System Behavior Reporter

User's Guide

DPS7000/XTA
NOVASCALE 7000

Operating System: Tuning

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Trademarks and Acknowledgements

Preface

MANUAL OBJECTIVES

This manual explains in broad terms what SBR is, what it does, and how it works. It also describes in detail how to use it and, most importantly, how to interpret its statistical findings.

STRUCTURE OF THIS DOCUMENT

Chapter 1:	provides an overview of SBR, its data collection and data analysis, its different levels of operation, and its CPU and memory overheads.
Chapter 2:	describes how to operate the SBR data collection facility.
Chapter 3:	describes how to activate and interpret SBR on-line display facilities.
Chapter 4:	describes how to operate The SBR data analysis facility.
Chapter 5:	describes how to activate SBR archiving and billing facilities.
Chapter 6:	describes how to interpret SBR statistical findings.

INTENDED READERS

This manual is intended for:

- the system performance analyst
- the site manager/system administrator
- personnel responsible for monitoring and tuning the system's performance and for planning its growth

RELATED DOCUMENTS

SBR-Basic User's Guide 47 A2 06US
SBR Open Interface Programmer's Guide..47 A2 15US
GCOS 7 System Operator's Guide (V5/V6).. 47 A2 60UU
GCOS 7 System Operator's Guide (V7) 47 A2 47US
GCOS 7 System Operator's Guide (V8) 47 A2 53US
UFAS-EXTENDED User's Guide..47 A2 04UF
GAC-EXTENDED User's Guide 47 A2 12UF
TDS Administrator's Guide (V5) 47 A2 02UT
TDS Administrator's Guide (V6) 47 A2 20UT
TDS Administrator's Guide (V7 and V8) 47 A2 32UT
GCOS 7 System Administrator's Manual (V5/V6)..47 A2 10US
GCOS 7 System Administrator's Manual (V7) 47 A2 41US
GCOS 7 System Administrator's Manual (V8) 47 A2 54US
ARM User's Guide 47 A2 11US
Large Memory Cache User's Guide (V5/V6)..47 A2 12US
Large Memory Cache User's Guide (V7) 47 A2 42US
GCOS 7 System Installation Configuration and Updating Guide (V5-VBO)..47 A2 07US
GCOS 7 System Installation Configuration and Updating Guide (V5-FBO) 47 A2 16US
GCOS 7 System Installation Configuration and Updating Guide (V6)............47 A2 17US
GCOS 7 System Installation Configuration and Updating Guide (V7)............47 A2 18US
GCOS 7 System Installation Configuration and Updating Guide (V8)............47 A2 19US

SUMMARY OF THE V7 ENHANCEMENTS

Upgrade users already familiar with SBR should note the following enhancements for Release V7 TS 7458 and V8 TS 8458 onwards:

- The compilation phase during SBR data analysis is now faster.
- Up to 100 ANALYZER options can be used in a single data analysis.
- Usage of configurable resources is displayed during data collection (if specified using the CONFIG parameter of the DISPLAY_SBR directive) and is also shown in the charts CONFIGURED RESOURCE USAGE and GAC RESOURCE USAGE.
- The ANALYSIS ACTIVITY option has been modified:
  - This option no longer implies the ANALYSIS STANDARD option, and thus fewer charts are printed when ANALYSIS ACTIVITY is specified.
  - A STEP parameter has been added to ANALYSIS ACTIVITY, allowing analysis by RON and DSN.
- In data analysis charts, in SERIAL DISPLAY and in FULL SCREEN DISPLAY, CPU usage is broken down into IPU usage and EPU usage.
- Ready time (time spent in the ready state, waiting for the CPU) accounting is provided at the DETAILED level in the following charts:

- CPU TIME PER TASK FOR <TYPE>
- READY TIME (requested using SET CHARTS, LONG)
- READY TIME PER LOAD MODULE (requested using SET CHARTS, LONG)

- A detailed event trace (for debugging purposes only) can be obtained using the ANALYSIS TRACE option.

The following enhancements are intended for GCOS 7 V8 TS 8560 and up:

- CDP/HRP LOAD chart: information improved with CDP.

- CPU I/O MP PER LOAD MODULE chart: capability of each load-module (standard or CDPI).

NOTE: V3 users migrating to V5, V6, V7 or V8 should refer to Appendix D for details concerning the upgrading from UFAS to UFAS-EXTENDED and its impact on SBR.

SYNTAX NOTATION

The following conventions are used for presenting GCL/JCL command syntax.

ITEM An item in upper case is a literal value, to be specified as shown. The upper case is merely a convention; in practice you can specify the item in upper or lower case.

item An item in lower case is non-literal, indicating that a user-supplied value is expected.

In most cases, the item indicates the type and maximum length of the value:

`dec5`	a decimal integer value of up to 5 digits
`file78`	a file name of up to 78 characters

In some cases, the item gives the format of the value:

`a`	a single alphabetic character
`nnn`	a 3-digit number
`hh.mm`	a time in hours and minutes

In other cases, the item simply describes the value:

```
device-class
condition
```

ITEM An underlined item is a default value.

bool A boolean value which is either 1 or 0. A boolean parameter can be specified by its keyword alone, optionally prefixed by "N". Specifying the keyword alone always sets the value to 1. Prefixing the keyword with "N" always sets it to 0.

{ } Braces indicate a choice of values. Only one may be selected.

[ ] Square brackets indicate that the enclosed item is optional. An item not enclosed in square brackets is mandatory.

( ) Parentheses indicate that a single value or a list of values can be specified. A list of values must be enclosed by parentheses, with each value separated by a comma or a space.

... Ellipses indicate that the item concerned can be specified more than once.

+=$*/ These are literal characters to be specified as shown.

Example 1:

```
{                            }
{      { IMMED             } }
{ WHEN={ [dd.mm.yy.]hh.mm  } }
{      { +nnnn{W|D|H|M}    } }
{                            }
```

This means you can specify:

- Nothing at all (WHEN=IMMED applies).
- WHEN=IMMED (the same as nothing at all).
- WHEN=22.30 to specify a time (and today's date).
- WHEN=10.11.87.22.30 to specify a date and time.
- WHEN=+0002W to specify 2 weeks from now.
- WHEN=+0021D to specify 21 days from now.
- WHEN=+005H to specify 5 hours from now.
- WHEN=+0123M to specify 123 minutes from now.

Example 2:

```
[ PAGES=(dec4[-dec4] ...) ]
```

An optional parameter giving either a single value or a list of values enclosed in parentheses, with each value separated by a comma or space. Each value can consist of either a single number or a pair of numbers connected by a hyphen. For example:

```
PAGES=(2,4,10-25,33-36,78 83 90)
```

Example 3:

```
[ REPLACE ={ bool | 0 } ]
```

A boolean parameter whose default value is zero. You can specify:

- Nothing at all (REPLACE=0 applies)
- REPLACE=0 or simply NREPLACE
- REPLACE=1 or simply REPLACE

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1. Introduction

1.1 WHAT IS SBR?

The System Behavior Reporter (SBR) is a GCOS 7 application that measures the workload and usage of the hardware and software resources of a DPS 7000 installation. It outputs charts containing histograms, tabulations, dictionaries and statistics on nearly all measurable aspects of system activity, such as:

- system configuration
- CPU and I/O activity
- VMM load and memory usage
- response times for TDS, IOF and other applications
- behavior of the disk subsystem
- multiprogramming level
- real time activity
- missing page processing
- TPRs for TDS processing

The charts range from basic overviews to extensive and detailed analyses. By regularly studying and analyzing the overviews, the System Administrator can observe short- and long-term trends in system performance, detect inadequate hardware resources, and anticipate system bottlenecks. Detailed analyses can then be performed when a specific performance problem is suspected. Performance problems are generally caused by:

- poor performance organization
- resource contentions
- programming problems

Poor Performance Organization

Poor performance organization is the most difficult type of performance problem since it interferes with the other activities of the installation. However, SBR enables the System Administrator to solve this kind of conflict provided he has clear and precise performance objectives.

Performance Objectives

Certain rules should be observed in order to properly manage the performance of an installation. In particular, performance objectives for each type of application must be specified. Many installations that have a performance problem have in fact a prioritization problem. If performance objectives are made clear, this will greatly help the organization of the priorities for sharing of main memory, for CPU dispatching, and so on.

> ***Example:***
>
> On site X, SBR analysis indicated that the system disk is overloaded and that the missing page rate is very high. The diagnostic points to main memory contention. Either the main memory is too small, or it is shared by too many users. One solution would be to add more memory, and another would be to prevent low-priority users from logging on. The choice of solution depends on the performance objectives for site X: for example, adding memory if long-term growth is planned and prioritization if it is not. If prioritization is chosen, then the questions to be answered are who should be privileged and at which hours?

Control of the Installation

This consists essentially of supervising the priority of each job submitted to the system. For instance, it may be necessary to prevent some IOF users from logging on during the peak period of the highest priority application, if it has been diagnosed that contention arose due to the presence of these users during that period.

Great care must be taken to avoid short cuts or illegal modifications of the set of priorities. For information, refer to your *GCOS 7 System Administrator's Manual*.

Billing

A large community of users may share the system. It is necessary to supervise them and to record and archive their resource consumption, day after day, for weekly and monthly accounting purposes. SBR offers this facility.

Performance Reporting

SBR provides low-overhead performance measurement on a long-term basis and, when necessary, extensive measurements on a short-term basis.

Low-overhead measurements are used to survey general trends in system activity, e.g., the number of jobs per day, response times, CPU utilization, and I/O rates. The System Administrator is strongly advised to study these figures regularly. Once familiar with the system's normal workload and performance, the System Administrator will be able to quickly recognize signs of unusual workload and diagnose system bottlenecks as they occur.

Extensive measurements are run only when necessary to solve a specific performance problem or to tune certain system parameters.

Resource Contentions

Resource contention problems are more technical, and therefore easier to diagnose. Contentions are sometimes detected by SBR low overhead measurements but more certainly by its extensive measurements. These problems (and more subtle ones) are discussed in detail in Chapter 6.

Programming Problems

Programming problems are generally difficult to identify since they may be hidden behind contention at a subsystem level. Contention is the visible symptom, but the actual problem lies inside the software, either with some user program and its files, or with GCOS itself. Nonetheless, SBR has facilities that can usually detect this kind of problem.

1.2 HOW DOES SBR WORK?

SBR operation consists of the following phases, as shown in Figure 1-1:

- a *data collection* phase, which observes and records information on system activity, and which optionally allows a real-time display of system load and performance data
- a *data analysis* phase that processes the collected data and produces the output charts, and that optionally archives data for accounting purposes

The figure also shows the three major SBR programs, COLLECTOR, ANALYZER, and BILL, which are described in the next section.

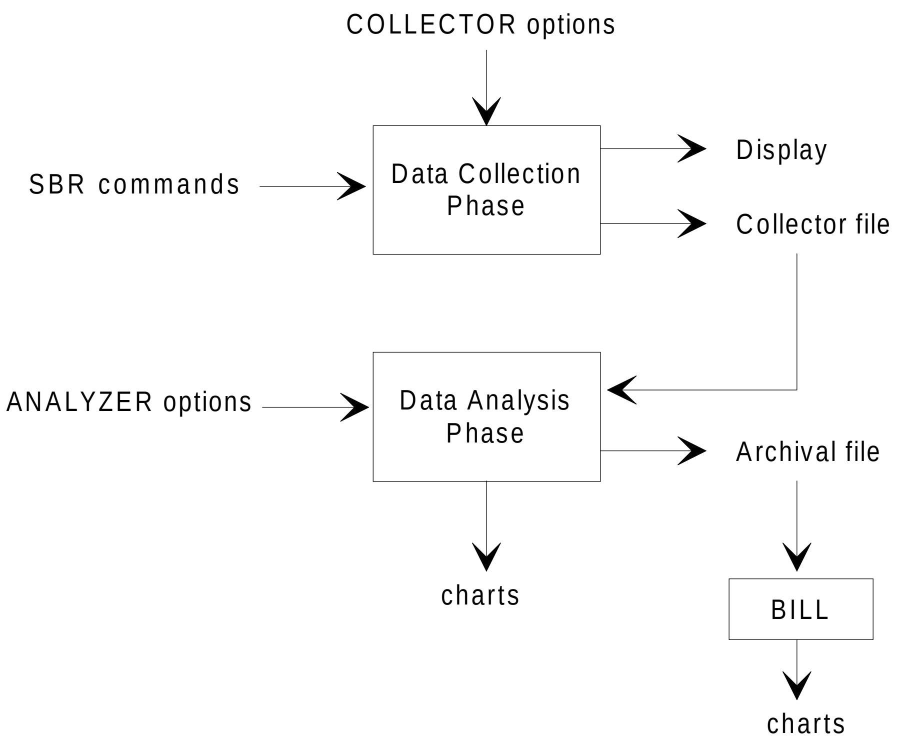

Figure 1-1. SBR Operation

1.2.1 Data Collection Phase

This phase is performed by the COLLECTOR program (H_SBR) in three stages:

INIT stage

- Clears the SBR collector file.
- Inserts probes into the software to be monitored, loads segments into memory, creates tables, etc.

COLLECT stage

Collects data on system activity and writes it to the collector file. The data consists of 'events' recorded by the inserted probes, and 'samples' taken at regular intervals by the snapshot mechanism (see *Snapshot Technique*, Chapter 2)

During this stage, you can dynamically modify certain collector parameters (see *Modifying COLLECTOR Parameters*, Chapter 2) and call a serial or full-screen display of real-time information on system load and performance (see Chapter 3).

When the collector file is full, the user may choose to:

- start an analysis and continue the real-time display of information
- continue the real-time display of information without starting an analysis
- stop both the data collection and the display

CANCEL stage

Triggered by the GCL directive TERMINATE_SBR (see *Stopping the Data Collection*, Chapter 2), the CANCEL stage stops the collection, collects the last of the data, and closes the collector file.

1.2.2 Data Analysis Phase

This phase is performed by the ANALYZER program (H_ANSBR). It processes the data currently held in the collector file, performs a statistical analysis of the collected data, and then outputs diagrams, tables, dictionaries, histograms, and chronologies (see Chapter 4).

If required, the ANALYZER will also archive data to a sequential file for analysis by the BILL program (H_SBR_BILL), for global accounting purposes. See Chapter 5 for details.

1.3 HOW TO RUN SBR

To run SBR, you may use:

- the GCL directives START_SBR (to activate data collection or data collection/data analysis), ANALYZE_SBR (to activate data analysis), and BILL_SBR (to activate the BILL program). Directives are available with menus and helps for standard SBR operation.

- the job submission directive EJR SBR, which allows you to perform data collection and/or data analysis if SBR has been transferred from the standard system library SYS.HSLLIB to a private library.

All the above commands can be executed using a standard set of SBR options that handle the most common requirements. However, if your installation has special needs or if specific performance analysis is required, you can select a wider range of ANALYZER options. You implement these at input enclosure level and then execute your job as shown in the paragraph 'By Specific job Submission' in chapter 4. ANALYZER options are fully described in Chapter 4.

To call the real-time display of information, you can do either of the following:

- To call the serial display, use the GCL directive DISPLAY_SBR (DSBR).

- To call the full-screen display, use the GCL directive START_SBR_DISPLAY (SSBRD).

NOTE: No more than one data collection can be active at any moment.

1.4 SBR LEVELS AND OPTIONS

SBR provides four levels of operation for both the data collection and data analysis phases:

- BASIC level
- CONCISE level
- DETAILED Level
- EXTENDED Level (data collection only)

(Analysis levels are chosen using the special ANALYZER options in Chapter 4.) The higher levels provide the same facilities as the lower levels, plus some additional facilities.

Normally, the same level is selected for data analysis and data collection. In any case, the analysis level cannot exceed the collection level. For example, if a CONCISE data collection session has taken place, only a CONCISE or a BASIC analysis can be performed. If DETAILED is specified for the data analysis session, a CONCISE analysis will be provided.

Figure 1-2 shows all the options available with each COLLECTOR and ANALYZER level, and Table 1-1 summarizes the main uses of these options. Briefly, the following options are available:

- TDS option, which is used to instrument the Transaction Driven Subsystem

- SNAPIC option, which is used to observe CPU utilization in detail

- SNAPMM option, which is used to observe memory utilization

- MSC option, which is used to observe MSP4370/MSM controller activity

- UFAS option, which is used for UFAS-EXTENDED buffer pool instrumentation

1.4.1 BASIC Level

This is a low-overhead level which is used on a long term measurement basis to survey general trends in workload and resource usage. It produces 8 charts on the following areas:

- system configuration
- CPU and I/O activity
- VMM load and memory usage
- response times of TDS, IOF and other applications
- behavior of the disk subsystem.

1.4.2 CONCISE Level

This is normally used to resolve performance organization problems, and will sometimes reveal resource contentions. Like the BASIC level, it has a low overhead and is used on a long term measurement basis. In addition it reports on the I/O load per device, resource consumption per load module and on real-time activity. It also provides a simple but powerful billing facility.

1.4.3 DETAILED Level

This too provides information on the use of system resources, but at a deeper level: device service times, I/O rates, etc. The analyst would use this level if a specific performance problem is suspected (and studies of individual programs required) or if there are possible bottlenecks which need isolating. It can also provide a TDS instrumentation option to detect TDS-specific bottlenecks.

Important:

A DETAILED analysis requires a DETAILED (or EXTENDED) data collection and entails non-negligible CPU and memory overheads (see *SBR Overheads* below). Therefore, a request for a DETAILED analysis assumes that:

- The CONCISE (low-overhead) level has proved to be insufficient.
- The system to be analyzed must be the subject of specific performance improvement operations.

1.4.4 EXTENDED Level

This is a high-overhead level which should only be used with precise performance objectives in mind. It provides accurate information on system services utilization, UFAS-EXTENDED buffer pool behavior, and controller activity.

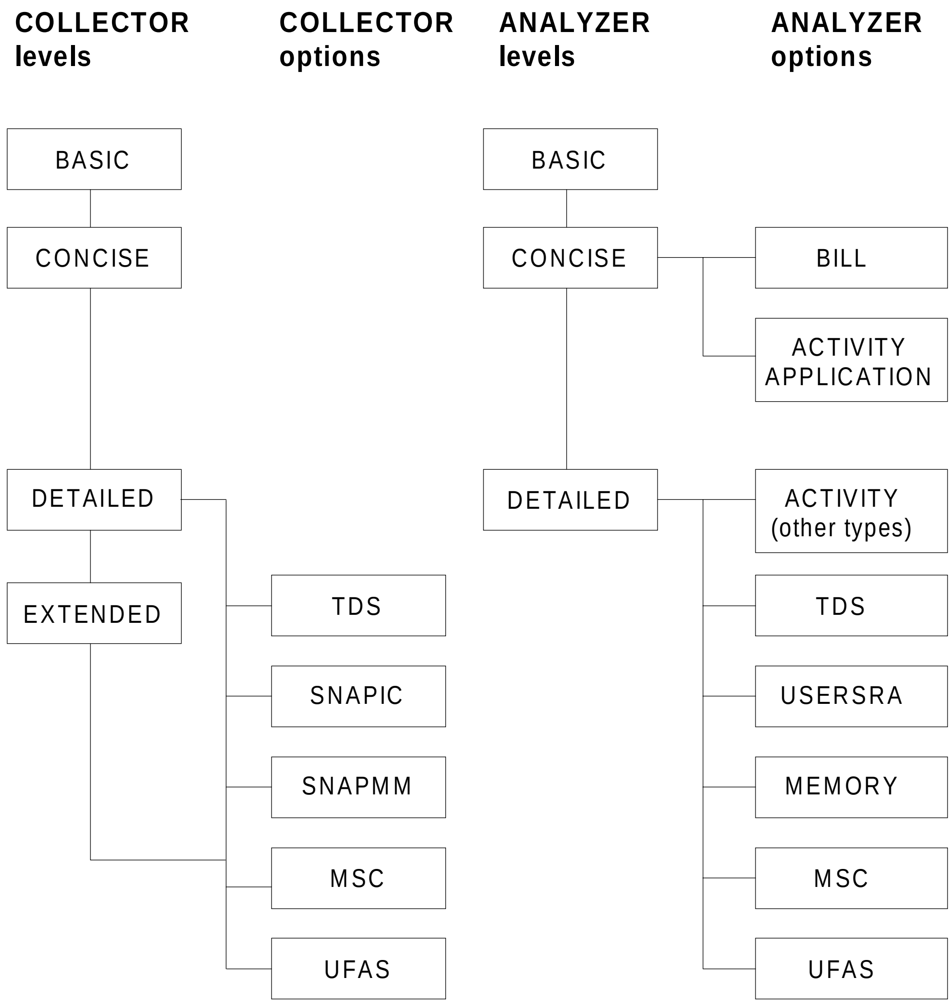

Figure 1-2. SBR Levels and Options

Table 1-1. Main Uses of SBR

COLLECTOR level and options	***ANALYZER level and options***	***Usage***
Basic	Basic	Locate peak periods. Evolution of response time & throughput.
Concise	Concise Bill	Solve performance organization problems by studying the load environment. Resource utilization. General statistics for accounting.
Detailed Extended	Detailed Activity Activity	Diagnose bottlenecks on devices and memory. Service time per device. BKST activity. Real-time activity. Page faults and I/O operations for a specific load module. Media and file activity. System process activity. MSP4370/MSM activity. * UFAS-EXTENDED buffer pool behavior. *
TDS	TDS	Observe the behavior of TDS, GAC, and UFAS.
SNAPIC	Activity USERSRA	CPU consumed by each procedure . Locate highest CPU consumer sequences.
SNAPMM	Memory	Detailed analysis of memory occupation, by load module and dimension.
MSC	MSC	MSP4370 activity /MSM.
UFAS	UFAS	UFAS-EXTENDED buffer pool behavior.
* At EXTENDED level, the MSC and UFAS options are selected by default.		

1.5 SBR OVERHEADS

SBR monitors the use of system resources, but in doing so, it itself can become a significant consumer of some of these resources. Thus effective use of SBR must take into account the overheads that it incurs. Overheads are measured in terms of CPU time, main memory and peripheral requirements.

CPU and Main Memory Requirements

The amount of CPU time and main memory space needed by the data collection and analysis programs depends on:

- the CPU model
- the level of resource of evaluation
- the workload.

The collection and analysis overheads for different levels and options are summarized in Table 1-2 (which assumes that collection and analysis are performed on the same model).

The figures given in this table apply to peak periods of a transactional workload with saturated CPU (monoprocessor). For a whole session on a non-saturated CPU, the figures should be weighted with the average load (i.e. the number of generated events).

Note that you can obtain the exact overhead in CPU, by doing an analysis on the H_SBR load module with the ANALYSIS ACTIVITY <load-module> option.

Peripheral Requirements

Each record of the collector file contains 128 events, each 32 bytes long. Thus the record size is by default 4096, though it may be modified to contain 64, 256, 512 or 1024 events. The CI size is a multiple of the record size, plus 512. ***The CI size should be chosen as close as possible to the actual track size, to improve the throughput***.

By default the collector file is a UFAS Sequential file, with RECFORM=F. You can specify however:

- a tape file,
- a BFAS Sequential (RECFORM=FB) file on VBO volumes (this is supported for V5 VBO, but not for V5 FBO, V6 or V7).
- a queued monosubfile (i.e. BFAS) on FBO volumes.

To estimate the size required for the collector file, refer to *#0 General Information*, Chapter 6

Table 1-2. COLLECTOR and ANALYZER Overheads

COLLECTOR level & options	***Overhead*** (1) CPU	memory	***ANALYZER level & options***	***Overhead*** (1) CPU	memory
BASIC CONCISE	*1%*	*400K*	BASIC CONCISE(2) & BILL(3)	*4%*	*150K*
DETAILED	*2-3%*	*440K*	DETAILED Activity (4)	*10%* *+3%*	*150-300K* *+150K*
EXTENDED	*2-5%*	*500K*	DETAILED Activity (4)	*10%* *+3%*	*150-300K* *+150K*
TDS	*<1%*		TDS	*+3%*	*+150K*
SNAPIC	*+2%*(5)		Activity (4) USERSRA(4)	*+3%* *+3%*	-
SNAPMM	*+2%*		Memory	*10%*	*+150K*
MSC	*<1%*		MSC	*2%*	-
UFAS	*<1%*		UFAS	*+3%*	-

(1) CPU overhead for both collection and analysis is in % of total collection CPU time. Memory overhead includes type 0 segments reserved by SBR.

(2) When doing a CONCISE analysis of a DETAILED collection, the overhead grows up to 6%.

(3) Billing option implies no extra overhead at any level.

(4) Activity overhead is 3% and 150K per ACTIVITY or USERSRA command.

(5) <0.5% on DPS 7000/5xx/7xx/8xx.

When analyzing only part of the collector file, events before the interval concerned will be skipped. The cost of skipping events, however, is very low (10000 events = 1s. CPU).

2. Data Collection

2.1 MECHANISM

The SBR COLLECTOR uses two different techniques to collect information:

- the probe or event-driven technique
- the snapshot or state-sampling technique

2.1.1 Probe Technique

A probe is a branch instruction within a program to a special routine that extracts information. Probes may be inserted into system and user programs. SBR system probes are inserted by the COLLECTOR at the beginning of the data collection phase, while SBR user probes are deferred until the step into which they are to be inserted is initiated.

Example:

Three probes may be inserted into the system program that handles the I/O operations (see Figure 2-1). The last two probes (at CONNECT and at End-of-I/O) are inserted only in the case of a DETAILED or EXTENDED data collection.

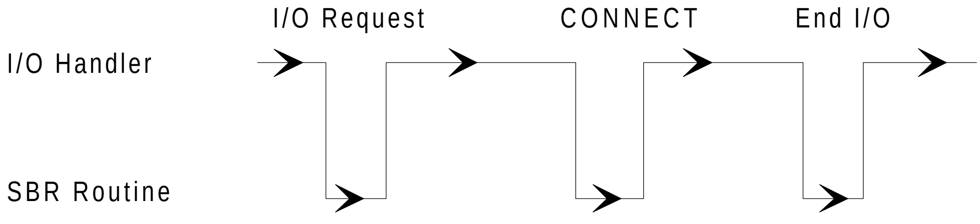

Figure 2-1. Probes in I/O Handler

When present, these probes are activated each time an I/O operation is requested by a process. The first probe (at I/O Request) creates one Event 455 every 61 I/O requests in the case of a CONCISE data collection, or one Event 456 at each I/O request in the case of other types of data collection. The other two probes create Events 451 and 452 respectively every 31 CONNECT operations. All these events contain the name of the requested device, the name of the requesting process and the current time. Event 456 also contains the queue length before the device, the address of the cylinder requested, and the contents of the CPU time counter attached to the requesting process.

2.1.2 Snapshot Technique

The snapshot technique consists of recording data about system activity at predefined points in time. The period between these points in time can be modified using the MODIFY_SBR directive. However, it is rarely necessary to change the period.

Examples:

1) Every 30 seconds, the COLLECTOR records the amount of system resources (CPU, I/O, Main Memory, Missing Page, etc.) consumed by each process (system or user). This mechanism is referred to hereafter as Snapshot.

2) Every 20 milliseconds (on DPS 7000/380), when both DETAILED and SNAPIC are specified in the data collection command, the COLLECTOR records the value of the Instruction Counter together with the name of the interrupted process at the time of the snapshot. This period depends on the CPU power. This mechanism is referred to hereafter as SNAPIC.

2.2 STARTING THE DATA COLLECTION

You can activate an SBR data collection by doing either of the following:

- using the GCL directive START_SBR (SSBR)
- submitting the standard SBR job (EJR SBR)

The START_SBR directive is the simpler method, but it does not give you control, as EJR SBR does, over the record size, block size, number of file data buffers, and block transfer rate of the collector file.

2.2.1 By GCL Directive START_SBR (SSBR)

Activates the simpler method of SBR data collection.

If the ANLZ parameter in START_SBR equals 1, the data analysis automatically begins as soon as you stop data collection. If ANLZ equals 0, you must use another command to initiate data analysis (see Chapter 4). To stop the data collection, use the GCL directive TERMINATE_SBR (see *Stopping the Data Collection* later in this chapter).

Syntax:

```
{ START_SBR }
{ SSBR      }

      [ LEVEL = {BASIC | CONCISE | DETAILED | EXTENDED} ]

      [ SNAPIC = { bool | 0 } ]

      [ SNAPMM = { bool | 0 } ]

      [ MSC = { bool | 0 } ]

      [ UFAS = { bool | 0 } ]

      [ TDS = { bool | 0 } ]

      [ FILE = { SBRFILE | file78 } ]

      [ SIZE = { 20 | dec4 } ]

      [ ANLZ = { bool | 1 } ]

      [ ENDFILE = { ANALYZE | IGNORE | STOP } ]

      [ AFILE = { DUMMY | file78 } ]

      [ TIME = { 10 | dec2 } ]

      [ LM = name31 ];
```

Parameters:

LEVEL	defines the level of the data collection (default is CONCISE). The four different levels and their corresponding options are discussed in Chapter 1, *SBR Levels and Options*.
SNAPIC	enables snapshots (see *Snapshot Technique* above) of the Instruction Counter for detecting the CPU-consumer procedures (applicable only when LEVEL = DETAILED or EXTENDED). The SNAPIC period is computed according to CPU power (36 ms. on a DPS7/1107).
SNAPMM	enables snapshots (see *Snapshot Technique* above) of memory occupation for detecting the memory-consumer load modules and system functions (applicable only if LEVEL = DETAILED or EXTENDED).
MSC	enables monitoring of MSP4370/MSM controllers (applicable only if LEVEL = DETAILED or EXTENDED). When LEVEL = DETAILED, the default value is 0; when LEVEL = EXTENDED, the default value is 1.
UFAS	enables monitoring of the UFAS-EXTENDED buffer pool (applicable only if LEVEL = DETAILED or EXTENDED). Normally, only TDS files are monitored, but you can alter this to all files by specifying FILES=ALL in the GCL directive MODIFY_SBR (see *Modifying COLLECTOR Parameters* below). When LEVEL = DETAILED, the default value is 0; when LEVEL = EXTENDED, the default value is 1.
TDS	enables measurement of TDS, GAC, and UFAS activity (applicable only when LEVEL = DETAILED or EXTENDED).
FILE	specifies the name of the collector file (by default SBRFILE). If you specify a cataloged file, append "$CAT" to its name. If you specify an uncataloged file, append the media and device class to the file's name (e.g. MY_FILE:TAPE01:MT).
SIZE	defines the size (in cylinders) of the collector file specified by FILE. If this file already exists with its size already pre-allocated, then that specified by SIZE is ignored. If you wish to control the record size, block size and number of file buffers, you must specify these using the job submission directive EJR SBR; see *By Submission of Standard SBR Job (EJR SBR)* below.
ANLZ	If ANLZ=1, the data analysis commences using default analysis options as soon as you stop the data collection using the GCL directive TERMINATE_SBR (see *Stopping the Data Collection* later in this chapter). Normally you would specify ANLZ=0 so as to be able to start the analysis (see Chapter 4) at a time that suits you.

ENDFILE	specifies what must happen when the end of the collector file is reached: ANALYZE = start the analysis (even if ANLZ=0) and continue collecting data for the display. IGNORE = continue collecting for the display but do not start the analysis (unless ANLZ=1). STOP = stop collecting data for the display and do not start the analysis (unless ANLZ=1). If you specify ANLZ=0, you should not also specify ENDFILE=ANALYZE.
AFILE / TIME / LM	are applicable only when ANLZ=1 (see *Starting the Data Analysis*, Chapter 4).

Constraints:

If you use START_SBR with ANLZ=1, the analysis will be started with default options. To use the ANALYZER options described in Chapter 4, submit a specific (customized) data analysis job following the instructions in "By Specific Job Submission" in Chapter 4.

Examples:

```
SSBR DETAILED SNAPIC;

SSBR FILE=MY_FILE:TAPE01:MT ENDFILE=STOP;
```

2.2.2 By Submission of Standard SBR Job (EJR SBR)

Activates the more flexible method of SBR data collection, where you can control the record size, block size, number of file data buffers, and block transfer rate of the collector file. Also use this directive to start the SBR data collection if the SBR JCL job has been transferred out of the standard library SYS.HSLLIB into your private library.

If the ANLZ parameter in EJR SBR equals YES, the data analysis automatically begins as soon as you stop data collection. If ANLZ equals NO, you must use another command to initiate data analysis (see Chapter 4). To stop the data collection, use the GCL directive TERMINATE_SBR (see *Stopping the Data Collection* later in this chapter).

Syntax:

```
EJR SBR

[ LIB = lib31 ]

[ VALUES = ([[LEVEL=]{BASIC | CONCISE | DETAILED | EXTENDED}]
            [,{ SNAPIC | NSNAPIC }]
            [,{ SNAPMM | NSNAPMM }]
            [,{ MSC | NMSC }]
            [,{ UFAS | NUFAS }]
            [,TDS = { YES | NO }]
            [,EFN = { SBRFILE | file44 }]
            [,FILESTAT = CAT ]
            [,DVC = devclass ]
            [,{ MD = media | MD1 = media,...,MD10 = media }]
            [,FSN = filenumber ]
            [,SIZE = dec4 ]
            [,RECSIZE = record-size ]
            [,CISIZE = control-interval-size ]
            [,NBBUF = buffer-number ]
            [,ANLZ = { YES | NO }]
            [,ANSIZE = memory-size ]
            [,ENDFILE = { ANALYZE | IGNORE | STOP }]
            [,AEFN = { DUMMY | file44 }]
            [,ADVC = devclass ]
            [,AMD = media ]
            [,LM=lm-name ]
            [,TIME = { 10 | dec2 }]
            [,INTERVAL = 'hh:mm:ss,hh:mm:ss'] ) ];
```

Parameters:

LIB
: names the library containing SBR. The standard library is SYS.HSLLIB. If the search path does not include this library, you must specify LIB=SYS.HSLLIB. If, on the other hand, SBR has been transferred to a private library, you must specify LIB=private-library.

LEVEL / SNAPIC / SNAPMM / MSC / UFAS / TDS / SIZE / ENDFILE
: These (or their near-identical equivalents) are described above for the START_SBR directive.

ANLZ — If ANLZ=YES, the data analysis commences using default analysis options as soon as you stop the data collection using the GCL directive TERMINATE_SBR (see *Stopping the Data Collection* later in this chapter).

Normally you would specify ANLZ=NO so as to be able to start the analysis (see Chapter 4) at a time that suits you.

EFN — defines the name of the collector file (by default SBRFILE). If you choose a non-resident or uncataloged file, give its media (MD=) and device class (DVC=). Note that up to 10 media may be specified.

FILESTAT — defines the file status of the collector file. If this is a cataloged file, then FILESTAT = CAT is mandatory. If it is an uncataloged or resident file, then omit this parameter.

FSN — specifies the file sequence number of the collector file (tape only).

RECSIZE — defines both the size of an SBR buffer and the logical record size on the collector file. It may be 2048, 4096 (default), 8192 or 16384. To change the RECSIZE after a collection, you must deallocate the collector file if it is on disk (as SBR does not override the file label information).

CISIZE — defines the CI size of the collector file (default = 25088). For optimal use of the collector file on disk, the CISIZE should just fit into one disk track (to minimize the number of disk revolutions between I/Os).

NBBUF — is the number of SBR data buffers (in a system-shared segment locked in main memory). It may be 2, 4, 8 (default), 16, 32 or 64. Collected events are stored in these buffers, and then transferred via the data management buffers to the collector file. A slowdown on the collector file will lead to buffer saturation and possible loss of incoming events. To avoid this, there must be enough space reserved in memory to cater for an occasional slowdown. With default values for RECSIZE, CISIZE, and NBBUF, the available size of memory for events is 80Kb (32Kb for SBR buffers and 48Kb for data management buffers). This prevents events being missed on even a large, heavily loaded system (such as a DPS 7000/780).

Note that NBBUF is ***not*** the number of data management buffers (which should always be 2).

AEFN / ANSIZE / LM / TIME / INTERVAL — These concern the analysis phase and are meaningful only when ANLZ=YES (see *Starting the Data Analysis*, in Chapter 4).

Constraints:

- If you execute EJR SBR with ANLZ=NO, you can then run the standard SBR data analysis job, or you can run a customized SBR data analysis job using ANALYZER options. For instructions on both methods, see Chapter 4.
- If you execute EJR SBR with ANLZ=YES, you cannot use the ANALYZER options described in Chapter 4.
- To execute a specific (customized) SBR job that performs data collection *and* then directly performs data analysis using ANALYZER options, create a JCL job based on the standard SBR job description in Appendix A. In your job, use the data collection syntax in the current section (including ANLZ=YES) and use the data analysis syntax in "By Specific Job Submission" in Chapter 4. Then execute the job using EJR SBR.

Example 1:

```
EJR SBR;
```

This directive requests a CONCISE data collection on the resident file SBRFILE. The collection will be automatically followed (on being stopped by the GCL directive TERMINATE_SBR) by a CONCISE data analysis. There will be no archiving.

Example 2:

```
EJR SBR VL=(DETAILED, SNAPIC, AEFN=SBRARCH);
```

This requests a DETAILED data collection, with snapshots of the Instruction Counter, on the resident file SBRFILE. The collection will be immediately followed (on being stopped by the GCL directive TERMINATE_SBR) by a DETAILED data analysis. Data will also be archived for billing purposes on the resident file SBRARCH.

Example 3:

```
EJR SBR VL=(ANLZ=NO);
```

This requests a CONCISE data collection on the resident file SBRFILE.

If you execute EJR SBR with ANLZ=YES, the analysis will be started with default options. To use the ANALYSER options described in chapter 4, submit a specific (customized) job following the instruction in "By Specific Job Submission" in chapter 4.

2.3 MODIFYING COLLECTOR PARAMETERS

You can dynamically redefine certain options of an SBR data collection using the GCL directive MODIFY_SBR (MDSBR). See *Starting the Data Collection* above for an explanation of these options.

```
{ MODIFY_SBR }
{            }
{ MDSBR      }

     [ LEVEL = {BASIC | CONCISE | DETAILED | EXTENDED} ]

     [ SNAPIC = bool ]

     [ SNAPMM = bool ]

     [ MSC = bool ]

     [ UFAS = bool ]

     [ { SNAPSHOT | SNAP } = dec3 ]

     [ FILES = { TDS | ALL } ]

     [ TDS = bool ];
```

Parameters:

LEVEL	redefines the current data collection level. You cannot specify a higher level than was originally specified when the data collection was launched. If you specify a level where the options SNAPIC, SNAPMM, MSC, and UFAS do not apply (e.g. if you change from DETAILED to CONCISE), these options are turned off.
SNAPIC	turns on or off the SNAPIC option. This is applicable only if the level is DETAILED or EXTENDED.
SNAPMM	turns on or off the SNAPMM option. This is applicable only if the level is DETAILED or EXTENDED.
MSC	turns on or off the MSC option. This is applicable only if the level is DETAILED or EXTENDED.
UFAS	turns on or off the UFAS option. This is applicable only if the level is DETAILED or EXTENDED.
SNAPSHOT (SNAP)	alters the snapshot period (in seconds). The initial default value is 30 seconds. This should not need changing.

FILES	redefines which files are to be observed under the UFAS option. This is applicable only if the level is DETAILED or EXTENDED and the UFAS option is active.
TDS	turns on or off the TDS instrumentation. This is applicable only if the level is DETAILED or EXTENDED.

Constraints:

- A data collection must be in progress.
- Only the SBR submitter and the MAIN operator can use this command.

Examples:

```
MDSBR CONCISE;
```

```
MDSBR SNAP=20;
```

2.4 STOPPING THE DATA COLLECTION

You can terminate an SBR data collection using the GCL directive TERMINATE_SBR (TSBR).

Syntax:

```
{ TERMINATE_SBR }
{ TSBR          }
;
```

Constraints:

- The data collection must be in progress.
- Only the SBR submitter and the MAIN operator can use this command.

3. The On-Line Displays

While an SBR data collection is in progress, you can request on-line display facilities for monitoring system behavior. First start SBR data collection (see *Starting the Data Collection* in Chapter 2). Then use a directive to request one of these two displays:

- The serial display allows any IOF user to obtain a quick overview of the system's workload and performance. To call this display, use the DISPLAY_SBR directive. For details, see *The Serial Display* below.

- The full-screen display, also available to any IOF user, is more comprehensive and is updated at each snapshot to show in detail the progression of system workload and performance. To call this display, use the START_SBR_DISPLAY directive. For details, see *The Full-Screen Display* below.

Up to 20 displays may run simultaneously, but note that the terminals must support formatted mode (that is, they must have FORMS firmware).

3.1 THE SERIAL DISPLAY

Depending on the options specified (see below), this display gives:

- general information on system load and performance (default option)
- the currently active COLLECTOR options
- the current smoothing coefficients (see below)
- the CPU model identification and cycle time

You can specify that the display giving system load and performance be updated and logged at each snapshot period (usually every 30 seconds). Then on pressing the TRANSMIT key, all the displays logged since the previous TRANSMIT are sent to the screen, thus providing a simple trace of system load and performance. For a graphic and more detailed trace, however, you should call the full-screen display (see *The Full-Screen Display* below).

3.1.1 Calling the Serial Display

Any IOF user can call the serial display by executing the DISPLAY_SBR (DSBR) directive, and then bring it to the screen by pressing the TRANSMIT key.

Syntax:

```
{ DISPLAY_SBR }
{             }
{ DSBR        }

    [ OPTION = { GENERAL | STATUS | DISP | DV | MODEL | CONFIG } ]

    [ { DEVICE | DV } = MSnn ]

    [ LOG = bool ];
```

Parameters:

OPTION — specifies the type of information to be displayed:

GENERAL
: displays general information on load and performance (see below).

STATUS
: displays which COLLECTOR options are currently active, and what time period and dimension(s) are being used.

DISP
: displays the current smoothing coefficients for the CPU rate, disk I/O rate, IOF response time, and missing page rate.

DV
displays for each active disk, or for a specified disk (DEVICE), the following:
- the device name
- the volume name
- the I/O rate
- the mean length of the request queue

MODEL
displays the CPU model identification and cycle time.

CONFIG
gives the maximum value, the current value, and the usage rate of some configured resources (defined at CONFIG time); see Example below.

Use this option to check if the configurable resources are underused or close to saturation. When modifying your system configuration, you must find a balance between under-estimation (risk of long queues and aborts through resource shortage) and over-estimation (performance degradation, or wastage of memory or disk space).

When over-estimation has no major drawback, you are recommended to set the resource configuration parameters to their maximum value. See the *GCOS 7 System Installation, Configuration and Updating Guide* for details.

The resources reported by this command (DSBR OPTION=CONFIG) are:

MAXJOB
(number of known jobs in the system, i.e. RONs)
MULTLEV
(number of steps in execution, Nucleus excluded)
MAXTASK
(number of processes in execution)
MAXFSIT
(maximum number of transfer activities per site)
MAXFILE
(number of assigned files)
MAXDEF
(number of DEFINE statements)
FILSHARE
(maximum file sharing level)
MAXCAT
(number of attached catalogs)
BJSIMU
(number of steps using Before Journal)
GAC LOCKID
(number of GAC lock owners)
GAC LOCKSIZE
(size of GAC lock table, in Kbytes)

For MAXTFSIT and FILSHARE, only the configured value is given.

DEVICE	Relevant only when OPTION=DV. It specifies a particular disk (e.g., DSBR DV DEVICE=MS04). If omitted, the DV information is displayed for all active disks.
LOG	Relevant only when OPTION=GENERAL. If LOG=1, the display is updated and logged once every snapshot period (by default every 30s). Press the TRANSMIT key to bring the logged display(s) to the screen. There is no default value for LOG. It retains whichever value has been specified by a previous DISPLAY_SBR directive. If its current value is LOG=1, and you want to cancel the logging, you must specify explicitly LOG=0.

Constraints:

An SBR data collection must be in progress.

Examples:

DSBR LOG;	Displays an overview of system load and performance (see example below), and requests that it be updated and logged once every snapshot.
DSBR LOG=0;	Displays information on system load and performance. If the display is currently being logged (as the result of a previous DSBR LOG command), this cancels the logging.

3.1.2 Example Displays

Example 1 (GENERAL Option):

```
S: DSBR OPTION=GENERAL ;
```

This gives general information on system load and performance.

```
------------------------------------------------------------------------------

-->13:50:25  CPU  = 4x0.12      EX= 79.2+1/250        IOF= 29.1
             RT   =   1.19 S    EXCH   =    2.08/S.   STEP/MN=    9.1
             M.PAG=   5.27/S.   DISK IO=   74.14/S.   NOT DISK IO=  25.21/S.
             BVU808             MSF8 IO=   23.04/S.   QL= 0.03


-->13:53:37  CPU  = 20x0.93 (IPU=16x0.94  EPU= 4x0.88)
                                EX= 59.0+1/254        IOF= 10.0
             RT   =  199.80 S.  EXCH   =    0.26/S.   STEP/MN=  278.0
             M.PAG=   34.66/S.  DISK IO=  311.66/S.   NOT DISK IO= 176.00/S.
             0051N1             MSN1 IO=   44.20/S.   QL= 1.40

------------------------------------------------------------------------------
```

The first line gives system load:

CPU activity:
CPU = number of available CPUs x mean CPU utilization rate
IPU = number of available IPUs x mean IPU utilization rate (appears only if IPUs are present)
EPU = number of available EPUs x mean EPU utilization rate (appears only if EPUs are present)
EX = number of executing jobs / maximum number
IOF = number of active IOF jobs

The second line gives system performance:

RT = IOF and TDS response time
STEP/MN = number of step terminations (PGT) per minute (i.e. mean throughput)
EXCH = number of IOF and TDS exchanges per second

The third line gives I/O load:

M.PAG = number of page faults per second
IO = number of disk and non-disk I/Os per second

The fourth line gives information on the most loaded disk (this line does not appear at the BASIC level):

volume name
device name
IO = number of I/Os per second on that volume
QL = mean number of enqueued requests (PIO parameter)

Example 2 (CONFIG Option):

```
S: DSBR OPTION=CONFIG ;
```

This gives the maximum value, the currently used value, and the usage rate of some configured resources:

```
Config param                 max  current
jobs                        5250      895 ( 17.04%)
steps                        251       83 ( 33.06%)
tasks                        500      486 ( 97.20%)
MAXTFSIT                       3
files                       2000      488 ( 24.40%)
defines                      500       86 ( 17.20%)
FILSHARE                     120
catalogs                     100       35 ( 35.00%)
B.J. simu                    100       15 ( 15.00%)
GAC lockids                 3500       14 (  0.40%)
GAC locksize (kb)            298        8 (  2.68%)
```

3.1.3 Modifying the Display's Smoothing Coefficients

The statistics provided by the serial display are averaged, smoothed values. The average is calculated from instantaneous values measured during the snapshot period. To avoid large oscillations between consecutive snapshot periods, this average is then 'tempered' by both a smoothing coefficient and the value calculated for the previous snapshot period.

The formula used is as follows:

$$S_n = [(100 - C) * S_{n-1} + C * A_n] / 100$$

S_n is the average, smoothed value calculated for the current snapshot period. It is based on the average, unsmoothed value (A_n), the average, smoothed value for the previous snapshot (S_{n-1}), and a smoothing coefficient (C). The greater the coefficient, the smaller the smoothing effect; a maximum coefficient (C=100) produces an unsmoothed value.

The default smoothing coefficient is 50, and usually does not need altering. If, however, the values are fluctuating too wildly (or too marginally) for you to have a clear picture of their trend, you can decrease (or increase) this coefficient using the MODIFY_SBR_DISPLAY command.

Syntax:

```
{ MODIFY_SBR_DISPLAY }
{                    }
{ MDSBRD             }

                                      { CPU   }
                                      { DISK  }
                                      { LOAD  }
     [ { SELECT_SMOOTH | SELSMTH } =  { MS    } ]
                                      { NDISK }
                                      { RT    }
                                      { STEP  }

     [ { SMOOTH | SMTH } = dec3 ] ;
```

Parameters:

SELECT_SMOOTH	specifies which of the display variables is to have its smoothing coefficient modified. CPU = utilization rate of the CPU DISK = disk I/O rate LOAD = number of jobs MS = missing page rate NDISK = non-disk I/O rate RT = IOF response time STEP = number of step terminations per minute If this parameter is omitted, then the smoothing coefficient specified by SMOOTH applies to all these variables.
SMOOTH	the new smoothing coefficient (from 1 to 100) for the display variable specified by SELECT_SMOOTH. The lower the value of SMOOTH, the greater the smoothing effect.

Constraints:

- An SBR data collection must be in progress.
- Only the SBR submitter and MAIN operator can use this command.

NOTE: You can display the current value of the smoothing coefficients using the DISPLAY_SBR directive with the DISP option.

Example:

```
DSBR DISP;
MDSBRD 40;
MDSBRD MS 30;
```

This sequence of commands first displays the current value of all the smoothing coefficients, and then it sets them all to 40. Finally, it increases the smoothing effect (by reducing the coefficient) on the missing page rate value.

3.2 THE FULL-SCREEN DISPLAY

This is a menu-driven display consisting of the following general screens:

MAIN MENU screen — through which you can select one of five load and performance screens or the HELP screen, modify the screen refresh period, or quit (see Figure 3-1).

HELP screen — which explains the abbreviations and units used in the load and performance screens (see Figure 3-2).

The five load and performance screens are:

OVERALL ACTIVITY screen — giving numerical statistics on global load and performance; split between SERVICE, BATCH, IOF, and TDS activity (see Figure 3-3)

MS ACTIVITY screen — giving numerical and graphic statistics on the most loaded disks, their I/O throughput, and their queue length (see Figure 3-4). Note that this screen is not available at the BASIC level.

MEMORY and CPU LOAD screen — giving numerical and graphic statistics on steps which are CPU-intensive, plus numerical statistics on used memory, page faults, and I/Os (see Figure 3-5).

APPLICATIONS and JOBTYPE screen — giving global figures for SERVICE, BATCH, IOF, and TDS activity, plus numerical and some graphic statistics on interactive applications (number of users, throughput, response times). See Figure 3-6.

I/O and CPU PEAK ACTIVITY screen — giving numeric and graphic statistics on steps and disks; this gives the same information as in the above screens plus disk service times (see Figure 3-7). Note that this screen is not available at the BASIC level.

When you select a load and performance screen, a wait message appears while computation of the figures for the requested screen takes place.

To return to the MAIN MENU at any time, use the break command $*$BRK. You can then select a different screen, change the refresh period, or quit the SBR display.

Note that all displayed memory figures exclude dedicated I/O cache memory usage. Dedicated I/O cache memory consists of one or more 256 Mbyte boards used exclusively by the Large Memory Cache facility.

3.2.1 Calling the Full-Screen Display

Any IOF user can call the full-screen display with the START_SBR_DISPLAY (SSBRD) directive.

Syntax:

```
{ START_SBR_DISPLAY }
{ SSBRD             }

    [ SCREEN = dec1 ]

    [ PERIOD = dec4 ] ;
```

Parameters:

SCREEN — specifies (by number) the load and performance screen you want to display:

1 OVERALL ACTIVITY screen
2 MS ACTIVITY screen
3 screen now not available
4 MEMORY and CPU LOAD screen
5 APPLICATIONS and JOBTYPE screen
6 I/O and CPU PEAK ACTIVITY screen

The default is 1, OVERALL ACTIVITY screen. For a description of these screens, see the previous section.

PERIOD — specifies the refresh period, in seconds, for all screens in the full-screen display. The value can range from 15 to 999; the default value is 15 seconds.

Constraints:

An SBR data collection must be in progress.

3.2.2 Example Displays

If you issue a BREAK, the following MAIN MENU is displayed.

```
18:19:52   SEP 18,  1991         SBR DISPLAY

                                    MENU

              Overall activity        :  1
                   MS activity        :  2
                                      :  3
          MEMORY and CPU load         :  4
      APPLICATIONS and JOBTYPE        :  5
      IO and CPU peak activity        :  6
        Give a new period time        :  7
           Return at IOF level        :  /
                          Help        :  ?



     GIVE THE REQUESTED OPTION        :
              if 7, new period        :          seconds

Default period between 2 screens :  0015 seconds
```

Figure 3-1. Main Menu Screen

If you request the HELP screen from the MAIN MENU, the following is displayed.

```
                            SBR  DISPLAY

                                 HELP

The START_SBR_DISPLAY (abbreviation SSBRD) command is used to display
general information about system load performance.

The PERIOD parameter of SSBRD must be greater than 14 seconds.

GLOSSARY : Abbreviation     Explanation                           Unit
           Mem.p           Memory Private                       KBYTES
           Miss.p/s        Missing pages per second
           Exch/s          Exchange per second
           Resp.time       Response time                        Second
           IOd/s           Disk I/O count per second
           IOn/s           Not disk I/O count per second
           Ql.             Queue length

 TRANSMIT to return to main menu
```

Figure 3-2. Help Screen

If you request the OVERALL ACTIVITY screen using the START_SBR_DISPLAY directive or from the SBR Display MAIN MENU, the following is displayed.

```
      13:58:13  DEC 06, 1996    SBR  DISPLAY        BC10   DPS 7000/780

                             OVERALL ACTIVITY

GCOS7  V700  FW: M1-127 SYS: 7458  SM: UP21 LM: 7458 IPU: 4/6  EPU:

MEMORY :  Physical       :      327680        Resident     :    8344
 (kb)     Shared         :       49604        Private      :  224776

CPU activity:  Total   : 10.76 %    IPU     :  10.76 %  EPU     :      %
               Process :  9.41 %    Standard:   8.33 %  Enhanced:  1.08%

Missing pages            :             /s     Exchanges     :    2.12 /s

IO activity :        Disk :       7.31 /s     Others        :     .06 /s

Jobtype       Mem.p        IOd/s  IOn/s  Miss.p/s   Exch/s    %CPU
BATCH         92576         2.62                              2.88
SERVICE       77308         1.49                              4.44
TDS           33304         2.93                        1.99    1.51
IOF           21588          .12     .06                 .12    1.09

BREAK to return to main menu;     PERIOD :  15 seconds
```

Figure 3-3. Overall Activity Screen

If you request the MS ACTIVITY screen using the START_SBR_DISPLAY directive or from the SBR Display MAIN MENU, the following is displayed.

```
     18:22:58  SEP 18, 1991     SBR  DISPLAY       BY04     DPS 7000/780

                              MS ACTIVITY

Name   Media  Type  IO/s    I / O  per second    Ql.    QUEUE length
                           0----10----20----30      0-----1-----2-----3

MSB3  HIT1B3  B10   50.56  :*******************  .67 :****
MS63  FSD63   D500  34.30  :******************* 8.56 :******************
MS06  FSD506  D500  29.80  :****************** 7.67 :******************
MS68  FSD68   D500  29.46  :****************** 3.45 :******************
MS87  FSD87   D500  29.33  :****************** 1.73 :**********
MS62  FSD62   D500  27.26  :****************   4.63 :******************
MS13  FSD13   D500  27.16  :****************   2.77 :*****************
MS12  FSD12   D500  26.03  :****************   6.31 :******************
MS02  FSD502  D500  25.80  :***************    7.64 :******************
MS84  FSD84   D500  20.80  :************        .84 :*****
MS65  FSD65   D500  17.66  :***********        2.70 :****************
MS04  FSD504  D500  16.86  :**********         1.19 :*******
MS03  FSD503  D500  16.13  :**********          .90 :*****

BREAK to return to main menu;      PERIOD : 0015 seconds
```

Figure 3-4. MS Activity Screen

If you request the MEMORY AND CPU LOAD screen using the START_SBR_DISPLAY directive or from the SBR Display MAIN MENU, the following is displayed.

```
     18:24:02  SEP 18, 1991      SBR  DISPLAY      BY04     DPS 7000/780

                              MEMORY AND CPU LOAD

RON    User   Cl Memo.  IOd   Miss.  LM  %CPU  0----60---120---180---240
                 priv.   /s   pa./s

1655 OPERATOR     4276 60.11   .00 DBTX       108.11 :***********
1692 LOUXADMI P   4252   .00   .00 FORTRANMAI 100.49 :**********
1690 LOUXADMI P    284   .00   .00 IDLE       100.02 :**********
1684 LOUXIQST P   4252   .00   .00 FORTRANMAI  87.67 :*********
1635 OPERATOR J  86120 52.10   .39 XTDS        33.49 :***
1663 OPERATOR I   3144   .00   .00 H_TILS      15.15 :**
   1 OPERATOR SY  2932 19.65   .59 H_NUCLEUS   10.42 :*
1672 LOUXIQST P    444 31.18   .00 PROGCOB      7.68 :*
1721 FRATEC-T P   1268  3.53   .46 H_F7C        3.37 :
1551 OPERATOR V   1408   .00   .00 H_TRCCL      2.01 :

for all RONs 0---60---120---180---240---300---360---420---480---540---600
Total %CPU : :*********************************************

BREAK to return to main menu;      PERIOD : 0015 seconds
```

Figure 3-5. Memory and CPU Load Screen

If you request the APPLICATIONS AND JOBTYPE screen using the START_SBR_DISPLAY directive or from the SBR Display MAIN MENU, the following is displayed.

```
      18:25:03  SEP 18, 1991      SBR  DISPLAY      BY04     DPS 7000/780

                        APPLICATIONS AND JOBTYPE
Jobtype
Name   Mem.p IOd/s  IOn/s Miss.p/s Exch/s %CPU  0----60---120---180---240
BATCH  40408 113.99       11.46         316.45 :***********************
SERVICE30808  34.46   .39  2.39          28.99 :***
TDS   126568 351.90         .59  156.58 175.08 :*****************
IOF     4760  11.33   .13   .79     .19   1.75 :

For all RONs 0----60---120---180---240---300---360---420---480---540---600
Total %CPU   :******************************************************

Applications
Name    Users    Exch/s  Resp.time (s) 0---10---20---30---40---50---60
XTDS        1798    60.52     13.18        :*******
IOF           20      .19      5.41        :***
DBTX         200    96.06      2.10        :*

BREAK to return to main menu;      PERIOD : 0015 seconds
```

Figure 3-6. Applications and Jobtype Screen

If you request the I/O AND CPU PEAK ACTIVITY screen using the START_SBR_DISPLAY directive or from the SBR Display MAIN MENU, the following is displayed.

```
      18:26:02  SEP 18, 1991      SBR  DISPLAY      BY04     DPS 7000/780

                          IO AND CPU PEAK ACTIVITY

Response time IOF :   1.75 s        Total IO disk/s : 48.13
RON    User   Cl Mem.p IOd/s Mis.p/s  LM  %CPU  0----60---120---180---240
1655 OPERATOR I  40276 241.93 .00 DBTX       93.47 :*********
1690 LOUXADMI P    284    .00 .00 IDLE       89.44 :*********
1692 LOUXADMI P   4252    .00 .00 FORTRANMAI 88.81 :*********
1684 LOUXIQST P   4252    .00 .00 FORTRANMAI 74.65 :*******
1635 OPERATOR J  86248  61.25 .22 XTDS       33.21 :***

 For all RONs 0----60---120---180---240---300---360---420---480---540---600
 Total %CPU   :*******************************************
Name   Disk Service IO/s   I / O  per second     Ql.     QUEUE length
              Time          0----10----20----30      0-----1-----2-----3
MS03  FSD503 36.18 38.89  :*******************   .11 :*
MSB3  HIT1B3 54.50 37.63  :*******************   .71 :****
MS63  FSD63  62.96 36.83  :*******************  5.43 :******************
MS02  FSD502 94.52 32.06  :*******************  5.28 :******************
MS12  FSD12  94.77 31.66  :*******************  4.54 :******************

 BREAK to return to main menu;      PERIOD : 0015 seconds
```

Figure 3-7. I/O and CPU Peak Activity Screen

3.2.3 Modifying the Screen Refresh Period

You can modify the screen refresh period using the MAIN MENU (see Figure 3-1 above). The default period is 15 seconds, which is usually the most appropriate value. You may request a longer period if you find that the displayed data is too erratic for easy reading.

4. Data Analysis

The SBR data analysis phase processes the data contained in the collector file and then prints out the results.

This chapter describes:

- briefly how SBR analyzes the collected data (event processing)
- the types of output that it produces
- the limits of the analysis
- the compatibility between the V5/V6/V7 analysis and pre-V5 data collection
- how to start the analysis (by GCL directive or by standard Job or by customized job submission)
- the different analysis options

The data analysis phase may be executed at any time prior to the next SBR data collection, if the same collector file is to be re-used.

4.1 EVENT PROCESSING

Each item of data collected by a probe or by a snapshot is called an event. Events are created either by the instrumented steps (probe technique) or by the COLLECTOR program itself (snapshot technique). These are explained in Chapter 2.

Events are 32 bytes long and are stored sequentially into n blocks of the SBR buffers (see NBBUF option described in *Starting the Data Collection*, Chapter 2. during the data collection phase. The blocks each hold 128 events (by default) and are used alternately. When a block is full, it is copied by the COLLECTOR to the collector file. If the next block to be written has not yet been copied to the collector file the event is lost, but a counter is incremented. The value of this counter (= total number of Missed Events) is printed at CANCEL time and also by the ANALYZER program in the chart *General Information'*.

If a block is copied before some of its events are completely recorded, the corresponding gaps in the event sequence are filled with holes. A hole is a particular event that contains no information except its identification and current time. The events will actually be stored in a further block, thus introducing delays in event chronology. The ANALYZER has a front-end sorter that reinserts delayed events in the appropriate place, provided they are not too late. Very late events are taken as missed.

To summarize, events are categorized as follows:

- normal events (in sequence)
- holes
- events missed at collection time (they are not in the file)
- delayed events, recovered by the sorter
- events missed because they were too late.

4.2 TYPES OF OUTPUT

The ANALYZER produces five types of output:

- diagrams
- tabulations
- dictionaries
- histograms
- chronologies

4.2.1 Diagrams

Diagrams show the chronological evolution of main resource activity during the measurement session. All the diagrams of ANALYSIS STANDARD (except REAL TIME ACTIVITY) are built from data collected by means of the snapshot technique. All the other diagrams are built from data collected by means of the probe technique.

Each line of a diagram corresponds to a time-interval, the length of which is determined by the value of the TIME parameter of the ANALYSIS STANDARD and ANALYSIS ACTIVITY commands (default value = 10 minutes). More precisely, let T be the value of the TIME parameter and let R be one of the measured resources. For instance, R may be the number of batch steps, the CPU time used by system, the number of disk I/Os, the memory size used by user locked segments, etc.. Each line of the R-diagram shows the mean value of R during the last T minutes.

For instance, in the case of the diagrams built from snapshot events (whose periodicity is 30 seconds) there are on an average 2 x T events related to R during a time-interval of T minutes: all these events are taken into account by the ANALYZER to update the lines of the R-diagram.

4.2.2 Tabulations

Tabulations of the ANALYSIS STANDARD and ANALYSIS ACTIVITY commands show the number of occurrences of a given family of variables (e.g., the number of loadings of each LM) together with statistics (mean, minimum and maximum values) about their utilization of a given resource (e.g., CPU time used by each LM).

Tabulations of the BILL command show general statistics concerning the main resources utilization for accounting and billing purposes.

4.2.3 Dictionaries

Dictionaries show the number of occurrences of a given family of variables (e.g. the number of I/Os on each volume). The data used by the ANALYZER to construct such reports is collected by means of the event-driven facility of SBR. Dictionaries are sorted either by Key or by Count, depending on the type of dictionary. Key means that the values are sorted according to their names. Count means that the values are sorted according to their utilization rate.

The headings TOTAL COUNT and COUNT of each dictionary show the number of observations, that is the number of times the SBR probe has been activated.

4.2.4 Histograms

Histograms show the distribution of the values taken by a given variable (response time, service time, disk queue length, etc.). They are used to indicate the existence of multiple modes. They also give the mean, the minimum and the maximum values taken by the variable.

4.2.5 Chronologies

A chronology is a list of particular events in chronological order, such as volume recognitions or VCAM connections. Each line of the chronology begins with the current time, followed by some data related to the event, output in the appropriate format.

4.3 LIMITS OF THE ANALYSIS

To produce tabulations and histograms, the ANALYZER makes an extensive use of memory during its execution.

In case of memory shortage (ANALYZER abort with RC=SGOV or RC=SPACEOV), try to reduce the number of submitted ANALYSIS commands (split the analysis into several jobs).

You can check the memory usage in the *General Information* chart. The upper limits are:

- SIZE OF COMMENTS : 4 MB
- SIZE OF VARIABLES : 4 MB
- SIZE OF STATEMENTS : 4 MB
- SIZE OF DECLARED NAMES : 4 MB
- SIZE OF WORK AREA : 20 MB

These limits should allow more than 100 ANALYSIS commands.

Note that the total number of diagrams and chronologies cannot exceed 250.

4.4 MULTI-RELEASE COMPATIBILITY

SBR can analyze a collector file created under a previous release (from V1 upwards).

Certain charts, however, are not produced when the collector file is pre-V5, because corresponding data was not recorded in this release. Some fields may appear as zeros or blanks for the same reason.

4.5 STARTING THE DATA ANALYSIS

After you have run an SBR data collection and therefore data has been stored in the SBR collector file ready to be analyzed, you can activate an SBR data analysis by doing one of the following:

- using the GCL directive ANALYZE_SBR (ANSBR)
- submitting the standard SBR job (using EJR SBR)
- submitting a specific (customized) SBR job, where you can select a wider range of ANALYZER options.

NOTE: If ANLZ=1 or YES in your data collection command (see Chapter 2., data analysis is performed automatically as soon as you stop the data collection. In that case, no separate data analysis command needs to be issued.

4.5.1 By GCL Directive ANALYZE_SBR (ANSBR)

To use this GCL directive to start the data analysis, SBR must be stored in the standard system library SYS.HSLLIB.

Syntax:

```
{ ANALYZE_SBR }
{             }
{ ANSBR       }

     [ FILE = { SBRFILE | file78 } ]

     [ AFILE = { DUMMY | file78 } ]

     [ TIME = { 10 | dec2 } ]

     [ INTERVAL = 'hh:mm:ss,hh:mm:ss' ]

     [ LM = name31 ];
```

Parameters:

FILE	specifies the collector file to be analyzed (by default SBRFILE). If this file is non-resident or uncataloged, give the media and device class (e.g. MY_FILE:TAPE01:MT).
AFILE	specifies the name of the file onto which data is to be archived for billing purposes. If this file is non-resident or uncataloged, give the media and device class.
TIME	specifies the time interval between each line of the histograms. The default value is 10 minutes, but a shorter interval, e.g. TIME=1, will give more detailed histograms.
INTERVAL	specifies which period of the collection is to be analyzed. By default, the whole period (i.e. all of the collector file) is analyzed.
LM	specifies a load module to be analyzed in detail and specifies that some ACTIVITY charts relating to this load module be produced.

Examples:

```
ANSBR FILE=MY_FILE:TAPE01:MT$MFT;
```

```
ANSBR LM=DBTX;
```

4.5.2 By Submission of Standard SBR Job (EJR SBR)

The GCL directive EJR SBR requests execution of the data analysis portion of the standard SBR job (see the standard SBR job description in Appendix A). Use this directive to start the data analysis if SBR is *not* stored in the standard system library SYS.HSLLIB.

Syntax:

```
EJR SBR

[ LIB = lib31 ]

VALUES = ( ANLZ
           [,EFN = { SBRFILE | file44 }]
           [,DVC = devclass ]
           [,{MD = media | MD1 = media,..., MD10 = media }]
           [,AEFN = { DUMMY | file44 ]
           [,AMD = media ]
           [,ADVC = devclass ]
           [,AFSTAT = filestat ]
           [,ANSIZE = memory-size ]
           [,LM = name31 ]
           [,TIME = { 10 | dec2 }]
           [,INTERVAL = '[d/]hh:mm:ss,[d/]hh:mm:ss' ] );
```

Parameters:

LIB	names the library containing SBR. The standard library is SYS.HSLLIB. If the search path does not include this library, you must specify LIB=SYS.HSLLIB. If, on the other hand, SBR has been transferred to a private library, you must specify LIB=private-library.
ANLZ	specifies that the data analysis portion of the standard SBR job should be executed.
EFN	defines the name of the collector file (by default SBRFILE) to be analyzed. If this is non-resident or uncataloged, give its media (MD=) and device class (DVC=). Note that up to 10 media may be specified.

AEFN	specifies the name of the file onto which data is to be archived for billing purposes (the default name is DUMMY). If the file is non-resident or uncataloged, give the media (AMD=), device class (ADVC=), and file status (AFSTAT=).
ANSIZE	specifies the amount of memory to be reserved for the analyzer (in $SIZE JCL statement). The default is 150K. Add 150K per ACTIVITY or USERSRA command, otherwise the analyzer may abort because of memory shortage.
LM	specifies that a load module be analyzed and that some ACTIVITY charts relating to this load module be produced.
TIME	specifies the time interval between each line of the histograms. The default value is 10 minutes, but a shorter interval, e.g. TIME=1, will give more detailed histograms.
INTERVAL	specifies which period of the collection is to be analyzed. By default, the whole period (i.e. all of the collector file) is analyzed.

Example:

```
EJR SBR VL=(ANLZ, EFN=MYFILE, DVC=MT/T9, MD=MYTAPE, AEFN=MYARCH);
```

This requests an analysis of the tape file MYFILE containing data collected by a previous SBR session. The level of the analysis is the same as the level that was specified for the collection. Data is also archived for billing purposes onto the resident file MYARCH.

4.5.3 By Specific Job Submission

If your installation has special needs or if specific performance analysis is required, you can submit a specific (customized) SBR job where you specify a number of ANALYZER options. In this method, you create a JCL job (as shown in the example below) and include a range of ANALYZER options (commands) at the DANLZ input enclosure level. You store this JCL job as a member (my_member) of your source library (my_sllib), and then execute it as follows:

```
EJR my_member LIB=my_sllib;
```

Example:

```
INVOKE SBR_JCL_ANALYSIS, SYS.HSLLIB
     VALUES=(EFN=sbrfile-name,
             MD1=media [ MD2=media, ... , MD10=media ]
             DVC=devclass);
$INPUT DANLZ, TYPE=DATASSF,PRINT,JVALUES;
SET CHARTS LONG;
ANALYSIS STANDARD, DETAILED, 1;
ANALYSIS ACTIVITY APPLICATION, TDSX, 1;
ANALYSIS ACTIVITY LM, TDSX, 1;
ANALYSIS TDS, TDSX, 1;
ANALYSIS ACTIVITY LM, H_OR_SORW, 1;
ANALYSIS ACTIVITY LM, H_OR_SORA, 1;
ANALYSIS ACTIVITY ALL;
ANALYSIS ACTIVITY DISK, DISK01, 1;
ANALYSIS ACTIVITY DISK, DISK02, 1;
TIME 09:30:00, 10:30:00;
BILL YNNNNN;
$ENDINPUT;
```

Parameters:

SBR_JCL_ANALYSIS	The JCL sequence that is invoked to perform the SBR data analysis. To see the JCL expansion, refer to Appendix B.
EFN	specifies the name of the collector file to be analyzed. If the file is non-resident or uncataloged, give its media (MD=) and device class (DVC=). Up to 10 media may be specified.
DANLZ	the name of the SBR input enclosure that contains the ANALYZER options to be used when running SBR_JCL_ANALYSIS.

ANALYZER Options (Inside the DANLZ Input Enclosure):

The ANALYZER options shown above are only put as an example. Put the ANALYZER options which depend on your needs.

Refer to the next section, *ANALYZER Options*.

4.6 ANALYZER OPTIONS

If you need a customized analysis of SBR data, you may specify up to 100 specific data analysis options when you run the SBR data analysis. To do this, you must create your own JCL job and include a range of ANALYZER options (commands) at the DANLZ input enclosure level. (The DANLZ input enclosure must have TYPE=DATASSF, and there must be no more than one command per line.) Refer to the previous section, 'By Specific Job Submission'.

The following ANALYZER options (commands) are available. All these commands are discussed in the following sections:

ANALYSIS BASIC	for a general analysis of system load and performance.
ANALYSIS STANDARD	for producing the standard range of SBR charts.
ANALYSIS ACTIVITY	for analysis of job, real-time, and I/O activity.
ANALYSIS USERSRA	for identifying the most frequently used sequences of code in user programs (with SNAPIC collection option).
ANALYSIS TDS	for identifying the most frequently used TPRs, and for some data about UFAS and GAC behavior.
ANALYSIS MEMORY	for an analysis of memory usage by the load modules (with the SNAPMM collection option).
ANALYSIS MSC	for an analysis of disk controller activity.
ANALYSIS UFAS	for an analysis of UFAS-EXTENDED buffer pool behavior.
ANALYSIS OPEN	for a summary file (for details, see *SBR Open Interface Programmer's Guide*).
ANALYSIS TRACE	for a detailed event trace (for debugging purposes only).
BILL	for accounting information.
SET	for selecting some of the charts produced by ANALYSIS STANDARD.
PRINT	for debugging.
TITLE	for printing titles in the output listing.
TIME	for an analysis of only part of the data collection period.

4.6.1 ANALYSIS BASIC

This requests an overview of system behavior. The effect is the same as for the command ANALYSIS STANDARD BASIC (see below).

Syntax:

```
ANALYSIS BASIC [,time];
```

4.6.2 ANALYSIS STANDARD

This requests a general analysis of the main resources.

Syntax:

```
                         {BASIC   }
                         {CONCISE }
ANALYSIS STANDARD [,{         } [,time] ];
                         {DETAILED}
                         {NONE    }
```

Parameters:

BASIC/CONCISE/DETAILED
: indicate the type of analysis to be performed. The effective analysis level cannot exceed the collection level; e.g. if a CONCISE data collection session has taken place, then a CONCISE analysis will be executed, even if DETAILED is specified. If DETAILED or EXTENDED was specified for the data collection, you have a choice of a BASIC, CONCISE, or DETAILED analysis.

NONE
: produces no analysis; it is sometimes used in conjunction with the BILL command (see *BILL* below).

The default value is CONCISE.

time
: is an integer number of minutes representing the length of one line on a histogram. The default value is 10.

Charts Produced:

1. With BASIC:

   - a table of contents/summary of results
   - a description of the configuration
   - diagrams showing the evolution of the CPU and I/O activities, memory utilization, and disk subsystem balance
   - tabulations and histograms on real-time activity

2. With CONCISE:

   - the same as BASIC
   - complementary diagrams on System load, I/O and memory load, real-time activity, and ARM activity
   - tabulations on the resource utilization of each load module
   - dictionaries on volume utilization

3. With DETAILED:

   - the same as CONCISE
   - tabulations of disk and channel activity
   - tabulations on service time, queue length, and seek length per volume
   - backing store activity
   - histograms on missing page overhead

Constraint:

The SET command must *always* be used before the ANALYSIS STANDARD command.

Example:

```
ANALYSIS STANDARD, DETAILED, 1;
```

This command requests a DETAILED analysis, with each line on the resulting histograms representing 1 minute.

4.6.3 ANALYSIS ACTIVITY

This requests a detailed analysis of specified resources.

Syntax:

```
ANALYSIS ACTIVITY, type, type-name [,time ];
```

Parameters:

type

A system resource in one of the following three classes:

- Job activity. Possible values are: LM, DIMENSION, JOBUSER, CLASS, RON, SYSTEM, NSYSTEM, STEP, TASK and ALL.
- Real-time activity. Possible values are APPLICATION, TERMUSER, and TERMINAL.
- Media activity. Possible values are DISK, MS, TAPE, MT, and CT.

Note that STEP and TASK are two job activity types with a slightly different syntax (see descriptions below).

type-name

is the name of the specific resource or user concerned. The following table shows the correspondence between type and type-name.

Type	Type-Name
LM	lm-name
JOBUSER	Name of the initiator of a job (Interactive or Batch)
CLASS	Class identifier (one or two letters from A to ZZ)
DIMENSION	Dimension-name (e.g. BATCH, IOF)
RON	Run Occurrence Number (not preceded by X)
SYSTEM	None
NSYSTEM	None (all jobs together except System)
ALL	None (all jobs together)
APPLICATION	Application name (IOF, TDS, ...)
TERMUSER	Name of the user of a line (through IOF, TDS, ...)
TERMINAL	Terminal identification (TMBX)
DISK or MS	Media name
TAPE or MT	Media name
CT	Media name
STEP	ron,[time],dsn
TASK	lm-name,[time],task-name

time	specifies the length of time, in minutes, to be represented by one line on a diagram (if any). The default value is the value used in the previous analysis command.
STEP	requests that all related charts be produced by STEP, including charts on I/O cache.
ron	specifies the run occurrence number (for use in a STEP chart).
dsn	specifies the dynamic step number. (for use in a STEP chart).
TASK	requests that charts be produced for the load module task specified in lm-name task-name.

Charts Produced:

1. With Job activity class parameters (available only if DETAILED or EXTENDED were specified for the data collection):

   - a diagram showing the evolution of the CPU and I/O activities of type-name
   - the list of the segments used by type-name (if SNAPIC was specified for the data collection)
   - the list of the missing segments loaded by type-name
   - a dictionary on the I/O operations made by type-name on each file
   - a diagram showing the usage of the memory by the dimension (if DIMENSION was specified)
   - a histogram showing the distribution of the cylinder addresses for each disk (if SEEK has been set to YES, see SET command below)
   - a histogram showing the number of I/Os per missing page
   - reports on system processes activity, if SYSTEM was specified

2. With Real-Time activity class parameters (available only if a CONCISE or higher level was specified for the data collection):

   - a diagram showing the number of connected terminals, with the connection/disconnection rates
   - a histogram showing the distribution of the response, delivery, and service times for type-name
   - a diagram showing the evolution of the message rate and response time for type-name
   - a dictionary showing the response, delivery, and service times per LM

3. With Media activity class parameters (available only if DETAILED or EXTENDED were specified for the data collection):

   - histograms showing the distribution of the queue length, the seek length, and the cylinder addresses for type-name
   - a histogram showing the distribution of the service time for type-name
   - a diagram showing the evolution of the I/O rate, the queue length, and the service time (eventually) for type-name
   - lists of the users, LM, and RON having used type-name

Examples:

```
ANALYSIS ACTIVITY, JOBUSER, TOTO, 15;
```

This command requests a DETAILED analysis of the activity of the jobs initiated by the user TOTO. Each line on the resulting histograms will represent 15 minutes.

```
ANALYSIS ACTIVITY, SYSTEM;
ANALYSIS ACTIVITY, APPLICATION, IOF;
ANALYSIS ACTIVITY, LM, H_IQS;
ANALYSIS ACTIVITY, TERMINAL, V511;
ANALYSIS ACTIVITY, RON, 342;
ANALYSIS ACTIVITY, DISK, K052;
```

These commands request a DETAILED analysis of system (J=0) activity, IOF, the load module H_IQS, the terminal V511, the RON X342, and the disk K052. Each line on the resulting histograms will represent 10 minutes (default value).

4.6.4 ANALYSIS USERSRA

This requests a detailed analysis of the CPU time spent in one particular segment of a specific step.

Syntax:

```
ANALYSIS USERSRA, [lm-name], segment-number, [,task-name]
                  [,sm-name.file-name];
```

Parameters:

lm-name	specifies the name of the load module to be studied (ALL is the default).
segment-number	specifies the number of the segment to be studied. The segment-number consists of the Segment Table Number (STN), which is one hexadecimal digit, and the Segment Table Entry (STE), which is two hexadecimal digits. The segment-number is determined from the load module link map.
task-name	specifies the particular task (16 characters) of the load module to be studied. Default is ALL. This parameter is ignored (i.e. ALL is assumed) if lm-name = ALL.
sm-name.file-name	specifies the Sharable Module and the SYS.SYSTEM file (24 characters) in case of type 1 segment (STN=B, E or F).

Constraints:

- The DETAILED or EXTENDED parameter, plus the SNAPIC parameter, must have been specified for the data collection.
- The command ANALYSIS USERSRA must be used in conjunction with the command ANALYSIS STANDARD; it cannot be specified alone. Moreover, ANALYSIS STANDARD must be specified before ANALYSIS USERSRA.

Chart Produced:

A list of the segment relative addresses (SRA), with a count of the number of snapshots taken for each SRA.

Example:

```
ANALYSIS STANDARD;
ANALYSIS USERSRA, MYLM, 81F, MYTASK;
```

This sequence requests an analysis of the private segment STN=8 STE=1F of the task MYTASK of the load module MYLM, in addition to a CONCISE analysis (mandatory).

4.6.5 ANALYSIS TDS

This requests a detailed analysis of the TPRs used in one particular TDS specified by its lm-name.

Syntax:

```
ANALYSIS TDS, lm-name [,time] ;
```

Parameters:

lm-name	specifies the name of the load module of the TDS to be studied.
time	specifies the length of time, in minutes, to be represented by one line on a histogram. The default value is 10.

Constraints:

- The DETAILED or EXTENDED parameter, plus the TDS parameter, must have been specified for the data collection.
- The command ANALYSIS TDS must be used in conjunction with the command ANALYSIS STANDARD; it cannot be specified alone. Moreover, ANALYSIS STANDARD must be specified before ANALYSIS TDS.

Charts Produced:

1. a diagram showing the activity of the TDS (number of TPRs per second, commitments, transactions, aborted TPRs, aborted transactions, mean number of idle processes, mean number of pending messages).
2. a diagram showing the activity of UFAS and GAC related to the TDS (deadlocks, serializations, long waits, CI and CA splittings etc.).
3. a sorted list of activated TPRs (the STN,STE of the TPR are provided with the name of the SM).
4. a list of aborted TPRs, with the reason for the abort.
5. the CPU time per TPR / transaction.
6. the number of I/Os per TPR / transaction.
7. the number of locked pages per commitment unit.

8. a list of restarted TPRs.

9. a list of the GAC conflicts, sorted by internal file names.

10. a list of deadlocks, with the address of the TPR which has diagnosed the deadlock, and the name of the TPR which holds the resource.

11. the elapsed time spent in commitment unit.

12. a list of CI/CA splittings (CA splittings is not applicable to CURRENT version files under UFAS-EXTENDED).

13. histograms of GAC pending time and conflict duration.

14. a list of Commitment Units > 60 seconds

15. ...

Example:

```
ANALYSIS STANDARD;
ANALYSIS TDS, MYLM;
```

This sequence requests an analysis of the TDS called MYLIM, in addition to the mandatory CONCISE analysis.

4.6.6 ANALYSIS MEMORY

This requests a detailed analysis of memory utilization.

Syntax:

```
                     {NONE    }                        {MEMORY     }
ANALYSIS MEMORY  [,{lm-name} ]  [,time ]  [,{dimension } ] ;
                     {ALL     }                        {ALL        }
```

Parameters:

lm-name	specifies the load module to be analyzed. The default (NONE) provides only general information.
time	specifies the time interval, in minutes, to be represented by one line on a histogram.
dimension	specifies the dimension to be analyzed. Default = MEMORY, which means the whole memory is to be analyzed. ALL means that all dimensions are to be analyzed separately.

Constraint:

The DETAILED or EXTENDED parameter, plus the SNAPMM parameter, must have been specified for the data collection.

Charts Produced:

- a diagram showing the number of page matches performed by the memory sample for each time slot
- a dictionary showing the number of page matches for each LM
- a dictionary showing the number of page matches for each segment of the LM

Example:

```
ANALYSIS MEMORY, MYLM, 10, BATCH;
```

4.6.7 ANALYSIS MSC

This requests a general analysis of all MSP4370 or MSM controller loads and/or a detailed analysis of the load induced on a given controller (by a given volume).

Syntax:

```
ANALYSIS MSC [,MSCxy [,media-name ] [,time ]] ;
```

Parameters:

MSCxy	specifies the device string considered for detailed analysis, where xy is the number of the lowest ranking MC (= PSI) connected to this controller.
media-name	specifies the volume connected to MSCxy for which a detailed analysis is to be performed.
time	specifies the length of time, in minutes, to be represented by one line on a histogram.

Constraints:

- The DETAILED and MSC parameter (or simply the EXTENDED parameter) must have been specified for the data collection. (The MSC parameter is included by default in the EXTENDED data collection.)
- The MSC data collection option is effective only with MSP4370 or MSM controllers.
- In the case of shared controllers (i.e. MSC-coupled systems), the controller statistics account for all I/Os, originating from either one of the two systems.

Charts Produced:

1. a sorted list of all active MSP4370 or MSM controllers showing their usage ratio, with corresponding I/O rate and KBytes throughput.
2. a sorted list of all active disk drives connected to these MSP4370 controllers showing the partial usage ratio of the controllers due to each of these devices, with additional information about the number of Read and Write Channel commands per I/O.
3. a sorted list of errors/anomalies detected on these controllers.
4. a diagram showing the activity of MSCxy [and media-name] along the SBR Analysis Interval: usage ratio, Read/Write commands rate, error rate.

NOTE: The usage ratio of MSMs is not available.

Examples:

```
ANALYSIS MSC, MSC36, FSD22;
```

```
ANALYSIS MSC, MSC40,,1;
```

These commands give general information about all controllers, with additional detailed information about MSC40, MSC36, and the pair (MSC36 <--> FSD22..

4.6.8 ANALYSIS UFAS

Requests a detailed analysis of the UFAS-EXTENDED access method statistics.

Syntax:

```
ANALYSIS UFAS, lm-name [,efn [,time]] ;
```

Parameters:

lm-name	specifies the name of the load module to be studied.
efn	specifies the external file name of the file to be studied.
time	specifies the length of time, in minutes, to be represented by one line on a histogram. The default value is 10.

Constraint:

The DETAILED and UFAS parameter (or simply the EXTENDED parameter) must have been specified for the data collection. (The UFAS parameter is included by default in the EXTENDED data collection.)

Charts Produced:

1. a list of all the UFAS Files present in the Pool for the given load module. The list gives for each file: its Pool name, its Buffer Size present in the Pool, the number of saved I/Os, and the time-averaged efficiency ratio.

2. a diagram showing, for the EFN file, the evolution of its Buffer Size present in the Pool, and the number of physical I/Os and hit ratios.

Example:

```
ANALYSIS UFAS, MYLM, MYFILE;
```

This command requests an analysis of the Buffer Pool of the load module called MYLM, and an analysis of I/Os and Poolsize of MYFILE for MYLM.

4.6.9 ANALYSIS TRACE

Requests a detailed event trace. This trace generates thousands of events and thousands of output lines. Therefore, it is strongly suggested that the trace be launched alone, separate from the usual analysis, and that the trace be limited to a very short interval (a few seconds).

NOTE: This command is designed for debugging purposes and should be used by GCOS7 specialists only, when a detailed knowledge of all event occurrences is necessary to diagnose some specific synchronization or sequencing problems. This command and the resulting chart is not useful for a normal user.

Syntax:

```
ANALYSIS TRACE, [siu] [object] [trace-id] [max-lines] ;
```

Parameters:

siu — specifies the System Integration Unit to be analyzed. Possible values include:

SYSTEM
VMM
PIO
VCAM
LOGON
DYNAD
SNAPIC
TDS
GAC
UFAS
FIMA
ALL (the default value)

object — specifies the name of the object to be analyzed. Possible values include:

lm-name
mailbox-name
ron (run occurrence number) preceded by X (format is Xnnnn).
ALL (the default value)

trace-id — is an alphanumeric string identifying the trace.
(default = nil)

max-lines — specifies the maximum number of lines to be included in trace reports generated by this command.
(default = no limit)

Constraints:

- The parameter DETAILED (or EXTENDED) must have been specified for the data collection.

- To limit the trace to a short time interval (a few seconds), use the TIME command (see *TIME* later in this chapter).

Chart Produced:

A chronology for each siu, object, and trace-id specified (the EVENT TRACE chart).

All traces with the same trace-id are merged together.

Example:

```
ANALYSIS TRACE  ;
TIME 09:00:00, 09:00:02  ;
```

This command requests a trace of events for all SIUs for two seconds.

4.6.10 BILL

This requests accounting charts from the collector file.

Syntax:

```
BILL abcdef;
```

Parameters:

Each of the letters a, b, c, d, e, f may take the value Y or N. Each letter corresponds to one chart as follows:

```
a -->  STATISTICS BY STEP
b -->  STATISTICS BY RON
c -->  STATISTICS BY USER
d -->  STATISTICS BY BILLING
e -->  STATISTICS BY PROJECT
f -->  STATISTICS BY CLASS
```

The keyword Y means that the chart is requested. The keyword N means that the chart is not requested.

Constraints:

- The command BILL must be used in conjunction with the command ANALYSIS STANDARD; it cannot be specified alone.
- If specified, the command BILL must always contain at least one keyword Y. In other words, at least one accounting chart must be requested.

Charts Produced:

Tabulations giving general statistics about the utilization of the main resources broken down by Step, RON, User, Billing, Project, Class.

Example:

```
ANALYSIS STANDARD, NONE;
BILL NYNNNY;
```

These commands request general statistics on RONs and CLASSES activities. It is mandatory to specify an ANALYSIS STANDARD command before a BILL command, but note that the ANALYSIS STANDARD command does not produce any charts.

4.6.11 SET

Controls the processing and the printing of certain charts.

Syntax:

```
SET keyword, value
```

Parameters:

keyword	identifies the chart or set of charts involved (see the table below).
value	For each keyword except CHARTS, possible values are YES or NO, to indicate whether or not the chart associated with that keyword is requested. If the keyword is CHARTS, possible values are SHORT (meaning that a certain group of charts is requested; see the list in the table below) or LONG (meaning that the charts available with SHORT, plus additional charts, are requested).

The following table shows the default value (YES or NO) for each keyword and lists the charts produced if the value for a keyword is YES.

Keyword	Charts Produced if Keyword has a Value of YES	Default
LOGLIST LOGRESPONSE LOGELAPSED CYLINDERS SEEK SHORT	LIST OF CONNECTIONS RESP. TIME PER TERMINAL OR USER CONNECT TIME PER TERMINAL OR USER SEEK ADDRESSES PER MEDIA ADDRESSES PER LM AND MEDIA suppress SNAPSHOTS OF IC, MISS SEG	NO NO NO NO NO NO
CHARTS	I/Os PER BKST SERVICE TIME PER FILE CPU, I/O PER TPR/TRANSACTION LOCKED PAGES PER TPR/TRANSACTION	SHORT
	See #7 in *Charts Produced* below.	LONG

Constraints:

The SET command must *always* be used before the ANALYSIS STANDARD command; it cannot be specified alone.

Charts Produced:

1. chronological list of connections and disconnections (LOGLIST)
2. tabulations showing the breakdown of Response Time between terminals or users (LOGRESPONSE)
3. tabulations showing the breakdown of connection time between terminals or users (LOGELAPSED)

4. histograms of the disk addresses for each disk unit (CYLINDERS)

5. dictionaries of segment names, for the snapshot of the instruction counter, and the missing segments (SHORT)

6. histograms of disk addresses for every disk unit used by one load module (SEEK)

7. SET CHARTS, LONG produces the charts produced with SET CHARTS, SHORT (see table on previous page) plus the following more detailed charts:

   - I/O per BKST
   - CPU and I/Os per TPR/transaction are given in separate charts, with the minimum and maximum values shown in addition to the mean value
   - Locked pages per TPR/transaction
   - READY TIME and READY TIME PER LOAD MODULE charts

Example:

```
SET LOGELAPSED, YES;
SET LOGLIST, NO;
ANALYSIS STANDARD;
```

These commands request a concise analysis without the printing of charts on response per terminal and per user (default value) and without the list of connections, but *with* the printing of charts on connection time, broken down between terminals and users.

4.6.12 PRINT

This command has two different functions:

- PRINT DEBUG requests the printing of some debugging information in the chart *General Information.*
- PRINT NOHELP requests that no comments are printed at the beginning of any chart.

Syntax:

```
PRINT { DEBUG | NOHELP  } ;
```

4.6.13 TITLE

This prints the specified title as the heading of every diagram, dictionary and histogram produced.

Syntax:

```
TITLE "title-to-be-printed";
```

Constraint:

The title-to-be-printed must be specified between quotes.

Example:

```
TITLE  "SBR OUTPUT RESULTS" ;
ANALYSIS STANDARD;
ANALYSIS ACTIVITY, LM, MYSTEPS;
```

These commands request a CONCISE analysis, with each line on the resulting histograms representing 10 minutes (default value for the ANALYSIS STANDARD command). An analysis of the behavior of the step MYSTEPS is also required. The title printed on each chart will be SBR OUTPUT RESULTS.

4.6.14 TIME

This defines the start time and end time for a selective analysis.

Syntax:

```
TIME [d1/]hh1:mm1:ss1,[d2/]hh2:mm2:ss2;
```

Constraints:

- Only one TIME command can be used.
- To specify an interval within a session of several days, give the number of days (0 for the first day) followed by a slash (/).
- Both times are expressed in local time, not in UTC.

Example:

```
ANALYSIS STANDARD, DETAILED, 5;
TIME 09:00:00, 10:00:00;
```

This sequence requests a DETAILED analysis of data collected between 9am and 10am. Each line on the diagrams will represent 5 minutes.

5. Archiving and Billing

SBR provides accounting information per step, RON, user, billing, project, or class.

The information is gathered from data stored in the collector file or from data cumulated over long periods and appended to an archival file.

Analysis of the collector file is performed by the ANALYZER program when its input enclosure DANLZ contains the BILL directive (see *ANALYZER Options* in Chapter 4).

Analysis of the archival file is performed by the BILL program (H_SBR_BILL), which contains the BILL R directive in its input enclosure UBILL.

5.1 STARTING THE BILLING

5.1.1 By GCL Directive BILL_SBR

This processes a specified archival file (containing data generated by one or more SBR analyses).

Syntax:

```
BILL_SBR  AFILE = file44;
```

Parameter:

AFILE is the name of the file (matching that specified previously by an analysis command) containing the billing information to be processed. If the file is non-resident or uncataloged, give the media and device class (e.g. AFILE=MYFILE:V4:MS/D500).

Example:

```
BILL_SBR AFILE=SBRARCH;
```

5.1.2 By Job Submission

You can execute the billing function using the job submission directive EJR SBR. Unlike the GCL directive BILL_SBR, this directive allows you to call SBR if it has been transferred from the standard system library to a private library.

Syntax:

```
EJR SBR    [ LIB = lib31 ]
           VALUES = ( BILL,[AEFN=]archfile
                      [,AMD=media,ADVC=device-class] );
```

Parameters:

LIB	names the library containing SBR. The standard library is SYS.HSLLIB. If the search path does not include this library, you must specify LIB=SYS.HSLLIB. If, on the other hand, SBR has been transferred to a private library, you must specify LIB=private-library.

AEFN specifies the name of the file containing the data archived for billing purposes by the Analyzer, and must match that previously specified by an analysis command. If the file is non-resident or uncataloged, give the media (AMD) and device class (ADVC).

Example:

```
EJR SBR VL=(BILL, AEFN=MONTH_ARCH, AMD=MYTAPE, ADVC=MT/T9);
```

This command requests an analysis of the archival file MONTH_ARCH containing data archived by SBR during one month period. This data is for billing purposes only. The file is located on the tape MYTAPE.

5.1.3 Statistics Produced

You can request specific statistics by USER, BILLING, PROJECT, and/or CLASS by modifying the BILL R directive in the SBR input enclosure UBILL (see Appendix A).

Syntax:

```
BILL R, cdef;
```

Each of the letters c, d, e or f may take the value 'Y' or 'N', and each corresponds to one chart as follows:

```
  c  -->  STATISTICS PER USER
  d  -->  STATISTICS PER BILLING
  e  -->  STATISTICS PER PROJECT
  f  -->  STATISTICS PER CLASS
```

Y means that the chart is requested, and N means that the chart is not requested. There must be at least one Y specified. In other words, at least one accounting chart must be requested.

Example:

```
BILL R, YYNY;
```

This command requests general statistics on User, Billing, and Class activities.

NOTE: Statistics per STEP or RON are produced through an analysis of the collector file only; they are not archived.

5.2 EXAMPLE

Suppose we wish to monitor the system on a continuous, daily basis, gather some statistical information on a weekly basis, and produce some global figures on a monthly basis.

The different steps to follow are:

1. When launching SBR by the directive EJR SBR, specify the location of the archival file. The ANALYZER will recognize that archiving has been requested and will produce such a file.

   For instance:

   EJR SBR VL=(AEFN=SBRARCH);

   This will make the ANALYZER store data in the resident file SBRARCH in addition to the STANDARD Analysis.

2. At the end of the week, after several days of data collection and analysis, execute SBR with the parameter BILL and specify the same AEFN, AMD, ADVC as was used for the daily analysis).

   For instance:

   EJR SBR VL=(BILL, AEFN=SBRARCH);

   This will produce an analysis of your archival file.

3. When the preceding job is completed, you may save the archival file SBRARCH onto another file, and destroy your weekly file (or use another one, to be safe). The SAVE operation may be performed by a CREATE job utility (see below), and the destruction by a DEALLOC utility.

   The characteristics of the file to be created are:

   recform = F
   recsize = 124 bytes.

Example of JCL for the save operation:

```
CREATE  INFILE=(SBRARCH),
        OUTFILE=(monthly-archival,DVC=MT,MD=your-tape),
        OUTDEF=(CISIZE=12288,BLOCKSZ=12400,RECSIZE=124,RECFORM=F),
        APPEND;
```

6. Interpreting the Charts

This chapter gives the system performance analyst some guidelines on how to read and use the charts produced by SBR.

Order of Output

Generally speaking, the charts should be read in the order they are produced, that is, as follows:

- a general report on the data collection phase showing whether or not any difficulties were encountered.
- a summary of all the results produced by SBR.
- outputs produced at BASIC level.
- outputs produced at CONCISE level.
- outputs produced at DETAILED level.
- outputs produced by the optional command ANALYSIS ACTIVITY (see Chapter 4).
- outputs produced by the optional command BILL (see Chapter 5). These charts are called *Statistics By ...* and are located at the very end of the output.

Chart Classification

The charts provided here are numbered from 0 to 103. These numbers are only valid within this manual, since SBR numbers its charts in the order they are produced. The title also includes a letter between parentheses for classification, as follows:

(B)	---->	Standard with Basic
(C)	---->	Standard with Concise
(D)	---->	Standard with Detailed
(A)	---->	ACTIVITY with APPLICATION, LM, CLASS, RON ...
(M)	---->	ACTIVITY with DISK, TAPE, MEMORY
(A)	---->	ACTIVITY with TERMINAL, TERMUSER
(U)	---->	Detailed level + USERSRA option
(T)	---->	Detailed Level + TDS option
(M)	---->	Detailed/Extended level + MSC option
(M)	---->	Detailed Level + MEMORY option
(U)	---->	Detailed Level + UFAS option
(S)	---->	Statistics by STEP, RON, USER, PROJECT, BILLING, CLASS

IMPORTANT

New charts may be added in a technical status delivery, and existing charts may be improved or adapted to new releases or new systems. These modifications are now summarized in a short "Technical Status Bulletin" printed at the beginning of an SBR output (before chart #0). This starts with TS A358/B358/5234.

6.1 GENERAL INFORMATION #0

This chart is the first of the SBR output. It provides information about the events recorded in the collector file.

It first gives the number of records read from the collector file (by default, one record contains 128 events) and the corresponding number of events.

If some events have been lost during the data collection, they are reported under NUMBER OF MISSED EVENTS. (Data may have been lost because of an I/O error.) If the analysis period has been specified (by using INTERVAL), the number of events that fall within this time interval is reported at the end of the chart under the heading RECEIVED EVENTS.

Events can be broken down into:

1. Job Management: 4 events per Step, 3 events per Job, 1 event per task.

2. VCAM: 2 events per message processed by VCAM, 4 events per session.

3. I/O Operations: in the case of a CONCISE data collection, 1 event every 61 I/O requests. In the case of a DETAILED collection, 1.07 events per I/O request.

4. Missing Page: 2 events per page fault, in the case of a DETAILED collection.

5. SM Switching: 1 event per switching or attachment of an SM, in the case of a DETAILED collection.

6. System Process: two events at each request to a System Process, only in case of an EXTENDED collection.

7. Snapshot: about 15 events per standard snapshot (every 30 seconds).

8. SNAPIC: 1 event per snapshot of the Instruction Counter every 25 milliseconds, when CPU is active, in the case of a DETAILED collection with SNAPIC option (on DPS7000/320).

9. TDS: about five events per TPR execution (TDS instrumentation).

10. Optional Instrumentations: this category includes events related to memory instrumentation (SNAPMM, about 70 events per second), UFAS buffer pool instrumentation, or MSC instrumentation (variable throughput).

11. Miscellaneous and Environment: events to describe the configuration.

To estimate the size needed for your collector file (on disk), you should calculate the event production rate from the RECEIVED EVENTS figure.

For instance, the relationship:

$$\frac{\text{received events}}{128} \times \frac{3600}{\text{duration}}$$

will give the number of collector file records needed for 1 hour of data collection under similar load conditions.

Example:

The space requirements for an interactive and batch workload on a DPS 7000/72 are:

LEVEL & OPTIONS	**EVENTS RATE** (evt/hour)	**SPACE NEEDED** for 10 hours
BASIC/CONCISE	60,000	10 MB
DETAILED	500,000	80 MB
EXTENDED	1,000,000	160 MB
EXTENDED, SNAPIC, SNAPMM	1,500,000	240 MB

These figures apply to peak periods. They would be probably lower on a customer site with medium load. To estimate the number of generated events, one may use the chart #0 produced by a CONCISE session on a sample period.

Lost Events

If some events have been lost during data collection, the message "Number of events lost on this time" helps to locate the period when the events were lost, due to a collector overload.

6.2 SUMMARY OF RESULTS #1

This chart summarizes the different results of the analysis.

The title of every chart is printed with its serial number and some results (mean, percentage etc.).

The serial number of the chart is the order of the chart inside the output of SBR. This number is contained in the title of every page, and can be treated as a page number.

Each line (or group of lines) of the chart *Summary of Results'* contains:

- the chart number, starting from 0 for the general information.
- one letter between parentheses. It shows the classification of the different outputs (see the introduction to the present chapter).
- the main title of the chart (up to 30 characters).
- a subtitle (also up to 30 characters) if the chart is a histogram or diagram, and if there is a need to distinguish between charts or lines which have the same main title.
- some results, with self explanatory headings: MEAN is a mean value, TIME is a time in seconds, PERCENT is a utilization rate or a percentage of usage (from 0% to 100%*), NUMBER is a number of occurrences of events, TOTAL is a sum or a time in seconds and FREQ is a frequency of events measured in number of events per second. ENTRIES is related to a dictionary, and denotes the number of different elements stored in the dictionary. ITEMS is related to a tabulation, and denotes the number of different items measured in that tabulation.

If the MEAN value is preceded by >> then it is slightly lower than the true mean value. (This is because measurements which fell outside the likelihood thresholds were not included in the mean calculation.)

NOTE: The reported average quantities (FREQ or MEAN) are representative of the whole SBR INTERVAL only if their fluctuations along the time are not too large.

* For CPU usage, this figure may go up to 600%; depending on the number of CPUs involved.

6.3 (B) CONFIGURATION DESCRIPTION #2

This chart is produced to describe the devices and the characteristics of the system.

- DEVICE TYPE gives the type of peripherals. The first two letters represent the class of peripheral. For instance MS/M500 is the class Mass Storage (disk unit), type M500.

  NUMBER is the number of peripherals known, but not necessarily connected to the system (some peripherals may be declared in the SRST but not physically connected).

- CPU SERIAL NUMBER is the identification number of the system which has been measured.
- HARDWARE MODEL identifies the possible commercial models corresponding to the measured CPU power.
- FIRMWARE is the version of the firmware.
- SOFTWARE is the version of software (release name and status).
- SM, LM are sharable module status and load module status.
- PROCESSORS gives the current number of available CPUs and the total number of configurable CPUs.
- TIME COUNTER FOR CALIBRATION and DEVIATION can be used to calibrate the CPU models (engineering use only).
- HOST is the System name.
- LOCAL NODE is the name of the System in the DSA network.
- GENCOM NAME is the name given to the network generation.
- CONFIGURABLE MAIN MEMORY is the total amount of allocatable memory, in Kbytes. This figure includes dedicated I/O cache memory*, if any.
- AVAILABLE MAIN MEMORY is the amount of allocatable memory, minus the dedicated I/O cache memory*, if any.
- AVAILABLE I/O CACHE MEMORY is the amount of dedicated I/O cache memory.*

---

* Dedicated I/O cache memory consists of one or more 256 Mbyte memory boards used exclusively by the Large Memory Cache function.

- The maximum value set for certain configuration parameters:

MAXJOB	(number of known jobs in the system, i.e. RONs)
MULTLEV	(number of steps in execution, Nucleus excluded)
MAXTASK	(number of processes in execution)
MAXFSIT	(maximum number of transfer activities per site)
MAXFILE	(number of assigned files)
MAXDEF	(number of DEFINE statements)
FILSHARE	(maximum file sharing level)
MAXCAT	(number of attached catalogs)
BJSIMU	(number of steps using Before Journal)
GAC LOCKID	(number of GAC lock owners)
GAC LOCKSIZE	(size of GAC lock table, in Kbytes)

- Created, deleted and modified dimensions, together with their current attribute values (see the *ARM User's Guide*) are listed with the trace of the MODIFY_DIMENSION command. The current ARM mode (BASIC or FULL) is also given.

- The available and unavailable processors are listed.

- The available MSP4370/MSM controllers are listed with their firmware release status.

6.4 (B) CPU AND I/O ACTIVITY #3

This is the favorite chart of the performance expert. It is concerned with two of the major system resources, namely CPU and I/O. It shows the evolution of the consumption of these resources during the measurement period.

How to Read this Chart

The CPU part:

The leftmost part covers the CPU activity. Each character denotes some percentage of CPU utilization. The TOTAL CPU TIME includes all the time spent in executing instructions; it does not include the hardware CPU time needed for the execution of I/Os. It is broken down into:

- total CPU time (all jobs)
- CPU time per job category

SERVICE JOBS	includes the time consumed by the Interrupt Handler, the Centralized Nucleus processes (PGID=0), and by all the service jobs, e.g.: Reader(s), Writers, Telecoms, SBR, ...
TDS JOBS	includes the time consumed by the Transaction Driven Subsystem.
IOF JOBS	entry includes the time consumed under the Interactive Operation Facility.
OTHERS	Batch jobs, i.e. whatever does not fall into the previous categories.
TOTAL CPU TIME	gives the sum of all the previously described figures. Most of this time appears in the Accounting. However, unlike the Accounting figures, TOTAL CPU TIME also includes the System CPU time. Note that the percentage ranges from 0 to 600%, depending on the number of processors involved.
NOT IDLE TIME	includes total CPU time and time spent in System firmware.

The I/O part:

The rightmost half of the chart covers the I/O activities. Each character denotes one or more I/O requests per second. The exact unit and range are specified below the diagram. The TOTAL I/O includes all the I/O connects. As above, they are broken down into connects issued by:

- Service jobs
- TDS jobs
- IOF jobs
- Other jobs

How to Use this Chart

Analyze the global figures first, and, if necessary, examine the diagram line by line.

A simple glance at the figure TOTAL CPU TIME will indicate if the CPU was saturated (over 85% of use for a mono-processor) or rather underloaded (less than 50% of use). The latter situation sometimes means that a bottleneck exists somewhere. In both cases one must carry the analysis further.

If the CPU or I/O load is badly distributed, the peak periods must be isolated for comparison with the subsequent diagrams. The above calculations should be redone for the critical periods in question, either manually, or automatically by re-running the analysis just for these periods (see *TIME,* Chapter 4).

6.5 (B) VMM LOAD AND MEMORY USAGE #4

This diagram shows the evolution of:

- the memory size used by shared and private pages
- the VMM (Virtual Memory Manager) activity.

How to Read this Chart

The Memory part:

Each line of the leftmost half shows the mean size of Main Memory used by different classes of segments during the corresponding time interval. In no case do these lines correspond to actual addresses in main memory (this is not a Memory Map).

The unit is 2% of the TOTAL MAIN MEMORY, that is, of all allocatable memory minus the dedicated I/O cache memory (if any)*.

TOTAL USED MEMORY is the amount of memory occupied by system and private segments. It does not include pages in the ESW (eligible to be swapped) state, nor does it include dedicated I/O cache memory (if any)*.

SBR categorizes segments present in main memory as follows:

- SYSTEM OVERALL - this includes the whole system related memory, and is further subdivided into:

  - FIRMWARE (f) which shows the size occupied by DPS 7000 firmware,

  - RESIDENT (r) which includes the permanent segments of GCOS 7 nucleus (centralized processes and some sharable segments); they are made resident at ISL time. Note that the sizes of TOTAL MAIN MEMORY, FIRMWARE and RESIDENT SYSTEM do not vary from one GCOS session to another. SBR records their values at the very beginning of the data collection phase.

  - SHARED (h) which includes:

    system data structures
    system shared procedures
    segments shared between users (e.g. compiler run-time packages, TDS system procedures, etc.)

  - SERVICE (s) which includes the private segments of PGID=0 (not resident) and of all service jobs (Readers, Writers, Telecoms, SBR, ...). The memory used by the I/O Server job, H_IOSER, is included but the dedicated I/O cache pages (if any) are not*.

---

* Dedicated I/O cache memory consists of one or more 256 Mbyte memory boards used exclusively by the Large Memory Cache function.

- TDS (t), IOF (i) and OTHERS (*) PRIVATE; this includes the private segments:
  - user buffers
  - control structures (PGCS)
  - user data and code segments
  - TPR of TDS
  - ...

A full definition of the subdivisions of main memory is given in the *GCOS 7 System Operator's Guide*.

The VMM part:

The rightmost part of the chart shows the evolution along time of the percentage of currently active (i.e. RUNNING, READY or WAITING for less than 10s) processes which are executing some VMM function (mainly missing page handling).

How to Use this Chart

The % OF PROCESSES IN VMM is a good indicator of VMM activity, and thus of memory overload. First locate peak periods. If there are long intervals (say 10 minutes or more) with a percentage higher than 5%, then you have a strong memory problem.

The leftmost part does not itself provide sufficient grounds for making a diagnosis, but rather is used to supplement the VMM load data and to verify hypotheses.

Example:

Analysis of % OF PROCESSES IN VMM (plus that of the diagram *MS and Disk I/O Activity*) has located some peak periods with a high VMM activity. The leftmost half of this histogram is then examined, and it is observed that the size of the memory space occupied by the user segments ('t' + 'i' + '*') increases with the load.

As a corollary, the main memory space occupied by the shared segments (h) decreases, and consequently the number of page swaps (i.e. exchanges of pages between main memory and the backing stores) increases. If this page swapping activity is high, it is likely that the same shared pages are swapped in and out of main memory several times during the measurement period.

This probably indicates an under-estimation of the memory needs for the shared segments.

One or several of the following tuning actions may then be appropriate:

- compute main memory requirements
- reduce the multiprogramming level or ARM's MPL ranges
- add main memory.

Any action on the multiprogramming level can be aimed at the main consumers. If i users are essentially involved, shrink Q class. If t appears to lead the trend of memory overloading, reduce TDS Simultaneity Level. If * is mainly concerned, deal with batch classes.

6.6 (B) RESPONSE TIME SUMMARY #5

This tabulation is a breakdown of application response times.

The following figures are given for each application:

MEAN	mean application response time in milliseconds. Minimum and maximum values are also given
TOTAL NBR	number of exchanges processed for that application
NUMBER	number of exchanges, where the application response time is below 100 seconds.

- TDS indicates the application is a TDS application.
- TDSname____ are mailboxes used for PASSTHRU from the TDS to IOF. In these cases, the response time given is in fact the remote IOF response time.
- BIA are mailboxes used for PASSTHRU from IOF.

See the following *Response Time Distribution* charts for a detailed explanation.

6.7 (B) RESPONSE TIME DISTRIBUTION #6-#7

These histograms are used to complement the information of the *Response Time Summary* histogram. Two charts of this type are issued:

- one for all TDS applications
- one for the IOF application.

Global Figures

NUMBER shows the number of observed exchanges. By exchange, we mean a pair of messages (I, O) related to the same terminal such that:

- I is an Input Message
- O is the first Output Message after I
- If several Input Messages I arrive before the first Output Message O, only the last one is taken into account.
- If several Output Messages O are transmitted for 1 Input Message, only the first Output Message is taken into account.

Because of these rules, the number of exchanges may sometimes be less than the number of Input Messages and Output messages.

Details of Histogram Contents

These histograms give statistics on the time spent in the different phases of the processing of a message. (Only complete exchanges are taken into account). Each line of a histogram corresponds to a box. Each box corresponds to a range of response times.

For each box, SBR gives:

- in the column COUNT, the number of exchanges for which the processing lasted a time corresponding to the box
- in the column %, the percentage corresponding to the ratio of the count with the total number of exchanges included in the histogram.
- in the column CUM %, the cumulated sum of percentages from the first line of the histogram to the current line.
- on the remainder of the line, the (possibly truncated) graphic display of the column %, each * being 0.1 %.

Remark on Terminology

From the point of view of the terminal operator, the time between two consecutive exchanges with the computer system comprises two different periods of times:

- A period of operator activity which includes reading an output message, thinking about the answer, typing in the entire input message. At the end of this period, the operator presses the TRANSMIT key. This period is called the Think Time.

- A period during which the operator is inactive, as he waits for the answer to his input message. This period is called the Response Time, and usually represents the time elapsed between the moment when the transmit key is depressed and the moment when the first character of the response is received.

The Think Time depends on the individual operator. Typically, the average Think Time is 20 seconds for a data entry type application, and 40 seconds for a query type application.

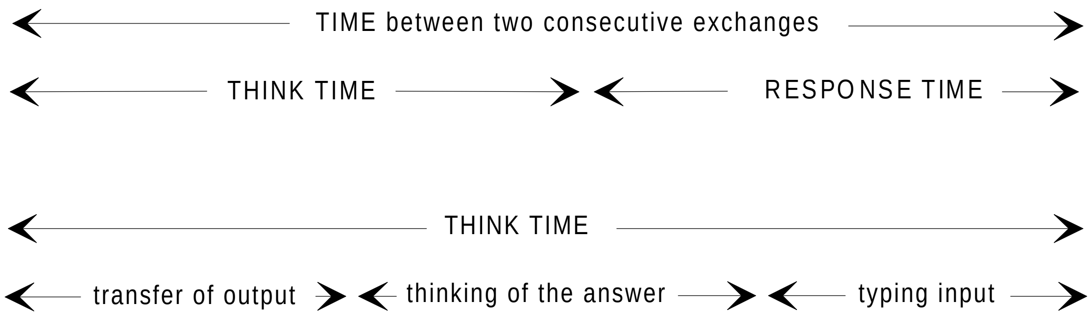

Figure 6-1. Time Periods

The Response Time is the result of the delays encountered in the process of handling the input message and preparing the output message. It also includes the effect of contentions leading to waiting times. In order to identify these, it is necessary to analyze the computer facility.

The computer facility can be separated into two categories:

1. The terminals, lines and line processor

2. The computer itself with its I/O channels and devices

A message exchange has to deal with each of them, and delays and waiting times are introduced at each stage . The total time spent in those stages is the Response Time. It can be broken down as follows:

1. The Transmit Time - the time spent by the terminal waiting for a polling message and then transmitting the input message over the line (case of VIP procedure), or time used to transmit carriage return (case of TTY procedure). Transmit time also includes the time required to execute some retries over the line in the case of transmit errors. A good estimation of transmit time is the time elapsed between the depression of the transmit key and the extinction of the busy light (if the terminal does possess such a light).

2. The System Response Time - the time elapsed between the moment when the message has finished being read by the central system (end-of-I/O from a software point of view), and the moment when the response message is ready to be sent out.

   The checking of the transfer is done by the Front End Processor and the message is transmitted to VCAM by a SEND command. The application program issues a RECEIVE command to accept the input message, processes the message and prepares a response message. The application program issues a SEND to transmit the output message to the Front End Processor through VCAM. The Front End Processor then extracts the message from the tables of VCAM by the means of a RECEIVE command, and send the output message to the terminal.

3. The Output Wait Time - the time elapsed between the moment when the response message is ready to be sent, and the moment when the first character of the response is received.

Transmit Time and Output Wait Time are not measured by SBR.

SBR measures the time between the SEND and the next RECEIVE issued by the Front End Processor related to the same terminal. That time is called the *application response time*.

Figure 6-2 below describes the flow of the messages between the Front End Processor and the application. The time of the SEND is captured at the beginning of the SEND, and the time of the RECEIVE is captured at the end of the RECEIVE.

We define:

- The Application Response Time as the time between the beginning of the SEND of the Front End Processor and the end of the RECEIVE by the Front End Processor of the first response from the application.

- The Delivery Time as the time between the beginning of a SEND and the end of the corresponding RECEIVE. It is the time taken to cross VCAM and deliver the message to its destination. It includes the time spent waiting before the application (e.g. for a TDS simultaneity level).

- The Service Time as the time between the end of a RECEIVE by the application, and the beginning of the SEND of the response.

- The Return Time as the time between the beginning of the SEND (of the response) and the end of the RECEIVE by the Front End Processor. It is generally low.

Thus the Application Response Time as seen by the Front End Processor is the Delivery Time to the application, plus the Service Time of the application, plus the Return Time to the Front End Processor.

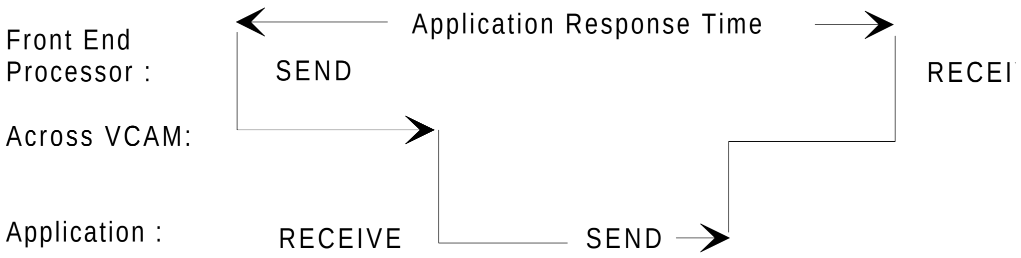

Figure 6-2. Response Time

How to Use these Charts

These histograms are mainly used to survey the evolution of the performances of the central subsystem workload parameters, during the measurement period.

The first chart, *For All TDS Applications*, exists if only one application was running. But if there were several running, the charts are merged.

The second one, *For IOF*, includes the application response time for all IOF sessions. Other activities (e.g., file transfer, remote batch, pass-through) are not given here.

To get the application response time of these activities, or to discriminate between several TDSs, refer to the chart *Response Time Summary*, or use the command:

```
ANALYSIS ACTIVITY, APPLICATION, <your-application>;
```

These charts can reveal bottlenecks in the central subsystem. The first indicator is the mean response time in milliseconds (shown under the heading MEAN): this mean value should be less than 3 seconds. The second indicator is the value of the response time for 90 per cent of exchanges (shown on the line corresponding to a CUM % of 90, in the column heading <): this value should be less than 8 seconds.

In no case can these histograms reveal bottlenecks on the network lines since the above-defined Transmit Time is not measured by SBR.

6.8 (B) DISK SUBSYSTEM DYNAMIC BEHAVIOR #8

This chart is very helpful in diagnosing disk overload, disk unbalance and disk controller overload.

How to Read this Chart

SBR monitors the I/Os of each disk, and every 60 seconds, the following occurs:

- The disks are sorted by their I/O count in the last period
- The three highest counts are recorded
- The mean count is computed over the disks with non-zero count
- Another mean is computed over the number of ready disk controllers (zero count included).

These figures are then plotted along time as frequencies (in I/Os per second), with the four first ones (1, 2, 3, MEAN/DISK=*) on the leftmost half of the chart, and the last one (MEAN/CONTROLLER=c) on the right.

The average throughput per controller might be optimistic if any disk controller is held after the beginning of SBR session (e.g. for maintenance purpose). Such an event (in fact quite infrequent) is not currently seen by SBR. However, if this controller is then released, SBR will not take it a second time in its list of active disk controllers. Any connected, not held controller is accounted as active and so the plotted average throughput per MSC is a lower bound for the exact value, but most of the time very close to it.

How to Use this Chart

All information in this chart is related to the problem of disk configuration, overload and balancing. Just like in mechanics, this problem has a static part and a dynamic one. One can define the following quantity:

$$\text{Device Unbalance Factor} = \frac{\text{Highest Device I/O Rate}}{\text{Average Device I/O Rate}} - 1$$

where Device is either Disk or MSC, and where the I/O rate can be measured over a large and representative interval (static balance), or arbitrary short periods (dynamic balance). The time period selected is one minute, which gives a reasonable trade-off between sampling noise and excessive smoothing (with too large an interval, dynamic factor equals static factor).

Static balance can nearly always be achieved, or at least reasonably approached, by spreading "hot" files over the different disks and "hot" disks over the various controllers. Static balancing is a prerequisite to dynamic equilibrium, though the latter is almost impossible to achieve.

But whatever the static unbalance factor, strong dynamic unbalance is the real, physical manifestation of I/O bottlenecks, since it shows that, at any time, there are disks that cannot work fast enough for the central subsystem.

Interpretation of MSC part

As usual, first detect peak periods. If the average traffic keeps on over 40-50 I/O per second, there is a strong possibility that at least one of your MSCs is overloaded. This can be checked with the chart *I/O Per Controller*.

Note that in RPS mode, the I/O rate is not a significant figure for detecting overload. The acceptable load may be much higher and depends greatly on I/O length. Check the MSC busy ratio of the most loaded controllers in the chart *MSC Usage*.

Interpretation of Disk part

The static unbalance factor of a finely tuned system should remain under 1.5. Hence if the dynamic unbalance factor computed from the present chart happens to reach 2.5, there is presumably an underlying unbalance problem.

This can be easily checked with the chart *I/O Per Volume*, and more accurately by computing disk utilization rate from the chart *Service Time per Volume* or by using the command:

```
ANALYSIS ACTIVITY, DISK;
```

6.9 (C) MULTIPROGRAMMING LEVEL #9

This chart shows the variation of System Load during the measurement session. The System Load is expressed in number of steps or in number of processes (including System Process Group, service and user jobs) in Executing or Suspended state.

How to Read this Chart

Each line of the diagram shows the mean System Load during the corresponding time interval. The range depends on the automatic adjustment performed by the ANALYZER. The exact range is indicated at the end of the chart.

The chart is split into three parts. The leftmost part describes the load in number of steps (or process groups):

s	Service steps (such as Readers, Writers, GTP, SBR or the System Process Group)
i	Interactive (IOF) steps
t	TDS steps
*	User batch steps, i.e. those which do not fall into the three previous classes.
TOTAL JOBS	gives the sum of all the above.

The middle part of the chart is similar to the leftmost part, but the load is expressed in number of processes, giving a more accurate view of the multiprogramming level (in particular t denotes actual TDS Simultaneity Levels, plus one for each TDS monitor). As above, TOTAL PROCESSES records the sum of the four categories.

The rightmost part splits the processes between active (a) and idle (i) ones. A process is said to be active when it is either running, ready or waiting for less than 5 seconds on the same resource. It is said to be idle when it has been waiting for more than 5 seconds on the same resource (generally it is a service process waiting for a request). Two figures overlap the active process count:

- ready processes (r) includes running processes
- busy processors (p) is the number of processors on which a process is running.

How to Use this Chart

This diagram should be compared against all the others for a clear understanding of the relationship between the number of active users and the utilization of the system resources. In particular, see the *Real Time Activity* chart.

6.10 (C) MP AND DISK I/O ACTIVITY #10

This is the twin chart to the *CPU and I/O Activity* chart. It deals with the third main problem of performance tuning: missing pages.

How to Read this Chart

Missing pages (on the left) and disk I/Os (on the right) are plotted along time as frequencies (events per second), and subdivided under the same categories as in the chart *CPU and I/O Activity*, namely:

s Service jobs: J=0, Telecoms, H_RUN, H_SBR, H_EXECUTE, etc.

t All TDS load modules

i IOF jobs

* All other jobs: i.e. user batch jobs.

How to Use this Chart

This chart can be used to confirm information gathered from the chart *VMM Load and Memory Usage*.

The following are useful calculations to make:

1. The ratio

```
'Nbr of missing pages'/'disk connects'
```

   This is a good indicator of VMM activity. It is generally considered that no more than 30 percent of disk I/O activity should be devoted to the treatment of page faults. Since the handling of a missing page necessitates about 1.3 disk I/O (on average), it follows that S should not exceed 0.23.

   Note that the above ratio may be inaccurate if:
   - there are many page faults without I/Os
   - there are page faults with several I/Os

2. In DETAILED mode, use the alternative ratio:

```
'Nbr of Missing Pages'x'Mean Nbr of I/Os per Missing Page'
                     Total Disk I/O
```

   Another indicator of VMM activity, to be used in conjunction with the one above, is the frequency of missing pages (FREQ); i.e. the number of page faults per second.

3. A further indicator of VMM activity (but only if a DETAILED analysis has been requested, i.e. when the chart *CPU Time per Missing Page* is available) is the ratio:

```
'CPU Time per Missing Page' x 'Missing Page'
             'Total CPU time'
```

   from the chart *Number of I/Os per Missing Page.*

   This indicates the percentage of total CPU time needed for the processing of all the page faults during the observed period. This ratio should remain below 0.1 (10%).

6.11 (C) REAL TIME ACTIVITY #11

This chart is concerned exclusively with IOF and TDS (and therefore appears only if one of these was active). It provides information about the real-time activity during the SBR measurement session.

How to Read this Chart

The diagram is divided into two parts. The leftmost half shows the message rate for each time interval. Each character I (or 0) denotes some number of input (or output) messages per second (0.8 in the example). SBR adjusts the range automatically, so that the maximum can always be observed on the chart.

The rightmost half shows the mean application response time for each time interval. Each character R denotes some number of seconds (0.4 in the example). Also shown are the application response time-2 (+) and the Service Time (-). For the definition of response time, response time-2 and Service Time, see *Response Time Distribution*.

How to Use this Chart

The time periods with a high message rate together with a high System response time (over 3 seconds) will be detected. Care must be taken not to include those periods with a high application response time combined with a low message rate: they correspond to exceptional phenomena (such as one or two messages with a very long treatment) and therefore are of little statistical interest.

The peak time-periods will then be compared against the periods with a high activity located through the *Multiprogramming Level* chart. If they correspond and if the application response time is judged unacceptable, then you must reduce the load (i.e. decrease the multiprogramming level), or restructure the hardware resources, or add equipment to the system configuration. (Remember: the active users can be identified by means of the general accounting tabulation produced by the BILL command.) If on the other hand the correlation between the number of active steps and the application response time is not clear, further analysis is necessary.

6.12 (C) CPU TIME, DISK I/O, MISSING PAGES PER LM #12

These tabulations show the number of times a load module (LM) has been loaded during the SBR session and the resources used at each execution. It also takes into account the LMs that were already present in memory when the COLLECTOR was started, or that were not completed when the collection was stopped.

Each lm-name is followed by its type, i.e. IOF, TDS or SERVICE (as applicable), and the dimension in which it executes.

The report can be used to locate the most frequently loaded LMs. These should be pre-initialized (using the PLM command).

The heading MEAN gives the mean of the resources used per execution. The heading TOTAL gives the total of the resources for one load module, divided by 1000. For instance, under the heading CPU TIME, the figure TOTAL gives the CPU time in seconds for all the executions of the related load module, whereas MEAN gives the mean CPU time in milliseconds for one execution.

A * before the dimension name means that the LM is able to use the X-HRP processor(s).

IMPORTANT

In the case of CONCISE analysis by interval, this chart only accounts steps completed within the interval, whatever their start time.

6.13 (C) ARM LOAD CONDITION #13

This chart shows the system load as seen by ARM (Automatic Resource Manager).

ARM operates at either BASIC level (limited load control) or FULL level (system under load control), depending on which level has been installed.

ARM goes into DEGRADED mode (i.e. BASIC level) if an incident occurs in FULL mode.

The system is said to be ***underused*** when all the variables defining CPU usage, VMM usage, disk and BKST usage, are below their bottom threshold (see the *ARM User's Guide* for a definition of these variables and their thresholds).

On a normally loaded system, ARM keeps the MPL of each dimension inside the MPL limits specified for each dimension.

The system is in a state of thrashing when any of the following conditions occurs:

- Backing Store is overloaded
- there are too many processes in VMM
- VMM service time is too high (contention on BKST files)

As a result, ARM reduces the MPLs of the dimensions.

The memory is constrained when the page-out activity exceeds a given threshold. This means that the memory is too small to efficiently support the system load.

More information can be found in the *ARM User's Guide*.

6.14 (C) RESPONSE TIME PER TERMINAL, USER #14-#15

These tabulations are the same as those in the *Response Time Summary* chart, except that the breakdown is done between terminals or users names.

They are optional, and are produced only if the command:

```
SET LOGRESPONSE, YES;
```

is specified before the ANALYSIS STANDARD command.

NOTE: in Release V5, if the connections are already established at the beginning of the data collection, Nodes, and Terminals are output blank.

6.15 (C) LIST OF CONNECTIONS #16

This chart describes the connections to the system (i.e. to VCAM) performed by terminals or applications.

It is optional and is produced only if the command

```
SET LOGLIST, YES;
```

is specified before the ANALYSIS STANDARD command.

For each connection it gives the time of the connection, the initiator (the name of entity which required the connection) and the destination (the name of the entity which the initiator connects to).

Each connection creates a message group, which is a link between an initiator and a destination.

Every line of the chart describes a connection and disconnection. In front of the line, the time is printed in hours-minutes-seconds. The values are as follows:

TNODE	describes the terminal node: it may be the local node, or a Datanet, or a remote System.
TMBX	describes the terminal mailbox: it is the terminal name or a remote application that simulates a terminal.
ANODE	describes the application node: it is normally the local node.
AMBX	describes the application mailbox: it is the local application name.
USER	is the name of the user requesting for the connection.
POOL	is the type of the buffer pool used by the VCAM session: it may be a USER pool (dialog between two local applications), a TNS pool (CNP7 connection), or an FEPS pool (datanet connection).
TYPE	defines the connection type. The first letter refers to the initiator of the connection. The second letter refers to the acceptor of the connection. (A stands for an application, T for a terminal) The symbols <> or -> stand for two-way or one-way dialog.

With TYPE, three cases may arise:

- Initiator is a terminal and acceptor is an application.
- Both initiator and acceptor are applications (for instance, initiator is a terminal simulator). In this case, the terminal node and mailbox are assumed to be the initiator's.
- Initiator is an application and acceptor is a terminal (the case of an auto-logged printer).

Connections are not included in response time computation if the dialog is one-way or if the acceptor is a terminal.

In subsequent charts, TMBX is referred to as the terminal name whereas AMBX will be referred to as the application name.

NOTE: For V5, when SBR is started after interactive applications, TNODE and TMBX are left blank for sessions already opened through the front-end processor (because corresponding information cannot be accessed).

6.16 (C) CONNECTION TIME PER APPLICATION #17

This chart provides the connection time per application, that is to say the time between the connection of one terminal and its disconnection, measured for each application. It is a tabulation of connection times. Each line describes one application.

Only the pairs of connection-disconnection observed by SBR are measured. In the case of SBR failure (COLLECTOR abort or system crash), the sessions that were still opened at that time are ignored.

MEAN	provides the mean of one connection time, in minutes.
TOTAL NBR	is the number of connections/disconnections observed by SBR.

6.17 (C) CONNECTION TIME PER TERMINAL, USER #18-#19

These tabulations are the same as in the *Connection Time per Application* chart, except that the breakdown is done between terminals or user names.

They are optional, and are produced only if the command:

```
SET LOGELAPSED, YES;
```

is specified before the ANALYSIS STANDARD command.

6.18 (C) LIST OF VOLUMES #20

This chart describes the volumes which were premounted at the beginning of the data collection, and the volumes mounted by the operator during the data collection.

Each line of the chart stands for a mounting operation (or a premounted volume).

The time is the time of the volume recognition (the time when the system recognized the volume or the SBR initiation time for premounted volumes).

MS	Mass Storage device.
MT	Magnetic Tape.
CT	Cartridge Tape.

The number after the letters MS, MT, CT is the external device number, as it appears on the physical devices, and as they are known by the operator.

MEDIA	is the volume serial number (or media name), as it appears in the JCL parameter MEDIA. That name is used in other charts of SBR. In this guide, we use either media or volume to name the volume serial number or media name.
MIRROR	means the disk is part of a mirror pair.
RSDT	means the media is a resident disk.
SYSTEM	indicates the System disk.
BKST	indicates a disk other than the System one, that contains at least one Backing Store File.
FBO	means the disk is formatted in fixed blocks (FSA disks are always FBO, CKD disks may be FBO or VBO).

The full Device Class identification is also given: for instance, MS/D500 indicates a MSU 1007 disk drive.

For each premounted disk, the disk size is indicated; it is expressed in cylinders for CKD devices, in data blocks for FSA devices. The disk size is meaningless for a non-standard (NSTD) disk.

A volume may be non-standard if:

- it is a new disk pack
- some hardware incident has occurred.

6.19 (C) I/O PER VOLUME #21

This dictionary indicates the number of I/Os per volume for all peripheral types (disk, tape or unit record device).

The dictionary displays the Volume Serial Number (Media name, as it appears in JCL keyword MEDIA or MD), and the Device Class of the volume under the heading DVC=. The Device Class can be MS (Disk), MT (magnetic Tape), or CT (Cartridge Tape).

The mean I/O length is also provided if the data collection was DETAILED or EXTENDED. Its value is only an indication since it is the static sum of all transfer CCE counts in the Channel Program.

How to Use this Chart

This dictionary can be used to locate the most frequently used volumes. If the disk configuration proves to be unbalanced (i.e., if more than 25 I/Os* per second are concentrated on one physical device) this is likely to create a bottleneck. In order to check this, you should perform a DETAILED analysis and examine the charts *Disk Queue Length* and *Service Time per Volume*.

If a bottleneck is detected, then identify the volume and distribute the contents of the saturated volume across two different disk volumes. In order to perform this task correctly, you should study the relevant *Cylinder Address* chart produced by the command:

```
ANALYSIS ACTIVITY, DISK, disk-name;
```

Note that in the case of coupled systems, with dynamically shared disk(s), only the I/Os of the host system are accounted.

IMPORTANT

In CONCISE mode the numbers given may differ from the actual numbers, mainly in the following special situations:

- the COLLECTOR has aborted
- analysis by INTERVAL has been requested

In such situations, the values TOTAL COUNT and COUNT of the dictionaries on I/O activity are only valid if less than 61. This is due to the event-driven technique used by SBR and also because an I/O event 455 is created (except at the CANCEL Phase) only every 61 I/0 requests.

* 10 I/Os per second on FSA (DPS 7000/An)

6.20 (C) I/O CACHE STATISTICS #22 (FROM V6 ON)

This diagram shows the evolution of I/O server activity during the measurement session. From Release V6, the LMC (Large Memory Cache) function and the Mirror Disks function operate on FBO volumes only. Backing Store files and some access methods are never cached.

How to Read this Chart

The chart is split into three parts.

The first part (s) gives the total cache size in Kbytes. This is the cache size in standard memory and dedicated I/O cache memory* (if any) combined. The figure is averaged over time if the cache size is modified by the START_IO_CACHE, MODIFY_IO_CACHE or TERMINATE_IO_CACHE commands.

The second part gives the disk I/O throughput:

r represents all disk I/O requests, submitted either directly to the devices or through the I/O server (including the cache hits). This figure does not include read-ahead and secondary write requests.

c represents disk I/O requests submitted through the I/O server (including the cache hits). This figure does not include read-ahead and secondary write requests. The difference r - c represents the non-cached and non-mirrored I/Os, that is I/Os on non-cached files (such as BKSTs and VBO volumes).

\+ represents cache hits, i.e. saved physical I/Os (data was found in the cache). For the current release, this concerns only read requests.

The third part (a) gives the number of read-ahead I/Os asynchronously performed by the I/O server. The MIRROR REQUESTS do not include secondary writes.

The following ratios can be computed from the above figures:

- CACHE HITS / REQUESTS gives the cache hit ratio.
- (CACHE REQUESTS - CACHE HITS) / CACHE REQUESTS gives the cache miss ratio
- (CACHE HITS - READ AHEADS) / DISK REQUESTS gives the global hit ratio of the system. This is what is meant by the HIT RATIO in all other cache-related charts of SBR. It gives a more realistic measure of I/O cache efficiency than the simple HITS/REQUESTS ratio, since it also includes non-cached I/Os. Note, however, that it may sometimes be a negative value if unnecessary read-aheads were performed.

---

* Dedicated I/O cache memory consists of one or more 256 Mbyte memory boards used exclusively by the Large Memory Cache function.

If the I/O server is started for the Mirror Disks function only (that is, without the I/O cache function), the following information is provided:

- CACHE SIZE has its default value for mirror support (1024 Kbytes)

- DISK REQUESTS includes all requested I/Os (including secondary writes on mirror devices)

- CACHE REQUESTS only includes I/O requests to mirror pairs

If the I/O server is not started, only DISK REQUESTS is provided.

How to Use this Chart

This chart may be used to evaluate the efficiency of I/O cache, i.e. the effect of additional cache size on physical I/O saving. Not all files benefit equally from being cached, so the chart *Hit Ratio per File* will be useful for evaluating whether or not the global hit ratio can be improved. Tuning the cache size may be difficult because the LMC may compete with the UFAS buffer pool. To find a reasonable balance, the following rules should be applied:

- Favor UFAS buffer pool whenever possible, since this has write-into capability and works on VBO.

- Avoid the coexistence of the UFAS buffer pool and LMC in the TDS/UFAS/IDS2 environment:

  - if there is only one TDS, or several TDSs with separate databases
  - if the memory size is less than 100 Mbytes

- Use LMC whenever possible in batch (sequential files) and IOF environments (read-ahead facility, caching of catalogs and temporary files, etc.).

- LMC is important for getting the maximum benefit from large memories (above 128 Mbytes).

In the case of LMC and UFAS buffer pool coexistence, start with 1/3 cache and 2/3 buffer pool; check the hit ratios and then try other proportions.

When tuning the cache size, one should also take into account the CPU overhead of the I/O server (LM name H_IOSER).

NOTES:

1. In all I/O related charts of SBR, only physical I/Os are accounted (cache hits excluded), unless otherwise specified.

2. I/Os are accounted to their actual requester whenever possible. The only I/Os accounted to the I/O server are:

   - housekeeping I/Os performed for its own sake (including BKST I/Os)

   - read-ahead I/Os

   - secondary writes on mirror disks

6.21 (+) CONFIGURED RESOURCE USAGE #23 (FROM V7 ON)

This chart is produced only if the command:

```
SET CHARTS LONG;
```

is specified before the ANALYSIS STANDARD command.

It shows the maximum value and the currently used value over time of the following resources:

MAXJOB	(number of known jobs in the system, i.e. RONs)
MULTLEV	(number of steps in execution, Nucleus excluded)
MAXTASK	(number of processes in execution)
MAXFSIT	(maximum number of transfer activities per site)
MAXFILE	(number of assigned files)
MAXDEF	(number of DEFINE statements)
FILSHARE	(maximum file sharing level)
MAXCAT	(number of attached catalogs)
BJSIMU	(number of steps using Before Journal)

Use this chart and the *GAC Resource Usage* chart to check if the configurable resources are underused or close to saturation. For further information, see the DISPLAY_SBR directive, Chapter 3.

6.22 (+) GAC RESOURCE USAGE #24 (FROM V7 ON)

This chart is produced only if the command:

```
SET CHARTS LONG;
```

is specified before the ANALYSIS STANDARD command.

It shows the maximum value and the currently used value over time of the following resources:

AC LOCKID	(number of GAC lock owners)
AC LOCKSIZE	(size of GAC lock table, in Kbytes)

Use this chart and the *Configured Resource Usage* chart to check if the configurable resources are underused or close to saturation. For further information, see the DISPLAY_SBR directive, Chapter 3.

6.23 (D) I/O PER CONTROLLER #25

This dictionary shows the number of I/Os performed on each controller. When a controller is accessed through 2 PSIs connected to the host system, the total number of I/Os performed through both PSIs is given. By convention, the controller has the name of the first PSI (the lowest external name, e.g. MSC41 for MC41-MC42).

It is used to detect MSC unbalance. If the most loaded disks are connected to the same MSC with an I/O rate of over 40-50 I/Os per second*, there is a potential bottleneck on the controller. To correct this, spread the load between different MSCs. Note that the total count indicated in this chart may differ from the total count of the chart *I/O per Volume*. This is due to the I/O sampling performed by SBR (see the *Service Time per Volume* chart). Table 6-1 below gives the accuracy of the different I/O charts.

Table 6-1. I/O Chart Accuracy

Level & Chart name	Accuracy	
	Analysis on the whole file	Analysis by interval
CONCISE: I/O per volume	Exact	within 61 I/O
DETAILED: I/O per volume Media files ... Queue length Seek length	Exact	Exact
I/O per controller I/O per control./media	within 31 I/O	within 31 I/O
MSC usage (MSP4370/MSM only)	Exact	within 10 seconds

* In RPS mode, the I/O rate is not a significant figure for detecting overload. The acceptable load may be much higher and depends greatly on I/O length. Check the MSC busy ratio of the most loaded controllers in the chart MSC Usage.

6.24 (D) I/O PER CONTROLLER AND MEDIA #26

This dictionary shows the number of I/Os on each controller, device name and media.

It shows the connection between the physical location and the logical name of each media: what channel is connected to what media, and what media are mounted on what channel. It also shows the contribution of each device/media to the MSC load, and helps you decide which of these should then be connected to another MSC.

Note that a device connected to two controllers (dual LOS), appears twice in this chart: I/O count is split between the two access paths. Only the host system's PSIs are accounted. To get the actual MSC load in this case, use the MSC option (only for MSP4370 controllers).

6.25 (D) DISK QUEUE LENGTH #27

Each time a disk I/O is requested (by a process), SBR measures a variable called Queue Length (henceforth abbreviated as QL). The different possible values taken by QL are the following:

QL = 0	whenever the peripheral is free
QL = 1	whenever the peripheral is busy without any other request waiting for it
QL = N+1	whenever the peripheral is busy with N requests already waiting for it

Thus, QL denotes the queue length as seen by the requester, at the time of the request. This value QL is therefore different from the usual queue length; that is, the queue length as seen by a neutral observer outside the system. However, it can be proved that in the important case when the I/O requests are statistically independent (i.e. not burst), the two notions actually lead to the same mean value.

How to Read this Chart

TOTAL NBR — shows the total number of I/O requests for the peripheral. This heading also represents the total number of measurements taken by SBR.

NUMBER OF NULL VALUES — shows the number of times the peripheral was observed inactive (QL = 0). In other words, this heading shows the number of I/Os executed without waiting.

The other global figures concern the specific range described under VALUES BETWEEN 0 AND N UNITS. For instance, MEAN shows the mean value of those QLs that belong to the range in question.

How to Use this Chart

This chart should be used carefully since the interpretation of QL depends on the distribution of the I/O requests. Remember however that in most cases these I/O requests are statistically independent.

1. The first indicator of contention on a peripheral is the mean value of QL (shown under MEAN)

   Let Q denote this value and let T denote the mean service time of an I/O (see the chart *Service Time per Volume*). It can easily be seen that, in the case of statistically independent I/O requests, the total delay time necessary to satisfy an I/O request is equal (on average) to T+QT. Hence, the higher the Q, the higher the mean delay.

   In fact, with statistically independent I/O requests, it can be proved that if Q < 0.2 there is no contention and that if Q > 0.4 there probably is contention.

   In practice, if Q is observed to be greater than 0.4, you should estimate the occupation rate of the device through the chart *Service Time per Volume* before taking any action. If this occupation rate also appears to be high, this confirms that contention does exist on the device, and that corrective action must be taken. If, on the contrary, the occupation rate appears to be acceptable, this means that the I/O requests were not statistically independent.

2. A second useful indicator of contention is the percentage of null values: it can be computed with the figures under the heading NBR=0. More precisely, it is the ratio:

   $$\frac{\mathtt{NBR=0}}{\mathtt{NUMBER}} \times 100$$

   This gives the percentage of non-waiting I/Os. Hence, the higher it is, the lower the mean delay.

   Here again, in the case of statistically independent I/O requests, if the above ratio is greater than 80% there is no contention, or if less than 70% there probably is contention.

   In practice, the remarks following the rules on the QL indicator also apply here.

6.26 (D) SERVICE TIME PER VOLUME #28

This tabulation shows the time spent in executing I/Os on each physical device (volume).

The SERVICE TIME is the time elapsed between the start and the end of an I/O. The SERVICE TIME therefore includes the hardware CPU time necessary to execute the I/O and the time spent by the channel program waiting for the availability of the MSP, as well as the seek, the search and the transfer time if any. It does not include the waiting time due to the queue before the device. The total delay time necessary to satisfy an I/O request is equal (on average) to T+QT. (T and QT were defined under chart *Disk Queue Length*.)

How to Read this Chart

The heading TOTAL NBR shows the total number of I/O connects recorded by SBR for this device. SBR samples one connect every 31 on a given device, in order to save on collector file space and on CPU overhead. So the TOTAL NBR is generally the number of executed I/Os divided by 31. There is one exception: SBR records all I/O connects executed for the event collector process (mainly on the collector file). As a result, the sampling factor of the media supporting collector file ranges from 1 to 31. Generally speaking, therefore, the TOTAL NBR is not significant and neither are SUM and SUM/1000.

The other global figures show the lowest, the highest, and the mean service time measured within the specified range, as well as the number of observations made for this range.

How to Use this Chart

The main purpose of this chart is to complement the information provided by the previous chart *Disk Queue Length*.

The occupation rate of the physical device can be estimated, roughly, by the ratio:

```
I/O NUMBER x MEAN / DURATION
```

The I/O NUMBER is obtained from the chart *I/O per Volume*.

MEAN and DURATION must have the same units. (Note that DURATION denotes the duration of the SBR measurement session, and is given on the title line at the top of every chart.)

Clearly, this kind of estimation is significant only if the DURATION and the NUMBER are sufficiently large for exceptional phenomena to be negligible.

The occupation rate can be used to:

- verify whether the configuration is well balanced
- locate the overloaded devices (U greater than 60 %) and the nature of the problem (in conjunction with the study of the queue length).

6.27 (+) SERVICE TIME PER FILE #29

The chart is produced only with a DETAILED (or EXTENDED) collection and with SET CHARTS LONG specified for the analysis.

For each file it gives the number of samples taken (generally 1 every 31 I/Os) and the average service time in milliseconds. This is the time between the I/O Connect and the end-of-I/O modification; it does ***not*** include the time spent in the device queue.

This chart is used to identify which files are contributing to a bad service time (due to a specific access method). Corrective action could be to isolate these files, or change their access method, or reduce the number of I/Os.

6.28 (D) SEEK LENGTH #30

This tabulation shows the length of arm displacements. The length is expressed as a percentage of disk size.

How to Read this Chart

The disk size is recalled for each media, either in cylinders (VBO) or in data blocks (FBO). The figure TOTAL NUMBER shows the number of times SBR measured a seek length between two consecutive I/Os.

The figure NUMBER OF NULL VALUES shows the number of I/Os that did not cause arm movement.

The other global figures show the lowest, the highest and the mean measured displacements within the range from ***0 to 100%***.

How to Use this Chart

Here again, this tabulation is useful only if a bottleneck has been detected on the disk through other reports. If this is the case, you may have an idea of the mean seek time on this disk by looking at the mean seek length. Clearly, the longer the arm displacement is, the longer will be the seek time.

The MEAN displacement should not exceed a third of the total range. If this is not the case, locate the longest displacements, and then identify the cylinders (and the files) that cause such long movements by examining carefully the *Seek Address For <type>* histogram. Appropriate corrective action in this case may be to restructure the physical data space on the disk(s), to modify program structure for those steps which need those files, and/or to expand the disk configurations.

Note that the 1/3 limit given above is a mean value, the actual limit depending on the disk load. Heavily loaded disks should be optimized first, while space optimization is less critical for rarely accessed disks.

For more details about the disk type-name, and to output the *Seek Address For <type>* histogram, specify the command:

```
ANALYSIS ACTIVITY, DISK, type-name;
```

or

```
SET CYLINDERS, YES;
```

6.29 (+) I/O PER BKST #31

This dictionary describes the different Backing Store files (BKST), and gives for each of them the number of input/output operations.

The chart is produced only with a DETAILED (or EXTENDED) collection and with SET CHARTS LONG specified for the analysis.

Two lines are provided for each backing store, one for reads and one for writes.

How to Use this Chart

An I/O rate of over 10-15 per second indicates an overloaded BKST. An overloaded BKST should be spread over several BKST files. The most loaded ones must be located on separate media, and accessed through different PSIs.

6.30 (D) SEEK ADDRESS FOR MEDIA <media> #32

This tabulation is produced for each active disk, and gives the access map of the corresponding disk by ***1/100th of disk space*** during the SBR session. Full details are given under the *Seek Address For <type>* tabulation.

To obtain this output, specify the command:

```
SET CYLINDERS, YES;
```

before the ANALYSIS STANDARD command.

6.31 (D) HIT RATIO PER FILE #33 (FROM V6 ON)

This dictionary accounts all disk I/O requests per media, file and file type. The following figures are printed:

REQ	number of I/O requests for this file (number and percentage over total). This includes cache hits but not read-ahead and secondary write requests.
HITS	number of cache hits for this file
HIT RATIO	percentage of HITS (minus number of read-aheads) over REQUESTS for this file (see the chart *I/O Cache Statistics* for a full definition).
RAH	number of read-ahead I/Os performed by the I/O server for this file.

Non-cached files always appear in this chart with a null hit ratio.

This chart may be useful for detecting files which are not benefiting from the I/O cache feature (i.e., those with a low hit ratio even with a large cache size). These files should be used with the cache by-pass option to avoid I/O server overhead. Also check that all files which usually do benefit from I/O cache (sequential read, UFAS indexed, catalogs, etc.) have a high hit ratio; if they do not, try a larger cache size to improve the hit ratio for those files. Refer to the *Large Memory Cache User's Guide* for details.

6.32 (D) CPU TIME PER MISSING PAGE #34

How to Read this Chart

The figure TOTAL NUMBER shows the number of missing pages observed during the measurement period. The other global figures show the lowest, the highest and the mean process time (CPU time in milliseconds) necessary to process a missing page, within the specified range (VALUES BETWEEN 0 AND N UNITS).

Each line of the detailed histogram corresponds to a range of process times. For each range, one finds:

- the number of missing pages for which the processing lasted a time corresponding to the range.
- the percentage corresponding to the preceding number
- the cumulated sum of percentages from the first line of histogram to the current line.
- the (possibly truncated) graphic display of the column %.

How to Use this Chart

The mean process time spent in VMM (shown under the heading MEAN) can be used to estimate the CPU overhead induced by missing pages for some particular load module. To do so, multiply this mean value by the number of missing pages loaded by the load module as given in the *Statistics By ** chart. Likewise, the overall CPU overhead induced by all the missing pages can be estimated by multiplying TOTAL NUMBER and MEAN.

6.33 (D) ELAPSED TIME PER MISSING PAGE #35

This is similar to the preceding histogram except that it deals with real time (elapsed time) rather than process time.

The first line of the detailed histogram concerns missing pages which did not need I/O operations; that is, pages which were already in memory.

The elapsed time per missing page increases with the number of I/Os performed and the time spent waiting for VMM resources. Very long delays or high deviation in delay distribution indicate either memory contention or a problem with VMM (e.g. bottleneck on BKSTs).

6.34 (D) NUMBER OF I/O PER MISSING PAGE #36

This histogram gives the number of I/Os per missing page.

NUMBER gives the total number of page faults, and NULL VALUES gives the number of missing pages where the page to load is already in memory.

Each line of the detailed histogram gives the number of missing pages which require 0.1 or more I/Os.

Note that on paged memory, only read I/Os are accounted in this chart, since pages are swapped out by a centralized process of the system; the figure given is therefore <= 1. The number of swap-out I/Os can be obtained by an analysis of the System itself.

For each line, one finds:

- the number of I/O (under the heading >=)
- the number of missing pages for which the corresponding number of I/Os was met.
- the percentage corresponding to the preceding number.

How to Use this Chart

The average number of I/Os per missing page should normally be below 1.

6.35 (A) CPU TIME PER TASK FOR <type> #37

This tabulation is produced if type-name is a multi-task load module or the System. For each active task of the load module, we find:

- TOTAL NBR: number of CPU time samples for this task
- TOTAL 1: CPU time consumed by this task, in seconds
- TOTAL 2: Ready time (time spent waiting for the CPU) consumed, in seconds

The mean is not significant.

This chart can be used to find the most CPU-consuming task in an LM.

6.36 (A) CPU AND I/O FOR <type> #38

This diagram describes the resources used by type-name, and can be used to check the behavior of a user program or to isolate the resource consumption of a category of users.

It is produced by the command:

```
ANALYSIS ACTIVITY, type, type-name ;
```

How to Read this Chart

The chart shows the evolution of the consumption of the major resources (CPU, I/O, missing pages, and SM switchings) at time intervals during the measurement session and is divided into four parts:

1. The leftmost part of the chart (for example, columns 1 to 39 in the sample Chart 38 in Appendix G) covers the CPU activity for the type and type-name that you specified in the ANALYSIS ACTIVITY command. Each character * represents a unit percentage of CPU time (the unit value is indicated after the chart). The TIME heading gives the CPU time in seconds for type-name.

   Remember that the measurement takes into account intervals of CPU time between 2 consecutive I/Os, VCAM exchanges, or SNAPIC samples. Therefore, jobs which do not perform many I/Os may have a very long CPU time between I/O, and so might not be observed during a time period used to build a line of the diagram. For such jobs, this diagram may be useless (unless the SNAPIC option was in use).

   To improve the measurement of jobs with low I/O rates:

   - either use the SNAPIC option at data collection time (Warning: this option has high overheads).
   - or decrease the snapshot period from 30 seconds (default value) to 10 seconds using the MODIFY_SBR directive. Do this while the data collection is in progress. For the analysis, avoid histogram line durations of less than two minutes.

2. The second part of the chart (for example, columns 41 to 69 in the sample chart in Appendix G) covers the I/O activities. Each character denotes n I/O requests per second (the value of "n PER S" is given after the chart). The connects include all the I/O requests issued by type-name. They are broken down into:

   - Disk I/Os, which are further split into:

     . Read I/Os (r)
     . Write I/Os (w)
     . Mixed I/Os (Read and Write) (m)
     . Undefined I/Os (exotic Channel Programs) (?)

   - Not Disk I/Os (*)

3. The third part of this chart (for example, columns 71 to 89 in the sample chart in Appendix G) shows the missing page activity. The scale is as explained above for I/Os.

4. The rightmost part of this chart (for example, columns 91 to 109 in the sample chart in Appendix G) shows the number of Sharable Module (SM) switchings per second. When a procedure linked within an SM calls a function located in another SM with the same Segment Table Number (STN), an "unavailable segment" exception occurs and is recovered by DYNAD (DYnamic ADdresser), which replaces the calling segment table by the called segment table in the current process address space. This mechanism is called SM switching.

   Another switching occurs when the called procedure exits to the calling one, through a non-zero SAM exception. SM switching is a CPU-consuming operation (one can check its cost by looking at the IC shapshots taken in H_DY_* segments). For a TDS, the number of SM switchings should be less than 1 per TPR. If the number gets higher, try to link your TPR to another STN (B or F is allowed), or contact your Service Center.

6.37 (A) IC SNAPSHOTS FOR <TYPE> #39

This dictionary is available only if the SNAPIC option was used during data collection. The data collected by this snapshot mechanism (see Chapter 2) includes the name of the interrupted process and the value of the Instruction Counter (IC) at the time of the snapshot.

How to Read this Chart

This provides a list of those segment numbers (Ring-STN-STE), related to the specified load module, that have been recorded by the IC-snapshot mechanism. It gives, for each such segment number:

- the number of times it has been recorded
- the corresponding percentage
- the cumulated sum of percentages from the first line to the current line

The global figure TOTAL COUNT gives the total number of snapshots (samples) that have been taken during the SBR session.

How to Use this Chart

This dictionary is used to estimate the (CPU) time spent in each displayed segment STN-STE. If we let n denote the number of times STN-STE has been recorded, N the total number of SNAPIC samples for type-name, and T the CPU time consumed by type-name then the ratio:

$$t = \frac{n \times T}{N}$$

is a good indicator of the time spent processing the segment STN-STE. (To retrieve the symbolic name from STN-STE, use the linkage map of the load module.)

This dictionary makes it possible to locate the heaviest CPU user procedures of a load module. In most cases this is sufficient to optimize a program.

However, if an even more thorough study of a particular procedure proves to be necessary, use the USERSRA option.

NOTE: In all charts referring to STN-STEs, some segment characteristics (size, sharability and usage) may be derived from their STN, according to Table 6-2 below.

Table 6-2. Segment Characteristics

Size	**STN**	**Sharability**	**Purpose**
Large Segments (-> 4MB)	1, 2, 3	2, 3	Data
	0, 4, 5, 6	Reserved for addressing	
Illegal	7		
Small Segments (-> 64K)	8	3	Code/Data
	9	2	
	B, E, F	1	Code
	A, C	0	
	D		Data

Sharability:

type 0 = System shared

type 1 = Sharable Module (can be shared between some process groups or between some processes of a process group)

type 2 = Private to a process group

type 3 = Private to a process

For all Activity types involving several load modules (e.g. CLASS), this dictionary is limited to type 0 and type 1 segments; the chart title is *Type 0-1 IC Snapshots for <type>*.

The task name is indicated when type-name is either a multi-process LM or the System.

System segment names are given if the collection and analysis are performed on the same GCOS release.

IMPORTANT

When the collection and analysis are performed on different sites, the segment names may be different for the re-delivered products.

For type 1 segments, the chart gives the SM-name. For non-system SMs (e.g. TPRs), the symbolic segment name must be retrieved from the linkage map of the LKU.

6.38 (A) SEEK ADDRESS FOR <type> MEDIA = <media> #40

This histogram is identical to the chart *Seek Addresses For <type>*, except that it is limited to the I/Os performed by one specific load module (or user, etc.).

One chart is produced for each accessed media if SEEK has been set to YES in a SET command and a job-class ANALYSIS ACTIVITY command is specified. It is helpful for detecting which files are accessed by a load module (or user, etc.). For more details refer to chart *Seek Addresses For <type>*.

6.39 (A) NUMBER OF I/O PER MISSING PAGE FOR <type> #41

This histogram is identical to the chart *Number of I/O per Missing Page*, except that it is limited to a specific load module (or user, etc.).

6.40 (A) MISSING PAGES FOR <type> #42

This dictionary consists of an exhaustive list of all the page faults caused by the specified load module. It gives, for each type-name the (missing) segment number (STN-STE):

- its symbolic name, if it is a system segment (and if collection and analysis are performed under the same GCOS release)
- the number of page faults
- the corresponding percentage
- the cumulated sum of percentages from the first line of the dictionary to the current line

The main usage of the dictionary, for type-name TDS, is to select which TPRs are to be made resident (M PMM command).

To retrieve the symbolic name of a private segment from its segment number (STN-STE), use the linkage map of the load module.

Note that some segments are used after Initial Load (ISL) as Vacant entries, and that their names are no longer significant. They are listed in Appendix D.

Note also that, for all Activity types involving several load modules (e.g. CLASS), this dictionary is limited to type 0 and type 1 segments; the chart title is *Type 0-1 Missing Pages for <type>*.

For type 1 segments, the chart gives the SM-name. For non-system SMs (e.g., TPRs), to retrieve the symbolic name from STN-STE, use the linkage map of the LKU.

The task name is also indicated if type=SYSTEM, or type=LM and the load module is a multiprocess one. For TDS, this is TDSEXEC or MAIN.

6.41 (A) MEDIA-FILES FOR <type> #43

This chart is produced only if the option DETAILED (or EXTENDED) was specified for the data collection. It gives for type-name (like LM and lm-name), the I/Os performed on each file, with the name of the media and the type of I/O (Read or Write operation). Moreover it gives the type of file, file format, and file organization. The task name is indicated if type=SYSTEM or type=LM and the load module is a multi-process one. For TDS, this is TDSEXEC or MAIN.

Detailed information about the type of file is provided at the top of the chart.

UNKNOWN EFN	refers to a file which is not recognized by this data collection, and will appear very rarely or not at all.
UNKNOWN EFN WITH FILEID=xxxx	refers to I/Os detected before the SBR file table is ready to be used. This will happen very rarely or not at all, and will in any case involve only a few I/Os at the very beginning of the data collection.

Some special file names are prefixed with a semicolon (;):

;VTOC	Volume Table Of Contents (VBO disks).
;VTOCP	Primary VTOC (FBO disks).
;VTOCS	Secondary VTOC (FBO disks).
;LABEL	Disk label
;MIRLAB	Mirror label
;TEMPRY.filename	Temporary file
;INVOL	Volume level assignation (i.e. the entire volume is accessed by a volume save/restored utility).
RPS	indicates the I/Os performed in RPS mode.
FSA	indicates the I/Os performed in FSA mode.

The mean I/O length (in bytes) is also given; it is somewhat biased, since it is the static sum of all transfer requests contained in the Channel Program.

6.42 (A) I/O PER EFN FOR <type> #44

This chart is produced in the same manner as the previous one, but does not take the volumes into account. It is useful to summarize I/O traffic through external files in the case of numerous multi-volume files (PREALLOC with SPLIT option).

6.43 (A) HIT RATIO PER FILE FOR <type> #45 (FROM V6 ON)

This dictionary is very similar to *Hit Ratio per File*, except it only accounts disk I/Os requested by type-name. Read-aheads are not listed, since they are not accountable to an individual requester. For the same reason, read-aheads are not deduced from hits, so the hit ratio may be slightly more optimistic than the one given in the chart *Hit Ratio per File*.

6.44 (A) CPU AND I/O FOR DIMENSION <dim> #46

This chart is produced only if the option DETAILED (or EXTENDED) was specified for the data collection, and if ANALYSIS ACTIVITY DIMENSION was specified for the analysis.

It is similar to the chart *CPU Time and I/O For <type>*, except that CPU time, I/Os and missing pages are accounted within the specified dimension. It also gives the number of page faults on private segments (PAGE_IN), and the number of pages swapped out of the dimension (PAGE_OUT).

Further information can be found in the chart header and in the *ARM User's Guide*.

6.45 (A) ACTIVITY OF DIMENSION <dim> #47

This chart is produced only if the option DETAILED (or EXTENDED) was specified for the data collection, and if ANALYSIS ACTIVITY DIMENSION was specified for the analysis. Its outputs differ depending on the version of the collector file.

The chart is split into five parts. The first (leftmost) part describes the average MPL (Multi-Programming Level), and the current system load in number of steps, with s giving the average number of steps and h giving the average number of steps held by ARM,

The second part describes the evolution of the relative (r) and the absolute (a) service rate.

The third and the fourth parts describe respectively the evolution of the average Execution Level (x) and the Queue Length (q) which is defined as the number of steps waiting for resources within the dimension.

The last part of the chart gives used and fixed memory sizes expressed in Kbytes.

More details can be found in the chart header and in the *ARM User's Guide*.

6.46 (A) MISSING PAGE OVERHEAD PER SYS TASK #48

This tabulation gives for each System task the number of missing pages, and the CPU time required to manage them. This chart and the two next ones are produced if ANALYSIS ACTIVITY SYSTEM was specified.

TOTAL NBR gives the number of missing pages, while SUM/1000 gives the time in seconds to manage all of them. MEAN is the mean CPU time, per missing page.

The names of the system processes (PGID = 0) in GCOS 7-V5/V6/V7 are listed below.

Task name	**Process number**	**Function**
MAIN	00	MEH (Machine Error Handler)
PEH	01	Peripheral Error Handler
STKOV	02	Stack Overflow handler
OPRTR_AVR	03	Automatic Volume Recognition
SEQUENCER	04	Command interpreter
CONDUCTOR	05	Scheduler
TIMER	06	Timer management
PIO	07	Physical I/O (Interrupt Handler Process)
MIZOP	08	Reserved for debugging
OW_RB_LGN	09	Output Writer, DJP, Console handling
XTIMER	0A	Timer management
LOAD	0B	Loader
PIAR	0C	Peripheral integrity and Recovery
PAGE_OUT	0D	VMM page swapper
ARM	0E	Automatic Resource Manager
AS_TRAP	0F	Asynchronous trap
BEH	10	Backing Store Error Handler
NEWSEQ	11 - 1A	JOBM sequencer-loader
JASB	1B	After journal
JASG	1C	After journal
IOMIR	1D	disk mirrorring
INVMIR	1E	dis mirrorring
MIR	1F	disk mirrorring
LH_ERASE	20	file erase
PIO1	21	Physical I/O (alternate IHP)

6.47 (A) SERVICE TIME PER SYSTEM TASK #49

This tabulation gives for each System task the amount of resources (elapsed time, CPU time, I/Os) used during the data collection. It is produced only if the option EXTENDED was specified for the data collection.

General information on how to read the chart is given at the front of the chart.

TOTAL 1 is very helpful for computing the occupation of the main system processes. To get the occupation of the main system processes, divide TOTAL 1 (total elapsed time) by DURATION (the measurement period).

This chart gives the different contributions to the CPU time and I/O for the System. Only the PIO Interrupt Handler (process 07) is not described by this chart.

6.48 (A) SEQUENCER ACTIVITY #50

This diagram complements the previous one. It is produced only if the EXTENDED option was specified for the data collection.

It gives for the System Sequencer task (ten centralized processes) the evolution of two usage rates over the elapsed time:

- Sequencer processes occupation.

- JOBM lock occupation (as some parallel processing is performed under this unique lock). The following activities are performed under the JOBM lock:

  - Scheduling

  - Step initiation and step termination in the following cases:

    . PGI file allocation and deallocation
    . volume/media allocation
    . space allocation in KNODET
    . use of the after journal
    . LM loading when not preinitialized
    . Type 0 vacant entries allocation

The diagram also gives the number of I/Os under lock and frequencies of step initiations (broken down into pre-initialized and not pre-initialized ones), and terminations.

It may reveal that over certain periods of time, the occupation was high (>60 %), and that this system task might constitute a bottleneck.

In case of Sequencer saturation:

- If the SERIAL PART is too high, one corrective action is to reduce the multiprogramming level (MPL), or use full ARM to control the MPL.

- If OVERALL OCCUPATION is too high and the NOT PRE-INITIALIZED part is high, one corrective action is to pre-initialize the most commonly used LMs.

6.49 (U) SRA IN <lm>, [TASK=<task>], SEGMENT #51

This chart is produced from a DETAILED analysis containing the command:

```
ANALYSIS USERSRA [,lm-name] segment [,task-name]
                    [,SM-name.file-name];
```

The collection must be DETAILED or EXTENDED, with the SNAPIC option.

> **IMPORTANT**
>
> When the collection and analysis are performed on different sites, the segment names may be different for the re-delivered products.

It provides a detailed analysis of the CPU time spent in one particular segment of the specified load module (or task or SM, if any).

The output produced is a list of those segment relative addresses (SRA), related to the specified STN-STE, that have been recorded by the IC-snapshot mechanism. The dictionary is thus similar to the dictionary *IC Snapshots For <type>*.

The compiler output must be used to identify the source line number corresponding to a given SRA (which is a hexadecimal digit showing the displacement inside the segment). The compilation must have been done with the MAP option.

The dictionary is used to locate the costly (in CPU time) sequences of source statements of the specified procedures, and thus will help the programmer to optimize his programs.

6.50 (A) LOGON, LOGOFF FOR APPLICATION <type> #52

This diagram shows the evolution of the number of terminals logged under the application. It is produced only if the command ANALYSIS ACTIVITY APPLICATION has been specified.

In the leftmost part of the diagram, Logon and Logoff operations performed by VCAM for the related application are traced. A plus sign (+) corresponds to Logon, whereas a minus sign (-) corresponds to Logoff. In the middle part, the average number of logged terminals (a terminal is said to be logged between a Logon and a Logoff), is represented by *. In the rightmost part, printers (terminals without input capability) are represented by p.

Terminals already logged-on at the start of the SBR collection are also accounted.

6.51 (A) ... TIME DISTRIBUTION FOR APPLICATION <type> #53-#57

These histograms are similar to those in the *Response Time Summary* charts, and describe the different measurements of time intervals for the related application.

How to Read these Charts

The different times are:

- Response Time-1: time between the SEND to the application by the Front End Processor, and the first RECEIVE issued by the Front End Processor. Multiple responses from the application are not included in this measurement.
- Response Time-2: time between the SEND to the application by the Front End Processor, and the last RECEIVE of the exchange issued by the Front End Processor. Multiple responses from the application are included.
- Delivery Time: time between the SEND to the application by the Front End Processor, and the corresponding RECEIVE of the application. It is the time for one input message to cross VCAM.
- Service Time-1: time between the RECEIVE issued by the application, and the first SEND issued by the application. It does not include multiple responses.
- Service Time-2: time between the RECEIVE issued by the application, and the last SEND of the application, corresponding to the same exchange. It includes multiple responses.

How to Use these Charts

The tabulation Delivery Time can be used to measure the waiting time in the TDS environment. When going to a TDS application, a message has to wait for a free process of TDS (number of processes of TDS = multi-tasking level of TDS). Thus, in this situation, the Delivery Time includes the wait time for a TDS process.

When the mean is rather small (less than 100 milliseconds), we can assume that there is no performance problem for the multi-tasking level of TDS. If on the contrary, the mean is high (greater than 1000 milliseconds), there is a definite performance problem. Corrective action may be to increase the multi-tasking level of TDS (parameter SIMULTANEITY of TDS Generation), if the response time proper to TDS is correct. Generally, the times to cross VCAM toward the Front End Processor are low (lower than 100 milliseconds).

Complementary information can be found under the *Response Time Summary* chart.

6.52 (A) RESPONSE, SERVICE TIMES PER LM FOR APPL. <type> #58

This tabulation gives, for all the load modules executing under the application type-name, the number of exchanges and a summary of time measurements.

In front of each load module, denoted by LM, we find:

EX	is the number of exchanges performed by the load module for the application.
RT1	is the response time, as given by the *Distribution of Response Time* chart, but related to this LM and application.
RT2	is the response time, including all the responses, related to this LM and application.
DT	is the Delivery Time.
ST1	is the Service Time, related to this LM and application. It includes only the first response.
ST2	is the Service Time, related to this LM and application, but including all the responses.
RN	is the Return Time, from the application to FEPS/TNS.
TT1	is the Think Time, from first Receive to Send on the terminal side.
TT2	is the Think Time, from last Receive to Send on the terminal side.

Note that there are several entries (one per load module) for application IOF, while there is only one entry for TDS (the TDS load module). This, therefore, is the only chart where one can observe the differences in response time between load modules (e.g., between H_IQS and H_FSE).

6.53 (A) REAL TIME ACTIVITY OF APPLICATION <type> #59

This diagram shows the evolution of the rates of input/output messages received/sent by the application, and the average response time, as measured by *Distribution of Response Time for Application*.

The leftmost part shows the rates, whereas the rightmost shows the response time.

6.54 (M) ACTIVITY OF DISK <type> #60

This diagram shows the evolution of some variables which characterize the load of one disk. To get this chart, the data collection must be DETAILED (or EXTENDED), and the analysis must specify ANALYSIS ACTIVITY DISK.

How to Read this Chart

The diagram is divided into three parts. The leftmost part shows the I/O rate for this disk. Each * denotes a number of I/Os per second. The middle part gives some indication of the queue length. Each Q denotes some waiting I/Os (the scale is given at the end of the chart). The rightmost part shows the evolution of the service time. Each plus sign + denotes a unit number of milliseconds. The size of this unit is given at the end of the chart.

How to Use this Chart

This chart may exhibit the peak periods for the disk. It shows if a bottleneck is permanent (several Q everywhere), or only temporary (rare or unevenly distributed Q).

6.55 (M) SERVICE TIME, QUEUE LENGTH, SEEK LENGTH FOR <type> #61-#63

These histograms complete the chart *Activity of Disk <type>*. They show the distribution of three parameters related to media utilization.

- Queue length: number of requests waiting for the device. Null values mean the device was not busy at the request time. Most values should be 0 or 1. A peak in higher values denotes bursting IOs, or competition for that media.

- Service Time: time between Start IO and End-of-IO. It does not include the delay due to the enqueued requests. Service Time variations are mainly due to the arm displacements needed by the IOs.

- Seek length: length of arm displacements, in ***percentage of disk space***. Peaks in high values denote poor file organization, or competition for that media.

6.56 (M) SEEK ADDRESSES FOR <type> #64

This histogram shows which parts of the disk have been accessed during the SBR session.

How to Read this Chart

The heading TOTAL NUMBER shows the total number of I/Os, with a seek command, actually executed on the device during the SBR session. This number is therefore usually less than the TOTAL NUMBER shown by the corresponding histograms on the *Service Time per Volume* and *Disk Queue Length* charts.

The other global figures show the lowest, the highest and the mean referred addresses within the global range ***from 0 to 100% of disk size***.

Each line of the histogram corresponds to a range of disk addresses (1/100th of disk size). The lowest value of the range is shown in the column heading >=, the highest value in the column heading <. For each line of the histogram, SBR gives:

- the number of I/Os having accessed an address belonging to the specified range.
- the percentage of all the accesses falling within this range
- the cumulated sum of percentages, from the first line to the current line
- the (possibly truncated) graphic display of the column %.

How to Use this Chart

This chart is useful only in the case where a bottleneck has been detected on the disk through other charts such as *I/O Per Volume* or *Disk Queue Length*.

If this is the case, first locate the most frequently accessed disk areas. Next, identify the files corresponding to these areas, by using LIST_VOLUME with the MAP parameter for instance. This should help to determine problem causes and the most appropriate corrective actions.

6.57 (M) LMS, RONS, USERS USING DISK <type> #65-#67

This dictionary gives for one disk, all the load modules (or RONs, or Users) which have used it during the data collection.

The TOTAL COUNT gives the total number of I/Os on the disk. Before every load module (or RON or User), COUNT gives the number of I/Os that it performed on the disk.

6.58 (T) TDS REAL TIME ACTIVITY #68

This diagram is concerned with the behavior of TDS during the measurement period.

It appears only when TDS has been specified for a DETAILED (or EXTENDED) data collection, when ANALYSIS TDS, tds-name; has been specified for the data analysis, and when tds-name was active during the measurement period.

How to Read this Chart

Each character t (TPR) refers to a number of TPRs.

Each character c (COMMITMENT) refers to a number of Commitments.

Each character x (TRANSACTION) refers to a number of Transactions.

Begins of TPR/Commitment/Transaction (BEGIN OF ...) are plotted within columns 1-60 (overlapped). Failed begins of TPR are plotted with -.

Aborts of TPR/Commitment/Transaction (ABORTED ...) are plotted within columns 61-80 (overlapped).

Each character i (MEAN NUMBER OF IDLE PROCESSES) refers to a number of idle TDS executive processes.

Each time a TDS Executive Process (= Simultaneity Level) is activated by a TDS event (input message, GAC notification, etc.), the number of TDS processes remaining idle ***immediately after*** the activation is measured in the SBR event TDS Process Allocation. Possible values fall within the range:

0 to <TDS Simultaneity>-1

The value for MEAN gives the number of idle TDS executive processes time averaged on all process activations.

Each character m (MEAN NB OF PENDING MESSAGES) refers to a number of pending messages waiting in front of the TDS process dispatcher. It is measured simultaneously with the NUMBER OF IDLE PROCESSES in the SBR event TDS Process Allocation. Since any idle process is immediately allocated upon arrival of a TDS input message, the NB OF PENDING MESSAGES is null whenever at least one TDS PROCESS is IDLE. The value after MEAN= gives the number of pending messages averaged on all process activations.

How to Use this Chart

Begins and Aborts statistics show the exact TDS load during peak hour (using the analysis command TIME HH:MM:SS, HH:MM:SS;).

For a given <TDS SIMULTANEITY> level, the average usage rate for all TDS Simultaneities may then be computed as:

$$\text{\%TDS Simultaneities Used} = 100 \times \left(1 - \frac{\text{MEAN NB OF IDLE PROCESSES}}{\text{<TDS SIMULTANEITY>}}\right)$$

If the TDS Simultaneity Usage rate is low (say below 40%), it means that on average the TDS Simultaneity Level could be significantly reduced (over the measurement period), without significantly impeding TDS performance.

The MEAN NUMBER OF PENDING MESSAGES gives the average message queue length in front of the TDS Dispatcher, i.e. the number of messages which are waiting for a TDS Simultaneity Level to become available to process them. When this mean number is a significant fraction (say 40% or more) of the declared TDS Simultaneity Level, it means either that TDS was overloaded and/or that the it was under-sized.

To determine whether or not to increase the Simultaneity Level, check first if any hardware or software resource used by TDS was saturated (i.e. used above 70% or so). The Simultaneity Level is the bottleneck and must be increased only when no such hardware resource is overloaded.

You may also tune the Simultaneity Level using the <M SIMU> TDS Master command* together with the SBR display facilities. Under heavy loading with the CPU nearly saturated, a Simultaneity Level which is too low will impede a 100% CPU usage. An optimum value on the other hand will give the best response times.

* The maximum simultaneity level of a TDS is the value declared in TDSGEN. The M SIMU command allows you to reduce this value, and then to bring it back again to the maximum.

6.59 (T) UFAS/GAC ACTIVITY FOR LM <tds> #69

(See *TDS Real Time Activity* for COLLECTOR and ANALYZER options.)

This diagram is concerned with the behavior of TDS/UFAS/GAC during the measurement period.

How to Read this Chart

Each character f (GAC TABLES FULL) refers to the number of times the demand for lock entries within GAC LOCKTAB exceeded the configured maximum number. The Commitment Units are then aborted with Return Code TABOV, and restarted by GAC later on, when enough space is again available.

Each character a (DIE WAIT ABORT) refers to a number of times when a younger Commitment Unit was killed because it held a resource demanded by an older one running under Die-Wait conflict resolution mode. This happens only after this older Commitment Unit has been aborted once because of a deadlock detection. Thus Die-Wait aborts should never occur unless there has been at least one previous Deadlock abort.

Each character d (DEADLOCK) refers to a number of deadlocks detected by GAC (TPR aborted immediately with Return Code = DEADLOCK, and restarted by GAC once the DEADLOCK is resolved.)

Each character n (TDS NON-CONCURRENCE CONFLICT) refers to a number of times when an attempt to start a new Commitment Unit was deferred by TDS because it was declared Non-Concurrent with another active Commitment Unit.

Each character l (LONGWAIT) refers to a number of times when a Return Code = LONGWAIT was returned (by GAC) to TDS. This may occur either after an aborted attempt to start a new Commitment Unit (see GAC TABLES FULL above), or when a running TPR aborts because of a long (or expected long) Conflict (see below). In both cases, the TPR is restarted by GAC when more space is available or when the conflict is resolved.

Each character c (CONFLICT) refers to a number of simple GAC conflicts (excluding deadlocks) which occurred when a TPR attempted to access an already locked object (page, CI). A Conflict may, or may not, be followed by a TPR abort, depending on the (expected) duration of the Conflict.

Each character k (MEAN NB OF ACTIVE COMMITMENTS) refers to the number of Commitment Units belonging to this TDS which were active when the event TDS Process Allocation occurred.

Each character p (MEAN NB OF LOCKED PAGES/COMMITMENT) refers to the number of GAC lock entries which have been filled per average Commitment Unit. For TPRs doing random accesses on an IDS-II/UFAS database, it is equal to the number of IDS-II Pages/CI locked; due to a GAC optimization in the case of sequential accesses, the effective number of locked pages per CI may be greater than the instrumented value.

Each character i (UFAS CI SPLIT) refers to a number of UFAS Indexed CI splittings which occurred during the measurement period on a TDS assigned file.

Each character c (UFAS CI COMPACTION) refers to a number of UFAS Indexed CI Compaction which occurred during the measurement period, on a TDS assigned file.

How to Use this Chart

When the number of serializations (GAC SERIALIZATION or TDS NON-CONCURRENCE CONFLICT) is even moderately low (around 1% of COMMITS), the effective TDS throughput may decrease ***dramatically***. The worst case occurs when:

- TDS Simultaneity Level is high (say above 5).
- TDS is heavily loaded.

If the number of CONFLICTs is high when compared to the number of CONNECTs (say more than 3%), it means that either the sharing mode of some file(s) is inadequate, or that the mapping of the database is faulty. Look at the *GAC Conflicts* chart to identify the conflicting files. A low CONFLICT rate, say less than 1% of the CONNECTs, is a ***prerequisite*** for good performance.

A significant number of DEADLOCKs (say more than 0.1% of the number of CONNECTs) is usually correlated with an even larger number of CONFLICTs for the same file(s). See also under *GAC Conflicts for LM <tds>* and *GAC Conflicts Duration For TDS <tds>*.

The MEAN NB OF LOCKED PAGES/COMMITMENT* should be small enough (say < 5-10) so that the number of CONFLICTs is kept low, even for high Simultaneity Levels (above 10). Depending on the maximum number of entries configured in the UFAS/TDS buffer pool, the number of LOCKED PAGES/COMMITMENT will also react to the maximum number of Simultaneity Levels working properly with DEFERRED UPDATES.

Even moderately large numbers of CI/CA splittings, say above 1% of the number of COMMITs will dramatically decrease the effective number of TDS Simultaneity Levels available for processing, and thus reduce the maximum throughput of TDS with the penalty of higher response times. The number of splittings should be kept as low as possible to obtain the best performance. Use large CIFSP at PREALLOC time.

When correlated to the number of CI/CA Splittings, a moderately large value of CI compactions usually denotes some programming sequence such as:

DELETE <old_record> using <key>

followed by:

WRITE <new_record> using <key> (=> CI compaction + CI splitting).

This is bad programming practice, and you should instead use REWRITE (since a rewritten record always retains the same size as its previous version).

The use of the NON-CONCURRENT clause of the Transaction Section of the TDS Generation should be restricted to infrequent transactions executed out of peak hours.

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* The measured value is in fact the number of GAC entries filled by the Commitment Unit in LOCKTAB for CI/Page lock purposes. Note that GAC uses a data compaction algorithm for consecutive CI/Page lock accesses, thus the actual value of LOCKED objects may thus be greater than the printed value when this kind of access occurs.

The overflow of GAC TABLES (= GAC TABLES FULL) usually occurs because the GAC TABLES (= LOCKTAB) are under-sized (see the statement CONFIG GAC LOCKSIZE=..., NBLOCKID=...;, in the *GCOS 7 System Installation, Configuration, and Updating Guide*). Note however that when a Commitment Unit aborts because of (temporary) GAC tables saturation (RC=TABOV), it will be restarted later.

A serialization at TDS level is performed at the 2nd BUFNBOV, or for functional reasons such as:

- NON-CONCURRENCY declared for TX
- or usage of M CLOSE, M OPEN, M SWITCH or M PMM master commands.

For V5 systems

The restarted CU will be guaranteed a certain number of entries on restart, according to the table given below.

CURLOCK value	Number of entries guaranteed
CURLOCK <= 25	Minimum (NUMLOCK, 50)
CURLOCK > 25	Minimum (CURLOCK * 2, NUMLOCK)

CURLOCK	number of lock list entries currently assigned to the aborted Commitment Unit,
NUMLOCK	the MAXIMUM NUMBER OF LOCKED PAGES declared in the TDS Section of the TDS Generation.

CURLOCK ***must never*** exceed NUMLOCK, otherwise the transaction will be aborted with Return Code = COUNTOV.

For V6 systems and higher

GAC regulates the usage of LOCKTAB by estimating the amount of resources needed by the CUs. If incoming CUs need more resources than there are available entries (according to GAC's calculations), these CUs wait until sufficient entries have been freed in LOCKTAB.

When an overflow occurs (i.e. when a CU exceeds the resource usage estimated by GAC), the CU is aborted with RC=TABOV, and a tighter regulation is applied until the LOCKTAB saturation eases off. The biggest LOCKTAB users (using more than 20% of entries) are aborted and the number of allowed simultaneous CUs is reduced.

Refer to the *GAC-EXTENDED User's Guide* for further details.

6.60 (T) ACTIVATED TPRS FOR TDS <tds> #70

(See *TDS Real Time Activity* for COLLECTOR and ANALYZER options).

This dictionary gives, per TPR, the number of times it was activated, whatever its future completion status (aborted or not).

How to Read this Chart

The TOTAL COUNT gives the number of TPR activated during the measurement period.

For each TPR with at least one activation during the measurement period, one finds:

TPR:SM	the name and SM of the TPR.
#	the number of times the TPR was activated (and the corresponding percentage), ***whatever its TDS Restart Status*** (see TDS-STORAGE).
##	the cumulated number (and percentage) from the first line of the histogram up to the present one.

How to Use this Chart

When you tune your TDS, the most frequently activated TPRs should be optimized first. See also the chart *CPU Time and I/O per Completed TPR* to identify the TPR(s) whose CPU and I/O consumption is heaviest (see SUM/1000 columns on these charts).

If you have ***sufficient main memory*** and you want to suppress the data refreshing I/O on SYS.LIBs for the most frequently started TPRs, you may use this chart to identify the TPR subset which accounts, for instance, for 70% of all TPR activations.

After you have checked that the cumulated size (code + data page) of the TPRs belonging to this subset is ***compatible with the available Main Memory size***, you may then apply the TDS command M PMM <tpr-name> to the TPRs belonging to the subset, thus removing a potential system bottleneck on SYS.LIBs.

Also, the most frequently accessed TPRs should be in the same sharable module (SM/SM_Library), in order to avoid unnecessary SM switching.

6.61 (T) RESTARTED TPRS FOR TDS <tds> #71

(See *TDS Real Time Activity* for COLLECTOR and ANALYZER options).

This is similar to the *Activated TPRs for TDS <tds>* dictionary, but only the TPRs with a non-null restart status (see TDS-STORAGE) are given. These TPRs have been restarted as a consequence of some previous TPR or Commitment Unit abort.

6.62 (T) ABORTED TPRS FOR TDS <tds> #72

(See *TDS Real Time Activity* for COLLECTOR and ANALYZER options).

For each type of abort and each different aborted TPR it gives the number of times such an event occurred.

How to Read this Chart

The TOTAL COUNT gives the number of times a TPR aborted.

Users are notified of any fatal abort (Transaction Aborts; Level = TX), but not of any automatically restartable abort (Commitment Unit aborts; Level = CU).

The most frequent functional Return Codes are:

LONGWAIT

returned by GAC to TDS after a Conflict occurred on an already locked object (page, CI), and either the time limit set at CONFIG was exhausted ("GAC LONGWAIT=...;"), or the conflict is expected to be long (for instance if the resource in conflict is held by somebody doing a conversation). It may also be returned by GAC to TDS when an attempt to execute a new Commitment Unit fails because the GAC TABLES (= LOCKTAB) are FULL. In this case, the user is enqueued by GAC in WAITTAB, and will be automatically restarted by GAC when enough space is available in LOCKTAB (see also *UFAS/GAC Activity For LM <tds>* chart).

If LONGWAIT occurs because of a long conflict, the COMMIT is enqueued by GAC in WAITTAB, and will be automatically restarted by GAC when the required CI is free.

When the number of TDS Simultaneity Levels pending in GAC reaches 50% of the total value, any conflict occurrence will lead to a TPR abort with Return Code = LONGWAIT.

DEADLOCK

returned by GAC to TDS in the case of deadlock detection on locked resources between two Commitment Units (which may both belong or not to the same TDS).

After the first deadlock in a given Commitment, this Commitment is restarted in Die-Wait mode. Any subsequent deadlock in this CU will lead to the abort of the younger CUs waiting on the corresponding resource. This kind of abort is reported here by the symbol *DEADLOCK.

BUFNBOV	returned by UFAS to GAC when the UFAS/IDS buffer pool is saturated, and the aborted Commitment Unit failed to obtain the buffer(s) it needed to proceed. If the aborted Commitment Unit was in Deferred Update mode, it is restarted a first time with Before Journal instead of Deferred Updates. If the aborted Commitment Unit was already using Before Journal instead of Deferred Updates (possibly as a consequence of a first abort and restart), the transaction is aborted or restarted in Exclusive Mode (Serialization) with Before Journal. If BUFNBOV occurs again, the TX is aborted with RC = BUFNBOV. Note that with UFAS-EXTENDED/GAC-EXTENDED, the buffers pool should normally be large enough to avoid this kind of abort.
TABOV	returned by GAC because the TPR attempted to lock one more object when all entries were already allocated within GAC tables. It is then restarted by TDS after notification by GAC with a guaranteed number of lock entries (See chart *UFAS/GAC Activity for LM <tds>*).
COUNTOV	returned by GAC after an attempt to lock in a Commitment Unit more than the TDS declared MAXIMUM NUMBER OF LOCKED PAGES. Either this value is too low, or it is a programming error. The transaction is then aborted.
ABORTCU	the Commitment Unit abort is due to either a functional incident in TDS processing (LONGWAIT, TABOV or DEADLOCK detected by GAC under critical section, inter TPRs Die-Wait abort) or a disconnect.
USEREQ	in the case of transaction abort initiated by the user (i.e. within a TPR).
DONE	the TPR to be activated was non-concurrent with a running one.

Other Return Codes are either JCL, TDS Generation or programming errors (such as ITMNAV, WDNAV) or due to the environment.

On each line of the dictionary, we find:

TPR:SM	name and SM of the aborted TPR.
LEVEL	gives the abort severity level: transaction (TX) or Commitment Unit (CU) abort.
RC	gives the explicit Return Code.
#	gives the number of times (and percentage) a given TPR has aborted with such a severity level and Return Code (LEVEL + RC).
##	gives the cumulated COUNT (and percentage) from the first line of the chart up to the current one.

How to Use this Chart

Too many DEADLOCK/LONGWAITs mean that the data base is ill-designed and/or that Commitment Units are too long and/or that they lock too many objects. For additional information, look at other TDS charts.

TABOV aborts usually mean that the GAC lock table size was configured too small.

BUFNBOV means that UFAS/IDS buffer pool was too small for the prescribed TDS Simultaneity Level. It may occur because too many buffers are locked in the pool in Deferred Update Mode, which may be checked using the UFAS instrumentation option of SBR. This implies the TDS buffer pool is badly dimensioned. Serialization occurs at the second BUFNBOV.

6.63 (T) FAILED BEGIN OF TPRS FOR TDS <tds> #73

This dictionary lists every TPR which could not be started because the Commitment Unit initialization failed.

There is one entry per abort type (see *Aborted TPRs For TDS <tds>* to interpret type and Return Code).

6.64 (T) CPU TIME AND I/O PER COMPLETED TPR FOR TDS <tds> #74

(See *TDS Real Time Activity* for COLLECTOR and ANALYZER options.)

This chart gives the overall CPU process time and I/Os for all TPRs started and completed with a null TDS termination status within the measurement period.

How to Read this Chart

This chart is split between *CPU Time per Completed TPR* and *I/O per Completed TPR* if SET CHARTS, LONG was specified for the analysis.

For each TPR we find:

TPR,SM	name and SM of the TPR.
TOTAL NBR	gives the number of TPR started and completed with a null TDS termination status, within the measurement period.
TOTAL 1	gives the total CPU time for this TPR, in seconds.
MEAN 1	gives the mean CPU time per activation of the TPR, in milliseconds.
TOTAL 2	gives the total number of I/Os for the TPR (in thousands).
MEAN 2	gives the mean number of I/Os per TPR activation.

If SET CHARTS, LONG is specified, the following additional information is given:

NUMBER	gives the number of TPRs within the measurement period whose CPU time (with respect to the number of I/Os) was within the specified range (Values Between 0 and nnnnnn). It is those TPR which account for the following statistics (MEAN/...).
SUM/1000	cumulated CPU time (with respect to counts of 1000 I/Os) ***in seconds*** for all NUMBER completions of the given TPR.
MEAN/MINIMUM/MAXIMUM	average and extreme values for the CPU process time (with respect to the number of I/Os performed) spent within each TPR.

The measured CPU time ***includes*** all the CPU time spent on the current JP (= TDS Simultaneity) between the SBR events Begin of TPR and End of TPR: data management time, VMM swap-in time, GAC time, TPR user time spent in this interval are all added up.

This time ***does not include*** the CPU time spent in the TDS monitor between the completion of a TPR (End of TPR) and the start of the next one (Begin of TPR), nor the time spent outside of the TDS process group (= J) related to TDS activity (centralized VMM, PIO for instance).

The count of measured I/Os includes all I/Os performed under TDS Process Group (= same PG-identifier) between the SBR events Begin of TPR and End of TPR, including missing page I/Os and Before Journal I/Os.

It does not include the I/Os performed outside this time span, between the completion of a TPR (End of TPR) and the start of the next one (Begin of TPR), such as Deferred Updates, TDS Swap, SYS.LIBs, and After Journal I/Os.

How to Use this Chart

TPRs which weight most in TDS CPU consumption (highest values for SUM/1000) should be identified and optimized first to improve TDS Performance (when CPU bound).

Also, TPRs whose MAXIMUM CPU value is much larger than the overall MEAN CPU value should be checked for unwanted (CPU) loops, and if necessary split into several TPR/Commitment Units (since an overlong TPR will keep resources such as locked pages until its completion, if not for longer).

This chart may also be useful for redesigning TPRs which are too costly in TDS I/O consumption.

6.65 (T) CPU TIME AND I/O PER TRANSACTION FOR TDS <tds> #75

(See *TDS Real Time Activity* for COLLECTOR and ANALYZER options.)

This chart is similar to the chart *CPU Time and I/O Per Completed TPR* but CPU time and I/Os are accounted by transaction name. As above, the CPU time spent and I/Os performed outside the TPRs (i.e., in the TDS Monitor) are not accounted.

Transaction = ??????? or Transaction = TPR_name refer to transactions already in progress when the SBR data collection was started.

6.66 (+) LOCKED PAGES PER TPR/TRANSACTION FOR <tds> #76

(See *TDS Real Time Activity* for COLLECTOR and ANALYZER options.)

These two charts are only produced if SET CHARTS LONG was specified for the analysis.

For each transaction it gives the mean, minimum and maximum number of resources locked by the transaction (LOCKTAB entries).

The first chart gives the name of the TPR ending the COMMITMENT UNIT; the second gives the transaction name.

These charts are used to identify which transactions use a high number of GAC resources, and therefore which transactions are possibly causing a high GAC conflict rate.

NOTE: Only one specimen chart (LOCKED PAGES BY TPR) is provided in Appendix G.

6.67 (T) RESPONSE TIMES PER TRANSACTION FOR TDS <tds> #77

This chart is very similar to the chart *Response, Service Times per LM for Application ...*. It gives the number of exchanges performed for each transaction, and the corresponding response times (RT1 and RT2) and Service Times (ST2 and ST1).

This chart can be used to find the transactions for which there is a response time problem, while the previous one can be used to find the costly transactions.

TX = ??????? or TX = TPR_name refer to transactions already in progress when the SBR data collection was started.

6.68 (T) COMMITMENTS LONGER THAN 60 SECONDS FOR <tds> #78

(See *TDS Real Time Activity* for COLLECTOR and ANALYZER options.)

This chart lists the completion of the only Commitment Units whose overall duration exceeded 60 seconds.

How to Read this Chart

For every completed Commitment Unit which lasted more than 60 seconds, a line is printed with:

HH:MM:SS.xxxx	the real time of the Commitment Unit ***completion***
DURATION	the total elapsed time between the begin of Commitment Unit (DEFLOCK time) and its completion.
RESTART_COUNT	the number of times some TPR has been restarted within this Commitment Unit (either at TPR or Commitment level).
USER	the TDS external User Name to which the Commitment Unit belonged.
ENDING_TPR	the last TPR which completed the Commitment Unit.
JP	the TDS Executive Process on which the Ending TPR was running.

How to Use this Chart

Long Commitment Units (say > 5-10 seconds) should never occur in a properly tuned application: since GAC resources (CI/Page locks, LOCKTAB entries, ...) are held for the duration of the Commitment Unit, overlong ones induce an aggravated rate of conflicts and degradations of corresponding throughput and response time.

Very long Commitment Units, say > 30 seconds, may arise in the case of imbedded conversations within the Commitment Unit, which is bad programming practice, and to be avoided.

6.69 (T) GAC CONFLICTS FOR LM <tds> #79

(See *TDS Real Time Activity* for COLLECTOR and ANALYZER options.)

This chart details the GAC simple conflicts and deadlock aborts for each file (EFN) assigned to TDS. See also *UFAS/GAC Activity for LM <tds>*.

How to Read this Chart

TOTAL COUNT gives the overall number of Conflicts+Deadlocks that occurred during the measurement period.

For each different type of Deadlock or Conflict, one line is printed with:

EFN — external file name of the TDS file on which the conflict occurred, or GAC-EXTENDED identifier of the pseudo-resource.

TYPE — type of conflict. The possible types are as follows:

- =E the conflict is between Commitment Units belonging to different process groups.
- =I the conflict is between Commitment Units of the same TDS.
- =C simple conflict on a resource (no immediate abort).
- =D first DEADLOCK within a Commitment Unit.
- =L Longwait abort.
- =I CI index conflict.
- =S CI/CA Splitting conflict.
  For data integrity reasons, as soon as any Commitment Unit initiates a Splitting on a given file, every other Commitment Unit attempting to split the same file (whatever the CI/CA) will have to wait in GAC until the completion of the splitting.
- =P Pseudo-resource conflict. This might be a Controlled Common Storage, a Non-Concurrency abstract resource, or any GAC-controlled resource taken dynamically by the "LOCK" primitive.
- # number of Conflicts/Deadlocks for the same EFN (and percentage of TOTAL COUNT).
- ## cumulated number (and percentage) from the first line up to the current line.

How to Use this Chart

When the file(s) with the highest Conflict/Deadlock rate have been located, you may:

- modify the sharing mode
- modify the data base mapping on CI/Pages
- change the CI/Page size
- etc.

6.70 (T) LIST OF DEADLOCKS FOR TDS <tds>: ABORTED TPR AND TENANTS #80

(See *TDS Real Time Activity* for COLLECTOR and ANALYZER options.)

This chart lists every occurrence of a TPR abort whose Return Code was DEADLOCK when the deadlock occurred between two commitments belonging to the same TDS.

How to Read this Chart

For each TPR deadlock, a line is printed with:

HH:MM:SS.xxxx:	the real time of the TPR abort.
TYPE	the TPR abort type (see *GAC Conflicts for LM*).
TPR	identification (name/SM) of the aborted TPR.
AT SRA	most plausible user SRA (= COBOL or GPL verb) within the aborted TPR which may have brought about the conflict detection by GAC; actually, it is the first type 2 or 3 Instruction Counter Content found when climbing down the Stack at Conflict Time from GAC level towards User level.
ON EFN	the EFN to which the object in conflict belongs, or "Pseudo-resource".
CI	the GAC internal identifier of the CI/Page in conflict.
WITH TPR	it is the ***current last TPR*** within the Commitment Unit which holds the GAC resource. When there are multiple owners, the last Commitment Unit which locked the resource is selected.

IMPORTANT

The above TPR is not necessarily the actual TPR which locked the resource in conflict, since it is only the current last one in the owner Commitment Unit at the time of the Deadlock.

How to Use this Chart

Deadlocks should be avoided as much as possible in a properly tuned application since they degrade throughput and response times.

Deadlocks may induce Die-Wait aborts when the Commitment in deadlock is restarted later on.

6.71 (T) ELAPSED TIME PER COMMITMENT UNIT FOR TDS <tds> #81

(See *TDS Real Time Activity* for COLLECTOR and ANALYZER options.)

This histogram is concerned with the real time duration (elapsed time) of the Commitment Units of this TDS.

How to Read this Chart

The global figures show the LOWEST, the HIGHEST and the MEAN elapsed time for the NUMBER of Commitment Units ***started and completed*** during the measurement period and whose duration is within the specified range (Values between 0 and nnnnnn ms). A Commitment Unit lasts as long as its LOCKID lasts, i.e. as long as resources are held (GAC entries in LOCKTAB, pages, CI, ...).

Each line of the detailed histogram corresponds to a range of elapsed times. For each range, one finds:

- the number of Commitment Units whose duration is within the range.
- the percentage corresponding to the preceding number (referenced to the TOTAL NUMBER of Commitment Units).
- the cumulated sum of percentages from the first line of histogram up to the current line.
- the (possibly truncated) graphic display of the column %.

How to Use this Chart

Since GAC locks are granted on objects (pages, CI) for the duration of the Commitment Unit which holds the lock, this duration must be kept small to avoid high conflict rates. Too long Commitment Units (say above 5-10 seconds) should be avoided, since they increase greatly the probability of conflicts and deadlocks. They arise, in particular, when some Commitment Unit contains an imbedded Conversation, which should always be avoided to achieve performance. Ideally, there should be one, and only one, Commitment Unit per exchange.

6.72 (T) CI-CA SPLIT FOR LM <tds> #82

This chart gives, per TDS-assigned UFAS Indexed file, the number of CI/CA splittings incurred during the measurement period.

Note that CA does not exist from release V5 onwards. It is only preserved by SBR for compatibility with previous version files.

How to Read this Chart

TOTAL COUNT gives the overall number of CI splittings occurred during the measurement period.

For each different type of splitting and each different file, one line is printed with:

EFN: EFN of the TDS file victim of the splitting

TYPE: detailed type of splitting:

CI-S	CI splitting
CA-S	index CI reorganization
CI-C	CI compaction

COUNT: number of splittings or compactions for this same EFN (and percentage of Total Count).

CUMUL: cumulated number (and percentage) from the first line up to the present line.

How to Use this Chart

This chart should be used to identify precisely which file(s) are responsible for CI splittings, before undertaking actions to cure the problem using the CIFSP option at PREALLOC.

With previous version files:

While a splitting is in progress on a given file, ***all*** accesses to this file are delayed until the splitting is completed, thus reducing the effective number of available TDS Simultaneities. Consequently, the TDS throughput will decrease, and the response times will increase.

With current version files:

Only the CIs affected by the splitting are unavailable for the duration of the splitting (for index CIs) or the duration of the CU (for data CIs).

Heavy rates of CI compactions ***and*** CI splittings (say > 0.1/exchange) are usually related to some programming sequence similar to DELETE(key) ... WRITE(key). This should be replaced whenever possible by a single REWRITE(key).

6.73 (T) GAC PENDING TIME FOR TDS <tds> #83

(See *TDS Real Time Activity* for COLLECTOR and ANALYZER options.)

This histogram gives a tight UPPER-BOUND for the elapsed time spent pending by a TDS Simultaneity Level while waiting for a simple GAC conflict arbitration.

How to Read this Chart

A GAC Conflict pending period starts with the GAC detection of the conflict and ends (at worst) with the termination of the current CU (aborted or not). While pending, a TDS Simultaneity is unavailable for any other task, which thus decreases the effective TDS Simultaneity Level by one unit, with a possible drawback on throughput and response times.

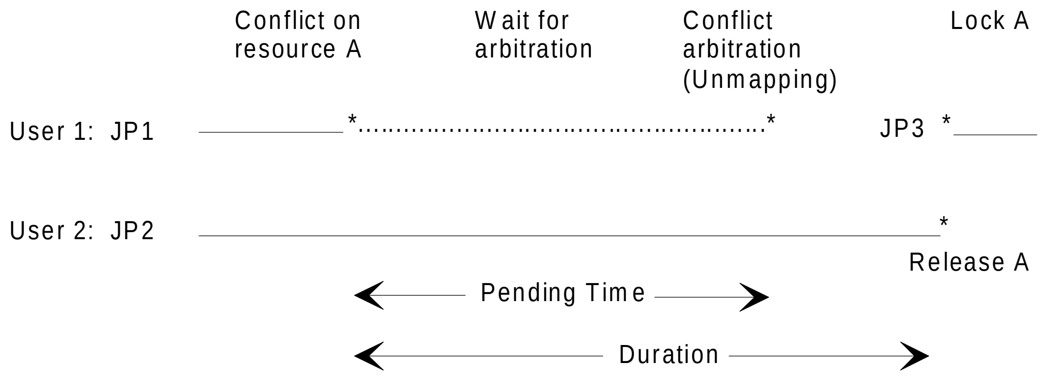

Figure 6-3. Pending Time versus Conflict Duration

During Pending Time, User 1 holds a simultaneity level. If the resource has been released at the time of conflict arbitration, both times are equal. Duration is the conflict duration as seen by the user.

The global figures of the chart show the LOWEST, the HIGHEST and the MEAN elapsed time for GAC conflict pending periods during the measurement period, and whose duration is within the specified range (Values between 0 and nnnnnn ms).

Each line of the detailed histogram corresponds to a range of elapsed times. For each range, one finds:

- the number of GAC Conflicts pending periods whose duration is within the range.
- the percentage corresponding to the preceding number (referenced to the TOTAL NUMBER of GAC Conflicts).
- the cumulated sum of percentages from the first line of histogram up to the current line.
- the (possibly truncated) graphic display of the column %.

How to Use this Chart

This histogram can be used to count the actual number of GAC conflicts which resulted in a Time Out with RC= LONGWAIT (default: 60 seconds Time Out). The GAC Time Out value should then be set to the minimum compatible with the observed GAC pending time distribution (CONFIG command: GAC ... LONGWAIT= ss;).

Too many (= NUMBER) or too long pending periods (= MEAN, HIGHEST VALUES) decrease the effective TDS Simultaneity Level.

Using LITTLE's formula, you may compute an estimate for the average number of TDS executive Processes pending in GAC:

$$\text{\% TDS Simultaneities pending in GAC} = \frac{\text{100 x NUMBER x MEAN}}{\text{DURATION x TDS SIMULTANEITY}}$$

where DURATION is that of the analysis interval.

When this value exceeds 5-10%, it means that the GAC conflict rate and/or the conflicts duration and/or the GAC Time Out value are too high and should be reduced by whatever means available.

6.74 (T) GAC CONFLICTS DURATION FOR TDS <tds> #84

(See *TDS Real Time Activity* for COLLECTOR and ANALYZER options.)

This histogram is similar to the *GAC Pending Time For TDS <tds>* histogram. It gives a tight ***upper bound*** for the real time duration (elapsed time) of the GAC conflicts.

How to Use this Chart

To optimize response times, conflict rate and conflicts duration should be kept as low as possible (say less than 0.01 conflict/Commitment Unit).

For random conflicts, their duration should be about equal to the average duration of Commitment Units (see *Elapsed Time Per Commitment Unit For TDS <tds>*), since GAC locks are granted for the duration of the Commitment Unit.

Even a few long conflicts (see HIGHEST VALUE) can produce erratic response times, and thus they should be tracked and corrected.

6.75 (S) MATCHES WITHIN MEMORY/<dim> #85

This chart and the next two appear when the following conditions are met:

- SNAPMM option was selected for the data collection (DETAILED or EXTENDED level).
- <dimension-name> was active during the SBR session
- ANALYSIS MEMORY, <lm-name>, time, <dimension-name> was specified for data analysis (even if <lm-name> was not active during the SBR session).

  If MEMORY is specified instead of dimension-name (default parameter), these three charts are produced just once and refer to the whole memory.

  If ALL is specified instead of <dimension-name>, these charts produced for all dimensions that were active during the SBR session.

  NONE (default) or ALL may be specified instead of <lm-name>.

The SNAPMM mechanism is basically what could be called a "Stochastic Memory Sampler". At regular time intervals, a dedicated process of SBR computes a whole new set of ***random absolute addresses*** within the main memory. Then, for each of these addresses, SBR finds if the page frame is occupied or not. If the page frame is occupied, SBR identifies the virtual page to which it is allocated. If the page is allocated, an SBR event is produced giving the page full identity and its main attributes (static and dynamic ones at sampling time).

When there is a hole (i.e. an unallocated page frame), a hole counter is incremented and later saved on the collector file, after the whole set of absolute addresses has been processed. Thus, the SNAPMM mechanism delivers an ***unbiased*** statistic on the SPACE*TIME PRODUCT of the pages actually present in main memory.

How to Read this Chart

This diagram gives, during each time slot:

TOTAL MATCHES
the total number of random absolute addresses within main memory (dedicated I/O cache memory included, if any*) which have been sampled and analyzed by the SNAPMM mechanism.

PRESENT PAGE MATCHES
the number of random absolute addresses found to belong to a stable page present in memory, and whose complete identity and whole attributes were available. This includes the pages in ESW (eligible to be swapped) state and those in dedicated I/O cache (if any)*.

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* Dedicated I/O cache memory consists of one or more 256 Mbyte memory boards used exclusively by the Large Memory Cache function.

HOLE MATCHES — the number of random absolute addresses found to be within standard memory holes only (dedicated I/O cache memory holes excluded)*.

EXTENDED MEMORY HOLE MATCHES

the number of random absolute addresses found to be within dedicated I/O cache memory holes.

NOTE: A match on a dedicated I/O cache memory page simply means that the page was requested in dedicated I/O cache memory at segment creation. It may actually be allocated in standard memory if the I/O cache memory is full.

Additionally we find:

MISSED MATCH IDENTIFICATIONS
BIASED PAGE MATCHES

These values should always be null, unless some SBR event(s) have been lost during the data collection phase (given for debugging purpose only).

UNSTABLE MATCHES

the number of random absolute addresses which belonged to an unstable VMM container (page or hole). This value should always be negligible when compared to the TOTAL MATCHES value.

On a paged system, HOLE MATCHES and UNSTABLE MATCHES are only given for MEMORY (holes and unstable containers do not belong to a particular dimension).

How to Use this Chart

During any time slot, the ratio:

$$\frac{\texttt{PRESENT PAGE/MATCHES}}{\texttt{TOTAL MATCHES}}$$

gives the fraction of the instrumented memory which was actually loaded with pages.

This value is usually very similar to the total percentage of occupied memory printed in the *VMM Load and Memory Usage* chart (excluding the FIRMWARE part).

6.76 (S) MATCHED SEGMENTS LENGTH DISTRIBUTION WITHIN MEMORY/<dim> #86

(See *Matches Within Memory/<dim>* for COLLECTOR and ANALYZER options).

How to Read this Chart

This chart gives the overall distribution of segment length (in bytes), for those sampled in main memory at random absolute addresses, during the SBR time interval.

This distribution ***is not*** the overall distribution for segments present in memory since, when SBR samples segments at random absolute addresses, large segments have a greater probability of being found than small ones; this distribution is thus an upper-biased estimate of the actual distribution of the length of segments present in main memory.

How to Use this Chart

Although it is somewhat biased, this chart may be of very great help for analyzing memory overload problems due to unexpected (very) large segments (such as FORTRAN's COMMONS for instance).

6.77 (S) PRESENT SEG COUNTS PER LM-TYPE WITHIN MEMORY/<dim> #87

(See *Matches Within Memory/<dim>* for COLLECTOR and ANALYZER options).

How to Read this Chart

The segments in memory sampled at random by SBR are sorted according to load module then sharing Type (0, 2, 3, ...) then, on segmented memory only, location within memory (i.e. within TDS Areas, or not).

How to Use this Chart

The total COUNT of segments sampled in memory which belonged to a given load module is directly proportional to the SPACE*TIME PRODUCT of this load module (with a provision for the stochastic uncertainty).

It means for instance that:

- when two LMs had the same elapsed time during the SBR Time interval, the ratio of their respective COUNTs gives the ratio of their effective (private) memory consumption (i.e. a COUNT twice as large means twice as much memory occupied).
- when two LMs have the same memory behavior (consumption), the ratio of their respective COUNTs gives the ratio of their elapsed time within main memory (i.e. a COUNT twice as large means a double time spent in memory).

Using this chart, it is thus possible to identify which load modules account for most of the memory consumption (since, on average, only the Space*Time product matters).

In the case of an overloaded memory (too many missing pages) you may:

- add additional main memory
- admit simultaneously within memory only those jobs which have enough space to execute properly (control Scheduling Classes and Priorities, or for V2/V3, re-evaluate $SIZE values)
- optimize the memory consumption of the more greedy jobs (using this chart and the chart *Present Segments For LM <lm>*).

Since shared segments (types 0, 10) are not accountable to any particular LM (although they may be of use to only one of the LMs), you will have to estimate yourself which fraction of the shared page may have to be added to a given load module (depending on the kind of work it does) to obtain its total main memory occupancy. To do this, use the chart Present Segments For LM <lm>.

6.78 (S) PRESENT SEGMENTS FOR LM <name> WITHIN MEMORY/<dim> #88

This chart is output only if:

- SNAPMM option was selected for SBR data collection (DETAILED or EXTENDED level).
- <dimension-name> was active during the SBR session
- ANALYSIS MEMORY, <lm-name>, time, <dimension-name> was specified for data analysis
- <lm-name> was active during SBR session within <dimension-name>.

If ALL is specified instead of <lm-name>, the chart is produced for all the load modules that were active during SBR session within <dimension-name>.

If ALL is specified instead of <dimension-name>, then the chart is produced for all the dimensions where an occurrence of <lm-name> was active.

ALL for both parameters will produce one chart for each valid pair <load module, dimension>.

If MEMORY is specified instead of <dimension-name> (default), the chart accounts all occurrences of <lm-name>.

ALL and MEMORY will produce one chart for each active load module.

This chart is not produced if NONE is specified instead of lm-name (default).

How to Read this Chart

Within any LM, the COUNT of segments sampled by SBR at random absolute addresses is proportional to their respective SPACE*TIME PRODUCT.

For every sampled segment belonging to this LM we have:

Task/SM/LKU/STN-STE	the complete, non-ambiguous identity of the segment (see LINKER report for symbolic names correspondence).
ATTributes	the ***static*** ones of the sampled segment (see chart header for explanation).
SIZE	mean segment size, averaged on the number of matches for this segment. If the segment size changed during SBR session, the SIZE provided here is not the mean size of the segment over the whole session. Despite this bias, the SIZE value may be useful for detecting an unexpectedly large segment in the specified load module.
PP	average number of present pages for this segment. All the pages of a segment are not necessarily present; this figure shows how many pages are actually needed in memory.
COUNT	proportional to the Space*Time Product of the segment, during the SBR time interval.

How to Use this Chart

For LM with an (over) large memory consumption, this chart is used to identify among all the segments belonging to the LM those which weigh most in its cumulated memory occupancy. It may then be possible to optimize some procedures in order to reduce unnecessary wasted space.

Incidentally, this chart may also show that some unexpected segments are loaded in memory, following a programming error which has no functional drawback.

Assuming that the LM has been active along the whole SBR time interval, it is possible to compute the average effective SIZE of the LM during the interval. When doing so, remember that the TOTAL MATCHES of absolute addresses (whatever the LM) apply to the whole memory, whose effective size may be found in the *VMM Load and Memory Usage* chart (excluding the FIRMWARE part).

Thus, we obtain:

$$\text{LM-size} = \frac{\text{LM-count}^{(1)}}{\text{Total-matches}^{(2)}} \times \text{Memory-size}$$

IMPORTANT

Here again we obtain the overall Space*Time product of the page private to the LM (types 2, 3, 12) ***and not*** the size of shared segments (types 0, 10), which have possibly been recalled in memory for the sole benefit of this LM. Whether or not this has a negligible effect depends on the kind of work done by the LM.

(1) = TOTAL COUNT in chart PRESENT SEGMENTS FOR LM <lm> WITHIN MEMORY/<dim>

(2) = TOTAL MATCHES in chart MATCHED SEGMENTS LENGTH DISTRIBUTION WITHIN MEMORY/<dim>

6.79 (M) MSC USAGE #89

This chart gives, for every active MSP4370/MSM controller, its effective usage ratio and the corresponding I/O load.

It is output only if:

- the MSC (or EXTENDED) option is specified for the data collection
- I/Os have been made on a MSP4370/MSM controller
- the ANALYSIS MSC option has been specified for the analysis.

How to Read this Chart

In this chart, we study the effective load of every device string, called hereafter an MSC, which may be connected to the SBR Host through one or more PSIs (= MCxx). The name of the MSC is derived from that of the connected MC with lowest number; for instance, a dual PSI configuration with MC36 and MC37 connected to the same device string will correspond to MSC36.

A single data transfer may take place at a given time along a single device string (whatever the number of connected PSIs).

In the case of shared controllers (i.e. MSC-coupled systems), the statistics given hereafter account for all devices connected to the MSC, used by either or both systems.

For each MSP4370/MSM active along the SBR session (i.e. with at least one I/O served) we find:

BUSY	the total elapsed time when the MSC was either searching or transferring data, divided by the analysis interval duration; this time excludes the time spent in RPS location mode while looking for a given record. This figure is not available on MSM controllers.
IO/S	the averaged number of Seek Cylinder Channel commands executed per second. Since some specific Channel Programs may contain more than one Seek command, this number may differ slightly from the I/O count edited elsewhere by SBR (see *IO Per Controller* chart). Also, it includes the I/Os made through an alternate PSI connected to a coupled system, which this other I/O count does not.
KBYTES/S	the averaged number of Kbytes actually transferred to or from the MSC per second.

How to Use this Chart

This chart's main use is for checking the actual busy ratio of all MSCs (since when RPS is used on disks with large track sizes, the number of IO/s is a very poor estimate of the actual MSC load).

Consider for example a 40% loaded MSP4370 executing 4 KByte transfers on MSU1007s: if all I/Os are performed under RPS location mode, this MSC load corresponds roughly to an overall I/O rate of 170 I/Os per second, while without RPS the same load will be reached with only 37 I/Os per second*.

These limits should be decreased when good response times are of primary concern and/or when the MSC controls some very critical files/volumes (such as SYS.KNODET, BKSTs, SYS.OUT, swap files, ...).

A strong correlation should be observed between large disk service times (see *Service Time Per Volume* chart) and overloaded MSCs, assuming the disk seek lengths are reasonable (see *Seek Length* chart).

When an MSC is overloaded, look at the *Usage Per Media For MSCxx* chart to identify the connected devices which are consuming most of the MSC bandwidth.

---

* In RPS mode, the MSC is kept busy for a device only during the actual transfer of data, made at the device effective speed (roughly equal to track-size/rotation-period).

Thus the sensitivity to RPS increases in proportion to the ratio of the disk track size over the mean transfer length. To obtain good performance, the mean MSC busy ratio should stay under 30-40%, with peak values averaged over one minute periods well under 50-60% (see *MSCxx ACTIVITY* chart).

When RPS is not used, the MSC is also kept busy during the record search time (latency time) which is approximately equal to half the rotation period for random I/Os.

6.80 (M) USAGE PER MEDIA FOR MSC<xx> #90

(See *MSC Usage* for COLLECTOR and ANALYZER options.)

This chart complements the *MSC Usage* chart, and is to be looked at when some MSC has been found overloaded.

How to Read this Chart

This chart gives MSC usage statistics on a per device basis. The total MSC usage is the sum over all connected devices of those partial usage values. Each device is identified by its local name (= MSxx), and the name of the mounted volume when applicable.

In the case of Non-Standard volumes, the volume name is forced to its device name: ?MSxy.

In the case of shared controllers, some disks accessible only by the foreign system may be unknown to the SBR Host, and thus their Device/Volume names will be printed as: MS?? ?PC-xy, where xy is the LC number connecting the device to the MSC (the foreign PC number is then unknown). Also, the statistics given hereafter will then account for all devices connected to the MSC, used by either or both systems.

For each MSC-Device pair, we find:

- BUSY = the partial MSC usage ratio due to this only Device/Volume (not available on MSM).

- I/O = the total number of Seek Cylinder Channel commands executed by the MSC on this Device/Volume.

- KBYTES/IO = total number of KBytes transferred to or from this Device/Volume, divided by its total number of Seeks.

- R+W/IO = total number of Read or Write Channel Commands executed for this Device/Volume, divided by the number of Seeks. Most Channel Programs contain a single transfer command. This item is given for general information only.

- W/R+W = percentage of Write Commands among transfer commands. Given for general information only.

How to Use this Chart

A heavy load may result from a large number of I/Os (I/O=), and/or from transfers of long average length (KBytes/IO=), and/or from a large proportion of non-RPS I/Os (which should not happen for V5 systems and higher).

To alleviate the load of an MSC, one may:

- connect the most heavily loaded Device/Volume to some other (underloaded) MSC
- if not already done, use the dual ports provided on the MSU1007 devices of the overloaded MSC, and connect them to an additional MSP4370.
- remove some (very) active files from the most heavily loaded volumes (using the *Media-Files For All* chart, produced by the ANALYSIS ACTIVITY, LM, ALL command) and allocate them on some other (underloaded) MSC/Device.

The MSCs with an averaged load near or over prescribed limits should also be checked for excessive peak values using the ANALYSIS MSC, MSCxy [,Volume] command.

6.81 (M) MSC ERRORS OR ANOMALIES PER MEDIA #91

(See *MSC Usage* for COLLECTOR and ANALYZER options.)

This chart gives cumulated statistics for MSC/Device errors or anomalies. It should always be exploited in conjunction with a GCOS PRLOG report.

How to Read this Chart

For every MSC/Device/Volume with a significant error count, we find:

RETRIES	total number of retries after Read errors encountered on this Device/Volume. Such retries usually denote an altered media. The MSC is held busy for one full disk rotation period for each retry; the number of MSC automatic retries per single I/O is bounded to 33. More details about these errors are logged in PRLOG.
ALTERNATES	total number of implicit Seeks made on alternate tracks by the MSC in the case of defective track accesses. The MSC is kept busy during the whole duration of the implicit Seek and return.
RECONNECTS	when during the execution of some I/O the number of RPS misses reaches some (very) high value, the Channel Program is aborted and automatically reconnected by the MSC with no RPS and the highest priority level for MSC acquisition. The MSC is then kept busy for one full rotation period until completion of the transfer.
SLIPS	the total number of Channel commands Chaining Slips encountered by the MSC for this device. This value should always be negligible, unless the IOC is (very) heavily overloaded. Check with your Service Center the number of UNDERRUNs logged on PRLOG for this Device.

How to Use this Chart

This chart lists all the errors or anomalies which induce some undue additional MSC usage. They should occur at most very infrequently (say 1 per 100 000 I/Os except for Chaining Slips), or never.

When these anomalies can no longer be neglected, then for:

- Retries after Read error: since the media is somehow altered, the best solution is to avoid allocating files over the faulty tracks (reported in PRLOG) and to call the Service Center if it gets worse.

- Seek on alternate tracks: do not allocate any frequently accessed file over defective tracks.

- RPS time-out reconnection: it denotes a completely overloaded MSC (look at the BUSY percentage on the *MSC Usage* chart). The only solution is to decrease the MSC load.

- Chaining slip between CCE: this counter should remain below 0.2% of the I/Os. If not, it usually denotes some hardware/software malfunction, or a strongly overloaded IOC (depending on the number of UNDERRUNs logged in PRLOG). The MSC may also be overloaded.

6.82 (M) MSC<xx> ACTIVITY [FOR <volume>] #92

(See *MSC Usage* for COLLECTOR and ANALYZER options.)

This chart complements the previous three charts by giving the variations of the main parameter values along the analysis time interval.

How to Use this Chart

Although the averaged values of MSC load and error ratio may be well under the specified limits when computed over the whole analysis interval duration, peak values over one minute periods may exceed these limits when the workload is far from stationary.

Since most performance problems will come from system overload at peak usage hours, tuning decisions should be taken on the basis of peak values for critical parameters, and not only long term averaged ones.

All recommendations listed for previous MSC charts also apply here.

6.83 (U) BUFFER POOLS PERFORMANCE FOR LM <lm> #93

This chart appears only when the following conditions are met:

- UFAS option was selected for SBR data collection (DETAILED or EXTENDED level) and <lm-name> was active during the SBR session.
- ANALYSIS UFAS, <lm-name> was specified for the data analysis.

How to Read this Chart

This chart gives the list of all the UFAS files present in the Pool for the given load module.

For each file, its Pool name and its buffer SIZE present in Pool are given; moreover, this size is distributed between the BUSY size, which corresponds to the Buffers locked present in Pool by the Access Method (UFAS, IDS) while processing a primitive, and the DEFERRED UPDATES size, which corresponds to modified Buffers locked present in the Pool until commitment time.

Given also are the values of the HIT count (sum of all GETCI finding the requested CI present in the Pool) and of the time averaged efficiency Ratio computed as the number of GETCI finding the requested CI present in Pool (per second) divided by Buffer Size in the Pool (x 1000).

How to Use this Chart

The lowest Ratio (different from zero) constitutes a ***very loose upper-bound*** for the marginal Buffer Pool Efficiency, which is the number of additional saved I/Os per additional KByte allocated to the Buffer Pool.

Since the biggest I/O gains are obviously obtained for the first KBytes of the Buffer Pool, the greater the Pool size, the lower the global efficiency Ratio.

The Busy Buffers and the Deferred Updates are ***not swappable*** buffers; so the sum of Busy size and Deferred sizes for all files should not exceed 30 or 40 % of the whole Pool size.

If this is not achieved:

- increase the Buffer Pool (and Real Memory !) size
- look at the greatest contributors (files)

If some Deferred size appears much too big, you may suppress Deferred Updates for this file (be warned that this will increase the number of Before Journal and Data Base I/Os).

If some Busy size appears much too big, you may decrease the TDS Simultaneity Level (assuming it stays sufficient to maintain the maximum throughput), since the Busy value is proportional to the effective Simultaneity Level.

6.84 (U) <efn-name> IOS AND POOLSIZE FOR LM <lm> #94

(See *Buffer Pools Performance For LM <lm>* for COLLECTOR and ANALYZER options.)

How to Read this Chart

This diagram gives, during each time slot:

SIZE USED IN POOL
: the time-averaged buffer size allocated in the Pool for this file

BUSY BUFFERS
: part of the preceding Size composed of Busy Buffers

DEFERRED UPDATES
: part of the preceding Size composed of modified buffers with Deferred Update

PHYSICAL READ AND WRITE IO'S
: frequency of physical IOs made on the file

% OF READ AND WRITE HITS
: the Hit Ratios, computed as the number of hits divided by the sum of hits and physical IOs

How to Use this Chart

Since the workload may be far from stationary, this chart will allow you to check that the peak values over one minute period do not exceed the previously recommended limits.

6.85 (B) STATISTICS BY STEP #95

This chart gives information about resources used by every step. Steps are sorted according to the RON number, and, inside one RON, by the dynamic step number. (The dynamic step number is the order of execution inside one specific RON. The RON is a number identifying one specific job).

> **IMPORTANT**
>
> In the case of a CONCISE analysis on a time interval, the charts *Statistics By* account all steps completed before the end of the interval, whatever their start time.

At the end of the chart, global information is provided such as total CPU time, total number of jobs, etc.

From the left to the right, are printed:

RON	RON of the job (Run Occurrence Number).
START DATE TIME	Date and time of the beginning of the step (ALREADY STARTED if the step was already running when SBR was launched).
END DATE TIME	date and time of the end of the step. If the step has not been executed completely, SBR distinguishes between: - step not ended, because the CANCEL occurred before the end of the step (indicated by NOT ENDED). - step not ended, because the data collection has been aborted by another way (indicated by SHUTDOWN).
PGID	Process-Group identifier of the Job. All the steps of one Job have the same PGID number except some service steps (H_EXECUTE, H_WRITER, H_GTP). PGID is printed in hexadecimal characters.
CL	Class name
DSN	Dynamic Step Number.
LOAD MODULE NAME	name of the load module. It is truncated at 16 characters.
TYPE	indicates IOF, TDS, SERVICE steps; left blank for other steps (user batch).
CPU TIME	CPU time in seconds.
MISSING PAGES	number of missing pages.

I/O DISK	number of I/Os performed for that step on any disk.
I/O NOT DISK	number of I/Os performed for that step on tapes or any device but disks.
MAXSIZE-ALL	maximum size reached by the step (in K bytes).
MAXSIZE-LOCK	maximum size of locked data, reached by the step (in Kbytes). Note that MAXSIZE-ALL also includes the locked data.

6.86 (B) STATISTICS BY RON #96

This chart provides for each RON (Run Occurrence Number) the resources used, i.e. CPU time, I/O and missing page.

The headings are the same as for the chart *Statistics By Step*.

Instead of the lm-name, there are specified:

USER NAME	name of the user who submitted the job.
BILLING	billing under which the job was run.
NBR STP	number of steps executed in the job.

6.87 (B) STATISTICS BY USER, BILLING, PROJECT, CLASS #97-#100

These charts give for each parameter the resources used (CPU TIME, number of I/Os, number of missing pages).

The last lines of each chart give the cumulated values for the whole file:

- SBRFILE for the analyzer
- archival file for H_SBR_BILL.

How to Use these Charts

First, the accounting chart can be used to locate which steps consume the largest amounts of resources.

Second, in the case where a peak period has been detected by the chart *CPU and I/O Activity*, the accounting chart identifies which steps contributed most to this peak load.

Finally, the accounting chart can be used to verify the class of any step.

6.88 (D) READY TIME #101

This chart gives the total ready time (time spent by processes in the ready state, waiting for the CPU) consumed by service jobs (s character), TDS jobs (t character), IOF jobs (i character), and other jobs such as batch jobs (* character), expressed as a percentage of total CPU time. The ready time consumed (in seconds) is also provided.

Ready time figures can reveal contention for the CPU resource even if the CPU is not saturated, when many processes request the CPU at the same time.

6.89 (D) READY TIME PER LOAD MODULE #102

This chart gives the total ready time (time spent in the ready state, waiting for the CPU) consumed by each load module during the measurement session.

Ready time figures can reveal contention for the CPU resource even if the CPU is not saturated, when many processes request the CPU at the same time.

6.90 (D) EVENT TRACE #103

This chart gives a detailed trace of events occurring during the measurement session. The chart lists each event, with its ron.dsn, lm-name, and task name, and gives the amount of elapsed time and process time (if applicable).

If you are a GCOS 7 specialist, you can use this chart to diagnose specific synchronization or sequencing problems.

6.91 (C) CDP/HRP LOAD #104

This chart gives two types of information:

1. CPU time used by jobs, distributed between standard jobs and jobs having HRP/CDPi capability.

2. Real CPU load on each processor group, distributed between standard and HRP/CDPi processors.

A. SBR Stored Job Description

```
$JOB SBR;
$COMM '* COPYRIGHT (C) Bull S.A. 1988 * SBR JCL 33.00 * GCOS7 V5.0 * SEP 27, 1988 *';
$COMM '* SER F8898 * corr. BPB * STAR G62089 * corr. multi-volume *';
$VALUES CONCISE,,,,EFN=SBRFILE,SIZE=20,
RECSIZE=4096,CISIZE=4608,NBBUF=8,ANSIZE=150,FILESTAT=NIL,
DVC='',MD='',FSN='',AEFN=DUMMY,ADVC='',AMD='',ANLZ=YES,
ENDFILE=STOP,TIME=10,INTERVAL=NONE,VERBOSE=NO,
TDS=NO,LM=NONE,LIST='SHORT',KEY=,COMMAND=;
MVL MD1=&MD MD2='' MD3='' MD4='' MD5='' MD6='' MD7='' MD8='' MD9='' MD10='';
MODVL START=&1;
$COMM '

parameters:
  1 = BASIC/CONCISE/DETAILED/EXTENDED/BILL/ANLZ

  2,3,4 = SNAPIC, NSNAPIC, SNAPMM, NSNAPMM, UFAS, NUFAS, MSC, NMSC
          (EXTENDED includes UFAS AND MSC)

  EFN = external file name for the SBRFILE
  DVC = Device Class for the SBRFILE
  MD = MEDIA for the SBRFILE
  SIZE = size of SBRFILE, in cylinders
  RECSIZE, CISIZE = parameters of SBRFILE
  NBBUF = number of SBR buffers
  BPB = number of blocks per BFAS buffer

  COMMAND = command to be set into DINIT
  TDS = YES/NO  (measure TDS activity)
  LM = NONE/LM-name  (LM to analyze in detail)
  ANLZ = YES/NO
  ANSIZE = memory size for analysis
  ENDFILE = IGNORE/STOP/ANALYZE

  AEFN = external file name of the archival file
  ADVC,AMD = DVC and MEDIA of the archival file
';
LET SW5 0;
LET SW6 0;
$JUMP &1;
```

```
BILL:
STEP H_SBR_BILL,FILE=SYS.HLMLIB;
SIZE 150;
ASG UBILL,*UBILL;
ASG D3,&AEFN,DVC=&ADVC,MD=&AMD;
ASG D4,D4,FILESTAT=TEMPRY;
ALLOCATE D4,SIZE=1,INCRSIZE=1,UNIT=CYL;
DEFINE D4,CISIZE=3584,RECSIZE=124,RECFORM=F;
ENDSTEP;
$INPUT UBILL,PRINT,JVALUES;
BILL R,YYYY;
$ENDINPUT;
JUMP NO;


BASIC:
CONCISE:
DETAILED:
EXTENDED:
SEND '****** BEGIN OF SBR DATA COLLECTION ******';
COLLECT:
STEP H_SBR,FILE=SYS.HLMLIB,ELAPTIME=9998,DUMP=DATA, OPTIONS=&KEY;
ASG H_CR,*DINIT;
ASG LIB,SYS.HSLLIB,SHARE=DIR,ACCESS=READ;
ASG COPY,&EFN,DVC=&DVC,MD=(&MD1 &MD2 &MD3 &MD4 &MD5 &MD6 &MD7 &MD8 &MD9 &MD10),FSN=&FSN;
DEFINE COPY,CISIZE=&CISIZE,RECSIZE=&RECSIZE,RECFORM=F,NBBUF=2;
JUMP F&FILESTAT;
F:
ALLOCATE COPY,SIZE=&SIZE,UNIT=CYL;
FCAT:
SIZE 200;
ENDSTEP;
$INPUT DINIT,TYPE=DATASSF,PRINT,JVALUES;
&COMMAND
LIST &LIST;
OPTIONS RECSIZE=&RECSIZE,NBBUF=&NBBUF,START=&START;
OPTIONS ENDFILE=&ENDFILE;
INIT STANDARD,&1;
OPTIONS &2,&3,&4,&5,&6;
SET TDS,&TDS;
JUMP NOTDS,TDS,NE,YES;
INIT TDS;
LABL NOTDS;
$ENDINPUT;
JUMP CONTINUE;


JUMP OK SEV LE 2;
SEND '****** SBR DATA COLLECTION ABORTED ******';
OK:
SEND '****** END OF SBR DATA COLLECTION ******';
JUMP NORM SEV LE 3;
LET SW5 1;
NORM:
JUMP &ANLZ;


CANCEL:
SEND '** ERROR **  USE THE COMMAND:   SBR CANCEL';
JUMP NO;

YES:
ANLZ:
JUMP NO,SW6,EQ,1;
SEND '****** BEGIN OF SBR DATA ANALYSIS ******';
INVOKE SBR_JCL_ANALYSIS,SYS.HSLLIB,
       VALUES=(EFN=&EFN DVC=&DVC
              MD1=&MD1 MD2=&MD2 MD3=&MD3 MD4=&MD4
              MD5=&MD5 MD6=&MD6 MD7=&MD7 MD8=&MD8
              MD9=&MD9 MD10=&MD10
              FSN=&FSN AEFN=&AEFN ADVC=&ADVC
              AMD=&AMD ANSIZE=&ANSIZE);


$INPUT DANLZ,TYPE=DATASSF,PRINT,JVALUES;
SET VERBOSE,&VERBOSE;
ANALYSIS STANDARD,&1,&TIME;
```

```
BILL YYYYYY;
SET LM,&LM;
JUMP NOLM,LM,EQ,NONE;
ANALYSIS ACTIVITY,LM,&LM,&TIME;
ANALYSIS ACTIVITY,APPLICATION,&LM,&TIME;
ANALYSIS TDS,&LM,&TIME;
ANALYSIS UFAS,&LM,,&TIME;
ANALYSIS MEMORY,&LM,&TIME;
LABL NOLM;
SET INTERVAL,C"&INTERVAL";
JUMP NOTIME,INTERVAL,EQ,NONE;
TIME &INTERVAL;
LABL NOTIME;
$ENDINPUT;
SEND '****** END OF SBR DATA ANALYSIS ******';


JUMP NO SW5 NE 1;
SEND '****** RESUME SBR DATA COLLECTION ******';
LET SW5 0;
JUMP COLLECT;


NO:
$ENDJOB;
```

NOTE: For the JCL expansion of SBR_JCL_ANALYSIS, see Appendix B.

B. Expansion of JCL Sequence SBR_JCL_ANALYSIS

Expansion of SBR_JCL_ANALYSIS:

This JCL sequence calls the ANALYZER program H_ANSBR. This JCL is invoked either by the standard SBR job, or directly by *Specific Job Submission* (See Chapter 4).

```
$COMM '* COPYRIGHT (C) Bull S.A. 1988 * SBR_JCL_ANALYSIS 33.00 * GCOS7 V5.0 * JUN 24, 1988 *';
$COMM '* SER F8898 * STAR G62089 * corr. multi-volume *';
VALUES EFN=SBRFILE,DVC='',MD='',FSN='',ANSIZE=150, AEFN=DUMMY,ADVC='',AMD='';
MVL MD1=&MD MD2='' MD3='' MD4='' MD5='' MD6='' MD7='' MD8='' MD9='' MD10='';
STEP H_ANSBR,
     DUMP=DATA,
     FILE=(SYS.HLMLIB),CPTIME=9999998,LINES=99999998;
ASG H_CR,*DANLZ;
ASG LIB,SYS.HSLLIB,SHARE=DIR,ACCESS=READ;
ASG TAPE,&EFN,DVC=&DVC,MD=(&MD1 &MD2 &MD3 &MD4 &MD5 &MD6 &MD7 &MD8 &MD9
&MD10),FSN=&FSN,ACCESS=READ;
DEFINE TAPE,NBBUF=2,BPB=8;
ASG FILE_A,ANLZ,FILESTAT=TEMPRY;
ALLOCATE FILE_A,SIZE=2,INCRSIZE=1,UNIT=CYL;
DEFINE FILE_A CISIZE=3584 RECSIZE=154,RECFORM=F;
ALLOCATE D1,SIZE=1,INCRSIZE=1,UNIT=CYL;
ASG D1,D1,FILESTAT=TEMPRY;
DEFINE D1 CISIZE=3584 RECSIZE=92,RECFORM=F,NBBUF=2;
ALLOCATE D2,SIZE=1,INCRSIZE=1,UNIT=CYL;
ASG D2,D2,FILESTAT=TEMPRY;
DEFINE D2 CISIZE=3584 RECSIZE=92,RECFORM=F,NBBUF=2;
ALLOCATE D3,SIZE=1,INCRSIZE=1,UNIT=CYL;
ASG D3,D3,FILESTAT=TEMPRY;
DEFINE D3 CISIZE=3584 RECSIZE=124,RECFORM=F,NBBUF=2;
ALLOCATE D4,SIZE=1,INCRSIZE=1,UNIT=CYL;
ASG D4,D4,FILESTAT=TEMPRY;
DEFINE D4 CISIZE=3584 RECSIZE=124,RECFORM=F,NBBUF=2;
ASG D5,&AEFN,DVC=&ADVC,MD=&AMD;
ALLOCATE D5,SIZE=5,INCRSIZE=1,UNIT=CYL;
DEFINE D5 CISIZE=3584 RECSIZE=124,RECFORM=F,NBBUF=1;
SIZE &ANSIZE;
ENDSTEP;
```

C. List of SYSDEF's Vacant Entries

H_ACT_JINIT	A.97
H_ARM_EINIT	A.0C
H_AVAIL_JTAB	C.71
H_CC_DTAB	D.42
H_DCTLG_JINI	A.AE
H_DEBPR_ISL	A.AA
H_DFASG_JIKN	C.28
H_DV_DCLTAB	A.F5
H_DV_GENTAB	A.F9
H_DV_INIT2	C.6A
H_JRNAL_EFD1	C.70
H_MZ_JINIT	C.7E
H_OP_ILDCAT	A.82
H_OP_MG7G	A.CF
H_OPRTR_INSC	A.93
H_OPRTR_MG1G	D.17
H_OPRTR_MG2G	D.18
H_OPRTR_MG3G	D.19
H_OPRTR_MG4G	D.57
H_QC_DCBUF	D.41
H_SSA_EFCB	D.7A
H_SSA_EICPI	D.71
H_SSA_EICPM	D.72
H_SSA_EIGBE	D.73
H_SSA_EIGCI	D.74
H_SSA_EIGET	D.75
H_SSA_EIOP	D.76
H_SSA_EIRCI	D.77
H_SSA_EIRROR	D.78
H_SSA_JISLOP	D.79
H_SSM_LIAIS	D.7B
H_STD_KOSIC	D.13
H_TASKM_NOTQ	D.66
H_VMM_IINIT0	A.8F
JC_VMFCB	D.47

D. Upgrading From V3 to V5/V6/V7

UFAS Versions

- The UFAS access method available in V3A0/V3B0 systems is referred to simply as "UFAS" in this manual.

- The introduction under V3A7/V3B7 and V5/V6/V7 of the UFAS-EXTENDED product affects SBR in two ways:

  - the contents of some charts change, mainly under the chapter (T) TDS. Their interpretation and the suggested tuning actions vary accordingly. The TDS charts concerned are:

    UFAS/GAC activity
    Aborted TPRs
    GAC conflicts
    List of deadlocks

  - the UFAS instrumentation option of SBR and consequently the corresponding charts (chapter (U) UFAS) are available only with UFAS-EXTENDED.

The main functional differences between UFAS/GAC and UFAS-EXTENDED/GAC-EXTENDED are the following:

- the granularity of locking has been increased (mainly by the introduction of 'lockable' pseudo-resources) in such a way that no serialization can occur unless explicitly stated by a NON-CONCURRENT clause in Transaction Section of TDS Generation. TDS also uses this new facility to offer new functionalities, like Controlled Common Storages or User defined lockable pseudo-resources.

- the deadlock prevention/detection algorithm has been modified. Deadlocks are detected at the first occurrence: the last tenant is then aborted. If they happen to occur a second time, the younger tenants are aborted (switch to Die-Wait mode after a first fatal deadlock).

- the GAC static reservation mechanism has been upgraded to a dynamic one, leading to a better utilization of GAC table space, although this may lead to isolated CU aborts with Return Code = TABOV. Global throughput is nevertheless enhanced. In V6, the NUMLOCK parameter is ignored, and the regulation of the LOCTAB has been re-designed to anticipate overflows.

- 'CA Splitting' has been replaced by a local reorganization of the lowest level index. When the number of active entries in an index CI reaches a given value (computed by XUFAS access method), a CI Splitting is no longer possible. A new index CI is inserted, and the full index CI is split in two parts. This operation is similar to the UFAS 'CA Split', but data records are no longer moved, so there is much less impact on global performance. However, SBR still reports index CI reorganizations under the heading 'CA Split'.

Pagination vs Segmentation

- A segmented memory organization was supported by GCOS 7 Release V2/V3A. The transfer unit between the Main Memory and the Backing Store is the segment, which may be of any length (from 16 bytes to 4 Mbytes). Segments always lie on a single extent in memory, and they are allocated by VMM at any free location, so a segment occupies its exact size in memory.

- A paged segmented memory organization is supported by GCOS7 Releases V5/V6/V7: segments are mapped on fixed size (4 Kbytes) extents called pages. The page is normally the transfer unit between the Main Memory and the Backing Store. Segments are not necessarily contiguous in memory (they lie upon several pages, which may be allocated at different locations). VMM does not always load (or swap out) all the pages of a segment at once, so a segment may occupy less than its size in memory space (only those pages needed are present).

Very short segments should be avoided on such systems, in order to reduce wastage of memory space. For instance, a 256-byte segment will need a whole 4 Kbyte page.

Stacks are allocated with their maximum size, so stack overflows no longer occur.

SBR recognizes the type of memory management (Paged/Segmented) and adapts its outputs accordingly (e.g. VMM activity appears through segment fault rate on a segmented system, and page fault rate on a paged system).

E. Some Useful Formulae and Indicators

We summarize here some of the useful figures and thresholds mentioned in this guide. They are only given for quick reference purposes, and they should be used carefully when interpreting an SBR chart.

CPU Activity

saturation	: > 85 %
under-use	: < 50 %

I/O Subsystem Activity

MSC & Disk Unbalance Factor

Static	: < 1.5
Dynamic	: < 2.5

Disk overloaded

MS/FSA (on DPS 7000/Ax)	: > 10 IO/s
MS/B10	: > 20 IO/s
MS/FSA (LSS/MSUD)	: > 25 IO/s
MS/FSA (CDA7)	: > 50-70 IO/s

Disk Queue Length

Normal	: < 0.2
Contention	: > 0.4

% of Non-Waiting I/Os

Normal	: > 80%
Contention	: < 70%

Seek Length	: < 33% of disk size

MSC controller overloaded

Non-RPS	: > 40-50 IO/s
RPS	: variable

MSC controller Busy Ratio

Mean value	: < 30-40 %
Max value	: < 50-60 %

MSC anomalies:

	: < 1 per 100000 I/Os for anomalies
	: < 2 per 1000 for Chaining Slips

Real Time Activity

Application Mean Response Time
: < 3 seconds
: < 8 seconds for 90 % of exchanges

VMM Activity

Number of I/Os per Missing Page: <= 1

% of processes in VMM at peak period: < 5%

$$\frac{\text{(Nbr of Missing Pages) x (Mean nbr of I/Os per Missing Page)}}{\text{Nbr of Disk Connects}} < 15\%$$

$$\frac{\text{(CPU time per Missing Page) x (Nbr of Missing Pages)}}{\text{Total CPU Time}} < 10\ \%$$

TDS/GAC/UFAS Activity

TDS Delivery Time
: Normal if < 100 ms
: Insufficient simultaneity level if > 1000 ms

TDS Overloaded

$$\frac{\text{Mean number of waiting messages}}{\text{TDS Simultaneity}} > 40\%$$

% TDS simultaneities pending in GAC: < 5-10%

CPU	: < 250 ms per exchange (on DPS 7000/380)
TPR	: 1 to 3 per exchange
CU	: 1 to 1.5 per exchange
physical IO	: 5-15 per exchange
Miss. Page	: < 0.1 per exchange

Nbr of GAC Conflicts / Nbr of CUs

Normal	: < 1%
Contention	: > 3%

Nbr of Deadlocks / Nbr of CUs: < 0.1%

Nbr of CI splittings / Nbr of CUs: < 1 %

Locked pages/CU: 5-10

$$\frac{\text{Deferred size + Busy size}}{\text{UFAS Pool size}} < 30\text{-}40\ \%$$

Physical I/O on After Journal: < 1 per exchange

Physical I/O on Before Journal: < 1.5 per exchange

F. What To Do in the Case of SBR Malfunction

We list here the information to be enclosed when making a STAR concerning an SBR malfunction or system failure involving SBR.

Type of Information	**Problem Category**			
	System crash in SBR code	**JOB abort in SBR code**	**SBR abort**	**Analysis charts anomalies**
DP_SAVE	Yes	/	/	/
PRLOGC	(included)	Yes	Optional	Optional
SBRFILE(1)	Optional	Optional	Optional	Yes
Listings(2) JOR, outputs	Optional	Yes	Yes	Yes
LM Patch listings	(included)	Yes	Yes	Yes
Segment dump if available	A.64, A.65	A.64, A.65 D.37, D.38 D.48	/	/

(1) Note that the SBRFILE should be saved in 'logical' format using CREATE or LOAD_FILE utility (rather than SAVE_FILE utility).

(2) Enclose the whole listing.

G. Specimen Output

The output shown here was produced during one SBR session with a multi-dimensional workload (IOF, TDS, batch) on a DPS 7000/340.

The following INIT commands were used for the collection:

```
    INIT STANDARD EXTENDED;
    INIT TDS;
    OPTIONS SNAPIC SNAPMM;
```

The following ANALYZER commands were used:

```
SET       LOGELAPSED   YES;
SET       LOGRESPONSE  YES;
SET       LOGLIST      YES;
SET       CYLINDERS    YES;
ANALYSIS  STANDARD     DETAILED      5;
ANALYSIS  ACTIVITY     LM            TDX            5;
ANALYSIS  ACTIVITY     DIMENSION     TDS            5;
ANALYSIS  ACTIVITY     SYSTEM        ,              5;
ANALYSIS  USERSRA      TDX           A3C            5;
ANALYSIS  ACTIVITY     APPLICATION   TDX            5;
ANALYSIS  ACTIVITY     DISK          K058           5;
ANALYSIS  TDS          TDX           5;
ANALYSIS  MEMORY       TDX           5              ALL;
ANALYSIS  MSC          MC41          5;
ANALYSIS  UFAS         DBTX          TDX.DATA.BANK  5;
BILL      YYYYYY;
```

To avoid repetitions, ***only one example*** for each type of chart is presented. For cross-reference purposes, the chart numbers provided here are ***those used in Section 6***. (Remember that, in practice, SBR charts are numbered in the order they are produced and so their numbers may differ from one analysis to another, according to the selected options.)

#0 GENERAL INFORMATION

```
 SBR                                    GENERAL INFORMATION                                                      CHART      0
-------------------------------------------------------------------------------------------------------------------------------
BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

 NUMBER OF RECORDS RECEIVED BY THE ANALYZER =    7723

 NUMBER OF EVENTS =     988672

 NUMBER OF MISSED EVENTS (DETECTED BY THE COLLECTOR) =       0

 NUMBER OF SORTER GENERATED HOLES (PADDING EVENTS)   =       127
 NUMBER OF COLLECTOR GENERATED HOLES                 =      1326

   NUMBER OF DROPPED EVENTS (UNRECOVERABLE TIME)       =         0
   NUMBER OF DROPPED EVENTS (TOO LATE)                 =         0
   NUMBER OF DROPPED EVENTS (TOO EARLY)                =         0
   NUMBER OF SORTED EVENTS LATE WITHIN THEIR RECORD    =     26147
   NUMBER OF SORTED EVENTS LATE BEYOND THEIR RECORD    =    387850
 SORTER DELAY LINE SIZE IN EVENTS HAS BEEN FORCED TO :    65536

 SIZE OF COMMENTS                 67584
 SIZE OF VARIABLES                69632
 SIZE OF STATEMENTS              208896
 SIZE OF DECLARED NAMES          110592
 SIZE OF WORK AREA               643072
 COUNTERS OF ACCESS TO MEMORIZE FUNCTIONS      5893835   3568748     11477   4948813

 EVENT NUMBER   258    EV_HBR_PLAN              HBR PLAN DEFINITION                                   COUNT =       24
 EVENT NUMBER   260    EV_HBR_SNAPMINI          HBR : BEGIN OF MINITRACE                              COUNT =   101252
 EVENT NUMBER   261    EV_HBR_AINSTR                                                                  COUNT =   180080
 EVENT NUMBER   263    EV_HBR_SAMP_ROLLIN       SAMPLED ROLL-IN (1 PER CENT)                          COUNT =     4255
 EVENT NUMBER   264    EV_HBR_TRACE_POP_0       BLOCKING P-OP (1/2)                                   COUNT =     6654
 EVENT NUMBER   265    EV_HBR_TRACE_POP_1       BLOCKING P-OP (2/2)                                   COUNT =     6654
 EVENT NUMBER   266    EV_HBR_TRACE_VOP_0       UNBLOCKING V-OP (1/2) EXCEPT SIMULATED V              COUNT =     4862
 EVENT NUMBER   267    EV_HBR_TRACE_VOP_1       UNBLOCKING V-OP (2/2)                                 COUNT =     6605
 EVENT NUMBER   268    EV_HBR_TRACE_CHOP_0      CHOP (1/2)                                            COUNT =     8798
 EVENT NUMBER   269    EV_HBR_TRACE_CHOP_1      CHOP (2/2)                                            COUNT =     8798
 EVENT NUMBER   270    EV_HBR_TRACE_ROLLIN      ROLL-IN WITHIN DISPATCHES TRACE                       COUNT =     9980
 EVENT NUMBER   299    EV_HBR_SNAPIC            SNAPSHOT OF IC AND RUA                                COUNT =    68138
 EVENT NUMBER   300    EV_SBR_FILE_BEGIN        BEGINNING OF MEASUREMENTS (1/2)                       COUNT =        1
 EVENT NUMBER   301    EV_SBR_HEADER            BLOCK HEADER                                          COUNT =     7722
 EVENT NUMBER   303    EV_SBR_HOLE              HOLE                                                  COUNT =     1453
 EVENT NUMBER   305    EV_SBR_FILE_BEGIN_1      BEGINNING OF MEASUREMENTS (2/2)                       COUNT =        1
 EVENT NUMBER   306    EV_SBR_TIMEDEV           LOCAL TIME DEVIATION                                  COUNT =        1
 EVENT NUMBER   307    EV_SBR_CONTEXT_END       END OF CONTEXT SAMPLING                               COUNT =        1
 EVENT NUMBER   320    EV_SBR_FILE_END          SBR ANALYSIS : END OF SBRFILE                         COUNT =        1
 EVENT NUMBER   340    EV_SBR_PT                PROCESS TIME                                          COUNT =      203
 EVENT NUMBER   350    EV_SNAP_IWS              SNAPSHOT OF IWS                                       COUNT =      272
 EVENT NUMBER   351    EV_SNAP_COUNTERS         SNAPSHOT OF GLOBAL COUNTERS                           COUNT =      272
 EVENT NUMBER   352    EV_SNAP_SYS              SNAPSHOT OF SYSTEM COUNTERS                           COUNT =       68
 EVENT NUMBER   353    EV_SNAP_MULT             SNAPSHOT OF MULTIPROGRAMMING LEVEL                    COUNT =       68
```

#1 SUMMARY OF RESULTS

```
SBR                                  SUMMARY  OF  RESULTS                                                   CHART      1
-------------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

    0     GENERAL INFORMATION
    1     SUMMARY  OF  RESULTS
    2 (B) CONFIGURATION DESCRIPTION
    3 (B) CPU AND I/O ACTIVITY          NOT IDLE TIME (n.a. DPS7/x07)  TIME    = 2784.78 S  PERCENT = 138.3 %
                                        TOTAL CPU TIME                 TIME    = 2670.68 S  PERCENT = 132.6 %
                                              SERVICE JOBS             TIME    =  541.46 S  PERCENT = 26.90 %
                                              TDS      ''              TIME    = 1101.00 S  PERCENT = 54.70 %
                                              IOF      ''              TIME    =   28.90 S  PERCENT =  1.43 %
                                              Others (Batch...)        TIME    =  999.30 S  PERCENT = 49.64 %
                                        TOTAL I/O                      NUMBER  =   78759    FREQ    =   39.14
                                              SERVICE JOBS             NUMBER  =   22211    FREQ    =   11.03
                                              TDS      ''              NUMBER  =   40971    FREQ    =   20.36
                                              IOF      ''              NUMBER  =    1224    FREQ    =    0.60
                                              Others (Batch...)        NUMBER  =   14353    FREQ    =    7.13
    4 (B) VMM LOAD AND MEMORY USAGE     TOTAL MAIN MEMORY              MEAN    =32768.00    PERCENT = 100.0 %
                                        TOTAL USED MEMORY              MEAN    =22969.41    PERCENT = 70.09 %
                                              SYSTEM OVERALL           MEAN    =18636.82    PERCENT = 56.87 %
                                                     FIRMWARE          MEAN    =  548.00    PERCENT =  1.67 %
                                                     RESIDENT          MEAN    = 2012.00    PERCENT =  6.14 %
                                                     SERVICE           MEAN    = 5159.58    PERCENT = 15.74 %
                                                     SHARED            MEAN    =11465.23    PERCENT = 34.98 %
                                              TDS  PRIVATE             MEAN    = 2057.88    PERCENT =  6.28 %
                                              IOF    ''                MEAN    =  252.17    PERCENT =  0.76 %
                                              Others (Batch...)        MEAN    = 2055.76    PERCENT =  6.27 %
                                        % OF PROCESSES IN VMM          MEAN    =    0.21
    5 (B) RESPONSE TIME SUMMARY                                        NUMBER  =    6525    ENTRIES =        1
    6 (B) RESPONSE TIME DISTRIBUTION FOR ALL TDS APPLICATIONS          NUMBER  =    6525    MEAN   >> 3623.11 MS
    7 (B) DISK SUBSYSTEM DYNAMIC BEHAVIORHIGHEST     DISK THROUGHPUT   NUMBER  =   36487    FREQ    =   18.13
                                        2nd HIGHEST DISK THROUGHPUT    NUMBER  =   22534    FREQ    =   11.19
                                        3rd HIGHEST DISK THROUGHPUT    NUMBER  =    8465    FREQ    =    4.20
                                        AVERAGE     DISK THROUGHPUT    NUMBER  =   15089    FREQ    =    7.49
                                        AVERAGE     MSC  THROUGHPUT    NUMBER  =   12852    FREQ    =    6.38
    8 (C) MULTIPROGRAMMING LEVEL        TOTAL JOBS                     MEAN    =   11.52
                                              SERVICE                  MEAN    =    6.69
                                              TDS                      MEAN    =    0.92
                                              IOF                      MEAN    =    1.00
                                              Others (Batch...)        MEAN    =    2.91
                                        TOTAL PROCESSES                MEAN    =   80.64
                                              SERVICE                  MEAN    =   64.45
                                              TDS                      MEAN    =   12.04
                                              IOF                      MEAN    =    1.00
                                              Others (Batch...)        MEAN    =    3.14
                                        ACTIVE PROCESSES               MEAN    =   27.85
                                        IDLE PROCESSES                 MEAN    =   52.52
                                        READY PROCESSES                MEAN    =    4.05
                                        BUSY PROCESSORS                MEAN    =    1.60
    9 (C) MP AND DISK I/O ACTIVITY      TOTAL MISSING PAGES            NUMBER  =    1962    FREQ    =    0.97
                                              SERVICE JOBS             NUMBER  =     558    FREQ    =    0.27
                                              TDS      ''              NUMBER  =     378    FREQ    =    0.18
                                              IOF      ''              NUMBER  =     103    FREQ    =    0.05
                                              Others (Batch...)        NUMBER  =     923    FREQ    =    0.45
```

#2 CONFIGURATION DESCRIPTION

```
SBR    (B) BASIC                    CONFIGURATION DESCRIPTION                                                    CHART
---------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 95/02/03  09:15:02      END TIME = 95/02/03  09:30:02      DURATION = 00:15:00 =        900.  0 SECONDS

DEVICE TYPE = MS/D500                                  NUMBER =     8
DEVICE TYPE = MS/B10                                   NUMBER =    20
DEVICE TYPE = MS/FSA                                   NUMBER =   120
DEVICE TYPE = MT/T9/D1600/D6250                        NUMBER =     2
DEVICE TYPE = PR/PR54/FI/SI/H136                       NUMBER =     2
DEVICE TYPE = CL                                       NUMBER =    30
DEVICE TYPE = LN                                       NUMBER =     7
DEVICE TYPE = LT                                       NUMBER =    48
DEVICE TYPE = CT/M5                                    NUMBER =     2
DEVICE TYPE = CT/M5/C                                  NUMBER =     2
DEVICE TYPE = DI                                       NUMBER =     1
DEVICE TYPE = MF                                       NUMBER =    19
DEVICE TYPE = MC                                       NUMBER =    60
DEVICE TYPE = TC/M3                                    NUMBER =     1
DEVICE TYPE = TC/M5                                    NUMBER =     1
DEVICE TYPE = TC                                       NUMBER =     1

CPU SERIAL NUMBER = 88500004

HARDWARE MODEL = DPS 7000/870

GCOS7       V720       FIRMWARE   =   P1-44H       SOFTWARE = 7G63  W451         SM = W451      LM = W451

PROCESSORS =12/12    TIME COUNTER FOR CALIBRATION =    22.16      DEVIATION = + 0.70%

RPS option is on

UFAS-EXTENDED is available


HOST =      BYD2       LOCAL NODE =     BYD2       GENCOM NAME = BYD2


CONFIGURABLE MAIN MEMORY             SIZE =1048576 K BYTES
AVAILABLE MAIN MEMORY                SIZE =1048576 K BYTES

Configuration parameters: MAXJOB  = 9252  MULTLEV=  253  MAXTASK=  3500  MAXTFSIT=  6  MAXFILE= 2048   MAXDEF=  512
                          FILSHARE=   90  MAXCAT =  128  BJSIMU =    50  GAC LOCKSIZE= 309 K     GAC NBLOCKID= 5000

   08:51:42  ARM : dimension SYS      created
                                            RWGHT=100   BW=  0  MPL=( 50- 50)  XL=(  0-100)  PA=OFF   ICA=OFF   HO=OF

   08:51:42  ARM : dimension TDS      created
                                            RWGHT=100   BW=  0  MPL=( 50- 50)  XL=( 60- 99)  PA=OFF   ICA=ON    HO=OF

   08:51:42  ARM : dimension IOF      created
                                            RWGHT= 70   BW= 20  MPL=(  5-200)  XL=( 30- 69)  PA=OFF   ICA=OFF   HO=OF

   08:51:42  ARM : dimension BATCH    created
                                            RWGHT= 50   BW= 30  MPL=(250-250)  XL=( 10- 49)  PA=ON    ICA=OFF   HO=ON

   08:51:42  Processor IP00 available      IPU-M
   08:51:42  Processor IP01 available      IPU-M
   08:51:42  Processor IP02 available      IPU-M
   08:51:42  Processor IP03 available      IPU-M
   08:51:42  Processor IP04 available      IPU-M
   08:51:42  Processor IP05 available      IPU-M
   08:51:42  Processor EP06 available      COPRO
   08:51:42  Processor EP07 available      COPRO
   08:51:42  ARM mode = FULL
   08:53:40  I/O Server started (I/O Cache off),  size =     1024 K bytes
   08:53:40  I/O Server started (I/O Cache on),   size =   262144 K bytes
CONTROLLER MSCMO    TYPE = MSP       FW RELEASE = 96.01    MC
CONTROLLER MSCNH    TYPE = MSP       FW RELEASE = 96.01    MC
CONTROLLER MSCPI    TYPE = MSP       FW RELEASE = 96.01    MC
CONTROLLER MSCKJ    TYPE = MSP       FW RELEASE = 96.01    MC
CONTROLLER MSC01    TYPE = MSC-4A    FW RELEASE = 50.12    MC
CONTROLLER MSCPO    TYPE = MSP       FW RELEASE = 96.01    MC
CONTROLLER MSCM4    TYPE = MSP       FW RELEASE = 96.01    MC
CONTROLLER MSCK6    TYPE = MSP       FW RELEASE = 96.01    MC
CONTROLLER MSCP7    TYPE = MSP       FW RELEASE = 96.01    MC
CONTROLLER MSCN8    TYPE = MSP       FW RELEASE = 96.01    MC
CONTROLLER MSC08    TYPE = MSC-4A    FW RELEASE = 50.12    MC
CONTROLLER MSCM7    TYPE = MSP       FW RELEASE = 96.01    MC
CONTROLLER MSCL8    TYPE = MSP       FW RELEASE = 96.01    MC
CONTROLLER MSCM1    TYPE = MSP       FW RELEASE = 96.01    MC
CONTROLLER MSCN2    TYPE = MSP       FW RELEASE = 96.01    MC
CONTROLLER MSC06    TYPE = MSC-4A    FW RELEASE = 50.12    MC
```

#3 CPU AND I/O ACTIVITY

```
SBR    (B) BASIC                   CPU AND I/O ACTIVITY                                                        CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

SERVICE JOBS  : J=0, Reader(s), Writer(s), H_SBR,...
NOT IDLE TIME : Total CPU accounted time + System Firmware Time
                (not available on DPS7/x07; set to Total CPU Time.)
WARNING :
  CPU percentages on a n-processor vary between 0 and n * 100%
  (See 'PROCESSORS=' in the 'CONFIGURATION DESCRIPTION' chart).


                 0         1         2         3         4         5         6         7         8         9
                 0123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
89/02/11 15:18:45.ssssst**-.         .         .         .         .         .sssstt*  .         .         .
         15:23:45.sssssssssssttttt******************-    .         .         .sssssssssssttti********      .
         15:28:45.ssssssssssss************************************--         .sssssssssst************      .
         15:33:45.sssstttttttttttttttt***********************-     .         .sssttttttttttttt** .         .
         15:38:45.sssssttttttttttttttttttttttttttttt**-- .         .         .sssttttttttttttttttttttttt   .
         15:43:45.sssssttttttttttttttttttttttttttttti**--.         .         .sssttttttttttttttttttttttti  .
         15:47:17.ssstttttttttttti-  .         .         .         .         .sssstttt* .         .         .

NOT IDLE TIME (n.a. DPS7/x07)    1- 51 O      - =       4 %       TIME=  2784.78 S PERCENT=  138.35 %
TOTAL CPU TIME                   1- 51 O        =       4 %       TIME=  2670.68 S PERCENT=  132.68 %
      SERVICE JOBS               1- 51 O      s =       4 %       TIME=   541.46 S PERCENT=   26.90 %
      TDS      ''                1- 51 C      t =       4 %       TIME=  1101.00 S PERCENT=   54.70 %
      IOF      ''                1- 51 C      i =       4 %       TIME=    28.90 S PERCENT=    1.43 %
      Others (Batch...)          1- 51 C      * =       4 %       TIME=   999.30 S PERCENT=   49.64 %

TOTAL I/O                       61-110 O        =       2 PER S  NUMBER =     78759 FREQ =    39.14
      SERVICE JOBS              61-110 O      s =       2 PER S  NUMBER =     22211 FREQ =    11.03
      TDS      ''               61-110 C      t =       2 PER S  NUMBER =     40971 FREQ =    20.36
      IOF      ''               61-110 C      i =       2 PER S  NUMBER =      1224 FREQ =     0.60
      Others (Batch...)         61-110 C      * =       2 PER S  NUMBER =     14353 FREQ =     7.13
```

#4 VMM LOAD AND MEMORY USAGE

```
SBR    (B) BASIC                    VMM LOAD AND MEMORY USAGE                                                CHART      4
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 95/02/03  09:15:02      END TIME = 95/02/03  09:30:02      DURATION = 00:15:00 =       900.  0 SECONDS

TOTAL USED MEMORY is the sum of SYSTEM OVERALL, TDS PRIVATE, IOF PRIVATE, Others

SYSTEM OVERALL includes :
   - FIRMWARE : DPS7 Firmware
   - RESIDENT : GCOS7 permanent segments
   - SHARED   : type 0 or 10 segments (not resident)
   - SERVICE  : private segments from PGID=0 (not resident)
                or Service jobs (Writer(s), Reader(s), H_SBR,...).
TDS/IOF/Others PRIVATE  :
     segments private to load modules (types 2, 3, 12,...).

All sizes are in K bytes.

% of processes in VMM > 5% indicates memory overload.

                 0         1         2         3         4         5         6         7         8         9         0         1
                 01234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
95/02/03 09:16:02.rshhttttttttttttttttt*                                     .         .         .         .         .         .
         09:17:02.rshhttttttttttttttttt*                                     .         .         .         .         .         .
         09:18:02.rshhttttttttttttttttt*                                     .         .         .         .         .         .
         09:19:02.rshhttttttttttttttttt*                                     .         .         .         .         .         .
         09:20:02.rshhttttttttttttttttt*                                     .         .         .         .         .         .
         09:21:02.rshhttttttttttttttttt*                                     .         .         .         .         .         .
         09:22:02.rshhttttttttttttttttt*                                     .         .         .         .         .         .
         09:23:02.rshhttttttttttttttttt*                                     .         .         .         .         .         .
         09:24:02.rshhttttttttttttttttt*                                     .         .         .         .         .         .
         09:25:02.rshhttttttttttttttttt*                                     .         .         .         .         .         .
         09:26:02.rshhttttttttttttttttt*                                     .         .         .         .         .         .
         09:27:02.rshhttttttttttttttttt*                                     .         .         .         .         .         .
         09:28:02.rshhttttttttttttttttt*                                     .         .         .         .         .         .
         09:29:02.rshhttttttttttttttttt*                                     .         .         .         .         .         .
         09:30:02.rshhttttttttttttttttt*                                     .         .         .         .         .         .

TOTAL MAIN MEMORY                 1- 51 O        =      2 %       PERCENT =100.0 % MEAN =1048576.0
TOTAL USED MEMORY                 1- 51 O        =      2 %       PERCENT =42.95 % MEAN =450418.57
      SYSTEM OVERALL              1- 51 O        =      2 %       PERCENT = 6.83 % MEAN = 71651.33
             FIRMWARE             1- 51 O      f =      2 %       PERCENT = 0.29 % MEAN =  3072.00
             RESIDENT             1- 51 C      r =      2 %       PERCENT = 0.94 % MEAN =  9960.00
             SERVICE              1- 51 C      s =      2 %       PERCENT = 2.93 % MEAN = 30824.00
             SHARED               1- 51 C      h =      2 %       PERCENT = 2.65 % MEAN = 27795.33
      TDS  PRIVATE                1- 51 C      t =      2 %       PERCENT =34.58 % MEAN =362671.46
      IOF    ''                   1- 51 C      i =      2 %       PERCENT = 0.04 % MEAN =   420.00
      Others (Batch...)           1- 51 C      * =      2 %       PERCENT = 1.49 % MEAN = 15675.77

% OF PROCESSES IN VMM            61-110 O      v =   0.10 MEAN =    0.00
```

#5 RESPONSE TIME SUMMARY

```
SBR    (B) BASIC                    RESPONSE TIME SUMMARY                                                          CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

Definition of times:
   t1    = time when TNS/FEPS (or the simulator) issues a SEND to the application
   t2    = time when the application receives the message (RECEIVE)
   t3    = time when the application sends the first response
   t4    = time when TNS/FEPS (or the simulator) receives the first response
   t2n+1 = time when the application sends the last response (nth)
   t2n+2 = time when TNS/FEPS receives the last response corresponding to the message sent at t1

 TNS:      SEND                                                 1st RECEIVE                                   last RECEIVE
FEPS        t1                  t2                  t3                  t4                  t2n+1            t2n+2
      -----+-------------------+-------------------+--------------------+--------//---------+-----------------+--> ti
APPLICATION:                   RECEIVE           1st SEND                                 last SEND

           <....Delivery.......><......Service_1...><.....Delivery_2...>
           <............. Application Response Time .................>
                               <.................... Service_2 ................//........>
           <....................................... Response_2 ................//..........................>

The following figures are the <Application Response Time> ones ;
Only those found lower than 100 seconds are given below.

---------------------------------------------------------------------------------------------------------------
                                            !          !        VALUES  BETWEEN 0 AND 100000.0
                  VARIABLE                  ! TOTAL NBR!  NUMBER   NBR =0  SUM/1000     MEAN    MINIMUM  MAXIMUM
---------------------------------------------------------------------------------------------------------------
NODE=BP84  APPLICATION=TDX      TDS         !     6525 !     6436        0  23318.35  3623.11    53.55 97344.53
---------------------------------------------------------------------------------------------------------------
            **** TOTAL ****                 !     6525 !     6436        0  23318.35  3623.11    53.55 97344.53
---------------------------------------------------------------------------------------------------------------
```

#6 RESPONSE TIME DISTRIBUTION FOR ALL TDS APPLICATIONS

```
SBR    (B) BASIC                    RESPONSE TIME DISTRIBUTION FOR ALL TDS APPLICATIONS                     CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS


The following distribution is the <Application Response Time> one.
See Time definitions on 'RESPONSE TIME SUMMARY' above.

To be more specific, use 'ANALYSIS ACTIVITY,APPLICATION,<YourApplication>'.


LINES ARE NOT PRINTED WHEN THE CUMULATIVE PERCENTAGE REACHES  98%

VALUES BETWEEN 0 AND 100000 MS      LOWEST VALUE =  53.55 MS    HIGHEST VALUE = 97344. MS
                                    NUMBER =     6436     MEAN =  3623.11 MS

VALUES BETWEEN 0 AND 1.00+6 MS      LOWEST VALUE =  53.55 MS    HIGHEST VALUE = 339231 MS
                                    NUMBER =     6525     MEAN =  6493.61 MS


DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND 100000 MS
******************************
 BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
   1!     0!  1000!     15!  0.233!  0.233! **
   2!  1000!  2000!     12!  0.186!  0.419! *
   3!  2000!  3000!   3479! 54.055! 54.474! *************************************************************************
   4!  3000!  4000!   2604! 40.459! 94.934! *************************************************************************
   5!  4000!  5000!     85!  1.320! 96.255! *************
   6!  5000!  6000!     19!  0.295! 96.550! **
   7!  6000!  7000!     38!  0.590! 97.141! *****
   8!  7000!  8000!     43!  0.668! 97.809! ******
   9!  8000!  9000!     42!  0.652! 98.461! ******
```

#7 RESPONSE TIME DISTRIBUTION FOR IOF

```
SBR    (B) BASIC                    RESPONSE TIME DISTRIBUTION FOR IOF                                          CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 86/06/10  19:40:02   END TIME =  86/06/10  20:48:24   DURATION = 01:08:21 =       4101.779 SECONDS


The following distribution is the <Application Response Time> one.
See Time definitions on 'RESPONSE TIME SUMMARY' above.


LINES ARE NOT PRINTED WHEN THE CUMULATIVE PERCENTAGE REACHES  98%

VALUES BETWEEN 0 AND 100000 MS      LOWEST VALUE =   4.45 MS    HIGHEST VALUE = 65214. MS
                                    NUMBER =     2916     MEAN =   986.88 MS


DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND 100000 MS
******************************
 BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
   1!     0!  1000!   2610! 89.506! 89.506! **************************************************************************
   2!  1000!  2000!     89!  3.052! 92.558! ******************************
   3!  2000!  3000!     41!  1.406! 93.964! **************
   4!  3000!  4000!     27!  0.925! 94.890! *********
   5!  4000!  5000!      7!  0.240! 95.130! **
   6!  5000!  6000!      8!  0.274! 95.404! **
   7!  6000!  7000!     19!  0.651! 96.056! ******
   8!  7000!  8000!     22!  0.754! 96.810! *******
   9!  8000!  9000!      8!  0.274! 97.085! **
  10!  9000! 10000!      5!  0.171! 97.256! *
  11! 10000! 11000!      2!  0.068! 97.325!
  12! 11000! 12000!     12!  0.411! 97.736! ****
  13! 12000! 13000!      5!  0.171! 97.908! *
  14! 13000! 14000!      4!  0.137! 98.045! *
  15! 14000! 15000!      5!  0.171! 98.216! *
  16! 15000! 16000!      3!  0.102! 98.319! *
  17! 16000! 17000!      3!  0.102! 98.422! *
  18! 17000! 18000!      2!  0.068! 98.491!
  19! 18000! 19000!      4!  0.137! 98.628! *
  20! 19000! 20000!      3!  0.102! 98.731! *
  21! 20000! 21000!      3!  0.102! 98.834! *
  22! 21000! 22000!      3!  0.102! 98.936! *
```

#8 DISK SUBSYSTEM DYNAMIC BEHAVIOR

```
SBR    (B) BASIC                    DISK SUBSYSTEM DYNAMIC BEHAVIOR                                         CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

The dynamic disk load (un)balance is analyzed below.
Every minute, the I/O count of each disk is sampled, and the
following processing occurs :
  . The three disks with the highest throughput are extracted :
    '1' > '2' > '3'
  . The average I/O count per disk is computed over the only
    disks with non-null throughput : '*'
  . The average I/O count per disk controller is computed over
    the number of active disk controllers : 'c'

THROUGHPUTS are plotted in I/O per second.

                 0         1         2         3         4         5         6         7         8         9
                 0123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
89/02/11 15:18:45.***1111111         .         .         .         .         .         .ccc      .         .
         15:23:45.******2211111111111.         .         .         .         .         .ccccccc  .         .
         15:28:45.*****22111111111111.         .         .         .         .         .ccccccc  .         .
         15:33:45.*******222222111   .         .         .         .         .         .cccccc   .         .
         15:38:45.***************22222211111   .         .         .         .         .ccccccccc.         .
         15:43:45.************2222222221111    .         .         .         .         .ccccccccc.         .
         15:47:17.***1111  .         .         .         .         .         .         .cc       .         .

HIGHEST     DISK THROUGHPUT      1- 61 O      1 =      1 PER S  NUMBER =     36487 FREQ =    18.13
2nd HIGHEST DISK THROUGHPUT      1- 61 O      2 =      1 PER S  NUMBER =     22534 FREQ =    11.19
3rd HIGHEST DISK THROUGHPUT      1- 61 O      3 =      1 PER S  NUMBER =      8465 FREQ =     4.20
AVERAGE     DISK THROUGHPUT      1- 61 O      * =      1 PER S  NUMBER =     15089 FREQ =     7.49

AVERAGE     MSC  THROUGHPUT     71-110 O      c =      1 PER S  NUMBER =     12852 FREQ =     6.38
```

#9 MULTIPROGRAMMING LEVEL

```
SBR    (C) CONCISE                  MULTIPROGRAMMING LEVEL                                                      CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

Service jobs and processes : J=0, Reader(s), Writer(s), H_SBR, H_RUN,...

ACTIVE PROCESSES  : Running, Ready or Waiting for less than 5 seconds
IDLE PROCESSES    : Waiting for more than 5 seconds (Suspended ones excluded)
READY PROCESSES   : Running or Ready ones.
BUSY PROCESSORS   : Processors on which a process is running


                 0         1         2         3         4         5         6         7         8         9
                 0123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
89/02/11 15:18:45.sssssssi .         .         .         .ssssssssssssssssstt .         .         .aaaaiiiiiiiiiiiiii
         15:23:45.sssssssti*****     .         .         .sssssssssssssssssstttti*      .         .raaaaaaaaiiiiiiiiii
         15:28:45.ssssssssti********* .        .         .ssssssssssssssssssttttt**     .         .praaaaaaaiiiiiiiiii
         15:33:45.ssssssssti**       .         .         .sssssssssssssssssstttt        .         .paaaaaaiiiiiiiiiiii
         15:38:45.ssssssssti*        .         .         .sssssssssssssssssstttt        .         .paaaaaaiiiiiiiiiiii
         15:43:45.ssssssssti*        .         .         .sssssssssssssssssstttt        .         .raaaaaaiiiiiiiiiiii
         15:47:17.sssssssi  .        .         .         .ssssssssssssssssssstti.       .         .aaaaiiiiiiiiiiiiiii

TOTAL JOBS                     1- 39 O      =      1 MEAN =   11.52
      SERVICE                  1- 39 O    s =      1 MEAN =    6.69
      TDS                      1- 39 C    t =      1 MEAN =    0.92
      IOF                      1- 39 C    i =      1 MEAN =    1.00
      Others (Batch...)        1- 39 C    * =      1 MEAN =    2.91

TOTAL PROCESSES               41- 79 O      =      4 MEAN =   80.64
      SERVICE                 41- 79 O    s =      4 MEAN =   64.45
      TDS                     41- 79 C    t =      4 MEAN =   12.04
      IOF                     41- 79 C    i =      4 MEAN =    1.00
      Others (Batch...)       41- 79 C    * =      4 MEAN =    3.14

ACTIVE PROCESSES              81-110 O    a =      4 MEAN =   27.85
IDLE PROCESSES                81-110 C    i =      4 MEAN =   52.52
READY PROCESSES               81-110 O    r =      4 MEAN =    4.05
BUSY PROCESSORS               81-110 O    p =      4 MEAN =    1.60
```

#10 MP AND DISK I/O ACTIVITY

```
SBR    (C) CONCISE                  MP AND DISK I/O ACTIVITY                                                    CHART      10
-------------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

SERVICE JOBS  : J=0, Reader(s), Writer(s), H_SBR,...


                 0         1         2         3         4         5         6         7         8         9         0
                 01234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
89/02/11 15:18:45.s**      .         .         .         .         .         .sssstt*  .         .         .         .
         15:23:45.sssssssssssssssttti*********************         .         .sssssssssssttt********       .         .
         15:28:45.sssssssssti*********************       .         .         .sssssssssst***********       .         .
         15:33:45.s*       .         .         .         .         .         .sssttttttttttttt** .         .         .
         15:38:45.i        .         .         .         .         .         .sstttttttttttttttttttttttt   .         .
         15:43:45.i        .         .         .         .         .         .sssttttttttttttttttttttttt   .         .
         15:47:17.sssttttttttttttttttti****    .         .         .         .ssstttt  .         .         .         .

TOTAL MISSING PAGES              1- 51 O        =   0.06 PER S  NUMBER =      1962 FREQ =     0.97
      SERVICE JOBS               1- 51 O      s =   0.06 PER S  NUMBER =       558 FREQ =     0.27
      TDS      ''                1- 51 C      t =   0.06 PER S  NUMBER =       378 FREQ =     0.18
      IOF      ''                1- 51 C      i =   0.06 PER S  NUMBER =       103 FREQ =     0.05
      Others (Batch...)          1- 51 C      * =   0.06 PER S  NUMBER =       923 FREQ =     0.45

TOTAL DISK I/O                  61-110 O        =      2 PER S  NUMBER =     77331 FREQ =    38.43
      SERVICE JOBS              61-110 O      s =      2 PER S  NUMBER =     21607 FREQ =    10.73
      TDS      ''               61-110 C      t =      2 PER S  NUMBER =     40971 FREQ =    20.36
      IOF      ''               61-110 C      i =      2 PER S  NUMBER =       400 FREQ =     0.19
      Others (Batch...)         61-110 C      * =      2 PER S  NUMBER =     14353 FREQ =     7.13
```

#11 REAL TIME ACTIVITY

```
SBR    (C) CONCISE                  REAL TIME ACTIVITY                                                       CHART     17
------------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 97/07/25  14:07:35      END TIME = 97/07/25  14:42:01      DURATION = 00:34:25 =       2065.682 SECONDS


Input messages:   messages received by the applications.
Output messages:  messages sent by the applications.
Exchanges:        complete exchanges between terminals and/or applications. This figure may be lower than the previous
                  ones in case of asymmetric protocol (Send without turn).
                  (All exchanges started AND completed within the interval are accounted, whatever their response time)

For Time Definitions, refer to the chart 'RESPONSE TIME SUMMARY' above.
(Times above 100 seconds are not accounted)


                 0         1         2         3         4         5         6         7         8         9         0

12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
97/07/25 14:09:35.xoooo    .         .         .         .         .--------------++   .         .         .         .
         14:11:35.xoo      .         .         .         .         .--------------------+        .         .         .
         14:13:35.xooo     .         .         .         .         .---------------    .         .         .         .
         14:15:35.xoo      .         .         .         .         .-----++++.         .         .         .         .
         14:17:35.x        .         .         .         .         .---      .         .         .         .         .
         14:19:35.xo       .         .         .         .         .-------------------------+   .         .         .
         14:21:35.xooooo   .         .         .         .         .---------------------        .         .         .
         14:23:35.xooooooooo         .         .         .         .--------------+    .         .         .         .
         14:25:35.xoooo    .         .         .         .         .----++++ .         .         .         .         .
         14:27:35.xo       .         .         .         .         .---------------------        .         .         .
         14:29:35.xoo      .         .         .         .         .-----R   .         .         .         .         .
         14:31:35.xxoo     .         .         .         .         .----     .         .         .         .         .
         14:33:35.xxooooooooooooooooooooooo    .         .         .-R+++    .         .         .         .         .
         14:35:35.xo       .         .         .         .         .-----------------+++++       .         .         .
         14:37:35.o        .         .         .         .         .--------------     .         .         .         .
         14:39:35.oo       .         .         .         .         .------------------------     .         .         .
         14:41:35.oo       .         .         .         .         .--       .         .         .         .         .
         14:42:01.o        .         .         .         .         .---------------------------  .         .         .

Input messages                  1- 40 O      i =   1.60 PER S  NUMBER =      2899 FREQ =     1.40
Output messages                 1- 40 C      o =   1.60 PER S  NUMBER =     12946 FREQ =     6.26
Exchanges                       1- 40 O      x =   1.60 PER S  NUMBER =      2827 FREQ =     1.36

Application response time (2)  51-100 O      + =     50 MS MEAN =  598.61 MS
Application response time      51-100 O      R =     50 MS MEAN =  534.32 MS
Application service time       51-100 O      - =     50 MS MEAN =  530.27 MS
```

#12 CPU I/0 MP PER LOAD MODULE

SBR (C) CONCISE CPU I/O MP PER LOAD MODULE CHART 19

BEGIN TIME = 97/07/25 14:07:35 END TIME = 97/07/25 14:42:01 DURATION = 00:34:25 = 2065.682 SECONDS

Figures are accounted per LM, type, dimension, domain.

TOTAL NBR = Total number of activations for the LM

TOTAL 1 = Total CPU time in seconds
MEAN 1 = Mean CPU time in milliseconds, per activation

TOTAL 2 = Total number of physical disk I/O's (in thousands of I/O's); Cache hits are excluded.
MEAN 2 = Mean number of physical disk I/O's, per activation

TOTAL 3 = Total number of missing pages (in thousands of missing pages)
MEAN 3 = Mean number of missing pages, per activation

LM NAME	TYPE	DIMENSION	DOMAIN		CPU TIME		NUMBER OF DISK IO'S		MISSING PAGES	
	VARIABLE			! TOTAL NBR!	TOTAL 1	MEAN 1 !	TOTAL 2	MEAN 2 !	TOTAL 3	MEAN 3
AGIL30NOYAU	IOF	IOF	STANDARD!	15 !	2.61	174.33 !	0.34	22.80 !	0.26	17.46
ESS_RTCPULOAD2		BATCH	STANDARD!	1 !	8.15	8159.19 !	0.00	1.00 !	0.00	1.00
H_ABSENTEE		BATCH	STANDARD!	1 !	0.42	425.20 !	0.08	86.00 !	0.02	24.00
H_ARS	SRV	SYS	STANDARD!	1 !	0.00	0.00 !	0.00	0.00 !	0.00	0.00
H_CATALOG		BATCH	STANDARD!	33 !	2.41	73.13 !	0.70	21.27 !	0.43	13.24
H_CATALOG	IOF	IOF	STANDARD!	5 !	2.33	466.63 !	0.29	59.80 !	0.10	20.00
H_CMN		BATCH	STANDARD!	2 !	4.09	2049.11 !	1.03	518.00 !	0.06	31.00
H_CMN	IOF	IOF	STANDARD!	2 !	6.90	3452.23 !	0.79	399.00 !	0.07	36.00
H_DSAC	SRV	SYS	STANDARD!	1 !	3.14	3141.38 !	0.22	223.00 !	0.00	5.00
H_EDIT		BATCH	STANDARD!	1 !	0.19	191.90 !	0.07	74.00 !	0.02	23.00
H_EXDIR		BATCH	STANDARD!	1 !	0.05	50.41 !	0.01	13.00 !	0.01	10.00
H_EXECUTE	SRV	SYS	STANDARD!	1 !	1.95	1954.00 !	0.68	687.00 !	0.03	34.00
H_FSE	IOF	IOF	STANDARD!	2 !	7.16	3580.66 !	0.48	241.00 !	0.07	36.00
H_FW_LKI		BATCH	STANDARD!	1 !	42.17	42170.01 !	9.54	9549.00 !	0.02	20.00
H_GMP_AP		BATCH	STANDARD!	1 !	5.88	5887.11 !	0.53	530.00 !	0.00	0.00
H_GTP	SRV	SYS	STANDARD!	3 !	3.97	1325.10 !	1.89	630.33 !	0.06	23.00
H_HSL_SVR		BATCH	STANDARD!	4 !	0.06	15.19 !	0.00	1.50 !	0.00	0.00
H_IOF	IOF	IOF	STANDARD!	32 !	16.83	526.24 !	2.46	77.03 !	0.31	9.75
H_IOF	IOF	SYS	STANDARD!	6 !	1.83	306.36 !	0.04	7.16 !	0.01	2.66
H_IOFLOOP	IOF	IOF	STANDARD!	47 !	7.33	156.02 !	1.65	35.21 !	0.04	0.93
H_IOSER	SRV	SYS	STANDARD!	1 !	86.06	86069.42 !	0.00	5.00 !	0.00	4.00
H_IQS		BATCH	STANDARD!	1 !	6.85	6856.47 !	0.57	570.00 !	0.04	41.00
H_IQS	IOF	IOF	STANDARD!	3 !	27.24	9082.84 !	4.68	1562.33 !	0.38	128.66
H_JPPC1	SRV	SYS	STANDARD!	1 !	0.00	0.00 !	0.00	0.00 !	0.00	0.00
H_JVCAM	SRV	SYS	STANDARD!	1 !	0.88	885.97 !	0.00	7.00 !	0.00	0.00
H_LIBMAINT		BATCH	STANDARD!	27 !	10.25	379.74 !	3.70	137.25 !	0.49	18.14
H_LIBMAINT	IOF	IOF	STANDARD!	10 !	4.82	482.09 !	0.58	58.60 !	0.10	10.00
H_NCCD7	SRV	SYS	STANDARD!	1 !	17.69	17695.08 !	0.00	1.00 !	0.00	3.00
H_NUCLEUS	SRV	SYS	STANDARD!	1 !	110.65	110659.37 !	4.97	4971.00 !	16.47	16477.00
H_OMH	SRV	SYS	STANDARD!	1 !	9.23	9233.03 !	0.55	557.00 !	0.11	119.00
H_OPEN7		SYS	CDP1 !	5 !	33.11	6623.98 !	10.18	2037.60 !	1.08	216.80
H_OPEN7P		OPEN7	CDP1 !	5 !	246.56	49312.14 !	8.62	1725.40 !	55.08	11017.00
H_OPEN7R		OPEN7	CDP1 !	5 !	1.03	206.25 !	0.01	2.00 !	0.00	0.60
H_PT	IOF	IOF	STANDARD!	4 !	8.75	2189.50 !	0.07	18.25 !	0.05	13.50
H_RUN		BATCH	STANDARD!	3 !	0.54	181.82 !	0.15	52.00 !	0.05	18.33
H_RUN	SRV	SYS	STANDARD!	2 !	2.82	1410.80 !	0.87	435.00 !	0.04	20.50
H_SBR	SRV	SYS	STANDARD!	1 !	30.77	30774.26 !	0.56	561.00 !	0.02	24.00
H_SCANNER	IOF	IOF	STANDARD!	4 !	5.75	1439.26 !	7.21	1803.50 !	0.13	33.75
H_SI7	IOF	IOF	STANDARD!	1 !	1.74	1740.64 !	0.15	150.00 !	0.02	20.00
H_SI7_INSTAL		BATCH	STANDARD!	1 !	1.89	1894.72 !	0.25	256.00 !	0.02	26.00
H_SI7_VSER		BATCH	STANDARD!	1 !	0.02	24.76 !	0.00	3.00 !	0.00	0.00
H_SYSMAINT		BATCH	STANDARD!	11 !	8.88	807.39 !	1.58	143.90 !	0.13	12.18
H_SYSMAINT	IOF	IOF	STANDARD!	1 !	1.29	1296.13 !	0.17	176.00 !	0.00	9.00
H_TILS		SYS	STANDARD!	1 !	1.21	1219.79 !	0.42	423.00 !	0.27	275.00
H_TNS	SRV	SYS	STANDARD!	1 !	1.57	1576.86 !	0.00	0.00 !	0.00	0.00
H_TRCCL	SRV	SYS	STANDARD!	1 !	0.66	660.27 !	0.00	2.00 !	0.00	0.00
H_TWCOMM		BATCH	STANDARD!	1 !	0.00	5.61 !	0.00	0.00 !	0.00	0.00
H_TWRITER		BATCH	STANDARD!	2 !	0.14	73.34 !	0.00	0.00 !	0.00	0.00
H_UNIX_MOVELM		BATCH	STANDARD!	4 !	0.31	78.40 !	0.09	24.00 !	0.00	0.00
H_UTILITY		BATCH	STANDARD!	30 !	16.29	543.21 !	31.15	1038.36 !	0.46	15.53
H_UTILITY	IOF	IOF	STANDARD!	22 !	3.19	145.11 !	0.93	42.54 !	0.38	17.36
H_WRITER	SRV	SYS	STANDARD!	1 !	0.00	0.00 !	0.00	0.00 !	0.00	0.00
MML	TDS	TDS	STANDARD!	1 !	0.00	3.82 !	0.00	0.00 !	0.00	0.00
TEST_CPCONFS		BATCH	STANDARD!	1 !	0.09	90.67 !	0.00	9.00 !	0.00	1.00
XDQ7	TDS	TDS	STANDARD!	1 !	0.00	3.71 !	0.00	0.00 !	0.00	0.00
**** TOTAL ****			!	317 !	757.99	2391.13 !	98.45	310.58 !	76.97	242.82

#13 ARM LOAD CONDITION

```
SBR    (C) CONCISE                  ARM LOAD CONDITION                                                      CHART
-------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

This chart shows the system load as seen by ARM.

ARM mode may be BASIC (no load control) or FULL (system under load control). It may be changed to BASIC or FULL
by operator command MDRP. ARM enters DEGRADED mode if an incident occurs in FULL mode.

- System is said to be underused when the number of active step in each dimension is below the minimum MPL
  of these dimensions. In this mode ARM has a little influence on the System load.
- On a normally loaded system, ARM keeps the MPL of each dimension between the MPL range of this dimension.
- System is under thrashing when some of the following conditions are met:
  Backing Store is overloaded, or disk load is unbalanced, or there are too many processes in VMM,
  or VMM service time is too high (contention on BKST files). As a result, ARM reduces the MPLs of the dimensions.

The memory is constrained when the page-out activity exceeds a given threshold.
This means that the memory is too small to efficiently support the system load.

                 0         1         2         3         4         5         6         7         8         9
                 0123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
89/02/11 15:18:45. F       .         .         .         .         .         .         .         .         .
         15:23:45. F       .         .         .         .         .         .         .         .         .
         15:28:45. F       .         .         .         .         .         .         .         .         .
         15:33:45. F       .         .         .         .         .         .         .         .         .
         15:38:45. F       .         .         .         .         .         .         .         .         .
         15:43:45. F       .         .         .         .         .         .         .         .         .
         15:47:17. F       .         .         .         .         .         .         .         .         .

ARM mode : BASIC                 2-  3 O      B =      1 MEAN =    0.00
           FULL                  2-  3 O      F =      1 MEAN =    1.00
           DEGRADED              2-  3 O      D =      1 MEAN =    0.00

System usage: < underused        5-  6 O      < =   0.50
              = normal           5-  6 C      = =   0.50
              > thrashing        5-  6 C      > =   0.50

Constrained memory               8-  9 O      C =   0.50 MEAN =    0.05
```

#14 RESPONSE TIME PER TERMINAL / MAILBOX

```
SBR    (C) CONCISE                  RESPONSE TIME PER TERMINAL / MAILBOX                                    CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

 TOTAL NBR = Number of exchanges involving the terminal or mailbox
 VALUES    = Application response time in milliseconds

Warning : remote terminal or mailbox is left blank for all sessions
          already opened through a Datanet at SBR initiation time.

-----------------------------------------------------------------------------------------------------------------
                                            !          !        VALUES  BETWEEN 0 AND 100000.0
                  VARIABLE                  ! TOTAL NBR!  NUMBER   NBR =0  SUM/1000    MEAN    MINIMUM  MAXIMUM
-----------------------------------------------------------------------------------------------------------------
NODE = BP84 TERM =TILDTDX0                  !     6525 !     6436        0  23318.35  3623.11    53.55 97344.53
-----------------------------------------------------------------------------------------------------------------
            **** TOTAL ****                 !     6525 !     6436        0  23318.35  3623.11    53.55 97344.53
-----------------------------------------------------------------------------------------------------------------
```

#15 RESPONSE TIME PER TERMUSER

```
SBR    (C) CONCISE                RESPONSE TIME PER TERMUSER                                   CHART
-------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =      2012.771 SECONDS

 TOTAL NBR = number of exchanges involving the terminal user
 VALUES    = Application response time in milliseconds
```

VARIABLE	TOTAL NBR	VALUES BETWEEN 0 AND 100000.0					
		NUMBER	NBR =0	SUM/1000	MEAN	MINIMUM	MAXIMUM
TERMUSER= PERF0001	164	162	0	606.59	3744.38	909.50	93762.62
TERMUSER= PERF0002	164	162	0	606.97	3746.75	177.05	93769.65
TERMUSER= PERF0003	164	162	0	607.01	3746.99	1445.10	90280.66
TERMUSER= PERF0004	164	161	0	514.40	3195.08	944.12	13718.47
TERMUSER= PERF0005	164	161	0	513.25	3187.91	155.05	13267.79
TERMUSER= PERF0006	164	162	0	607.96	3752.87	164.01	97234.92
TERMUSER= PERF0007	164	162	0	616.31	3804.43	140.23	93397.16
TERMUSER= PERF0008	163	160	0	511.68	3198.01	144.94	13572.12
TERMUSER= PERF0009	163	160	0	512.42	3202.66	140.13	10745.76
TERMUSER= PERF0010	163	161	0	606.18	3765.10	271.38	95839.61
TERMUSER= PERF0011	164	162	0	608.46	3755.92	205.25	97344.53
TERMUSER= PERF0012	162	160	0	616.38	3852.40	550.23	93423.13
TERMUSER= PERF0013	163	161	0	605.12	3758.54	1037.51	94015.87
TERMUSER= PERF0014	162	159	0	512.73	3224.77	1973.16	11510.70
TERMUSER= PERF0015	162	160	0	604.66	3779.15	1758.97	93125.21
TERMUSER= PERF0016	163	161	0	608.96	3782.41	2428.12	90957.84
TERMUSER= PERF0017	164	162	0	596.84	3684.23	2475.75	87187.29
TERMUSER= PERF0018	164	161	0	508.57	3158.86	2425.31	10798.55
TERMUSER= PERF0019	164	161	0	506.35	3145.09	2418.31	10477.68
TERMUSER= PERF0020	163	161	0	602.51	3742.29	2418.46	93838.19
TERMUSER= PERF0021	164	161	0	511.47	3176.88	2437.34	10742.66
TERMUSER= PERF0022	162	160	0	574.07	3587.94	2392.48	65012.04
TERMUSER= PERF0023	163	160	0	513.21	3207.58	2440.90	11910.00
TERMUSER= PERF0024	163	161	0	607.43	3772.86	2432.57	93723.99
TERMUSER= PERF0025	163	161	0	619.87	3850.13	2426.04	63420.92
TERMUSER= PERF0026	161	159	0	599.73	3771.88	2418.48	63953.61
TERMUSER= PERF0027	164	162	0	600.86	3709.06	2464.07	91523.53
TERMUSER= PERF0028	163	161	0	578.73	3594.61	2573.20	65140.18
TERMUSER= PERF0029	163	161	0	618.90	3844.14	2432.90	86135.53
TERMUSER= PERF0030	162	160	0	588.22	3676.42	2493.78	59208.60
TERMUSER= PERF0031	162	160	0	588.03	3675.22	2496.47	46189.20
TERMUSER= PERF0032	163	161	0	601.52	3736.17	2464.20	64321.32
TERMUSER= PERF0033	163	161	0	574.12	3566.00	2429.53	43147.77
TERMUSER= PERF0034	162	160	0	582.20	3638.75	2264.59	50379.18
TERMUSER= PERF0035	162	160	0	604.57	3778.61	2386.08	95572.57
TERMUSER= PERF0036	163	161	0	609.78	3787.48	2342.93	74057.43
TERMUSER= PERF0037	163	161	0	624.42	3878.40	2291.96	89384.12
TERMUSER= PERF0038	162	160	0	624.90	3905.65	2568.77	92906.11
TERMUSER= PERF0039	162	160	0	612.27	3826.73	2455.04	93794.67
TERMUSER= PERF0040	167	165	0	610.50	3700.03	53.55	93879.61
**** TOTAL ****	6525	6436	0	23318.35	3623.11	53.55	97344.53

#16 LIST OF CONNECTIONS

```
SBR    (C) CONCISE                  LIST OF CONNECTIONS                                                       CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

TERMINAL NODE    : identifies the remote host or Datanet
TERMINAL MBX     : identifies the terminal or the remote application
APPLICATION NODE : normally the local node
APPLICATION MBX  : identifies the local application
TUSER            : terminal user identification
POOL             : buffer pool type (may be USER, BTNS, FNPS1 to FNPS5)

TYPE : Session type  XXXX
                     !!!!
                     !!!+--- Acceptor type  (A = application, T = terminal)
                     !++---- Dialog type    ( <> = two way,  -> = one way )
                     +------ Initiator type (A = application, T = terminal)

Warning : remote terminal or mailbox is left blank for all sessions
          already opened through a Datanet at SBR initiation time.
```

DISCONNECT TIME	CONNECT TIME	TERMINAL NODE	TERMINAL MBX	APPLICATION NODE	APPLICATION MBX	TUSER	POOL	TYPE
89/02/11 15:43:32	89/02/11 15:18:29	BP84	TILDTDX0	BP84	TDX	PERF0016	USER	A<>A
89/02/11 15:43:32	89/02/11 15:19:09	BP84	TILDTDX0	BP84	TDX	PERF0036	USER	A<>A
89/02/11 15:43:32	89/02/11 15:18:27	BP84	TILDTDX0	BP84	TDX	PERF0015	USER	A<>A
89/02/11 15:43:32	89/02/11 15:18:35	BP84	TILDTDX0	BP84	TDX	PERF0019	USER	A<>A
89/02/11 15:43:32	89/02/11 15:18:07	BP84	TILDTDX0	BP84	TDX	PERF0005	USER	A<>A
89/02/11 15:43:32	89/02/11 15:18:51	BP84	TILDTDX0	BP84	TDX	PERF0027	USER	A<>A
89/02/11 15:43:32	89/02/11 15:18:31	BP84	TILDTDX0	BP84	TDX	PERF0017	USER	A<>A
89/02/11 15:43:32	89/02/11 15:19:03	BP84	TILDTDX0	BP84	TDX	PERF0033	USER	A<>A
89/02/11 15:43:32	89/02/11 15:18:39	BP84	TILDTDX0	BP84	TDX	PERF0021	USER	A<>A
89/02/11 15:43:32	89/02/11 15:18:55	BP84	TILDTDX0	BP84	TDX	PERF0029	USER	A<>A
89/02/11 15:43:32	89/02/11 15:18:11	BP84	TILDTDX0	BP84	TDX	PERF0007	USER	A<>A
89/02/11 15:43:32	89/02/11 15:18:43	BP84	TILDTDX0	BP84	TDX	PERF0023	USER	A<>A
89/02/11 15:43:36	89/02/11 15:18:01	BP84	TILDTDX0	BP84	TDX	PERF0002	USER	A<>A
89/02/11 15:43:36	89/02/11 15:17:59	BP84	TILDTDX0	BP84	TDX	PERF0001	USER	A<>A
89/02/11 15:43:36	89/02/11 15:18:03	BP84	TILDTDX0	BP84	TDX	PERF0003	USER	A<>A
89/02/11 15:43:36	89/02/11 15:18:05	BP84	TILDTDX0	BP84	TDX	PERF0004	USER	A<>A
89/02/11 15:43:36	89/02/11 15:18:09	BP84	TILDTDX0	BP84	TDX	PERF0006	USER	A<>A
89/02/11 15:43:36	89/02/11 15:18:13	BP84	TILDTDX0	BP84	TDX	PERF0008	USER	A<>A
89/02/11 15:43:36	89/02/11 15:18:15	BP84	TILDTDX0	BP84	TDX	PERF0009	USER	A<>A
89/02/11 15:43:36	89/02/11 15:18:17	BP84	TILDTDX0	BP84	TDX	PERF0010	USER	A<>A
89/02/11 15:43:36	89/02/11 15:18:19	BP84	TILDTDX0	BP84	TDX	PERF0011	USER	A<>A
89/02/11 15:43:36	89/02/11 15:18:53	BP84	TILDTDX0	BP84	TDX	PERF0028	USER	A<>A
89/02/11 15:43:36	89/02/11 15:18:21	BP84	TILDTDX0	BP84	TDX	PERF0012	USER	A<>A
89/02/11 15:43:36	89/02/11 15:18:23	BP84	TILDTDX0	BP84	TDX	PERF0013	USER	A<>A
89/02/11 15:43:39	89/02/11 15:18:25	BP84	TILDTDX0	BP84	TDX	PERF0014	USER	A<>A
89/02/11 15:43:39	89/02/11 15:18:33	BP84	TILDTDX0	BP84	TDX	PERF0018	USER	A<>A
89/02/11 15:43:40	89/02/11 15:18:37	BP84	TILDTDX0	BP84	TDX	PERF0020	USER	A<>A
89/02/11 15:43:40	89/02/11 15:18:41	BP84	TILDTDX0	BP84	TDX	PERF0022	USER	A<>A
89/02/11 15:43:40	89/02/11 15:18:45	BP84	TILDTDX0	BP84	TDX	PERF0024	USER	A<>A
89/02/11 15:43:40	89/02/11 15:18:47	BP84	TILDTDX0	BP84	TDX	PERF0025	USER	A<>A
89/02/11 15:43:40	89/02/11 15:18:49	BP84	TILDTDX0	BP84	TDX	PERF0026	USER	A<>A
89/02/11 15:43:40	89/02/11 15:18:57	BP84	TILDTDX0	BP84	TDX	PERF0030	USER	A<>A
89/02/11 15:43:40	89/02/11 15:18:59	BP84	TILDTDX0	BP84	TDX	PERF0031	USER	A<>A
89/02/11 15:43:40	89/02/11 15:19:01	BP84	TILDTDX0	BP84	TDX	PERF0032	USER	A<>A
89/02/11 15:43:40	89/02/11 15:19:05	BP84	TILDTDX0	BP84	TDX	PERF0034	USER	A<>A
89/02/11 15:43:40	89/02/11 15:19:07	BP84	TILDTDX0	BP84	TDX	PERF0035	USER	A<>A
89/02/11 15:43:43	89/02/11 15:19:11	BP84	TILDTDX0	BP84	TDX	PERF0037	USER	A<>A
89/02/11 15:43:43	89/02/11 15:19:13	BP84	TILDTDX0	BP84	TDX	PERF0038	USER	A<>A
89/02/11 15:43:43	89/02/11 15:19:15	BP84	TILDTDX0	BP84	TDX	PERF0039	USER	A<>A
89/02/11 15:43:43	89/02/11 15:19:17	BP84	TILDTDX0	BP84	TDX	PERF0040	USER	A<>A

#17 CONNECTION TIME PER APPLICATION

```
SBR    (C) CONCISE                  CONNECTION TIME PER APPLIC.                                       CHART
----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

TOTAL NBR = number of connections completed under the corresponding application
VALUES    = duration (elapsed time) of the connection (in minutes)

----------------------------------------------------------------------------------------------------------------
                                            !          !        VALUES  BETWEEN 0 AND 10000.00
                  VARIABLE                  ! TOTAL NBR!  NUMBER   NBR =0  SUM/1000    MEAN    MINIMUM  MAXIMUM
----------------------------------------------------------------------------------------------------------------
NODE=BP84  APPLIC=TDX                       !       40 !       40        0      0.97    24.47    24.00    25.00
----------------------------------------------------------------------------------------------------------------
            **** TOTAL ****                 !       40 !       40        0      0.97    24.47    24.00    25.00
----------------------------------------------------------------------------------------------------------------
```

#18 CONNECTION TIME PER TERMINAL / MAILBOX

```
SBR    (C) CONCISE                  CONNECTION TIME PER TERMINAL / MAILBOX                                  CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

TOTAL NBR = number of connections completed on the corresponding terminal or mailbox
VALUES    = duration (elapsed time) of the connection (in minutes)

Warning : remote terminal or mailbox is left blank for all sessions
          already opened through a Datanet at SBR initiation time.

-----------------------------------------------------------------------------------------------------------------
                                            !          !        VALUES  BETWEEN 0 AND 10000.00
                  VARIABLE                  ! TOTAL NBR!  NUMBER   NBR =0  SUM/1000    MEAN    MINIMUM  MAXIMUM
-----------------------------------------------------------------------------------------------------------------
NODE=BP84  TERM=TILDTDX0                    !       40 !       40        0      0.97    24.47    24.00    25.00
-----------------------------------------------------------------------------------------------------------------
            **** TOTAL ****                 !       40 !       40        0      0.97    24.47    24.00    25.00
-----------------------------------------------------------------------------------------------------------------
```

#19 CONNECTION TIME PER TERMUSER

SBR (C) CONCISE CONNECTION TIME PER TERMUSER CHART

BEGIN TIME = 89/02/11 15:13:45 END TIME = 89/02/11 15:47:17 DURATION = 00:33:32 = 2012.771 SECONDS

TOTAL NBR = number of connections completed for the corresponding termuser
VALUES = duration (elapsed time) of the connection (in minutes)

VARIABLE	TOTAL NBR	VALUES BETWEEN 0 AND 10000.00					
		NUMBER	NBR =0	SUM/1000	MEAN	MINIMUM	MAXIMUM
TERMUSER = PERF0001	1	1	0	0.02	25.00	25.00	25.00
TERMUSER = PERF0002	1	1	0	0.02	25.00	25.00	25.00
TERMUSER = PERF0003	1	1	0	0.02	25.00	25.00	25.00
TERMUSER = PERF0004	1	1	0	0.02	25.00	25.00	25.00
TERMUSER = PERF0005	1	1	0	0.02	25.00	25.00	25.00
TERMUSER = PERF0006	1	1	0	0.02	25.00	25.00	25.00
TERMUSER = PERF0007	1	1	0	0.02	25.00	25.00	25.00
TERMUSER = PERF0008	1	1	0	0.02	25.00	25.00	25.00
TERMUSER = PERF0009	1	1	0	0.02	25.00	25.00	25.00
TERMUSER = PERF0010	1	1	0	0.02	25.00	25.00	25.00
TERMUSER = PERF0011	1	1	0	0.02	25.00	25.00	25.00
TERMUSER = PERF0012	1	1	0	0.02	25.00	25.00	25.00
TERMUSER = PERF0013	1	1	0	0.02	25.00	25.00	25.00
TERMUSER = PERF0014	1	1	0	0.02	25.00	25.00	25.00
TERMUSER = PERF0015	1	1	0	0.02	25.00	25.00	25.00
TERMUSER = PERF0016	1	1	0	0.02	25.00	25.00	25.00
TERMUSER = PERF0017	1	1	0	0.02	25.00	25.00	25.00
TERMUSER = PERF0018	1	1	0	0.02	25.00	25.00	25.00
TERMUSER = PERF0019	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0020	1	1	0	0.02	25.00	25.00	25.00
TERMUSER = PERF0021	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0022	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0023	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0024	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0025	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0026	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0027	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0028	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0029	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0030	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0031	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0032	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0033	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0034	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0035	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0036	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0037	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0038	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0039	1	1	0	0.02	24.00	24.00	24.00
TERMUSER = PERF0040	1	1	0	0.02	24.00	24.00	24.00
**** TOTAL ****	40	40	0	0.97	24.47	24.00	25.00

#20 LIST OF VOLUMES

```
SBR    (C) CONCISE                  LIST OF VOLUMES                                                             CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

   recognition        device   media                 device class                                 disk size
       time            name    name

89/02/11 15:13:53     DK11     MD2                   DK/DS/DD/SZ256/DCE/DCA/MD
89/02/11 15:13:53     DK01     MD1                   DK/DS/DD/SZ256/DCE/DCA/MD
89/02/11 15:13:53     MT01     TIMER                 MT/T9/D1600/D6250
89/02/11 15:13:53     MS07     FSA507                MS/M300/D500                               609120 Data Blocks
89/02/11 15:13:53     MS06     FSA506                MS/M300/D500                               609120 Data Blocks
89/02/11 15:13:53     MS05     FSA505                MS/M300/D500                               152280 Data Blocks
89/02/11 15:13:53     MS08     FSD508                MS/D500                                       707 Cylinders
89/02/11 15:13:53     MS04     FSD504  RSDT          MS/D500                                       707 Cylinders
89/02/11 15:13:53     MS03     FSD503  RSDT  SYSTEM  MS/D500                                       707 Cylinders
89/02/11 15:13:53     MS18     FSD518                MS/D500                                       707 Cylinders
89/02/11 15:13:53     MS17     FBO517  RSDT          MS/D500                                       707 Cylinders
89/02/11 15:13:53     MS16     FBO516                MS/D500                                       707 Cylinders
89/02/11 15:13:53     MS15     FBO515                MS/D500                                       707 Cylinders
89/02/11 15:13:53     MS14     FSD514        BKST    MS/D500                                       707 Cylinders
89/02/11 15:13:53     MS13     FSD513                MS/D500                                       707 Cylinders
89/02/11 15:13:53     MS11     FSD511                MS/D500                                       707 Cylinders
89/02/11 15:13:53     MS54     *MS54                 MS/M452
89/02/11 15:13:53     MS53     K060                  MS/M452                                       808 Cylinders
89/02/11 15:13:53     MS52     K058                  MS/M452                                       808 Cylinders
89/02/11 15:13:53     MS59     MSU559                MS/M500                                       840 Cylinders
89/02/11 15:19:44     MS54     K059                  MS/M452                                       808 Cylinders
```

#21 I/O PER VOLUME

```
SBR    (C) CONCISE                  I/O PER VOLUME                                                    CHART
-------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

DVC   = Device Class (e.g. MS for Mass Storage, MT for Magnetic Tape ...)
MEDIA = Volume name
Len   = mean IO length, in bytes


TOTAL COUNT =      77324     FREQUENCY (NUMBER OVER TIME DURATION) =    38.43 PER SECOND


DVC = MS/D500    Media = FBO517    #=    5483 =  7.090%  ##=      5483 =  7.090 %
DVC = MS/D500    Media = FSD503    #=   15237 = 19.705%  ##=     20720 = 26.796 %
DVC = MS/D500    Media = FSD504    #=    2411 =  3.118%  ##=     23131 = 29.914 %
DVC = MS/D500    Media = FSD511    #=    7716 =  9.978%  ##=     30847 = 39.893 %
DVC = MS/D500    Media = FSD514    #=    1664 =  2.151%  ##=     32511 = 42.045 %
DVC = MS/D500    Media = FSD518    #=    1585 =  2.049%  ##=     34096 = 44.094 %
DVC = MS/M452    Media = *MS54     #=       5 =  0.006%  ##=     34101 = 44.101 %
DVC = MS/M452    Media = K058      #=   18647 = 24.115%  ##=     52748 = 68.216 %
DVC = MS/M452    Media = K059      #=    3746 =  4.844%  ##=     56494 = 73.061 %
DVC = MS/M452    Media = K060      #=   20830 = 26.938%  ##=     77324 =100.000 %
```

#22 I/O CACHE STATISTICS *(from V6)*

```
 SBR    (C) CONCISE                  I/O CACHE STATISTICS                                                        CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 91/04/24  12:18:29      END TIME = 91/04/24  12:33:29      DURATION = 00:15:00 =        900.  0 SECONDS

Disk requests               includes all disk I/O requests, cached or not
                            this does not include Read-Ahead and Secondary Writes
Cache requests              includes only the requests to the I/O cache
Number of hits              number of cache hits
Mirror requests             includes all mirrored I/O requests, cached or not
Secondary Writes            number of secondary writes performed by the I/O server on mirror devices

Read Ahead                  number of Read Ahead I/Os performed by the I/O cache
Deferred Writes             number of Deferred Writes performed by the I/O cache


                 0         1         2         3         4         5         6         7         8         9         0

                 01234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
91/04/24 12:19:29.sssssssssssssss    .++++++++cccccccccccccc       .         .         .         .aaaa     .         .
         12:20:29.ssssssssssssssssss .++++++++cccccccccccccc       .         .         .         .         .         .
         12:21:29.ssssssssssssssssss .++++++++cccccccccccccc       .         .         .         .         .         .
         12:22:29.ssssssssssssssssss .++++++++cccccccccccccc       .         .         .         .aaaa     .         .
         12:23:29.ssssssssssssssssss .++++++++cccccccccccccc       .         .         .         .         .         .
         12:24:29.ssssssssssssssssss .++++++++cccccccccccccc       .         .         .         .aaaaaaaaaaaaaaaaa  .
         12:25:29.ssssssssssssssssss .++++++++cccccccccccccc       .         .         .         .aaaaaaaaaaaaaaaa   .
         12:26:29.ssssssssssssssssss .++++++++cccccccccccccc       .         .         .         .aaaaaaaaaaaaa      .
         12:27:29.ssssssssssssssssss .++++++++cccccccccccccc       .         .         .         .aaaa     .         .
         12:28:29.ssssssssssssssssss .++++++++cccccccccccccc       .         .         .         .aaaaaaaaaaaa       .
         12:29:29.ssssssssssssssssss .++++++++cccccccccccccc       .         .         .         .aaaaaaaaaaaaaa     .
         12:30:29.ssssssssssssssssss .++++++++cccccccccccccc       .         .         .         .aaaaaaaaaaaaaaaaaaa.
         12:31:29.ssssssssssssssssss .++++++++cccccccccccccc       .         .         .         .aaaaaaaaaaaaaaaaa  .
         12:32:29.ssssssssssssssssss .++++++++cccccccccccccc       .         .         .         .aaaa     .         .
         12:33:29.ssssssssssssssssss .++++++++cccccccccccccc       .         .         .         .aaaaaaaaaaaaaaaaa  .

Cache size (K bytes)            1- 20 O      s =  16384 MEAN =260701.2

Disk requests                  21- 50 O      r =     16 PER S  NUMBER =   4719077 FREQ =    85.52
 Cache requests                21- 50 O      c =     16 PER S  NUMBER =   2217153 FREQ =    40.18
  Number of hits               21- 50 O      + =     16 PER S  NUMBER =   1552472 FREQ =    28.13

Read Ahead                     81-110 O      a =   0.00 PER S  NUMBER =       248 FREQ =     0.00
Deferred Writes                81-110 C      d =   0.00 PER S  NUMBER =         0 FREQ =     0.00
```

#23 CONFIGURED RESOURCE USAGE *(from V7)*

```
SBR    (C) CONCISE                  (+) CONFIGURED RESOURCE USAGE                                               CHART     23
-------------------------------------------------------------------------------------------------------------------------
BEGIN TIME = 95/02/03  09:15:02      END TIME = 95/02/03  09:30:02      DURATION = 00:15:00 =        900.  0 SECONDS

                 0         1         2         3         4         5         6         7         8         9         0
                 01234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
95/02/03 09:16:02.                    ssssssssssssssss    tttttttttt          ffffffff            d         ccc
         09:17:02.                    ssssssssssssssss    tttttttttt          ffffffff            d         ccc
         09:18:02.                    ssssssssssssssss    tttttttttt          ffffffff            d         ccc
         09:19:02.                    ssssssssssssssss    tttttttttt          ffffffff            d         ccc
         09:20:02.                    ssssssssssssssss    tttttttttt          ffffffff            d         ccc
         09:21:02.                    ssssssssssssssss    tttttttttt          ffffffff            d         ccc
         09:22:02.                    ssssssssssssssss    tttttttttt          ffffffff            d         ccc
         09:23:02.                    ssssssssssssssss    tttttttttt          ffffffff            d         ccc
         09:24:02.                    ssssssssssssssss    tttttttttt          ffffffff            d         ccc
         09:25:02.                    ssssssssssssssss    tttttttttt          ffffffff            d         ccc
         09:26:02.                    ssssssssssssssss    tttttttttt          ffffffff            d         ccc
         09:27:02.                    ssssssssssssssss    tttttttttt          ffffffff            d         ccc
         09:28:02.                    ssssssssssssssss    tttttttttt          ffffffff            d         ccc
         09:29:02.                    ssssssssssssssss    tttttttttt          ffffffff            d         ccc
         09:30:02.                    ssssssssssssssss    tttttttttt          ffffffff            d         ccc

JOBS:     max                 1- 20 O       =   0.50 %       PERCENT =100.0 % MEAN =  9252.00
          used                1- 20 O     j =   0.50 %       PERCENT = 0.23 % MEAN =    22.00

STEPS:    max                21- 40 O       =   0.50 %       PERCENT =100.0 % MEAN =   253.00
          used               21- 40 O     s =   0.50 %       PERCENT = 8.30 % MEAN =    21.00

TASKS:    max                41- 60 O       =   0.50 %       PERCENT =100.0 % MEAN =  3500.00
          used               41- 60 O     t =   0.50 %       PERCENT =14.28 % MEAN =   500.00

FILES :   max                61- 80 O       =   0.25 %       PERCENT =100.0 % MEAN =  2048.00
          used               61- 80 O     f =   0.25 %       PERCENT =10.79 % MEAN =   221.00

DEFINES:  max                81- 90 O       =      1 %       PERCENT =100.0 % MEAN =   512.00
          used               81- 90 O     d =      1 %       PERCENT = 1.17 % MEAN =     6.00

CATALOGS: max                91-100 O       =      1 %       PERCENT =100.0 % MEAN =   128.00
          used               91-100 O     c =      1 %       PERCENT = 3.12 % MEAN =     4.00

BJSIMU:   max               101-110 O       =      1 %       PERCENT =100.0 % MEAN =    50.00
          used              101-110 O     b =      1 %       PERCENT = 0.00 % MEAN =     0.00
```

#24 GAC RESOURCE USAGE *(from V7)*

```
SBR    (C) CONCISE                  (+) GAC RESOURCE USAGE                                                        CHART
----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 95/02/03  09:15:02      END TIME = 95/02/03  09:30:02      DURATION = 00:15:00 =        900.  0 SECONDS


                 0         1         2         3         4         5         6         7         8         9
                 0123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
95/02/03 09:16:02.lllllllllllllllllllllllllllllllll                sssssssssssssssssssssssss
         09:17:02.lllllllllllllllllllllllllllllllll                sssssssssssssssssssssssss
         09:18:02.lllllllllllllllllllllllllllllllll                sssssssssssssssssssssssss
         09:19:02.lllllllllllllllllllllllllllllllll                sssssssssssssssssssssssss
         09:20:02.lllllllllllllllllllllllllllllllll                sssssssssssssssssssssssss
         09:21:02.lllllllllllllllllllllllllllllllll                sssssssssssssssssssssssss
         09:22:02.lllllllllllllllllllllllllllllllll                sssssssssssssssssssssssss
         09:23:02.lllllllllllllllllllllllllllllllll                sssssssssssssssssssssssss
         09:24:02.lllllllllllllllllllllllllllllllll                sssssssssssssssssssssssss
         09:25:02.lllllllllllllllllllllllllllllllll                sssssssssssssssssssssssss
         09:26:02.lllllllllllllllllllllllllllllllll                sssssssssssssssssssssssss
         09:27:02.lllllllllllllllllllllllllllllllll                sssssssssssssssssssssssss
         09:28:02.lllllllllllllllllllllllllllllllll                sssssssssssssssssssssssss
         09:29:02.lllllllllllllllllllllllllllllllll                sssssssssssssssssssssssss
         09:30:02.lllllllllllllllllllllllllllllllll                sssssssssssssssssssssssss

LOCKIDS:  max                    1- 50 O       =   0.24 %       PERCENT =100.0 % MEAN =  5000.00
          used                   1- 50 O     l =   0.24 %       PERCENT = 7.80 % MEAN =   390.08

LOCKSIZE: max                   51-100 O       =   0.04 %       PERCENT =100.0 % MEAN =   309.00
  (kb)    used                  51-100 O     s =   0.04 %       PERCENT =11.30 % MEAN =    34.92
```

#25 I/O PER CONTROLLER

```
SBR    (D) DETAILED                 I/O PER CONTROLLER                                                       CHART
------------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS


TOTAL COUNT =      78551     FREQUENCY (NUMBER OVER TIME DURATION) =    39.04 PER SECOND


Controller = MSC0C    # =    17732 =  22.57 %    ## =    17732 =  22.57 %    Frequency =    8.80 I/O per second
Controller = MSC0D    # =     9509 =  12.10 %    ## =    27241 =  34.67 %    Frequency =    4.72 I/O per second
Controller = MSC05    # =    21080 =  26.83 %    ## =    48321 =  61.51 %    Frequency =   10.47 I/O per second
Controller = MSC06    # =     7135 =   9.08 %    ## =    55456 =  70.59 %    Frequency =    3.54 I/O per second
Controller = MSC11    # =    22103 =  28.13 %    ## =    77559 =  98.73 %    Frequency =   10.98 I/O per second
Controller = URC01    # =      868 =   1.10 %    ## =    78427 =  99.84 %    Frequency =    0.43 I/O per second
Controller = URC02    # =      124 =   0.15 %    ## =    78551 = 100.00 %    Frequency =    0.06 I/O per second


Controller = MSC11    # =    22103 =  28.13 %    ## =    22103 =  28.13 %    Frequency =   10.98 I/O per second
Controller = MSC05    # =    21080 =  26.83 %    ## =    43183 =  54.97 %    Frequency =   10.47 I/O per second
Controller = MSC0C    # =    17732 =  22.57 %    ## =    60915 =  77.54 %    Frequency =    8.80 I/O per second
Controller = MSC0D    # =     9509 =  12.10 %    ## =    70424 =  89.65 %    Frequency =    4.72 I/O per second
Controller = MSC06    # =     7135 =   9.08 %    ## =    77559 =  98.73 %    Frequency =    3.54 I/O per second
Controller = URC01    # =      868 =   1.10 %    ## =    78427 =  99.84 %    Frequency =    0.43 I/O per second
Controller = URC02    # =      124 =   0.15 %    ## =    78551 = 100.00 %    Frequency =    0.06 I/O per second
```

#26 I/O PER CONTROLLER AND MEDIA

```
SBR    (D) DETAILED                 I/O PER CONTROLLER AND MEDIA                                            CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

TOTAL COUNT =      78551     FREQUENCY (NUMBER OVER TIME DURATION) =    39.04 PER SECOND

Controller = MSC0C  Device = MC0C  Media = *MSC0C  #=     124 =  0.157%  ##=       124 =  0.157 %
Controller = MSC0C  Device = MS03  Media = FSD503  #=   15221 = 19.377%  ##=     15345 = 19.535 %
Controller = MSC0C  Device = MS04  Media = FSD504  #=    2387 =  3.038%  ##=     17732 = 22.573 %
Controller = MSC0D  Device = MC01  Media = *MSC0D  #=     124 =  0.157%  ##=     17856 = 22.731 %
Controller = MSC0D  Device = MS11  Media = FSD511  #=    5665 =  7.211%  ##=     23521 = 29.943 %
Controller = MSC0D  Device = MS14  Media = FSD514  #=     744 =  0.947%  ##=     24265 = 30.890 %
Controller = MSC0D  Device = MS17  Media = FBO517  #=    2294 =  2.920%  ##=     26559 = 33.811 %
Controller = MSC0D  Device = MS18  Media = FSD518  #=     682 =  0.868%  ##=     27241 = 34.679 %
Controller = MSC05  Device = MS52  Media = K058    #=     589 =  0.749%  ##=     27830 = 35.429 %
Controller = MSC05  Device = MS53  Media = K060    #=   20491 = 26.086%  ##=     48321 = 61.515 %
Controller = MSC06  Device = MC12  Media = *MSC06  #=     124 =  0.157%  ##=     48445 = 61.673 %
Controller = MSC06  Device = MS11  Media = FSD511  #=    2051 =  2.611%  ##=     50496 = 64.284 %
Controller = MSC06  Device = MS14  Media = FSD514  #=     899 =  1.144%  ##=     51395 = 65.428 %
Controller = MSC06  Device = MS17  Media = FBO517  #=    3162 =  4.025%  ##=     54557 = 69.454 %
Controller = MSC06  Device = MS18  Media = FSD518  #=     899 =  1.144%  ##=     55456 = 70.598 %
Controller = MSC11  Device = MS52  Media = K058    #=   18042 = 22.968%  ##=     73498 = 93.567 %
Controller = MSC11  Device = MS53  Media = K060    #=     310 =  0.394%  ##=     73808 = 93.961 %
Controller = MSC11  Device = MS54  Media = K059    #=    3751 =  4.775%  ##=     77559 = 98.737 %
Controller = URC01  Device = LN02  Media = *LN02   #=     868 =  1.105%  ##=     78427 = 99.842 %
Controller = URC02  Device = PR11  Media = I10000  #=     124 =  0.157%  ##=     78551 =100.000 %
```

#27 DISK QUEUE LENGTH

```
SBR    (D) DETAILED                 DISK QUEUE LENGTH                                                    CHART
-------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =      2012.771 SECONDS

TOTAL NBR = Number of I/O requests for the media
VALUES    = Queue Length seen by the requester, at the time of
            the request

-------------------------------------------------------------------------------------------------------------
                                            !          !        VALUES  BETWEEN 0 AND 100000.0
                  VARIABLE                  ! TOTAL NBR!  NUMBER   NBR =0  SUM/1000     MEAN    MINIMUM  MAXIMUM
-------------------------------------------------------------------------------------------------------------
DVC = MS/D500    Media = FBO517             !     5483 !    5483     5015      0.51     0.09      0.00     3.00
DVC = MS/D500    Media = FSD503             !    15237 !   15237     9968      9.43     0.61      0.00     6.00
DVC = MS/D500    Media = FSD504             !     2411 !    2411     1919      0.60     0.25      0.00     3.00
DVC = MS/D500    Media = FSD511             !     7716 !    7716     7716      0.00     0.00      0.00     0.00
DVC = MS/D500    Media = FSD514             !     1664 !    1664     1543      0.13     0.07      0.00     2.00
DVC = MS/D500    Media = FSD518             !     1585 !    1585     1464      0.12     0.07      0.00     1.00
DVC = MS/M452    Media = *MS54              !        5 !       5        5      0.00     0.00      0.00     0.00
DVC = MS/M452    Media = K058               !    18647 !   18647     2655     51.92     2.78      0.00    11.00
DVC = MS/M452    Media = K059               !     3746 !    3746     2602      2.33     0.62      0.00     6.00
DVC = MS/M452    Media = K060               !    20830 !   20830     1480     68.23     3.27      0.00    10.00
-------------------------------------------------------------------------------------------------------------
            **** TOTAL ****                 !    77324 !   77324    34367    133.29     1.72      0.00    11.00
-------------------------------------------------------------------------------------------------------------
```

#28 SERVICE TIME PER VOLUME

```
SBR    (D) DETAILED                 SERVICE TIME PER VOLUME                                                  CHART
---------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

TOTAL NBR = Number of measures for the corresponding media
            (Samples are taken at a variable frequency, generally every 31 I/O's)
MEAN      = mean Service Time of the media (time spent between connect and
            end-of-I/O, in milliseconds)

The sum is not significant.

To get the occupation rate of one media, multiply MEAN by the number of I/O's
(given in the above chart 'I/O PER VOLUME'), and divide by DURATION.
```

VARIABLE		TOTAL NBR	VALUES BETWEEN 0 AND 100000.0 NUMBER	NBR =0	SUM/1000	MEAN	MINIMUM	MAXIMUM
DVC = MS/D500	Media = FBO517	176	176	0	3.68	20.94	4.59	122.99
DVC = MS/D500	Media = FSD503	491	491	0	10.72	21.85	2.35	140.66
DVC = MS/D500	Media = FSD504	77	77	0	2.34	30.44	5.86	195.59
DVC = MS/D500	Media = FSD511	7716	7716	0	130.18	16.87	6.71	142.18
DVC = MS/D500	Media = FSD514	53	53	0	1.88	35.54	6.73	129.31
DVC = MS/D500	Media = FSD518	51	51	0	4.10	80.43	2.70	183.11
DVC = MS/M452	Media = K058	601	601	0	27.87	46.38	7.91	154.15
DVC = MS/M452	Media = K059	121	121	0	4.17	34.47	3.87	85.84
DVC = MS/M452	Media = K060	671	671	0	25.38	37.83	7.14	76.36
**** TOTAL ****		9957	9957	0	210.36	21.12	2.35	195.59

#29 SERVICE TIME PER FILE

```
 SBR    (D) DETAILED                (+) SERVICE TIME PER FILE                                                 CHART
-----------------------------------------------------------------------------------------------------------------------

 BEGIN TIME = 89/02/11  15:30:00   END TIME =  89/02/11  15:40:00   DURATION = 00:10:00 =       600.000 SECONDS

St = mean I/O service time for the file, in milliseconds
#  = number of samples taken for this file

Only physical I/Os are accounted (Cache hits excluded)


TOTAL COUNT =      3584      FREQUENCY (NUMBER OVER TIME DURATION) =  5.97 PER SECOND


LN  *LNO2   *LNO2                                               St=  564.00 ms  #=       6
MC  *MSCOC  *MSCOC                                              St=    1.00 ms  #=       1
MC  *MSCOD  *MSCOD                                              St=    2.00 ms  #=       1
MC  *MSCO6  *MSCO6                                              St=    1.00 ms  #=       1
MS  FB0517  SYS.KNODET                               BFAS NONE  St=   25.00 ms  #=       1
MS  FB0517  SYS.OUT                                  BFAS LKQD  St=   15.40 ms  #=      10
MS  FB0517  SYS.SPOOL0                               BFAS LKQD  St=   17.00 ms  #=       1
MS  FB0517  SYS.SPOOL1                               BFAS LKQD  St=   14.50 ms  #=       2
MS  FSD503  SITE.CATALOG                             BFAS NONE  St=    9.42 ms  #=       7
MS  FSD503  SYS.PVMF                                 BKST       St=   26.50 ms  #=       2
MS  FSD503  SYS.TVMF                                 BKST       St=   13.00 ms  #=       1
MS  FSD511  SBRFILE                                  UFAS SEQ   St=   16.20 ms  #=    2697
MS  FSD514  SYS.PVMF1                                BKST       St=   22.50 ms  #=       2
MS  FSD518  SITE.QUOTA                               BFAS NONE  St=   15.00 ms  #=       2
MS  KO58    SYS.JA.J1KO58                            BFAS SEQ   St=   28.92 ms  #=      94
MS  KO58    TP1.SWAP                                 BFAS NONE  St=   52.43 ms  #=     154
MS  KO58    TP1.SWAP01                               BFAS NONE  St=   49.86 ms  #=     131
MS  KO59    UFAS.SCDATA                              UFAS SEQ   St=   29.25 ms  #=       8
MS  KO60    TP1.DATA.BANK                            UFAS IDS2  St=   34.25 ms  #=     161
PR  I10000  PR_FILE                                  BFAS SEQ   St= 2549.00 ms  #=       1
```

#30 SEEK LENGTH

```
SBR    (D) DETAILED                 SEEK LENGTH                                                             CHART
----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

TOTAL NBR = Number of I/O's with a seek command for the media
VALUES    = Length of arm displacement (from 0 to 100 % of disk size)

----------------------------------------------------------------------------------------------------------------
                                            !          !        VALUES  BETWEEN 0 AND   100.00
                  VARIABLE                  ! TOTAL NBR!  NUMBER   NBR =0  SUM/1000    MEAN    MINIMUM  MAXIMUM
----------------------------------------------------------------------------------------------------------------
Media = *MS54       (    808 Cylinders  )   !        2 !       2        2      0.00     0.00      0.00     0.00
Media = FBO517      (    707 Cylinders  )   !     5483 !    5483     3801     23.38     4.26      0.00    50.00
Media = FSD503      (    707 Cylinders  )   !    15237 !   15237     8019    204.95    13.45      0.00    99.00
Media = FSD504      (    707 Cylinders  )   !     2409 !    2409     1378     14.02     5.82      0.00    51.00
Media = FSD511      (    707 Cylinders  )   !     7716 !    7716     7706      0.02     0.00      0.00    15.00
Media = FSD514      (    707 Cylinders  )   !     1664 !    1664     1103     12.23     7.35      0.00    65.00
Media = FSD518      (    707 Cylinders  )   !     1585 !    1585     1133     43.84    27.66      0.00    97.00
Media = K058        (    808 Cylinders  )   !    18646 !   18646     5391     90.11     4.83      0.00    97.00
Media = K059        (    808 Cylinders  )   !     3742 !    3742     2197     58.17    15.54      0.00    98.00
Media = K060        (    808 Cylinders  )   !    20830 !   20830     1068    420.89    20.20      0.00    54.00
----------------------------------------------------------------------------------------------------------------
            **** TOTAL ****                 !    77314 !   77314    31798    867.63    11.22      0.00    99.00
----------------------------------------------------------------------------------------------------------------
```

#31 I/O PER BKST

```
 SBR    (D) DETAILED                 (+) I/O PER BKST              MEDIA = FSD514                                  CHART
-----------------------------------------------------------------------------------------------------------------------

 BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

#   = Number of I/O per BKST file.
      Figures are accounted per media and file


R   = Read,  W = Write,  RW = mixed,  ? = undefined

Ln  = average length of transferred data


TOTAL COUNT =        164     FREQUENCY (NUMBER OVER TIME DURATION) =     0.27 PER SECOND

FSD503 SYS.BKST                        R. RPS     Ln=5120.00    #=     12 =   7.31%  ##=       12 =  7.31 %
FSD503 SYS.LIB                         R. RPS     Ln=4096.00    #=      1 =   0.60%  ##=       13 =  7.92 %
FSD503 SYS.PVMF                        .W RPS     Ln=4527.15    #=     38 =  23.17%  ##=       51 = 31.09 %
FSD503 SYS.PVMF                        R. RPS     Ln=5802.66    #=     24 =  14.63%  ##=       75 = 45.73 %
FSD503 SYS.TVMF                        .W RPS     Ln=4096.00    #=      6 =   3.65%  ##=       81 = 49.39 %
FSD503 SYS.TVMF                        R. RPS     Ln=4096.00    #=     12 =   7.31%  ##=       93 = 56.70 %
FSD514 SYS.BKST1                       R. RPS     Ln=4096.00    #=     11 =   6.70%  ##=      104 = 63.41 %
FSD514 SYS.PVMF1                       .W RPS     Ln=4572.27    #=     43 =  26.21%  ##=      147 = 89.63 %
FSD514 SYS.PVMF1                       R. RPS     Ln=6144.00    #=     16 =   9.75%  ##=      163 = 99.39 %
FSD514 SYS.TVMF1                       R. RPS     Ln=4096.00    #=      1 =   0.60%  ##=      164 =100.00 %

* TOTAL *                                         Ln=4845.26    #=    164 = 100.00%  ##=     164 =100.00 %
```

#32 SEEK ADDRESS

```
SBR    (D) DETAILED                 (*) SEEK ADDRESS             MEDIA = FSD514                            CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =      2012.771 SECONDS

TOTAL NBR = Number of I/O's with a seek command for the media
VALUES    = Address of arm
(the mean is not significant)


VALUES BETWEEN 0 AND 100.00         LOWEST VALUE =   0.00        NULL VALUES =       22 HIGHEST VALUE =  67.00
                                    NUMBER =     1664     MEAN =    44.71        MEAN (WITHOUT NULLS)=   45.31


DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND    100
******************************
 BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
   1!     0!     1!     22!  1.322!  1.322! *************
   2!     1!     2!     46!  2.764!  4.086! ***************************
   3!     2!     3!     36!  2.163!  6.250! *********************
   4!     3!     4!    107!  6.430! 12.680! ****************************************************************
   5!     4!     5!      0!  0.000! 12.680!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  29!    28!    29!    110!  6.610! 19.290! ******************************************************************
  30!    29!    30!    143!  8.593! 27.884! **************************************************************************
  31!    30!    31!     58!  3.485! 31.370! **********************************
  32!    31!    32!      0!  0.000! 31.370!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  57!    56!    57!    126!  7.572! 38.942! **************************************************************************
  58!    57!    58!   1012! 60.817! 99.759! **************************************************************************
  59!    58!    59!      0!  0.000! 99.759!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  68!    67!    68!      4!  0.240!100.000! **
  69!    68!    69!      0!  0.000!100.000!
 = = = = = = = = = = = =  = = = = = = = = = = = =
```

#33 HIT RATIO PER FILE *(from V6)*

```
SBR    (D) DETAILED        HIT RATIO PER FILE                                                                  CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 91/04/24 12:18:29 END TIME=91/04/24 12:33:29 DURATION=00:15:00 =  900.  0 SECONDS

All disk I/O requests are accounted here (cached or not).

Req         number (and percentage) of I/O requests for the file
Hits        number of cache hits minus number of Read Ahead
Hit Ratio   percentage over number of requests
Rah         number of Read Ahead I/Os performed by the Cache

Figures are accounted by media, file, file type.



TOTAL COUNT =     160039     FREQUENCY (NUMBER OVER TIME DURATION) =   177.82 PER SECOND


BE8FA1 DBTX.DATA.CUSTOMER            UFAS IDS2 Req=   1374 = 0.85 % Hits=    901 Hit Ratio= 65.57 % Rah=      0
BE8FA2 DBTX.SWAP07                   BFAS NONE Req=   3561 = 2.22 % Hits=   1188 Hit Ratio= 33.36 % Rah=      0
BE8FA3 DBTX.DATA.DIVERSE             UFAS IDS2 Req=    565 = 0.35 % Hits=    194 Hit Ratio= 34.33 % Rah=      0
BE8FA5 DBTX.DATA.ITEM                UFAS IDS2 Req=   2487 = 1.55 % Hits=   1055 Hit Ratio= 42.42 % Rah=      0
BE8FA6 DBTX.SWAP15                   BFAS NONE Req=   3549 = 2.21 % Hits=   1187 Hit Ratio= 33.44 % Rah=      0
BE8FA7 DBTX.DATA.ORDER               UFAS IDS2 Req=   6715 = 4.19 % Hits=   2179 Hit Ratio= 32.44 % Rah=      0
BE8FE1 DBTX.DATA.ORDER               UFAS IDS2 Req=   5159 = 3.22 % Hits=   1871 Hit Ratio= 36.26 % Rah=      0
BE8FE2 DBTX.DATA.ORDER               UFAS IDS2 Req=   6933 = 4.33 % Hits=   2263 Hit Ratio= 32.64 % Rah=      0
BE8F03 SYS.JA.J1BE8F03               BFAS LKQD Req=   3992 = 2.49 % Hits=      0 Hit Ratio=  0.00 % Rah=      0
BE8F31 DBTX.DATA.CUSTOMER            UFAS IDS2 Req=   1547 = 0.96 % Hits=   1003 Hit Ratio= 64.83 % Rah=      0
BE8F32 DBTX.SWAP                     BFAS NONE Req=   3530 = 2.20 % Hits=   1179 Hit Ratio= 33.39 % Rah=      0
BE8F33 DBTX.DATA.DIVERSE             UFAS IDS2 Req=    620 = 0.38 % Hits=    189 Hit Ratio= 30.48 % Rah=      0
BE8F33 SYS.PVMF5                     BKST      Req=      3 = 0.00 % Hits=      0 Hit Ratio=  0.00 % Rah=      0
BE8F35 DBTX.DATA.ITEM                UFAS IDS2 Req=   2692 = 1.68 % Hits=   1193 Hit Ratio= 44.31 % Rah=      0
BE8F36 DBTX.SWAP08                   BFAS NONE Req=   3569 = 2.23 % Hits=   1190 Hit Ratio= 33.34 % Rah=      0
BE8F37 DBTX.DATA.ORDER               UFAS IDS2 Req=   5134 = 3.20 % Hits=   1812 Hit Ratio= 35.29 % Rah=      0
BE8F41 DBTX.DATA.CUSTOMER            UFAS IDS2 Req=   1426 = 0.89 % Hits=    941 Hit Ratio= 65.98 % Rah=      0
BE8F42 DBTX.SWAP01                   BFAS NONE Req=   3558 = 2.22 % Hits=   1187 Hit Ratio= 33.36 % Rah=      0
BE8F43 DBTX.DATA.DIVERSE             UFAS IDS2 Req=    673 = 0.42 % Hits=    219 Hit Ratio= 32.54 % Rah=      0
BE8F45 DBTX.DATA.ITEM                UFAS IDS2 Req=   2568 = 1.60 % Hits=   1092 Hit Ratio= 42.52 % Rah=      0
BE8F46 DBTX.SWAP09                   BFAS NONE Req=   3544 = 2.21 % Hits=   1189 Hit Ratio= 33.54 % Rah=      0
BE8F47 DBTX.DATA.ORDER               UFAS IDS2 Req=   8887 = 5.55 % Hits=   2905 Hit Ratio= 32.68 % Rah=      0
BE8F51 DBTX.DATA.CUSTOMER            UFAS IDS2 Req=   1425 = 0.89 % Hits=    911 Hit Ratio= 63.92 % Rah=      0
BE8F52 DBTX.SWAP02                   BFAS NONE Req=   3550 = 2.21 % Hits=   1187 Hit Ratio= 33.43 % Rah=      0
BE8F53 DBTX.DATA.DIVERSE             UFAS IDS2 Req=    686 = 0.42 % Hits=    230 Hit Ratio= 33.52 % Rah=      0
BE8F55 DBTX.DATA.ITEM                UFAS IDS2 Req=   2712 = 1.69 % Hits=   1210 Hit Ratio= 44.61 % Rah=      0
BE8F56 DBTX.SWAP10                   BFAS NONE Req=   3566 = 2.22 % Hits=   1192 Hit Ratio= 33.42 % Rah=      0
BE8F57 DBTX.DATA.ORDER               UFAS IDS2 Req=   4934 = 3.08 % Hits=   1760 Hit Ratio= 35.67 % Rah=      0
BE8F61 DBTX.DATA.CUSTOMER            UFAS IDS2 Req=   1467 = 0.91 % Hits=    944 Hit Ratio= 64.34 % Rah=      0
BE8F62 DBTX.SWAP03                   BFAS NONE Req=   3394 = 2.12 % Hits=   1132 Hit Ratio= 33.35 % Rah=      0
BE8F63 DBTX.DATA.DIVERSE             UFAS IDS2 Req=    696 = 0.43 % Hits=    238 Hit Ratio= 34.19 % Rah=      0
BE8F65 DBTX.DATA.ITEM                UFAS IDS2 Req=   2519 = 1.57 % Hits=   1093 Hit Ratio= 43.39 % Rah=      0
BE8F66 DBTX.SWAP11                   BFAS NONE Req=   3533 = 2.20 % Hits=   1183 Hit Ratio= 33.48 % Rah=      0
BE8F67 DBTX.DATA.ORDER               UFAS IDS2 Req=   6767 = 4.22 % Hits=   2276 Hit Ratio= 33.63 % Rah=      0
BE8F71 DBTX.DATA.CUSTOMER            UFAS IDS2 Req=   1441 = 0.90 % Hits=    905 Hit Ratio= 62.80 % Rah=      0
BE8F72 DBTX.SWAP04                   BFAS NONE Req=   3699 = 2.31 % Hits=   1234 Hit Ratio= 33.36 % Rah=      0
BE8F73 DBTX.DATA.DIVERSE             UFAS IDS2 Req=    615 = 0.38 % Hits=    195 Hit Ratio= 31.70 % Rah=      0
BE8F75 DBTX.DATA.ITEM                UFAS IDS2 Req=   2622 = 1.63 % Hits=   1138 Hit Ratio= 43.40 % Rah=      0
BE8F76 DBTX.SWAP12                   BFAS NONE Req=   3525 = 2.20 % Hits=   1179 Hit Ratio= 33.44 % Rah=      0
BE8F77 DBTX.DATA.ORDER               UFAS IDS2 Req=   4950 = 3.09 % Hits=   1772 Hit Ratio= 35.79 % Rah=      0
BE8F81 DBTX.DATA.CUSTOMER            UFAS IDS2 Req=   1505 = 0.94 % Hits=    956 Hit Ratio= 63.52 % Rah=      0
BE8F82 DBTX.SWAP05                   BFAS NONE Req=   3571 = 2.23 % Hits=   1194 Hit Ratio= 33.43 % Rah=      0
BE8F83 DBTX.DATA.DIVERSE             UFAS IDS2 Req=    628 = 0.39 % Hits=    200 Hit Ratio= 31.84 % Rah=      0
BE8F85 DBTX.DATA.ITEM                UFAS IDS2 Req=   2682 = 1.67 % Hits=   1189 Hit Ratio= 44.33 % Rah=      0
BE8F86 DBTX.SWAP13                   BFAS NONE Req=   3529 = 2.20 % Hits=   1180 Hit Ratio= 33.43 % Rah=      0

* TOTAL *                                      Req= 160039 =100.00 % Hits=  57987 Hit Ratio= 36.23 % Rah=     0


BE8F47 DBTX.DATA.ORDER               UFAS IDS2 Req=   8887 =  5.55 % Hits=  2905 Hit Ratio= 32.68 % Rah=      0
BE8FE2 DBTX.DATA.ORDER               UFAS IDS2 Req=   6933 =  4.33 % Hits=  2263 Hit Ratio= 32.64 % Rah=      0
BE8F67 DBTX.DATA.ORDER               UFAS IDS2 Req=   6767 =  4.22 % Hits=  2276 Hit Ratio= 33.63 % Rah=      0
```

#34 CPU TIME PER MISSING PAGE (OVERALL DISTRIBUTION)

```
SBR    (D) DETAILED                 CPU TIME PER MISSING PAGE (OVERALL DISTRIBUTION)                        CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

TOTAL NBR = Number of missing pages loaded by all the Load-Modules
VALUES    = CPU time per missing page (in milliseconds)


VALUES BETWEEN 0 AND 100.00 MS       LOWEST VALUE =   1.26 MS    HIGHEST VALUE =  55.91 MS
                                     NUMBER =     1961     MEAN =     4.94 MS

VALUES BETWEEN 0 AND 1000.0 MS       LOWEST VALUE =   1.26 MS    HIGHEST VALUE = 256.69 MS
                                     NUMBER =     1962     MEAN =     5.07 MS


DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND    100 MS
******************************
 BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
   1!     0!     1!      0!  0.000!  0.000!
   2!     1!     2!    366! 18.663! 18.663! *************************************************************************
   3!     2!     3!    115!  5.864! 24.528! **********************************************************
   4!     3!     4!     26!  1.325! 25.854! *************
   5!     4!     5!    236! 12.034! 37.888! *************************************************************************
   6!     5!     6!    890! 45.385! 83.273! *************************************************************************
   7!     6!     7!    194!  9.892! 93.166! *************************************************************************
   8!     7!     8!     24!  1.223! 94.390! ************
   9!     8!     9!     22!  1.121! 95.512! ***********
  10!     9!    10!     24!  1.223! 96.736! ************
  11!    10!    11!      9!  0.458! 97.195! ****
  12!    11!    12!     10!  0.509! 97.705! *****
  13!    12!    13!      8!  0.407! 98.113! ****
  14!    13!    14!      3!  0.152! 98.266! *
  15!    14!    15!      5!  0.254! 98.521! **
  16!    15!    16!      7!  0.356! 98.878! ***
  17!    16!    17!      7!  0.356! 99.235! ***
  18!    17!    18!      6!  0.305! 99.541! ***
  19!    18!    19!      4!  0.203! 99.745! **
  20!    19!    20!      2!  0.101! 99.847! *
  21!    20!    21!      0!  0.000! 99.847!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  24!    23!    24!      1!  0.050! 99.898!
  25!    24!    25!      0!  0.000! 99.898!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  27!    26!    27!      1!  0.050! 99.949!
  28!    27!    28!      0!  0.000! 99.949!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  56!    55!    56!      1!  0.050!100.000!
  57!    56!    57!      0!  0.000!100.000!
 = = = = = = = = = = = =  = = = = = = = = = = = =
```

#35 ELAPSED TIME PER MISSING PAGE (OVERALL DISTRIBUTION)

```
SBR    (D) DETAILED                 ELAPSED TIME PER MISS PAGE (OVERALL DISTRIBUTION)                       CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

TOTAL NBR = Number of missing pages loaded by all the Load-Modules
VALUES    = Elapsed time per missing page (in milliseconds)


LINES ARE NOT PRINTED WHEN THE CUMULATIVE PERCENTAGE REACHES  98%

VALUES BETWEEN 0 AND 100.00 MS      LOWEST VALUE =   1.26 MS    HIGHEST VALUE = 100.97 MS
                                    NUMBER =     1690     MEAN =    31.21 MS

VALUES BETWEEN 0 AND 1000.0 MS      LOWEST VALUE =   1.26 MS    HIGHEST VALUE = 863.67 MS
                                    NUMBER =     1954     MEAN =    53.15 MS

VALUES BETWEEN 0 AND 10000. MS      LOWEST VALUE =   1.26 MS    HIGHEST VALUE = 2186.1 MS
                                    NUMBER =     1962     MEAN =    58.49 MS


DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND    100 MS
******************************
 BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
   1!     0!     1!      0!  0.000!  0.000!
   2!     1!     2!    171! 10.118! 10.118! *************************************************************************
   3!     2!     3!     27!  1.597! 11.715! ***************
   4!     3!     4!     11!  0.650! 12.366! ******
   5!     4!     5!     13!  0.769! 13.136! *******
   6!     5!     6!    155!  9.171! 22.307! *************************************************************************
   7!     6!     7!     30!  1.775! 24.082! *****************
   8!     7!     8!     11!  0.650! 24.733! ******
   9!     8!     9!      8!  0.473! 25.207! ****
  10!     9!    10!      9!  0.532! 25.739! *****
  11!    10!    11!     12!  0.710! 26.449! *******
  12!    11!    12!     14!  0.828! 27.278! ********
  13!    12!    13!     27!  1.597! 28.875! ***************
  14!    13!    14!     12!  0.710! 29.585! *******
  15!    14!    15!     26!  1.538! 31.124! ***************
  16!    15!    16!      9!  0.532! 31.656! *****
  17!    16!    17!     25!  1.479! 33.136! **************
  18!    17!    18!     16!  0.946! 34.082! *********
  19!    18!    19!     19!  1.124! 35.207! ***********
  20!    19!    20!     26!  1.538! 36.745! ***************
  21!    20!    21!     17!  1.005! 37.751! **********
  22!    21!    22!     22!  1.301! 39.053! *************
  23!    22!    23!     20!  1.183! 40.236! ***********
  24!    23!    24!     37!  2.189! 42.426! *********************
  25!    24!    25!     25!  1.479! 43.905! **************
  26!    25!    26!     36!  2.130! 46.035! *********************
  27!    26!    27!     26!  1.538! 47.573! ***************
  28!    27!    28!     40!  2.366! 49.940! ***********************
  29!    28!    29!     38!  2.248! 52.189! **********************
  30!    29!    30!     33!  1.952! 54.142! *******************
  31!    30!    31!     24!  1.420! 55.562! **************
  32!    31!    32!     37!  2.189! 57.751! *********************
  33!    32!    33!     27!  1.597! 59.349! ***************
  34!    33!    34!     30!  1.775! 61.124! *****************
  35!    34!    35!     26!  1.538! 62.662! ***************
  36!    35!    36!     32!  1.893! 64.556! ******************
  37!    36!    37!     22!  1.301! 65.857! *************
  38!    37!    38!     26!  1.538! 67.396! ***************
  39!    38!    39!     21!  1.242! 68.639! ************
  40!    39!    40!     15!  0.887! 69.526! ********
  41!    40!    41!     19!  1.124! 70.650! ***********
  42!    41!    42!     18!  1.065! 71.715! **********
  43!    42!    43!     16!  0.946! 72.662! *********
  44!    43!    44!     17!  1.005! 73.668! **********
  45!    44!    45!     15!  0.887! 74.556! ********
  46!    45!    46!     25!  1.479! 76.035! **************
  47!    46!    47!     21!  1.242! 77.278! ************
```

#36 NUMBER OF I/O PER MISSING PAGE

```
SBR    (D) DETAILED                  NUMBER OF I/O PER MISSING PAGE                                                       CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

TOTAL NBR = Number of missing pages loaded by all the Load-Modules
VALUES    = Number of I/O's per missing page

NULL VALUES = Number of missing pages without any I/O
              They correspond to pages already present
              or being loaded when the page fault occurs.


VALUES BETWEEN 0 AND 100.00          LOWEST VALUE =   0.00        NULL VALUES =      796 HIGHEST VALUE =   3.00
                                     NUMBER =     1962     MEAN =     0.62        MEAN (WITHOUT NULLS)=    1.05


DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND    100
******************************
 BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
   1!     0!     1!    796! 40.570! 40.570! *************************************************************************
   2!     1!     2!   1105! 56.320! 96.890! *************************************************************************
   3!     2!     3!     54!  2.752! 99.643! ***************************
   4!     3!     4!      7!  0.356!100.000! ***
   5!     4!     5!      0!  0.000!100.000!
 = = = = = = = = = = = =  = = = = = = = = = = = =
```

#37 CPU TIME PER TASK FOR LM

```
SBR    (A) LM                        CPU TIME PER TASK FOR LM H_SBR                              CHART     37
-------------------------------------------------------------------------------------------------------------------
BEGIN TIME = 96/12/17  16:20:25      END TIME = 96/12/17  16:30:50
DURATION = 00:10:24 =        624.924 SECONDS
TOTAL NBR = number of CPU time samples for the task.
TOTAL 1   = CPU time consumed by the task, in seconds.
            The mean is not significant.
TOTAL 2   = Ready time for the task (time spent waiting for the CPU), in seconds.
            The mean is not significant.
--------------------------------------------------------------------------------------------------------------
               VARIABLE          ! TOTAL NBR!  TOTAL 1    MEAN 1 !  TOTAL2   MEAN 2 !  TOTAL 3    MEAN 3
--------------------------------------------------------------------------------------------------------------
Task = COLLECT                   !        2 !     0.15     79.58 !    0.02    13.45 !     0.00       0.00
Task = CONTEXT                   !       49 !     0.87     17.95 !    0.00     0.11 !     0.00       0.00
Task = MAIN                      !        2 !     0.00      0.00 !    0.00     0.00 !     0.00       0.00
Task = MSC                       !        2 !     0.00      0.00 !    0.00     0.00 !     0.00       0.00
Task = OIM                       !      525 !     2.14      4.08 !    0.03     0.06 !     0.00       0.00
Task = SNAPMM                    !        2 !     0.00      0.00 !    0.00     0.00 !     0.00       0.00
Task = SNAPSHOT                  !       21 !     0.97     46.40 !    0.05     2.64 !     0.00       0.00
Task = UFAS                      !        2 !     0.00      0.00 !    0.00     0.00 !     0.00       0.00
Task = WRITER                    !       24 !     1.67     69.78 !    0.11     4.70 !     0.00       0.00
--------------------------------------------------------------------------------------------------------------
            **** TOTAL ****      !      629 !     5.83      9.27 !    0.23     0.36 !     0.00       0.00
--------------------------------------------------------------------------------------------------------------
```

#38 CPU AND I/O FOR LM

```
SBR    (A) LM                      CPU AND I/O FOR LM OSCX                                        CHART     38
 ------------------------------------------------------------------------------------------------------------
 BEGIN TIME = 92/09/17  14:15:00      END TIME = 92/09/17  14:46:18     DURATION = 00:31:17 =       1877.461 SECONDS
 *   = Percentage of CPU time
       This percentage is significant if one of the following conditions is met for
       all processes of LM OSCX :
           - the process makes I/Os or Send/Receive
           - the process is a system one and the collection level was EXTENDED
           - the SNAPIC option was active Only physical I/Os are accounted here (Cache hits excluded).
                  0         1         2         3         4         5         6         7         8         9         0         1
                  012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
 92/09/17 14:20:00.*****************************.         .rrrrrrrrwwwwwm     .         .mmm      .         .wwwwwwwwww         .
          14:25:00.***********        .         .         .rrwww    .         .         .mmmmmmm  .         .wwwww    .         .
          14:30:00.**********************       .         .rrrrrwwww          .         .mmmmmmmmmmmmm      .wwwwwww  .         .
          14:35:00.**********************************     .rrrrrrrwwwwwwwm    .         .mmmmm    .         .wwwwwwwww.         .
          14:40:00.*************      .         .         .rrrwwm   .         .         .mmmmmmmmm.         .wwwwwww  .         .
          14:45:00.*********************************      .rrrrrrrwwwwwwm     .         .mmmmmmmmmm         .wwwwwwwwwwwwwww    .
          14:46:18.*************      .         .         .rrrwww   .         .         .mm       .         .www      .         .
 CPU TIME                     1- 39 O      * =      1 %       TIME=   459.65 S PERCENT=   24.48 %
 TOTAL I/O                   41- 69 O        =      1 PER S  NUMBER =    21457 FREQ =    11.43
   DISK I/O                  41- 69 O        =      1 PER S  NUMBER =    21457 FREQ =    11.43
        READ                 41- 69 O      r =      1 PER S  NUMBER =    11881 FREQ =     6.32
        WRITE                41- 69 C      w =      1 PER S  NUMBER =     8781 FREQ =     4.67
        MIXED                41- 69 C      m =      1 PER S  NUMBER =795 FREQ =     0.42
        UNDEFINED            41- 69 C      ? =      1 PER S  NUMBER =  0 FREQ =     0.00
   NOT DISK I/O              41- 69 C      * =      1 PER S  NUMBER =  0 FREQ =     0.00
 MISSING PAGES               71- 89 O      m =   0.00 PER S  NUMBER = 28 FREQ =     0.01
 SM SWITCHINGS               91-109 O      w =   0.03 PER S  NUMBER =533 FREQ =     0.28
```

#39 IC SNAPSHOTS FOR LM

```
SBR    (A) LM                       IC SNAPSHOTS FOR LM TDX                                                   CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =      2012.771 SECONDS

TOTAL COUNT = Number of snapshots of the Instruction Counter
              related to LM TDX
#           = Number of snaphots of the Instruction Counter
              related to LM TDX and involving the Ring-Stn-Ste
WARNING: Some segment names can be 'Vacant Entry' names. Refer to the SBR User Guide


TOTAL COUNT =      28115     FREQUENCY (NUMBER OVER TIME DURATION) =    13.97 PER SECOND


MAIN                                 Ring-Stn-Ste = 0A20                #=       6 =  0.021%  ##=         6 =  0.021 %
MAIN                                 Ring-Stn-Ste = 0A25 H_DY_JDYNAD1  #=       2 =  0.007%  ##=         8 =  0.028 %
MAIN                                 Ring-Stn-Ste = 0A28 H_DFASG_ERWK  #=      20 =  0.071%  ##=        28 =  0.099 %
MAIN                                 Ring-Stn-Ste = 0A36 H_DY_VFMGT1   #=       1 =  0.003%  ##=        29 =  0.103 %
MAIN                                 Ring-Stn-Ste = 0A3C H_VMM_EMSHDL  #=      69 =  0.245%  ##=        98 =  0.348 %
MAIN                                 Ring-Stn-Ste = 0A3E H_VMM_IMODWS  #=       1 =  0.003%  ##=        99 =  0.352 %
MAIN                                 Ring-Stn-Ste = 0A43 H_TASKM_IRPC  #=       1 =  0.003%  ##=       100 =  0.355 %
MAIN                                 Ring-Stn-Ste = 0A45 H_TIMER_ISDT  #=       3 =  0.010%  ##=       103 =  0.366 %
MAIN                                 Ring-Stn-Ste = 0A53 H_DPU_GRING0  #=       2 =  0.007%  ##=       105 =  0.373 %
MAIN                                 Ring-Stn-Ste = 0A5A H_ERLOG_UGET  #=      61 =  0.216%  ##=       166 =  0.590 %
MAIN                                 Ring-Stn-Ste = 0A64 H_SBR_SPCD    #=      64 =  0.227%  ##=       230 =  0.818 %
MAIN                                 Ring-Stn-Ste = 0A72 H_PIO_ICQST   #=      36 =  0.128%  ##=       266 =  0.946 %
MAIN                                 Ring-Stn-Ste = 0A73 H_PIO_ICQST   #=       2 =  0.007%  ##=       268 =  0.953 %
MAIN                                 Ring-Stn-Ste = 0A76 H_PIO_ICQST   #=      24 =  0.085%  ##=       292 =  1.038 %
MAIN                                 Ring-Stn-Ste = 0A88 H_DSMGT_JDOV  #=       4 =  0.014%  ##=       296 =  1.052 %
MAIN                                 Ring-Stn-Ste = 0A98 H_VMM_IBLKCR  #=       8 =  0.028%  ##=       304 =  1.081 %
MAIN                                 Ring-Stn-Ste = 0AA7 H_TASKM_BABM  #=       3 =  0.010%  ##=       307 =  1.091 %
MAIN                                 Ring-Stn-Ste = 0C17 H_TASKM_BRDT  #=      10 =  0.035%  ##=       317 =  1.127 %
MAIN                                 Ring-Stn-Ste = 0C18                #=      67 =  0.238%  ##=       384 =  1.365 %
MAIN                                 Ring-Stn-Ste = 0C1C H_DFPRE_EFEC  #=       1 =  0.003%  ##=       385 =  1.369 %
MAIN                                 Ring-Stn-Ste = 0C34 H_DY_ISCEPT2  #=      15 =  0.053%  ##=       400 =  1.422 %
MAIN                                 Ring-Stn-Ste = 0C38 H_DFPRE_JCRE  #=       1 =  0.003%  ##=       401 =  1.426 %
MAIN                                 Ring-Stn-Ste = 0C64 H_TASKM_IBSM  #=       1 =  0.003%  ##=       402 =  1.429 %
MAIN                                 Ring-Stn-Ste = 0CB7 H_EXCEP_ETSP  #=       3 =  0.010%  ##=       405 =  1.440 %
MAIN                                 Ring-Stn-Ste = 1A16 H_JOB_JWRJOR  #=       3 =  0.010%  ##=       408 =  1.451 %
MAIN                                 Ring-Stn-Ste = 1A1F H_DFASG_JDAF  #=       3 =  0.010%  ##=       411 =  1.461 %
MAIN                                 Ring-Stn-Ste = 1A21 H_DFPRE_URFL  #=       1 =  0.003%  ##=       412 =  1.465 %
MAIN                                 Ring-Stn-Ste = 1A24 H_ACT_UPACNT  #=       1 =  0.003%  ##=       413 =  1.468 %
MAIN                                 Ring-Stn-Ste = 1A26                #=       6 =  0.021%  ##=       419 =  1.490 %
MAIN                                 Ring-Stn-Ste = 1A2A H_DFASG_JAF   #=       6 =  0.021%  ##=       425 =  1.511 %
MAIN                                 Ring-Stn-Ste = 1A37 H_JOB_JINJET  #=       1 =  0.003%  ##=       426 =  1.515 %
MAIN                                 Ring-Stn-Ste = 1A3B H_STD_BINCHL  #=       3 =  0.010%  ##=       429 =  1.525 %
MAIN                                 Ring-Stn-Ste = 1A4F H_SCH_JBINIT  #=       1 =  0.003%  ##=       430 =  1.529 %
MAIN                                 Ring-Stn-Ste = 1A50 H_SCH_JCOMST  #=       2 =  0.007%  ##=       432 =  1.536 %
MAIN                                 Ring-Stn-Ste = 1A7E H_DFPRE_UOPF  #=       1 =  0.003%  ##=       433 =  1.540 %
MAIN                                 Ring-Stn-Ste = 1A92 H_DCTLG_JATS  #=       2 =  0.007%  ##=       435 =  1.547 %
MAIN                                 Ring-Stn-Ste = 1AAF H_OW_EPRVPF   #=      47 =  0.167%  ##=       482 =  1.714 %
MAIN                                 Ring-Stn-Ste = 1C05 H_HPR_UPTP    #=     318 =  1.131%  ##=       800 =  2.845 %
MAIN                                 Ring-Stn-Ste = 1C06 H_STD_UCBAN   #=       1 =  0.003%  ##=       801 =  2.849 %
```

#41 NUMBER OF I/O PER MISSING PAGE FOR LM

```
SBR    (A) LM                        NUMBER OF I/O PER MISSING PAGE FOR LM TDX                                CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

TOTAL NBR   = Number of missing pages loaded by LM TDX
VALUES      = Number of I/O's per missing page

NULL VALUES = Number of missing pages without any I/O
              They correspond to pages already present
              or being loaded when the page fault occurs.


VALUES BETWEEN 0 AND 100.00          LOWEST VALUE =   0.00        NULL VALUES =       93 HIGHEST VALUE =   3.00
                                     NUMBER =      378     MEAN =     0.81        MEAN (WITHOUT NULLS)=    1.08


DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND    100
******************************
 BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
   1!     0!     1!     93! 24.603! 24.603! *************************************************************************
   2!     1!     2!    265! 70.105! 94.708! *************************************************************************
   3!     2!     3!     17!  4.497! 99.206! *********************************************
   4!     3!     4!      3!  0.793!100.000! *******
   5!     4!     5!      0!  0.000!100.000!
 = = = = = = = = = = = =  = = = = = = = = = = = =
```

#42 MISSING PAGES FOR LM

```
SBR    (A) LM                      MISSING PAGES FOR LM TDX                                                     CHART
-------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

TOTAL COUNT = Number of missing pages loaded by LM TDX
#           = Number of page faults for this segment
WARNING: Some segment names can be 'vacant entry' names. Refer to the SBR User Guide


TOTAL COUNT =        378     FREQUENCY (NUMBER OVER TIME DURATION) =     0.18 PER SECOND


MAIN                                 Stn-Ste = 0100                #=       1 =  0.264%  ##=         1 =  0.264 %
MAIN                                 Stn-Ste = 0803                #=       1 =  0.264%  ##=         2 =  0.529 %
MAIN                                 Stn-Ste = 0834                #=       1 =  0.264%  ##=         3 =  0.793 %
MAIN                                 Stn-Ste = 0837                #=       1 =  0.264%  ##=         4 =  1.058 %
MAIN                                 Stn-Ste = 0838                #=       1 =  0.264%  ##=         5 =  1.322 %
MAIN                                 Stn-Ste = 0839                #=       1 =  0.264%  ##=         6 =  1.587 %
MAIN                                 Stn-Ste = 083A                #=       1 =  0.264%  ##=         7 =  1.851 %
MAIN                                 Stn-Ste = 083C                #=      15 =  3.968%  ##=        22 =  5.820 %
MAIN                                 Stn-Ste = 084C                #=      16 =  4.232%  ##=        38 = 10.052 %
MAIN                                 Stn-Ste = 0901                #=       1 =  0.264%  ##=        39 = 10.317 %
MAIN                                 Stn-Ste = 091A                #=       1 =  0.264%  ##=        40 = 10.582 %
MAIN                                 Stn-Ste = 091B                #=       4 =  1.058%  ##=        44 = 11.640 %
MAIN                                 Stn-Ste = 0923                #=       1 =  0.264%  ##=        45 = 11.904 %
MAIN                                 Stn-Ste = 0927                #=       1 =  0.264%  ##=        46 = 12.169 %
MAIN                                 Stn-Ste = 0928                #=       1 =  0.264%  ##=        47 = 12.433 %
MAIN                                 Stn-Ste = 092B                #=       1 =  0.264%  ##=        48 = 12.698 %
MAIN                                 Stn-Ste = 092E                #=       1 =  0.264%  ##=        49 = 12.962 %
MAIN                                 Stn-Ste = 092F                #=       1 =  0.264%  ##=        50 = 13.227 %
MAIN                                 Stn-Ste = 0930                #=       4 =  1.058%  ##=        54 = 14.285 %
MAIN                                 Stn-Ste = 0934                #=       1 =  0.264%  ##=        55 = 14.550 %
MAIN                                 Stn-Ste = 0935                #=       3 =  0.793%  ##=        58 = 15.343 %
MAIN                                 Stn-Ste = 0938                #=       3 =  0.793%  ##=        61 = 16.137 %
MAIN                                 Stn-Ste = 093A                #=       1 =  0.264%  ##=        62 = 16.402 %
MAIN                                 Stn-Ste = 0947                #=       1 =  0.264%  ##=        63 = 16.666 %
MAIN                                 Stn-Ste = 094A                #=       2 =  0.529%  ##=        65 = 17.195 %
MAIN                                 Stn-Ste = 094E                #=       1 =  0.264%  ##=        66 = 17.460 %
MAIN                                 Stn-Ste = 0951                #=       1 =  0.264%  ##=        67 = 17.724 %
MAIN                                 Stn-Ste = 0957                #=       1 =  0.264%  ##=        68 = 17.989 %
MAIN                                 Stn-Ste = 0972                #=       1 =  0.264%  ##=        69 = 18.253 %
MAIN                                 Stn-Ste = 0973                #=       1 =  0.264%  ##=        70 = 18.518 %
MAIN                                 Stn-Ste = 097B                #=      16 =  4.232%  ##=        86 = 22.751 %
MAIN                                 Stn-Ste = 0A49 H_PIO_INITAB   #=       1 =  0.264%  ##=        87 = 23.015 %
MAIN                                 Stn-Ste = 0A9E                #=       3 =  0.793%  ##=        90 = 23.809 %
MAIN                                 Stn-Ste = 0AAD H_CN_IINIT     #=       1 =  0.264%  ##=        91 = 24.074 %
MAIN                                 Stn-Ste = 0ABC H_OP_MG4G      #=       1 =  0.264%  ##=        92 = 24.338 %
MAIN                                 Stn-Ste = 0AC1 H_TIMER_UGTI   #=       4 =  1.058%  ##=        96 = 25.396 %
MAIN                                 Stn-Ste = 0AC6                #=      16 =  4.232%  ##=       112 = 29.629 %
MAIN                                 Stn-Ste = 0AC7                #=      16 =  4.232%  ##=       128 = 33.862 %
MAIN                                 Stn-Ste = 0AC8                #=      16 =  4.232%  ##=       144 = 38.095 %
MAIN                                 Stn-Ste = 0AC9                #=      16 =  4.232%  ##=       160 = 42.328 %
MAIN                                 Stn-Ste = 0ACA                #=      15 =  3.968%  ##=       175 = 46.296 %
```

#43 MEDIA-FILES FOR LM

```
 SBR    (A) LM                       MEDIA-FILES FOR LM TDX                                                          CHART     43
------------------------------------------------------------------------------------------------------------------------------------

 BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

 Number of I/O per file
 Each file is characterized by the volume which contains
 the file (dvc, media) and by its format (form) and organization (org).

 Some File Names are not recognized (UNKNOWN EFN). They correspond to
 system files (SYS.KNODET, SYS.JRNAL ..).

 Type of IO: R = Read    W = Write    RW = mixed    ? = undefined
 Ln = average length of transferred data


 TOTAL COUNT =      40971     FREQUENCY (NUMBER OVER TIME DURATION) =    20.36 PER SECOND


 MAIN     MS  FBO517 ;VTOC                          VTOC       .W RPS   Ln= 4096.00    #=     8 =  0.01 %   ##=     8 =  0.
 MAIN     MS  FBO517 ;VTOC                          VTOC       R. RPS   Ln= 4094.33    #=     6 =  0.01 %   ##=    14 =  0.
 MAIN     MS  FBO517 SYS.IN                         BFAS LKQD  R. RPS   Ln= 4096.00    #=     1 =  0.00 %   ##=    15 =  0.
 MAIN     MS  FBO517 SYS.KNODET                     BFAS NONE  .W RPS   Ln=13824.00    #=    42 =  0.10 %   ##=    57 =  0.
 MAIN     MS  FBO517 SYS.KNODET                     BFAS NONE  R. RPS   Ln=13824.00    #=    15 =  0.03 %   ##=    72 =  0.
 MAIN     MS  FBO517 SYS.OUT                        BFAS LKQD  .W RPS   Ln= 8192.00    #=  1058 =  2.58 %   ##=  1130 =  2.
 MAIN     MS  FBO517 SYS.OUT                        BFAS LKQD  R. RPS   Ln= 8192.00    #=     8 =  0.01 %   ##=  1138 =  2.
 MAIN     MS  FBO517 SYS.SPOOL0                     BFAS LKQD  R. RPS   Ln= 8192.00    #=     2 =  0.00 %   ##=  1140 =  2.
 MAIN     MS  FSD503 ;VTOC                          VTOC       .W RPS   Ln=  140.00    #=     1 =  0.00 %   ##=  1141 =  2.
 MAIN     MS  FSD503 ;VTOC                          VTOC       R. RPS   Ln=  210.00    #=     4 =  0.00 %   ##=  1145 =  2.
 MAIN     MS  FSD503 SITE.CATALOG                   BFAS NONE  .W RPS   Ln= 1327.00    #=     2 =  0.00 %   ##=  1147 =  2.
 MAIN     MS  FSD503 SITE.CATALOG                   BFAS NONE  R. RPS   Ln= 1327.00    #=    29 =  0.07 %   ##=  1176 =  2.
 MAIN     MS  FSD503 SYS.BKST                       BKST       R. RPS   Ln= 4160.00    #=    64 =  0.15 %   ##=  1240 =  3.
 MAIN     MS  FSD503 SYS.CATALOG                    BFAS NONE  .W RPS   Ln= 1327.00    #=     2 =  0.00 %   ##=  1242 =  3.
 MAIN     MS  FSD503 SYS.CATALOG                    BFAS NONE  R. RPS   Ln= 1327.00    #=     6 =  0.01 %   ##=  1248 =  3.
 MAIN     MS  FSD503 SYS.JADIR                      BFAS LKQD  .W RPS   Ln=  877.03    #=    29 =  0.07 %   ##=  1277 =  3.
 MAIN     MS  FSD503 SYS.JADIR                      BFAS LKQD  R. RPS   Ln= 1044.00    #=     9 =  0.02 %   ##=  1286 =  3.
 MAIN     MS  FSD503 SYS.JADIR                      BFAS LKQD  RW RPS   Ln= 2088.00    #=     9 =  0.02 %   ##=  1295 =  3.
 MAIN     MS  FSD503 SYS.JRNAL                      BFAS NONE  .W RPS   Ln=  682.66    #=     6 =  0.01 %   ##=  1301 =  3.
 MAIN     MS  FSD503 SYS.LIB                        BKST       R. RPS   Ln= 5331.30    #=    63 =  0.15 %   ##=  1364 =  3.
 MAIN     MS  FSD503 SYS.LOGF                       BFAS NONE  .W RPS   Ln= 4096.00    #=     4 =  0.00 %   ##=  1368 =  3.
 MAIN     MS  FSD503 SYS.PVMF                       BKST       .W RPS   Ln= 4096.00    #=     3 =  0.00 %   ##=  1371 =  3.
 MAIN     MS  FSD514 SYS.BKST1                      BKST       R. RPS   Ln= 4276.70    #=    68 =  0.16 %   ##=  1439 =  3.
 MAIN     MS  FSD514 SYS.LIB1                       BKST       R. RPS   Ln= 5442.63    #=    73 =  0.17 %   ##=  1512 =  3.
 MAIN     MS  FSD514 SYS.PVMF1                      BKST       .W RPS   Ln= 4096.00    #=     8 =  0.01 %   ##=  1520 =  3.
 MAIN     MS  FSD514 SYS.PVMF1                      BKST       R. RPS   Ln= 8192.00    #=     1 =  0.00 %   ##=  1521 =  3.
 MAIN     MS  FSD518 ;Unknown EFN with FILEID=001B             R. RPS   Ln= 1327.00    #=     1 =  0.00 %   ##=  1522 =  3.
 MAIN     MS  FSD518 ;VTOC                          VTOC       R. RPS   Ln=  126.66    #=    24 =  0.05 %   ##=  1546 =  3.
 MAIN     MS  FSD518 ;VTOC                          VTOC       RW RPS   Ln=  570.00    #=    16 =  0.03 %   ##=  1562 =  3.
 MAIN     MS  FSD518 SITE.QUOTA                     BFAS NONE  .W RPS   Ln= 1327.00    #=     1 =  0.00 %   ##=  1563 =  3.
 MAIN     MS  FSD518 SITE.QUOTA                     BFAS NONE  R. RPS   Ln= 1327.00    #=    16 =  0.03 %   ##=  1579 =  3.
 MAIN     MS  FSD518 TDX.SWAP                       BFAS NONE  R. RPS   Ln= 1327.00    #=     1 =  0.00 %   ##=  1580 =  3.
 MAIN     MS  K058   ;TEMPRY..SYSJRNAL.01           BFAS NONE  .W RPS   Ln=  528.00    #=   176 =  0.42 %   ##=  1756 =  4.
 MAIN     MS  K058   ;Unknown EFN                              ?        Ln=    0.00    #=     1 =  0.00 %   ##=  1757 =  4.
```

#44 I/O PER EFN FOR LM

```
SBR    (A) LM                          I/O PER EFN FOR LM TDX                                                         CHART
--------------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

Some File Names are not recognized (UNKNOWN EFN). They correspond to
system files (SYS.KNODET, SYS.JRNAL ..).


TOTAL COUNT =       40971     FREQUENCY (NUMBER OVER TIME DURATION) =    20.36 PER SECOND


Task = MAIN          EFN = ;TEMPRY..SYSJRNAL.01           #=     176 =  0.429%  ##=       176 =  0.429 %
Task = MAIN          EFN = ;Unknown EFN                   #=       1 =  0.002%  ##=       177 =  0.432 %
Task = MAIN          EFN = ;Unknown EFN with FILEID=001B  #=       1 =  0.002%  ##=       178 =  0.434 %
Task = MAIN          EFN = ;VTOC                          #=      84 =  0.205%  ##=       262 =  0.639 %
Task = MAIN          EFN = SITE.CATALOG                   #=      31 =  0.075%  ##=       293 =  0.715 %
Task = MAIN          EFN = SITE.QUOTA                     #=      17 =  0.041%  ##=       310 =  0.756 %
Task = MAIN          EFN = SYS.BKST                       #=      64 =  0.156%  ##=       374 =  0.912 %
Task = MAIN          EFN = SYS.BKST1                      #=      68 =  0.165%  ##=       442 =  1.078 %
Task = MAIN          EFN = SYS.CATALOG                    #=       8 =  0.019%  ##=       450 =  1.098 %
Task = MAIN          EFN = SYS.IN                         #=       1 =  0.002%  ##=       451 =  1.100 %
Task = MAIN          EFN = SYS.JA.J1K058                  #=       2 =  0.004%  ##=       453 =  1.105 %
Task = MAIN          EFN = SYS.JADIR                      #=      47 =  0.114%  ##=       500 =  1.220 %
Task = MAIN          EFN = SYS.JRNAL                      #=       6 =  0.014%  ##=       506 =  1.235 %
Task = MAIN          EFN = SYS.KNODET                     #=      57 =  0.139%  ##=       563 =  1.374 %
Task = MAIN          EFN = SYS.LIB                        #=      63 =  0.153%  ##=       626 =  1.527 %
Task = MAIN          EFN = SYS.LIB1                       #=      73 =  0.178%  ##=       699 =  1.706 %
Task = MAIN          EFN = SYS.LOGF                       #=       4 =  0.009%  ##=       703 =  1.715 %
Task = MAIN          EFN = SYS.OUT                        #=    1066 =  2.601%  ##=      1769 =  4.317 %
Task = MAIN          EFN = SYS.PVMF                       #=       3 =  0.007%  ##=      1772 =  4.325 %
Task = MAIN          EFN = SYS.PVMF1                      #=       9 =  0.021%  ##=      1781 =  4.346 %
Task = MAIN          EFN = SYS.SPOOL0                     #=       2 =  0.004%  ##=      1783 =  4.351 %
Task = MAIN          EFN = TDX.BINLIB                     #=       3 =  0.007%  ##=      1786 =  4.359 %
Task = MAIN          EFN = TDX.CATALOG                    #=      82 =  0.200%  ##=      1868 =  4.559 %
Task = MAIN          EFN = TDX.CTLM                       #=       5 =  0.012%  ##=      1873 =  4.571 %
Task = MAIN          EFN = TDX.CTLN                       #=      10 =  0.024%  ##=      1883 =  4.595 %
Task = MAIN          EFN = TDX.DATA.BANK                  #=       4 =  0.009%  ##=      1887 =  4.605 %
Task = MAIN          EFN = TDX.DATA.ZONE00                #=       4 =  0.009%  ##=      1891 =  4.615 %
Task = MAIN          EFN = TDX.RECOV                      #=       2 =  0.004%  ##=      1893 =  4.620 %
Task = MAIN          EFN = TDX.SWAP                       #=       1 =  0.002%  ##=      1894 =  4.622 %
Task = TDSEXEC       EFN = ;TEMPRY..SYSJRNAL.01           #=       2 =  0.004%  ##=      1896 =  4.627 %
Task = TDSEXEC       EFN = ;VTOC                          #=      19 =  0.046%  ##=      1915 =  4.674 %
Task = TDSEXEC       EFN = SITE.CATALOG                   #=      30 =  0.073%  ##=      1945 =  4.747 %
Task = TDSEXEC       EFN = SYS.BKST                       #=       1 =  0.002%  ##=      1946 =  4.749 %
Task = TDSEXEC       EFN = SYS.BKST1                      #=       5 =  0.012%  ##=      1951 =  4.761 %
Task = TDSEXEC       EFN = SYS.JA.J1K058                  #=    4041 =  9.863%  ##=      5992 = 14.624 %
Task = TDSEXEC       EFN = SYS.JADIR                      #=      51 =  0.124%  ##=      6043 = 14.749 %
Task = TDSEXEC       EFN = SYS.JRNAL                      #=       5 =  0.012%  ##=      6048 = 14.761 %
Task = TDSEXEC       EFN = SYS.KNODET                     #=       8 =  0.019%  ##=      6056 = 14.781 %
Task = TDSEXEC       EFN = SYS.LIB                        #=      26 =  0.063%  ##=      6082 = 14.844 %
Task = TDSEXEC       EFN = SYS.LIB1                       #=      11 =  0.026%  ##=      6093 = 14.871 %
Task = TDSEXEC       EFN = SYS.LOGF                       #=       5 =  0.012%  ##=      6098 = 14.883 %
Task = TDSEXEC       EFN = SYS.PVMF                       #=       3 =  0.007%  ##=      6101 = 14.891 %
```

#45 HIT RATIO PER FILE FOR LM *(from V6)*

```
SBR  (A) LM          HIT RATIO PER FILE FOR LM DBTX                                                                CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME=91/04/24 12:18:29 END TIME=91/04/24 12:33:29 DURATION = 00:15:00 =  900.  0 SECONDS

All disk I/Os requested by LM DBTX are accounted here (cached or not).
Read Ahead are not deduced from Hits.

Req         number (and percentage) of I/O requests for the file
Hits        number of hits for this file
Hit Ratio   percentage over number of requests

Figures are accounted by task, media, file, file type.


TOTAL COUNT =     158480     FREQUENCY (NUMBER OVER TIME DURATION) =   176.08 PER SECOND


TDSEXEC  BE8FA1  DBTX.DATA.CUSTOMER UFAS IDS2 Req= 1374 =0.86 % Hits=  901  Hit Ratio= 65.57 %
TDSEXEC  BE8FA2  DBTX.SWAP07        BFAS NONE Req= 3561 =2.24 % Hits= 1188  Hit Ratio= 33.36 %
TDSEXEC  BE8FA3  DBTX.DATA.DIVERSE  UFAS IDS2 Req=  565 =0.35 % Hits=  194  Hit Ratio= 34.33 %
TDSEXEC  BE8FA5  DBTX.DATA.ITEM     UFAS IDS2 Req= 2487 =1.56 % Hits= 1055  Hit Ratio= 42.42 %
TDSEXEC  BE8FA6  DBTX.SWAP15        BFAS NONE Req= 3549 =2.23 % Hits= 1187  Hit Ratio= 33.44 %
TDSEXEC  BE8FA7  DBTX.DATA.ORDER    UFAS IDS2 Req= 6715 =4.23 % Hits= 2179  Hit Ratio= 32.44 %
TDSEXEC  BE8FE1  DBTX.DATA.ORDER    UFAS IDS2 Req= 5159 =3.25 % Hits= 1871  Hit Ratio= 36.26 %
TDSEXEC  BE8FE2  DBTX.DATA.ORDER    UFAS IDS2 Req= 6933 =4.37 % Hits= 2263  Hit Ratio= 32.64 %
TDSEXEC  BE8F03  SYS.JA.J1BE8F03    BFAS LKQD Req= 3866 =2.43 % Hits=    0  Hit Ratio=  0.00 %
TDSEXEC  BE8F31  DBTX.DATA.CUSTOMER UFAS IDS2 Req= 1547 =0.97 % Hits= 1003  Hit Ratio= 64.83 %
TDSEXEC  BE8F32  DBTX.SWAP          BFAS NONE Req= 3530 =2.22 % Hits= 1179  Hit Ratio= 33.39 %
TDSEXEC  BE8F33  DBTX.DATA.DIVERSE  UFAS IDS2 Req=  620 =0.39 % Hits=  189  Hit Ratio= 30.48 %
TDSEXEC  BE8F33  SYS.PVMF5          BKST      Req=    3 =0.00 % Hits=    0  Hit Ratio=  0.00 %
TDSEXEC  BE8F35  DBTX.DATA.ITEM     UFAS IDS2 Req= 2692 =1.69 % Hits= 1193  Hit Ratio= 44.31 %
TDSEXEC  BE8F36  DBTX.SWAP08        BFAS NONE Req= 3569 =2.25 % Hits= 1190  Hit Ratio= 33.34 %
TDSEXEC  BE8F37  DBTX.DATA.ORDER    UFAS IDS2 Req= 5134 =3.23 % Hits= 1812  Hit Ratio= 35.29 %
TDSEXEC  BE8F41  DBTX.DATA.CUSTOMER UFAS IDS2 Req= 1426 =0.89 % Hits=  941  Hit Ratio= 65.98 %
TDSEXEC  BE8F42  DBTX.SWAP01        BFAS NONE Req= 3558 =2.24 % Hits= 1187  Hit Ratio= 33.36 %
TDSEXEC  BE8F43  DBTX.DATA.DIVERSE  UFAS IDS2 Req=  673 =0.42 % Hits=  219  Hit Ratio= 32.54 %
TDSEXEC  BE8F45  DBTX.DATA.ITEM     UFAS IDS2 Req= 2568 =1.62 % Hits= 1092  Hit Ratio= 42.52 %
TDSEXEC  BE8F46  DBTX.SWAP09        BFAS NONE Req= 3544 =2.23 % Hits= 1189  Hit Ratio= 33.54 %
TDSEXEC  BE8F47  DBTX.DATA.ORDER    UFAS IDS2 Req= 8887 =5.60 % Hits= 2905  Hit Ratio= 32.68 %
TDSEXEC  BE8F51  DBTX.DATA.CUSTOMER UFAS IDS2 Req= 1425 =0.89 % Hits=  911  Hit Ratio= 63.92 %
TDSEXEC  BE8F52  DBTX.SWAP02        BFAS NONE Req= 3550 =2.24 % Hits= 1187  Hit Ratio= 33.43 %
TDSEXEC  BE8F53  DBTX.DATA.DIVERSE  UFAS IDS2 Req=  686 =0.43 % Hits=  230  Hit Ratio= 33.52 %
TDSEXEC  BE8F55  DBTX.DATA.ITEM     UFAS IDS2 Req= 2712 =1.71 % Hits= 1210  Hit Ratio= 44.61 %
TDSEXEC  BE8F56  DBTX.SWAP10        BFAS NONE Req= 3566 =2.25 % Hits= 1192  Hit Ratio= 33.42 %
TDSEXEC  BE8F57  DBTX.DATA.ORDER    UFAS IDS2 Req= 4934 =3.11 % Hits= 1760  Hit Ratio= 35.67 %
TDSEXEC  BE8F61  DBTX.DATA.CUSTOMER UFAS IDS2 Req= 1467 =0.92 % Hits=  944  Hit Ratio= 64.34 %
TDSEXEC  BE8F62  DBTX.SWAP03        BFAS NONE Req= 3394 =2.14 % Hits= 1132  Hit Ratio= 33.35 %
TDSEXEC  BE8F63  DBTX.DATA.DIVERSE  UFAS IDS2 Req=  696 =0.43 % Hits=  238  Hit Ratio= 34.19 %
TDSEXEC  BE8F65  DBTX.DATA.ITEM     UFAS IDS2 Req= 2519 =1.58 % Hits= 1093  Hit Ratio= 43.39 %
TDSEXEC  BE8F66  DBTX.SWAP11        BFAS NONE Req= 3533 =2.22 % Hits= 1183  Hit Ratio= 33.48 %
TDSEXEC  BE8F67  DBTX.DATA.ORDER    UFAS IDS2 Req= 6767 =4.26 % Hits= 2276  Hit Ratio= 33.63 %
TDSEXEC  BE8F71  DBTX.DATA.CUSTOMER UFAS IDS2 Req= 1441 =0.90 % Hits=  905  Hit Ratio= 62.80 %
TDSEXEC  BE8F72  DBTX.SWAP04        BFAS NONE Req= 3699 =2.33 % Hits= 1234  Hit Ratio= 33.36 %
TDSEXEC  BE8F73  DBTX.DATA.DIVERSE  UFAS IDS2 Req=  615 =0.38 % Hits=  195  Hit Ratio= 31.70 %
TDSEXEC  BE8F75  DBTX.DATA.ITEM     UFAS IDS2 Req= 2622 =1.65 % Hits= 1138  Hit Ratio= 43.40 %
TDSEXEC  BE8F76  DBTX.SWAP12        BFAS NONE Req= 3525 =2.22 % Hits= 1179  Hit Ratio= 33.44 %
TDSEXEC  BE8F77  DBTX.DATA.ORDER    UFAS IDS2 Req= 4950 =3.12 % Hits= 1772  Hit Ratio= 35.79 %
TDSEXEC  BE8F81  DBTX.DATA.CUSTOMER UFAS IDS2 Req= 1505 =0.94 % Hits=  956  Hit Ratio= 63.52 %
TDSEXEC  BE8F82  DBTX.SWAP05        BFAS NONE Req= 3571 =2.25 % Hits= 1194  Hit Ratio= 33.43 %
TDSEXEC  BE8F83  DBTX.DATA.DIVERSE  UFAS IDS2 Req=  628 =0.39 % Hits=  200  Hit Ratio= 31.84 %
TDSEXEC  BE8F85  DBTX.DATA.ITEM     UFAS IDS2 Req= 2682 =1.69 % Hits= 1189  Hit Ratio= 44.33 %
TDSEXEC  BE8F86  DBTX.SWAP13        BFAS NONE Req= 3529 =2.22 % Hits= 1180  Hit Ratio= 33.43 %
TDSEXEC  BE8F87  DBTX.DATA.ORDER    UFAS IDS2 Req= 5267 =3.32 % Hits= 1901  Hit Ratio= 36.09 %
TDSEXEC  BE8F91  DBTX.DATA.CUSTOMER UFAS IDS2 Req= 1509 =0.95 % Hits=  983  Hit Ratio= 65.14 %
TDSEXEC  BE8F92  DBTX.SWAP06        BFAS NONE Req= 3544 =2.23 % Hits= 1185  Hit Ratio= 33.43 %
TDSEXEC  BE8F93  DBTX.DATA.DIVERSE  UFAS IDS2 Req=  635 =0.40 % Hits=  203  Hit Ratio= 31.96 %
TDSEXEC  BE8F95  DBTX.DATA.ITEM     UFAS IDS2 Req= 2604 =1.64 % Hits= 1148  Hit Ratio= 44.08 %
TDSEXEC  BE8F96  DBTX.SWAP14        BFAS NONE Req= 3533 =2.22 % Hits= 1184  Hit Ratio= 33.51 %

* TOTAL *                            Req= 158480 =100.00 %  Hits=  57987  Hit Ratio= 36.58 %
```

#46 CPU AND I/O FOR DIMENSION

```
SBR    (A) DIMENSION                CPU AND I/O FOR DIMENSION TDS                                   CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

*   = Percentage of CPU time (measured between I/O's).
      This percentage is not significant if some processes of
      DIMENSION TDS  do not make I/O or Send/Receive

MISSING PAGES = number of page faults issued by the steps within the dimension (including type 0-1)
PAGE IN       = number of page faults on private segments (type 2 or 3) within the dimension
PAGE OUT      = number of pages swapped or cleared out of the dimension


                 0         1         2         3         4         5         6         7         8         9
                 0123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
89/02/11 15:18:45.*        .         .         .         .         .rm       .         .         .         .
         15:23:45.****     .         .         .         .         .rww      .         .         .oooooooooooo
         15:28:45.         .         .         .         .         .         .         .         .ooooooooo.
         15:33:45.****************** .         .         .         .rrrwwwwwwwwwmmm    .         .         .
         15:38:45.*****************************.         .         .rrrrwwwwwwwwwwwwwwwmmmm      .         .
         15:43:45.**************************** .         .         .rrrrwwwwwwwwwwwwwwwmmmm      .mm       .
         15:47:17.***********        .         .         .         .rww      .         .         .iiiimmmmmmmmmm

CPU TIME                         1- 49 O      * =      4 %       TIME=  1100.44 S PERCENT=   54.67 %

TOTAL I/O                       51- 79 O        =      2 PER S  NUMBER =     40971 FREQ =    20.36
  DISK I/O                      51- 79 O        =      2 PER S  NUMBER =     40971 FREQ =    20.36
       READ                     51- 79 O      r =      2 PER S  NUMBER =      8842 FREQ =     4.39
       WRITE                    51- 79 C      w =      2 PER S  NUMBER =     25539 FREQ =    12.69
       MIXED                    51- 79 C      m =      2 PER S  NUMBER =      6589 FREQ =     3.27
       UNDEFINED                51- 79 C      ? =      2 PER S  NUMBER =         1 FREQ =     0.00
  NOT DISK I/O                  51- 79 C      * =      2 PER S  NUMBER =         0 FREQ =     0.00

MISSING PAGES                   81-109 O      m =   0.06 PER S  NUMBER =       378 FREQ =     0.18
PAGE IN                         81-109 O      i =   0.06 PER S  NUMBER =       129 FREQ =     0.06
PAGE OUT                        81-109 O      o =   0.06 PER S  NUMBER =       391 FREQ =     0.19
```

#47 ACTIVITY OF DIMENSION

```
SBR    (A) DIMENSION                ACTIVITY OF DIMENSION TDS                                                   CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

MPL is the multiprogramming level of the dimension; it varies within the MPL range
defined for this dimension.
AVERAGE NUMBER OF STEPS is the acual number of active steps within the dimension.
AVERAGE NUMBER OF STEPS HELD is the number of steps held by ARM to avoid thrashing.

RSR is the Relative Service Rate : SR(DIM)/SUM OF SR(DIM)
ASR is the Absolute Service Rate : SR(DIM)/SYSTEM CAPACITY

XL is the average eXecution. Level of the dimension.

QUEUE LENGTH is the number of steps waiting for resources before  the dimension.


                 0         1         2         3         4         5         6         7         8         9
                 0123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
89/02/11 15:18:45.+++++++++++++++++++++++++    .arrrrrrrrrrrrrrrrrrrxxxxxxxxxxxxxxxxxxx.         .         .fuuu
         15:23:45.+++++++++++++++++++++++++    .rrrrrrrrrrrrrrrrrrrrxxxxxxxxxxxxxxxxxxxx         .         .ffffuuuuu
         15:28:45.+++++++++++++++++++++++++    .rrrrrrrrrrrrrrrrrrrrxxxxxxxxxxxxxxxxxxxx         .         .fffffuuuu
         15:33:45.+++++++++++++++++++++++++    .rrrrrrrrrrrrrrrrrrrrxxxxxxxxxxxxxxxxxxxx         .         .fffffuu
         15:38:45.+++++++++++++++++++++++++    .rrrrrrrrrrrrrrrrrrrrxxxxxxxxxxxxxxxxxxxx         .         .fffffuu
         15:43:45.+++++++++++++++++++++++++    .rrrrrrrrrrrrrrrrrrrrxxxxxxxxxxxxxxxxxxxx         .         .fffffuu
         15:47:17.+++++++++++++++++++++++++    .rrrrrrrrrrrrrrrrrrrrxxxxxxxxxxxxxxxxxxxx         .         .ffffuuu

AVERAGE MPL                     1- 30 O      + =      2 MEAN =   50.00
AVERAGE NUMBER OF STEPS         1- 30 O      s =      2 MEAN =    0.00
AVERAGE NUMBER OF STEPS HELD    1- 30 O      h =      2 MEAN =    0.00

RELATIVE SERVICE RATE (%)      31- 50 O      r =      4 MEAN =   79.00
ABSOLUTE SERVICE RATE (%)      31- 50 O      a =      4 MEAN =    0.39

AVERAGE XL                     51- 70 O      x =      5 MEAN =   97.80

QUEUE LENGTH x 100             71- 90 O      * =      5 MEAN =    0.00

USED SIZE (K bytes)            91-110 O      u =    250 MEAN = 1862.56
FIXED SIZE (K bytes)           91-110 O      f =    250 MEAN = 1041.17
```

#48 MISSING PAGE OVERHEAD PER SYSTEM TASK

```
SBR    (A) SYSTEM                   MISS PAGE OVERHEAD PER SYSTEM TASK                                      CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

TOTAL NBR = Number of missing pages loaded by the corresponding system task
VALUES    = CPU time per missing page (in milliseconds)

----------------------------------------------------------------------------------------------------------------
                                            !          !        VALUES  BETWEEN 0 AND 100000.0
                  VARIABLE                  ! TOTAL NBR!  NUMBER   NBR =0  SUM/1000     MEAN    MINIMUM  MAXIMUM
----------------------------------------------------------------------------------------------------------------
Task = CONDUCTOR                            !        5 !        5        0      0.01      3.98      1.70     5.47
Task = NEWSEQ                               !      277 !      277        0      1.47      5.32      1.45   256.69
Task = OPRTR_AVR                            !       14 !       14        0      0.07      5.49      4.38     7.28
Task = OW_LGN_RB                            !       64 !       64        0      0.37      5.82      1.29    14.31
Task = PEH                                  !        2 !        2        0      0.00      3.55      1.68     5.42
Task = PIAR                                 !        3 !        3        0      0.01      4.00      1.48     5.26
Task = SEQUENCER                            !        1 !        1        0      0.00      1.37      1.37     1.37
----------------------------------------------------------------------------------------------------------------
            **** TOTAL ****                 !      366 !      366        0      1.96      5.37      1.29   256.69
----------------------------------------------------------------------------------------------------------------
```

#49 SERVICE TIME PER SYSTEM TASK

```
SBR    (A) SYSTEM                    SERVICE TIME PER SYSTEM TASK                                          CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

Times are measured between the notification to the system task (beginning of the service),
and the end of the execution of the function.

TOTAL NBR = total number of calls to this system task
TOTAL 1 = total elapsed time for this task, in seconds
MEAN  1 = mean elapsed time per activation
TOTAL 2 = total cpu time, in seconds
MEAN  2 = mean cpu time per activation, in milliseconds
TOTAL 3 = total number of I/O ( in thousands )
MEAN  3 = mean number of I/O per activation

To get the occupation of each system task, divide TOTAL 1 by DURATION
```

VARIABLE	TOTAL NBR	TOTAL 1	MEAN 1	TOTAL 2	MEAN 2	TOTAL 3	MEAN 3
Task = ARM	1001	22.94	22.91	16.49	16.48	0.00	0.00
Task = AS_TRAP	3	0.00	0.46	0.00	0.41	0.00	0.00
Task = BEH	143	0.32	2.26	0.31	2.19	0.00	0.00
Task = CONDUCTOR	104	48.81	469.38	13.60	130.79	2.85	27.45
Task = MAIN	204	0.08	0.39	0.07	0.38	0.00	0.00
Task = NEWSEQ	109	732.95	6724.39	141.98	1302.62	7.13	65.44
Task = OPRTR_AVR	12	2.04	170.23	0.71	59.70	0.04	3.33
Task = OW_LGN_RB	199	26.77	134.53	4.06	20.43	0.27	1.35
Task = PAGE_OUT	67	24.31	362.96	3.77	56.30	0.27	4.10
Task = PEH	1898	13.86	7.30	10.19	5.37	0.95	0.50
Task = PIAR	4	0.08	20.61	0.01	3.49	0.00	0.50
Task = SEQUENCER	85	0.47	5.62	0.28	3.32	0.00	0.00
Task = STKOV	4	0.13	34.56	0.02	5.87	0.00	1.00
Task = TIMER	16331	16.11	0.98	15.31	0.93	0.00	0.00
Task = XTIMER	1695	1.89	1.11	1.82	1.07	0.00	0.00
**** TOTAL ****	21859	890.83	40.75	208.69	9.54	11.53	0.52

#50 SEQUENCER ACTIVITY

```
SBR    (A) SYSTEM                  SEQUENCER ACTIVITY                                                       CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

JOBM requests (step initiations or terminations) are performed by 10 centralized processes;
some processings are performed under a unique lock. Thus two usage rates can be computed:
     - sequencer process occupation (time spent in sequencer processes over elapsed time,
       divided by the number of processes),
     - JOBM lock occupation (time spent under JOBM lock over elapsed time).

JOBM usage is characterized by the highest of these two usage rates.

SEQUENCER USAGE    = actual utilization rate of the JOBM resource
OVERALL OCCUPATION = occupation of the sequencer processes
SERIAL PART        = occupation of JOBM lock

SEQUENCER USAGE is computed every 30 seconds as the max of OVERALL OCCUPATION and SERIAL PART.


                 0         1         2         3         4         5         6         7         8         9
                 0123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
89/02/11 15:18:45.s        .         .         .         .++++++++++++       .         .nnt      .         .
         15:23:45.sssspp   .         .         .         .++++++++++++++++++++         .nnnnnnnnnttttttt   .
         15:28:45.sspppp*  .         .         .         .++++++++ .         .         .nnnnntttttt        .
         15:33:45.         .         .         .         .         .         .         .t        .         .
         15:38:45.         .         .         .         .         .         .         .         .         .
         15:43:45.         .         .         .         .         .         .         .         .         .
         15:47:17.         .         .         .         .+        .         .         .t        .         .

SEQUENCER USAGE              1- 40 O      * =      2 %       TIME=    79.22 S PERCENT=    3.93 %
    OVERALL OCCUPATION       1- 40 O      p =      2 %       TIME=    73.29 S PERCENT=    3.64 %
    SERIAL PART              1- 40 O      s =      2 %       TIME=    39.79 S PERCENT=    1.97 %

IOs UNDER JOBM LOCK         41- 70 O      + =   0.03 PER S  NUMBER =       384 FREQ =     0.19

STEP INITIATIONS            71-100 O        =   0.01 PER S  NUMBER =        73 FREQ =     0.03
     NOT PREINITIALIZED     71-100 O      n =   0.01 PER S  NUMBER =        73 FREQ =     0.03
     PREINITIALIZED         71-100 C      p =   0.01 PER S  NUMBER =         0 FREQ =     0.00
STEP TERMINATIONS           71-100 C      t =   0.01 PER S  NUMBER =        73 FREQ =     0.03
```

#51 SRA IN TDX, SEGMENT=A3C

```
SBR    (U) USERSRA                  SRA IN TDX, SEGMENT=A3C                                                   CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS


TOTAL COUNT =       1323     FREQUENCY (NUMBER OVER TIME DURATION) =     0.65 PER SECOND


                              SRA = 00F0  H_II_BEGVMM          #=       4 =  0.302%  ##=          4 =  0.302 %
                              SRA = 0100  H_VMM_EMSHDL         #=       6 =  0.453%  ##=         10 =  0.755 %
                              SRA = 0110  H_VMM_EMSHDL         #=      11 =  0.831%  ##=         21 =  1.587 %
                              SRA = 0120  H_VMM_EMSHDL         #=       4 =  0.302%  ##=         25 =  1.889 %
                              SRA = 0130  H_VMM_EMSHDL         #=       2 =  0.151%  ##=         27 =  2.040 %
                              SRA = 0160  H_VMM_EMSHDL         #=       3 =  0.226%  ##=         30 =  2.267 %
                              SRA = 0170  H_VMM_EMSHDL         #=       2 =  0.151%  ##=         32 =  2.418 %
                              SRA = 0180  H_VMM_EMSHDL         #=       2 =  0.151%  ##=         34 =  2.569 %
                              SRA = 01C0  H_VMM_EMSHDL         #=       1 =  0.075%  ##=         35 =  2.645 %
                              SRA = 0350  H_VMM_EMSHDL         #=       1 =  0.075%  ##=         36 =  2.721 %
                              SRA = 0470  H_VMM_EMSHDL         #=       1 =  0.075%  ##=         37 =  2.796 %
                              SRA = 0500  H_VMM_EMSHDL         #=       2 =  0.151%  ##=         39 =  2.947 %
                              SRA = 0510  H_VMM_IVEMGT         #=       2 =  0.151%  ##=         41 =  3.099 %
                              SRA = 0530  H_VMM_IVEMGT         #=       4 =  0.302%  ##=         45 =  3.401 %
                              SRA = 0540  H_VMM_IVEMGT         #=       6 =  0.453%  ##=         51 =  3.854 %
                              SRA = 05D0  H_VMM_IVEMGT         #=       4 =  0.302%  ##=         55 =  4.157 %
                              SRA = 05E0  H_VMM_IVEMGT         #=       1 =  0.075%  ##=         56 =  4.232 %
                              SRA = 05F0  H_VMM_IVEMGT         #=       1 =  0.075%  ##=         57 =  4.308 %
                              SRA = 0670  H_VMM_IVEMGT         #=       2 =  0.151%  ##=         59 =  4.459 %
                              SRA = 06B0  H_VMM_IVEMGT         #=       1 =  0.075%  ##=         60 =  4.535 %
                              SRA = 06C0  H_VMM_IVEMGT         #=       1 =  0.075%  ##=         61 =  4.610 %
                              SRA = 06D0  H_VMM_IVEMGT         #=       1 =  0.075%  ##=         62 =  4.686 %
                              SRA = 06F0  H_VMM_IVEMGT         #=       2 =  0.151%  ##=         64 =  4.837 %
                              SRA = 0700  H_VMM_IVEMGT         #=       1 =  0.075%  ##=         65 =  4.913 %
                              SRA = 0710  H_VMM_IVEMGT         #=       1 =  0.075%  ##=         66 =  4.988 %
                              SRA = 0760  H_VMM_IVEMGT         #=       1 =  0.075%  ##=         67 =  5.064 %
                              SRA = 0770  H_VMM_IVEMGT         #=       6 =  0.453%  ##=         73 =  5.517 %
                              SRA = 0780  H_VMM_IVEMGT         #=       6 =  0.453%  ##=         79 =  5.971 %
                              SRA = 0790  H_VMM_IVEMGT         #=       5 =  0.377%  ##=         84 =  6.349 %
                              SRA = 07A0  H_VMM_IVEMGT         #=       1 =  0.075%  ##=         85 =  6.424 %
                              SRA = 07C0  H_VMM_IVEMGT         #=       2 =  0.151%  ##=         87 =  6.575 %
                              SRA = 07E0  H_VMM_IVEMGT         #=       1 =  0.075%  ##=         88 =  6.651 %
                              SRA = 0810  H_VMM_IVEMGT         #=       2 =  0.151%  ##=         90 =  6.802 %
                              SRA = 0820  H_VMM_IVEMGT         #=       1 =  0.075%  ##=         91 =  6.878 %
                              SRA = 0840  H_VMM_IVEMGT         #=       1 =  0.075%  ##=         92 =  6.953 %
                              SRA = 0850  H_VMM_IVEMGT         #=       1 =  0.075%  ##=         93 =  7.029 %
                              SRA = 0880  H_VMM_IVEMGT         #=       2 =  0.151%  ##=         95 =  7.180 %
                              SRA = 08A0  H_VMM_IVEMGT         #=       1 =  0.075%  ##=         96 =  7.256 %
                              SRA = 08B0  H_VMM_IVEMGT         #=       1 =  0.075%  ##=         97 =  7.331 %
                              SRA = 0900  H_VMM_IVEMGT         #=       5 =  0.377%  ##=        102 =  7.709 %
                              SRA = 0910  H_VMM_IVEMGT         #=       4 =  0.302%  ##=        106 =  8.012 %
                              SRA = 0920  H_VMM_IVEMGT         #=       1 =  0.075%  ##=        107 =  8.087 %
                              SRA = 0990  H_VMM_IVEMGT         #=       2 =  0.151%  ##=        109 =  8.238 %
                              SRA = 09A0  H_VMM_IVEMGT         #=       4 =  0.302%  ##=        113 =  8.541 %
                              SRA = 18C0  H_VMM_EAUM           #=       1 =  0.075%  ##=        114 =  8.616 %
```

#52 LOGON, LOGOFF FOR APPLICATION

```
SBR    (A) APPLICATION              LOGON, LOGOFF FOR TDX                                                           CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

'LOGON' and 'LOGOFF' entries include both terminals with read capability and printers.
'NUMBER OF LOGGED' entry does not include the printers.
'NUMBER OF PRINTERS' entry describes only the printers.

                 0         1         2         3         4         5         6         7         8         9
                 0123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
89/02/11 15:18:45.++++++++++        .*         .         .         .         .         .         .         .
         15:23:45.+++++++  .         .***************************************.         .         .         .
         15:28:45.         .         .***************************************.         .         .         .
         15:33:45.         .         .***************************************.         .         .         .
         15:38:45.         .         .***************************************.         .         .         .
         15:43:45.-----------------  .************************************** .         .         .         .
         15:47:17.         .         .         .         .         .         .         .         .         .

NUMBER OF LOGON                 1- 20 O      + =   0.00 PER S  NUMBER =       40 FREQ =     0.01
NUMBER OF LOGOFF                1- 20 C      - =   0.00 PER S  NUMBER =       40 FREQ =     0.01

NUMBER OF LOGGED               21- 60 O      * =      1 MEAN =   29.78

NUMBER OF PRINTERS             61-100 O      p =      1 MEAN =    0.00
```

#53 RESPONSE TIME DISTRIBUTION FOR APPLICATION

```
 SBR    (A) APPLICATION             RESPONSE TIME DISTRIBUTION FOR APPLICATION TDX                          CHART
----------------------------------------------------------------------------------------------------------------------

 BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

 THIS RESPONSE TIME DOES NOT INCLUDE THE PRINTERS OF THE APPLICATION


 LINES ARE NOT PRINTED WHEN THE CUMULATIVE PERCENTAGE REACHES  98%

 VALUES BETWEEN 0 AND 100000 MS      LOWEST VALUE =  53.55 MS    HIGHEST VALUE = 97344. MS
                                     NUMBER =     6436     MEAN =  3623.11 MS

 VALUES BETWEEN 0 AND 1.00+6 MS      LOWEST VALUE =  53.55 MS    HIGHEST VALUE = 339231 MS
                                     NUMBER =     6525     MEAN =  6493.61 MS


 DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND 100000 MS
 ******************************
  BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
    1!     0!  1000!     15!  0.233!  0.233! **
    2!  1000!  2000!     12!  0.186!  0.419! *
    3!  2000!  3000!   3479! 54.055! 54.474! *************************************************************************
    4!  3000!  4000!   2604! 40.459! 94.934! *************************************************************************
    5!  4000!  5000!     85!  1.320! 96.255! *************
    6!  5000!  6000!     19!  0.295! 96.550! **
    7!  6000!  7000!     38!  0.590! 97.141! *****
    8!  7000!  8000!     43!  0.668! 97.809! ******
    9!  8000!  9000!     42!  0.652! 98.461! ******
```

#54 APPLICATION RESPONSE TIME (2) FOR APPLICATION

```
SBR    (A) APPLICATION              APPLICATION RESPONSE TIME  (2)  FOR APPLICATION TDX                      CHART
---------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

For explanations, refer to the chart 'Response Time Summary'


LINES ARE NOT PRINTED WHEN THE CUMULATIVE PERCENTAGE REACHES  98%

VALUES BETWEEN 0 AND 100000 MS      LOWEST VALUE =  53.55 MS    HIGHEST VALUE = 97344. MS
                                    NUMBER =     6436     MEAN =  3625.19 MS

VALUES BETWEEN 0 AND 1.00+6 MS      LOWEST VALUE =  53.55 MS    HIGHEST VALUE = 339231 MS
                                    NUMBER =     6525     MEAN =  6495.67 MS


DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND 100000 MS
******************************
 BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
   1!     0!  1000!     14!  0.217!  0.217! **
   2!  1000!  2000!     11!  0.170!  0.388! *
   3!  2000!  3000!   3473! 53.962! 54.350! *************************************************************************
   4!  3000!  4000!   2612! 40.584! 94.934! *************************************************************************
   5!  4000!  5000!     85!  1.320! 96.255! *************
   6!  5000!  6000!     19!  0.295! 96.550! **
   7!  6000!  7000!     38!  0.590! 97.141! *****
   8!  7000!  8000!     43!  0.668! 97.809! ******
   9!  8000!  9000!     42!  0.652! 98.461! ******
```

#55 APPLICATION DELIVERY TIME FOR APPLICATION

```
SBR    (A) APPLICATION              APPLICATION DELIVERY TIME    FOR APPLICATION TDX                        CHART
----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS


LINES ARE NOT PRINTED WHEN THE CUMULATIVE PERCENTAGE REACHES  98%

VALUES BETWEEN 0 AND 100000 MS      LOWEST VALUE =   5.57 MS    HIGHEST VALUE = 94604. MS
                                    NUMBER =     6441     MEAN =  2465.65 MS

VALUES BETWEEN 0 AND 1.00+6 MS      LOWEST VALUE =   5.57 MS    HIGHEST VALUE = 280862 MS
                                    NUMBER =     6525     MEAN =  4764.05 MS


DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND 100000 MS
******************************
 BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
   1!     0!  1000!     28!  0.434!  0.434! ****
   2!  1000!  2000!   4363! 67.737! 68.172! *************************************************************************
   3!  2000!  3000!   1792! 27.821! 95.994! *************************************************************************
   4!  3000!  4000!     28!  0.434! 96.429! ****
   5!  4000!  5000!     48!  0.745! 97.174! *******
   6!  5000!  6000!     40!  0.621! 97.795! ******
   7!  6000!  7000!     47!  0.729! 98.525! *******
```

#56 APPLICATION SERVICE TIME 1 FOR APPLICATION

```
SBR    (A) APPLICATION              APPLICATION SERVICE TIME   1  FOR APPLICATION TDX                       CHART
------------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =      2012.771 SECONDS


LINES ARE NOT PRINTED WHEN THE CUMULATIVE PERCENTAGE REACHES  98%

VALUES BETWEEN 0 AND 100000 MS      LOWEST VALUE =  42.17 MS    HIGHEST VALUE = 72652. MS
                                    NUMBER =     6517     MEAN =  1579.56 MS

VALUES BETWEEN 0 AND 1.00+6 MS      LOWEST VALUE =  42.17 MS    HIGHEST VALUE = 128489 MS
                                    NUMBER =     6525     MEAN =  1722.17 MS


DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND 100000 MS
******************************
 BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
   1!     0!  1000!   2369! 36.351! 36.351! **************************************************************************
   2!  1000!  2000!   3879! 59.521! 95.872! **************************************************************************
   3!  2000!  3000!    131!  2.010! 97.882! ********************
   4!  3000!  4000!     18!  0.276! 98.158! **
```

#57 APPLICATION SERVICE TIME 2 FOR APPLICATION

```
 SBR    (A) APPLICATION              APPLICATION SERVICE TIME   2  FOR APPLICATION TDX                       CHART
-----------------------------------------------------------------------------------------------------------------------

 BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =      2012.771 SECONDS


 LINES ARE NOT PRINTED WHEN THE CUMULATIVE PERCENTAGE REACHES  98%

 VALUES BETWEEN 0 AND 100000 MS      LOWEST VALUE =  42.17 MS    HIGHEST VALUE = 72652. MS
                                     NUMBER =     6517     MEAN =  1581.61 MS

 VALUES BETWEEN 0 AND 1.00+6 MS      LOWEST VALUE =  42.17 MS    HIGHEST VALUE = 128489 MS
                                     NUMBER =     6525     MEAN =  1724.21 MS


 DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND 100000 MS
 ******************************
  BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
    1!     0!  1000!   2354! 36.120! 36.120! *************************************************************************
    2!  1000!  2000!   3894! 59.751! 95.872! *************************************************************************
    3!  2000!  3000!    131!  2.010! 97.882! ********************
    4!  3000!  4000!     18!  0.276! 98.158! **
```

#58 RESPONSE, SERVICE TIMES PER LM FOR APPLICATION

```
SBR    (A) APPLICATION              RESPONSE,SERVICE TIMES PER LM  FOR APPLICATION TDX                     CHART     58
-------------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

LM is the name of the load module which executes the application.

Ex gives the number of exchanges processed by the LM

RT  = 1) Application Response Time (first response from the LM)
      2) Application Response Time (last response from the LM)
DT  = Delivery Time, from TNS/FEPS (or simulator) to the LM. It is the time spent
      waiting on the application semaphore (e.g. for a TDS simultaneity level).
ST  = 1) Service Time (first response from the LM)
      2) Service Time (last response from the LM)
RN  = Return Time, from the LM to TNS/FEPS (or simulator)
TT  = 1) Think Time (from first Receive to Send, on terminal side)
      2) Think Time (from last Receive to Send, on terminal side)

All the times are in milliseconds


TOTAL COUNT =       6525     FREQUENCY (NUMBER OVER TIME DURATION) =     3.24 PER SECOND


LM=TDX              Ex=   6525   RT=( 6493.11  6495.17)  DT= 4763.55  ST=( 1721.67  1723.71)  RN=    6.97  TT=( 2019.90  2017
```

#59 REAL TIME ACTIVITY OF APPLICATION

```
SBR    (A) APPLICATION             REAL TIME ACTIVITY OF IOF                                                   CHART     59
-------------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 95/01/26  15:04:43      END TIME = 95/01/26  15:18:46      DURATION = 00:14:02 =        842.98 SECONDS


Input messages:   messages received by APPLICATION IOF.
Output messages:  messages sent by APPLICATION IOF.
Exchanges:        complete exchanges between terminals and APPLICATION IOF. This figure may be lower than the previous
                  ones in case of asymmetric protocol (Send without turn).
                  (All exchanges started AND completed within the interval are accounted, whatever their response time)

For Time Definitions, refer to the chart 'RESPONSE SERVUCES TIME PER LM FOR APPLICATION IOF' above.
(Times above 100 seconds  (900 seconds for Think Time) are not accounted)


                 0         1         2         3         4         5         6         7         8         9         0
                 12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
95/01/26 15:06:43.xxooooo  .         .ss       .         .         .sss      .         .         .ttttttttt.         .
         15:08:43.xxoooo   .         .ss       .         .         .sss      .         .         .tttttttttttttttt   .
         15:10:43.xxooo    .         .s        .         .         .s        .         .         .ttttttttttt        .
         15:12:43.xxoooo   .         .s        .         .         .s        .         .         .ttttttttttttt      .
         15:14:43.xxoooooooooo       .         .         .         .s        .         .         .tttttttttttt--     .
         15:16:43.xxooooo  .         .s        .         .         .sss      .         .         .ttttttttttttttttttttttt-
         15:18:43.xxoooo   .         .s        .         .         .ss       .         .         .ttttttttttttttttttttt
         15:18:46.         .         .         .         .         .         .         .         .tttt     .         .

Input messages                   1- 20 O      i =   1.40 PER S  NUMBER =       764 FREQ =     0.90
Output messages                  1- 20 C      o =   1.40 PER S  NUMBER =      1617 FREQ =     1.92
Exchanges                        1- 20 O      x =   1.40 PER S  NUMBER =       762 FREQ =     0.90

RESPONSE TIME 1                 21- 50 O        =    200 MS MEAN =  249.68 MS
    SERVICE TIME 1              21- 50 O      s =    200 MS MEAN =  243.72 MS
    DELIVERY TIME               21- 50 c      d =    200 MS MEAN =    0.20 MS
    RETURN TIME                 21- 50 c      t =    200 MS MEAN =    5.73 MS

RESPONSE TIME 2                 51- 80 O      r =    200 MS MEAN =  405.42 MS
SERVICE TIME 2                  51- 80 O      s =    200 MS MEAN =  399.14 MS

THINK TIME 1                    81-110 O      - =   800 MS MEAN =12998.21 MS
THINK TIME 2                    81-110 O      t =   800 MS MEAN =12597.64 MS
```

#60 ACTIVITY OF DISK

```
SBR    (M) DISK                    ACTIVITY OF DISK K058                                                         CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

Device class = MS/M452


                  0         1         2         3         4         5         6         7         8         9
                  0123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
89/02/11 15:18:45.***      .         .         .         .         .         .+++++++++++++++++++++++++    .
         15:23:45.***      .         .         .         .QQQQ     .         .+++++++++++++++++++++++      .
         15:28:45.         .         .         .         .         .         .+++++++++++++++++++.         .
         15:33:45.*************      .         .         .QQQQQQQQ .         .+++++++++++++++++++++++      .
         15:38:45.*********************        .         .QQQQQQQQ .         .+++++++++++++++++++++++      .
         15:43:45.*********************        .         .QQQQQQQQQQQQ       .+++++++++++++++++++++++      .
         15:47:17.         .         .         .         .         .         .++++++++++++++     .         .

I/O RATE (I/O PER SECOND)        1- 40 O      * =      1 PER S  NUMBER =     18647 FREQ =     9.26

QUEUE LENGH                     41- 60 O      Q =   0.25 MEAN =    2.78

SERVICE TIME (MILLISECONDS)     61-100 O      + =      2 MS MEAN =   46.38 MS
```

#61 SERVICE TIME FOR DISK

```
SBR    (M) DISK                    SERVICE TIME FOR DISK K058                                                       CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS


LINES ARE NOT PRINTED WHEN THE CUMULATIVE PERCENTAGE REACHES  98%

VALUES BETWEEN 0 AND 500.00 MS      LOWEST VALUE =   7.91 MS    HIGHEST VALUE = 154.15 MS
                                    NUMBER =      601     MEAN =    46.38 MS


DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND    500 MS
******************************
 BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
   1!     0!     5!      0!  0.000!  0.000!
   2!     5!    10!      6!  0.998!  0.998! *********
   3!    10!    15!      5!  0.831!  1.830! ********
   4!    15!    20!     12!  1.996!  3.826! *******************
   5!    20!    25!     14!  2.329!  6.156! ***********************
   6!    25!    30!     64! 10.648! 16.805! *************************************************************************
   7!    30!    35!     35!  5.823! 22.628! **********************************************************
   8!    35!    40!     40!  6.655! 29.284! ******************************************************************
   9!    40!    45!      4!  0.665! 29.950! ******
  10!    45!    50!    275! 45.757! 75.707! *************************************************************************
  11!    50!    55!     49!  8.153! 83.860! *************************************************************************
  12!    55!    60!     42!  6.988! 90.848! *********************************************************************
  13!    60!    65!     36!  5.990! 96.838! ***********************************************************
  14!    65!    70!      1!  0.166! 97.004! *
  15!    70!    75!      0!  0.000! 97.004!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  17!    80!    85!      9!  1.497! 98.502! **************
```

#62 QUEUE LENGTH FOR DISK

```
 SBR    (M) DISK                     QUEUE LENGTH  FOR DISK K058                                            CHART
----------------------------------------------------------------------------------------------------------------------

 BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

 TOTAL NBR = Number of I/O requests for K058
 VALUES    = Queue Length seen by the requester, at the time of
             the request


 VALUES BETWEEN 0 AND 100.00         LOWEST VALUE =   0.00        NULL VALUES =     2655 HIGHEST VALUE =  11.00
                                     NUMBER =    18647     MEAN =      2.78        MEAN (WITHOUT NULLS)=    3.24


 DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND    100
 ******************************
  BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
    1!     0!     1!   2655! 14.238! 14.238! *************************************************************************
    2!     1!     2!   2451! 13.144! 27.382! *************************************************************************
    3!     2!     3!   3437! 18.431! 45.814! *************************************************************************
    4!     3!     4!   3837! 20.577! 66.391! *************************************************************************
    5!     4!     5!   3100! 16.624! 83.016! *************************************************************************
    6!     5!     6!   1882! 10.092! 93.108! *************************************************************************
    7!     6!     7!    757!  4.059! 97.168! ****************************************
    8!     7!     8!    232!  1.244! 98.412! ************
    9!     8!     9!     32!  0.171! 98.584! *
   10!     9!    10!     19!  0.101! 98.686! *
   11!    10!    11!     12!  0.064! 98.750!
   12!    11!    12!    233!  1.249!100.000! ************
   13!    12!    13!      0!  0.000!100.000!
  = = = = = = = = = = = =  = = = = = = = = = = = =
```

#63 SEEK LENGTH FOR DISK

```
SBR    (M) DISK                    SEEK LENGTH FOR DISK K058                                                                CHART
----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

TOTAL NBR = Number of I/O with a seek command for the media
VALUES    = Length of arm displacement
            ( in % of disk size :     808 Cylinders   )


VALUES BETWEEN 0 AND 100.00         LOWEST VALUE =   0.00        NULL VALUES =     5391 HIGHEST VALUE =  97.00
                                    NUMBER =    18646     MEAN =     4.83        MEAN (WITHOUT NULLS)=    6.79


DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND    100
******************************
 BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
   1!     0!     1!   5391! 28.912! 28.912! *************************************************************************
   2!     1!     2!   5023! 26.938! 55.851! *************************************************************************
   3!     2!     3!    831!  4.456! 60.307! ********************************************
   4!     3!     4!      1!  0.005! 60.313!
   5!     4!     5!      3!  0.016! 60.329!
   6!     5!     6!      0!  0.000! 60.329!
 = = = = = = = = = = = =  = = = = = = = = = = = =
   9!     8!     9!    422!  2.263! 62.592! **********************
  10!     9!    10!   1186!  6.360! 68.953! ***************************************************************
  11!    10!    11!   1568!  8.409! 77.362! *************************************************************************
  12!    11!    12!   1652!  8.859! 86.222! *************************************************************************
  13!    12!    13!   1587!  8.511! 94.733! *************************************************************************
  14!    13!    14!    809!  4.338! 99.072! *******************************************
  15!    14!    15!    117!  0.627! 99.699! ******
  16!    15!    16!      0!  0.000! 99.699!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  34!    33!    34!      2!  0.010! 99.710!
  35!    34!    35!      2!  0.010! 99.721!
  36!    35!    36!      0!  0.000! 99.721!
  37!    36!    37!      2!  0.010! 99.731!
  38!    37!    38!      0!  0.000! 99.731!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  55!    54!    55!      3!  0.016! 99.747!
  56!    55!    56!      8!  0.042! 99.790!
  57!    56!    57!      3!  0.016! 99.806!
  58!    57!    58!      0!  0.000! 99.806!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  77!    76!    77!      2!  0.010! 99.817!
  78!    77!    78!      0!  0.000! 99.817!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  81!    80!    81!      2!  0.010! 99.828!
  82!    81!    82!      0!  0.000! 99.828!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  89!    88!    89!      1!  0.005! 99.833!
  90!    89!    90!      0!  0.000! 99.833!
  91!    90!    91!      3!  0.016! 99.849!
  92!    91!    92!      3!  0.016! 99.865!
  93!    92!    93!      4!  0.021! 99.887!
  94!    93!    94!      0!  0.000! 99.887!
  95!    94!    95!      3!  0.016! 99.903!
  96!    95!    96!      2!  0.010! 99.914!
  97!    96!    97!      2!  0.010! 99.924!
  98!    97!    98!     14!  0.075!100.000!
  99!    98!    99!      0!  0.000!100.000!
 = = = = = = = = = = = =  = = = = = = = = = = = =
```

#64 SEEK ADDRESSES FOR DISK

```
SBR    (M) DISK                    SEEK ADDRESSES FOR DISK K058                                                        CHART
---------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

TOTAL NBR = Number of I/O with a seek command for the media
VALUES    = Address of arm
            ( in % of disk size :     808 Cylinders   )
(the mean is not significant)


VALUES BETWEEN 0 AND 100.00         LOWEST VALUE =   0.00        NULL VALUES =      268 HIGHEST VALUE =  97.00
                                    NUMBER =    18646     MEAN =    84.66        MEAN (WITHOUT NULLS)=   85.90


DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND    100
******************************
 BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
   1!     0!     1!    268!  1.437!  1.437! **************
   2!     1!     2!      0!  0.000!  1.437!
 = = = = = = = = = = =  = = = = = = = = = = = =
  55!    54!    55!     11!  0.058!  1.496!
  56!    55!    56!     34!  0.182!  1.678! *
  57!    56!    57!     48!  0.257!  1.936! **
  58!    57!    58!     46!  0.246!  2.182! **
  59!    58!    59!     46!  0.246!  2.429! **
  60!    59!    60!     22!  0.117!  2.547! *
  61!    60!    61!      0!  0.000!  2.547!
 = = = = = = = = = = =  = = = = = = = = = = = =
  77!    76!    77!    870!  4.665!  7.213! **********************************************
  78!    77!    78!    911!  4.885! 12.099! ************************************************
  79!    78!    79!    896!  4.805! 16.904! ************************************************
  80!    79!    80!    888!  4.762! 21.666! ***********************************************
  81!    80!    81!    479!  2.568! 24.235! *************************
  82!    81!    82!      0!  0.000! 24.235!
 = = = = = = = = = = =  = = = = = = = = = = = =
  89!    88!    89!   6966! 37.359! 61.594! ************************************************************************
  90!    89!    90!   5880! 31.534! 93.129! ************************************************************************
  91!    90!    91!   1145!  6.140! 99.270! *************************************************************
  92!    91!    92!      3!  0.016! 99.286!
  93!    92!    93!      5!  0.026! 99.313!
  94!    93!    94!      0!  0.000! 99.313!
  95!    94!    95!     21!  0.112! 99.426! *
  96!    95!    96!      9!  0.048! 99.474!
  97!    96!    97!     65!  0.348! 99.823! ***
  98!    97!    98!     33!  0.176!100.000! *
  99!    98!    99!      0!  0.000!100.000!
 = = = = = = = = = = =  = = = = = = = = = = = =
```

#65-#67 LM, RON, USER USING DISK

```
SBR    (M) DISK                     LM USING DISK K058                                                         CHART
---------------------------------------------------------------------------------------------------------------------
BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

LINES ARE NOT PRINTED WHEN THE PERCENTAGE IS LOWER THAN   1%
TOTAL COUNT =      18647     FREQUENCY (NUMBER OVER TIME DURATION) =     9.26 PER SECOND

 LOAD MODULE = TDX              #=   18414 = 98.750%  ##=     18414 = 98.750 %
```

#68 TDS REAL TIME ACTIVITY FOR TDS

```
SBR    (T)  TDS                     TDS REAL TIME ACTIVITY FOR TDS TDX                                          CHART
------------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

For detailed abort causes, look at 'ABORTED TPR' Chart
and 'FAILED BEGIN OF TPRs' Chart

                 0         1         2         3         4         5         6         7         8         9
                 0123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
89/02/11 15:18:45.         .         .         .         .         .         .         .         .ii       .
         15:23:45.xxxxx    .         .         .         .         .         .         .         .mmmmmm   .
         15:28:45.x        .         .         .         .         .         .         .         .mmmmmmmmmm
         15:33:45.xxxxxxxxxxxxxxxxxxxxxxxx     .         .         .         .         .         .mmmmm    .
         15:38:45.xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx.         .         .         .         .mmmmm    .
         15:43:45.xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx  .         .         .         .         .mmmmm    .
         15:47:17.         .         .         .         .         .         .         .         .         .

BEGIN OF TPR                      1- 60 O      t =   0.20 PER S  NUMBER =      6635 FREQ =     3.29
FAILED BEGIN OF TPR               1- 60 C      _ =   0.20 PER S  NUMBER =         0 FREQ =     0.00
BEGIN OF COMMITMENT               1- 60 O      c =   0.20 PER S  NUMBER =      6635 FREQ =     3.29
BEGIN OF TRANSACTION              1- 60 O      x =   0.20 PER S  NUMBER =      6635 FREQ =     3.29

ABORTED TPR                      61- 80 O      t =     10 PER S  NUMBER =         0 FREQ =     0.00
ABORTED COMMITMENT               61- 80 O      c =     10 PER S  NUMBER =         0 FREQ =     0.00
ABORTED TRANSACTION              61- 80 O      x =     10 PER S  NUMBER =         0 FREQ =     0.00

MEAN NB OF IDLE PROCESSES        81-100 O      i =   3.10 MEAN =    0.10
MEAN NB OF PENDING MESSAGES      81-100 C      m =   3.10 MEAN =   15.26
```

#69 UFAS/GAC ACTIVITY FOR LM

```
SBR    (T)  TDS                    UFAS/GAC ACTIVITY FOR LM TDX                                                 CHART
-------------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

The number of active Commitment Units is given for this only TDS.

LONGWAIT aborts occur either after a time-out following a previous
GAC conflict, or immediately at conflict detection time, in case of
a too long expected conflict duration.

                 0         1         2         3         4         5         6         7         8         9
                 01234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
89/02/11 15:18:45.         .         .         .         .         .         .         .         .         .
         15:23:45.ccc      .         .         .         .kkkkkkkk .         .pppppppppppp       .         .
         15:28:45.         .         .         .         .kkkkkkkkkkk        .pppppppppppppppp   .         .
         15:33:45.cccccccccccccccccc.          .         .kkkkkkkkkk         .pppppppppppppppp   .         .
         15:38:45.ccccccccccccccccccccccccccccc.         .kkkkkkkkkk         .pppppppppppppppp   .         .
         15:43:45.cccccccccccccccccccccccc     .         .kkkkkkkkkk         .pppppppppppp       .         .
         15:47:17.         .         .         .         .         .         .         .         .         .

DEADLOCK                         1- 40 O      d =   0.03 PER S  NUMBER =         0 FREQ =    0.00
GAC DIE-WAIT ABORT               1- 40 C      a =   0.03 PER S  NUMBER =         0 FREQ =    0.00
GAC TABLES FULL                  1- 40 C      f =   0.03 PER S  NUMBER =         0 FREQ =    0.00
TDS NON-CONCURRENCE CONFLICT     1- 40 C      n =   0.03 PER S  NUMBER =         0 FREQ =    0.00
LONGWAIT                         1- 40 C      l =   0.03 PER S  NUMBER =         0 FREQ =    0.00
CONFLICT                         1- 40 C      c =   0.03 PER S  NUMBER =       895 FREQ =    0.44

MEAN NB OF ACTIVE COMMITMENTS   41- 60 O      k =      1 MEAN =    7.98

MEAN NB OF LOCKED PAGES/COMMIT  61- 80 O      p =   0.25 MEAN =    3.96

UFAS CA SPLIT                   81-100 O      a =     10 PER S  NUMBER =         0 FREQ =    0.00
UFAS CI SPLIT                   81-100 C      i =     10 PER S  NUMBER =         0 FREQ =    0.00
UFAS CI COMPACTION              81-100 C      c =     10 PER S  NUMBER =         0 FREQ =    0.00
```

#70 ACTIVATED TPRS FOR TDS

```
SBR    (T)  TDS                    ACTIVATED TPR'S FOR TDS TDX                                                        CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

Are given here only the TPR's which have been actually started,
whichever their TDS Restart Status (including restarted ones).


TOTAL COUNT =       6635     FREQUENCY (NUMBER OVER TIME DURATION) =     3.29 PER SECOND


TPR:SM = GOGO        :TPR.TDX.SMLIB              #=      40 =  0.602%  ##=        40 =  0.602 %
TPR:SM = H_MT_DISCNCT:H_SM2.SYS.SYSTEM           #=      40 =  0.602%  ##=        80 =  1.205 %
TPR:SM = H_MT_GYMASTR:H_SM2.SYS.SYSTEM           #=       1 =  0.015%  ##=        81 =  1.220 %
TPR:SM = H_MT_LOGON  :H_SM2.SYS.SYSTEM           #=      40 =  0.602%  ##=       121 =  1.823 %
TPR:SM = H_MT_SHUTDWN:H_SM2.SYS.SYSTEM           #=       1 =  0.015%  ##=       122 =  1.838 %
TPR:SM = H_MT_STARTUP:H_SM2.SYS.SYSTEM           #=       1 =  0.015%  ##=       123 =  1.853 %
TPR:SM = TX          :TPR.TDX.SMLIB              #=    6512 = 98.146%  ##=      6635 =100.000 %


TPR:SM = TX          :TPR.TDX.SMLIB              #=    6512 = 98.146%  ##=      6512 = 98.146 %
TPR:SM = H_MT_LOGON  :H_SM2.SYS.SYSTEM           #=      40 =  0.602%  ##=      6552 = 98.749 %
TPR:SM = GOGO        :TPR.TDX.SMLIB              #=      40 =  0.602%  ##=      6592 = 99.351 %
TPR:SM = H_MT_DISCNCT:H_SM2.SYS.SYSTEM           #=      40 =  0.602%  ##=      6632 = 99.954 %
TPR:SM = H_MT_STARTUP:H_SM2.SYS.SYSTEM           #=       1 =  0.015%  ##=      6633 = 99.969 %
TPR:SM = H_MT_GYMASTR:H_SM2.SYS.SYSTEM           #=       1 =  0.015%  ##=      6634 = 99.984 %
TPR:SM = H_MT_SHUTDWN:H_SM2.SYS.SYSTEM           #=       1 =  0.015%  ##=      6635 =100.000 %
```

#71 RESTARTED TPRS FOR TDS

```
SBR    (T)  TDS                     RESTARTED TPR'S FOR TDS DBTX                                            CHART
---------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/03/08  19:03:15   END TIME =  89/03/08  19:18:15   DURATION = 00:15:00 =       900.  0 SECONDS

Only the started TPR with a non-null TDS restart Status are given here

Level = TPR : restart at TPR level
      = CU  : restart at Commitment Unit level


TOTAL COUNT =        240     FREQUENCY (NUMBER OVER TIME DURATION) =     0.26 PER SECOND


TPR:SM = TB03B       :TPR.DBTX.NEW.SMLIB       Level = CU  #=      51 = 21.250%  ##=        51 = 21.250 %
TPR:SM = TB04B       :TPR.DBTX.NEW.SMLIB       Level = CU  #=      85 = 35.416%  ##=       136 = 56.666 %
TPR:SM = TB06A       :TPR.DBTX.NEW.SMLIB       Level = CU  #=       2 =  0.833%  ##=       138 = 57.500 %
TPR:SM = TKHA0       :TPR.DBTX.NEW.SMLIB       Level = CU  #=      49 = 20.416%  ##=       187 = 77.916 %
TPR:SM = TKHA2       :TPR.DBTX.NEW.SMLIB       Level = CU  #=      24 = 10.000%  ##=       211 = 87.916 %
TPR:SM = TKHA3       :TPR.DBTX.NEW.SMLIB       Level = CU  #=      24 = 10.000%  ##=       235 = 97.916 %
TPR:SM = TKN30       :TPR.DBTX.NEW.SMLIB       Level = CU  #=       5 =  2.083%  ##=       240 =100.000 %
```

#72 ABORTED TPRS FOR TDS

```
 SBR    (T)  TDS                    ABORTED TPR'S FOR TDS DBTX                                                   CHART
------------------------------------------------------------------------------------------------------------------------

 BEGIN TIME = 89/03/08  19:03:15   END TIME =  89/03/08  19:18:15   DURATION = 00:15:00 =        900.  0 SECONDS

 Level = TPR : TPR abort
       = CU  : Commitment Unit abort
       = TX  : Transaction abort (not automatically Restarted)

 The expected functionnal Return Codes are :
     LONGWAIT, DEADLOCK, TABOV, COUNTOV, ENQUE (from GAC)
     BUFNBOV,                              (from UFAS)
     USEREQ,                               (from User : Call Abort)

 Symbol *DEADLOCK means that the TPR was the younger tenant of a resource
 held by another CU running under Die-Wait conflict resolution mode
 (the deadlock thus lead to a Die-wait abort)


 TOTAL COUNT =        273     FREQUENCY (NUMBER OVER TIME DURATION) =     0.30 PER SECOND


 TPR:SM = TB01A      :TPR.DBTX.NEW.SMLIB      Level=CU  RC = LONGWAIT #=      10 =  3.663%  ##=        10 =  3.663 %
 TPR:SM = TB03B      :TPR.DBTX.NEW.SMLIB      Level=CU  RC = LONGWAIT #=       1 =  0.366%  ##=        11 =  4.029 %
 TPR:SM = TB04A      :TPR.DBTX.NEW.SMLIB      Level=CU  RC = LONGWAIT #=       4 =  1.465%  ##=        15 =  5.494 %
 TPR:SM = TB04C      :TPR.DBTX.NEW.SMLIB      Level=CU  RC = LONGWAIT #=      14 =  5.128%  ##=        29 = 10.622 %
 TPR:SM = TB06A      :TPR.DBTX.NEW.SMLIB      Level=CU  RC = LONGWAIT #=       2 =  0.732%  ##=        31 = 11.355 %
 TPR:SM = TKHA1      :TPR.DBTX.NEW.SMLIB      Level=CU  RC = LONGWAIT #=      50 = 18.315%  ##=        81 = 29.670 %
 TPR:SM = TKHA2      :TPR.DBTX.NEW.SMLIB      Level=CU  RC = LONGWAIT #=      27 =  9.890%  ##=       108 = 39.560 %
 TPR:SM = TKHA3      :TPR.DBTX.NEW.SMLIB      Level=CU  RC = LONGWAIT #=      23 =  8.424%  ##=       131 = 47.985 %
 TPR:SM = TKHA4      :TPR.DBTX.NEW.SMLIB      Level=CU  RC = LONGWAIT #=     126 = 46.153%  ##=       257 = 94.139 %
 TPR:SM = TKN20      :TPR.DBTX.NEW.SMLIB      Level=CU  RC = LONGWAIT #=       3 =  1.098%  ##=       260 = 95.238 %
 TPR:SM = TB04C      :TPR.DBTX.NEW.SMLIB      Level=CU  RC = DEADLOCK #=       2 =  0.732%  ##=       262 = 95.970 %
 TPR:SM = TKHA3      :TPR.DBTX.NEW.SMLIB      Level=CU  RC = DEADLOCK #=       3 =  1.098%  ##=       265 = 97.069 %
 TPR:SM = TKHA4      :TPR.DBTX.NEW.SMLIB      Level=CU  RC = DEADLOCK #=       7 =  2.564%  ##=       272 = 99.633 %
 TPR:SM = TKHA2      :TPR.DBTX.NEW.SMLIB      Level=CU  RC =*DEADLOCK #=       1 =  0.366%  ##=       273 =100.000 %
```

#73 FAILED BEGIN OF TPRS FOR TDS

```
SBR    (T)  TDS                     FAILED BEGIN OF TPR'S FOR TDS DBTX                                           CHART     73
------------------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 88/04/01  19:33:19   END TIME =  88/04/01  19:52:59   DURATION = 00:19:39 =       1179.140 SECONDS

TYPE  = TPR : TPR ABORT
      = CU  : COMMITMENT UNIT ABORT
      = TX  : TRANSACTION ABORT

TDS MAY FAIL TO START A NEW TPR BECAUSE A RUNNING TPR IS NON-CONCURRENT , WITH THE NEW ONE(I.E. A PARTIAL OR
TOTAL SERIALIZATION OCCURS), OR BECAUSE , THE COMMITMENT UNIT INITIALIZATION FAILED (SEE 'UFAS/GAC ACTIVITY' CHART)


TOTAL COUNT =         11     FREQUENCY (NUMBER OVER TIME DURATION) =     0.00 PER SECOND


LEVEL = CU      RC=868704CC->TDS    7,ABORTCU  #=       6 = 54.545%  ##=         6 = 54.545 %
LEVEL = CU      RC=868704CC->TDS    7,ABORTCU  #=       5 = 45.454%  ##=        11 =100.000 %
```

#74 CPU AND I/O PER COMPLETED TPR FOR TDS

```
SBR    (T)  TDS                     CPU AND I/O PER COMPLETED TPR FOR TDS TDX                              CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

TOTAL NBR = number of activations of the TPR

TOTAL1    = total CPU time for the TPR, in seconds
MEAN1     = mean CPU time per activation, in ms

TOTAL2    = total number of I/O for the TPR,in thousands of I/O
MEAN2     = mean number of I/O per activation

Only TPR's normally completed are measured
User Deferred Updates I/Os (when applicable) are not accounted here,
since they are done by TDS at Commit time, after the TPR ending.

---------------------------------------------------------------------------------------------------------------
               VARIABLE                ! TOTAL NBR!  TOTAL 1    MEAN 1 !  TOTAL 2    MEAN 2 !  TOTAL 3    MEAN 3
---------------------------------------------------------------------------------------------------------------
TPR:SM = GOGO        :TPR.TDX.SMLIB   !        40 !     2.68     67.03 !     0.00      0.15 !     0.00      0.00
TPR:SM = H_MT_DISCNCT:H_SM2.SYS.SYSTEM!        40 !     0.12      3.01 !     0.00      0.05 !     0.00      0.00
TPR:SM = H_MT_GYMASTR:H_SM2.SYS.SYSTEM!         1 !     0.18    181.45 !     0.01     13.00 !     0.00      0.00
TPR:SM = H_MT_LOGON  :H_SM2.SYS.SYSTEM!        40 !     0.12      3.01 !     0.00      0.00 !     0.00      0.00
TPR:SM = H_MT_SHUTDWN:H_SM2.SYS.SYSTEM!         1 !     0.00      3.10 !     0.00      0.00 !     0.00      0.00
TPR:SM = H_MT_STARTUP:H_SM2.SYS.SYSTEM!         1 !     0.00      3.02 !     0.00      0.00 !     0.00      0.00
TPR:SM = TX          :TPR.TDX.SMLIB   !      6512 !   460.13     70.66 !     7.78      1.19 !     0.00      0.00
---------------------------------------------------------------------------------------------------------------
            **** TOTAL ****           !      6635 !   463.24     69.81 !     7.80      1.17 !     0.00      0.00
---------------------------------------------------------------------------------------------------------------
```

#75 CPU AND I/O PER TRANSACTION FOR TDS

```
SBR    (T)  TDS                     CPU AND I/O PER TRANSACTION FOR TDS TDX                                  CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

TOTAL NBR = number of TPR activations for the transaction

TOTAL1    = total CPU time for the transaction, in seconds
MEAN1     = mean CPU time per activation, in ms

TOTAL2    = total number of I/O for the transaction,in thousands of I/O
MEAN2     = mean number of I/O per activation

Only TPR's normally completed are measured
User Deferred Updates I/Os (when applicable) are not accounted here,
since they are done by TDS at Commit time, after the TPR ending.
```

VARIABLE	TOTAL NBR	TOTAL 1	MEAN 1	TOTAL 2	MEAN 2	TOTAL 3	MEAN 3
Transaction = DEBICRED	6512	460.13	70.66	7.78	1.19	0.00	0.00
Transaction = DISCNCT	40	0.12	3.01	0.00	0.05	0.00	0.00
Transaction = GO	40	2.68	67.03	0.00	0.15	0.00	0.00
Transaction = LOGON	40	0.12	3.01	0.00	0.00	0.00	0.00
Transaction = M	1	0.18	181.45	0.01	13.00	0.00	0.00
Transaction = SHUTDOWN	1	0.00	3.10	0.00	0.00	0.00	0.00
Transaction = STARTUP	1	0.00	3.02	0.00	0.00	0.00	0.00
**** TOTAL ****	6635	463.24	69.81	7.80	1.17	0.00	0.00

#76 LOCKED PAGES PER TPR FOR TDS

```
 SBR    (T)  TDS                (+) LOCKED PAGES PER TPR FOR TDS TP1                                         CHART
-----------------------------------------------------------------------------------------------------------------------

 BEGIN TIME = 89/02/11  15:30:00   END TIME =  89/02/11  15:40:00   DURATION = 00:10:00 =       600.000 SECONDS

TOTAL NBR = number of activations of the TPR ending a commitment unit.
MEAN      = mean number of LOCKTAB entries used by the commitment unit.
MINIMUM, MAXIMUM: min and max values reached by the number of LOCKTAB entries.

Only normally completed Commitment Units are measured.

------------------------------------------------------------------------------------------------------
                                       !          !        VALUES  BETWEEN 0 AND 100000.0
                VARIABLE               ! TOTAL NBR!  NUMBER   NBR =0  SUM/1000    MEAN    MINIMUM  MAXIMUM
----------------------------------------------------------------------------------------------------------
TPR:SM = TX          :TPR.TP1.SMLIB    !      4488 !    4488        0      18.12      4.03          4.00     6.00
----------------------------------------------------------------------------------------------------------
            **** TOTAL ****            !      4488 !    4488        0      18.12      4.03          4.00     6.00
----------------------------------------------------------------------------------------------------------
```

#77 RESPONSE TIMES PER TRANSACTION FOR TDS

```
SBR    (T)  TDS                     RESPONSE TIMES PER TRANSACTION FOR TDS TDX                              CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

Tx  = transaction name
#   = number of exchanges (and percentage) for this transaction
##  = cumul of exchanges (and percantage)
RT1 = Response Time 1 (first response from TDS)
RT2 = Response Time 2 (last response from TDS)
ST1 = Service Time 1 (first response from TDS)
ST2 = Service Time 2 (last response from TDS)
All times are in milliseconds.


TOTAL COUNT =       6525     FREQUENCY (NUMBER OVER TIME DURATION) =     3.24 PER SECOND


Tx = ????????  #=       4 =  0.06 %  ##=       4 =  0.06 %  RT1=  125.50  RT2=  125.50  ST1=   48.00  ST2=   48.00
Tx = DEBICRED  #=    6481 = 99.32 %  ##=    6485 = 99.38 %  RT1= 6525.48  RT2= 6525.48  ST1= 1729.39  ST2= 1729.39
Tx = GO        #=      40 =  0.61 %  ##=    6525 =100.00 %  RT1= 1886.22  RT2= 2221.87  ST1=  638.05  ST2=  970.92
```

#78 COMMITMENTS LONGER THAN 60 SECONDS FOR TDS

```
SBR    (T)  TDS                     COMMITMENTS LONGER THAN 60 SECONDS FOR TDS TDX                          CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

The printed Time_Of_Day is the completion time of the Commitment Unit

89/02/11 15:22:48.8945  Duration=  64795.36ms. Rst-Cnt= 0  User=PERF0040     End-TPR=TX     :TPR.TDX.SMLIB     on JP=
89/02/11 15:25:06.3457  Duration=  64098.33ms. Rst-Cnt= 0  User=PERF0033     End-TPR=TX     :TPR.TDX.SMLIB     on JP=
89/02/11 15:27:39.3173  Duration=  96203.83ms. Rst-Cnt= 0  User=PERF0010     End-TPR=TX     :TPR.TDX.SMLIB     on JP=
89/02/11 15:27:50.4771  Duration=  99937.02ms. Rst-Cnt= 0  User=PERF0006     End-TPR=TX     :TPR.TDX.SMLIB     on JP=
89/02/11 15:27:53.5635  Duration=  98727.83ms. Rst-Cnt= 0  User=PERF0011     End-TPR=TX     :TPR.TDX.SMLIB     on JP=
89/02/11 15:27:57.3761  Duration= 102402.78ms. Rst-Cnt= 0  User=PERF0008     End-TPR=TX     :TPR.TDX.SMLIB     on JP=
89/02/11 15:27:58.9751  Duration= 100965.85ms. Rst-Cnt= 0  User=PERF0004     End-TPR=TX     :TPR.TDX.SMLIB     on JP=
89/02/11 15:27:59.2425  Duration= 101106.25ms. Rst-Cnt= 0  User=PERF0019     End-TPR=TX     :TPR.TDX.SMLIB     on JP=
89/02/11 15:27:59.9353  Duration= 101882.83ms. Rst-Cnt= 0  User=PERF0005     End-TPR=TX     :TPR.TDX.SMLIB     on JP=
89/02/11 15:28:07.4794  Duration= 100514.54ms. Rst-Cnt= 0  User=PERF0023     End-TPR=TX     :TPR.TDX.SMLIB     on JP=
```

#79 GAC CONFLICTS FOR LM

```
SBR    (T)  TDS                    GAC CONFLICTS FOR LM TDX                                                           CHART
----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =      2012.771 SECONDS

Serializations and GAC table saturations (TABOV) are not accounted here.

Type =                         x xxx
                               ! ! !
     I : Intra-TDS conflict----+ ! !
     E : Extra-TDS conflict----+ ! !
                                 ! !
     C : Conflict----------------+ !
     L : Longwait abort----------+ !
     D : Deadlock----------------+ !
     I : CI Index conflict---------+
     S : CI/CA split conflict------+
     P : Pseudo resource conflict--+

TOTAL COUNT =        895     FREQUENCY (NUMBER OVER TIME DURATION) =     0.44 PER SECOND

EFN= TDX.DATA.BANK                               Type= I C__ #=     893 = 99.776%  ##=      893 = 99.776 %
EFN= TDX.DATA.ZONE00                             Type= I C__ #=       2 =  0.223%  ##=      895 =100.000 %


EFN= TDX.DATA.BANK                               Type= I C__ #=     893 = 99.776%  ##=      893 = 99.776 %
EFN= TDX.DATA.ZONE00                             Type= I C__ #=       2 =  0.223%  ##=      895 =100.000 %
```

#80 LIST OF DEADLOCKS FOR TDS : ABORTED TPR AND TENANTS

```
SBR    (T)  TDS                     LIST OF DEADLOCKS FOR TDS DBTX : ABORTED TPR AND TENANTS                CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/03/08  19:03:15   END TIME =  89/03/08  19:18:15   DURATION = 00:15:00 =       900.  0 SECONDS

The resource in conflict was not necessarily locked by the last TPR
executed within the Commitment Unit which owns it;
as such, the TPR given here as resource owner is only indicative.

CI = address space number (8 bits) + CI number (24 bits)

89/03/08 19:13:24.1884  Type=D__ TPR=TB04C       :TPR.DBTX.NEW.SMLIB       at SRA=122E on EFN=DBTX.DATA.CUSTOMER
                   with TPR=TKHA1       :TPR.DBTX.NEW.SMLIB                      CI=00001740
89/03/08 19:14:28.5506  Type=D__ TPR=TKHA4       :TPR.DBTX.NEW.SMLIB       at SRA=07D2 on EFN=DBTX.DATA.ITEM
                   with TPR=TB04C       :TPR.DBTX.NEW.SMLIB                      CI=00001753
89/03/08 19:15:25.9026  Type=D__ TPR=TKHA4       :TPR.DBTX.NEW.SMLIB       at SRA=0DFA on EFN=DBTX.DATA.ORDER
                   with TPR=TB04A       :TPR.DBTX.NEW.SMLIB                      CI=00002DF7
89/03/08 19:15:31.1218  Type=D__ TPR=TKHA3       :TPR.DBTX.NEW.SMLIB       at SRA=0D48 on EFN=DBTX.DATA.ITEM
                   with TPR=TKHA2       :TPR.DBTX.NEW.SMLIB                      CI=00001948
89/03/08 19:15:35.1722  Type=D__ TPR=TKHA4       :TPR.DBTX.NEW.SMLIB       at SRA=0DFA on EFN=DBTX.DATA.ORDER
                   with TPR=TKHA1       :TPR.DBTX.NEW.SMLIB                      CI=000011DC
89/03/08 19:15:35.5849  Type=D__ TPR=TKHA3       :TPR.DBTX.NEW.SMLIB       at SRA=0D48 on EFN=DBTX.DATA.ITEM
                   with TPR=TB04C       :TPR.DBTX.NEW.SMLIB                      CI=00003944
89/03/08 19:15:57.5036  Type=D__ TPR=TKHA4       :TPR.DBTX.NEW.SMLIB       at SRA=0DFA on EFN=DBTX.DATA.ORDER
                   with TPR=TKHA2       :TPR.DBTX.NEW.SMLIB                      CI=00000916
89/03/08 19:16:01.4887  Type=D__ TPR=TKHA4       :TPR.DBTX.NEW.SMLIB       at SRA=0DFA on EFN=DBTX.DATA.ORDER
                   with TPR=TKHA4       :TPR.DBTX.NEW.SMLIB                      CI=000037FA
89/03/08 19:17:09.3973  Type=D__ TPR=TKHA4       :TPR.DBTX.NEW.SMLIB       at SRA=0DFA on EFN=DBTX.DATA.ORDER
                   with TPR=TKHA4       :TPR.DBTX.NEW.SMLIB                      CI=00003B20
89/03/08 19:17:53.8381  Type=D__ TPR=TKHA4       :TPR.DBTX.NEW.SMLIB       at SRA=0DFA on EFN=DBTX.DATA.ORDER
                   with TPR=TKHA4       :TPR.DBTX.NEW.SMLIB                      CI=000042F6
```

#81 ELAPSED TIME PER COMMITMENT UNIT FOR TDS

```
SBR    (T)  TDS                    ELAPSED TIME PER COMMITMENT UNIT FOR TDS TDX                           CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =      2012.771 SECONDS

A commitment unit lasts as long as its LOCKID lasts,
i.e. as long as the locked resources (GAC entries, pages, files)
are not freed.


VALUES BETWEEN 0 AND 20000. MS      LOWEST VALUE =   2.49 MS    HIGHEST VALUE = 19948. MS
                                    NUMBER =     6574     MEAN =   498.24 MS

VALUES BETWEEN 0 AND 200000 MS      LOWEST VALUE =   2.49 MS    HIGHEST VALUE = 102402 MS
                                    NUMBER =     6635     MEAN =   901.75 MS


DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND  20000 MS
******************************
 BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
   1!     0!   200!    767! 11.667! 11.667! ************************************************************************
   2!   200!   400!   3546! 53.939! 65.606! ************************************************************************
   3!   400!   600!   1195! 18.177! 83.784! ************************************************************************
   4!   600!   800!    396!  6.023! 89.808! ************************************************************
   5!   800!  1000!    243!  3.696! 93.504! ************************************
   6!  1000!  1200!    184!  2.798! 96.303! ***************************
   7!  1200!  1400!     83!  1.262! 97.566! ************
   8!  1400!  1600!     48!  0.730! 98.296! *******
   9!  1600!  1800!     22!  0.334! 98.630! ***
  10!  1800!  2000!      8!  0.121! 98.752! *
  11!  2000!  2200!      7!  0.106! 98.859! *
  12!  2200!  2400!      5!  0.076! 98.935!
  13!  2400!  2600!      4!  0.060! 98.996!
  14!  2600!  2800!      1!  0.015! 99.011!
  15!  2800!  3000!      2!  0.030! 99.041!
  16!  3000!  3200!      1!  0.015! 99.056!
  17!  3200!  3400!      3!  0.045! 99.102!
  18!  3400!  3600!      5!  0.076! 99.178!
  19!  3600!  3800!      8!  0.121! 99.300! *
  20!  3800!  4000!      1!  0.015! 99.315!
  21!  4000!  4200!      4!  0.060! 99.376!
  22!  4200!  4400!      3!  0.045! 99.421!
  23!  4400!  4600!      0!  0.000! 99.421!
  24!  4600!  4800!      1!  0.015! 99.437!
  25!  4800!  5000!      1!  0.015! 99.452!
  26!  5000!  5200!      0!  0.000! 99.452!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  30!  5800!  6000!      1!  0.015! 99.467!
  31!  6000!  6200!      0!  0.000! 99.467!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  34!  6600!  6800!      1!  0.015! 99.482!
  35!  6800!  7000!      1!  0.015! 99.498!
  36!  7000!  7200!      0!  0.000! 99.498!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  39!  7600!  7800!      1!  0.015! 99.513!
  40!  7800!  8000!      0!  0.000! 99.513!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  50!  9800! 10000!      1!  0.015! 99.528!
  51! 10000! 10200!      1!  0.015! 99.543!
  52! 10200! 10400!      3!  0.045! 99.589!
  53! 10400! 10600!      0!  0.000! 99.589!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  55! 10800! 11000!      1!  0.015! 99.604!
  56! 11000! 11200!      1!  0.015! 99.619!
  57! 11200! 11400!      1!  0.015! 99.634!
  58! 11400! 11600!      0!  0.000! 99.634!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  60! 11800! 12000!      2!  0.030! 99.665!
  61! 12000! 12200!      2!  0.030! 99.695!
  62! 12200! 12400!      2!  0.030! 99.726!
  63! 12400! 12600!      1!  0.015! 99.741!
```

#82 CI-CA SPLIT FOR LM

```
 SBR    (T)  TDS                     CI-CA SPLIT FOR LM DBTX                                                   CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 86/06/10  19:40:02   END TIME =  86/06/10  20:48:24   DURATION = 01:08:21 =       4101.779 SECONDS

Type= CI-S : CI Splitting
      CI-C : CI Compaction
      CA-S : CA Splitting


TOTAL COUNT =          1     FREQUENCY (NUMBER OVER TIME DURATION) =     0.00 PER SECOND


EFN= DBTX.CTLN                               Type= CI-S COUNT =       1 =100.000 %     CUMUL =          1 =100.000 %
```

#83 GAC PENDING TIME FOR TDS

```
SBR    (T)  TDS                    GAC PENDING TIME FOR TDS TDX                                          CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =      2012.771 SECONDS

It gives an UPPER-BOUND for the elapsed time spent pending by a TDS Simultaneity Level
while awaiting for a simple GAC conflict arbitration;
Using LITTLE's formula, one may then obtain the average number of TDS
Simultaneity Levels waiting because of GAC conflicts during the SBR session.


VALUES BETWEEN 0 AND 60000. MS      LOWEST VALUE =   2.30 MS    HIGHEST VALUE = 48449. MS
                                    NUMBER =      895     MEAN =   901.13 MS


DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND  60000 MS
******************************
 BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
   1!     0!   600!    542! 60.558! 60.558! **************************************************************************
   2!   600!  1200!    303! 33.854! 94.413! **************************************************************************
   3!  1200!  1800!     24!  2.681! 97.094! **************************
   4!  1800!  2400!      6!  0.670! 97.765! ******
   5!  2400!  3000!      1!  0.111! 97.877! *
   6!  3000!  3600!      1!  0.111! 97.988! *
   7!  3600!  4200!      2!  0.223! 98.212! **
   8!  4200!  4800!      1!  0.111! 98.324! *
   9!  4800!  5400!      1!  0.111! 98.435! *
  10!  5400!  6000!      2!  0.223! 98.659! **
  11!  6000!  6600!      1!  0.111! 98.770! *
  12!  6600!  7200!      0!  0.000! 98.770!
  13!  7200!  7800!      1!  0.111! 98.882! *
  14!  7800!  8400!      0!  0.000! 98.882!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  16!  9000!  9600!      1!  0.111! 98.994! *
  17!  9600! 10200!      0!  0.000! 98.994!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  20! 11400! 12000!      1!  0.111! 99.106! *
  21! 12000! 12600!      0!  0.000! 99.106!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  23! 13200! 13800!      1!  0.111! 99.217! *
  24! 13800! 14400!      0!  0.000! 99.217!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  42! 24600! 25200!      1!  0.111! 99.329! *
  43! 25200! 25800!      1!  0.111! 99.441! *
  44! 25800! 26400!      0!  0.000! 99.441!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  59! 34800! 35400!      1!  0.111! 99.553! *
  60! 35400! 36000!      0!  0.000! 99.553!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  75! 44400! 45000!      1!  0.111! 99.664! *
  76! 45000! 45600!      0!  0.000! 99.664!
 = = = = = = = = = = = =  = = = = = = = = = = = =
  79! 46800! 47400!      2!  0.223! 99.888! **
  80! 47400! 48000!      0!  0.000! 99.888!
  81! 48000! 48600!      1!  0.111!100.000! *
  82! 48600! 49200!      0!  0.000!100.000!
 = = = = = = = = = = = =  = = = = = = = = = = = =
```

#84 GAC CONFLICTS DURATION FOR TDS

```
 SBR    (T)  TDS                    GAC CONFLICTS DURATION FOR TDS TDX                                        CHART
-----------------------------------------------------------------------------------------------------------------------

 BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

 It gives an UPPER-BOUND for the average elapsed time
 from a GAC simple conflict or deadlock up to its termination.


 VALUES BETWEEN 0 AND 60000. MS       LOWEST VALUE =    2.30 MS    HIGHEST VALUE = 48449. MS
                                      NUMBER =      895     MEAN =   901.13 MS


 DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND  60000 MS
 ******************************
  BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
    1!     0!   600!    542! 60.558! 60.558! **************************************************************************
    2!   600!  1200!    303! 33.854! 94.413! **************************************************************************
    3!  1200!  1800!     24!  2.681! 97.094! **************************
    4!  1800!  2400!      6!  0.670! 97.765! ******
    5!  2400!  3000!      1!  0.111! 97.877! *
    6!  3000!  3600!      1!  0.111! 97.988! *
    7!  3600!  4200!      2!  0.223! 98.212! **
    8!  4200!  4800!      1!  0.111! 98.324! *
    9!  4800!  5400!      1!  0.111! 98.435! *
   10!  5400!  6000!      2!  0.223! 98.659! **
   11!  6000!  6600!      1!  0.111! 98.770! *
   12!  6600!  7200!      0!  0.000! 98.770!
   13!  7200!  7800!      1!  0.111! 98.882! *
   14!  7800!  8400!      0!  0.000! 98.882!
  = = = = = = = = = = = =  = = = = = = = = = = = =
   16!  9000!  9600!      1!  0.111! 98.994! *
   17!  9600! 10200!      0!  0.000! 98.994!
  = = = = = = = = = = = =  = = = = = = = = = = = =
   20! 11400! 12000!      1!  0.111! 99.106! *
   21! 12000! 12600!      0!  0.000! 99.106!
  = = = = = = = = = = = =  = = = = = = = = = = = =
   23! 13200! 13800!      1!  0.111! 99.217! *
   24! 13800! 14400!      0!  0.000! 99.217!
  = = = = = = = = = = = =  = = = = = = = = = = = =
   42! 24600! 25200!      1!  0.111! 99.329! *
   43! 25200! 25800!      1!  0.111! 99.441! *
   44! 25800! 26400!      0!  0.000! 99.441!
  = = = = = = = = = = = =  = = = = = = = = = = = =
   59! 34800! 35400!      1!  0.111! 99.553! *
   60! 35400! 36000!      0!  0.000! 99.553!
  = = = = = = = = = = = =  = = = = = = = = = = = =
   75! 44400! 45000!      1!  0.111! 99.664! *
   76! 45000! 45600!      0!  0.000! 99.664!
  = = = = = = = = = = = =  = = = = = = = = = = = =
   79! 46800! 47400!      2!  0.223! 99.888! **
   80! 47400! 48000!      0!  0.000! 99.888!
   81! 48000! 48600!      1!  0.111!100.000! *
   82! 48600! 49200!      0!  0.000!100.000!
  = = = = = = = = = = = =  = = = = = = = = = = = =
```

#85 MATCHES WITHIN MEMORY

```
SBR    (M) MEMORY                    MATCHES WITHIN MEMORY                                                    CHART
---------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

Adress matches are done on the overall main memory

PRESENT SEGMENTS MATCHES:SHARED include all present system shared segments (types 0 and 10)
                         USER include the other present segments,especially those private to the LMs
MISSED MATCHES and BIASED MATCHES never occur unless some SBR events
have been lost during SBR collection phase


                 0         1         2         3         4         5         6         7         8         9
                 0123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
89/02/11 15:18:45.**************************************>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>-------------
         15:23:45.**************************************>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>---
         15:28:45.***************************************>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>--------
         15:33:45.***************************************>>>>>>>>>>>>>>>>>>>>>>>----------------------------------
         15:38:45.***************************************>>>>>>>>>>>>>>>>>>>>>>-----------------------------------
         15:43:45.***************************************>>>>>>>>>>>>>>>>>>>>>>>----------------------------------
         15:47:17.*******************************>>>>>>>>>>>>>------------------------ .         .         .

TOTAL MATCHES                    1-100 O        =      1 PER S  NUMBER =    190740 FREQ =    94.80
  MISSED MATCH IDENTIFICATIONS   1-100 O      m =      1 PER S  NUMBER =         0 FREQ =     0.00
  BIASED   SEGMENT MATCHES       1-100 C      b =      1 PER S  NUMBER =         0 FREQ =     0.00
  UNSTABLE SEGMENT MATCHES       1-100 C      u =      1 PER S  NUMBER =       197 FREQ =     0.09
  PRESENT SEGMENT MATCHES:SHAR   1-100 C      * =      1 PER S  NUMBER =     78561 FREQ =    39.04
                          USER   1-100 C      > =      1 PER S  NUMBER =     66857 FREQ =    33.22
  HOLE MATCHES                   1-100 C      - =      1 PER S  NUMBER =     45125 FREQ =    22.42
```

Specimen Output

#86 MATCHED SEGMENTS LENGTH DISTRIBUTION WITHIN MEMORY

```
SBR    (M) MEMORY                   MATCHED SEGMENTS LENGTH DISTRIBUTION WITHIN MEMORY                      CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

The following distribution is a biased statistic of the true distribution of present segment length,since we have :

AVERAGE(matched lengths) = (1+C**2) * AVERAGE(true lengths)

where C**2 is the squared coefficient of variation of the true lengths distribution.

Lengths VALUES are in bytes.


VALUES BETWEEN 0 AND 100000         LOWEST VALUE =  16.00       HIGHEST VALUE = 97776.
                                    NUMBER =   138467     MEAN = 26539.32

VALUES BETWEEN 0 AND 1.00+6         LOWEST VALUE =  16.00       HIGHEST VALUE = 589824
                                    NUMBER =   142948     MEAN = 37667.99

VALUES BETWEEN 0 AND 1.00+7         LOWEST VALUE =  16.00       HIGHEST VALUE = 1.02+6
                                    NUMBER =   145418     MEAN = 54421.35


DETAILS OF HISTOGRAM CONTENTS.   VALUES BETWEEN 0 AND 100000
******************************
 BOX! >=   !  <   ! COUNT !   %   ! CUM % !   ONE STAR = 0.1%, 10 STARS = 1% . LINES MAY BE TRUNCATED
   1!     0!  1000!  11147!  8.050!  8.050! *************************************************************************
   2!  1000!  2000!   4237!  3.059! 11.110! ******************************
   3!  2000!  3000!   2460!  1.776! 12.886! *****************
   4!  3000!  4000!   1982!  1.431! 14.318! **************
   5!  4000!  5000!  10468!  7.559! 21.878! *************************************************************************
   6!  5000!  6000!   2002!  1.445! 23.323! **************
   7!  6000!  7000!   2186!  1.578! 24.902! ***************
   8!  7000!  8000!   1681!  1.214! 26.116! ************
   9!  8000!  9000!  11977!  8.649! 34.766! *************************************************************************
  10!  9000! 10000!   1648!  1.190! 35.956! ***********
  11! 10000! 11000!   1509!  1.089! 37.046! **********
  12! 11000! 12000!    834!  0.602! 37.648! ******
  13! 12000! 13000!   1552!  1.120! 38.769! ***********
  14! 13000! 14000!   2406!  1.737! 40.507! *****************
  15! 14000! 15000!   1357!  0.980! 41.487! *********
  16! 15000! 16000!    959!  0.692! 42.179! ******
  17! 16000! 17000!   2547!  1.839! 44.019! ******************
  18! 17000! 18000!  17391! 12.559! 56.578! *************************************************************************
  19! 18000! 19000!    745!  0.538! 57.116! *****
  20! 19000! 20000!    728!  0.525! 57.642! *****
  21! 20000! 21000!    948!  0.684! 58.327! ******
  22! 21000! 22000!    640!  0.462! 58.789! ****
  23! 22000! 23000!   1273!  0.919! 59.708! *********
  24! 23000! 24000!    264!  0.190! 59.899! *
  25! 24000! 25000!   2072!  1.496! 61.395! **************
  26! 25000! 26000!    722!  0.521! 61.917! *****
  27! 26000! 27000!    618!  0.446! 62.363! ****
  28! 27000! 28000!   1397!  1.008! 63.372! **********
  29! 28000! 29000!   1213!  0.876! 64.248! ********
  30! 29000! 30000!    320!  0.231! 64.479! **
  31! 30000! 31000!   1037!  0.748! 65.228! *******
  32! 31000! 32000!    458!  0.330! 65.559! ***
  33! 32000! 33000!   2921!  2.109! 67.668! *********************
  34! 33000! 34000!    192!  0.138! 67.807! *
  35! 34000! 35000!   1149!  0.829! 68.637! ********
  36! 35000! 36000!    658!  0.475! 69.112! ****
  37! 36000! 37000!    533!  0.384! 69.497! ***
  38! 37000! 38000!    927!  0.669! 70.166! ******
  39! 38000! 39000!    518!  0.374! 70.540! ***
  40! 39000! 40000!    655!  0.473! 71.014! ****
  41! 40000! 41000!   1243!  0.897! 71.911! ********
  42! 41000! 42000!    361!  0.260! 72.172! **
```

#87 PRESENT SEGMENT COUNTS PER LM-TYPE WITHIN MEMORY

```
SBR    (M) MEMORY                   PRESENT SEG COUNTS PER LM-TYPE WITHIN MEMORY                            CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

Segment types :
        0      System shared
        2      Process Group private
        3      Process private
        10     System Sharable Module
        12     Private Sharable Module
        XAS    Extended Adress Space buffers (MIDAS segments)
        2.10   )
        2.12   ) Private Data
        3.10   ) of SM/lku
        3.12   )
        F.x.1x fresh copy in memory of Private Data (TDS command "M PMM <tpr>")

TOTAL COUNT =     143921     FREQUENCY (NUMBER OVER TIME DURATION) =    71.53 PER SECOND


LM = BENCH            TYPE =   2    #=       3 =  0.002%  ##=        3 =  0.002 %
LM = BENCH            TYPE =   3    #=      15 =  0.010%  ##=       18 =  0.012 %
LM = BMK02A           TYPE =   2    #=     131 =  0.091%  ##=      149 =  0.103 %
LM = BMK02A           TYPE =   3    #=     100 =  0.069%  ##=      249 =  0.173 %
LM = CIS4             TYPE =   2    #=      32 =  0.022%  ##=      281 =  0.195 %
LM = CIS4             TYPE =   3    #=      21 =  0.014%  ##=      302 =  0.209 %
LM = CIS4             TYPE = XAS    #=       7 =  0.004%  ##=      309 =  0.214 %
LM = C1I5             TYPE =   2    #=       9 =  0.006%  ##=      318 =  0.220 %
LM = C1I5             TYPE =   3    #=      11 =  0.007%  ##=      329 =  0.228 %
LM = C1I5             TYPE = XAS    #=       2 =  0.001%  ##=      331 =  0.229 %
LM = C1I8             TYPE =   2    #=      17 =  0.011%  ##=      348 =  0.241 %
LM = C1I8             TYPE =   3    #=      13 =  0.009%  ##=      361 =  0.250 %
LM = C1I8             TYPE = XAS    #=       4 =  0.002%  ##=      365 =  0.253 %
LM = C111             TYPE =   2    #=       7 =  0.004%  ##=      372 =  0.258 %
LM = C111             TYPE =   3    #=       9 =  0.006%  ##=      381 =  0.264 %
LM = C121             TYPE =   2    #=      11 =  0.007%  ##=      392 =  0.272 %
LM = C121             TYPE =   3    #=      10 =  0.006%  ##=      402 =  0.279 %
LM = C141             TYPE =   2    #=      57 =  0.039%  ##=      459 =  0.318 %
LM = C141             TYPE =   3    #=      67 =  0.046%  ##=      526 =  0.365 %
LM = C141             TYPE = XAS    #=       2 =  0.001%  ##=      528 =  0.366 %
LM = DCDATEST         TYPE =   2    #=      48 =  0.033%  ##=      576 =  0.400 %
LM = DCDATEST         TYPE =   3    #=      36 =  0.025%  ##=      612 =  0.425 %
LM = DCDATEST         TYPE = XAS    #=       3 =  0.002%  ##=      615 =  0.427 %
LM = ECLATE           TYPE =   2    #=      51 =  0.035%  ##=      666 =  0.462 %
LM = ECLATE           TYPE =   3    #=      49 =  0.034%  ##=      715 =  0.496 %
LM = ECLATE           TYPE = XAS    #=       8 =  0.005%  ##=      723 =  0.502 %
LM = FNMA             TYPE =   2    #=      95 =  0.066%  ##=      818 =  0.568 %
LM = FNMA             TYPE =   3    #=     110 =  0.076%  ##=      928 =  0.644 %
LM = H_COBOL85        TYPE =   2    #=    1868 =  1.297%  ##=     2796 =  1.942 %
LM = H_COBOL85        TYPE =   3    #=    2283 =  1.586%  ##=     5079 =  3.529 %
LM = H_DSORT          TYPE =   2    #=     118 =  0.081%  ##=     5197 =  3.611 %
LM = H_DSORT          TYPE =   3    #=     132 =  0.091%  ##=     5329 =  3.702 %
```

#88 PRESENT SEGMENTS FOR LM WITHIN MEMORY

```
SBR    (M) MEMORY                   PRESENT SEGMENTS FOR LM    TDX              WITHIN MEMORY            CHART     88
-------------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

Each time a given segment was found present at a randomly choosen
location in main memory, its COUNT was incremented by one.
Thus, the COUNT value printed for each segment is proportionnal
to its average Space*Time product during the SBR session.

LKU : it gives the STE in the SM of the first entry point
      within the LKU to which belongs the Private Data segment

Ty(pe) : see 'present segments counts per lm and type'chart
         if F.x.1x, STN-STE are not sgnificant

At(tributes) :

                          XXXXXXXXXXX
                          !!!!!!!!!!!
Write Ring ---------------+!!!!!!!!!!
 I : in Iof area  ---------+!!!!!!!!!
 T : in Tds area  ---------+!!!!!!!!!
 M : eMulator segment -----+!!!!!!!!!
 W : Write permit ----------+!!!!!!!!
 E : Execute permit----------+!!!!!!!
 B : Buffer segment-----------+!!!!!!
 V : Vmf block    -------------+!!!!!
 S : Stack segment--------------+!!!!
 R : Relocatable segment---------+!!!
 P : Permanent segment------------+!!
 N : resideNt segment--------------+!
 D : Dynamic segment----------------+

Sz : average size of the segment(in bytes)

PP : average number of present pages

# gives the number of references (and percentage) of the segment
## gives the cumulated number (and percentage) of referenced segments


TOTAL COUNT =      14937     FREQUENCY (NUMBER OVER TIME DURATION) =     7.42 PER SECOND

                                   Seg=0100 Ty=  2    At=3.W....R..D Sz= 4096.00 PP=  1.00 #=    8    0.05 ##=     8
                                   Seg=0101 Ty=  2    At=3.W....R..D Sz= 4096.00 PP=  1.00 #=   24    0.16 ##=    32
                                   Seg=0102 Ty=  2    At=3.W....R..D Sz= 4096.00 PP=  1.00 #=   21    0.14 ##=    53
                                   Seg=0103 Ty=  2    At=3.W....R..D Sz= 4096.00 PP=  1.00 #=   28    0.18 ##=    81
                                   Seg=0900 Ty=  2    At=0.W.....P.. Sz=12288.00 PP=  3.00 #=   77    0.51 ##=   158
                                   Seg=0901 Ty=  2    At=0.W....R... Sz=   80.00 PP=  1.00 #=    3    0.02 ##=   161
                                   Seg=0902 Ty=  2    At=1.W....R... Sz= 1168.00 PP=  1.00 #=   22    0.14 ##=   183
                                   Seg=0903 Ty=  2    At=0.W....R... Sz=   96.00 PP=  1.00 #=    2    0.01 ##=   185
                                   Seg=0904 Ty=  2    At=0.W.....P.. Sz= 4096.00 PP=  1.00 #=   25    0.16 ##=   210
                                   Seg=0916 Ty=  2    At=0.WEB...P.. Sz= 4096.00 PP=  1.00 #=   22    0.14 ##=   232
                                   Seg=0918 Ty=  2    At=0.W....R... Sz= 1136.00 PP=  1.00 #=   19    0.12 ##=   251
                                   Seg=091A Ty=  2    At=1.W....R..D Sz= 6432.00 PP=  1.50 #=   16    0.10 ##=   267
                                   Seg=091B Ty=  2    At=1.W....R..D Sz=13456.00 PP=  4.00 #=   37    0.24 ##=   304
                                   Seg=091C Ty=  2    At=3.W....R... Sz= 4688.00 PP=  2.00 #=   38    0.25 ##=   342
                                   Seg=091D Ty=  2    At=3..E...R... Sz=  704.00 PP=  1.00 #=    2    0.01 ##=   344
                                   Seg=091E Ty=  2    At=3.W....R... Sz=  256.00 PP=  1.00 #=   26    0.17 ##=   370
                                   Seg=091F Ty=  2    At=1.W....R... Sz=  176.00 PP=  1.00 #=   26    0.17 ##=   396
                                   Seg=0921 Ty=  2    At=3.W.B...P.. Sz= 3072.00 PP=  1.00 #=   25    0.16 ##=   421
                                   Seg=0922 Ty=  2    At=3.W.B...P.. Sz= 1024.00 PP=  1.00 #=   22    0.14 ##=   443
                                   Seg=0923 Ty=  2    At=3.W....R... Sz=  384.00 PP=  1.00 #=    3    0.02 ##=   446
                                   Seg=0924 Ty=  2    At=3.W....R... Sz= 1280.00 PP=  1.00 #=    4    0.02 ##=   450
                                   Seg=0925 Ty=  2    At=3.W....R... Sz=  416.00 PP=  1.00 #=   26    0.17 ##=   476
                                   Seg=0926 Ty=  2    At=0.W.....P.. Sz= 1936.00 PP=  1.00 #=   13    0.08 ##=   489
                                   Seg=0927 Ty=  2    At=1.W....R... Sz= 1648.00 PP=  1.00 #=    8    0.05 ##=   497
                                   Seg=0928 Ty=  2    At=0.W....R... Sz=   96.00 PP=  1.00 #=    2    0.01 ##=   499
                                   Seg=0929 Ty=  2    At=1..E...R... Sz=  320.00 PP=  1.00 #=    2    0.01 ##=   501
```

#89 MSC USAGE

```
SBR    (M) MSC                      MSC USAGE                                                                CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

TOTAL COUNT : meaningless
Busy        : percentage of time when the MSC was either searching or transfering data
I/O/s       : number of Seek Cylinder commands per second
KBytes/s    : number of Read or Written KBytes per second (1 Kb = 1024 bytes)
#           : number of MSC statistics samples used to build this statistic

WARNING : In case of MSC coupled systems,
          these statistics account for both of them.


TOTAL COUNT =     331487     FREQUENCY (NUMBER OVER TIME DURATION) =   164.75 PER SECOND


MSC0C     Busy=  5.00%  I/O/s=   9.27  KBytes/s=   44.57  #=  105
MSC0D     Busy=  6.36%  I/O/s=   6.06  KBytes/s=   28.08  #=  129
MSC06     Busy=  5.10%  I/O/s=   4.69  KBytes/s=   21.74  #=  124


MSC0D     Busy=  6.36%  I/O/s=   6.06  KBytes/s=   28.08  #=  129
MSC06     Busy=  5.10%  I/O/s=   4.69  KBytes/s=   21.74  #=  124
MSC0C     Busy=  5.00%  I/O/s=   9.27  KBytes/s=   44.57  #=  105
```

#90 USAGE PER MEDIA FOR MSCxx

```
SBR    (M) MSC                      USAGE PER MEDIA FOR          MSC0D                                      CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

Busy        : percentage of time when the MSC was either searching or transfering data for this media
I/O         : number of Seek Cylinder commands for this media
KBytes/IO   : number of Read or Written KBytes per Seek (1 Kb = 1024 bytes)
R+W/IO      : number of Read or Write Channel commands executed per Seek
W/R+W       : percentage of Write commands
#           : number of Device_path statistics samples used to build this statistic

WARNING : In case of MSC coupled systems,
          these statistics account for both of them.


LINES ARE NOT PRINTED WHEN THE CUMULATIVE PERCENTAGE REACHES  99%

TOTAL COUNT =     128173     FREQUENCY (NUMBER OVER TIME DURATION) =    63.70 PER SECOND


MS18 FSD518     Busy=  2.62%  I/O=      3048  KBytes/IO=   0.22  R+W/IO=  1.07  W/R+W= 37.84%  #=   29
MS11 FSD511     Busy=  2.38%  I/O=      5655  KBytes/IO=   4.50  R+W/IO=  1.00  W/R+W=100.00%  #=  120
MS17 FBO517     Busy=  0.74%  I/O=      2373  KBytes/IO=   8.32  R+W/IO=  1.00  W/R+W= 70.96%  #=   53
MS14 FSD514     Busy=  0.61%  I/O=      1127  KBytes/IO=   9.46  R+W/IO=  1.10  W/R+W= 63.25%  #=   64
```

#91 MSC ERRORS OR ANOMALIES PER MEDIA

```
SBR    (M) MSC                      MSC ERRORS OR ANOMALIES PER MEDIA                                       CHART     91
------------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

TOTAL COUNT : total number of errors/anomalies
Retries     : number of retries after Read error
Alternates  : number of Seeks made on alternate tracks
Reconnects  : number of forced Channel Program reconnections after RPS time-out
Slips       : number of 'Chaining Slips'
Abn. term.  : number of abnormal terminations (FSA)
Conflicts   : number of conflicts (FSA)

When this Chart appears, look at GCOS PRLOG for detailed anomalies reports


TOTAL COUNT =         31     FREQUENCY (NUMBER OVER TIME DURATION) =     0.01 PER SECOND


MSC0C MS03 FSD503  Retries=      0  Alternates=      0  Reconnects=      0  Slips=    19  Abn. term.=    0  Conflicts=
MSC0C MS04 FSD504  Retries=      0  Alternates=      0  Reconnects=      0  Slips=     8  Abn. term.=    0  Conflicts=
MSC0D MS18 FSD518  Retries=      0  Alternates=      0  Reconnects=      0  Slips=     3  Abn. term.=    0  Conflicts=
MSC0D MS14 FSD514  Retries=      0  Alternates=      0  Reconnects=      0  Slips=     1  Abn. term.=    0  Conflicts=
```

#92 MSCxx ACTIVITY

```
 SBR    (M) MSC                      MSC41 ACTIVITY                                                        CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 86/06/10  19:40:02   END TIME =  86/06/10  20:48:24   DURATION = 01:08:21 =      4101.779 SECONDS

WARNING : In case of MSC coupled systems,
          these statistics account for both of them.

        0         1         2         3         4         5         6         7         8         9         0
        0123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
19:50:02.***********************************    .         .wwwwwwwwwwwwwwwwwwwww         .         .         .
20:00:02.***********************         .      .         .ww       .         .         .         .         .
20:10:02.********************************       .         .rrrwwwww .         .         .         .         .
20:20:02.************************************   .         .rrrwwwwww.         .         .         .         .
20:30:02.*************************************  .         .rrrwwwwww.         .         .         .         .
20:40:02.*************************************  .         .rrrwwwwww.         .         .         .         .
20:48:24.**********************          .      .         .rrwww    .         .         .         .         .

BUSY PERCENTAGE                  1- 49 O      * =   0.50 %       TIME=   664.89 S PERCENT=   16.20 %

R+W COMMANDS                    51- 89 O        =      4 PER S  NUMBER =    145579 FREQ =    35.49
  R                             51- 89 O      r =      4 PER S  NUMBER =     33052 FREQ =     8.05
  W                             51- 89 C      w =      4 PER S  NUMBER =    112527 FREQ =    27.43

ERRORS/ANOMALIES                91-110 O        =   0.05 PER S  NUMBER =         0 FREQ =     0.00
  RETRY AFTER READ ERROR        91-110 O      e =   0.05 PER S  NUMBER =         0 FREQ =     0.00
  SEEK ON ALTERNATE TRACK       91-110 C      a =   0.05 PER S  NUMBER =         0 FREQ =     0.00
  RPS TIME-OUT RECONNECTION     91-110 C      t =   0.05 PER S  NUMBER =         0 FREQ =     0.00
  CHAINING SLIP                 91-110 C      s =   0.05 PER S  NUMBER =         0 FREQ =     0.00
```

#93 BUFFER POOLS PERFORMANCE FOR LM

```
SBR    (U) UFAS                     BUFFER POOLS PERFORMANCES     FOR LM TDX                               CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =      2012.771 SECONDS

TOTAL COUNT : total number of I/Os saved for this LM (Buffer Pools hits)
Sz          : KBytes in <Pool> for this file,time averaged over the file active period,
              (i. e. when it was sampled with at least one CI present in Pool).
Bus         : KBytes in <Pool> corresponding to Busy Buffers (Those kept in pool by
              the Access Method (UFAS,IDS) while processing a primitive (not swappable)).
Def         : KBytes in <Pool> corresponding to modified buffers of files
              using Deferred Updates.
Hits        : total number of hits in <Buffer_Pool> for this file.
Ratio       : time averaged quotient : (number of saved I/Os per second / <Sz>) * 1000
#           : number of snapshots used to build the statistics for this file


TOTAL COUNT =       5725     FREQUENCY (NUMBER OVER TIME DURATION) =     2.84 PER SECOND


TDX.CTLN                                  Sz=     8.22 Bus=    0.00 Def=    0.00 Hits=       25 Ratio=    1.62  #=   1
TDX.CTLM                              TDX  Sz=    14.02 Bus=    0.00 Def=    0.00 Hits=       17 Ratio=    0.43  #=   1
TDX.DATA.BANK                         TDX  Sz=   146.39 Bus=    6.16 Def=    9.06 Hits=     5459 Ratio=   19.74  #=   1
TDX.DATA.ZONE00                       TDX  Sz=   335.75 Bus=    5.88 Def=   26.56 Hits=       27 Ratio=    0.04  #=   1
TDX.FORM                              TDX  Sz=    33.17 Bus=    0.00 Def=    0.00 Hits=      158 Ratio=    2.69  #=   1
TDX.INITSEED                          TDX  Sz=    15.04 Bus=    0.00 Def=    0.00 Hits=       39 Ratio=    1.49  #=   1


TDX.DATA.BANK                         TDX  Sz=   146.39 Bus=    6.16 Def=    9.06 Hits=     5459 Ratio=   19.74  #=   1
TDX.FORM                              TDX  Sz=    33.17 Bus=    0.00 Def=    0.00 Hits=      158 Ratio=    2.69  #=   1
TDX.INITSEED                          TDX  Sz=    15.04 Bus=    0.00 Def=    0.00 Hits=       39 Ratio=    1.49  #=   1
TDX.DATA.ZONE00                       TDX  Sz=   335.75 Bus=    5.88 Def=   26.56 Hits=       27 Ratio=    0.04  #=   1
TDX.CTLN                                  Sz=     8.22 Bus=    0.00 Def=    0.00 Hits=       25 Ratio=    1.62  #=   1
TDX.CTLM                              TDX  Sz=    14.02 Bus=    0.00 Def=    0.00 Hits=       17 Ratio=    0.43  #=   1
```

#94 EFN I/O AND POOLSIZE FOR LM

```
SBR    (U) UFAS                     TDX.DATA.BANK IO'S AND POOLSIZE FOR LM TDX                              CHART
-----------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 89/02/11  15:13:45   END TIME =  89/02/11  15:47:17   DURATION = 00:33:32 =       2012.771 SECONDS

SIZE IN POOL      : time averaged value in KBytes
BUSY BUFFERS      : those kept in pool by the Access Method (UFAS,IDS) while processing a primitive (not swappable)
DEFFERED UPDATES : modified buffers kept in pool until Commitment Time (not swappable)
% OF R/W HITS     : on each line, sum of Read + Write values gives the overall hit ratio for the file over this
                    period.
                    Beware that global figures ARE NOT the actual ratios over the whole analysis session,
                    but are the AVERAGED values of all printed lines


                 0         1         2         3         4         5         6         7         8         9
                 0123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
89/02/11 15:18:45.         .         .         .         .         .         .         .         .         .
         15:23:45.d************      .         .         .rw       .         .rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr
         15:28:45.bd******************         .         .         .         .rrrrrrrrrrrrrrrrrrrr         .
         15:33:45.bd*******************        .         .rrwwwwwwwwww       .rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr
         15:38:45.bdd******************        .         .rrwwwwwwwwwwwwwwww .rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr
         15:43:45.bdd******************        .         .rrrwwwwwwwwwwwwwww .rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr
         15:47:17.****************   .         .         .         .         .         .         .         .

SIZE USED IN POOL               1- 39 O      * =      8 MEAN =  135.12
  BUSY BUFFERS                  1- 39 O      b =      8 MEAN =    4.99
  DEFERRED UPDATES              1- 39 C      d =      8 MEAN =    7.36

NUMBER OF PHYSICAL IO'S        41- 59 O        =   0.50 PER S  NUMBER =      7573 FREQ =     3.76
             READ  IO'S        41- 59 O      r =   0.50 PER S  NUMBER =      1057 FREQ =     0.52
             WRITE IO'S        41- 59 C      w =   0.50 PER S  NUMBER =      6516 FREQ =     3.23

% HITS                         61-110 O        =   1.00 MEAN =    0.00
      READ  PART               61-110 O      r =   1.00 MEAN =    0.00
      WRITE PART               61-110 C      w =   1.00 MEAN =    0.00
```

#95 STATISTICS BY STEP

```
 SBR BILL                                  S T A T I S T I C S   B Y   S T E P                              CHART
                                           -----------------------------------
*************************************************************************************************************************
*         START        *        END        *      *  *   *LOAD MODULE*       *  CPU  * MISSING* I/O *   I/O  * MAXSIZE
* RON *  DATE  *  TIME  *  DATE  *  TIME   * PGID *CL*DSN*   NAME     * TYPE  *  TIME *SEGMENTS*DISK *NOT DISK*LOCK  ALL
*     *        *        *        *         *      *  *   *            *       *       * (PAGES)*     *        *
*-----*--------*--------*--------*---------*------*--*---*------------*-------*-------*--------*-----*--------*---------
*X0001  ALREADY STARTED       NOT ENDED     0000  SY    1 H_NUCLEUS   SERVICE  264.344      366 11531        0* 244  226
*X0003  ALREADY STARTED       NOT ENDED     0005  X     1 H_EXECUTE   SERVICE   12.724       65   479        0* 136   69
*X0003  ALREADY STARTED       NOT ENDED     0001  V     1 H_TRCCL     SERVICE    0.900        0    94        0*  48   33
*X0004  ALREADY STARTED       NOT ENDED     0002  Z     1 H_OMH       SERVICE    9.931       13    21       66* 528  343
*X0006 89/02/11 15:21:30 89/02/11 15:45:29  0010  W     1 H_WRITER    SERVICE   15.579       92  1525      140* 128   46
*X0008  ALREADY STARTED       NOT ENDED     0003  Z     1 H_IOF       IOF       28.904      103   400      824*  72   41
*X0010  ALREADY STARTED       NOT ENDED     0004  R     1 H_RUN       SERVICE    4.507        4   225        0* 140   37
*X0016  ALREADY STARTED       NOT ENDED     0006  P     1 H_SBR       SERVICE  233.496       18  7732      398* 480  361
*X0017 89/02/11 15:15:14 89/02/11 15:15:24  0007  P     1 H_MAC                  3.535        1   210        0*  64   50
*      89/02/11 15:15:26 89/02/11 15:15:37  0007  P     2 H_RUN                  3.376        3   179        0* 132   36
*X0018 89/02/11 15:15:36 89/02/11 15:15:46  0008  P     1 H_SYSMAINT             4.854       15   182        0* 172   86
*      89/02/11 15:15:53 89/02/11 15:47:04  0008  P     2 TDX         TDS     1101.006      378 40971        0*1308  321
*      89/02/11 15:47:07 89/02/11 15:47:10  0008  P     3 H_JAGEN                1.324        1    77        0* 128   44
*X0019 89/02/11 15:17:14 89/02/11 15:17:29  0007  P     1 H_MAC                  6.573        0   235        0* 132   56
*      89/02/11 15:17:32 89/02/11 15:17:36  0007  P     2 H_MAC                  1.872        0    89        0* 132   56
*      89/02/11 15:17:44 89/02/11 15:43:43  0007  P     3 H_TILS                88.466      105   291        0* 252  252
*X0020 89/02/11 15:19:49 89/02/11 15:19:52  0009  P     1 H_RUN                  1.317        1    77        0*  52   30
*      89/02/11 15:19:54 89/02/11 15:20:00  0009  P     2 H_RUN                  1.229        1    68        0*  52   30
*      89/02/11 15:20:02 89/02/11 15:20:09  0009  P     3 H_RUN                  1.978        6   106        0* 132   36
*      89/02/11 15:20:11 89/02/11 15:20:17  0009  P     4 H_RUN                  1.706        1    90        0* 132   36
*      89/02/11 15:20:19 89/02/11 15:20:26  0009  P     5 H_RUN                  1.674        5    85        0* 132   36
*      89/02/11 15:20:29 89/02/11 15:20:34  0009  P     6 H_RUN                  1.853        1    91        0* 132   36
*      89/02/11 15:20:36 89/02/11 15:20:41  0009  P     7 H_RUN                  1.636        1    80        0* 132   36
*      89/02/11 15:20:43 89/02/11 15:20:47  0009  P     8 H_RUN                  1.632        1    79        0* 132   36
*      89/02/11 15:20:49 89/02/11 15:20:53  0009  P     9 H_RUN                  1.615        1    79        0* 132   36
*      89/02/11 15:20:55 89/02/11 15:20:59  0009  P    10 H_RUN                  1.653        1    81        0* 132   36
*      89/02/11 15:21:00 89/02/11 15:21:07  0009  P    11 H_RUN                  1.675        2    81        0* 132   36
*      89/02/11 15:21:09 89/02/11 15:21:14  0009  P    12 H_RUN                  1.315        1    69        0*  52   30
*      89/02/11 15:21:27 89/02/11 15:21:45  0009  P    13 H_RUN                  1.760        2    84        0* 132   36
*      89/02/11 15:21:47 89/02/11 15:22:21  0009  P    14 H_RUN                  1.950        1    92        0* 136   36
*      89/02/11 15:22:23 89/02/11 15:22:54  0009  P    15 H_RUN                  1.939        1   100        0* 132   36
*      89/02/11 15:22:57 89/02/11 15:23:07  0009  P    16 H_RUN                  1.277        1    70        0*  52   30
*      89/02/11 15:23:08 89/02/11 15:23:19  0009  P    17 H_RUN                  1.566        1    79        0* 132   36
*      89/02/11 15:23:22 89/02/11 15:23:30  0009  P    18 H_RUN                  1.561        1    77        0* 132   36
*      89/02/11 15:23:32 89/02/11 15:23:43  0009  P    19 H_RUN                  2.599        1    77        0* 132   36
*      89/02/11 15:23:46 89/02/11 15:24:00  0009  P    20 H_RUN                  1.583        1    79        0* 132   36
*      89/02/11 15:24:01 89/02/11 15:24:13  0009  P    21 H_RUN                  1.565        1    79        0* 132   36
*      89/02/11 15:24:15 89/02/11 15:24:23  0009  P    22 H_RUN                  1.277        1    68        0*  52   30
*      89/02/11 15:24:25 89/02/11 15:24:37  0009  P    23 H_RUN                  1.320        1    70        0*  52   30
*      89/02/11 15:24:41 89/02/11 15:24:56  0009  P    24 H_RUN                  1.526        1    75        0* 132   36
*      89/02/11 15:24:59 89/02/11 15:25:14  0009  P    25 H_RUN                  1.276        1    73        0*  52   30
*      89/02/11 15:25:17 89/02/11 15:25:35  0009  P    26 H_RUN                  1.313        2    75        0*  52   28
*      89/02/11 15:25:39 89/02/11 15:25:57  0009  P    27 H_RUN                  1.345        1    76        0*  52   30
*      89/02/11 15:26:00 89/02/11 15:26:17  0009  P    28 H_RUN                  1.640        2    86        0* 132   36
*      89/02/11 15:26:22 89/02/11 15:26:38  0009  P    29 H_RUN                  2.033        1   119        0* 136   36
*X0021 89/02/11 15:20:25 89/02/11 15:21:34  000A  C     1 H_COBOL85             18.364       36   581        0* 204  306
*      89/02/11 15:21:40 89/02/11 15:22:14  000A  C     2 H_LINKER               3.926        5   196        0* 132   78
*      89/02/11 15:22:17 89/02/11 15:30:57  000A  C     3 XCF046N               87.085       12   958        0* 128   36
```

#96 STATISTICS BY RON

SBR BILL S T A T I S T I C S B Y R O N CHART

RON	START DATE	START TIME	END DATE	END TIME	PGID	CL	TYPE	USER NAME	BILLING	NBR STP	CPU TIME	MISSING SEGMENTS (PAGES)	I/O DISKS	I/O NOT D
*X0001	ALREADY	STARTED	NOT	ENDED	0000	SY	SERVICE	OPERATOR	INSTALL	1	264.344	366	11531	
*X0002	ALREADY	STARTED	NOT	ENDED	0005	X	SERVICE	JTRA	INSTALL	1	12.724	65	479	
*X0003	ALREADY	STARTED	NOT	ENDED	0001	V	SERVICE	OPERATOR		1	0.900	0	94	
*X0004	ALREADY	STARTED	NOT	ENDED	0002	Z	SERVICE	OPERATOR		1	9.931	13	21	
*X0006	89/02/11	15:21:24	89/02/11	15:45:29	0010	W	SERVICE	OPERATOR	INSTALL	1	15.579	92	1525	
*X0008	ALREADY	STARTED	NOT	ENDED	0003	Z	IOF	OPERATOR	INSTALL	1	28.904	103	400	
*X0010	ALREADY	STARTED	NOT	ENDED	0004	R	SERVICE	OPERATOR	INSTALL	1	4.507	4	225	
*X0016	ALREADY	STARTED	NOT	ENDED	0006	P	SERVICE	OPERATOR	INSTALL	1	233.496	18	7732	
*X0017	89/02/11	15:15:11	89/02/11	15:15:37	0007	P		OPERATOR	INSTALL	2	6.911	4	389	
*X0018	89/02/11	15:15:31	89/02/11	15:47:10	0008	P		OPERATOR	INSTALL	3	1107.184	394	41230	
*X0019	89/02/11	15:17:11	89/02/11	15:43:43	0007	P		OPERATOR	INSTALL	3	96.911	105	615	
*X0020	89/02/11	15:19:47	89/02/11	15:26:38	0009	P		PCMU01	PERF	29	46.813	42	2365	
*X0021	89/02/11	15:19:53	89/02/11	15:30:57	000A	C		PCMU01	PERF	3	109.375	53	1735	
*X0022	89/02/11	15:21:03	89/02/11	15:25:44	000B	C		PCMU01	PERF	1	39.737	17	123	
*X0023	89/02/11	15:21:04	89/02/11	15:26:11	000C	C		PCMU01	PERF	7	72.332	45	1230	
*X0024	89/02/11	15:21:04	89/02/11	15:22:58	000D	C		PCMU01	PERF	1	29.898	24	716	
*X0025	89/02/11	15:21:04	89/02/11	15:21:53	000E	C		PCMU01	PERF	1	2.315	16	71	
*X0026	89/02/11	15:21:04	89/02/11	15:21:50	000F	C		PCMU01	PERF	1	2.306	19	74	
*X0027	89/02/11	15:21:04			0010	C		PCMU01	PERF	0	0.000	0	0	
*X0028	89/02/11	15:21:04	89/02/11	15:22:06	0011	C		PCMU01	PERF	1	4.123	69	131	
*X0029	89/02/11	15:21:04	89/02/11	15:22:03	0012	C		PCMU01	PERF	1	3.768	68	122	
*X0030	89/02/11	15:21:04			0013	C		PCMU01	PERF	0	0.000	0	0	
*X0031	89/02/11	15:21:09	89/02/11	15:22:45	0014	C		PCMU01	PERF	1	14.056	27	342	
*X0032	89/02/11	15:21:19	89/02/11	15:25:41	0015	C		PCMU01	PERF	1	40.404	19	60	
*X0033	89/02/11	15:21:41	89/02/11	15:22:12	0013	C		PCMU01	PERF	1	3.295	20	86	
*X0034	89/02/11	15:22:21	89/02/11	15:22:39	000E	C		PCMU01	PERF	1	2.874	19	73	
*X0035	89/02/11	15:22:55	89/02/11	15:23:49	000E	C		PCMU01	PERF	1	9.251	26	341	
*X0036	89/02/11	15:23:08	89/02/11	15:23:40	000D	C		PCMU01	PERF	1	4.709	2	191	
*X0037	89/02/11	15:23:19	89/02/11	15:23:45	000F	C		PCMU01	PERF	1	3.661	50	114	
*X0038	89/02/11	15:23:29	89/02/11	15:23:58	0011	C		PCMU01	PERF	1	10.733	6	159	
*X0039	89/02/11	15:23:43	89/02/11	15:24:50	000D	C		PCMU01	PERF	1	28.205	56	336	
*X0040	89/02/11	15:23:59	89/02/11	15:26:21	000E	C		PCMU01	PERF	1	21.337	11	69	
*X0041	89/02/11	15:24:12	89/02/11	15:30:26	000F	C		PCMU01	PERF	1	98.692	30	866	
*X0042	89/02/11	15:24:24	89/02/11	15:26:16	0011	C		PCMU01	PERF	1	17.849	65	465	
*X0043	89/02/11	15:24:39	89/02/11	15:27:08	0012	C		PCMU01	PERF	1	36.170	81	759	
*X0044	89/02/11	15:24:57	89/02/11	15:27:16	000D	C		PCMU01	PERF	1	12.123	17	535	
*X0045	89/02/11	15:25:16	89/02/11	15:28:15	0013	C		PCMU01	PERF	1	49.078	6	1123	
*X0046	89/02/11	15:25:35	89/02/11	15:27:54	0014	C		PCMU01	PERF	1	28.628	3	765	
*X0047	89/02/11	15:26:00	89/02/11	15:27:45	000B	C		PCMU01	PERF	1	6.944	2	100	
*X0048	89/02/11	15:26:18	89/02/11	15:30:07	0011	C		PCMU01	PERF	1	81.215	3	66	
*X0049	89/02/11	15:26:37	89/02/11	15:30:45	000C	C		PCMU01	PERF	1	109.714	2	69	

TOTAL NUMBER OF RONS : 41 TOTAL NUMBER OF STEPS : 80
ACCOUNTED CPU TIME : 2670.996 SEC.
TOTAL MISSING SEGMENTS/PAGES : 1962
TOTAL I/O DISKS : 77327
TOTAL I/O NOT DISKS : 1428

#97 STATISTICS BY USER

```
SBR BILL                                S T A T I S T I C S   B Y   U S E R                    CHART     97
                                        ----------------------------------
                   ********************************************************************************
                   *    USER     *NBR OF*NBR OF*     CPU     *  MISSING  *    I/0     *    I/O     *
                   *    NAME     * JOBS * STEPS*     TIME    * SEGMENTS  *   DISKS    * NOT DISKS  *
                   *             *      *      *             *  (PAGES)  *            *            *
                   *-------------*------*------*-------------*-----------*------------*------------*
                   *JTRA         *     1*     1*       12.724*         65*         479*           0*
                   *OPERATOR     *    10*    15*     1768.667*       1099*       63762*        1428*
                   *PCMU01       *    30*    64*      889.605*        798*       13086*           0*
                   **FINAL TOTAL:     41*    80*     2670.996*       1962*       77327*        1428*
```

#98 STATISTICS BY BILLING

```
SBR BILL                                S T A T I S T I C S   B Y   B I L L I N G               CHART     98
                                        -----------------------------------------
                  *******************************************************************************
                  *  BILLING    *NBR OF*NBR OF*     CPU     *  MISSING  *    I/0     *    I/O     *
                  *    NAME     *  JOBS* STEPS*     TIME    *  SEGMENTS *   DISKS    *  NOT DISKS *
                  *             *      *      *             *  (PAGES)  *            *            *
                  *-------------*------*------*-------------*-----------*------------*------------*
                  *             *     2*     2*       10.831*         13*         115*          66*
                  *INSTALL      *     9*    14*     1770.560*       1151*       64126*        1362*
                  *PERF         *    30*    64*      889.605*        798*       13086*           0*
                  **FINAL TOTAL:     41*    80*     2670.996*       1962*       77327*        1428*
```

#99 STATISTICS BY PROJECT

```
SBR BILL                        S T A T I S T I C S   B Y   P R O J E C T                CHART     99
                                -----------------------------------------
                  *********************************************************************************
                  *  PROJECT    *NBR OF*NBR OF*     CPU     *   MISSING  *    I/0     *    I/O     *
                  *    NAME     * JOBS * STEPS*     TIME    *  SEGMENTS  *   DISKS    *  NOT DISKS *
                  *             *      *      *             *   (PAGES)  *            *            *
                  *-------------*------*------*-------------*------------*------------*------------*
                  *OPERATOR     *    11*    16*     1781.391*        1164*       64241*        1428*
                  *PCMU01       *    30*    64*      889.605*         798*       13086*           0*
                  **FINAL TOTAL:     41*    80*     2670.996*        1962*       77327*        1428*
```

#100 STATISTICS BY CLASS

```
SBR BILL                            S T A T I S T I C S   B Y   C L A S S                 CHART    100
                                    -------------------------------------
                  ********************************************************************************
                  *            *NBR 0F*NBR 0F*     CPU     *  MISSING  *    I/O     *    I/O     *
                  *    CLASS   * JOBS * STEPS*     TIME    *  SEGMENTS *   DISKS    * NOT DISKS  *
                  *            *      *      *             *  (PAGES)  *            *            *
                  *------------*------*------*-------------*-----------*------------*------------*
                  *      C     *   29*    35*     842.792*        756*       10721*           0*
                  *      P     *    5*    38*    1491.315*        563*       52331*         398*
                  *      R     *    1*     1*       4.507*          4*         225*           0*
                  *      SY    *    1*     1*     264.344*        366*       11531*           0*
                  *      V     *    1*     1*       0.900*          0*          94*           0*
                  *      W     *    1*     1*      15.579*         92*        1525*         140*
                  *      X     *    1*     1*      12.724*         65*         479*           0*
                  *      Z     *    2*     2*      38.835*        116*         421*         890*
                  **FINAL TOTAL:   41*    80*    2670.996*       1962*       77327*        1428*
```

#101 READY TIME

```
SBR    (D) DETAILED                 (+) READY TIME                                                  CHART     101
 ------------------------------------------------------------------------------------------------------------------------
 BEGIN TIME = 96/12/17  16:20:25      END TIME = 96/12/17  16:30:50     DURATION = 00:10:24 =        624.924 SECONDS
 TOTAL READY TIME  : Time spent by processes in ready state (waiting for CPU)
                  0         1         2         3         4         5         6         7         8         9         0         1
                  01234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
 96/12/17 16:30:25.sssssssssssssssssssiii***********       .         .         .       .         .         .         .         .
          16:30:50.**          .         .         .         .         .         .       .         .         .         .         .
 TOTAL READY TIME                1- 51 O        =   0.03 %      TIME    =    6.49 S PERCENT=    1.03 %
       SERVICE JOBS              1- 51 O      s =   0.03 %      TIME    =    3.62 S PERCENT=    0.57 %
       TDS      ''               1- 51 C      t =   0.03 %      TIME    =    0.00 S PERCENT=    0.00 %
       IOF      ''               1- 51 C      i =   0.03 %      TIME    =    0.60 S PERCENT=    0.09 %
       Others (Batch...)         1- 51 C      * =   0.03 %      TIME    =    2.26 S PERCENT=    0.36 %
```

#102 READY TIME PER LOAD MODULE

```
SBR    (D) DETAILED                 (+) READY TIME PER LOAD MODULE                              CHART     102
----------------------------------------------------------------------------------------------------------------------
BEGIN TIME = 96/12/17  16:20:25      END TIME = 96/12/17  16:30:50
DURATION = 00:10:24 =        624.924 SECONDS
Figures are accounted per LM, type, dimension.
TOTAL NBR = Total number of activations for the LM
TOTAL 1 = Total Ready Time in seconds
MEAN  1 = Mean Ready Time in milliseconds, per activation
---------------------------------------------------------------------------------------------------------------
               VARIABLE                ! TOTAL NBR!  TOTAL 1    MEAN 1 !  TOTAL2   MEAN 2 !  TOTAL 3    MEAN 3
---------------------------------------------------------------------------------------------------------------
LM =                            ????????!        1 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = AGIL30NOYAU      IOF       IOF      !       21 !    0.00      0.30 !   0.00      0.00 !    0.00      0.00
LM = AH001                      BATCH    !        1 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = AJT_SM2                    BATCH    !       14 !    0.15     11.40 !   0.00      0.00 !    0.00      0.00
LM = BANK             TDS       TDS      !        1 !    0.00      0.02 !   0.00      0.00 !    0.00      0.00
LM = COMPTEST                   BATCH    !        5 !    0.05     10.03 !   0.00      0.00 !    0.00      0.00
LM = CREJC                      BATCH    !        1 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = CRSEG6           IOF       IOF      !        1 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = H_ANSBR                    BATCH    !        1 !    0.14    141.82 !   0.00      0.00 !    0.00      0.00
LM = H_ARS            SERVICE SYS        !        1 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = H_ARSMIG         IOF       IOF      !        1 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = H_BINDER                   BATCH    !        1 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = H_CMN            IOF       IOF      !        1 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = H_DSAC           SERVICE SYS        !        1 !    0.02     27.53 !   0.00      0.00 !    0.00      0.00
LM = H_EXDIR                    BATCH    !       13 !    0.00      0.14 !   0.00      0.00 !    0.00      0.00
LM = H_EXECUTE                  BATCH    !        9 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = H_EXECUTE        SERVICE SYS        !        1 !    0.02     23.53 !   0.00      0.00 !    0.00      0.00
LM = H_FEPS           SERVICE SYS        !        1 !    0.29    290.30 !   0.00      0.00 !    0.00      0.00
LM = H_FSE            IOF       IOF      !        1 !    0.00      6.54 !   0.00      0.00 !    0.00      0.00
LM = H_GMP_AP                   BATCH    !        1 !    0.26    263.97 !   0.00      0.00 !    0.00      0.00
LM = H_GPL                      BATCH    !        3 !    0.19     64.94 !   0.00      0.00 !    0.00      0.00
LM = H_HEADER                   BATCH    !        1 !    0.00      8.55 !   0.00      0.00 !    0.00      0.00
LM = H_HSL_SVR                  BATCH    !        1 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = H_IOF            IOF       IOF      !       35 !    0.03      1.03 !   0.00      0.00 !    0.00      0.00
LM = H_IOF            IOF       SYS      !        5 !    0.06     13.42 !   0.00      0.00 !    0.00      0.00
LM = H_IOFLOOP        IOF       IOF      !       13 !    0.33     25.84 !   0.00      0.00 !    0.00      0.00
LM = H_IOSER          SERVICE SYS        !        1 !    0.53    534.78 !   0.00      0.00 !    0.00      0.00
LM = H_JPPC1          SERVICE SYS        !        1 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = H_JVCAM          SERVICE SYS        !        1 !    0.02     21.52 !   0.00      0.00 !    0.00      0.00
LM = H_LIBMAINT                 BATCH    !       18 !    0.60     33.50 !   0.00      0.00 !    0.00      0.00
LM = H_LIBMAINT       IOF       IOF      !       17 !    0.10      6.09 !   0.00      0.00 !    0.00      0.00
LM = H_LINKER                   BATCH    !        4 !    0.08     21.79 !   0.00      0.00 !    0.00      0.00
LM = H_MAC                      BATCH    !        4 !    0.13     32.72 !   0.00      0.00 !    0.00      0.00
LM = H_MLP                      BATCH    !        2 !    0.06     34.24 !   0.00      0.00 !    0.00      0.00
LM = H_MTRA                     BATCH    !        2 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = H_MVHEAD         SERVICE SYS        !        1 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = H_NCCD7          SERVICE SYS        !        1 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = H_NUCLEUS        SERVICE SYS        !        1 !    2.18   2186.60 !   0.00      0.00 !    0.00      0.00
LM = H_OMH            SERVICE SYS        !        1 !    0.15    152.39 !   0.00      0.00 !    0.00      0.00
LM = H_OPEN7                    SYS      !        1 !    0.11    113.02 !   0.00      0.00 !    0.00      0.00
LM = H_OPEN7P                   OPEN7    !        2 !    0.19     99.36 !   0.00      0.00 !    0.00      0.00
LM = H_OPEN7R                   OPEN7    !        2 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = H_O7LIST                   BATCH    !        1 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = H_PT             IOF       IOF      !        8 !    0.04      5.80 !   0.00      0.00 !    0.00      0.00
LM = H_READJOR                  BATCH    !        1 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = H_RUN                      BATCH    !        1 !    0.00      6.26 !   0.00      0.00 !    0.00      0.00
LM = H_RUN            SERVICE SYS        !        2 !    0.04     22.61 !   0.00      0.00 !    0.00      0.00
LM = H_SBR            SERVICE SYS        !        1 !    0.23    232.63 !   0.00      0.00 !    0.00      0.00
LM = H_SCANNER        IOF       IOF      !        1 !    0.00      4.63 !   0.00      0.00 !    0.00      0.00
LM = H_SERVER2        SERVICE SYS        !       11 !    0.06      5.55 !   0.00      0.00 !    0.00      0.00
LM = H_SYSMAINT                 BATCH    !        1 !    0.17    173.69 !   0.00      0.00 !    0.00      0.00
LM = H_TILS                     SYS      !        3 !    0.03     10.37 !   0.00      0.00 !    0.00      0.00
LM = H_TNS            SERVICE SYS        !        1 !    0.02     26.54 !   0.00      0.00 !    0.00      0.00
LM = H_TRCCL          SERVICE SYS        !        1 !    0.02     24.25 !   0.00      0.00 !    0.00      0.00
LM = H_TWCOMM                   BATCH    !        1 !    0.00      9.13 !   0.00      0.00 !    0.00      0.00
LM = H_TWRITER                  BATCH    !        1 !    0.00      7.87 !   0.00      0.00 !    0.00      0.00
LM = H_UTILITY                  BATCH    !        1 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = H_WRITER         SERVICE SYS        !        1 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = MML              TDS       TDS      !        1 !    0.00      0.02 !   0.00      0.00 !    0.00      0.00
LM = NC151                      BATCH    !        1 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = NC152                      BATCH    !        1 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = PSGCOM_C                   BATCH    !        1 !    0.00      0.00 !   0.00      0.00 !    0.00      0.00
LM = SA7              TDS       TDS      !        1 !    0.00      0.02 !   0.00      0.00 !    0.00      0.00
LM = TQA1             TDS       TDS      !        1 !    0.00      0.02 !   0.00      0.00 !    0.00      0.00
LM = VERS_75_P                  BATCH    !        2 !    0.00      4.98 !   0.00      0.00 !    0.00      0.00
--------------------------------------------------------------------------------------------------------------
            **** TOTAL ****              !      238 !    6.49     27.28 !   0.00      0.00 !    0.00      0.00
---------------------------------------------------------------------------------------------------------------
```

#103 EVENT TRACE

```
SBR    (T) TRACE                    EVENT TRACE 1                                                 CHART      103
------------------------------------------------------------------------------------------------------------------------
BEGIN TIME = 92/09/17  14:20:00      END TIME = 92/09/17  14:30:00     DURATION = 00:10:00 =       600.  0 SECONDS
+-----------+---------+------------+--------+-----+------+---------+-----------------------------------------------+
| time      | Ron.Dsn | LM name    |  task  | J P |elaps | process | event                                         |
|           |         |            |  name  |     | (ms) |  time   |                                               |
+-----------+---------+------------+--------+-----+------+---------+-----------------------------------------------+
             ** tracing SIU ALL for ALL **
14:20:00.005 X1    .1   H_NUCLEUS    TIMER    00.06        392924.6  begin request from 00.06 reqid=000176B8
14:20:00.006 X1    .1   H_NUCLEUS    TIMER    00.06  0.38  392925.0  end  request
14:20:00.015 X1    .1   H_NUCLEUS    NEWSEQ   00.11                  end  IBLKHD   on    REP
14:20:00.016 X6074.10   OSCX         TDSEXEC  19.04        363405.7  write on MS34 FSD69  TSU.OSCARX.KPSINDW     q= 0  ln=  4096
14:20:00.017 X6532.8    H_UTILITY    MAIN     26.00         21280.9  write on MS12 FSD61  TSU.OSCAR7.BSTB-KU     q= 0  ln=  4104
14:20:00.021 X1    .1   H_NUCLEUS    NEWSEQ   00.11        709743.9  write on MS03 FSD99  SYS.PVMF1              q= 0  ln=  4096
14:20:00.024 X1    .1   H_NUCLEUS    TIMER    00.06        392925.0  begin request from 00.06 reqid=000176B8
14:20:00.025 X1    .1   H_NUCLEUS    TIMER    00.06  0.33  392925.4  end  request
14:20:00.037 X6532.8    H_UTILITY    MAIN     26.00         21287.2  read  on MS74 BVS133 ;006532.TSU.TEMP.KUS   q= 1  ln=  4608
14:20:00.041 X6537.4    H_LIBMAINT   MAIN     0F.00           713.9  read  on MS74 BVS133 ;006537.TEMP.SLLIB     q= 1  ln=  1084
14:20:00.045 X1    .1   H_NUCLEUS    NEWSEQ   00.11        709745.0  end  request
14:20:00.045 X1    .1   H_NUCLEUS    CONDUCTO 00.05        155646.1  begin request from 00.05 reqid=0000946F
14:20:00.046 X1    .1   H_NUCLEUS    CONDUCTO 00.05  0.82  155646.9  end  request
14:20:00.047 X1    .1   H_NUCLEUS    TIMER    00.06        392925.5  begin request from 00.06 reqid=000176B9
14:20:00.047 X1    .1   H_NUCLEUS    TIMER    00.06  0.33  392925.8  end   request
14:20:00.049 X6074.10   OSCX         TDSEXEC  19.04                  CI compaction on       TSU.OSCARX.KPSINDW         at 02002FA9
14:20:00.057 X6074.10   OSCX         TDSEXEC  19.04        363415.3  read  on MS34 FSD69  TSU.OSCARX.KPSINDW     q= 0  ln=  4096
14:20:00.068 X6532.8    H_UTILITY    MAIN     26.00         21291.7  write on MS12 FSD61  TSU.OSCAR7.BSTB-KU     q= 0  ln=  4104
14:20:00.086 X6074.10   OSCX         TDSEXEC  19.04        363434.1  write on MS34 FSD69  ;006074..SYSJRNAL.01   q= 0  ln=  5120
14:20:00.088 X1    .1   H_NUCLEUS    TIMER    00.06        392925.9  begin request from 00.06 reqid=000176B9
14:20:00.089 X1    .1   H_NUCLEUS    TIMER    00.06  0.38  392926.2  end  request
14:20:00.089 X6532.8    H_UTILITY    MAIN     26.00         21298.0  IC snapshot  at  0A720EA6    Pty=07   Cpn=00    Treg=00000000
14:20:00.089 X6537.4    H_LIBMAINT   MAIN     0F.00           715.1  IC snapshot  at  0A3C6DC0    Pty=07   Cpn=02    Treg=00000000
14:20:00.090 X6532.8    H_UTILITY    MAIN     26.00         21298.2  read  on MS74 BVS133 ;006532.TSU.TEMP.KUS   q= 0  ln=  4608
14:20:00.091 X6537.4    H_LIBMAINT   MAIN     0F.00           716.8  read  on MS74 BVS133 ;006537.TEMP.SLLIB     q= 1  ln=  1084
14:20:00.122 X6532.8    H_UTILITY    MAIN     26.00         21302.7  write on MS12 FSD61  TSU.OSCAR7.BSTB-KU     q= 0  ln=  4104
14:20:00.129 X6074.10   OSCX         TDSEXEC  19.04        363451.1  read  on MS34 FSD69  TSU.OSCARX.KPSINDW     q= 0  ln=  4096
14:20:00.130 X1    .1   H_NUCLEUS    TIMER    00.06        392926.4  begin request from 00.06 reqid=000176B9
14:20:00.130 X1    .1   H_NUCLEUS    TIMER    00.06  0.39  392926.7  end  request
14:20:00.131 X5176.1    H_SPIX_V6    DRIVER   10.0C        139955.8  IC snapshot  at  11814E76    Pty=0D   Cpn=04    Treg=00000000
14:20:00.141 X6537.4    H_LIBMAINT   MAIN     0F.00           719.6  read  on MS74 BVS133 ;006537.TEMP.SLLIB     q= 0  ln=  1084
14:20:00.143 X6532.8    H_UTILITY    MAIN     26.00         21310.2  write on MS12 FSD61  TSU.OSCAR7.BSTB-KU     q= 0  ln=  4104
14:20:00.159 X6532.8    H_UTILITY    MAIN     26.00         21314.4  read  on MS74 BVS133 ;006532.TSU.TEMP.KUS   q= 0  ln=  4608
14:20:00.159 X6537.4    H_LIBMAINT   MAIN     0F.00           723.5  read  on MS74 BVS133 ;006537.TEMP.SLLIB     q= 1  ln=  1084
14:20:00.172 X1    .1   H_NUCLEUS    TIMER    00.06        392926.9  begin request from 00.06 reqid=000176B9
14:20:00.172 X1    .1   H_NUCLEUS    TIMER    00.06  0.51  392927.3  end   request
14:20:00.173 X6074.10   OSCX         TDSEXEC  19.04        363466.0  IC snapshot  at  1E152992    Pty=0B   Cpn=04    Treg=00000000
14:20:00.179 X6074.10   OSCX         TDSEXEC  19.04        363471.7  write on MS34 FSD69  ;006074..SYSJRNAL.01   q= 0  ln=  5120
14:20:00.192 X6532.8    H_UTILITY    MAIN     26.00         21321.6  write on MS12 FSD61  TSU.OSCAR7.BSTB-KU     q= 0  ln=  4104
14:20:00.209 X6537.4    H_LIBMAINT   MAIN     0F.00           726.3  read  on MS74 BVS133 ;006537.TEMP.SLLIB     q= 0  ln=  1084
14:20:00.213 X1    .1   H_NUCLEUS    TIMER    00.06        392927.4  begin request from 00.06 reqid=000176B9
```

#104 CDP / HRP LOAD

```
SBR    (C) CONCISE                  CDP / HRP LOAD                                                          CHART     14
------------------------------------------------------------------------------------------------------------------------

BEGIN TIME = 97/07/25  14:07:35      END TIME = 97/07/25  14:42:01      DURATION = 00:34:25 =       2065.682 SECONDS

Standard jobs     = CPU time used by jobs without CDP / HRP capability
CDPi jobs         = CPU time used by jobs with CDPi or HRP capability

This chart can reveal the saturation of the following resources:
    The standard workload saturates if 'Standard jobs' percentage reaches the number of standard processors.
    The global workload saturates if 'Standard jobs' + 'CDPi jobs' percentage reaches the total (Standard + CDPi)
    for at least one of the present CDP types.

Note that 'Standard processors' and 'CDPi processors' figures include the time spent in system firmware.


                 0         1         2         3         4         5         6         7         8         9         0
                 12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
97/07/25 14:09:35.ss       .         .         .         .         .iiiiiiiiiiiii      .         .         .         .
         14:11:35.ssss     .         .         .         .         .iiiiiiiiiiiiiiiii  .         .         .         .
         14:13:35.ssss1    .         .         .         .         .iiiiiiiiiiiiiiiiii .         .         .         .
         14:15:35.sss      .         .         .         .         .iiiiiiiiiiiiiiiiii .         .         .         .
         14:17:35.ss1      .         .         .         .         .iiiiiiiiiiiiiiiii  .         .         .         .
         14:19:35.ss1      .         .         .         .         .iiiiiiiiiiiiiii    .         .         .         .
         14:21:35.sss1     .         .         .         .         .iiiiiiiiiiiiiiiiiii.         .         .         .
         14:23:35.ssssss1  .         .         .         .         .iiiiiiiiiiiiiiiiiiiiiiiiiiiiiii        .         .
         14:25:35.sss1     .         .         .         .         .iiiiiiiiiiiiiiiiiii.         .         .         .
         14:27:35.s1       .         .         .         .         .iiiiiiiiiiiiiii    .         .         .         .
         14:29:35.ssssssssssss1      .         .         .         .iiiiiiiiiiiiiiiiiiii         .         .         .
         14:31:35.sssssssssssss11    .         .         .         .iiiiiiiiiiiiiiiiii .         .         .         .
         14:33:35.ssssssss1.         .         .         .         .iiiiiiiiiiiiiiiiiiiii        .         .         .
         14:35:35.sss1     .         .         .         .         .iiiiiiiiiiiiiiiiii .         .         .         .
         14:37:35.sssssssss1         .         .         .         .iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii     .         .
         14:39:35.ssssssssss1        .         .         .         .iiiiiiiiiiiiiiiiiiiiiiiii    .         .         .
         14:41:35.sssssssss.         .         .         .         .iiiiiiiiiiiii      .         .         .         .
         14:42:01.sssss111111111111111111111111111111111111111111111iiiiiiiiii         .         .         .         .

Total CPU Time                  1- 50 O        =       4 %      TIME    =   762.53 S PERCENT=   36.91 %
   Standard jobs                1- 50 O      s =       4 %      TIME    =   481.82 S PERCENT=   23.32 %
   CDP1/HRP jobs                1- 50 C      1 =       4 %      TIME    =   280.71 S PERCENT=   13.58 %
   CDP2     jobs                1- 50 C      2 =       4 %      TIME    =     0.00 S PERCENT=    0.00 %
   CDP3     jobs                1- 50 C      3 =       4 %      TIME    =     0.00 S PERCENT=    0.00 %

Not Idle Time                  51-100 O        =       4 %      TIME    =  1633.35 S PERCENT=   79.07 %
   Standard processors (IPUs)  51-100 O      i =       4 %      TIME    =  1633.35 S PERCENT=   79.07 %
   CDP1/HRP processors (EPUs)  51-100 C      e =       4 %      TIME    =     0.00 S PERCENT=    0.00 %
   CDP2     processors (FPUs)  51-100 C      f =       4 %      TIME    =     0.00 S PERCENT=    0.00 %
   CDP3     processors (GPUs)  51-100 C      g =       4 %      TIME    =     0.00 S PERCENT=    0.00 %
```

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