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ARIS Database Administrator's Guide

Prepared for Bellcore by:

Learning Support Organization

For further information, please contact:

Peggy LaTorre

(732) 699-5680

To obtain copies of this document, Regional Company/BCC personnel should contact their company's document coordinator; Bellcore personnel should call (732) 699-5802.

ARIS Database Administrator's Guide

Contents

1. DBA Guide

1.1 Purpose And Scope

The ARIS DATABASE ADMINISTRATOR's GUIDE provides background material, guidelines, and procedures necessary for maintaining the integrity of and administering the on-going ARIS EDP and database subsystems. This document, along with the *SECURITY ADMINISTRATOR's GUIDE* BR 252-551-934, provides a complete reference tool for the database administrator.

1.2 Functions Of The DBA

The database administrator is an administrator at a BOC whose functions include the following:

- Insuring the availability, integrity and performance of the ARIS databases
- Controlling space allocation
- Monitoring the performance of the databases
- Administering database recovery and reorganization procedures

The database administrator should be familiar with such topics as IMS/VS, OS/VS2 , VSAM, and have knowledge of the ARIS component system.

1.3 The ARIS Product Line In The IMS/VS and MVS Environment

The ARIS Product Line consists of application programs and databases to support entry and tracking of Access Service Requests. The operating system ARIS uses is MVS, the control software which interfaces between MVS and the application programs is IMS/VS. IMS/VS provides database management services as well as the control environment for all ARIS systems.

IMS/VS must have MVS regions in order to function. Once IMS/VS gains control (via an MVS START command), those regions are referred to as IMS/VS regions. With IMS, the ARIS application developer can readily construct databases and interface with those databases via local and remote terminals. ARIS on-line application programs are brought into a message processing region to process transactions and data. A set of macros defines the entire IMS/VS environment - programs, transactions, and data elements - to the system.

1.4 ARIS Configuration Within The IMS/VS Environment

To meet the specific needs of the ARIS IMS/VS environment, several essential elements for ARIS application program execution must be built. Some of these elements are:

A. DBD (Database Description)
The DBD is associated with the ARIS database and the DBD contains information about the following:

- The database organization and access method
- The relationship between segments
- The formats of the fields within the segments

B. PSB (Program Specification Block)
The program specification block is associated with the ARIS application program and consists of one or more database program communication blocks (PCBs). The PCB includes the following information:

- Which databases are used by the application program
- What segments within the databases are used by the application program and how they are affected (retrieve only, update)
- Which DBD names are associated with the databases

The DBDs and PSBs are generated through the use of utility programs. Once the DBDs and PSBs are built, they are merged and expanded into a format acceptable to IMS/VS internally. The format created by this merging process is called an application control block (ACB), which is built via an IBM utility.

For more information on IMS/VS refer to the *IMS/VS Installation Guide IBM.*

1.5 System Definition

IMS/VS must be structured to the specific needs of ARIS. This is accomplished through a process called "system definition." Along with specifying IMS/VS resources to be used by ARIS, the process of system definition includes telling the system about valid transactions, programs, and databases. System definition is a two-stage utility. Stage 1 processes the ARIS application-oriented macros. The Stage 1 cards are processed by the assembler, which produces a stream of jobs. The stream of jobs is then input to Stage 2 of system definition, which structures the specific IMS/VS system ARIS will use. The macros input via Stage 1 encompass three categories of information:

- DL/1 (Data Language)
- Data Communications
- General System Environment specifications

The DL/1 information includes specifications for application programs, transaction codes, and databases used in the combined Database/Data Communications (DB/DC) environment. The data communications information includes the specification of telecommunication devices to be supported by the system. The general system information encompasses the environment in which the application programs work and includes such information as the number of message processing regions, the sizes of database buffers and a definition of library data sets.

1.6 ARIS Databases

In ARIS, there are a number of on-line and batch databases. Each database can be categorized by type of access:

- HSAM (Hierarchic Sequential Access Method)
- HISAM (Hierarchic Indexed Sequential Access Method)
- HDAM (Hierarchic Direct Access Method)
- HIDAM (Hierarchic Indexed Direct Access Method)

Each database is made up of one or more segments in hierarchical order and each segment is divided into a number of fields. The hierarchical order is defined to the system via the SEGM statement used during DBD generation.

Some of the databases are secondary index files. A secondary index database allows data to be referred to in sequences different from those in which is it physically stored. Faster data retrieval is often possible with secondary indices.

Two of the advantages of using secondary indices are:

- Reduction of the number of databases
- Simplification of backup and recovery procedures

In addition to being categorized by type, databases are also categorized by access method:

- VSAM (Virtual Sequential Access Method)
- ISAM/OSAM (Indexed Sequential Access Method/Overflow)
- Sequential

The type and access method of ARIS databases are chosen according to the most efficient possible utilization.

Figure 1-1 *DATABASE TYPES*

DATABASE TYPE	CHARACTERISTICS	ARIS EXAMPLE
HISAM	Segments related through physical adjacency. Indexed access to data base records. VSAM or ISAM/ OSAM can be access method. Secondary indexing can be specified.	TSEND Initiator Database (VMTPPASP) - HISAM/VSAM
HDAM	Segments related through pointers. Access to root is through user-written randomizing module. VSAM or OSAM can be access method. Secondary indexing can be specified.	EXACT™ Screen Reference Database (VMGC01DD) HDAM/ VSAM
HIDAM	Segments related through pointers. Access to root is through an index. VSAM or ISAM/OSAM can be access method. Secondary indexing can be specified.	EXACT Access Service Request Database (VMIC03DP) - HIDAM VSAM

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2. Databases

Database: **VMAECRDP**

Full Name: ACES Customer Service Record Database

Type: HIDAM/OSAM

Subsystem: ACES

Description This database contains customer service record information.

Associated Database: VMAECRDI - HIDAM Index
VMAECRP1 - Secondary Index/VSAM
VMAECRP2 - Secondary Index/VSAM
VMAECRP3 - Secondary Index/VSAM

Database: **VMAEFNDP**

Database: VMAEFNDP

Full Name: ACES Field Name Database

Type: HIDAM/OSAM

Subsystem: ACES

Description: This Database lists the fields that are involved with back population and their processing rules.

Associated Database: VMAEFNDI

Database: **VMC1XXDD**

Full Name: TGM Terminal Database

Type: HDAM/OSAM

Subsystem: COMMON

Description: This database provides data save areas and reference information for all systems and their databases.

Associated Database: None

Database: **VMGCHODD**

Full Name: EXACT Holiday Database

Type: HDAM/OSAM

Subsystem: EXACT

Description: VMGCHODD is a root only database. It contains holidays defined for a five year period.

Associated Database: None

Database: **VMGC01DD**

Full Name: The EXACT Save Database

Type: HDAM/VSAM

Subsystem: ARIS/GOC

Description: Used to maintain data entered on previous screens. An initial space allocation of one to five cylinders is recommended depending on the number of terminals using ARIS. The maximum space requirements are currently 15061 bytes per terminal.

Associated Database: None

Database: **VMGC02DD**

Full Name: The EXACT Data Dictionary Database

Type: HDAM/VSAM

Subsystem: ARIS/GOC

Description: It contains descriptions of all the fields that are referenced in ARIS screens, and in ARIS databases.

Associated Database: VMGC02P1 - Secondary Index/VSAM

Database: **VMIC03DP**

Full Name: EXACT Access Service Request Database

Type: HIDAM/OSAM

Subsystem: EXACT

Description: The main EXACT database. This database stores all Access Service Requests entered.

Associated Database: VMIC03DI - Primary Index/VSAM
VMIC03P1 - Secondary Index/VSAM
VMIC03P2 - Secondary Index/VSAM
VMIC03P3 - Secondary Index/VSAM
VMIC03P4 - Secondary Index/VSAM
VMIC03P5 - Secondary Index/VSAM
VMIC03P6 - Secondary Index/VSAM
VMIC03P7 - Secondary Index/VSAM
VMIC03P8 - Secondary Index/VSAM
VMIC03P9 - Secondary Index/VSAM
VMIC03DG Secondary Data Set Group

Database: VMIC04DP

Full Name: EXACT Security Database

Type: HIDAM/OSAM

Subsystem: EXACT

Description: The Security User ID Database.

Associated Database: VMIC04DI - Primary Index
VMIC04PI- Secondary Index

Database: VMIC05DP

Full Name: EXACT Location Database

Type: HIDAM/OSAM

Subsystem: EXACT

Description: The EXACT Location Reference Data Database.

Associated Database: VMIC05P1 - Secondary Index
VMIC05DI - Primary Index

Database: **VMICACDP**

Full Name: MWA Assignment Criteria Database

Type: HIDAM/OSAM

Subsystem: EXACT

Description This database holds the assignment criteria needed to automatically assign ASRs to a particular person's worklist.

Associated Database: VMICACDI - Primary Index/VSAM
VMICACP1 - Secondary Index/VSAM
VMICACP2 - Secondary Index/VSAM
VMICACP3 - Secondary Index/VSAM
VMICACP4 - Secondary Index/VSAM
VMICACP5 - Secondary Index/VSAM

Database: **VMICAHDP**

Full Name: ASR Archive History Database

Type: HIDAM/OSAM

Subsystem: EXACT

Description: This is the History Database for Archived ASR DB records.

Associated Database: VMICAHDI - Primary Index/VSAM
VMICAHP1 - Secondary Index/VSAM
VMICAHP2 - Secondary Index/VSAM
VMICAHP3 - Secondary Index/VSAM
VMICAHP4 - Secondary Index/VSAM
VMICAHP5 - Secondary Index/VSAM
VMICAHP6 - Secondary Index/VSAM

Database: **VMICARSS**

Full Name: EXACT ASR Archive Database

Type: HSAM/BSAM

Subsystem: EXACT

Description: The EXACT ASR Archive Database for permanent retention of completed ASRs which are no longer kept on VMIC03DP.

Associated Database: None

Database: **VMICDADD**

Full Name: EXACT Date-Sequence Database

Type: HDAM/OSAM

Subsystem: EXACT

Description: This database contains date sequences defined by specific fields for versions used in orders. It also contains rules for manipulation of data.

Associated Database: None

Database: **VMICDBDP**

Full Name: Debug Output Database

Type: HIDAM/OSAM

Subsystem: TUF

Description: This database contains the debug output generated by Downstream Validations modules.

Associated *Database*: VMICDBDI

Database: **VMICDIDP**

Full Name: EXACT Enhanced Critical Date Interval Database

Type: HIDAM/OSAM

Subsystem: EXACT

Description: Contains the catalog of the intervals, in working days, necessary to complete the various work function. The intervals cover the period between the application date and the due date.

Associated Database: VMICDIDI - Primary Index
VMICDIP1 - Secondary Index

Database: **VMICEMDP**

Full Name: Edit Module Database

Type: HIDAM/OSAM

Subsystem: EXACT

Description: This database holds programmable validation edit modules. These modules can be edited on the ICFEM screen.

Associated Database: VMICEMDI - Primary Index
VMICEMDG - Secondary Data Set Group

Database: **VMICFCDD**

Full Name: Contract Cache Database

Type: HDAM/OSAM

Subsystem: EXACT

Description: This database holds local copies of received downstream validation contract data.

Associated Database: None

Database: **VMICMFDP**

Full Name: ECI EC/IC Fields Data Dictionary

Type: HIDAM/OSAM

Subsystem: EXACT

Description: The ECI EC/IC Fields Data Dictionary holds the user defined fields requested and assigned by the ASR OBF committee. These fields are defined using screen ICFLD and the definitions are stored in this database.

Associated *Database:* Primary Index - VMICMFDI

Database: **VMICMGDP**

Full Name: EXACT Interface Message Database

Type: HIDAM/OSAM

Subsystem: EXACT

Description: This database will store messages coming from and going to external contract interfaces.

Associated *Database:* VMICMGDI - Primary Index

Database: **VMICMSDP**

Full Name: Pending Message Database

Type: HIDAM/OSAM

Subsystem: EXACT

Description: This database holds pending messages for downstream validations feature.

Associated Database: Primary Index - VMICMSDI

Database: **VMICMRDP**

Full Name: ECI EC/IC Record/Segment Layout Design

Type: HIDAM/OSAM

Subsystem: EXACT

Description: The ECI EC/IC Record Segment Database holds the user defined layouts for fields assigned by the ASR OBF committee. These layouts are defined using screen ICFLD and the definitions are stored in this database.

Associated Database: Primary Index - VMICMRDI

Database: **VMICNCDP**

Full Name: ARIS NC NCI Database

Type: HIDAM/OSAM

Subsystem: EXACT

Description: This database contains information currently stored in TTS regarding NC code and NCI and SECNCI information. It is capable of additional segmentation by ICSC code.

Associated Database: Primary Index - VMICNCDI

Database: **VMICSTDP**

Full Name: Downstream Validations Definition Database

Type: HIDAM/OSAM

Subsystem: EXACT

Description: This database holds the downstream validations definitions in EXACT.

Associated Database: Primary Index - VMICSTDI

Database: **VMICSUDP**

Full Name: EXACT Supp Overlay Database

Type: HIDAM/OSAM

Subsystem: EXACT

Description: This database will contain carrier entered supplemental ASR information which is being held pending ICSC action to accept or reject each data item. This data will then go into VMIC03DP if accepted, and will be stored in its Audit Trail whether accepted or rejected.

Associated Database: Primary Index - VMICSUDI

Database: **VMICWLDP**

Full Name: MWA Worklist Database

Type: HIDAM/OSAM

Subsystem: EXACT

Description: This database holds the lists of ASRs that were assigned to particular users during the ASR assignment process of the Mechanized Work Assignment feature.

Associated Database: VMICWLDI - Primary Index/VSAM
VMICWLP1 - Secondary Index/VSAM
VMICWLP2 - Secondary Index/VSAM
VMICWLP3 - Secondary Index/VSAM
VMICWLP4 - Secondary Index/VSAM
VMICWLP5 - Secondary Index/VSAM
VMICWLP6 - Secondary Index/VSAM

Database: **VMMPAADP**

Full Name: TCM Administrative Applications Database

Type: HIDAM/OSAM

Subsystem: TCM

Description: This database supports the TCM Administrator functions. The existing function is to store the error exception list segments. This is a root-only database.
There is one segment: AADPSEG1

Associated *Database:* Primary Index - VMMPAADI

Database: **VMMPCRDD**

Full Name: CRON Database

Type: HDAM/OSAM

Subsystem: TCM

Description: This database stores time initiated request information used to schedule message processing transactions through the TCM CRON BMP (VMMPM01).

Associated *Database*: None

Database: **VMMPSCDD**

Full Name: Network (Sec) Database

Type: HDAM/OSAM

Subsystem: TCM

Description: The SEC (System Entity Code) database is used to store network information regarding the logical paths that exist between those systems that are communicating with TCM. Statistics for messages received and transmitted by TCM for each path is also stored in this database.

Associated Database: VMMPSCP1 - Secondary Index/VSAM
VMMPSCP1 is keyed by linkname which enables the TCM "automatic link verification" process to quickly access all logical interface paths for the purpose of updating the physical link status.

Database: **VMMPSQDP**

Full Name: Deferred Message Queue (SENDQ) Database

Type: HIDAM/OSAM

Subsystem: TCM

Description: The SENDQ (Send Queue) database is used to store messages that have been deferred for processing by TCM. When messages are "dequeued" from this database, they are deleted.

Associated Database: VMMPSQDI - Primary Index/VSAM
VMMPSQP1 - Secondary Index/VSAM
VMMPSQP1 is keyed by activity number which enables TCM to quickly access all messages on VMMPTLDD associated with a given activity number.

Database: **VMMPTLDD**

Full Name: Transaction Log (TLOG) Database

Type: HDAM/OSAM

Subsystem: TCM

Description: The TLOG database is used to log input messages, TPAM output messages and any application or TCM (parsing, mapping or translation) errors detected as a result of processing the message.

Associated Database: VMMPTLP1 - Secondary Index/VSAM
VMMPTLP1 is keyed by activity number which enables TCM to quickly access all messages on VMMPTLDD associated with a given activity number.
VMMPTLP2 - Secondary Index/VSAM
VMMPTLP2 is keyed by error code which enables TCM to quickly access all messages on VMMPTLDD associated with a given error code.
VMMPTLP3 - Secondary Index/VSAM

Database: **VMPTEMDP**

Full Name: Edit Module Database

Type: HIDAM/OSAM

Subsystem: PTE

Description: This database holds Edit Modules for the Post TUF Editor, which are edited on the ICETM screen.

Associated Database: VMPTEMDI - Secondary Index

Database: **VMPTFDDP**

Full Name: FID Table Database

Type: HIDAM/OSAM

Subsystem: PTE

Description: This database holds Fid Tables for the Post TUF Editor, which are edited on the ICFDS screen.

Associated Database: VMPTFDDI - Secondary Index
VMPTFDP1 - Secondary Index

Database: **VMPTTPDP**

Full Name: FID Table Database

Type: HIDAM/OSAM

Subsystem: PTE

Description: This database holds Group Sequencing Templates for the Post TUF Editor, which are edited on the ICTDS screen.

Associated Database: VMPTTPDI - Secondary Index
VMPTTPP1 - Secondary Index

Database: **VMRMSPDD**

Full Name: Manager's "Scratch Pad" Database

Type: HDAM/OSAM

Subsystem: TQS

Description: This database is used to store output of queries and user defined databases.

Associated Database: VMRMSPP1 - Secondary Index

Database: **VMRQSADP**

Full Name: TQS Query Database

Type: HIDAM/OSAM

Subsystem: TQS

Description: This database is used to store queries and internal TQS information. Also, it is used primarily for storage of user's ad hoc queries for later retrieval and update.

Associated Database: VMRQSADI - Primary Index
VMRQSAP1 - Secondary Index/VSAM

Database: **VMRQUPDP**

Full Name: TQS User Profile Database

Type: HIDAM/OSAM

Subsystem: TQS

Description: This database allows for temporary storage of screens. Specifications for extracting records and formatting of reports, along with graphics parameters, are available. Information for report distribution is held.

Associated Database: VMRQUPDI - Primary Index
VMRQUPP1 - Secondary Index

Database: **VMS1XXDD**

Full Name: ARIS - S1 Security Database

Type: HDAM/OSAM

Subsystem: S1

Description: This database is a root segment only database, and consists of variable length segments. It is used to store security information.

Associated Database: VMS1XXP1 - Secondary Index/VSAM
VMS1XXP2 - Secondary Index/VSAM
VMS1XXP3 - Secondary Index/VSAM
VMS1XXP4 - Secondary Index/VSAM

Database: **VMTTBLDD**

Full Name: TTS Tables Database

Type: HDAM/OSAM

Subsystem: TTS

Description: VMTTBLDD is a tables reference database. There are two types of records that exist: Table Descriptor Records, which are the specifications for how a given table

is to be constructed, and Table Data Records, which contain the table itself and all the data values that go into the table.

Associated Database: None

Database: **VMUFAUDP**

Full Name: TUF Audit Trail Database

Type: HIDAM/OSAM

Subsystem: TUF

Description: This database contains the oldest version for each ASR/order or contains differences between the current and previous versions.

Associated Database: VMUFAUDI - HIDAM Index
VMUFAUP1 - Secondary Index/VSAM
VMUFAUP2 - Secondary Index/VSAM
VMUFAUP3 - Secondary Index/VSAM

Database: **VMUFAUSS**

Full Name: TUF Archive Database

Type: HSAM/HSAM

Subsystem: TUF

Description: The TUF Archive Database for permanent retention of all SOWA images which are no longer kept on VMUFAUDP.

Associated *Database*: None

Database: **VMUFBPDP**

Full Name: TUF Border Interconnection Percentage Reference Database

Type: HIDAM/OSAM

Subsystem: TUF

Description: Contains BIP percentages and other associated data for all pairs of CLLI codes listed in the FCC-4 TARIFF (ECA-4). This data is used for generating Meet Point Billing & Cross-Boundary Billing FIDs/USOCs.

Associated Database: VMUFBPDI

Database: **VMUFSODD**

Full Name: Service Order Database

Type: HDAM/OSAM

Subsystem: TUF

Description: This database contains Service Order Workaids translated from EXACT to TUF.

Associated Database: VMUFSOP1 - Secondary Index/VSAM (by Order Number)
VMUFSOP2 - Secondary Index/VSAM (by ASR Number)
VMUFSOP3 - Secondary Index/VSAM (used by past due date run in PBSI)

Database: **VMUFSPDD**

Full Name: TUF Scratch Pad Database

Type: HDAM/OSAM

Subsystem: TUF - ACES

Description: This database is used for minimizing the performance impact when manipulating the Service Order Workaid. This database contains service order workaids translated from EXACT to TUF, and CSR workaids built by ACES.

Associated Database: VMUFSPP1 - Secondary Index/VSAM (by Order Number)
VMUFSPP2 - Secondary Index/VSAM (by ASR Number)

Database: **VMUFSQDP**

Full Name: FID Sequence Database

Type: HIDAM/OSAM

Subsystem: TUF

Description: This database contains FID sequence tables.

Associated Database: VMUFSQDI - HIDAM Index

Database: **VMUFSVDP**

Full Name: Service Type Database

Type: HIDAM/OSAM

Subsystem: TUF

Description: This database contains TUF user defined service types.

Associated Database: VMUFSVDI - HIDAM Index

Database: **VMUFTMDP**

Full Name: Translation Module Database

Type: HIDAM/OSAM

Subsystem: TUF

Description: This database contains Flex-TUF translation modules.

Associated Database: VMUFTMDI - HIDAM Index

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3. Configuration Planning

Configuration Planning is a means to determine the resources necessary to support the ARIS system under production conditions. During installation and conversion each company may require individualized planning assistance, but as the company moves toward total implementation of ARIS, more and detailed configuration will be required in advance. Some of the topics to be considered in configuration planning are:

- Hardware Requirements
- Busy Hour (Peak Usage)
- CPU Sizing
- Storage Allocation
- DASD Requirements (Direct Access Storage Devices)

4. Peripheral Sizing

In order to plan the peripheral device configuration, several factors which affect its size must be known. Some of these factors are:

- The Order Volume ARIS is Going to Handle
- The Amount of Inventory to be Maintained
- Anticipated Growth

4.1 Database Sizing

Database sizing can be calculated by taking into account the characteristics of the individual databases, what data is contained in each segment of the database, the number of bytes in the segment and the number of bytes for access method overhead. In addition, space should be provided for growth and tuning.

4.2 Data Set Placement

The aim in pre-determining data set placement is to minimize the elapsed I/O time by reducing average seek times on ARIS packs and balancing the load across disk packs and channels. Two of the major items to consider are the relative activity of the major ARIS data sets and their space requirements. Using the amount of required storage as a constraint, the data sets should be spread across the available packs in such a way that:

- The total amount of space on a pack does not exceed that which is available
- All databases should be allocated in a single extent (except for multi-volume databases)
- The prime and secondary indices of a database are not on the same pack as the data portion.

5. System Performance Tuning

5.1 Pre-Implementation Tuning

In ARIS, the time spent in configuration design and pre-implementation tuning can eliminate many times the effort spent in determining performance. By addressing specific critical areas of system performance in the configuration design, the system will not only run better but yield lower response time and its capability will be enhanced. These critical areas of system performance include:

— Data Set Placement

— Data Set Allocation

— Number of Message Processing Regions

— Modules to be Pre-loaded

— Internal Buffer Size

— Core Allocations

— DBDGEN Parameters

— Controller Layout

— Disk Channel

5.2 On-going Performance Tuning

Even though the system may be tuned as fine as possible when implemented, the very nature of the business it serves is such that the system environment is constantly changing. Records are added and deleted; programs are updated and upgraded and a variety of other factors cause the system to grow and change in many aspects. The system should be monitored regularly, paying attention to indicators of performance. Both system component utilization and ARIS response times should be periodically reviewed in order to assure that potential problems are investigated and resolved before they become critical.

The DC Monitor is the major tool used for performance evaluation. The DC Monitor analyzes application programs, checks database design, and monitors system performance. The DC Monitor, in conjunction with other utilities, is the primary tool for tuning the IMS system.

5.3 IMS Tuning

The IMS system should be tuned to handle peak transaction arrival rates without increase in response time. A system that is tuned to the peak arrival rate will normally handle the non-peak volumes. To tune to the peak workload,

measurements must be made at peak times to obtain a representative transaction profile. The action of tuning IMS comprises minimizing contention for system resources and reducing the IMS transaction profile. Main storage contention can be reduced by running fewer jobs, by page fixing less storage, or in some cases, by adding more storage.

5.4 Reasons For Monitoring

Some of the reasons for monitoring the system are:

- Prevention of Performance Problems
- Tuning the System if Performance Problems Exist
- Tuning the System After a Change in the System Workload
- Establishing Base Profiles for Tuning Comparisons and Capacity Planning

A. Prevention of performance problems
Frequent monitoring of the system and the plotting of key performance indicators will point out changes in trends that might affect response time before the terminal operator notices them. The frequency of monitoring depends upon the volatility of the systems.

B. Gradual or significant changes in the performance indicators should be noted and an effort should be made to explain the cause of each change. Once the cause of the change has been identified, tuning can be done to compensate for the change.

C. Tuning a thoroughly tuned system
A thorough tuned system is one that gets maximum transaction with minimum response time on hardware resources available. Since many of the IMS performance problems are caused by factors outside IMS, the IMS environment must be monitored along with IMS. Monitoring should be done during peak IMS transaction volume or when the performance problem is occurring.

D. Establishing Base Profiles
A base transaction profile is the transaction profile in a stand-alone environment, without interference. It is desirable to build a base profile for those transactions that have the highest volume and/or generate the most work in terms of calls and I/Os.

5.5 Performance Analysis Tools

The effective use of system resources is the goal of any performance tuning effort. Before tuning can be accomplished, it is necessary to examine the current use of these resources in order to determine the specific performance problems that exist

in the system. Measurement tools which determine how the resources are currently used are necessary for any performance evaluation.

Performance analysis tools are discussed in detail in the IBM documentation manual IMS/VS UTILITIES REFERENCE MANUAL. However a sampling of some of them are listed below:

A. DC Monitor
The DC Monitor collects information on all dispatchable events in the IMS system. It is the primary tool for:

- Tuning the System
- Analyzing Application Programs
- Validating Database Design
- Monitoring System Performance

It is also a means of determining the effect on IMS of the interaction of the hardware and software components of the total system.

B. DC Monitor Report Program
The DC Monitor Report Program is a batch program that takes data collected by the DC Monitor and prints summary reports and distribution detail of the data.

C. Log Transaction Analysis Utility
The IMS/VS Log Transaction Analysis Utility Program collects information about individual transactions from the IMS/VS system log tape. A report is generated that identifies each transaction.

6. Backup And Recovery Procedures

Essential to the integrity of ARIS is a workable backup and recovery system. Log information and checkpoints, two topics essential to backup and recovery procedures, are referred to below.

6.1 System Log

The major tool for backup and recovery is the system log. The log is created during execution of the IMS/VS control region. Whenever a database modification is made, this information is placed into the log:

- ID of the Database and the Data Set Within That Database
- ID of the Modified Record Within the Data Set
- Contents of the Database Record Before and After Updating

6.2 Checkpoints

Checkpoints are a key element in the backup and recovery system. Checkpoints are used to mark the status of the system on the log tape at specific points in time. Checkpoints may be used as a "backout" point if a system problem later occurs. Emergency restart, restarts IMS/VS from the last usable IMS/VS checkpoint and then, if necessary, "backs out" the effect of incomplete processing. During emergency restart, the system restores data back to a point where it was before a unit of processing was performed upon that data.

Application programs running as BMP or IMS batch may be taking checkpoints which can be restarted from. Refer to individual runbook steps for information regarding a particular step's restartability.

A BMP automatically backs out to the last checkpoint when abending. A restartable IMS batch program requires the IMS backout utility DFSBBO00 to be run to backout to the last or any previous checkpoint. IMS restart procedures can then be invoked.

6.3 Batch Backout/Restart

6.3.1 Backout Changes

Backout updates to the IMS DBS to last checkpoint taken. Use the IMS Backout Utility DFSBBO00 to do this. Reference the Master Terminal Operator (MTO) console or sysout printout for the checkpoint information for the job step that abended. The following information is needed to execute the BACKOUT procedure:

- Identify the last checkpoint ID (e.g. SC025940)
- Identify the DSN name of the IMS log tape which corresponds to the IEFRDER DD statement from job step that abends.
- Identify the IMS log tape VOLSER number. If multiple tapes were used, just reference the tape that contains the checkpoint id you are backing out to.
- Make sure all IMS DBs and GSAM files which were part of the Job step are included in the backout procedure.

6.3.2 Image Copy DBS

At this point, depending on the complexity of the program, an image copy of the associated IMS DBS may be needed.

6.3.2.1 Restart Program (Job Step)

After successfully backing out updates to IMS DBS to a specified checkpoint id, restart the job step supplying the following information:

- Identify the job step and program to be restarted in the specified procedure.
- Identify the checkpoint id. The checkpoint id is passed into the program via a checkpoint symbolic parameter on the EXEC statement, (CKPTID).
- IMSLOGR must identify the DSN and unit of the IMS Log Tape that was used in the initial processing before the abnormal termination of the program occurred. This IMS Log is input to the RESTART process and contains the checkpoint id from which the program will restart.
- The IEFRDER LOGDSN symbolic parameter is where the IMS Log will log all updates for the RESTART process. If the job step should abend again, this DSN must be used as input to the BACKOUT procedure and again as input IMSLOGR symbolic parameter.