMShsm commands

Protecting the DFSMShsm processing environment includes limiting the number of users who can issue DFSMShsm commands. DFSMShsm commands are divided into *authorized commands*, which control operations against any data set accessible to DFSMShsm; and *unauthorized commands*, which control operations against only those data sets for which an issuer has the appropriate security authority.

One system user is defined as the control storage administrator. The control storage administrator can issue authorized commands and authorize other storage administrators for these commands.

DFSMShsm also allows you to control how it detects whether a user is authorized to submit DFSMShsm commands in a batch environment. If you have RACF, DFSMShsm can check the user ID in the RACF access control environment element (ACEE). If you do not have RACF, DFSMShsm can check the user ID in the TSO/E-protected step control block (PSCB).

Protect DFSMSrmm functions

DFSMSrmm uses the System Authorization Facility (SAF) to perform authorization checking for DFSMSrmm resources defined in the RACF FACILITY class. DFSMSrmm optionally uses RACF to maintain TAPEVOL access lists.

DFSMSrmm provides automatic security classification through installation-specified criteria based on data set names. See the *z/OS DFSMSrmm Implementation and Customization Guide* for more information.

Provide for new device installations

The hardware configuration of your processors and I/O devices determines how many devices you can attach to your system. z/OS supports up to 65,536 attached devices, each with up to eight access paths. Table 51 on page 303 summarizes the most commonly-used I/O devices supported by z/OS that are also directly supported by DFSMS functions. If you have a question about support for a device not listed, contact your IBM representative.

Following are general considerations related to I/O device support:

- **Attaching devices through the HCD:** You can define, or attach, new devices to your system through the interactive panels of the hardware configuration definition (HCD) program. The HCD has dynamic I/O capabilities, changing hardware definitions without the need for an IPL or hard power-on reset.

  Any time you make changes to your I/O configuration, you need to execute the HCD to modify your system's I/O definition file (IODF). You should also update the input/output configuration data set (IOCDS) when you run the HCD to ensure that the configuration information is consistent across the software and microcode. For more information on the HCD, see *z/OS HCD Planning*. For information on working with IODFs, see the *z/OS HCD User's Guide*.
- **Operating modes:** Most devices attached to z/OS operate in *full function mode*; that is, all features on the device are compatible with, and usable on, the operating system. Some of these features include:
  - For DASD devices: dynamic path reconnection, extended count-key-data operation, and caching and cache-related facilities
  - For tape devices: cartridge stack loading and data compaction

  Some devices also operate in *compatibility mode*, which allows you to simulate the function of another device or model. Compatibility mode causes the device to function like a different device of the same type, ignoring some or all of the additional features the device might have. This allows you to migrate between devices with minimal impact on programs that have device dependencies.
- **UCB virtual storage constraint relief:** Each device attached to the system has one or more unit control blocks (UCBs) associated with it. You have the option to define UCBs either above or below the 16 MB line by specifying the LOCANY parameter on the HCD panel.
- **Hardware maintenance:** Some devices require a specific level of hardware maintenance to operate properly on a z/OS system. DFSMS software support for new hardware devices might also require the installation of PTFs. These PTFs are listed in the RETAIN® PSP Hardware Install Indexes, available through the IBM support center.

The sections that follow offer additional hardware considerations for specific device types or uses.

Cache storage control units

Some availability requirements for storage classes can only be met with devices attached to an IBM 3990 Model 3 or Model 6 storage control unit, RAMAC subsystem, or Enterprise Storage Server.

Common migration actions

The IBM 3390 Model 9 offers more capacity at a lower cost than other 3390 models. While performance without cache might be acceptable for much of the data that is placed on the IBM 3390 Model 9, configuring with a cache-capable 3990 storage control can improve throughput and performance and also provide access to availability functions, such as concurrent copy, fast dual copy and DASD fast write.

IBM Automated Tape Library

Devices in an IBM TotalStorage™ Enterprise Automated Tape Library (3494 or 3495) are defined to the operating system automatically by the Automated Tape Library; however, you should use HCD to ensure that a device is defined properly if it is unavailable during the system IPL, either because it is not physically attached or because it is busy during device initialization. A device that is off-line but still available at IPL will not have a problem.

For JES3, there are additional initialization deck requirements. These are discussed in the *z/OS JES3 Initialization and Tuning Guide*.

IBM 3800/3900 Printing Subsystem

If you are installing an IBM 3800 or 3900 Printing Subsystem for the first time, you must install library character sets, graphic character modification modules, and character arrangement tables in SYS1.IMAGELIB. A job to accomplish this task is stored in member LCSBLD1 of SYS1.SAMPLIB after DFSMSdfp is installed. If you ran the job LCSBLD1 for previous releases, you do not need to rerun it again after installing DFSMSdfp.

Convert to system-managed storage

By creating an environment in which storage is managed by the system and controlled by a storage administrator, the Storage Management Subsystem (SMS) can help you improve data availability, performance, space utilization, and device installation in your data center.

Just as storage management needs differ from site to site, planning needs also vary. Some installations moving to a system-managed storage environment are in a position to exploit the full potential of SMS—for example, their storage is already pooled and their data is centrally-managed. For other installations, the move to administrator-controlled storage is more gradual, as new storage management policies evolve.

Converting to system-managed storage is often a big step and should be given the same planning consideration as other major projects. You'll want to design an SMS configuration to achieve your storage management goals and stage the implementation of these goals over time. A simple model configuration, or starter set, is provided with DFSMS to help you begin this process. "SMS Starter Set" on page 47 provides additional information about this sample configuration.

Table 8 on page 47 outlines the general tasks you need to take to build a system-managed storage environment and tells you where you can find additional guidance in this effort.

Table 8. SMS implementation tasks and procedure references

Task	Procedure Reference
• Understand SMS concepts. • Establish a project team. • Define policies for your SMS implementation. • Follow a sample implementation plan. • Examine the SMS Starter Set. • Follow the Fast Implementation Technique to migrate a large amount of data with minimal effort.	*z/OS DFSMS: Implementing System-Managed Storage*
• Define SMS control data sets. • Use ISMF storage administrator applications to set up SMS classes, groups, and ACS routines based on defined policies. • Protect SMS resources. • Set up recovery procedures for the SMS conversion. • Update, translate, validate, and activate the SMS configuration. • Migrate data to SMS-management.	• *z/OS DFSMSdfp Storage Administration Reference* • *z/OS DFSMShsm Storage Administration Guide* • *z/OS DFSMSdss Storage Administration Guide* • *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries* • *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*
• Maintain and monitor the SMS configuration.	• *z/OS DFSMSdfp Storage Administration Reference*
• Prepare for, and manage system and user catalogs that store SMS control data sets and SMS-managed data sets.	• *z/OS DFSMS: Managing Catalogs*
• Determine application and system data set requirements for system-management.	• *z/OS DFSMS: Using Data Sets* • *z/OS DFSMSdfp Advanced Services* • *z/OS DFSMS: Implementing System-Managed Storage*
• Educate end users on general SMS concepts and show them how to access SMS information for their data sets.	• *z/OS DFSMS Introduction* • *z/OS DFSMS: Implementing System-Managed Storage* • *z/OS DFSMS: Using the Interactive Storage Management Facility*

SMS Starter Set

The SMS Starter Set is a predefined Source Control Data Set (SCDS) containing information that defines a storage management policy. This sample SCDS is provided for new SMS users to get the storage management subsystem up and running before going through the implementation tasks of defining constructs and writing Automatic Class Selection (ACS) routines tailored to their installation.

The sample SCDS named SCDS.PRIMARY.LINEAR is packaged in the DFSMSdfp target library SYS1.IGDVBS1 as member DFPSSCDS. SYS1.SAMPLIB contains the following members:

- DFPSSDCR - source ACS routine for DATACLAS
- DFPSSMCR - source ACS routine for MGMTCLAS

Common migration actions

- DFPSSSCR - source ACS routine for STORCLAS
- DFPSSSGR - source ACS routine for STORGRP
- DFPSSIMP - JCL to IMPORT SCDS

After the SMP/E APPLY is performed for DFSMS, run job DFPSSIMP available in SYS1.SAMPLIB to IMPORT 'SCDS.PRIMARY.LINEAR' from target library SYS1.IGDVBS1.

For more details on the SMS Starter Set, including information on how to look at its contents through ISMF, refer to *z/OS DFSMS: Implementing System-Managed Storage*.

Ensure data integrity of shared system resources

If you share catalogs, DASD volumes, tape libraries, or other system resources in a parallel sysplex or other multiprocessor environment, you must provide for data integrity across the systems sharing these resources. This section describes common migration activities and coexistence considerations for a multisystem environment.

Recommendations:

- Consider coexistence when you migrate to a new release of DFSMS, even if you have a *single system image.*
- If you have a test environment set up for the new system level you will, most likely, share system resources serially between your test system and your production system. While testing (or for fallback situations), ensure that your system resources are left intact for your production environment.

For more information about how multisystem coexistence is defined for the purpose of migration planning, see "Terms you need to know" on page 10.

Catalogs

Follow these steps to successfully share a catalog in a multisystem environment:

- **Define the correct sharing options for the catalog:** A *shared catalog* is a basic catalog structure that is used by more than one system. It must be defined with SHAREOPTIONS(3 4) and reside on a DASD volume defined through the HCD as a shared device. By default, every catalog and VSAM volume data set (VVDS) is defined as shared.
- **Determine the sharing protocol for the catalog:** With the *VVDS sharing mode*, information that describes changes to a shared catalog are stored in, and retrieved from, the VVDS requiring additional I/O to the volume containing the catalog. VVDS mode sharing is the default mode of sharing, and is the only protocol that is supported by systems prior to DFSMS V1R5. *Enhanced Catalog Sharing (ECS) mode* is a protocol in which the information that describes changes to a shared catalog are stored in the coupling facility. The I/O required for the VVDS mode protocol is eliminated, resulting in better sysplex-wide performance. For more information on ECS sharing, including coexistence considerations, see "Catalog sharing enhancements for sysplex environments" on page 188.
- **Decide if the catalog should be SMS-managed:** Any catalog can contain entries for both data sets that are system-managed and data sets that are not system-managed. Although this is not a requirement, we recommend that catalogs containing entries for system-managed data sets also be system-managed.

- **Use GRS to prevent lockouts on shared volumes that contain catalogs:** DFSMSdfp catalog management uses the SYSIGGV2 reserve to serialize access to a catalog's basic catalog structure (BCS), and the SYSZVVDS reserve to serialize access to the VVDS. These reserves provide an essential mechanism to facilitate cross system sharing. To prevent a lockout between systems sharing a catalog, always convert the SYSIGGV2 reserve to a SYSTEMS ENQUEUE using Global Resource Serialization (GRS) or an equivalent product. It is not necessary to convert the SYSZVVDS reserve. The SYSZVVDS reserve is issued with a scope of SYSTEMS. For this reason, it must be excluded from GRS processing.
- **Ensure that catalog functions are compatible between mixed levels of DFSMS:** Table 9 is a matrix showing catalog function compatibility between levels of DFSMS.

  Keep in mind that even if you're not planning to maintain mixed levels over the long-term, it is common to have systems at different releases while you complete the installation and testing process. During this test period, you must *avoid implementing new catalog function* in the event you might need to fall back to a previous level of DFSMS.

  For further information on catalog sharing, see *z/OS DFSMS: Managing Catalogs*.

Table 9. Catalog functions available, by product release

Catalog Type or Function	z/OS V1R1 OS/390 V2R10	DFSMS/MVS V1R5	DFSMS/MVS V1R4
CVOL or VSAM structure	N/A	N/A	N/A
ICF structure	full support	full support	full support
VSAM password protection	ignored	ignored	full support
Catalog search interface	full support	full support	full support
Enhanced Catalog Sharing	full support	full support	coexistence support
Extended alias entries	full support	full support	coexistence support

SMS control data sets

In a multisystem Storage Management Subsystem (SMS) complex, operating systems share a common set of SMS classes, groups, ACS routines, and a configuration base, which make up the storage management policy for the complex. This storage management policy is maintained in a source control data set (SCDS). When this policy is activated for SMS, the bound policy is maintained in processor storage and on DASD in an active control data set (ACDS). Systems in the complex communicate SMS information through a common communications data set (COMMDS).

To successfully share SMS control data sets in a multisystem environment where there are mixed levels of DFSMS:

- **Update, translate, validate, and activate SMS policies on the system with the highest level of DFSMS:** You must perform the following on the system running the highest release level of DFSMS:
  1. Define or update your SMS constructs and ACS routines.
  2. Translate your ACS routines.
  3. Validate your SCDS.

  Recommendation: Translate your ACS routines and validate your SCDS on the highest level of DFSMS. You can then activate and share the ACDS among

systems with mixed levels of DFSMS. If the highest level system is not available, you can validate and activate the configuration on a lower level system; however, you must repeat the validate and activation on the highest level system when it becomes available. If you do not translate your ACS routines and validate your SCDS on the highest level of DFSMS, the translation and validation might fail. This failure occurs because some constructs and definitions are known only to higher levels of DFSMS. It can also occur due to changes in validation rules between releases. Once the control data sets are formatted by the higher-level system, the SMS control blocks reflect the new rather than the down-level lengths and control information.

When you update an SCDS, the process of saving those updates results in both ISMF and SMS validating the SMS constructs. During subsequent SCDS validation, the consistency between the constructs and between the ACS routines and the constructs are checked (for example, that a storage group exists when an ACS routine assigns it). A given level of the system can only validate consistency rules that it knows about. For this reason, you should always validate the configuration from system with the highest level of DFSMS.

If the highest level system is used only for test purposes, take a backup of the SCDS before accessing it from that higher level test system. You can then use the backup to revert to the lower level production system. Note that it is always a good practice to periodically back up the SCDS before updating it from any system.

- **Run systems in coexistence mode until all sharing systems in the SMS complex are ready for conversion to 32-name mode:**

  With the functions introduced in DFSMS/MVS V1R3, it is possible to combine up to 32 systems in an SMS complex. When you convert an SMS system to *32-name mode*, the SMS control data sets are converted to a new format that supports up to 32 system names. This conversion is permanent. Once converted to 32-name mode, the SMS configuration can no longer be accessed by any system at a release lower than DFSMS/MVS V1R3.

  Sharing SMS control data sets with DFSMS/MVS V1R2 systems is possible only if you run all systems in the SMS complex, at DFSMS/MVS V1R3 and above, in *coexistence mode*. With coexistence mode, also called *8-name mode*, no more than eight system names can be defined in the SMS configuration. Coexistence maintenance is required for DFSMS/MVS V1R2 systems in this sharing environment.

  At the point in which an SMS configuration is converted to 32-name mode, it cannot be shared with any other system that is not also in 32-name mode, regardless of the coexistence maintenance applied.

- **Store SMS control data sets and SMS-managed data on volumes that have full connectivity to all systems in the complex:** The ACDS and COMMDS must be accessible from all systems that are part of the SMS complex. The SCDS must be accessible from all systems that need to perform an ACTIVATE of the configuration. If you have more than 16 systems in an SMS complex, you need to define the ACDS and COMMDS on volumes attached through a subsystem that supports greater than 16 systems, such as an IBM 3990 Model 6 Storage Control, a RAMAC subsystem, or an Enterprise Storage Server.

  When you define a volume or storage group to have connectivity to a system group, the volume or storage groups must be accessible to all systems that are part of that system group. Otherwise, job failures will occur.

- **Maintain all volumes in an SMS complex within the same parallel sysplex:** Cross-system sharing functions, such as VSAM record-level sharing, PDSE

sharing, RACF security, and GRS serialization only work within the scope of a single parallel sysplex. They are not supported when your SMS complex extends beyond the boundaries of the parallel sysplex in which they are carried out.

- **Avoid setting up multiple SMS complexes sharing the same volumes:** This not only requires extra work to maintain duplicate SMS configurations, but also creates problems such as running out of disk space, because one configuration does not know about changes that occurred in another configuration, such as data set allocations and deletions, or storage group and volume status changes.
- **Isolate sharing systems where SMS is not active:** You can share system-managed data sets among any systems using the Storage Management Subsystem that share the same SMS control data sets. In the case where SMS is not active on any one of the sharing systems, users on that system cannot do the following:
  – Create data sets on system-managed volumes.
  – Delete system-managed data sets.
  – Extend system-managed data sets to new volumes.
  – Use JCL keywords supported by SMS.

  The COMMDS does not record DASD space usage changes for a system that has not activated SMS. If you cannot isolate the systems where SMS is not active, you should set up strict procedures to prevent these systems from accessing system-managed volumes
- **Define procedures for transferring system-managed data to off-site locations:** If you transfer data between systems using the TSO TRANSMIT and RECEIVE commands, the Distributed File Manager (DFM), or another file transfer program, SMS class names are not transmitted with the data set because SMS control information is stored externally, not in the data set.

  If SMS receives a data set from either a system-managed or non-system-managed environment, and ACS processing determines that the data set should be system-managed, SMS assigns classes just as it does for any new data set.

  If you are sending application JCL to other sites that use the facilities provided by DFSMS (such as JCL parameters used with SMS), you need to synchronize the use of SMS at these sites.

Table 10 is a matrix showing SMS control data set function coexistence between levels of DFSMS. Keep in mind that even if you're not planning to maintain mixed levels over the long-term, it is common to have systems at different releases while you complete the installation and testing process.

Table 10. SMS control data set function available, by product release

SMS Structure or Function	z/OS V1R1 OS/390 V2R10	DFSMS/MVS V1R5	DFSMS/MVS V1R4
CDS structure changes	full support	full support	coexistence support
VTS import/export support	full support	full support	coexistence support

Tape libraries

See the *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries* for information on sharing tape libraries among systems in a sysplex.

Ensure data integrity of shared data sets

This section gives a brief overview of sharing considerations for common data set types. These considerations are not just for daily operations in a sysplex environment. They are also important if you are setting up a test environment in which you might be sharing real data between a system or partition running the new level of DFSMS, and a system or partition running a previous level of DFSMS.

PDSEs

Access to partitioned data sets extended (PDSEs) can be shared between systems provided they are part of the same sysplex. See *z/OS DFSMS: Using Data Sets* for procedures on defining the extent to which a PDSE is shared with the PDSESHARING keyword in SYS1.PARMLIB member IGDSMSxx.

VSAM data sets

Cluster or record-level sharing: VSAM data sets can be shared between systems at the data set cluster-level or at the record-level. For record-level access, sharing systems must be part of the same parallel sysplex and also share a coupling facility to maintain data integrity. Migration and coexistence tasks for this environment are further detailed in the *z/OS DFSMSdfp Storage Administration Reference*.

Extended format: There are a multitude of extended format functions available for all VSAM data set organizations, including key-sequenced data sets (KSDS), entry-sequenced data sets (ESDS), relative-record data sets (RRDS), variable-length relative-record data sets (VRRDS) and linear data sets (LDS).

To help clarify the details regarding coexistence between EF functions, Table 11 provides a summary, by level of DFSMS, of the extended format functions available for each type of VSAM data set organization.

Table 11. Summary of extended format functions, by support level

Function	z/OS V1R1 OS/390 V2R10	DFSMS/MVS V1R5	DFSMS/MVS V1R4
EF definition	All	All	KSDS
Extended addressability (RLS for KSDS only)	All	All	KSDS
Candidate volume space	All	All	KSDS
Partial release	All	All	KSDS
Data striping (non-RLS)	All	n/a	n/a
Host data compression	KSDS	KSDS	KSDS
System-managed buffering (NSR only)	All	All	KSDS

Notes:
- **All** indicates that the function is available for all VSAM data set organizations defined in the extended format: **KSDS, ESDS, RRDS, VRRDS, and LDS**.
- Extended addressability is available for all VSAM data set organizations, but if VSAM record-level sharing (RLS) is used, only the KSDS has support for both functions.
- System-managed buffering is available only for data sets defined for non-shared resources (NSR), which excludes RLS access. To use this option with linear data sets, control interval access must be set in the ACB.

Migration considerations related to specific VSAM extended format functions are described under:

- "VSAM extended format data set enhancements" on page 197.
- "VSAM load enhancements" on page 233.
- "VSAM system-managed buffering" on page 235.

Checkpoint data sets

Checkpoint data sets contain system data. To ensure integrity of this data, checkpoint data sets are, by default, allowed only on non-shared DASD and tape volumes.

To ensure data set integrity across multiple systems, you can authorize users to create checkpoints on shared DASD by using the RACF Facility Class IHJ.CHKPT.*volser*, where *volser* is the volume serial of the volume to contain the checkpoint data set. For more information, see *z/OS DFSMS: Using Data Sets* and *z/OS MVS Planning: Global Resource Serialization*.

DFSMShsm functions for user data sets

DFSMShsm provides two alternatives for serializing user data sets. The first, DFHSMSERIALIZATION, relies on volume reserves and is needed when sharing data with other systems outside of a GRS environment. In this mode, multivolume data sets are not supported.

The second, USERDATASETSERIALIZATION, relies on data set enqueues. It is ideal for single-host implementations or multi-host implementations where all host systems belong to the same GRS environment to propagate the enqueues correctly. Refer to the *z/OS DFSMShsm Implementation and Customization Guide* for details.

Chapter 5. Migration Overview for z/OS V1R3 DFSMS

This chapter presents a migration overview of all new and expanded DFSMS functions introduced with z/OS V1R3. Details for each functional change include some or all of the following:

- High-level description of new or expanded features
- Summary of affected information technology tasks and interfaces
- Hardware or software dependencies
- Coexistence considerations for multisystem environments
- General processing restrictions and other coexistence issues
- Mapping of migration tasks to implement the change
- References to other publications that contain supporting implementation information

APARs referenced in this chapter are provided as a courtesy to help you correlate the functional enhancements with corresponding coexistence maintenance or other programming requisites listed in your installation documentation or in the PSP bucket. The APARs listed here are not considered all-inclusive and are not intended to replace any information that you obtain from these other sources.

Release summary of changes

Table 12 summarizes DFSMS changes introduced in z/OS V1R3.

Table 12. What's new in z/OS V1R3 DFSMS, summarized by functional component

For information about:	Refer to location:
DFSMSdfp changes	
Advanced copy services	57
Capacity utilization and performance enhancements	59
Catalog customer satisfaction	63
Dynamic volume count	66
CONFIGHFS enhancements	65
Large volume support	68
OAM multiple object backup	85
RLS coupling facility caching enhancements	73
RLS lock table CF duplexing	75
SMS miscellaneous enhancements	77
VSAM large real storage	80
VSAM striped data set enhancements	84
DFSMSdss changes	
DFSMSdss COPY command enhancement	89
DFSMSdss HFS logical copy	90
DFSMShsm changes	
Capacity utilization and performance enhancements	59
DFSMShsm common recall queue	91
Large volume support	68

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Table 12. What's new in z/OS V1R3 DFSMS, summarized by functional component (continued)

For information about:	Refer to location:
DFSMSrmm changes	
DFSMSrmm special character support	93
DFSMSrmm TSO/E help packaging enhancement	94
DFSMSrmm bin management enhancements	95
DFSMSrmm report generator	98
DFSMSrmm macro enhancements	100
DFSMSrmm ACS pooling control enhancements	101
DFSMSrmm reporting enhancements	103
DFSMSrmm support for using storage locations as home locations	105

Advanced copy services

Description

Advanced copy services comprises the following functions and enhancements:

- **Extended remote copy (XRC)**: XRC is a combined hardware and software solution that offers the highest levels of continuous data availability in a disaster recovery and workload movement environment. XRC provides an asynchronous remote copy solution, offered on the IBM ESS, of both system-managed and non-system-managed data to a second, remote location.

  Enhancements to XRC include coupled extended remote copy (CXRC) and multiple extended remote copy (MXRC). CXRC and MXRC are designed to support large environments that have an expanded number of primary disk subsystems and volumes, in excess of those supported by a single datamover configuration.
- **Peer-to-peer remote copy (PPRC)**: PPRC is a hardware solution for rapid and accurate disaster recovery as well as a solution to workload and migration. Updates made on the primary volumes are synchronously shadowed to the secondary volumes.
- **FlashCopy**: FlashCopy is a point-in-time copy services function that can quickly copy data from a source location to a target location.
- **SnapShot**: SnapShot is a point-in-time copy services function that allows you to *snap* (quickly copy) data directly from the source location to a target location.
- **Concurrent copy (CC)**: Concurrent copy is a copy services function that generates a copy of data while applications are updating that data.

What this change affects

DFSMS components that are enhanced for this support are DFSMSdfp and DFSMSdss.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	A master data set named *mhlq.XCOPY.msession.MASTER*.
Operations	The following commands have been added for coupled extended remote copy (CXRC): • XADVANCE • XCOUPLE • XQUERY MASTER Existing commands: XEND, XSUSPEND, and XRECOVER have been enhanced for use in a coupled environment. There are also a number of new and revised messages for this coupled environment support. See *z/OS MVS System Messages, Vol 1 (ABA-AOM)*, the ANT prefix, for the specific messages.
Auditing	None.

Advanced copy services

Area	Considerations
Application development	CXRC is implemented through enhancements to existing TSO commands and through the provision of new TSO commands that affect the master session and individual coupled sessions. To take advantage of the new CXRC support, you have to update your existing REXX execs and CLISTS. There are changes to the ANTRQST application programming interface to allow support for the IBM 2105 Enterprise Storage Server (ESS). These changes affect the following parameters and commands: • PPRC request CESTPATH RESETHP(YES/NO) parameter • CESTPAIR ONLINESEC(YES/NO) parameter • New FlashCopy commands: – FCESTABL – FCQUERY – FCWITHDR • All XRC and CXRC commands
General use	None.

Hardware or software dependencies

No additional hardware or software dependencies are associated with this support.

Coexistence considerations

CXRC can coexist with the previous version of XRC and the multi-datamover by using different physical sessions on a primary disk subsystem.

For more information

You can find information about using this support in *z/OS DFSMS Advanced Copy Services*.

Capacity utilization and performance enhancements

Description

Capacity utilization:

- Allows DFSMShsm and assembler programs to use the full 3590 media capacity when 3490E emulation mode is used with the IBM TotalStorage Enterprise Tape Controller 3590 Model A60 (3590 Model A60).

Deferred conditional tape marks:

- CLOSE writes the last tape mark on an IBM TotalStorage Enterprise Tape Drive 3590 (3590) with a new command. The command tells the tape subsystem to conditionally write the tape mark unless another write is issued. The result is that until the tape gets demounted or rewound, it should have less backhitches (reversals of direction). CLOSE does this automatically with no software change.

Buffered tape marks:

- To maximize data integrity and prevent backhitches, tape subsystems without the new option automatically write all buffered data on the tape whenever a tape mark is written. This ensures that all user data and the tape labels are on the tape before the application program leaves the tape. This also causes a write error to be reflected accurately either to user data or to labels. On standard labeled tapes, there are three other tape marks for each file. If it is not important to distinguish between an error in the data and in the labels, the application can use a new DCBE macro option that requests tape marks to be buffered.
- For the IBM 3590, the application program can request that the OPEN, EOV and CLOSE functions buffer tape marks when writing.

High speed positioning:

- OPEN issues one new command that tells how many tape marks to position over. When you read or write a file other than the first one on the tape, high-speed positioning allows the tape subsystem to position quickly across all the appropriate tape marks to go directly to the right place. OPEN does this automatically with no software changes.

What this change affects

The DFSMS components enhanced for this support are DFSMSdfp, DFSMShsm, and DFSMSrmm.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.

Capacity utilization and performance enhancements

Area	Considerations
Storage administration	DFSMShsm changes: • CAPACITYMODE(COMPATIBILITY|EXTENDED) is a new optional subparameter of the SETSYS TAPEUTILIZATION command that allows you to specify the maximum capacity to which a tape is filled. COMPATIBILITY specifies that an IBM 3590 emulating an IBM 3490 fills a tape to no more than the capacity allowed by an IBM 3590 emulating an IBM 3490 not operating in extended capacity mode. Data on these tapes is accessible to IBM 3590 drives emulating IBM 3490 drives, regardless of whether they are CAPACITYMODE switchable. EXTENDED specifies that an IBM 3590 emulating an IBM 3490 fills a tape to the same capacity as 3590 drives allow. Data on these tapes is accessible only to tape units that are CAPACITYMODE switchable. • SELECT(CAPACITYMODE(COMPATIBILITY | EXTENDED)) is a new optional subparameter of the LIST TTOC command that allows you to identify nonempty 3490 tape volumes by their CAPACITYMODE status. COMPATIBILITY lists all nonempty tape volumes written by an IBM 3590 in 3490 emulation mode that are not written in CAPACITYMODE(EXTENDED) mode. Data on these tapes is accessible to IBM 3590 drives emulating 3490 drives, regardless of CAPACITYMODE switching support. EXTENDED lists all nonempty tape volumes written by an IBM 3590 in 3490 emulation mode that were written in CAPACITYMODE(EXTENDED) mode. Data on these tapes is accessible only to tape units capable of CAPACITYMODE switching. On input, DFSMShsm will dynamically switch to CAPACITYMODE(EXTENDED) temporarily to read the tape even if the unit name is in CAPACITYMODE(COMPATIBILITY).
Operations	None.
Auditing	DFSMShsm changes: • SMF type 14, 15, and 21 records can show more blocks and bytes written on IBM 3590s emulating IBM 3490s than on real 3490s. • More data sets, blocks, and bytes can fit on IBM 3590s emulating IBM 3490s. • The AUDIT command determines a tape's CAPACITYMODE status by looking at new bits in the TTOC, MCV, and MCT.
Application development	Assembler language exploitation: • There is extended capacity of IBM 3590s emulating IBM 3490s, using your assembler language applications. The program must supply a DCBE macro with the CAPACITYMODE option. • Your assembler language applications can exploit buffered tape marks on the IBM 3590. The program must supply a DCBE macro with the SYNC option. *z/OS DFSMS Macro Instructions for Data Sets* describes the DCBE macro.
General use	None.

Hardware or software dependencies

IBM 3590 drives in 3490 emulation mode must be at or above the required tape subsystem level.

Coexistence considerations

Table 13 on page 61 shows the PTFs that are required for release levels prior to z/OS V1R3. Install the fixes for all these APARs in your environment. These PTFs refer to OS/390 V2R10 unless otherwise noted in this table. For the latest support recommendations, see the PSP bucket.

Table 13. Capacity utilization: PTF numbers for release levels prior to z/OS V1R3

PTF number	APAR number	Component
UW99378	OW49828	Open/close/end-of-volume
UW99380	OW49829	DFSMShsm
UW83029	OW50323	DFSMShsm (DFSMS/MVS V1R4 coexistence)
UW99383	OW49830	Device support
UW99378	OW49831	Sequential access method
UW99388	OW49832	Checkpoint/restart
UW99390	OW49833	DFSMSrmm (V2R10 only)

Migration tasks

To implement this change, you need to consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
You can specify the DCBE macro option for increased tape capacity or for buffered tape marks without testing the system level. Your system must be at the z/OS V1R3 level or have the PTFs stated in Table 13 on page 61 to take advantage of increased tape capacity and buffered tape marks. If you are running a prior level on your system, there will be no effect, and there will be no message, failure or degradation. For DFSMShsm: 1. Define an esoteric unit name to MVS that contains only IBM 3590 drives emulating 3490 drives with CAPACITYMODE switching support. 2. Identify the new esoteric in DFSMShsm using SETSYS USERUNITTABLE. Provide an input translation esoteric (perhaps the same esoteric as that specified for output) such that the input esoteric is capable of operating in the same CAPACITYMODE as that used by the output esoteric. 3. Define the use of the drives in that esoteric using SETSYS TAPEUTILIZATION(CAPACITYMODE(EXTENDED) UNITTYPE(*new esoteric*) PERCENTFULL(*rr*)).	Required	• *z/OS DFSMS Macro Instructions for Data Sets* • *z/OS DFSMShsm Storage Administration Reference*

Capacity utilization and performance enhancements

Application-Level Tasks	Condition	Procedure Reference
DFSMSdfp tasks: • Examine applications that cannot fill tapes because the drive is an IBM 3590 emulating a 3490. Either use 3590 in native mode or use the CAPACITYMODE keyword on the DCBE macro. • Examine each application that writes multiple data sets on one tape volume without demounting the volume. The performance of the application will improve if you specify the SYNC=NONE parameter on the DCBE macro.	Required	*z/OS DFSMS Macro Instructions for Data Sets*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMS Macro Instructions for Data Sets*
- *z/OS DFSMShsm Storage Administration Reference*

Catalog customer satisfaction

Description

Catalog customer satisfaction improves your ability to self-diagnose problems when using catalog functions. The benefits are:

- Operator console responses to catalog address space (CAS) commands now contain additional information.
- Discarded queued operator commands that are addressed to the CAS are now highlighted.

What this change affects

The DFSMS component enhanced for this support is DFSMSdfp.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	MODIFY CATALOG changes: • Issue the MODIFY CATALOG,DISABLE(DSNCHECK) command if your installation uses locally written or vendor programs that create data set names that do not match syntax requirements. System programmers should review syntax guidelines, which are documented in *z/OS DFSMS: Using Data Sets* and *z/OS MVS JCL Reference*.
Storage administration	None.
Operations	The console operator must understand the enhancements and changes to the MODIFY CATALOG,REPORT,PERFORMANCE(RESET) command. Use the default option SDATA=SERVERS on the CHNGDUMP command. When you activate this option, consider the following situations: • The size of SVC dumps might increase, because the dump might now include the catalog address space. • To allow for the catalog address space, increase the size of SVC dumps. • The amount of space is specified by the MAXSPACE parameter on the CHNGDUMP command. • Test vendor products and locally-written utility programs, particularly those that support catalog recovery, to ensure there is no unexpected loss of function.
Auditing	Use the RESET subparameter, on the MODIFY CATALOG,REPORT,PERFORMANCE command, to provide a way to reset the statistics and begin accumulating them again.
Application development	None.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

Review software that is dependent on the format of the output from the MODIFY CATALOG,REPORT,PERFORMANCE command. Ensure that the additional information now provided in the response title does not affect the software. The following types of software might be dependent on the format of the output:

- Automated operations support software.
- Software that scans console logs.

Identify whether there are any vendor programs or locally written programs that create invalid data set names that are to be cataloged. Use the following SMF records to look for names of cataloged data sets that have incorrect syntax:

- Type 14, INPUT or RDBACK data set activity (the data set name is in the first 44 bytes of the JFCB)
- Type 15, OUTPUT, UPDAT, INOUT, or OUTIN data set activity (the data set name is in the first 44 bytes of the JFCB)
- Type 17, scratch data set status
- Type 18, rename non-VSAM data set
- Type 42 subtype 6, data set statistics
- Type 60, VSAM volume data set updated
- Type 61, catalog define
- Type 62, VSAM component or cluster opened
- Type 65, catalog delete entry activity
- Type 66, catalog alter entry activity

Restrictions: You cannot write programs with incorrect syntax data set names if you want the data sets to be cataloged.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

Application-Level Tasks	Condition	Procedure Reference
Review your BLDVRP specifications and update the values if they are inadequate, based on the previously calculated index CISIZE.	Optional	• *z/OS DFSMS: Using Data Sets*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMSdfp Diagnosis Reference*
- *z/OS DFSMS: Managing Catalogs*
- *z/OS DFSMS: Using Data Sets*

CONFIGHFS enhancements

Description

The CONFIGHFS command is supported from clients as well as from the server. HFS sysplex sharing allows support of the CONFIGHFS command for any system in the sysplex, regardless of which system issued the command.

What this change affects

The DFSMS component enhanced for this support is DFSMSdfp.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	None.
Operations	The restriction of issuing the CONFIGHFS command only from the system on which the HFS file system was mounted has been removed. This command can now be issued from any system within a sysplex at z/OS V1R3 or later, assuming that the system on which the file system is mounted is also running z/OS V1R3 or later.
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

There are no additional software or hardware requirements for this support.

Coexistence considerations

There are no coexistence considerations related to this support.

Migration tasks

There are no migration actions for this support.

For more information

You can find information about using this support in the following publication:

- *z/OS UNIX System Services Command Reference*

Dynamic volume count

Description

Dynamic volume count enables dynamic addition of volumes to a DASD data set. You can specify a value for dynamic volume count, a data class space constraint relief subparameter, so that SMS can determine the number of volumes that a VSAM base cluster or a non-VSAM data set can span. The number can be 1–59, with 1 as the default value and 59 as the z/OS volume limit.

Dynamic volume count is used in the following circumstances:

- Functions that involve scheduler or dynamic allocation for building the TIOT/JFCB control blocks
- Space constraint relief and the number of volumes that a DADSM allocation can spread across

What this change affects

DFSMS components enhanced for this support are DFSMSdfp and DFSMSdss.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	System administrators can use the ISMF data class application to specify the dynamic volume count for a data set.
Storage administration	`Dynamic Volume Count` is a new parameter in the Data Class panels.
Operations	None.
Auditing	None.
Application development	Data sets that are defined with a data class that has a `dynamic` volume count will have more volumes, and therefore space available to them.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Processing restrictions

Dynamic volume count does not support:

- SAM striped data sets
- VSAM system data sets, such as the VVDS and the ICF catalog
- VSAM data sets created with the IMBED option
- VSAM alternate indexes
- Non-SMS data sets
- SMS-managed data sets with no data class

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMS: Implementing System-Managed Storage*
- *z/OS DFSMSdfp Storage Administration Reference*
- *z/OS DFSMS: Using the Interactive Storage Management Facility*

Large volume support

Description

The system now supports volume sizes as large as 24 GB and 32 760 cylinders, allowing you to access a larger amount of data. All functions currently supported for 3390 mod 9 continue to be supported.

DFSMSdss supports large volume copying and backup to other media, while providing continuous data access. The DFSMSdss COPY or DUMP/RESTORE commands can be used to migrate data to large volumes. You do not need to apply any coexistence support for DFSMSdss because the large volume support functions of DFSMSdss are internal. At the DFSMSdfp and DFSMShsm level, however, coexistence code and related task changes are applicable.

What this change affects

The DFSMS components enhanced for this support are DFSMSdfp, DFSMSdss, and DFSMShsm.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Data recovery	Using large volumes can affect data recovery plans for the following reasons: • Because large volumes contain more data, they require longer backup and restore times. • Large volumes require more virtual memory when DFSMS operates on the entire volume. • Physical dumps to tape for large volumes must be restored to a volume that can accommodate the large volume capacity.
Storage administration	DEVSERV changes: • You can issue the DEVSERV QDASD command to use or diagnose problems with large volumes. • The output shows the number of configured cylinders for a large volume. ISMF panel changes: • On the Volume Selection entry panel: the Allocated Space, Free Space, and Largest Extent fields have been expanded to eight digits to allow a value as a selection criterion. The Free DSCB field has been expanded to six digits. • On the Volume List panel: the Free Space, Alloc Space, and Largest Extent fields have been expanded to nine digits. The Free DSCB field has been expanded to six digits. • On the Volume Filter entry panel: the Allocated Space, Free Space, and Largest Extent fields have been expanded to nine digits so that you can enter a value as a filter criterion. The Free DSCB field has been expanded to six digits.
Operations	DFSMShsm changes: • The output field lengths for LIST, REPORT, and various messages have increased to accommodate data sets and statistics of operations on large volumes. For changes to the LIST and REPORT output, refer to the *z/OS DFSMShsm Storage Administration Reference*.

Area	Considerations
Messages	Changed DFSMShsm messages: • ARC0157I • ARC0158I • ARC0400I • ARC0401I • ARC0523I • ARC0531I • ARC0723I • ARC0736I For more information, see the *z/OS MVS System Messages, Vol 2 (ARC-ASA)*.
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

When you use large volume storage, it is important to use parallel access volumes (PAV), to achieve the highest level of I/O performance from Enterprise Storage Server (ESS). If you define large volume sizes on storage that does not support PAV, you will impact the time that it takes to access these volumes. You should define an adequate number of alias addresses on ESS to get better throughput.

You need to update the RAS configuration process and the StorWatch™ Enterprise Storage Server Specialist to allow the definition of up to 32 760 cylinders for a given logical volume.

Processing restrictions

For DFSMShsm, large volume support can extend processing time for volume space management (migration), volume backup and recover, volume dump and restore, and AUDIT MEDIACONTROLS.

Coexistence considerations

Table 14 shows the PTFs that are required for release levels prior to z/OS V1R3. Install the fixes for all these APARs in your environment. These PTFs refer to OS/390 V2R10 unless otherwise noted in this table. For the latest support recommendations, see the PSP bucket.

Table 14. Large volume support: PTF numbers for release levels prior to z/OS V1R3

PTF number	APAR number	Component
UW99406	OW50734	CVAF
	OW47497	Device support
UQ60515	PQ42534	ICKDSF Release 16 MVS VM VSE Stand-alone
UW81156	OW46067	Device support (V2R10)

Large volume support

Table 14. Large volume support: PTF numbers for release levels prior to z/OS V1R3 (continued)

PTF number	APAR number	Component
UW81155	OW46067	Device support (DFSMS/MVS V1R5)
UW81154	OW46067	Device support (DFSMS/MVS V1R4)
UW83221	OW49147	DFSMShsm (V2R10)
UW83220	OW49148	DFSMShsm (DFSMS/MVS V1R5)
UW83219	OW49148	DFSMShsm (DFSMS/MVS V1R4)
UW81156	OW46068, OW50268	DADSM/CVAF
	OW49292	IEHLIST
	OW46841	FAMS
	OW47210, OW50217	ISMF Naviquest
	OW47161	Sequential access method
UW81900	OW50405	DFSMSdss
UQ58312	PQ47926	DFSORT Release 14
UW79169 UW78960 UW78963	OW48394 OW48197	Base control program (BCP)
UW82690	OW51073	ISMF
UW77465	OW47857	ISPF
UW84645 UW84615	OW49317, OW49373	JES2
HJS7703	OW49477	JES3
UW81158	OW47210, OW50217	Kanji Panels
UW82187	OW50745	Optimizer
UQ58450	PQ49610	System display and search facility (SDSF)
UW81157	OW47210, OW50217	U.S. Panels

You must install DFSMSdfp coexistence PTF, fix for APAR OW46067, on all releases prior to OS/390 V2R10. UW99406 is the enabling PTF for OS/390 V2R10. The system is changed to prevent large volumes from being varied online. A volume configured with more than 10 017 cylinders (X'2721') will not come online during an IPL or VARY device online processing.

For OS/390 V2R10 or higher, install the large volume support before you use data on large volumes. A volume configured with more than 32 760 cylinders (X'7FF8') will not come online during an IPL or VARY device online processing.

The DFSMShsm large volume support includes changes to the DFSMShsm control data sets. Before using the large volume support, the following DFSMShsm support must be installed on all systems sharing the same DFSMShsm control data sets:

- z/OS DFSMShsm V1R3: Included in base product
- OS/390 DFSMShsm R10: APAR OW49147

- OS/390 DFSMShsm V1R5: APAR OW49148
- OS/390 DFSMShsm V1R4: APAR OW49148

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
Install the large volume support and coexistence support on all sharing systems in the sysplex.	Required	• *IBM TotalStorage ESS DFSMS Software Support Reference* • *z/OS Planning for Installation*
Configure PAV-alias and PAV-base devices in HCD and ESS.	Required	*TotalStorage Enterprise Server User's Guide*
Configure large volumes in ESS by using the ESS Specialist to create a noninterleaved 3390 rank.	Required	*TotalStorage Enterprise Server User's Guide*
Implement workload management (WLM) goal mode.	Required	*z/OS MVS Planning: Workload Management*
Enable WLM dynamic alias tuning.	Required	• *z/OS MVS Planning: Workload Management* • *z/OS MVS Programming: Workload Management Services*
Install required vendor product support for large volumes.	Required	See your vendor documentation.
Initialize large volumes with the ICKDSF INIT function.	Required	• *Device Support Facilities User's Guide and Reference* • *IBM TotalStorage ESS DFSMS Software Support Reference*
Migrate data to the ESS large volumes based on your storage need.	Required	• *z/OS DFSMSdss Storage Administration Guide* • *z/OS DFSMSdss Storage Administration Reference*
Monitor configuration performance.	Required	*TotalStorage Enterprise Server User's Guide*

Large volume support

System-Level Tasks	Condition	Procedure Reference
For DFSMShsm: 1. Install the large volume support coexistence PTFs for the proper releases, if an HSMplex includes a release prior to OS/390 V2R10. 2. Ensure that an SMS-managed large volume can have affinity only to a system where large volumes can be attached and the large volume PTF is installed. 3. IBM recommends that you use at least one more ML1 volume than the maximum number of concurrent migration tasks. 4. Issue one or more ADDVOL commands if you want large volumes as L0, ML1, ML2, or BACKUP volumes. 5. Use the FREEVOL command to populate large volumes introduced as migration or backup DASD volumes. 6. Look at all programs that use the LIST or REPORT command output for possible modifications as the offsets to specific fields have changed.	Required	• *IBM TotalStorage ESS DFSMS Software Support Reference* • *z/OS DFSMShsm Storage Administration Reference*

Application-Level Tasks	Condition	Procedure Reference
Plan the PAV pool size.	Optional	*z/OS MVS Planning: Workload Management*
Assess the impact of large volumes in disaster recovery and contingency plans.	Optional	*TotalStorage Enterprise Server User's Guide*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMShsm Storage Administration Reference*
- *IBM TotalStorage ESS DFSMS Software Support Reference*
- *z/OS DFSMS: Implementing System-Managed Storage*
- *z/OS DFSMSdfp Storage Administration Reference*
- *z/OS DFSMS: Using the Interactive Storage Management Facility*

RLS coupling facility caching enhancements

Description

RLS coupling facility caching enhancements allow you to specify the amount of data that is cached in the coupling facility (CF) cache structure defined to DFSMS.

What this change affects

The DFSMS component enhanced for this support is DFSMSdfp.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	To activate the RLS CF caching support: 1. Ensure that all systems in the sysplex are using z/OS V1R3. 2. Specify the keyword RLS_MaxCfFeatureLevel(A) in the IGDSMSxx PARMLIB member. • Specify `A` to cache VSAM data with control intervals larger than 4 KB in the CF cache. • If you do not specify a value or specify `z`, the system caches only VSAM data sets with control intervals of 4 KB or less in the CF cache. If this criteria is not met, the system continues to place all VSAM/RLS data in the CF cache, as in previous releases.
Storage administration	ISMF supports the RLSCFCACHE keyword with a new field in the DATACLAS panel

Operations	A new keyword is available for SETSMS=XX command, SETSMS command, and D SMS,Options command:
	• RLS_MaxCfFeatureLevel
	
	To determine the RLS_MaxCfFeatureLevel for a single system in the sysplex, use the following command:
	`D SMS,SMSVSAM`
	
	To determine the RLS_MaxCfFeatureLevel for the entire sysplex, use the following command:
	`D SMS,SMSVSAM,ALL`
	
	To display a specific CF cache structure, use the following command:
	`D SMS,CFCACHE(cacheName)`
	
	To display all the CF cache structures that are defined in the SMS active configuration, use the following command:
	`D SMS,CFCACHE(*)`
	
	To set the CF controls, specify one of the following values in the RLSCFCACHE field in the SMS DATACLAS panel:
	• NONE indicates that VSAM/RLS caches only the VSAM index entries and does not place any VSAM data sets in the CF cache structures.
	• UPDATESONLY places only the changed VSAM data in the CF cache structures.
	• ALL places all of the VSAM data and index entries in the CF cache structures.

Auditing	SMF record 42 subtypes 15 and 16 are changed. For details, see Table 31 on page 266.
Application development	None.

RLS coupling facility caching enhancements

Area	Considerations
General use	None.

Hardware or software dependencies

Install PTF OW49450 on all down-level systems for this support.

Processing restrictions

None.

Coexistence considerations

All systems in the sysplex must be at z/OS V1R3.

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMSdfp Diagnosis Reference*
- *z/OS DFSMS: Implementing System-Managed Storage*
- *z/OS DFSMSdfp Storage Administration Reference*
- *z/OS DFSMS: Using the Interactive Storage Management Facility*

RLS lock table CF duplexing

Description

VSAM RLS lock table coupling facility (CF) duplexing provides support in the following circumstances:

- A validity check function during the user-managed rebuild and lock structure ALTER process.

  This validity-check ensures that the new lock structure has enough free space for locking to proceed.
- System-managed duplexing rebuild function for coupling facility (CF) lock structures

What this change affects

The DFSMS component enhanced for this support is DFSMSdfp.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	None.
Operations	Changes and enhancements have been made to these operator commands: • SETXCF START,REBUILD,DUPLEX (MVS) Starts the system-managed duplexing rebuild for the VSAM RLS lock structure. (You must specify the ALLOWED keyword in the CFRM policy before you can use SETXCF to start the duplexing function.) • SETXCF STOP,REBUILD,DUPLEX (MVS) Stops the system-managed duplexing rebuild for the VSAM RLS lock structure. (Another way to turn off the duplexing function is to specify the DISABLED keyword in the CFRM policy.) • DISPLAY SMS,CFLS Displays information about the CF lock structure for system-managed duplex rebuild. • DISPLAY SMS,SMSVSAM[,ALL] Displays the status of SMSVSAM servers and the lock structure mode. • V SMS,SMSVSAM,FORCEDELETELOCKSTRUCTURE Resets the space if validity checking indicates that there is not enough space in a specific lock structure for future locking activity to proceed. This command is rejected if it occurs while duplexing mode is being established. • DISPLAY SMS,SEP Displays the name of the data separation profile.
Auditing	None.
Application development	None.
General use	None.

Migration tasks

To implement this change, you need to consider each task listed. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only

specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-level Tasks	Condition	Procedure Reference
Update the CF configuration to support system-managed duplexing rebuild of the VSAM RLS lock structure. IBM strongly recommends that you use the rebuild process to change the size of the lock structure instead of the ALTER process.	Required	*z/OS MVS Programming: Sysplex Services Guide*
Ensure that all of the VSAM RLS instances on all systems are upgraded to support system-managed duplexing rebuild. Change the CFRM policy to enable the duplexing function (ENABLE or ALLOWED) for the lock structure (IGWLOCK00). To turn off the duplexing function, specify DISABLED in the CFRM policy.	Required	*z/OS DFSMSdfp Storage Administration Reference*
Enable CFRM for system-managed duplexing rebuild by formatting the CFRM coupled data set for system-managed duplexing rebuild and including it in the system.	Required	*z/OS DFSMSdfp Storage Administration Reference*
Modify and activate the CFRM policy to control the sizing and placement of the VSAM RLS lock structure. The DUPLEX parameter specifies that the lock structure is to be duplexed with system-managed duplexing rebuild.	Required	*z/OS DFSMSdfp Storage Administration Reference*

Hardware or software dependencies

To use system-managed duplexing, you must have the following hardware:

- CFLEVEL=10 coupling facility architecture support and CFCC licensed internal code implementation
- CF-to-CF peer links
- A duplexed pair of primary and secondary VSAM RLS lock structure instances
- Possible additional CF storage, CF processor capacity, and z/OS V1R3-to-CF link capacity
- The message architecture LIC support for each VSAM RLS system image, with a connector to a duplexed lock structure

Coexistence considerations

All systems must be z/OS V1R3 or later.

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMS Access Method Services*
- *z/OS DFSMSdfp Diagnosis Guide*
- *z/OS DFSMSdfp Diagnosis Reference*
- *z/OS DFSMS: Managing Catalogs*
- *z/OS DFSMSdfp Storage Administration Reference*

SMS miscellaneous enhancements

Description

The following enhancements are now provided with DFSMSdfp:

- Automation assistance

  With this support, selected volume selection failure messages are written to a hardcopy log, in addition to the job log.
- Extend storage groups

  Extend storage groups allows the storage administrator to define another storage group name when defining a storage group. The second storage group is called the extend storage group. The extend storage group is used during extend processing for data set end-of-volume if the currently allocated storage group does not have sufficient space.
- Overflow storage groups

  This support allows the storage administrator to designate certain storage groups as overflow storage groups. These overflow storage groups are used during primary space allocation if the volumes in the nonoverflow storage groups are full (above the space allocation threshold).
- Data set separation

  Data set separation allows the storage administrator to designate groups of data sets to be kept separate at the physical control unit (PCU) level. *Failure isolation* means separate volumes, control units, storage subsystems, and paths to the controllers. That way, if one control unit fails, the sysplex can access the data sets on the other control unit.
- SMS-managed data set EXPDT/RETPD

  This support recognizes the EXPDT/RETPD parameters on the DD statement of an existing (DISP=OLD) SMS-managed data set, as limited by the data set's management class. EXPDT/RETPD is recognized under the following circumstances:
  - The data set is opened for output processing
  - The calculated date is within the bounds of the expiration data/retention period limitations in the management class for the data set.
- SMF records
  - If data set allocation fails because of insufficient space, the system writes a new SMF record type 42, subtype 10. This SMF record contains the following information:
    - Job name
    - Program name
    - Step name
    - DD name
    - Data set name
    - Requested space quantity
    - Data class
    - Management class
    - Storage group

What this change affects

The DFSMS component enhanced for this support is DFSMSdfp.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	Storage group configuration.
Operations	DISPLAY CONSOLES,HARDCOPY command is used to display: • The type of hardcopy log, SYSLOG or a device • The type of messages directed to the log • The number of messages waiting to be put in the log
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

There are no coexistence considerations related to this support.

Migration tasks

To implement this change, you need to consider each task listed. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
Determine which storage groups, either new or existing, should be designated as overflow storage groups and make the necessary changes in the Storage Group definition of the SMS configuration.	Required	*z/OS DFSMSdfp Storage Administration Reference*
Set the overflow storage group status to quiesced for each of the lower level systems (below z/OS V1R3 DFSMS) to prevent lower level systems from using the overflow storage group prematurely.	Required	*z/OS DFSMSdfp Storage Administration Reference*
Define an extend storage group for the storage groups where you want to implement the extend storage group enhancement, and make sure that the connectivity is the same for all systems in the sysplex for the storage group and the extend storage group.	Required	*z/OS DFSMSdfp Storage Administration Reference*

System-Level Tasks	Condition	Procedure Reference
Determine which data sets should be kept separate and create a data set separation profile for SMS. Keep the following data set types on separate control units: • Software-duplexed data sets such as DB2 logs, SYSPLEX, or CFRM data sets. The instances are called *primary couple data sets* and *secondary couple data sets*. • Data sets that the coupling facility and backup coupling facility create.	Required	*z/OS DFSMSdfp Storage Administration Reference*
Define the name of the separation profile in the SMS base configuration.	Required	*z/OS DFSMSdfp Storage Administration Reference*
Ensure that the initial data set allocation (DISP=NEW) and end-of-volume extend for data sets specified in the data set separation profile are directed to only z/OS V1R3, for data set separation support.	Required	*z/OS DFSMSdfp Storage Administration Reference*
Make sure that there is a sufficient number of physical control units (PCUs) when implementing this enhancement for multistriped data sets.	Required	*z/OS DFSMSdfp Storage Administration Reference*
For each data set separation group, specify the desired SMS action if data set separation cannot be completed: • SEPARATIONGROUP indicates the beginning of a data set group. A separation group contains a fail level and a list of data set names that need separation on the PCU level, from other data sets within the same group. • SEPARATIONGROUP|FAILLEVEL|PCU indicates that the allocation will fail if the requested data set cannot be separated in the PCU level from other data sets listed in the group.	Required	*z/OS DFSMSdfp Storage Administration Reference*
For each data set separation group: • SEPARATIONGROUP|FAILLEVEL|NONE indicates that the allocation is allowed on the same PCU, if the data set cannot be separated from other data sets listed in the group.	Optional	*z/OS DFSMSdfp Storage Administration Reference*
For each data set separation group: • SEPARATIONGROUP|DSNLIST specifies the group of data sets that need to be separated from other data sets within the DSNLIST.	Required	*z/OS DFSMSdfp Storage Administration Reference*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMS Access Method Services*
- *z/OS MVS System Management Facilities (SMF)*
- *z/OS DFSMS Advanced Copy Services*
- *z/OS DFSMSdfp Diagnosis Guide*
- *z/OS DFSMS: Implementing System-Managed Storage*
- *z/OS DFSMSdfp Storage Administration Reference*
- *z/OS DFSMS: Using Data Sets*

VSAM large real storage

Description

VSAM large real storage enables I/O processing with real addresses greater than two GB for all VSAM data sets, except for:

- VSAM improved control interval processing (ICIP)
- VSAM data sets used before the master scheduler is initialized

This support allows VSAM OPEN or the application program to obtain buffer storage from any real address location available to the processor. This location can have a real address greater than 2 GB or less than 2 GB. For VSAM ICIP, obtain buffers from 31-bit real storage.

From base element DFSMSdfp, the KEYRANGE specification is withdrawn. The value of keyranges as a feature of VSAM key-sequenced data sets has diminished significantly over the last few years with the introduction of new DASD cached controllers, improved SMS DASD performance parameters, and VSAM data striping. Because of this, the KEYRANGE specification is ignored on the IDCAMS DEFINE and IMPORT commands for any new data sets beginning in z/OS V1R3.

What this change affects

The DFSMS components enhanced for this support are DFSMSdfp and DFSMShsm.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	CISIZE calculation changes: • The algorithm for calculating the controlinterval size (CISIZE) has changed to a 3:1 compression ratio for the data set key. • Some data sets might now be allocated with larger index CISIZE values. • The value used will be the larger of the value that you specify or the value calculated by the algorithm, so you might see a change in the values for existing data sets when you redefine them. BLDVRP specification changes: • If you have coded the index buffer size based on the index CISIZE previously calculated, these values might be inadequate beginning with z/OS V1R3. • Review the BLDVRP specifications and update the values if necessary, after the data set is defined.
Operations	None.
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

The system automatically handles any real address.

Coexistence considerations

If you currently use keyrange data sets for your DFSMShsm control data sets (CDSs), it is strongly recommended that you begin planning to convert your CDSs to multicluster dynamic keyrange (nonkeyrange) control data sets. For the steps, see “Migration tasks”.

DFSMSdss should be the default datamover before migration to z/OS V1R3. If DFSMShsm is the default datamover:

- IDCAMS export is invoked to migrate or back up VSAM data sets.
- IDCAMS import is invoked to recall and recover VSAM data sets which will remove keyranges.
- Attempts to migrate VSAM keyrange data sets fail.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

VSAM large real storage

Application-Level Tasks	Condition	Procedure Reference
If keyrange data sets are currently being used for DFSMShsm control data sets: 1. Convert those control data sets to multicluster nonkeyrange control data sets, preferably during a planned reorganization of the control data sets. Remove the KEYRANGE keyword from the IDCAMS DEFINE statements used to define the multicluster control data sets, then follow your normal reorganization process. When DFSMShsm is restarted, since the VSAM keyranges are not present, DFSMShsm dynamically calculates the key boundaries of each cluster. 2. Use the QUERY CONTROLDATASETS command to view both the low and high keys that DFSMShsm calculated for each cluster. 3. If the keyrange multicluster control data sets are not converted to nonkeyrange data sets before migration, use UPDATEC for control data set recovery. If control data sets still contain keyranges during V1R3 migration, the enhanced control data set recovery procedure will not perform properly. Determine if DFSMShsm is the default datamover by locating a patch to the Datamover Selection Table in the DFSMShsm startup PARMLIB (PATCH .DMVST.+0). If the patch is present, the default datamover is DFSMShsm. Change the default to DFSMSdss by removing the patch. When DFSMShsm is the datamover: • Attempts to migrate VSAM keyrange data sets with the DFSMShsm datamover will be failed. VSAM keyrange data sets must be migrated using the DFSMSdss datamover. • VSAM keyrange data sets that were previously migrated with the DFSMShsm datamover will be recalled, but the keyranges will be removed and a warning message will be issued. If possible, recall VSAM keyrange data sets on a down-level system. VSAM keyrange data sets that were previously migrated with the DFSMSdss datamover will be recalled with the keyranges. • Attempts to backup VSAM keyrange data sets with the DFSMShsm datamover will be allowed, but a warning message will indicate that the keyranges will be removed if the data set is recovered. • VSAM keyrange data sets that were previously backed up with the DFSMShsm datamover will be recovered, but the keyranges will be removed and a warning message will be issued. If possible, recover VSAM keyrange data sets on a down-level system. VSAM keyrange data sets that were previously backed up with the DFSMSdss datamover will be recovered with the keyranges. **Note:** DFSMShsm provides an ARCTOOLS REXX program called FINDKRDS that identifies all migrated VSAM keyrange data sets.	Recommended	• *z/OS DFSMShsm Implementation and Customization Guide* • *z/OS DFSMShsm Storage Administration Reference*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMS Access Method Services*
- *z/OS DFSMSdfp Diagnosis Reference*
- *z/OS DFSMS: Managing Catalogs*
- *z/OS DFSMS: Using Data Sets*
- *z/OS DFSMShsm Implementation and Customization Guide*
- *z/OS DFSMShsm Storage Administration Reference*

VSAM striped data set enhancements

Description

- VSAM striped data sets no longer require contiguous extents when they obtain secondary space. The system allocates secondary space in multiples of control area size. Previously, the system allocated secondary space as one contiguous extent.
- VSAM striped data sets support the REUSE parameter of the DEFINE CLUSTER and ALTER commands.

What this change affects

The DFSMS component enhanced for this support is DFSMSdfp.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	None.
Operations	None.
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

None.

Coexistence considerations

To reuse VSAM striped data sets on OS/390 V2R10, apply coexistence PTF OW50528. To improve performance in allocating secondary space for VSAM striped data sets on OS/390 V2R10, apply coexistence PTFs OW49968 and OW49964.

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMS Access Method Services*
- *z/OS DFSMS: Using Data Sets*

OAM multiple object backup

Description

With OAM multiple object backup support, you can physically separate backup copies of objects based on the object storage group to which the object belongs. You can direct your backup copies of objects to different media types, including optical or tape, based on the definitions for the target object backup storage group that will contain the backup copy.

The multiple object backup storage group capability allows you to make a second backup copy of objects. You can direct Object Access Method (OAM) to create up to two backup copies of objects using current fields in the SMS management class construct and by specifying a first and a second object backup storage group for your object storage groups in the CBROAM*xx* member of PARMLIB. Additionally, you can direct OAM to write the first and second backup copies on the same removable media type or on different removable media types.

Finally, with this support, OAM improves the overall reliability and usability of the volume recovery utility. OAM will provide a full list of volumes required to accomplish a recovery beyond the previous limit of 70 144 objects that could be recovered during a single invocation of the recovery utility. Additionally, during a volume recovery, OAM provides improved informational messages. It also provides the ability to obtain statistics on the volume recovery.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	• Add SETOSMC statements to the CBROAM*xx* member of PARMLIB to enable multiple object backup support. Associate at least one object backup storage group with a SECONDBACKUPGROUP keyword in a SETOSMC statement in order to write a second backup copy of an object.
Storage administration	• Update automatic class selection (ACS) routines to accommodate the new tape data set name of OAM.BACKUP2.DATA. The storage of backup objects to this data set is determined by the SETOAM statement of the CBROAM*xx* member of PARMLIB. • Update the SMS management class definition construct to indicate the number of backup versions of objects that you want. The field that displays the number of backup versions now displays the number of backup versions to be maintained for objects. The default value for this field is 2. • Change SYS1SAMPLIB to SYS1.SAMPLIB.
Operations	• New parameters have been added for selected operator commands. These include: – MODIFY OAM,START,AB,*reason*,BACKUP1 | BACKUP2 – MODIFY OAM,START,OBJRECV,*colctn*,*object*,BACKUP1 | BACKUP2 – MODIFY OAM,START,RECOVERY,*volser*,BACKUP1 | BACKUP2 • Output has been modified for selected DISPLAY commands. • There is a new operator command: F OAM,DISPLAY,SETOSMC,ALL or F OAM,DISPLAY,SETOSMC,*group-name* • This support introduces a number of new and changed CBR*xxxxx* messages and return codes.
Auditing	None.

OAM multiple object backup

Area	Considerations
Application development	• A new keyword, VIEW=BACKUP2, has been added to the OSREQ macro RETRIEVE function. • A new retrieval order key has been added to the OSREQ macro QUERY function. • Run the migration jobs supplied in the CBRSMR13 member of SYS1.SAMPLIB. These jobs add new columns to the OAM DB2 tables. • Modify and run the OAM bind jobs: – CBRPBIND – CBRIBIND – CBRHBIND – CBRABIND • Interface changes have been made as follows: – OSREQ macro (RETRIEVE function) – CBRIQEL macro (QUERY function) – CBROAM*xx* member of PARMLIB (modified SETOAM statement and new SETOSMC statement) – New columns, ODBK2LOC and ODBK2SEC, have been added to the DB2 object directory tables to indicate locations of backup copies of objects. – A new column, BKTYPE, has been added to the DB2 optical volume table to indicate the backup type for optical volumes. – A new column, BKTYPE, has added to the DB2 tape volume table to indicate the backup type for tape volumes. – New reporting fields have been added to certain SMF 85 records. • Five new reason codes have been added.
General use	None.

Hardware or software dependencies

No additional hardware or software dependencies are associated with this support.

Coexistence considerations

The z/OS V1R3 release of OAM provides coexistence for lower-level systems in an OAMplex in the following areas: object directory tables, XCF messaging, and post-migration fallback to a previous release.

Modified Object directory tables: The DBRMs that interface with the object directory tables will now select specific columns instead of the full row.

This coexistence is necessary when falling back to a previous release of OAM after migrating to the current release of OAM, or when z/OS V1R3 and one or more systems at a previous level are in the same OAMplex.

Cross-coupling facility (XCF) messaging: In z/OS V1R3, coexistence has been provided for OAM messages sent through the coupling facility across lower-level and current-level system OAMs in an OAMplex.

Processing restrictions

None.

Migration tasks

To implement this change, consider the following tasks. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

Migration tasks are required when moving to the z/OS V1R3 release of OAM. SAMPLIB jobs have been provided to add the necessary columns to the OAM DB2 tables for object support, as follows:

- **CBRSMR13 SAMPLIB job:** This job performs two functions:
  - Performs the migration from any pre-z/OS V1R3 system level of the optical configuration database to the z/OS V1R3 version that supports the multiple object backup storage groups and the second object backup function in OAM/OSMC. This job adds a new column BKTYPE to the existing VOLUME table. It also adds a new column BKTYPE to the existing TAPEVOL table. For recovery purposes, IBM recommends that you create a DB2 image copy of the existing VOLUME and TAPEVOL tables prior to executing this migration job.
  - Performs the migration from the base version of the OAM object directory tables to the z/OS V1R3 version, which supports second backup copies of objects. This job adds new columns ODBK2LOC and ODBK2SEC to the existing object directory tables. For recovery purposes, IBM recommends that you create a DB2 image copy of the existing object directory tables prior to running this migration job.

Recommendation: Perform these tasks in the order listed:

1. Run the CBRSMR13 job.
2. Run a DB2 REORG.

Coexistence PTFs are required to fall back to previous releases of OAM after migrating to this release. PTFs are also required for the coexistence of multiple levels of OAM in an OAMplex that share resources with this release of OAM.

System-Level Tasks	Condition	Procedure Reference
Update automatic class selection (ACS) routines to accommodate the new tape data set name of OAM.BACKUP2.DATA.	Optional (do this step only if implementing multiple object backup support) and storing second backup copies to tape media	*z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*
Define multiple object backup storage groups using ISMF.	Optional (do this step only if implementing multiple object backup support)	*z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*

OAM multiple object backup

Application-Level Tasks	Condition	Procedure Reference
Add the SETOSMC statement to the CBROAM*xx* member of PARMLIB.	Optional (do this step only if implementing multiple object backup support)	*z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*
Run the jobs in the CBRSMR13 member of SAMPLIB to add new columns to the OAM DB2 tables.	Required (even if not implementing multiple object backup support)	*z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*

For more information

You can find information about using multiple object backup support in the following publications:

- *z/OS DFSMS: Implementing System-Managed Storage*
- *z/OS DFSMS OAM Application Programmer's Reference*
- *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*. Chapter 3, "Migrating, Installing, and Customizing OAM," has a critical, detailed installation and migration checklist. Each step in this checklist must be performed and verified during migration.
- *z/OS DFSMSdfp Storage Administration Reference*
- *z/OS MVS System Messages, Vol 4 (CBD-DMO)*

DFSMSdss COPY command enhancement

Description

A new optional keyword, DUMPCONDITIONING, was added to the DFSMSdss COPY command. When specified, DUMPCONDITIONING allows the target volume of a FULL volume COPY operation to remain online for dumping. By specifying COPY DUMPCONDITIONING, the target volume can be output to tape while the source volume remains available for application use. When FlashCopy or SnapShot are used to perform the copy, the period of time that the source volume is unavailable for applications is minimized.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	None.
Operations	A new keyword is available for the COPY command. • DUMPCONDITIONING DUMPCONDITIONING specifies that you want to create a copy of the source volume for backup purposes, rather than for the applications to use the target volume.
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

There are no coexistence considerations related to this support.

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMSdss Storage Administration Guide*
- *z/OS DFSMSdss Storage Administration Reference*

DFSMSdss HFS logical copy

Description

The COPY command can now be used by DFSMSdss to process a hierarchical file system (HFS) data set. DFSMSdss customers were previously required to use two commands before this support, DUMP and RESTORE, to process an HFS data set.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	You can use the COPY command to process HFS data sets.
Operations	None.
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

There are no coexistence considerations related to this support.

For more information

You can find information about using this support in the following publication:

- *z/OS DFSMSdss Storage Administration Reference*

DFSMShsm common recall queue

Description

In DFSMShsm, recall requests are currently only processed by the host on which they were initiated. The common recall queue (CRQ) is a single recall queue that is shared by multiple DFSMShsm hosts. The CRQ enables the recall workload to be balanced across each of these hosts. This queue is implemented through the use of a coupling facility (CF) list structure.

Restriction: A CRQ cannot be shared between separate HSMplexes.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	The active coupling facility resource management (CFRM) policy must contain the definition for the common recall queue. The DFSMShsm PARMLIB member should be updated to include the SETSYS COMMONQUEUE(RECALL(CONNECT(basename))) command. This SETSYS command indicates that DFSMShsm should connect to the common recall queue during startup.
Storage administration	All concurrent recall requests that require an ML2 tape volume are processed by a single tape mount, regardless of where the requests originated. This feature reduces tape mounts and improves recall processing time. Functional statistics records (FSR) for recall requests include the originating hosts system identifier. Only the host that actually processes a recall request creates an FSR for that request. The host that originated the request, if different from the processing host, will not have an FSR for that request. A new field in the FSR (FSR_ORGNL_HID) contains the host id of the host that originated the recall request (this field is only valid for recall).
Operations	• HOLD COMMONQUEUE is a new optional parameter that allows you to specify whether DFSMShsm prevents all processing in the common queue. COMMONQUEUE(RECALL) is an optional subparameter that allows you to specify that a host neither places recall requests in the CRQ, nor selects recall requests from the CRQ. COMMONQUEUE(RECALL(PLACEMENT)) is an optional subparameter that allows you to specify that the host does not place additional requests in the CRQ. COMMONQUEUE(RECALL(SELECTION)) allows you to specify that the host does not select recall requests from the CRQ. • RELEASE COMMONQUEUE is a new optional parameter that allows you to specify that DFSMShsm is to release all holds at the COMMONQUEUE, RECALL, PLACEMENT, and SELECTION levels. COMMONQUEUE(RECALL) is a subparameter that allows you to specify that DFSMShsm is to release holds at the RECALL, PLACEMENT, and SELECTION levels. COMMONQUEUE(RECALL(PLACEMENT)) is a subparameter that allows you to specify that DFSMShsm is to release a hold at the PLACEMENT level. COMMONQUEUE(RECALL(SELECTION)) is a subparameter that allows you to specify that DFSMShsm is to release a hold at the SELECTION level. • QUERY COMMONQUEUE is a new optional parameter that allows you to specify that DFSMShsm is to display percent full information for the common queue. COMMONQUEUE(RECALL) is a subparameter that allows you to specify that DFSMShsm is to display the percent full of the CRQ, all outstanding recall requests on the CRQ, and all recall requests currently being processed from the CRQ.

DFSMShsm common recall queue

Area	Considerations
Auditing	AUDIT COMMONQUEUE is a new parameter that allows you to specify that DFSMShsm is to audit all of the DFSMShsm common queues. COMMONQUEUE(RECALL) is a subparameter that allows you to specify that DFSMShsm is to audit the CRQ.
Application development	None.
General use	None.

Note: Many DFSMShsm commands are designed to allow the addition of future common queues. At this time, only the common recall queue is available, and you can have only one common recall queue per HSMplex.

Hardware or software dependencies

DFSMShsm must be in a parallel sysplex configuration. The minimum CFLEVEL is 8, and the preferred CFLEVEL is 10. CFLEVEL 10 offers many enhancements that DFSMShsm can take advantage of, such as CF duplexing.

Coexistence considerations

All hosts using the CRQ must be at z/OS V1R3 DFSMShsm or higher. Other hosts in the same HSMplex that are not using the CRQ can be at any supported level.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
Determine the size of the CRQ structure.	Required	*Chapter 5, Specifying Commands that Define Your DFSMShsm Environment*, in *z/OS DFSMShsm Implementation and Customization Guide*
Update the active coupling facility resource management (CFRM) policy to include the definition of the CRQ.	Required	*Chapter 5, Specifying Commands that Define Your DFSMShsm Environment*, in *z/OS DFSMShsm Implementation and Customization Guide*
Update the DFSMShsm PARMLIB member to include the SETSYS COMMONQUEUE(RECALL(CONNECT(basename))) command.	Required	SETSYS chapter in *z/OS DFSMShsm Storage Administration Reference*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMShsm Storage Administration Guide*
- *z/OS DFSMShsm Implementation and Customization Guide*
- *z/OS DFSMShsm Storage Administration Reference*
- *z/OS DFSMShsm Data Recovery Scenarios*

DFSMSrmm special character support

Description

You can use all the characters that z/OS V1R3 supports when you define volume serial numbers. For information about the characters supported by z/OS V1R3, see *z/OS MVS JCL Reference*.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	You can use volume serial numbers that contain all the characters supported by z/OS V1R3.
Storage administration	None.
Operations	None.
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

For volumes that reside in IBM automated tape libraries, only alphanumeric characters are supported (with barcode labels) unless the unlabeled tape facility is used. When the unlabeled tape facility is used, then the alphanumeric characters plus - (hyphen), # (number or pound sign), & (ampersand), $ (dollar sign) and @ (at sign) are supported.

For more information

You can find information about using this support in the following publication:

- *z/OS DFSMSrmm Application Programming Interface*
- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Implementation and Customization Guide*
- *z/OS DFSMSrmm Reporting*

DFSMSrmm TSO/E help packaging enhancement

Description

You no longer need to copy DFSMSrmm TSO/E help into SYS1.HELP or to concatenate the SYS1.SEDGHELP library because DFSMSrmm TSO/E help is now included in SYS1.HELP with the rest of DFSMS.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	DFSMSrmm TSO/E help is packaged in SYS1.HELP so no addition customization is required.
Storage administration	None.
Operations	None.
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

There are no coexistence considerations related to this support.

For more information

You can find information about using this support in the following publication:

- *z/OS DFSMSrmm Implementation and Customization Guide*

DFSMSrmm bin management enhancements

Description

DFSMSrmm bin management enhancements allow you to:

- Reuse bins in storage locations without having to confirm that the volumes residing in the bin have moved.
- Assign volumes to bins in volume serial number sequence and bin number sequence.
- Redirect and reassign moving volumes.
- Obtain information about where volumes reside and where they are moving to or moving from.
- Perform storage location management by location.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	• If you enable extended bin support, you might need to increase the size of the DFSMSrmm control data set to accommodate increased record sizes for the volume record and the bin record in the control data set. You might also need to increase the size of the journal. • User-written programs, REXX execs, and reports that use bin information might have to be changed as a result of new bin information made available with the enhanced bin management function.
Storage administration	• To reuse a bin in a storage location that is available, modify the DFSMSrmm EDGRMMxx PARMLIB member. • You might experience some increase in runtime when extended bin support is enabled or when you request storage location management processing INSEQUENCE. The amount of the time depends on the number of volumes that move to bin-managed storage locations and from bin-managed storage locations.
Operations	None.
Auditing	None.
Application development	None.
General use	The RMM SEARCHRACK subcommand and RMM SEARCHBIN subcommand default value has changed so you can obtain all rack or bin information in one invocation of the subcommand.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

To avoid corruption of the DFSMSrmm control data set, before you enable extended bin support, ensure that for all DFSMSrmm systems sharing a control data set in an RMMplex, you have installed coexistence APAR OW4794 or APAR OW4986 or are running DFSMSrmm on z/OS V1R3 or higher.

DFSMSrmm bin management enhancements

In an RMMplex, your system-managed libraries must be connected to at least one system on which enhanced bin management is installed. You might have to change user-written programs, REXX execs, and reports that use bin information as a result of new bin information made available with the enhanced bin management function.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
To avoid corruption of the DFSMSrmm control data set, before you enable extended bin support, ensure that for all DFSMSrmm systems sharing a control data set in an RMMplex, you have installed coexistence APAR OW4794 or APAR OW4986 or are running DFSMSrmm on z/OS V1R3 or higher.	Required	*z/OS DFSMSrmm Implementation and Customization Guide*
Update existing reports to incorporate additional information provided.	Required	*z/OS DFSMSrmm Reporting*
Decide if and when you want to enable extended bin support. Remember that you cannot turn off extended bin support once you have enabled it.	Required	*z/OS DFSMSrmm Implementation and Customization Guide*
Ensure that all volume moves from bin-managed storage locations and to bin-managed storage locations have been completed. If you use the global confirm move command to complete the volume moves, run inventory management vital record processing or expiration processing to process the confirm moves for the volume records. Do not run storage location management processing since doing so could start new volume moves.	Required	*z/OS DFSMSrmm Implementation and Customization Guide*
Specify the EXTENDEDBIN parameter in the EDGUTIL SYSIN commands if you enable extended bin support.	Required	*z/OS DFSMSrmm Implementation and Customization Guide*
Increase the size of the DFSMSrmm control data set and the journal to accommodate increased record sizes for the volume record and the bin record in the control data set.	Optional	*z/OS DFSMSrmm Implementation and Customization Guide*
Specify the OPTION REUSEBIN operand on the EDGRMMxx PARMLIB to reuse an available bin in a storage location sooner as soon as the volume move begins.	Optional	*z/OS DFSMSrmm Implementation and Customization Guide*
Move volumes to selected storage locations by running the EDGHSKP utility with the DSTORE(*location*) parameter.	Optional	*z/OS DFSMSrmm Implementation and Customization Guide*
Run the EDGHSKP utility with the DSTORE(INSEQUENCE) parameter to assign volumes to storage locations in volume serial number and bin number sequence	Optional	*z/OS DFSMSrmm Implementation and Customization Guide*
Redirect and reassign a moving volume by running the EDGHSKP utility with the DSTORE(REASSIGN) parameter.	Optional	*z/OS DFSMSrmm Implementation and Customization Guide*

System-Level Tasks	Condition	Procedure Reference
To obtain a list of all bin numbers using the RMM TSO SEARCHRACK or RMM TSO SEARCHBIN subcommand, you no longer need to invoke the subcommand more than one time. The subcommands no longer use the INUSE operand as the default. If neither INUSE nor EMPTY is specified in the search request, DFSMSrmm lists all bins regardless of their status. You can change existing user-written-programs and REXX-programs that are written to request search twice to retrieve all rack numbers and bin numbers to only make one search request.	Optional	*z/OS DFSMSrmm Guide and Reference*

For more information

You can find information about using this support in the following publication:

- *z/OS DFSMSrmm Application Programming Interface*
- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Implementation and Customization Guide*
- *z/OS MVS System Messages, Vol 5 (EDG-GFS)*

DFSMSrmm report generator

Description

DFSMSrmm report generator provides a new ISPF function for creating reports.

- You can now create reports using sequential data sets as input. You must provide mappings of the records in the input data set for the report generator to pick out information in the input data set.
- You can create a DFSMSrmm extract data set using the EDGHSKP utility to create an input file for the report generator. Using the extract data set as input, DFSMSrmm provides mapping macros for the records in the extract data set.
- DFSMSrmm provides report types that associate the input file with the needed mapping macros.
- The default version of the report generator uses DFSORT ICETOOL as the reporting tool to create reports.
- You can modify the report generator to use other types of input data sets or other reporting tools.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
Storage administration	See “Migration tasks” on page 99 for storage administration considerations.
Operations	None.
Auditing	• Complete the job statement in the DFSMSrmm Options panel. • Create the report JCL needed to create the report. • Submit the job. • Make sure that the PRODUCT, INSTALLATION, and USER libraries are available. • Update the Report Options panel to point to the USER library you use. • Define the JCL library. • Select the report types and report definitions that you will use to create reports.
Application development	None.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

There are no coexistence considerations related to this support.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
• Define the libraries for the report types, report definitions, and JCL that the report generator requires.	Required	*z/OS DFSMSrmm Reporting*
• Tailor DFSMSrmm-supplied report types for your installation. • Make sure that the PRODUCT, INSTALLATION, and USER libraries are available. • Provide access to the libraries • Select the report types and report definitions that your installation will use.	Optional	*z/OS DFSMSrmm Reporting*

For more information

You can find information about using this support in the following publication:

- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Implementation and Customization Guide*
- *z/OS DFSMSrmm Reporting*

DFSMSrmm macro enhancements

Description

New fields have been added to existing DFSMSrmm mapping macros. Field descriptions on existing macros have been updated to allow easier use within the report generator.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	You must recompile any programs that use these mapping macros: EDGRVEXT, EDGRDEXT, and EDGRXEXT.
Storage administration	None.
Operations	None.
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

There are no coexistence considerations related to this support.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
Recompile any programs that use the EDGRVEXT, EDGRDEXT, and EDGRXEXT mapping macros. New fields have been appended to the existing macros and existing field comments have been updated to allow easier use within the DFSMSrmm report generator	Optional	*z/OS DFSMSrmm Reporting*

For more information

You can find information about using this support in the following publication:

- *z/OS DFSMSrmm Reporting*

DFSMSrmm ACS pooling control enhancements

Description

DFSMSrmm automatic class selection (ACS) pooling control enhancements have been made so you can enable or disable ACS processing introduced with OS/390 V2R10. Use this enhancement to control DFSMSrmm support for pre-ACS processing and to control assignment of storage group and management class. You can set up DFSMSrmm to call SMS ACS processing to use your ACS routine management class and storage group values instead of vital record specification management values and scratch pools.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	Use the DFSMSrmm EDGRMMxx PARMLIB member OPTION PREACS or OPTION SMSACS to select the DFSMSrmm processing you require.
Storage administration	The RMM LISTCONTROL subcommand output has been changed.
Operations	None.
Auditing	None.
Application development	Additional REXX variables and structured field introducers (SFI) have been added. See “REXX variables and structured field introducers” on page 300.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

This function was made available by a PTF for APAR OW48865 for OS/390 V2R10.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
Update the DFSMSrmm EDGRMMxx PARMLIB OPTION PREACS and OPTION SMSACS operands to enable the function.	Required	*z/OS DFSMSrmm Implementation and Customization Guide*

DFSMSrmm ACS pooling control enhancements

System-Level Tasks	Condition	Procedure Reference

Before you enable SMS ACS support in your installation, at a minimum, you must make a preventative change in your SMS ACS routines to keep DFSMSrmm from incorrectly processing tape volumes. Update your ACS management class (MC) and storage group (SG) routines to check whether the ACS environment variable (&ACSENVIR) is set to either RMMPOOL or RMMVRS, and if it is, avoid setting an MC or SG name. You can add statements such as the following to your MC and SG routines:
`WHEN (&ACSENVIR = 'RMMPOOL' | &ACSENVIR = 'RMMVRS')`
`DO`
`EXIT`
`END`
 	
If you do not make this change, it is possible for DFSMSrmm to use a management class name or a storage group name that was incorrectly returned by the ACS routines.
	Required	*z/OS DFSMSrmm Implementation and Customization Guide*

For more information

You can find information about using this support in the following publication:

- *z/OS DFSMSrmm Reporting*
- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Implementation and Customization Guide*
- *z/OS MVS System Messages, Vol 5 (EDG-GFS)*

DFSMSrmm reporting enhancements

Description

DFSMSrmm reporting enhancements simplify the task of obtaining information about data sets and volumes using DFSMSrmm reporting utilities. You can now create an extract data set of the DFSMSrmm control data set that contains an extended record. The extended record combines data set and volume information into a single record. Additionally, the DFSMSrmm-supplied sample EDGRRPTE exec that uses the extract data set as input has been enhanced as part of this new function.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	• You can select whether DFSMSrmm extract processing produces an extract file either with or without extended records. • You can run multiple report extracts at the same time so ensure that unique data sets are specified for each extract request.
Storage administration	None.
Operations	None.
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

There are no coexistence considerations related to this support.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
Customize the EDGJRPT JCL in SYS1.SAMPLIB or any existing JCL that calls EDGRRPTE to work with the new version of EDGRRPTE exec.	Required	
To create extended records in the extract data set, customize your reporting JCL to specify the //XREPTEXT DD instead of the //REPTEXT DD.	Optional	

DFSMSrmm reporting enhancements

System-Level Tasks	Condition	Procedure Reference
When you create multiple report extract data sets or when multiple users create report extract data sets, ensure that each job uses a different data set for the MESSAGE file and the report extract data set.	Optional	

For more information

You can find information about using this support in the following publication:

- *z/OS DFSMSrmm Implementation and Customization Guide*
- *z/OS DFSMSrmm Reporting*
- *z/OS MVS System Messages, Vol 5 (EDG-GFS)*

DFSMSrmm support for using storage locations as home locations

Description

The support consists of the following functions:

- Enabling storage locations to be used as home locations.
- Enhancing RMM TSO subcommands so that the creating system ID can be specified.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	If you want to use storage locations as home locations you must update the DFSMSrmm PARMLIB member LOCDEF command. Using storage locations as home locations enables you to: • Return volumes to scratch without moving the volumes to a system-managed library or to the location SHELF • Map a storage location to an existing non-system managed library to enable improved management of volumes which previously had to be in location SHELF
Storage administration	Update your copy of the DFSMSrmm EDGUX200 installation exit to use owner information. The RMM ADDDATASET, RMM CHANGEDATASET, RMM SEARCHDATASET, RMM ADDVOLUME, RMM CHANGEVOLUME, and RMM SEARCHRACK subcommands have been changed. The RMM LISTCONTROL LOCDEF output and the RMM LISTVOLUME VOLUME output have been changed.
Operations	None.
Auditing	None.
Application development	Additional REXX variables and structured field introducers (SFI) have been added. See “REXX variables and structured field introducers” on page 300.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

There are no coexistence considerations related to this support.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
To define the system name for volumes and data set created on systems not managed by DFSMSrmm, issue the RMM CHANGEVOLUME volser CRSYSID(*creating_system_name*) for each volume.	Optional	*z/OS DFSMSrmm Guide and Reference*

To change existing storage locations so that they can be used as home locations as well as storage locations,
• Update storage location definitions with the DFSMSrmm EDGRMMxx PARMLIB LOCDEF TYPE(STORAGE,HOME) operand.
• Refresh DFSMSrmm parameters by issuing:
`F DFRMM,M=xx`
• Change the home location of volumes to a specific storage home location by issuing:
`RMM CHANGEVOLUME HOME(storname)`
 	
storname is the storage location name.
	Optional	*z/OS DFSMSrmm Implementation and Customization Guide*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMSrmm Application Programming Interface*
- *z/OS DFSMSrmm Command Reference Summary*
- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Implementation and Customization Guide*
- *z/OS DFSMSrmm Reporting*
- *z/OS MVS System Messages, Vol 5 (EDG-GFS)*

Chapter 6. Migration Overview for z/OS V1R1 and OS/390 V2R10 DFSMS

This chapter presents a migration overview of all new and expanded DFSMS functions introduced with OS/390 V2R10. z/OS V1R1 is functionally equivalent to OS/390 V2R10. Details for each functional change include some or all of the following:

- High-level description of new or expanded features
- Summary of information technology tasks and interfaces affected
- Hardware or software dependencies
- Coexistence considerations for multisystem environments
- General processing restrictions and other coexistence issues
- Mapping of migration tasks to implement the change
- References to other publications that contain supporting implementation information

APARs referenced in this chapter are provided as a courtesy to help you correlate the functional enhancements with corresponding coexistence maintenance or other programming requisites listed in your installation documentation or in the PSP bucket. The APARs listed here are not considered all-inclusive and are not intended to replace any information you obtain from these other sources.

Release summary of changes

Table 15 summarizes DFSMS changes introduced in OS/390 V2R10.

Table 15. What's new in OS/390 V2R10 DFSMS, summarized by functional component

For information about:	Refer to location:
DFSMSdfp changes	
Device support for IBM 2105 Enterprise Storage Server	109
Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x	112
Large tape block size support	118
Manual tape library support	125
Non-SMS-managed HFS data set support	132
Non-SMS-managed PDSE support	134
Rename function for duplicate data set names	137
VSAM data striping	141
VSAM tracing and error recording improvements	144
Unit affinity support	139
DFSMSdfp OAM changes	
Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x	112
Peer-to-Peer Virtual Tape Server	145
DFSMSdss changes	
VSAM data striping	141
DFSMSdss extent reduction	148

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Table 15. What's new in OS/390 V2R10 DFSMS, summarized by functional component (continued)

For information about:	Refer to location:
DFSMShsm changes	
Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x	112
DFSMShsm ABARS support for UTDS large tape block sizes	156
DFSMShsm data set backup enhancements	149
DFSMShsm fast subsequent migration	153
DFSMShsm multiple address spaces	160
DFSMShsm tracing improvements and release identifier change	157
DFSMSrmm changes	
Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x	112
DFSMSrmm system-managed tape audit support	171
DFSMSrmm support for fast tape positioning	166
DFSMSrmm tape processing support enhancements	164
DFSMSrmm multivolume set retention and movement	174
DFSMSrmm pooling and policy enhancements	169
DFSMSrmm pre-ACS interface support	172
DFSMSrmm program name support	181
DFSMSrmm problem determination enhancements	176
DFSMSrmm TCDB processing controls	182
DFSMSrmm Tivoli OPC support	178
DFSMSrmm processing for purged volumes	179
DFSMSrmm Virtual Tape Server enhancements	167

Device support for IBM 2105 Enterprise Storage Server

Description

DFSMS provides device support for the IBM 2105 Enterprise Storage Server (ESS), a high-end storage subsystem. Nicknamed “Shark”, the ESS is the newest storage subsystem succeeding the 3880, 3990, and 9340 subsystem families. Designed for mid-range and high-end environments, the ESS gives you large capacity, high performance, continuous availability, and storage expandability.

The ESS is also the first of the Seascape® architecture storage products to attach directly to IBM S/390® and open-system platforms. The Seascape architecture products come with integrated storage controllers. These integrated storage controllers allow the attachment of physical storage devices that emulate 3390 Models 2, 3, and 9 or provide 3380 track-compatability mode.

Housed in one to three storage racks, the ESS can attach to multiple S/390 systems by way of ESCON® adapters, and to open-system platforms through SCSI adapters. It also offers concurrent, multi-host attachment support for the IBM RS/6000® and AS/400® host systems as well as other servers.

The ESS presents a wide range of technological advancements over previous storage subsystems. It also introduces some new functional features. Specifically, the ESS:

- Emulates existing 3990 storage subsystems.
- Allows 256 volumes per control unit and 16 control units per ESS.
- Provides multiple allegiance capability.
- Supports parallel access volumes (PAVs) to allow multiple simultaneous data paths to each volume.
- Supports the FlashCopy service.
- Uses performance-oriented channel command words (CCWs) to improve data access.
- Enhances suspend/resume functions of extended remote copy (XRC) service to accommodate unplanned outages.
- Supports the enhanced peer-to-peer remote copy (PPRC) service.

DFSMS support enables you to fully exploit these capabilities.

What this change affects

DFSMS functional components enhanced for this support are DFSMSdfp and DFSMSdss.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	DEVSERV system command changes: • The DEVSERV command now provides software and hardware configuration information and identifies any configuration discrepancies. Changes are also included in the DEVSERV QPAV command.

Device support for Enterprise Storage Server

Area	Considerations
Storage administration	IDCAMS LISTDATA report changes: • The IDCAMS SUBSYSTEMS COUNTERS report and the IDCAMS RAID RANK COUNTERS report, created through LISTDATA commands, now include an identifier, RAID RANK ID, of the logical volume.
Operations	None.
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

This support is dependent on ESS hardware which consists of the IBM 2105 control unit attached to 3380A, 3380B, 3390A, or 3390B DASD devices.

Coexistence considerations

Exploitation support in the form of program temporary fix (PTF) maintenance is available for DFSMS/MVS V1R3, V1R4, and V1R5 systems. Coexistence support in the form of PTF maintenance also provides for coexistence or transparency for some earlier releases. Table 16 on page 110 describes the type of support available with each release of DFSMS.

Table 16. Applicable levels of DFSMS support for the Enterprise Storage Server

Release	Exploitation	Coexistence	Transparency
DFSMS/MVS V1R4	X		X
DFSMS/MVS V1R5	X		
OS/390 V2R10 DFSMS	X		

The differences in the types of support are as follows:

- **Exploitation support** enables a system to define and recognize both the new ESS control unit type (2105) and the associated device types (3380A, 3380B, 3390A, and 3390B). This support allows you to fully exploit ESS capabilities, such as PAVs and copy services.
- **Coexistence support** allows a system to define and recognize both the new ESS control unit type (2105) and the associated device types (3380A, 3380B, 3390A, and 3390B). As a result, this system can share an input/output definition file (IODF) created by other systems, including exploiting systems. However, this system will see an ESS as a 3990 control unit and the attached devices as regular 3380s and 3390s and therefore it cannot exploit ESS capabilities.
- **Transparency support** allows a system to use an ESS only as a regular 3990 control unit. In this case, you must define the ESS as a 3990 control unit in the hardware configuration definition (HCD). As a result, this system cannot recognize the new ESS control unit type (2105) or the associated device types (3380A, 3380B, 3390A, or 3390B), therefore it cannot share an IODF with exploiting systems. You must maintain a separate IODF for systems with transparency support levels.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
Configure the ESS after installing the ESS hardware. You can display the logical configuration that results with the DEVSERV QDASD command.	Required	• *z/OS DFSMS Software Support for the IBM Enterprise Storage Server* • *z/OS MVS System Commands*
Define the ESS to your operating system, modifying your MVS IODF to match your ESS logical configuration. To accomplish this, use the HCD to: • Define control units and associated unit addresses. • Define logical volumes and associated device numbers. • Specify PAVs or non-PAVs for device numbers.	Required	• *z/OS DFSMS Software Support for the IBM Enterprise Storage Server* • *z/OS HCD User's Guide*
Activate the updated IODF through a system IPL or by issuing a dynamic I/O command. **Note:** After you activate the new IODF, you will receive new exposure-specific information in response to DISPLAY commands. You need to understand this information and, if necessary, act accordingly.	Required	*z/OS HCD Planning*
Initialize the ESS volumes with the INIT function of ICKDSF.	Required	*Device Support Facilities User's Guide and Reference*
Define or alter SMS constructs to include ESS volumes in new or existing storage groups and to ensure proper storage class allocation.	Required	*z/OS DFSMSdfp Storage Administration Reference*
Monitor I/O activity to the ESS using the GTF I/O trace facility.	Optional	*z/OS MVS Diagnosis: Tools and Service Aids*

Application-Level Tasks	Condition	Procedure Reference
Migrate data to the ESS based on your storage needs. To manage data movement, you can use: • **SMS** to direct new allocations and temporary workspace. • **DFSMSdss** for high speed, batch-oriented data movement. • **Extended remote copy (XRC)** for non-disruptive data movement to ESS volumes. • **RAMAC Data Migrator** for data migration with minimum application disruption.	Required	Depending on your method for data movement: • *z/OS DFSMSdfp Storage Administration Reference* • *z/OS DFSMSdss Storage Administration Reference* • *z/OS DFSMS Advanced Copy Services*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMS Software Support for the IBM Enterprise Storage Server*
- *z/OS DFSMSdfp Storage Administration Reference*
- *z/OS DFSMSdss Storage Administration Reference*
- *z/OS HCD Planning*
- *z/OS MVS System Commands*

Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x

Description

The IBM TotalStorage Enterprise Tape Drive 3590 Model E1x (3590 Model E1x) offers improvements in both capacity and performance to help you keep up with the escalating demands for tape management, and to help you control an increasing duration in batch processing and backup windows as you continue to expand your enterprise.

The new 256-track recording technology in the 3590 Model E1x yields a 2X capacity improvement, resulting in an uncompacted data capacity of up to 20 GB on 3590 High Performance Cartridge Tape. Performance improvements include shorter load and search times, and faster data transfer rates.

The 3590 Model E1x tape drive runs in one of two emulation modes, either as 3590-1 or as 3490E. It accepts only 3590 High Performance Cartridge Tape (MEDIA3) and 3590 Extended High Performance Cartridge Tape (MEDIA4). The device reads and writes using the 256-track recording technology and can also read 128–track recording format tape volumes, such as those written by the 3590-1 tape drive.

With the 3590-1 emulation mode available, it is relatively easy for you to enable the 3590 Model E1x to operate within an Automated Tape Library (3494).

What this change affects

DFSMS functional components enhanced for this support are DFSMSdfp, DFSMSdss, DFSMShsm and DFSMSrmm. Software changes are also integrated into OS/390 device allocation and the JES3 element.

Implementing this change could affect the following areas of your processing environment:

Device support for TotalStorage Enterprise Tape Drive 3590 Model E1x

Area	Considerations
System customization	DFSMSdfp tape management exit mapping macro IFGTEP includes new fields: • Installation Exit Main Parameter List: TEPMRECTK, TEPMMEDT, TEPMCAPM, TEPMCAPP • Installation Exit File End on Volume Parameter List: TEPETBLK, TEPEPARP • Installation Exit File Start on Volume Parameter List: TEPSPARP • Installation Exit File Validation Parameter List: TEPVNINDEX • Installation Exit Volume Mount Parameter List: TEPONINDEX DFSMSdfp OAM changes to reflect the new 256-track recording technology for object tape support: • SYS1.PARMLIB member CBROAMxx parameters TAPEUNITNAME and TAPECAPACITY. • High Level Assembler macro CBRXLCS change use attribute (CUA®) function DEVTYPE parameter. • Tape device selection information (TDSI) mapping macro CBRTDSI and tape volume information (TVI) mapping macro CBRTVI. • Installation exit parameter lists with new TDSI are CBRUXCPL, CBRUXEPL, CBRUXJPL, and CBRUXNPL. OAM also provides a migration job to add the new Physical Identifier (EPI) column in the DB2 TAPEVOL table. The sample jobs that create the DB2 TAPEVOL (CBRSAMPL and CBRSAMMT) are also updated with this new column. DFSMSrmm changes: • New and changed mapping macros are EDGRDEXT, EDGRVEXT, EDGSDREC, and EDGSVREC. • DFSMSrmm also has a dependency on the OAM installation exit parameter lists, changed to support the new TDSI: CBRUXCPL, CBRUXEPL, CBRUXJPL, and CBRUXNPL. • DFSMSrmm uses media type names different from what the other functional components use to describe TDSI information.

Device support for TotalStorage Enterprise Tape Drive 3590 Model E1x

Area	Considerations
Storage administration	ISMF changes for storage administrator applications: • Data Class Define/Alter Panels include a new value for *Recording Technology, '256'*. • The Mountable Tape Volume Application lists a new value for *Recording Technology, '256'*. IDCAMS changes affecting tape volume catalog records: • ALTER VOLUMEENTRY and CREATE VOLUMEENTRY have a new parameter, RECORDING (256TRACK). • LISTCAT displays a new recording value of '256TRACK'. DFSMSdfp OAM changes: • Prior to this support, to fully utilize the capacity of a 3490E emulated device, you had to set the tape capacity using the SETOAM command with the TAPECAPACITY parameter. With device support for the 3590 Model E1x, OAM automatically derives the true capacity and media type directly from the control unit. DFSMShsm changes: • Tape reuse capacity calculations have two new categories, 128-track and 256-track. • For the 3590 Model E1x, the media capacity used for TAPEUTILIZATION PERCENTFULL is based on the true device instead of a logical device, as it was for earlier tape drives. This enables DFSMShsm to better utilize the cartridge and eliminates the need for you to adjust the PERCENTFULL value to accommodate the true capacity. DFSMSrmm changes: • TSO subcommands that include additional tape device selection information (TDSI) for the 256-track recording format are: DFSMSrmm ADDVOLUME, CHANGEVOLUME, and SEARCHVOLUME. DFSMSrmm LISTVOLUME output has also changed. See "Commands" on page 279. • TSO command REXX variables and structured field introducers (SFI) also have changes.
Operations	The message display MSGDISP macro has a new keyword, INDEX, to indicate whether an automatic cartridge loader (ACL) should be indexed for a scratch mount. This applies only to a non-library environment. OAM messages have been updated for this support.
Auditing	EREP changes: • There is no group command to format and print all tape devices in a single job. To include both emulated and real device types, you must specify DEV=(3490,3590). • Changes to EREP reports include: – EVENT – SYSEXN – EMULATED DEVICE SUMMARY DFSMSrmm reporting changes: • Report extract mapping macro EDGRVEXT is changed to accommodate the new TDSI. • SMF audit record mapping macros EDGSVREC and EDGSDREC are changed to accommodate the new TDSI
Application development	None.
General use	None.

Hardware or software dependencies

This support requires you to install 3590 Model E1x tape drives which attach to 3590 Model A50 or 3590 Model A60 control units.

Coexistence considerations

- **Full device support:** As a small programming enhancement (SPE), full support for the 3590 Model E1x was retrofitted back to DFSMS/MVS V1R3 and all intermediate levels. Additional maintenance is required for OS/390 MVS allocation, and for JES3 installations, to fully implement the device support on these earlier release levels. An IPL is required after installing this support. See the *3590device* PSP bucket for an extensive list of APARs related to this support.
- **Coexistence support:** Coexistence maintenance is also required on all lower level systems that attach to a 3494 Automated Tape Library, or that share tape configuration information (TCDBs) associated with an Automated Tape Library, that contain one or more 3590 Model E1x tape drives. This maintenance prevents the new device from being varied online until **all** sharing systems have the full device support installed, enabling you to schedule the maintenance for each system at times when it is convenient for you. An IPL is required after installing this coexistence support.

  Systems that support 3590 Model B devices, but do not have all the 3590 Model E1x support installed and enabled, can share a library with full-support systems, provided the coexistence PTFs are installed. Without the coexistence maintenance, a 3590 Model E1x tape drive appears to lower-level systems as a 3590 Model B device and the TDSI information recorded in the TCDB volume record incorrectly indicates 128-track recording technology. To avoid subsequent job failures, with the wrong device type getting allocated, and to avoid having to manually update the TCDB to correctly show 256-track, it is critical that you install the coexistence support. Installing the full device support and coexistence PTFs on all systems allows full exploitation of library devices on all attached hosts.

  For DFSMSrmm, coexistence maintenance enables systems without the full device support to recognize the new TDSI, and to update EDGINERS to recognize an “unsupported format” condition.

  The coexistence maintenance is available for DFSMS/MVS V1R2 and higher releases. See the *3590device* PSP bucket for a list of APARs related to this coexistence maintenance.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
Prior to installation, review relevant PSP buckets for any additional required maintenance: 3590DEVICE, 3590MVS/ESA, 3590MVS/ESA2.	Required	*3590device* PSP bucket

Device support for TotalStorage Enterprise Tape Drive 3590 Model E1x

System-Level Tasks	Condition	Procedure Reference
Use the HCD to define 3590 Model E1x tape drives to the operating system. IPL the system or use the ACTIVATE command to reference the resulting IODF and the LOADxx member in SYS1.PARMLIB. **Note:** The 3590 Model E1x is defined to the HCD exactly like other 3590 devices.	Required	• *z/OS HCD User's Guide* • *z/OS MVS Initialization and Tuning Guide*
To use the 3590 Model E1x to store data in an IBM library environment: • Define or alter an existing SMS data class to specify the 256-track recording technology. • Define or alter an existing SMS storage group to include libraries with the new 256-track devices. • Update the ACS routines to assign data to the new SMS constructs. • Activate the modified SMS configuration.	Optional	*z/OS DFSMSdfp Storage Administration Reference*
To use the 3590 Model E1x to store OAM objects: • Define or alter an existing SMS data class to specify the 256-track recording technology. • Define an esoteric unit name that represents either: – 3590 Model E1x tape drives in 3590-1 emulation mode – 3590 Model E1x tape drives in 3590E emulation mode • Update the SETOAM command, specifying OBJECT or OBJECT BACKUP storage group associated with the data class or esoteric unit name defined for this new recording technology. • Update the ACS routines to assign data to the new SMS constructs. • Activate the modified SMS configuration.	Optional	• *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support* • *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries* • *z/OS DFSMSdfp Storage Administration Reference*
To use the 3590 Model E1x for DFSMShsm processing: • For automated tape library operations, DFSMShsm is dependent on the OAM setup. • For output tape selection in a stand-alone environment, supply an esoteric name for the new device with the SETSYS USERUNITTABLE command.	Optional	*z/OS DFSMShsm Storage Administration Reference*
To use the 3590 Model E1x in a JES3 environment, document the new esoteric names for users so they can add these names to their JES3 initialization decks.	Optional	*z/OS JES3 Initialization and Tuning Guide*

Application-Level Tasks	Condition	Procedure Reference
For programs that use dynamic allocation and cannot take advantage of predefined data class definitions, set the key in DALINCHG to specify the media type and recording technique for system-managed tape library allocations. This is allowed only for programs that are APF-authorized, running in supervisor state, or running in PSW key 0–7.	Optional	*z/OS MVS Programming: Authorized Assembler Services Guide*
To maximize the performance benefits of the new device, consider application changes to exploit the support for block sizes larger than 32 760 bytes.	Optional	See "Large tape block size support" on page 118 for more information.

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMS: Using Magnetic Tapes*
- *z/OS DFSMSdfp Storage Administration Reference*
- *z/OS DFSMS Installation Exits*
- *z/OS DFSMS Access Method Services*
- *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*
- *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries*
- *z/OS DFSMSrmm Application Programming Interface*
- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Reporting*

Large tape block size support

Description

To help you fully exploit the newer high capacity tape media, such as that of the IBM 3590, tape block sizes larger than 32 KB are now supported. You can use block sizes up to 262 144 bytes for 3590 tape, and up to 65 535 bytes for IBM 3480 and 3490 tape cartridge media. For reel tapes and DASD, the limit remains at 32 760 bytes.

Using these larger tape block sizes enables your BSAM and QSAM applications to read and write tape at a much faster rate.

Note: Maximum record lengths are not affected by this support.

What this change affects

DFSMS functional components enhanced for this support are DFSMSdfp, DFSMShsm, and DFSMSrmm. Changes for this support are also included as part of the OS/390 BCP.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	Installation exit changes: • Tape label exits: The block size value is now included in the parameter list. Block ID and block size are passed to the exit routine as parameters for all tape devices. • DCB OPEN or DCB ABEND exits: When an application is set up to use the larger block sizes (DCBESLBI is set on), the tape block size value is placed in the DCBEBLKSI field instead of DCBBLKSI. SYS1.PARMLIB member DEVSUPxx changes: • New keyword TAPEBLKSZLIM allows you to set a system-level limit for tape block size default. This default is used by OPEN processing when no block size (BLKSIZE) value is available from any source. These are the possible sources: – Application program such as the DCB, DCBE, DCB OPEN exit, OPEN macro with TYPE=J and dynamic allocation. – DCB OPEN installation exit. – Tape label when extending a data set. When no BLKSIZE value is available, OPEN calculates one, if possible, for fixed or variable-length records. This calculation is limited to the first non-zero value in this list: – BLKSZLIM keyword on the DD statement or dynamic allocation equivalent. – Block size limit in data class even if not SMS-managed. – TAPEBLKSZLIM keyword in DEVSUPxx. – 32760. The minimum value for TAPEBLKSZLIM is 32 760. • New keyword COPYSDB allows you to supply a system-level default for the new SDB keyword used by the IEBGENER utility.

Area	Considerations
Storage administration	SMS changes: • ISMF data class define, alter, and display panels contain new fields for block size limit. A block size limit defined in the data class provides a default for the new *BLKSZLIM* parameter that can be specified on the JCL DD statement or in dynamic allocation. This helps to limit the block size generated by the system when an application program does not specify a block size value. This is especially beneficial for programs set up to use the new large block interface (LBI) if there are occasions when the user does not want the system to determine a large block size during program execution. • ISMF Automatic Class Selection application's test case define/alter panel allows you to specify block size. • ACS read-only variable &BLKSIZE is a new variable that can be used for tape or DASD data sets. It contains a numeric value for the block size specified on the JCL DD statement, for dynamic allocation, or TSO ALLOCATE. This variable is also useful for tape mount management (TMM). EXCP program considerations: EXCP programs that already handle long blocks might be incompatible with the newer large block interfaces. Prior to this support, tape error recovery procedures (ERPs) could not recover from many possible errors if the block size exceeded 65 535 bytes when command chaining and data chaining were used. Now the tape ERPs provide for full recovery for long blocks.
Operations	Message changes: • This support introduces a number of new IEC*nnn*I messages and return codes. Refer to *z/OS Summary of Message Changes* for more details.
Auditing	SMF and LOGREC changes: • SMF record types 14, 15, 21, and 30 now contain 4-byte block size fields. • LOGREC recording OBR and MDR records have a new 4-byte block size. **Note:** For EXCP tape processing before OS/390 V2R10, the block size value was copied from the tape label and JFCB to SMF and LOGREC records. Now the EXCP program can supply it in the DCBE macro as well, even if the value is less than 32 KB. The EXCP program can also learn the block size of an existing DASD or tape data set by examining the DCBE.

Tape block size > 32 KB

Area	Considerations
Application development	JCL changes: • BLKSZLIM is a new parameter for the DD statement (also available to dynamic allocation). • Jobs that specify an invalidly large JCL BLKSIZE now fail during open processing, when in previous releases they failed with a JCL error. Interface changes: • Large block interface (LBI): BSAM and QSAM provide a new large block interface for processing large block sizes. The LBI uses the same macros, for example, READ, WRITE, GET, PUT, that are used for data sets with smaller block sizes. Therefore, you can actually use these interfaces for data sets from a tape, DASD, spool, or dummy source without regard to their block size. • DCBE macro: A new BLKSIZE keyword is added to the DCBE macro. A new DCBEBLKSI field is defined in the DCBE structure. New flags in the DCBE indicate that the LBI is in use. • BDW data area: The format of the block descriptor word is extended to provide a 4-byte block size. BSAM users can specify the large block length in this BDW when using variable length records and LBI. • UCB DCE data area: The minimum length for a tape DCE has increased. • DEVTYPE macro: The DEVTYPE macro now returns a maximum and optimum block size for any device. • SYNADAF buffer format: Message formats are changed. If an application uses the LBI, the buffer format is modified to allow 4-byte fields. • RDJFCB macro: The allocation retrieval area (ARA) returned by the RDJFCB macro now contains the 8–byte block size value and block size limit. • Tape labels: The IBM standard tape label includes a new field that accommodates larger block sizes.
General use	Utility changes: • If you omit the BLKSIZE keyword for the output DD statement, IEBGENER supplies a more optimal default value for the block size. If you prefer the less efficient block size default supplied in older releases, you can use the new SDB keyword in the PARM string. If you want all unchanged invocations of IEBGENER to have less efficient block sizes, use the new COPYSDB keyword in the DEVSUPxx member of SYS1.PARMLIB. • IEBGENER now checks the length and content of the PARM string. The length must be zero or positive. If it is positive, the string must begin with “SDB=” and be followed by INPUT, SMALL, LARGE, YES or NO. If the invocation violates one of these rules, IEBGENER issues a message. IEBGENER does this checking even if you are not using larger block sizes. DFSMShsm changes: • DFSMShsm supports user tape data sets (UTDS) with a block size greater than 32 KB. Refer to “DFSMShsm ABARS support for UTDS large tape block sizes” on page 156 for a description of the support.

Hardware or software dependencies

There are no additional software or hardware requirements for this support.

BSAM and QSAM support the maximum block size available for a 3590 tape device. There is a dependency on the 3590 device to return the maximum block size and the optimum block size supported as part of the Read Device Characteristics data. Most 3590 devices return 262,144 as the maximum and optimum block size but some older models return 229,376 as the optimum block

size. If the 3590 does not provide this data, DFSMSdfp device support uses 262,144 for the maximum block size and 229,376 for the optimum block size.

Table 17 summarizes the maximum block size available for each device type:

Table 17. Maximum block sizes based on device type

Device type	Maximum block size
3590	256 KB (262 144 bytes)
3490	64 KB – 1 (65 535 bytes)
3480	64 KB – 1 (65 535 bytes)
All reel tape devices	32 KB – 8 (32 760 bytes)
All DASD devices	32 KB – 8 (32 760 bytes)

Coexistence considerations

Coexistence maintenance: Coexistence PTFs are provided for DFSMS/MVS V1R2, V1R3, V1R4, and V1R5 to allow these system levels to detect the larger block sizes and block formats and respond to the executing program. See APARs OW40629, OW41030, OW40414, and OW41865.

Sharing applications: An application program set up to use larger block sizes, by specifying the BLKSIZE parameter on the DCBE macro or by setting the DCBEULBI indicator on, can operate correctly on earlier DFSMS levels provided the actual block size is not greater than 32 760 bytes and the program is designed to handle the lack of LBI support. If a block size larger than 32,760 is specified in the DCBE, the tape label, or a user exit, open processing will fail on the lower system levels.

For block sizes less than, or equal to, 32 760 bytes, the lower-level system does not set DCBESLBI during OPEN processing. The application is notified that it cannot use the large block interfaces for sequential data set processing. If the application running on the lower level release is coded to check the setting of DCBESLBI to determine whether to use the interfaces that existed before this release, or to use the SAM large block interfaces, it will operate correctly. If the application is coded only for the large block interfaces, it will fail.

Using a default block size with IEBGENER: In some cases, both on DASD and tape, IEBGENER sets a more efficient block size than in previous releases, even if you have not changed your JCL. This might cause a problem for other programs that read the data sets. Consider using the IEBGENER SDB parameter to control system-determined block size.

To change the system-wide default for the IEBGENER SDB parameter, use the COPYSDB parameter in the DEVSUPxx member of SYS1.PARMLIB.

JES3 considerations: JES3 systems could ignore an invalidly large value for JCL BLKSIZE and any value for BLKSZLIM. This can occur when a job runs through the converter/interpreter on a system at the current level but job execution takes place on a system that does not have this support installed. To avoid this situation, you should avoid using tape block sizes larger than 32,760 until all systems sharing the spool have a level of OS/390 that includes this block size support.

Tape block size > 32 KB

Processing restrictions

The following restrictions apply to this support:

- IDCAMS REPRO does not support tape block sizes larger than 32 KB.
- DCB OPTCD=H is not supported with LBI.
- OPEN with UPDAT option is not supported with LBI.
- IEBGENER supports block sizes larger than 32,760 except with RECFM=U.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
Update SYS1.PARMLIB member DEVSUPxx keyword *TAPEBLKSZLIM* to set a system–level default for block size.	Optional	*z/OS MVS Initialization and Tuning Reference*
Update SYS1.PARMLIB member DEVSUPxx keyword COPYSDB to set a system-level default for the SDB keyword used by the IEBGENER utility and for other programs.	Optional	• *z/OS MVS Initialization and Tuning Reference* • *z/OS DFSMSdfp Utilities* • *z/OS DFSMSdfp Advanced Services*
Use the ISMF define/alter data class application to specify block size limits in new or existing SMS data classes.	Optional	*z/OS DFSMSdfp Storage Administration Reference*
Use the ISMF ACS application to specify block size values in ACS test cases.	Optional	*z/OS DFSMSdfp Storage Administration Reference*
Modify any installation exits that examine the block size fields in the DCB, tape label, TCT, JFCB, SMF, LOGREC, or JCL text unit fields. You might need to contact your software vendors for assistance.	Required	• *z/OS DFSMS Installation Exits* • *z/OS MVS Installation Exits*
Modify any system–level programs that supply or use tape block size information to ensure they handle the newer block sizes or block size fields correctly. Specifically, look for programs that: • Store or interrogate the block size in the DCB (use the DCBE instead if the DCBE exists and the DCBESLBI bit is on) • Store or interrogate the block size in the JFCB (use the DCBE instead) • Interrogate the block size in the timing control table (TCT) • Interrogate the block size fields in SMF Type 14, 15, 21, or 30 records • Interrogate the block size fields in OBR or MDR LOGREC records	Required	• *z/OS DFSMS Macro Instructions for Data Sets* • *z/OS DFSMS: Using Data Sets* • *z/OS MVS System Management Facilities (SMF)*

Application-Level Tasks	Condition	Procedure Reference
Identify the assembler language application programs that use BSAM or QSAM that could benefit from reading or writing tape blocks larger than 32760 bytes. Modify each application to: • Change program coding to use the LBI interface. You could also set up a dual path in the program to decide between standard or large block size interfaces. This is a convenient way to provide for compatibility if the program needs to run on a lower level system without this support. • Provide a DCBE along with a DCB for the data set. Place the address of the DCBE in the DCB. • Set the DCBEULBI bit in the DCBE to indicate that the program is capable of using interfaces for larger block sizes. The DCBEULBI is set automatically if you code a BLKSIZE keyword on the DCBE macro.	Optional	• *z/OS DFSMS: Using Data Sets* • *z/OS DFSMS Macro Instructions for Data Sets*
If you have VS COBOL II applications, consider taking advantage of this support. If you coded 'BLOCK CONTAINS 0 CHARACTERS' you don't need to change source code or recompile. Consider using the BLKSZLIM keyword on the DD statements, block size limit in the associated data class, or the TAPEBLKSZLIM keyword in the DEVSUPxx member.	Optional	*z/OS MVS JCL Reference*
Examine invocations of IEBGENER where the BLKSIZE keyword is not specified for the output data set. This is especially important if the new TAPEBLKSZLIM keyword in the DEVSUPxx member of SYS1.PARMLIB, or the block size limit in a data class, is not 32760. If you perceive a problem, do one of the following: • Change the job that reads the tape created by IEBGENER. • Code the BLKSZLIM keyword on the SYSUT2 DD statement. • Use a data class that has an appropriate block size limit. • Code SDB=SMALL on the IEBGENER invocation. • Switch to ICEGENER, part of DFSORT, which has different block size defaults. • Code BLKSIZE.	Optional	• *z/OS MVS JCL Reference* • *z/OS DFSMSdfp Utilities* • *z/OS MVS Initialization and Tuning Reference*
Examine invocations of IEBGENER in JCL and from programs. If the length of the PARM value passed on the invocation is not zero, either change the length to zero or pass a string that begins with SDB=. An invalid PARM value will result in a message. If the name IEBGENER is an alias for ICEGENER, see DFSORT documentation.	Required	• *z/OS DFSMSdfp Utilities* • *z/OS MVS Initialization and Tuning Reference* • *DFSORT Application Programming Guide R14*
Examine programs that copy data sets to see if their use might benefit from an option to externally control the logic that sets the output block size. You could change the program to use its PARM field. You could change the program to use the system's value for COPYSDB in the DEVSUPxx member in SYS1.PARMLIB. Its value is in the DFA control block.	Optional	• *z/OS DFSMSdfp Advanced Services* • *z/OS MVS Initialization and Tuning Reference*

Tape block size > 32 KB

Application-Level Tasks	Condition	Procedure Reference
If you compile any other program with a compiler that supports block sizes over 32 760 bytes, consult the compiler documentation. You might want to use the BLKSZLIM keyword on DD statements, block size limit in data class, the TAPEBLKSZLIM keyword in the DEVSUPxx member or force a block size in the source code.	Optional	Compiler documentation
For an EXCP program that might supply a tape block size greater than 32 760, change the program to specify a DCBE macro with the BLKSIZE keyword. The program can still run on lower level systems.	Optional	*z/OS DFSMSdfp Advanced Services*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMSdfp Storage Administration Reference*
- *z/OS DFSMS: Using Data Sets*
- *z/OS DFSMS Macro Instructions for Data Sets*
- *z/OS DFSMSdfp Utilities*
- *z/OS DFSMS Installation Exits*
- *z/OS MVS Installation Exits*
- *z/OS MVS Initialization and Tuning Reference*
- *z/OS MVS JCL Reference*

Manual tape library support

Description

A manual tape library (MTL) is an installation-defined set of tape drives and the associated set of tape volumes that can be mounted on those tape drives. Manual tape library management provides the advantages of system-managed tape in the stand-alone environment. A stand-alone drive, in this context, pertains to a tape drive that is independent of robotics.

The logical nature of MTL definitions gives you greater latitude in defining MTL drives. You do not have to define all of the drives on a control unit to the same MTL. You can split the control unit's drives between multiple MTLs, or between an MTL and a stand-alone device. For example, if you have a physical string of four 3590–E11 tape drives, you can define two of the drives to one MTL and the second two to another MTL. Or you can define one drive to each of four different MTLs.

No JCL changes are required to use an MTL. SMS storage groups and ACS routines can be updated to determine the placement of new tape data sets to an MTL.

What this change affects

DFSMS functional components enhanced for this support are DFSMSdfp, DFSMShsm, and DFSMSrmm. Software changes are also integrated into OS/390 BCP.

Implementing this change could affect the following areas of your processing environment:

Manual tape library support

Area	Considerations
System customization	HCD changes: • The HCD “Define Device Parameters/Features“ panel supports the new MTL keyword. Specifying this keyword with the LIBRARY-ID and LIBPORT-ID keywords causes the UCB to be defined as MTL resident. The LIBRARY-ID keyword links the tape library definition with a tape library. The LIBPORT-ID keyword links the tape library definition to the particular control unit within the library. Changes to SYS1.IPLPARM and SYS1.PARMLIB LOADxx: • There is a new keyword, MTLSHARE, defined in the SYS1.IPLPARM or SYS1.PARMLIB LOADxx member, to enable coexistence mode functioning. Refer to “Coexistence considerations” on page 127 for more information about MTLSHARE. DFSMSdfp tape management exit mapping macro IFGTEP includes new fields: • Installation Exit Main Parameter List: TEPMATL, TEPMMTL DFSMSrmm exit changes: • If you do not use the EDGUX100 exit, or do not modify your EDGUX100 exit, DFSMSrmm can use the storage group name assigned by ACS routines to make pooling decisions. To continue using DFSMSrmm system-based scratch pooling, you must implement the supplied EDGUX100 sample exit. To continue using exit-selected pooling, you do not need to make any changes to your EDGUX100 exit. However, if you have a mix of some system-based pooling and some exit-selected pooling, you must implement or modify the supplied EDGUX100 sample exit. If the PL100_INFO_MTL field is set to B'1', set the PL100_SET_IGNORE_SGNAME field to B'1' to request that DFSMSrmm use system-based scratch pooling, or set PL100_SET_POOL to B'1' and provide a pool prefix in PL100_POOL to request that DFSMSrmm use exit-selected pooling, instead of the storage group name set by SMS ACS processing. The DFSMSrmm supplied sample exits, EDGUX100 and EDGCVRSX, have been updated to ignore the storage group name and use either system-based pooling or exit-selected pooling. If you use the sample exits and want to use storage group names for MTL scratch pooling, you must remove the setting of PL100_SET_IGNORE_SGNAME and no longer assign a pool prefix by setting PL100_SET_POOL and PL100_POOL.
Storage administration	None.
Operations	The message display MSGDISP macro for mounts and demounts has a new keyword, MEDIATYPE, to indicate what media type should be mounted for scratch mounts. As in the stand-alone environment, the operator or tape librarian responds to mount messages and commands at the MVS console. For a scratch mount, a media type indicator is passed in the mount message and on the message display indicating if a specific media type has been requested through DATACLASS. Also, for scratch mounts, the operator must mount a scratch volume that resides in the manual tape library where the drive resides. By default, the cartridge loaders in a manual tape library are set to NONE at system IPL. Use the LIBRARY SETCL command to indicate what type of media is loaded in the cartridge loader. The operator can use DFSMSrmm message EDG4013I to determine the location of a volume and if the volume can be mounted.
Auditing	None.
Application development	None.
General use	DFSMShsm supports the use of MTL drives.

Hardware or software dependencies

This support is dependent on the installation of the manual tape library small programming enhancement (SPE).

The following tape drives are supported:

Device type	Support allows	Support does not allow
3480	read/write 18 track	compaction; sharing MTL with 3480x drives
3480x	read/write 18 track; compaction	sharing MTL with 3480 drives
3490	read 18/36 track; write 36 track; compaction	
3590-Bxx	read/write 128 track; compaction, in native mode	3490 emulation mode
3590-Exx	read 128/256 track; write 256 track; compaction, in 3590 emulation mode	3490 emulation mode

Restriction: 3490E emulation is not supported in the MTL. The following devices are prohibited:

- 3590-Bxx drives in 3490 emulation mode
- 3590-Exx drives in 3490 emulation mode
- 3591 drives which only run in 3490 emulation mode
- DAT tapes emulating 3490s

Coexistence considerations

The MTL SPE provides different degrees of support based on product level:

- **Full-function support:** With OS/390 V2R10 DFSMS or DFSMS/MVS V1R5 (an element of OS/390 V2R7, V2R8, or V2R9) you can fully implement manual tape libraries.
- **Coexistence support:** With DFSMS/MVS V1R2, V1R3, and V1R4, you can share MTL-resident tape drives in a coexistence mode. You can also set up higher level systems to operate in a coexistence mode.

  See the following PSP buckets for a list of APARs related to this coexistence maintenance:

  – Upgrade ID=3480device, subset=3480/MTL/MVS
  – Upgrade ID=3490device, subset=3490/MTL/MVS
  – Upgrade ID=3590device, subset=3590/MTL/MVS

With a sysplex, you might elect to stage MTL implementation because you must IPL each system for the new support to take effect. You might also find that, even after you enable the MTL support, you cannot yet update your SMS constructs and ACS routines to take advantage of this support. The MTL SPE includes coexistence support to help you stage implementation across your sysplex.

If you intend to share an MTL across multiple systems, consider the following:

- **IODF sharing:** MTL coexistence support allows a system without full-function MTL capabilities to use a tape device as a stand-alone drive even if it is defined as MTL-resident on another system that does have MTL full-function support. This is especially important if you have a sysplex in which systems running mixed levels of DFSMS are sharing a single I/O definition file (IODF).

  Without the MTL SPE installed, a system accessing an IODF that contains MTL definitions will display error messages such as CBDA384I during IPL. With the MTL SPE installed, the sharing system can IPL or activate the IODF without

these errors. Consequently, the drives residing at MTL-defined UCBs are recognized and initialized as stand-alone drives on the system with the coexistence-level support.

The sharing of a tape drive, for example between one system with MTL full-function support and another without this support, can occur independently of sharing the IODF. Two or more systems can access the same physical tape drive without accessing the same IODF. Using MTLSHARE, as described below, helps to ensure that any MTL-resident drives are used appropriately as stand-alone drives when they are accessed on systems with only coexistence-level support.

- **Device sharing and ACL indexing:** A full-function MTL system can preload automatic cartridge loaders (ACLs) with a media type that is indexed, whenever it detects a particular type of scratch mount. A system without full-function support cannot index in this way. As a result, a non-MTL system could potentially exhaust the ACL by indexing inappropriately. This situation is addressed by MTL coexistence support in the following ways:

  MSGDISP: The updated message display function recognizes this situation and does not allow indexing for any reason. These changes on a coexistence-level system will help to avoid exhausting the ACL.

  MTLSHARE: The MTLSHARE keyword specified in LOADxx enables a full-support MTL system with a shared IODF to treat manual tape library devices as stand-alone devices. This implies that the cartridge loader for MTL volumes residing at MTL-defined UCBs should not be indexed.

  You do not need to specify MTLSHARE on a coexistence-level system that also shares an IODF with a full-function MTL system. The coexistence-level system can recognize that a tape drive is used elsewhere as a manual tape library device and will not index any stand-alone device that it considers part of a manual tape library.

  Restriction: In DFSMS/MVS V1R5 and above, you specify MTLSHARE in the LOADxx member of SYS1.IPLPARM or SYS1.PARMLIB. At the lower release levels, you can only specify the MTLSHARE keyword in the DEVSUPxx member of SYS1.PARMLIB. If you include MTLSHARE in the DEVSUPxx member with DFSMS/MVS V1R5 and above, it will have no effect.
- **Setting Cartridge Loader Media Types:** The OAM LIBRARY SETCL command issued for an MTL on one system does not affect indexing on another system. This is different than the ATL environment. If multiple systems are sharing scratch volumes in the cartridge loader, make sure the same OAM LIBRARY SETCL command is issued on all sharing systems. Specify SETCL=NONE for non-sharing systems that can access the same stand-alone drives.

There are several ways you can manage MTL-related resources in a cross-system sharing environment. Table 18 on page 129 and Table 19 on page 129 illustrate common sharing scenarios between systems operating with full-function MTL support and systems operating in a coexistence mode, or systems without any MTL support.

In Table 18 on page 129, SYSTEM-A and SYSTEM-B are part of the same sysplex. SYSTEM-A represents the current level of DFSMS, capable of operating in a full-function mode with the MTL SPE installed. SYSTEM-B represents a DFSMS/MVS V1R2, V1R3, or V1R4 level that can operate only in a coexistence mode with the MTL SPE installed. The IODF is shared between SYSTEM-A and SYSTEM-B.

Table 18. Common sharing scenario between a system operating with full-function MTL support and a system capable of coexistence support

SYSTEM-A with full-function support	SYSTEM-B capable of coexistence support	SYSTEM-B processing results
MTL SPE installed; IODF shared (no MTL definitions)	MTL SPE not installed; IODF shared	No changes.
MTL SPE installed; IODF shared (no MTL definitions)	MTL SPE installed; IODF shared; MTLSHARE= NO (default taken)	No changes.
MTL SPE installed; IODF shared (no MTL definitions)	MTL SPE installed; IODF shared; MTLSHARE=YES specified	Stand-alone tape drives are not indexed.
MTL SPE installed; IODF updated with MTL definitions	MTL SPE not installed; IODF shared	HCD-issues error messages when MTL definitions are encountered (at IPL or when the IODF is activated). Stand-alone devices are indexed as before MTL.
MTL SPE installed; IODF updated with MTL definitions	MTL SPE installed; IODF shared; MTLSHARE= NO (default taken)	All tape drives at MTL-defined UCBs are treated as stand-alone drives. All stand-alone drives (including MTL) are indexed as before MTL.
MTL SPE installed; IODF updated with MTL definitions	MTL SPE installed; IODF shared; MTLSHARE=YES specified	All tape drives at MTL-defined UCBs are treated as stand-alone and are not indexed. Other stand-alone tape drives are indexed as they were before MTL.

In Table 19, SYSTEM-A and SYSTEM-C are part of the same sysplex. SYSTEM-A represents the current level of DFSMS, capable of operating in a full-function mode with the MTL SPE installed. SYSTEM-C represents a system that is also at the current level of DFSMS, or with a minimum of DFSMS/MVS V1R5 (OS/390 V2R7, V2R8, or V2R9) installed, that is capable of operating in a full-function mode, or in a more limited coexistence mode, with the MTL SPE installed. The IODF is shared between SYSTEM-A and SYSTEM-C.

Table 19. Common sharing scenario between a system operating with full-function MTL support and a system capable of full-function support

SYSTEM-A with full-function support	SYSTEM-C capable of full-function support	SYSTEM-C processing results
MTL SPE installed; IODF shared (no MTL definitions)	MTL SPE not installed; IODF shared	No changes.
MTL SPE installed; IODF shared (no MTL definitions)	MTL SPE installed; IODF shared; MTLSHARE= NO (default taken)	No changes.
MTL SPE installed; IODF shared (no MTL definitions)	MTL SPE installed; IODF shared; MTLSHARE=YES specified	No library control blocks (LCBs) are built. Stand-alone tape drives are not indexed.

Table 19. Common sharing scenario between a system operating with full-function MTL support and a system capable of full-function support (continued)

SYSTEM-A with full-function support	SYSTEM-C capable of full-function support	SYSTEM-C processing results
MTL SPE installed; IODF updated with MTL definitions	MTL SPE not installed; IODF shared	HCD-issues error messages when MTL definitions are encountered (at IPL or when IODF is activated). All tape drives at MTL-defined UCBs are treated as stand-alone drives. Stand-alone drives (including MTL) are indexed as they were before MTL.
MTL SPE installed; IODF updated with MTL definitions	MTL SPE installed; IODF shared; MTLSHARE= NO (default taken)	All MTL functions are operative. Stand-alone drives are indexed as before MTL. All MTL functions are operative. Stand-alone drives are indexed as before MTL. MTL-resident drives are not indexed, by default. However, if SETCL is specified, indexing rules for MTL-resident drives are as follows: • If SETCL with a media type is specified for a drive, index only preferred allocations where the media types match, or for non-preferred allocations. • If SETCL with ANY is specified for a drive, index only non-preferred allocations. • If SETCL is specified with NONE, restore the default so that the MTL drive is not indexed.
MTL SPE installed; IODF updated with MTL definitions	MTL SPE installed; IODF shared; MTLSHARE=YES specified	No LCBs are built. All tape drives at MTL-defined UCBs are treated as stand-alone drives and are not indexed. Other stand-alone tape drives are indexed as before MTL.

Processing restrictions

The 3495 M10 (also known as the Manual Tape Library Dataserver, or MTLDS) is no longer supported.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than

one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
Review relevant PSP buckets for any additional required maintenance.	Required	PSP buckets: • 3480device—3480/MTL/MVS • 3490device—3490/MTL/MVS • 3590device—3590/MTL/MVS
Install the MTL SPE on all systems sharing an IODF containing MTL definitions or sharing tape drives.	Required	
Use HCD to define the manual tape libraries and drives to the operating system. In the ″Define Device Parameters Feature″ panel, specify MTL with the LIBRARY-ID and LIBPORT-ID keywords, to define the UCB as MTL resident.	Required	*z/OS DFSMS: Implementing System-Managed Storage*
Define your manual tape libraries in SMS storage groups.	Required	*z/OS DFSMS: Implementing System-Managed Storage*
Update your ACS routines to use storage group names to allocate new data sets to manual tape libraries.	Required	*z/OS DFSMS: Implementing System-Managed Storage*
Create a TCDB volume catalog on the full function system, if you do not already have one. Review the four OAM tape-library installation exits, CBRUXENT, CBRUXEJC, CBRUXCUA, and CBRUXVNL for applicability to your environment.	Required	*z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries*
Implement or customize the EDGUX100 installation exit.	Optional	*z/OS DFSMSrmm Implementation and Customization Guide*
Code MTLSHARE in the SYS1.IPLPARM or SYS1.PARMLIB LOADxx member.	Optional	*z/OS DFSMS: Implementing System-Managed Storage*
IPL the systems on which code is installed.	Required	
Use the CBRXLCS Manual Cartridge Entry (MCE) interface, the LIBRARY ENTER command, or DFSMSrmm subcommands to add volumes to the MTL library.	Required	• *z/OS DFSMSrmm Guide and Reference* • *z/OS DFSMSrmm Implementation and Customization Guide*
For DFSMShsm migration or backup processing, modify your ACS routines to map all new migrations or backups to an MTL.	Required	*z/OS DFSMShsm Implementation and Customization Guide*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMSdfp Storage Administration Reference*
- *z/OS DFSMS: Implementing System-Managed Storage*
- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Implementation and Customization Guide*
- *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries*
- *z/OS DFSMShsm Implementation and Customization Guide*

Non-SMS-managed HFS data set support

Description

Data sets that are part of a hierarchical file structure used in the OS/390 UNIX System Services environment can now be managed outside of SMS control. If you define a non-SMS-managed HFS data set, you must store it on a single volume.

With the SMS-managed requirement removed, you can now create uncataloged HFS data sets. However, you cannot mount these file systems until they are cataloged.

What this change affects

DFSMS functional components enhanced for this support are DFSMSdfp, DFSMSdss, and DFSMShsm.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	SMS changes: • SMS now allows a specification of DSNTYPE=HFS when SMS is active and no STORCLAS is derived. Catalog changes for non-SMS-managed HFS data sets: • SMS cell information is not stored in the catalog. • The VVDS does not contain NVR entries. Volume differences for non-SMS-managed HFS data sets: • The SMS bit is not set in the Format 1 DSCB.
Operations	None.
Auditing	None.
Application development	ISITMGD macro: • HFS indicators return without the SMS setting.
General use	DFSMSdss functions are available for non-SMS-managed HFS data sets. DFSMShsm functions are also available, provided the non-managed HFS data sets are cataloged.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

This support is available by PTF for DFSMS/MVS V1R4 and DFSMS/MVS V1R5 systems. Additional PTFs are required for BCP allocation, TSO/E and ISPF for full function support. See APAR OW35441 which includes HOLD dependencies for all related APARs

To determine if a lower level system has the maintenance to support non-SMS-managed HFS data sets, you can test the new DFAUPDSE bit in the DFA (pointed to by CVTDFA). This indicates whether full support is available for creating,

deleting and copying non-managed HFS data sets. It does not guarantee, however, that the correct TSO/E and ISPF support is installed.

On sharing systems that do not have the equivalent support installed, you can expect the following:

- ISPF and ISMF will not display correct data set properties.
- DFSMSdss and DFSMShsm cannot process the data sets.
- HFS data sets cannot be accessed on systems below DFSMS/MVS V1R4.

Processing restrictions

You cannot mount multivolume HFS data sets that are not SMS-managed.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
Modify the ACS routines for your SMS configuration to: • Allow for the definition of non-SMS-managed HFS data sets. • Ensure that the routines do not assign a storage class to all new HFS data sets or they will be placed on SMS-managed volumes. **Note:** In most cases, SMS-management is still recommended.	Required	*z/OS DFSMSdfp Storage Administration Reference*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMSdfp Storage Administration Reference*
- *z/OS DFSMSdfp Advanced Services*
- *z/OS DFSMS Macro Instructions for Data Sets*

Non-SMS-managed PDSE support

Description

Although SMS-management is optimal for most user data sets, it is no longer a requirement for PDSEs. You can now define PDSEs on non-SMS-managed volumes. This helps to simplify certain PDSE maintenance procedures and also provides for PDS and PDSE common processing. In particular, this change eases the maintenance of multiple OS/390 images:

- You do not need to catalog non-SMS-managed PDSEs. This makes it easier for PDSEs to reside on system residence volumes. You can also clone the volume since the catalog requirement is removed. Keep in mind, however, that DFSMShsm cannot process uncataloged PDSEs.
- You can also use indirect cataloging and extended indirect cataloging.
- You can manipulate uncataloged PDSEs.
- You can now have more than one PDSE with the same name which enables you to concurrently access multiple PDSEs with the same data set name.
- You can use DFSMSdss to logically dump and restore the SYSRES volume containing PDSEs.

What this change affects

DFSMS functional components enhanced for this support are DFSMSdfp, DFSMSdss, and DFSMShsm.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	SMS changes: • SMS allows a specification of DSNTYPE=LIBRARY when SMS is active and no STORCLAS is derived. Non-SMS-managed PDSEs can remain uncataloged. For non-managed PDSEs that are cataloged: • SMS cell information is not stored in the catalog. • The VVDS does not contain NVR entries. Volume differences for non-SMS-managed PDSEs: • The SMS bit is not set in the Format 1 DSCB.
Operations	None.
Auditing	None.
Application development	ISITMGD macro: • PDSE indicators return without the SMS setting.
General use	DFSMSdss functions are available for non-SMS-managed PDSEs. DFSMShsm functions are also available, provided the non-managed PDSEs are cataloged.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

This support is available by PTF for DFSMS/MVS V1R4 and DFSMS/MVS V1R5 systems. Additional PTFs are required for BCP allocation, TSO/E and ISPF for full function support. See APAR OW35441 which includes HOLD dependencies for all related APARs.

To determine if a lower level system has the maintenance to support non-SMS-managed PDSEs, you can test the new DFAUPDSE bit in the DFA (pointed to by CVTDFA). This indicates whether full support is available for creating, deleting and copying PDSEs. It does not guarantee, however, that the correct TSO/E and ISPF support is installed.

On sharing systems that do not have the equivalent support installed, you can expect the following:

- Non-SMS-managed PDSEs can be opened and modified once they are created on a system that does have the support.
- ISPF and ISMF will not display correct data set properties.
- DFSMSdss and DFSMShsm cannot process the data sets.

Processing restrictions

There are restrictions associated with this support:

- DFSMShsm cannot process uncataloged PDSE data sets.
- If SMS is inactive when you are allocating a PDSE using the TSO/E ALLOCATE command with the LIKE operand, you must add DSNTYPE(LIBRARY) to the ALLOCATE command, or a PDS will be created instead.

In addition, you should be aware that this new support did not remove all of the previous restrictions regarding PDSEs. The full list of PDSE allocation and processing restrictions is provided in *z/OS DFSMS: Using Data Sets*.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
Modify the ACS routines for your SMS configuration to: • Allow for the definition of non-SMS-managed PDSE data sets. • Ensure that the routines do not assign a storage class to all new PDSEs or the data sets will be placed on SMS-managed volumes. **Note:** In most cases, SMS-management is still recommended.	Required	*z/OS DFSMSdfp Storage Administration Reference*

Application-Level Tasks	Condition	Procedure Reference
Modify JCL, CLISTs, or programs to create non-SMS-managed PDSEs as needed. Specify VOL=SER instead of STORCLAS when defining the PDSE.	Required	*z/OS MVS JCL Reference*, *z/OS DFSMS: Using Data Sets*

Non-SMS-managed PDSE

Application-Level Tasks	Condition	Procedure Reference
Modify programs that use interfaces such as ISITMGD, TSO LISTDSI, or ISPF services to accept PDSEs without assuming SMS management.	Required	*z/OS DFSMS Macro Instructions for Data Sets*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMSdfp Storage Administration Reference*
- *z/OS DFSMS: Using Data Sets*
- *z/OS DFSMS Macro Instructions for Data Sets*
- *z/OS MVS Data Areas, Vol 2 (DCCB-ITZYRETC)*

Rename function for duplicate data set names

Description

If you attempt to scratch or rename a data set allocated to any other address space in your system or sysplex, the operation fails. The scratch and rename functions reject the operation to protect data integrity but they cannot distinguish between two identically named data sets on different volumes. There are times when you might need to scratch or rename a data set that has the same name as a data set used by another address space, for example, when you are building a new system.

An option added to the RENAME function allows you to bypass data integrity checks, provided you meet all of the following requirements:

- invoke the function through ISPF or an assembler language program.
- try to rename only non-SMS-managed data sets.
- know that the data set you are renaming is not open in any address space on any system; and if the data set name is in use, it is a different data set.
- have at least read authority to the new RACF facility class named STGADMIN.DPDSRN.*olddsname*, where *olddsname* represents the name, are partial name, of the existing data set.

The new option does not affect processing when you rename or scratch a data set that is allocated to your current address space. It also does not allow you to rename or scratch a data set that is open in your current address space.

What this change affects

The DFSMS functional component enhanced for this support is DFSMSdfp.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	Consider using this function when you build a new operating system.
Security Administration	There is a new RACF facility class named STGADMIN.DPDSRN.*olddsname*, where *olddsname* represents up to 23 characters of the existing data set name.
Storage administration	None.
Operations	None.
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

There are no coexistence considerations related to this support.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
If you want select users to have authority to rename data sets with this new option, define RACF facility class STGADMIN.DPDSRN.*olddsname* and give read authority to these users. **Note:** Because of the risk to data integrity, only a very small number of people in system programming or storage administration should have read authority to this class.	Required	*z/OS DFSMSdfp Advanced Services*

For more information

You can find information about using this support in the following publication:

- *z/OS DFSMSdfp Advanced Services*

Unit affinity support

Description

When two or more volumes are assigned the same device, the volumes are said to have *unit affinity* within the same job step allocation. Unit affinity implies deferred mounting for all except one of the volumes. Unit affinity, specified on the JCL DD statement as UNIT=AFF, is typically used to minimize the number of tape drives required for a job as well as to stack multiple data sets on a tape.

Beginning with the tape mount management enhancements introduced in DFSMS/MVS V1R3, allocation failures could be prevented for data set stacking (specified with VOL=REF= or VOL=SER=) as the ACS routines could determine whether the referenced DD was directed to SMS-managed DASD, SMS-managed tape, or to a non-managed volume. This could not be done for non-stacking jobs (without VOL=REF=) that specified UNIT=AFF.

With this release, the system can now determine whether a referencing DD resides on SMS-managed DASD, SMS-managed tape, or on non-managed volumes, even when data sets are not stacked. Without needing to make JCL changes, you can use your ACS routines to direct allocations to either disk or tape based on data characteristics (for example, size) rather than based on the fact that the job has UNIT=AFF specified.

This support enables you to increase utilization of your automated tape library or virtual tape server.

What this change affects

The DFSMS functional component enhanced for this support is DFSMSdfp. Changes for this support are also included as part of the OS/390 BCP.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	New values for the &UNIT ACS read-only variable are: • AFF=SMSD • AFF=SMST • AFF=NSMSS These values enable you to set up your ACS routines to make appropriate media selections based on this and other data set characteristics.
Operations	None.
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

There are no coexistence considerations related to this support.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
Update the ACS routines for your SMS configuration to: • Check the &UNIT read-only variable passed for the "referred" DD (AFF=SMSD, AFF=SMST, or AFF=NSMSS). • Test if the "referring" DD had DISP=NEW specified and if so, assign the same storage group list to the "referred" DD for optimum unit selection.	Required	*z/OS DFSMSdfp Storage Administration Reference*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMSdfp Storage Administration Reference*

VSAM data striping

Description

Placing sections, or stripes, of data across multiple DASD volumes can improve sequential throughput significantly. This form of data striping is available for all SMS-managed VSAM extended format data set organizations—key-sequenced data sets (KSDS), entry-sequenced data sets (ESDS), relative-record data sets (RRDS), and linear data sets (LDS).

A striped VSAM data set has a new physical structure. It is organized in such a way that the data control intervals are distributed across a group of volumes, known as the stripes. Ideally, the stripes are placed in a manner that allows an application to access data from each control interval simultaneously. In the case of a KSDS, only the data component of the base cluster is striped. The index component has the same organization as an unstriped KSDS.

When a striped data set extends to one or more new volumes, this process is called multilayering. The Storage Management Subsystem now contributes to volume selection for end-of-volume processing. SMS gives preference to volumes that are on the same path as the extending stripe and to other volumes that are not allocated to any other active stripe for the data set. A single volume cannot contain allocations for multiple stripes.

Data striping enables DB2 and other VSAM applications with continuous sequential access to reduce runtimes and shorten batch windows. It is most effective for sequential processing when a data set is accessed with non-shared resources (NSR). Applications that require direct access to striped data sets will see little, if any, performance improvement.

For a summary of extended format functions available for each type of VSAM data set organization see Table 11 on page 52.

What this change affects

DFSMS functional components enhanced for this support are DFSMSdfp, DFSMSdss, and DFSMShsm.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	
Storage administration	In your SMS configuration, you can now specify data class and storage class information to determine how a VSAM data set is striped. The following ISMF storage administrator applications reflect these changes: • Data Class Define/Alter *Data Set Name Type = Extended Format*, along with a new parameter, *If Ext = Required/Preferred* determine that a data set is eligible for striping. • Storage Class Define/Alter *Sustained Data Rate (MB/sec):* At allocation, SMS distinguishes between striped data sets and multivolume data sets based on the value of this parameter. Previously, you could only use this parameter for striped sequential data sets.
Operations	None.
Auditing	None.

VSAM data striping

Area	Considerations
Application development	• JCL statements The AMP subparameters of the DD statement have been extended. • ACB macro Using the default BUFND negates some of the benefits of striping. Instead use system-managed buffering or increase BUFND as needed. • Control area (CA) size calculations for a data set are also affected by striping. If user-defined, the CA size must be an integral multiple of the number of stripes, up to a maximum of 16.
General use	• IDCAMS commands LISTCAT now indicates the stripe number for each data set extent. • DFSMSdss commands – You can use logical data set DUMP, logical data set RESTORE and data set COPY commands for a VSAM striped data set, even if it has been extended. – You can use COPY or RESTORE to convert a multistriped data set back to a single-striped data set. – You can use the RELEASE command to perform a partial release on a striped VSAM data set. • DFSMShsm commands All commands used for a VSAM data set can also be used for a striped VSAM data set.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

Coexistence maintenance enables lower level systems to produce an error message when an attempt is made to open or extend a VSAM extended format data set that is striped. See APAR OW41297.

Coexistence maintenance is also available for DFSMSdss to prevent prior releases from processing striped data sets. See APARs OW24645 and OW31473.

Processing restrictions

Restrictions related to the use of striped data sets are as follows:

- REUSE or RESET processing is not supported.
- VSAM record-level sharing is not allowed.
- All other restrictions that apply to extended format data sets. See the section on “Processing Restrictions” in “VSAM extended format data set enhancements” on page 197.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
Update one or more SMS storage classes to set the sustained data rate (SDR) to a value greater than the minimum for the device type (for example, 3390=4 MB/SEC)	Required	*z/OS DFSMSdfp Storage Administration Reference*

Application-Level Tasks	Condition	Procedure Reference
Define a new system-managed VSAM extended format data set of the desired record organization (for example, KSDS or LDS). Specify or default to a storage class that includes the required sustained data rate (SDR). **Note:** You must do this even if you want to convert an existing cluster to use more than one stripe.	Required	*z/OS DFSMS: Using Data Sets*
Use a utility such as IDCAMS, or a user program, to load the new striped data set from the data of an existing VSAM cluster or some other source.	Required	*z/OS DFSMS Access Method Services*
Open the data set for processing using system-managed buffering (SMB) or increase the BUFND value based on the application's buffer requirements. Do not use the default BUFND.	Optional	*z/OS DFSMS Macro Instructions for Data Sets*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMSdfp Storage Administration Reference*
- *z/OS DFSMS: Using Data Sets*
- *z/OS DFSMS Macro Instructions for Data Sets*

VSAM tracing and error recording improvements

Description

If you need to help in the diagnosis of errors during VSAM processing, should they occur, the task should be easier as a result of the following changes:

- Overhead for VSAM record management trace is reduced.
- You can now specify tracing activity for dynamically allocated data sets.
- GTF trace performance is also improved now that the VSAM record management trace routine is more sensitive to the status of GTF trace activity. VSAM will format its control blocks only if GTF is active. This makes it more feasible for you to reproduce the error, if necessary, in a production environment.
- Error recording in SYS1.LOGREC now includes additional information regarding hardware errors. You can specify a unique name for the log record data set with the LOGREC keyword in SYS1.PARMLIB member IEASYSxx.

Media manager problem determination is also improved in this release.

What this change affects

The DFSMS functional component enhanced for this support is DFSMSdfp.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	None.
Operations	None.
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

There are no coexistence considerations related to this support.

Migration tasks

There are no migration actions for this support.

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMSdfp Diagnosis Reference*
- *z/OS MVS Initialization and Tuning Reference*

Peer-to-Peer Virtual Tape Server

Description

The IBM TotalStorage Peer-to-Peer Virtual Tape Server (VTS) addresses data availability, system availability, remote copy, and data vaulting desires for the VTS family, which consists of two Model B18s and one or two Model CX0 Auxiliary frames with four Model AX0 Virtual Tape Controllers. The Model B18s provide virtual tape function for two 3494 libraries. The Model AX0 Virtual Tape Controllers exist between MVS hosts and multiple B18s to provide replication, transparent tracking, and synchronization of the Logical Tape volumes. The Peer-to-Peer VTS provides multiple copies of all tape data.

The Peer-to-Peer VTS supports an immediate or deferred copy option. In immediate copy mode, the copy is started upon receiving the host rewind/unload command and signals completion of the rewind/unload command when the copy operation is complete. In deferred copy mode, the library schedules creation of the copy upon receiving the rewind/unload command from the host. The copy is then made in the background as VTS activity permits.

The Peer-to-Peer VTS appears as one library image to the attached hosts. The single library image is referred to as the composite library. The underlying physical VTS libraries that make up the composite library are referred to as the distributed libraries. All three libraries (the composite library and two distributed libraries) will be defined to the host, whereas the drives and volumes will be defined and associated with the composite library.

The composite library will reflect the overall state of the VTS subsystems, with individual library status being reflected through the distributed libraries. For example, if one of the distributed libraries is in paused mode and the other is in automated mode, the overall status of the VTS composite library will be automated with messages to the host indicating which of the distributed libraries is paused. If one of the distributed libraries is taken offline at the library, the state of the composite will remain online and operational as long as one of the distributed libraries is operational.

Restriction: The Import/Export feature is not supported in a Peer-to-Peer VTS.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	There are no changes to the tape library-related exits (CBRUXENT, CBRUXEJC, CBRUXCUA, and CBRUXVNL). There are also no changes to the CBRXLCS programming interface.
Storage administration	Refer to “Migration tasks” on page 146 for information on the storage administration-related items.
Operations	There are changes to both OAM and RMM messages.
Auditing	None.
Application development	None.
General use	None.

Peer-to-Peer Virtual Tape Server

Hardware or software dependencies

This support is dependent on the installation of the Peer-to-Peer VTS tape library.

Coexistence considerations

System levels that do not fully support the Peer-to-Peer VTS (DFSMS/MVS V1R3), or support the library but do not have the supporting PTFs installed on the system (DFSMS/MVS V1R4 or V1R5) are able to use the Peer-to-Peer VTS; however, coexistence PTFs are required. For adequate usability and error reporting capabilities, at least one of the sharing systems must have the full support PTFs installed.

The coexistence support recognizes if an attention message is associated with a distributed library and ignores the attention message. Without this support, attention messages from the distributed libraries would be handled as if they came from the composite library, resulting in the operational status of the library being overlaid.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
To couple two new virtual tape server libraries: • Use HCD to define 64 device addresses with each string of 16 having CUADD=0. The library ID of the composite library should be used when defining the device addresses. • Use ISMF panels to define the composite and distributed libraries. • Define or alter one or more tape storage group definitions to include the composite library. • Modify the ACS routines to write data to the new library. • ACTIVATE the IODF that has the new drives defined. • ACTIVATE the SCDS to bring in the ISMF changes. • Verify that the composite library and its two distributed libraries all come online.	Required	*z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries*

System-Level Tasks	Condition	Procedure Reference
To couple a new virtual tape server to an existing virtual tape server: • Use HCD to delete the drive addresses for the existing VTS. • Use HCD to define 64 new device addresses with each string of 16 having CUADD=0. • Use the ISMF library definition for the existing VTS for the composite library (this will eliminate the need to modify TCBD entries). • Use ISMF to create the library definitions for the other distributed libraries. • ACTIVATE the IODF that has the old drives deleted and the new drives defined. • ACTIVATE the SCDS to bring in the ISMF changes. • Verify that the composite library and its two distributed libraries all come online.	Required	*z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries*
- *z/OS DFSMSrmm Implementation and Customization Guide*

DFSMSdss extent reduction

Description

A new optional keyword, CONSOLIDATE, has been added to the DFSMSdss DEFRAG command. When you specify CONSOLIDATE for a moveable data set that has multiple extents on the same volume, DEFRAG attempts to combine the data set extents into a single extent when possible.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	None.
Operations	The DFSMSdss DEFRAG command now offers the optional keyword CONSOLIDATE.
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

There are no coexistence considerations related to this support.

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMSdss Storage Administration Guide*
- *z/OS DFSMSdss Storage Administration Reference*

DFSMShsm data set backup enhancements

Description

Storage administrators and end-users can issue DFSMShsm commands to perform backups of individual data sets. Four methods are currently available: BACKDS, HBACKDS, ARCINBAK, and ARCHBACK.

Previously the following limitations existed with the data set backup function:

- The data set backup function was single threaded. For each OS/390 image, only one data set at a time was backed up.
- Backups went only to ML1 DASD and were then moved to tape during Automatic Incremental Backup on the DFSMShsm primary host or with a FREEVOL command. The backups never went directly to tape.
- DFSMShsm did not support the concurrent copy function fully. When the management class specified concurrent copy, DFSMSdss, on behalf of DFSMShsm, used concurrent copy to perform the data movement. The issuer of the backup was not notified of completion until physical complete was received from DFSMSdss.

The following data set backup enhancements address these limitations:

- Per DFSMShsm host, up to sixty-four backup tasks are supported.
- Data sets can be backed up directly to tape.
- When you use the new concurrent copy keyword, DFSMShsm notifies you, if requested, when logical end is received from DFSMSdss. In addition, concurrent copy supports non-SMS data sets and, if specified on the command for an SMS data set, overrides the management class.

In addition, installations that decide to have continuously-mounted backup tapes now have a simple way to demount those tapes and deallocate those drives in preparation for disaster backup or introduction of new tape devices.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.

DFSMShsm data set backup enhancements

Area	Considerations
Storage administration	The data set backup function operates differently in OS/390 V2R10. You can use the defaults set by DFSMShsm or you can modify any of the following commands for your environment: • BACKDS Command Data set backups can be moved to a target output device type, such as ML1 DASD or backup tape. A new keyword, TARGET(DASD | TAPE), allows you to specify the type of volume for the backup. A new CC(PREFERRED | STANDARD | REQUIRED) keyword allows you to tailor concurrent copy backups for both SMS and non-SMS data sets. • DEFINE Command A new DEFINE keyword, SWITCHTAPES(DSBACKUP), allows for both automatic and periodic demounting of mounted tapes for offsite disaster storage or the introduction of new tape devices. TIME, AUTOBACKUP, and PARTIALTAPE are subparameters of the DSBACKUP parameter. • SETSYS Command A new SETSYS keyword, DSBACKUP, allows you to control the data set backup environment. DASDSELECTIONSIZE(*maximum standard)*, DASD(TASKS(*nn*)), TAPE(TASKS(*nn*)), and DEMOUNTDELAY(MAXIDLETASKS(*drives*) MINUTES(*minutes*)) are optional subparameters of the SETSYS DSBACKUP command.
Operations	• HOLD Command A new HOLD BACKUP keyword, DSCOMMAND(DASD | TAPE | SWITCHTAPES), allows you to control when all data set backups by command (BACKDS, HBACKDS, ARCHBACK, and ARCINBAK) are held and inuse retry backups are held. The HOLD BACKUP DSCOMMAND also allows you to control when tape or DASD can be used for backing up data sets or when mounted tapes are demounted. • QUERY Command The DFSMShsm QUERY function outputs information for the new SETSYS DSBACKUP parameters. The QUERY ACTIVE, QUERY BACKUP, and QUERY SETSYS requests report on the status of the data set backup function. • RELEASE Command A new RELEASE BACKUP keyword, DSCOMMAND(DASD | TAPE), allows you to control when all data set backups are released for both tape and ML1 DASD.
Auditing	None.
Application development	The ARCHBACK and ARCINBAK programming interfaces have been modified for this support. Data set backups can be moved to a target output device type, such as ML1 DASD or backup tape. A new ARCHBACK keyword, TARGET(DASD | TAPE), allows you to specify the type of volume for the backup. A new CC(PREFERRED | STANDARD | REQUIRED) keyword allows you to tailor concurrent copy backups for both SMS and non-SMS data sets. ARCINBAK supports an optional keyword, PARM, so that parameters can be passed that affect processing. TARGET(DASD | TAPE) and CC(PREFERRED | STANDARD | REQUIRED) are optional subparameters.

Area	Considerations
General use	• HBACKDS and ARCHBACK Commands Data set backups can be moved to a target output device type, such as ML1 DASD or backup tape. A new keyword, TARGET(DASD | TAPE), allows you to specify the type of volume for the backup. A new CC(PREFERRED | STANDARD | REQUIRED) keyword allows you to tailor concurrent copy backups for both SMS and non-SMS data sets. • The ISMF HBACKDS Entry Panel (DFQDDHB1) is modified to support the new fields for the DFSMShsm HBACKDS command.

Hardware or software dependencies

No additional hardware or software dependencies are associated with this support.

Coexistence considerations

Programs that use the ARCHBACK macro or jobs that use the ARCINBAK function can submit the new keywords on a lower-level system. DFSMShsm issues a warning message to users that they are not getting all of the desired functions. DFSMShsm ignores any of the new keywords that are specified, and the backup request is still processed.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
Define the data set backup environment by using the SETSYS DSBACKUP command.	Required	SETSYS chapter in *z/OS DFSMShsm Storage Administration Reference*
Define the data set backup workload between DASD and tape tasks by using the SETSYS DSBACKUP(DASDSELECTIONSIZE) parameter.	Required	SETSYS chapter in *z/OS DFSMShsm Storage Administration Reference*
Define the number of data set backup tasks per DFSMShsm host by using the SETSYS DSBACKUP(DASD(TASKS) TAPE(TASKS)) command.	Required	SETSYS chapter in *z/OS DFSMShsm Storage Administration Reference*
Define the number of tape drives that you want dedicated to the data set backup function by using the SETSYS DSBACKUP(TAPE(DEMOUNTDELAY(MAXIDLETASKS))) command.	Required	SETSYS chapter in *z/OS DFSMShsm Storage Administration Reference*
Define if and when all tapes mounted for data set backup are to be demounted by using the DEFINE SWITCHTAPES command.	Optional	DEFINE chapter in *z/OS DFSMShsm Storage Administration Reference*

DFSMShsm data set backup enhancements

Application-Level Tasks	Condition	Procedure Reference
To invoke inline backup by using the ARCINBAK program, define the output target device of DASD or TAPE by using the TARGET parameter with the PARM keyword. Define the level of concurrent copy support for backups (PREFERRED | STANDARD | REQUIRED) by using the CC parameter with the PARM keyword.	Optional	HBACKDS chapter in *z/OS DFSMShsm Managing Your Own Data*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMShsm Storage Administration Guide*
- *z/OS DFSMShsm Storage Administration Reference*
- *z/OS DFSMShsm Managing Your Own Data*
- *z/OS DFSMShsm Implementation and Customization Guide*
- *z/OS DFSMShsm Diagnosis Reference*
- *z/OS MVS System Messages, Vol 1 (ABA-AOM)*

DFSMShsm fast subsequent migration

Description

Previously, when a data set was recalled from ML2 tape, the copy remained on the tape, but was indicated in DFSMShsm's control data set records as no longer being a valid migration copy. When the data set that was recalled was again migrated, it was copied to a new tape. Eventually, tapes that had their data sets invalidated were recycled, so that any data that was still valid was consolidated onto new tapes.

With this enhancement, data sets that are recalled from ML2 tape, but not changed or recreated, can be reconnected back to the original ML2 tape. This reconnection eliminates unnecessary data movement and reduces the need to recycle these tapes. Reconnection can take place during individual data set migration or during volume migration. DFSMShsm supports both SMS and non-SMS data sets.

Because a number of products can turn off the Format 1 DSCB change indicator and leave DFSMShsm unaware that the recalled data set has changed, you must request reconnection with a new SETSYS TAPEMIGRATION parameter. You are effectively assuring DFSMShsm that the reconnection eligibility criteria is sufficient to determine if the old migration copy remains valid.

Reconnection is only supported in a SETSYS USERDATASETSERIALIZATION environment. This simplifies the serialization performed during reconnection and is consistent with restrictions that are placed on other recent functions in DFSMS/MVS V1R5.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	The ARCMDEXT can be used to redirect, on an exception basis, those migrations that target ML1 to now target ML2 tape instead, and thus have reconnection attempted for those data sets who are valid candidates for reconnection. Or, the exit can be used when TAPEMIGRATION(RECONNECT(ALL)) has been specified to deny reconnection for specific data sets. Two new return codes, RC44 and RC48, are added. See EXITS in the Summary of DFSMShsm Interface Changes on "Exits" on page 275.
Storage administration	• SETSYS TAPEMIGRATION(RECONNECT) is a new parameter that allows you to specify whether or not, during migration of a data set, DFSMShsm should attempt to reconnect a data set recalled from tape to the existing migration copy. • A new optional parameter, *reconnectdays*, is included in the SETSYS MIGRATIONCLEANUPDAYS parameter. When a data set is recalled, an earliest next migrate date is estimated. *reconnectdays* specifies how many additional days past this ″earliest next migrate date″ an MCD record should be maintained in order to improve the chances of a successful reconnection. (Once the MCD record for a data set has been deleted, it is no longer a reconnection candidate.) The value of *reconnectdays* is used by Secondary Space Management during migration cleanup.
Operations	The REPORT command includes two new fields, 'DATA SET MIGRATIONS BY RECONNECTION' is the number of data sets that were reconnected and 'NUMBER OF TRACKS RECONNECTED TO TAPE' is the number of tracks written to tape.

DFSMShsm fast subsequent migration

Area	Considerations
Auditing	None.
Application development	The ARCMDEXT installation exit parameter list is expanded to include offsets for the following information: • An indication of whether or not a data set is eligible for reconnection • The management class • An indication of the environment of the exit invocation (extent reduction, volume command CONVERT, volume command DAYS(0), normal volume command, Primary Space Management, or Interval Migration). Two new return codes, RC44 and RC48, are added. See EXITS in the Summary of DFSMShsm Interface Changes on “Exits” on page 275.
General use	None.

Hardware or software dependencies

No additional hardware or software dependencies are associated with this support.

Coexistence considerations

This enhancement has the following coexistence considerations with earlier releases of DFSMShsm:

- The migration cleanup phase of Secondary Space Management on down-level systems will delete the MCD record for reconnectible data sets that are based solely on the SETSYS MIGRATIONCLEANUPDAYS value, thus forcing the data set to be no longer reconnectible. No coexistence PTF is required. Instead, to avoid the loss of reconnectability, we advise you to run Secondary Space Management on your OS/390 V2R10 or z/OS systems.
- Data sets recalled on a down-level system are never candidates for reconnection.

Processing restrictions

Data sets are reconnected only if they have not changed since the last time they were recalled. Non-DFSMShsm products that back up changed data sets and then reset the DSCB changed flag, do this without DFSMShsm’s knowledge and this could result in reconnecting a data set that had in fact changed. Consequently, storage administrators are given control over whether or not to activate Fast Subsequent Migration with a new SETSYS TAPEMIGRATION keyword.

Data sets cataloged in non-ICF catalogs are not supported because DFSMSdfp no longer supports VSAM catalogs and CVOLs. VSAM data sets having alternate indexes are not supported for fast subsequent migration.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
Issue the SETSYS TAPEMIGRATION(RECONNECT) parameter	Required	SETSYS chapter in *z/OS DFSMShsm Storage Administration Reference*
Run Secondary Space Management on your OS/390 V2R10 or z/OS systems to avoid the loss of reconnectability to the MCD record.	Required	*z/OS DFSMShsm Storage Administration Guide*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMShsm Storage Administration Guide*
- *z/OS DFSMShsm Storage Administration Reference*
- *z/OS DFSMShsm Implementation and Customization Guide*
- *z/OS DFSMShsm Diagnosis Reference*
- *z/OS MVS System Messages, Vol 1 (ABA-AOM)*

DFSMShsm ABARS support for UTDS large tape block sizes

Description

DFSMShsm now includes support for user tape data sets (UTDS) with a block size greater than 32 KB. The ABARS function allows all block sizes supported by 3590 tape devices to a block size of 512KB-1. The previously supported block size was 32 KB-1. ABARS supports a block size of 64 KB bytes on all non-3590 cartridge-type tape devices.

The ABARS function continues to create ABACKUP tapes with a 32 KB-1 block size. The only difference is that data sets residing on user tapes with a block size 32 KB or greater can now be backed up using ABACKUP and recovered using ARECOVER. No other DFSMShsm function supports block sizes this large.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	A coexistence PTF is required. See ″Coexistence Considerations″ section.
Operations	The ARC6172E message description has been modified for this support.
Auditing	None.
Application development	User tape data sets with a block size greater than 32 KB can be defined in your aggregate definition.
General use	None.

Hardware or software dependencies

No additional hardware or software dependencies are associated with this support.

Coexistence considerations

You can do an ABACKUP on an OS/390 V2R10 system, backing up a data set on a user tape that has a block size greater than 32 KB-1. Although the UTDS cannot be recovered on a pre-V2R10 system, coexistence maintenance is provided to *identify* a large block tape data set and issue the ARC6172E message to inform the user.

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMShsm Storage Administration Guide*
- *z/OS DFSMShsm Implementation and Customization Guide*
- *z/OS MVS System Messages, Vol 1 (ABA-AOM)*

DFSMShsm tracing improvements and release identifier change

Description

Two types of tracing improvements are added for this release. The first improvement is the additional tracing of CPOOL GETs and FREEs of CELLs. These traces are recorded in the problem determination aid (PDA) and can be used in problem determination.

The second improvement is conditional tracing. Conditional tracing allows you to turn off some of the PDA tracing that is normally performed. If conditional tracing is turned OFF performance improves. If conditional tracing is turned ON, serviceability improves. You must be aware, however, that if any tracing is turned off, the data capture on the first failure might be compromised, and a problem recreation might be required.

Three tracing functions can be turned off with the following PATCH commands:

- PATCH .MCVT.+558 BITS (0.....) OFF = Do not trace CPOOL calls (GETCELL or FREECELL)
- PATCH .MCVT.+558 BITS (.0.....) OFF = Do not trace entries with CONDitional specified
- PATCH .MCVT.+558 BITS (..0.....) OFF = Do not trace entries of REJECTION during volume selection

The management communication vector table (MCVT), queue control table (QCT), and migration control record (MCD) programming interfaces have been modified for this support. The DFSMShsm release level identifier for OS/390 V2R10 is X'02020A00'.

Old Name = MCVTRV
Version, release, and modification level of the active DFSMShsm. This value is frozen at X'34' representing release DFSMS/MVS Version 1 Release 5.

New Name = MCVT_VRM
Version, release, and modification level of the active DFSMShsm. This four-byte field is defined in the following format:

- Byte 1 represents the name level indicator. If this byte is zero, then DFSMShsm is running at OS/390 R9 or earlier; refer to MCVTRV. If this byte is X'02', then DFSMShsm is running at OS/390 R10, z/OS V1R1, or z/OS V1R2. If this byte is X'03', then DFSMShsm is running at z/OS V1R3. For any non-zero value, the next three bytes indicate the system level for DFSMShsm.
- Byte 2 contains the version number (in binary)
- Byte 3 contains the release number (in binary)
- Byte 4 contains the modification level (in binary)

Old Name = MQCTVRM
DFSMShsm version, release, and modification level. This value is frozen at X'40F1F5F9' representing a release later than DFSMS/MVS V1R5, with the actual levels in MQCT_VRM.

New Name = MQCT_VRM
Version, release, and modification level of the active DFSMShsm. This four-byte field is defined in the following format:

- Byte 1 represents the name level indicator. If this byte is zero, then DFSMShsm is running at OS/390 R9 or earlier; refer to MQCTRVM. If this byte is X'02', then DFSMShsm is running at OS/390 R10, z/OS V1R1, or z/OS V1R2. If this byte is X'03', then DFSMShsm is running at z/OS V1R3. For any non-zero value, the next three bytes indicate the system level for DFSMShsm.
- Byte 2 contains the version number (in binary)
- Byte 3 contains the release number (in binary)
- Byte 4 contains the modification level (in binary)

Old Name = MCDRV
Version, release, and modification level of the active DFSMShsm. This value is frozen at X'34' representing release DFSMS/MVS Version 1 Release 5.

New Name = MCD_VRM
Version, release, and modification level of the active DFSMShsm. This four-byte field is defined in the following format:

- Byte 1 represents the name level indicator. If this byte is zero, then DFSMShsm is running at OS/390 R9 or earlier; refer to MCDRV. If this byte is X'02', then DFSMShsm is running at OS/390 R10, z/OS V1R1, or z/OS V1R2. If this byte is X'03', then DFSMShsm is running at z/OS V1R3. For any non-zero value, the next three bytes indicate the system level for DFSMShsm.
- Byte 2 contains the version number (in binary)
- Byte 3 contains the release number (in binary)
- Byte 4 contains the modification level (in binary)

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	None.
Operations	None.
Auditing	None.
Application development	Prior to installing OS/390 V2R10, update any user programs that reference the DFSMShsm release level.
General use	Prior to installing OS/390 V2R10, update any user programs that reference the DFSMShsm release level.

Hardware or software dependencies

No additional hardware or software dependencies are associated with this support.

Coexistence considerations

In a mixed release environment where OS/390 V2R10 is running with other releases of OS/390, you will need to change any user programs that reference the DFSMShsm release level identifier to the correct name for each system level.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to specified operating environments only or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

Application-Level Tasks	Condition	Procedure Reference
Update any user programs that reference the DFSMShsm release level.	Required	None

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMShsm Implementation and Customization Guide*
- *z/OS DFSMShsm Diagnosis Reference*

DFSMShsm multiple address spaces

Description

Previously, only a single instance of DFSMShsm, called a *host*, could be started in an OS/390 image. You can now have multiple address spaces for DFSMShsm and you can start multiple hosts in a single OS/390 image. The following are advantages to this support:

- Multiple DFSMShsm address spaces mean less work per address space and less contention between functions because each SYSZTIOT resource serializes only functions in its address space.
- Multiple DFSMShsm address spaces mean that each address space that is doing some part of DFSMShsm's work can have an appropriate MVS dispatching priority for that type of work.
- Multiple DFSMShsm address spaces provide a larger number of tasks that perform any given DFSMShsm function; for example, migration.
- DFSMShsm functions that operate in more than one address space allow more MIPs that are allocated to DFSMShsm functions.

A multiple address space for DFSMShsm environment is defined as an environment where you have started at least one instance of DFSMShsm in a single OS/390 image using the HOSTMODE=AUX keyword in the DFSMShsm startup procedure.

In one OS/390 image, you can have one of the following combinations, all at OS/390 V2R10, and all sharing the same DFSMShsm control data sets:

- One MAIN host either by default or HOSTMODE=MAIN (non-multiple address space environment)
- One MAIN host and one or more AUX hosts (multiple address space environment)
- One or more AUX hosts without a MAIN host (multiple address space environment). This environment would normally be a temporary condition, however, because hosts can be started and stopped in any order, this combination is valid.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	Previously, in an OS/390 image, DFSMShsm had one MCVT anchored in the DFSMShsm CVT. Now there can be multiple MCVTs anchored in the QCT, one for each DFSMShsm host. DFSMShsm has a linked list of host elements anchored in the QCT. If no host is started for HOSTMODE=AUX, the pointers in the base QCT (to the MCVT, ASCB, ECB, and ESD) are still valid for a host started for (or defaulted to) HOSTMODE=MAIN. There is also a single host element for that MAIN host that contains the same pointers. Once a host is started for HOSTMODE=AUX, the pointers in the base QCT (to the MCVT and ESD for the MAIN host) are no longer valid, and can be obtained only from the host element for the MAIN host.

Area	Considerations
Storage administration	• The interface that the storage administrator uses to specify a multiple address space for DFSMShsm environment is through the DFSMShsm startup procedure. Two new keywords, HOSTMODE and PRIMARY, have been added to the DFSMShsm startup procedure. The HOST startup procedure keyword has been modified to support the new PRIMARY keyword. The HOST keyword can have up to two characters defined, HOST=*xy*. The character *x* represents the unique host ID. The character *y* indicates whether a host is the primary host. With the introduction of the PRIMARY keyword, the second character, *y* of the HOST keyword, is ignored if the PRIMARY keyword is specified. If the PRIMARY keyword is not specified, then the HOST=*xy* keyword is used to determine whether a host is a primary host. • There are a number of DFSMShsm data sets for which their usage must be clearly understood when running in a multiple address spaces for DFSMShsm environment. These data sets are the control data sets, the journal, the PDA data sets, and the activity logs. • DFSMShsm control data set serialization requirements vary based on whether DFSMShsm is running in multiple address spaces. You must specify HOSTMODE=MAIN or HOSTMODE=AUX, CDSQ=YES or CDSSHR=RLS in each startup procedure. DFSMShsm in a multiple address space environment supports the following serialization techniques: – CDSQ=YES, CDSR=NO – CDSQ=YES, CDSR=YES – CDSSHR=RLS For the first two options, the MCDS, BCDS, and OCDS data sets must either reside on DASD volumes defined as SHARED, or the CDSSHR=YES option must also be specified. The default serialization technique is CDSR=YES, CDSQ=NO which is not supported for multiple address spaces for DFSMShsm. This default is only supported for a single MAIN host. Any attempt to start an AUX host with this default fails with the ARC0006I error message.
Operations	None.
Auditing	None.
Application development	Two installation exits, ARCINEXT and ARCSDEXT, are passed the address of the MCVT control block. This does not change; however, both the *z/OS DFSMS Installation Exits* and *z/OS DFSMShsm Diagnosis Guide* have diagrams that show how to address a DFSMShsm MCVT control block by way of the system CVT and the DFSMShsm QCT. Since there is a separate MCVT for each host, but only one QCT, if you have installation exits that address the MCVT by going through the QCT, you must update your installation exits to access the correct offsets before running in this multiple address space environment. DFSMShsm provides a sample installation exit (ARCTPEXT) that is shipped in SYS1.SAMPLIB. This sample exit has code that shows how to access an MCVT by way of the QCT.
General use	None.

Hardware or software dependencies

In this release, support for multiple address spaces for DFSMShsm with JES3 is initially disabled.

Coexistence considerations

No coexistence APARs are required for this enhancement. The design is implemented so that an additional DFSMShsm host cannot be started within an OS/390 image if it is not specified as a host able to participate in a multiple address space environment.

In a multiple-system environment, it is acceptable and necessary to have OS/390 pre-V2R10 systems sharing DFSMShsm control data sets with OS/390 V2R10 systems. Coexistence across OS/390 V2R10 systems is allowed.

The QCT is an anchor control block, accessible from the system CVT. This anchor control block is often used to get to the DFSMShsm CVT, called the MCVT. The structure of the QCT has changed for this support. The QCT can be used as it is currently structured as long as a DFSMShsm in a multiple address space environment (an auxiliary host) is not started. Once an auxiliary host is started, the new QCT structure must be used.

In a DFSMShsm multiple address space environment, DFSMShsm hosts on one OS/390 image can share data with OS/390 pre-V2R10 hosts on other OS/390 images in the same HSMplex. An HSMplex can consist of a mix of environments with and without multiple address spaces for DFSMShsm.

Processing restrictions

In a DFSMShsm multiple address space environment, ABARS commands (ARECOVER, ABACKUP, HOLD and RELEASE ABACKUP and ARECOVER, and SETSYS ABARS) can only be directed to the host identified as the MAIN host. In addition, SETSYS CSALIMITS can only be directed to the host identified as the MAIN host. If these commands are directed to an AUX host, the commands are ignored, and messages ARC6016I and ARC0103I are issued.

In an OS/390 sysplex environment, it is possible for some systems to be part of one HSMplex sharing a set of control data sets and journal, while other systems belong to a different HSMplex sharing a different set of control data sets and journal. However, all DFSMShsm address spaces in the same OS/390 system image must share the same control data sets and journal. This restriction is enforced. If there is already an DFSMShsm active in an OS/390 image and the start of a subsequent host is initiated, this subsequent host must specify the same control data sets and journal. If not, the ARC0006I message is issued and the startup of that subsequent host fails.

Each host must have its own DFSMShsm log (LOGX and LOGY), PDA Data Sets (PDOX and PDOY), and activity logs. These data sets cannot be shared. (Note that these data sets are optional, and need not be defined. However, if they are defined, they must be unique to each DFSMShsm host.)

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
Update your DFSMShsm startup procedures with the new HOSTMODE and PRIMARY keywords.	Required	*z/OS DFSMShsm Implementation and Customization Guide*
Update any installation exits (other than ARCINEXT and ARCSDEXT) that access the MCVT control block.	Required	*z/OS DFSMS Installation Exits*
Each DFSMShsm host that is running in a single OS/390 image can have a unique version of an installation exit. There are two ways to accomplish this: • Define each startup procedure using a STEPLIB of one library containing exits unique to the started procedure, followed by a second library containing DFSMSdss and other modules common to all hosts. • Design each exit so that it determines the ASCB address for the address space in which it is running, then scans the QCT's linked list of DFSMShsm host entries for the DFSMShsm host running under that ASCB. A sample exit, ARCTPEXT, that is shipped in SYS1.SAMPLIB performs this ASCB scan. This exit can have conditional logic based on either the MCVTHOST value or values patched into the MCVTUSR1, MCVTUSR2, MCVTUSR3, and MCVTUSR4 user-defined fields.	Optional	*z/OS DFSMS Installation Exits*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMShsm Storage Administration Guide*
- *z/OS DFSMShsm Storage Administration Reference*
- *z/OS DFSMShsm Implementation and Customization Guide*
- *z/OS DFSMShsm Diagnosis Guide*
- *z/OS DFSMShsm Diagnosis Reference*
- *z/OS DFSMS Installation Exits*
- *z/OS MVS System Messages, Vol 1 (ABA-AOM)*

DFSMSrmm tape processing support enhancements

Description

DFSMSrmm tape processing models tape processing that is performed by DFSMSdfp:

- DFSMSrmm uses all tape exit points to replace the use of IECRES intercepts.
- DFSMSrmm prevents messages IEC507D, IEC704A, and IEC534D from being issued by providing information directly to OPEN processing. You determine how DFSMSrmm performs processing based on the DFSMSrmm EDGRMMxx PARMLIB options you set and information defined to DFSMSrmm.
- DFSMSrmm disables the cartridge loader for remount after a non-specific volume mount is rejected.
- DFSMSrmm supports the use of scratch volumes for checkpoint processing.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	None.
Operations	• DFSMSrmm avoids issuing messages IEC507D, IEC704A, and IEC534D by providing information directly to OPEN processing. • DFSMSrmm issues the WTOR EDG4012D once per system instead of once per request to avoid multiple WTORs. See “Messages” on page 299. • When a volume is rejected for a non-specific request and the tape drive has an autoloader, the operator must manually load the next scratch tape into the tape loader or use the drive operator control to index the loader to the next scratch tape to ensure an acceptable scratch tape is mounted.
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

There are no coexistence considerations related to this support.

Migration tasks

None.

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Implementation and Customization Guide*
- *z/OS MVS System Messages, Vol 3 (ASB-BPX)*
- *z/OS MVS System Messages, Vol 4 (CBD-DMO)*
- *z/OS MVS System Messages, Vol 5 (EDG-GFS)*

DFSMSrmm support for fast tape positioning

Description

DFSMSrmm enables the use of cartridge tape block identifiers, on IBM standard labels, for applications that do not exploit tape block identifiers. DFSMSrmm records the starting and ending tape block identifiers. DFSMSrmm requests that the identifiers be used when files are read and when more data is written to a tape volume.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	None.
Operations	None.
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

There are no coexistence considerations related to this support.

Migration tasks

None.

For more information

You can find information about using this support in the following publication:

- *z/OS DFSMSrmm Implementation and Customization Guide*

DFSMSrmm Virtual Tape Server enhancements

Description

DFSMSrmm provides support for a volume type of stacked that identifies stacked volumes in a Virtual Tape Server. DFSMSrmm uses the stacked volume type to direct the management of logical volumes when they are exported. DFSMSrmm retrieves information about stacked volumes from the Library Manager database when DFSMSrmm commands are issued and when stacked volumes move in and out of a library.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	• Stacked volume support must be enabled using the DFSMSrmm EDGUTIL utility. See “Utilities” on page 301. • The DFSMSrmm EDGLCSUX programming interface issues new reason codes. See “Callable services” on page 279.
Operations	New and changed mapping macros are: the EDGRHEXT mapping macro, the EDGRVEXT mapping macro, and the EDGSVREC mapping macro. See “Data areas” on page 284.
Auditing	None.
Application development	None.
General use	• The DFSMSrmm EDGUTIL utility has been changed to enable stacked volume support. See “Utilities” on page 301. • The DFSMSrmm ADDVOLUME subcommand, CHANGEVOLUME subcommand, DELETEVOLUME subcommand, and the SEARCHVOLUME subcommand have been changed to support stacked volumes. See Table 44 on page 279. • DFSMSrmm ISPF panels have been changed to support stacked volumes. See “DFSMSrmm ISPF panels” on page 286.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

To avoid coexistence problems between this support and earlier VTS export/import support, you must enable stacked volume support. Use the DFSMSrmm EDGUTIL utility with the UPDATE EXEC parameter to enable stacked volume support. Then run the EDGUTIL utility with the MEND EXEC parameter to convert any existing container information in volume records. Do not enable stacked volume support until all systems sharing the DFSMSrmm control data set are at the same software level.

See APAR OW37516 for a description of the coexistence maintenance that you must apply on all systems sharing the DFSMSrmm control data set.

DFSMSrmm VTS enhancements

See APAR OW36350 for a description of the coexistence maintenance that you must apply for VTS import/export support.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
1. Update all systems that share a DFSMSrmm control data set to the OS/390 V2R10 software level or higher. 2. Optionally, if you already have stacked volumes defined to DFSMSrmm, but not as TYPE(STACKED), you should update the volume information for these volumes to set the correct volume type and volume location using the DFSMSrmm CHANGEVOLUME subcommand `RMM CHANGEVOLUME volser TYPE(STACKED) NORACK LOCATION(vts_name)` 3. Use the DFSMSrmm EDGUTIL utility to enable stacked volume support. Once stacked volume support is enabled, you cannot remove the support. 4. Verify that volume information for the stacked volumes is correct. 5. Update procedures to use the REQUIRED location of the logical volume when importing and exporting logical volumes. If all systems are not on the correct level of software, you might experience unpredictable results when you run IMPORT or EXPORT on a lower level system when stacked support is activated. You should not activate stacked volume support until all systems sharing the DFSMSrmm control data set are on the OS/390 V2R10 or higher level of software. Once you have enabled stacked volume support, do not attempt to run DFSMSrmm inventory management on a lower level of DFSMSrmm. If you run on lower levels of DFSMSrmm that share a DFSMSrmm control data set where stacked volume support has been enabled, and those systems handle export functions, you must perform the migration actions before each inventory management run. If you do not perform the migration actions, DFSMSrmm does not allow inventory management processing to run.	Required	*z/OS DFSMSrmm Implementation and Customization Guide*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMSrmm Application Programming Interface*
- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Implementation and Customization Guide*

DFSMSrmm pooling and policy enhancements

Description

DFSMSrmm pooling and policy enhancements include:

- Support for using storage group name to assign a scratch pool for non-specific non-system-managed tape requests
- Support for using the storage group name as the pool name
- Support for changing assigned storage group names for system-managed volumes that are defined to DFSMSrmm
- The introduction of scratch list reports that can be used to help manage pools
- Support for converting non-DFSMSrmm pool definitions and building ACS filter lists using a sample REXX exec if you are converting to DFSMSrmm.
- Support for assigning a management class to non-system-managed tape data sets

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	• DFSMSrmm uses the EDGRMMxx PARMLIB VLPOOL PREFIX operand and the VLPOOL NAME operand to validate volume usage when volumes are defined to DFSMSrmm and when scratch volumes are needed. Storage group names can now be used as the VLPOOL NAME value to support pooling by storage group name. • DFSMSrmm now calls the MC and SG ACS routines with special environment parameter values to enable customers to use the ACS routines to select pools and policies for non-system-managed tape data sets.
Storage administration	To use this function, you must have the SMS subsystem active and have a valid SMS configuration. You can then use DFSMSrmm in the following ways: • Assign a storage group for scratch volumes. • Change a storage group for system-managed volumes. • Use the EDGRPTD reporting utility to create lists of scratch volumes. • Use the DFSMSrmm calls to SMS ACS routines to replace some of your existing EDGUX100 function for non-system-managed tape. You must use SMS facilities for ATL or VTS libraries. The new ACS routine calls are only for non-system-managed tape data sets. • Assign a management class to a new, non-system-managed tape data set.
Operations	Operators might see a mount message that contains a storage group name as the pool name.
Auditing	None.
Application development	None.
General use	Use the RMM ADDVOLUME or RMM CHANGEVOLUME subcommands to specify a storage group name for a volume.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

There are no coexistence considerations related to this support.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference

Update your ACS routines so that when the MC or SG routines are called with the &ACSENVIR set to either RMMPOOL or RMMVRS, the ACS routines should not set a management class name or storage group name. This migration action should be performed BEFORE starting up the system. If you do not make this change, it is possible for DFSMSrmm to use a storage group name or a management class name returned by the ACS routines incorrectly.
 	
You can add statements into your management class and storage group ACS routines as follows.
`WHEN (&ACSENVIR = 'RMMPOOL' | &ACSENVIR = 'RMMVRS')`
`  DO`
`  EXIT`
`  END`
	Required	*z/OS DFSMSrmm Implementation and Customization Guide*

Update the DFSMSrmm EDGRMMxx PARMLIB VLPOOL command NAME operand with SMS storage group names.	Optional	*z/OS DFSMSrmm Implementation and Customization Guide*
Change existing volumes to be pooled by storage group name, if they are not by default in the correct pool based on volume or rack prefix.	Optional	*z/OS DFSMSrmm Implementation and Customization Guide*
Specify storage group name for volumes using the RMM ADDVOLUME and RMM CHANGEVOLUME subcommands.	Optional	*z/OS DFSMSrmm Implementation and Customization Guide*
Update your ACS routines to assign a management class name when called with &ACSENVIR set to RMMVRS, and to assign a storage group when &ACSENVIR is set to RMMPOOL.	Optional	*z/OS DFSMSrmm Implementation and Customization Guide*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMSrmm Implementation and Customization Guide*
- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMS Installation Exits*

DFSMSrmm system-managed tape audit support

Description

DFSMSrmm audit support also includes support that synchronizes data in the DFSMSrmm control data set, OAM TCDB, and the Library Manager database for any IBM system-managed tape library.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	Use the DFSMSrmm EDGUTIL utility to use this function. Run EDGUTIL on the system where the highest software level is installed to obtain the most comprehensive error resolution and error reporting.
Operations	None.
Auditing	None.
Application development	None.
General use	New EXEC parameters have been added to the DFSMSrmm EDGUTIL utility. See “Utilities” on page 301.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

See APAR OW37516 for a description of the coexistence maintenance that you must apply on all systems sharing the DFSMSrmm control data set.

Migration tasks

None.

For more information

You can find information about using this support in the following publication:

- *z/OS DFSMSrmm Implementation and Customization Guide*

DFSMSrmm pre-ACS interface support

Description

DFSMSrmm pre-ACS interface support helps you manage your tape data set allocations by providing pool name and policy information to the DFSMS ACS routines.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	The DFSMSrmm EDGUX100 installation exit has been updated to include support for pre-ACS processing. See “Exits” on page 299.
Storage administration	Using pre-ACS processing, within system-managed tape, you can use information supplied by DFSMSrmm to decide how you want the allocation to be directed. Implement or customize the sample EDGUX100 exit or the EDGCVRSX sample of EDGUX100 to feed pool and VRS management value information into the ACS processing. Base your ACS processing decisions on the MSPOOL and MSPOLICY values supplied by DFSMSrmm.
Operations	None.
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

There are no coexistence considerations related to this support.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
Update your ACS routines to use the new MSPOLICY and MSPOOL variables that DFSMSrmm uses to pass pooling and policy information.	Required	*z/OS DFSMSrmm Implementation and Customization Guide*
Code the EDGUX100 installation exit to pass the MSPOLICY and MSPOOL values.	Required	*z/OS DFSMSrmm Implementation and Customization Guide*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMSrmm Implementation and Customization Guide*
- *z/OS DFSMS Installation Exits*

DFSMSrmm multivolume set retention and movement

Description

With DFSMSrmm multivolume set retention and movement support, you can manage tape volumes as sets of volumes or as individual volumes. This function makes DFSMSrmm more compatible with other products during migration to DFSMSrmm and gives you more flexibility in managing your data.

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	Use the DFSMSrmm EDGRMMxx PARMLIB member OPTION RETAINBY and OPTION MOVEBY operands to specify if multivolume sets are managed as sets or as individual volumes. DFSMSrmm sets the default values for these operands so volumes are retained and moved as individual volumes. See “SYS1.PARMLIB members” on page 301.
Storage administration	Use the DFSMSrmm EDGRMMxx PARMLIB OPTION RETAINBY operand or the OPTION MOVEBY operand when all systems sharing the DFSMSrmm control data set are at the software level that supports the multivolume set retention and movement function, or when you can guarantee to run inventory management on a system that supports RETAINBY and MOVEBY. Using these options results in changes to the control data set information during inventory management that could be regressed when inventory management is run on a system that does not support the multivolume set retention and movement function.
Operations	None.
Auditing	None.
Application development	Additional REXX variables and structured field introducers (SFI) have been added. See “REXX variables and structured field introducers” on page 300.
General use	• The DFSMSrmm LISTCONTROL subcommand output and the DFSMSrmm LISTVOLUME subcommand output have been updated to include multivolume set retention and movement information. SeeTable 44 on page 279. • DFSMSrmm ISPF panels have been updated to include multivolume set retention and movement information. See“DFSMSrmm ISPF panels” on page 286.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

If not all systems run the software level that supports multivolume set retention and movement, run inventory management on the system that supports the function.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
If you implement the multivolume set retention and movement function, you must run inventory management on the system with the software level that supports the multivolume set retention and movement function.	Required	*z/OS DFSMSrmm Implementation and Customization Guide*
Update the DFSMSrmm EDGRMMxx PARMLIB member with the OPTION RETAINBY and OPTION MOVEBY operands.	Required	*z/OS DFSMSrmm Implementation and Customization Guide*
Run DFSMSrmm inventory management vital record processing and storage location management processing to enable the new retention and movement values specified in the DFSMSrmm EDGRMMxx PARMLIB member.	Required	*z/OS DFSMSrmm Implementation and Customization Guide*

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMSrmm Implementation and Customization Guide*
- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Application Programming Interface*

DFSMSrmm problem determination enhancements

Description

DFSMSrmm problem determination enhancements include:

- Providing additional diagnostic information by adding the reason code to message EDG4003E.
- Providing additional Problem Determination Aid trace points.
- Providing the EDGIRIP DFSMSrmm IPCS verb exit documented in *z/OS DFSMSrmm Diagnosis Guide*.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	Update the DFSMSdfp IGWIPCSP PARMLIB member by adding DFSMSrmm control block analysis and DFSMSrmm PDA trace analysis entries.
Storage administration	None.
Operations	None.
Auditing	None.
Application development	None.
General use	• The DFSMSrmm ISPF EDGPC200 panel has been updated to include Problem Determination Aid (PDA) information. See “DFSMSrmm ISPF panels” on page 286. • The DFSMSrmm LISTCONTROL subcommand output has been updated to include Problem Determination Aid (PDA) information. See Table 44 on page 279. • The DFSMSrmm LISTCONTROL subcommand output has been updated to include installation exit information. See Table 44 on page 279. • Additional REXX variables and structured field introducers (SFI) have been added. “REXX variables and structured field introducers” on page 300

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

There are no coexistence considerations related to this support.

Migration tasks

Update the DFSMSdfp IGWIPCSP PARMLIB member by adding DFSMSrmm control block analysis and DFSMSrmm PDA trace analysis entries.

For more information

You can find information about using this support in the following publications:

- *z/OS DFSMSrmm Application Programming Interface*
- *z/OS DFSMSrmm Diagnosis Guide*
- *z/OS DFSMSrmm Guide and Reference*
- *z/OS MVS System Messages, Vol 3 (ASB-BPX)*
- *z/OS MVS System Messages, Vol 4 (CBD-DMO)*
- *z/OS MVS System Messages, Vol 5 (EDG-GFS)*

DFSMSrmm Tivoli OPC support

Description

DFSMSrmm Tivoli OPC support includes a set of supplied jobs and procedures you can use to manage DFSMSrmm inventory management tasks. This support includes sample jobs you can use to set up DFSMSrmm to be managed by OPC. You can use these jobs and procedures with Tivoli OPC or with other scheduling systems.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	• To take advantage of OPC event triggered tracking, change the DFSMSrmm EDGRMMxx PARMLIB member OPTION BACKUPPROC and SCRATCHPROC operands to name the EDGBETT and EDGSETT supplied procedures. These procedures support these conditions: – To trigger back up processing when the journal data set threshold has been reached. – To trigger expiration processing to return volumes to scratch status when a low on scratch condition is detected.
Storage administration	None.
Operations	None.
Auditing	None.
Application development	None.
General use	DFSMSrmm ships sample programs and procedures in SAMPLIB. See *z/OS DFSMSrmm Implementation and Customization Guide* for a list of the samples you can use as-is or modify to suit the needs of your installation.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

There are no coexistence considerations related to this support.

Migration tasks

See *z/OS DFSMSrmm Implementation and Customization Guide* for information about setting up Tivoli OPC and DFSMSrmm.

For more information

You can find information about using this support in the following publication:

- *z/OS DFSMSrmm Implementation and Customization Guide*

DFSMSrmm processing for purged volumes

Description

DFSMSrmm TVEXTPURGE option processing allows you to specify extra time after a volume is purged. This support is available for use with the DFSMSrmm EDGTVEXT and DFSMSrmm EDGDFHSM callable programming interfaces.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	Use the DFSMSrmm EDGRMMxx PARMLIB member OPTION TVEXTPURGE operand to specify how DFSMSrmm processes volumes to be purged.“SYS1.PARMLIB members” on page 301.
Storage administration	The DFSMSrmm EDGTVEXT and DFSMSrmm EDGDFHSM programming interfaces have been updated.
Operations	None.
Auditing	None.
Application development	None.
General use	• The DFSMSrmm LISTCONTROL subcommand output has been changed. SeeTable 44 on page 279. • The DFSMSrmm ISPF panels have been changed. See“DFSMSrmm ISPF panels” on page 286. • Additional REXX variables and structured field introducers (SFI) have been added. “REXX variables and structured field introducers” on page 300

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

This function was made available by PTF (APAR OW42648) for DFSMS/MVS Release 1.5.0. There are no coexistence considerations related to this support.

Migration tasks

There are no migration tasks if you use the default value TVEXTPURGE(RELEASE). If you use TVEXTPURGE(EXPDT), you can perform the following optional migration steps.

System-Level Tasks	Condition	Procedure Reference
Add TVEXTPURGE(EXPDT) to the DFSMSrmm EDGRMMxx PARMLIB member.	Optional	*z/OS DFSMSrmm Guide and Reference*
If you use vital record specifications to manage the volumes, change vital record specifications you use for managing DFSMShsm volumes and Tivoli Storage Manager volumes. The vital record specifications must use the UNTILEXPIRED retention value.	Optional	*z/OS DFSMSrmm Guide and Reference*

DFSMSrmm processing for purged volumes

System-Level Tasks	Condition	Procedure Reference
Create NAME vital record specifications that specify the EXTRADAYS operand if you want to retain the volume after the purge is completed.	Optional	*z/OS DFSMSrmm Guide and Reference*
Specify the DFSMSrmm EDGRMMxx PARMLIB OPTION VRSEL(NEW) operand if you have defined a NAME vital record specification.	Optional	*z/OS DFSMSrmm Implementation and Customization Guide*

For more information

You can find information about using this support in the following publication:

- *z/OS DFSMSrmm Application Programming Interface*
- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Implementation and Customization Guide*

DFSMSrmm program name support

Description

DFSMSrmm records the program name that created a data set and the last used name for tape data sets. DFSMSrmm also records the last use job name, step name, DD name, and device name.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	None.
Operations	New and changed mapping macros are: the EDGRDEXT mapping macro and the EDGSDREC mapping macro. See “Data areas” on page 284.
Auditing	None.
Application development	None.
General use	• The DFSMSrmm CHANGEDATASET subcommand, and DFSMSrmm SEARCHDATASET subcommand have been changed. The DFSMSrmm LISTDATASET subcommand output has been changed. See Table 44 on page 279. • Additional REXX variables and structured field introducers (SFI) have been added. “REXX variables and structured field introducers” on page 300 • DFSMSrmm ISPF panels have been changed to support creating program name. See “DFSMSrmm ISPF panels” on page 286.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

This function was made available by PTF (APAR OW40710) for DFSMS/MVS Release 1.4.0. There are no coexistence considerations related to this support.

Migration tasks

Use the DFSMSrmm subcommands to add the program name information for existing data sets. This task is optional.

For more information

You can find information about using this support in the following publication:

- *z/OS DFSMSrmm Application Programming Interface*
- *z/OS DFSMSrmm Guide and Reference*

DFSMSrmm TCDB processing controls

Description

DFSMSrmm TCDB processing controls allow the customer to control when volume information in the TCDB is purged and when TCDB information is updated based on DFSMSrmm subcommand processing and inventory management processing.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	Use the DFSMSrmm EDGRMMxx PARMLIB member OPTION SMSTAPE to control how DFSMSrmm handles TCDB update processing.
Storage administration	None.
Operations	None.
Auditing	None.
Application development	None.
General use	• The DFSMSrmm LISTCONTROL subcommand output has been changed. SeeTable 44 on page 279. • Additional REXX variables and structured field introducers (SFI) have been added. “REXX variables and structured field introducers” on page 300

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

This function was made available by PTF (APAR OW43476) for DFSMS/MVS Release 1.5.0. There is no support for the new parameters on lower levels of DFSMSrmm. The DFSMSrmm default processing for the DFSMSrmm OPTION SMSTAPE operand value is different than the default processing on prior levels of DFSMSrmm. Use the default value for the SMSTAPE parameters or create a new PARMLIB member for use on the system that supports this function.

Migration tasks

To implement this change, consider each task listed in the following table. **Required** tasks apply to any DFSMS installation enabling the function. **Optional** tasks apply to only specified operating environments or to situations where there is more than one way to set up or enable the function. For more details on the procedures associated with a given task, see the reference listed.

System-Level Tasks	Condition	Procedure Reference
Specify the DFSMSrmm OPTION SMSTAPE operand to control TCDB handling.	Required	*z/OS DFSMSrmm Implementation and Customization Guide*
Tailor the DFSMSrmm OPTION OPMODE operand values.	Optional	*z/OS DFSMSrmm Implementation and Customization Guide*
Change installation exits like the CBRUXVNL installation exit if you are not using the DFSMSrmm-supplied samples.	Optional	*z/OS DFSMSrmm Implementation and Customization Guide*

For more information

You can find information about using this support in the following publication:

- *z/OS DFSMSrmm Application Programming Interface*
- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Implementation and Customization Guide*

DFSMSrmm reporting

Description

DFSMSrmm reporting includes support for creating reports using DFSORT ICETOOL symbols.

What this change affects

Implementing this change could affect the following areas of your processing environment:

Area	Considerations
System customization	None.
Storage administration	Set up jobs using the ICETOOL symbols shipped with DFSMSrmm.
Operations	DFSMSrmm provides mappings for DFSORT symbols for the DFSMSrmm ACTIVITY report, the DFSMSrmm extract data set, and the DFSMSrmm SMF records report. See “Data areas” on page 284.
Auditing	None.
Application development	None.
General use	None.

Hardware or software dependencies

There are no additional hardware or software dependencies associated with this support.

Coexistence considerations

There are no coexistence considerations related to this support.

Migration tasks

DFSMSrmm has rewritten some of the reporting samples to use DFSORT symbols. You might want to switch to using the new samples to exploit the use of the symbols. To customize JCL and DFSORT output, you can use the symbols mapping macros which are shipped as part of the function.

For more information

You can find information about using this support in the following publication:

- *z/OS DFSMSrmm Reporting*

Chapter 7. Migration Overview for DFSMS/MVS V1R5

This chapter presents a migration overview of all new and expanded DFSMS functions introduced with DFSMS/MVS V1R5 (also an element of OS/390 V2R7, V2R8, and V2R9). Details for each functional change include some or all of the following:

- High-level description of new or expanded features
- Hardware or software dependencies
- Coexistence considerations for multisystem environments
- General processing restrictions and other coexistence issues
- Summary of commands or interfaces affected
- Migration scenarios and guidance information for implementing the change
- References to other publications that contain supporting implementation information

APARs referenced in this chapter are provided as a courtesy to help you correlate the functional enhancements with corresponding coexistence maintenance or other programming requisites listed in your installation documentation, or in the PSP bucket. The APARs listed here are not considered all-inclusive and are not intended to replace any information you obtain from these other sources.

Note: Most of the migration information in this chapter was taken from an earlier release of the product; therefore you will find the format is somewhat different from what you see in the chapter that describes the most current release.

Release summary of changes

Table 20 summarizes changes introduced in DFSMS/MVS V1R5.

Table 20. What was new in DFSMS/MVS V1R5, summarized by functional component

For information about:	Refer to location:
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Table 20. What was new in DFSMS/MVS V1R5, summarized by functional component (continued)

For information about:	Refer to location:
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Catalog alias and usability improvements

Catalog usability and performance is improved in the following ways:

- **Extended alias entries:** Catalog alias entries can now be defined using system symbols. This enables each system in a sysplex to resolve an alias with a different user catalog or different non-VSAM data set name. For example, the alias name IMSCAT can identify user catalog IMS™.PRODCAT on one system and user catalog IMS.TESTCAT on another system.

  Symbolic substitution also allows a non-VSAM data set to be resolved at the time the alias is referenced (and differently on each system), rather than when the alias is defined. For example, SYS1.PLILIB can resolve to SYS1.V4.PLILIB on one system and resolve to SYS1.V5.PLILIB on a another system.

- **MLA enhancements:** In a sysplex environment, virtual storage requirements of the multi-level alias (MLA) table have been reduced, thus improving search performance.
- **Operator command for tracking performance:** The command MODIFY CATALOG,REPORT,PERFORMANCE, is now available to track the performance of key events occurring in the catalog address space.

Other changes to catalog support include the following:

- **IMBED option no longer supported:** IDCAMS will ignore the IMBED parameter on a DEFINE CLUSTER statement. SVC 26 calls specifying a DEFINE with IMBED are still honored, allowing users of this interface to create data sets as necessary; however, users creating new data sets through the documented IDCAMS interfaces can no longer specify the IMBED option. See “IDCAMS changes for DEFINE CLUSTER with IMBED or REPLICATE” on page 192 for additional information.
- **Passwords within ICF catalogs ignored:** Passwords will not be checked when access is authorized for a data set cataloged in an ICF catalog. A security product should be used to control access to catalogs and data sets.

Functional components enhanced
DFSMSdfp

Software dependencies
There are no software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
Attempts to use an alias defined with a symbolic value will fail on systems prior to DFSMS/MVS V1R5.

Coexistence maintenance is needed on lower-level systems to prevent unnecessary IDCAMS errors from occurring as a result of some catalog functions. See APAR OW32335.

System interfaces affected
The names for symbolic substitution are defined on the SYMDEF parameter in SYS1.PARMLIB member LOADXX.

Symbolic substitution for non-VSAM data sets occurs at time of use; for catalogs, substitution occurs at IPL, catalog address space restart, or when the master catalog is updated with user catalog names on another shared system.

Operator commands modified
Operator command, MODIFY CATALOG,REPORT,PERFORMANCE, extracts information on internal catalog performance. This command tracks and displays the number of key performance-related events in the catalog address space and calculates the average time that elapses when these events occur.

Commands or control statements modified
With the DEFINE ALIAS command, users typically specify a user catalog with the RELATE parameter to indicate that all references to data sets beginning with that alias should use the catalog specified. In the example below, all references to data sets starting with “MYALIAS” will find the data set by way of the user catalog “SAMPLE.USERCAT”.

```
DEFINE ALIAS (NAME(MYALIAS) RELATE(SAMPLE.USERCAT))
```

Catalog alias and usability improvements

A new DEFINE ALIAS keyword, SYMBOLICRELATE (or SYM), is provided for symbolic substitution and is mutually exclusive with the RELATE keyword. In the following example, the value of system symbol "&USERCAT1" can be set to a different user catalog for each system that has the alias defined.

```
DEFINE ALIAS (NAME(MYALIAS) SYMBOLICRELATE('&USERCAT1'))
```

Processing restrictions

Products that extract information from a catalog on one system and send it to another system might not work properly when a symbolic value is used in an alias reference because the true value of the alias could vary from system to system.

In a JES3 environment, in particular, JCL procedures and INCLUDE segments are expanded from data sets found by LOCATEs occurring on the conversion system. Conversely, problem program data, including STEPLIB, JOBLIB, and DD statements specified in the JCL, and DD statements opened dynamically by a program, are found by LOCATEs occurring on the execution system.

Where to find more information

- *z/OS DFSMS Introduction*
- *z/OS DFSMS: Using Data Sets*
- *z/OS DFSMSdfp Storage Administration Reference*
- *z/OS DFSMS Access Method Services*
- *z/OS DFSMS: Managing Catalogs*

Catalog sharing enhancements for sysplex environments

By using the S/390 coupling facility cache structure instead of DASD to store catalog sharing control information, shared catalog performance in a sysplex environment can be improved considerably. This new sharing method, *enhanced catalog sharing* (ECS), eliminates a reserve, dequeue, and I/O request to the VVDS on most catalog calls.

Functional components enhanced

DFSMSdfp

Software dependencies

There are no additional software dependencies.

Hardware dependencies

A coupling facility is required for ECS. A new cache structure, SYSIGGCAS_ECS is used in the coupling facility for this support. All systems in the parallel sysplex that share catalogs through ECS must have connectivity to SYSIGGCAS_ECS in the coupling facility.

Coexistence considerations

All systems must be at DFSMS/MVS V1R5, or higher, to share catalogs through ECS. The systems sharing a catalog must use the same method for sharing; mixed-mode (ECS and non-ECS) sharing is not permitted. Explicit action must be taken to enable a catalog for ECS; by default, catalogs are not ECS-eligible. Coexistence PTFs are available for lower-level systems to ensure data integrity in this mixed environment. See APAR OW32576.

On a lower-level system, or on a current-level system in which ECS is not activated, access to a catalog is blocked if that catalog is currently shared through ECS. The systems can continue sharing catalogs that are not using ECS.

If, during testing, it becomes necessary to back out to a level prior to DFSMS/MVS V1R5, you should deactivate ECS for all catalogs affected, *before* the back-out takes place.

In the case of catalogs that are ECS-enabled, IDCAMS EXPORT or DFSMSdss DUMP/RESTORE or COPY will preserve the ECS indicator that was specified when the catalog was defined or altered. If the catalog is then imported, restored, or copied to a lower-level system, that system will ignore the ECS indicator.

Note: Procedures for enabling ECS improved in OS/390 V2R10 DFSMS, reducing manual intervention for activation. See APAR OW39071 for related changes at the DFSMS/MVS V1R5 level.

Performance characteristics

Overall, CPU usage and elapsed time could decrease considerably with this support.

System interfaces affected

A Coupling Facility Resource Management (CFRM) policy must be established in setting up the sysplex for enhanced catalog sharing.

All systems in the sysplex sharing catalogs through ECS must be in the same GRS complex. ECS uses a new GRS major name, SYSZCATS, to preserve the integrity of the catalog by preventing mixed-mode (ECS and non-ECS) sharing. This GRS enqueue specifies RNL=NO to ensure that an integrity exposure is not inadvertently created by someone including it in an inappropriate RNL.

Operator commands modified

A new parameter, ECSHR, on the operator command, MODIFY CATALOG, activates or deactivates ECS for the entire system or for an individual catalog.

Commands or control statements modified

A new parameter, ECSHARING or NOECSHARING, on the IDCAMS DEFINE USERCATALOG and ALTER commands, determines whether ECS is enabled or disabled for an individual catalog. This allows you to easily stage in the use of this support—even catalog by catalog.

Where to find more information

- *z/OS DFSMS Introduction*
- *z/OS DFSMS Access Method Services*
- *z/OS DFSMS: Managing Catalogs*
- *z/OS MVS System Commands*
- *z/OS MVS Setting Up a Sysplex*

DEB table expansion

Prior to this release, the maximum size of the DEB table was approximately 32 KB. This allowed for up to 8191 DEB entries per address space. Each entry represents a DEB for a DCB or ACB, opened for a data set.

DEB table expansion

The DEB table has moved above the 16 MB line of storage, providing for greater flexibility in sizing. The DEB table can now accommodate up to 65 532 DEB entries per address space.

This enhancement allows IMS installations to fully exploit the newer 10 KB DD limit, enabling IMS to allocate and open a large number of OSAM or VSAM data sets at a given time.

Functional components enhanced
DFSMSdfp

Software dependencies
IMS users who want to exploit this support must have a minimum level of IMS V6R1 installed. Additional IMS maintenance is also required. See APAR PQ06455.

Hardware dependencies
There are no hardware dependencies for this support.

Coexistence considerations
No coexistence PTFs are needed for previous releases.

Programming interfaces affected
There are no external programming interfaces introduced or changed by this support. Applications using the EXCP macro or any of the standard data management macros, such as OPEN or CLOSE, do not require modification. The larger DEB table is obtained above the 16MB line automatically during the first DEBCHK TYPE=ADD processing for an address space.

Any advanced applications that access the DEBTBLOF field in the DEB, or process the DEB table directly without using the DEBCHK macro, must be modified to handle the new DEB table format and storage location. Applications can check a flag in the DEB table header to determine whether the new or old format of the DEB table is active. As an extra precaution, the new DEB table header was designed in such a way that a failure will occur if any program does access the old DEB table directly.

Other migration considerations
Data sets accessed by the media manager do not have a DEB data area. Therefore, they are not impacted by the maximum size of the DEB Table and are not affected by this change.

Where to find more information

- *z/OS DFSMS Introduction*
- *z/OS DFSMSdfp Advanced Services*

Extended remote copy enhancements

The extended remote copy (XRC) suspend/resume function provides support for planned outages. A planned outage is an event that can be scheduled in advance and has a known duration. Examples include physical configuration changes and disruptive updates to system code.

Functional components enhanced
DFSMSdss, DFSMSdfp

Software dependencies
There are no additional software dependencies.

Hardware dependencies

When migrating data with XRC, the primary storage device must be attached to a remote copy-capable storage subsystem, such as an Enterprise Storage Server.

Coexistence considerations

There are no coexistence issues related to this support.

Command changes

Two new XRC commands, XSET and XSUSPEND, allow you to modify session characteristics and suspend a session, respectively. Parameters are added to new and existing commands to allow control over the timing of delete, suspend, and end functions.

A new PPRC command, CGROUP, gives you an easy way to control all PPRC activity on any storage control.

Where to find more information

- *z/OS DFSMS Advanced Copy Services*

Hierarchical file system performance and other enhancements

The hierarchical file system (HFS) includes the following functional enhancements:

- Performance is improved. In conjunction with z/OS UNIX System Services, DFSMS/MVS V1R5 includes fundamental changes in the way it writes HFS data to disk. Multiple updates are now batched into a single I/O operation, reducing both I/O and path length and greatly decreasing file access contention. HFS now maintains its own buffer pools and also takes advantage of caching for file data, file attributes, and HFS indexes.
- File system integrity is improved in a multisystem shared environment. Integrity of volume mounts is assured with a new serialization protocol used when HFS data sets are shared among systems in a sysplex.
- HFS data sets can now span multiple volumes.

Functional components enhanced

DFSMSdfp, DFSMSdss

Software dependencies

A new FMID is included on the product tape to install DFSMS/USS—an extension to the z/OS UNIX System Services provided for this new support. A separate FMID is required in this case because it must be applied to the system as part of Wave® 2 of the z/OS installation rather than in Wave 1, which includes only the basic elements. After DFSMS/USS is installed, no additional user action is required, as the function becomes integrated with z/OS UNIX System Services.

Hardware dependencies

There are no hardware dependencies.

Coexistence considerations

Previous releases of DFSMS/MVS cannot mount HFS data sets that span more than one volume. Coexistence PTFs must be installed on lower-level systems that share HFS data with current-level systems to ensure the integrity of multivolume HFS data sets. See APARs OW30999, OW31002, OW34335, OW34343.

Single volume HFS data sets created on a current-level system are still accessible on previous releases.

Processing restrictions

A colony address space is one that z/OS UNIX starts in order to run certain types of physical file systems. This is indicated by the presence of the ASNAME() parameter on the FILESYSTYPE statement that defines the PFS. It is rare for HFS to get started in a colony address space. You should be aware, however, that with the changes introduced by this support, HFS should not be allowed to run in a colony address space.

Command or control statements modified

Users can extend the HFS using the new z/OS UNIX System Services shell command *confighfs*.

Migration considerations

Refer to *z/OS UNIX System Services Planning* for migration planning information related to these HFS changes.

You should be aware of differences in running DCOLLECT at this level. Because of the changes in HFS multivolume support, the HFS data set must be mounted, or mountable, on any system where DCOLLECT is initiated. If the data set is not mounted, DFSMS will attempt to mount it. If DFSMS cannot mount the data set because, for example, it is already mounted on another system or because Open/MVS is not started, DCOLLECT issues messages and error byte X'20' for the HFS data set. This is a processing restriction until OS/390 V2R9.

Where to find more information

- *z/OS UNIX System Services Planning*
- *z/OS UNIX System Services File System Interface Reference*
- *z/OS UNIX System Services Command Reference*

IDCAMS changes for DEFINE CLUSTER with IMBED or REPLICATE

With advances in DASD and control unit hardware, particularly with cache control units, the IMBED and REPLICATE options of the IDCAMS DEFINE CLUSTER command no longer offer performance advantages. Support for these IDCAMS options is now limited to existing data sets only.

If you define a new VSAM key-sequenced data set with IMBED or REPLICATE, IDCAMS ignores these options. If you have data sets that are already cataloged with these options, processing is not affected.

Functional components enhanced

DFSMSdfp

Software dependencies

There are no additional software dependencies.

Hardware dependencies

There are no hardware dependencies.

Coexistence considerations

There are no coexistence considerations for this support. All existing data sets defined with IMBED or REPLICATE are processed as in past releases; therefore they can be shared with lower level systems.

Commands or control statements modified

The IMBED and REPLICATE parameters are no longer valid for IDCAMS DEFINE CLUSTER. There is no need to change existing jobs because these options are ignored when the command is processed.

You should, however, review all applications that use the IMBED option and also explicitly specify the SPACE parameter when defining the index component of a cluster. When IMBED was in effect, the index sequence set was stored within the data control areas. With the removal of IMBED processing, the index sequence set is stored in whatever space is allocated for the entire index component. Consequently, you might need to increase your index SPACE values, or remove the SPACE parameter altogether and let the system determine the optimum index space for you.

Data sets that are already defined with IMBED or REPLICATE are not affected by these changes.

Where to find more information

- *z/OS DFSMS Access Method Services*

ISO/ANSI Version 4 tape support

ISO and ANSI Version 4 tape labels are now supported for data interchange with non-S/390 platforms. Version 4 tape labels follow industry standards for ISO 1001-1986(E) and ANSI X3.27-1987, enabling data to be written in any national or user-defined character standard supported by the conversion utility. The 2K block size limit for data has been removed with this support.

Support continues for users reading Version 1 tape volumes (following ISO 1001-1967 and ANSI X3.27-1969 standards) and users reading or creating Version 3 tape volumes (ISO 1001-1979, ANSI X.27-1978, and FIPS 79 standards).

You can specify a system-wide default for ISO/ANSI labeling with the new ALVERSION parameter in SYS1.PARMLIB member DEVSUPxx. You can also override this default with labeling utilities IEHINITT or DFSMSrmm EDGINERS.

As with Version 3 tapes, Version 4 labels must be in 7-bit American Standard Code for Information Interchange (ASCII); however, the actual data can be written in any supported code page. For ease of migration, the data written to Version 4 tapes will be converted to ASCII; however, you can choose to convert the data to any of the supported code pages.

You can request a national or installation-defined character standard with the new JCL parameter, CCSID, on a DD, exec or JOB statement. During output processing, the data is converted from the JOB/EXEC statement CCSID, where the system default is a CCSID of 500 (International EBCDIC) to the CCSID specified on the DD statement, where the system default is a CCSID of 367 (ANSI X3.4 ASCII). The CCSID is recorded in the HDR2 tape label and is used for conversion on read operations. A CCSID of 65 535 has a special meaning and results in bypassing conversion.

Functional components enhanced
DFSMSdfp, DFSMSrmm

Software dependencies
There are no additional software dependencies.

Hardware dependencies
There are no additional hardware dependencies.

Coexistence considerations
There is no requirement that all systems in a sysplex have the same system-wide ALVERSION specified. You can have a default of Version 3 on one system and Version 4 on another system. Refer to “Other migration

considerations" for a suggested method of converting from Version 3 to Version 4 tape processing across your installation.

Coexistence PTFs must be applied to any system below DFSMS/MVS V1R5, if the new ALVERSION parameter is specified in SYS1.PARMLIB member DEVSUPxx, and the DEVSUPxx member is shared among the systems of mixed releases. Coexistence PTFs allow the lower level systems to ignore the ALVERSION parameter.

Coexistence PTFs are also needed if Version 4 tapes created on the current-level system and read by systems below DFSMS/MVS V1R5. The Version 4 tapes must remain in ASCII format. If the data is converted to any other code page, unpredictable results will occur on the lower-level systems.

See APARs OW31927/OW31944 and OW26078 for more information.

You should take precautions to ensure that a lower level system does not convert Version 4 tapes back to Version 3 by either modifying the system's associated tape or installation exits or by preventing Version 4 tapes from being mounted on that system.

System interfaces affected

You can update SYS1.PARMLIB member DEVSUPxx to include the ALVERSION parameter to specify a system-wide default for the tape labeling version and to indicate whether the version level should be forced when tape labels are rewritten. Version 3 is the IBM-supplied default if DEVSUPxx is not updated.

Independent of what conversion is done for the user data, tape labels are always created in ASCII, and are converted through the IBM-supplied XLATE function.

Programming interfaces affected

No changes to existing applications are required; however, if you want to override the system-wide default for the labeling version used, you need to update the appropriate applications.

You can take advantage of the new options available through DFSMSrmm EDGINERS or the IEHINITT utility to specify whether tapes should be initialized as Version 3 or Version 4. This could require a modification to existing jobs.

All currently-supported tape exits and installation exits that get control for Version 3 tapes also get control for Version 4 tapes. You can override the system-defined version by changing the volume mount exit. By modifying the label anomaly exit, you can reject volumes that have a version discrepancy between what is currently used on the tape and what will be written.

The following general-use programming macros are affected by these changes:

IFGTEP label exit parameter list: The volume mount (VOLMT) section is changed to include an option to override the version number specified in the DEVSUPxx PARMLIB member. The label anomaly (LABAN) section is changed to indicate if there is a discrepancy between the current version of a tape and the version in which the tape will be written.

IEZDEB: User application and tape CCSIDs are saved in the second DEB extension.

IFGSMF14: User, tape, and label CCSID values and other information are saved in a new ISO/ANSI Version 4 CCSID Extended Information Section defined in SMF record types 14 and 15.

If you have any OEM applications, tape exits, or installations exits tailored to process only ISO/ANSI Version 3 tape labels, the code might require an update to support ISO/ANSI Version 4 labels. Changes might include modifying an installation exit to support an accessibility value that is acceptable to Version 4 but not acceptable to Version 3; or modifying an exit to specify a labeling version other than the system-wide default.

If you intend to use a character standard other than ASCII or EBCDIC, user applications could require changes to recognize the new format.

The DFSMSrmm ISPF dialog has been changed for ISO/ANSI support.

Commands or control statements modified

If you have applications for which you need to specify a national or user-defined character set other than ASCII or EBCDIC, you need to modify the associated application JCL to include the new CCSID parameter on the DD, exec or JOB statement.

Processing restrictions

Character set conversion is supported only when BSAM or QSAM are used and the conversion does not result in a change to the length of user data.

Recommendations

Take a staged approach to exploiting ISO/ANSI Version 4 tape support. Following is one method for migrating from Version 3 to Version 4 tape processing:

1. After installation, either specify ALVERSION=3 in DEVSUPxx or let it default to Version 3. Allow individual users to label Version 4 tapes using IEHINITT or DFSMSrmm to test Version 4 processing until results are satisfactory.
2. After consulting with the owners of tape applications, change the installation version level to Version 4 (ALVERSION=4). This allows current Version 3 tapes to remain unchanged, but will create new tapes as Version 4.
3. When there is no longer any need to process Version 3 tapes, or when it is determined that all receiving systems can process Version 4 tapes, change the DEVSUPxx member to force Version 4 (ALVERSION=FORCE4). This causes any remaining Version 3 tapes to be converted to Version 4 tapes when the first file is written.

Where to find more information

- *z/OS DFSMS Introduction*
- *z/OS DFSMS Macro Instructions for Data Sets*
- *z/OS DFSMS: Using Data Sets*
- *z/OS DFSMS Access Method Services*
- *z/OS DFSMSdfp Advanced Services*
- *z/OS DFSMS Installation Exits*
- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Implementation and Customization Guide*
- *z/OS DFSMSdfp Utilities*
- *z/OS DFSMS: Using Magnetic Tapes*

- *z/OS MVS Initialization and Tuning Reference*
- *z/OS MVS JCL Reference*
- *z/OS MVS JCL User's Guide*

NaviQuest batch support

NaviQuest offers additional storage administrator options related to setting up and maintaining an SMS configuration. Batch functions include:

- SMS base configuration define, alter and display
- Data class define, alter and display
- Storage class define, alter and display
- Management class define, alter and display
- VIO, dummy, object, and object backup storage group define and alter
- Aggregate group define, alter, and display

Functional components enhanced
DFSMSdfp

Software dependencies
There are no additional software dependencies.

Hardware dependencies
There are no additional hardware dependencies.

Coexistence considerations
Coexistence with ISMF/E is not feasible. ISMF/E was a program offering (5764-033) available through IBM branch offices. It was a predecessor to the first release of NaviQuest.

Installations using either ISMF/E or NaviQuest Version 1 Release 1 (5655-ACS, FIND HACS110) need to delete the earlier programs before applying this version.

ISMF changes
NaviQuest runs under ISMF and is invoked as "Enhanced ACS Management" from the ISMF Primary Option Menu for storage administrators. This has not changed from the previous release; however, there are changes to the ISMF Primary Option Menu for end users to invoke the aggregate group application.

Control statements modified
The NaviQuest batch program interface includes new or modified execs and keywords for the following:

Data class DEFINE/ALTER/DISPLAY
Storage class DEFINE/ALTER/DISPLAY
Management class DEFINE/ALTER/DISPLAY
VIO storage group DEFINE/ALTER
POOL storage group VOLUME DEFINE/ALTER
Dummy storage group DEFINE/ALTER
Object storage group DEFINE/ALTER
Object backup storage group DEFINE/ALTER
Aggregate group DEFINE/ALTER/DISPLAY
Base configuration DEFINE/ALTER/DISPLAY

The functions that NaviQuest provides online are also available in a library of sample jobs which you can modify and submit to run on the system. These JCL members reside in the library SYS1.SACBCNTL.

Other migration considerations

Users who defined test cases with earlier releases of NaviQuest might have filled in both lines of the test case description field. With the changes for this support, the second line of the description field is now replaced by the expected results after testing with NaviQuest.

Where to find more information

- *z/OS DFSMSdfp Storage Administration Reference*
- *z/OS DFSMS: Implementing System-Managed Storage*

SMS control data set structure changes

The SMS control data set structure changed significantly with the functions introduced by DFSMS/MVS V1R5. If you intend to share SMS control data sets (SCDS, ACDS and COMMDS) with lower-level releases, compatibility maintenance must be applied to preserve data integrity in this cross-system sharing environment.

Functional components enhanced

DFSMSdfp

Software dependencies

There are no additional software dependencies.

Hardware dependencies

There are no hardware dependencies.

Coexistence considerations

Compatibility maintenance is provided for DFSMS/MVS V1R2, and above, to allow the SMS control data sets to be shared with lower level systems in an SMS complex. See APAR OW31930.

Where to find more information

- *z/OS DFSMSdfp Storage Administration Reference*

VSAM extended format data set enhancements

Many advanced VSAM functions previously available only for key-sequenced data sets (KSDS) are now available for the other VSAM data set organizations: entry-sequenced data sets (ESDS), relative-record data sets (RRDS), variable-length relative-record data sets (VRRDS) and linear data sets (LDS).

All VSAM data sets can now be defined in extended format, which provides the basis for other enhancements as follows:

- **Extended addressability:** Extended format data sets larger than 4 GB are now supported for all VSAM record organizations. Use data class parameter `DSNTYPE=EXT` to define a data set as extended format. Use data class parameter `EXTENDED ADDRESSABILITY` to specify this additional option.
- **Partial release:** Space beyond the high-used control area can now be released to the system for all VSAM extended format data sets. You can specify partial release through the management class, through JCL using `SPACE=(,,RLSE)` or with the DFSMSdss RELEASE command.

VSAM extended format data sets

- **Space allocation on candidate volumes:** An extension to a new volume can now use either the primary or the secondary space quantity for any VSAM extended format data set. Use the data class parameter `ADDITIONAL VOLUME AMOUNT` to identify which one is preferred.
- **System-managed buffering:** For non-shared resource (NSR) access, system-managed buffering is available to all VSAM extended format data set types. You can invoke system-managed buffering by specifying a `Record_Access_Bias` in the data class or by using the JCL `ACCBIAS` subparameter of the `AMP` parameter.

For a summary of the extended format functions available for each type of VSAM data set organization see Table 11 on page 52.

Functional components enhanced
DFSMSdfp, DFSMSdss, DFSMShsm

Software dependencies
There are no software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
Extended format data sets other than the KSDS cannot be accessed on DFSMS/MVS releases prior to V1R5. Compatibility PTFs are available for DFSMSdfp and DFSMSdss at the DFSMS/MVS V1R2, V1R3 and V1R4 levels to prevent data integrity problems on these earlier releases that already support the extended format KSDS. Coexistence maintenance is also necessary for VSAM RLS at the DFSMS/MVS V1R3 and V1R4 levels. See APARs OW32778, OW32754, OW31473.

DB2 support has PTFs available to recognize when linear data sets are defined for extended addressability.

ISMF changes
The Define/Alter panel of the ISMF Data Class Application has changed to remove the restriction on defining extended format data sets (previously, only Recorg=KS was allowed).

Programming interfaces affected
An application that uses an RRDS or VVRDS should not require changes provided the application accesses the data using a relative record number and not a relative byte address (RBA) for control interval access.

An application that uses an ESDS or LDS will require changes if the data is defined for extended addressability. With addressed or control interval processing, the RBA is passed as the argument in the request parameter list (RPL). The RPL also contains an option code specifying whether the request is using a 4-byte or 8-byte RBA. The application must provide an 8-byte RBA when the data set is defined for extended addressability and the type of access uses the RBA specified.

There are no new programming macros for this support. VSAM macros used for an extended format KSDS are also now available for the other data set types. Control block manipulation macros have special keywords to retrieve the longer RBA values.

Commands or control statements modified
DFSMSdss supports logical dump, logical restore, data set copy, and release operations for all types of VSAM extended format data sets. DFSMSdss does not support physical data set dump or physical data set

restore for any VSAM extended format data set. No DFSMSdss commands, keywords, or parameters have changed for this support.

DFSMShsm processing is affected in the following ways:

- DFSMShsm supports VSAM extended addressability through the use of relative control intervals rather than relative byte addresses when performing space calculations.
- DFSMShsm invokes DFSMSdss as the datamover to migrate, backup/dump, recall, or recover/restore VSAM data sets defined with extended addressability.
- DFSMShsm ABARS processing invokes DFSMSdss to dump and restore VSAM data sets defined with extended addressability.

Processing restrictions

Note the following restrictions associated with extended format data sets:

- An alternate index cannot be defined over an extended format ESDS.
- For a KSDS, the data set cannot be defined with keyranges.
- Data sets defined for VSAM RLS access cannot use system-managed buffering.
- VSAM RLS does not support the use of linear data sets.
- Hiperbatch™ support is not available.
- IMS users must not define an extended format VSAM KSDS that is compressed or that has extended addressability (for data set size greater than 4 GB)
- DFSMShsm will not migrate to DASD (or allow a BACKDS) any VSAM extended format data set that is larger than 64K tracks.

It is also important to note that you must be careful when performing a REPRO on a catalog that contains extended format data sets. If you run REPRO while data sets are open in the source catalog, and any of those data sets extend, changes might not get copied to the target catalog, resulting in a mismatch between the information contained in the VVDS and the new target BCS. This could result in a loss of information or make the data sets inaccessible.

Other migration considerations

This support also enables applications that access very large BDAM data sets (with fixed block records) to convert to using VSAM RRDS to exploit sharing and data extension.

When converting an existing VSAM data set to an extended format VSAM data set, you can use IDCAMS REPRO to move data from its current location.

Other migration considerations for VSAM extended format data sets are described under:

- “VSAM load enhancements” on page 233
- “VSAM system-managed buffering” on page 235

Where to find more information

- *z/OS DFSMS Introduction*
- *z/OS DFSMS: Using Data Sets*
- *z/OS DFSMS Macro Instructions for Data Sets*
- *z/OS DFSMS Access Method Services*
- *z/OS DFSMS: Managing Catalogs*

VSAM extended format data sets

- *z/OS DFSMS: Implementing System-Managed Storage*
- *z/OS DFSMSdfp Storage Administration Reference*
- *z/OS DFSMShsm Storage Administration Guide*
- *z/OS DFSMSdss Storage Administration Guide*
- *z/OS DFSMS: Using the Interactive Storage Management Facility*
- *z/OS DFSMS Checkpoint/Restart*

Virtual Tape Server import/export support

OAM provides the ability to physically import and export logical volumes within the Virtual Tape Server (VTS) subsystem. This enhancement to existing support includes managing the physical removal of the 3590 cartridges containing stacked logical volumes from a VTS and the corresponding function for entering these cartridges into a VTS. These functions require interactions with the host and the tape management system.

DFSMSrmm also provides support for import and export. You can define volumes that reside in a Virtual Tape Server subsystem to DFSMSrmm; then use DFSMSrmm to manage the retention and movement of these volumes. Using DFSMSrmm TSO subcommands, you can keep your inventory accurate and up-to-date. You can also use the DFSMSrmm TSO subcommands or the DFSMSrmm application programming interface and the DFSMSrmm EDGRPTD utility to create reports that your operators can use to move volumes.

Also included in this support is a DFSMS pre-ACS interface routine that enables an external source, such as a tape management system, to provide input (through read-only variables) to the ACS routine to influence construct selection and assignment. The variables provided by the tape management systems can be used to direct allocations to a particular tape library, thereby coordinating vaulting runs for backups, off-site storage, and so forth.

Functional components enhanced
DFSMSdfp, DFSMSrmm

Software dependencies
There are no additional software requirements.

Hardware dependencies
Hardware requirements include:

- Virtual Tape Server model B18 with the extended high performance option (EHPO) feature
- Minimum of four 3590 native devices
- Convenience I/O station installed.

Coexistence considerations
OAM-related coexistence support is provided for lower releases of DFSMS/MVS.

Operator commands modified
The following commands were modified for this support:

DISPLAY SMS,VOLUME(*volser*)
DISPLAY SMS,LIBRARY(*library-name*),DETAIL
DISPLAY SMS,OAM

New operator commands

LIBRARY IMPORT,*volser*
LIBRARY EXPORT,*volser*

Programming interfaces affected

- Pre-ACS interface
- CBRXLCS
  - FUNC=EXPORT allows an installation to identify the export list volume and initiate or cancel an export operation. This is a new function.
  - FUNC=IMPORT allows an installation to identify the import list volume and initiate or cancel an import operation. This is a new function.
  - FUNC=QVR allows an installation to query the library residency of a volume that does not have a volume record in the tape configuration database (TCDB). This is a modification of this function.
- CBRLCSPL is updated with new function reason codes.
- CBRUXENT/CBRUXEPL is updated with indicators to indicate whether the volume is a logical or physical volume and whether the logical volume was imported.
- CBRUXEJC/CBRUXJPL is updated with an indicator to indicate if the logical volume was exported and it is updated with a new field for the container volume.
- CBRTVI is updated to provide additional information for volumes associated with a VTS.
- DFSMSrmm programming interfaces:
  - The DFSMSrmm ISPF dialog has been changed.
  - New reason codes have been added for the EDGLCSUX programming interface.
  - DFSMSrmm macros EDGLCSUP, EDSVREC, and EDGRVEXT have been modified.
  - Additional reason codes have been added for DFSMSrmm.
  - The DFSMSrmm TSO ADDVOLUME, CHANGEVOLUME, and SEARCHVOLUME subcommands have been modified.

Other migration considerations

To implement import/export in a VTS, you need to enhance its current code and procedures. First, an export operation needs to be initiated at the host as part of the vaulting run and then the tape management system needs to track which container volume the exported logical volume resides on. The container volume will be reported through the cartridge eject installation exit (CBRUXEJC). When the logical volumes are needed in a library, the tape management system must initiate an import operation at the host to get the logical volumes entered into the library or for a single volume being imported, the operator can initiate a single volume import at the library itself.

For full functional capability, you must use the DFSMSrmm subcommands to ensure that the Virtual Tape Server logical volumes are identified to DFSMSrmm as logical volumes.

Where to find more information

- *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries*

- *z/OS DFSMS Installation Exits*
- *z/OS MVS System Messages, Vol 3 (ASB-BPX)*
- *z/OS MVS System Messages, Vol 4 (CBD-DMO)*
- *z/OS MVS System Messages, Vol 5 (EDG-GFS)*
- *z/OS DFSMSrmm Implementation and Customization Guide*
- *z/OS DFSMSrmm Diagnosis Guide*
- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Command Reference Summary*
- *z/OS DFSMSrmm Application Programming Interface*
- *z/OS DFSMSdfp Storage Administration Reference*

OAM device support for IBM 3995-SW4 optical drive

OAM supports a new optical disk drive, the 3995-SW4, which is a drive device type for the 3995-Cxx series libraries, both library resident and operator accessible. This drive is capable of writing to 8x (eight times density) and 4x (quadruple density) WORM, rewritable, or CCW optical disk media. The 8x media can contain up to 5.2 GB of OAM object data. This drive is also capable of reading from 2x (double density) and 1x (single density) WORM or rewritable optical disk media.

Functional components enhanced
DFSMSdfp

Software dependencies
No additional software dependencies.

Hardware dependencies
This support is available in conjunction with the IBM 3995-SW4 optical drive.

Coexistence considerations
There are no coexistence issues. This support is also available, by PTF, for DFSMS/MVS V1R4 systems.

ISMF changes

- 3995 Drive Define (modified)

Where to find more information

- *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*

OAM operator command changes

The following OAM operator commands and utilities are either new or changed to support various functions.

- **Reformatting a 3995 Optical Disk:** The OAM reformat utility (the TSO command OAMUTIL) is used to perform various tasks against a 3995 optical disk cartridge to reclaim usable space on the cartridge. This utility can be run either by running the CBRSAMUT SAMPLIB job or by issuing a TSO command to start the utility. This utility allows you to perform the following tasks:
  - Reformat one or both sides of a 3995 optical disk cartridge
  - Reformat and rename the volume serial number of one or both sides of an optical disk cartridge.

  - Return the volumes back to the SCRATCH storage group upon completion of the REFORMAT utility (only when there is a request for both sides of the optical disk to be reformatted) to be used for subsequent write requests.
- **Relabeling a 3995 Optical Disk volume:** The relabel command is used to allow an operator to rename a volume serial number on a previously defined 3995 optical disk volume.
- **Displaying OAM XCF status:** This command displays system status for an instance of OAM in relation to the sysplex and XCF.
- **Displaying SETOPT and SETOAM parameters:** This command displays the current settings of the SETOPT and SETOAM parameters for the OAM address space.
- **Using the UPDATE command to set SETOAM and SETOPT values:** Most of the current values of the SETOAM and SETOPT commands can be changed using the F OAM,UPDATE command without having to restart OAM. These commands can also define settings of most of the SETOAM and SETOPT values if a CBROAMxx PARMLIB member was not used at OAM startup. This command provides dynamic processing that provides another method (other than using the CBROAMxx PARMLIB member) for customizing your object tape and optical support.

Functional components enhanced
DFSMSdfp

Software dependencies
There are no additional software requirements.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
There are no coexistence issues.

New and changed operator commands
Following are new and changed operator commands:

```
DISPLAY  SMS,OAMXCF
DISPLAY  SMS,SETOAM,ALL
DISPLAY  SMS,SETOAM,storgrp
DISPLAY  SMS,SETOPT,ALL
DISPLAY  SMS,SETOPT,storgrp
F  OAM,UPDATE,SETOAM
F  OAM,UPDATE,SETOPT
```

Where to find more information

- *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*
- *z/OS MVS System Messages, Vol 3 (ASB-BPX)*
- *z/OS MVS System Messages, Vol 4 (CBD-DMO)*
- *z/OS MVS System Messages, Vol 5 (EDG-GFS)*

OAM parallel sysplex support

OAM supports the parallel sysplex environment. Using services of the cross-system coupling facility (XCF), each DFSMS OAM instance running in a z/OS parallel sysplex communicates with all other instances of OAM on other systems in the sysplex, provided they belong to the same XCF group.

OAM parallel sysplex support

Each instance of OAM in a single parallel sysplex, sharing the same database for OAM, must belong to the same XCF group, and the DB2 subsystem must belong to the same DB2 data sharing group. This collection of address spaces in a sysplex is known as an OAMplex. Each instance of OAM in an OAMplex is connected to a subsystem, each of which belongs to the same DB2 data sharing group, so each OAM has the same DB2 database. Also, each instance of OAM in an OAMplex is a member of a single XCF group.

Any OAM object may be retrieved from any z/OS system in a parallel sysplex regardless of which OAM in the sysplex stored the object or on which media (DASD, 3995 optical, or tape) the object resided as long as each instance of OAM is part of the same OAMplex.

OAM no longer has a 100-object storage group restriction. It is now possible to define more than 100 object storage groups in your configuration. If fewer than 100 object storage groups are needed, views are no longer required to define all 100 as was previously required.

Functional components enhanced
DFSMSdfp

Software dependencies
A minimum of DB2 Version 4 is required. This support also requires cross-system coupling facility (XCF) software.

Hardware dependencies
This support requires cross-system coupling facility (XCF) hardware.

Coexistence considerations
See APARs OW31930 and OW34385.

New operator commands
A new operator command is introduced for this support:

- D SMS,OAMXCF

Operator commands modified
The following commands were modified for this support:

- VARY SMS,DRIVE
- VARY SMS,LIBRARY
- LIBRARY EJECT
- MODIFY OAM,LABEL
- MODIFY OAM,QUERY
- MODIFY OAM,START,MOVEVOL
- MODIFY OAM,STOP,MOVEVOL
- MODIFY OAM,START,LIBMGT
- DISPLAY SMS,OAM
- DISPLAY SMS,LIBRARY
- DISPLAY SMS,DRIVE
- DISPLAY SMS,VOLUME
- MODIFY OAM,UPDATE

Where to find more information

- *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*

OAM pseudo library concept changes

In addition to real optical libraries, OAM also supports the concept of pseudo optical libraries. With the support of parallel sysplex, the concept of pseudo libraries has changed from previous releases; however, pseudo libraries defined in previous releases are still supported. There are no longer restrictions on the number of pseudo optical libraries that can be defined in an SCDS. Also, there is no longer a device type associated with pseudo optical libraries.

A pseudo library can now be a collection of stand-alone or operator-accessible drives, or both, and shelf-resident volumes, defined by the installation and not necessarily of the same device and media type. Pseudo libraries can be defined without a device type. When operator-accessible drives are defined, they can be assigned to a pseudo library chosen by the person defining the devices. These devices can be grouped in a manner that best fits the needs of the installation (for example, physical location, device and media affinity, backup and primary objects stored together, and so forth). Additionally, there is no limit on the number of pseudo libraries that can be defined within an active SMS configuration.

It is the responsibility of the installation to determine which pseudo library an optical volume is to be associated with. This determination is made either when the volume is ejected from a real library or when a volume is labeled on an operator-accessible drive.

Pseudo libraries defined prior to DFSMS/MVS V1R5 are still supported. These pseudo libraries were defined as a collection of one or more stand-alone or operator-accessible drives of the same device type, and one or more shelf-resident optical volumes of a like media type. OAM continues to honor these old pseudo library definitions. Support for both concepts allows installations the option of deciding which method would be more beneficial or efficient in their environments. It also allows installations wishing to convert their environments to the new pseudo library concept over a period of time, the ability to use their previously defined pseudo libraries during the transition period.

Functional components enhanced
DFSMSdfp

Software dependencies
No additional software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
There are no coexistence issues.

ISMF changes
The following ISMF panels are either new or have been modified for this support:

- 9246 Library Define (modified)
- 3995 Library Define (modified)
- Pseudo Library Define (new)
- 9246 Library Alter (modified)
- 3995 Library Alter (modified)
- Object Storage Group Define/Alter (modified)

OAM pseudo library concept

Operator commands modified
There are no operator commands modified.

Where to find more information

- *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*

DFSMSdss logical release support

Logical release processing is now available along with physical release processing. Logical release does not require input volumes to be specified. This type of processing can be used for VSAM extended-format data sets. Both logical and physical release can be used to process sequential or partitioned data sets.

Functional components enhanced
DFSMSdss

Software dependencies
There are no additional software dependencies.

Hardware dependencies
There are no additional hardware dependencies.

Coexistence considerations
There are no coexistence issues for this support.

Commands or control statements modified
DFSMSdss RELEASE command has new optional keywords LOGDDNAME, LOGDYNAM, INCAT, ONLYINCAT, SPHERE, and SELECTMULTI.

Where to find more information

- *z/OS DFSMSdss Storage Administration Reference*

DFSMSdss SnapShot support for RAMAC Virtual Array

SnapShot is a function of the RAMAC Virtual Array (RVA) which allows you to make a very quick copy of a set of tracks (an entire volume, a data set, or just a random set of tracks). The copy operation completes with very few I/O requests to the device.

DFSMSdss offers two levels of snapshot support:

Native snapshot:
Data is quickly copied, or “snapped”, directly from the source location to the target location. This capture occurs when you issue a DFSMSdss COPY command to copy volumes, tracks, or data sets from one DASD volume to another. DFSMSdss uses this method whenever the source and target data are on like devices in the same partition on the same RVA subsystem. No reblocking is required and a utility is not required. DFSMSdss can use this method whether or not the CONCURRENT keyword is specified. With native snapshot, the copy of the data is logically and physically complete as soon as the snap is complete.

Virtual concurrent copy:
Data is “snapped” from the source location to an intermediate location and then gradually copied to the target location using normal I/O methods. This capture occurs when you issue either the DFSMSdss COPY or DUMP command and specify the CONCURRENT keyword. As the name implies, this method operates much like existing concurrent copy (CC) operations.

DFSMSdss SnapShot support for RAMAC Virtual Array

All DFSMSdss users and callers of the DFSMSdss API (such as DFSMShsm, DB2, and IMS) can continue to use the CONCURRENT keyword and receive functionally identical CC support, but on a wider range of devices. Using virtual concurrent copy, the copy or dump of the data is logically complete after the source data is snapped to the intermediate location, and then physically complete after the data has been moved to the target media. It is also possible to perform concurrent copy on VM minivolumes using virtual concurrent copy support. Virtual concurrent copy is also known as “CC-compatible snapshot”.

Functional components enhanced
DFSMSdss, DFSMSdfp

Software dependencies
This support requires IXFP 2.1 with a minimum PTF level of L170019.

Hardware dependencies
The snapshot function requires snapshot-capable storage devices. For RAMAC Virtual Array, microcode must be at 4.3.26 or higher, and must have snapshot enablement feature 6001.

Coexistence considerations
There are no coexistence issues related to this support.

Where to find more information

- *z/OS DFSMSdss Storage Administration Reference*
- *z/OS DFSMSdss Storage Administration Guide*
- *Implementing DFSMSdss SnapShot and Virtual Concurrent Copy (Redbook)*

DFSMSdss storage group filtering

The DFSMSdss STORGRP parameter is a new source-volume-group keyword that allows selection of all volumes in a storage group, with a single parameter. The new volume selection keyword can be specified during logical data set dump, data set copy, and logical release. The STORGRP keyword with a storage group name is the functional equivalent of the LOGINDYNAM keyword (LOGDYNAM for RELEASE) listing all online volumes in the storage group.

Functional components enhanced
DFSMSdss

Software dependencies
There are no additional software dependencies.

Hardware dependencies
There are no additional hardware dependencies.

Coexistence considerations
There are no coexistence issues for this support.

Commands or control statements modified
The DFSMSdss commands COPY, DUMP, and RELEASE have been modified to add the new optional keyword STORGRP.

Where to find more information

- *z/OS DFSMSdss Storage Administration Reference*

DFSMShsm control data set extended addressability

With the possibility of combining even more HSMplexes into a single HSMplex, it becomes more likely that the CDS clusters will grow beyond 4 GB. Currently, the MCDS and BCDS can increase up to 16 GB but the OCDS is limited to 4 GB. The MCDS and BCDS can achieve 16 GB when they are comprised of four 4 GB clusters.

DFSMShsm now supports VSAM KSDS extended addressability (EA) using record-level sharing (RLS) access mode for its control data sets. This allows the MCDS and BCDS to exceed the 16GB limitation and the OCDS to exceed the 4 GB limitation. DFSMShsm does not support EA control data sets in CDSQ or CDSR serialization modes.

Since keyrange values are not allowed for EA KSDS data sets, DFSMShsm supports EA multicluster configurations with implicit keyranges. Multicluster support allows the MCDS and BCDS to be represented by up to 4 KSDS EA data sets. Having separate clusters reduces backup processing time by allowing parallel operations. Potential recovery time is also reduced when only one of the clusters is damaged or lost and needs to be forward recovered.

Functional components enhanced
DFSMShsm

Software dependencies
There are no additional software dependencies.

Hardware dependencies
This support requires a coupling facility.

Coexistence considerations
In order to use EA control data sets, all DFSMShsm systems sharing the same control data sets must be at DFSMS/MVS V1R5 or higher. Systems can coexist with DFSMShsm V1R4 provided coexistence maintenance is applied to the V1R4 system. The coexistence APAR addresses the support of EA control data sets that are accessed with RLS. See APAR OW33226.

Migration to this new support requires that all DFSMShsm systems in the sysplex shutdown while the control data sets are copied to new EA control data sets using IDCAMS REPRO, to allow for RLS access.

Performance characteristics
There are no additional performance characteristics.

Processing restrictions
With this new support, extended format (EF) data sets, EA or not, are accepted when CDSSHR=RLS is specified as a startup procedure keyword. Mixing EF and non-EF clusters is permissible since each is treated as a separate entity. However, if any cluster is accessed in RLS mode, all clusters must be accessed in RLS mode. This RLS requirement was established by DFSMShsm V1R4.

Where to find more information

- *z/OS DFSMShsm Storage Administration Guide*
- *z/OS DFSMShsm Implementation and Customization Guide*

DFSMShsm GRSplex serialization

During migration to a parallel sysplex, you can place multiple HSMplexes into a single GRSplex. An HSMplex consists of one or more processors running DFSMShsm that share common control data sets and a journal.

Previously, if two HSMplexes existed within a single GRSplex environment, one HSMplex interfered with the other HSMplex. Although the HSMplexes had unique resources, each HSMplex used the same resource names for global serialization, thus interfering with each other. To prevent this interference within a single GRSplex, you must change DFSMShsm serialization methods.

Restriction: All DFSMShsm systems sharing the same control data sets must use the same serialization method.

Functional components enhanced
DFSMShsm

Software dependencies
There are no additional software dependencies.

Hardware dependencies
There are no additional hardware dependencies.

Coexistence considerations

All hosts within an HSMplex must use the same serialization technique. Any time DFSMShsm detects an inconsistency in the method of serialization, the detecting DFSMShsm shuts down immediately.

Consider the coexistence requirements for each of the following HSMplex scenarios:

1. All DFSMShsm hosts within a single HSMplex are running at DFSMS/MVS V1R5 or higher.

   All hosts within the HSMplex must specify RNAMEDSN=Y to use the new serialization method. Or, they must all specify RNAMEDSN=N (also the default) to continue using the old serialization method. If any DFSMShsm host attempts to use a different serialization method, each host detecting a mismatch will shut down.
2. DFSMShsm hosts within a single HSMplex are running mixed levels of DFSMS, at least one below DFSMS/MVS V1R5.

   Hosts at DFSMS/MVS V1R5 and above must not specify RNAMEDSN=Y. If RNAMEDSN=Y is attempted, hosts that detect the mismatched serialization method will shut down.
3. Two or more HSMplexes are running concurrently.

   Each HSMplex using an old serialization method will interfere with other HSMplexes using the old method. HSMplexes using the new serialization method will not interfere with other HSMplexes. However, in a two–HSMplex environment, one can use the old method and the other can use the new method and neither will interfere with the other.

Coexistence maintenance is available. See APARs OW32531/OW32532 and OW34475/OW34476.

Performance characteristics
There are no additional performance characteristics. Users can avoid one HSMplex affecting another by selecting different time windows for periodic functions such that no overlaps occur. This may not be possible or practical

in all cases, and so this enhancement will resolve conflicts between HSMplexes with overlapping processing windows.

Commands or control statements modified

A new keyword has been added to help you convert your systems to this new serialization method. This keyword, RNAMEDSN=Y | N, can be specified in the startup procedure and has the following values:

- The value Y means: serialization which includes the data set names of the control data sets and journal in the resource names.
- The value N means: continue to use the old method of serialization. In a sysplex with multiple HSMplexes, one HSMplex will interfere with another. This option provides compatibility with down-level releases.

The default value is N.

Processing restrictions

All hosts within an HSMplex MUST be using the same serialization technique. Any time DFSMShsm detects an inconsistency in the method of serialization, the detecting DFSMShsm shuts down immediately.

Where to find more information

- *z/OS DFSMShsm Implementation and Customization Guide*

DFSMShsm overhead reduction

During volume migration or volume backup, one task manages the volume and a different task processes data sets. This data set control task performs setup, data movement, and post processing. The setup and post processing are considered overhead.

With this enhancement, DFSMShsm overhead is overlapped with data movement for volume backup functions, thus improving performance (throughput) for the data stream to the output device.

Functional components enhanced

DFSMShsm

Software dependencies

There are no additional software dependencies.

Hardware dependencies

There are no additional hardware dependencies.

Coexistence considerations

There are no specific coexistence considerations introduced by this enhancement.

Performance characteristics

For volume backup processing, this enhancement produces a better throughput to the output device when the SETSYS USERDATASETSERIALIZATION option is used. The amount of improvement depends on the size of the data set, the order of data sets processed, and the configuration.

Where to find more information

- *z/OS DFSMShsm Storage Administration Guide*
- *z/OS DFSMShsm Implementation and Customization Guide*

DFSMShsm secondary host promotion

Using the Cross-System Coupling Facility (XCF), which is available in both basic and parallel sysplex environments, DFSMShsm enables a secondary host to take over the unique functions performed by a failed primary host. This failure can be either an address space failure or an entire MVS image failure. Support is also provided to enable a DFSMShsm host to take over secondary space management (SSM) from a failed host which can be either the primary or a secondary host.

Functional components enhanced
DFSMShsm

Software dependencies
XCF must be configured and running in Multisystem mode.

Hardware dependencies
There are no additional hardware dependencies.

Coexistence considerations
There are no coexistence issues.

Performance characteristics
Typically an address space or processor failure is detected and corrected within 12 hours. DFSMShsm's goal is that secondary host promotion occurs within minutes of the time of failure of the primary or SSM host.

Commands or control statements modified
Two parameters have been added to the DFSMShsm SETSYS command. The first new parameter is PLEXNAME(hsmplex_suffix). This parameter allows you to name multiple HSMplexes within a sysplex. This parameter is used during the startup of DFSMShsm and must be specified if there are multiple HSMplexes in a sysplex because this HSMplex name is used to distinguish between the separate HSMplexes. The prefix of ARC is used by DFSMShsm and you can specify a maximum of five characters as the suffix for the HSMplex name. The default suffix used by DFSMShsm is PLEX0.

The second new parameter is PROMOTE(PRIMARYHOST(Y|N) SSM(Y|N)). This parameter allows the user to specify which hosts in an HSMplex can be promoted and which cannot. Currently, one host in an HSMplex is designated as the primary host and all other hosts are considered secondary. You should specify the PROMOTE parameter on only those hosts that are actually eligible for promotion. Order is not assigned for which host takes over for a failed host.

The PROMOTE parameter has been added to the DFSMShsm STOP command. This parameter is used to request that this host in a HSMplex is eligible to have its primary functions or secondary space management functions taken over by another host.

Migration considerations
The following information applies to configuring XCF for DFSMShsm:

- There is one DFSMShsm XCF group per HSMplex. The XCF group name is the HSMplex name. The default HSMplex name is ARCPLEX0.
- There is one XCF group member for each DFSMShsm host in the HSMplex.
- DFSMShsm does not use the XCF messaging facilities.

Where to find more information

- *z/OS MVS Setting Up a Sysplex*
- *z/OS MVS Programming: Sysplex Services Guide*

- *z/OS MVS Programming: Sysplex Services Reference*
- *z/OS MVS Programming: JES Common Coupling Services*
- *z/OS MVS System Commands*
- *z/OS DFSMShsm Storage Administration Guide*
- *z/OS DFSMShsm Implementation and Customization Guide*
- *z/OS DFSMShsm Storage Administration Reference*

DFSMShsm general function and usability improvements

This section provides a summary of the general improvements to DFSMShsm functions. Changes include:

- **Improved filling of ML2 partial tapes:** Utilizing the complete capacity of a large tape is not a simple matter, especially when you need to recall data already written to a tape before DFSMShsm completes its continuous writing to that tape. Another problem associated with a computing environment that uses a single storage group spanning several libraries, is that you can have too many ML2 partials. DFSMShsm has made significant changes that increase the average amount of data placed on your ML2 tapes. These changes result in the use of fewer tapes and in recycling fewer tapes than when DFSMShsm is running with the mark-full-on-take-away capability. This new enhancement is accomplished without any degradation to recall performance and includes some new options for the LIST command.

  DFSMShsm has added one new subparameter to the LIST SELECT command: ASSOCIATED or NOTASSOCIATED. With this subparameter, you can specify a listing of only those ML2 partial tape volumes currently associated or not associated for output by specific migration or recycle tasks.

  DFSMShsm has also added one new subparameter to the LIBRARY and NOLIBRARY parameters of the LIST SELECT command: ALTERNATE. With the ALTERNATE subparameter, you can list only the tape volumes having their alternate tape volumes in a library or not in a library.

  A new ML2PARTIALSNOTASSOCIATEDGOAL parameter has been added to the SETSYS command. This parameter allows you to specify the maximum number of allowed partial ML2 tapes beyond those currently associated with a specific ML2 output task. The rest of the partial ML2 tapes will now be eligible for recycle.
- **Tape conversion to 3590s:** The expected way to convert DFSMShsm migration and backup tapes to new technologies is with the DFSMShsm generic RECYCLE command. As an aid to processing only the old technology cartridges, DFSMShsm has added a new SELECT parameter to the RECYCLE command. The SELECT parameter has two subparameters, INCLUDE and EXCLUDE. You can now include or exclude ranges of tape volumes.
- **Volume dump stacking:** This improvement adds the capability to stack a specified number of DFSMShsm invoked DFSMSdss physical volume dumps to a single cartridge (or stream of cartridges) as separate files during the auto dump processing. A single TotalStorage cartridge will hold the dumps on the order of 14 different 3390–3 DASD volumes.

  DFSMShsm still retains the same ease of use for volume and/or data set recovers and cartridge management. The stacking value is specified in the dump class provided by DFSMShsm. The capability to concurrently dump to multiple output streams is retained with each stream capable of having its own stack value. During recovers from dump copies, the high speed positioning with the locate record order is used to position to the beginning of the appropriate dump copy.

DFSMShsm has added a new STACK subparameter to the DEFINE DUMPCLASS command. This subparameter is used to specify to DFSMShsm how many dump copies should be placed on a dump volume assigned to this dump class during one invocation of automatic dump.

A new subparameter has been added to the DUMPCONTENTS subparameter of the LIST DUMPVOLUME command. This *srcvol* subparameter allows you to specify which dump contents are desired in the LIST output. The LIST DUMPCLASS outputs have been changed to include a new STACK field.

DFSMShsm has also added a new SOURCEVOLUME(volser) to the RECOVER DUMPVOLUME command. This subparameter allows you to identify which dump copy on a dump volume should be used to restore a data set.

- **Recall take-away from recall:** DFSMShsm has an internal tape mount optimization capability that minimizes the number of tape mounts when there are multiple requests on one host to use the same tape. However, if this list of data sets to be processed gets excessively long it can prevent service to requests on other hosts needing the same tape or for requests on the same host needing a different tape.

  This problem could be addressed by an operator if it was brought to his or her attention. This enhancement enables the storage administrator to set a response time so that after a tape has been in continuous use by recall for that amount of time, DFSMShsm detects the existence of higher priority requests and conditionally terminates the mount optimization process. This makes the tape and the recall task available for doing higher priority work.

  DFSMShsm has added a new TAPERECALLLIMITS parameter to the SETSYS command. The TAPERECALLLIMITS parameter has two subparameters, TASK and TAPE. With these subparameters you can specify limits to continuously mounted ML2 tapes during multiple recalls.

- **Reel-type tape support removed:** DFSMShsm has discontinued the use of reel-type tapes for migration and backup output. Consequently, the following tape units are no longer supported for the creation of backup or migration tapes: 3400–3, 3400–4, 3400–5, 3400–6, and 3400–9.

  The following notes relate to the removal of reel-type tape support:

  – 3400–9 are cartridge-type tapes that emulate reel-type tapes and are no longer supported for backup or migration output.

  – Multifile tape format is no longer supported. This format was used for reel-type tapes.

  Note: Many DFSMShsm commands have defaults that are used when a parameter is not specified. **Unit type defaults changed to 3590–1.**

  Data sets that are already backed up or migrated to reel-type tapes can still be recovered or recalled from these tapes. Reel-type tapes can be recycled, but the new tapes created will only be cartridge-type tapes.

  CDS backup and dump still support reel-type tapes as output. ABARS still supports reel-type tapes as output (including ARECOVER to ML2) as well as supporting reel-type user tapes.

- **VSAM extended format data set support:** DFSMShsm can be used to process any of the new VSAM extended format data set organizations. See “VSAM extended format data set enhancements” on page 197 for more information.

Functional components enhanced

DFSMShsm

DFSMShsm function and usability improvements

Software dependencies
There are no additional software dependencies.

Hardware dependencies
There are no additional hardware dependencies.

Coexistence considerations
There are no additional coexistence considerations introduced by these enhancements.

Where to find more information

- *z/OS DFSMShsm Storage Administration Guide*
- *z/OS DFSMShsm Implementation and Customization Guide*

DFSMSrmm application programming interface

DFSMSrmm provides an application programming interface that can be used to obtain information about resources defined to DFSMSrmm. Using the DFSMSrmm API, you can read, extract, and update data in the DFSMSrmm control data set. You can use the data to create reports or implement automation.

Functional components enhanced
DFSMSrmm

Software dependencies
There are no additional software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
There are no coexistence issues.

Programming interfaces affected
These structured field introducers have been added or changed:

- CATS — CATSYSID value
- CSDT — Catalog synchronize date
- CSTM — Catalog synchronize time
- CTLG — Catalog status
- DSPD — Disposition DD name
- DSPM — Disposition message prefix
- FCSP — Catalog synchronize in progress
- KEYF — Key from
- KEYT — Key to
- LVC — Current label version
- LVN — Required label version
- TYPF — Type from
- TYPT — Type to

Where to find more information

- *z/OS DFSMSrmm Application Programming Interface*
- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Implementation and Customization Guide*

DFSMSrmm catalog status tracking

DFSMSrmm inventory management has been improved by dynamically tracking changes in catalog status of tape data sets. This removes the need to check catalog status of all recorded data sets other than on an exception basis. As long as the DFSMSrmm control data set is shared and accessible, this allows DFSMSrmm environments where catalogs are not shared. DFSMSrmm provides an option where you can identify a set of shared catalogs. Then you can run DFSMSrmm inventory management once to synchronize the set of catalogs you identified. DFSMSrmm also provides a utility you can use to synchronize DFSMSrmm with user catalogs which has the same capability to support both shared catalog or non-shared catalog environments. Run the utility periodically as a safeguard or during recovery activities.

Functional components enhanced
DFSMSrmm

Software dependencies
There are no additional software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
All systems sharing the DFSMSrmm control data set must be at the software level that supports this function before you can specify the DFSMSrmm EDGRMMxx PARMLIB member CATSYSID operand.

System interfaces affected
You must enable this function by specifying the DFSMSrmm EDGRMMxx PARMLIB member OPTION command CATSYSID option.

Programming interfaces affected
The following DFSMSrmm macros have been modified for this function: EDGSDREC and EDGACTRC.

The DFSMSrmm ISPF panels have been modified for this function.

The CATSYNCH parameter is been added to the EXEC parameters for the DFSMSrmm EDGHSKP utility.

The CATSYNCH operand has been added to the DFSMSrmm EDGUTIL utility SYSIN CONTROL statement.

The CATSYSID operand has been added for the DFSMSrmm EDGRMMxx PARMLIB member OPTION command.

Processing restrictions
When catalogs are not fully shared, you might have data sets with the same name or GDGs with the same base name that are cataloged in different, unshared catalogs. If you specify catalog retention to retain these data sets, DFSMSrmm retains these data sets without any problems. If, however, you combine cycle retention and catalog control, you can get unexpected results because DFSMSrmm does no special processing for this case. DFSMSrmm uses normal cycles processing which might retain a mix of data sets from both catalogs.

For DFSMSrmm to group cycles correctly we recommend that you use the jobname to further qualify the data sets, using a different jobname for each 'set' of cataloged data sets. For example, use JOBNAME(A) and JOBNAME(B) to differentiate between data sets created on system A and system B.

DFSMSrmm catalog status tracking

Where to find more information

- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Implementation and Customization Guide*

DFSMSrmm disposition control

DFSMSrmm now supports use of a special DD statement to point to a data set containing special handling information needed by the tape operator. This can be used to identify tapes needed for further processing or for immediate removal to a disaster recovery site. It can also be used to create sticky labels containing data set and volume information.

Functional components enhanced
DFSMSrmm

Software dependencies
There are no software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
There are no coexistence issues.

Programming interfaces affected
The DFSMSrmm EDGUX100 installation exit and parameter list has been updated with new fields.

The DFSMSrmm ISPF dialog panels have been modified for this function.

The DISPDDNAME and DISPMSGID operands have been added to the DFSMSrmm EDGRMMxx PARMLIB member OPTION command.

The EDGSLAB macro has been added to DFSMSrmm.

Other migration considerations

You might need to modify your version of the EDGUX100 installation exit to use some of the functions provided by this new function. If you plan on updating EDGUX100 to use it on older software versions, be sure to check the parameter list version number before using fields that are only present in a higher version. If you want to continue to use your current exit, you can do so without reassembling the exit if your version of the exit only validates the parameter list header name.

Where to find more information

- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Implementation and Customization Guide*

DFSMSrmm subsystem enhancements

DFSMSrmm has been enhanced to improve the handling of requests when DFSMSrmm is stopped, modified, or quiesced. When DFSMSrmm is stopped, outstanding requests are completed. When DFSMSrmm is modified or quiesced, only current requests are completed and outstanding requests are processed only after the modify or quiesce is completed.

Functional components enhanced
DFSMSrmm

Software dependencies
There are no software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
There are no coexistence issues.

Programming interfaces affected
DFSMSrmm issues WTOR EDG1107D REQUESTS WAIT TO BE PROCESSED = REPLY ″STOP″, ″QUIESCE″, ″RESTART″, OR ″M=xx″

Other migration considerations
None.

Where to find more information

- *z/OS DFSMSrmm Application Programming Interface*
- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Implementation and Customization Guide*
- *z/OS MVS System Messages, Vol 3 (ASB-BPX)*
- *z/OS MVS System Messages, Vol 4 (CBD-DMO)*
- *z/OS MVS System Messages, Vol 5 (EDG-GFS)*

DFSMSrmm TSO subcommand enhancements

DFSMSrmm provides new operands for DFSMSrmm TSO subcommands so you can change data set name and volume serial number recorded in the DFSMSrmm control data set.

Functional components enhanced
DFSMSrmm

Software dependencies
There are no software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
There are no coexistence issues.

Commands or control statements modified
The following DFSMSrmm TSO subcommands have been modified.

- CHANGEDATASET — The NEWDSNAME operand has been added so you can change the name of a data set in the DFSMSrmm control data set.
- CHANGEVOLUME — The NEWVOLUME operand has been added so you can change the volume serial number of a volume already defined in the DFSMSrmm control data set.
- SEARCHDATASET — The CHAIN operand has been added so you can search for all data set information for all physical files in the same multivolume data set.
- SEARCHVOLUME — The CHAIN operand has been added so you can search for all volumes in the same multivolume set.

DFSMSrmm TSO subcommand enhancements

Where to find more information

- *z/OS DFSMSrmm Application Programming Interface*
- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Implementation and Customization Guide*

DFSMSrmm vital record specification enhancements

The DFSMSrmm vital record specification enhancements improve the way DFSMSrmm processes the policies which control expiration and vaulting characteristics of a tape data set. These enhancements allow expiration date and vaulting specifications to be assigned through separate policies or a single policy, as the situation requires. These enhancements increase the flexibility of tape management policy definitions and simplify the migration from other solutions to DFSMSrmm.

Here is a summary of the capabilities available in the DFSMSrmm vital record specification enhancements.

- Data sets can be managed using more than one retention policy.
- All the copies of a data set created on the same day can be retained as a single cycle.
- Extra days can be defined so data sets can be retained beyond the date specified in the DFSMSrmm retention policy for the data sets.
- Volumes can remain in their current locations so that it is not necessary to know where volumes are located.
- Data sets or volumes can be managed using a combination of retention and movement policies.
- Enhanced DFSMSrmm inventory management processing allows the release of volumes and their return to scratch status in one run of inventory management by using the RELEASE(SCRATCHIMMEDIATE) operand on the RMM ADDVRS subcommand. The operand is honored for volumes that have no release actions pending other than return to scratch.
- VRS policies can control total retention for a data set by overriding the volume expiration date that is used to retain a data set when the data set is no longer VRS retained.

Functional components enhanced
DFSMSrmm

Software dependencies
None.

Hardware dependencies
None.

Coexistence considerations
A compatibility PTF is required. See APAR OW28155.

Programming interfaces affected
New messages, return codes, and reason codes have been added.

The DFSMSrmm EDGHSKP inventory management utility has been changed.

The DFSMSrmm ISPF dialog has been changed.

Commands or control statements modified

The following DFSMSrmm TSO subcommands been modified: ADDBIN, ADDDATASET, ADDRACK, ADDVOLUME, ADDVRS, DELETEBIN, DELETERACK, and SEARCHVRS.

Where to find more information

- *z/OS DFSMSrmm Application Programming Interface*
- *z/OS DFSMSrmm Diagnosis Guide*
- *z/OS DFSMSrmm Guide and Reference*
- *z/OS DFSMSrmm Implementation and Customization Guide*
- *z/OS DFSMSrmm Command Reference Summary*
- *z/OS MVS System Messages, Vol 3 (ASB-BPX)*
- *z/OS MVS System Messages, Vol 4 (CBD-DMO)*
- *z/OS MVS System Messages, Vol 5 (EDG-GFS)*

Chapter 8. Migration Overview for DFSMS/MVS V1R4

This chapter presents a migration overview of all new and expanded DFSMS functions introduced with DFSMS/MVS V1R4 (also an element of OS/390 V2R4, OS/390 V2R5, and OS/390 V2R6). Details for each functional change include the following:

- High-level description of new or expanded features
- Hardware or Software dependencies
- Coexistence considerations for multisystem environments
- General processing restrictions and other coexistence issues
- Summary of commands or interfaces affected
- Migration scenarios and guidance information for implementing the change
- References to other publications that contain supporting implementation information

Note: Most of the migration information in this chapter was taken from an earlier release of the product; therefore you will find the format is somewhat different from what you see in the chapter that describes the most current release.

Release summary of changes

Table 21 summarizes changes introduced in DFSMS/MVS V1R4.

Table 21. What was new in DFSMS/MVS V1R4, summarized by functional component

For information about:	Refer to location:
DFSMSdfp changes	
Catalog search interface	222
Distributed file manager data agents	224
IDCAMS DCOLLECT enhancements	225
Device support for IBM TotalStorage Enterprise Tape System 3590	223
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Open/close/end-of-volume tracing and problem determination aids	227
Program management binder extensions	227
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SMS-managed checkpointed data set protection	230
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DFSMSdfp OAM changes	
OAM device support for IBM 3995-Cxx optical libraries	237
Virtual Tape Server and volume stacking	236
OAM operator command changes	239
OAM move volume enhancements for tape media	238

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DFSMS/MVS V1R4 changes

Table 21. What was new in DFSMS/MVS V1R4, summarized by functional component (continued)

For information about:	Refer to location:
OAM SMF recording	240
DFSMSdss changes	
Distributed file manager data agents	224
DFSMSdss multivolume selection	241
DFSMSdss Stand-Alone Services	241
SMS-managed checkpointed data set protection	230
DFSMShsm changes	
DFSMShsm ABARS backup and recovery expanded functions	242
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DFSMShsm ABARS file stacking	245
DFSMShsm ABARS GDG base name in allocate	246
DFSMShsm ABARS 64 tasks	247
DFSMShsm control data set RLS serialization	247
DFSMShsm dump analysis elimination	249
DFSMShsm duplex tape function	250
DFSMShsm general function and usability improvements	252
Device support for IBM TotalStorage Enterprise Tape System 3590	223
SMS-managed checkpointed data set protection	230
DFSMSrmm changes	
DFSMSrmm enhancements	254
Device support for IBM TotalStorage Enterprise Tape System 3590	223

Catalog search interface

The catalog search interface provides a high speed application programming interface (API) from assembler and high-level language programs to catalog information. It is an alternative to IDCAMS LISTCAT which allows data extraction using filtering criteria of the output. The catalog search interface also provides some information that LISTCAT does not provide.

Functional components enhanced
DFSMSdfp

Software dependencies
There are no software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
The catalog search interface can be used on earlier releases by including module IGGCSI00 in the bind for the user application.

Programming interfaces affected

The catalog search interface is a general-use programming interface that can be invoked by a user application written in assembler or a high level language.

In an assembler program, the catalog search interface module IGGCSI00 can be invoked by a LINK macro, by the LOAD and CALL macros, or by a CALL statement that results in a V-type address constant.

Using a high level language, the catalog search interface can be invoked by using instructions that translate to one of the assembler language invocations described above.

Upon invocation, the user application supplies a parameter list that includes the selection criteria for locating information in the catalog. A generic filter key is used to specify either a fully-qualified name to obtain information for one entry, or a partially-qualified name to obtain multiple entries from the catalog.

Where to find more information

z/OS DFSMS: Using Data Sets
z/OS DFSMSdfp Storage Administration Reference
z/OS DFSMS: Implementing System-Managed Storage
z/OS DFSMS Access Method Services
z/OS DFSMS: Managing Catalogs
z/OS MVS System Messages, Vol 3 (ASB-BPX)
z/OS MVS System Messages, Vol 4 (CBD-DMO)
z/OS MVS System Messages, Vol 5 (EDG-GFS)
z/OS MVS JCL Reference

Device support for IBM TotalStorage Enterprise Tape System 3590

New support for the IBM TotalStorage Enterprise Tape System 3590 family of tape products includes:

- MEDIA3, the IBM High Performance Cartridge Tape
- MEDIA4, the IBM Extended High Performance Cartridge Tape.

Functional components enhanced

DFSMSdfp, DFSMShsm, DFSMSrmm

Software dependencies

There are no other Software dependencies.

Hardware dependencies

There are no hardware dependencies.

Coexistence considerations

Coexistence PTFs are required for DFSMS/MVS V1R2.

Other migration considerations

Tape drives in a tape library dataserver are defined using the HCD. A library ID defined to the ISMF Library application links the system-managed tape library definition to the tape library dataserver. The library ID is defined to HCD by specifying the LIBID and PORTID parameters for each library device. HCD help text for the LIBID and PORTID parameters explains how you can obtain the IDs.

Use the HCD to define 3590-1 devices to your system. An IPL or ACTIVATE of the resulting IODF is necessary. Changes to the LOADxx PARMLIB member are necessary if a new IODF is used.

IBM TotalStorage Enterprise Tape System 3590

You also need to update your ACS filter routines, SMS constructs, and installation exits to manage the usage of the new drives and media. Users of SVC 99 can change invocations to specify the new media type.

Where to find more information

z/OS DFSMS Installation Exits
z/OS DFSMSdfp Advanced Services
z/OS DFSMS Access Method Services
z/OS DFSMSdfp Storage Administration Reference
z/OS DFSMSdfp Utilities
z/OS DFSMS: Using Magnetic Tapes
z/OS DFSMShsm Storage Administration Guide
z/OS DFSMShsm Storage Administration Reference Summary
z/OS DFSMSrmm Guide and Reference
z/OS DFSMSrmm Implementation and Customization Guide
z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support
z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries
IBM TotalStorage Enterprise Tape Subsystem Introduction and Planning Guide

Distributed file manager data agents

The distributed file manager (DFM) provides a technique for initiating remote procedures, called data agents, from workstations that run on z/OS. These procedures can, for example, issue TSO commands, execute sorts, and perform functions not directly supported by the DFM component itself. DFM data agents allow the workstation application to execute routines that can operate on data or to execute functions such as CLISTs and REXX execs.

Functional components enhanced

DFSMSdfp, DFSMSdss

Software dependencies

The distributed file manager requires APPC/MVS and VTAM® for communicating with other systems on an SNA LU 6.2 network. RACF is required for checking the authorization of the remote systems to connect to z/OS and to access specific data sets.

Hardware dependencies

There are no hardware dependencies.

Coexistence considerations

There are no coexistence issues.

Other migration considerations

See “Distributed file manager data agents” on page 36 for postinstallation procedures required to enable the DFM data agent.

Where to find more information

z/OS DFSMS DFM Guide and Reference
z/OS DFSMS Introduction
z/OS MVS System Messages, Vol 5 (EDG-GFS)
z/OS MVS System Messages, Vol 6 (GOS-IEA)
z/OS MVS System Messages, Vol 7 (IEB-IEE)

IDCAMS DCOLLECT enhancements

IDCAMS DCOLLECT now provides the volume serial number for the volume where a data set resided before it was migrated or backed up. Only the volume serial number for the first volume of the data set is included in the DCOLLECT report.

A new parameter has also been added to the DCOLLECT command to give users a method for limiting the amount of output generated for the DCOLLECT report. The new parameter, EXCLUDEVOLUMES, allows a user to eliminate volumes identified by the STORAGEGROUP and VOLUMES parameters; these parameters can specify a set of volumes for which data is collected.

In addition, DCOLLECT reports new VSAM association information and also now reports actual device type information, if available, rather than the generic device (for example, 3380 or 3390) information.

Functional components enhanced
DFSMSdfp

Software dependencies
There are no software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
There are no coexistence issues.

IDCAMS changes
IDCAMS DCOLLECT has a new optional parameter, EXCLUDEVOLUMES to specify the volumes to be excluded from the collection.

IDCAMS DCOLLECT output provides the following new information:

- The new field, UMFRVOL, contains the first DASD volume that was the original source of a migrated data set. UBFRVOL is used for a data set that is backed up.
- VSAM Association Information (record type A) contains two new fields DCACISZ and DCACICA for control interval and control area size information.
- Volume Information (record type V) now reports the actual physical device type rather than the generic 3380/3390, which is the logical device type.
- Data Class Information (record type DC) contains a new bit DDCRABS for record access bias, and a new field, DDCRBIAS for the VSAM record access bias constant.

Where to find more information
z/OS DFSMS: Using Data Sets
z/OS DFSMSdfp Storage Administration Reference
z/OS DFSMS: Implementing System-Managed Storage
z/OS DFSMS Access Method Services
z/OS DFSMS: Managing Catalogs
z/OS MVS System Messages, Vol 5 (EDG-GFS)
z/OS MVS System Messages, Vol 6 (GOS-IEA)
z/OS MVS System Messages, Vol 7 (IEB-IEE)
z/OS MVS JCL Reference

NaviQuest

As a tool that runs under ISMF, NaviQuest can assist you in your migration to system-managed storage or it can be used to test changes to your existing SMS configuration. The NaviQuest interface is accessible from an application program or a REXX EXEC and does not require hands-on operation as ISMF does.

Running in a batch mode, NaviQuest is especially useful for extracting or updating a subset of an SMS configuration. With NaviQuest, you can perform storage management tasks such as:

- testing SMS ACS routines
- defining and altering a management class, pool storage group, or tape storage group
- adding or deleting a volume in a pool storage group

Functional components enhanced
DFSMSdfp

Software dependencies
There are no software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
There are no coexistence considerations.

Performance characteristics
Performance is dependent on the TSO/E workload of the system.

SMS changes
NaviQuest does not require any changes to SMS.

ISMF changes
NaviQuest runs under ISMF under the system administrator menu. ISMF panels are modified to support NaviQuest functions. ISMF Primary Option Menu has an option (11) for invoking NaviQuest. Data Set Selection and Volume Selection Entry Panels contain a new field 'Query Name to Save or Retrieve' to support QSAVE and QRETRIEV. ACS Test Define/Alter panel has a new field, 'Expected Result', reducing the description field to one line.

Programming interfaces affected
NaviQuest provides batch processing but does not affect any interfaces.

Other migration considerations
NaviQuest resides in the ISMF libraries.

Users who still have ISMF/E (5764-033) or NaviQuest Version 1 Release 1 (5655-ACS, FMID HACS110) need to delete it before applying this version.

Where to find more information
z/OS DFSMSdfp Diagnosis Reference
z/OS DFSMSdfp Storage Administration Reference
z/OS DFSMS Introduction
z/OS DFSMS: Implementing System-Managed Storage

Open/close/end-of-volume tracing and problem determination aids

Open/close/end-of-volume (O/C/EOV) processing has the following tracing and problem determination improvements:

- Started task for problem determination work area trace
- Problem determination trace that provides information for tape management system tape exits
- Work area extension above 16 MB line
- Problem determination trace that formats additional fields in the O/C/EOV work area and new work area extension
- Abend message that displays the name of the module that detected an error
- Message IEC813I generated when abend 213 reason code 30 is issued. When a program issues OPEN for output to a PDS with DISP=SHR.
- LOGREC record written for ATL devices whenever a 613 or 637 abend occurs
- SMF type 42 subtype 9 record written for B37/D37/E37 abends

Functional components enhanced
DFSMSdfp

Software dependencies
There are no software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
There are no coexistence issues.

Where to find more information
z/OS DFSMSdfp Diagnosis Reference
z/OS MVS System Management Facilities (SMF)
z/OS MVS System Messages, Vol 7 (IEB-IEE)
z/OS MVS System Messages, Vol 8 (IEF-IGD)

Program management binder extensions

Program management has been extended to support dynamic linking and loading and to support DLLs. Until DFSMS/MVS V1R4 and OS/390 R4, LPA only supported partitioned data sets and load modules. DFSMS now supports the inclusion of PDSEs and program objects in LPA. This support is part of the dynamic LPA function in z/OS.

The program management binder's role is to bind program sections into modules, and save them in program libraries or prepare them for immediate execution. The binder API continues to provide support for calling programs to access module data and to construct, bind, or copy modules. The binder is further enhanced to include functions provided by the LE/370 Prelinker Utility.

The binder now excepts, as input, the object text files from the C and C++ compilers. This eliminates the need for the intermediate pre-link job step between the compilation and binding of a C or C++ module when the target SYSLMOD library is a PDSE.

Program management defaults to a P03 level program object when binding into a PDSE or into an HFS file. P03 can consist of multiple text classes and associated information that supports DLL processing. On a system level lower than

DFSMS/MVS V1R4, the P02 level program object is created. This format cannot be loaded or rebound on an earlier release of DFSMS.

The program management loader has changed to include support for the deferred binding of program objects until execution. This release also provides three new program management utilities and changes to DE services to support new extensions of the DESERV interface.

Functional components enhanced
DFSMSdfp

Software dependencies
There are no additional Software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
When the program management binder stores a program object (PO) in a PDSE, it will store it using the highest program management (PM) format by default. For example, the binder running at level PM3 will store a program object using format PO3. Earlier levels of the binder and program loader do not support new PM formats.

Program objects that will be loaded on systems with earlier PM levels should either be bound on those systems or, if the new level of the binder is used, they must be bound using the COMPAT option. The COMPAT option is specified as COMPAT=xxx, where xxx is the PM level corresponding to the lowest level system on which the program object can be loaded. The PM levels are:

PM1 For DFSMS/MVS V1R1 and DFSMS/MVS V1R2

PM2 For DFSMS/MVS V1R3

PM3 For DFSMS/MVS V1R4 and above

You can specify COMPAT in these ways: By including the COMPAT parameter on the EXEC statement in JCL; by including it in the installation options for the binder; by modifying CSECT IEWBODEF in load module IEWBLINK.

During API processing for ″intent access″ a module will be saved in the same format it had on input if followed by a copy operation. During API processing for ″intent bind″ (and both libraries are PDSEs), the module will be saved as a PO3 program object unless overridden with the COMPAT option.

PO3 program objects do not support overlay format. The binder will automatically produce a PO1 version of the program object if overlay is requested and the SYSLMOD data set is a PDSE.

Programming interfaces affected
DE Services supports new extensions to the DESERV interface:

- DESERV FUNC=GET supports the SUBPOOL and AREAPTR parameters.
- DESERV FUNC=GET_ALL supports the CONCAT(ALL) parameter.

In support of these changes, the interface to the DESERV exit has changed. For information on possible updates you should make to the DESERV exit defined for your system, refer to *z/OS DFSMSdfp Advanced Services*.

Utility changes

The following utilities are added to support the new functions:

IEWTPORT Transport Utility
IEWBFDAT (Fast Data Utility)
IEWDLIST (DLL List Utility)

Where to find more information

z/OS DFSMS Program Management
z/OS DFSMSdfp Advanced Services
z/OS DFSMSdfp Storage Administration Reference
z/OS DFSMSdfp Diagnosis Reference
z/OS DFSMS: Using Data Sets
z/OS DFSMS Macro Instructions for Data Sets
z/OS MVS System Messages, Vol 7 (IEB-IEE)
z/OS MVS System Messages, Vol 8 (IEF-IGD)
z/OS MVS Diagnosis: Tools and Service Aids

Sequential access method tailored compression

Tailored compression introduces a new form of compression for sequential extended format data sets. With tailored compression, the system tries to derive a compression dictionary that is tailored specifically to the initial data written to a data set. Once a tailored dictionary is derived, it is imbedded in the compressed data set. This technique is expected to provide improved compression ratios, thereby, reducing DASD usage.

Since the dictionary is tailored to the user data, significantly more data is sampled than is done by generic compression. The process of sampling the data and building the dictionary during creation of a new data set is costly in terms of CPU cycles and is, therefore, most noticeable when compressing small data sets. For larger data sets, the cost of sampling is amortized significantly. Reuse of a tailored compressed data set saves the cost of sampling and dictionary creation. Input operations are expected to perform better than with generic compression.

Functional components enhanced

DFSMSdfp

Software dependencies

There are no software dependencies.

Hardware dependencies

There are no hardware dependencies.

Coexistence considerations

Data sets created with tailored compression are accessible only on systems with DFSMS/MVS V1R4 and later releases installed. Coexistence PTFs are required for prior releases of DFSMS/MVS to fail an attempt to access such a data set through an OPEN SVC, DFSMSdss, or DFSMShsm function.

Performance characteristics

Tailored compression should improve DASD usage.

SMS changes

A new parameter, COMPRESS(TAILORED|GENERIC) is available for the

Sequential access method tailored compression

IGDSMSxx member of SYS1.PARMLIB which allows the user to specify the form of compression the system is to use for newly created sequential extended format data sets. COMPRESS(GENERIC) refers to generic DBB based compression introduced previously. This is the default. COMPRESS(TAILORED) refers to tailored compression where the system attempts to derive a dictionary tailored specifically to the initial data written to the data set.

For a complete description of this parameter, refer to *z/OS DFSMSdfp Storage Administration Reference*.

System interfaces affected

To request tailored compression, specify the parameter COMPRESS(TAILORED) in the IGDSMSxx member of SYS1.PARMLIB. Once this member is activated, (via SET SMS=xx command or an IPL), the system will use tailored compression for newly created sequential compressed data sets.

Other migration considerations

During data set creation when tailored compression is in effect, compression services require approximately 3 MB of storage to perform dictionary creation. The majority of this storage (>2.5 MB) is released once the dictionary is created.

Where to find more information

z/OS DFSMS Access Method Services
z/OS DFSMSdfp Diagnosis Reference
z/OS DFSMS Macro Instructions for Data Sets
z/OS DFSMSdfp Storage Administration Reference
z/OS DFSMS: Using Data Sets

SMS-managed checkpointed data set protection

When an application program takes a checkpoint, the system records information about the status of that program in a checkpoint data set. This information includes the location on disk or tape where the application is currently reading or writing each open data set. If a data set that is open at the time of the checkpoint is moved to another location before the restart, you cannot restart the application from the checkpoint because the location-dependent information recorded by checkpoint/restart is no longer valid.

To ensure that all checkpointed data sets remain available for restart, the checkpoint/restart function now sets the unmovable attribute for every SMS-managed sequential data set that is open during a checkpoint. An exception is the data set containing the actual recorded checkpoint information (called the checkpoint data set), which does not require the unmovable attribute. The unmovable indicator prevents other applications and automated system functions, such as tape-mount-management or DFSMShsm migrate, from moving these data sets prematurely, in the event a restart must be performed.

You can still move checkpointed data sets when you no longer need them to perform a restart. DFSMShsm and DFSMSdss have a new keyword, FORCECP(days), that you can use with operations such as migrate, copy, or defrag to move an SMS-managed sequential data set based on a number of days since the last access. DFSMShsm recall, and DFSMSdss restore and copy operations turn off the unmovable attribute for the target data set.

Functional components enhanced
DFSMSdfp, DFSMSdss, DFSMShsm

Software dependencies
There are no additional Software dependencies.

Hardware dependencies
There are no additional Hardware dependencies.

Coexistence considerations
There are no coexistence issues related to this support.

Commands modified
DFSMSdss commands CONVERTV, COPY, DUMP, DEFRAG, RELEASE and RESTORE have a new optional keyword, FORCECP(*days*). Unless the FORCECP keyword is specified, DFSMSdss will not move SMS-managed checkpointed data sets when a storage administrator specifies these operations. When DFSMSdss does process a checkpointed data set, the unmovable indicator is removed from the target of the operation.

DFSMShsm now includes the FORCECP(*days*) keyword and parameter when invoking DFSMSdss for MIGRATION, RECALL, BACKUP, RECOVER, ABACKUP, or ARECOVER on checkpointed data sets.

Users cannot include the FORCECP keyword as part of DFSMShsm MIGRATION command syntax. Instead, a supported patch byte is used to force migration. DFSMShsm migration, including extent reduction, is delayed for a fixed number of days for checkpointed data sets. The default delay is five days. A checkpointed data set is eligible for migration when the date-last-referenced, plus the number of days the data set is to be treated as unmovable, are less than or equal to the current date. If the data set is eligible, DFSMShsm builds the command syntax for a DFSMSdss logical data set dump, including the keyword and parameter FORCECP(0).

Programming interfaces affected
A programming patch is available to enable DFSMShsm users to modify the number of days elapsed since the date-last-referenced, thus allowing a checkpointed data set to be eligible for migration.

Where to find more information
z/OS DFSMS Checkpoint/Restart
z/OS DFSMSdss Storage Administration Reference
z/OS DFSMShsm Storage Administration Guide
z/OS DFSMShsm Storage Administration Reference

SMS-managed volume space abend reduction

Users occasionally encounter data set allocation or extension failures (X37 abends) because there is not enough space available on a volume to satisfy the request. SMS alleviates this situation to some extent by performing volume selection, checking all candidate volumes before failing an allocation.

Out-of-space conditions are now further reduced for new volume processing of SMS-managed data sets. VSAM and non-VSAM data sets can now acquire up to 123 extents instead of just 5 extents on a volume. Multivolume VSAM data sets can now have a maximum of 255 extents across volumes for each component, but no more than 123 extents per volume.

Two new parameters, *SPACE CONSTRAINT RELIEF* and *REDUCE SPACE UP TO (%)*, are added to the SMS data class definition for this support.

SMS-managed volume space abend reduction

Functional components enhanced
DFSMSdfp

Software dependencies
There are no software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
Compatibility PTFs are required to accommodate the increase in the maximum number of extents for a VSAM component from 123 to 255. With these PTFs applied, lower level systems can access all 255 extents of a VSAM component created on a system that has this function.

ISMF changes
ISMF Data Class panels contain two new fields:
- Space Constraint Relief
- Reduce Space Up To (%)

IDCAMS changes
For allocations initiated by IDCAMS DEFINE or ALLOCATE, IDCAMS recognizes the new data class attributes, *SPACE CONSTRAINT RELIEF* and *REDUCE SPACE UP TO (%)*.

Processing restrictions
This support is not available for VSAM striped data sets.

Other migration considerations
Users who specify *SPACE CONSTRAINT RELIEF* in one or more data classes should note the following:
- Very large allocations that would have failed previously could succeed if a sufficiently large volume count is specified in the data class or in the JCL.
- Existing data sets could end up with less space than requested on extends due to the changes in a data class or in the active configuration.
- The space allocated for new data sets could be less than requested depending on the usage of new attributes in the data class.
- The number of extents used during initial allocation could result in fewer extensions to new volumes or even current volumes.
- Overall, there should be fewer X37 abends.

Where to find more information
z/OS DFSMSdfp Diagnosis Reference
z/OS DFSMSdfp Storage Administration Reference
z/OS DFSMS: Implementing System-Managed Storage
z/OS MVS System Messages, Vol 3 (ASB-BPX)
z/OS MVS System Messages, Vol 4 (CBD-DMO)
z/OS MVS System Messages, Vol 5 (EDG-GFS)
z/OS MVS System Messages, Vol 6 (GOS-IEA)
z/OS MVS System Messages, Vol 8 (IEF-IGD)
z/OS MVS System Messages, Vol 9 (IGF-IWM)

VSAM last-referenced date changed for close processing

The last-referenced date (LRD) for a VSAM data set can now be updated in the VTOC Format-1 DSCB DS1REFD field both at the time the data set is opened and at the time it is closed. Only the base data component of a VSAM sphere is updated.

VSAM LRD updating for close processing

Previously, the LRD for a VSAM data set was updated only at the time the data set was opened. Updating the LRD at the time the data set is closed helps to prevent the premature migration of data sets because of the elapsed time between the date the data set is opened and the date it is closed.

For open processing, the Format-1 DSCB DS1REFD field is updated if the current date (CVTDATE) is greater than the Format-1 DSCB DS1REFD date.

For close processing, the Format-1 DSCB DS1REFD field is updated if all of the following conditions are true:

- The close is the last close for the data set on all systems.
- The current date (CVTDATE) is greater than the date that the data set was opened.
- The current date (CVTDATE) is greater than the Format-1 DSCB DS1REFD date.

Functional components enhanced
DFSMSdfp

Software dependencies
There are no software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
There are no coexistence issues.

Programming interfaces affected
There are no changes to user interactions for this support.

Where to find more information
z/OS DFSMS: Using Data Sets
z/OS DFSMSdfp Storage Administration Reference
z/OS DFSMS: Implementing System-Managed Storage
z/OS DFSMS Access Method Services
z/OS DFSMS: Managing Catalogs
z/OS MVS System Messages, Vol 3 (ASB-BPX)
z/OS MVS System Messages, Vol 4 (CBD-DMO)
z/OS MVS System Messages, Vol 5 (EDG-GFS)
z/OS MVS JCL Reference

VSAM load enhancements

An improvement in load performance can be realized for extended format key-sequenced data sets (KSDS) when the data set is defined with the SPEED option and system-managed buffering is used during the load process.

The number of data buffers is optimized for load mode processing, which is sequential by nature. System-managed buffering monitors the current state of the data set and adjusts to the load mode requirements by regulating the number of buffers it uses, thereby minimizing the number of I/O operations needed.

Functional components enhanced
DFSMSdfp

Software dependencies
There are no software dependencies.

VSAM load enhancements

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
There are no coexistence issues for this support.

Other migration considerations
To take advantage of the improvements in load performance, users need to define their extended format key-sequenced data sets using SPEED on the IDCAMS DEFINE CLUSTER and specify system-managed buffering in the associated data class or in the JCL AMP parameter. See "VSAM system-managed buffering" on page 235 for more information on ways to specify system-managed buffering for the data set.

Where to find more information
z/OS DFSMS: Using Data Sets
z/OS DFSMSdfp Storage Administration Reference
z/OS DFSMS: Implementing System-Managed Storage
z/OS DFSMS Access Method Services
z/OS DFSMS: Managing Catalogs
z/OS MVS System Messages, Vol 3 (ASB-BPX)
z/OS MVS System Messages, Vol 4 (CBD-DMO)
z/OS MVS System Messages, Vol 5 (EDG-GFS)
z/OS MVS JCL Reference

VSAM LSR enhancements

VSAM local shared resources (LSR) has increased the maximum number of buffer pools from 16 (0-15) to 256 (0-255).

Functional components enhanced
DFSMSdfp

Software dependencies
There are no software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
There are no coexistence issues for this support.

Other migration considerations
The ACB, BLDVRP, DLVRP, GENCB ACB and MODCB ACB macros are changed to allow a specification of LSR pools from 0 through 255.

Where to find more information
z/OS DFSMS: Using Data Sets
z/OS DFSMSdfp Storage Administration Reference
z/OS DFSMS: Implementing System-Managed Storage
z/OS DFSMS Access Method Services
z/OS DFSMS: Managing Catalogs
z/OS MVS System Messages, Vol 3 (ASB-BPX)
z/OS MVS System Messages, Vol 4 (CBD-DMO)
z/OS MVS System Messages, Vol 5 (EDG-GFS)
z/OS MVS JCL Reference

VSAM system-managed buffering

System-managed buffering (SMB) allows VSAM to determine the optimum number of buffers as well as the type of buffer management to use for a data set. System-managed buffering is available for extended format data sets only.

For a summary of the extended format functions available for each type of VSAM data set organization see Table 11 on page 52.

Functional components enhanced
DFSMSdfp

Software dependencies
There are no software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
There are no coexistence issues.

ISMF changes
ISMF data class panels are changed to include a new data class parameter, RECORD ACCESS BIAS.

JCL changes
Several new JCL AMP parameters and subparameters are added for this support. JCL AMP specifications override any ACB or data class specifications. These parameters include:

ACCBIAS - record access bias
- USER - no change to current processing
- SYSTEM - force system-managed buffering
- SO - system-managed buffering with sequential optimization
- SW - system-managed buffering weighted for sequential processing
- DO - system-managed buffering with direct optimization
- DW - system-managed buffering weighted for direct processing

RMODE31 - virtual storage location of buffers and control blocks
- BUFF - buffers above the 16 MB line
- CB - control blocks above the 16 MB line
- ALL - control blocks and buffers above the 16 MB line
- NONE - control blocks and buffers below the 16 MB line

SMBDFR - record management PUT defer processing
SMBHWT - LSR Hiperspace weighting factor
SMBVSP - Maximum data buffer space

Other migration considerations
VSAM users who wish to take advantage of system-managed buffering for their extended format data sets will need to do the following:

- Set the Record Access Bias to *SYSTEM* in the associated data class or set up the JCL AMP ACCBIAS with one of the following subparameters: SYSTEM, SO, SW, DO, or DW.
- Ensure that the ACB MACRF on OPEN does not contain LSR, GSR, RLS, ICI, AIX, or UBF. NSR is required for the buffer management specification in the ACB (NSR is the default).
- If the Record Access Bias (or ACCBIAS) is set to SYSTEM, also set up the ACB MACRF with SEQ, DIR, or SKP, to specify how the data will be accessed. Optionally, the storage class values of BIAS and MSR can also be specified.

Where to find more information

z/OS DFSMS: Using Data Sets
z/OS DFSMSdfp Storage Administration Reference
z/OS DFSMS: Implementing System-Managed Storage
z/OS DFSMS Access Method Services
z/OS DFSMS: Managing Catalogs
z/OS MVS System Messages, Vol 3 (ASB-BPX)
z/OS MVS System Messages, Vol 4 (CBD-DMO)
z/OS MVS System Messages, Vol 5 (EDG-GFS)
z/OS MVS JCL Reference

Virtual Tape Server and volume stacking

DFSMS/MVS supports the Virtual Tape Server (VTS) in the TotalStorage Enterprise Automated Tape Library (3494). This subsystem uses virtual tape drives and virtual tape volumes that emulate 3490-type tape devices and Cartridge System Tape or Enhanced Capacity Cartridge System Tape media, or both, to the host system for processing purposes. Data is read and written as if it is stored on Cartridge System Tape or Enhanced Capacity Cartridge System Tape; however, within the subsystem it is really stored on DASD.

The virtual volumes and the data associated with them are stored in the tape-volume cache when they are being used by the host system. The tape-volume cache consists of a high performance array of DASD and control software. The tape-volume cache on the VTS enables utilization of 3590 tape technology.

When a virtual volume is moved from tape-volume cache to a 3590 cartridge, it becomes a logical volume. Physical 3590 cartridges are used for these logical volumes just to exploit the 3590 tape technology and storage capacity. To the host system, these cartridges look like Cartridge System Tape or Enhanced Capacity Cartridge System Tape media. A 3590 cartridge that contains logical volumes is referred to as a stacked volume.

As virtual volumes are moved from the tape-volume cache (becoming logical volumes), they are stacked end to end on the cartridge taking up only the number of bytes written by the host, thereby, effectively utilizing all of the storage capacity of the 3590 cartridge. The VTS stacks multiple host created volumes onto a 3590 cartridge to create a stacked volume. The 3590 volumes used in a library as stacked volumes are identified through their volume serial numbers.

When a stacked volume is inserted into a library, it becomes part of the volumes managed by the VTS and is not reported to the host as a newly inserted volume. By buffering host-created volumes, then later stacking them on a 3590 cartridge, the cartridge capacity of the 3590 technology is fully utilized.

Functional components enhanced
DFSMSdfp (OAM)

Software dependencies
There are no software dependencies.

Hardware dependencies
The Virtual Tape Server in a 3494 Automated Tape Library.

Coexistence considerations
There are no coexistence issues.

Programming interfaces affected
No program interfaces affected.

Other migration considerations
There are no migration considerations.

Where to find more information
For more information regarding volume stacking and the VTS, refer to *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries*.

OAM device support for IBM 3995-Cxx optical libraries

OAM provides additional optical device support for the new 3995-Cxx optical libraries. These libraries consist of a controller (3995-C3A) and a multifunction optical disk drive (3995-SW3—the drive used in all the C-xx model libraries). The new multifunction optical disk drive provides faster processing speed, along with the capability of handling a larger cartridge capacity than previous 3995 optical disk drives. Additionally, all 3995 media types can be read from or written to (with the exception of single-density WORM or rewritable media—read only capability) using the 3995-SW3 multifunction optical disk drive. The 3995-SW3 can also be used as an operator-accessible drive.

The new 3995 optical library models are available in a variety of slot sizes. This provides users the versatility of smaller or larger storage capacities to suit their requirements. These libraries can vary in size from 52 to 258 slots.

OAM also supports a new media that has four times the capacity of a single-density optical disk cartridge and twice the capacity of the double-density cartridges used on previous 3995 optical devices. The 3995 quad-density (2600 MB), WORM or rewritable optical disk cartridge is used in support of the new 3995 devices.

Functional components enhanced
DFSMSdfp (OAM)

Software dependencies
There are no additional Software dependencies.

Hardware dependencies
This device support is connected with the IBM 3995-Cxx series Optical Library Dataserver.

Coexistence considerations
If you are running SMS in a shared sysplex environment with other DFSMS/MVS system levels and you have 3995-Cxx models defined, you must apply PTFs to all the DFSMS/MVS systems prior to installation of this release to allow the 3995-Cxx models to have zero drives defined to SMS.

Programming interfaces affected
No programming Interfaces are affected.

Other migration considerations
Refer to *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support* for migration considerations.

Where to find more information
z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support

OAM move volume enhancements for tape media

The OAM Move Volume utility (MOVEVOL) is enhanced to include tape media. The utility is now capable of moving objects from a primary or backup source volume (a tape volume or one side of an optical disk) to one or more target volumes.

Additionally, if the source volume (either optical or tape) belongs to the OBJECT BACKUP storage group, the media type used for writing the objects is derived from the definition of the OBJECT BACKUP storage group. For example, if there is a valid SETOAM command for the OBJECT BACKUP storage group to which the source volume belongs, the target volume chosen is a tape volume. If there is no valid SETOAM command for the OBJECT BACKUP storage group belonging to the source volume, the target volume chosen is an optical disk volume.

The MOVEVOL utility can perform the following:

- Write objects using the optical drives defined in the OBJECT storage group when moving objects off a primary optical source volume.
- Write objects using the tape drives allocated to the OBJECT storage group using the tape unit name specified in the SETOAM command for the OBJECT storage group when moving objects off a primary tape source volume.
- Write objects using optical drives defined to or tape devices allocated to the OBJECT BACKUP storage group when moving objects off a backup optical or tape source volume.

Functional components enhanced
DFSMSdfp (OAM)

Software dependencies
There are no software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
There are no coexistence issues.

Other migration considerations
For media migration purposes, the following scenarios are possible:

SCENARIO	MOVE FROM	MOVE TO
Movement from one optical media type to another optical media type for migration purposes to newer technology.	12-inch WORM 12-inch WORM 5.25-inch WORM	5.25-inch WORM 5.25-inch rewritable 5.25-inch rewritable
Movement from one optical media type to the same optical media type.	5.25-inch WORM 12-inch WORM	5.25-inch WORM 12-inch WORM
Movement from one optical media type to another optical media type of older technology.	5.25-inch WORM	12-inch WORM

SCENARIO	MOVE FROM	MOVE TO
Movement from one tape media type to another tape media type.	IBM Cartridge System Tape, IBM Enhanced Capacity Cartridge System Tape, IBM High Performance Cartridge Tape, or IBM Extended High Performance Cartridge Tape	IBM Cartridge System Tape, IBM Enhanced Capacity Cartridge System Tape, IBM High Performance Cartridge Tape, or IBM Extended High Performance Cartridge Tape
Movement from any optical media type to a tape volume belonging to the OBJECT BACKUP storage group.	12-inch WORM or 5.25-inch rewritable or 5.25-inch WORM	IBM Cartridge System Tape, IBM Enhanced Capacity Cartridge System Tape, IBM High Performance Cartridge Tape, or IBM Extended High Performance Cartridge Tape
Movement from any tape media type to optical media belonging to the OBJECT BACKUP storage group.	IBM Cartridge System Tape, IBM Enhanced Capacity Cartridge System Tape, IBM High Performance Cartridge Tape, or IBM Extended High Performance Cartridge Tape	12-inch WORM or 5.25-inch rewritable or 5.25-inch WORM
Note: WORM = write-once-read-many		

Where to find more information

z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support device connectivity requirements

OAM operator command changes

There are additions and changes to the following OAM commands:

- **DUMP command:** OAM uses SVC dumps as a diagnostic tool for system hangs or performance delays to capture pertinent data areas. OAM now provides the F OAM,DUMP command to allow OAM to collect these data areas instead of operators keying in the necessary parameters after a recreate.
- **RESTART command:** Previously, OAM would restart in the event of a change to an SMS SCDS or in the activation of a new or changed SCDS into the current ACDS. This restart was done because OAM had no way to determine if the activation of the SCDS included changes to OAM configuration information. Often, these updates did not affect any work executing in the OAM address space. OAM now provides a RESTART option as a parameter on the OAM started procedure statement. This option indicates to OAM whether it should restart after a notification is received indicating that a new SCDS has been activated.
- **QUERY command:** OAM provides a QUERY command that enables system operators to query the status of active and waiting OAM requests. The F OAM,QUERY or MODIFY OAM,QUERY command can display summary or detailed information about optical, object tape, or tape library requests that are either active or waiting.
- **MODIFY UPDATE command:** The MODIFY OAM command now includes the UPDATE parameter that allows users to update specific fields in the DB2 Volume Table or the Tape Volume Table. This command provides an alternative to using SPUFI to update the DB2 row for a specific volume in the table and using STOP and START on the OAM address space before the change is reflected.
- **LIBRARY DISABLE command:** The LIBRARY DISABLE, CBRUXENT command can be used to disable cartridge entry processing on a particular system or direct tape library cartridge entry processing to a particular system.

OAM operator command changes

Functional components enhanced
DFSMSdfp (OAM)

Software dependencies
There are no software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
There are no coexistence issues.

Programming interfaces affected
New and changed commands are:
- F OAM,DUMP
- F OAM,RESTART
- F OAM,QUERY or MODIFY OAM,QUERY
- F OAM,UPDATE or MODIFY OAM,UPDATE
- LIBRARY DISABLE,*CBRUXENT*

Other migration considerations
There are no migration considerations.

Where to find more information.
z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support and
z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries.

OAM SMF recording

OAM System Management Facility (SMF) Recording allows users to collect data on OAM activities. This data can be used for:
- information system usage accounting and charge back to end user departments.
- OAM performance analysis and monitoring of systems to ensure optimum performance.
- capacity planning for procurement of additional hardware such as DASD devices and media.
- potential problem determination data.

OAM SMF Recording provides the flexibility for users to collect OAM statistical records at any specified time frame. Users can also choose to collect OAM statistics against all, a set of, one, or none of the OAM functions or activities. These functions and activities include:
- Invocations of Object Store and Retrieval (OSR) functions
- Invocations of the OAM Storage Management Component (OSMC) activities
- Optical library activities
- Object tape activities

Functional components enhanced
DFSMSdfp (OAM)

Software dependencies
There is no additional software required.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
There are no coexistence issues.

Programming interfaces affected
The OSREQ macro (OAM Application Programming Interface) is updated with a new keyword—TTOKEN for user supplied information.

Other migration considerations
There are no migration considerations.

Where to find more information
z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support
z/OS DFSMS OAM Application Programmer's Reference

DFSMSdss multivolume selection

DFSMSdss multivolume selection adds a new data set selection keyword that works with the user-supplied input volume list to control the selection of multivolume data sets during logical data set dump and copy, and during conversion to or from SMS management. It is now possible to select a multivolume data set only if its first volume is included in the input volume list. The new SELECTMULTI keyword obsoletes the current ALLMULTI keyword.

Functional components enhanced
DFSMSdss

Software dependencies
There are no additional Software dependencies.

Hardware dependencies
There are no additional Hardware dependencies.

Coexistence considerations
There are no coexistence issues for this support.

Commands modified
The DFSMSdss commands CONVERTV, COPY, and DUMP have been modified with the optional keyword SELECTMULTI(ALL | ANY | FIRST).

Where to find more information
z/OS DFSMSdss Storage Administration Reference

DFSMSdss Stand-Alone Services

The Stand-Alone Services program completely replaces the previous DFSMSdss stand-alone restore function, which was available in the early releases of DFSMS/MVS.

Stand-Alone Services is a single-purpose data recovery program that enables you to restore vital system packs during disaster recovery without relying on the operating system. Stand-Alone Services runs independently of a system environment either as a "true" stand-alone system or under a VM system.

Functional components enhanced
DFSMSdss

Software dependencies
There are no software dependencies.

Hardware dependencies
There are no hardware dependencies beyond the DFSMS/MVS requirements.

Coexistence considerations
There are no coexistence issues.

Operator commands modified
The command syntax to perform a restore with the new Stand-Alone Services is different than with the previous stand-alone restore function. Refer to *z/OS DFSMSdss Storage Administration Reference* for details.

Other migration considerations
The method to build an IPL-able core image for Stand-Alone Services is different than for the previous stand-alone restore function. Refer to *z/OS DFSMSdss Storage Administration Reference* for a complete description of the DFSMSdss Stand-Alone Services function, including a listing of supported devices and instructions for creating the IPL-able Stand-Alone Services core image.

Where to find more information
z/OS DFSMSdss Storage Administration Reference
z/OS MVS System Messages, Vol 1 (ABA-AOM).
z/OS MVS System Messages, Vol 2 (ARC-ASA).

DFSMShsm ABARS activity log deletion

The ABARS activity log deletion enhancement allows users to specify whether or not they want DFSMShsm to automatically delete the ABARS activity log during ABARS roll-off processing or EXPIREBV ABARSVERSIONS processing. When automatic deletion is specified, DFSMShsm deletes older versions of the ABARS activity log, leaving only the versions of the log that correspond to existing aggregate backup and recovery versions. The ABARS activity logs no longer need to be manually managed.

Functional components enhanced
DFSMShsm

Software dependencies
There are no additional Software dependencies.

Hardware dependencies
There are no additional Hardware dependencies.

Coexistence considerations
There are no coexistence issues.

Commands modified
The ABARSDELETEACTIVITY(Y |N) parameter has been added to the DFSMShsm SETSYS command. This parameter allows users to specify whether or not they want DFSMShsm to automatically delete the ABARS activity log during ABARS roll-off processing or EXPIREBV ABARSVERSIONS processing. The default is N, which specifies that there is no automatic deletion.

Where to find more information
z/OS DFSMShsm Storage Administration Guide
z/OS DFSMShsm Storage Administration Reference

DFSMShsm ABARS backup and recovery expanded functions

DFSMShsm is externalizing the functions of the TGTGDS parameter used by ARECOVER processing, and the OPTIMIZE parameter used by ABACKUP processing, by adding two new SETSYS parameters.

The new SETSYS ARECOVERTGTGDS(*option*) parameter provides greater flexibility managing SMS-managed generation data sets that are being restored to level 0 DASD.

The new SETSYS ABARSOPTIMIZE(*n*) parameter allows installations to adjust performance when backing up level 0 DASD data sets that are specified in an ABARS INCLUDE data set list.

Functional components enhanced
DFSMShsm

Software dependencies
There are no additional Software dependencies.

Hardware dependencies
There are no additional Hardware dependencies.

Coexistence considerations
There are no coexistence issues.

Commands modified
The new SETSYS ARECOVERTGTGDS(*option*) command allows you to select from the following options:

DEFERRED Specifies that the target data set is to be assigned the DEFERRED status.

ACTIVE Specifies that the target data set is to be assigned the ACTIVE status, for example, rolled into the GDG base.

ROLLEDOFF Specifies that the target data set is to be assigned the ROLLEDOFF status.

SOURCE Specifies that the target data set is to be assigned the same status the data set had when it was backed up.

The default option is SOURCE, which is consistent with prior releases of DFSMShsm.

Installations can override the SETSYS ARECOVERTGTGDS(*option*) specification with a new ARECOVER command parameter, ARECOVER TGTGDS(*option*). The options for ARECOVER TGTGDS are the same options as for SETSYS ARECOVERTGTGDS.

The new SETSYS ABARSOPTIMIZE(*n*) command controls what ABACKUP will specify with the OPTIMIZE parameter when invoking DFSMSdss to back up level 0 DASD data sets.

Installations can override the SETSYS ABARSOPTIMIZE(*n*) specification with a new ABACKUP parameter, OPTIMIZE(*option*).

Where to find more information
z/OS DFSMShsm Storage Administration Guide
z/OS DFSMShsm Storage Administration Reference

DFSMShsm ABARS CPU time recording

This enhancement allows ABARS to maintain the CPU time for processing ABACKUP and ARECOVER requests in the WWFSR control block. Installations can then use the reported CPU time to assist in calculating the “charge back” costs for users’ ABARS requests.

DFSMShsm ABARS CPU time recording

A WWFSR is created at the completion of each individual ABACKUP and ARECOVER request and can be written as an SMF record if requested.

The ABR record maintains an ABACKUP CPU time and an ARECOVER CPU time.

If an ARECOVER request fails and is reissued with a valid RESTART data set, the CPU time in the WWFSR only reflects the processing time of the remaining data sets. The ABR record, however, accumulates the CPU times of each restart until the recovery of the aggregate is successful.

Functional components enhanced
DFSMShsm

Software dependencies
There are no additional Software dependencies.

Hardware dependencies
There are no additional Hardware dependencies.

Coexistence considerations
There are no coexistence issues.

ISMF changes
The ISMF aggregate group definition panels allow specification of a 32-character accounting code. This accounting code is written to the WWFSR control block, ABR records, and the ABACKUP control file. It is written to the ABACKUP control file so the account code can be used at the recovery site without requiring an aggregate definition at the recovery site.

The affected ISMF aggregate group definition panels include:
- Aggregate Group Define/Alter
- Aggregate Group Display
- Aggregate Group List Display
- Aggregate Group List Sort
- Aggregate Group List View
- Aggregate Group List Print

System interfaces affected
If the installation specifies SETSYS SMF(*smfid*), then ABARS writes the WWFSR as *smfid*+1 in the SYS1.MANx or SYS1.MANy system data sets.

Where to find more information
z/OS DFSMShsm Storage Administration Guide
z/OS DFSMShsm Storage Administration Reference
z/OS DFSMShsm Diagnosis Reference

DFSMShsm ABARS extended invocation of backup error exit

ABACKUP processing has been enhanced to extend the error conditions for which the ABARS backup error installation exit (ARCBEEXT) gets control. The exit allows the user to skip a data set when various error conditions are encountered during ABACKUP. With this enhancement, the ARCBEEXT exit will gain control when DFSMSdss errors occur while dumping level 0 DASD data sets in the INCLUDE list.

The ARCBEEXT installation exit is not invoked for DFSMSdss filter errors. When DFSMSdss errors occur during DFSMSdss filter processing, ABACKUP processing now fails immediately following the error detection.

Functional components enhanced
DFSMShsm

Software dependencies
There are no additional Software dependencies.

Hardware dependencies
There are no additional Hardware dependencies.

Coexistence considerations
There are no coexistence issues.

Programming interfaces affected
The ARCBEEXT installation exit can be invoked by DFSMSdss during ABACKUP processing when DFSMSdss is dumping level 0 data sets. The interface to ARCBEEXT passes a new bit (in the flag bytes) that indicates that the exit is being invoked due to a failure during DFSMSdss processing.

To use this support, the ARCBEEXT installation exit must be activated by specifying the DFSMShsm SETSYS EXITON(BE) command before the ABACKUP command is issued.

Where to find more information
z/OS DFSMShsm Storage Administration Guide
z/OS DFSMShsm Storage Administration Reference
z/OS DFSMS Installation Exits

DFSMShsm ABARS file stacking

ABARS file stacking allows the output files from a single aggregate group to be stacked on a minimum of tape cartridges.

Functional components enhanced
DFSMShsm

Software dependencies
There are no additional Software dependencies.

Hardware dependencies
There are no additional Hardware dependencies.

Coexistence considerations
You can use ARECOVER to recover aggregate backups created by a lower-level release of DFSMS. However, a lower-level release of DFSMS/MVS can only use ARECOVER on an aggregate backup created by a system with this function only if the NOSTACK option was specified when the aggregate backup was created.

Performance characteristics
During ARECOVER processing, the control file is always the first file read. Because it must be the last file written during ABACKUP processing, the control file will always be on file sequence number four. This requires that the tape cartridge be forward-spaced to file sequence number four before the control file data can be read. With new tape technologies, such as those found on the IBM 3490E, 3590-1, and 3591 tape drives, this performance impact should be minimal.

Using the stacking option with ABACKUP minimizes the number of tape cartridges used, thus reducing the number of tape mounts and tape allocations required.

DFSMShsm ABARS file stacking

ISMF changes

The aggregate group backup and aggregate group recover ISMF panels for the aggregate group application have been changed to include several new fields, including a field for selecting the STACK or NOSTACK option. If the field is left blank, the value specified by the SETSYS ABARSTAPES command, or its default value of STACK, is used.

There are also new ISMF message help panels to support the new fields.

Commands modified

The ABARSTAPES(STACK | NOSTACK) parameters have been added to the DFSMShsm SETSYS command, with STACK being the default.

STACK and NOSTACK parameters have been added to the ABACKUP command, allowing installations to override the SETSYS ABARSTAPES command setting as needed.

STACK and NOSTACK parameters have been added to the ARECOVER DATASETNAME command so you can indicate to ARECOVER processing whether the ABACKUP output files are stacked or not. The STACK and NOSTACK parameters are not used with the ARECOVER AGGREGATE command, as it obtains the information it needs from the ABR record and catalog.

The DFSMShsm QUERY SETSYS and QUERY ABARS commands have been enhanced to display the status of the ABARSTAPES parameter in message ARC6036I.

Other migration considerations

The ARECOVER DATASETNAME command used with the NOSTACK parameter allows a lower-level system to recover ABACKUP output created on a system with this function.

If installations want to redirect the ABACKUP output file allocations using their ACS routines, they must use the NOSTACK option.

Where to find more information

z/OS DFSMShsm Storage Administration Guide
z/OS DFSMShsm Storage Administration Reference

DFSMShsm ABARS GDG base name in allocate

ABARS support has been enhanced to allow installations to specify a generation data group (GDG) base name in the ABARS ALLOCATE statement. ABARS defines the GDG base name, if one does not already exist, prior to restoring any generation data sets (GDSs) associated with the GDG. This can be done even if GDSs associated with the GDG have not been specified in the selection data set.

Functional components enhanced

DFSMShsm

Software dependencies

There are no additional Software dependencies.

Hardware dependencies

There are no additional Hardware dependencies.

Coexistence considerations

If an installation includes GDG base names in the ABARS ALLOCATE statements, and they want to recover the aggregate backups on a pre-DFSMS/MVS V1R4 system, a coexistence PTF is required.

Processing restrictions

GDG base names specified in the ALLOCATE statement have the following restrictions:

- They are only defined if they do not already exist at the recovery site.
- The DSCONFLICT parameter of the ARECOVER command does not apply to these GDG base names.
- The ARCCREXT installation exit does not get control for conflicts that occur with GDG base names in the ALLOCATE statement.
- RECOVERNEWNAMELEVEL and RECOVERNEWNAMEALL apply to these GDG base names.

Where to find more information

z/OS DFSMShsm Storage Administration Guide

DFSMShsm ABARS 64 tasks

ABARS has been enhanced to allow up to 64 concurrent ABARS address spaces. The current restrictions remain that an installation cannot simultaneously back up the same aggregate group name, or recover using the same aggregate group name or control file data set name.

Functional components enhanced

DFSMShsm

Software dependencies

There are no additional Software dependencies.

Hardware dependencies

There are no additional Hardware dependencies.

Coexistence considerations

There are no coexistence issues.

Performance characteristics

Installations should closely monitor ABARS as they increase the number of ABARS tasks running concurrently to ensure that ABARS tasks don't overutilize system resources. Some things to consider are channel path loads, data set contention, catalog contention, and contention for ML2 tape volumes.

Commands modified

The DFSMShsm SETSYS MAXABARSADDRESSSPACE(*nn*) command has been enhanced to allow the value of *nn* to range from 1 to 64, with the default remaining as 1.

Where to find more information

z/OS DFSMShsm Storage Administration Guide
z/OS DFSMShsm Storage Administration Reference

DFSMShsm control data set RLS serialization

You can now set up your DFSMShsm control data sets for access in VSAM record-level sharing (RLS) mode. This enables DFSMShsm to take advantage of the features of the coupling facility hardware for control data set access.

When RLS is used to access control data sets, they cannot be defined with key ranges. Multicluster support for the control data sets has been enhanced to enable DFSMShsm to dynamically calculate key boundaries for multicluster control data

sets. DFSMShsm continues to support keyranges for non-RLS accessed control data sets. RLS is not a requirement for using dynamic boundary multicluster control data sets.

The header for log and journal records has been changed to include a one-byte field to store the host id that generated the record. In addition to this, sequence numbers are no longer written in the record header. The sequence numbers are not required because DFSORT has an EQUALS parameter that keeps sorted records in the chronological order that they are found. This requires that all journal records be sorted by key along with the EQUALS parameter, instead of sorting by key and sequence number.

Functional components enhanced
DFSMShsm

Software dependencies
Global resource serialization or an equivalent function is required.

Hardware dependencies
To access the control data sets in RLS mode, processors must be attached to enabled coupling facility hardware.

Coexistence considerations
In multiprocessor installations where the processors are accessing the same control data sets, if one processor accesses the control data sets in RLS mode, all processors in the installation must access the control data sets in RLS mode.

DFSMShsm fails at startup if the selected control data set serialization technique of the starting DFSMShsm processor differs from the control data set serialization technique of another DFSMShsm processor already active in a multiprocessor installation.

DFSMShsm fails at startup on processors running a release prior to DFSMS/MVS V1R4 if an active processor is accessing the control data sets in RLS mode. A coexistence PTF is available for this condition.

If the DFSMShsm control data sets are set up to use dynamic-key boundary multicluster support, they cannot be accessed by processors running DFSMShsm at releases prior to DFSMS/MVS V1R4.

Performance characteristics
Accessing control data sets in RLS mode is expected to reduce contention when running primary space management and automatic backup on two or more processors. DFSMShsm benefits from the serialization and data cache features of VSAM RLS, and does not have to perform control data set VERIFY or buffer invalidation.

To maximize performance for control data set accesses, a CI size of 4K is recommended for the control data sets. A higher value should be used if the maximum record length is greater than 4K.

System interfaces affected
The startup procedure keyword CDSSHR has been enhanced by adding RLS as a parameter. When RLS is specified, the DFSMShsm control data sets are accessed in RLS mode, and any values specified for CDSQ and CDSR are ignored.

ARCIMPRT has been enhanced to recover multicluster key-boundary control data sets. A new parameter, FORCE, has been added to ARCIMPRT to assist users in performing control data set recoveries.

When using DCOLLECT to analyze the DFSMShsm control data sets, DFSMShsm first attempts to open the control data sets in RLS mode. If the control data sets are not RLS eligible, an error message is issued. This message can be ignored for non-RLS eligible data sets because the OPEN will be retried in non-RLS mode.

Commands modified

The QUERY CONTROLDATASETS command has been enhanced to display the control data set serialization technique in use, and the key ranges being used for dynamic key-boundary multicluster control data sets.

Processing restrictions

If control data set backup is invoked while the control data sets are accessed in RLS mode, DFSMSdss must be the datamover. If the backup is directed to tape, the PARALLEL parameter of the SETSYS CDSVERSIONBACKUP(BACKUPDEVICECATEGORY) must be specified.

Other migration considerations

Before control data sets can be accessed in RLS mode, they must be defined or altered to be RLS eligible. You must do this for all three of the control data sets. The control data sets must also be SMS-managed, with a storage class definition that indicates which coupling facility to use.

All operating systems running with DFSMShsm must be coupling facility capable, and the processors must have access to the coupling facility.

The control data sets cannot be defined as keyrange data sets. Control data sets previously defined as multicluster must be redefined without key ranges.

Control data sets accessed in RLS mode enqueue resources differently from control data sets accessed in non-RLS mode. In a multiprocessor environment, the resources must be propagated by using global resource serialization (GRS) or an equivalent product.

Where to find more information

z/OS DFSMShsm Storage Administration Guide
z/OS DFSMShsm Storage Administration Reference

DFSMShsm dump analysis elimination

DFSMShsm generates dumps to gather first-failure diagnostic information. Problems that occur multiple times, including on different hosts, often generate a storage dump for each occurrence. DFSMShsm supplies support to the dump analysis elimination (DAE) function, allowing that function to build a symptom string to be used in the suppression of duplicate dumps.

Functional components enhanced

DFSMShsm

Software dependencies

There are no additional software dependencies.

Hardware dependencies

There are no additional hardware dependencies.

Coexistence considerations

There are no coexistence issues for this support.

Programming interfaces affected

SETSYS SYS1DUMP must be used.

DFSMShsm dump analysis elimination

The SYS1.PARMLIB member ADYSET*xx* must be coded with the keyword SUPPRESSALL. For example:

```
DAE=START,RECORDS(400),
    SYSMDUMP(MATCH,UPDATE),
    SVCDUMP(MATCH,UPDATE,SUPPRESSALL)
```

To allow a single DAE data set to be shared by multiple systems in a parallel sysplex, and for dumps to be suppressed across multiple OS/390 systems, the coupling services of the cross system coupling facility (XCF), and global resource serialization (GRS) must be enabled.

Processing restrictions

DAE support can be used for functions that run in the DFSMShsm primary address space, and the ABARS secondary address space.

DAE does not suppress SYSABEND, SYSUDUMP, SYSMDUMP, or SNAP dumps, nor does it suppress dumps that originate from SLIP or DUMP operator commands. It also does not suppress dumps produced by the DFSMShsm TRAP command.

DFSMShsm duplex tape function

The duplex tape function provides an alternative to TAPECOPY processing for backup and migration cartridge-type tapes. Two tapes are created concurrently with one designated the original, the other the alternate. The intent is that the original tape be kept onsite, while the alternate can either be taken offsite or written to a remote tape library. The tapes labels indicate whether a tape is an original or an alternate.

The new tapes are compatible with tapes created by TAPECOPY. The TAPECOPY functions and methodology continue to be supported.

In an SMS environment, the ACS routines can direct the alternate tape to a different tape library. In a non-SMS environment, the output restrictor is used for both the original and the alternate. ACS filtering or esoteric restrictor unit names can be set up to cause the desired tape allocations to occur.

DFSMShsm selects tapes using the following selection process:

- A partial tape and its alternate are selected.
- If no partial tapes with alternates are found, an empty ADDVOLed volume with a scratch volume as an alternate are selected.
- If there are no empty ADDVOLed volumes, two scratch volumes are selected.

When problems occur that allow an original tape to be created, but prevent the alternate from being created by the duplex tape function, DFSMShsm automatically schedules internal TAPECOPY processing to ensure that valid alternate tapes exist. At either the EOV for the original volume or the end of the task, DFSMShsm runs TAPECOPY processing to create an alternate tape. If that also is unsuccessful, automatic scheduling of internal TAPECOPY processing occurs during secondary space management for migration volumes, and during automatic backup processing on the primary host for backup volumes.

As part of the automatic internal scheduling of TAPECOPY processing, a tape copy needed (TCN) record is written in the OCDS. When the automatic internal TAPECOPY completes successfully, the TCN record for the target volume is deleted.

Functional components enhanced
DFSMShsm

Software dependencies
There are no additional software dependencies.

Hardware dependencies
There are no additional hardware dependencies.

Coexistence considerations
Releases of DFSMS prior to DFSMS/MVS V1R4 must not attempt to extend an DFSMShsm backup or migration tape created in duplex. PTFs are available to prevent lower level releases from processing tapes that have duplex alternates.

Recommendations
Run comparison performance tests using the duplex tape function in one case, and using non-duplexing with TAPECOPY processing in the other case.

Programming interfaces affected
A new flag has been added to the ARCTVEXT installation exit parameter list. When an alternate tape is being replaced and returned to scratch, and if the ARCTVEXT installation exit is active, the flag indicates if the action is the result of a user-issued TAPECOPY command. This information is provided so users are aware that an alternate tape is being returned to scratch, and that the original tape is not.

Commands modified
An optional DUPLEX parameter has been added to the SETSYS command, along with the optional subparameters of BACKUP and MIGRATION.

You have the option of selecting the DUPLEX tape function:
- Not at all
- For backup volumes only
- For migration volumes only
- For both backup and migration volumes

The QUERY SETSYS command has been enhanced to display the current duplex status of migration and backup processing.

The LIST and HLIST commands have been enhanced to show duplex tape status and alternate tape volume serial numbers.

Processing restrictions
The alternate tape must have the same tape geometry as the original. For example, if the original tape is a 3490 ECCST tape, the alternate must be also. DFSMShsm also maintains the existing TAPECOPY methodology for installations with tape-drive constraints.

The duplex tape function is not supported with SETSYS TAPEUTILIZATION NOLIMIT set for the output unit being duplexed. This is because the alternate tape must match the original tape exactly, and with SETSYS TAPEUTILIZATION set to NOLIMIT this is impossible to guarantee, since the original tape could be longer than the alternate.

The duplex tape function does not support creating duplex copies of ML2 tapes during ARECOVER processing. ARECOVER processing writes a TCN record in the OCDS when recovering an ML2 volume. That causes a TAPECOPY to be submitted during the next occurrence of secondary

migration processing. The TAPECOPY is not submitted immediately because a TAPECOPY running during the recovery process might not be wanted.

Other migration considerations

When using the duplex tape function, one additional tape drive is required per writing task. Adequate numbers of drives must be available for the specified tasking level used by the duplexing DFSMShsm functions during the time periods those functions run. This also applies to the recycling of duplexed tapes.

If you are currently using the PARTIALTAPE(REUSE) option, and you are going to begin using the duplex tape function, you should consider marking the existing partial tapes as full. This can be done with the DELVOL MARKFULL command. Partial tapes without alternates are not selected for duplexing. If you mark the tapes as full, they become eligible to be recycled.

If you use duplex creation for both migration and backup and you have been auto scheduling tape copying, you probably want to remove the auto scheduling. If you are duplexing either migration or backup tapes but not both, you can auto schedule tape copies based on the type indicated in the ARC0421I message.

Where to find more information

z/OS DFSMShsm Storage Administration Guide
z/OS DFSMShsm Storage Administration Reference

DFSMShsm general function and usability improvements

This section provides a summary of the general improvements to DFSMShsm function and usability introduced in this release.

Improvements include:

- **An alter without recall function:** This function is intended to replace the function previously supplied by the HALTER exec found in ARCTOOLS. The function is invoked by an IDCAMS ALTER *entryname* command, and can be used to alter the storage class, or the management class, or both the storage and management classes for migrated data sets, without recalling the data sets.

  The new alter without recall function causes both DFSMShsm's and catalog's records to be updated and kept in synchronization. The HALTER exec was rewritten to invoke the IDCAMS ALTER command, which updates both DFSMShsm's and catalog's records.
- **Improved granularity to the AUDIT DATASETCONTROLS restart (RESUME) function:** This improvement is accomplished by saving all 44 characters of the record key.

  An AUDIT DSCTL(MIG) RESUME or an AUDIT DSCTL(BACKUP) RESUME command can continue the immediately preceding AUDIT DSCTL(MIG) or AUDIT DSCTL(BACKUP) command on the same host. The granularity of the resuming position is expanded from 27 to 44 bytes. See *z/OS DFSMShsm Storage Administration Reference* for more information.

Improvements to usability include:

- **DFSMSrmm and Optimizer no longer need be invoked through the DFSMShsm ARCTVEXT and ARCINEXT installation exits:** This allows you to use the ARCTVEXT installation exit for tape management systems other than DFSMSrmm, and releases the ARCINEXT for other uses.

If the DFSMSrmm ARCTVEXT installation exit and the ARCINEXT installation exit were used in the past for DFSMSrmm and Optimizer support only, you can turn the exits off using the DFSMShsm SETSYS EXITOFF command.

ADSM users who previously invoked the ARCTVEXT installation exit to utilize DFSMSrmm services should now invoke the new DFSMSrmm general-use programming interface EDGTVEXT.

- **Aliases for DFSMShsm keywords:** The intent in creating the following aliases is to simplify the usage of DFSMShsm commands. This change allows the term "BACKUP" to be used as an alias for BCDS, and the term "MIGRAT" to be used as an alias for MCDS on the DFSMShsm LIST and HLIST commands. This support includes the LIST LEVEL and LIST DSNAME commands. For example:

  ```
  LIST LEVEL(qualifier) BACKUP

  LIST LEVEL(datasetname) MIGRAT
  ```

  The BACKUPCONTROLDATASET and MIGRATIONCONTROLDATASET aliases that already existed will continue to be supported.

  In addition to BACKUP and MIGRAT, the abbreviation UUT can be used for USERUNITTABLE, and NOUUT for NOUSERUNITTABLE on the SETSYS command.

  For more information and examples regarding these aliases, see *z/OS DFSMShsm Managing Your Own Data* and *z/OS DFSMShsm Storage Administration Reference*.

- **Four new FSR types have been created:** This enhancement causes type 6 FSR records only to be written for user-requested, migrated data set deletions. The two records being converted from a type 6 to a type 17 are:
  – Expire data set from ML1
  – Expire data set from ML2

  The four new FSR types are:

  Type 17 Expire data set, which categorizes the data set being expired as being from a level 0, ML1, or ML2 volume. It also indicates if the data set is being deleted by its expiration date in the catalog or by the management class attributes, rather than by automatic deletion.

  Type 18 Partial release data set on Level 0 DASD

  Type 19 Expire incremental backup version, which indicates if the incremental backup version is being deleted by the EXPIREBV command, and if it's on a tape volume.

  Type 20 Delete incremental backup version, which indicates if the incremental backup version being deleted is on a tape volume.

  The following four new FSR records have been created:
  – Expire data set from L0 DASD, ML1, and ML2 volumes
  – Partial release data set on L0 DASD
  – Expire incremental backup version
  – Delete incremental backup version

- **DCOLLECT has been enhanced:** The enhancement enables DCOLLECT to provide the volume serial number from which the source is obtained for migration and backup processing. The volume serial number is for the first volume of the data set. The sizes of both record types M and B have been increased to accommodate the enhancement.

DFSMShsm general function and usability improvements

Functional components enhanced
DFSMShsm

Software dependencies
There are no software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations
There are no coexistence issues.

Where to find more information
z/OS DFSMShsm Storage Administration Guide
z/OS DFSMShsm Storage Administration Reference

DFSMSrmm enhancements

DFSMSrmm enhancements include:

- Improvements to DFSMSrmm inventory management vital records processing so vital record information is maintained for data sets even when they are no longer managed by a vital record specification
- Trial run vital record processing to see the effect of movement and retention policies on data sets and volumes before actually making changes to the DFSMSrmm control data set
- The new DFSMSrmm EDGTVEXT programming interface is provided as DFSMSrmm no longer provides its own version of the ARCTVEXT exit. EDGTVEXT as well as the existing EDGDFHSM programming interface can be used by products like DFSMShsm and ADSM for DFSMSrmm tape management support. DFSMShsm automatically calls EDGTVEXT so you no longer need to use ARCTVEXT to communicate with DFSMSrmm.
- The problem determination aid (PDA) trace facility is added to DFSMSrmm so that diagnostic information can be gathered at entry and exit points in the DFSMSrmm modules. The purpose of the trace is to gather sufficient information for problem analysis. The PDA trace is active by default.
- The DFSMSrmm EDGUX100 installation exit can be used to control recording of data sets on a volume. Use EDGUX100 to suppress recording for file 2 for certain volumes.
- DFSMSrmm TSO subcommands are enhanced to support search and change for ABEND and OPEN operands.
- ABEND and OPEN vital record specifications have been enhanced to support the use of JOBNAME.
- DFSMSrmm TSO CHANGEVOLUME PREVVOL subcommand can be used for all private volumes.
- DFSMSrmm recognizes DFSMShsm tape requests and allows input processing of volumes as long as the last 17 characters of the data set match the data set name that DFSMSrmm recorded.

Functional components enhanced
DFSMSrmm

Software dependencies
There are no software dependencies.

Hardware dependencies
There are no hardware dependencies.

Coexistence considerations

There are no coexistence issues.

Performance characteristics

There are no additional performance characteristics.

Programming interfaces affected

New general-use programming interface: EDGTVEXT

Where to find more information

z/OS DFSMSrmm Diagnosis Guide
z/OS DFSMSrmm Guide and Reference
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Chapter 9. Summary of DFSMSdfp Interface Changes

This chapter summarizes new and changed interfaces, commands, and panels for DFSMSdfp. It covers DFSMSdfp interfaces that were updated since DFSMS/MVS V1R5. It also includes changes resulting from service updates and small programming enhancements that followed DFSMS/MVS V1R5.

Access method services

Table 22 lists new and changed access method services (IDCAMS) commands and report types. See *z/OS DFSMS Access Method Services* for more specific information about these commands.

Table 22. DFSMSdfp: Summary of changed IDCAMS commands

Command Name	Release	Description	Related Support
ALTER	OS/390 V2R10	**New:** FRLOG=NONE|REDO	See the AMP JCL parameter in the *z/OS MVS JCL Reference* and the *CICS VSAM Recovery V3R1 Implementation Guide*.
	z/OS V1R3	**Changed:** REUSE You can now use the REUSE parameter for existing VSAM striped data sets.	None.
CREATE VOLUMEENTRY	OS/390 V2R10	**New:** RECORDING (256TRACK)	"Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
DEFINE CLUSTER	z/OS V1R3	DFSMS now ignores ORDERED and KEYRANGES parameters	"VSAM large real storage" on page 80
	z/OS V1R3	**Changed:** REUSE You can now use the REUSE parameter for new VSAM striped data sets.	None.
	OS/390 V2R10	**New:** FRLOG=NONE|REDO	See the AMP JCL parameter in the *z/OS MVS JCL Reference* and the *CICS VSAM Recovery V3R1 Implementation Guide*.
LISTCAT	OS/390 V2R10	Updates to reports: LISTCAT output displays a recording value of 256TRACK.	"Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
LISTDATA	OS/390 V2R10	Updates to reports: SUBSYSTEMS COUNTERS and RAID RANK COUNTERS now include the RAID RANK ID of the logical volume.	"Device support for IBM 2105 Enterprise Storage Server" on page 109

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Callable services

Table 23 lists changes to callable services. See *z/OS DFSMSdfp Advanced Services* for more specific information about these callable services.

Table 23. DFSMSdfp: Summary of changed callable services

Callable Service Name	Release	Description	Related Support
IGWASYS	OS/390 V2R10	**New**: A value of 2 for *system_level* represents OS/390 Version 2.	OS/390 V2R10 base
IGWASYS	z/OS V1R3	**New**: A value of 3 for *system_level* represents z/OS Version 1 Release 3.	z/OS V1R3 base

Commands

Table 24 lists new and changed system-level commands related to DFSMSdfp support. See *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support* and *z/OS MVS System Commands* for more specific information about OAM commands.

Table 24. DFSMSdfp: Summary of new and changed system-level commands

Command Name	Release	Description	Related Support
DEVSERV	OS/390 V2R10	Updated to include software and hardware configuration information.	“Device support for IBM 2105 Enterprise Storage Server” on page 109
DEVSERV QPAV	OS/390 V2R10	Updated to include software and hardware configuration information.	“Device support for IBM 2105 Enterprise Storage Server” on page 109
MODIFY OAM,DISPLAY, SETOSMC	z/OS V1R3	**New:** Displays the current settings for the SETOSMC statement.	“OAM multiple object backup” on page 85 and *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*
MODIFY OAM,DISPLAY, LOSTVOL	z/OS V1R3	**New:** Displays the optical and tape volumes that have LOSTFLAG set.	“OAM multiple object backup” on page 85 and *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*
MODIFY OAM,START,AB	z/OS V1R3	Updated to allow you to specify which backup copy is to be accessed.	“OAM multiple object backup” on page 85 and *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*
MODIFY OAM,START,OBJRECV	z/OS V1R3	Updated to allow you to specify which backup copy is to be used to recover the primary copy of an object.	“OAM multiple object backup” on page 85 and *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*

Table 24. DFSMSdfp: Summary of new and changed system-level commands (continued)

Command Name	Release	Description	Related Support
MODIFY OAM,START, RECOVERY	z/OS V1R3	Updated to recover all of the objects on a volume belonging to an Object storage group, and to allow specification of which backup copy to use to recover objects on a primary volume.	"OAM multiple object backup" on page 85 and *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*
DISPLAY SMS,OAM	z/OS V1R3	Updated to show which backup copy is being used by automatic access to backup processing.	"OAM multiple object backup" on page 85 and *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*
DISPLAY SMS,OSMC, TASK(*task-name*)	z/OS V1R3	Updated to show progress of second backup copy writes for the specified Object or Object Backup storage group.	"OAM multiple object backup" on page 85 and *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*
DISPLAY SMS, STORGRP(*group-name*),DETAIL	z/OS V1R3	Updated to provide detailed information for Object and Object Backup storage groups.	"OAM multiple object backup" on page 85 and *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*
DISPLAY SMS,SMSVSAM	z/OS V1R3	Updated to show the CF caching level for a single system in the sysplex.	"RLS coupling facility caching enhancements" on page 73
DISPLAY SMS,SMSVSAM,ALL	z/OS V1R3	Updated to show the CF caching level for the entire sysplex.	"RLS coupling facility caching enhancements" on page 73
DISPLAY SMS,CFCACHE	z/OS V1R3	**New:** Displays information about CF cache structures.	"RLS coupling facility caching enhancements" on page 73
DISPLAY SMS,VOLUME	z/OS V1R3	Updated to show backup volume type.	"OAM multiple object backup" on page 85 and *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*
SETSMS	z/OS V1R3	**New:** RLS_MaxCfFeatureLevel Specifies the method that VSAM RLS uses to determine the size of the data that is placed in the CF cache structure.	"RLS coupling facility caching enhancements" on page 73
SETXCF START,REBUILD, DUPLEX(MVS)	z/OS V1R3	Starts the duplexing rebuild for the VSAM RLS lock structure.	"RLS lock table CF duplexing" on page 75
SETXCF STOP,REBUILD, DUPLEX(MVS)	z/OS V1R3	Stops the duplexing rebuild for the VSAM RLS lock structure.	"RLS lock table CF duplexing" on page 75

Table 24. DFSMSdfp: Summary of new and changed system-level commands (continued)

Command Name	Release	Description	Related Support
VARY SMS	z/OS V1R3	**New: CFCACHE** Alters the state of the specified CF cache structure.	*z/OS DFSMSdfp Storage Administration Reference*
	z/OS V1R3	**New: CFVOL** Alters the state of the specified volume for all CF cache structures.	*z/OS DFSMSdfp Storage Administration Reference*
	z/OS V1R3	**New: FALLBACK** Completes the VSAM RLS fallback procedure.	*z/OS DFSMSdfp Storage Administration Reference*
	z/OS V1R3	**New: SHCDS** Adds a new, active shared control data set.	*z/OS DFSMSdfp Storage Administration Reference*
	z/OS V1R3	**New: SHCDS CFRESET** Resets RLS indicators in all applicable catalogs.	*z/OS MVS System Commands*
	z/OS V1R3	**New: SMSVSAM** Restarts the SMSVSAM server.	*z/OS DFSMSdfp Storage Administration Reference*

Data areas

Table 25 lists new and changed data areas. For more information about using DFSMSdfp data areas, see the *z/OS DFSMSdfp Diagnosis Guide*.

Table 25. DFSMSdfp: Summary of new and changed data areas

Data Area Name	Release	Description	Related Support
BDW	OS/390 V2R10	Expanded block size field to 4 bytes.	“Large tape block size support” on page 118

Exits

Table 26 lists the changes to DFSMSdfp exits and Table 27 on page 263 lists the changes for exit parameter list mapping macros. For more exit information, refer to *z/OS DFSMS Installation Exits*.

Table 26. DFSMSdfp: Summary of changed exits

Exit Name	Release	Description	Related Support
Cartridge Eject Installation Exit (CBRUXEJC) Parameter List (CBRUXJPL)	OS/390 V2R10	Constants to define tape recording technology updated to include 256-track device.	“Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x” on page 112
Cartridge Entry Installation Exit (CBRUXENT) Parameter List (CBRUXEPL)	OS/390 V2R10	Constants to define tape recording technology updated to include 256-track device.	“Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x” on page 112

Table 26. DFSMSdfp: Summary of changed exits (continued)

Exit Name	Release	Description	Related Support
Change Use Attribute Installation Exit (CBRUXCUA) Parameter List (CBRUXCPL)	OS/390 V2R10	Constants to define recording technology updated to include 256-track device.	"Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
DCB ABEND (IFG0199I)	OS/390 V2R10	Modified to store the tape block size value in DCBEBLKSI instead of DCBBLKSI when DCBESLBI is set on.	"Large tape block size support" on page 118
DCB OPEN (IFG0EX0B)	OS/390 V2R10	Modified to store the tape block size value in DCBEBLKSI instead of DCBBLKSI when DCBESLBI is set on.	"Large tape block size support" on page 118
Volume Not in Library Installation Exit (CBRUXVNL) Parameter List (CBRUXNPL)	OS/390 V2R10	Constants to define tape recording technology updated to include 256-track device.	"Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112

Table 27. DFSMSdfp: Summary of changed mapping macros

Macro Name	Release	Description	Related Support
CBRIQEL Mapping Macro Syntax, Version 5	z/OS V1R3	A secondary backup retrieval order key, QELQB2OK, has been added to this macro to support multiple object backup.	"OAM multiple object backup" on page 85 and *z/OS DFSMS OAM Application Programmer's Reference*
IFGTEP	OS/390 V2R10	**New:** Fields and flags for tape management exit parameter lists: • Installation Exit Main Parameter List: TEPMRECTK, TEPMMEDT, TEPMCAPM, TEPMCAPP, TEPMATL, TEPMMTL • Installation Exit File End on Volume Parameter List: TEPETBLK, TEPEPARP • Installation Exit File Start on Volume Parameter List: TEPSPARP • Installation Exit File Validation Parameter List: TEPVNINDEX • Installation Exit Volume Mount Parameter List: TEPONINDEX	"Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112; "Manual tape library support" on page 125
IHADFA	z/OS V1R3	**New:** A value of 3 in the first byte of the DFARELS field represents z/OS.	

ISMF panels

Table 28 lists changes to ISMF panels. For more information about these panels, see *z/OS DFSMSdfp Storage Administration Reference* and *z/OS DFSMS: Using the Interactive Storage Management Facility*.

Table 28. DFSMSdfp: Summary of new and changed ISMF panels

Panel and Application Name	Release	Description	Related Support
Automatic Class Selection Test Case Define/Alter Panel	OS/390 V2R10	**New:** Block Size Value	"Large tape block size support" on page 118
ISMF Data Class Define/Alter Panel	OS/390 V2R10	**New:** Recording technology modified to include 256TRACK as a valid value.	"Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
	OS/390 V2R10	**New:** Block Size Limit	"Large tape block size support" on page 118
	z/OS V1R3	**New:** Dynamic Volume Count	"Dynamic volume count" on page 66
	z/OS V1R3	**New:** • RLSCFCACHE ALL • RLSCFCACHE UPDATESONLY • RLSCFCACHE NONE	"RLS coupling facility caching enhancements" on page 73
Mountable Tape Volume List Panel	OS/390 V2R10	**New:** Recording Technology modified to include 256TRACK as a valid value.	"Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112

JCL statements

Table 29 lists changes to JCL statement parameters. See the *z/OS MVS JCL Reference* for more specific information about these statements.

Table 29. DFSMSdfp: Summary of changed JCL statements

JCL Statement	Release	Description	Related Support
DD	OS/390 V2R10	**New:** BLKSZLIM BLKSIZE allows larger values and supports nK, nM, and nG.	"Large tape block size support" on page 118
	z/OS V1R3	**New:** FRLOG=NONE|REDO Enables or disables VSAM batch logging for a VSAM data set.	*z/OS MVS JCL Reference* and the *CICS VSAM Recovery V3R1 Implementation Guide*
SMS	z/OS V1R3	**New:** RLSTMOUT Specifies the maximum time, in seconds, that a VSAM record-level sharing (RLS) request must wait for a required lock before the request is assumed to be in deadlock.	*z/OS MVS JCL Reference* and *z/OS DFSMSdfp Storage Administration Reference*

Macros

Table 30 lists new and changed executable macros.

Table 30. DFSMSdfp: Summary of changed executable macros

Macro Name	Release	Description	Related Support
CBRXLCS CUA Assembler Macro Syntax	OS/390 V2R10	**New:** The DEVTYPE parameter has been modified to include 256TRACK recording technology.	"Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112 and *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries*
CBRXLCS PTPDATA Assembler Macro Syntax	z/OS V1R3	New functionality has been added to this interface to obtain operational mode settings and device-related information from the Peer-to-Peer VTS library (reference APAR OW49900). **Note:** The new CBRXLCS functions will be available on DFSMS/MVS V1R5 and above, with DFSMS/MVS V1R5 and OS/390 V2R10 requiring PTFs.	*z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries*
CBRXLCS PTPMC Assembler Macro Syntax	z/OS V1R3	New functionality has been added to this interface to enable operating modes of the Peer-to-Peer VTS library to be changed (reference APAR OW49900). **Note:** The new CBRXLCS functions will be available on DFSMS/MVS V1R5 and above, with DFSMS/MVS V1R5 and OS/390 V2R10 requiring PTFs.	*z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries*
DCBE	OS/390 V2R10	**New:** BLKSIZE keyword	"Large tape block size support" on page 118 and *z/OS DFSMS Macro Instructions for Data Sets*
	z/OS V1R3 and PTFs on OS/390 V2R10 and DFSMS/MVS V1R5	**New:** CAPACITYMODE keyword to allow programs to read and write tapes that have more than 4 megablocks on a 3590 that is emulating a 3490E. **New:** SYNC keyword and bits to request tape mark buffering. This is available on the IBM 3590 tape drive. It improves performance when writing, especially when writing many data sets on one volume.	"Capacity utilization and performance enhancements" on page 59 and *z/OS DFSMS Macro Instructions for Data Sets*
GENCB	z/OS V1R3	**Changed:** RLSREAD=CRE description. EXLIST subparameter JRNAD not supported.	*z/OS DFSMS Macro Instructions for Data Sets*

DFSMSdfp interface changes

Table 30. DFSMSdfp: Summary of changed executable macros (continued)

Macro Name	Release	Description	Related Support
MSGDISP	OS/390 V2R10	**New:** INDEX	"Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
MSGDISP	OS/390 V2R10	**New:** MEDIATYPE	"Manual tape library support" on page 125
OSREQ Application Program Interface	z/OS V1R3	The RETRIEVE function has been modified to include an additional value for the VIEW parameter: VIEW=BACKUP2. This modification supports multiple object backup.	"OAM multiple object backup" on page 85 and *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*
RDJFCB	OS/390 V2R10	Returns large block size and block size limit.	"Large tape block size support" on page 118

Messages

For a listing of all new and changed DFSMSdfp messages and return codes, refer to *z/OS Summary of Message Changes*.

SMF and LOGREC records

Table 31 lists changes to SMF records used by DFSMS. For more detailed SMF information, refer to *z/OS MVS System Management Facilities (SMF)*. For more LOGREC information, see the *z/OS MVS Diagnosis: Reference*. For information on the SMF Type 85 records, refer to *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*. For information on other SMF Type records, refer to *z/OS MVS System Management Facilities (SMF)*.

Table 31. DFSMSdfp: Summary of new and changed SMF records

Event Code or Record Type	Release	Description	Related Support
LOGREC Type MDR	OS/390 V2R10	Expanded block size field to 4 bytes.	"Large tape block size support" on page 118
LOGREC Type OBR	OS/390 V2R10	Expanded block size field to 4 bytes.	"Large tape block size support" on page 118
SMF Type 14	OS/390 V2R10	Expanded block size field to 4 bytes.	"Large tape block size support" on page 118
SMF Type 15	OS/390 V2R10	Expanded block size field to 4 bytes.	"Large tape block size support" on page 118
SMF Type 21	OS/390 V2R10	Expanded block size field to 4 bytes.	"Large tape block size support" on page 118
SMF Type 30	OS/390 V2R10	Expanded block size field to 4 bytes.	"Large tape block size support" on page 118
SMF Type 42, Subtype 10	z/OS V1R3	**New:** Written when data set allocation fails because of insufficient space.	"SMS miscellaneous enhancements" on page 77

Table 31. DFSMSdfp: Summary of new and changed SMF records (continued)

Event Code or Record Type	Release	Description	Related Support
SMF Type 42, Subtype 15	z/OS V1R3	Storage class summary record: Added a new field to indicate that >4 KB caching is active.	"RLS coupling facility caching enhancements" on page 73
SMF Type 42, Subtype 16	z/OS V1R3	Data set summary record: Added new fields to indicate the following: • SMS data class value • RLSCFCACHE value (ALL, NONE, or UPDATESONLY) • Whether >4 KB caching is active	"RLS coupling facility caching enhancements" on page 73
SMF Type 85, Subtype 3	z/OS V1R3	Added a new indicator in the processing flags section to show that VIEW=BACKUP2 was specified.	"OAM multiple object backup" on page 85
SMF Type 85, Subtype 6	z/OS V1R3	Changed two indicators in the processing flags section to show deletion of the first backup copy of an object. Added two new indicators in the processing flags section to show deletion of the second backup copy of an object.	"OAM multiple object backup" on page 85
SMF Type 85, Subtype 32	z/OS V1R3	Added 12 new fields to support the second backup copy of an object data. Added two new SMF flags.	"OAM multiple object backup" on page 85
SMF Type 85, Subtype 33	z/OS V1R3	Added 12 new fields to support the second backup copy of an object data. Added two new SMF flags.	"OAM multiple object backup" on page 85
SMF Type 85, Subtype 34	z/OS V1R3	Added 12 new fields to support the second backup copy of an object data. Added two new SMF flags.	"OAM multiple object backup" on page 85
SMF Type 85, Subtype 35	z/OS V1R3	Added 12 new fields to support the second backup copy of an object data. Added two new SMF flags.	"OAM multiple object backup" on page 85
SMF Type 85, Subtype 36	z/OS V1R3	Added two new SMF flags.	"OAM multiple object backup" on page 85

SMS ACS read-only variables

Table 32 lists changes to read-only variables used by SMS ACS routines. See the *z/OS DFSMSdfp Storage Administration Reference* for more specific information about these variables.

Table 32. DFSMSdfp: Summary of changed ACS read-only variables

ACS Variable	Release	Description	Related Support
&BLKSIZE	OS/390 V2R10	**New:** Variable	"Large tape block size support" on page 118

Table 32. DFSMSdfp: Summary of changed ACS read-only variables (continued)

ACS Variable	Release	Description	Related Support
&UNIT		**New:** Values: • AFF=SMSD • AFF=SMST • AFF=NSMSS	"Unit affinity support" on page 139

SYS1.PARMLIB members

Table 33 identifies changes to the DFSMS members of SYS1.PARMLIB. See the *z/OS MVS Initialization and Tuning Reference* for more information about these members. Refer to *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support* for information on the changes to the CBROAM*xx* member of PARMLIB.

Table 33. DFSMSdfp: Summary of changes to SYS1.PARMLIB

Member Name	Release	Description	Related Support
CBROAM*xx*	z/OS V1R3	Added the SETOSMC statement to support multiple object backup.	"OAM multiple object backup" on page 85
DEVSUP*xx*	OS/390 V2R10	**New:** • TAPEBLKSZLIM • COPYSDB	"Large tape block size support" on page 118
IGDSMS*xx*	z/OS V1R3	**New:** • RLSTMOUT • RLS_MaxCfFeatureLevel (valid values are **A** or **z**)	"RLS coupling facility caching enhancements" on page 73 and *z/OS MVS Setting Up a Sysplex*
LOAD*xx*	OS/390 V2R10	**New:** MTLSHARE	"Manual tape library support" on page 125

TSO Commands

Table 34 lists new and changed TSO commands for Advanced Copy Services.

Table 34. DFSMSdfp: Summary of changes to TSO commands

Command Name	Release	Description	Related Support
XADVANCE	z/OS V1R3	Used for updating secondary volumes in an XRC session to a time that is consistent with volumes in other sessions that are coupled to the master session.	*z/OS DFSMS Advanced Copy Services*
XCOUPLE	z/OS V1R3	Used for adding or deleting XRC sessions from a master session.	*z/OS DFSMS Advanced Copy Services*
XQUERY MASTER	z/OS V1R3	Updated to display information about coupled XRC sessions.	*z/OS DFSMS Advanced Copy Services*

Utilities

Table 35 identifies changes to the DFSMS members of SYS1.PARMLIB. For detailed information about DFSMS utilities, refer to *z/OS DFSMS Utilities*.

Table 35. DFSMSdfp: Summary of changes to utilities

Utility Name	Release	Description	Related Support
IEBGENER	OS/390 V2R10	**New:** SDB keyword in PARM field value.	“Large tape block size support” on page 118

Chapter 10. Summary of DFSMSdss Interface Changes

This chapter summarizes new and changed interfaces and commands for DFSMSdss. It covers DFSMSdss interfaces that were updated since DFSMS/MVS V1R5. It also includes changes resulting from service updates and small programming enhancements that followed DFSMSdss z/OS V1R1.

Commands

Table 36 lists new and changed commands. Refer to the *z/OS DFSMSdss Storage Administration Reference* for more specific command information.

Table 36. DFSMSdss: Summary of changed commands

Command name	Release	Description	Related Support
COPY	z/OS V1R3	The following optional parameters have been added: • DUMPCONDITIONING	APAR OW48234 APAR OW45674
COPY	z/OS V1R3	COPY command can process HFS data sets	HFS Logical Copy PFS
FCNOCOPY	z/OS V1R3	FCNOCOPY on the DUMP command prevents the ESS subsystem from performing a physical copy of the data.	APAR OW50446 *z/OS DFSMSdss Storage Administration Reference*
FCWITHDRAW	z/OS V1R3	FCWITHDRAW on the DUMP command causes DFSMSdss to withdraw the FlashCopy relationship.	APAR OW50446 *z/OS DFSMSdss Storage Administration Reference*

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Chapter 11. Summary of DFSMShsm Interface Changes

This chapter summarizes new and changed interfaces, commands, and panels for DFSMShsm. It covers DFSMShsm interfaces that were updated since DFSMS/MVS V1R5. It also includes changes resulting from service updates and small programming enhancements that followed DFSMS/MVS V1R5.

Commands

Table 37 lists new and changed commands. See the *z/OS DFSMShsm Storage Administration Reference* for more specific information about these commands.

Table 37. DFSMShsm: Summary of changed commands

Command Name	Release	Description	Related Support
ABACKUP	OS/390 V2R10	The following optional parameters have been added: • LIST(SKIPPED) • SKIP(PPRC | NOPPRC) • SKIP(XRC | NOXRC)	APAR OW37976
AUDIT	z/OS V1R3	COMMONQUEUE has been added as an optional parameter.	“DFSMShsm common recall queue” on page 91
BACKDS	OS/390 V2R10	The following optional parameters have been added: • TARGET(DASD | TAPE) • CC(PREFERRED | STANDARD | REQUIRED) • CC(LOGICALEND | PHYSICALEND)	“DFSMShsm data set backup enhancements” on page 149
DEFINE	OS/390 V2R10	The following optional parameters have been added: • SWITCHTAPES(DSBACKUP) • TIME | AUTOBACKUPEND and PARTIALTAPE are optional subparameters of the DSBACKUP parameter • SETSYS | REUSE | MARKFULL are subparameters of the PARTIALTAPE parameter	“DFSMShsm data set backup enhancements” on page 149
HOLD	OS/390 V2R10	DSCOMMAND(DASD | TAPE | SWITCHTAPES) have been added as an optional subparameter of the BACKUP parameter	“DFSMShsm data set backup enhancements” on page 149
	z/OS V1R3	COMMONQUEUE has been added as an optional parameter.	“DFSMShsm common recall queue” on page 91
LIST	z/OS V1R3	CAPACITYMODE(COMPATIBILITY | EXTENDED) has been added as an optional subparameter of the TTOC SELECT parameter.	“Capacity utilization and performance enhancements” on page 59
QUERY	z/OS V1R3	COMMONQUEUE has been added as an optional parameter.	“DFSMShsm common recall queue” on page 91

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DFSMShsm interface changes

Table 37. DFSMShsm: Summary of changed commands (continued)

Command Name	Release	Description	Related Support
RELEASE	OS/390 V2R10	DSCOMMAND(DASD | TAPE) has been added as an optional subparameter of the BACKUP parameter.	"DFSMShsm data set backup enhancements" on page 149
	z/OS V1R3	COMMONQUEUE has been added as an optional parameter.	"DFSMShsm common recall queue" on page 91
SETSYS	OS/390 V2R10	The following optional parameters have been added: • A third subparameter, *reconnectdays*, has been added to the MIGRATIONCLEANUPDAYS parameter • DSBACKUP has been added. DASDSELECTIONSIZE, DASD, and TAPE are optional subparameters of DSBACKUP. TASKS is an optional subparameter of the DASD parameter. DEMOUNTDELAY(MINUTES MAXIDLETASKS) and TASKS are optional subparameters of the TAPE parameter. • TAPEMIGRATION(RECONNECT (ALL | ML2DIRECTEDONLY | NONE)) • ABARSKIP(PPRC | NOPPRC) • ABARSKIP(XRC | NOXRC)	• "DFSMShsm fast subsequent migration" on page 153 • "DFSMShsm data set backup enhancements" on page 149 • APAR OW37976
	z/OS V1R3	COMMONQUEUE has been added as an optional parameter.	"DFSMShsm common recall queue" on page 91
		CAPACITYMODE(COMPATIBILITY | EXTENDED) has been added as an optional subparameter of the TAPEUTILIZATION parameter.	"Capacity utilization and performance enhancements" on page 59

Keywords

Table 38 lists new and changed keywords for the DFSMShsm startup procedure. See the *z/OS DFSMShsm Implementation and Customization Guide* for more specific information about these keywords.

Table 38. DFSMShsm: Summary of changed keywords

Keyword	Release	Description	Related Support
HOSTMODE	OS/390 V2R10	You can specify either MAIN or AUX as values for the HOSTMODE keyword.	"DFSMShsm multiple address spaces" on page 160
PRIMARY	OS/390 V2R10	You can specify either YES or NO as values for the PRIMARY keyword.	"DFSMShsm multiple address spaces" on page 160

Data areas

Table 39 lists new and changed data areas. For more information about DFSMShsm data areas, see the *z/OS DFSMShsm Diagnosis Reference*.

Table 39. DFSMShsm: Summary of new and changed data areas

Data Area Name	Release	Description	Related Support
ARCFSR	z/OS V1R3	• New - FSR_ORGNL_HID • New - FSRF_REMOTE_HOST_PROCESSED	"DFSMShsm common recall queue" on page 91
ARCMCD	OS/390 V2R10	• New - MCD_VRM • Changed - MCDRV	"DFSMShsm tracing improvements and release identifier change" on page 157
ARCMCVT	OS/390 V2R10	• New - MCVT_VRM • Changed - MCVTRV	"DFSMShsm tracing improvements and release identifier change" on page 157
ARCMWE	z/OS V1R3	• New - MWEF_REMOTE_HOST_PROCESSED • New - MWEF_CRQ_PROCESSED • New - MWE_ORGNL_HID	"DFSMShsm common recall queue" on page 91
ARCQCT	OS/390 V2R10	• New - MQCT_VRM • Changed - MQCTVRM	"DFSMShsm tracing improvements and release identifier change" on page 157

Exits

Table 40 lists the changes to DFSMShsm exits. For more information, refer to the *z/OS DFSMS Installation Exits*.

Table 40. DFSMShsm: Summary of changed exits

Exit Name	Release	Description	Related Support
ARCINEXT	OS/390 V2R10	Offsets for accessing the address of the MCVT control block have changed.	"DFSMShsm multiple address spaces" on page 160

DFSMShsm interface changes

Table 40. DFSMShsm: Summary of changed exits (continued)

Exit Name	Release	Description	Related Support
ARCMDEXT	OS/390 V2R10	Parameter list expanded to include: • The management class • An indication that the data set is reconnectable • An indication that the data set is being extent reduced • Indications as to what type of migration is currently being performed (interval, daily or command) • An indication of whether a MIGRATE CONVERT is being performed • An indication that DAYS(0) was specified on the MIGRATE command Of these items, only the reconnectable status is directly related to Fast Subsequent Migration. The remaining changes satisfy a number of user requirements. New return codes added: RC44 and RC48	"DFSMShsm fast subsequent migration" on page 153
ARCSDEXT	OS/390 V2R10	Offsets for accessing the address of the MCVT control block have changed.	"DFSMShsm multiple address spaces" on page 160

ISMF panels

Table 41 lists new and changed ISMF panels.

Table 41. DFSMShsm: Summary of new and changed panels

Panel Number	Release	Description	Related Support
DFQDDHB1	OS/390 V2R10	HBACKDS entry panel is modified to accommodate the new fields	"DFSMShsm data set backup enhancements" on page 149

Macros

Table 42 lists new and changed executable macros. For more information, refer to *z/OS DFSMShsm Managing Your Own Data*.

Table 42. DFSMShsm: Summary of changed executable macros

Macro Name	Release	Description	Related Support
ARCHBACK	OS/390 V2R10	New keywords of TARGET and CC have been added to tailor concurrent copy backups for both SMS and non-SMS data sets.	"DFSMShsm data set backup enhancements" on page 149

Messages

For a listing of DFSMShsm messages that have changed, refer to *z/OS MVS System Messages, Vol 1 (ABA-AOM)* or *z/OS MVS System Messages, Vol 2 (ARC-ASA)*.

Chapter 12. Summary of DFSMSrmm Interface Changes

This chapter summarizes new and changed interfaces for DFSMSrmm. It covers DFSMSrmm interfaces that were updated since DFSMS/MVS V1R5. It also includes changes resulting from service updates and small programming enhancements that followed DFSMS/MVS V1R5.

Callable services

Table 43 lists changes to DFSMSrmm callable services.

Table 43. DFSMSrmm: Summary of changed callable services

Callable Service Name	Release	Description	Related Support
EDGTVEXT	OS/390 V2R10	Based on the DFSMSrmm EDGRMMxx PARMLIB OPTION TVEXTPURGE operand specified, the EDGTVEXT callable service retains volumes in different ways.	"DFSMSrmm processing for purged volumes" on page 179
EDGDFHSM	OS/390 V2R10	Based on the DFSMSrmm EDGRMMxx PARMLIB OPTION TVEXTPURGE operand specified, the EDGDFHSM callable service retains volumes in different ways.	"DFSMSrmm processing for purged volumes" on page 179
EDGLCSUX	OS/390 V2R10	EDGLCSUX issues new reason codes.	"DFSMSrmm Virtual Tape Server enhancements" on page 167

Commands

Table 44 lists new and changed commands. See the *z/OS DFSMSrmm Guide and Reference* for more specific information about these commands.

Table 44. DFSMSrmm: Summary of changed commands

Command Name	Release	Description	Related Support
ADDDATASET	OS/390 V2R10	The following optional parameters have been changed: • BLOCKSIZE • CRSYSID • SYSID	• "DFSMSrmm tape processing support enhancements" on page 164 • "DFSMSrmm pooling and policy enhancements" on page 169 • "DFSMSrmm support for using storage locations as home locations" on page 105
	z/OS V1R3	The following parameter has been changed: • VOLUME	"DFSMSrmm special character support" on page 93
ADDRACK	z/OS V1R3	The following optional parameter has been added or changed: • rack_number	"DFSMSrmm special character support" on page 93

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DFSMSrmm interface changes

Table 44. DFSMSrmm: Summary of changed commands (continued)

Command Name	Release	Description	Related Support
ADDVOLUME	OS/390 V2R10	The following optional parameters have been added or changed: • RECORDINGFORMAT(256TRACK) • STORAGEGROUP • TYPE(STACKED)	• "DFSMSrmm Virtual Tape Server enhancements" on page 167 • "Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112 • "DFSMSrmm pooling and policy enhancements" on page 169
	z/OS V1R3	The following parameters have been changed: • CRSYSID • LOCATION • POOL • PREVVOL • RACK • volser	• "DFSMSrmm support for using storage locations as home locations" on page 105 • "DFSMSrmm special character support" on page 93
ADDVRS	z/OS V1R3	The following optional parameter has been added or changed: • VOLUME	"DFSMSrmm special character support" on page 93
CHANGEDATASET	OS/390 V2R10	The following optional parameters have been changed: • BLOCKSIZE • LASTPROGRAMNAME • NOLASTPROGRAMNAME • NOPROGRAMNAME • PROGRAMNAME	• "DFSMSrmm tape processing support enhancements" on page 164 • "DFSMSrmm pooling and policy enhancements" on page 169 • "DFSMSrmm program name support" on page 181
	z/OS V1R3	The following parameters have been changed: • CRSYSID • SYSID • VOLUME	• "DFSMSrmm support for using storage locations as home locations" on page 105 • "DFSMSrmm special character support" on page 93

Table 44. DFSMSrmm: Summary of changed commands (continued)

Command Name	Release	Description	Related Support
CHANGEVOLUME	OS/390 V2R10	The following optional parameters have been added or changed: • CLOSE • CONTAINER • INITIALIZE • LOCATION • NEWVOLUME • NOSTORAGEGROUP • OPEN • RECORDINGFORMAT(256TRACK) • STORAGEGROUP • TYPE(STACKED)	• "DFSMSrmm Virtual Tape Server enhancements" on page 167 • "Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112 • "DFSMSrmm pooling and policy enhancements" on page 169
	z/OS V1R3	The following parameters have been changed: • ACCOUNT • BIN • CRSYSID • HOME • RACK • POOL • PREVVOL • volser	• "DFSMSrmm support for using storage locations as home locations" on page 105 • "DFSMSrmm special character support" on page 93
DELETERACK	z/OS V1R3	The optional rack number parameter has been added or changed.	"DFSMSrmm special character support" on page 93
DELETEDATASET	z/OS V1R3	The optional VOLUME parameter has been added or changed.	"DFSMSrmm special character support" on page 93
DELETEVOLUME	OS/390 V2R10	The following optional parameters have been added or changed: • FORCE • RELEASE • REMOVE	"DFSMSrmm Virtual Tape Server enhancements" on page 167
	z/OS V1R3	The following parameter has been changed: • volser	"DFSMSrmm special character support" on page 93
DELETEVRS	z/OS V1R3	The following optional parameter has been added or changed: • VOLUME	"DFSMSrmm special character support" on page 93
LISTBIN	z/OS V1R3	Output has been changed.	• "DFSMSrmm bin management enhancements" on page 95 • "DFSMSrmm special character support" on page 93

DFSMSrmm interface changes

Table 44. DFSMSrmm: Summary of changed commands (continued)

Command Name	Release	Description	Related Support
LISTCONTROL	OS/390 V2R10	Output has been changed.	"Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
	z/OS V1R3	Output has been changed.	• "DFSMSrmm support for using storage locations as home locations" on page 105 • "DFSMSrmm bin management enhancements" on page 95 • "DFSMSrmm ACS pooling control enhancements" on page 101
LISTDATASET	OS/390 V2R10	Output has been changed.	"DFSMSrmm program name support" on page 181
	z/OS V1R3	Output has been changed and the following parameter has been changed: • VOLUME	• "DFSMSrmm bin management enhancements" on page 95 • "DFSMSrmm special character support" on page 93
LISTRACK	z/OS V1R3	The following optional parameter has been added or changed: • rack_number	"DFSMSrmm special character support" on page 93
LISTVOLUME	OS/390 V2R10	Output has been changed.	"Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
	z/OS V1R3	Output has been changed and the following parameter has been changed: • volser	• "DFSMSrmm support for using storage locations as home locations" on page 105 • "DFSMSrmm bin management enhancements" on page 95 • "DFSMSrmm special character support" on page 93
LISTVRS	z/OS V1R3	The following optional parameter has been added or changed: • VOLUME	"DFSMSrmm special character support" on page 93
SEARCHBIN	z/OS V1R3	Output has been changed and the following optional parameter has been added or changed: • INUSE	"DFSMSrmm bin management enhancements" on page 95

Table 44. DFSMSrmm: Summary of changed commands (continued)

Command Name	Release	Description	Related Support
SEARCHDATASET	OS/390 V2R10	Output has been changed and the following optional parameters have been added or changed: • JOBNAME • NOJOBNAME • LASTPROGRAMNAME • NOLASTPROGRAMNAME • NOPROGRAMNAME • PROGRAMNAME	• "DFSMSrmm program name support" on page 181 • "Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
	z/OS V1R3	The following parameters have been changed: • CRSYSID • SYSID • VOLUME	• "DFSMSrmm support for using storage locations as home locations" on page 105 • "DFSMSrmm special character support" on page 93
SEARCHRACK	z/OS V1R3	The following optional parameters have been added or changed: • CLIST • INUSE • LOCATION • POOL • rack_number	• "DFSMSrmm support for using storage locations as home locations" on page 105 • "DFSMSrmm bin management enhancements" on page 95 • "DFSMSrmm special character support" on page 93
SEARCHVOLUME	OS/390 V2R10	The following optional parameters have been added or changed: • RECORDINGFORMAT(256TRACK) • REQUIRED • STATUS • TYPE	• "DFSMSrmm Virtual Tape Server enhancements" on page 167 • "Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
	z/OS V1R3	The following parameters have been changed: • CRSYSID • CLIST • DSNCRSYSID • DSNSYSID • HOME • POOL • VOLUME	• "DFSMSrmm support for using storage locations as home locations" on page 105 • "DFSMSrmm special character support" on page 93
SEARCHVRS	z/OS V1R3	The following optional parameters have been added or changed: • VOLUME	"DFSMSrmm special character support" on page 93

Data areas

Table 45 lists new and changed data areas. For more information about DFSMSrmm data areas, see the *z/OS DFSMSrmm Reporting*.

Table 45. DFSMSrmm: Summary of new and changed data areas

Data Area Name	Release	Description	Related Support
EDGACTSY	OS/390 V2R10	**New:** Uses DFSORT symbols to map the DFSMSrmm ACTIVITY report.	"DFSMSrmm reporting" on page 184
EDGEXTSY	OS/390 V2R10	**New:** Uses DFSORT symbols to map the DFSMSrmm extract data set.	"DFSMSrmm reporting" on page 184
	z/OS V1R3	• Additional symbols have been added.	"DFSMSrmm bin management enhancements" on page 95
EDGPL100	OS/390 V2R10	**New:** • PL100_INFO_MTL • PL100_SET_IGNORE_SGNAME	"Manual tape library support" on page 125
EDGPL200	z/OS V1R3	**New:** • PL200_DESCRIPTION • PL200_OWNER	"DFSMSrmm support for using storage locations as home locations" on page 105
EDGRDEXT	OS/390 V2R10	**New:** • RDTOTAL_BLKCNT • RDPERCENT • RDCPGM • RDLPGM • RDLJOB • RDLSTEP • RDLDDNM • RDLDEVN • RDTOTAL_BLKCNT • RDPERCENT	• "DFSMSrmm program name support" on page 181 • "Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
EDGRHEXT	OS/390 V2R10	**New:** DFSMSrmm Report Extract File Header Record	"DFSMSrmm reporting" on page 184
	z/OS V1R3	**New:** • RHEXTENDEDBIN	"DFSMSrmm bin management enhancements" on page 95
EDGRSEXT	z/OS V1R3	**New:** • RSVOLSER • RSMOVINGINVOL • RSMOVINGOUTVOL • RSOLDVOL	"DFSMSrmm bin management enhancements" on page 95

Table 45. DFSMSrmm: Summary of new and changed data areas (continued)

Data Area Name	Release	Description	Related Support
EDGRVEXT	OS/390 V2R10	**New:** • RVVOLTYPE • RVVOLTYPE_STACKED • RVRBYSET • RVEXPTOKEN • RVSTACKED_VOLCOUNT • RVMEDREC • RVCAPACITY • RVPERCENT	• "DFSMSrmm Virtual Tape Server enhancements" on page 167 • "Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
	z/OS V1R3	• RVDCRSID • RVDESTBIN • RVDESTBINMEDIA	• "DFSMSrmm support for using storage locations as home locations" on page 105 • "DFSMSrmm bin management enhancements" on page 95
EDGRXEXT	z/OS V1R3	**New:** • XVDESTBIN • XVDESTBINMEDIA • XVDCRSID • XVPERCENT	• "DFSMSrmm support for using storage locations as home locations" on page 105 • "DFSMSrmm reporting enhancements" on page 103 • "DFSMSrmm bin management enhancements" on page 95
EDGSDREC	OS/390 V2R10	**New:** • MDBLKIDS • MDBLKIDE • MDLEV2SC • MDBLKIDS • MDBLKIDE • MDCPGM • MDLPGM • MDLJOB • MDLSTEP • MDLDDNM • MDLDEVN • MDTOTALS_BLKS • MDSTART_POSN • MDEND_POSN	• "DFSMSrmm tape processing support enhancements" on page 164 • "DFSMSrmm program name support" on page 181 • "Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
EDGSMFSY	OS/390 V2R10	**New:** Uses DFSORT symbols to map the DFSMSrmm SMF records report.	"DFSMSrmm reporting" on page 184
	z/OS V1R3	• Additional symbols have been added.	"DFSMSrmm bin management enhancements" on page 95

DFSMSrmm interface changes

Table 45. DFSMSrmm: Summary of new and changed data areas (continued)

Data Area Name	Release	Description	Related Support
EDGSSREC	z/OS V1R3	**New:** • MSMOVINGINVOL • MSMOVINGOUTVOL • MSOLDVOL	"DFSMSrmm bin management enhancements" on page 95
EDGSVREC	OS/390 V2R10	**New:** • MVFLGA • MVEXRFLG • MVFLGF • MVVOLTYPE • MVVOLTYPE_STACKED • MVOLD_CONTAINER • MVEXPTOKEN • MV_STV_VOLCOUNT • MVTDSI • MVMEDREC • MVCAPACITY • MVLAST_POSN	• "DFSMSrmm Virtual Tape Server enhancements" on page 167 • "Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
	z/OS V1R3	• MVOTYFLG • MVDESTBIN • MVDESTBINMEDIA	"DFSMSrmm bin management enhancements" on page 95

DFSMSrmm ISPF panels

Table 46 lists new and changed DFSMSrmm ISPF panels.

Table 46. DFSMSrmm: Summary of new and changed panels

Panel Number	Release	Description	Related Support
EDGH@CMD	z/OS V1R3	DFSMSrmm COMMAND MENU	"DFSMSrmm report generator" on page 98
EDGH@LIB	OS/390 V2R10	DFSMSrmm Librarian Menu Help	"DFSMSrmm Virtual Tape Server enhancements" on page 167
	z/OS V1R3	DFSMSrmm Librarian Menu Help	"DFSMSrmm report generator" on page 98
EDGH@OPT	z/OS V1R3	DFSMSrmm Dialog Options Menu Help	"DFSMSrmm report generator" on page 98
EDGH@OP3	z/OS V1R3	DFSMSrmm Report Options Help	"DFSMSrmm report generator" on page 98
EDGH@OP6	z/OS V1R3	DFSMSrmm Dialog Options Menu – Overview	"DFSMSrmm report generator" on page 98
EDGP@SR1	z/OS V1R3	DFSMSrmm Rack and Bin List Sort Options - Overview Help	"DFSMSrmm bin management enhancements" on page 95
EDGP@ST3	z/OS V1R3	Priority Help	"DFSMSrmm bin management enhancements" on page 95

Table 46. DFSMSrmm: Summary of new and changed panels (continued)

Panel Number	Release	Description	Related Support
EDGH@USR	z/OS V1R3	DFSMSrmm User Menu Help	"DFSMSrmm report generator" on page 98
EDGH@O31	z/OS V1R3	Report Definition Libraries Help	"DFSMSrmm report generator" on page 98
EDGH@O32	z/OS V1R3	User Report JCL Library Help	"DFSMSrmm report generator" on page 98
EDGHC100	OS/390 V2R10	DFSMSrmm Control Record Display Help	"DFSMSrmm Virtual Tape Server enhancements" on page 167
EDGHC10M	OS/390 V2R10	Options Help	"DFSMSrmm Virtual Tape Server enhancements" on page 167
	z/OS V1R3	Options Help	"DFSMSrmm bin management enhancements" on page 95
EDGHC10N	OS/390 V2R10	Exit Status Help	"DFSMSrmm Virtual Tape Server enhancements" on page 167
EDGHC11M	z/OS V1R3	Stacked Volume Help	"DFSMSrmm bin management enhancements" on page 95
EDGHC12M	z/OS V1R3	Extended Bin Help	"DFSMSrmm bin management enhancements" on page 95
EDGHC200	OS/390 V2R10	DFSMSrmm System Options Display Help	• "DFSMSrmm multivolume set retention and movement" on page 174 • "DFSMSrmm processing for purged volumes" on page 179 • "DFSMSrmm TCDB processing controls" on page 182
	z/OS V1R3	DFSMSrmm System Options Display Help	• "DFSMSrmm bin management enhancements" on page 95 • "DFSMSrmm ACS pooling control enhancements" on page 101
EDGHC20H	OS/390 V2R10	VRS Help	• "DFSMSrmm Virtual Tape Server enhancements" on page 167 • "DFSMSrmm TCDB processing controls" on page 182
EDGHC20N	OS/390 V2R10	TVEXT Purge Help	"DFSMSrmm processing for purged volumes" on page 179

DFSMSrmm interface changes

Table 46. DFSMSrmm: Summary of new and changed panels (continued)

Panel Number	Release	Description	Related Support
EDGHC20W	OS/390 V2R10	Retain By Help	"DFSMSrmm multivolume set retention and movement" on page 174
EDGHC20X	OS/390 V2R10	Move By Help	"DFSMSrmm multivolume set retention and movement" on page 174
EDGHC20Y	z/OS V1R3	Reuse Bin Help	"DFSMSrmm bin management enhancements" on page 95
EDGHC20Z	OS/390 V2R10	SMSTAPE Help	"DFSMSrmm TCDB processing controls" on page 182
EDGHC21C	z/OS V1R3	PREACS Help	"DFSMSrmm bin management enhancements" on page 95
EDGHC21D	z/OS V1R3	SMSACS Help	"DFSMSrmm bin management enhancements" on page 95
EDGHC805	z/OS V1R3	Location Type (4) Help	"DFSMSrmm support for using storage locations as home locations" on page 105
EDGHD010	OS/390 V2R10	DFSMSrmm Data Set Search Help	"DFSMSrmm program name support" on page 181
EDGHD110	OS/390 V2R10	DFSMSrmm Data Set Details Help	• "DFSMSrmm program name support" on page 181 • "Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
EDGHD11K	OS/390 V2R10	DFSMSrmm Step Name Help	"DFSMSrmm program name support" on page 181
EDGHD11L	OS/390 V2R10	DFSMSrmm DD Name Help	"DFSMSrmm program name support" on page 181
EDGHD118	OS/390 V2R10	DFSMSrmm Job Name Help	"DFSMSrmm program name support" on page 181
EDGHD204	OS/390 V2R10	DFSMSrmm Device Number Help	"DFSMSrmm program name support" on page 181
EDGHD11T	OS/390 V2R10	DFSMSrmm Total Block Count Help	"Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
EDGHD11U	OS/390 V2R10	DFSMSrmm Percent of Volume Help	"Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
EDGHD11V	OS/390 V2R10	DFSMSrmm Program Name Help	"DFSMSrmm program name support" on page 181

Table 46. DFSMSrmm: Summary of new and changed panels (continued)

Panel Number	Release	Description	Related Support
EDGHD207	OS/390 V2R10	DFSMSrmm Block Size Help	"DFSMSrmm tape processing support enhancements" on page 164
EDGHD310	OS/390 V2R10	DFSMSrmm Data Set Details Help	"Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
EDGHD410	OS/390 V2R10	DFSMSrmm Confirm Delete Data Set Help	"Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
EDGHG000	z/OS V1R3	DFSMSrmm Report Generator Menu Help	"DFSMSrmm report generator" on page 98
EDGHG001	z/OS V1R3	DFSMSrmm Report Generator - Overview Help	"DFSMSrmm report generator" on page 98
EDGHG010	z/OS V1R3	DFSMSrmm Report Definition Search Help	"DFSMSrmm report generator" on page 98
EDGHG011	z/OS V1R3	Report Name Help	"DFSMSrmm report generator" on page 98
EDGHG012	z/OS V1R3	User ID Help	"DFSMSrmm report generator" on page 98
EDGHG013	z/OS V1R3	Libraries Help	"DFSMSrmm report generator" on page 98
EDGHG020	z/OS V1R3	DFSMSrmm Report Definitions Help	"DFSMSrmm report generator" on page 98
EDGHG021	z/OS V1R3	S Help	"DFSMSrmm report generator" on page 98
EDGHG022	z/OS V1R3	Report Name Help	"DFSMSrmm report generator" on page 98
EDGHG023	z/OS V1R3	Report Title Help	"DFSMSrmm report generator" on page 98
EDGHG024	z/OS V1R3	Report Type Help	"DFSMSrmm report generator" on page 98
EDGHG025	z/OS V1R3	User ID Help	"DFSMSrmm report generator" on page 98
EDGHG026	z/OS V1R3	Sorting Report Lists Help	"DFSMSrmm report generator" on page 98
EDGHG030	z/OS V1R3	Select Report Types Help	"DFSMSrmm report generator" on page 98
EDGHG031	z/OS V1R3	S Help	"DFSMSrmm report generator" on page 98
EDGHG032	z/OS V1R3	Report Type Help	"DFSMSrmm report generator" on page 98
EDGHG033	z/OS V1R3	Name Help	"DFSMSrmm report generator" on page 98
EDGHG040	z/OS V1R3	Select Reporting Tool Help	"DFSMSrmm report generator" on page 98

DFSMSrmm interface changes

Table 46. DFSMSrmm: Summary of new and changed panels (continued)

Panel Number	Release	Description	Related Support
EDGHG041	z/OS V1R3	S Help	“DFSMSrmm report generator” on page 98
EDGHG042	z/OS V1R3	Reporting Tool Help	“DFSMSrmm report generator” on page 98
EDGHG050	z/OS V1R3	DFSMSrmm Report Definition Help	“DFSMSrmm report generator” on page 98
EDGHG051	z/OS V1R3	DFSMSrmm Report Definition - Overview Help	“DFSMSrmm report generator” on page 98
EDGHG052	z/OS V1R3	Report Title Help	“DFSMSrmm report generator” on page 98
EDGHG053	z/OS V1R3	Report Footer Help	“DFSMSrmm report generator” on page 98
EDGHG054	z/OS V1R3	Report Tool Help	“DFSMSrmm report generator” on page 98
EDGHG055	z/OS V1R3	Report Width Help	“DFSMSrmm report generator” on page 98
EDGHG056	z/OS V1R3	S Help	“DFSMSrmm report generator” on page 98
EDGHG057	z/OS V1R3	Column Order Help	“DFSMSrmm report generator” on page 98
EDGHG058	z/OS V1R3	Sort Order Help	“DFSMSrmm report generator” on page 98
EDGHG059	z/OS V1R3	Field Name Help	“DFSMSrmm report generator” on page 98
EDGHG05A	z/OS V1R3	Column Header Text Help	“DFSMSrmm report generator” on page 98
EDGHG05B	z/OS V1R3	Column Width Help	“DFSMSrmm report generator” on page 98
EDGHG05C	z/OS V1R3	Field Length Help	“DFSMSrmm report generator” on page 98
EDGHG05D	z/OS V1R3	Field Type Help	“DFSMSrmm report generator” on page 98
EDGHG060	z/OS V1R3	DFSMSrmm Report Criteria Help	“DFSMSrmm report generator” on page 98
EDGHG061	z/OS V1R3	DFSMSrmm Report Criteria - Overview Help	“DFSMSrmm report generator” on page 98
EDGHG062	z/OS V1R3	Report Title Help	“DFSMSrmm report generator” on page 98
EDGHG063	z/OS V1R3	S Help	“DFSMSrmm report generator” on page 98
EDGHG064	z/OS V1R3	Field Name Help	“DFSMSrmm report generator” on page 98
EDGHG065	z/OS V1R3	Operator Help	“DFSMSrmm report generator” on page 98
EDGHG066	z/OS V1R3	Compare Value(s) Help	“DFSMSrmm report generator” on page 98

Table 46. DFSMSrmm: Summary of new and changed panels (continued)

Panel Number	Release	Description	Related Support
EDGHG067	z/OS V1R3	Conjunction Help	“DFSMSrmm report generator” on page 98
EDGHG068	z/OS V1R3	Field Length Help	“DFSMSrmm report generator” on page 98
EDGHG069	z/OS V1R3	Field Type Help	“DFSMSrmm report generator” on page 98
EDGHG200	z/OS V1R3	DFSMSrmm Report Types Help	“DFSMSrmm report generator” on page 98
EDGHG201	z/OS V1R3	DFSMSrmm Report Types - Overview Help	“DFSMSrmm report generator” on page 98
EDGHG202	z/OS V1R3	S Help	“DFSMSrmm report generator” on page 98
EDGHG203	z/OS V1R3	Report Type Name Help	“DFSMSrmm report generator” on page 98
EDGHG204	z/OS V1R3	Report Type Criteria Help	“DFSMSrmm report generator” on page 98
EDGHG205	z/OS V1R3	Macro Library Help	“DFSMSrmm report generator” on page 98
EDGHG206	z/OS V1R3	Applicable Macros Help	“DFSMSrmm report generator” on page 98
EDGHG207	z/OS V1R3	Input Data Set Help	“DFSMSrmm report generator” on page 98
EDGHG210	z/OS V1R3	DFSMSrmm Report Type Help	“DFSMSrmm report generator” on page 98
EDGHG211	z/OS V1R3	Report Type Help	“DFSMSrmm report generator” on page 98
EDGHG212	z/OS V1R3	Field Name Help	“DFSMSrmm report generator” on page 98
EDGHG213	z/OS V1R3	Column Header Text Help	“DFSMSrmm report generator” on page 98
EDGHG220	z/OS V1R3	DFSMSrmm Report Type Criteria Help	“DFSMSrmm report generator” on page 98
EDGHG300	z/OS V1R3	Reporting Tools Help	“DFSMSrmm report generator” on page 98
EDGHG301	z/OS V1R3	Reporting Tools - Overview Help	“DFSMSrmm report generator” on page 98
EDGHG302	z/OS V1R3	S Help	“DFSMSrmm report generator” on page 98
EDGHG303	z/OS V1R3	Reporting Tool Help	“DFSMSrmm report generator” on page 98
EDGHG304	z/OS V1R3	Report Exec Help	“DFSMSrmm report generator” on page 98
EDGHG305	z/OS V1R3	Colspace Help	“DFSMSrmm report generator” on page 98
EDGHR016	z/OS V1R3	Rack Status Help	“DFSMSrmm bin management enhancements” on page 95

DFSMSrmm interface changes

Table 46. DFSMSrmm: Summary of new and changed panels (continued)

Panel Number	Release	Description	Related Support
EDGHR019	z/OS V1R3	Bin Status Help	“DFSMSrmm bin management enhancements” on page 95
EDGHR01B	z/OS V1R3	Rack Number Help	“DFSMSrmm special character support” on page 93
EDGHR020	z/OS V1R3	DFSMSrmm Racks or Bins Help	“DFSMSrmm bin management enhancements” on page 95
EDGHR022	z/OS V1R3	S Help	“DFSMSrmm bin management enhancements” on page 95
EDGHR023	z/OS V1R3	Rack/Bin Number Help	“DFSMSrmm special character support” on page 93
EDGHR024	z/OS V1R3	Media Name Help	“DFSMSrmm bin management enhancements” on page 95
EDGHR025	z/OS V1R3	Current Volume Help	“DFSMSrmm bin management enhancements” on page 95
EDGHR026	z/OS V1R3	Status Help	“DFSMSrmm bin management enhancements” on page 95
EDGHR027	z/OS V1R3	Sorting Rack or Bin Lists Help	“DFSMSrmm bin management enhancements” on page 95
EDGHR029	z/OS V1R3	Location Help	“DFSMSrmm bin management enhancements” on page 95
EDGHR02A	z/OS V1R3	Moving-In Volume Help	“DFSMSrmm bin management enhancements” on page 95
EDGHR02B	z/OS V1R3	Moving-Out Volume Help	“DFSMSrmm bin management enhancements” on page 95
EDGHR02C	z/OS V1R3	Old Volume Help	“DFSMSrmm bin management enhancements” on page 95
EDGHR032	z/OS V1R3	DFSMSrmm Rack or Bin Details	“DFSMSrmm bin management enhancements” on page 95
EDGHR033	z/OS V1R3	Moving Help	“DFSMSrmm bin management enhancements” on page 95
EDGHR102	z/OS V1R3	Rack Number Help	“DFSMSrmm special character support” on page 93

Table 46. DFSMSrmm: Summary of new and changed panels (continued)

Panel Number	Release	Description	Related Support
EDGHR103	z/OS V1R3	Location Help	“DFSMSrmm bin management enhancements” on page 95
EDGHR110	z/OS V1R3	DFSMSrmm Rack or Bin Details Help	“DFSMSrmm bin management enhancements” on page 95
EDGHR111	z/OS V1R3	Current Volume Help	“DFSMSrmm bin management enhancements” on page 95
EDGHR112	z/OS V1R3	Moving-In Volume Help	“DFSMSrmm bin management enhancements” on page 95
EDGHR113	z/OS V1R3	Moving-Out Volume Help	“DFSMSrmm bin management enhancements” on page 95
EDGHR114	z/OS V1R3	Old Volume Help	“DFSMSrmm bin management enhancements” on page 95
EDGHR115	z/OS V1R3	Pool Help	“DFSMSrmm bin management enhancements” on page 95
EDGHR203	z/OS V1R3	Rack Number Help	“DFSMSrmm special character support” on page 93
EDGHR403	z/OS V1R3	Rack Number Help	“DFSMSrmm special character support” on page 93
EDGHT000	OS/390 V2R10	DFSMSrmm Volume Menu Help	“DFSMSrmm Virtual Tape Server enhancements” on page 167
EDGHT010	OS/390 V2R10	DFSMSrmm Volume Search Help	“DFSMSrmm Virtual Tape Server enhancements” on page 167
EDGHT015	z/OS V1R3	Pool Help	“DFSMSrmm special character support” on page 93
EDGHT016	OS/390 V2R10	Status Help	“DFSMSrmm Virtual Tape Server enhancements” on page 167
EDGHT027	z/OS V1R3	Location Help	“DFSMSrmm bin management enhancements” on page 95
EDGHT028	z/OS V1R3	DFSMSrmm Data Sets Help	“DFSMSrmm special character support” on page 93
EDGHT029	z/OS V1R3	DFSMSrmm Rack Number Help	“DFSMSrmm special character support” on page 93

DFSMSrmm interface changes

Table 46. DFSMSrmm: Summary of new and changed panels (continued)

Panel Number	Release	Description	Related Support
EDGHT02L	z/OS V1R3	Destination Help	“DFSMSrmm bin management enhancements” on page 95
EDGHT034	OS/390 V2R10	Recorded Format Help	“Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x” on page 112
EDGHT044	OS/390 V2R10	Format Help	“Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x” on page 112
EDGHT105	z/OS V1R3	DFSMSrmm Pool Help	“DFSMSrmm special character support” on page 93
EDGHT11A	z/OS V1R3	DFSMSrmm Rack Number Help	“DFSMSrmm special character support” on page 93
EDGHT11H	OS/390 V2R10	Set Retained Help	“DFSMSrmm multivolume set retention and movement” on page 174
EDGHT11I	OS/390 V2R10	Stacked Count Help	DFSMSrmm Virtual Tape Server enhancements
EDGHT110	OS/390 V2R10	DFSMSrmm Volume Details (Page 1) General Information Help	DFSMSrmm multivolume set retention and movement
EDGHT120	z/OS V1R3	Volume Details (Page 2) - Volume Access Help	“DFSMSrmm support for using storage locations as home locations” on page 105
EDGHT12H	z/OS V1R3	File 1 System ID Help	“DFSMSrmm support for using storage locations as home locations” on page 105
EDGHT130	OS/390 V2R10	DFSMSrmm Volume Details (Page 3) Volume Statistics Help	“Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x” on page 112
EDGHT130	OS/390 V2R10	DFSMSrmm Volume Details (Page 3) Volume Statistics Help	“DFSMSrmm support for using storage locations as home locations” on page 105
EDGHT13A	OS/390 V2R10	Capacity Help	“Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x” on page 112
	z/OS V1R3	DFSMSrmm Number of Data Sets Help	“DFSMSrmm special character support” on page 93
EDGHT13B	OS/390 V2R10	Percent Full Help	“Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x” on page 112

Table 46. DFSMSrmm: Summary of new and changed panels (continued)

Panel Number	Release	Description	Related Support
EDGHT13L	z/OS V1R3	System ID Help	"DFSMSrmm support for using storage locations as home locations" on page 105
EDGHT140	z/OS V1R3	DFSMSrmm Volume Details - Location Help	"DFSMSrmm bin management enhancements" on page 95
EDGHT141	z/OS V1R3	Location Type Help	"DFSMSrmm bin management enhancements" on page 95
EDGHT142	z/OS V1R3	Location Name Help	"DFSMSrmm bin management enhancements" on page 95
EDGHT143	z/OS V1R3	Bin Number Help	"DFSMSrmm bin management enhancements" on page 95
EDGHT144	z/OS V1R3	Old Location Help	"DFSMSrmm bin management enhancements" on page 95
EDGHT14A	z/OS V1R3	Required Location Help	"DFSMSrmm bin management enhancements" on page 95
EDGHT14C	z/OS V1R3	Media Name Help	"DFSMSrmm bin management enhancements" on page 95
EDGHT14E	z/OS V1R3	Current Location Help	"DFSMSrmm bin management enhancements" on page 95
EDGHT14F	z/OS V1R3	Destination Help	"DFSMSrmm bin management enhancements" on page 95
EDGHT14G	z/OS V1R3	Home Location Help	"DFSMSrmm bin management enhancements" on page 95
EDGHT21A	z/OS V1R3	DFSMSrmm Rack Number Help	"DFSMSrmm special character support" on page 93
EDGHT21C	z/OS V1R3	DFSMSrmm Rack Number Help	"DFSMSrmm special character support" on page 93
EDGHT21D	z/OS V1R3	DFSMSrmm Rack Number Help	"DFSMSrmm special character support" on page 93
EDGHT240	OS/390 V2R10	DFSMSrmm Add Stacked Volume Help	"DFSMSrmm Virtual Tape Server enhancements" on page 167
EDGHT241	OS/390 V2R10	DFSMSrmm Add Stacked Volume - Overview (Page 1 of 3) Help	"DFSMSrmm Virtual Tape Server enhancements" on page 167

DFSMSrmm interface changes

Table 46. DFSMSrmm: Summary of new and changed panels (continued)

Panel Number	Release	Description	Related Support
EDGHT242	OS/390 V2R10	DFSMSrmm Add Stacked Volume - Overview (Page 2 of 3) Help	"DFSMSrmm Virtual Tape Server enhancements" on page 167
EDGHT243	OS/390 V2R10	DFSMSrmm Add Stacked Volume - Overview (Page 3 of 3) Help	"DFSMSrmm Virtual Tape Server enhancements" on page 167
EDGHT618	z/OS V1R3	DFSMSrmm Rack Number Help	"DFSMSrmm special character support" on page 93
EDGP@CMD	z/OS V1R3	DFSMSrmm Command Menu	"DFSMSrmm report generator" on page 98
EDGP@LIB	OS/390 V2R10	DFSMSrmm Librarian Menu	"DFSMSrmm Virtual Tape Server enhancements" on page 167
	z/OS V1R3	DFSMSrmm Librarian Menu	"DFSMSrmm report generator" on page 98
EDGP@OPT	z/OS V1R3	DFSMSrmm Dialog Options Menu	"DFSMSrmm report generator" on page 98
EDGP@OP3	z/OS V1R3	DFSMSrmm Report Options	"DFSMSrmm report generator" on page 98
EDGP@STR	z/OS V1R3	DFSMSrmm Rack and Bin List Sort Options	"DFSMSrmm bin management enhancements" on page 95
EDGP@USR	z/OS V1R3	DFSMSrmm User Menu	"DFSMSrmm report generator" on page 98
EDGPC100	OS/390 V2R10	DFSMSrmm Control Record Display	• "DFSMSrmm Virtual Tape Server enhancements" on page 167 • "DFSMSrmm processing for purged volumes" on page 179
	z/OS V1R3	DFSMSrmm Control Record Display	"DFSMSrmm bin management enhancements" on page 95

Table 46. DFSMSrmm: Summary of new and changed panels (continued)

Panel Number	Release	Description	Related Support
EDGPC200	OS/390 V2R10	DFSMSrmm System Options Display	• "DFSMSrmm Virtual Tape Server enhancements" on page 167 • "DFSMSrmm processing for purged volumes" on page 179 • "Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
	z/OS V1R3	DFSMSrmm System Options Display	• "DFSMSrmm bin management enhancements" on page 95 • "DFSMSrmm ACS pooling control enhancements" on page 101
EDGPD010	OS/390 V2R10	DFSMSrmm Data Set Search	"DFSMSrmm program name support" on page 181
EDGPD110	OS/390 V2R10	DFSMSrmm Data Set Details	• "DFSMSrmm program name support" on page 181 • "Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
EDGPD310	OS/390 V2R10	DFSMSrmm Data Set Details	• "DFSMSrmm program name support" on page 181 • "Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
EDGPD410	OS/390 V2R10	DFSMSrmm Confirm Delete Data Set	• "DFSMSrmm program name support" on page 181 • "Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
EDGPG000	z/OS V1R3	DFSMSrmm Report Generator	"DFSMSrmm bin management enhancements" on page 95
EDGPG010	z/OS V1R3	DFSMSrmm Report Definition Search	"DFSMSrmm report generator" on page 98
EDGPG020	z/OS V1R3	DFSMSrmm Report Definitions	"DFSMSrmm report generator" on page 98
EDGPG021	z/OS V1R3	Popup window	"DFSMSrmm report generator" on page 98

DFSMSrmm interface changes

Table 46. DFSMSrmm: Summary of new and changed panels (continued)

Panel Number	Release	Description	Related Support
EDGPG022	z/OS V1R3	Popup window	“DFSMSrmm report generator” on page 98
EDGPG023	z/OS V1R3	Popup window	“DFSMSrmm report generator” on page 98
EDGPG030	z/OS V1R3	Select Report Type	“DFSMSrmm report generator” on page 98
EDGPG040	z/OS V1R3	Select Reporting Tool	“DFSMSrmm report generator” on page 98
EDGPG050	z/OS V1R3	DFSMSrmm Report Definition	“DFSMSrmm report generator” on page 98
EDGPG060	z/OS V1R3	DFSMSrmm Report Criteria	“DFSMSrmm report generator” on page 98
EDGPG061	z/OS V1R3	DFSMSrmm Report Criteria Details	“DFSMSrmm report generator” on page 98
EDGPG200	z/OS V1R3	DFSMSrmm Report Types	“DFSMSrmm report generator” on page 98
EDGPG210	z/OS V1R3	DFSMSrmm Report Type	“DFSMSrmm report generator” on page 98
EDGPG220	z/OS V1R3	DFSMSrmm Report Type Criteria	“DFSMSrmm report generator” on page 98
EDGPG300	z/OS V1R3	DFSMSrmm Reporting Tool	“DFSMSrmm report generator” on page 98
EDGPR010	z/OS V1R3	DFSMSrmm Rack and Bin Search	“DFSMSrmm bin management enhancements” on page 95
EDGPR020	z/OS V1R3	DFSMSrmm Racks or Bins	“DFSMSrmm bin management enhancements” on page 95
EDGPR110	z/OS V1R3	DFSMSrmm Rack or Bin Details	“DFSMSrmm bin management enhancements” on page 95
EDGPT010	OS/390 V2R10	DFSMSrmm Volume Search	“DFSMSrmm Virtual Tape Server enhancements” on page 167
EDGPT040	OS/390 V2R10	DFSMSrmm Volume Search	“Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x” on page 112

Table 46. DFSMSrmm: Summary of new and changed panels (continued)

Panel Number	Release	Description	Related Support
EDGPT110	OS/390 V2R10	DFSMSrmm Volume Details	• "DFSMSrmm Virtual Tape Server enhancements" on page 167 • "Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x" on page 112
	z/OS V1R3	DFSMSrmm Volume Details	• "DFSMSrmm support for using storage locations as home locations" on page 105 • "DFSMSrmm bin management enhancements" on page 95
EDGPT240	OS/390 V2R10	DFSMSrmm Add Stacked Volume	"DFSMSrmm Virtual Tape Server enhancements" on page 167

Exits

Table 47 lists the changes to DFSMSrmm exits. For more information, refer to the *z/OS DFSMSrmm Implementation and Customization Guide*.

Table 47. DFSMSrmm: Summary of changed exits

Exit Name	Release	Description	Related Support
EDGCVRSX	OS/390 V2R10	Enhanced for pre-ACS support with the PL100_ACEROPTR field.	"DFSMSrmm pre-ACS interface support" on page 172
EDGUX100	OS/390 V2R10	• Enhanced for pre-ACS support with the PL100_ACEROPTR field. • Enhanced for manual tape library support	• "DFSMSrmm pre-ACS interface support" on page 172 • "Manual tape library support" on page 125
EDGUX200	z/OS V1R3	• Enhanced for multiple systems and platforms support with the PL200_DESCRIPTION and PL200_OWNER information from the volume record.	

Messages

For a listing of DFSMSrmm messages that have been added or changed, refer to *z/OS MVS System Messages, Vol 3 (ASB-BPX)*, *z/OS MVS System Messages, Vol 4 (CBD-DMO)*, or *z/OS MVS System Messages, Vol 5 (EDG-GFS)*.

REXX variables and structured field introducers

For detailed information about new REXX variables you can use in REXX execs, refer to *z/OS DFSMSrmm Guide and Reference*. For detailed information about the DFSMSrmm application programming interface and new and changed SFIs, refer to the*z/OS DFSMSrmm Application Programming Interface*.

SMF records

Table 48 lists changes to SMF records that are used by DFSMSrmm. For more detailed information, refer to *z/OS DFSMSrmm Implementation and Customization Guide*.

Table 48. DFSMSrmm: Summary of new and changed SMF records

Event Code or Record Type	Release	Description	Related Support
EDGSDREC	OS/390 V2R10	See “Data areas” on page 284.	• “DFSMSrmm tape processing support enhancements” on page 164 • “DFSMSrmm program name support” on page 181 • “Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x” on page 112
EDGSVREC	OS/390 V2R10	See “Data areas” on page 284.	• “DFSMSrmm tape processing support enhancements” on page 164 • “Device support for IBM TotalStorage Enterprise Tape Drive 3590 Model E1x” on page 112

SYS1.PARMLIB members

Table 49 identifies changes to the DFSMSrmm member of SYS1.PARMLIB.

Table 49. DFSMSrmm: Summary of changes to SYS1.SAMPLIB

Member Name	Release	Description	Related Support
EDGRMMxx	OS/390 V2R10	Updated with new operands: • MOVEBY • OPTION PREACS • OPTION SMSACS • OPTION REUSEBIN • RETAINBY • SMSTAPE • TLCSV1 has been deleted. • TVEXTPURGE	• "DFSMSrmm multivolume set retention and movement" on page 174 • "DFSMSrmm TCDB processing controls" on page 182 • "DFSMSrmm processing for purged volumes" on page 179 • "DFSMSrmm bin management enhancements" on page 95 • "DFSMSrmm ACS pooling control enhancements" on page 101
	z/OS V1R3	• LOCDEF TYPE • VLPOOL PREFIX • VLPOOL REJECT	"DFSMSrmm support for using storage locations as home locations" on page 105

Utilities

Table 50 lists changes to DFSMSrmm utilities. For detailed information about DFSMS utilities, refer to the*z/OS DFSMSrmm Implementation and Customization Guide*.

Table 50. DFSMSrmm: Summary of changed utilities

Utility Name	Release	Description	Related Support
EDGAUD	OS/390 V2R10	Stacked volume support added.	"DFSMSrmm Virtual Tape Server enhancements" on page 167
EDGINERS	z/OS V1R3	Special character support added.	"DFSMSrmm special character support" on page 93
EDGHSKP	z/OS V1R3	New XREPTEXT DD added • DSTORE(LOCATION) • INSEQUENCE • REASSIGN	• "DFSMSrmm reporting enhancements" on page 103 • "DFSMSrmm bin management enhancements" on page 95
EDGRPTD	OS/390 V2R10	New SCRDATE DD, SCRLIST DD and NEWSCR DD added	"DFSMSrmm pooling and policy enhancements" on page 169

DFSMSrmm interface changes

Table 50. DFSMSrmm: Summary of changed utilities (continued)

Utility Name	Release	Description	Related Support
EDGUTIL	OS/390 V2R10	3-Way Audit (DFSMSrmm control data set - TCDB - Library Manager database) • MEND(SMSTAPE) • VERIFY(SMSTAPE) • SMSTAPE	• "DFSMSrmm system-managed tape audit support" on page 171 • "DFSMSrmm Virtual Tape Server enhancements" on page 167 • "DFSMSrmm pooling and policy enhancements" on page 169
	z/OS V1R3	• EXTENDBIN	"DFSMSrmm bin management enhancements" on page 95

Appendix A. I/O Devices and Subsystems Supported by DFSMS

Table 51 summarizes the most commonly-used I/O devices supported by z/OS that are also directly supported by DFSMS functions. If you have a question about support for a device not listed, please contact your IBM representative.

Table 51. IBM I/O devices and subsystems supported by z/OS

Direct Access Storage	
3380 Direct Access Storage[1]	9340 Direct Access Storage[2]
3390 Direct Access Storage[1]	9341—9345 Direct Access Storage
Models 1, 2, 3, and 9	9343—9345 Direct Access Storage
RAMAC Array Device[11]	
Storage Control Units	
3880 Storage Control	3990 Storage Control
Model 3[14]	Models 1 and 2[1]
Cache Storage Control Units	
3880 Storage Control	9393 RAMAC Virtual Array Storage Subsystem
Model 23 with 3880 AJ4/AK4 Attachment	Model xx2[15]
3990 Storage Control	9396 RAMAC Scalable Array Storage
Models 3 and 6[1 11 12]	9397 RAMAC Electronic Array Storage
9391 RAMAC Array Subsystem[11]	2105 Enterprise Storage Server
Optical	
9246 Optical Library Unit RPQ# 8B6001[10]	3995 Optical Library Dataserver
9247 Optical Disk Drive RPQ# 8B6003[10]	Models 11x, 13x, 15x, C1x, C3x
Expand 9246 to Four Drives RPQ# 8B6002[10]	3995 Optical Library Drive
MVS/ESA Direct Optical Attachment RPQ# 8B6004[10]	Models–SWx
S/370™ and S/390 Optical Media Attach/2[13]	
Magnetic Tape	
2440 Magnetic Tape Subsystem	3590 TotalStorage Enterprise Tape Subsystem
Models A01, A02, B01, and J02[3]	Models Bxx, Exx
3420 Magnetic Tape Unit	3490 Magnetic Tape Subsystem[5]
Models 3, 4, 5, 6, 7, and 8	3490 Enhanced Capacity Magnetic Tape Subsystem
3422 Magnetic Tape Subsystem	3494 TotalStorage Enterprise Automated Tape Library
3423 Device[13]	3494 Virtual Tape Server
3424 Magnetic Tape Subsystem[4]	3494 TotalStorage Peer-to-Peer Virtual Tape Server
3430 Magnetic Tape Subsystem	3495 TotalStorage Enterprise Automated Tape Library
3480 Magnetic Tape Subsystem	
Console	
3180 Display Station	3277 Display Station
Models 140 and 145	Models 1 and 2
3205 Color Display Station	3278 Display Station
Model 100	Models 1, 2, 2A, 3, and 4
3206 Display Station	3279 Color Display Station
Models 100 and 110	Models 2A, 2B, 2C, 3A, and 3B
3251 Display Station	5080 High Function Graphics System
Card Readers and Communications Devices	
2501 Card Reader	3525 Card Punch
Models B1 and B2	37xx Communications Controllers
2540 Card Read Punch	3838 Array Processor
Models 1 and 2	3848 Cryptographic Unit
3505 Card Reader	3890™ Document Processor

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Table 51. IBM I/O devices and subsystems supported by z/OS (continued)

Printers	
1403 Printer Models 2, 7, and N1	3820 Page Printer[8]
3203 Printer Model 5	3825 Page Printer[8 9]
3211 Printer	3827 Page Printer[8 9]
3262 Line Printer Model 5[6]	3828 Advanced Function MICR Printer[8 9]
3284 Printer Models 1 and 2	3835 Page Printer[8 9]
3286 Printer Models 1 and 2	3900 Advanced Function Printer[8 9]
3800 Printing Subsystem Models 3, 6, 8[7] and 1	4028 LaserPrinter Model NS1[7]
3812 Page Printer Model 2[7]	4245 Line Printer Models 01, 12, and 20
3816 Page Printer Models 01S, and 01D[7]	4248 Impact Line Printer Models 1 and 2
	6262 Impact Line Printer Models 014, and 022[6]

Note:

1. Most models of the IBM 3380 Direct Access Storage and all models of the IBM 3390 Direct Access Storage can operate with Enterprise Systems Connection (ESCON) channels when attached to a 3990 Storage Control Model 2, 3, or 6 with ESCON capability.
2. All models of the IBM 9345 Direct Access Storage Devices mounted in an IBM 9343—9345 Model D04 cabinet can operate with ESCON channels.
3. These models of the IBM 2440 Magnetic Tape Subsystem are supported in 3420-4 compatibility mode.
4. The 3424 Magnetic Tape Unit is available only in Brazil, S.A.
5. All models of the IBM 3490 Magnetic Tape Subsystem can operate with ESCON channels if an ESCON adapter is installed.
6. This printer must be initialized to the system as 4248.
7. This printer requires the use of PSF for z/OS if you want it to run as an Advanced Function Printer (AFP*). PSF for z/OS is a separate product.
8. This printer requires the use of PSF for z/OS, which is a separate product.
9. This printer must be defined to the system as AFP1.
10. This feature or device is supported by the object access method.
11. All RAMAC subsystems, and the 3990 Storage Control Models 3 and 6 support sequential and VSAM extended format data sets.
12. The 3990 Storage Control Models 3 and 6 Extended Platform support concurrent copy.
13. The IBM S/370 and the S/390 Optical Media Attach/2 products emulate an IBM 3422 Magnetic Tape Subsystem, supporting both 1600 and 6250 bpi formats. They are defined to the system as 3423 tape devices.
14. The 3880 Storage Control Model 3 can support the 3380 AJ4/AK4 Attachment (Feature 3005).
15. The RAMAC Virtual Array supports both 3380 and 3390 device types in single, double, and triple capacity volume sizes.

Appendix B. Year 2000 support for DFSMS

As an element of the z/OS operating system, DFSMS is certified as Year 2000-ready by the Information Technology Association of America (ITAA).

DFSMS/MVS V1R2 and V1R3 are Year 2000-ready with maintenance applied. DFSMS/MVS V1R4 and higher releases are shipped Year 2000-ready. Always consult the Year 2000 PSP bucket for the latest maintenance information.

This chapter provides an overview of the changes introduced by DFSMS in support of the year 2000. It includes considerations for migration and testing and also presents a list of additional sources where you can get assistance with the migration effort.

Summary of Year 2000 changes

DFSMS includes a number of changes to messages, reporting records, data area fields, and catalog information to handle date information in the new millennium.

Modifications have been made to input and output date formats to recognize century values, allowing data with dates beyond the year 2000 to be processed correctly. For example, some dates in the form of *mm/dd/yy* were changed to *mm/dd/yyyy*. Other dates in the form of *yy.ddd* were changed to *yyyy.ddd*. Refer to the specific command or function for the exact format. Inclusion of this century information allows a valid comparison to be made between data stored before, during, and after the year 2000.

Restarting a system with old log data or older record formats for constructs such as catalogs, VTOCs, or control data sets continues to work after the year 2000. In some cases, however, formatting has changed to accommodate a full date specification; therefore, care must be taken to process any date information in the same format in which it was stored.

It is especially important to note that only ICF catalogs are supported in this environment. Data cataloged in VSAM catalogs is not accessible as of January 1, 2001.

DFSMSdfp has added support to SMS to correctly calculate dates, including leap year dates, for the year 2000 and beyond. Other DFSMSdfp changes include the following:

- All access methods and catalog services correctly handle date attributes created before, during, and after the year 2000.
- IEBCOPY utility uses 4-digit years in all date displays and calculations.
- ISMF data set lists now display “NEVER” for a data set with no expiration date, rather than display a date of “1999/12/31”.
- DFSMSdfp messages written to SYSLOG now include dates with a century field.

DFSMSdss commands can all be used to process data sets associated with dates that follow 12/31/1999 (1999-December-31). DFSMSdss Year 2000 support includes changes to the following:

- Expiration date processing now enables DFSMSdss to process data sets with never-expiring dates such as “99.365” or “99.366”.

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- BY filtering using keywords CREDT, REFDT, or EXPDT now allows 7-digit dates (*yyyyddd*). The explanation of DFSMSdss message ADR140E was modified to support the changes in BY filtering.
- DFSMSdss messages now have 4-digit years in their titles and headers. Changed messages include:

  ```
  ADR006I          ADR109I          ADR734I
  ADR012I          ADR208I          ADR735W
  ADR013I          ADR209I          ADR738E
  ADR014I          ADR213I          ADR767I
  ADR017E          ADR720I          ADR962I
  ADR108I          ADR726W          ADR963I
  ```

  Messages now show the date as, for example, “1998.305” rather than “98305”.

DFSMShsm is enhanced to enable automatic functions to continue to start after 12/31/1999 (1999-December-31). All commands can be used to process data sets with dates later than 12/31/1999. DFSMShsm Year 2000 support includes changes to the following:

- ARCHRCOV macro, DATE=*dateaddr* parameter
- ARCPRPDO program, START and END parameters
- DEFINE command, CYCLESTARTDATE parameter
- DEFINE command, DUMPCLASS parameter, RETENTIONPERIOD(*days*) and TAPEEXPIRATIONDATE(*yyyyddd*|*yyddd*) subparameters
- HRECOVER and RECOVER commands, DATE parameter
- REPORT command, FROMDATE(*date*) and TODATE(*date*) parameters
- SETSYS command, CDSVERSIONBACKUP parameter, BACKUPDEVICECATEGORY(TAPE) and (EXPIRATIONDATE(*expirationdate*)) subparameters
- TAPECOPY command, INDATASET, EXPDT, and RETPD parameters
- Fields in the DFSMShsm data areas: CDSV-CDSVERSIONBACKUP Parameters Table, and MCD-Migration Control Data Set Data Set Record
- DFSMShsm messages with new or changed text:

  ```
  ARC0103I         ARC0284I         ARC2006I
  ARC0216I         ARC0424I         ARC2007I
  ARC0281I         ARC0430I         ARC2008I
  ARC0282I         ARC1067I         ARC2009I
  ARC0283I
  ```

- DFSMShsm messages with text changed specifically to include a 4-digit year:

  ```
  ARC0526I         ARC0718I         ARC0742I
  ARC0530I         ARC0722I         ARC0743I
  ARC0622I         ARC0724I         ARC0750I
  ARCO623I         ARC0735I         ARC0832I
  ARC0680I         ARC0740I         ARC6045I
  ARC0681I         ARC0741I         ARC6102I
  ```

DFSMSrmm and DFSMS Optimizer are relatively new to the MVS environment and were developed using 4-digit year formats as part of their initial offerings.

Related Year 2000 migration actions

Consider the following actions for your Year 2000 migration plan:

- VSAM catalogs can no longer be processed by z/OS. You must convert old VSAM catalogs to the ICF structure.

- Stored values for date formats have been redefined and expanded to represent dates beyond 1999. A date in the VTOC, for example, uses a 3-byte binary value represented by *yyddd*. The format has not actually changed but the definition of the contents has changed. The *yy* value, which is the offset from the year 1900, now has a valid range of “0” to “255”. Originally, *yy* had a maximum value of “99”. The *ddd* value represents the day of the year, which continues to have a valid range between “1” and “366”.

  Other data structures use a 4-byte hexadecimal date field with a format of *0cyydddf*. The century value is contained in the high-order byte, whereas in the past, this byte was reserved.

  You need to assess the impact these changes have on older applications that process dates based on the older data area formats.
- Many installation exits allow your code to examine or set date values. You must evaluate these exits to make sure they continue to process correctly as you implement other Year 2000 changes. For example, ensure that the code can adjust to the updated formats provided by other interfacing programs, so that they can provide or accept 4-digit years. They also need to properly handle the specification of “never-expire” for an expiration date.

Where to find Year 2000 migration assistance

For further information on Year 2000 support and migration assistance, refer to the following sources:

- IBM’s Year 2000 web site describes migration tools, offerings, and other services that are available. Visit the web site at:

  `http://www.ibm.com/year2000`
- *The Year 2000 and 2-Digit Dates: A Guide for Planning and Implementation* , GC28-1251, provides information to help you plan your migration to a Year 2000-ready environment, including how to determine the best techniques for reformatting year-date notation and what techniques to use for testing Year 2000 changes. This guide is available on-line, which you can download from IBM’s Year 2000 web site. It can also be ordered through your IBM representative.
- The YR2000MVS PSP bucket contains the most up-to-date Year 2000 maintenance information.
- The IBM Year 2000 Technical Support Center can be contacted through the internet at `y2ktsc@us.ibm.com`, or by calling 1-800-IBM-4YOU and mentioning the “Call-down Keyword” of “Y2K”.

Appendix C. Accessibility

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. The major accessibility features in z/OS enable users to:

- Use assistive technologies such as screen-readers and screen magnifier software
- Operate specific or equivalent features using only the keyboard
- Customize display attributes such as color, contrast, and font size

Using assistive technologies

Assistive technology products, such as screen-readers, function with the user interfaces found in z/OS. Consult the assistive technology documentation for specific information when using it to access z/OS interfaces.

Keyboard navigation of the user interface

Users can access z/OS user interfaces using TSO/E or ISPF. Refer to *z/OS TSO/E Primer*, *z/OS TSO/E User's Guide*, and *z/OS ISPF User's Guide Volume I* for information about accessing TSO/E and ISPF interfaces. These guides describe how to use TSO/E and ISPF, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.

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Glossary

This glossary defines technical terms and abbreviations used in DFSMS documentation. If you do not find the term you are looking for, refer to the index of the appropriate DFSMS manual or view the *IBM Dictionary of Computing Terms* located at:

http://www.ibm.com/networking/nsg/nsgmain.htm

This glossary includes terms and definitions from:

- The *American National Standard Dictionary for Information Systems*, ANSI X3.172-1990, copyright 1990 by the American National Standards Institute (ANSI). Copies may be purchased from the American National Standards Institute, 11 West 42nd Street, New York, New York 10036. Definitions are identified by the symbol (A) after the definition.
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- The *IBM Dictionary of Computing*, New York: McGraw-Hill, 1994.

The following cross-reference is used in this glossary:

See: This refers the reader to (a) a related term, (b) a term that is the expanded form of an abbreviation or acronym, or (c) a synonym or more preferred term.

Numerics

8–name mode. See *compatibility mode*.

32-name mode. For DFSMS, it is the mode of running SMS on a DFSMS system in which up to 32 names—representing systems, system groups, or both—are supported in the SMS configuration. When running in this mode, the DFSMS system can only share SCDSs, ACDSs, and COMMDSs with other DFSMS systems running in 32-name mode.

A

ABARS. Aggregate backup and recovery support.

ACB. See *Access method control block (ACB)*.

access method control block (ACB). A control block that links an application program to VSAM or VTAM programs.

access method services. A multifunction service program that manages VSAM and nonVSAM data sets, as well as integrated catalog facility (ICF). Access method services provides the following functions:

- defines and allocates space for data sets and catalogs
- converts indexed-sequential data sets to key-sequenced data sets
- modifies data set attributes in the catalog
- reorganizes data sets
- facilitates data portability among operating systems
- creates backup copies of data sets
- assists in making inaccessible data sets accessible
- lists the records of data sets and catalogs
- defines and builds alternate indexes
- converts CVOLS and VSAM catalogs to ICF catalogs

ACDS. See *Active control data set (ACDS)*.

ACS. See *Automatic class selection (ACS) routine*.

ACS installation exit. User-written code, run after an ACS routine, that provides capabilities beyond the scope of the ACS routine.

ACS interface routine. This calls an ACS routine from an ACS installation-exit routine.

activate. To load the contents of a source control data set (SCDS) into Storage Management Subsystem address space storage and into an active control data set (ACDS), or to load the contents of an existing ACDS into subsystem address space storage. This establishes a new storage management policy for the subsystem complex.

active configuration. The most recently activated SCDS, which now controls storage management for the Storage Management Subsystem complex.

active control data set (ACDS). A VSAM linear data set that contains an SCDS that has been activated to control the storage management policy for the

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installation. When activating an SCDS, you determine which ACDS will hold the active configuration (if you have defined more than one ACDS). The ACDS is shared by each system that is using the same SMS configuration to manage storage. See also *source control data set, communications data set*.

active data. (1) (1) Data that can be accessed without any special action by the user, such as data on primary storage or migrated data. Active data also can be stored on tape volumes. (2) (2) For tape mount management, application data that is frequently referenced, small in size, and managed better on DASD than on tape. (3) Contrast with *inactive data*.

addressing mode (AMODE). An attribute of an entry point in a load module or program object that identifies the addressing range in virtual storage which the module is capable of addressing. Above the 16-megabyte line, only 31-bit addresses can be used.

aggregate backup. The process of copying an aggregate group and recovery instructions so that a collection of data sets can be recovered later as a group.

aggregate group. A collection of related data sets and control information that have been pooled to meet a defined backup or recovery strategy.

alternate index. In systems with VSAM, a collection of index entries related to a given base cluster and organized by an alternate key, that is, a key other than the prime key of the associated base cluster data records; it gives an alternate directory for finding records in the data component of a base cluster.

always call. See *RACF always call*.

AMASPZAP. A service program used to used to dynamically update or dump programs and data sets.

AMODE. See *Addressing mode (AMODE).*

ANSI. American National Standards Institute.

API. Application program interface.

APPC. Advanced Program-to-Program Communication.

ASCII. American Standard Code for Information Interchange.

automated tape library data server. A device consisting of robotic components, cartridge storage areas, tape subsystems, and controlling hardware and software, together with the set of tape volumes that reside in the library and can be mounted on the library tape drives. Contrast with *manual tape library*. See also *tape library*.

automatic backup. (1) (1) In DFSMShsm, the process of automatically copying data sets from primary storage volumes or migration volumes to backup volumes. (2) (2) In OAM, the process of automatically copying a primary copy of an object from DASD, optical, or tape volume to a backup volume contained in an object backup storage group.

automatic class selection (ACS) routine. A procedural set of ACS language statements. Based on a set of input variables, the ACS language statements generate the name of a predefined SMS class, or a list of names of predefined storage groups, for a data set.

automatic dump. In DFSMShsm, the process of using DFSMSdss automatically to do a full-volume dump of all allocated space on a primary storage volume to designated tape dump volumes.

automatic primary space management insert. In DFSMShsm, the process of deleting expired data sets, deleting temporary data sets, releasing unused space, and migrating data sets from primary storage volumes automatically.

automatic secondary space management. In DFSMShsm, the process of automatically deleting expired migrated data sets, deleting expired records from the migration control data sets, and migrating eligible data sets from migration level 1 volumes to migration level 2 volumes.

automatic volume space management. In DFSMShsm, the process that includes automatic primary space management and interval migration.

availability. For a storage subsystem, the degree to which a data set or object can be accessed when requested by a user.

backhitch. Reversal of direction in a tape.

B

backup. The process of creating a copy of a data set or object to be used in case of accidental loss.

backup control data set (BCDS). In DFSMShsm, a VSAM key-sequenced data set that contains information about backup versions of data sets, backup volumes, dump volumes, and volumes under control of the backup and dump functions of DFSMShsm.

backup-while-open (BWO). This makes a backup copy of a data set while the data set is open for update. The backup copy can contain partial updates.

base configuration. The part of an SMS configuration that contains general storage management attributes, such as the default management class, default unit, and default device geometry. It also identifies the systems or system groups that an SMS configuration manages.

basic catalog structure (BCS). The name of the catalog structure in the integrated catalog facility environment. See also *integrated catalog facility catalog*.

basic direct access method (BDAM). An access method used to directly retrieve or update particular blocks of a data set on a direct access device.

basic partitioned access method (BPAM). An access method that can be applied to create program libraries in direct access storage for convenient storage and retrieval of programs.

basic sequential access method (BSAM). An access method for storing or retrieving data blocks in a continuous sequence, using either a sequential access or a direct access device.

BCS. See *Basic catalog structure (BCS)*.

BCDS. See *Backup control data set (BCDS)*.

BDAM. See *basic direct access method (BDAM)*.

binder. The DFSMS program that processes the output of language translators and compilers into an executable program (load module or program object). It replaces the linkage editor and batch loader in z/OS.

BPAM. See *Basic partitioned access method (BPAM)*.

BSAM. See *Basic sequential access method (BSAM)*.

buffer. A routine or storage used to compensate for a difference in rate of flow of data, or time of occurrence of events, when transferring data from one device to another.

C

cache fast write. A storage control capability in which the data is written directly to cache without using nonvolatile storage. Cache fast write is useful for temporary data or data that is readily recreated, such as the sort work files created by DFSORT. Contrast with *DASD fast write*.

cache set. A parameter on storage class and defined in the base configuration information that maps a logical name to a set of CF cache structure names.

capacity planning. The process of forecasting and calculating the appropriate amount of physical computing resources required to accommodate an expected workload.

Cartridge System Tape. The base tape cartridge media used with 3480 or 3490 Magnetic Tape Subsystems. Contrast with *Enhanced Capacity Cartridge System Tape*.

CAS. Catalog address space.

CCSID. Coded character set identifier.

CCW. See *channel command word (CCW).*

CDRA. See *Character Data Representation Architecture (CDRA)*.

CDS. Control data set.

CF. See *Coupling facility.*

CFRM. Coupling facility resource management.

channel command word (CCW). A double word at the location in main storage specified by the channel address word. One or more CCWs make up the channel program that directs data channel operations.

Character Data Representation Architecture (CDRA) API. A set of identifiers, services, supporting resources, and conventions for consistent representation, processing, and interchange of character data.

CI. See *Control interval (CI).*

CICS. Customer Information Control System.

class transition. An event that brings about change to an object's service-level criteria, causing OAM to invoke ACS routines to assign a new storage class or management class to the object.

client. (1) A function that requests services from a server, and makes them available to the user. (2) An address space in MVS that is using TCP/IP services. (3) A term used in an environment to identify a machine that uses the resources of the network. See also *source*.

client-server relationship. Any process that provides resources to other processes on a network is a *server*. Any process that employs these resources is a *client*. A machine can run client and server processes at the same time.

cluster. In VSAM, a named structure consisting of a group of related components. For example, when the data is key-sequenced, the cluster contains both the data and the index components.

Coded Character Set Identifier (CCSID). A 16-bit number that identifies a specific encoding scheme identifier, character set identifiers, code page identifiers, and additional coding required information. The CCSID uniquely identifies the coded graphic character representation used.

coexistence. Two or more systems at different levels (for example, software, service or operational levels) that share resources. The following are examples of multisystem configurations in which resource sharing can occur:

- A single system running multiple LPARs

- A single processor that is time-sliced to run different levels of the system (for example, during different times of the day)
- Two or more systems running separate processors
- A parallel sysplex configuration (also includes a basic sysplex)

Coexistence implies the ability of a system to know how to respond to a new function that is introduced on another system with which it shares resources. When coexistence is established, a system should respond in one of the following ways: support the new function, ignore the new function, or terminate gracefully.

COMMDS. See *Communications data set (COMMDS).*

common service area (CSA). A part of the common area that contains data areas addressable by all address spaces, but protected during its use by the key of the requester.

communications data set (COMMDS). The primary means of communication among systems governed by a single SMS configuration. The COMMDS is a VSAM linear data set that contains the name of the ACDS and current utilization statistics for each system-managed volume, which helps balance space among systems running SMS. See also *active control data set* and *source control data set*.

compatibility mode. For devices, it is a mode of operation that allows you to simulate the function of another device or model. This causes the device to function like a different device of the same type, ignoring some or all of the additional features the device might have. This allows you to migrate between devices with minimal impact on programs that have device dependencies.

compatibility mode. The mode of running SMS in which no more than eight names—representing systems, system groups, or both—are supported in the SMS configuration.

composite library. The virtual view of the Peer-to-Peer VTS subsystem to the host. In general, host communications with the library will be at the composite level with the virtual volumes and drives being defined to the composite library.

compress. (1) (1) To reduce the amount of storage required for a given data set by having the system replace identical words or phrases with a shorter token associated with the word or phrase. (2) (2) To reclaim the unused and unavailable space in a partitioned data set that results from deleting or modifying members by moving all unused space to the end of the data set.

compressed format. A particular type of extended-format data set specified with the (COMPACTION) parameter of data class. VSAM can compress individual records in a compressed-format data set. SAM can compress individual blocks in a compressed-format data set. See *compress*.

concurrent copy. A function to increase the accessibility of data by enabling you to make a consistent backup or copy of data concurrent with the usual application program processing.

configuration (Storage Management Subsystem). See *SMS configuration*.

connectivity. (1) (1) The considerations regarding how storage controls are joined to DASD and processors to achieve adequate data paths (and alternative data paths) to meet data availability needs. (2) (2) In a system-managed storage environment, the system status of volumes and storage groups.

construct. One of the following: data class, storage class, management class, storage group, aggregate group, base configuration.

control interval (CI). A fixed-length area of auxiliary storage space in which VSAM stores records. It is the unit of information (an integer multiple of block size) transmitted to or from auxiliary storage by VSAM.

convert in place. See *in-place conversion*.

coupling facility (CF). The hardware that provides high-speed caching, list processing, and locking functions in a Parallel Sysplex.

cross-functional. Features, changes, or other characteristics that affect more than one DFSMS functional component.

coupled extended remote copy. Allows several logical data mover sessions running on independent MVS system images to be logically connected so that all volumes in all sessions are treated as if they are part of the same master data mover session. This makes the disaster recovery and workload migration functions of XRC available to large environments.

coupling facility (CF) cache structure. The CF hardware that provides a data cache.

coupling facility (CF) lock structure. The CF hardware that supports sysplex-wide locking.

CR. Consistent read.

CSA. See *Common service area (CSA).*

CVAF. Common VTOC access facility.

CXRC. See *Coupled Extended Remote Copy.*

D

DADSM. See *Direct access device space management (DADSM).*

DASD. See *Direct access storage device (DASD).*

DASD fast write. An extended function in which data is written concurrently to cache and nonvolatile storage and automatically scheduled for destaging to DASD. Both copies are retained in the storage control until the data is completely written to the DASD, providing data integrity equivalent to writing directly to the DASD. Use of DASD fast write for system-managed data sets is controlled by storage class attributes to improve performance. See also *dynamic cache management*. Contrast with *cache fast write*.

DASD volume. A DASD space identified by a common label and accessed by a set of related addresses. See also *volume, primary storage, migration level 1, migration level 2*.

datamover. The type of movement to be used when performing a backup of the DFSMShsm control data sets.

data class. A collection of allocation and space attributes, defined by the storage administrator, that are used to create a data set.

Data Facility Sort. An IBM licensed program that is a high-speed data processing utility. DFSORT provides an efficient and flexible way to handle sorting, merging, and copying operations, as well as providing versatile data manipulation at the record, field, and bit level.

data set. In DFSMS, the major unit of data storage and retrieval, consisting of a collection of data in one of several prescribed arrangements and described by control information to which the system has access. In z/OS non-UNIX environments, the terms *data set* and *file* are generally equivalent and sometimes are used interchangeably. See also *file*. In z/OS UNIX environments, the terms *data set* and *file* have quite distinct meanings.

data set collection. A group of data sets which are intended to be allocated on the same tape volume or set of tape volumes as a result of data set stacking.

data set organization. The type of arrangement of data in a data set. Examples are sequential organization or partitioned organization.

data set stacking. The function used to place several data sets on the same tape volume or set of tape volumes. It increases the efficiency of tape media usage and reduces the overall number of tape volumes needed by allocation. It also allows an installation to group related data sets together on a minimum number of tape volumes, which is useful when sending data offsite.

DDM. See *Distributed Data Management (DDM).*

default device geometry. Part of the SMS base configuration, it identifies the number of bytes per track and the number of tracks per cylinder for converting space requests made in tracks or cylinders into bytes, when no unit name has been specified.

default management class. Part of the SMS base configuration, it identifies the management class that should be used for system-managed data sets that do not have a management class assigned.

default unit. Part of the SMS base configuration, it identifies an esoteric (such as SYSDA) or generic (such as 3390) device name. If a user omits the UNIT parameter on the JCL or the dynamic allocation equivalent, SMS applies the default unit if the data set has a disposition of MOD or NEW and is *not* system-managed.

device category. A storage device classification used by SMS. The device categories are as follows SMS-managed DASD, SMS-managed tape, non-SMS-managed DASD non-SMS-managed tape.

device management. The task of defining input and output devices to the operating system, and then controlling the operation of these devices.

Device Support Facilities (ICKDSF). A program used for initialization of DASD volumes and track recovery.

DFM. See *Distributed FileManager.*

DFSMSdfp. A DFSMS functional component or base element of z/OS, that provides functions for storage management, data management, program management, device management, and distributed data access.

DFSMSdss. A DFSMS functional component or base element of z/OS, used to copy, move, dump, and restore data sets and volumes.

DFSMShsm. A DFSMS functional component or base element of z/OS, used for backing up and recovering data, and managing space on volumes in the storage hierarchy.

DFSMShsm control data set. In DFSMShsm, one of three VSAM key-sequenced data sets that contain records used in DFSMShsm processing. See also *backup control data set, migration control data set, offline control data set*.

DFSMShsm-managed volume. (1) (1) A primary storage volume, which is defined to DFSMShsm but which does not belong to a storage group. (2) (2) A volume in a storage group, which is using DFSMShsm automatic dump, migration, or backup services. Contrast with *system-managed volume, DFSMSrmm-managed volume*.

DFSMShsm-owned volume. A storage volume on which DFSMShsm stores backup versions, dump copies, or migrated data sets.

DFSMS Network File System. See *z/OS Network File System*.

DFSMS Optimizer Feature. A DFSMS feature that provides an analysis and reporting capability for SMS and non-SMS environments.

DFSMSrmm. A DFSMS functional component or base element of z/OS, that manages removable media.

DFSMSrmm-managed volume. A tape volume that is defined to DFSMSrmm. Contrast with *system-managed volume, DFSMShsm-managed volume*.

DFSORT. See *Data Facility Sort.*

dictionary. A table that associates words, phrases, or data patterns to shorter tokens. The tokens replace the associated words, phrases, or data patterns when a data set is compressed.

direct access device space management (DADSM). A DFSMSdfp component used to control space allocation and deallocation on DASD.

direct access storage device (DASD). A device in which time is effectively independent of the location of the data.

disaster recovery. A procedure for copying and storing an installation's essential business data in a secure location, and for recovering that data in the event of a catastrophic problem. Compare with *vital records*.

Distributed Data Management (DDM). A data protocol architecture for data management services across distributed systems in an SNA environment. DDM provides a common data management language for data interchange among different IBM system platforms.

distributed library. An underlying physical library in a Peer-to-Peer VTS subsystem.

Distributed FileManager/MVS. (1) The term used to describe the SAA® architectures and programming support that provide distributed file access capabilities between SAA systems. (2) The DFSMS component that implements the DDM target server.

drive definition. A set of attributes used to define an optical disk drive as a member of a real optical library or pseudo optical library.

DSORG. See *Data set organization.*

dual copy. A high availability function made possible by nonvolatile storage in some models of the IBM 3990 Storage Control. Dual copy maintains two functionally identical copies of designated DASD volumes in the logical 3990 subsystem, and automatically updates both copies every time a write operation is issued to the dual copy logical volume.

dummy storage group. A type of storage group that contains the serial numbers of volumes no longer connected to a system. Dummy storage groups allow existing JCL to function without having to be changed. See also *storage group*.

dump class. A set of characteristics that describes how volume dumps are managed by DFSMShsm.

duplexing. The process of writing two sets of identical records in order to create a second copy of data.

dynamic cache management. A function that automatically determines which data sets will be cached based on the 3990 subsystem load, the characteristics of the data set, and the performance requirements defined by the storage administrator.

E

EA. See *Extended addressability.*

ECS. Enhanced catalog sharing.

EF. See *Extended format.*

eject. The process used to remove a volume from a system-managed library. For an automated tape library dataserver, the volume is removed from its cell location and moved to the output station. For a manual tape library dataserver, the volume is not moved, but the tape configuration database is updated to show the volume no longer resides in the manual tape library dataserver.

ELPA. See *Extended link pack area (ELPA).*

Enhanced Capacity Cartridge System Tape. Cartridge system tape with increased capacity that can only be used with 3490E Magnetic Tape Subsystems. Contrast with *Cartridge System Tape*.

ESDS. Entry-sequenced data set.

EPLPA. See *Extended pageable link pack area (EPLPA).*

erase-on-scratch. The physical erasure of data on a DASD data set when the data set is deleted (scratched).

ESA. Enterprise Systems Architecture.

ESCON. Enterprise System Connection.

ESD. External symbol dictionary.

ESDS. See *Entry-sequenced data set (ESDS).*

esoteric unit name. A name used to define a group of devices having similar hardware characteristics, such as TAPE or SYSDA. Contrast with *generic unit name*.

ESS. Enterprise Storage Server.

EXCP. See *Execute channel program (EXCP).*

execute channel program (EXCP). A macro used to access a data set without specifying the organization.

expiration. (1) The process by which data sets or objects are identified for deletion because their expiration date or retention period has passed. On DASD, data sets and objects are deleted. On tape, when all data sets have reached their expiration date, the tape volume is available for reuse. (2) In DFSMSrmm, all volumes have an expiration date or retention period set for them either by vital record specification policy, by user-specified JCL when writing a data set to the volume, or by an installation default. When a volume reaches its expiration date or retention period, it becomes eligible for release.

export. The operation to remove one or more logical volumes from a virtual tape server library. First, the list of logical volumes to export must be written on an export list volume and then, the export operation itself must be initiated.

extended addressability. The ability to create and access a VSAM data set that is greater than 4 GB in size. Extended addressability data sets must be allocated with DSNTYPE=EXT and EXTENDED ADDRESSABILITY=Y.

extended format. The format of a data set that has a data set name type (DSNTYPE) of EXTENDED. The data set is structured logically the same as a data set that is not in extended format but the physical format is different. Data sets in extended format can be striped or compressed. Data in an extended format VSAM KSDS can be compressed. See also *striped data set, compressed format*.

extended format data set. A data set that is structured logically the same as a physical sequential or VSAM data set but that is stored in a different physical format. Extended format data sets consist of one or more stripes and can take advantage of the sequential data striping access technique. See also *striping* and *stripe*.

extended link pack area (ELPA). The extension of the link pack area that resides above 16 megabytes in virtual storage. See also *link pack area*.

extended pageable link pack area (EPLPA). The extension of the pageable link pack area that resides above 16 megabytes in virtual storage. See also *pageable link pack area*.

extended remote copy. Extended Remote Copy (XRC) is a technique involving both the DFSMS host and the I/O Subsystem that keeps a ″real time″ copy of designated data at another location. Updates to the primary center are replicated at the secondary center asynchronously.

F

FCT. File control table.

file. A collection of information treated as a unit. In non-z/OS UNIX environments, the terms *data set* and *file* are generally equivalent and are sometimes used interchangeably. See also *data set*.

file system. In the z/OS UNIX HFS environment, the collection of files and file management structures on a physical or logical mass storage device, such as a diskette or minidisk. See also *HFS data set*.

filtering. The process of selecting data sets based on specified criteria. These criteria consist of fully or partially-qualified data set names or of certain data set characteristics.

FLPA. Fixed link pack area.

FSR. See *Functional statistics record.*

functional component. A member of the DFSMS family that consists of:

- DFSMSdfp—a base element of z/OS
- DFSMSdss—an optional feature of z/OS
- DFSMShsm—an optional feature of z/OS
- DFSMSrmm—an optional feature of z/OS

functional statistics record. A record that is created each time a DFSMShsm function is processed. It contains a log of system activity and is written to the system management facilities (SMF) data set.

G

GB. Gigabyte

GDG. See *Generation data group (GDG).*

GDS. See *Generation data set.*

generalized trace facility (GTF). An optional OS/VS service program that records significant system events, such as supervisor calls and start I/O operations, for the purpose of problem determination.

generation data group (GDG). A collection of historically related non-VSAM data sets that are arranged in chronological order; each data set is a generation data set.

generation data set. One generation of a generation data group.

generic unit name. A name assigned to a class of devices with the same geometry (such as 3390). Contrast with *esoteric unit name*.

global access checking. In RACF, the ability to establish an in-storage table of default values containing

authorization levels for selected resources. RACF refers to this table prior to performing its usual RACHECK processing, and grants the request without performing a RACHECK if the requested access authority does not exceed the global value. Global access checking can grant a user access to the resource, but it cannot deny access.

global resource serialization (GRS). A component of z/OS used for serializing use of system resources and for converting hardware reserves on DASD volumes to data set enqueues.

GOFF. Generalized object file format.

GRS. See *Global resource serialization (GRS).*

GRS complex (GRSplex). One or more z/OS images that share a common global resource serialization policy in either a ring or star configuration.

group. (1) (1) With respect to partitioned data sets, a member and the member's aliases that exist in a PDS or PDSE, or in an unloaded PDSE. (2) (2) A collection of users who can share access authorities for protected resources.

GSR. Global shared resources.

GTF. See *Generalized trace facility (GTF).*

guaranteed space. A storage class attribute indicating that DFSMS is to honor user-specified VOL=SER= parameters, and that the Storage Management Subsystem is to fail the request if space is not available on the requested volumes. You can use this attribute to preallocate space on all volumes that you specify. If you do not supply volume serials, the Storage Management Subsystem selects volumes and preallocates space on as many of them as you requested, either explicitly by being specified on the JCL or implicitly from the "volume count" field of the data class.

GUI. Graphical user interface.

H

hardware configuration definition (HCD). An interactive interface in MVS that enables an installation to define hardware configurations from a single point of control.

HCD. See *Hardware Configuration Definition (HCD).*

HFS. See *Hierarchical file system (HFS) data set.*

hierarchical file system (HFS) data set. A data set that contains a POSIX-compliant file system, which is a collection of files and directories organized in a hierarchical structure, that can be accessed using z/OS UNIX System Services. See also *file system.*

Hiperspace™. A high-performance space backed by either expanded storage or auxiliary storage, which provides high performance storage and retrieval of data.

HSM complex (HSMplex). One or more z/OS images running DFSMShsm that share a common set of control data sets (MCDS, BCDS, OCDS, and Journal).

I

IART. Initial access response time.

ICF. See *Integrated catalog facility.*

ICKDSF. See *Device Support Facilities (ICKDSF).*

implementation by milestone. A conversion approach that allows for a staged conversion of your installation's data to system-managed storage on DASD, tape, or optical devices.

import. The operation to enter previously exported logical volumes residing on a stacked volume into a virtual tape server library. First, the list of logical volumes to import must be written on an import list volume and the stacked volumes must be entered, and then, the import operation itself must be initiated.

improved data recording capability (IDRC). A recording mode that can increase the effective cartridge data capacity and the effective data rate when enabled and used. IDRC is always enabled on the 3490E Magnetic Tape Subsystem.

IMS. Information Management System.

inactive data. (1) (1) A copy of active data, such as vital records or a backup copy of a data set. Inactive data is never changed, but can be deleted or superseded by another copy. (2) (2) In tape mount management, data that is written once and never used again. The majority of this data is point-in-time backups. (3) (3) Objects infrequently accessed by users and eligible to be moved to the optical library or shelf. (4) Contrast with *active data*.

indexed VTOC. A volume table of contents with an index that contains a list of data set names and free space information, which allows data sets to be located more efficiently.

initial program load (IPL). (1) (1) The initialization procedure that causes an operating system to commence operation. (2) (2) The process by which a configuration image is loaded into storage at the beginning of a work day or after a system malfunction. (3) (3) The process of leading system programs and preparing a system to run jobs. (4) (4) Synonymous with system restart, system startup.

in-place conversion. The process of bringing a volume and the data sets it contains under the control of SMS without data movement, using DFSMSdss.

integrated catalog facility catalog. A catalog that is composed of a basic catalog structure (BCS) and its related volume tables of contents (VTOCs) and VSAM volume data sets (VVDSs). See also *basic catalog structure, VSAM volume data set*.

Interactive Storage Management Facility (ISMF). The interactive interface of DFSMS that allows users and storage administrators access to the storage management functions.

Interactive System Productivity Facility (ISPF). An interactive base for ISMF.

interval migration. In DFSMShsm, automatic migration that occurs when a threshold level of occupancy is reached or exceeded on a DFSMShsm-managed volume, during a specified time interval. Data sets are moved from the volume, largest eligible data set first, until the low threshold of occupancy is reached.

IPL. See *Initial program load (IPL).*

ISMF. See *Interactive Storage Management Facility (ISMF).*

ISO. International Organization for Standardization.

ISPF. See *Interactive System Productivity Facility (ISPF).*

J

JCL. See *Job control language (JCL).*

Job control language (JCL). A problem-oriented language used to identify the job or describe its requirements to an operating system.

K

KB. Kilobyte.

key-sequenced data set (KSDS). A VSAM data set whose records are loaded in ascending key sequence and controlled by an index.

KSDS. Key-sequenced data set.

L

LDS. See *Linear data set.*

LE. Language Environment.

linear data set. A VSAM data set that contains data but contains no control information. A linear data set can be accessed as a byte-addressable string in virtual storage.

link pack area (LPA). In MVS, an area of virtual storage that contains reenterable routines that are loaded at IPL time and can be used concurrently by all tasks in the system.

load module. An executable program stored in a partitioned data set program library. See also *program object*.

LPA. See *Link pack area (LPA).*

LPAR. Logical partition. For example, a single system can run multiple logical partitions.

LSR. Local shared resources.

M

MAC. Multiple allegiance capability.

management class. A collection of management attributes, defined by the storage administrator, used to control the release of allocated but unused space; to control the retention, migration, and backup of data sets; to control the retention and backup of aggregate groups, and to control the retention, backup, and class transition of objects.

manual tape library. Installation-defined set of tape drives defined as a logical unit together with the set of system-managed volumes which can be mounted on the drives.

MB. Megabyte.

MCD. Migration control record.

MCDS. See *Migration control data set (MCDS).*

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.

migration. The process of moving unused data to lower cost storage in order to make space for high-availability data. If you wish to use the data set, it must be recalled. See also *migration level 1, migration level 2*.

migration control data set (MCDS). In DFSMShsm, a VSAM key-sequenced data set that contains statistics records, control records, user records, records for data sets that have migrated, and records for volumes under migration control of DFSMShsm.

migration level 1. DFSMShsm-owned DASD volumes that contain data sets migrated from primary storage volumes. The data can be compressed. See also *storage hierarchy*. Contrast with *primary storage, migration level 2*.

migration level 2. DFSMShsm-owned tape or DASD volumes that contain data sets migrated from primary storage volumes or from migration level 1 volumes. The data can be compressed. See also *storage hierarchy*. Contrast with *primary storage, migration level 1*.

ML1. See *Migration level 1.*

ML2. See *Migration level 2.*

MLPA. See *Modified link pack area (MLPA).*

modified link pack area (MLPA). An area of virtual storage containing reenterable routines from the SYS1.LINKLIB, SYS1.SVCLIB, or SYS1.LPALIB system data sets that are to be part of the pageable extension of the link pack area during the current IPL. See also *link pack area*.

MSR. Millisecond response time.

MTL. See *manual tape library.*

MVS. Multiple virtual storage.

MVS/ESA. Multiple Virtual Storage/Enterprise Systems Architecture. A z/OS operating system environment that supports ESA/390.

MVS/ESA SP. An IBM licensed program used to control the z/OS operating system. MVS/ESA SP together with DFSMS compose the base MVS/ESA operating environment. See also *z/OS*.

N

NaviQuest. A component of DFSMSdfp for implementing, verifying, and maintaining your DFSMS SMS environment in batch mode. It provides batch testing and reporting capabilities that can be used to automatically create test cases in bulk, run many other storage management tasks in batch mode, and use supplied ACS code fragments as models when creating your own ACS routines.

NFS. Network File System.

nondisruptive installation. A capability that allows users to access data in an existing storage subsystem while installing additional devices in the subsystem.

nonvolatile storage (NVS). Additional random access electronic storage with a backup battery power source, available with an IBM Cache Storage Control, used to retain data during a power outage. Nonvolatile storage, accessible from all storage directors, stores data during DASD fast write and dual copy operations.

NRI. No read integrity.

NSR. Non-shared resources.

NVR. Non-VSAM volume record.

O

OAM. See *Object access method (OAM).*

OAM-managed volumes. Optical or tape volumes controlled by the object access method (OAM).

OAM complex (OAMplex). One or more instances of OAM running on systems that are part of a parallel sysplex. The OAM systems that are part of an OAM complex share a common OAM database in a DB2 data-sharing group.

object. A named byte stream having no specific format or record orientation.

object access method (OAM). An access method that provides storage, retrieval, and storage hierarchy management for objects and provides storage and retrieval management for tape volumes contained in system-managed libraries.

object backup storage group. A type of storage group that contains optical or tape volumes used for backup copies of objects. See also *storage group*.

object storage group. A type of storage group that contains objects on DASD, tape, or optical volumes. See also *storage group*.

object storage hierarchy. A hierarchy consisting of objects stored in DB2 table spaces on DASD, on optical or tape volumes that reside in a library, and on optical or tape volumes that reside on a shelf. See also *storage hierarchy.*

OCDS. See *Offline control data set (OCDS).*

OCO. Object code only.

offline control data set (OCDS). In DFSMShsm, a VSAM key-sequenced set that contains information about tape backup volumes and tape migration level 2 volumes.

OLTP. Online transaction processing.

OpenEdition MVS. See *z/OS UNIX System Services.*

OpenEdition MVS file system. See *z/OS UNIX file system.*

optical disk drive. The mechanism used to seek, read, and write data on an optical disk. An optical disk drive can be operator-accessible or library-resident.

optical library. A storage device that houses optical drives and optical cartridges, and contains a mechanism for moving optical disks between a cartridge storage area and optical disk drives.

optical volume. Storage space on an optical disk, identified by a volume label. See also *volume*.

z/OS Network File System. A base element of z/OS, that allows remote access to z/OS host processor data from workstations, personal computers, or any other system on a TCP/IP network that is using client software for the Network File System protocol.

z/OS UNIX System Services (z/OS UNIX). The set of functions provided by the SHELL and UTILITIES, kernel, debugger, file system, C/C++ Run-Time Library, Language Environment, and other elements of the z/OS operating system that allow users to write and run application programs that conform to UNIX standards.

P

pageable link pack area (PLPA). An area of virtual storage containing SVC routines, access methods, and other read-only system and user programs that can be shared among users of the system. See also *link pack area*.

parallel access volume. An Enterprise Storage Server capability of multiple concurrent access to a single volume from a single host.

parallel sysplex. A systems complex that consists of multiple systems coupled together by hardware elements and system services. The systems must be defined by the COUPLExx members of SYS1.PARMLIB as being a parallel sysplex.

partitioned data set (PDS). A data set on direct access storage that is divided into partitions, called members, each of which can contain a program, part of a program, or data.

partitioned data set extended (PDSE). A system-managed data set that contains an indexed directory and members that are similar to the directory and members of partitioned data sets. A PDSE can be used instead of a partitioned data set.

PAV. See *parallel access volume*.

PDA. Problem determination aid.

PDS. See *Partitioned data set (PDS)*.

PDSE. See *Partitioned data set extended (PDSE)*.

Peer-to-Peer remote copy (PPRC). A hardware-based remote copy option that provides a synchronous volume copy across storage subsystems for disaster recovery, device migration, and workload migration.

Peer-to-Peer Virtual Tape Server. Multiple VTS subsystems and their associated tape libraries coupled together to form one subsystem and library image to the host.

performance. (1) (1) A measurement of the amount of work a product can produce with a given amount of resources. (2) (2) In a system-managed storage environment, a measurement of effective data processing speed with respect to objectives set by the storage administrator. Performance is largely determined by throughput, response time, and system availability.

permanent data set. A user-named data set that is normally retained for longer than the duration of a job or interactive session. Contrast with *temporary data set*.

PLPA. See *Pageable link pack area (PLPA)*.

pool. See *storage pool*.

pool storage group. A type of storage group that contains system-managed DASD volumes. Pool storage groups allow groups of volumes to be managed as a single entity. See also *storage group*.

PPRC. See *Peer-to-Peer remote copy (PPRC)*.

primary data set. When referring to an entire data set collection, the primary data set is the first data set allocated. For individual data sets being stacked, the primary data set is the one in the data set collection that precedes the data set being stacked and is allocated closest to it.

primary space allocation. Amount of space requested by a user for a data set when it is created. Contrast with *secondary space allocation*.

primary storage. A DASD volume available to users for data allocation. The volumes in primary storage are called primary volumes. See also *storage hierarchy*. Contrast with *migration level 1, migration level 2*.

program management. The task of preparing programs for execution, storing the programs, load modules, or program objects in program libraries, and executing them on the operating system.

program object. All or part of a computer program in a form suitable for loading into virtual storage for execution. Program objects are stored in PDSE program libraries and have fewer restrictions than load modules. Program objects are produced by the binder.

pseudo optical library. A set of shelf-resident optical volumes associated with an operator-accessible optical disk drive; see also *real optical library*.

PSF. Print Services Facility™

PSP. Preventive Service Planning.

PTF. Program Temporary Fix.

Q

QCT. Queue control table.

QSAM. See *Queued sequential access method (QSAM)*.

queued sequential access method (QSAM). An extended version of the basic sequential access method (BSAM). Input data blocks awaiting processing or output data blocks awaiting transfer to auxiliary storage are queued on the system to minimize delays in I/O operations.

R

RACF. See *Resource Access Control Facility (RACF)*.

RACF always call. A term for the procedure used by DFSMSdfp to check all data sets automatically for discrete or generic RACF profiles to verify access authority.

RBA. See *Relative byte address (RBA)*.

real optical library. Physical storage device that houses optical disk drives and optical cartridges, and contains a mechanism for moving optical disks between a cartridge storage area and optical disk drives. Contrast with *pseudo optical library*.

record-level sharing. See *VSAM record-level sharing*.

recovery. The process of rebuilding data after it has been damaged or destroyed, often by using a backup copy of the data or by reapplying transactions recorded in a log.

relative byte address (RBA). In VSAM, the displacement of a data record or a control interval from the beginning of the data set to which it belongs independent of the manner in which the data set is stored.

relative-record data set (RRDS). A VSAM data set whose records are loaded into fixed-length slots.

removable media library. The volumes that are available for immediate use, and the shelves where they could reside.

residence mode (RMODE). The attribute of a load module or program object that identifies where in virtual storage the program is to reside (above or below 16 megabytes).

Resource Access Control Facility (RACF). An IBM licensed program that is included in z/OS Security Server and is also available as a separate program for the z/OS and VM environments. RACF provides access control by identifying and verifying the users to the system, authorizing access to protected resources, logging detected unauthorized attempts to enter the system, and logging detected accesses to protected resources.

Resource Measurement Facility (RMF). An IBM licensed program or optional element of z/OS, that measures selected areas of system activity and presents the data collected in the format of printed reports, system management facilities (SMF) records, or display reports. Use RMF to evaluate system performance and identify reasons for performance problems.

RETAIN. Remote Technical Assistance and Information Network.

retained lock. A lock protecting transaction updates when a problem delays transaction recovery of the updates. The retained status is cleared when transaction recovery completes.

RLS. See *Record-level sharing*.

RMF™. See *Resource Measurement Facility (RMF)*.

RMODE. See *Residence mode (RMODE)*.

RPL. Request parameter list.

RRDS. See *Relative-record data set (RRDS)*.

RSECT. Read-only control section.

S

SAA. Systems Application Architecture®.

SAF. System Authorization Facility.

SCDS. See *Source control data set (SCDS)*.

SDSP. See *Small data set packing (SDSP)*.

secondary space allocation. Amount of additional space requested by the user for a data set when primary space is full. Contrast with *primary space allocation*.

sequential data striping. A software implementation of a disk array that distributes a data set across multiple volumes to improve performance.

service level (Storage Management Subsystem). A set of logical characteristics of storage required by a Storage Management Subsystem-managed data set (for example, performance, security, availability).

service-level agreement. (1) (1) An agreement between the storage administration group and a user group defining what service-levels the former will provide to ensure that users receive the space, availability, performance, and security they need. (2) (2) An agreement between the storage administration group and operations defining what service-level operations will provide to ensure that storage management jobs required by the storage administration group are completed.

Service Level Reporter (SLR). An IBM licensed program that provides the user with a coordinated set of tools and techniques and consistent information to help manage the data processing installation. For example, SLR extracts information from SMF, IMS, and CICS logs, formats selected information into tabular or graphic reports, and gives assistance in maintaining database tables.

SFI. Structured field introducers.

sharing control data set. A VSAM linear data set that contains information DFSMSdfp needs to ensure the integrity of the data sharing environment.

SHCDS. See *Sharing control data set.*

shelf. A place for storing removable media, such as tape and optical volumes, when they are not being written to or read.

shelf location. (1) A single space on a shelf for storage of removable media. (2) In DFSMSrmm, a shelf location is defined in the removable media library by a rack number, and in a storage location, it is defined by a bin number. See also *rack number, bin number*.

small-data-set packing (SDSP). In DFSMShsm, the process used to migrate data sets that contain equal to or less than a specified amount of actual data. The data sets are written as one or more records into a VSAM data set on a migration level 1 volume.

small-data-set-packing data set. In DFSMShsm, a VSAM key-sequenced data set allocated on a migration level 1 volume and containing small data sets that have been migrated.

SMB. System-managed buffering.

SMF. See *System management facilities (SMF).*

SMS. See *Storage Management Subsystem (SMS).*

SMS complex. A collection of systems or system groups that share a common configuration. All systems in an SMS complex share a common active control data set (ACDS) and a communications data set (COMMDS). The systems or system groups that share the configuration are defined to SMS in the SMS base configuration.

SMS configuration. A configuration base, Storage Management Subsystem class, group, library, and drive definitions, and ACS routines that the Storage Management Subsystem uses to manage storage. See also *configuration, base configuration, source control data set* .

SMS control data set. A VSAM linear data set containing configurational, operational, or communications information that guides the execution of the Storage Management Subsystem. See also *source control data set, active control data set, communications data set*.

SNA. Systems Network Architecture.

source. That portion of the DDM architecture that is necessary for a system to provide source support, allowing a system providing this support to request access to remote data on a remote (target) system. See also *client*.

source control data set (SCDS). A VSAM linear data set containing an SMS configuration. The SMS configuration in an SCDS can be changed and validated using ISMF. See also *active control data set, communications data set*.

spill storage group. See *overflow storage group.*

SSM. Secondary space management.

stacked volume. Stacked volumes have a one-to-one association with physical tape media and are used in a Virtual Tape Server to store logical volumes. Stacked volumes are not used by MVS applications but by the Virtual Tape Server and its associated utilities. They may be removed from a Virtual Tape Server to allow transportation of logical volumes to a vault or to another VTS.

storage administration group. A centralized group within the data processing center that is responsible for managing the storage resources within an installation.

storage administrator. A person in the data processing center who is responsible for defining, implementing, and maintaining storage management policies.

storage class. A collection of storage attributes that identify performance goals and availability requirements, defined by the storage administrator, used to select a device that can meet those goals and requirements.

storage control. The component in a storage subsystem that handles interaction between processor channel and storage devices, runs channel commands, and controls storage devices.

storage director. In a 3990 Storage Control, a logical entity consisting of one or more physical storage paths in the same storage cluster. In a 3880, a storage director is equivalent to a storage path.

storage group. A collection of storage volumes and attributes, defined by the storage administrator. The collections can be a group of DASD volumes or tape volumes, or a group of DASD, optical, or tape volumes treated as a single object storage hierarchy. See also *VIO storage group, pool storage group, tape storage group, object storage group, object backup storage group, dummy storage group*.

storage group category. A grouping of specific storage groups which contain the same type of data. This concept is analogous to storage pools in a non-system-managed environment.

storage hierarchy. An arrangement of storage devices with different speeds and capacities. The levels of the storage hierarchy include main storage (memory, DASD cache), primary storage (DASD containing uncompressed data), migration level 1 (DASD containing data in a space-saving format), and migration level 2 (tape cartridges containing data in a space-saving format). See also *primary storage, migration level 1, migration level 2, object storage hierarchy*.

storage location. A location physically separate from the removable media library where volumes are stored for disaster recovery, backup, and vital records management.

storage management. The activities of data set allocation, placement, monitoring, migration, backup, recall, recovery, and deletion. These can be done either manually or by using automated processes. The Storage Management Subsystem automates these processes for you, while optimizing storage resources. See also *Storage Management Subsystem*.

Storage Management Subsystem (SMS). A DFSMS facility used to automate and centralize the management of storage. Using SMS, a storage administrator describes data allocation characteristics, performance and availability goals, backup and retention requirements, and storage requirements to the system through data class, storage class, management class, storage group, and ACS routine definitions.

storage pool. A predefined set of DASD volumes used to store groups of logically related data according to user requirements for service or according to storage management tools and techniques.

storage subsystem. A storage control and its attached storage devices. See also *tape subsystem*.

stripe. In DFSMS, the portion of a striped data set, such as an extended format data set, that resides on one volume. The records in that portion are not always logically consecutive. The system distributes records among the stripes such that the volumes can be read from or written to simultaneously to gain better performance. Whether it is striped is not apparent to the application program.

striping. A software implementation of a disk array that distributes a data set across multiple volumes to improve performance.

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 data. The data sets required by z/OS or its subsystems for initialization and control.

system group. All systems that are part of the same Parallel Sysplex and are running the Storage Management Subsystem with the same configuration, minus any systems in the Parallel Sysplex that are explicitly defined in the SMS configuration.

system-managed buffering for VSAM. A facility available for system-managed extended-format VSAM data sets in which DFSMSdfp determines the type of buffer management technique along with the number of buffers to use, based on data set and application specifications.

system-managed data set. A data set that has been assigned a storage class.

system-managed storage. Storage managed by the Storage Management Subsystem. SMS attempts to deliver required services for availability, performance, and space to applications. See also *system-managed storage environment*.

DFSMS environment. An environment that helps automate and centralize the management of storage. This is achieved through a combination of hardware, software, and policies. In the DFSMS environment for MVS, this function is provided by DFSMS, DFSORT, and RACF. See also *system-managed storage*.

system-managed tape library. A collection of tape volumes and tape devices, defined in the tape configuration database. A system-managed tape library can be automated or manual. See also *tape library.*

system-managed volume. A DASD, optical, or tape volume that belongs to a storage group. Contrast with *DFSMShsm-managed volume, DFSMSrmm-managed volume*.

system management facilities (SMF). A component of z/OS that collects input/output (I/O) statistics, provided at the data set and storage class levels, which helps you monitor the performance of the direct access storage subsystem.

system programmer. A programmer who plans, generates, maintains, extends, and controls the use of an operating system and applications with the aim of improving overall productivity of an installation.

T

tape configuration database (TCDB). One or more volume catalogs used to maintain records of system-managed tape libraries and tape volumes.

tape librarian. The person who manages the tape library. This person is a specialized storage administrator.

tape library. A set of equipment and facilities that support an installation's tape environment. This can include tape storage racks, a set of tape drives, and a set of related tape volumes mounted on those drives. See also *system-managed tape library, automated tape library data server*.

Tape Library Dataserver. A hardware device that maintains the tape inventory that is associated with a set of tape drives. An automated tape library dataserver also manages the mounting, removal, and storage of tapes.

tape mount management. The methodology used to optimize tape subsystem operation and use, consisting of hardware and software facilities used to manage tape data efficiently.

tape storage group. A type of storage group that contains system-managed private tape volumes. The tape storage group definition specifies the system-managed tape libraries that can contain tape volumes. See also *storage group*.

tape subsystem. A magnetic tape subsystem consisting of a controller and devices, which allows for the storage of user data on tape cartridges. Examples of tape subsystems include the IBM 3490 and 3490E Magnetic Tape Subsystems.

tape volume. A tape volume is the recording space on a single tape cartridge or reel. See also *volume*.

target. That portion of the DDM architecture that is necessary for a system to provide target support, allowing a system providing this support to receive and process requests from a remote (source) system. See also *server*.

TB. Terabyte.

TCDB. See *Tape configuration database.*

TCP/IP. See *Transmission Control Protocol/Internet Protocol (TCP/IP).*

temporary data set. An uncataloged data set whose name begins with & or &&, that is normally used only for the duration of a job or interactive session. Contrast with *permanent data set*.

threshold. A storage group attribute that controls the space usage on DASD volumes, as a percentage of occupied tracks versus total tracks. The *low migration threshold* is used during primary space management and interval migration to determine when to stop processing data. The *high allocation threshold* is used to determine candidate volumes for new data set allocations. Volumes with occupancy lower than the high threshold are selected over volumes that meet or exceed the high threshold value.

TMM. See *Tape mount management.*

Transmission Control Protocol/Internet Protocol (TCP/IP). A suite of protocols designed to allow communication between networks regardless of the technologies implemented in each network.

U

UCB. See *Unit control block (UCB).*

UIM. Unit information module.

unit affinity. Requests that the system allocate different data sets residing on different removable volumes to the same device during execution of the step to reduce the total number of tape drives required to execute the step. Explicit unit affinity is specified by coding the UNIT=AFF JCL keyword on a DD statement. Implicit unit affinity exists when a DD statement requests more volumes than devices.

unit control block (UCB). A control block in storage that describes the characteristics of a particular I/O device on the operating system.

use attribute. (1) (1) The attribute assigned to a DAD volume that controls when the volume can be used to allocate new data sets; use attributes are *public*, *private*, and *storage*. (2) (2) For system-managed tape volumes, use attributes are *scratch* and *private*.

user group. A group of users in an installation who represent a single department or function within the organization.

user group representative. A person within a user group who is responsible for representing the user group's interests in negotiations with the storage administration group.

V

validate. To check the completeness and consistency of an individual ACS routine or an entire SMS configuration.

VIO. Virtual I/O.

virtual input/output (VIO) storage group. A type of storage group that allocates data sets to paging storage, which simulates a DASD volume. VIO storage groups do not contain any actual DASD volumes. See also *storage group*.

Virtual Tape Server (VTS). This subsystem, integrated into the TotalStorage Enterprise Automated Tape Library (3494), combines the random access and high performance characteristics of DASD with outboard hierarchical storage management and virtual tape devices and tape volumes.

vital record specification. Policies defined to manage the retention and movement of data sets and volumes for disaster recovery and vital records purposes.

volume. The storage space on DASD, tape, or optical devices, which is identified by a volume label. See also *DASD volume, optical volume, tape volume*.

volume mount analyzer. A program that helps you analyze your current tape environment. With tape mount management, you can identify data sets that can be redirected to the DASD buffer for management using SMS facilities.

volume status. In the Storage Management Subsystem, indicates whether the volume is fully available for system management:

- "Initial" indicates that the volume is not ready for system management because it contains data sets that are ineligible for system management.
- "Converted" indicates that all of the data sets on a volume have an associated storage class and are cataloged in an integrated catalog facility catalog.
- "Non-system-managed" indicates that the volume does not contain any system-managed data sets and has not been initialized as system-managed.

VRRDS. Variable-length relative-record data set.

VSAM. Virtual storage access method.

VSAM record-level sharing (VSAM RLS). An extension to VSAM that provides direct record-level sharing of VSAM data sets from multiple address spaces across multiple systems. Record-level sharing uses the z/OS Coupling Facility to provide cross-system locking, local buffer invalidation, and cross-system data caching.

VSAM sphere. The base cluster of a VSAM data set and its associated alternate indexes.

VSAM volume data set (VVDS). A data set that describes the characteristics of VSAM and system-managed data sets residing on a given DASD volume; part of an integrated catalog facility catalog. See also *basic catalog structure, integrated catalog facility catalog*.

VTOC. Volume table of contents.

VTS. See *Virtual Tape Server (VTS).*

VVDS. See *VSAM volume data set (VVDS).*

VVR. VSAM volume record.

W

WORM. See also *write-once-read-many (WORM) media.*

write-one-read-many (WORM) media. This type of optical disk media cannot be rewritten or erased.

X

XCF. Cross-system coupling facility.

XRC. Extended remote copy.

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