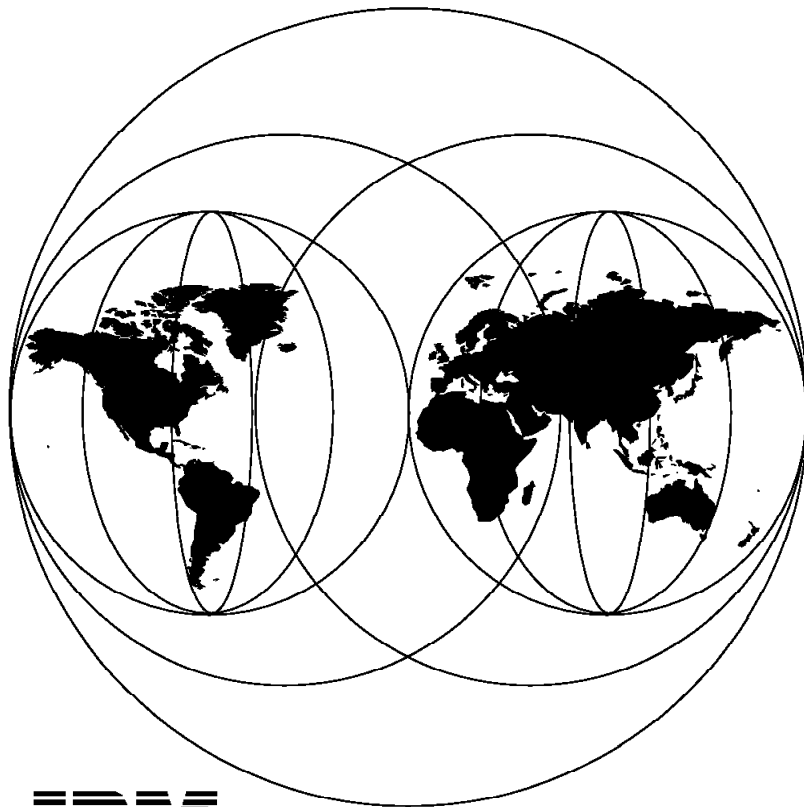


International Technical Support Organization

SG24-4675-00

**MVS Storage Management SmoothStart Services:
DFSMS Optimizer QUICK USE -
General Information Manual**

March 1996



IBM

**International Technical Support Organization
San Jose Center**



International Technical Support Organization

SG24-4675-00

**MVS Storage Management SmoothStart Services:
DFSMS Optimizer QUICK USE -
General Information Manual**

March 1996

Take Note!

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

First Edition (March 1996)

This edition applies to Version 1, Release 1.0 of IBM DFSMS Optimizer for MVS/ESA, 5655-OPT, and the DFSMS Optimizer Feature (DFSMSopt) of DFSMS/MVS Version 1, Release 2.0, 5695-DF1 and all subsequent releases and modifications unless otherwise indicated.

Order publications through your IBM representative or the IBM branch office serving your locality. Publications are not stocked at the address given below.

An ITSO Technical Bulletin Evaluation Form for reader's feedback appears facing Chapter 1. If the form has been removed, comments may be addressed to:

IBM Corporation, International Technical Support Organization
Dept. 471 Building 80-E2
650 Harry Road
San Jose, California 95120-6099

When you send information to IBM, you grant IBM a non-exclusive right to use or distribute the information in any way it believes appropriate without incurring any obligation to you.

© **Copyright International Business Machines Corporation 1996. All rights reserved.**

Note to U.S. Government Users — Documentation related to restricted rights — Use, duplication or disclosure is subject to restrictions set forth in GSA ADP Schedule Contract with IBM Corp.

Abstract

This document describes an IBM fee service offering to help installations with the implementation and initial use of the DFSMS Optimizer. It contains a brief description of the DFSMS Optimizer, a detailed description of the fee service offering, DFSMS Optimizer QUICK USE, and information about how to use the offering.

This document is written for MVS storage administrators and other people interested in the management of MVS storage products (hardware and software) or the implementation of the DFSMS Optimizer. Some knowledge of DFSMS, DFHSM, and DASD is assumed.

(18 pages)

Contents

Abstract	iii
Special Notices	vii
Preface	ix
How This Document Is Organized	ix
Related Publications	ix
International Technical Support Organization Publications	ix
ITSO Redbooks on the World Wide Web (WWW)	x
Acknowledgments	xi
Chapter 1. Consider Using the DFSMS Optimizer	1
1.1 Why Customers Use the DFSMS Optimizer	1
1.1.1 Are You Providing the Performance You Want?	2
1.1.2 Is Your Storage Service Cost Effective?	4
1.1.3 Can You Correctly Anticipate the Effect of Change?	5
1.1.4 Do You Have or Are You Planning an SMS Implementation?	5
1.1.5 Do You Have HSM Systems?	6
1.1.6 Do You Have Acceptable, Easy, and Flexible Management Reporting?	8
1.2 DFSMS Optimizer Components	10
1.3 Additional DFSMS Optimizer Information	11
Chapter 2. Using the DFSMS Optimizer QUICK USE Offering	13
2.1 What Is the QUICK USE Offering?	13
2.1.1 Contracted Statement of Work	13
2.1.2 Offering Deliverables	14
2.1.3 Contact to Get the QUICK USE Offering	14
2.2 Overview of Service Offering Process	14
2.2.1 Initial Contact	15
2.2.2 On-Site Activities	15
2.2.3 Prerequisites	18
Index	19

Special Notices

This document describes an IBM fee service offering to help installations with the implementation and initial use of the DFSMS Optimizer. It contains a brief description of the DFSMS Optimizer, a detailed description of the fee service offering, DFSMS Optimizer QUICK USE, and information about how to use the offering.

This document is written for MVS storage administrators and other people interested in the management of MVS storage products (hardware and software) or the implementation of the DFSMS Optimizer. Some knowledge of DFSMS, DFHSM, and DASD is assumed.

The information in this publication is not intended as the specification of any programming interfaces that are provided by Version 1, Release 1.0 of IBM DFSMS Optimizer for MVS/ESA, 5655-OPT, or the DFSMS Optimizer Feature, DFSMSopt, of DFSMS/MVS Version 1, Release 2.0, 5695-DF1 and all subsequent releases and modifications unless otherwise indicated.

See the PUBLICATIONS section of the IBM Programming Announcement for Version 1, Release 1.0 of IBM DFSMS Optimizer for MVS/ESA, 5655-OPT, and the DFSMS Optimizer Feature, DFSMSopt, of DFSMS/MVS Version 1, Release 2.0, 5695-DF1 for more information about what publications are considered to be product documentation.

References in this publication to IBM products, programs or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM product, program, or service is not intended to state or imply that only IBM's product, program, or service may be used. Any functionally equivalent program that does not infringe any of IBM's intellectual property rights may be used instead of the IBM product, program or service.

Information in this book was developed in conjunction with use of the equipment specified, and is limited in application to those specific hardware and software products and levels.

IBM may have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to the IBM Director of Licensing, IBM Corporation, 500 Columbus Avenue, Thornwood, NY 10594 USA.

The information contained in this document has not been submitted to any formal IBM test and is distributed AS IS. The use of this information or the implementation of any of these techniques is a customer responsibility and depends on the customer's ability to evaluate and integrate them into the customer's operational environment. While each item may have been reviewed by IBM for accuracy in a specific situation, there is no guarantee that the same or similar results will be obtained elsewhere. Customers attempting to adapt these techniques to their own environments do so at their own risk.

The following terms are trademarks of the International Business Machines Corporation in the United States and/or other countries:

DFSMS
DFSMSHsm

DFSMS/MVS
IBM

MVS/ESA
RMF

OS/2
VTAM

The following terms are trademarks of other companies:

Windows is a trademark of Microsoft Corporation.

C-bus is a trademark of Corollary, Inc.

PC Direct is a trademark of Ziff Communications Company and is used by IBM Corporation under license.

UNIX is a registered trademark in the United States and other countries licensed exclusively through X/Open Company Limited.

Other trademarks are trademarks of their respective companies.

Preface

This document describes an IBM fee service offering to help installations with the implementation and initial use of the DFSMS Optimizer. It is written for MVS storage administrators and other people interested in the management of MVS storage products (hardware and software) or the implementation of the DFSMS Optimizer.

How This Document Is Organized

The document is organized as follows:

- Chapter 1, "Consider Using the DFSMS Optimizer," provides a brief introduction to the functions and benefits of the DFSMS Optimizer.
- Chapter 2, "Using the DFSMS Optimizer QUICK USE Offering," provides a detailed description of the IBM DFSMS Optimizer QUICK USE service offering.

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 Optimizer for MVS/ESA User's Guide and Reference*, SC26-7047
- *DFSMS Optimizer for MVS/ESA Messages and Codes*, SC26-7049

International Technical Support Organization Publications

- *DFSMS Optimizer Presentation Guide*, SG24-4477

A complete list of International Technical Support Organization publications, known as redbooks, with a brief description of each, may be found in:

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

To get a catalog of ITSO redbooks, VNET users may type:

```
TOOLS SENDTO WTSCPOK TOOLS REDBOOKS GET REDBOOKS CATALOG
```

A listing of all redbooks, sorted by category, may also be found on MKTTOOLS as ITSOCAT.TXT. This package is updated monthly.

How to Order ITSO Redbooks

IBM employees in the USA may order ITSO books and CD-ROMs using PUBORDER. Customers in the USA may order by calling 1-800-879-2755 or by faxing 1-800-445-9269. Most major credit cards are accepted. Outside the USA, customers should contact their local IBM office. For guidance on ordering, send a note to BOOKSHOP at DKIBMVM1 or E-mail to bookshop@dk.ibm.com.

Customers may order hardcopy ITSO books individually or in customized sets, called BOFs, which relate to specific functions of interest. IBM employees and customers may also order ITSO books in online format on CD-ROM collections, which contain redbooks on a variety of products.

ITSO Redbooks on the World Wide Web (WWW)

Internet users can find information about redbooks on the ITSO World Wide Web home page. To access the ITSO Web pages, point your Web browser to the following URL:

<http://www.redbooks.ibm.com/redbooks>

IBM employees can access LIST3820s of redbooks as well. The internal Redbooks home page can be found at the following URL:

<http://w3.itsc.pok.ibm.com/redbooks/redbooks.html>

Acknowledgments

The project management and technical leadership for the development of the DFSMS Optimizer QUICK USE was provided by:

Jeff Wortner
U.S. Storage Service, Tampa

The project was defined and residencies were run by:

Dale Freeman
International Technical Support Organization-San Jose Center

The author of this document is:

Dale Freeman
International Technical Support Center-San Jose Center

Thanks to the following people for the invaluable advice and guidance provided in the production of this document:

Martin Berger, IBM Germany
Trevor Biddle, IBM UK
Sven-Erik Bjork, IBM Sweden
Dennis De Kraker, IBM Availability Services
Denise De Simone, IBM Storage Systems Division
Doug Dunham, IBM Storage Systems Division
Ed Gallagher, IBM Storage Systems Division
Randy Larson, IBM U.S.
Lou Lorber, IBM Storage Systems Division
Robert Mannsberger, IBM Austria
Richard Marchant, IBM South Africa
Dave Nugent, IBM Storage Systems Division
Chris Poliszczuk, IBM UK
Ron Ratcliffe, IBM U.S.
Leif Schioler, IBM Denmark
Greg Streufert, IBM U.S.
Giulio John Tarella, IBM Italy
John Tyrrell, IBM Storage Systems Division
Dennis Virginia, IBM ITSO-Poughkeepsie Center
Steve Winters, IBM Storage Systems Division
Peter Zerbini, IBM Germany

Chapter 1. Consider Using the DFSMS Optimizer

CHAPTER MANAGEMENT SUMMARY

The DFSMS Optimizer is a unique product. It enables you to provide much better control of system resources and user data than ever before.

From the moment data is created, the DFSMS Optimizer enables you to track where the data is, how much system resource the data is using, how well the data is performing, and how often it is accessed. It also enables you to make decisions and trade-offs between the level of MVS storage service you provide and the cost required for the service. The decisions can be made on the basis of carefully analyzed historical data.

Using the DFSMS Optimizer, you can identify the true costs of storage management. You can provide your own processor, DASD, and tape costs to analyze your existing environment and simulate proposed changes. You are then in a position to improve the cost-effectiveness of the storage hierarchy and thus ensure value for money. In many cases you will find that, after analysis with the DFSMS Optimizer, you can directly save money by reducing your configuration or having it perform more work.

You also have a powerful and flexible reporting capability for management-level reporting and detailed technical analyses. After initial implementation, you will probably run the DFSMS Optimizer automatically to provide hands-off reporting customized to meet your requirements. Contrast this reporting capability with some monitors that provide instant data but neither suggest what to do with a problem nor predict the effect of a change.

The DFSMS Optimizer also provides you with the real-time controls for monitoring and automatically tuning your HSM systems. You can use the HSM Monitor/Tuner to ensure that HSM resources match the application service level requirements at the operational level.

1.1 Why Customers Use the DFSMS Optimizer

The DFSMS Optimizer is designed to improve the use and performance of your MVS storage hierarchy. It achieves such improvements through real-time monitoring and tuning, reporting facilities based on data gathered during an extended period, and an analysis and modeling capability.

The DFSMS Optimizer is available in two forms:

- A feature, DFSMSopt, of the DFSMS/MVS program product
- A separate product, DFSMS Optimizer for MVS/ESA, designed to run with MVS/DFP version 3 release 3.

Both the feature and the separate product are similar in function. Some reports of the separate product show less data than the reports of DFSMSopt because of the limited data collection capability of DFP3. In this document, both products are referred to as the "DFSMS Optimizer."

You can use the DFSMS Optimizer to help manage your MVS storage environment. It is the right tool to use to answer the questions raised below. It

provides reports, graphs, models, and cost analysis of your storage hierarchy. Because it works efficiently from a database of information collected from the storage hierarchy over an extended period of time, you can be confident that its results are not based on a random spike in processing.

1.1.1 Are You Providing the Performance You Want?

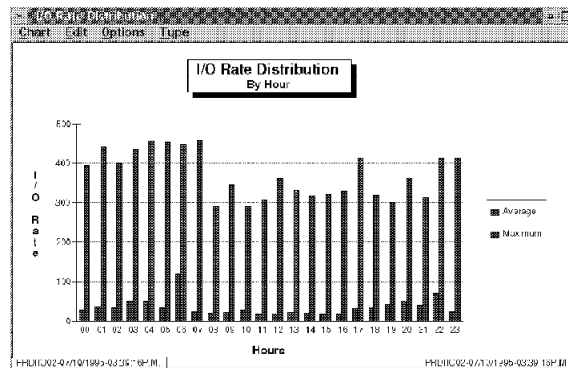
You have to determine whether you are effectively using other storage hierarchy functions, such as cache and storage classes. If you have SMS-managed data, you specify the performance requirements of new data sets, and SMS selects a device that best matches those requirements. If you are converting, or considering converting, data to SMS, you perform some kind of data activity analysis to determine the performance requirements that will be assigned to data sets. In either case, you must know whether you have an effective match between the performance capability of the device and the actual access characteristics of the data sets.

For example, a data set may have been placed on a noncached device, but the data set's I/O access behavior determines a need for a cached device or expanded storage. As a result, the data set's service needs are not being met, and you are not making appropriate use of the device performance capabilities.

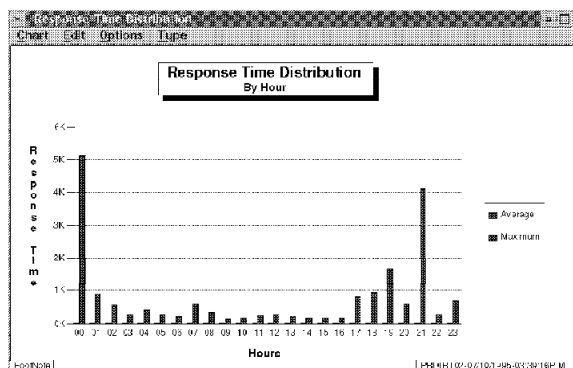
The DFSMS Optimizer collects and presents much performance data that has previously been difficult or impossible to obtain. Performance is reported for both individual MVS systems and sysplexwide.

The DFSMS Optimizer enables you to see how your storage hierarchy is performing. It looks at the performance of the storage hierarchy and your actual workload in detail over a long period of time to ensure that you make wise decisions. Several hundred charts are available including:

The I/O rate distribution chart enables you to view the amount of I/O in each hour. If the sample period is for several days, you can see whether the same hourly periods have consistently heavy I/O activity.



Instead of I/O rate you may want to look at response times:



The response time distribution chart is useful when you are concerned with online transaction systems. The I/O response time should be consistent to provide reasonable online transaction response time.

One of the unique capabilities of the DFSMS Optimizer is its ability to analyze and report at the data set level. The data set performance summary report shows you a breakdown of I/O statistics by data set. You can specify the number of data sets to be reported. Selected fields from this report can also be viewed in chart format.

Table 1. Data Set Performance Summary Report: Intensity Criterion

Data Set Name	Bytes X-fer	I/O Rate Avg	I/O Rate Max	Resp Time Avg	Resp Time Max	I/O Int Avg	I/O Int Max	Conn Time	Pend Time	Disc Time	IOSQ Time	Cach I/O %	Tot H/R	R/W Rat	R/H Rat	DFW H/R
CNT.PROD.DB.BKP	5M533	30.7	34.5	31.6	33.5	966	968	29.0	0.4	1.6	0.5	0.0	0.0	0.0	0.0	0.0
SYS95129.T002900.RA00.MR	848K0	6.6	6.6	146.1	146.1	964	964	4.5	1.1	0.5	139.9	0.0	0.0	0.0	0.0	0.0
SYS95129.T002900.RA00.MD	848K0	6.1	6.1	155.5	155.5	948	948	4.5	1.1	0.3	149.4	0.0	0.0	0.0	0.0	0.0
IBMSERV.SD.D95127.T0701	93904	16.3	16.3	55.0	55.0	896	896	21.5	0.0	33.0	0.5	0.0	0.0	0.0	0.0	0.0
SYS95130.T231321.RA00.SC	5M779	119.4	119.4	7.5	7.5	895	895	6.5	0.3	0.2	0.3	0.0	0.0	0.0	0.0	0.0
RCJ.ISPF.CLIST	9360	44.1	44.1	20.3	20.3	895	895	3.0	0.0	16.6	0.6	100	33.3	0.0	33.3	0.0
PRD40008.ISPF.OWNER	162K3	179.7	225.4	6.0	6.9	892	939	4.0	0.3	1.3	0.3	73.6	81.2	0.0	81.2	0.0
CTDUP.HRPY36.D652.N100	23476	3.0	3.0	290.0	290.0	870	870	10.0	1.0	27.0	252.0	0.0	0.0	0.0	0.0	0.0
CTDUP.J53116.D11251.N100	70428	9.1	9.2	94.6	96.0	861	864	10.3	1.0	81.6	1.6	0.0	0.0	0.0	0.0	0.0
C.PROD.IDMSR.LOADLIB	672K8	168.9	210.5	5.7	7.9	861	1K0	2.8	0.3	1.4	1.2	100	88.0	10	50.0	95.2
SYS95128.T174241.RA00.JC	2M796	91.5	172.5	7.3	84.3	860	893	5.1	0.2	0.5	1.4	0.0	0.0	0.0	0.0	0.0

You can get reports on performance of individual data sets, groups of data sets, and entire applications and SMS storage classes. Both response times and caching characteristics are reported.

The DFSMS Optimizer shows you how your control unit cache is being used and whether it is overcommitted or undercommitted. It also tells you which data sets or storage classes are using cache. The data from the sample subsystem performance summary report can also be viewed in chart format.

Table 2. Subsystem Performance Summary Report

SubSys ID	Unit Type	Total I/O	I/O Rate Avg	I/O Rate Max	Resp Time Avg	Resp Time Max	I/O Inten Avg	I/O Inten Max	Conn Time	Pend Time	Disc Time	IOSQ Time	Cach I/O %	Tot H/R	R/W Rat	R/H Rat	DFW H/R
0010	3990-3	34M38	172.8	2225	6.8	26.6	1175	7939	3.1	0.3	2.7	0.7	91.6	90.2	6.948	89.7	93.6
0020	3990-3	25M12	126.2	1217	7.6	37.4	959.1	4478	3.1	0.3	3.3	0.9	86.3	92.6	5.371	92.1	95.4

The subsystem performance summary report enables you to determine whether the workload is balanced across the subsystems. You can also see the I/O rate, response time, I/O components, cache percentage, and cache hit ratios for each subsystem.

The DFSMS Optimizer also recommends where to place your most active sets in the storage hierarchy. For example, some data sets should be accessed in processor storage through data in memory techniques. Others belong in cache.

The data set heavy hitter summary report shows data sets ranked by I/O intensity as requested by the user. This report can be used to determine recommended data set placement in the storage hierarchy.

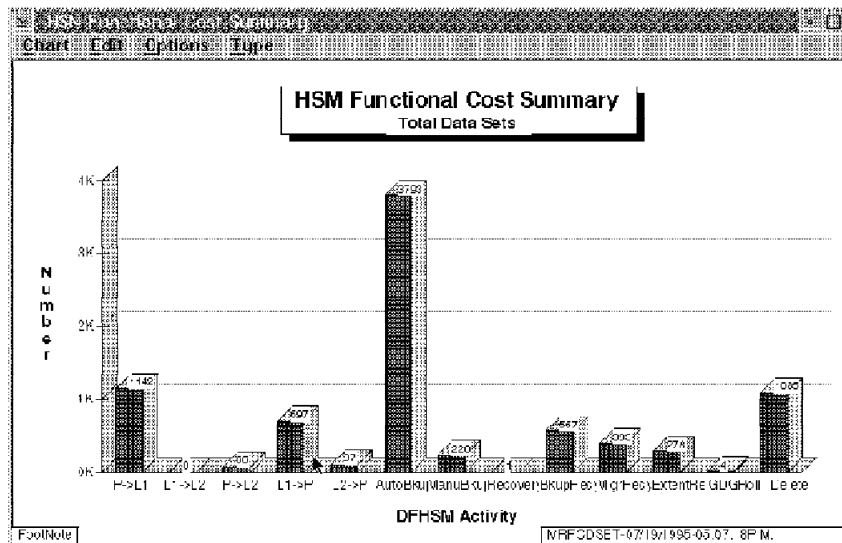
Table 3. Data Set Heavy Hitter Summary Report: Intensity Criterion

Rank	Data Set Name	Bytes X-fer	I/O Rate	Resp Time	I/O Int	Recommended Data Set Placement
1	CNTLM.PROD.DB.BKP	5M533	30.7	31.6	966.2	CACHE
2	SYS95129.T002900.RA000.MR	848K0	6.6	146.1	964.2	VIO ESTORE
3	CNTLM.TEST.DB.BKP	5M533	33.2	29.0	963.3	CACHE
4	SYS95128.T001530.RA000.CL	5M968	12.3	78.4	961.5	VIO ESTORE
5	SYS95129.T002900.RA000.MD	848K0	6.1	155.5	948.5	VIO ESTORE
6	PRD51700.J517.EXTRACT.FILE	176M9	30.2	31.2	942.2	CACHE
7	SYS95128.T160201.RA000.R00	0	9.6	97.0	931.2	VIO ESTORE
8	PRD40008.ISPF.MEMBR	15M69	40.4	25.6	930.8	CACHE
9	SYS95129.T002003.RA000.JC	145K2	4.6	198.0	910.8	VIO ESTORE
10	PRD57640.IDMSR.CV025.INCP	0	113.7	8.0	909.6	CACHE

1.1.2 Is Your Storage Service Cost Effective?

You provide storage services for application data that include managing space, performance, and availability. What are the costs of providing these services, in terms of use of cache, storage, and HSM resources? If you know the costs of these services, in relation to the access characteristics of your data, you can determine how cost effective these services are.

The HSM functional cost summary chart shows the breakdown of costs per data set and per megabyte for all key HSM functions. The HSM functional cost summary report (not shown) contains all of the cost and workload details used to generate this chart.



You can use this cost information to help provide cost recovery for the data management services you provide and identify opportunities for cost savings for the same or improved levels of service.

2 tape. However, because of the data set's access patterns, it is continually being recalled and remigrated. In this case, the mismatch between the data set's management policies and its access behavior results in system and application processing overhead and inefficient use of level 0 and level 1 (migration) storage.

SMS migrates, or archives, data sets that have not been used for some time. The purpose of this migration is to use cheaper storage devices (slower DASD, and eventually tape) to store less frequently used data sets. Migration incurs some costs, however, such as the processor cost of the data movement. A cost is also incurred when the data set is recalled for reuse and must be moved back up the storage hierarchy. The DFSMS Optimizer tells you the overall cost of space management.

A processor cost is incurred in taking backups of your data sets. The DFSMS Optimizer tells you which data sets and management classes (for SMS data) have the highest cost associated with backups, and it gives you the total cost of backups for various data set groups.

You can use the DFSMS Optimizer either to redesign your current storage classes to better fulfill your performance needs or to suggest parameters for new storage classes to be associated with data sets being converted to SMS.

1.1.5 Do You Have HSM Systems?

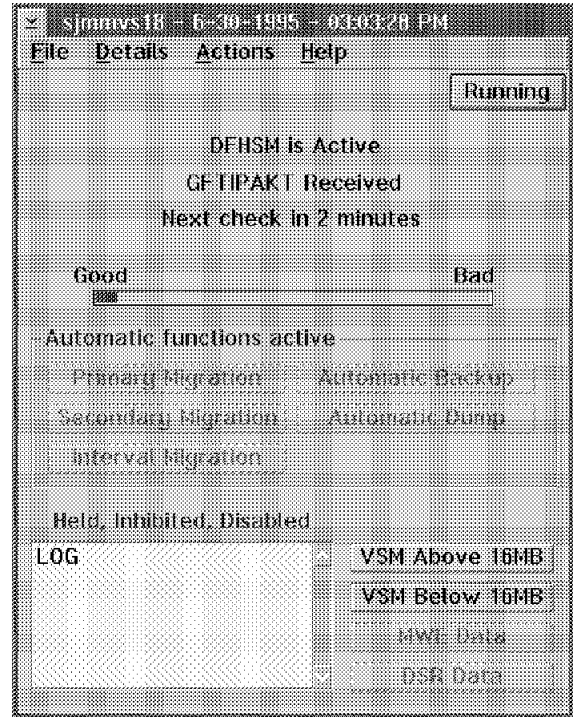
HSM has a significant amount of function and flexibility. You have to determine whether you are making the best use of the storage management capabilities of HSM. Are you meeting your service commitments within your HSM housekeeping windows? HSM may complete automatic backup processing on most days, but how do you cater for occasions when there is insufficient time to process all volumes?

You may or may not use SMS to specify the HSM migration requirements for data sets. However, how do you know whether you have an effective match between your migration policies and the access patterns of data sets?

You have to be able to determine the status of automatic storage management functions as they occur. You also have to dynamically react to any resource shortage or other problems that might prevent the successful completion of the HSM automatic functions.

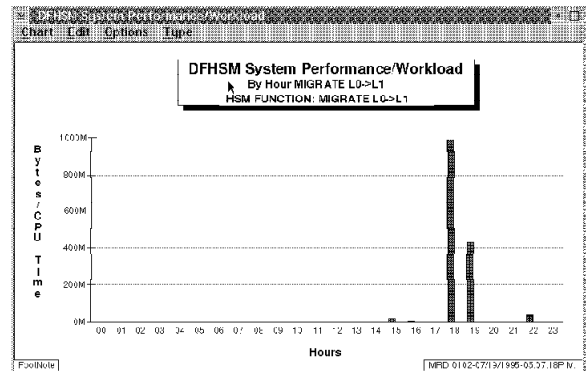
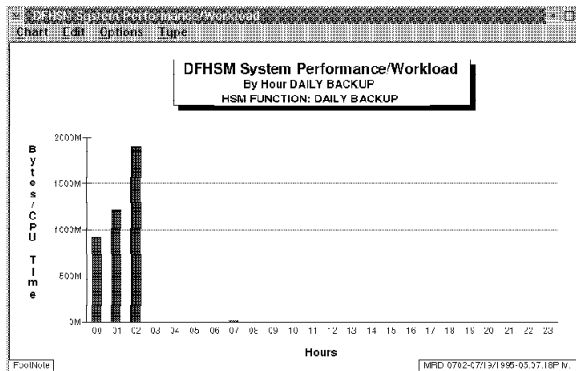
The DFSMS Optimizer contains the HSM Monitor/Tuner, a client/server application that enables a workstation with OS/2 to simultaneously monitor and manually or automatically tune many HSM systems. A GUI presents both current and past HSM behavior.

The main window for each system you monitor contains a status bar that provides a visual indication of the overall status of the system. You can view all of the HSM statistics from this window by selecting the appropriate push buttons or pull-down menu.

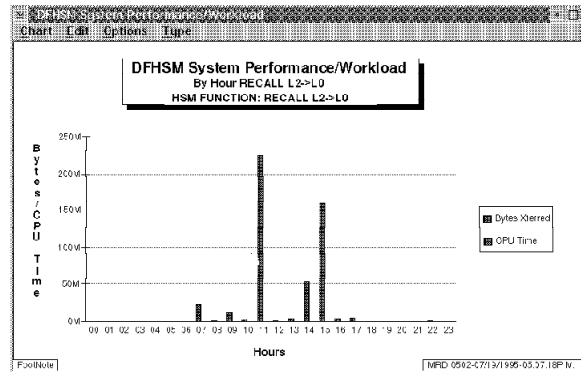
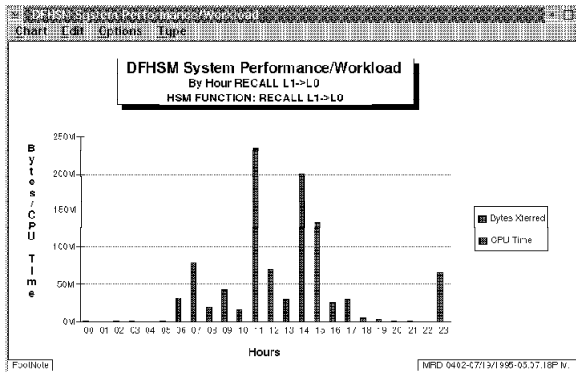


HSM processing costs include migration, recall, backup, restore, recycle, processor, DASD, and tape costs. The DFSMS Optimizer reports these costs. It also tells you how HSM is performing and how long HSM takes to perform its tasks.

Hourly distributions of backup, migration, and recall activities are provided as parts of the DFHSM system performance/workload charts.



The following charts shows the bytes recalled and CPU time by hour for L1 to L0 and L2 to L0 recalls:



You can monitor many HSM systems in real time from a single workstation running OS/2. You can display detailed information about HSM daily automatic functions, ML1, ML2, recalls and deletes, HSM CPU utilization, HSM I/O, HSM tasking levels, HSM tape usage, HSM processing errors, and HSM virtual storage use.

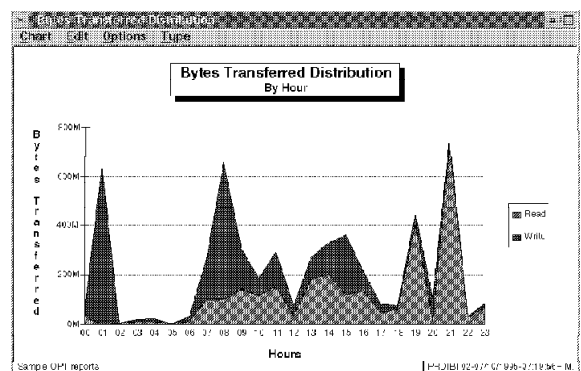
1.1.6 Do You Have Acceptable, Easy, and Flexible Management Reporting?

The reporting facility should provide selection function such that information is reported only on the criteria you specify. You need an easy-to-use filtering capability to select only the data in which you are interested.

You should have a reporting facility that includes standard reports, graphs, and charts. At the same time you should also be able to tailor charts so that they can be presented in the form or style that you choose.

The DFSMS Optimizer provides a highly efficient method of collecting the storage hierarchy's actual workload. Once the DFSMS Optimizer collects this data, it produces a flexible set of reports and graphs that show you what is happening within the storage hierarchy at any level; that is, data set, application, volume, or subsystem.

More than 200 charts are available. This chart shows the DASD I/O activity, including both read and write activity, in terms of the number of bytes transferred.



You can view data in chart format or get detailed data in report format as in the volume performance summary report. This report can be created with the data ordered by I/O rate, I/O response time, bytes transferred, or response time.

Table 4. Volume Performance Summary Report: Intensity Criterion

Volume	Storage Group	Unit Type	Unit Addr	Dev Util	Total I/O	I/O Rate Avg	I/O Rate Max	Resp Time Avg	Resp Time Max	I/O Inten Avg	I/O Inten Max
PROD3D	SGPROD3	3390-3	0522	11.5	3M019	15.1	232.6	8.9	56.3	134.3	1222
PROD31	SGPROD3	3390-3	0608	11.6	2M648	13.3	145.7	9.6	103.9	127.6	1206
PROD33	SGPROD3	3390-3	060A	9.9	1M838	9.2	40.2	11.7	54.9	107.6	880.6
PROD9K	SGPROD90	3390-2	061A	8.9	2M115	10.6	162.2	9.0	41.1	95.4	947.6
PROD9F	SGPROD90	3390-2	0605	8.8	2M010	10.1	107.8	9.4	41.0	94.9	990.0
PROD3L	SGPROD3	3390-3	052A	8.2	1M827	9.1	190.0	10.0	264.2	91.0	837.5
PROD34	SGPROD3	3390-3	060B	7.8	3M538	17.7	82.6	4.9	75.0	86.7	886.7
TEMP91	SGTEMP	3390-2	0606	6.2	717K9	3.6	66.2	23.5	156.3	84.6	1431
PROD38	SGPROD3	3390-3	050B	7.7	2M466	12.4	191.8	6.6	56.4	81.8	1149
PROD3K	SGPROD3	3390-3	0529	6.7	1M955	9.8	195.1	7.4	35.4	72.5	1092

Table 5. Volume Performance Summary Report: Intensity Criterion (Continued)

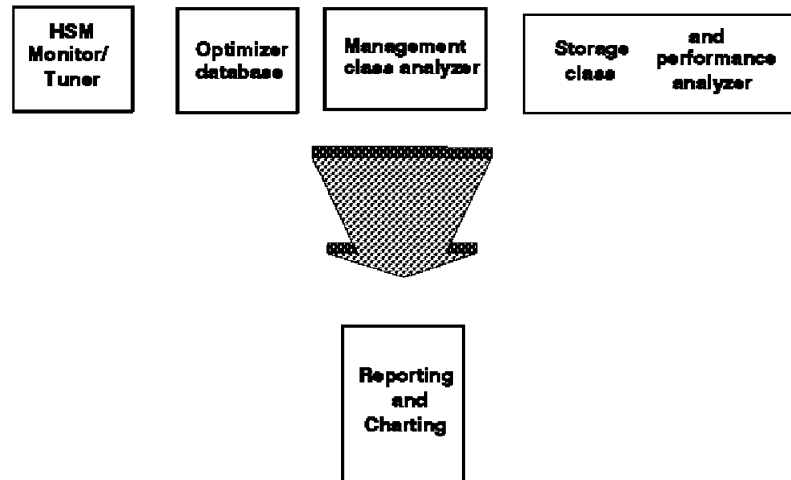
Volume	Storage Group	Unit Type	Unit Addr	Conn Time	Pend Time	Disc Time	IOSQ Time	Cach I/O %	Tot H/R	R/W Rat	R/H Rat	DFW H/R
PROD3D	SGPROD3	3390-3	0522	4.7	0.4	2.5	1.3	93.6	94.8	17	94.7	97.4
PROD31	SGPROD3	3390-3	0608	4.9	0.3	3.5	0.9	96.0	85.2	30	85.3	82.3
PROD33	SGPROD3	3390-3	060A	3.2	0.4	7.2	0.9	59.5	89.3	4.255	87.7	96.2
PROD9K	SGPROD90	3390-2	061A	2.9	0.3	5.2	0.6	67.0	94.3	7.525	94.1	95.5
PROD9F	SGPROD90	3390-2	0605	3.5	0.3	4.9	0.6	56.5	90.9	2.779	88.5	97.5
PROD3L	SGPROD3	3390-3	052A	4.6	0.5	3.9	1.0	90.0	88.5	6.842	87.1	98.2
PROD34	SGPROD3	3390-3	060B	2.4	0.4	1.6	0.5	96.1	94.2	3.266	93.8	95.8
TEMP91	SGTEMP	3390-2	0606	11.6	0.3	5.3	6.3	65.0	98.4	1.050	96.6	97.0
PROD38	SGPROD3	3390-3	050B	2.6	0.3	3.3	0.4	93.4	88.6	36	88.4	94.9
PROD3K	SGPROD3	3390-3	0529	2.7	0.4	3.7	0.7	89.4	86.2	25	85.9	92.6

You can tailor reports through powerful filters that enable you to select specific data sets and applications. The reports themselves can be printed, but they can also be presented on an OS/2 workstation through a GUI. More than 200 standard chart types are available. Reports can also be used as input to spreadsheets and graphics packages.

1.2 DFSMS Optimizer Components

The DFSMS Optimizer is an MVS-based product that has an OS/2 Presentation Manager GUI to help you analyze your data through the use of charts and graphs.

These are the main functional components of the DFSMS Optimizer:



The **HSM Monitor/Tuner** provides an OS/2 Presentation Manager GUI for real-time monitoring of HSM automatic migration, backup, and dump functions, recall and processing statistics, and management work elements on multiple HSM systems. You can automatically tune HSM with the HSM Monitor/Tuner threshold-based automation. The automation enables you to anticipate and automate corrective actions by using customized threshold triggers that invoke OS/2 REXX EXECs.

The HSM Monitor/Tuner function runs in its own address space and monitors various HSM activities at preselected intervals. The information collected is grouped into "packets" and transferred to the PC where the HSM status is displayed. The HSM Monitor/Tuner also records data into log files that can be "played back" on the PC.

The **DFSMS Optimizer database** is a database for the collection and extraction of system activity data. SMF records are read in by the DFSMS Optimizer Extract program and selected record types are extracted to create the database.

The DFSMS Optimizer database is used as input to the report generator jobs, which create the DFSMS Optimizer report, chart, and comma separated variables (CSV) files. The following is a brief description of the report generator output:

- DFSMS Optimizer report file - The report file is MVS-based and resides in either the JES spool or sequential data sets (depending on how you code the JCL).
- DFSMS Optimizer chart file - The chart file is downloaded to the workstation to be displayed by the DFSMS Optimizer charting facility.

- DFSMS Optimizer CSV file - The CSV file is downloaded to the workstation and can be processed by other spreadsheet or graphics programs to create custom charts.

You can use the **management class analyzer** to report status or simulate the effects of changes to management class policy assignments for SMS-managed data sets. You can also simulate new management class policy assignments for non-SMS-managed data sets.

The DFSMS Optimizer has a powerful management class simulation function that tests all possible migration parameters to find the most cost-efficient combination for the particular group of data in which you are interested. You can use this function to devise improvements to your current SMS management class design as well as assign the right management class for non-SMS data sets. Assigning management classes to data sets becomes an exact science, not inspired guesswork when you use the DFSMS Optimizer.

The **storage class and performance analyzer** enables you to analyze your storage subsystem performance on a storage subsystem and/or volume level, to help you isolate the source of performance problems, and on a data set level, to identify high I/O activity data sets and applications.

The storage class and performance analyzer also helps you analyze the effectiveness and cost of cache and the performance of SMS storage classes and data sets. You can also use the storage class and performance analyzer to determine data set placement appropriate to the actual data set performance needs.

The reporting portion of the reporting and charting component produces the various management class, storage class, and performance reports. You can print these reports as you would any file and use sophisticated filtering to customize your input for analysis and reporting for faster processing.

The **reporting and charting** components contains a charting facility that provides graphical editing and slide shows of the charts. You can use the charting facility to transform the reports into presentation-style color charts in bar, line, tabular, and 3D formats. You use the charting facility from a GUI at the client workstation. Alternatively, you can use a flat-file format of the report as input to your preferred spreadsheet program.

1.3 Additional DFSMS Optimizer Information

The DFSMS Optimizer provides so many capabilities and has such power to control costs and improve service in your installation that you may want additional documentation. The following two manuals will provide you with a complete understanding of the DFSMS Optimizer's capabilities:

- *DFSMS Optimizer Presentation Guide, SC24-4477*
- *DFSMS Optimizer User's Guide and Reference, SC26-7047*

A demonstration diskette is available from your IBM sales representative. With the diskette you can see the HSM Monitor/Tuner in action as well as view DFSMS Optimizer charts and graphs.

Listed below is the software that is minimally required for the DFSMS Optimizer in both an MVS and PWS environment. The latest version and release of each product is recommended. You probably already have the required products at the correct levels for support of the DFSMS Optimizer.

- MVS environment
 - MVS/ESA SP-JES2 V4 R3 or V5 R1, or MVS/ESA SP-JES3 V4 R3 or V5 R1
 - SMP/E V1 R7
 - APPC/MVS function of MVS/ESA or TCP/IP for MVS V2
 - DFSMS/MVS V1 R1, or DFP V3 R3
 - DFSMSHsm or DFHSM V2 R6 (required only for the HSM Monitor/Tuner functions)
 - ACF/VTAM V3 R4.1 or higher level (only if APPC used)
 - AFTP feature of APPC Application Suite or equivalent file transfer program
 - Cache RMF Reporter
 - RMF V4 R2
 - DFSORT R12 or equivalent
- PWS environment
 - OS/2 V2 R1 or V2 R2 with service package XR06055 or XR06100
 - Communications Manager/2 V1 with APPC feature or TCP/IP for OS/2 V2 base kit 65G1220
 - REXX feature of OS/2

Chapter 2. Using the DFSMS Optimizer QUICK USE Offering

CHAPTER MANAGEMENT SUMMARY

The DFSMS Optimizer QUICK USE offering is a quick and low-cost way of gaining the benefits of the DFSMS Optimizer within the first weeks of installing the product. The QUICK USE offering provides hands-on education for your storage administrator in tailoring the DFSMS Optimizer to your environment and then creating the most useful reports and charts. If you use HSM, the offering also provides hands-on education on how to use the HSM Monitor/Tuner with your HSM system.

The DFSMS Optimizer QUICK USE offering costs under \$10,000 in the United States and is comparably priced in other countries. An experienced DFSMS Optimizer support person completes the offering within a week at your location. This offering will enable your storage administrator to:

- Understand the DFSMS Optimizer's functions and structure
- Tailor the DFSMS Optimizer to your MVS, communications (APPC or TCP/IP), and programmable workstation (PWS) environments
- Create key reports and charts and operate the HSM Monitor/Tuner.

2.1 What Is the QUICK USE Offering?

After selecting the DFSMS Optimizer, you may want implementation support and education so that you can start using the DFSMS Optimizer as quickly as possible. Help in the initial implementation enables you to realize the benefits of the DFSMS Optimizer within the first week after installation.

The DFSMS Optimizer QUICK USE offering is an IBM fee service available to all customers who have purchased the DFSMS Optimizer and would like on-site assistance with the customizing and use of the product. This offering is provided at a very attractive price, under \$10,000 in the United States and comparably priced outside the United States.

2.1.1 Contracted Statement of Work



It is easy for you to contract for the DFSMS Optimizer QUICK USE offering because it has a predefined price, statement of work, and deliverables. The statement of work is:

IBM will provide an experienced DFSMS Optimizer support person to provide hands-on user education and assistance in building production level reports/graphs/procedures for the initial use of the DFSMS Optimizer. This assistance is not to exceed one week including reasonable service offering provider travel time.

2.1.2 Offering Deliverables



Within one week your staff will have learned and used all of the key functions of the DFSMS Optimizer. They will know how to create the tailored reports and charts to give you immediate value from the Optimizer. The following are the deliverables of the DFSMS Optimizer QUICK USE offering:

- Formal presentation on the DFSMS Optimizer, with handouts
- Review and assistance in modifying the DFSMS Optimizer MVS components and creating the DFSMS Optimizer database
- Review and assistance in defining the communications parameters for the DFSMS Optimizer's use of TCP/IP and/or APPC and CM/2 and establishing communications and using the HSM Monitor/Tuner
- Review and assistance on how to use the HSM Monitor/Tuner to monitor and automatically tune the HSM environment
- Hands-on education and assistance on how to create, tailor, and modify standard reports and graphical charts using the DFSMS Optimizer's filtering capabilities
- Review and assistance showing how to use the DFSMS Optimizer's data with other graphics packages such as Lotus 1-2-3

2.1.3 Contact to Get the QUICK USE Offering

Within the United States, you can contract for the DFSMS Optimizer Services: QUICK USE offering or obtain more information about it or other storage support services by contacting IBM at 1-800-IBM-4YOU. Outside the United States contact your local IBM marketing representative.

2.2 Overview of Service Offering Process

The DFSMS Optimizer QUICK USE offering begins with the IBM support person contacting you by phone to determine when the on-site activities should be scheduled. During this phone conversation you can verify that you are prepared to take full advantage of the support during the on-site time.

The on-site activities of the QUICK USE offering include three phases. The first phase is a short overview of the DFSMS Optimizer's functions and structure to establish a base to start the hands-on activities. The second phase is to tailor the MVS, APPC or TCP/IP, and PWS environments to use the DFSMS Optimizer. The third phase is to create and review the key reports and charts that you will want on a regular basis. The third phase also includes hands-on use of the HSM Monitor/Tuner if you have HSM systems.

2.2.1 Initial Contact



Once you have contracted for this service, an experience DFSMS Optimizer person will contact you to discuss the logistics of the QUICK USE service offering. As a result of this phone conversation the IBM support person and your staff will be able to:

- Determine the people to participate in the on-site activities
- Understand the expectations for the service
- Review the deliverables from the service
- Review your system environment
- Verify that the required software and maintenance levels are installed
- Review the MVS to PWS connectivity to be used
- Verify that the required SMF data is being collected
- Discuss the timing and agenda for the on-site visit
- Discuss the on-site facilities required

2.2.2 On-Site Activities

The on-site activities of the DFSMS Optimizer Services: QUICK USE offering are completed within a single week. You can have one or more of your staff involved in this process, but you have to consider that most of the activities are hands-on, so the number of participants should be an appropriate number for working at a single PWS. During the on-site visit the following activities are performed:



After an initial kickoff meeting, phase 1 of the QUICK USE offering begins with a short education session on the functions and structure of the DFSMS Optimizer. This session may include people who are interested in the DFSMS Optimizer but do not choose to participate in the hands-on activities.

The rest of the QUICK USE offering involves hands-on activities working with your MVS system or at a PWS tailoring and using the DFSMS Optimizer. The offering assumes you have installed (but not tailored) the DFSMS Optimizer and have selected and installed your communications product, APPC or TCP/IP, so that there is basic connectivity between MVS and a PWS running OS/2.



In phase 2 of the QUICK USE offering you tailor your DFSMS Optimizer environment. This activity includes selecting parameters and activating the Optimizer's MVS components, PWS components, and either TCP/IP or APPC for communications between MVS and the PWS. During phase 2 the IBM support person will work with you to:

- Customize the DFSMS Optimizer's MVS components
 - Verify that DFSMS Optimizer programs are installed and authorized
 - Set up MVS license authority

- Link edit the selected communication protocol programs (APPC or TCP/IP)
- Activate the IEFU83 exit
- Define the HSM Monitor/Tuner log data sets
- Activate the HSM initialization exit
- Verify the SMF data contents
- Synchronize the SMF/RMF data
- Create the DFSMS Optimizer database
 - Review the DFSMS Optimizer database configuration
 - Review and select the preferred or optional configuration
 - Review the DFSMS Optimizer job streams
 - Review DFSMS Optimizer data set naming conventions
 - Determine the DFSMS Optimizer database life cycle
 - Create the DFSMS Optimizer database
- Establish the DFSMS Optimizer's PWS connectivity
 - APPC communications setup
 - Determine values for the installation worksheet for APPC
 - Define the APPC/MVS transaction programs
 - Define the CM/2 transaction program
 - Verify the APPC definitions
 - TCP/IP communications setup
 - Determine or define the MVS IP address
 - Determine or define the PWS IP address
 - Determine or define the PWS routing IP address
 - Determine or define the host name/IP address relationship
 - Define the MVS TCP/IP port number
 - Define the PWS TCP/IP port number
 - Set up the host HSM Monitor/Tuner TCP/IP procedure
- DFSMS Optimizer PWS Installation
 - Download and create installation diskettes
 - Install PWS component
 - Customize PWS component
 - Define MVS to the HSM Monitor/Tuner
 - Verify the HSM Monitor/Tuner's installation
 - Verify the charting facility's installation, using the Presentation Manager
 - Verify the charting facility's installation, using manual file transfer



In phase 3 of the QUICK USE offering you work directly with the DFSMS Optimizer. The IBM support person provides a structured approach to enable you to generate and review the DFSMS Optimizer's key reports and charts. If you have HSM, you use the HSM Monitor/Tuner. During phase 3 you will:

- Use the HSM Monitor/Tuner
 - Use the icon user interface
 - Tailor setup parameters
 - Connect to the host MVS system

- Use playback
- Review how to automate host connection
- Send commands to HSM
- Monitor HSM with the host session window
- Tailor the host session window file options
- Use the host session window details options
- Discuss automated operations as controlled by host session window action options
- Review the reporting and charting facility
 - Review the query language format
 - Review the analysis and reporting job format and JCL
 - Review the output report and chart format
- Perform basic configuration performance analysis
 - Create and run basic report job
 - Create and review the configuration output
 - Create and review I/O rate distribution report and chart
 - Create and review response time distribution report and chart
 - Create and review I/O intensity distribution report and chart
 - Create and review data set performance report and chart
 - Create and review volume performance report and charts
 - Create and review subsystem performance reports
- Perform data set performance analysis
 - Use I/O rate distribution report to determine key time period
 - Use response time distribution report to determine key time period
 - Create and run data set report job for key time period
 - Create and review the data set performance summary reports
 - Create and review the heavy hitter report
 - Create and review the data set and storage class mismatch reports
 - Create and review the bytes transferred distribution report and chart
- Perform SMS management class analysis
 - Create and run management class report job
 - Create and review management class total cost report and chart
 - Create and review management class migration reports and chart
 - Create and review management class top data set report and charts
 - Create and review management class backup reports
- Perform HSM analysis
 - Create and run basic HSM reporting job
 - Create and review cost report and chart
 - Create and review functional workload performance reports and charts
 - Create and review compaction report and chart
- Review the interface with third-party graphics packages
 - Review CSV file creation job
 - Review receiving the CSV file at the PWS
 - Review entering the CSV data into a spreadsheet package
 - Review entering the CSV data into a graphics package

2.2.3 Prerequisites

The DFSMS Optimizer QUICK USE offering has several prerequisites that ensure that you will gain full benefit from the offering's on-site activities. The following prerequisites should be completed before the on-site activities and reviewed for completion during your phone conversation with the IBM support person:

- Availability of PWS with OS/2 (and the required DFSMS Optimizer prerequisite software installed) during the on-site period
- Installation (but not customizing) of the MVS component of the DFSMS Optimizer
- TSO and batch job access to the MVS system where the DFSMS Optimizer is installed
- Installation of either TCP/IP or APPC (and CM/2 for the PWS) on both the MVS and PWS systems if the HSM Monitor/Tuner is to be used
- Connectivity between the PWS and MVS systems using either TCP/IP or APPC

Instructions for verification of connectivity are provided before the start of the on-site activities

- Collection of the required SMF data before the start of the offering
- Dedicated availability of a storage administrator to work with the IBM support person during the on-site activities
- Access to PWS, MVS, and APPC/VTAM or TCP/IP support personnel during the on-site activities
- Availability of desk space, telephone, and office support for the IBM support person during the on-site activities

Index

A

additional documentation
 Presentation Guide 11
 User's Guide and Reference 11
APPC communications setup 16

C

charts 2
costs 4
creating the DFSMS Optimizer database 16
customizing the DFSMS Optimizer's
 components 15–17

D

DFSMS Optimizer
 general information 1–18
DFSMS Optimizer for MVS/ESA 1
DFSMSopt of the DFSMS/MVS program product 1

F

functional components
 DFSMS optimizer database 10
 HSM Monitor/Tuner 10
 management class analyzer 10
 reporting and charting 11
 REXX EXECs 10
 storage class and performance analyzer 11

G

graphical user interface
 See GUI
GUI 6

H

hands-on activities 15
heavy hitter summary report 4
HSM Monitor/Tuner 16
HSM systems 6

I

initial contact 15

M

management reporting facilities 8

O

offering deliverables 14
offering logistics 15
offering process 14
on-site activities
 education session 15
 kickoff meeting 15

P

performance determinations 2
performance improvements 1
performance reports 3
performing basic configuration performance
 analysis 17
prerequisites 18
PWS installation 16

Q

QUICK USE offering 13
QUICK USE overview 13

R

reports, summary 3
reviewing reporting and charting facilities 17

S

SMS implementation 5
software requirements
 MVS environment 12
 PWS environment 12
storage policy changes 5
summary 1
support 13

T

tailoring reports 9
TCP/IP communications setup 16

**International Technical Support Organization
MVS Storage Management SmoothStart Services:
DFSMS Optimizer QUICK USE -
General Information Manual
March 1996
Publication No. SG24-4675-00**

Your feedback is very important to help us maintain the quality of ITSO Bulletins. **Please fill out this questionnaire and return it using one of the following methods:**

- Mail it to the address on the back (postage paid in U.S. only)
- Give it to an IBM marketing representative for mailing
- Fax it to: Your International Access Code + 1 914 432 8246
- Send a note to REDBOOK@VNET.IBM.COM

**Please rate on a scale of 1 to 5 the subjects below.
(1 = very good, 2 = good, 3 = average, 4 = poor, 5 = very poor)**

Overall Satisfaction	_____		
Organization of the book	_____	Grammar/punctuation/spelling	_____
Accuracy of the information	_____	Ease of reading and understanding	_____
Relevance of the information	_____	Ease of finding information	_____
Completeness of the information	_____	Level of technical detail	_____
Value of illustrations	_____	Print quality	_____

Please answer the following questions:

- a) If you are an employee of IBM or its subsidiaries:
- | | | |
|--|----------|---------|
| Do you provide billable services for 20% or more of your time? | Yes_____ | No_____ |
| Are you in a Services Organization? | Yes_____ | No_____ |
- b) Are you working in the USA? Yes_____ No_____
- c) Was the Bulletin published in time for your needs? Yes_____ No_____
- d) Did this Bulletin meet your needs? Yes_____ No_____

If no, please explain:

What other topics would you like to see in this Bulletin?

What other Technical Bulletins would you like to see published?

Comments/Suggestions: (THANK YOU FOR YOUR FEEDBACK!)

Name

Address

Company or Organization

Phone No.



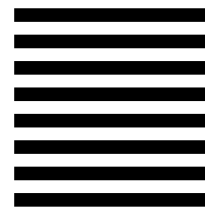
Fold and Tape

Please do not staple

Fold and Tape



NO POSTAGE
NECESSARY
IF MAILED IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 40 ARMONK, NEW YORK

POSTAGE WILL BE PAID BY ADDRESSEE

IBM International Technical Support Organization
Department 471/E2
650 Harry Road
San Jose, CA
USA 95120-6099



Fold and Tape

Please do not staple

Fold and Tape



Printed in U.S.A.

SG24-4675-00

