International Technical Support Organization

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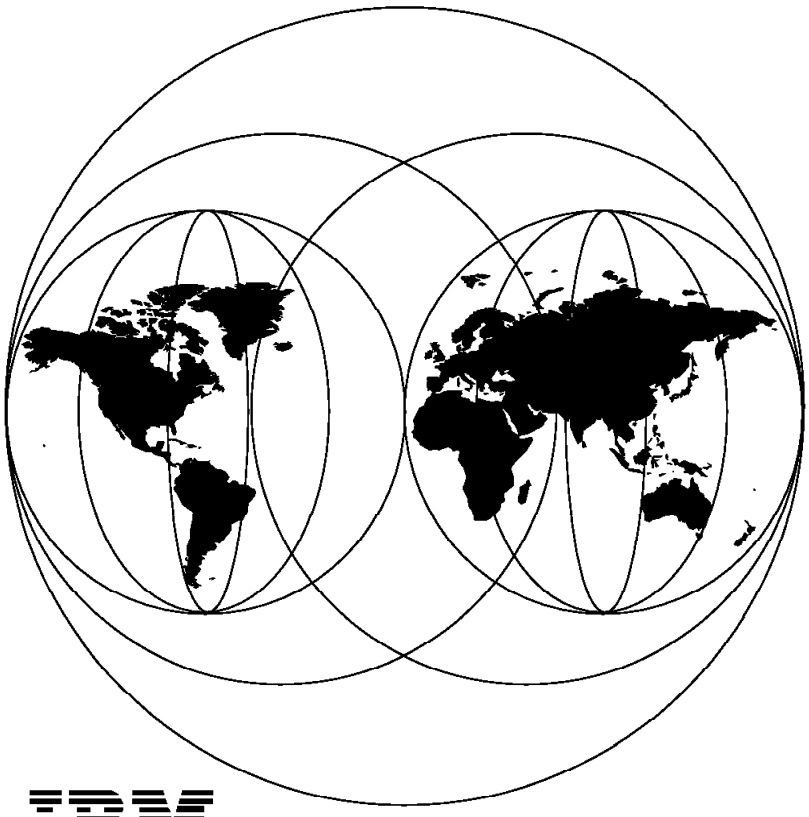
Get DFSMS FIT:
Fast Implementation Techniques

October 1995



IBM

International Technical Support Organization
San Jose Center

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Take Note!

Before using this information and the product it supports, be sure to read the general information under “Special Notices” on page ix.

First Edition (October 1995)

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Abstract

This document is written for those people who would like to find an easy, quick, and reliable way to implement IBM′s SMS, system-managed storage. The document introduces a process called DFSMS fast implementation techniques (DFSMS FIT), which implements SMS, tailored to your environment, within two to three weeks. Many installations have successfully used the DFSMS FIT process.

Contents

Special Notices

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The information in this publication is not intended as the specification of any programming interfaces that are provided by DFSMS/MVS. See the PUBLICATIONS section of the IBM Programming Announcement for DFSMS/MVS for more information about what publications are considered to be product documentation.

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Preface

This document is written for those people who would like to find an easy, quick, and reliable way to implement IBM′s SMS, system-managed storage. The document introduces a process called DFSMS fast implementation techniques (DFSMS FIT), which implements SMS, tailored to your environment, within two to three weeks. Many installations have successfully used the DFSMS FIT process.

How This Document Is Organized

The document is organized as follows:

- Chapter 1, “Why Get DFSMS FIT?” explains why you would want to use DFSMS FIT.
- Chapter 2, “What Is DFSMS FIT?” describes the DFSMS FIT process.
- Chapter 3, “Get DFSMS FIT” describes what you need to do to use the DFSMS FIT process.
- Appendix A, “DFSMS FIT Process Examples” provides a detailed description and examples of the DFSMS FIT process.
- Appendix B, “Jobs to Prepare for DFSMS FIT” provides jobs to run before starting the DFSMS FIT process.
- Appendix C, “Sample Storage Management Documentation” provides examples of the storage management documentation you should have before starting the DFSMS FIT process.

Related Publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this document.

- *DFSMS/MVS Version 1 Release 2 DFSMSdfp Storage Administration Reference*, SC26-4920
- *MVS/ESA Storage Management Library Implementing System-Managed Storage*, SC26-3123

International Technical Support Organization Publications

- *DFSMS FIT: Fast Implementation Techniques Process Guide*, SG24-4478 (available at a later date)
- *DFSMS FIT: Fast Implementation Techniques Forms and Foils*, SG24-2570 (available at a later date)
- *DFSMS FIT: Fast Implementation Techniques Installation Examples*, SG24-2569 (available at a later date)
- *DFSMS Implementation Primer Series: Writing ACS Routines*, GG24-3403

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Bibliography of International Technical Support Organization Technical Bulletins, GG24-3070.

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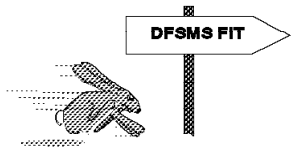
Chapter 1. Why Get DFSMS FIT?



This chapter contains an overview of why you should consider using both IBM's* system-managed storage (SMS; hereafter referred to as DFSMS*) and DFSMS fast implementation techniques (DFSMS FIT). The DFSMS FIT process is the surest means of achieving a successful, quick DFSMS implementation. It allows you to implement DFSMS in a very short period of time, ensuring a simple, tailored, successful design, and providing the cost reduction, operational improvements, and increased productivity of DFSMS.

Before considering DFSMS FIT, however, you must decide to implement and gain the benefits of DFSMS.

Why You Should Implement DFSMS

DFSMS has become the most popular method of managing DASD data on MVS platforms. The improved productivity, cost savings, and operational improvements from using DFSMS have been documented by installations in GUIDE and SHARE presentations, the DFSMS newsletter, and a variety of other articles and presentations.

DFSMS can be implemented with either DFSMS/MVS* or DFP V3. Many installations have realized the cost, productivity, and operational benefits of implementing DFSMS on both the DFSMS/MVS and DFP V3 platforms.

DFSMS/MVS provides functions that are not available in DFP V3. The additional DASD data functions include:

- Concurrent copy
- Data compression
- DFSMShsm* enhancements
- DFSMSdss* enhancements
- Dynamic cache management enhanced
- Hierarchical File System
- Sequential data striping
- VSAM KSDS extended addressability
- VSAM partial release
- VSAM record level sharing

Other DFSMS/MVS functions not provided in DFP V3 include:

- Distributed File Manager
- DFSMSrmm* enhancements
- Enhanced program management
- Network File System enhancements
- OAM enhancements
- SMS 32 name support
- System-managed tape
- Tape mount management enhancements

Value for Storage Administration Control and Productivity

With DFSMS you can automate the enforcement of data set standards. Controls include the placement of data only on selected volumes or pools of volumes, data set naming, and separation of different sized data sets. Enforcement of standards has been shown to significantly boost the productivity of storage administrators.

DFSMS provides you with the capability of enhancing JCL with parameters to allow all data sets to expand to multiple volumes, have data types spill to an overflow pool to prevent space abends, and have the system determine the optimal block size. These JCL enhancements improve the productivity of both storage users and administrators.

DFSMS also enables you to select the best way of storing tape data sets within the storage hierarchy. You can automate the selection to leave data sets on tape, move them onto tape in highly efficient tape format, or move them permanently to DASD. Automated management of tape data sets not only significantly reduces costs but also improves operations.

Value of Data Set Space Management Functions

One of the greatest benefits of DFSMS is its support of space management at the data set level. With DFSMS you can tailor the migration of data sets stored on the same volume. For example, you can migrate one data set immediately to tape, leave another data set in place, migrate a third data set after 15 days of nonuse, and a fourth after 2 days of nonuse. This tailoring at the data set level allows you to achieve the best balance between making data available and minimizing the amount of DASD required.

DFSMS can also provide you with tailored data set level system deletion of data sets or backup copies of data and reduction of overallocated and unused space. These functions also increase the effective use of DASD while reducing the overall configuration cost.

Space management control at the data set level is one major contributor to cost reductions of 20% or more in those installations that use DFSMS.

Value of Data Set Availability Management Functions

DFSMS provides data set level control of the backup of data sets. Data set level control is another major contributor to the 20% or more cost savings that installations realize as they implement DFSMS.

With backup at the data set level you do not have to back up those data sets that do not require backup. You also can process generation data groups in a tailored way, using backup only when necessary. DFSMS provides you with increased productivity and lower processing and tape costs associated with data set backup.

DFSMS also provides automated control of backup tapes after they have been created. You can let the system determine when backups are no longer needed and then have tapes returned for reuse.

DFSMS supports volume and site disaster recoveries. DFSMS can automate volume dumps and integrates volume and data set recovery. DFSMS also

provides a powerful application-oriented disaster recovery capability using Aggregate Backup and Recovery Support (ABARS), a function of HSM.

ABARS can be used with tape and DASD data and supports both SMS-managed and nonmanaged environments. ABARS enables significant cost savings and increased speed and integrity when a disaster recovery is necessary. These benefits result from ABARS′s application orientation, which reduces backup work and prioritizes application recovery.

Value of Performance Management Functions

DFSMS provides support for data set level caching. Every SMS-managed volume behind a 3990 cached storage controller can use data set level caching. Thus you can place data sets without regard to caching. Once the data sets are placed, some of them can be cached while others located on the same volume may not be cached.

With DFSMS you can use dynamic cache management enhanced (DCME). This function monitors the actual read and write hit ratios of data sets and caches data sets on the basis of most effective cache use. DCME allows your storage administrators to spend time concentrating on high priority activities rather than looking at online monitors or reports to determine which data sets to cache and which not to cache.

DFSMS has a powerful allocation approach that matches data sets to different types of devices (cached, uncached, 3380, 3390, RAMAC) according to the performance level you want the data sets to achieve. Thus you can gain full advantage of the performance characteristics of each device type.

DFSMS also provides your installation with sequential data striping. This function can result in a two to four times reduction in batch run time for selected qualifying applications.

DFSMS increases productivity through its dynamic system performance choices, shortens elapsed batch run times, increases the effectiveness and cost/benefit of cached controllers, and improves your system′s overall performance.

Why Have You Not Implemented DFSMS?

The large number of implemented systems and their documented successes and cost savings are not in question. Some installations, however, still have questions about DFSMS and when they should consider implementation. Many others still consider DFSMS a difficult, long, hard implementation; one that can take years. Thus, some installations that want DFSMS functions are still waiting while they implement other storage projects that they consider to be of higher priority.

Do You Think It Takes Too Long to Implement?

Many installations that have not yet implemented DFSMS have been led to believe that the implementation takes a long time, perhaps several years. Although this can be the case where there is no specific design and implementation process and the amount of data to convert is extremely large (tens of terabytes), it is not usual and definitely not required.

Many installations have implemented DFSMS within a month. Even without a specific implementation process like DFSMS FIT, however, DFSMS implementations of only three to six months are average. If you think your DFSMS implementation will take a long time, consider DFSMS FIT.

Do You Believe It Is Too Complex?

Installations commonly delay the implementation of SMS-managed data because of expected complexity. Although any new technology has some complexity simply by virtue of its being new, at this time we can no longer consider DFSMS a new or complex technology.

Processes like DFSMS FIT are built on the experiences of many installations that have successfully implemented DFSMS. Examples, parameter choices, code samples, jobs, tools, and approaches are available for your implementation. Complexity will no longer be a consideration if you use DFSMS FIT.

Do You Think You Do Not Know Your Data Well Enough?

Storage administrators, particularly at large installations, sometimes have so much data to manage that they simply cannot understand the characteristics of all of their data, and thus they avoid DFSMS implementation.

This consideration ties to one of the strengths of SMS-managed data. DFSMS lets you implement with an initial set of functions, data types, and data. Because DFSMS manages data at the data set level, you gain a better understanding of the data as it is managed by DFSMS. As you learn more about your data, DFSMS also makes it easy to add or change your implementation to reduce your costs and improve operations. The level of knowledge you have of your data is not an issue when using DFSMS FIT.

Do You Think You Need to Improve Your Data Set Naming Standards First?

Most installations have something other than ideal data set naming standards. Even those installations with good standards often have data set names that are historical. If you are in this situation, you may believe that you need to establish and enforce new data set naming standards before implementing DFSMS.

You can implement DFSMS with any data set naming currently in place. What is required is a process like DFSMS FIT′s data classification, which identifies the different types of data to which you want to assign specific data set level SMS-management policies.

Do You Think You Must Use DFHSM?

Although DFHSM (including both DFSMShsm and DFHSM V2.6) is the most common space and availability management tool used with SMS-management, it is not required. Many installations experience the cost savings and improvements in productivity and performance of DFSMS without DFHSM.

If you use another vendor′s space and availability management product, it is most likely that the vendor has enhanced it to support a DFSMS environment. You can use your product with DFSMS and take advantage of new functions like sequential data striping once you have completed the DFSMS FIT process.

If you do not have a product that automates space or availability management, you should consider implementing DFHSM at the same time that you implement

DFSMS. This joint implementation approach will enable you to take full advantage of the cost savings and operational advantages of DFSMS.

Do You Think You Cannot Spare the Resources?

Installations most commonly report that they have not yet implemented DFSMS because they have other higher priority projects that require the same people and resources that implementing DFSMS requires. These installations see the value in DFSMS but plan to implement at a later time when the resources and people are more available.

If you are putting off implementing DFSMS for this reason, consider DFSMS FIT so that you can gain the benefits of DFSMS within a very short time and with minimal impact on your other priority projects.

Here Is How DFSMS FIT Helps

DFSMS FIT supports you in your DFSMS implementation. It uses formal design steps to guide you through the implementation and keep it simple and quick, yet tailored to your requirements and environment.

Design and Initial Implementation in Two to Three Weeks

DFSMS FIT uses a question-and-answer approach to create a tailored DFSMS design in a very short period of time. This design approach allows you to complete a DFSMS implementation of your initial data within two to three weeks.

In addition, DFSMS FIT uses a data classification process that allows you to tailor the design quickly to your data and naming standards. Data classification also enables you to create a successful implementation quickly even if you have only a limited understanding of your data.

The DFSMS FIT process also includes a number of tools, jobs, and code that shorten the DFSMS implementation process.

The amount of data you select to include in the DFSMS FIT implementation determines the implementation time. For example, more time is required to move a large amount (many hundreds of gigabytes) of data to SMS-management than a small amount of data. This is particularly true when the time available to convert the data is limited as it is when the data is used by online systems.

Simple, Tailored Process Proven at Many Installations

The DFSMS FIT process is based on techniques proven at many installations that have successful DFSMS implementations. It includes examples from actual installations that illustrate the process and offer alternatives to help your installation make design decisions.

The DFSMS FIT process, with its extensive documentation, tools, sample jobs, and actual installation examples, will guide you through a quick, easy, and successful implementation. Many experienced DFSMS implementation people are available to help you implement with the DFSMS FIT process.

Uses a Question-and-Answer Approach with Sample Implementations

The DFSMS FIT process uses a question-and-answer approach for each step of the DFSMS design process to ensure the right balance between a highly tailored design and a quick-to-implement, simple design.

Each step of the DFSMS FIT process is documented with an example so that you can see how to complete the question-and-answer process. In addition, nine other DFSMS implementation samples are provided as a reference to help you during design.

Uses Data Classification to Validate Design

DFSMS FIT also uses a data classification approach based on examples from many installations that have successfully implemented DFSMS. Data classification provides a pictorial design aid that helps you understand your data. Because it is simple and pictorial, you can also use data classification as a communications tool with selected applications to validate the design.

After data classification and design validation with users, you code the design using DFSMS FIT samples. This coding provides a final verification that all technical issues are identified and resolved, usually on the third day of the DFSMS FIT process.

Supports Any DFP V3 or DFSMS/MVS Environment

You can use the design and implementation steps of the DFSMS FIT process for any SMS-capable environment. Both the data classification process and question-and-answer approach apply equally whether you are using DFSMS/MVS or DFP V3. The process is also equally valuable whether or not you use DFHSM.

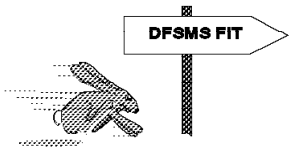
Provides Productivity, Cost Savings, and Operations Benefits Now

Because DFSMS FIT creates a design and implementation of SMS-managed data in two to three weeks, it has minimal impact on your other projects. This is particularly true when you use DFSMS FIT with an implementation leader who is experienced in DFSMS implementation and the use of DFSMS FIT.

In addition, because of DFSMS FIT′s detailed documentation and examples, one of your installation′s storage administrators can be trained during the three-week DFSMS FIT process.

The cost savings and productivity and operational improvements that you will experience with DFSMS will far outweigh the minimal resource costs of the implementation effort, and thus you can easily justify using DFSMS FIT in addition to your existing projects.

Chapter 2. What Is DFSMS FIT?



This chapter provides you with an overview of the DFSMS FIT process. For detailed examples of the process see Appendix A, “DFSMS FIT Process Examples.”

Description, Schedule, and Activities

The DFSMS FIT process provides support for your DFSMS implementation. Many installations have used DFSMS FIT to generate a good DFSMS implementation in a very short time, typically two to three weeks.

The initial implementation with DFSMS FIT is for the first phase of a DFSMS implementation. Normally the first phase would contain all nonproduction DASD data, selected production DASD data, and other selected DFSMS functions. Installations continue their DFSMS implementation after the first phase with additional phases for additional DASD data, tape and optical data, and additional DFSMS functions.

The DFSMS FIT process can be used for all phases of DFSMS implementation, but the two to three week implementation described throughout the DFSMS FIT documentation refers to the initial DFSMS phase.

DFSMS FIT uses formal design steps to guide you through a DFSMS implementation tailored to your requirements and environment. The process provides you with a simple, well-proven design that leads to a successful, quick DFSMS implementation.

The DFSMS FIT process usually covers two to three weeks of full-time work. The first week focuses on building and verifying the design. The second and third weeks focus on converting data to SMS-management.

A typical schedule is as follows:

Week 1

- Day 1
  - Data classification

    Determines the data your installation wants to have SMS-managed and groups the data by its performance, space, and availability management requirements
  - Storage class design

    Determines the performance-related services to assign to each type of your SMS-managed data
- Day 2
  - Storage group design

Determines the storage pool to assign to each type of your SMS-managed data

  - Storage class ACS coding

    Creates your installation's logic for SMS to assign storage classes to your data sets

  - Storage group ACS coding

    Creates your installation's logic for SMS to assign storage groups to your data sets

- Day 3
  - Management class design

    Determines the space and availability services to assign to each type of your SMS-managed data

  - Management class ACS coding

    Creates your installation's logic for DFSMS to assign management classes to your data sets

- Day 4
  - Data class design

    Determines whether to use data classes and, if so, establishes the JCL and standards services to assign to each type of your SMS-managed data

  - Data class ACS coding

    Creates your installation's logic for SMS to assign data classes to your data sets

  - Phased implementation design

    Determines the phased order of data conversion for your installation

- Day 5
  - Testing

    Automates the structured testing of the phased data conversion.

Week 2

- Staged data conversion

  Is the actual conversion of data to SMS-management one phase at a time

Week 3

- Staged data conversion continued (if needed).

Using DFSMS FIT

The best way to take full advantage of DFSMS FIT is to use it with an experienced DFSMS implementation person who is familiar with the DFSMS FIT process. Fee-based storage services people both within and outside IBM who are skilled in applying the DFSMS FIT process are available to work with your installation.

DFSMS Implementation Examples

The DFSMS FIT process was built after working with many DFSMS implementations and uses proven design techniques from many installations that have successfully implemented DFSMS.

The DFSMS FIT process includes many examples of successful DFSMS implementations. Each step of the process is illustrated with one real example, and the documentation includes nine other examples for each design step.

The DFSMS FIT process is intended to be used with an implementation leader who has experience with both DFSMS and the DFSMS FIT process. The implementation leader could be an IBM services or non-IBM DFSMS implementation person.

Phased Implementation

Installations typically implement DFSMS in phases. In the first phase you might convert all data that you are sure you want to move to SMS-management. After you have gained some operational experience, in the second phase you might move additional data to DFSMS.

DFSMS FIT was developed to support a phased implementation. The entire first phase can be designed and implemented within two to three weeks. DFSMS FIT also allows you to develop a complete design first and then implement portions of the design in phases.

If you have massive (one or more terabytes) amounts of data you should limit the first phase. In this way you can complete the implementation in a short time and gain DFSMS benefits and experience quickly.

Prerequisite Activities

Before using DFSMS FIT you should have some familiarity with DFSMS functions and capabilities. You also should have some understanding of your data, including which data should and should not be SMS-managed, the general use of different types of data, and the data set naming standards actually used by the different types of data.

You must have installed the products that DFSMS will use and at a maintenance level required for a stable system.

A DFSMS “minimal” configuration should be installed and operational before you start the DFSMS FIT process. A minimal configuration is created and discussed in Chapter 3, “Get DFSMS FIT,” and sample jobs to create a minimal configuration are included on the diskette provided with this book and described in Appendix B, “Jobs to Prepare for DFSMS FIT.”

An environment in which to test DFSMS also must be available.

Staying DFSMS FIT

To facilitate a quick and successful implementation, the DFSMS FIT process uses an IBM product, IBM NaviQuest* for MVS (NaviQuest) to test your DFSMS environment before data conversion.

The DFSMS FIT process also includes many sample jobs to help you set up your DFSMS environment, convert data to SMS-managed volumes, and operate and control your DFSMS environment after data conversion.

Testing Tool

NaviQuest is an IBM testing and reporting product for the DFSMS environment. Plan to use NaviQuest while you are using the DFSMS FIT process to convert your data to SMS-management.

NaviQuest provides an automated testing capability to ensure that your DFSMS design will perform correctly. It allows you to use all or selected sets of your actual data sets for testing. Installations that have used the precursor to NaviQuest have found that testing against their actual data sets has allowed them to implement and make changes to DFSMS easily and successfully.

NaviQuest was built specifically to support the DFSMS FIT process, and its use is integrated with the data classification process of DFSMS FIT.

Sample Jobs

The many sample jobs and sets of operational commands included in the DFSMS FIT documentation are designed to help you implement DFSMS quickly and successfully. You can tailor the sample jobs for your installation.

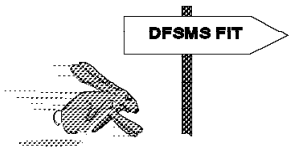
Some of these jobs are to be used before you begin the DFSMS FIT process. See Appendix B, “Jobs to Prepare for DFSMS FIT.” DFSMS FIT provides sample jobs to:

- Protect the SMS environment
- Identify unsupported data sets
- Allocate and create the minimal configuration and control data sets
- Create the SMS startup parameters
- Analyze DASD space requirements for data conversion
- Move data to SMS-managed volumes
- Roll forward the control data sets
- Roll back the control data sets.

DFSMS FIT provides sample commands for:

- Normal SMS operations
- Control data set recovery.

Chapter 3. Get DFSMS FIT



This chapter explains in detail how to prepare to use DFSMS FIT. You should complete the activities discussed in this chapter before starting the DFSMS FIT process.

Appendix B, “Jobs to Prepare for DFSMS FIT,” contains jobs that you can tailor and use to complete the activities described in this chapter. Appendix C, “Sample Storage Management Documentation,” provides examples of the information about your installation that you should document and have available during the DFSMS FIT process.

Resources Required

The DFSMS FIT process is meant to be a dedicated effort carried out over two to three weeks. You will need to have a DFSMS implementation leader and one or two people from your installation involved during this period.

You will also need to provide facilities for the DFSMS FIT implementation, such as workroom space and machine resources.

DFSMS Implementation Leader

It is best to go through the DFSMS FIT process with an experienced DFSMS implementation leader. In many cases it may be more appropriate to bring in someone with DFSMS implementation experience rather than train someone within your installation.

The value of an experienced DFSMS implementation leader lies in his or her ability to help you understand DFSMS FIT and make the best choices during the question-and-answer sessions. An experienced leader will also be able to help you quickly resolve any data conversion problems.

A group of experienced DFSMS implementation people have DFSMS FIT training. These people are available on a fee basis to help you with your DFSMS implementation. They have the DFSMS FIT implementation jobs that you can use during the DFSMS FIT process.

Within the United States, you can identify an appropriate experienced DFSMS implementation leader by contacting IBM at 1-800-IBM-4YOU. Outside the United States contact your local IBM marketing representative.

Other Project Members

Once you have identified a DFSMS implementation leader, you must select one or two people in your installation who will be involved in the DFSMS FIT process and support the SMS-managed environment after data conversion. You will probably select these people from among your current storage support staff.

At least one of the people you select should have responsibility for any current storage management products and automated services. The other person would be a backup and might have storage systems programming responsibilities.

Your installation′s primary person should have completed some DFSMS education before starting the DFSMS FIT process. The education could be a half-day to one-day overview class, or, ideally, a three- to five-day implementation class. It is mandatory that at least one person involved with the DFSMS FIT process understand DFSMS functions, such as storage, management, and data class and storage group services, and the concepts of automatic class selection.

If your installation is large (more than 500GB of DASD) you may want to involve additional storage administration people in the DFSMS FIT process.

There will be times during the DFSMS FIT process when other people in your installation will be interested in or involved with the project. Selected application developers, database administrators, and operations support people should be involved in validating the DFSMS FIT design and in some limited (one to two hours) DFSMS education.

Facilities

During most of the first week of the DFSMS FIT process you will need a small conference room where your core people can work with the implementation leader to build your installation′s tailored design. The work room should be able to accommodate 5 to 10 people and have a conference table and an overhead foil projector.

At the end of the first week and during the additional two weeks of the DFSMS FIT process you will need a terminal work area. This area may be the work area of your installation′s storage administrator. During this time all DFSMS FIT work will be MVS system oriented.

Test Environment and Seed DASD

The initial system time will be spent in testing. You can test DFSMS in any appropriate environment. A systems programming test environment is the best place for initial testing as long as it has access to the required DASD. The next best testing environment is on an MVS image associated with application test and development.

A limited amount of DASD space is required for the DFSMS control data sets and the creation of the minimal configuration. This space can be on existing volumes with other system or subsystem data sets. It would also contain the DFSMS FIT tools and sample jobs.

You probably will require an additional amount of DASD, frequently called “seed” DASD, during the data conversion. Seed DASD is used to facilitate the data conversion to SMS-management, but at the end of the conversion it can be

returned for other use. Seed DASD is highly desirable because it allows you to convert data to new volumes simply and safely. It is also the quickest method if you consider that you need to back up the data before conversion.

The amount of seed DASD you need for the DFSMS implementation varies and is relative to the amount of data you want to place into SMS-management. The amount also depends on the length of the time window available for data conversion. As a general recommendation, seed DASD should be between 4 and 8 volumes for an installation under 500 GB of DASD and between 8 and 12 volumes for larger (1+ TB) installations.

Activities to Complete

Once you have decided to convert data to SMS-management (whether you use the DFSMS FIT process or not) you must set up a stable environment to begin the implementation.

A diskette accompanying this document contains jobs that you can tailor to perform some of these activities. Appendix B, “Jobs to Prepare for DFSMS FIT,” contains a more detailed description of these support jobs, the tailoring you need to do, and how to verify that they have run correctly.

Verify Maintenance Levels

Before beginning the DFSMS FIT process you should have installed the latest levels and versions of each of the following software products or their functional equivalents:

- DFSMS/MVS or MVS/DFP*
- MVS/SP and JES 2 or 3
- DFSMSdss or DFDSS
- DFSMShsm or DFHSM
- RACF*
- ICKDSF
- TSO/E
- ISPF/PDF.

Your installation should apply all HIPER maintenance and be no more than two PUT levels back from the current PUT for all non-HIPER maintenance.

If your installation uses any non-IBM storage products, check with the vendors to ensure that you are at the correct maintenance levels for DFSMS. Also assess any of your own installation′s locally developed storage tools.

Protect the SMS Environment

As you implement DFSMS, new storage services and facilities are introduced into your MVS system environment. You will need to determine how to control some of these new services and facilities. Initially the best approach is to protect them with RACF or an equivalent security product. The initial protection should authorize storage administrators, system programmers, and operations people to use the new storage services and facilities but prevent other users from using them until they are authorized.

The set of storage services and facilities that you should consider protecting include the following:

- SMS control data sets
- DFSMS functions and commands
- Selected Interactive Storage Management Facility (ISMF) functions

Appendix B, “Jobs to Prepare for DFSMS FIT,” includes a sample job to set up a recommended set of protections. You will need to tailor this job to reflect your installation′s environment. You may want to remove some functions to allow them to be used by anyone. You also will want to tailor who is authorized to use protected resources.

Create the Minimal Configuration

The next activity in preparation for the start of the DFSMS FIT process is to create a minimal DFSMS configuration. This configuration does not manage any data. It is established to allow your installation to become comfortable with the DFSMS operational environment. It also allows you to begin testing during the DFSMS FIT process.

Appendix B, “Jobs to Prepare for DFSMS FIT,” contains sample jobs that you can tailor to create the minimal configuration. The appendix also contains a detailed set of instructions to show you how to view the minimal configuration after it is loaded on your system so you can gain some limited experience using ISMF with DFSMS and validate that your tailoring was done correctly.

There are several steps in creating the minimal configuration, as described below.

Create Control Data Sets

Your installation will need to create the three control data sets that SMS uses: the source (SCDS) and active (ACDS) control data sets and the communications data set (COMMDS). Place these control data sets on volumes that are accessible from the MVS image that you plan to use for DFSMS testing during the DFSMS FIT process.

Sample jobs in Appendix B allocate your control data sets and load the source control data set with a predefined minimal configuration. The sample jobs also create and load a source library for the ACS source code associated with the minimal configuration.

Included in the minimal configuration is the base configuration. After the sample jobs create the minimal configuration, you will need to add your specific MVS system names to the base configuration. Appendix B contains a detailed set of ISMF panels showing you how to customize the configuration.

View and Alter the Minimal Configuration

The last step in defining the minimal configuration is to view the configuration to make sure that it is valid for your environment. You alter the configuration by adding your MVS system names to the base configuration.

Use ISMF panels to look at and change the SMS constructs that are stored in the SCDS. Appendix B contains a sequence of panels to use to view and alter the minimal configuration.

Create SMS Startup Parameters

Once you have created the minimal configuration you must create the startup parameters for SMS. Appendix B, “Jobs to Prepare for DFSMS FIT,” contains a sample job to create the appropriate startup parameters in your installation′s system parameter library (SYS1.PARMLIB).

Once you have tailored and run the sample job you will be able to start the SMS address space using the minimal configuration. This configuration establishes the SMS address space and executes SMS code for allocations. However, because it is a minimal configuration, no data will be SMS-managed.

Identify Unsupported Data Sets

Almost all of your nonsystem data sets can be moved to SMS-management. There are a few exceptions, such as unmovable and ISAM data sets, model DSCBs for generation data groups, and uncataloged data sets. You can use ISMF to identify these data sets or you can run sample jobs (see Appendix B, “Jobs to Prepare for DFSMS FIT”).

The job provided in Appendix B places a program on your system and then executes it to produce a report. The report lists all data sets not eligible for SMS-management. The job looks at VTOCs and the catalog structure. It does not access any data sets, and its only output is a report.

Collect Current Storage Management Documentation

Collect basic documentation about your installation′s current storage management environment before beginning the DFSMS FIT process. The documentation should include both general and specific information, which will be used at key points in the DFSMS FIT process.

Appendix C, “Sample Storage Management Documentation,” provides a detailed example of the documentation of one installation′s storage environment before it began the DFSMS FIT process.

Include in your documentation the MVS system images that have access to volumes that will become SMS-managed. Be sure to include all systems that have physical connectivity to these volumes even though they typically are not varied on to the MVS system. Include such systems as:

- Systems programming test
- Application development and test
- Batch and online production.

You also need to document the storage-related software that is running or you plan to run in these MVS systems. Include both IBM and non-IBM products and their release levels. Ensure that all storage-related products are at the proper maintenance levels before starting the DFSMS implementation.

Include the following software products:

- MVS and JES
- DFSMS/MVS or DFP
- DFSMSdss or equivalent non-IBM data mover product
- DFSMShsm or equivalent non-IBM archive and backup product
- RMM or equivalent non-IBM tape control product
- RACF or equivalent non-IBM security product

- GRS or equivalent non-IBM serialization control product
- ICFRU or equivalent non-IBM catalog recovery product
- All other storage-related non-IBM products and locally developed tools
- DFP or HSM exits.

Document the DASD environment connected to the MVS images that will support your installation's use of DFSMS. Include the following information:

- DASD in GB or TB
- Types of DASD devices
- Types of storage controllers
- Percentage of volumes cached
- Physical and logical attachment between volumes and MVS images.

Along with the DASD environment, document the pools (groups of volumes all used for the same purpose) and the method of data set allocation. A specific VOL=SER or UNIT esoteric name are the common methods of allocation control.

Examples of pools are:

- Private application
- System
- Online database
- TSO
- Test
- Batch production
- Work.

For each pool or data type document the current storage management services that your installation provides. You may want to include some brief information about the services such as the number of backup copies created or how often backups are taken.

The information about your installation's current storage management services should include:

- Standards
  - Allocation control
  - Naming conventions
- Space Management
  - Data migration
  - Extent reduction
  - Space release
  - Deletion control
  - Default blocking
- Availability Management
  - Volume dump
  - Incremental backup
  - Application inline backup
  - Disaster recovery
  - Catalog recovery
- Performance Management
  - Data set placement
  - Volume caching.

Critical information that you must document before starting the DFSMS FIT process is your installation's data set naming conventions. Many installations may have more than one naming convention and many exceptions. Make sure you include all variations and exceptions.

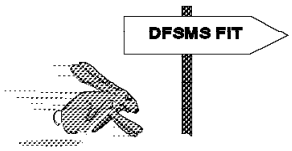
The documentation should include use of all levels of the data set names that are part of the installation standards. Include the naming standards and exceptions for all of the data types that you are considering for SMS-management, such as:

- Batch production data identifier
- Online data identifier
- System data identifier
- Test data identifier
- TSO data identifier
- Permanent work data identifier
- Backup data identifier
- Library data identifier.

Your DFSMS implementation goals and objectives can be useful during the DFSMS FIT process to make design trade-offs. Although the following documentation is optional, it does force you to give some thought to how you want to change your current storage management services and implement DFSMS:

- Management goals for DFSMS implementation
- Changes in storage management services that your storage administrator wants with DFSMS
- Aspects of your installation's current storage management services that should not change with DFSMS
- Your storage administrator's desired approach to DFSMS implementation and data conversion.

Appendix A. DFSMS FIT Process Examples



To facilitate your understanding of the question-and-answer approach, the role of data classification, and the overall DFSMS FIT method, this appendix provides some examples of the DFSMS FIT process.

Before you proceed further, we want to ensure that you understand some terms and functions of DFSMS. The terms storage class, management class, and data class refer to types of storage services that DFSMS provides for data sets. The term storage group is associated with the set of volumes used to store related data sets.

DFSMS associates your installation's data sets that are selected for SMS-management with services for space, availability, and performance. The services are associated with specific data sets in a process called automatic class selection (ACS). Once the data sets have been associated with the services your installation wants, DFSMS automatically performs functions to provide those services.

Data Classification Questions and Answers for Test Data

Data classification is the initial step in the DFSMS FIT process. Like most of the steps in this process, data classification is determined by answering a question set.

The question set presented below is used to determine whether an installation has a data type of test data and to help create the data subtypes within test data.

The question set, created from working with many DFSMS implementations, provides a structure for data classification. An experienced DFSMS implementation leader is also very helpful in providing additional support for data classification.

The answers to the questions are from a sample installation that successfully implemented DFSMS by using the DFSMS FIT process.

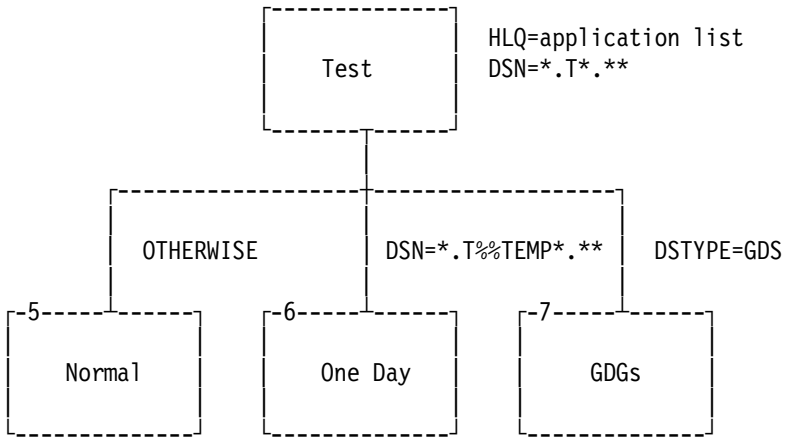
1. Do you want to consider TSO data separately or include it with test data? SEPARATELY
2. Do you want to consider test data separately or include it with production data? SEPARATELY
3. Do you want to handle batch and online test data differently? NOT AT THIS TIME
4. Do you want to handle online test data (VSAM, DB2*, IMS) differently? NO
5. Do you want to handle test libraries differently? NO
6. Do you want to handle test GDGs differently? YES

7. Are there work or short-duration test data sets, and do you want to handle them differently? YES
8. Do you want to handle large data sets differently? NO
9. Do you have quality assurance or acceptance test data, and do you want to separate it or include it with test data? NO

You will use these questions and answers are used how to build data classification pictures. For details, see the *DFSMS FIT: Fast Implementation Techniques Process Guide*, SG24-4478.

Test Data Classification

Using the question set presented above, the discussion surrounding the questions, and the answers, an experienced DFSMS implementation leader created the following data classification picture for test data. The DFSMS FIT sample installation identified three subtypes of test data, boxes 5, 6, and 7 in the data classification picture. Also shown in the data classification picture is the logic to identify the installation's data sets that each box represents.



Data classification pictures are created for all of the data types your installation wants to convert to SMS-management. Data types might include work, TSO, test, batch production, online production, and other data types unique to your installation.

Storage Class Design Questions and Answers

DFSMS FIT uses question sets for storage, management, and data classes and storage groups that enable an installation to tailor its design and keep the DFSMS implementation simple, quick, and successful.

Each question in these question sets is a multiple choice question. The answers shown for the storage class design question presented below are for the DFSMS FIT sample installation's test data.

- What level of performance do you want?
  - Maybe cache (DCME) YES FOR BOXES 5, 6, and 7

  - Never cache
  - Always cache
  - Data striping, single stripe
  - Data striping, multiple stripes
- What level of availability do you want?
  - Standard YES FOR BOXES 5, 6, and 7
  - Concurrent copy
  - Dual copy
- If concurrent copy is used, what type of controllers?
  - Mixed (relative to extended platform) controllers NO
- What required exception controls?
  - GUARANTEED SPACE YES
  - Override to make data set non-managed YES
  - VIO and sort work data sets NO

Storage Class Naming

The storage class design questions are asked for each box of the data classification pictures. The answers are recorded on DFSMS FIT forms where they are used to generate the exact storage, management, and data classes and storage groups needed for your installation.

The DFSMS FIT sample installation required five storage classes for the DFSMS implementation. These five storage classes were to support all SMS-managed data types, not just test data. The installation used the following naming approach for the five storage classes:

1. SCFAST
2. SCNORMAL
3. SCSPECN
4. SCSPECF
5. SCNOSMS.

Storage Class Protection

Most of your data sets will have their storage, management, and data classes assigned automatically by DFSMS through logic in the ACS routines. In some cases your installation will want to enter these class names on JCL.

The results shown for the sample installation document the use of DFSMS parameters with JCL and define any protection logic required in the ACS routines:

```
SCFAST     NO JCL USE

SCNORMAL   NO JCL USE

SCSPECN    PROTECTED JCL USE BY ACS CODE

SCSPECF    PROTECTED JCL USE BY ACS CODE
```

```
SCNOSMS    PROTECTED JCL USE BY ACS CODE.
```

Storage Class Parameters

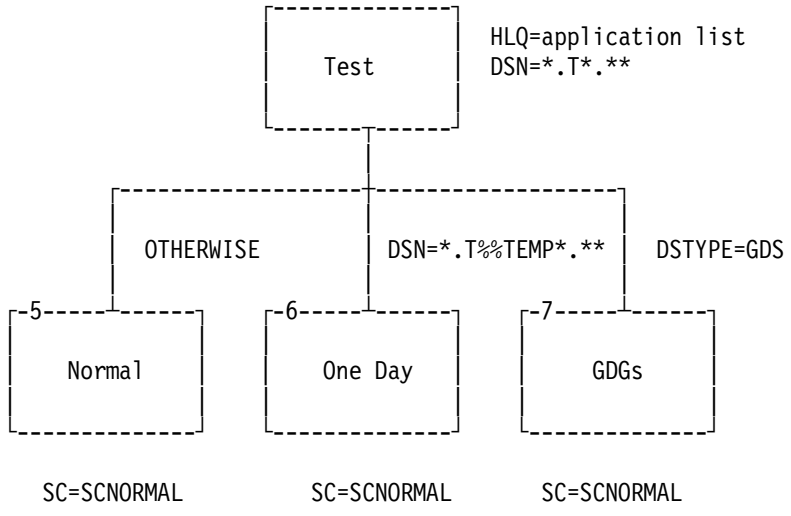
Once you have used the DFSMS FIT process to define the storage services required for your installation, you then complete forms to select the specific values for the services. The sample installation selected the following parameter values for its storage classes:

```
SCFAST    MSR=5   BIAS=W  AVAILABILITY=STANDARD  GUARANTEED SPACE=N
SCNORMAL  MSR=25          AVAILABILITY=STANDARD  GUARANTEED SPACE=N
SCSPECN   MSR=25          AVAILABILITY=STANDARD  GUARANTEED SPACE=Y
SCSPECF   MSR=5   BIAS=W  AVAILABILITY=STANDARD  GUARANTEED SPACE=Y
SCNOSMS
```

The DFSMS FIT process question-and-answer approach provides a starting point for defining these parameters. An experienced DFSMS implementation leader can help you make any adjustments to the parameters to fit your specific environment.

Updated Data Classification

Once you have defined the storage, management, and data classes and storage groups by using the DFSMS FIT process, you add them to the data classification pictures to complete the documentation. The following data classification picture is for the sample installation's test data type and shows the storage classes assigned to each subtype of test data:



Repeat the storage class design steps for storage groups. Again, data classification and the question-and-answer approach are used to help determine the storage groups required for your installation's implementation.

Storage Class ACS Fragment

Once you have designed your storage classes and groups, you must ensure that the design can be implemented without technical problems using your data set names and other information from your environment.

To code and validate the design, you code the ACS routine logic to support your installation's implementation. ACS coding is done within a structured ACS routine format. This format and all common ACS code logic are part of the DFSMS FIT package. The code is in small sections of logic that includes places for your installation tailoring. The following is one code logic section for storage class ACS routines:

```
/*********************************************************************/
/* INCLUDE ALL DASD ALLOCATIONS IN THIS BLOCK, INCLUDE BOTH DASD     */
/* ALLOCATION FOR SMS AND NON-SMS                                    */
/*********************************************************************/

       FILTLIST &VALID_DASD_UNIT INCLUDE
       ('3380','3390','SYSDA','SYSALLDA','',
        '________','________','________')

       FILTLIST &VALID_OPTICAL_ACSENVIR INCLUDE
       ('STORE','CHANGE','CTRANS')

       WHEN ((&UNIT EQ &VALID_DASD_UNIT)
       AND (&ACSENVIR NE &VALID_OPTICAL_ACSENVIR))

           SELECT /* DASD DATA ALLOCATION */

/*********************************************************************/
/* ALLOW SPECIAL USERS TO PLACE SELECTED DATA SETS OUTSIDE OF SMS    */
/* BY USING STORCLAS=SCNOSMS AT ALLOCATION                           *//
/*********************************************************************/

               FILTLIST &SPECIAL_SCNOSMS_USER INCLUDE
               ('________','________','________')

               WHEN ((&USER EQ &SPECIAL_SCNOSMS_USER)
               AND (&STORCLAS EQ 'SCNOSMS'))

                   DO
                       SET &STORCLAS = ''
                       EXIT
                   END /* DO */
```

Most technical issues are discovered and resolved when coding the ACS logic. This is a place in the DFSMS FIT process where you will want to take advantage of the examples of many installations that are included with the DFSMS FIT documentation and the skill of an experienced DFSMS implementation leader.

Management and Data Class Design

Once you have validated the overall implementation design by coding the storage class and group ACS logic, the DFSMS FIT process continues with the design of management and data classes. The question set and data classification process described for storage class design are also used for management and data class design. After you have defined the management and data classes, you code the ACS routines.

Management class design provides the greatest opportunity for cost savings and operational improvements for your installation. At the same time, management class design can be extremely difficult. Management class design is the area where DFSMS FIT will provide you with the greatest benefit.

Phased Implementation

The last step of the DFSMS FIT design is to determine a phased order of data conversion. The phased data conversion approach of DFSMS FIT moves data sets to SMS-managed volumes one portion at a time to simplify and control the implementation.

A question and answer set is again used to help your installation determine the order of data conversion. This phased implementation is determined by working with the data classification pictures built during the DFSMS FIT process.

Here is the phased implementation order for the sample installation:

1. Temporary data sets for selected users
2. All temporary data sets
3. TSO data for selected users
4. All TSO data
5. Test data for selected users
6. All test data
7. Batch production data for selected users
8. All batch production data.

Testing

Once you have determined your DFSMS design and phased implementation, you begin testing to ensure that the design will function correctly with your installation's data.

The NaviQuest product runs as an extension to ISMF. With it you can use the actual ACS routines and DFSMS definitions defined during the DFSMS FIT process and test them against your installation's data. You can test selected or all data of given data types at one time.

NaviQuest was specifically built to support the DFSMS FIT process and uses the data classification approach. Each box of the data classification pictures represents data sets and DFSMS logic that need to be tested. Each box is related to a set of NaviQuest test cases. These test cases are built from your

installation's actual data sets that would be associated with the particular data classification box.

NaviQuest runs a series of test cases as a batch job and automatically compares the test results to a preset value. Thus, NaviQuest verifies that the correct storage, management, and data classes and storage groups will be assigned to all of your data sets before data conversion.

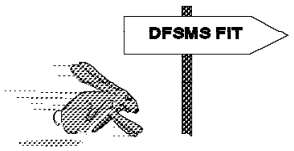
The functions of NaviQuest include the following:

- Runs ISMF in batch
- Relates test cases to data classification boxes
- Accesses real data to generate test cases
- Adds usability information to test case data
- Compares results automatically
- Manages groups of test cases to aid the data conversion approach.

NaviQuest also contains many other productivity and reporting functions for your DFSMS implementation.

The last step of the DFSMS FIT process is to execute the phased data conversion. Sample jobs to run the data conversion and manage the DFSMS environment are included in the DFSMS FIT documentation.

Appendix B. Jobs to Prepare for DFSMS FIT



This appendix describes the steps to follow to prepare for DFSMS FIT as well as the sample jobs that your installation can tailor to set up your DFSMS environment. The steps are as follows:

- Load the samples into your MVS system
- Protect your DFSMS resources
- Allocate and create a minimal configuration
- View and alter the minimal configuration for your MVS systems
- Translate and validate the minimal configuration
- Start the SMS address space
- Activate the SMS minimal configuration
- Identify the data sets not supported by SMS.

The diskette that accompanies this book contains the sample jobs and other supporting materials. You must tailor each job to your installation's environment. Comments in the jobs indicate the type of tailoring required. All of the jobs are provided on an "as is" basis.

To tailor the jobs, change the **%SMSHLQ** variable to the high-level qualifier name for the SMS control data sets and change the **%FITHLQ** variable to the high-level qualifier name you want to use for all of the materials for getting DFSMS FIT. Each job may include other variables that you must change to fit your installation.

Loading the Samples

The diskette accompanies this book contains three files: SMSFITG.CNT, SMSFITG.CLT, and SMSFITG.SCD. SMSFITG.CNT is an unloaded fixed block PDS that contains the sample jobs. SMSFITG.CLT in an unloaded variable spanned PDS that contains two REXX procedures used by one of the sample jobs. SMSFITG.SCD contains the unloaded source control data set for the minimal configuration.

As you upload these three files to your installation's MVS system, add an appropriate high-level qualifier (**%FITHLQ** is used in this discussion) to their names. You also should extend the low-level qualifiers to the complete names of **%FITHLQ**.SMSFITG.CNTLSEQ, **%FITHLQ**.SMSFITG.CLISTSEQ, and **%FITHLQ**.SMSFITG.SCDSMIN.UNLOAD.

You can use any file upload program to upload the files in binary format. You must specify RECFM(F) and LRECL(80) when uploading SMSFITG.CNT and SMSFITG.CLT. You must specify RECFM(V) and LRECL(4100) when uploading SMSFITG.SCD.

Once the files are on MVS, reload the unloaded PDSs, **%FITHLQ**.SMSFITG.CNTLSEQ and **%FITHLQ**.SMSFITG.CLISTSEQ, by issuing the TSO RECEIVE command with the DATASET parameter:

```
RECEIVE INDATASET(%FITHLQ.SMSFITG.CNTLSEQ)
RECEIVE INDATASET(%FITHLQ.SMSFITG.CLISTSEQ)
```

When prompted by the receive, assign the PDS the following name:

```
DATASET(%FITHLQ.SMSFITG.CNTL)
DATASET(%FITHLQ.SMSFITG.CLIST)
```

The **%FITHLQ**.SMSFITG.CNTL PDS should now contain the following members:

- $README - information on the members of the PDS
- IEFSSN01 - sample SYS1.PARMLIB member
- IGDSMS00 - sample SYS1.PARMLIB member
- JOBNAME - place to keep a job card for your installation
- LOADMIN - sample jobs to create the minimal configuration
- PRINTIT - sample job to print all members of both PDSs
- REPTNON - sample job to run DCOLLECT to collect data set information to identify data sets not supported by SMS and to report the data sets not supported by SMS
- SAMPOUT - sample output report of data sets not supported by SMS
- SCMIN - storage class ACS routine for the minimal configuration
- SGMIN - storage group ACS routine for the minimal configuration
- SMSRACF - sample job to run RACF to protect the DFSMS environment
- VERFMIN - instructions to view and update the minimal configuration.

The **%FITHLQ**.SMSFITG.CLIST PDS should now contain the following members:

- $README - information on the members of the PDS
- REXNON1 - REXX procedure used by the REPTNON sample job
- REXNON2 - REXX procedure used by the REPTNON sample job

Leave the unloaded source control data set, **%FITHLQ**.SMSFITG.SCDSMIN.UNLOAD, as it is after the upload.

Protecting DFSMS Resources

You must include your DFSMS environment in your installation's overall security implementation. You must protect DFSMS facilities in a manner consistent with how you protect other system services.

A sample job to protect DFSMS resources is provided for a RACF environment. Tailor this sample to fit your installation's needs. If you do not use RACF but another security product that has the SAF interface, you can easily adapt the RACF control statements to that security product.

Protecting the SMS Environment

We recommend that you protect the SMS control data sets, the ISMF storage administration functions for DFSMS, and the DFSMS storage administration utility or command functions.

SMS Control Data Sets

You must prevent unauthorized access to the SMS control data sets. The SCDS, ACDS, and COMMDS should be protected. Allow read access to the control data sets as a default. Authorize selected users to alter the control data sets.

ISMF Storage Administration Functions for DFSMS

You must prevent unauthorized use of the DFSMS functions in ISMF that create and alter storage class, management class, data class, and storage group. You must also protect the automatic class selection and control data set applications.

DFSMS Storage Administration Utility or Command Functions

You must prevent unauthorized use of the DFSMS storage administrator commands. You also must prevent general users from activating new SMS configurations, using DFDSS′s CONVERTV function, and bypassing the ACS routines when copying or restoring data sets. The ability to alter the storage and management class names assigned to data sets also should be protected. The storage administrator utility commands are associated with the following system facility names:

- STGADMIN.IGD.ACTIVATE.CONFIGURATION
- STGADMIN.ADR.CONVERTV
- STGADMIN.ADR.COPY.BYPASSACS
- STGADMIN.ADR.RESTORE.BYPASSACS
- STGADMIN.IGG.ALTER.UNCONVERT
- STGADMIN.IGG.ALTER.SMS.

Sample Job

The sample job to protect your installation′s DFSMS environment is in the SMSRACF member of the **%FITHLQ**.SMSFITG.CNTL PDS. You must tailor this job by changing the **%SMSHLQ** variable to the high-level qualifier name you want to use for your SMS control data sets. You also must change the **%AUTHID** variable to the userid of the storage administrator who is responsible for building and maintaining the SMS configurations.

You must define **%SMSHLQ** as a RACF group or userid, if it is not already defined, before running this sample job.

Allocating and Creating a Minimal Configuration

The main advantages of installing the minimal configuration are to provide operator training and awareness of the SMS address space and allow for an easy transition to testing.

Without the minimal configuration, when testing with SMS active, an IPL is required after the test to return the system to its pretest status. With the

minimal configuration, your installation can go from a test environment to pretest status without an IPL by reactivating the minimal configuration.

Allocating and Loading the Control Data Sets

To create an SMS minimal configuration you must allocate the SMS control data sets. The minimal configuration includes one storage class and one storage group. The storage group must contain one volume serial number, although this number does not need to be associated with a real volume.

The storage class ACS routine must assign all new data set allocations a null storage class so that no data sets are SMS-managed while you are using the minimal configuration.

Control Data Sets

You must build the SMS control data sets, SCDS, ACDS and COMMDS. The easiest method is to import the data sets from a supplied exported copy.

Import the Minimal Configuration

The minimal configuration contains one storage class and storage class ACS routine, one storage group and storage group ACS routine, and the base configuration to provide systemwide defaults for SMS.

Minimal Configuration Storage Class ACS Routine

The purpose of the minimal configuration storage class ACS routine is to provide a skeleton for further ACS development. To start the SMS address space, SMS constructs are required, but for the minimal configuration you must leave all data sets nonmanaged. The minimal configuration consists of a STORCLAS ACS routine that assigns a null value to any data set passed and thus ensures that the data set will not be managed.

The minimal configuration's storage class ACS routine is member name SCMIN in the **%FITHLQ**.SMSFITG.CNTL PDS.

Minimal Configuration Storage Group ACS Routine

When a data set has no STORCLAS value assigned, it remains nonmanaged, and all remaining ACS routines will not be invoked. To have a valid minimal configuration, however, a storage group ACS routine is required.

The minimal configuration's storage group ACS routine is member name SGMIN in the **%FITHLQ**.SMSFITG.CNTL PDS.

Sample Job

The sample job allocates the SCDS, **%SMSHLQ**.SCDSMIN, the ACDS, **%SMSHLQ**.ACDS, and the COMMDS, **SMSHLQ**.COMMDS, and loads the SCDS with an initial minimal configuration.

Tailor this sample job to fit your installation's environment. It allocates and builds the minimal configuration. The member name in the **%FITHLQ**.SMSFITG.CNTL PDS for this job stream is LOADMIN.

To tailor this job change the **%SMSHLQ** variable to the high-level qualifier name for the SMS control data sets and change the **%FITHLQ** variable to the high-level qualifier name you use for all of the materials for getting DFSMS FIT. Change

the **%SRCDSVOL**, **%ACDSVOL**, and **%COMMDSVOL** variables to volume serial numbers that you want for the source data sets (for both source control data set and ACS routine source code), the active control data set, and the communications data set. Also change the **%DEVTYP** variable to the device type for the volume serial numbers used.

Viewing and Altering the Minimal Configuration

After creating the minimal configuration, use ISMF to view and alter it.

The VERFMIN member in the **%FITHLQ**.SMSFITG.CNTL PDS contains sample ISMF panels and text to help you.

After verification of the entire configuration, you must alter the base configuration component of the minimal configuration to add the system names of your installation′s MVS images that will use DFSMS. Replace the SMFID1 system name with one of your MVS system names and then add any additional MVS systems. The VERFMIN member contains instructions to alter the base configuration.

Translating and Validating the Minimal Configuration

Before you can use the minimal configuration you must translate and validate it. Because you have changed only the system names of the minimal configuration, translation and validation should be easy and result in no errors. The translation and validation process ensures that the entire configuration is correct and complete.

Starting the SMS Address Space

The IGDSMSxx and IEFSSNnn members of SYS1.PARMLIB direct the initialization and activation of the SMS address space. You now need to set up the MVS environment for the SMS address space. This setup should be done in multiple, small steps so that your installation maintains control. The steps are as follows:

1. Define SMS to the MVS system and control startup of the SMS address space through command rather than by IPL.
2. IPL MVS to have it accept the SMS definition.
3. Place the SMS startup parameters in SYS1.PARMLIB.
4. Start up the SMS address space by command.
5. Activate the minimal configuration by command.
6. Redefine SMS to the MVS system for automatic startup.
7. Re-IPL MVS to initiate automatic startup.

Define SMS to MVS

The SMS entry in IEFSSNnn identifies SMS as a subsystem to MVS. This entry can specify that the SMS address space is to be started either automatically or not automatically at IPL.

Initially you should create the SMS entry so that the SMS address space is not started automatically at IPL. You then start the SMS address space by command

to ensure that there are no problems. Once you have run the address space successfully, you can redefine SMS to MVS to have the address space started automatically at IPL.

For the initial definition, with no automatic startup, copy the IEFSSN01 member from **%FITHLQ**.SMSFITG.CNTL to SYS1.PARMLIB. This action enables you to start the minimal configuration by command.

The IEFSSN01 member contains the following command:

```
SMS,,'ID=00,PROMPT=DISPLAY'
```

Place the IEFSSNO1 member in the SYS1.PARMLIB of each MVS system that will be part of your installation's SMS complex.

Update the SSN statement of the IEASYSyy member of SYS1.PARMLIB so that the new IEFSSNxx member is concatenated ahead of the current subsystem name table (IEFSSN00). This action allows the SMS address space to be started before the other subsystems.

An example where xx has the value of 01 is:

```
SSN=(01,00)
```

IPL MVS

The SMS definition to MVS takes effect at the next IPL. This IPL is required before you can start up the SMS address space.

Place SMS Startup Parameters in SYS1.PARMLIB

IGDSMS00 provides initialization parameters to SMS. For the minimal configuration you need to identify the ACDS and COMMDS data sets to be used. Copy the member IGDSMS00 from **%FITHLQ**.SMSFITG.CNTL to SYS1.PARMLIB to use the minimal configuration. This member defines the SMS control data sets with the following command:

```
SMS ACDS(%SMSHLQ.ACDS) COMMDS(%SMSHLQ.COMMDS)
```

Start Up SMS Address Space by Command

Ensure that the SMS address space starts without any operational problems. The command to start the address space without any configuration is:

```
T SMS=00
```

This set command indicates that the 00 member of IGDSMSxx is to be used for the SMS address space.

To display that the SMS address space is now active but running with no configuration (a null configuration), issue the following command:

```
D SMS
```

Activate the Minimal Configuration by Command

Activate the minimal configuration by using the SETSMS command. An example of this, where **%SMSHLQ** is your installation's high-level qualifier for the SMS control data sets, is as follows:

```
SETSMS SCDS(%SMSHLQ.SCDSMIN)
```

To display that the SMS address space is now active but running the minimal configuration, issue the command:

```
D SMS
```

Redefine SMS to MVS for Automatic Startup

Once you are sure that the SMS address space starts with no operational problems, redefine SMS to MVS to have the SMS address space started automatically with each IPL. Edit the IEFSSN01 member. Make the previously used SMS statement into a comment and remove the comment syntax from the following:

```
SMS,IGDSSIIN,'ID=00,PROMPT=DISPLAY'
```

Initially change this IEFSSN01 statement in the SYS1.PARMLIB of the MVS images that you want to use immediately with the minimal configuration. You can change SYS1.PARMLIB for other MVS images that are part of the SMS complex as necessary.

Re-IPL MVS to Initiate Automatic Startup

The SMS redefinition to MVS takes effect at the next IPL. At this time the SMS address space and the minimal configuration will be started automatically with each IPL.

At this point the SMS address space is part of the operational environment. All new allocations are examined by the minimal configuration's ACS routines, but the data sets are not SMS-managed.

You now have an SMS environment that is ready for the DFSMS FIT process.

Identifying Data Sets Not Supported by SMS

You must identify data sets that cannot be SMS-managed. You also must ensure that all volumes to be used for SMS-managed data have indexed VTOCs. You also need to have ICF catalogs for all SMS-managed data.

Most of your data sets can be SMS-managed. SMS-managed data sets must satisfy two major requirements:

- They must be cataloged.

  Three categories of uncataloged data sets require consideration before they can be converted to system management. First, you must change pattern DSCBs to cataloged data sets. Batch jobs typically use these data sets to generate DCB information for the GDSs.

  Second, you must identify data sets that are not located by the standard catalog search order. The system locates these data sets with JOBCAT or STEPCAT statements. JOBCAT or STEPCAT usage is not permitted for

system-managed data sets. You must identify the owning catalogs before you convert these data sets to system management. The ISPF/PDF SUPERC utility is valuable for scanning your JCL and identifying any use of JOBCATs or STEPCATs.

Third, you must identify uncataloged data sets whose names match data set names that are already cataloged in the standard search order. You will probably choose to delete or not manage those data sets.

- They must be movable.

  System-managed data sets should be able to reside on any volume that can deliver the performance and storage management services required. You must identify and isolate unmovable and ISAM data sets so that you do not try to SMS-manage them.

Sample Job

Tailor the sample DCOLLECT and reporting job to identify and report those data sets that are unsupported for SMS-management. This job uses the IDCAMS DCOLLECT function to collect data set information with which to identify those data sets that SMS does not support. Tailor and run the sample job against all volumes containing data sets that you are going to convert to SMS-management.

This job is the REPTNON member in the **%FITHLQ**.SMSFITG.CNTL PDS. To tailor this job change the **%FITHLQ** variable to the high-level qualifier you are using for the getting DFSMS FIT materials. You must change the **%CLIB**, **%MLIB**, **%PLIB**, **%SLIB**, and **%TLIB** variables to the data set names that your installation uses for the ISPF CLIB, MLIB, PLIB, SLIB, and TLIB data sets. You must change the **%DEVTYP** variable to the device type (unit name) to use for temporary data sets and the report output. You also need to supply the list of volume serial numbers that contain all data to be SMS-managed. This list of volume serial numbers replaces the **%******** variable.

REXX Procedures

The sample reporting job uses two REXX procedures. The first procedure formats the report data, and the second procedure extracts data from the DCOLLECT output.

The two REXX procedures are members REXNON1 and REXNON2 in the **%FITHLQ**.SMSFITG.CNTL PDS. Do not change these procedures if you want to use the sample job to identify non-SMS-supported data.

Job Output

The sample reporting job output shows each data set that is unsupported for SMS-management. The volume serial number, DSORG, and catalog status are also included in the output report.

A sample job output report is provided in the SAMPOUT member of the **%FITHLQ**.SMSFITG.CNTL PDS.

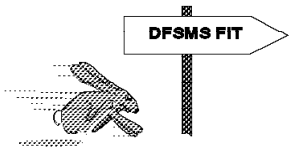
Handling Unsupported Data Sets

Once you have identified data sets that cannot be supported by SMS-management, you must determine how you want to proceed. You can exclude those data sets from conversion to SMS-management. To exclude the data sets move them to volumes that will not be SMS-managed and thereby avoid managing them in the storage class ACS routine.

You can also adjust the data sets so that SMS supports them. If possible you can catalog uncataloged data sets or recatalog them so that they can be located by the standard catalog search order. You can replace pattern DSCBs with LIKE references to cataloged data sets or use data class parameters for GDS requirements.

You will want to determine whether unmovable data sets can be made movable. ISAM data sets can be converted to VSAM. If unmovable data sets cannot be made movable, place them on volumes that will not be SMS-managed.

Appendix C. Sample Storage Management Documentation



This appendix provides sample documentation of the storage management environment from an installation that has used the DFSMS FIT process. All the information documented is useful during a DFSMS implementation, but the pools and allocation process, current storage management services, and data set naming conventions are mandatory for the DFSMS FIT design process.

Storage Environment

The sample installation collected information about its storage hardware and software environment before starting the DFSMS FIT process.

MVS Systems

The sample installation had two MVS images that shared the DASD configuration containing volumes to be SMS-managed. These MVS images were:

- Development and test - SYSA
- Production - SYSB.

Storage Software

The following storage-related software ran on the sample installation's MVS images before the DFSMS implementation using the DFSMS FIT process:

- MVS/ESA* 4.2
- DFSMS/MVS 1.1
- DFSMShsm 1.1
- DFSMSdss 1.1
- RACF 1.8
- FDR 5.1
- STOPX37
- GRS
- ICFRU
- CA1
- HSM tape volume exit (ARCTVEXT)
- HSM data set backup exit (ARCBDEXT).

DASD Configuration

The sample installation's DASD environment can be summarized as follows:

- DASD in GB - 200
- Type of devices - 50% 3390, 50% 3380
- Type of cache - 3990 model 3
- % of volumes cached - 50%
- All DASD physically attached to both MVS images

- All DASD logically attached to both MVS images.

Pools and Allocation Process

The sample installation had four pools that it planned to convert to SMS-management as part of the initial DFSMS implementation. The four pools, with the method of allocating data sets within the pool, were:

- Work volumes - UNIT=SYSDA
- Test volumes - VOL=SER
- Batch production Volumes - VOL=SER
- TSO volumes - UNIT=TSODA.

Current Storage Management Services

The following table documents the sample installation's storage management services before the start of the DFSMS implementation. The four pools that were to be converted to SMS-management are shown. The storage services are grouped into categories of standards, space management, availability management, and performance management.

There are no entries for some functions for the work pool because they did not make sense for temporary data sets.

Service	Work	Test	Batch Prod	TSO
Standards				
Allocation control	No	No	No	No
Naming convention		Yes	Yes	Yes
Space Management				
Data migration		No	No	Yes
Extent reduction		No	No	Limited
Space release		No	No	No
Deletion control	System	User	User	User
Default blocking	No	No	No	No
Availability Management				
Volume dump		Weekly Keep 4	Weekly Keep 4	Weekly Keep 4
Incremental backup		Appl	Appl	Appl
Application inline backups		Many	Many	Many
Disaster recovery		Volume Dump	Volume Dump	Volume Dump
Catalog recovery		ICFRU	ICFRU	ICFRU
Performance Management				
Data set placement		No	Limited	No
Volume caching		No	No	No

Data Set Naming Conventions

The sample installation had a typical data set naming standard for the data types planned for initial SMS-management:

- Test data
  - Must have HLQ of application system
  - Must have TEST as the first four characters of the second-level qualifier of the data set name
  - Purchased application with nonstandard naming convention
- Batch production data
  - Must have HLQ of application system
  - Must have PROD as the first four characters of the second level qualifier of the data set name
- TSO data
  - Must have HLQ of TSO userid
  - TSO userids can be identified
  - No TSO userid naming convention.

DFSMS Objectives

The last set of information documented by the sample installation was data about the planned DFSMS implementation. This optional information is useful during the DFSMS FIT process and is an indicator of the degree of involvement of the installation's management and storage administrator in the DFSMS implementation.

Management Goals

The sample installation's management objectives in installing DFSMS were to:

- Position for the future
- Maintain support for DASD growth without staff increase
- Provide more tailored services to allow migration of private data to be centrally managed
- Increase DASD hardware efficiency.

Storage Administrator's Desired Changes

The sample installation's storage administrator wanted to change the storage environment with the implementation of DFSMS. These changes included:

- Moving private volumes to SMS-managed volumes
- Separating test and production data
- Providing system data set backup to protect applications
- Migrating inactive data to reduce DASD requirements
- Exploitation of 3990 model 6 controller.

Storage Administrator′s Service Not to Change

The storage administrator wanted to ensure that the DFSMS implementation did not change any of the following:

- TSO and work pools
- Disaster recovery approach
- Data set naming standards.

Storage Administrator′s Conversion Objectives

The sample installation′s storage administrator also documented the way in which DFSMS was to be introduced in the installation′s complex:

- Extensive test in system test complex to minimize impact on production
- Continue to provide services by data type
- Expand services, with minimal risk
  - Establish current services under DFSMS
  - Extend current services to data set level
  - Expand to users who are not centrally managed
- Expand functions
  - Implement one set of functions at a time
  - Provide to all users
  - Stage implementation by one pool at a time

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October 1995

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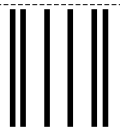

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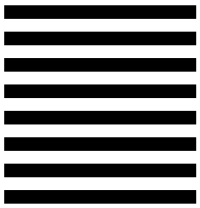

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