IBM

Data Facility Hierarchical Storage Manager Version 2 Release 5.0

Program Product

Planning Guide

Order Number
GC35-0109-2

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5665-329

Version 2
Release 5.0

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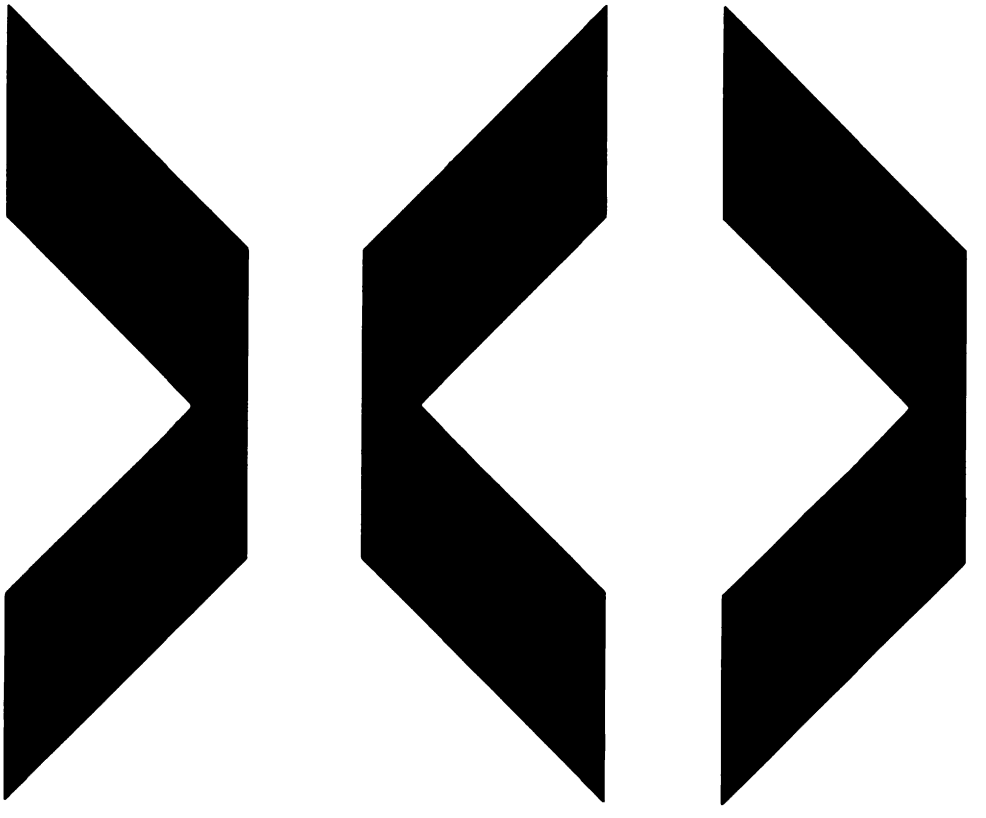

Order Number
GC35-0109-2

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Version 2
Release 5.0

Third Edition (July 1989)

This is a major revision of GC35-0109-1, which is now obsolete. Changes from the previous edition are marked with a vertical bar in the left margin. Significant changes are summarized under "Summary of Changes." This edition applies to Version 2, Release 5, Modification Level 0, of the Data Facility Hierarchical Storage Manager, Licensed Program 5665-329, and subsequent release and modification levels until specified otherwise in new editions or technical newsletters.

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Preface

This book is intended to provide planning information to be considered during the incorporation of Data Facility Hierarchical Storage Manager (DFHSM) into your present data processing environment.

This book contains information written primarily for data processing personnel who are planning the initial installation of DFHSM on a system. These individuals should understand the information presented in *Data Facility Hierarchical Storage Manager: Version 2 Release 5.0 General Information.*

Data Facility Hierarchical Storage Manager: Version 2 Release 5.0 Planning Guide provides no programming interfaces for customers.

Some terms that must also be understood are:

Planning Planning is the task of making fundamental decisions about the options a program offers. In this context it is deciding how to use the functions that DFHSM offers to make your environment more productive.

Installation Installation is the task of preparing a program for productive work. This may include installing DFHSM using the System Modification Program Extended (SMP/E), initializing the DFHSM program product, and applying maintenance to DFHSM as necessary. It also includes defining DFHSM to other supporting system products.

Customization Customization is the process of selecting available functions, and the parameters that control those functions, to perform work towards the installation's objectives.

Organization of this Publication

This book contains three chapters:

- Chapter 1 presents an overview of how DFHSM helps you effectively manage your storage resources.
- Chapter 2 contains planning work sheets that should be tailored to your environment.
- Chapter 3 identifies additional information sources relating to DFHSM.

This book also contains a glossary of terms and abbreviations, and an index.

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MVS/DFP™

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Prerequisite Books

Some of the decisions you have to make as part of your planning tasks require that you have read and understood the following books:

- *Data Facility Hierarchical Storage Manager: Version 2 Release 5.0 General Information*, GH35-0092, introduces the concepts of DFHSM.
- *MVS/DFP Version 3 Release 2: General Information*, GC26-4552, introduces the concepts of the MVS environment.
- *Data Facility Data Set Services: General Information*, GC26-4123, introduces the concepts of Data Facility Data Set Services.
- *Resource Access Control Facility: General Information*, GC26-4123, introduces the concepts of establishing resource and system data security.
- *Data Facility Sort: General Information*, GC33-4033, presents an overview of DFSORT, its functions, and its program requirements.

If you are installing DFHSM on a system that uses the Storage Management Subsystem (SMS), the following book is recommended in addition to the above mentioned books:

- *MVS Storage Management Library: Migration Planning Guide*, SC26-4406, which introduces the concepts of SMS, including how it interacts with and affects DFHSM.

Related Books

The following are related books that support the information contained in the Planning Guide:

- *MVS Storage Management Library*, SBOF-1241 provides guidance in how to use today's hardware and software to take advantage of current storage management products and prepare for the transition toward system-managed storage. The library consists of the following books:
  - *MVS Storage Management Library: Focus on Storage Management*, GC26-4404
  - *MVS Storage Management Library: Leading an Effective Storage Administration Group*, SC26-4405
  - *MVS Storage Management Library: Configuring Storage Subsystems*, SC26-4409
  - *MVS Storage Management Library: Managing Data Sets*, SC26-4408

- *MVS Storage Management Library: Managing Storage Pools*, SC26-4407
- *MVS Storage Management Library: Storage Management Reader's Guide*, GC26-4403.

- *Data Facility Hierarchical Storage Manager: Version 2 Release 5.0 Installation and Customization Guide*, SH35-0084 describes the DFHSM data sets, how to create DFHSM data sets and procedures, describes the user exits in DFHSM, contains migration information and coexistence considerations. The guide also contains information about the Installation Verification Procedures (IVP), Functional Verification Procedures (FVP), and the DFHSM Starter Set.
- *Data Facility Hierarchical Storage Manager: Version 2 Release 5.0 System Programmer's Guide*, SH35-0085 describes the concepts of DFHSM.
- *Program Directory* for DFHSM, shipped with the product, contains sample SMP/E jobs used to install DFHSM.

Summary of Changes

Third Edition

This edition applies to DFHSM Version 2 Release 5.0. DFHSM Version 2 Release 5.0. contains multiple enhancements to DFHSM. The enhancements that affect the contents of this book are as follows:

- **Aggregate backup and recovery support (ABARS)** (also called application backup and recovery), which aids processing centers in the identification and backup of aggregate groups of data sets. The user defines the aggregate groups. An example of an aggregate group would be all the data sets required to run a particular application. The aggregate backup command allows the aggregate groups to be backed up and stored at an alternate site, and in the event of a disaster that destroys the original data sets, the aggregate recovery command allows those aggregate groups to be recovered locally or at an alternate site.

  Besides allowing aggregate groups of data sets to be backed up and recovered in emergency situations, aggregate processing also provides the ability to move applications, or other user-defined groups of data sets, in non-emergency situations, such as:

  - Dividing a data processing center for workload management
  - Data movement between locations or businesses
  - Setting up parallel operations
  - Archiving
  - Problem replication.

- **Support for using Data Facility Data Set Services (DFDSS)** as a data set mover, for data sets cataloged in an integrated catalog facility catalog, for migration, recall, backup, and recovery between level 0 volumes and DFHSM owned volumes.

  When DFDSS is used as the data set mover, DFHSM provides the following:

  - Expanded support for small data set packing (SDSP)
  - Support for multivolume non-VSAM data sets that are managed by the Storage Management Subsystem (SMS)
  - Partitioned data sets extended (PDSE) support
  - Reblocking support for partitioned data sets.

- **Backup and recovery of integrated catalog facility (ICF) catalogs.**

Second Edition

This edition incorporates enhancements for DFHSM Version 2 Release 4.0 which includes the following:

The management function of DFHSM has been expanded to include the **Storage Management Subsystem (SMS).**

SMS allows an installation to define storage management requirements based on the user's needs rather than on hardware characteristics and configurations. It also provides functions to manage volumes and data sets. Data set requirements for performance, availability, and space are defined to SMS in:

- **Management classes**, which control DFHSM functions (such as retention, migration, backup, and partial release) that are performed on SMS-managed data sets.
- **Storage groups**, which determine the SMS-managed volumes for which the DFHSM automatic functions will be performed.
- **Storage classes**, which, by the presence of a storage class name, indicate to DFHSM that a data set is SMS managed.
- **Data classes**, which are lists of allocation attributes that the system uses for the creation of data sets. Data classes are not used by DFHSM.

DFHSM can automatically do the following when processing SMS-managed data:

- Recognize and save SMS class names when recalling or recovering SMS-managed data sets.
- Manage data based on SMS management class attributes.
- Convert non-SMS-managed data sets to SMS-managed data sets, or convert SMS-managed data sets to non-SMS-managed data sets, when recalling or recovering those data sets. Automatic class selection (ACS) routines are invoked by DFHSM to determine which data sets are eligible for conversion.

Other enhancements to this release include:

- A new command, **EXPIREBV**, which allows the expiration of backup versions of data sets, and is available to authorized users. This command applies to the backup versions of both SMS and non-SMS-managed data sets.
- Recognition and support of system reblockable sequential data sets.
- Allowing the data-set-migration exit to route specific migrations to tape, for non-SMS-managed data sets.

First Edition

This edition incorporates the following enhancements for DFHSM Version 2 Release 3.0:

- Invocation of Data Facility Data Set Services (DFDSS)
- Optimum DASD Blocking
- Erase-on-Scratch
- Volume Pools for Recall
- Volume Space Management and Backup Exit
- Second Level Migrate Data Set Exit
- Quiesce Time.

This edition also incorporates the following enhancements from DFHSM Version 2 Release 2.0:

- Interactive Storage Management Facility (ISMF)
- Virtual Storage Constraint Relief (VSCR)
- Automatic Cartridge Loader Feature for the 3480 Tape Subsystem.

Contents

Chapter 1. DFHSM Introduction 1
DFHSM Overview 1
DFHSM as Part of System-Managed Storage 4
How to Begin Using DFHSM 5

Chapter 2. Developing a Plan for DFHSM 7
An Overview of the Plan 7
Planning Tasks 9
Planning the Objectives for DFHSM 9
Planning for the Installation of DFHSM 11
Planning Basics for Choosing DFHSM Functions 12
Implementation Tasks 14
Installing DFHSM 15
Customizing DFHSM 17
Starting Availability Management 18
Starting Space Management 21
Production Preparation 22
Post-Install Review 24
Future Implementation 24

Chapter 3. Where to Find More Information 25
Other Sources of Information 25
Restricted Books 26

Bibliography 27

Glossary of Terms and Abbreviations 29

Index 41

Chapter 1. DFHSM Introduction

With the increasing need for effective use of storage as a major system resource, many organizations have realized a need for the DFHSM storage management program. Today you may be at the point where user demands have outgrown your present system's resources, and a plan of action is required to define your current and future needs. This book will help you plan for the implementation of DFHSM as a key component of your overall strategy.

Before using this guide to create a plan, it is important that you have done the prerequisite reading listed for this book. See "Prerequisite Books" on page iv. Some of the planning decisions you have to make require that you understand the information supplied in the prerequisite reading.

If you are installing DFHSM on a system that uses the Storage Management Subsystem (SMS), some of the planning decisions you have to make are based on the way in which DFHSM interacts with SMS. For a brief discussion of some of the changes that SMS brings to DFHSM, see the Summary of Changes, "Second Edition" on page viii. For more detailed information, see the books listed under "Prerequisite Books" on page iv.

DFHSM Overview

DFHSM is a storage management product that automatically manages DASD space, controls data availability, and ensures that backup copies of data are created that are both reliable and timely. DFHSM reduces the storage administrator's time-consuming task of monitoring and managing DASD storage by using computing system resources.

Space Management is a DFHSM process that is controlled by a storage administrator to ensure the effective use of storage for active and low-activity data sets.

Availability Management is a DFHSM process that ensures the recoverability of user data sets from both physical (for example a head crash), and logical (for example a delete) destruction.

DFHSM offers a space and availability management technique that processes data in the following three categories. The data is classified according to access requirements.

1. *Active data* is data that is most frequently accessed by users, and is kept on active data volumes.
2. *Low-activity data* is data that is less frequently accessed by users and can be removed from the active data volume for a short period of time, such as a few days or more.
3. *Inactive data* is a copy of a data set that is created for recovery support, and is not on an active data volume.

Figure 1 is an overview of the relationship of data and DFHSM management techniques.

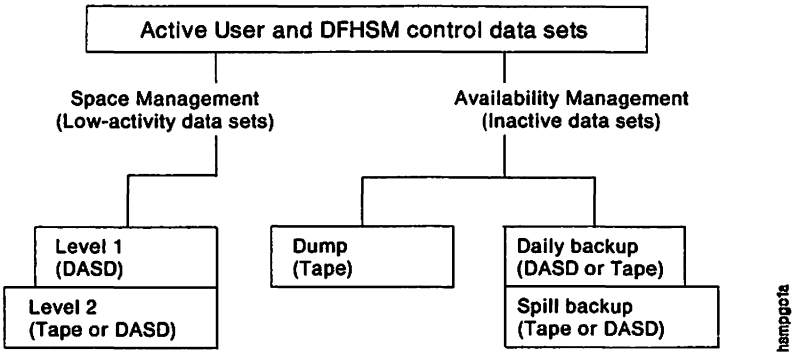

Figure 1. Overview of DFHSM

Space Management Functions: DFHSM space management functions ensure that DASD space is available when users need it. Automatically moving low-activity data sets from volumes containing active data is one of DFHSM's important space saving techniques. This is the automatic migration function, which migrates data sets that have not been accessed recently to lower-cost format/types of storage. Supporting automatic migration is recall, which automatically places the low-activity data back on the volume containing active data when requested by user reference.

Space management functions of DFHSM include the following and are described in more detail in *Data Facility Hierarchical Storage Manager: Version 2 Release 5.0 General Information*:

- Migration of data sets
- Deletion of temporary data sets
- Release of over-allocated space
- Deletion of expired data sets
- Extent reduction.

Availability Management Functions: DFHSM's availability management functions ensure that the data is available when users need it. The inactive data can be created as a backup in case the original data is lost or inadvertently made unavailable. This is done by DFHSM's incremental backup, aggregate backup, and by DFHSM's invocation of the DFDSS physical volume dump. DFHSM can recover a data set or a volume, or invoke DFDSS to restore a data set or a volume. DFHSM can also aid in recovering an application or other aggregate groups of data sets that have been backed up.

Availability management functions of DFHSM include the following and are described in more detail in *Data Facility Hierarchical Storage Manager: Version 2 Release 5.0 General Information*:

- Automatic physical full-volume dump invoking Data Facility Data Set Services (DFDSS)
- Automatic incremental backup
- Automatic backup of DFHSM control data sets
- Backup and recovery of integrated catalog facility catalogs
- The ability to identify, backup, and recover data sets that comprise an application or aggregate group
- Command dump and backup
- Command full volume restore and data set recovery
  - Managing data sets from inventory information
  - Volume restore and system-managed recovery of individual data sets
- Expiration of backup versions.

DFHSM as Part of System-Managed Storage

The Data Facility family of products and the Resource Access Control Facility (RACF) provide system-managed storage. System-managed storage is an approach to storage management in which the system determines data placement, and handles data backup, movement, space, and security. The relationship of DFHSM to the other products that work together to provide system-managed storage is shown in Figure 2. The arms in the illustration that project over and under the different products indicate support or use of one product by another. In other words, RACF provides support for Data Facility Data Set Services (DFDSS), DFHSM, and MVS/DFP. DFDSS and MVS/DFP provide support for DFHSM. MVS/DFP provides support for active application data, and DFDSS and DFHSM provide support for low activity and inactive application data.

As shown in the chart, the interactive storage management facility (ISMF) provides the main access, for both the storage administrator and end user, to the storage management functions.

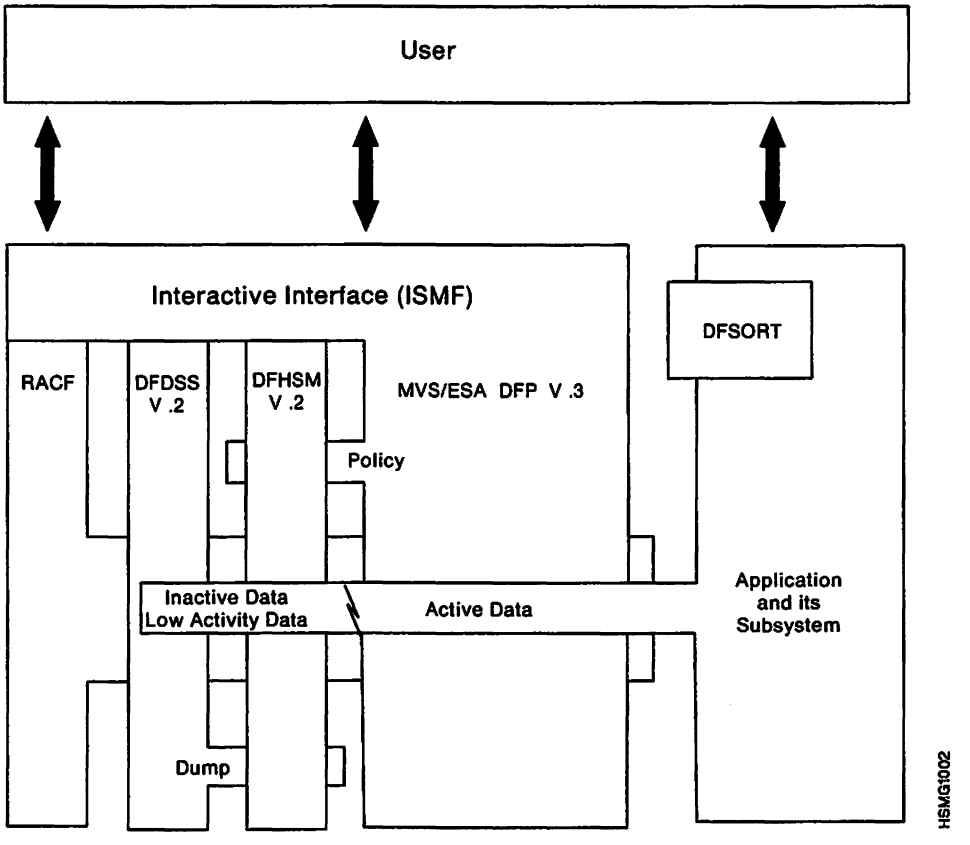

Figure 2. DFHSM as Part of System-Managed Storage

How to Begin Using DFHSM

Your DFHSM implementation can use the guidelines outlined in the *MVS Storage Management Library*. This basic structure can be the foundation for DFHSM management functions, or you can use your own.

Space and availability management are major DFHSM functions and can be implemented separately. If you are not presently using a backup process, availability management would be the best place to start. This should be followed by the space saving techniques provided by DFHSM space management. Wherever you start, DFHSM is designed to allow you to begin operations with a small number of storage groups or volumes to receive early space and availability benefits. As your experience grows, the number of storage groups or volumes and types of data managed can be expanded.

In the next chapter, we will step through the process of implementing DFHSM. It starts with the identification of the present environment and objectives for change. The plan continues with the installation and customization process.

Chapter 2. Developing a Plan for DFHSM

How do I incorporate DFHSM into my environment successfully? This question and others are answered in this chapter.

An Overview of the Plan

The process of implementing DFHSM begins with a plan. In this chapter, several guidelines are provided to develop a plan for implementing DFHSM in your data center. Figure 3 on page 8 illustrates the general flow of a DFHSM plan.

The guidelines in this chapter are arranged by task in the order that they occur in the process. You can use all or part of the tasks as they apply to your environment.

The following are the major task categories and their definitions:

Planning: Making fundamental decisions about the options offered by DFHSM. These decisions may be based on information gained from reading through the material presented under the tasks of:

- **Objectives** (see "Planning the Objectives for DFHSM" on page 9)
- **Installation** (see "Planning for the Installation of DFHSM" on page 11)
- **Choosing functions** (see "Planning Basics for Choosing DFHSM Functions" on page 12).

Implementation: The tasks that help you start incorporating DFHSM in your data center, after the initial planning phase is complete.

- **Installation**: Preparing a program for productive work. (See "Installing DFHSM" on page 15.) This may include:
  - Installing DFHSM using the System Modification Program Extended (SMP/E)
  - Initializing the DFHSM program product
  - Applying maintenance to DFHSM as necessary
  - Defining DFHSM to RACF and other supporting system products.
- **Customization**: Implementing a DFHSM function to fulfill the goals set for the data center. (See "Customizing DFHSM" on page 17.) Some examples are provided using the DFHSM Starter Set for:
  - Availability management
  - Space management.

  Also included are some considerations for disaster backup and recovery.
- **Production Preparation**: Instructing operators for on-going tasks, developing procedures for the data center, and user training.

Post-Install Review: A review that helps you assess the implementation of DFHSM.

Future Implementation: More considerations for future expanded use of DFHSM.

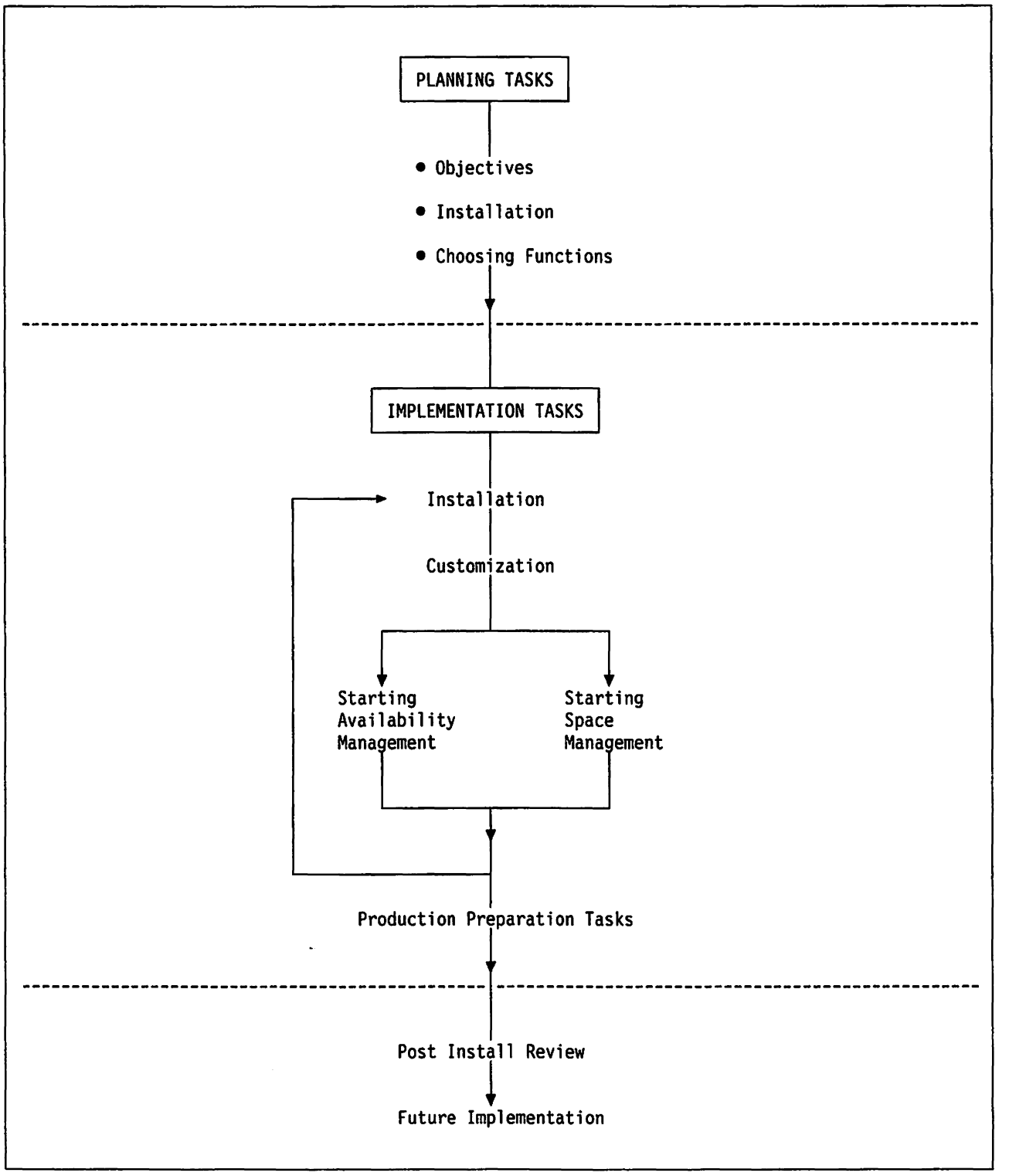

Figure 3. Overview of DFHSM Planning

Planning Tasks

These tasks aid in making the fundamental decisions about the options offered by DFHSM. These decisions may be based on information gained from reading through the material presented under the tasks of:

- **Objectives**
- **Installation**
- **Choosing functions.**

Planning the Objectives for DFHSM

GI	DFHSM General Information	**SPCR**	DFHSM System Programmer's Command Reference
ICG	DFHSM Installation and Customization Guide	**SPG**	DFHSM System Programmer's Guide
MSG	DFHSM Messages	**UG**	DFHSM User's Guide
PD	DFHSM Program Directory	**USER**	This denotes user developed information.
SML	MVS Storage Management Library		

Table 1 (Page 1 of 2). Planning Objectives for DFHSM

Task	Subtask	Information needs / Notes	Planned Strt/Cmpl	Actual Strt/Cmpl	Responsible Person
Setting storage management objectives.	DFHSM Education.	• See the GI. Optional courses: • DFHSM Implementation, 32910. • DASD Storage Subsystem Management, J3607. • Tailoring DFHSM, J3608. • DFSMS Implementation, J3611.			
	Define your current storage environment.	Both SMS and non-SMS-managed systems: • Established service levels. • Current storage management guidelines. • Known storage management requirements. • Data set and volume serial number naming conventions. Non-SMS-managed systems: • Pool structure. (SML) SMS-managed systems: • Management class definitions. • Storage groups. • Dump class requirements.			

Table 1 (Page 2 of 2). Planning Objectives for DFHSM

Task	Subtask	Information needs / Notes	Planned Strt/Cmpl	Actual Strt/Cmpl	Responsible Person
Setting storage management objectives.	Review the Storage Management Library.	Examine the library for applicable information for your environment; information on topics such as: • Space management • Availability management • SMS management.			
	Document the DFHSM objectives.	Using the information gathered in the previous steps, list a new set of goals for your environment.			

Planning for the Installation of DFHSM

GI	DFHSM General Information	**SPCR**	DFHSM System Programmer's Command Reference
ICG	DFHSM Installation and Customization Guide	**SPG**	DFHSM System Programmer's Guide
MSG	DFHSM Messages	**UG**	DFHSM User's Guide
PD	DFHSM Program Directory	**USER**	This denotes user developed information.
SML	MVS Storage Management Library		

Table 2. Installation Planning for DFHSM

Task	Subtask	Information needs / Notes	Planned Strt/Cmpl	Actual Strt/Cmpl	Responsible Person
Order products.	Order any hardware required.	Identify what hardware is currently installed. Identify what hardware is required to install DFHSM.			
	Order software.	List the software products to order. (GI, ICG) • DFHSM licensed program (5665-329). • Any prerequisite program software. • SMS functional corequisite software. • Any other functional corequisite software. – See "Installation Requirements" in the ICG.			
Other tasks	Identify what maintenance level is necessary.	List of prerequisite and corequisite service requirements.			
	Identify what procedures can be used to test the installation of the product.	Understand the descriptions of the installation verification procedures (IVP), functional verification procedures (FVP), and the Starter Set. (ICG) Note: This planning process is based upon beginning with the Starter Set.			
	Order other publications.	See the Bibliography for any other related publications that may be useful.			

Planning Basics for Choosing DFHSM Functions

GI	DFHSM General Information	**SPCR**	DFHSM System Programmer's Command Reference
ICG	DFHSM Installation and Customization Guide	**SPG**	DFHSM System Programmer's Guide
MSG	DFHSM Messages	**UG**	DFHSM User's Guide
PD	DFHSM Program Directory	**USER**	This denotes user developed information.
SML	MVS Storage Management Library		

Table 3 (Page 1 of 2). Planning the Functions for DFHSM

Task	Subtask	Information needs / Notes	Planned Strt/Cmpl	Actual Strt/Cmpl	Responsible Person
Decide which functions to use.	Develop the function plan according to the needs of your environment. If you are not using a backup process now, we recommend starting with the availability management functions.	• Understanding of availability management and space management. (SPG) • Backup of the control data sets requires the use of availability management functions.			
Decide what data types DFHSM will manage.	Develop a plan outlining what data types will be managed by DFHSM by function.	Data type examples (both SMS and non-SMS): (SML) • Test batch • Batch • Test on-line • TSO • Data Base 2 – Production data – Private data sets.			
	If using SMS, choose your management class attributes.	See the SPG.			
Determine coexistence considerations and restrictions.	Review other system software.	• Acquire information on any tape management program that will be working with DFHSM. • Identify any program that may change or modify the data set control information or standard data set OPEN processing.			
	Review DFHSM incompatibilities.	See the ICG, "Special Considerations" chapter.			
	Review common service area (CSA) limiting considerations.	See "Calculating DFHSM Storage Requirements" in the ICG, and see the SPCR, for a description of the SETSYS CSALIMITS command.			
Protecting resources.	Set up security procedures (ICG, SPG): • RACF user identification for DFHSM • Protecting tapes – RACF – Other.	See the ICG, "DFHSM 2.5.0 Starter Set" chapter for the following: • Backup and migration prefix • Control data set protection • Small-data-set-packing (SDSP) data set protection.			

Table 3 (Page 2 of 2). Planning the Functions for DFHSM

Task	Subtask	Information needs / Notes	Planned Strt/Cmpl	Actual Strt/Cmpl	Responsible Person
DFHSM management strategy.	Understand DFHSM volume conventions and how they fit into your environment. (ICG)	• Understand the following DFHSM volume convention names and how they relate to the list of DFHSM supported devices: – DFHSM managed DASD volumes – Migration level 1 DASD – Migration level 2 tape or DASD – Daily backup – Spill backup – Tape dump. • List of devices supported by DFHSM. (GI, ICG)			
Planning the storage management environment.	Estimate the number of data sets that DFHSM will manage.	See the ICG, "Calculating DFHSM Data Sets" chapter for information about determining the size of the control data sets based on the number of data sets managed.			
	Decide where the DFHSM data sets will be located. (ICG)	• The following DFHSM control data sets can be placed on the same volume: – Migration Control Data Set (MCDS - always required) – Backup Control Data Set (BCDS - optional) – Offline Control Data Set (OCDS - optional). • Other DFHSM data sets that should be on a separate volume from the control data set volume: – Journal data set – Log data sets – Control data set backup copies.			
	Select the volumes that DFHSM will manage or own.	• The volumes that DFHSM will manage or own are: (SPG) – Non-SMS volumes – Automatically managed storage group volumes – Migration level 1 (at least one is required) – Migration level 2 tape or DASD – Tape backup – Dump tapes. • Review the size of the VTOC for migration level 1 volumes. • Consider use of the small-data-set-packing (SDSP) data set function. (ICG)			

Implementation Tasks

Once you have completed the planning phase, you are ready to start incorporating DFHSM in your environment. Several tasks are recommended:

Installation: Preparing a program for productive work. This may include:

- Installing DFHSM using the System Modification Program Extended (SMP/E)
- Initializing the DFHSM program product
- Applying maintenance to DFHSM as necessary
- Defining DFHSM to RACF and other supporting system products.

Customization: Incorporating a DFHSM function to fulfill the objectives set for the environment. Two examples are provided using the DFHSM Starter Set:

- Availability management
- Space management.

Production Preparation: Instructing operators for on-going tasks, developing procedures for the environment, and user training.

Installing DFHSM

GI	DFHSM General Information	**SPCR**	DFHSM System Programmer's Command Reference
ICG	DFHSM Installation and Customization Guide	**SPG**	DFHSM System Programmer's Guide
MSG	DFHSM Messages	**UG**	DFHSM User's Guide
PD	DFHSM Program Directory	**USER**	This denotes user developed information.
SML	MVS Storage Management Library		

Table 4 (Page 1 of 2). Installing DFHSM

Task	Subtask	Information needs / Notes	Planned Strt/Cmpl	Actual Strt/Cmpl	Responsible Person
Preparing for DFHSM installation.	Back up system libraries and data sets.	• Procedure telling how to back up system libraries and data sets. (USER) • List of libraries changed by installation. (PD)			
	Order Preventive Service Planning (PSP) upgrade.	PSP upgrade and subsets. (PD)			
	Verify installation of prerequisite products.	• List of prerequisite product names and levels (PD): – Software – Hardware.			
	Apply service updates for prerequisite products.	• List of Cumulative Service (CUM) tape numbers. (PD) • List of PTF Update Tapes (PUT). (PD)			
	Apply maintenance for DFHSM coexistence.	List of coexistence PTFs. Refer to PSP upgrade.			
	Prepare volumes for DFHSM data sets.	• List of volumes containing the DFHSM data sets. (ICG) • Initialize migration DASD with a larger VTOC and VTOC index. (SML)			
	Define data sets.	• List of DFHSM data sets. (PD) • List of system data sets. (PD)			
	Allocate Space.	Procedure telling how to estimate space for each data set. (PD)			
Installing the DFHSM tape.	Install DFHSM with SMP/E.	Sample JCL. (PD)			
	Apply DFHSM service updates.	List of CUM or PUT tapes.			

Table 4 (Page 2 of 2). Installing DFHSM

Task	Subtask	Information needs / Notes	Planned Strt/Cmpl	Actual Strt/Cmpl	Responsible Person
Define DFHSM to RACF and other supporting system products.	Create generic profile for DFHSM data sets (control data sets, journals, control data set backup copies, and SDSP data sets).	• Instructions. (ICG) • Consult your security administrator.			
	Define operations authority for DFHSM.	• Instructions. (ICG) • Consult your security administrator.			
	Create generic profile for DFHSM migrated and backup data sets.	• Instructions. (ICG) • Consult your security administrator.			
	Define RACF TAPEVOL resource.	• Instructions. (ICG) • Consult your security administrator.			
	Define DFHSM to RACF in the started task table. (ICHRIN03)	• Instructions. (ICG) • Consult your security administrator.			
	Define DFHSM to other supporting system products.	See the ICG.			
Verify DFHSM installation and functions.	Run the IVP for DFHSM.	IVP procedures for DFHSM. (ICG)			
	Create a test environment for FVP.	Set up a temporary testing environment using the Starter Set as a model. (ICG)			
	Define the control data sets for the FVP.	Use the Starter Set as a model. (ICG)			
	Run the FVP for DFHSM.	FVP procedures for DFHSM. (ICG)			

Customizing DFHSM

GI	DFHSM General Information	**SPCR**	DFHSM System Programmer's Command Reference
ICG	DFHSM Installation and Customization Guide	**SPG**	DFHSM System Programmer's Guide
MSG	DFHSM Messages	**UG**	DFHSM User's Guide
PD	DFHSM Program Directory	**USER**	This denotes user developed information.
SML	MVS Storage Management Library		

Table 5. Customizing DFHSM

Task	Subtask	Information needs / Notes	Planned Strt/Cmpl	Actual Strt/Cmpl	Responsible Person
Preparing to start DFHSM.	Perform the setup requirements for the DFHSM Starter Set.	See the ICG.			
	Edit and run SAMPL98 in SYS1.SAMPLIB. A data set is created called HSM.SAMPLE.CNTL.	See the ICG.			
	Edit the member STARTER and make changes for your environment.	See the ICG.			
	Understand DFHSM defaults.	Table of DFHSM defaults and results. (SPCR, SPG)			
	Install ISMF.	This is mandatory if you use the SMS or aggregate processing functions.			
	Create an ARCCMDxx PARMLIB member, for example: • Select activity log option. • Set up control data set backup. • Select SMF recording option.	The DFHSM Starter Set contains examples you can use as a model for your own ARCCMDxx. • Information on the select activity log can be found in the ICG. • Set up the number of backup versions of the control data sets and journals that you require. (ICG) • See the ICG, SPCR, and SPG.			
	Learn to issue DFHSM-authorized commands from a TSO terminal.	Description of HSENDCMD command. (SPCR) To use aggregate backup and recovery, you must use ISMF aggregate group panels to define aggregate components.			
Starting a DFHSM function.		See Table 6 on page 18 for starting the availability management tasks or Table 7 on page 21 for starting the space management tasks.			

Starting Availability Management

GI	DFHSM General Information	**SPCR**	DFHSM System Programmer's Command Reference
ICG	DFHSM Installation and Customization Guide	**SPG**	DFHSM System Programmer's Guide
MSG	DFHSM Messages	**UG**	DFHSM User's Guide
PD	DFHSM Program Directory	**USER**	This denotes user developed information.
SML	MVS Storage Management Library		

Table 6 (Page 1 of 3). Availability Management

Task	Subtask	Information needs / Notes	Planned Strt/Cmpl	Actual Strt/Cmpl	Responsible Person
Exercise availability management.	Use the control data set recovery function to ensure that control data set journaling, backup, and recovery is working correctly, and that you know how to use the function.	Description of backup and recovery of control data sets. (SPG)			
	Test backing up a specific test data set.	Description of BACKDS command. (SPCR)			
	Test recovering a specific test data set.	Description of RECOVER command. (SPCR)			
	Test backing up data sets from a single volume.	Description of BACKVOL command. (SPCR)			
	Recover a backup version of a data set.	Description of RECOVER command. (SPCR)			
	Delete backup versions of data sets.	Description of EXPIREBV command. (SPCR)			
	Test identifying and backing up the components of an aggregate group.	Description of ABACKUP command. (SPCR)			
	Test recovering an aggregate group.	Description of ARECOVER command. (SPCR) Some JCL statements may include the volume serial number (volser) and relative tape position of data to be processed. The volser and relative tape position of that data changes when the data is recovered using the ARECOVER command. The JCL statements need to be altered to reflect those changes.			
	Shut down DFHSM to return the system to production mode after a test session.	Before stopping DFHSM, issue HSENDCMD SETSYS DEBUG to signal that you are running DFHSM in a testing mode. Then issue a STOP command to DFHSM. This prevents extraneous operator messages.			

Table 6 (Page 2 of 3). Availability Management

Task	Subtask	Information needs / Notes	Planned Strt/Cmpl	Actual Strt/Cmpl	Responsible Person
Initiate automatic backup.	Review options that affect availability management.	See the SPG.			
	Select data set incremental backup time of day.	Description of SETSYS command. (SPCR)			
	Change the number of volume backup tasks on the system.	Description of SETSYS MAXBACKUPTASKS command. (SPCR)			
	Select a backup cycle.	Description of DEFINE command. (SPCR)			
Backup and recover a volume.	Start DFHSM automatic incremental backup.	Description of the incremental backup function. (SPG)			
	Test volume recovery for a single volume.	Description of RECOVER command. (SPCR)			
Initiate automatic dump.	Select volume dump time of day.	See the SPG.			
	Select a dump cycle.	Description of DEFINE command. (SPCR)			
Dump and restore a volume.	Start DFHSM automatic dump.	Description of the dump function. (SPG)			
	Test volume recovery with APPLYINCREMENTAL.	Description of RECOVER command. (SPCR)			
Add automatic backup and dump to remaining volumes.		See the SPG.			
Consider the needs of disaster backup/recovery.	Add automatic backup or dump to any volumes or data sets you want to recover in the event of a physical or logical disaster.	See the SPG. Determine: • Which DASD volumes to dump, for example: – System volumes – Level 0 volumes – DFHSM-owned volumes – Non-DFHSM managed volumes. • How often to perform the dumps. • How often to copy any full tape volumes, such as: – Migration level 2 tape volumes – Tape backup volumes. • When to back up and copy the DFHSM control data sets. • Which individual data sets to back up and how often.			

Table 6 (Page 3 of 3). Availability Management

Task	Subtask	Information needs / Notes	Planned Strt/Cmpl	Actual Strt/Cmpl	Responsible Person
Consider the needs of disaster backup/recovery.	Determine when to back up aggregate groups of data sets.	See the SPG.			
	Determine where backup data sets should be stored in the event a primary site is lost to disaster.	Examples: • At another site • At a remote secure area			
	Determine where the aggregate groups will be recovered.	Ensure that the hardware and software required to run the aggregate recovery procedure exists at the recovery site. (SPG)			
	Determine documentation needs.	For example, a listing with information about all DFHSM-managed volumes.			

Starting Space Management

GI	DFHSM General Information	**SPCR**	DFHSM System Programmer's Command Reference
ICG	DFHSM Installation and Customization Guide	**SPG**	DFHSM System Programmer's Guide
MSG	DFHSM Messages	**UG**	DFHSM User's Guide
PD	DFHSM Program Directory	**USER**	This denotes user developed information.
SML	MVS Storage Management Library		

Table 7. Space Management

Task	Subtask	Information needs / Notes	Planned Strt/Cmpl	Actual Strt/Cmpl	Responsible Person
Exercise space management.	Test migration for a test data set.	Description of MIGRATE command. (SPCR)			
	Test recalling the migrated test data set.	Description of RECALL command. (SPCR)			
	Test deleting the migrated test data set.	Description of DELETE command. (SPCR)			
	Shut down DFHSM to return the system to a production mode after a test session.	Before stopping DFHSM, issue HSENDCMD SETSYS DEBUG to signal that you are running DFHSM in a testing mode. Then issue a STOP command to DFHSM. This prevents extraneous operator messages.			
Initiate space management.	Review options that affect daily space management.	See the SPG.			
	Identify first data types to manage.	Objectives for DFHSM. (USER)			
	Exclude specific data sets from migration. (For example: PROCLIBs.)	Description of SETMIG command. (SPCR)			
	Identify a threshold for the volumes (for systems not managed by SMS).	See the SPG. Thresholds are defined by the storage groups in SMS-managed systems.			
	Select data set migration time.	Description of SETSYS command. (SPCR)			
Migrate a volume.	Start automatic migration.	Objectives for DFHSM. (USER)			
Add automatic migration to remaining volumes (on systems not managed by SMS).		See the SPG. Migration is defined by the storage groups in SMS-managed systems.			
Enable interval migration.		See the SPG.			

Production Preparation

GI	DFHSM General Information	**SPCR**	DFHSM System Programmer's Command Reference
ICG	DFHSM Installation and Customization Guide	**SPG**	DFHSM System Programmer's Guide
MSG	DFHSM Messages	**UG**	DFHSM User's Guide
PD	DFHSM Program Directory	**USER**	This denotes user developed information.
SML	MVS Storage Management Library		

Table 8 (Page 1 of 2). Production Preparation

Task	Subtask	Information needs / Notes	Planned Strt/Cmpl	Actual Strt/Cmpl	Responsible Person
Storage administrator orientation.	Identify special storage administrator areas.	• Backup / recovery • DFHSM activity rates • DFHSM data set allocations • Audit considerations • Report facility • Recycle management			
	Review Storage Management Library for storage administrator description.	See the SML.			
	Prepare any necessary materials.				
	Conduct orientation.				
Prepare supplemental operations procedures.	Identify the areas to be addressed.	• Recycling tapes. • Small data set packing, backup, and reorganization. • Recovery procedures. • Reorganization of DFHSM control data sets. • Expiring backup versions. (This is a function of the management class definition on systems managed by SMS.) • Aggregate backup and recovery processing.			
	Develop materials.	• Follow any organization standards. • Refer to DFHSM publications where possible.			

Table 8 (Page 2 of 2). Production Preparation

Task	Subtask	Information needs / Notes	Planned Strt/Cmpl	Actual Strt/Cmpl	Responsible Person
Operator training.	Select the functions you want the operator to receive training on.	• Starting / stopping DFHSM. (ICG) • Holding / releasing functions. (SPCR) • Querying DFHSM status. (SPCR) • General messages response. (MSG) • Common service area limiting. (ICG) • Log swapping. (SPCR) • Construct procedures for when you have situations such as a journal becoming full, shortages of space, or warning messages. (SPG) • Use problem determination aid logs (PDA). (ICG) • Handling DFHSM secondary address spaces. (SPG)			
	Prepare training format.	• Lectures • On-the-job training.			
	Conduct operator training.				
TSO user orientation.	Identify the suggested functions for TSO users.	ISMF information and DFHSM user commands. (UG)			
	Select training format.	• Development center training group • General I/S training department • Special space management session.			
	Prepare training materials.				
	Conduct TSO user training.				

Post-Install Review

You should conduct a post-install review to assess the implementation of DFHSM. The assessment should include:

- Reviewing the original objectives.
  - If the objectives were not completely met, or if the objectives have changed, your implementation of DFHSM may require some changes.
- Establishing priorities for adding functions or expanding DFHSM to include more of your environment.

Plan to conduct periodic reviews of the objectives as your experience and environment grows.

Future Implementation

The following list provides topics for more DFHSM-related objectives that are not addressed in this guide. They involve unique considerations for each environment. However, these topics may be important to some environments to obtain the maximum benefits of using DFHSM. Additional reference information is listed in the Bibliography.

- Data Base 2 utilization
- Multiple-processing-unit considerations
- Device management using the FREEVOL command
- Performance management.

Chapter 3. Where to Find More Information

These courses can help you learn more about DFHSM and its functions.

32910 **DFHSM Implementation.** This is a self-study course designed to help in the successful implementation of DFHSM.

J3607 **DASD Storage-Subsystem Management.** This classroom course provides students with the information that is necessary to develop and implement a set of MVS storage subsystem management strategies and procedures. Emphasis is placed on volume, data set, and media management, and the use of currently available MVS components, tools, and aids for these functions.

J3608 **Tailoring DFHSM.** This classroom course is designed to train Storage Administrators in the use of DFHSM. Emphasis is placed on modifying the supplied starter-set values and parameters to those that match the requirements of the installation. Other topics will cover how to ensure integrity of the DFHSM control data sets, how exits can be used to achieve installation objectives, planning user data set availability management, and planning user and operations awareness.

J3611 **DFSMS Implementation.** This is a classroom course designed for Storage Administrators, Data Base Administrators, and System Programmers who are responsible for implementing system-managed storage. Subjects covered in the course include creating storage classes, data classes, management classes, storage groups, automatic class selection (ACS) routines, and SMS control data sets. Other topics include migration planning, an explanation of the role of DFHSM in a system-managed storage environment, and a discussion of the changes in catalog management. The material discussed in the classroom will be reinforced by exercises on machines.

Other Sources of Information

- *Data Facility Hierarchical Storage Manager: Version 2 Release 5.0 System Programmer's Command Reference*, SH35-0083 describes the DFHSM system programmer, storage administrator, operator commands, and how the system programmer, storage administrator, and operator use the commands.
- *Data Facility Hierarchical Storage Manager: Version 2 Release 5.0 Messages*, SH35-0094 describes the messages issued by DFHSM.
- *Data Facility Hierarchical Storage Manager: Version 2 Release 5.0 User's Guide*, SH35-0093 describes DFHSM user commands, and space and availability management.

Restricted Books

The following books contain restricted materials of IBM:

Data Facility Hierarchical Storage Manager: Version 2 Release 5.0 Diagnosis Guide, LY35-0098 gives information that helps diagnose failures in DFHSM.

Data Facility Hierarchical Storage Manager: Version 2 Release 5.0 Diagnosis Reference Volume 1, LY35-0101 contains extended descriptions of DFHSM modules.

Data Facility Hierarchical Storage Manager: Version 2 Release 5.0 Diagnosis Reference Volume 2, LY35-0102 contains extended descriptions of DFHSM modules.

Data Facility Hierarchical Storage Manager: Version 2 Release 5.0 Diagnosis Reference Volume 3, LY35-0103 contains extended descriptions of DFHSM modules.

Data Facility Hierarchical Storage Manager: Version 2 Release 5.0 Diagnosis Reference Volume 4, LY35-0104 describes the logic of DFHSM routines, the data areas used by DFHSM, the modules that pass error codes to the error recovery procedures, and relates each module to its operating system data set and functional description diagram. It also contains a message to module cross reference, and a function to subfunction cross reference.

Bibliography

DB2 Storage Management Usage Guide, GG24-3056.

Managing Data Availability In An Integrated Catalog Facility Environment, GG66-D212.

MVS Storage Management Library: Migration Planning Guide, SC26-4406.

Glossary of Terms and Abbreviations

This glossary includes definitions of some terms found in this document. Some of the terms defined below are from:

- The *American National Dictionary for Information Processing Systems*, copyright 1982 by the Computer and Business Equipment Manufacturers Association. Copies may be purchased from the American National Standards Institute at 1430 Broadway, New York, New York 10018. These definitions are identified by an asterisk.
- The *ISO Vocabulary - Information Processing*, and the *ISO Vocabulary - Office Machines*, developed by the International Standards Organization, Technical Committee 97, Subcommittee 1. Definitions from published sections of this vocabulary are identified by the symbol "(ISO)" preceding the definition. Definitions from draft proposals and working papers under development by the ISO/TC97 vocabulary subcommittee are identified by the symbol "(TC97)," indicating that final agreement has not yet been reached among its participating members.

A

ABARS. Aggregate backup and recovery support.

accompany data set. In aggregate backup and recovery processing, a data set that is physically transported from the backup site to the recovery site instead of being copied to the aggregate data tape. It is cataloged during recovery.

ACCOMPANY keyword. The keyword used in the selection data set to create an accompany list.

accompany list. An optional list in the selection data set that identifies the accompany data sets.

ACEE. Access control environment element.

ACS. Automatic class selection.

active data. Data that is frequently accessed by users and that resides on level 0 volumes.

activity log. In DFHSM, a SYSOUT or DASD-type data set used to record activity and errors that occurred during DFHSM processing.

AG. Aggregate group.

aggregate backup. The process of copying the data sets and control information of a user-defined group of data sets so that they may be recovered later as an entity by an aggregate recovery process.

aggregate group. A Storage Management Subsystem class that defines control information and identifies the data sets to be backed up by a specific aggregate backup.

aggregate recovery. The process of recovering a user-defined group of data sets that were backed up by aggregate backup.

aggregated data sets. In aggregate backup and recovery processing, data sets that have been defined in an aggregate group as being related.

AIX. See alternate index.

allocate data set. In aggregate backup and recovery processing, a data set name that is listed in the selection data set. The space for this data set is allocated and the data set is cataloged at the recovery location, but the actual data is not restored.

ALLOCATE keyword. The keyword used in the selection data set to create an allocate list.

allocate list. An optional list in the selection data set that identifies the allocate data sets.

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. Its function is to provide an alternate directory for locating records in the data component of a base cluster. See also path.

alternate index cluster. In VSAM, the data and index components of an alternate index.

alternate tape volumes. In DFHSM, copies of original tape volumes created during tape copy processing. The volumes can either be stored on-site or off-site for use later in the event of a disaster. During the tape replace processing, these volumes can replace the original volumes that may be lost.

alternate tape volume reference. In DFHSM, additional fields in the TTOC record that record information about the alternate tape volume. These fields provide DFHSM with the necessary information to refer to the alternate tape volume.

audit. A DFHSM process that detects discrepancies between data set information in the VTOCs, the computing system catalog, the MCDS, BCDS, and OCDS.

AUTH. The DFHSM command used to identify an authorized user who can issue DFHSM system programmer and storage administrator commands.

authorized user. In DFHSM, the person or persons who are authorized through the DFHSM AUTH command to issue DFHSM system programmer, storage administrator, and operator commands.

automatic backup. In DFHSM, the process of automatically copying eligible data sets from DFHSM-managed volumes or migration volumes to backup volumes during a specified backup cycle.

automatic cartridge loader feature. A feature of the 3480 Magnetic Tape Subsystem providing the operator with the capability of preloading multiple tapes to be used as migration, backup, or dump tapes.

automatic class selection (ACS). A mechanism for assigning SMS classes and storage groups.

automatic dump. In DFHSM, the process of using DFDSS to automatically do a full volume dump of all allocated space on DFHSM-managed volumes to designated tape dump volumes.

automatic migration. In DFHSM, the process of automatically moving eligible data sets from user volumes to migration level 1 or level 2 volumes, or from migration level 1 volumes to migration level 2 volumes, without a specific request for each data set moved. See interval migration.

availability management. In DFHSM, the process of ensuring that a current version (backup copy) of the installation's data sets resides on tape or DASD.

B

backup. In DFHSM, the process of copying a data set residing on a level 0 volume, level 1 volume, or a volume not managed by DFHSM to a backup volume. See automatic backup, incremental backup.

backup control data set (BCDS). 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 DFHSM.

backup copy. In DFHSM, a copy of a data set that is kept for reference in case the original data set is destroyed.

backup cycle. In DFHSM, a period of days for which a pattern is used to specify the days in the cycle on which automatic backup is scheduled to take place.

backup frequency. In DFHSM, the number of days that must elapse since the last backup version of a data set was made until a changed data set is again eligible for backup.

backup profile. In DFHSM, a RACF discrete data set profile associated with the backup version of a cataloged data set that is protected by a RACF discrete data set profile.

backup version. See backup copy.

backup volume. A volume managed by DFHSM to which backup versions of data sets are written.

backup volume cleanup process. A DFHSM process that scratches data set backup versions on DASD that are no longer needed.

backup VTOC copy data set. In DFHSM, a copy of the VTOC of a volume that was backed up by DFHSM. This VTOC data set contains only part of the Format 1 DSCB for each data set from the original data set. This data set is written on a migration level 1 volume.

base cluster. In systems with VSAM, a key-sequenced or entry-sequenced file over which one or more alternate indexes are built. See also cluster.

BCDS. See backup control data set.

base data component. In VSAM, a component of the base cluster containing data of a data set.

BDAM. Basic direct access method.

BVR. Backup cycle volume record.

C

catalog. (1) * (ISO) A directory of files and libraries, with reference to their locations. A catalog may contain other information such as the types of devices in which the files are stored, passwords, blocking factors. (2) * (ISO) To enter information about a file or a library into a catalog. (3) The collection of all data set indexes that are used by the control program to locate a volume containing a specific data set. (4) To include the volume identification of a data set in the catalog. (5) See VSAM master catalog, VSAM user catalog.

CDD. See common data set descriptor record.

CDT. Class descriptor table.

changed data set. In DFHSM, a data set that has been opened for other than read-only access.

CLIST. See command list.

cluster. In systems with VSAM, a named structure consisting of a group of related components, for

example, a data component with its index component. See also base cluster.

command list. A command procedure containing executable sequences of TSO commands, subcommands, and command procedure statements.

command procedure. In TSO, a data set or a member of a partitioned data set containing TSO commands to be performed sequentially by the EXEC command. See also CLIST.

common data set descriptor record. A record which precedes a user's data set on a DFHSM-owned volume and that is used to return the data set to the user's format.

common filter services. A subcomponent of DFP common services. Common filter services compares data items with filter keys and indicates which data items match the keys and how many matches have been found.

common service area (CSA). In OS/VS2, 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.

compaction. In DFHSM, a method of compressing and encoding data that is migrated or backed up.

compress. In DFHSM, to release unused space in a partitioned data set during the migrate/recall and backup/recovery processes.

computing system catalog. In DFHSM, the master catalog and any associated user catalogs used as sources during the audit process.

contiguous space. An unbroken consecutive series of storage locations.

control data set. In DFHSM, one of three data sets (BCDS, MCDS, and OCDS) that contain records used in DFHSM processing.

control file. In aggregate backup and recovery processing, one of three aggregate files generated by the aggregate backup process. It contains the catalog, allocation, volume, and related information necessary to perform aggregate recovery.

converter/interpreter processing. The job segment that converts and interprets JCL for MVS.

CSA. See common service area.

current backup version. In DFHSM, a backup copy of the data set that was created on a date after the data set was last updated.

cycle start date. In DFHSM, the date a backup cycle, dump cycle, or migration cleanup cycle is started.

D

daily backup volume. In DFHSM, a volume associated with a given day in the backup cycle and assigned to contain backup versions created on that cycle day.

daily space management. In DFHSM, the automatic space management of data sets that occurs once every 24 hours.

DASD. See direct access storage device.

DASD calculation services (DCS). A subcomponent of DFP common services. DCS retrieves and calculates data set information for both VSAM and non-VSAM data sets based on the user's input request.

data class. A list of allocation attributes that the system uses for the creation of data sets.

data control block (DCB). A control block used by access method routines in storing and retrieving data.

Data Facility Data Set Services (DFDSS). An IBM licensed program used to copy, move, dump, and restore data sets and volumes.

Data Facility Hierarchical Storage Manager (DFHSM). An IBM licensed program used to manage volumes and data sets. data in an MVS operating environment.

data file. In aggregate backup and recovery processing, one of three aggregate files generated by the aggregate backup process. It contains the backup copies of the data sets to be recovered.

data migration. See migration.

data set change indicator. A bit in the DSCB that indicates whether the data set was opened for output. This is bit 6 of the DS1DSIND field in the Format 1 DSCB. This indicator is supported on MVS systems that have data-set-changed flag support installed.

data set deletion. In DFHSM, the space management technique of deleting non-SMS-managed data sets that have not been used for a specified number of days and that do not have expiration date protection.

data set group. Data sets that have the same set of initial characters in their names.

data set organization. The type of arrangement of data in a data set. Examples are sequential organization or partitioned organization.

data set pool. One or more volumes managed by DFHSM to which data sets that have migrated can be

recalled, depending on the set of initial characters of the data set name.

data set retirement. In DFHSM, the space management technique of deleting non-SMS-managed data sets that have not been referred to for a specified number of days, and that have a backup version.

date last referred to. In DFHSM, the last date when a data set was opened.

DBA. See delete-by-age.

DBU. See delete-if-backed-up.

DCB. See data control block.

DCS. See DASD calculation services.

debug mode. In DFHSM, the method of operation that projects the changes that would occur in normal operation but in which no user data moves.

decompaction. In DFHSM, the process of decoding and expanding data that was compacted during daily space management or backup.

delete-by-age (DBA). In DFHSM, the space management technique of deleting non-SMS-managed data sets that have not been opened for a specified number of days.

delete-if-backed-up (DBU). In DFHSM, the space management technique of deleting non-SMS-managed data sets that have not been opened for a specified number of days, and that have a current backup version.

DFDSS. See Data Facility Data Set Services.

DFHSM. See Data Facility Hierarchical Storage Manager.

DFHSM-authorized user. In DFHSM, the person or persons who are authorized through the DFHSM AUTH command to issue system programmer and storage administrator commands.

DFHSM log. In DFHSM, a pair of sequential data sets, X and Y, containing a chronological list of transactions and statistics occurring in DFHSM.

DFHSM-managed volume. A volume managed by DFHSM containing data sets that are directly accessible to the user.

DFHSM secondary address space. A separate address space started and controlled by DFHSM to perform aggregate backup or aggregate recovery processing.

DFP common services. A component of DFP that contains three subcomponents: common filter services (CFS), DASD calculation services (DCS), and device information services (DIS).

direct access storage device (DASD). A device in which the access time is effectively independent of the location of data.

directed recall. Moving a migrated data set from a level 1 or a level 2 volume to a level 0 volume and specifying the target volume and unit name where the data set can be allocated.

disaster. An unplanned occurrence that keeps a company or organization from conducting its normal business for some time period.

disaster backup. A means to protect a computing system complex against data loss in the event of a disaster. In DFHSM, the copying of all data on 3480 single-file tape volumes, or the equivalent, for storage at another location. The copied tape volumes can be used at another location to replace tape volumes that may be lost in a disaster.

disaster recovery. A means to replace lost data at another location with sufficient resources in order to resume operation. In DFHSM, the replacement of lost data that was contained on 3480 single-file tape volumes, or the equivalent, in the event of a disaster.

discrete backup profile. A RACF profile created when DFHSM backs up a cataloged, RACF-indicated data set.

discrete profile. A RACF profile that contains security information about a specific data set on a particular volume.

disposition processing. In OS/VS, a function performed by the initiator at the end of a job step to keep, delete, catalog, or uncatalog data sets, or pass them to a subsequent job step, depending on the data set status of the disposition specified in the DISP parameter of the DD statement.

DSCB. Data set control block. See also Format 1 DSCB.

DSLO. Distributed Systems License Option.

dump. See full volume dump.

dump class. A DFHSM-named set of characteristics that describe how volume dumps are managed.

dump copy. In DFHSM, a copy of the volume image produced by the DFDSS full volume dump function.

dump cycle. In DFHSM, a period of days for which a pattern is used to specify the days in the cycle on which automatic full volume dump is scheduled to take place.

dump generation. A successful full volume dump of a volume that may contain one to five identical dump copies.

dump VTOC copy data set. In DFHSM, a copy of the VTOC of a volume dumped by DFHSM. This VTOC data set contains only part of the Format 1 DSCB for each data set from the original data set. This data set is written on a migration level 1 volume.

E

eligibility age. The number of days since a data set met its criteria to be migrated.

emergency mode. In DFHSM, the method of operation that prevents data set movement and deletion in space management, backup, and recovery processes.

encode. (TC97) To convert data by the use of a code in such a manner that reconversion to the original form is possible.

erase-on-scratch. A RACF and DFP/XA function that overwrites the space occupied by a data set when the data set is scratched from a DASD device supported by MVS/XA.

ESDS. Entry-sequenced data set.

esoteric unit names. The names a user assigns to I/O devices that have the same device type. When the user specifies the assigned unit name to DFHSM, DFHSM associates the unit name to its device type.

exclude data set. In aggregate backup and recovery processing, a data set in the selection data set exclude list. This data set is to be excluded from being processed by aggregate backup.

EXCLUDE keyword. The keyword used in the selection data set to create an exclude list.

exclude list. An optional list in the selection data set that identifies those data sets that are to be excluded from being processed by aggregate backup.

expiration. The removal of a user data set from either a user (non-DFHSM-owned) volume, or from a DFHSM-owned volume when the user data set has been migrated. If there is an explicit expiration date, it is found in the Format 1 DSCB for a non-migrated data set, or in the MCD record for a migrated data set. If there is no explicit expiration date, the management class attributes are checked to determine an implicit expiration date.

extents. A continuous space on a direct access storage volume, occupied by or reserved for a particular data set, data space, or file.

extent reduction. In DFHSM, the releasing of unused space, reducing the number of extents, and compressing partitioned data sets.

F

FBA. See fixed-block architecture.

fixed-block architecture. Data stored in blocks of fixed size; these blocks are addressed by block number relative to the beginning of the particular file.

FMID. Function modification identifier.

Format 1 DSCB. An identifier DSCB that describes a data set or VSAM data space and its first three extents. Refer to the appropriate system data areas manual.

fragmentation index. The qualitative measure of the scattered free space on a volume.

FSR. Functional statistics record

full volume dump. In DFHSM, the process of using a DFDSS function that backs up the entire allocated space on a volume.

full volume restore. In DFHSM, the process of using a DFDSS function that restores the entire volume image.

functional statistics record. A record that is created each time a DFHSM function is processed. It contains a log of system activity and is written to SYS1.LOGREC.

functional verification procedure. A procedure distributed with DFHSM that tests to verify that all basic DFHSM functions are working properly.

G

general pool. In a DFHSM environment with JES3, the collection of all DFHSM primary volumes added to that processor that have a mount status of permanently-resident or reserved, that have the automatic recall attribute, specified, and that have a mount attribute of storage or private.

generic profile. A RACF profile that contains security information about multiple data sets, users, or resources that may have similar characteristics and require a similar level of protection.

H

high threshold of occupancy. In DFHSM, the upper limit of space to be occupied on a volume managed by DFHSM. Contrast with low threshold of occupancy.

I

IDCAMS data set. In aggregate backup and recovery processing, a file created during the aggregate recovery verification process. It can be used to resolve data set conflicts that were detected.

inactive age. In DFHSM, the number of days since the data set was last referred to.

inactive data. Copies of active or low-activity data that reside on DFHSM-owned dump and incremental backup volumes. See also low-activity data.

include data set. In aggregate backup and recovery processing, a data set in the selection data set include list. This data set is processed by aggregate backup.

INCLUDE keyword. The keyword used in the selection data set to create an include list.

include list. A required list in the selection data set that identifies the include data sets that are to be processed by aggregate backup.

incremental backup. In DFHSM, the process of copying a data set that has been opened for other than read-only access since the last backup version was created, and that has met the backup frequency criteria.

incremental recovery. Recovery of the latest backup copy of a data set or data sets made by incremental backup.

inline backup. The process of copying a specific data set to a migration level 1 volume from a batch environment. This process allows you to back up data sets in the middle of a job.

installation verification procedure (IVP). A procedure distributed with DFHSM that tests to verify that the basic facilities of DFHSM are functioning correctly.

instruction data set. In aggregate backup and recovery processing, a data set that contains instructions, commands, or any data the aggregate backup site defines as needed for aggregate recovery at the recovery site.

instruction file. In aggregate backup and recovery processing, one of three aggregate files generated by the aggregate backup process. It contains the instruction data set.

interactive storage management facility (ISMF). The interactive panels of MVS/DFP that allows users and storage administrators access to the storage management functions of DFDSS and DFHSM.

Interactive System Productivity Facility (ISPF). An IBM licensed program used to develop, test, and run application programs interactively. ISPF is the interactive access method for all storage management functions.

interval migration. In DFHSM, automatic migration that occurs when the high threshold of occupancy is reached or exceeded on a DFHSM-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.

ISMF. See interactive storage management facility.

ISPF. See Interactive System Productivity Facility.

ISPF/PDF. Interactive System Productivity Facility/Program Development Facility.

IVP. See installation verification procedure.

J

JCL. Job control language.

JES2. Job entry subsystem 2.

JES3. Job entry subsystem 3.

JFCB. Job file control block.

journal data set. In DFHSM, a sequential data set used by DFHSM for recovery of the MCDS, BCDS, and OCDS. The journal contains a duplicate of each record in the control data sets that has changed since the MCDS, BCDS, and OCDS were last backed up.

K

KSDS. Key-sequenced data set.

L

level 0 volume. A volume that contains data sets directly accessible by the user. The volume may be either DFHSM managed or not DFHSM managed.

level 1 volume. A volume owned by DFHSM containing data sets that migrated from a level 0 volume.

level 2 volume. A volume under control of DFHSM containing data sets that migrated from a level 0 volume, from a level 1 volume, or from a volume not managed by DFHSM.

like device. Pertaining to (DASD) devices with identical geometry: that is, the same number of bytes per track, the same number of tracks per cylinder, and the same number of cylinders per actuator.

linear data set. In VSAM, a named linear string of data, stored in such a way that it can be retrieved or updated in 4096-byte units.

low-activity data. Data that is infrequently accessed by users and is eligible to be moved or has been moved to DFHSM-owned migration volumes.

low threshold of occupancy. The lower limit of space to be occupied on a volume managed by DFHSM. Contrast with high threshold of occupancy.

M

management class. A list of data set migration, backup, and retention attributes that DFHSM uses to manage storage at the data set level.

management work element (MWE). A control block containing the necessary information to direct DFHSM functions.

managed volume. See DFHSM-managed volume and primary volume.

MCB. BCDS data set record.

MCC. Backup version record.

MCD. MCDS data set record.

MCDS. See migration control data set.

MCP. Eligible volume record.

MCT. Backup volume record.

MCV. Primary and migration volume record.

MCVT. Management communication vector table.

migration. In DFHSM, the process of moving a cataloged data set from a DFHSM-managed volume to a migration level 1 or migration level 2 volume, from a migration level 1 volume to a migration level 2 volume, or from a volume not managed by DFHSM to a migration level 1 or migration level 2 volume.

migration cleanup. In DFHSM, the first phase of daily space management. This process deletes unnecessary records or migration copies.

migration control data set (MCDS). 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 DFHSM.

migration level 1 volume. See level 1 volume.

migration level 2 volume. See level 2 volume.

migration volume. A volume under control of DFHSM that contains migrated data sets.

minimal discrete profile. A profile with no access list or model profile. The minimal discrete profile is used when recovering a RACF-indicated data set whose original profile or backup profile no longer exists.

minimum migration age. In DFHSM, the number of days a data set must remain unopened before DFHSM can select it to migrate from a volume.

ML1. Migration level 1. See level 1 volume.

ML2. Migration level 2. See level 2 volume.

model entity. A model data set name that defines a discrete data set profile for RACF protection.

multiple-file format. In DFHSM, a 3480 tape format, or the equivalent, that requires a unique standard label data set for each user data set written. When DFHSM writes in multiple-file format it writes one tape data set for every user data set to all 3480 migration and backup volumes.

mutually exclusive parameters. A set of parameters of which only one can be used. If more than one parameter is specified, only the last parameter specified is used.

MVS/DFP. An IBM licensed program used to manage programs, devices, and data in an MVS operating environment.

MVS/Enterprise Systems Architecture (MVS/ESA). An MVS operating system environment that supports accessing of virtual storage in multiple address spaces and data spaces.

MVS/Extended Architecture (MVS/XA). An MVS operating system environment that supports 31-bit real and virtual storage addressing, increasing the size of addressable real and virtual storage from 16 megabytes to 2 gigabytes.

MVS/SP. An IBM licensed program used to control the MVS operating system and establish a base for a MVS/XA or MVS/370 environment.

MVT. Mounted volume table.

MWE. See management work element.

N

non-DFHSM-managed volume. A volume not defined to DFHSM containing data sets that are directly accessible to users.

O

OCDS. See offline control data set.

offline control data set (OCDS). In DFHSM, a VSAM, key-sequenced data set that contains information about tape backup volumes and tape migration level 2 volumes.

online. (1) * (ISO) Pertaining to the operation of a functional unit when under the direct control of a computer. (2) * Pertaining to a user's ability to interact with a computer. (3) * Pertaining to a user's access to a computer via a terminal. (4) Controlled by, or communicating with, a computer.

original tape volume. In DFHSM, a 3480 single-file tape volume, or the equivalent, used to store data during migration or backup processing, and from which a copy (called the alternate volume) is made for disaster recovery.

OS/VS2. A virtual storage operating system that is an extension of OS/MVT.

owned space. The storage space on a set of volumes to which DFHSM allocates migrated data sets and backup versions, but to which user jobs should not allocate. Included in this set are migration level 1, migration level 2, and backup volumes.

owned volume. A volume on which DFHSM writes dump, migration, or backup data sets.

P

partitioned data set (PDS). A data set in DASD 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 DFP library structure that is an enhanced replacement for a partitioned data set.

path. (1) (TC97) In a network, any route between any two nodes. (2) In a data base, a sequence of segment occurrences from the root segment to an individual segment. (3) In VSAM, a named, logical entity providing access to the records of a base cluster either directly or through an alternate index. (4) In an online IMS/VS system, the route a message takes from the time it is originated through processing; in a multisystem environment, the route can include more than one IMS/VS system.

PCDD. Pseudo common data set descriptor (CDD) record

PDF. Program Development Facility.

PDS. Partitioned data set.

PDSE. Partitioned data set extended.

physical data set restore. In DFHSM, the process of using a DFDSS function to restore one data set from a dump copy created by using the DFHSM full volume dump function.

pool of volumes. See data set pool, general pool, and volume pool.

primary processing unit. In a multiple processing-unit-environment, the processing unit assigned to do level functions (such as backing up migrated data sets).

primary volume. A non-SMS volume managed by DFHSM containing data sets that are directly accessible to the user.

PSCB. Protected step control block.

PSP. Preventive services planning.

PTF. Program temporary fix.

Q

quiesce time. A time of day after which an automatic function does not start processing any more volumes.

R

RACF. See Resource Access Control Facility.

recall. The process of moving a migrated data set from a level 1 or level 2 volume to a DFHSM-managed volume or to a volume not managed by DFHSM.

recovery. In DFHSM, the process of copying a backup version of a data set from a backup volume to a specified volume or to the volume from which the backup version was created.

recycle process. A DFHSM process that, based on the percentage of valid data on a tape backup or migration level 2 volume, copies all valid data on the tape to a tape spill backup or migration level 2 volume.

Resource Access Control Facility (RACF). An IBM-licensed program that provides access control by identifying and verifying users to the system. RACF authorizes access to resources, logs unauthorized access attempts, and logs accesses to protected data sets.

restart data set. A data set created by DFHSM if aggregate recovery fails. It contains a list of all the data sets successfully restored during the aggregate recovery

and allows the user to restart the aggregate recovery once the cause of the failure has been resolved.

restore. In DFHSM, the process of invoking DFDSS to perform the program's recover function. In general, it is to return to an original value or image, for example, to restore data in main storage from auxiliary storage.

retired version. In DFHSM, a specially marked backup version that DFHSM created before it deleted the non-SMS-managed original data set during data set retirement.

retirement. See data set retirement.

RRDS. Relative record data set.

S

SAF. System authorization facility.

SCP. System control programming.

SDSP. See small data set packing.

secondary address space. See DFHSM secondary address space.

selection data set. In aggregate backup and recovery processing, a sequential data set or a member of a partitioned data set, used to define the data sets that comprise the input to the aggregate backup function. It contains any include, exclude, accompany, or allocate lists.

sequential data set. A data set whose records are organized on the basis of their successive physical positions, such as on magnetic tape.

similar device. A (DASD) device with the same number of bytes per track and tracks per cylinder.

single-file format. In DFHSM, a 3480 format, or the equivalent, consisting of one standard-label data set that spans up to 255 tape volumes.

small data set packing (SDSP). In DFHSM, 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 DFHSM, a VSAM key-sequenced data set allocated on a migration level 1 volume and containing small data sets that have migrated.

SMF. System Management Facilities

SMP. System Modification Program.

SMP/E. System Modification Program Extended.

SMS. See Storage Management Subsystem.

SMS class. A list of attributes that SMS applies to data sets having similar allocation (data class), performance (storage class), or availability (management class) needs.

SMS-managed data set. A data set that has been assigned a storage class.

space manager. See storage administrator.

space management. In DFHSM, the process of managing aged data sets on DFHSM-managed and migration volumes. The three types of space management are: migration, deletion, and retirement.

spill backup volume. A volume owned by DFHSM to which all but the latest backup version of a data set are moved when more space is needed on a DASD daily backup volume or all valid versions are moved when a tape backup volume is recycled.

spill process. A DFHSM process that moves all but the latest backup version of a data set from a DASD daily backup volume to a spill backup volume.

SSI. See subsystem interface.

SSSA. Subsystem option block extension for SMS.

storage administrator. In DFHSM, the person or persons who are authorized through the DFHSM AUTH command to issue DFHSM system programmer and storage administrator commands, who can affect the authority of other DFHSM users, and who control the ways DFHSM manages DASD space.

storage class. A list of storage performance and availability service requests.

storage group. A list of real DASD volumes, or a list of serial numbers of volumes that no longer reside on a system but that end users continue to refer to in their JCL.

storage hierarchy. An arrangement in which data may be stored in several types of storage devices that have different characteristics such as capacity and speed of access.

Storage Management Subsystem (SMS). An operating environment that helps automate and centralize the management of storage. To manage storage, SMS provides the storage administrator with control over data class, storage class, management class, storage group, and ACS routine definitions.

suballocated file. A VSAM file that occupies a portion of an already defined data space. The data space may contain other files. Contrast with unique file.

subsystem interface (SSI). The means by which system routines request services of the master subsystem, a job entry subsystem, or other subsystems defined to the subsystem interface.

system-managed storage. An approach to storage management in which the system determines data placement and an automatic data manager handles data backup, movement, space, and security.

T

threshold of occupancy. A limit of occupied space on a volume managed by DFHSM.

time sharing option (TSO). An option on the operating system for a System/370 that provides interactive time sharing from remote terminals.

TIOT. Task input/output table.

trace. (1) A record of the execution of a computer program that exhibits the sequence in which the instructions were executed. (2) To record a series of events as they occur. (3) In MSS, a monitor in the mass storage control that records data about the system's activity, staging, and destaging. The data describes completed 3850 Mass Storage System functions from the activity schedule queues plus time stamps.

TSO. See time sharing option.

TSO/E. Time sharing option/extended.

TTOC. Tape table of contents record.

U

undirected recall. In DFHSM, moving a migrated data set from a level 1 or level 2 volume to a level 0 volume without specifying the target volume or unit where the volume can be allocated. Undirected recall can be automatic or by command.

unique file. A VSAM file that occupies a data space of its own. The data space is defined at the same time as the file and cannot contain any other file. Contrast with suballocated file.

unlike device. A DASD device with a different number of bytes per track and tracks per cylinder, or both.

V

virtual DASD. In DFHSM, this refers to the 3850 Mass Storage System (MSS).

virtual storage access method (VSAM). An access method for indexed or sequential processing of fixed and variable-length records on direct access devices. The records in a VSAM data set or file can be organized in logical sequence by a key field (key sequence), in the physical sequence in which they are written on the data set or file (entry-sequence), or by relative-record number.

virtual storage constraint relief (VSCR). A function that increases the amount of storage available for the user's application program.

volume. (1) (ISO) A certain portion of data, together with its data carrier, that can be handled conveniently as a unit. (2) (ISO) A data carrier that is mounted and demounted as a unit, for example, a reel of magnetic tape, a disk pack. (3) That portion of a single unit of storage that is accessible to a single read/write mechanism, for example, a drum, a disk pack, or part of a disk storage module. (4) A storage medium that is mounted and demounted as a unit; for example, magnetic tape or diskette.

volume pool. In DFHSM, a set of related primary volumes. When a data set is recalled, if the original volume that it was on is in a defined volume pool, the data set can be recalled to one of the volumes in the pool.

volume serial number. An identification number in a volume label that is assigned when a volume is prepared for use in the system.

volume table of contents (VTOC). (1) A table on a direct access volume that describes each data set on the volume. (2) An area on a disk or diskette that describes the location, size, and other characteristics of each file and library on the disk or diskette.

VSAM. See virtual storage access method.

VSAM master catalog. A key-sequenced data set or file with an index containing extensive data set and volume information that VSAM requires to locate data sets or files, to allocate and deallocate storage space, to verify the authorization of a program or operator to gain access to a data set or file, and to accumulate usage statistics for data sets or files.

VSAM sphere. A VSAM sphere contains the following eight components: base cluster, base data object, base index object, base path, alternate index, alternate index data object, alternate index index object, and alternate index path.

VSAM user catalog. An optional VSAM catalog used in the same way as the master catalog and pointed to by the master catalog. Use of user catalogs lessens the contention for the master catalog and facilitates volume portability.

VSCR. See virtual storage constraint relief.

VTOC. See volume table of contents.

VVDS. VSAM volume data set.

Index

A

active data, definition of 1
availability management
  definition of 1
  functions 3
  starting 18

B

backup 19
backup/recovery, disaster planning for 19

C

common service area considerations 12
CSA considerations 12
customization
  definition of iii
  tasks 17

D

data
  active, definition of 1
  inactive, definition of 1
  low-activity, definition of 1
DFHSM
  as part of system-managed storage 4
  defining to other supporting systems 16
  education 9
  implementation tasks, overview of 14
  installing the tape 15
  overview 1
  planning
    diagram of overview 8
    overview of 7
    tasks 9
  preparing for installation 15
  verifying installation and functions 16
  volume naming convention 13
  volumes managed or owned 13
diagram of system-managed storage 4
disaster backup/recovery 19
dump 19

E

education, DFHSM 9
education, operator training 23

F

future implementation of DFHSM 24

I

implementation
  customizing DFHSM 17
  installing DFHSM 15
  of DFHSM, future considerations 24
  of DFHSM, overview of 14
inactive age, definition of 34
inactive data, definition of 1
installation
  definition of iii
  of the DFHSM tape 15
  preparing DFHSM for 15
  tasks 15
  verifying 16

L

low-activity data, definition of 1

M

migration 21

O

operator training 23

P

planning
  definition of iii
  diagram of tasks 8
  for choosing DFHSM functions 12
  major tasks, overview of 7
  the installation of DFHSM 11
  the objectives for DFHSM 9
post-install review 24
prerequisite reading iv
production preparation 22

R

RACF 12
recover 19
resource access control facility 12
restore 19
review, post install 24

S

security procedures 12
SMS
  recommended reading iv
  short discussion of viii

software, products to order 11
space management
  definition of 1
  functions 2
  initiating 21
  starting 21
storage administrator orientation 22
Storage Management Subsystem
  See SMS
system-managed storage diagram 4

T

TSO user orientation 23

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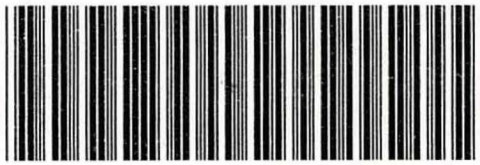

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