



WHAT YOU NEED TO KNOW. WHEN YOU NEED TO KNOW IT.



SOS/9000 Performance Advisor

User Guide

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SOS/9000 Performance Advisor version C.01

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SOS PERFORMANCE ADVISOR

Welcome to SOS Performance Advisor

Welcome to the SOS/9000 Performance Advisor™ software package by Lund Performance Solutions. SOS/9000 Performance Advisor, also referred to as SOS/9000, is the industry-standard performance monitoring and management application for HP 9000 Enterprise servers.

This software collects and measures HP 9000/HP-UX and Oracle performance data and provides system managers comprehensive, real-time and historical information in easy-to-read displays.

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240 2nd Avenue SW
Albany OR 97321 USA

Internet URL

Visit the Lund Performance Solutions website at <http://www.lund.com/>.

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For customer and technical support, call **(541) 812-7600**, Monday through Friday during the hours of 8:00 A.M., to 5:00 P.M., Pacific time, excluding holidays.

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When you call, please be at your computer, have the product documentation in hand, and be prepared to provide the following information:

- Product name and version number.
- Type of computer hardware you are using.
- Software version number of your operating system(s).
- Exact wording of any messages that appear on your screen.
- What you were doing when the problem occurred.
- How you tried to solve the problem.

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For information about Lund Training Institute or to receive an application, please review our website, send an e-mail message to **lti@lund.com**, or contact your account manager.

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For information about Lund Consulting Services, please review our website, send an e-mail message to **lcs@lund.com**, or contact your account manager.

Product Documentation

User's Guide

This document accompanies the SOS/9000 Performance Advisor software as a guide for the new user and as a quick reference for experienced users. This guide assumes that you have a working knowledge of the HP-UX operating environment.

Online Help System

In the online Help system, you will find explanations of the many features of SOS Performance Advisor, as well as tips to guide you through the program's basic functionality.

TECHNICAL OVERVIEW

SOS Performance Advisor Architecture

SOS Performance Advisor is comprised of several programs and files. The relationships between the most significant programs and files are illustrated in Figure 2.1 and described on page 6.

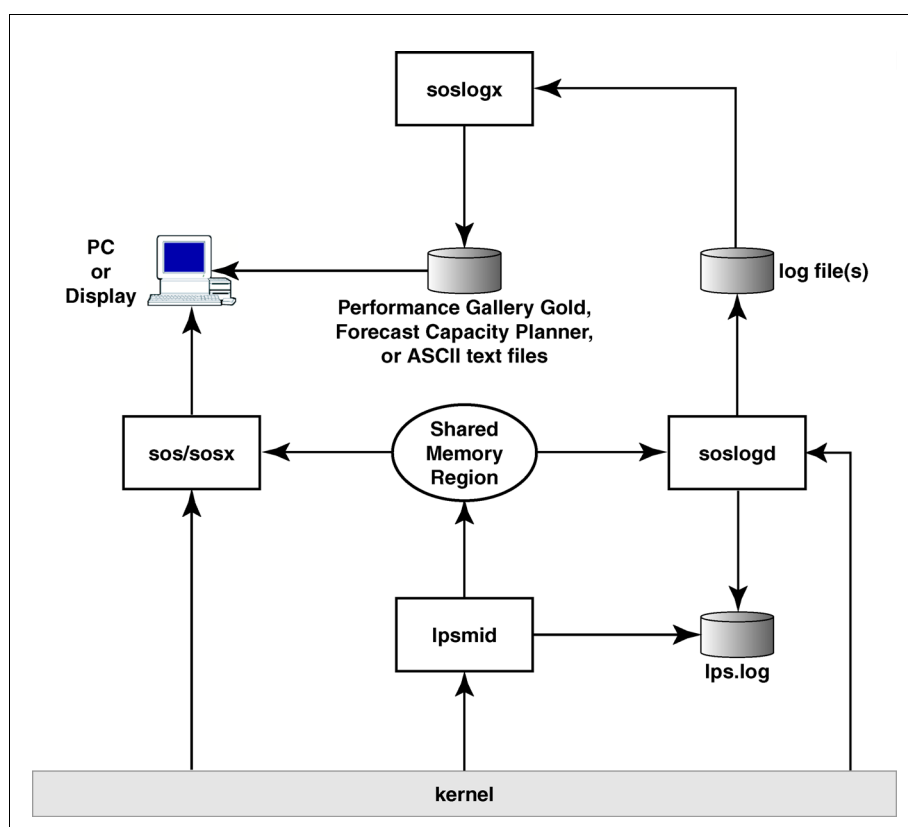


Figure 2.1 SOS/9000 Performance Advisor relationships between key processes and files

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The LPSMID process is responsible for retrieving much of the performance data from the kernel and providing it to other processes. The user does not have to execute LPSMID, it will be executed automatically by any process that requires it. LPSMID is a daemon process, so it executes in the background and does not interact with the user. Any informational, warning, and error messages from LPSMID will be stored in the lps.log file.

The LPSMID process uses a shared memory segment to deliver the performance data to other processes, which include SOS, SOSX, and SOSLOGD. In addition to the data provided by LPSMID, these processes retrieve some data from the kernel directly.

The SOS and SOSX processes display real-time performance data to the user. SOS displays in text mode, and SOSX uses a X/Motif to provide a GUI.

SOSLOGD is a daemon process. Its function is to periodically write performance data to log files for later historical analysis. Since it's a daemon process, it also stores informational, warning, and error messages in the lps.log file.

The SOSLOGX process reads the log files created by SOSLOGD. SOSLOGX displays this information to the user, and also allows the user to convert that information to other file formats:

- *.txt, ASCII text, to export data to spreadsheet applications such as MS Excel.
- *.col, to export data to Forecast Capacity Planner, a performance and capacity planning tool by Lund Performance Solutions.
- *.pfg, to export data to Performance Gallery (B.0x and higher), a trend analysis and graphical reporting applications by Lund Performance Solutions.



IMPORTANT LPSMID, SOS, and SOSLOGD should not run longer than 24 continuous hours. SOS (with LPSMID) is an interactive program and it should be shut down daily. SOSLOGD can be configured to run repeatedly using the -c command line switch (see "-c Command Line Switch" on page 228) or cron.

For information about Forecast Capacity Planner or Performance Gallery, please refer to the product documentation or contact your Lund account manager (see "Lund Performance Solutions Sales Team" on page 2).

OSF/1 Directory Hierarchy

SOS Performance Advisor version A.0x and later uses the OSF/1 directory hierarchy.



IMPORTANT A directory other than the default directory can be assigned during the installation process. Please be aware that every user of this software package will need the same directory in their path.

Directories



IMPORTANT The LPS directory statements that include the default directory and the corresponding environment variable must be set if the default location is not used.

For example:

LPS_OPT_PATH=/opt/lps

Where:

- LPS_OPT_PATH is the environment variable
- /opt/lps is the default directory location

In the past, all Lund Performance Solutions files (lps files) associated with the SOS Performance Advisor application could be found in one directory (LPSPATH=/opt/lps). In accordance with the OSF/1 standard, Lund Performance Solutions files are now located in three different directories, which are described in the next table.

Table 2.1 SOS Performance Advisor directory locations

Directory	Description
LPS_ETC_PATH=/etc/opt/lps	Contains host-specific configuration files that can be modified by the user.
LPS_OPT_PATH=/opt/lps	Contains host-specific, third-party files that do not generally change.
LPS_VAR_PATH=/var/opt/lps	Contains host-specific files that are dynamic in nature, including temporary files and files that grow in size.

Subdirectories

The subdirectories of each directory are listed and described in the next table (it is assumed the default directory is used).

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Table 2.2 *SOS Performance Advisor subdirectory listings*

Directory	Subdirectory	Description
/etc/opt/lps/	cfg	Contains configuration files used by the Lund Performance Solutions products. Initially, these will be the same files found under /opt/lps/newcfg, except they are actually used by the product and can be modified by the user.
	rpt	Contains SOSLOGX report files.
/opt/lps/	bin	Contains the lps binary files.
	contrib	Contains contributed files (helpful files that are not necessary to run Lund Performance Solutions products).
	lib	Contains the lps library files.
	newcfg	Contains the configuration files as distributed by Lund Performance Solutions (before user customization). These files are meant to be used as a reference point. They are not actually used by the product. See /etc/opt/lps for more information.
/var/opt/lps/	log	Contains log files.
	tmp	Contains temporary files.

Files

The following file listings are grouped by directory location.

Table 2.3 *SOS Performance Advisor file listings*

Location	File	Description
/etc/opt/lps/cfg/	advice	Contains configurations for the SYSTEM PERFORMANCE ADVICE messages in the Global Summary screen.
	holidays	Contains the configurations for holidays (predetermined days to be excluded from data collections).
	ppoints	Contains configurations for pulse points.
	soskip	Contains configurations for the KIP (key indicators of performance) line.
	workdefs	Contains workload definitions.
/etc/opt/lps/rpt/	reprtdef	Contains compiled SOSLOGX reports.
	*.rpt	Contains SOSLOGX reports.
/opt/lps/bin/	kiclean	An executable program that turns off kernel measurements and cleans up the interprocess communication (IPC) structures created by LPSMID (for example, the KI subsystem for HP-UX).
	lpscheck	A program that checks the license status.
	lpsextnd	An executable program used to extend the demonstration license expiration date.
	lpskill	An executable program that kills any lps daemon.
	lpsmid	A daemon that periodically reads process information from the /rocfs structure and saves it.

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User's Guide

Location	File	Description
/opt/lps/bin/	lpstrap	A script to send SNMP traps from the advice module to an event browser.
	sos	The character-based real-time performance tool.
	soslogd	A daemon that creates historical performance files.
	soslogx	A character-based tool to view the historical files and extract them for other formats (such as Performance Gallery gold data files (*.pfg)).
	sosrcrom	The SOSLOGX report compiler.
	sosx	sosx displays system performance data online in real time "snapshots" in a GUI environment via X/Motif.
/opt/lps/lib/	fcastitems	A list of data items that can be extracted for use in Forecast Capacity Planner.
	funcwait	A list of function-to-wait state mappings.
	itemlist	A list of all data items logged in historical files and usable by soskip, advice, and ppoints.
	ksymbols	A list of kernel symbols that need address mappings.
	license	A new version of license file.
	logxhelp	The SOSLOGX online help file.
	lpscfg	A license file.
	pfgitems	A list of Performance Gallery B.0x extraction items.
	pfgitems2	A list of Performance Gallery Gold (C.0x and higher) extraction items.
	soshelp	The SOS online help file.
	varwait	A list of variable-to-wait state mappings.

Location	File	Description
/opt/lps/newcfg/	cfg	The advice, ppoints, soskip, and holidays configuration files as distributed by Lund Performance Solutions (before user customization). See /etc/opt/lps/cfg for descriptions.
	rpt cfg	The reprtdef and *.rpt files as distributed by Lund Performance Solutions (before user customization). See /etc/opt/lps/rpt for descriptions.
/var/opt/lps/log/	SLLOGCAT	The log file catalog.
	SL*	Contains historical log files.
/var/opt/lps/tmp/	*unix.ino	Contains kernel inode to help determine if rebuild of ksymbols.db is necessary.
	ksymbols.db	Contains mapping of kernel symbols and addresses.
	lps.log	Contains messages from lps daemons.
	lpsmid.pid	Contains the LPSMID process ID.
	soslogd.pid	Contains SOSLOGX process ID.

Security

UNIX software products from Lund Performance Solutions utilize a system group for security purposes. The "lps" group is created during the software installation process.

Members of the lps group can execute the following tasks:

- Modify existing SOS Performance Advisor reports.
- Execute kiclean to remove unnecessary overhead and used memory by LPSMID when it is not able to perform cleanup prior to the last exit (when LPSMID is killed using the 9 signal (kill -9 PID)).

The lps group is also used to enforce security for log files, the log catalog and the lps directories.

ENVIRONMENT VARIABLES AND WORKLOAD GROUPS

Environment Variables

Each of the environment variables are outlined in Table 3.1. Instructions to set the environment variables are provided in the next section, "Setting the Environment Variables."

Table 3.1 *SOS Performance Advisor environment variables*

Variable Name	Default Value	Accepted Value
PATH	\$PATH:/opt/lps/bin	\$PATH:/<custom directory name>/bin
TERM	N/A	N/A
LPS_OPT_PATH	/opt/lps	An existing, fully-qualified directory
LPS_ETC_PATH	/etc/opt/lps	
LPS_VAR_PATH	/var/opt/lps	
LPS_TIME_SEP	: (colon)	Any single alpha-numeric character
LPS_DATE_SEP	/ (forward slash)	
LPS_DECIMAL_INDICATOR	. (period)	
LPS_DATE_FMT	MDY (month day year)	MDY, DMY, or YMD

Setting the Environment Variables

Prior to running the SOS Performance Advisor programs, set the appropriate environment variables:

- PATH
- TERM

- LPS_OPT_PATH
Set only if the host-independent application files were placed in a custom directory during installation.
- LPS_ETC_PATH
Set only if the host-specific configuration files were placed in a custom directory.
- LPS_VAR_PATH
Set only if the host-specific dynamic files were placed in a custom directory.
- Localization environment variables (optional).

Setting the PATH Environment Variable

Prior to running SOS Performance Advisor, it is necessary to set the PATH environment variable:

- If the SOS Performance Advisor application files were placed in the default directory (/opt/lps) during installation, add the following line to your .profile:

PATH=\$PATH:/opt/lps/bin

- If the SOS Performance Advisor application files were placed in a custom directory, add the following line to your .profile:

PATH=\$PATH:/<custom directory name>/bin

If you are not sure how to set the PATH environment variable for the shell used when running SOS Performance Advisor, please ask your system administrator for assistance.

Setting the TERM Environment Variable

Prior to running SOS Performance Advisor, it might be necessary to set the TERM environment variable equal to the appropriate device name of your terminal. For example:

TERM=vt100

For more information about the TERM environment variable, please refer to your system documentation.

Setting LPS_OPT_PATH, LPS_ETC_PATH, and LPS_VAR_PATH

In the past, all Lund Performance Solutions files (lps files) associated with the SOS Performance Advisor application could be found in one directory (/opt/lps). In accordance with the OSF/1 standard, Lund Performance Solutions files are now located in three different directories, which are listed in Table 3.2.

If the SOS Performance Advisor application files were placed in a custom directory during installation, it will be necessary to set the corresponding environment variable equal to the custom directory destination prior to running the application.

Table 3.2 *SOS Performance Advisor custom directory PATH environment variables*

Variable Name	Accepted Value	Default Value
LPS_OPT_PATH	An existing, fully-qualified directory	/opt/lps
LPS_ETC_PATH		/etc/opt/lps
LPS_VAR_PATH		/var/opt/lps

Setting the Localization Environment Variables

Four specific environment variables are available in SOS Performance Advisor to customize certain date, time, and numerical characteristics of the application for use in different countries or languages. These environment variables, including their acceptable ranges and default values, are outlined in the next table.

Table 3.3 *SOS Performance Advisor localization environment variables*

Variable Name	Accepted Value	Default Value
LPS_TIME_SEP	Any single alpha-numeric character	: (colon)
LPS_DATE_SEP		/ (forward slash)
LPS_DECIMAL_INDICATOR		. (period)
LPS_DATE_FMT	MDY, DMY, or YMD	MDY (month day year)

Workload Groups

A workload group is a set of similar, identifiable transactions on the host system performed by individual users and programs. Workload groups can be organized by:

- Applications
- User login
- Departmental processes

A workload group may be as simple as one user running one program, or as complex as entire departments running many programs.

Identifying and Characterizing Workload Groups

Make sure workload groups are homogeneous. A homogeneous workload group consists of processes of a similar type, function, and priority.

Averaging is meaningless for workload groups made up of dissimilar transactions. For example, if an average accounts receivable transaction takes 200 milliseconds of the CPU's time, while general ledger transactions average 500 milliseconds, taking an average of the two does not provide a meaningful average for either transaction.

Identifying Workload Groups

Input from management and system users is essential in identifying and defining workload groups. Interview managers and users to determine how the system is used and to identify distinct functions, such as order entry, telemarketing, or accounting. Break down the various departmental functions into essential components, based on your desired result. Identify groupings that will provide you with the needed information. These arranged components make up your workload groups.

Characterizing Workload Groups

Once you have identified your workload groups, use the following guidelines to further refine your definitions:

- 1 Limit the components of any workload group to users or transactions with service demands of comparable magnitude and similar balance across the system. Do not mix heavy-CPU/low-I/O transactions with light-CPU/heavy-I/O transactions.
- 2 Do not mix interactive processes and batch processes in the same workload group. System resources, priorities, and think times are different for interactive and batch processes.
- 3 Use separate workload groups for specific divisions, branches, or departments as needed.
- 4 Identify workload groups by user logon, if possible.

Creating a Workload Group Definition File

Once you have identified and refined your workload groups, enter the data in a workload group definition file.

Workload Group Definition File

User-defined workload groups are created in `/etc/opt/lps/cfg/workdefs`.

Workload Groups

Four workload groups are defined by default (see Table 3.4). These four workload groups should always exist.

Table 3.4 *SOS Performance Advisor default workload groups*

Workload Group	Description
INTERACT	The INTERACT workload group contains any processes attached to a terminal (interactive processes). The INTERACT workload group should be configured by the user.
DAEMON	The DAEMON workload group contains any daemon processes. By default, this workload group is configured to include any process not attached to a terminal and owned by the root user. The DAEMON workload group should be configured by the user to reflect the system.
BATCH	The BATCH workload group contains any batch job processes. By default, this is configured to include any process outside of the DAEMON workload group that is not attached to a terminal. The BATCH workload group should be configured by the user to reflect the system.
DEFAULT	The DEFAULT workload group contains any process that does not match any other workload group definition. Note that initially, this will be an empty workload group (no processes will match), because at least one of the other defaults will include any possible process. However, since those workload groups are configurable, this workload group must exist. The DEFAULT workload group cannot be modified. It guarantees a process will fall into at least one workload group by matching any process that does not fall into any other workload group definition.

Response Time Calculations

Response time calculations are performed for processes, workload groups, and on a system-wide basis. They include:

- Transactions
- Response time
- Average response time per transaction

The definitions of *transaction* and *response time* are dependent upon the type of workload group to which the process belongs. The response time calculations are described below.

INTERACT Response Time Calculations

- $Transactions = Terminal\ reads + Process\ deaths$
- $Response\ time = Process\ live\ time - Think\ time$

Process live time is the amount of time a process is alive during the interval. If the process was created before the interval and doesn't die until after the interval, process live time will equal the interval time.

Think time is defined as the amount of time a process is waiting for user input.

DAEMON Response Time Calculations

- $Transactions = Voluntary\ context\ switches + Process\ deaths$
- $Response\ time = Process\ live\ time - Process\ resource\ wait\ time$

Process resource wait time is the amount of time a process is waiting on resources (such as CPU) versus waiting on an event (such as a terminal input).

BATCH Response Time Calculations

- $Transactions = Process\ deaths$
- $Response\ time = Process\ live\ time$

Mix Response Time Calculations

The mix response times vary, based on whether the process is attached to a terminal or not.

- If the process is attached to a terminal, the INTERACT response time calculations are used.
- If the process is not attached to a terminal and it has a high Nice value, the BATCH response time calculations are used.
- If the process is not attached to a terminal and it has a default or low Nice value, the DAEMON response time calculation is used.

Workload Group Definition Requirements

The workdefs file requires the following information for each workload group:

- 1 The name of the workload group, up to ten characters.
- 2 The type of process or processes included in the workload group, such as INTERACT, DAEMON or BATCH.
- 3 The user or program specification, including one or more of the following:
 - USER (your user ID or logon ID)
 - PROG (the name of the executable program file)
 - TTY (the device name of your terminal)
 - GROUP (the user group identification)

Workload Group Definition File Configuration Guidelines

Use the following guidelines to create or edit workload group definition files:

- 1 Separate workload groups by one or more blank lines.
- 2 Include comments on any line, if desired, preceded by an exclamation character (!).
- 3 A workload group type specification is needed to indicate the types of processes to include or exclude from the workload group definition. This makes it possible to create two workload groups for processes that run in both interactive and batch modes. (Refer to Table 3.4.)
- 4 Program and user specifications are specified by:
 - PROG=program name
 - USER=user name/group name

System group names are valid specifications. Check the /etc/group file for a list of existing group names.

For more information about group names, refer to your system documentation or the manpage for *regex* (Regular Expressions).

- 5 Device file specifications, such as TTY=tty0p2, are also valid. You can capture activity on a terminal-by-terminal basis, or for multiple terminals.
- 6 There is no limit to the number of user, program, and tty specifications allowed for each workload group.
- 7 Name and type specification lines are required. All other lines are optional.
- 8 To be included in a workload group, a process must satisfy the program, user, and tty specifications, if all three are present.
 - If one or more program specification lines are included, a program needs to satisfy only one of these to be included in the group.
 - If no program specifications are entered, all process programs are included in the group, unless the process is somehow disqualified by the user or tty specifications.

- 9 A process can belong to only one workload group. If it fits the criteria for two or more groups, it is assigned to the first workload group in the file for which it qualifies.
- 10 Four workload groups appear by default: INTERACT, DAEMON, BATCH, and DEFAULT. Processes that do not fit into user-defined workload groups will be included in one of these pre-defined workload groups.

SOS

The Real-time Performance Data Utility

SOS is the character-based tool that will monitor and report system performance on-line and in real time. To start SOS, type **sos** from the command prompt.

Figure 4.1 shows the Global Summary screen, the initial data screen displayed in SOS.

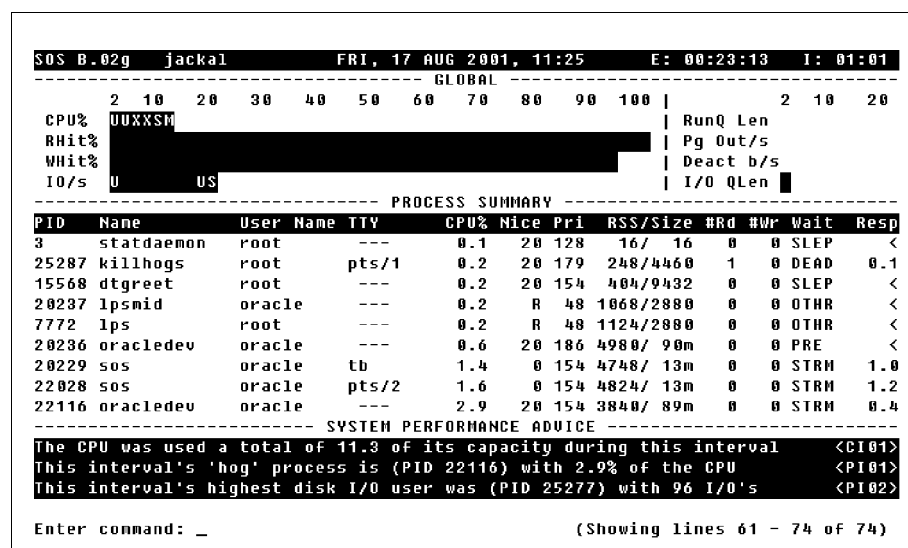


Figure 4.1 SOS Global Summary screen

Data Screens

The SOS application generates a variety of useful data screens. Each screen is outlined in "SOS Screen Selection Menu" on page 31, then described in detail in Chapters 9 through 33.

Screen Conventions

The conventions used in SOS data screens are listed and described in the next table.

Table 4.1 *SOS screen conventions*

Convention	Description
/	A forward slash character (/) indicates a rate. For example, "Packet In /s" denotes "Packets In per second".
***	Three consecutive asterisk characters (***) indicates a data value that cannot be converted by SOS, because the value is less than or greater than the eligible range.
[nnn.n]	When applicable and possible, cumulative averages are displayed in brackets ([]) next to the current interval values. For further information about cumulative averages, see "Displaying Cumulative Statistics" on page 40.
b	A "b" indicates the corresponding value is measured in bytes.
k	A "kb" indicates the corresponding value is measured in kilobytes.
m	An "m" indicates the corresponding value is measured in megabytes.
g	A "g" indicates the corresponding value is measured in gigabytes.
ms	"ms" indicates the corresponding value is measured in milliseconds.
s	An "s" indicates the corresponding value is measured in seconds.
min	"min" indicates the corresponding value is measured in minutes.

SOS MAIN COMMANDS

The Main Commands Screen

The Main Commands screen in SOS contains a list of single-key shortcut commands that can be entered from any SOS display screen.

To access the Main Commands screen from any SOS display screen, type ? at the command prompt.

```

                                MAIN COMMANDS
Navigation Keys:
  g - Go to screen
Detail Screen Quick Keys:
  P - Process detail
  M - Process memory usage
  V - Volume group detail
  Z - Hog process zoom
Action Keys:
  u - Update interval data
  p - Print screen
  R - Add a new Oracle instance
Other:
  H - Main on-line help
  o - Main option menu
  ^L - Refresh screen
  s - Screen menu
  F - Process file usage
  W - Workload detail
  D - Disk detail
  O - Oracle main screen
  r - Reset totals to zero
  f - Toggle update intervals on/off
  T - Delete an Oracle instance
  h - Context sensitive help
  ? - Command help (this screen)
  e - Exit program

[Press ESC to return to program]_

```

Figure 5.1 *SOS Main Commands screen*

To return to the SOS program from the Main Commands screen, press the Esc key.

To invoke a specific command displayed on the Main Commands screen, type the corresponding command key(s) from any SOS display screen.



NOTE All command keys are case-sensitive.

Main Commands

Each of the SOS commands is listed and explained in the following tables.

Navigation Keys

Table 5.1 *SOS navigation command keys*

Key	Command	Description
g	Go to screen	Type g from any SOS display screen to go to another screen of your choice. At the secondary command prompt, enter the screen option code or press the ? key for a list of valid options. For instance, type c to display the CPU Summary screen.
s	Screen menu	Type s from any SOS display screen to view the Screen Selection Menu.

Detail Screen Quick Keys

Table 5.2 *SOS Detail screen command keys*

Key	Command	Description
P	Process detail	Type P (upper case) from any SOS display screen to view the Process Detail screen for a specific process. At the secondary command prompt, specify the process's identification number (shown in the PID column of the PROCESS SUMMARY section in the Global Summary screen) or press the Enter key to accept the default (shown in brackets).

SOS MAIN COMMANDS

Main Commands

Key	Command	Description
F	Process file usage	Type F (upper case) from any SOS display screen to view the Process File Usage screen for a specific process. At the secondary command prompt, specify the process's identification number (shown in the PID column of the PROCESS SUMMARY section in the Global Summary screen) or press the Enter key to accept the default (shown in brackets).
M	Process memory usage	Type M (upper case) from any SOS display screen to view the Process Memory Regions screen for a specific process. Select the specific process at the secondary prompt.
W	Workload detail	Type W (upper case) from any SOS display screen to view the Workload Detail screen. Select the workload from the choices displayed in the dialog box (for example, INTERACT, BATCH, SYS, or DEFAULT).
V	Volume group detail	Type V (upper case) from any SOS display screen to view the Volume Detail screen for a specific volume. Select the volume from the choices displayed in the dialog box.
D	Disk detail	Type D (upper case) from any SOS display screen to view the Disk I/O Detail screen for a specified disk device. Select the physical disk ID from the choices displayed in the dialog box.
Z	Hog process zoom	Type Z (upper case) from any SOS display screen to view the "hog" process (the process that consumes the most CPU during the current interval) in the Process Detail screen.

Action Keys

Table 5.3 SOS action command keys

Key	Command	Description
u	Update interval data	Type u from any SOS display screen to start a new screen refresh and sample interval and update all performance indicator values. For an example, see "Updating Interval Data" on page 39.

Key	Command	Description
r	Reset totals to zero	Type r from any SOS display screen to (1) reset all cumulative values (shown in brackets), (2) reset the elapsed time to zero, and (3) update the interval data. For an example, see "Resetting Cumulative Statistics" on page 40.
p	Print screen	Type p from any SOS display screen to send the current screen display to a specified printer or a default printer, or to print the screen display to a specified file.
f	Toggle update intervals on/off	Type f from any SOS display screen to postpone (freeze) data updates for all SOS screens until the f key is pressed again (to un-freeze).
R	Add a new Oracle instance	<p>Type R (upper case) from any screen to add a new Oracle instance.</p> <p>SOS will prompt for instance name (a connect string). Enter a net service name (listed in <code>tsnames.ora</code>) or a full connect string in the form <code>host:port:SID</code> (oracle's listener port is usually 1521). If no instance name is entered, the default database instance on the local machine will be used.</p> <p>Next, SOS will prompt for a user name. This user should have select rights on <code>v\$</code> performance views, <code>ts\$</code>, and <code>file\$</code>. The user must also have rights to create, select, delete, and insert tables (for SOS temporary data).</p> <p>Finally, SOS will ask for the user's password.</p> <p>If more than one instance is configured, SOS will prompt you to select an instance each time you go to an oracle detail screen.</p>
T	Delete an Oracle instance	Type T (upper case) to delete an Oracle instance.

Configuration Keys

Table 5.4 *SOS configuration command keys*

Key	Command	Description
o	Main option menu	Type o from any SOS display screen to display the SOS Main Option Menu.

Other Keys

Table 5.5 *SOS (other) command keys*

Key(s)	Command	Description
H	Main on-line help	Type H (upper case) from any SOS display screen to display the main online help facility for SOS. Follow the instructions provided on the Welcome to the SOS/9000 Help Facility screen to navigate throughout the help system.
h	Context-sensitive on-line help	Type h (lower case) from any SOS display screen to display the context-sensitive online help for the current screen or menu.
o	Main option menu	Type o from any SOS display screen to display the SOS Main Option Menu.
?	Command help	Type ? (a question mark) from any SOS display screen to display a list of main command keys in the Main Commands screen.
!	UNIX shell	Suspends execution of SOS and executes a UNIX shell. To return to the SOS application, type exit .
Ctrl+l	Refresh screen	Press the Ctrl+l shortcut keys from any SOS display screen to refresh the screen.
e	Exit program	Type e from any SOS display screen to exit the SOS program.

Screen-Specific Commands

A second screen of commands, the Additional Commands screen, can be viewed by pressing any key from the Main Commands screen *when additional commands are available* for the active SOS display screen.

```

                                ADDITIONAL COMMANDS

Navigation:
  -/+ - Move up/down one line in scrollable area

Other:
  t - Toggle graphic/tabular display
  y - Toggle extended process display

[Press any key to view additional commands or ESC to return to program]_

```

Figure 5.2 SOS Additional Commands screen (example)

To return to the Main Commands screen from the Additional Commands screen, press any key.
To return to the SOS program, press the Esc key.

To invoke a specific command displayed on the Additional Commands screen, type the corresponding command key(s) from any SOS display screen.

Screen-Specific Navigation Commands

Table 5.6 SOS screen-specific navigation command keys

Key(s)	Command	Description
-	Move up in scrollable area	Type the hyphen character (-) from any SOS display screen to scroll back to the previous line in the screen display, if additional lines are available. The Up Arrow key can be used on terminals that support navigation keyboard keys.
+	Move down in scrollable area	Type the plus character (+) from any SOS display screen to scroll to the next line in the screen display, if additional lines are available. The Down Arrow key can be used on terminals that support navigation keyboard keys.

SOS MAIN COMMANDS

Screen-Specific Commands

Key(s)	Command	Description
Ctrl+b	Page up in scrollable area	Press the Ctrl+b shortcut keys from any SOS display screen to scroll back through the screen display one "page" at a time, when pages are available. The Page Up key can be used on terminals that support navigation keyboard keys.
Ctrl+f	Page down in scrollable area	Press the Ctrl+f shortcut keys from any SOS display screen to scroll ahead in the screen display one "page" at a time when pages are available. The Page Down key can be used on terminals that support navigation keyboard keys.

Screen-Specific Action Commands

Table 5.7 SOS screen-specific action command keys

Key	Command	Description
t	Toggle graphic/tabular display	Type t from most SOS display screens to display screen information in either a graphical or tabular format (if the alternative format is available).
y	Toggle extended process display	Type y from the Global or the Workload Detail screen to turn the Extended Process line display on or off.
n	Select new...	<ul style="list-style-type: none"> Type n from the Process Detail screen to select a new process. Type n from the Workload Detail screen to select a new workgroup. Type n from the Disk Detail screen to select a new disk. Type n from the Volume Detail screen to select a new volume.

SOS SCREEN SELECTION MENU

Screen Selection Menu Screen

To access the Screen Selection Menu screen from any SOS display screen, type **s** at the SOS Enter command: prompt.

```

                                SCREEN SELECTION MENU

g  Global Summary                u  User Summary
c  CPU Summary                  t  Terminal Summary
m  Memory Summary               b  System Table Summary
d  Disk I/O Summary             y  System Configuration
r  Disk Controller I/O Summary  h  Device Configuration
v  Volume Summary              p  Pulse Points
i  Global I/O                   k  Workload Definitions
f  File System I/O Summary      P  Process Detail
s  File System Space Summary    F  Process File Usage
l  Network Summary             M  Process Memory Regions
n  NFS Summary                 W  Workload Detail
w  Swap Summary                D  Disk Detail
                                U  Volume Detail

O  Oracle Main Screen          C  Oracle Detail - Cache
L  Oracle Detail - Latches     E  Oracle Detail - Events
A  Oracle Detail - Database    B  Oracle Detail - DBWR
N  Oracle Detail - Memory and Network
K  Oracle Detail - Rollback Segments
S  Oracle Detail - Datafiles

Enter screen ID:

```

Figure 6.1 SOS Screen Selection Menu

To return to the SOS program from the Screen Selection Menu screen, press the Enter key.

Screen Selection Commands

To view one of the screens listed in the Screen Selection Menu, type the screen's corresponding command key at the Enter screen ID: command prompt. Each screen is described briefly in Table 6.1. More detailed explanations are presented later.



NOTE All command keys are case-sensitive.

Table 6.1 *SOS Screen Selection Menu command keys*

Key	Screen Title	Description
g	Global Summary	Displays a basic, overall picture of your system's performance. See "SOS Global Summary" on page 81.
c	CPU Summary	Reports the general state of one or more CPUs. See "SOS CPU Summary" on page 105.
m	Memory Summary	Provides a more detailed look at memory performance data. See "SOS Memory Summary" on page 111.
d	Disk I/O Summary	Displays a summary of performance data for all disks on the system. See "SOS Disk I/O Summary" on page 117.
r	Disk Controller I/O Summary	Provides a summary of the different kinds of disk read and write actions performed per second for each disk controller. The read and write actions are categorized as physical, user, system, virtual memory, or raw. See "SOS Disk Controller I/O Summary" on page 121.
v	Volume Summary	Displays information for each logical volume and volume group. See "SOS Volume Summary" on page 123.
i	Global I/O Summary	Provides information about local and remote I/Os from a system-wide perspective. See "SOS Global I/O Detail" on page 125.
f	Files System I/O Summary	Displays the logical and physical read and write rates for each file system. See "SOS File System I/O Summary" on page 129.

SOS SCREEN SELECTION MENU

Screen Selection Menu Screen

•
•
•
•

Key	Screen Title	Description
s	File System Space Summary	Shows the block and fragment size, space usage, and inode usage for each file system. See “SOS File System Space Summary” on page 131.
l	Network Summary	Displays network performance information, including protocol data and network interface information. See “SOS Network Summary” on page 133.
n	NFS Summary	Provides information about the Network File System (NFS). See “SOS NFS Summary” on page 135.
w	Swap Summary	Provides information on system swap space utilization. See “SOS Swap Summary” on page 137.
u	User Summary	Reveals how each user is utilizing system resources. See “SOS User Summary” on page 141.
t	Terminal Summary	Displays information about the activity of the individual terminals. See “SOS Terminal Summary” on page 143.
b	System Table Summary	Reports the configuration and utilization of several system tables and caches. See “SOS System Table Summary” on page 145.
y	System Configuration	Shows significant system configuration parameters. See “SOS System Configuration Summary” on page 153.
h	Device Configuration	Provides a listing of hardware and pseudo devices that are configured on your system. See “SOS Device Configuration Summary” on page 159.
p	Pulse Points	Lists the key indicators of performance that appear on the Global Summary screen and categorizes each level of performance as acceptable, questionable, or unacceptable. See “SOS Pulse Points Summary” on page 161.

Key	Screen Title	Description
k	Workload Definitions	Displays the application workload definitions (workdefs) file. See "SOS Workload Definitions" on page 163.
P	Process Detail	Displays the performance of one process in detail. See "SOS Process Detail" on page 165.
F	Process File Usage	Lists all of the files currently accessed by a process. See "SOS Process File Usage" on page 171.
M	Process Memory Regions	Displays information about the process' memory and virtual memory address space usage. See "SOS Process Memory Regions" on page 175.
W	Workload Detail	Provides detailed information about a specific workload. See "SOS Workload Detail" on page 179.
D	Disk Detail	Provides detailed performance data about a specified disk. See "SOS Disk Detail" on page 185.
V	Volume Detail	Provides detailed performance numbers for a specified volume group or logical volume. See "SOS Volume Detail" on page 189.
O	Oracle Main	Lists all Oracle instances, and shows some important metrics for each, as well as some aggregate statistics (summed over all instances). See "SOS Oracle Main" on page 193.
L	Oracle Detail Latches	Provides latches statistics. See "SOS Oracle Detail Latches" on page 197.
A	Oracle Detail Database Activity	Shows statistics related to database activity, locking, sorts, table scans, and changes. See "SOS Oracle Detail Database Activity" on page 201.
N	Oracle Detail Mem and Net	Contains statistics about memory allocation and network transfers. See "SOS Oracle Detail Memory and Network" on page 205.

SOS SCREEN SELECTION MENU .
Screen Selection Menu Screen .
 .
 .

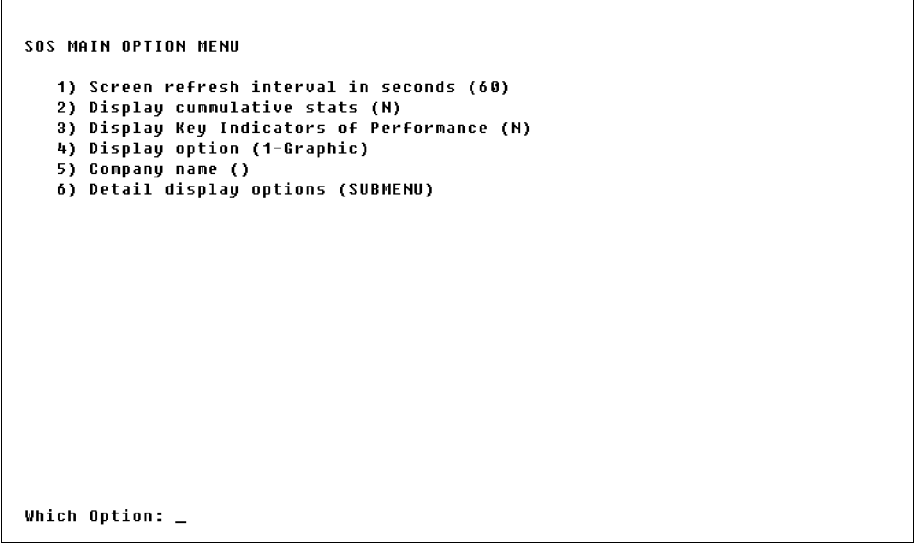
Key	Screen Title	Description
K	Oracle Detail Rollback	Provides statistics about rollback segments. See “SOS Oracle Detail Rollback Segments” on page 209.
C	Oracle Detail Cache	Displays the most important statistics related to Oracle cache management. See “SOS Oracle Detail Cache” on page 211.
E	Oracle Detail Events	Shows statistics related to database events. See “SOS Oracle Detail Events” on page 217.
B	Oracle Detail DBWR	Shows statistics about DBWR, the process that writes the modified buffers into a database. See “SOS Oracle Detail DBWR” on page 221.
S	Oracle Detail Datafiles	Displays the first 10 data files in order of their activity (the most active first). See “SOS Oracle Detail Datafiles” on page 225.

SOS MAIN OPTION MENU

SOS Main Option Menu Screen

The SOS Main Option Menu screen contains a set (and several subsets) of options that enable the user to configure the SOS program.

To access the SOS Main Option Menu screen, enter **o** from any SOS display screen.



```
SOS MAIN OPTION MENU

1) Screen refresh interval in seconds (60)
2) Display cumulative stats (N)
3) Display Key Indicators of Performance (N)
4) Display option (1-Graphic)
5) Company name ( )
6) Detail display options (SUBMENU)

Which Option: _
```

Figure 7.1 *SOS Main Option Menu*

Main Option Commands

To modify a main option, either temporarily or permanently:

- 1 Type the option command key from the SOS Main Option Menu screen and press the Enter key.
- 2 Enter a new parameter at the secondary command prompt. Press the Enter key.
- 3 Press Enter again to exit the SOS Main Options Menu screen.
- 4 At the Should these options be saved permanently? prompt:
 - Press the Enter key to return to the SOS program without saving the modifications permanently.
 - Type **Y** (Yes) to save the changes permanently and then press the Enter key.

Information about each of the main options is provided to assist you.



NOTE All command keys are case-sensitive.

Screen refresh interval in seconds

The SOS banner shows the length of the current interval (I: mm:ss) in minutes (mm) and seconds (ss). In the following example, the banner indicates the measurements reported in the screen are updated every minute (60 seconds).

```
SOS B.01g eagle MON, 11 JUN 2001, 12:01 E: 01:17:06 I: 01:00
```

Figure 7.2 SOS banner: current interval (I: 01:00)

Setting the Length of the Interval

The SOS program refreshes (updates) the performance measurement data every 60 seconds. This default can be changed to an interval ranging from 10 to 3600 seconds.



IMPORTANT SOS runs at a very high priority. Setting a short refresh interval or updating the screen too frequently may burden the system and result in skewed performance measurements. The default setting of 60 seconds is recommended for most systems.

To adjust the length of the interval:

- 1 From the SOS Main Options Menu screen, select the Screen refresh interval in seconds option. Press the Enter key.
- 2 At the next prompt, enter a positive integer from 10 to 3600 (seconds). Press the Enter key.

Updating Interval Data

To update interval data at any time, from any SOS display, type **u** at the prompt.

The current interval indicator in the SOS banner (I: mm:ss) marks the time that passed from the beginning of the interval to the second the data update occurred. The example in Figure 7.3 shows that the interval data was updated after the first 36 seconds (I: 00:36) of the interval. The interval data will be updated again according to the refresh interval rate set in the SOS Main Options Menu.



Figure 7.3 *SOS banner: current interval after update (I: 00:36)*

Display cumulative stats

Cumulative statistics are accumulated from the instant the SOS program is started or reset until the program is either stopped or reset. By default, cumulative statistics are suppressed—only the statistics for the most recent interval are displayed.

When cumulative statistics are enabled from the SOS Main Option Menu, they will be placed in brackets ([]) next to their corresponding current statistics in all tabular screens. For an example, see the Disk I/O Summary screen in Figure 7.4 on the next page.

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SOS B.01y eagle MON, 11 JUN 2001, 12:02 E: 01:17:43 I: 00:36									
DISK I/O SUMMARY									
Dev	I/O%	Qlen	Util%	Wait Time(ms)	Service Time(ms)	Rates (/s)		Avg Size(kb)	
						Read	Write	Read	Write
c0t6d0	0	0	0	0	0	0	0	0	0
	[43]	[1153]	[11]	[151]	[10]	[5]	[6]	[17]	[22]
c0t2d0	0	0	0	0	0	0	0	0	0
	[0]	[0]	[0]	[0]	[0]	[0]	[0]	[0]	[0]
c0t5d0	100	0	1.2	0.4	9.3	0	1.3	0	3
	[57]	[12.7]	[18]	[152]	[11]	[2]	[12]	[13]	[22]
TOTALS	100	0	0.4	0.4	9.3	0	1.3	0	3
	[100]	[1166]	[9]	[152]	[11]	[8]	[18]	[16]	[22]
Enter command: _									

Figure 7.4 SOS Disk I/O Summary screen (tabular display) with cumulative stats

In instances where a cumulative statistic is greater than zero, but its closest rounding value (to the tenth) is less than 0, a less than character (<) will be displayed instead of an integer.

Displaying Cumulative Statistics

To display cumulative statistics in all tabular displays:

- 1 From the SOS Main Options Menu screen, select the Display cumulative stats option. Press the Enter key.
- 2 At the next prompt, enter **Y** (Yes). Press the Enter key.

Resetting Cumulative Statistics

To reset the cumulative statistics in all tabular displays to zero (0), enter **r** at the SOS Enter command: prompt from any SOS screen. This reset function also updates the current interval (see "Updating Interval Data" on page 39).

Display Key Indicators of Performance

The KIP line can be displayed just below the SOS banner in all SOS screens.

KIP Line —	SOS B.01y eagle MON, 11 JUN 2001, 12:03 E: 01:18:43 I: 01:00									
	Total Busy: 1.9 High Pri: 1.9 Read Hit: 100.0%									

Figure 7.5 SOS Key Indicators of Performance (KIP) line

The configuration of the KIP line is discussed in “Key Indicators of Performance (KIP) Line” on page 85.

Displaying Key Indicators of Performance

By default, the key indicators of performance are suppressed. To show the key indicators of performance (KIP) line in all screen displays:

- 1 From the SOS Main Options Menu screen, select the Display Key Indicators of Performance option. Press the Enter key.
- 2 At the next prompt, enter **Y** (Yes). Press the Enter key.

Display option

The Display option determines how the GLOBAL statistics portion of the Global Summary screen is formatted. Two choices are available: graphical or tabular. You can press the **t** key from any data display screen to toggle between graphical and tabular displays, when both formats are available for that particular screen. Or, you can change the Display option.

Changing Display Formats

To toggle the GLOBAL statistics display formats between graphic/tabular:

- 1 From the SOS Main Options Menu screen, select Display option. Press the Enter key.
- 2 Enter the option number (1 or 2):
 - To view a graphical display, type **1** (1-Graphic). Press the Enter key.
 - To view a tabular display, type **2** (2-Tabular). Press the Enter key.

Company name

By default, the company name is not included in the SOS screens, reports or output. It can be added.

Adding a Company Name to the SOS Banner

- 1 From the SOS Main Options Menu screen, select the Company name option. Press the Enter key.
- 2 At the next prompt, type a company name or system name (up to 43 alpha-numeric characters) to display just below the SOS banner.

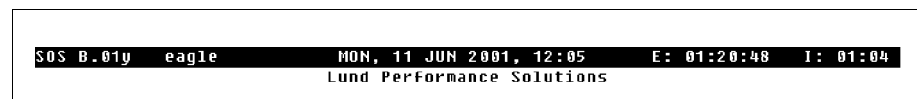


Figure 7.6 *SOS Company Name example (Lund Performance Solutions)*

Detail display options (SUBMENU)

To access the Detail display options submenu screen:

- 1 From the SOS Main Options Menu screen, enter the command key for Detail display options. Press the Enter key.
- 2 Select one of the following submenu options:
 - 1) Global display options (SUBMENU)
 - 2) Process display options (SUBMENU)
 - 3) Pulse Points display options (SUBMENU)
 - 4) User display options (SUBMENU)
 - 5) Terminal display options (SUBMENU)

Detail Display Options

Detail display options Submenu Screen

To access the Detail display options submenu screen from any SOS display screen:

- 1 Type **o** from the SOS Enter command: prompt to view the SOS Main Option Menu screen.
- 2 From the SOS Main Option Menu screen, select Detail display options and press Enter.

```
SOS MAIN OPTION MENU
Detail display options

1) Global display options (SUBMENU)
2) Process display options (SUBMENU)
3) Pulse Points display options (SUBMENU)
4) User display options (SUBMENU)
5) Terminal display options (SUBMENU)
```

```
Which Option: _
```

Figure 7.7 SOS Detail display options submenu screen

Detail display option Commands

To open one of the Detail display submenus, use the following procedure.

- 1 From the Detail display options submenu screen, enter the command key number of the submenu to open.
 - Global display options (SUBMENU)
See “Global display options Submenu Screen” on page 43.
 - Process display options (SUBMENU)
See “Process display options Submenu Screen” on page 50.
 - Pulse Points display options (SUBMENU)
See “Pulse Points display options” on page 56.
 - User display options (SUBMENU)
See “User Display Options” on page 59.
 - Terminal display options (SUBMENU)
See “Terminal Display Options” on page 62.
- 2 Press the Enter key.

Global Display Options

Global display options Submenu Screen

To access the Global display options submenu screen from any SOS display screen:

- 1 Type **o** from the SOS Enter command: prompt to view the SOS Main Option Menu screen.
- 2 From the SOS Main Option Menu screen. select Detail display options and press the Enter key.
- 3 From the Detail display options submenu screen, select Global display options and press the Enter key. The Global display options submenu screen will display (Figure 7.8).

```

SOS MAIN OPTION MENU
  Detail display options
    Global display options

      1) Display advice messages (Y)
      2) Display informational advice messages (Y)
      --- Display CPU information on global screen
      --- Display memory information on global screen
      --- Display miscellaneous information on global screen
      --- Display disk information on global screen
      --- Maximum number of disks to display (0=ALL)
      8) Display process information (Y)
      9) Display workload information (N)
      --- Display only active workloads
      --- CPU percentage required for workload display

Which Option: _

```

Figure 7.8 *SOS Global display options submenu screen*

Global display option Commands

To modify a global display option, either temporarily or permanently:

- 1 Type the option command key from the Global display options submenu screen and press the Enter key.
- 2 Enter a new parameter at the secondary command prompt. Press the Enter key.
- 3 Press Enter to exit the Global display options submenu screen.
- 4 Press Enter to exit the Detail display options submenu screen.
- 5 Press Enter to exit the SOS Main Options Menu screen.
- 6 At the Should these options be saved permanently? prompt:
 - Press the Enter key to return to the SOS program without saving the modifications permanently.
 - Type **Y** (Yes) to save the changes permanently and then press the Enter key.

Information about each of the global display options is provided to assist you.

Display advice messages

SYSTEM PERFORMANCE ADVICE messages displayed in the Global Summary screen deliver a basic interpretation of significant system performance events.

```

----- SYSTEM PERFORMANCE ADVICE -----
The CPU was used a total of 1.7 of its capacity during this interval <CI01>
This interval's 'hog' process is (PID 4762) with .9% of the CPU <PI01>
This interval's highest disk I/O user was (PID 7207) with 17 I/O's <PI02>
Collision percent indicates a moderate network bottleneck <LE01>
Buffer cache write hit percent low, increase cache <BE02>
LOCKS too high at 6 <GE03>

```

Figure 7.9 SOS Global Summary screen: SYSTEM PERFORMANCE ADVICE messages

Advice messages are discussed further in "SYSTEM PERFORMANCE ADVICE" on page 102.

Suppressing All Advice Messages

To suppress all advice messages in the Global Summary screen:

- 1 From the Global display options submenu screen, select the Display advice messages option. Press the Enter key.
- 2 At the next prompt, enter **N** (No). Press the Enter key.

Display informational advice messages

By default, SOS provides both informational and excessive use advice messages in the SYSTEM PERFORMANCE ADVICE section of the Global Summary screen.

- An "I" in the message ID code (for example, CI01) denotes an *informational* advice message. Informational messages usually state current performance levels for the current interval.
- An "E" in the message ID code (for example, ME01) denotes an *excessive use* advice message. This type of advice message alerts the user to a situation where system resources are overtaxed.

Suppressing Informational Advice Messages

To suppress informational advice messages from the Global Summary screen:

- 1 From the Global display options submenu screen, select the Display informational advice messages option.

This option is available only when advice messages are displayed in the Global Summary screen. Press the Enter key.
- 2 At the next prompt, enter **N** (No). Press the Enter key.

Display CPU information on global screen

By default, the GLOBAL section of the Global Summary screen includes CPU statistics. These statistics can be suppressed in the tabular display.

```

----- CPU UTILIZATION ----- CPU MISC -----
TOTAL BUSY: 35.7[ 36]  HIGH PRI: 35.7[ 36] | Capture Ratio    0.7[ <]
User    0[ 0]  Sys  16.0[16]  Mem   3.6[ 4] | RunQ Avg          0[ 0]
Real    0[ 0]  Intr  1.3[ 1]  Idle 64.3[65] | 5/15 Min RunQ Avg  0/ 0
Nice    0[ 0]  C SW  0.3[ <]                | RunQ Busy %       0[ 0]
NNice 14.5[15]  Trap  0.1[ <]                |

```

Figure 7.10 SOS Global Summary screen: CPU statistics

Global CPU statistics are discussed in “CPU UTILIZATION” on page 94 and “CPU MISC” on page 97.

Suppressing CPU Statistics

To suppress CPU statistics from the Global Summary screen:

- 1 From the Global display options submenu screen, select the Display CPU information on global screen option, which is available only when the Global Summary screen is displayed in tabular format. Press the Enter key.
- 2 At the next prompt, enter **N** (No). Press the Enter key.

Display memory information on global screen

By default, the GLOBAL section of the Global Summary screen includes memory and virtual memory statistics. These statistics can be suppressed.

```

----- MEM/VM -----
Read Hit % 100.0[100]  Page Outs    <[ 10]/5  Mem Used % 41.8[ 58]
Write Hit % 42.1[ 96]  Deact Byte  0[ 60]/5  VM Used %  22.7[ 36]

```

Figure 7.11 SOS Global Summary screen: MEM/VM statistics

Global memory statistics are discussed in “MEM/VM” on page 98.

Suppressing Memory Statistics

To suppress memory statistics from the Global Summary screen:

- 1 From the Global display options submenu screen, select the Display memory information on global screen option, which is available only when the Global Summary screen is displayed in tabular format. Press the Enter key.
- 2 At the next prompt, enter **N** (No). Press the Enter key.

Display miscellaneous information on global screen

Miscellaneous global information is provided in the GLOBAL section of the Global Summary screen. These statistics can be suppressed.

----- MISC -----									
#Sessions:	3	#Procs:	65	#Wait I/O:	0	Transactions:	10.0[33.7]/s		
#Active:	0	#Active:	16	#Deact:	0	Avg Response Time:	0.1		

Figure 7.12 SOS Global Summary screen: MISC statistics

Global miscellaneous statistics are discussed further in "MISC" on page 99.

Suppressing Miscellaneous Global Statistics

To suppress miscellaneous global statistics from the Global Summary screen:

- 1 From the Global display options submenu screen, select the Display miscellaneous information on global screen option, which is available only when the Global Summary screen is displayed in tabular format. Press the Enter key.
- 2 At the next prompt, enter **N** (No). Press the Enter key.

Display disk information on global screen

Disk information is provided in the GLOBAL section of the Global Summary screen. This information can be suppressed.

----- DISK -----											
Disk	IO/s	IO%	QLen	|	Disk	IO/s	IO%	QLen	|	Disk	IO/s
c0t5d0	1	100	0	|	c0t2d0	0	0	0	|	c0t6d0	0

Figure 7.13 SOS Global Summary screen: DISK statistics

Global disk statistics are discussed further in "DISK" on page 100.

Suppressing Disk Statistics

To suppress disk statistics from the Global Summary screen:

- 1 From the Global display options submenu screen, select the Display disk information on global screen option, which is available only when the Global Summary screen is displayed in tabular format. Press the Enter key.
- 2 At the next prompt, enter **N** (No). Press the Enter key.

Maximum number of disks to display

To set the maximum number of disks to display in the DISK portion of the Global Summary screen:

- 1 From the Global display options submenu screen, select the Maximum number of disks to display option, which is available only when the Global Summary screen is displayed in tabular format. Press the Enter key.
- 2 At the next prompt, enter the maximum number of disks to display (0=ALL, or a number from 1 to 196612). Press the Enter key.

Display process information

Process information is provided in the PROCESS SUMMARY section of the Global Summary screen. This information can be suppressed.

PROCESS SUMMARY											
PID	Name	User Name	TIV	CPU%	Nice	Pri	RSS/Size	#Rd	#Wr	Wait	Resp
This interval's 'hog' process is (PID 4762) with .7% of the CPU											
This interval's highest disk I/O user was (PID 28) with 7 I/O's											
Buffer cache write hit percent low, increase cache											
FLOCKS too high at 6											

Figure 7.14 SOS Global Summary screen: PROCESS SUMMARY

Global process statistics are discussed further in "PROCESS SUMMARY" on page 89.

Suppressing PROCESS SUMMARY

To suppress the PROCESS SUMMARY section of the Global Summary screen:

- 1 From the Global display options submenu screen, select the Display process information option. Press the Enter key.
- 2 At the next prompt, enter N (No). Press the Enter key.

Display workload information

By default, information about application workloads is not included in the Global Summary screen graphical display. This information can be displayed.

WORKLOAD SUMMARY						
Num	Name	CPU %	User CPU %	Disk I/O %	Resp Time	Trans/min
1	vi_edit	0[<]	0[32.6]	0[<]	0[0.1]	0[<]
2	INTERACT	1.2[25.3]	53.7[76.4]	16.0[54.1]	0.4[25.7]	<[42.0]
3	BATCH	0[0]	0[0]	0[0]	0[0]	0[0]
4	DAEMON	1.1[1.6]	18.9[13.5]	84.0[45.8]	<[<]	630[1950]
5	DEFAULT	0[0]	0[0]	0[0]	0[0]	0[0]

Figure 7.15 SOS Global Summary screen: WORKLOAD SUMMARY

Workload statistics are discussed further in “WORKLOAD SUMMARY” on page 93.

Displaying Workload Summary Information

To display workload information:

- 1 From the Global display options submenu screen, select the Display workload information option. Press the Enter key.
- 2 At the next prompt, enter **Y** (Yes). Press the Enter key.

Display only active workloads

This Display only active workloads option is available only when workload information is displayed in the Global Summary screen.

By default, all workloads defined in the workdefs (workload definitions) file are included in the WORKLOAD SUMMARY section of the Global Summary screen, even if they used 0.0% of the total CPU time in the current sample interval. The display can be configured to show only active workloads (workloads that used more than 0.0% of the total CPU time).

Displaying Only Active Workloads

To display active workloads and suppress inactive workloads in the Global Summary screen:

- 1 From the Global display options submenu screen, select the Display only active workloads option. Press the Enter key.
- 2 At the next prompt, enter **Y** (Yes). Press the Enter key.

CPU percentage required for workload display

This option is available only when workload information is displayed in the Global Summary screen and eligibility is restricted to active workloads.

When this option is disabled (default setting), all workloads that consumed 0.1% or more of the total CPU time in the current sample interval will be included in the WORKLOAD SUMMARY section of the Global Summary screen. A higher minimum CPU percentage can be specified.

Resetting the Minimum CPU Requirement

To set a new minimum CPU percentage requirement:

- 1 From the Global display options submenu screen, select the CPU percentage required for workload display option. Press the Enter key.
- 2 At the next prompt, enter a value from 0.1 to 100 percent. Press the Enter key.

Process Display Options

Process display options Submenu Screen

To access the Process display options submenu screen from any SOS screen:

- 1 Type **o** from the SOS Enter command: prompt to view the SOS Main Option Menu screen.
- 2 Ensure the Display process information option is enabled.
- 3 From the SOS Main Option Menu screen. select Detail display options and press the Enter key.
- 4 From the Detail display options submenu screen, select Process display options and press the Enter key. The Process Display Options submenu screen will display.

```

SOS MAIN OPTION MENU
  Detail display options
    Process display options

    1) Display extended process line (N)
    2) Display total and I/O percentage instead of read/write counts (N)
    3) Display only active processes (Y)
    4) CPU percentage required for process display (.0)
    5) Display interactive processes (Y)
    6) Display non-interactive processes (Y)
    7) Display processes which have died (Y)
    8) Process logon filter (.* )
    9) Process sort option (4-CPU time)
   10) Display processes sorted in ascending order (Y)
   11) Maximum number of processes to display (0=ALL) (0)

Which Option: _

```

Figure 7.16 SOS Process display options submenu screen

Process display option Commands

To modify a process display option, either temporarily or permanently:

- 1 Type the option command key from the Process display options submenu screen and press the Enter key.
- 2 Enter a new parameter at the secondary command prompt. Press the Enter key.
- 3 Press Enter to exit the Process display options submenu screen.

SOS MAIN OPTION MENU

Process Display Options

- 4 Press Enter to exit the Detail display options submenu screen.
- 5 Press Enter to exit the SOS Main Options Menu screen.
- 6 At the Should these options be saved permanently? prompt:
 - Press the Enter key to return to the SOS program without saving the modifications permanently.
 - Type **Y** (Yes) to save the changes permanently and then press the Enter key.

Information about each of the process display options is provided to assist you.

Display extended process line

Additional process information can be displayed in the PROCESS SUMMARY section of the Global Summary screen.

The extended PROCESS SUMMARY display includes:

- An extended process line below each process line, which shows the percentage of time the corresponding process spent in each wait state.
- The wait states column headings for the wait state statistics displayed in the extended process lines.

		----- PROCESS SUMMARY -----																									
Wait States	----	PID	Name	User Name	TTY	CPU%				Nice	Pri	RSS/Size				#Rd	#Wr	Wait	Resp								
		{	RN	CA	DI	GR	IN	IO	IP	LN	MG	NF	PI	PR	RP	SE	SH	SL	SD	ST	SY	TY	UN	OT	}	CPU	
		{	<	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66
Process Line	----	4727	sos	whitney	ta	0.7				0	154	4228/7544				0	3	STRM	0.4								
Extended	----	{	1	0	<	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	405	
Process Line		4762	sos	root	tb	0.9				0	154	4076/7384				0	6	STRM	0.6								
		{	1	0	<	0	0	0	0	0	0	0	0	<	0	0	0	<	0	0	0	0	0	0	0	530	

Figure 7.17 SOS Global Summary screen: wait states headings & extended process lines

The wait states headings line includes all possible wait states in which the current processes can spend CPU time ({RN, CA,..., OT}). For detailed information about each wait state, see "Wait State Codes" on page 302.

Extending the PROCESS SUMMARY

To extend the PROCESS SUMMARY portion of the Global Summary screen:

- 1 From the Process display options submenu screen, select the Display extended process line option. Press the Enter key.
- 2 At the next prompt, enter **Y** (Yes). Press the Enter key.

Display total and I/O percentage instead of read/write counts

The default column headings for the PROCESS SUMMARY section of the Global Summary screen are shown in Figure 7.17. I/O information can be displayed, by switching to an alternative set of column headings (see Figure 7.18).

----- PROCESS SUMMARY -----											
PID	Name	User	Name	TTY	CPU%	Nice	Pri	RSS/Size	#IO	I/O%	Wait Resp

Figure 7.18 *SOS PROCESS SUMMARY column headings (alternative)*

Switching the PROCESS SUMMARY Column Headings

To replace total reads (#Rd) with total I/O's (#IO) and total writes (#Wr) with I/O percentage (I/O%):

- 1 From the Process display options submenu screen, select the Display total and I/O percentage instead of read/write counts option. Press the Enter key.
- 2 At the next prompt, enter **Y** (Yes). Press the Enter key.

Display only active processes

An *active* process is defined as a process that used more than 0.0 percent of total CPU time during the current sample interval.

By default, only active processes are included in the PROCESS SUMMARY section of the Global Summary screen. Inactive processes can be included.



RECOMMENDATION The default setting, Y (display only active processes), is recommended.

Displaying Both Active and Inactive Processes

To display all processes currently on the system, both active and inactive:

- 1 From the Process display options submenu screen, select the Display only active processes option. Press the Enter key.
- 2 At the next prompt, enter **N** (No). Press the Enter key.

CPU percentage required for process display

The CPU percentage required for process display option is possible when only active processes are included in the PROCESS SUMMARY portion of the Global Summary screen. This option enables you to set a minimum threshold value (a minimum percentage of CPU time) that a

process must meet or exceed to be included in the PROCESS SUMMARY section of the Global Summary screen.

The default parameter of 0.0 percent will allow all active processes in the current sample interval to be displayed, including processes in the run queue (even though they did not use any CPU time). Entering a greater threshold value, for example 10 percent, will exclude all active processes that used less than 10 percent of the total CPU time.



RECOMMENDATION If you are doing general system monitoring, a CPU threshold value of less than 5.0 percent is recommended. If you are trying to pinpoint the top CPU "hog" processes, a value of 5.0 to 15.0 percent is recommended.

Setting the CPU Percentage Required for a Process to Display

To set the minimum CPU percentage:

- 1 From the Process display options submenu screen, select the CPU percentage required for process display option. Press the Enter key.
- 2 At the next prompt, enter a value between 0.0 and 100. Press the Enter key.

Display interactive processes

Interactive processes (processes attached to a terminal) are listed in the PROCESS SUMMARY section of the Global Summary screen. These processes can be suppressed.

Suppressing Interactive Processes

To exclude interactive processes from the screen display:

- 1 From the Process display options submenu screen, select the Display interactive processes option. Press the Enter key.
- 2 At the next prompt, type **N** (No). Press the Enter key.

Display non-interactive processes

Batch and daemon processes (non-interactive processes) are listed in the PROCESS SUMMARY section of the Global Summary screen. These processes can be suppressed.

Suppressing non-interactive Processes

To exclude non-interactive processes from the screen display:

- 1 From the Process display options submenu screen, select the Display non-interactive processes option. Press the Enter key.
- 2 At the next prompt, type **N** (No). Press the Enter key.

Display processes which have died

The PROCESS SUMMARY section displays all processes which have died. These processes are labeled "Dead" under the column heading, "Wait." These processes can be suppressed.

Suppressing Dead Processes

To exclude dead processes from the screen display:

- 1 From the Process display options submenu screen, select the Display processes which have died option. Press the Enter key.
- 2 At the next prompt, type **N** (No). Press the Enter key.

Process login filter

The default login filter (.*) allows all users and all processes to be displayed on the SOS screens.

Specifying a Process Login Filter

To limit displayed processes to those of just one login:

- 1 From the Process display options submenu screen, select the Process login filter option. Press the Enter key.
- 2 At the next prompt, enter the logon using any acceptable regular expression. For example, to match the login, "root," you would type **root** at the next prompt. Press the Enter key.

For information about regular expressions, refer to the Unix manpage, "regexp," by typing **man regexp** at the shell prompt.

Process sort option

The process sort option enables the user to select the order in which the qualifying processes will be displayed. By default, the processes are sorted by the amount of CPU time they utilized in the current sample interval.

Selecting a Process Sort Option

- 1 From the Process display options submenu screen, select Process sort option. Press the Enter key.
- 2 At the next prompt, type the key command that corresponds to the desired sort option (described in Table 7.1). Press the Enter key.

Table 7.1 *SOS process sort options*

Option	Sort Option Description	Column
1-PID#	Sort by process identification number.	PID

Option	Sort Option Description	Column
2-Logon terminal	Sort by terminal logon.	Tty
3-Workload group	Sort by the application workload group to which the process belongs. (Displays in the WORKLOAD SUMMARY section of the Global Summary screen.)	N/A
4-CPU time	Sort by the percentage of CPU time utilized by the process in the current sample interval.	CPU%
5-Disk I/O	Sort by the total number of disk I/O's incurred by the process.	#IO
6-Priority	Sort by process priority.	Pri
7-Wait state	Sort by the activity or sleep state a process is in during the current sample interval.	Wait

Display processes sorted in ascending order

By default, the processes displayed will be sorted in ascending order.

Displaying Processes in Descending Order

To sort and display processes in descending order:

- 1 From the Process display options submenu screen, select the Display processes sorted in ascending order option. Press the Enter key.
- 2 At the next prompt, type **N** (No). Press the Enter key.

Maximum number of processes to display

To specify a maximum number of processes to be displayed:

- 1 From the Process display options submenu screen, select the Maximum number of processes to display option. Press the Enter key.
- 2 At the next prompt, enter a whole numeric value between 0 and 999.

For example, to show the ten processes that consume the most CPU time, set the following three parameters:

- 1 Set the Process sort option to **4-CPU** time to sort the processes by CPU time utilized.
- 2 Set the Display processes sorted in ascending order option to **N**, to display the processes in descending order.
- 3 Set the Maximum number of processes to **10**, to display the ten processes using the most CPU time. (The default value, 0, will allow all eligible processes to be displayed.)

Pulse Points display options

Pulse Points display options Submenu Screen

To access the Pulse Points display options submenu screen from any SOS display screen:

- 1 Type **o** from the SOS Enter command: prompt to view the SOS Main Option Menu screen.
- 2 Ensure the Display process information option is enabled.
- 3 From the SOS Main Option Menu screen, select Detail display options and press Enter.
- 4 From the Detail display options submenu screen, select Pulse Points display options and press Enter. The Pulse Points display options submenu screen will display (Figure 7.19).

```
SOS MAIN OPTION MENU
  Detail display options
    Pulse Points display options

    1) Display CPU stats (Y)
    2) Display memory stats (Y)
    3) Display disk I/O stats (Y)
    4) Display network stats (Y)
    5) Display miscellaneous stats (Y)

Which Option: _
```

Figure 7.19 *SOS Pulse Points display options submenu screen*

Pulse Points display option Commands

To modify a pulse points display option, either temporarily or permanently:

- 1 Type the option command key from the Pulse Points display options submenu screen and press the Enter key.
- 2 Enter a new parameter at the secondary command prompt. Press the Enter key.
- 3 Press Enter to exit the Pulse Points display options submenu screen.
- 4 Press Enter to exit the Detail display options submenu screen.

SOS MAIN OPTION MENU

Pulse Points display options

- 5 Press Enter to exit the SOS Main Options Menu screen.
- 6 At the Should these options be saved permanently? prompt:
 - Press the Enter key to return to the SOS program without saving the modifications permanently.
 - Type **Y** (Yes) to save the changes permanently and then press the Enter key.

Information about each of the pulse points display options is provided to assist you.

Display CPU stats

CPU statistics are displayed in the Pulse Points screen.

SOS B.02g jackal						FRI, 17 AUG 2001, 11:31		E: 00:29:19		I: 01:01	
PULSE POINTS											
Indicator			Green	Yellow	Red	Comments					
--- CPU ---											
CPU Busy %			5.3	21.5							
Hi-Pri CPU %			5.3	21.5							
Queue Busy %			0	21.9							
Run-Q Average			0	0.7							
--- Memory ---											
Page Out Rate			0	0		/sec					
Deactivate Byte Rate			0	0		bytes/sec					
CPU Memory Mgt %			0	2.0							
Read Hit %			99.6	100.0							
--- Disk I/O ---											
Average Wait Time			0.8	6.5		System Wide					
Average Q-Length			0	0		System Wide					
Disk Utilization %			1.2	3.3		System Wide					
Disk I/O Rate (/sec)						136	10203	System Wide			
--- Network ---											
Collision %			0	10.29		System Wide					
Enter command: _											

Figure 7.20 SOS Pulse Points screen

Suppressing CPU Statistics

To suppress CPU statistics from the Pulse Points screen:

- 1 From the Pulse Points display options submenu screen, select the Display CPU stats option. Press the Enter key.
- 2 At the next prompt, type **N** (No). Press the Enter key.

Display memory stats

Memory statistics are displayed in the Pulse Points screen (refer to Figure 7.20).

Suppressing Memory Statistics

To suppress memory statistics from the Pulse Points screen:

- 1 From the Pulse Points display options submenu screen, select the Display memory stats option. Press the Enter key.
- 2 At the next prompt, type **N** (No). Press the Enter key.

Display disk I/O stats

Disk I/O statistics are displayed in the Pulse Points screen. To see an example of this screen, refer to Figure 7.20 on page 57.

Suppressing Disk I/O Statistics

To suppress disk I/O statistics from the Pulse Points screen:

- 1 From the Pulse Points display options submenu screen, select the Display disk I/O stats option. Press the Enter key.
- 2 At the next prompt, type **N** (No). Press the Enter key.

Display network stats

Network statistics are displayed in the Pulse Points screen.

Suppressing Network Statistics

To suppress network statistics from the Pulse Points screen:

- 1 From the Pulse Points display options submenu screen, select the Display network stats option. Press the Enter key.
- 2 At the next prompt, type **N** (No). Press the Enter key.

Display miscellaneous stats

Miscellaneous statistics, when available, are displayed in the Pulse Points screen. (Miscellaneous statistics are not displayed in the example in Figure 7.20 on page 57.)

Suppressing Miscellaneous Statistics

To suppress miscellaneous statistics from the Pulse Points screen:

- 1 From the Pulse Points display options submenu screen, select the Display miscellaneous stats option. Press the Enter key.
- 2 At the next prompt, type **N** (No). Press the Enter key.

User Display Options

User display options Submenu Screen

To access the User display options submenu screen from any SOS display screen:

- 1 Type **o** from the SOS Enter command: prompt to view the SOS Main Option Menu screen.
- 2 Ensure the Display process information option is enabled.
- 3 From the SOS Main Option Menu screen, select Detail display options and press the Enter key.
- 4 From the Detail display options submenu screen, select User display options and press the Enter key. The User display options submenu will appear (Figure 7.21).

```
SOS MAIN OPTION MENU
Detail display options
User display options

1) CPU percentage required for user display (.0)
2) User logon filter (.* )
3) User sort option (3-CPU time)
4) Display users sorted in ascending order (N)
5) Maximum number of users to display (0=ALL) (0)

Which Option:
```

Figure 7.21 SOS User display options submenu screen

User display option Commands

The purpose of the user display options is to fine tune the information in the User Summary screen (discussed in “SOS User Summary” on page 141).

To modify a user display option, either temporarily or permanently:

- 1 Type the option command key from the User display options submenu screen and press the Enter key.
- 2 Enter a new parameter at the secondary command prompt. Press the Enter key.
- 3 Press Enter to exit the User display options submenu screen.
- 4 Press Enter to exit the Detail display options submenu screen.
- 5 Press Enter to exit the SOS Main Options Menu screen.
- 6 At the Should these options be saved permanently? prompt:
 - Press the Enter key to return to the SOS program without saving the modifications permanently.
 - Type **Y** (Yes) to save the changes permanently and then press the Enter key.

Information about each of the user display options is provided to assist you.

CPU percentage required for user display

The CPU percentage required for user display option is used to filter out less-active users from the User Summary display. The option is specified as a percentage (0.0-100). The default setting is .0 (zero) percent, which means that processes that use 0 percent or more of CPU time will be displayed and no users will be filtered out.



RECOMMENDATION If you are performing general system monitoring, a CPU threshold value of less than 5.0 percent is recommended. If you are trying to pinpoint the top CPU "hog" processes, a value of 5.0 to 15.0 percent is recommended.

Setting the CPU Percentage Required for a User Name to Display

To set the minimum CPU percentage:

- 1 From the User display options submenu screen, select the CPU percentage required for user display option. Press the Enter key.
- 2 At the next prompt, enter a value between 0.0 and 100. Press the Enter key.

User logon filter

The User logon filter is used to sort out specific users from the User Summary display. The default setting, .* (meaning match any number of any character), will allow all user names to be listed in the User Summary screen.

Specifying a User Login Filter

To limit displayed users to those of a single login:

- 1 From the User display options submenu screen, select the User login filter option. Press the Enter key.
- 2 At the next prompt, type that user name logon filter (using Unix regular expression syntax) at the User logon filter prompt. For example, to limit the eligible user process to root users, type **root**. Press the Enter key.

For information about regular expressions, refer to the Unix manpage, "regex," by typing **man regex** at the shell prompt.

User sort option

The User sort option applies a specific sort option to the users displayed in the User Summary screen. The default, 3-CPU time, sorts the report lines on the screen by the percentage of CPU time utilized by each process in the most-recent interval.

Selecting a User Sort Option

- 1 From the User display options submenu screen, select User sort option. Press the Enter key.
- 2 At the next prompt, type the key command that corresponds to the desired sort option (described in Table 7.2). Press the Enter key.

Table 7.2 SOS user sort options

Sort Option	Description
1-User Name	Sort users alphabetically by the login name of the user.
2-UID	Sort users by the user ID number from /etc/passwd.
3-CPU time	Sort users by the amount of CPU time utilized during the last interval.
4-Phys I/O	Sort users by the number of physical I/O's accumulated in the last interval.
5-Term I/O	Sort users by the number of terminal I/O's accumulated in the last interval.
6-Processes	Sort users by process name.
7-Real Memory	Sort users according to real memory usage.
8-Virtual Memory	Sort users according to virtual memory usage.

Display users sorted in ascending order

This parameter determines whether the sort order for the sort option applied in Option 3 is ascending or descending. By default, the users will be sorted and displayed in descending order.

Displaying Users in Ascending Order

To sort and display processes in ascending order:

- 1 From the Process display options submenu screen, select the Display users sorted in ascending order option. Press the Enter key.
- 2 At the next prompt, type **Y** (Yes). Press the Enter key.

Maximum number of users to display

This setting determines the maximum number of users to be listed in the User Summary screen. The default setting, 0 (zero), allows all users to be displayed.

To specify a maximum number of processes to be displayed in the User Summary screen:

- 1 From the User display options submenu screen, select the Maximum number of users to display option. Press the Enter key.
- 2 At the next prompt, enter a whole numeric value between 0 and 999.

Terminal Display Options

Terminal display options Submenu Screen

To access the Terminal display options submenu screen from any SOS display screen:

- 1 Type **o** from the SOS Main Option Menu screen.
- 2 Ensure the Display process information option is enabled.
- 3 From the SOS Main Option Menu screen, select Detail display options and press the Enter key.
- 4 From the Detail display options submenu screen, select Terminal display options and press the Enter key. The Terminal Display Options submenu screen will display (Figure 7.22).

```
SOS MAIN OPTION MENU
Detail display options
Terminal display options

1) Filter getty processes from terminal display (Y)
2) Terminal sort option (1-Terminal)
3) Display terminals sorted in ascending order (N)
4) Maximum number of terminals to display (0=ALL) (0)

Which Option:
```

Figure 7.22 SOS Terminal display options submenu screen

Terminal display option Commands

The purpose of the terminal display options is to fine-tune the information in the Terminal Summary screen (discussed in “SOS Terminal Summary” on page 143).

To modify a terminal display option, either temporarily or permanently:

- 1 Type the option command key from the Terminal display options submenu screen and press the Enter key.
- 2 Enter a new parameter at the secondary command prompt. Press the Enter key.
- 3 Press Enter to exit the Terminal display options submenu screen.
- 4 Press Enter to exit the Detail display options submenu screen.
- 5 Press Enter to exit the SOS Main Options Menu screen.
- 6 At the Should these options be saved permanently? prompt:
 - Press the Enter key to return to the SOS program without saving the modifications permanently.
 - Type **Y** (Yes) to save the changes permanently and then press the Enter key.

Information about each of the terminal display options is provided to assist you.

Filter getty processes from terminal display

A *getty process* is a process that waits for a login, which corresponds to an inactive terminal. The default setting, **Y**, filters out the getty processes and displays only the active terminals in the Terminal Summary screen.

Including Getty Processes

To include getty processes as well as active terminals in the Terminal Summary screen:

- 1 From the Terminal display options submenu screen, select the Filter getty processes from the terminal display option. Press the Enter key.
- 2 At the next prompt, type **N** (No). Press the Enter key.

Terminal sort option

This setting applies a specific sort option to the terminals displayed in the Terminal Summary screen. The default setting, 1-Terminal, sorts the report lines on the screen by terminal device name.

Selecting a Terminal Sort Option

- 1 From the Terminal display options submenu screen, select Terminal sort option. Press the Enter key.
- 2 At the next prompt, type the key command that corresponds to the desired sort option (described in Table 7.3). Press the Enter key.

Table 7.3 *SOS terminal sort options*

Sort Option	Description
1-Terminal	Sort terminals by the terminal device name.
2-User Name	Sort terminals by the login user name.
3-Login Time	Sort terminals according to the time of login.
4-Idle Time	Sort terminals according to the current idle time.
5-Processes	Sort terminals according to the number of processes attached to the terminal.
6-TTY Ins	Sort terminals according to the number of characters input on the terminal.
7-TTY Outs	Sort terminals according to the number of characters output on the terminal.

Display terminals sorted in ascending order

This setting determines whether the sort order for the sort option applied in the previous option is ascending or descending. By default, the terminals will be sorted and displayed in descending order.

Displaying Terminals in Ascending Order

To sort and display terminals in ascending order:

- 1 From the Terminal display options submenu screen, select the Display terminals sorted in ascending order option. Press the Enter key.
- 2 At the next prompt, type **Y** (Yes). Press the Enter key.

Maximum number of terminals to display

This setting determines the maximum number of terminals to be listed in the Terminal Summary screen. The default setting, 0 (zero), allows all users to be displayed.

To specify a maximum number of processes to be displayed in the Terminal Summary screen:

- 1 From the Terminal display options submenu screen, select the Maximum number of terminals to display option. Press the Enter key.
- 2 At the next prompt, enter a whole numeric value between 0 and 999.

SOS HOST-SPECIFIC CONFIGURATION FILES

SOS advice File

In the SYSTEM PERFORMANCE ADVICE portion of the Global Summary screen, advice messages are displayed based upon system activity that occurred during the current interval. The advice messages and display criteria are maintained in the SOS advice file (a portion of which is shown below) located in the /etc/opt/lps/cfg directory.

```
User          #####
Notification  —— echo >/dev/console
Command
Comments      —— #lpstrap
               #uncomment the above line to start sending snmp trap messages with
               #notify information.  You must configure lpstrap for you environment also.
               #See lpstrap for more info.

Default       —— <CI01>The CPU was used a total of %s of its capacity during this interval
Advice
Specification  ALWAYS
Block         CPU-BUSY%
```

Figure 8.1 *SOS advice configuration file (example)*

SOS advice File Configuration

The SOS program can display a single-line message for each item-name variable (a data item selected from the /opt/lps/lib/itemlist file) placed in the advice file. For a list of the data items in the itemlist file, see Appendix B.

During each current interval, SOS compares the value of each variable being monitored to the threshold criteria placed in the advice file. If the monitored value meets its threshold criteria, the message associated with that variable is displayed in the SYSTEM PERFORMANCE ADVICE portion of the Global Summary screen.



NOTE Please note that the lower and upper bounds of the thresholds for the moderate, HEAVY, and EXCESSIVE categories of each default advice message in the advice file are suggested values. It may be appropriate to adjust these values to reflect your system's performance criteria.

Advice Message Specification Blocks

Advice message specification blocks are constructed in accordance with specific configuration rules and syntax. The rules for configuring advice message specification blocks within the advice file are listed in "Configuration Rules" on page 69. The syntax of the specification blocks is outlined below using the default ME01 advice message as an example.

Example

```
<ME01>Page out rate reveals %s %s memory load
VM-PAGE-OUT-RATE (10-50)
VM-PAGE-OUT-RATE | 20 an | 15 a | 10 a |
VM-PAGE-OUT-RATE | 20 EXCESSIVE | 15 HEAVY | 10 moderate |
```

Syntax

```
<message-id><message-text>
item-name (min-max)
item-name [ |<value1><string1>|<value2><string2>|<value3><string3>| ]
item-name [ |<value1><string1>|<value2><string2>|<value3><string3>| ]
```

Where:

- <message-id> is a unique, four-character message identification code.
- <message-text> is the actual advice message text.
- item-name is the itemlist value to be used to determine the text string.
- (min-max) is the minimum and maximum item threshold values required for the message to display.
- The last two lines in the example are each single-line text qualifiers that correspond to the text place-holder(s) (%s) in the message-text.
 - The first place-holder in the message-text corresponds to the first text qualifier in the specification block.

In the example, the first place-holder in the message-text line:

```
<ME01>Page out rate reveals %s %s memory load
```

is determined by the value thresholds in the corresponding text-qualifier:

VM-PAGE-OUT-RATE | 20 an | 15 a | 10 a |

- The second conversion specifiers in the <message-text> corresponds to the second text qualifier line in the block, and so on.

In the example, the first place-holder in the message-text line:

<ME01>Page out rate reveals %s %s memory load

is determined by the value thresholds in the corresponding text-qualifier:

VM-PAGE-OUT-RATE | 20 EXCESSIVE | 15 HEAVY | 10 moderate |

The item-name <value> determines which <string> text is inserted into the printed advice message.

Configuration Rules

- 1 Comment lines must be preceded by a number sign character (#).
- 2 The first line of the SOS advice file is followed by any number of user-notification commands, terminated by one or more blank lines.

User-notification commands can be used to redirect copies of advice messages to another output device. No validation is done to confirm the syntax of these lines. The actual message text should not be included in the command. Instead, the advice message will be appended to the end of it.

Example

echo>/dev/console7

- 3 The rest of the file contains any number of message advice specification blocks separated by one or more blank lines. Each advice specification block must contain a message-id code followed by the actual advice message-text on the first line. Subsequent lines contain threshold criteria.
- 4 The message-id code is made up of the following components:
 - A type code, which denotes the specific system activity monitored.
 - B for buffer cache activity
 - C for CPU activity
 - D for disk activity
 - G for global activity
 - M for memory activity
 - L for network activity
 - P for process activity
 - A user-defined priority code assigned to the <variable>
 - I indicates the advice message is informational.
 - E indicates the performance level is exceptional or excessive.
 - A unique two-digit identification number (00-99)

- 5 The <message-id> code is followed by the message text (<message-text>).

Example

```
<CE01> The CPU Queue length indicates %s %s CPU bottleneck
```

The message identification code precedes the message text in the specification file, but follows the message text in the actual advice message display.

- 6 Conversion specifications in the <message-text> specification must be introduced by the percent sign character (%). After the % character, a conversion character (either s or %) will indicate the type of conversion to be applied.

- %s (percent sign followed immediately by a lower-case s) indicates the argument is a string and characters from the string will be printed until the end of the string.
- %% (percent sign followed immediately by a percent sign) will print a % character; no argument is converted.

For *each variable text or value* to be included in the message text, a single-line text qualifier must follow the basic advice specification.

- 7 If the advice message should always be displayed, the second line of the advice specification block can be replaced with the word ALWAYS to specify the message should always be generated. The <item-name> from the .itemlist file would then be the only entry on the third line of the block.

Example

```
<PI01>This interval's 'hog' process is %s with %s%% of the CPU
ALWAYS
%CPUPCT -PID
%CPUPCT
```

- 8 The item-name specification used to determine the text string is usually, but not necessarily, the same as the advice threshold item. An item-name can be selected from block types 0, 6, 7, 8, 10, 12, 14, or 15 in the itemlist file. Or, it can be one of six special item-names preceded by a percent sign (%item-name).

The following three items can only be used as variable text item-names. They will be replaced with a string of the form #nnn (nnn=PIN) to identify the appropriate process:

- %CPU-HOG, which identifies the CPU hog process
- %DISC-HOG, which identifies the disk hog process
- %TERM-HOG, which identifies the terminal read hog process

The next three special items can be used anywhere as a regular item-name can be used:

- %HOG-CPU, the CPU percentage used by %CPU_HOG
- %HOG-DISK, the disk I/O's performed by %DISC_HOG
- %HOG-TERM, the terminal reads performed by %TERM_HOG

- 9 An item-name preceded by an exclamation character (!item-name), specifies that all occurrences of this advice message will be sent through user-notification commands.

SNMP Traps

SOS Performance Advisor provides the ability to send SNMP (Simple Network Management Protocol) traps to an SNMP event browser, such as OpenView Network Node Manager Alarm Browser. The executable program used to accomplish this, `snmptrap`, comes with the event browser—it is not shipped with the SOS Performance Advisor product.

Installing the Ipstrap File

Before enabling SNMP traps, you must first install the `Ipstrap` file on your host system.

- 1 Save the following file as `/opt/lps/bin/lpstrap` on your host system:

```
#!/bin/ksh -f

MGR_HOST=<host-systemname>

SNMPTRAP_PATH=/opt/OV/bin

$SNMPTRAP_PATH/snmptrap "" .1.3.6.1.4.1.11.2.17.1

$MGR_HOST 6 58916872\""\

.1.3.6.1.4.1.11.2.17.2.1.0 Integer 14 \

.1.3.6.1.4.1.11.2.17.2.5.0 octetstringascii "Major" \

.1.3.6.1.4.1.11.2.17.2.4.0 octetstringascii \

"SOS Performance Advisor: $@"
```

- 2 Change the file permissions as executable:

```
chmod 755 lpstrap
```

Enabling the SNMP Traps

To enable SNMP traps, perform the following steps.

- 1 Modify `MGR_HOST` in `/opt/lps/bin/lpstrap` to reflect the host that will receive the traps (the system running the browser).
- 2 Modify `SNMPTRAP_PATH` in `/opt/lps/bin/lpstrap` to reflect the path for `snmptrap` on the host executing SOS Performance Advisor. By default, `lpstrap` uses `/opt/OV/bin/`.
- 3 Modify the `/etc/opt/lps/cfg/advice` file to enable `lpstrap` by removing the number sign character (#) in the line: `#lpstrap`.
- 4 Modify the `/etc/opt/lps/cfg/advice` file to specify which messages you wish to be sent as SNMP traps by preceding the threshold specification with a greater than sign (>).

For example, the advice message specification block:

```
<CE01>CPU Queue length indicates %s %s CPU bottleneck
CPU-QUEUE-LEN (5-9999)
```

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```
CPU-QUEUE-LEN | 10 an | 5 a | 2 a
```

```
CPU-QUEUE-LEN | 10 EXCESSIVE | 5 HEAVY | 2 moderate
```

will become:

```
<CE01>CPU Queue length indicates %s %s CPU bottleneck
```

```
>CPU-QUEUE-LEN (5-9999)
```

```
CPU-QUEUE-LEN | 10 an | 5 a | 2 a
```

```
CPU-QUEUE-LEN | 10 EXCESSIVE | 5 HEAVY | 2 moderate
```



NOTE Although you can enable traps for all advice messages, this feature was designed to notify personnel of exceptional performance levels. For instance, enabling an SNMP trap for an advice message that is ALWAYS generated could be excessive and is not recommended.

- 5 Start the SOS Performance Advisor executable program (SOS or SOSLOGD) to which you want to send the traps, and enable advice messages within that program.
 - For instructions to enable advice messages in SOS, refer to “Display advice messages” on page 45.
 - For instructions to enable advice messages in SOSLOGD, see “Setting Advanced Configuration Parameters” on page 229.



NOTE If advice messages are enabled in more than one executable program or more than one occurrence of the same program, each program will create SNMP traps. To avoid duplication, enable the advice messages in SOSLOGD only.

SOS holidays File

The /etc/opt/lps/cfg/holidays file contains a list of dates to be ignored by SOSLOGX. By default, the file contains exclusion dates for the following holidays in the years 1996 through 2010:

- New Years Day (January 1)
- Presidents Day (3rd Monday in February)
- Memorial Day (last Monday in May)
- Independence Day (July 4)
- Labor Day (1st Monday in September)
- Veterans' Day (November 11)
- Thanksgiving Day (4th Thursday in November)
- Christmas Day (December 25)

The portion of the /etc/opt/lps/cfg/holidays file that excludes holidays for the year 2000 is provided as an example:

```
! 2000 Holidays
!
01/01/00    New Year's
02/21/00    President's Day
05/29/00    Memorial Day
07/04/00    Independence Day
09/04/00    Labor Day
11/11/00    Veteran's Day
11/23/00    Thanksgiving
12/25/00    Christmas
```

Figure 8.2 *SOS holidays configuration file (example)*

The purpose of the holidays file is to eliminate atypical computer performance data from the statistical analysis done by SOSLOGX. To add, delete, or modify the contents of this file, use the configuration rules listed below.

Configuration Rules

When you know in advance that computer resources used on particular date will not be typical and don't want that day's performance to skew performance statistics, you can exclude that date from SOSLOGX's computations by doing the following:

- 1 Add the date to the /etc/opt/lps/cfg/holidays file.
 - a Use the format MM/DD/YY.
 - b Precede any comment lines with an exclamation character (!).
- 2 Enable Exclusions in SOSLOGX.
- 3 Enable Holiday Exclusions in SOSLOGX.

SOS ppoints File

The /etc/opt/lps/cfg/ppoints file contains the configuration information for the Pulse Points screen. For information about pulse points, see "SOS Pulse Points Summary" on page 161

```
#####
CPU Pulse  ——— $PP_CPU    CPU-BUSY%      "CPU Busy %"      60,85    " "
Points
Indicator   $PP_CPU    CPU-HIGH-PRI-BUSY%  "Hi-Pri CPU %"    60,85    " "
Lines       $PP_CPU    CPU-QUEUE-BUSY%     "Queue Busy %"    75,90    " "
              $PP_CPU    CPU-QUEUE-LEN       "Run-Q Average"    5,10     " "

Memory      ——— $PP_MEMORY  VM-PAGE-OUT-RATE    "Page Out Rate"    15,20    "/sec"
Pulse Points
Indicator   $PP_MEMORY  VM-DEACT-BPS        "Deactivate Byte Rate"  1, 200   "bytes/sec"
Lines       $PP_MEMORY  CPU-VFLT%           "CPU Memory Mgt %"     3, 7     " "
              $PP_MEMORY  BC-RHIT%            "Read Hit %"          90,80    " "

Disk Pulse  ——— $PP_DISC    DISC-AVG-WAIT-TIME  "Average Wait Time"   30,40    "System Wide"
Points
Indicator   $PP_DISC    DISC-QUEUE-LEN      "Average Q-Length"     1, 3     "System Wide"
Lines       $PP_DISC    DISC-UTIL%          "Disk Utilization %"   40,60    "System Wide"
              $PP_DISC    DISC-IO-RATE        "Disk I/O Rate (/sec)" 40,60    "System Wide"

Network     ——— $PP_NET     NETIF-COLLISION%    "Collision %"         15,30    "System Wide"
Pulse Points
Indicator Line
```

Figure 8.3 *SOS ppoints configuration file (example)*

SOS ppoints File Configuration

An example of the Pulse Points screen is shown in Figure 8.4.

```
SOS B.02g jackal FRI, 17 AUG 2001, 11:31 E: 00:29:19 I: 01:01
```

```
                PULSE POINTS
```

Indicator	Green	Yellow	Red	Comments
--- CPU ---				
CPU Busy %	5.3	21.5		
Hi-Pri CPU %	5.3	21.5		
Queue Busy %	0	21.9		
Run-Q Average	0	0.7		
--- Memory ---				
Page Out Rate	0	0		/sec
Deactivate Byte Rate	0	0		bytes/sec
CPU Memory Mgt %	0	2.0		
Read Hit %	99.6	100.0		
--- Disk I/O ---				
Average Wait Time	0.8	6.5		System Wide
Average Q-Length	0	0		System Wide
Disk Utilization %	1.2	3.3		System Wide
Disk I/O Rate (/sec)			136	10203 System Wide
--- Network ---				
Collision %	0	10.29		System Wide

```
Enter command: _
```

Figure 8.4 SOS Pulse Points screen (example)

By default, the pulse point thresholds and messages are configured for you. You can edit the `/etc/opt/lps/cfg/ppoints` file in order to:

- Add, delete, or reorder the pulse point indicators (variables) that appear in each section
- Modify the Green (normal), Yellow (problematic), and Red (unacceptable) threshold values
- Modify the comments associated with each pulse point indicator

Pulse Point Indicator Lines

Example

```
$PP_MEMORY VM-DEACT-BPS "Deactivate Byte Rate" 1, 200 "bytes/sec"
```

Syntax

```
<section><value-spec><label><yellow-threshold, red-threshold><comment>
```

Configuration Rules

Use the following configuration rules when editing the ppoints file.

- 1 Any pulse points variable that you want to display in the Pulse Points screen must be defined in the /etc/opt/lps/cfg/ppoints file.
- 2 The first four specification fields in the pulse points indicator line must be completed. The <comments> field may be omitted.
- 3 Commas, spaces, or tabs must separate the specification fields in the pulse points indicator line to allow for "white space" in the display.
- 4 Each indicator line must begin with the name of the section in which the variable will appear in the Pulse Points screen. The section name in the <section> field must be preceded by "\$PP_". The valid section names are:

- \$PP_CPU (CPU section)
- \$PP_MEMORY (Memory section)
- \$PP_DISC (Disc I/O section)
- \$PP_NET (Network section)
- \$PP_MISC (Miscellaneous section)

- 5 The <value-spec> field is composed of a variable and an (optional) operator in the format:
 <variable>[<operator><variable>]...[<operator><variable>]

Where:

- <variable> is either the SOS variable name being monitored and displayed in the Pulse Points screen, or the SOS variable being used after the operator. A variable name must meet the following qualifications:
 - It must be included in the /opt/lps/lib/itemlist file.
 - It must have block numbers 1, 2, 3, 6, 7, 8, or 9.
 - It must have item types less than 1000.
- <operator> is either the addition (+) or subtraction (-) function applied to the corresponding variable within the indicator line. White space (achieved by inserting a comma, a space, or a tab) must exist on both sides of the operator within the indicator line.

Example

To subtract CPU-USER-BUSY% from CPU-HIGH-PRI-BUSY%, the indicator line would be:

```
$PP_CPU CPU-HIGH-PRI-BUSY% - CPU-USER-BUSY% 60,85 ""
```

- 6 The <label> field is the text that describes the <variable> on the Pulse Points screen. For example, in the indicator line:

```
$PP_MEMORY VM-DEACT-BPS "Deactivate Byte Rate" 1, 200 "bytes/sec"
```

"Deactivate Byte Rate" is the <label> that describes the <variable>, VM-DEACT-BPS.

- 7 The <yellow-threshold, red-threshold> field follows the <label> field in a pulse points indicator line. The values entered for the yellow- and red-thresholds should be in the scale or unit appropriate for the <variable>.

- Green

To display in the Green (normal) column in the Pulse Points screen, the value of the <variable> must be less than the value for the yellow-threshold when the scale is from low to high (the yellow-threshold value is less than the red threshold value). See Example 1 page 77.

When the scale is from high to low (the yellow-threshold value is greater than the red-threshold value), the value of the <variable> must be greater than the value for the yellow threshold. See Example 2 on page 77.

- Yellow

To display in the Yellow (problematic) column in the Pulse Points screen, the value of the <variable> must be equal to or greater than the yellow threshold value and less than the red threshold value when the scale is low to high. See Example 1.

When the scale is from high to low, the <variable> must be equal to or less than the yellow threshold value and greater than the red threshold value. See Example 2.

- Red

To display in the Red (unacceptable) column in the Pulse Points screen, the value of the <variable> must be equal to or greater than the red threshold value when the scale is set from low to high. See Example 1.

When the scale is from high to low, the <variable> must be equal to or less than the red threshold value. See Example 2.

Example 1

```
$PP_CPU    CPU-HIGH-PRI-BUSY%  "Hi-Pri CPU %"          60,85    " "
```

The pulse points for this example indicator line would be interpreted as:

- CPU-HIGH-PRI-BUSY% data values less than 60 will appear in the Green column in the Pulse Points screen.
- CPU-HIGH-PRI-BUSY% data values equal to or greater than 60 and less than 85 will appear in the Yellow column in the Pulse Points screen.
- CPU-HIGH-PRI-BUSY% data values greater than 85 will appear in the Red column in the Pulse Points screen.

Example 2

```
$PP_MEMORY BC-RHIT%           "Read Hit %"          90,80    " "
```

The pulse points for this second example would be interpreted as:

- BC-RHIT% data values greater than 90 will appear in the Green column in the Pulse Points screen.

- BC-RHIT% data values equal to or less than 90 and greater than 80 will appear in the Yellow column in the Pulse Points screen.
- BC-RHIT% data values less than 80 will appear in the Red column in the Pulse Points screen.

8 The <comment> field (optional) can be used to assist in the interpretation of the pulse points indicator. Any comments must be enclosed in quotation characters (" "). For example, in the indicator line:

```
$PP_MEMORY VM-DEACT-BPS "Deactivate Byte Rate" 1,200 "bytes/sec"
```

The comment, "bytes/sec", tells the user the Deactivate Byte Rate is calculated in bytes per second.

SOS soskip File

The /etc/opt/lps/cfg/soskip file contains the configuration information for the KIP (Key Indicators of Performance) line displayed in all SOS screens. For information see "Key Indicators of Performance (KIP) Line" on page 85.

```
# Var_name          row,column,width
CPU-BUSY%           ROW,13,WIDTH
CPU-HIGH-PRI-BUSY%  ROW,31,WIDTH
BC-RHIT%            ROW,49,WIDTH
```

Figure 8.5 SOS soskip configuration file (example)

Configuration Rules

The soskip configuration file requires one text line for each data item displayed in the KIP line.

Example

```
CPU-BUSY%           ROW,13,WIDTH
```

Syntax

```
<variable>          row,column,width
```

Where <variable> is the SOS variable name being monitored and displayed in the KIP line.

All soskip variable items:

- Must be found in /opt/lps/lib/itemlist.
- Must have block numbers: 6,7,8,10,12, or 14.
- Must have item types less than 1000.

Attribute Commands

The following attribute commands can be applied when editing the *soskip* file. The default setting is \$LEFT, \$INVERSE, \$UNDERLINE.

Table 8.1 *SOS soskip attribution commands*

Command	Description
\$TEXT	A required line and \$END is a required line. Blank lines are not ignored between \$TEXT and \$END.
\$BLINK	Makes the KIP line flash.
\$INVERSE	Displays the KIP line in reverse video.
\$UNDERLINE	Underlines the KIP line.
\$HALF	Displays the line in half bright mode.
\$NORMAL	Displays the line in normal text mode (overrides all previous attribute commands).
\$LEFT	Left-justifies text lines.
\$RIGHT	Right-justifies text lines.
\$CENTER	Centers text lines.

SOS GLOBAL SUMMARY

The Global Summary Screen

The SOS Global Summary screen provides a summary of activity system-wide:

- Product version and collection interval information
- Key indicators of performance data
- Global statistics
- CPU utilization statistics
- CPU miscellaneous statistics
- Memory and virtual memory statistics
- Miscellaneous statistics
- Disk statistics
- Process statistics
- Workload statistics
- System performance advice

The Global Summary screen is the first screen to display when you start SOS and the usual starting point for any review of system activity and performance. The screen can be displayed in either graphical or tabular format.

To access the Global Summary screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **g** (Global Summary). The Global Summary screen will display.
- 3 Type **t** from the Global Summary screen to toggle between the graphical and tabular formats.

Graphical Format

Figure 9.1 shows an example of the Global Summary screen in graphical format.

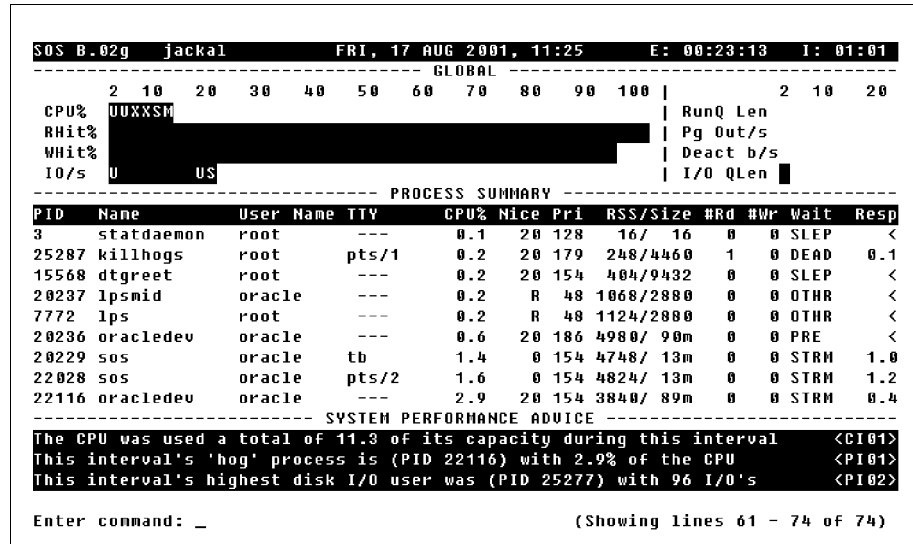


Figure 9.1 SOS Global Summary screen (graphical format)

The graphical Global Summary screen can show the following information:

- The SOS banner
- The Key Indicators of Performance (KIP) line (optional)
- GLOBAL statistics
- PROCESS SUMMARY (optional)
- WORKLOAD SUMMARY (optional)
- SYSTEM PERFORMANCE ADVICE messages (optional)

Each of these components is described in “Global Summary Screen Display Items” on page 84.

Tabular Format

To toggle between the graphical and tabular format options, press the **t** key from the Global Summary screen. Figure 9.2 shows an example of the Global Summary screen in tabular format.

SOS B.02g jackal FRI, 17 AUG 2001, 11:25 E: 00:23:13 I: 01:01									
CPU UTILIZATION					CPU MISC				
TOTAL BUSY: 11.3[26] HIGH PRI: 11.3[26] | Capture Ratio 1.9[1]									
User 4.6[11] Sys 2.3[9] Mem 0.4[3] | RunQ Avg 0.4[0.8]									
Real 0[0] Intr 0.6[1] Idle 88.7[74] | 5/15 Min RunQ Avg 0.4/ 0.8									
Nice 0[0] C SW 0.1[ <] | RunQ Busy % 22.9[26]									
NNice 2.7[2] Trap 0.5[ <] |									
MEM/VM									
Read Hit % 100.0[100] Page Outs 0[0]/s Mem Used % 92.8[92]									
Write Hit % 94.1[91] Deact Byte 0[0]/s VM Used % 42.3[41]									
MISC									
#Sessions: 4 #Procs: 90 #Wait I/O: 0 Transactions: 20.8[35.4]/s									
#Active: 1 #Active: 43 #Deact: 11 Avg Response Time: 0.1									
DISK									
Disk IO/s IO% QLen | Disk IO/s IO% QLen | Disk IO/s IO% QLen									
c0t6d0 16 82 1.8 | c0t5d0 4 18 0 |									
PROCESS SUMMARY									
PID Name User Name TTY CPU% Nice Pri RSS/Size #Rd #Wr Wait Resp									
SYSTEM PERFORMANCE ADVICE									
The CPU was used a total of 11.3 of its capacity during this interval									<CI01>
This interval's 'hog' process is (PID 22116) with 2.9% of the CPU									<PI01>
This interval's highest disk I/O user was (PID 25277) with 96 I/O's									<PI02>
Enter command: _					(Showing lines 70 - 74 of 74)				

Figure 9.2 SOS Global Summary screen (tabular format)

The tabular Global Summary screen can show the following information:

- The SOS banner
- CPU UTILIZATION statistics (including cumulative statistics)
- CPU MISC statistics
- MEM/VM statistics (optional)
- MISC global statistics (optional)
- DISK statistics (optional)
- PROCESS SUMMARY (optional)
- SYSTEM PERFORMANCE ADVICE messages (optional)

Each of these components is described in detail in “Global Summary Screen Display Items” on page 84.

Global Summary Screen Display Items

SOS Banner

The SOS banner is always displayed at the top of all SOS data display screens.



Figure 9.3 *SOS Global Summary screen: SOS banner*

The banner contains information about the SOS program, the host system, the elapsed interval, and the current interval.

Product Version Number (SOS V.nnx)

The first item displayed in the SOS banner (reading left to right) is the product version number (SOS V.nnx). The version number denotes the following about the product:

- **SOS** is the name of the product.
- **V** denotes the major version level.
- **nn** denotes the minor version level.
- **x** denotes the fix level.

The SOS version number displayed in the example (refer to Figure 9.3) is B.01y. When contacting technical support, please provide the product version number of the software installed on your system.

System Name

The second item displayed in the SOS banner is the name of the system given during the installation of the operating system. The name of the system used in the example shown in Figure 9.3 is eagle.

Current Date and Time (DDD, DD MMM YYYY, HH:MM)

The third item in the SOS banner is the current date and time:

- **DDD** denotes the day of the week.
- **DD** denotes the day of the month.
- **MMM** denotes the month.
- **YYYY** denotes the year.
- **HH:MM** denotes the hour and minutes.

Elapsed Time (E: HH:MM:SS)

The fourth item displayed in the SOS banner is the elapsed time (E:HH:MM:SS), which is the time counted in hours, minutes, and seconds that has passed since you started the current session of SOS. This elapsed time measurement is especially valuable when viewing cumulative statistics. For further information, refer to “Display cumulative stats” on page 39.

To reset the elapsed time to zero, type **r** from any SOS display screen.

Current Interval (I: MM:SS)

The last item displayed in the SOS banner is the current interval (I: MM:SS). The current interval is the amount of time in minutes and seconds accumulated since SOS last updated the screen. The measurements reported on any SOS display screen are valid for the current interval.

By default, the interval refresh rate is 60 seconds. You can adjust this rate from the Main Options Menu screen. For further information, refer to “Screen refresh interval in seconds” on page 38.

Assuming the interval refresh rate is 60 seconds, the current interval displayed in the SOS banner should be I: 01:00. However, if at some point during the measurement interval the program has to wait for user input, the interval update will be delayed. For example, when the **f** key is pressed from an SOS display screen to “freeze” the current interval, the next update is delayed until the user enters the command to “unfreeze” the interval.

If the current interval displayed is less than the interval refresh rate, the user pressed the **u** key from an SOS display screen to update the performance data mid-interval.

Current Interval Metrics vs. Cumulative Averages

The statistical values expressed in the format “nnn.n” represent measurements for the current interval (I: MM:SS). The values in brackets, [nnn.n], represent cumulative averages for the elapsed interval (E: HH:MM:SS).

Key Indicators of Performance (KIP) Line

The Key Indicators of Performance (KIP) line can be displayed just below the SOS banner. This option is invoked when the Display Key Indicators of Performance option is enabled from the SOS Main Option Menu screen.



Figure 9.4 SOS Global Summary screen: Key Indicators of Performance (KIP) line

The purpose of the KIP line is to display statistics associated with the primary indicators of system performance. The data displayed in the KIP line is configurable. By default, it shows Total Busy, High Pri, and Read Hit data for the current interval.

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Total Busy

The Total Busy value displayed in the KIP line is the percentage of time the CPU spent executing the following activities instead of being in a pause or idle state:

- Processing user and system process code
- Processing interrupts
- Processing context switches
- Managing main memory
- Managing traps

High Pri

The High Pri value displayed in the KIP line is the percentage of time the CPU spent executing high priority processes during the current interval.

Read Hit

The Read Hit value displayed in the KIP line is the read hit percentage for the current interval.



NOTE By editing the soskip text file located in the /etc/opt/lps/cfg directory, you can redefine the variables to display in the KIP line. For information about editing the soskip file, see "SOS soskip File" on page 78.

GLOBAL

The GLOBAL statistics portion of the Global Summary screen contains a simple bar graph that summarizes activity levels system-wide.

GLOBAL (Left Column)

CPU%

The CPU% bar graph (the left portion of the GLOBAL statistics) shows the percentage of CPU time expended during the current measurement interval on various activities.

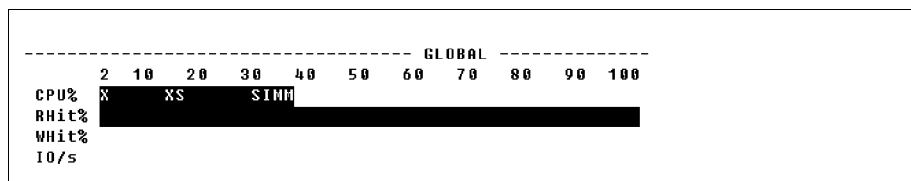


Figure 9.5 SOS Global Summary screen: GLOBAL (left column)

Each letter-width space on the CPU% bar graph represents approximately 2 percent of the CPUs time for the current interval. The code letters correspond to the CPU activities described in Table 9.1. Where a block of spaces on the bar graph is bordered by two instances of one code letter (e.g., S...S), that corresponding activity (e.g., executing system calls and code) would account for the CPU% range bordered by the two letters.

For example, the CPU% bar shown in Figure 9.5 indicates the following:

- 14 percent of CPU time in the current interval was spent executing processes with a negative nice value in user mode.
- 14 percent of CPU time was spent executing system calls and code (in kernel mode).
- 2 percent of CPU time was spent executing system interrupt handling code.
- 4 percent of CPU time was spent managing virtual memory.

The code letters used in the CPU% bar graph are described in Table 9.1.

Table 9.1 *CPU% states or activities*

Code	Statistic	Description
C	Context Switch	The percentage of time managing context switches between processes.
I	Interrupt	The percentage of time executing system interrupt handling code.
M	Memory	The percentage of time managing virtual memory.
N	Nice	The percentage of time executing processes w/a nice value in user mode.
R	Real Time	The percentage of time executing real-time processes in user mode.
S	System	The percentage of CPU time spent executing system calls and code (in kernel mode). This does not include time spent performing context switches or idle time.
T	Trap	The percentage of time managing traps.
U	User Mode	The percentage of CPU time spent executing user program code with a nice value of 20 and without any special priority .
W	Wait	The amount of idle time the CPU spent waiting for a disk I/O to complete.
X	Negative Nice	The percentage of time executing processes with a negative nice value in user mode.

RHit%

The RHit% bar represents the buffer cache read hit percentage.

WHit%

The WHit% bar represents the write hit percentage.

IO/s

The IO/s bar represents the disk I/O rate. This is the number of physical reads and writes per second for each type of physical I/O. Similarly to the CPU% bar (see “CPU%” on page 86), specific code letters in the bar graph tell you how many of each type of physical I/Os were accumulated in the current interval. Each of these code letters are listed and described in Table 9.2.

Table 9.2 *Physical I/Os*

Code	Physical I/O	Description
U	User File System	The number of user file system physical I/Os accumulated in the current interval.
S	System	The number of system physical I/Os accumulated in the current interval.
V	Virtual Memory	The number of virtual memory physical I/Os accumulated in the current interval.
R	Raw	The number of raw physical I/O's accumulated in the current interval.

GLOBAL (Right Column)

The scale for the next four global statistics ranges from 2 to 20. A value greater than 20 is represented by a trailing greater than character (>).

	2 10 20
RunQ Len	
Pg Out/s	
Deact b/s	
I/O QLen	

Figure 9.6 *SOS Global Summary screen: GLOBAL (right column)*

Each data item in the right column of the GLOBAL statistics is described in Table 9.3.

Table 9.3 *SOS Global data items*

Data Items	Description
RunQ Len	The average number of processes in the CPU run queue during the current interval.
Pg Out/s	The number of page outs per second.
Deact b/s	The number of deactivated bytes per second.
I/O QLen	The average number of disk I/O requests pending for all disks during the current interval.

PROCESS SUMMARY

After reviewing the general state of global resources, the next logical step in analyzing a system's performance is to observe individual processes. It is important to find out which users are running which programs and what kinds of resources those programs are consuming. The primary purpose of the PROCESS SUMMARY portion of the Global Summary screen is to help you to identify key resources consumed by various processes on the system.

To examine the CPU usage, disk I/O usage, and wait state information for a process, open the Process Detail screen. For further information, see "SOS Process Detail" on page 165.

PROCESS SUMMARY Display Options

The PROCESS SUMMARY section is included in the Global Summary screen by default when the SOS program is started. However, this information can be suppressed. For instructions, refer to "Display process information" on page 48.

You can configure the PROCESS SUMMARY display in the following ways:

- Display or suppress the extended process line.
- Display either the total and I/O percentages or the read and write counts.
- Display all processes or only the active processes.
- Display or suppress attached processes.
- Display or suppress detached processes.
- Display or suppress system processes.
- Display or suppress processes that have died.
- Apply a process logon filter.
- Apply a process sort option.
- Display sorted processes in either ascending or descending order.
- Set a maximum number of processes to display.

For information about these options, please refer to "Process Display Options" on page 50.

PROCESS SUMMARY Data Items

PROCESS SUMMARY											
PID	Name	User Name	TTY	CPU%	Nice	Pri	RSS/Size	#Rd	#Wr	Wait	Resp
This interval's 'hog' process is (PID 4762) with .7% of the CPU											
This interval's highest disk I/O user was (PID 28) with 7 I/O's											
Buffer cache write hit percent low, increase cache											
FLOCKS too high at 6											
											<PI01>
											<PI02>
											<BE02>
											<GE03>

Figure 9.7 SOS Global Summary screen: PROCESS SUMMARY

The contents of each PROCESS SUMMARY column (shown in Figure 9.7) are described in the next table.

Table 9.4 SOS Process Summary data items

Data Item	Description
PID	The process identification number that uniquely identifies each process running on the system.
Name	The process name.
User Name	The name of the user that owns (or creates) each process running on the system.
TTY	"TTY" is defined in SOS as the special device file of the terminal to which the process is attached. The TTY column will show three dashes (---) for processes that are not attached to a terminal (processes such as daemons and batch jobs).
CPU%	The CPU% column shows the percentage of system-wide CPU time that was used by each process. This is normalized for multiple-processors. In other words, all CPU% values added together should never exceed 100 (percent).
Nic	<p>The Nic (Nice) column displays the nice value associated with each process. This value, ranging from 0 to 39 (the default is 20), is a determining factor when a process's priority is recalculated.</p> <ul style="list-style-type: none"> A process with a larger nice value will receive a higher priority (resulting in a lower-priority status). A process with a smaller nice value will receive a lower priority (resulting in a higher-priority status). <p>A process that slows system response time can be "niced" to lower its priority and allow other processes to be executed more quickly.</p>

SOS GLOBAL SUMMARY
Global Summary Screen Display Items

Data Item	Description
Pri	<p>The Pri column shows the most recent priority that each process was given.</p> <p>As explained earlier, high priority numbers indicate low-priority status, and vice versa. The priority numbers between 0 and 127 indicate high-priority status and are reserved for certain system daemons or real-time processes. The majority of processes are given numbers between 128 and 255, which indicate timeshare-priority status. A typical timeshare process will fluctuate within this priority range, based on the process's CPU demands and the system's load. Processes executing at nice priorities typically have larger numbers (lower priorities).</p> <p>The system scheduler dynamically sets the priority by considering several factors, such as CPU utilization. Because the scheduler tries to allocate CPU time fairly among the processes, it will lower the scheduling priority of process that require a lot of CPU time. This means that as a process's CPU usage grows, its priority number in the Pri column will increase.</p>
RSS/Size	<p>The RSS/Size column presents two data items for each process running on the system. The RSS value represents the resident set size—the amount of RAM used by the process. The Size value represents the size in kilobytes of the core image of the process. This includes text, data, and stack space. In other words, the amount of swap or virtual memory the process has reserved.</p> <p>Performance Tip</p> <p>Large values in the RSS/Size column indicates the corresponding process uses a lot of memory. Processes in this category may need to be checked for memory usage problems.</p>
#Rd	<p>The #Rd column lists the number of physical reads performed by each process during the current interval.</p>
#Wr	<p>The #Wr column shows the number of physical writes performed by each process during the current interval.</p> <p>Performance Tip</p> <p>The #Wr values are important because they can point to processes that are performing excessive disk I/Os. To confirm, check the SYSTEM PERFORMANCE ADVICE portion of the Global Summary screen for a message that reports the high I/O process for the current interval. When high #Rd and #Wr values are evident, determine whether the I/Os are necessary or unnecessary.</p>

Data Item	Description
Wait	<p>The Wait column in the PROCESS SUMMARY portion of the Global Summary screen shows which wait state the corresponding process was in at the end of the current interval. Each wait state is described in the appendix, "Wait State Codes" on page 302.</p> <p>Performance Tip</p> <p>Wait state information is helpful when you want to determine why a process is "stuck." Keep in mind, however, that the wait state of a process can change radically in a manner of seconds. If you suspect a problem, check the information provided for that process in the Process Detail screen.</p>
Resp	The average response time (seconds). A less than character (<), represents a value less than 0.1.

Extended Process Statistics Lines

The PROCESS SUMMARY portion of the Global Summary screen can be expanded to show the percentage of time each process spent in one or more wait states during the current interval. This additional process information is displayed below each corresponding process statistics line in an extended process line.

Wait States		----- PROCESS SUMMARY -----	
Process Line		PID	Name
Extended		{ RN CA DI GR IN IO IP LN MG NF PI PR RP SE SH SL SO ST SY TY UM OT }	CPU
Process Line		{ < 0 }	66
		4727 sos	whitney ta
		{ 1 0 < 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 }	0.4
		4762 sos	root tb
		{ 1 0 < 0 0 0 0 0 0 0 0 0 < 0 0 0 < 0 99 0 0 0 0 }	0.6
			530

Figure 9.8 SOS Global Summary screen: extended process column headings and lines

The extended process lines together with the extended process headings line can be enabled from the Process Display Options submenu of the SOS Main Options Menu or by typing the y key from the Global Summary screen (toggles the extended process lines on and off).

The statistics in the extended process lines correspond with the column headings in the extended process headings line. Each column heading is described in Table 9.5.

Table 9.5 Extended process column headings

Heading	Description
{RN,...,OT}	The percentage of the process' time spent in the corresponding wait state during the current interval. See "Wait State Codes" on page 302 for a description of each state.
CPU (ms)	The total CPU time in milliseconds used by the process during the current interval.

The percentage of time the process spent in a wait state is represented by one of the following:

- A number between 0 and 100 (percent).
- A less than character (<), which represents a value less than 0.1 percent.
- An asterisk character (*), which represents a value greater than 100.0 percent.

For example, the extended process line for PID 3 shown in Figure 9.8 provides the following information:

- Process 3 spent 100 percent of the current interval in the SL wait state, waiting for a sleep or wait call to expire.
- Process 3 consumed 48 ms of the CPU time during the current interval.

Additional information about a process can be viewed in the Process Detail screen, which is discussed in "SOS Process Detail" on page 165.

WORKLOAD SUMMARY

The SOS program is able to track process statistics by application workloads. Workloads was discussed in "Workload Groups" on page 15. Workload statistics can be displayed in the WORKLOAD SUMMARY portion of the Global Summary screen.

WORKLOAD SUMMARY Display Options

To display the WORKLOAD SUMMARY statistics in the Global Summary screen, first enable the Display workload information option from the SOS Main Options Menu screen.

WORKLOAD SUMMARY						
Num	Name	CPU %	User CPU %	Disk I/O %	Resp Time	Trans/min
1	vi_edit	0[<]	0[32.6]	0[<]	0[0.1]	0[<]
2	INTERACT	1.2[25.3]	53.7[76.4]	16.0[54.1]	0.4[25.7]	<[42.0]
3	BATCH	0[0]	0[0]	0[0]	0[0]	0[0]
4	DAEMON	1.1[1.6]	18.9[13.5]	84.0[45.8]	<[<]	630[1950]
5	DEFAULT	0[0]	0[0]	0[0]	0[0]	0[0]

Figure 9.9 SOS Global Summary screen: WORKLOAD SUMMARY

By default, all workloads running on the system are included in this process summary. To show only the active workloads, enter **Y** (Yes) for the Display only active workloads option in the SOS Main Options Menu screen, then set the minimum CPU time required for workload display to a value between 0.1 and 99.9 percent.

WORKLOAD SUMMARY Data Items

The data items presented in the WORKLOAD SUMMARY portion of the Global Summary screen are described in the following table.

Table 9.6 *SOS Workload Summary data items*

Data Item	Description
Num	The workload numbers in ascending order as they appear in the workload definition file.
Name	The name assigned to each workload as it appears in the workload definition file.
CPU%	The percentage of CPU time used by each workload during the current interval and the elapsed interval. (Elapsed interval data is enclosed in brackets []).
User CPU%	The percentage of system-wide I/Os performed by this workload.
Disk I/O%	The percentage of each workload's CPU percentage that was spent on disk I/O during the current and elapsed intervals.
Resp Time	The average response times (seconds) calculated for each workload during the current and elapsed intervals.
Trans/min	The total number of transactions per minute counted for each workload during the current and elapsed intervals.

CPU UTILIZATION

Information presented in the CPU UTILIZATION portion of the tabular Global Summary screen will help you to evaluate your system's CPU performance by showing you how global activities are expending CPU time.

CPU UTILIZATION									
TOTAL BUSY:		2.4	[25]	HIGH PRI:		2.4	[25]		
User	<[<]	Sys	1.0	[5]	Mem	0	[1]		
Real	0	[0]	Intr	0.4	[1]	Idle	97.6	[75]	
Nice	0	[0]	C SW	<[<]					
NNice	1.0	[18]	Trap	0	[1]				

Figure 9.10 *SOS Global Summary screen: CPU UTILIZATION*

The statistical values expressed in the format "nnn.n" represent measurements for the current interval. The values in brackets, [nnn.n], represent cumulative averages for the elapsed interval.

CPU UTILIZATION Data Items

The data items presented in the CPU Utilization portion of the Global Summary screen are described in the next table.

Table 9.7 *SOS CPU Utilization data items*

Data Item	Description
TOTAL BUSY	<p>The percentage of time the CPU was busy (not idle) during the current (nn.n) and elapsed intervals ([nn]). The TOTAL BUSY value is the sum of the values reported for User, Real, Nice, NNice, Sys, Intr, C SW, Trap, and Mem values reported in the same area of the Global Summary screen.</p> <p>Performance Tip</p> <p>When the TOTAL BUSY value is consistently greater than 75 or 80 percent and the majority of this resource is consumed by high-priority interactive user processing, it is possible that the CPU is a bottleneck on your system. It is important to observe this data over time and not base your diagnosis on a brief spike in CPU activity.</p> <p>If the TOTAL BUSY value is excessive due to batch job activity, there is usually ample CPU capacity for interactive users. To confirm your diagnosis, investigate the average length of the CPU queue (see "RunQ Avg" on page 98).</p>
HIGH PRI	The percentage of time the CPU spent executing high priority processes.

Data Item	Description
User	<p>The percentage of time the CPU spent executing user code with a nice value of 20 and without any special priority status.</p> <p>Performance Tip</p> <p>It is usually advantageous to allow the majority of CPU time to be spent processing user code (including real- and nice-level code). To get a feel for the relative impact of productive or nonproductive work, monitor the Capture Ratio value (see "MEM/VM" on page 98).</p>
Real	The percentage of time executing real-time processes in user mode.
Nice	The percentage of time executing processes with a nice value in user mode.
NNice	The percentage of time executing processes with a negative nice mode.
Sys	<p>The Sys value in the CPU UTILIZATION portion of the Global Summary screen represents the percentage of time the CPU spent in system (kernel) mode.</p> <p>Performance Tip</p> <p>All processes spend some time executing system code. A large Sys value may indicate a problem with programs making unnecessary or inefficient system calls. You may want to identify all system processes and sort them by CPU usage to see which process(es) is (are) causing the problem.</p>
Intr	The percentage of time processing interrupts.
C SW	The percentage of time managing context switches.
Trap	The percentage of time processing traps.
Mem	The percentage of time the CPU spent managing virtual memory.

SOS GLOBAL SUMMARY .
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 .
 .

Data Item	Description
Idle	<p>The Idle value represents the percentage of time the CPU was not in use.</p> <p>Performance Tip</p> <p>A consistently high Idle value means your CPU is "on vacation" most of the time. Although it is not desirable to swamp the processor, it should "earn its keep" by performing at or near capacity.</p> <p>If the Idle value is consistently low and the lack of idle time is primarily due to session activity, the system may be overloaded. Either reduce such processing or obtain more CPU horsepower via an upgrade. It is best to observe entire days of idle time values. You may see plenty of idle time at noon, but no idle time between 3:00 and 4:00 P.M. Shifting workloads (batch scheduling, users work hours, etc.) will help bring this type of peak-period utilization down.</p>

CPU MISC

The CPU MISC portion of the tabular Global Summary screen provides statistics to further analyze the condition of your system.

CPU MISC	
Capture Ratio	0.6[2]
RunQ Avg	0[5.1]
5/15 Min RunQ Avg	0/ 1.9
RunQ Busy %	0[31]

Figure 9.11 *SOS Global Summary screen: CPU MISC*

CPU MISC Data Items

The data items presented in the CPU MISC portion of the Global Summary screen are described in Table 9.8.

Table 9.8 *SOS CPU Miscellaneous data items*

Data Item	Description
Capture Ratio	<p>The Capture Ratio value is calculated as:</p> $\text{Capture Ratio} = (\text{User} + \text{Real} + \text{Nice} + \text{NNice}) / (\text{Sys} + \text{Intr} + \text{C SW} + \text{Trap} + \text{Vflt})$ <p>Performance Tip</p> <p>A Capture Ratio value equal to one or greater indicates the system is spending more than half it's time on useful system work. A value of less than one means the system is spending more than half it's time on overhead.</p>
RunQ Avg	<p>The average number of processes present in the CPU run queue during the current interval. The value reported in brackets is the cumulative run queue average for the elapsed interval.</p> <p>The RunQ Avg values reported in the Global Summary screen are similar to the system load average values retrieved by typing the uptime command at the Unix command prompt.</p>
5/15 Min RunQ Avg	The 5/15 Min RunQ Avg values show the load average in the last five minutes and the last 15 minutes, respectively.
RunQ Busy%	The RunQ Busy% value represents the percentage of time that at least one process was waiting for the CPU. A high percentage is not uncommon, but 100 percent is not desirable.

MEM/VM

The MEM/VM statistics reported in the Global Summary screen provide a general overview of memory and virtual memory activities. To view specific memory statistics, refer to the Memory Summary screen. For further information, see "SOS Memory Summary" on page 111

MEM/VM			
Read Hit %	100.0[100]	Page Outs	<[10]/5
Write Hit %	42.1[96]	Deact Byte	0[60]/5
		Mem Used %	41.8[58]
		VM Used %	22.7[36]

Figure 9.12 *Global Summary screen: MEM/VM*

MEM/VM Display Options

To display or suppress the MEM/VM statistics in the Global Summary screen, enable/disable the Display memory information on global screen option from the SOS Main Options Menu screen.

MEM/VM Data Items

The data items presented in the MEM/VM portion of the Global Summary screen are described in Table 9.9.

Table 9.9 *SOS Memory/Virtual Memory data items*

Data Item	Description
Read Hit %	The percentage of disk reads satisfied in the buffer cache.
Write Hit %	The percentage of disk writes satisfied in the buffer cache.
Page Outs	The number of page outs per second.
Deact Bytes	The number of bytes deactivated per second.
Mem Used %	The percentage of RAM currently used.
VM Used %	The percentage of swap space currently used.

MISC

The MISC portion of the tabular Global Summary screen displays several miscellaneous data items such as the number of sessions, the number of processes, the number of I/Os in a wait state, and the average response time. These statistics provide a good overview of the system's general workload.

----- MISC -----					
#Sessions:	3	#Procs:	65	#Wait I/O:	0
#Active:	0	#Active:	16	#Deact:	0
				Transactions:	10.0[33.7]/s
				Avg Response Time:	0.1

Figure 9.13 *SOS Global Summary screen: MISC*

MISC Display Options

To display or suppress the MISC statistics in the Global Summary screen, enable/disable the Display miscellaneous information on global screen option from the SOS Main Options Menu screen.

MISC Data Items

The data items presented in the MISC portion of the Global Summary screen are described in the next table.

Table 9.10 *SOS Miscellaneous data items*

Data Item	Description
#Sessions	The current number of sessions logged on the system.
#Active	The #Active value (displayed below the #Sessions value) represents the current number of active sessions (sessions that used at least 0.0 percent of CPU time).
#Procs	The current number of processes present on the system.
#Active	The #Active value (displayed below the #Procs value) represents the current number of active processes (processes that used at least 0.0 percent CPU).
#Wait I/O	The current number of processes that waited on disk I/O.
#Deact	The current number of deactivated processes.
Transactions	The number of transactions per second that occurred during the current interval. A transaction is defined as a character read or write, or a process death.
Avg Response Time	<p>The Avg Response Time value in the MISC statistics portion of the tabular Global Summary screen represents the average response time for all terminals during the current interval.</p> <p>Response time is a difficult number to obtain from the Unix operating system. It is defined (as calculated by SOS) as the average number of requests in the system (average number of processes) divided by throughput (the transaction rate).</p> <p>Response Time = Number of Requests x Throughput</p>

DISK

The DISK portion of the tabular Global Summary screen presents a few statistics for each configured disk drive on the system (see Figure 9.14). This information can help answer:

- How balanced are the I/Os between disks?
- Is one disk accessed more than others?
- Is the number of disk I/Os exceeding acceptable limits?

DISK											
Disk	IO/s	IO%	QLen	Disk	IO/s	IO%	QLen	Disk	IO/s	IO%	QLen
c0t5d0	1	100	0	c0t2d0	0	0	0	c0t6d0	0	0	0

Figure 9.14 *SOS Global Summary screen: DISK*

DISK Display Options

To display or suppress the DISK statistics in the Global Summary screen, enable/disable the Display disk information on global screen option from the SOS Main Options Menu screen.

DISK Data Items

The data items presented in the DISK portion of the Global Summary screen are described in this section.

Table 9.11 *SOS Disk data items*

Data Item	Description
Disk	The disk drive in the system's configuration.
IO/s	The number of physical disk reads and writes per second that occurred in the current interval.
IO%	The percentage of disk I/Os performed by the disk compared to all other disks on the system.
QLen	<p>The QLen value represents the average length of the disk's queue.</p> <p>Performance Tip</p> <p>An average queue length of 1.0 or greater is not a good sign. While a typical system may experience "rush hour" situations, it is the consistently long queues that are suspect. If the QLen value for a particular drive is consistently high, explore the following possible causes:</p> <ul style="list-style-type: none"> Excessive disk arm movement due to heavily hit files. You might achieve better I/O balance by placing complementary files on separate drives. Database inefficiencies. Implement better database maintenance. Hardware issues. Upgrade slow disk drives.

SYSTEM PERFORMANCE ADVICE

The final portion of the Global Summary screen contains the SYSTEM PERFORMANCE ADVICE messages. These advice messages are designed to provide current performance information in plain-English "one-liners" in order to help system administrators zero-in on potential performance problems.

```

----- SYSTEM PERFORMANCE ADVICE -----
The CPU was used a total of 1.7 of its capacity during this interval      <CI01>
This interval's 'hog' process is (PID 4762) with .9% of the CPU          <PI01>
This interval's highest disk I/O user was (PID 7207) with 17 I/O's       <PI02>
Collision percent indicates a moderate network bottleneck              <LE01>
Buffer cache write hit percent low, increase cache                     <BE02>
FLOCKS too high at 6                                                    <GE03>

```

Figure 9.15 *SOS Global Summary screen: SYSTEM PERFORMANCE ADVICE*

At the end of each advice message is a four-character message identification code (for example, <CI01> or <ME01>). The identification code of any standard advice message can be referenced in "SYSTEM PERFORMANCE ADVICE Message Interpretations" on page 103 to obtain a more detailed explanation of the ascribed event.

Two types of advice messages can be generated: informational and excessive.

- An informational message (denoted by an uppercase I in the message identification code) summarizes a particular aspect of the system's performance during the current interval.
- An excessive message (denoted by an uppercase E) alerts the user to an excessive condition—a situation or problem that could require immediate action.

To get more information about a situation described in an advice message, refer to the GLOBAL or PROCESS SUMMARY portions of the Global Summary screen.

SYSTEM PERFORMANCE ADVICE Display Options

To enable SYSTEM PERFORMANCE ADVICE messages, enter **Y** for the Display advice messages option in the SOS Main Options Menu screen.

By default, the SYSTEM PERFORMANCE ADVICE messages include both informational messages and excessive use messages. To suppress the informational messages, enter **N** for the Display informational advice messages option in the SOS Main Options Menu screen.

SYSTEM PERFORMANCE ADVICE Message Configuration

The SYSTEM PERFORMANCE ADVICE messages are located in the SOS advice configuration file. This file can be edited by the user to add custom advice messages. For example, adding a message to alert personnel when the average system utilization exceeds 90 percent can be accomplished by following the instructions presented in "SOS advice File" on page 67.

SYSTEM PERFORMANCE ADVICE Message Interpretations



RECOMMENDATION The standard SYSTEM PERFORMANCE ADVICE messages that are contained in the SOS advice file (described below) are generic. These messages should be customized for the system using the instructions found in "SOS advice File" on page 67.

<BE01> Buffer cache read hit percent low, increase %s

Advice message BE01 is generated to alert the user when the buffer cache read-hit percentage is equal to or less than 90 percent.

- If the number of virtual memory page outs for the current interval is equal to or greater than 5, the message will advise the user to increase memory.
- If the virtual memory page outs number is greater than 0 and less than 5, the message will advise the user to increase the buffer cache size.

<BE02> Buffer cache read write hit percent low, increase %s

Advice message BE02 is generated to alert the user when the buffer cache write-hit percentage is equal to or less than 65 percent.

- When the number of virtual memory page outs counted in the current interval is equal to or greater than 5, the message will advise the user to increase memory.
- When the virtual memory page outs number is greater than 0 and less than 5, the message will advise the user to increase the buffer cache size.

<CE01> CPU Queue length indicates %s %s CPU bottleneck

Advice message CE01 is generated to alert the user when the CPU queue length for the current interval is equal to or greater than 5 processes.

- A CPU queue length equal to or greater than 5 and less than 10 during the current interval is HEAVY.
- A CPU queue length equal to or greater than 10 is EXCESSIVE.

<CI01> The CPU was used a total of %s of its capacity during this interval

Advice message CI01 is always generated to inform the user of the CPU busy percentage for the current interval.

<DE01> Average disk service time indicates possible disk bottleneck

Advice message DE01 is generated to alert the user when the average disk service time for the current interval is equal to or greater than 30 milliseconds, which can indicate a disk bottleneck.

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<GE01> Global average response time during this interval was %s

Advice message GE01 is generated to alert the user when the global average response time for the current interval is equal to or greater than 10 milliseconds.

- A global average response time in the range of 10-14 ms is moderate.
- A global average response time in the range of 15-19 ms is HEAVY.
- A global average response time equal to or greater than 20 ms is EXCESSIVE.

<LE01> Collision percent indicates %s %s network bottleneck

Advice message LE01 is generated to alert the user when the collision percentage for the current interval is equal to or greater than 5 percent, which indicates a possible network bottleneck.

- A collision percentage in the range of 5-14 percent is moderate.
- A collision percentage in the range of 15-29 percent is HEAVY.
- A collision percentage equal to or greater than 30 percent is EXCESSIVE.

<ME01> Page out rate reveals %s %s memory load

Advice message ME01 is generated to alert the user when the virtual memory page out rate for the current interval is in the range of 10-50 page outs per second.

- A virtual memory page out rate in the range of 10-14 is moderate.
- A virtual memory page out rate in the range of 15-19 is HEAVY.
- A virtual memory page out rate equal to or greater than 20 is EXCESSIVE.

<ME02> CPU consumption due to memory mgt overhead during this interval was %s

Advice message ME02 is generated to alert the user when the page fault percentage for the current interval is equal to or greater than 10 percent.

- A page fault percentage of 3-4 percent is moderate.
- A page fault percentage of 5-6 is HEAVY.
- A page fault percentage equal to or greater than 7 is EXCESSIVE.

<PI01> This interval's 'hog' process is %s with %s%% of the CPU

Advice message PI01 is always generated to inform the user of the current interval's largest CPU consumer. The message provides the process PID number and the process's CPU busy percentage.

<PI02> This interval's highest disk I/O user was %s with %s I/Os

Advice message PI02 is generated to inform the user of the current interval's largest disk I/O user. The message provides the disk PID number and the disk I/O percentage.

SOS CPU SUMMARY

The CPU Summary Screen

The CPU Summary screen reports the general state of one or more CPUs in graphical and tabular formats.

To access the CPU Summary screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **c** (CPU Summary). The CPU Summary screen will display.
- 3 Type **t** to toggle between the graphical and tabular displays.

Examples of the CPU Summary screen are provided in “Graphical Format” on page 106 (next page) and “Tabular Format” on page 107.

CPU Summary Display Items

Graphical Format

The graphical CPU Summary screen contains a horizontal bar graph of the CPU utilization statistics for each CPU on the system. Figure 10.1 shows an example of the screen.

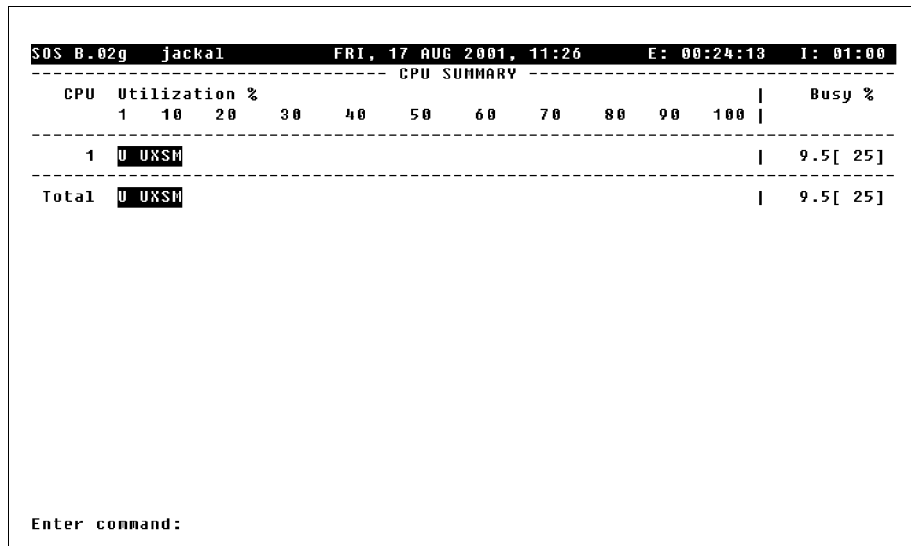


Figure 10.1 SOS CPU Summary screen (graphical format)

CPU SUMMARY

Each CPU SUMMARY data item is described in the next table.

Table 10.1 SOS CPU SUMMARY (graphical format) data items

Data Item	Description
CPU	The CPU column contains the sequential identification numbers assigned to the individual CPUs by SOS. If the system uses four processors, the graphical CPU summary would include four lines in the bar graph, and these lines would be numbered 1 through 4 in the CPU column.

Data Item	Description
Utilization%	<p>The Utilization% values provided in the CPU SUMMARY bar graph represent the percentage of CPU time expended during the current measurement interval on various activities.</p> <p>The CPU Utilization% data in the CPU Summary screen is reported exactly like the CPU% data in the Global Summary screen. For a description of each possible CPU activity, refer to "CPU%" on page 90.</p>
Busy%	<p>The Busy% value shown on the right portion of the CPU SUMMARY represents the total percentage of time the CPU was busy (not idle) during the current (nnn.n) and elapsed ([nnn]) intervals (if applicable).</p>
Total	<p>The Total value represents the average utilization percentage of all CPUs during the current interval.</p>

Tabular Format

The tabular CPU Summary screen contains CPU utilization information organized into four categories:

- Total CPU utilization statistics (CPU SUMMARY).
- CPU Run queue statistics (RUNQ STATISTICS).
- Miscellaneous CPU statistics (MISC STATISTICS).
- CPU utilization statistics for each CPU on the system (PER CPU UTILIZATION).

Figure 10.2 shows an example of the CPU Summary screen in tabular format.

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```

SOS B.02g    jackal          FRI, 17 AUG 2001, 11:26    E: 00:24:13    I: 01:00
----- CPU SUMMARY -----
                                TOTAL HIGH PRI
USER  REAL  NICE  NNICE  SYS  INTR  C SW  TRAP  MEM  IDLE  BUSY  BUSY
  4.4    0    0    2.0  2.2   0.6   0.1   <   0.2  90.5   9.5   9.5
----- RUNQ STATISTICS -----
Interval Avg: 0.2[0.8]  1/5/15 Min Avg: 0.3/ 0.4/ 0.8  Occ %: 17.0[ 25]
----- MISC STATISTICS -----
Forks:    0.3[ 2]/s                                C Sws:    43.2[ 95]/s
Intrs:    333.0[ 348]/s                          Traps:    25.4[ 275]/s
                                           Sys C:    425.1[1343]/s
----- PER CPU UTILIZATION -----
                                1/5/15 Min    Last
TOTAL CPU  BUSY  USER  REAL  NICE  NNICE  SYS  INTR  OHD  IDLE  RunQ  Avg  PID
  1    9.5  4.4    0    0    2.0  2.2   0.6   0.3  90.5   0.3/ 0.4/ 0.8  20236
    [ 25] [10] [ 0] [ 0] [ 2] [ 9] [ 1] [ 2] [75]

Enter command: _

```

Figure 10.2 SOS CPU Summary screen (tabular format)**CPU SUMMARY**

The CPU SUMMARY portion of the tabular CPU Summary screen displays the average percentage of CPU time expended on various activities during the current interval. Cumulative averages for the elapsed interval can also be displayed. For instructions, refer to “Display cumulative stats” on page 39. For a description of each data item, please refer to “CPU Terms” on page 297 in the Glossary of Terms.

Table 10.2 SOS CPU Utilization data items

Data Item	Description
User	The percentage of time the CPU spent executing user code with a nice value of 20 and without any special priority status.
Real	The percentage of time executing real-time processes in user mode.
Nice	The percentage of time executing processes with a nice value in user mode.
NNice	The percentage of time executing processes with a negative nice mode.
Sys	The percentage of time the CPU spent in system (kernel) mode.

Data Item	Description
Intr	The percentage of time processing interrupts.
C SW	The percentage of time managing context switches.
Trap	The percentage of time processing traps.
Mem	The percentage of time the CPU spent managing virtual memory.
Idle	The percentage of time the CPU was not in use.
TOTAL BUSY	The percentage of time the CPU was busy (not idle) during the current (nn.n) and elapsed intervals ([nn]). The TOTAL BUSY value is the sum of the values reported for User, Real, Nice, NNice, Sys, Intr, C SW, Trap, and Mem values.
HIGH PRI	The percentage of time the CPU spent executing high priority processes.

RUNQ STATISTICS

The RUNQ STATISTICS portion of the tabular CPU Summary screen contains the CPU run queue statistics for the current interval (and the elapsed interval if cumulative statistics are shown). Each data item is described in the following table.

Table 10.3 *SOS RUNQ STATISTICS data items*

Data Item	Description
Internal Avg	The average number of processes in the run queue.
1/5/15 Min Avg	The average number of processes in the run queue during the current 1-, 5-, and 15-minute periods, respectively.
Occ %	The percentage of time there was one or more processes in the run queue.

MISC STATISTICS

The MISC STATISTICS portion of the tabular CPU Summary screen provides some miscellaneous CPU statistics for the current and /or elapsed interval(s). Each data item is described in the next table.

Table 10.4 *SOS MISC STATISTICS data items*

Data Item	Description
Forks	The number of forks per second.

Data Item	Description
C Sws	The number of context switches per second.
Intrs	The number of interrupts per second.
Traps	The number of traps per second.
Sys C	The number of system calls per second.

PER CPU UTILIZATION

The PER CPU UTILIZATION portion of the tabular CPU Summary screen displays the same data listed in the CPU SUMMARY portion of the screen for each CPU on the system. Please refer to "CPU SUMMARY" on page 108 for a description of each data item.

SOS MEMORY SUMMARY

The Memory Summary Screen

The Memory Summary screen provides a detailed look at memory and virtual memory performance.

SOS B.02g		jackal		FRI, 17 AUG 2001, 11:26				E: 00:24:13		I: 01:00	
----- MEM/VM ALLOCATION -----										PROC MEM STATUS -----	
	Size	User	Sys	Buffer	Free	|	Run	Sleep	Total		
Mem	256m	94m	19m	121m	19m	|	Loaded	0	75	75	
VM	730m	306m	---		423m	|	Deact			11	
----- PAGING -----											
	In(/s)	Out(/s)		In(byte/s)	Out(byte/s)		#In		#Out		
Pg Flts	19.3[1k]						1k[320k]				
Pages	<[<]	0[0]		136[4294n]	0[0]		2[230]		0[0]		
(De)act	0[<]	0[<]		0[0]	0[0]		0[116]		0[116]		
VM I/O	<[<]	0[0]		136[4294n]	0[0]		2[230]		0[0]		
Forks	0.3[2]			4294m[4294n]			16[3430]				
----- PAGE SCANNER -----											
Page Recs	6.6[98]/s						Page Scans	0[0]/s			
----- SYSV BUFFER CACHE -----											
Read Cache Hit %	100.0[100]					Write Cache Hit %	46.3[91]				
headers	21410	size	121m	DBC min size	13104k	DBC max size	128m				
----- MEMORY MANAGEMENT CONFIG -----											
lotsfree:	13m		desfree: 3532k				minfree:		880k		
umen:	13m						page size:		4096		

Enter command:											

Figure 11.1 SOS Memory Summary screen

To access the Memory Summary screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **m** (Memory Summary). Figure 11.1 shows an example of the screen.

Memory Summary Screen Display Items

MEM/VM ALLOCATION

The MEM/VM ALLOCATION portion of the Memory Summary screen shows how RAM and virtual memory are allocated on the system. The data items are described in the following table.

Table 11.1 *SOS MEM/VM ALLOCATION data items*

Data Item		Description
Mem	Size	Megabytes of RAM on the system.
	User	Megabytes of RAM used by user processes.
	Sys	Megabytes of RAM used by the operating system.
	Buffer	Megabytes of RAM used by the buffer cache.
	Free	Megabytes of unused RAM.
VM	Size	Megabytes of virtual memory (swap space) configured on the system.
	User	Megabytes of virtual memory used by user processes.
	Sys	Not applicable.
	Buffer	Not applicable.
	Free	Megabytes of unused virtual memory.

PROC MEM STATUS

The PROC MEM STATUS portion of the Memory Summary screen shows where processes are currently located from a memory viewpoint. Each data item is described in the next table.

Table 11.2 *SOS PROC MEM STATUS data items*

Data Item		Description
Loaded	Run	Number of processes in memory that are able to run.
	Sleep	Number of processes in memory that are sleeping.
	Total	Total number of processes in memory.

SOS MEMORY SUMMARY .
Memory Summary Screen Display Items .
 .
 .

Data Item		Description
Deact	Run	Not applicable, since deactivated processes are not run by definition.
	Sleep	
	Total	Total number of deactivated processes.

PAGING

The PAGING portion of the Memory Summary screen displays detailed statistics on paging activity for the interval. Each data item is described in the following table.

Table 11.3 *SOS PAGING data items*

Data item		Description
Pg Flts	In (/s)	The number of page faults per second (see “page fault” on page 300).
	Out (/s)	A count of page faults.
Pages	In (/s)	The number of page ins per second (see “page in” on page 300).
	Out (/s)	The number of page outs per second (see “page out” on page 300).
	In (byte/s)	The rate of page ins in bytes per second.
	Out (byte/s)	The rate of page outs in bytes per second.
	#In	The number of page ins.
	#Out	The number of page outs.

Data item		Description
(De)act	In (/s)	The number of page ins per second that correspond with an activation (see "activation" on page 298 of the Glossary).
	Out (/s)	The number of page outs per second that correspond with a deactivation (see "deactivation" on page 299 of the Glossary).
	In (byte/s)	The rate of activations in bytes per second.
	Out (byte/s)	The rate of deactivations in bytes per second.
	#In	The number of activations.
	#Out	The number of deactivations.
VM I/O	In (/s)	The number of virtual memory reads per second.
	Out (/s)	The number of virtual memory writes per second.
	In (byte/s)	The rate of virtual memory reads in bytes per second.
	Out (byte/s)	The rate of virtual memory writes in bytes per second.
	#In	The number of virtual memory reads.
	#Out	The number of virtual memory writes.
Forks	In (/s)	The number of forks per second.
	Out (/s)	Not applicable.
	In (byte/s)	The pages paged in as a result of a fork, in bytes per second.
	Out (byte/s)	Not applicable.
	#In	The number of forks.
	#Out	Not applicable.

PAGE SCANNER

The PAGE SCANNER portion of the Memory Summary screen displays data the page scanning process for the interval. Each data item is described in Table 11.4.

Table 11.4 *SOS PAGE SCANNER data items*

Data Item	Description
Page Recs	The Page Recs value represents the number of pages reclaimed per second.
Page Scans	The Page Scans value represents the number of pages scanned by the page scanner per second.

SYSV BUFFER CACHE

The SYSV BUFFER CACHE portion of the Memory Summary screen displays the values of key buffer cache variables. Each data item is described in the following table.

Table 11.5 *SOS SYSV BUFFER CACHE data items*

Data Item	Description
Read Cache Hit %	The percentage of read requests satisfied in buffer cache.
Write Cache Hit %	The percentage of writes not written, because of write delays, to total writes attempted. Write delays are used to decrease the number of disk writes necessary and to organize outstanding writes in a more efficient order.
headers	The number of buffer cache headers. If a dynamic buffer cache is configured, this number will change over time.
size	The current size of buffer cache. If a dynamic buffer cache is configured, this number will change over time.
DBC min size	Minimum size of the Dynamic Buffer Cache. If DBC is not configured, "N/A" will be displayed.
DBC max size	Maximum size of the Dynamic Buffer Cache. If DBC is not configured, "N/A" will be displayed.

MEMORY MANAGEMENT CONFIG

The MEMORY MANAGEMENT CONFIG portion of the Memory Summary screen displays the values of key memory management variables. Each data item is described in the following table.

Table 11.6 *SOS MEMORY MANAGEMENT CONFIG data items*

Data Item	Description
lotsfree	The upper bound for paging. Once paging has started, it will continue until free memory (refer to “MEM/VM ALLOCATION” on page 112) is larger than lotsfree.
desfree	The lower bound for paging. When free memory drops below desfree, paging begins.
minfree	The threshold at which the system considers itself to be out of memory. At this point, the system will start swapping processes.
umem	Unlockable memory.
page size	Size of pages, in bytes.

SOS Disk I/O SUMMARY

The Disk I/O Summary Screen

The Disk I/O Summary screen provides a summary of performance data for all disks on the system. This screen is available in graphical and tabular formats.

To access the Disk I/O Summary screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **d** (Disk I/O Summary). The Disk I/O Summary screen will display.
- 3 Type **t** to toggle between the graphical and tabular displays.

Examples of the Disk I/O Summary screen are provided in “Graphical Format” on page 118 (next page) and “Disk I/O Summary Screen Display Items” on page 118.

Disk I/O Summary Screen Display Items

Graphical Format

Figure 12.1 shows an example of the Disk I/O Summary screen in graphical format.

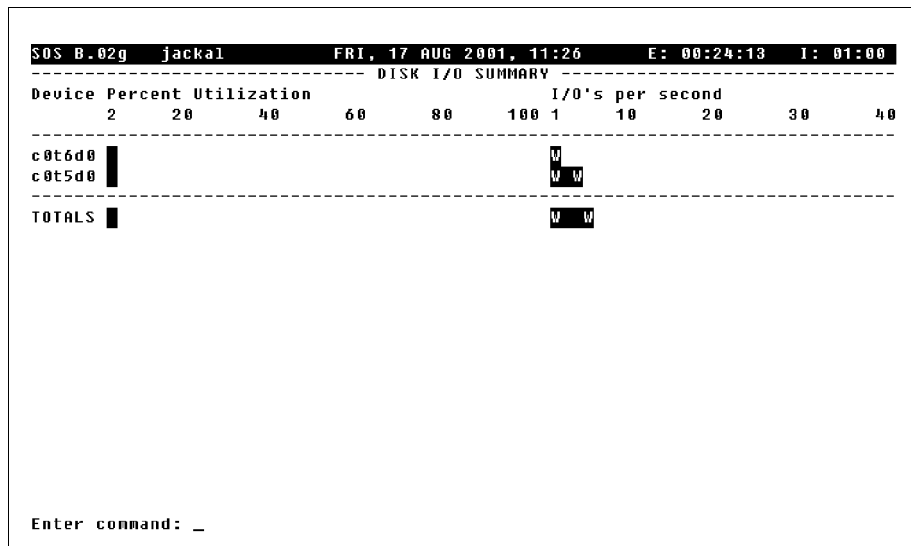


Figure 12.1 *SOS Disk I/O Summary screen (graphical format)*

DISK I/O SUMMARY (graphical format)

The DISK I/O SUMMARY data items are described in the following table.

Table 12.1 *SOS DISK I/O SUMMARY data items*

Data Item	Description
Device	The identification number of the device file that corresponds to the disk.
Percent Utilization	The percentage of time the device was in use during the interval.

SOS DISK I/O SUMMARY .
Disk I/O Summary Screen Display Items .
 .
 .

Data Item	Description
I/Os per second	The number of physical disk I/Os on the disk per second. Similarly to the IO/s bar graph in the Global Summary screen, specific code letters in the bar graph tell you how many of each type of physical I/Os were accumulated in the current interval. The code letters are defined in "IO/s" on page 88.
TOTALS	The TOTALS line shows the total utilization and disk I/Os per second for all disks.

Tabular Format

Figure 12.2 shows an example of the **Disk I/O Summary** screen in tabular format.

SOS B.02g jackal FRI, 17 AUG 2001, 11:27 E: 00:25:15 I: 01:01									
----- DISK I/O SUMMARY -----									
Dev	I/O%	Qlen	Util%	Wait Time(ms)	Service Time(ms)	Rates (/s)		Avg Size(kb)	
						Read	Write	Read	Write
c0t6d0	31	0	0.7	7.0	10.0	0	0.7	0	5
c0t5d0	69	0	1.7	<	10.6	0	1.6	0	8
TOTALS	100	0	1.2	2.2	10.4	0	2.3	0	7

Enter command:									

Figure 12.2 SOS Disk I/O Summary screen (tabular format)

DISK I/O SUMMARY (tabular format)

The data items in the DISK I/O SUMMARY portion of the Disk I/O Summary screen are described in the following table.

Table 12.2 *SOS DISK I/O SUMMARY data items*

Data Item	Description
Dev	The device identification number for each disk on the system.
I/O%	The percentage of all disk I/Os on the system performed by each disk during the interval.
Qlen	The average number of disk requests waiting to be serviced by each disk.
Util%	The percentage of time each disk was in use during the interval.
Wait Time (ms)	The average number of milliseconds an I/O request had to wait in the disk queue before being serviced for each disk.
Service Time (ms)	The average number of milliseconds an I/O request takes to be serviced once it is removed from the disk queue and processed.
Read Rate (/s)	The number of physical reads from the disk per second.
Write Rate (/s)	The number of physical writes from the disk per second.
Avg Size (kb) Read	The average size of the physical reads from the disk.
Avg Size (kb) Write	The average size of the physical writes from the disk.
TOTALS	The totals for each column in the tabular DISK I/O SUMMARY.

SOS DISK CONTROLLER I/O SUMMARY

The Disk Controller I/O Summary Screen

The Disk Controller I/O Summary screen displays a tabular summary of I/O activity for each disk controller on the system.

SOS B.02g		jackal		FRI, 17 AUG 2001, 11:27				E: 00:25:15		I: 01:01	
DISK CONTROLLER I/O SUMMARY											
Dev	I/O%	Phy Rt (/s)		User Rt (/s)		Sys Rt (/s)		UH Rt (/s)		Raw Rt (/s)	
		Read	Write	Read	Write	Read	Write	Read	Write	Read	Write
c0	100	0	2.3	0	1.5	0	0.7	0	0	0	0
TOTAL	100	0	2.3	0	1.5	0	0.7	0	0	0	0

Enter command:

Figure 13.1 SOS Disk Controller I/O Summary screen

To access the Disk Controller I/O Summary screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **r** (Disk Controller I/O Summary). The Disk Controller I/O Summary screen will display (refer to Figure 13.1).

Disk Controller I/O Summary Screen Display Items

DISK CONTROLLER I/O SUMMARY

The data items in the Disk I/O Summary screen are described in the following table.

Table 13.1 *SOS DISK CONTROLLER I/O SUMMARY data items*

Data Item		Description
Dev	N/A	The device identification number for the disk controller.
I/O%	N/A	The percentage of all disk I/Os on the system performed by each disk controller.
Phy rt (/s)	Read	The number of physical reads/writes per second performed by each disk controller during the interval.
	Write	
User Rt (/s)	Read	User reads/writes per second (see "user I/O" on page 301).
	Write	
Sys Rt (/s)	Read	System reads/writes per second (see "system I/O" on page 301).
	Write	
VM Rt (/s)	Read	Virtual memory reads/writes per second (see "virtual memory I/O" on page 301).
	Write	
Raw Rt (/s)	Read	Raw memory reads/writes per second (see "raw I/O" on page 301).
	Write	
TOTALS	N/A	The TOTALS line sums up the activities of all disk controllers for the interval.

SOS VOLUME SUMMARY

The Volume Summary Screen

The Volume Summary screen displays information for each logical volume and volume group.

S0S B.02g jackal		FRI, 17 AUG 2001, 11:27		E: 00:25:15 I: 01:01	
----- VOLUME GROUP SUMMARY -----					
Vol Group/Log Vol	Log Rd (/s)	Log Wr (/s)	Phy Rd (/s)	Phy Wr (/s)	

/dev/ug00	1.7 [57.6]	0 [28.9]	0 [0.1]	0.7 [8.5]	
/dev/ug00/group	0 [0]	0 [0]	0 [0]	0 [0]	
/dev/ug00/lvol1	0 [0]	0 [0]	0 [0]	0 [0]	
/dev/ug00/lvol2	0 [0]	0 [0]	0 [0]	0 [0]	
/dev/ug00/lvol3	0.6 [2.3]	0 [0.1]	0 [0]	0.1 [0.1]	
/dev/ug00/lvol5	0 [0.3]	0 [28.8]	0 [<]	0 [5.4]	
/dev/ug00/lvol6	0.1 [<]	0 [<]	0 [0]	< [<]	
/dev/ug00/lvol7	0 [53.8]	0 [0]	0 [0.1]	0.1 [0.1]	
/dev/ug00/lvol8	0 [0]	0 [0]	0 [0]	0 [<]	
/dev/ug00/lvol9	1.0 [1.2]	0 [0]	0 [0]	0.1 [2.6]	
/dev/ug00/lvol10	0 [0]	0 [<]	0 [0]	0.4 [0.3]	
/dev/ora	0.8 [18.3]	1.5 [2.8]	0 [0.1]	1.6 [3.1]	
/dev/ora/group	0 [0]	0 [0]	0 [0]	0 [0]	
/dev/ora/ora1	0.8 [18.3]	1.5 [2.8]	0 [<]	1.6 [3.1]	
/dev/ora/swap	0 [0]	0 [0]	0 [0.1]	0 [0]	
Enter command:					

Figure 14.1 SOS Volume Summary screen

To access the Volume Summary screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **v** (Volume Summary). The Volume Summary screen will display (refer to Figure 14.1).

Volume Summary Screen Display Items

VOLUME GROUP SUMMARY

The data items in the Volume Summary screen are described in the next table.

Table 14.1 *SOS VOLUME GROUP SUMMARY data items*

Data Item	Description
Vol Group/Log Vol	The volume group directory or logical volume special device file corresponding to the volume.
Log Rd (/s)	The number of logical reads per second (see “logical I/O” on page 301).
Log Wr (/s)	The number of logical writes per second.
Phy Rd (/s)	The number of physical reads per second (see “physical I/O” on page 301).
Phy Wr (/s)	The number of physical writes per second.

SOS GLOBAL I/O DETAIL

The Global I/O Detail Screen

The Global I/O Detail screen displays information about local and remote I/Os from a system-wide perspective.

SOS B.02g jackal FRI, 17 AUG 2001, 11:28 E: 00:25:15 I: 01:01							
GLOBAL I/O DETAIL							
		Reads		Writes		Rate (/s)	
						Read	Write
						Avg Size (kb)	
						Read	Write
Local	Logical	304	182	5.0	3.0	2	7
		[229k]	[95850]	[151]	[63]	[<k]	[1]
	Physical	0	138	0	2.3	0	7
		[271]	[17488]	[0.2]	[11]	[9]	[6]
	User FS	0	93	0	1.5	0	7
		[41]	[13751]	[0]	[9.1]	[7]	[6]
	Sys FS	0	45	0	0.7	0	5
		[0]	[3737]	[0]	[2.5]	[0]	[7]
	Virt Mem	0	0	0	0	0	0
		[230]	[0]	[0.2]	[0]	[10]	[0]
Remote	Logical	0	0	0	0	0	0
		[3463]	[10]	[2.3]	[0]	[6]	[<k]
	Physical	0	0	0	0	0	0
		[13025]	[68]	[8.6]	[0]	[<k]	[<]
Enter command:							

Figure 15.1 SOS Global I/O Detail screen

To access the Global I/O Detail screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **i** (Global I/O Detail). The Global I/O Detail screen will display (refer to Figure 15.1).

Global I/O Detail Screen Display Items

GLOBAL I/O SUMMARY

The data items in the Global I/O Detail screen are described in the following table.

Table 15.1 *SOS GLOBAL I/O SUMMARY data items*

Data Item			Description
Local	Logical	Reads	Total number of logical disk reads on the system (see "logical I/O" on page 301).
		Writes	Total number of logical disk writes.
		Read/s	Logical reads per second.
		Write/s	Logical writes per second.
		Avg Read Size	Average size of logical reads in kilobytes (kb).
		Avg Write Size	Average size of logical writes (kb).
Local	Physical	Reads	Total number of physical disk reads on the system (see "physical I/O" on page 301).
		Writes	Total number of physical writes on the system.
		Read/s	Physical reads per second.
		Write/s	Physical writes per second.
		Avg Read Size	Average size of physical reads (kb).
		Avg Write Size	Average size of physical writes (kb).

SOS GLOBAL I/O DETAIL ·
Global I/O Detail Screen Display Items ·
 ·
 ·

Data Item			Description
Local	User FS	Reads	Total number of user reads on the system (see “user I/O” on page 301).
		Writes	Total number of user writes on the system.
		Read/s	User reads per second.
		Write/s	User writes per second.
		Avg Read Size	Average size of user reads (kb).
		Avg Write Size	Average size of user writes (kb).
Local	Sys FS	Reads	Total number of system reads on the system (see “system I/O” on page 301).
		Writes	Total number of system writes on the system.
		Read/s	System reads per second.
		Write/s	System writes per second.
		Avg Read Size	Average size of system reads (kb).
		Avg Write Size	Average size of system writes (kb).
Local	Virt Mem	Reads	Total number of virtual memory reads on the system (see “virtual memory I/O” on page 301).
		Writes	Total number of virtual memory writes on the system.
		Read/s	Virtual memory reads per second.
		Write/s	Virtual memory writes per second.
		Avg Read Size	Average size of virtual memory reads (kb).
		Avg Write Size	Average size of virtual memory writes (kb).

Data Item			Description
Local	Raw	Reads	Total number of raw memory reads on the system (see "raw I/O" on page 301).
		Writes	Total number of raw memory writes on the system.
		Read/s	Raw memory reads per second.
		Write/s	Raw memory writes per second.
		Avg Read Size	Average size of raw memory reads (kb).
		Avg Write Size	Average size of raw memory writes (kb).
Remote	Logical	Reads	All NFS I/Os satisfied in a local buffer.
		Writes	
		Read/s	
		Write/s	
		Avg Read Size	
		Avg Write Size	
Remote	Physical	Reads	All NFS I/Os that cannot be serviced locally
		Writes	
		Read/s	
		Write/s	
		Avg Read Size	
		Avg Write Size	

SOS FILE SYSTEM I/O SUMMARY

The File System I/O Summary Screen

The File System I/O Summary screen displays a tabular summary of I/O activity for each file system

SOS B.02g jackal FRI, 17 AUG 2001, 11:28 E: 00:26:15 I: 01:00				
FILE SYSTEM I/O SUMMARY				
File System	Log Rd (/s)	Log Wr (/s)	Phy Rd (/s)	Phy Wr (/s)
/	0.6 [2.2]	0 [0.1]	0 [0]	< [0.1]
/stand	0 [0]	0 [0]	0 [0]	0 [0]
/var	1.0 [1.2]	0 [0]	0 [0]	0.1 [2.5]
/var/tmp	0 [0]	0 [<]	0 [0]	0.4 [0.3]
/usr	0 [51.7]	0 [0]	0 [0.1]	0 [0.1]
/usr/local	0 [0]	0 [0]	0 [0]	0 [<]
/tmp	0 [<]	0 [<]	0 [0]	< [<]
/ora	0.9 [17.7]	1.4 [2.7]	0 [<]	1.4 [3.0]
/opt	0 [0.3]	0 [27.7]	0 [<]	0 [5.2]

Enter command:

Figure 16.1 SOS File System I/O Summary screen

To access the File System I/O Summary screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **f** (File System I/O Summary). The File System I/O Summary screen will display. Figure 16.1 shows an example of the screen.

File System I/O Summary Screen Display Items

FILE SYSTEM I/O SUMMARY

The data items presented in the File System I/O Summary screen are described in the following table.

Table 16.1 *SOS FILE SYSTEM I/O SUMMARY data items*

Data Item	Description
File System	The mount points from the file system.
Log Rd (/s)	The number of logical reads from the file system per second (see "logical I/O" on page 301).
Log Wr (/s)	The number of logical writes to the file system per second.
Physical Read/s	The number of physical reads from the file system per second (see "physical I/O" on page 301).
Physical Write/s	The number of physical writes from the file system per second.

SOS FILE SYSTEM SPACE SUMMARY

The File System Space Summary Screen

The File System Space Summary screen displays file system space information for each file system.

```

SOS B.02g jackal FRI, 17 AUG 2001, 11:28 E: 00:26:15 I: 01:00
----- FILE SYSTEM SPACE SUMMARY -----

```

File System	Block Frag Size/Size	Size	Free	Free(su)	Used%	Total Inodes	Free Inodes
/	8192/1024	99669	14219	24186	76	16128	8542
/stand	8192/1024	83733	26194	34568	59	13440	13402
/var	8192/1024	384173	87275	125693	67	181696	169574
/var/tmp	8192/1024	31829	20702	23885	25	5376	5262
/usr	8192/1024	498645	68748	118613	76	79872	58652
/usr/local	8192/1024	31829	27298	30481	4	5376	5323
/tmp	8192/1024	145877	120267	134855	8	69632	69572
/ora	8192/1024	3236m	1142m	1466m	55	544000	528680
/opt	8192/1024	600571	98329	158387	74	95680	90276

```

Enter command: _

```

Figure 17.1 SOS File System Space Summary screen

To access the File System Space Summary screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **s** (File System Space Summary). The File System Space Summary screen will display. Figure 17.1 shows an example of the screen.

File System Space Summary Screen Display Items

FILE SYSTEM SPACE SUMMARY

The data items in the File System Space Summary screen are described in the following table.

Table 17.1 *SOS FILE SYSTEM SPACE SUMMARY data items*

Data Item	Description
File System	The mount point.
Block Size	The file system block size in bytes.
Frag Size	The file system fragment size in bytes.
Size	The overall size of each file system in kilobytes (kb).
Free	The number of file space kilobytes available to non-super users.
Free (su)	The number of file space kilobytes available to super users.
Used%	The percentage of the file system currently being used, based on the Free (su) value.
Total Inodes	The total number of inodes on the file system.
Free Inodes	The number of free inodes on the file system.

SOS NETWORK SUMMARY

The Network Summary Screen

The Network Summary screen displays network performance information.

SOS B.02g jackal		SAT, 18 AUG 2001, 11:38				E: 00:00:05		I: 00:05	
----- NETWORK SUMMARY -----									
Protocol	Packets	In/s	Packets	Out/s	Errors	In%	Errors	Out%	
IP	0.8[	1]	0[	0]	0[	0]	0[	0]	
TCP/IP	23.0[	23]	23.0[	23]	0[	0]	0[	0]	
ICMP	0[	0]	0[	0]	0[	0]	0[	0]	
UDP	61.2[	61]	61.2[	61]	0[	0]	N/A[	N/A]	
----- NETWORK INTERFACES -----									
Interface	Packets	In/s	Packets	Out/s	Collision%	Error	In%	Error	Out%
lan0	1.6[	2]	0[	0]	0[	0]	0[	0]	0[
lo0	0[	0]	0[	0]	0[	0]	0[	0]	0[

TOTALS	1.6[	2]	0[	0]	0[	0]	0[	0]	0[

Enter command:									

Figure 18.1 SOS Network Summary screen

To access the Network Summary screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **I** (Network Summary). The Network Summary screen will display. Figure 18.1 shows an example of the screen.

Network Summary Screen Display Items

NETWORK SUMMARY

The NETWORK SUMMARY portion of the screen displays the network traffic information from the perspective of each protocol. Each data item is described in the next table.

Table 18.1 *SOS NETWORK SUMMARY data items*

Data Item	Description
Protocol	The network protocols used for communication between systems.
Packets In/s	The number of packets received per second (the value in brackets is cumulative).
Packets Out/s	The number of packets sent per second.
Errors In%	The percentage of packets read during the interval that resulted in error.
Errors Out%	The percentage of packets written during the interval that resulted in error.

NETWORK INTERFACES

The NETWORK INTERFACES portion of the Network Summary screen displays performance information on a per-network-interface basis. Each data item is described in Table 18.2.

Table 18.2 *SOS NETWORK INTERFACES data items*

Data Item	Description
Interf	The name of the network interface.
Packets In/s	The number of packets received per second for the specific interface (the value in brackets is cumulative).
Packets Out/s	The number of packets sent per second for the specific interface.
Collision%	The number of output packets sent that resulted in a collision (see "collision" on page 301).
Error In%	The percentage of packets read during the interval that resulted in error.
Error Out%	The percentage of packets written during the interval that resulted in error.
TOTALS	Data values from a system-wide perspective.

SOS NFS SUMMARY

The NFS Summary Screen

The NFS Summary screen displays information about the network file system (NFS). A system can be a server (a system that provides its local disks to other systems), a client (a system that uses non-local disks), or both.

SOS B.02g jackal FRI, 17 AUG 2001, 11:28 E: 00:26:15 I: 01:00							
----- NFS SUMMARY -----							
	Server			Client			
System	Read(/s)	Write(/s)	SvcTm	Read(/s)	Write(/s)	SvcTm	NetwkTm
lynx.lund.com	0	0	0	0	0	0	0
spot.lund.com	0	0	0	0	0	0	0
jackal.lund.com	0	0	0	0	0	0	0
Enter command:							

Figure 19.1 SOS NFS Summary screen

To access the NFS Summary screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **n** (NFS Summary). The NFS Summary screen will display.

Additional Command Keys for the NFS Summary Screen

In addition to the command keys listed in the Main Commands screen, the following commands keys can be used to modify the display of the NFS Summary screen:

- The x command key can be used to toggle between NFS call rates and NFS call percentages. The section headings indicate which data is shown.
- The c command key can be used to toggle between NFS client data and NFS server data. The screen title indicates which data is displayed.

NFS Summary Screen Display Items

NFS SUMMARY

Table 19.1 *SOS NFS SUMMARY data items*

Data Item		Description
System		The name of the client or server.
Server	Read (/s)	The number of read calls per second from NFS clients to this system acting as a server.
	Write (/s)	The number of write calls per second from NFS clients to this system acting as a server.
	SvcTm	The number of milliseconds required to service a NFS request as a server during the current interval.
Client	Read (/s)	The number of read calls per second made from this system to NFS servers.
	Write (/s)	The number of write calls per second made from this system to NFS servers.
	SvcTm	The number of milliseconds required to service a NFS request as a client during current interval (this could also be thought of as NFS response time).
	NetwkTm	The number of milliseconds required to service a NFS request, not including local processing time (this is "Client SvcTime" less any local overhead). This number is more of a reflection of network and remote server overhead.

SOS SWAP SUMMARY

The Swap Summary Screen

The Swap Summary screen displays information on system swap space utilization. Swap space is used for paging and deactivating. (As of HP-UX 10.0, swapping has been replaced with process deactivating, however, the space used for paging/deactivating is still called "swap space" for historical reasons.)

SOS B.02g jackal		FRI, 17 AUG 2001, 11:29		E: 00:27:17		I: 01:01	
-----SWAP SUMMARY-----							
Total: 730m		Used: 211m	Reserved: 300m		Available: 430m		
-----PER SWAP UTILIZATION-----							
Dev/Mount		Type	Pri	Size(mb)	Used(mb)	Alloc(mb)	Free(mb)

/dev/vg00/lvol2		DEV	1	256	0	N/A	256
/dev/ora/swap		DEV	0	284	78	N/A	206
PSEUDO		MEM		190	133	N/A	57

Enter command:							

Figure 20.1 SOS Swap Summary screen

To access the Swap Summary screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **w** (Swap Summary). The Swap Summary screen will display. Figure 20.1 shows an example of the screen.

Swap Summary Screen Display Items

SWAP SUMMARY

The SWAP SUMMARY portion of the Swap Summary screen provides information from a system-wide perspective.

Table 20.1 *SOS SWAP SUMMARY data items*

Data Item	Description
Total	The total swap space configured for the system (megabytes).
Used	The total amount of swap space used by all processes (megabytes).
Reserved	The total amount of swap space reserved by all processes (megabytes). When a process is created, it reserves enough space for itself to be completely paged-out in the swap space.
Available	The amount of swap space remaining that is not reserved (megabytes).

PER SWAP UTILIZATION

The PER SWAP UTILIZATION portion of the Swap Summary screen provides information for each swap device and file system.

Table 20.2 *SOS PER SWAP UTILIZATION data items*

Data Item	Description
Dev/Mount	The device file or mount point for swap device or file system swap, respectively. If it is a memory swap, "PSEUDO" will be displayed.
Type	The type of swap: <ul style="list-style-type: none"> • DEV = device swap • MEM = memory swap • FS = file system swap
Pri	The priority of the swap device/file system.
Size (mb)	The amount of swap space configured for the device/file system.
Used (mb)	The amount of swap space used in the device/file system.

SOS SWAP SUMMARY

Swap Summary Screen Display Items

Data Item	Description
Alloc (mb)	The amount of file system swap space allocated. This value is not applicable to device or memory swap.
Free (mb)	The amount of swap space currently not used. This value differs from the Available data. The Free value is the amount not actually used. The Available value is the amount not reserved.

SOS USER SUMMARY

The User Summary Screen

The User Summary screen displays information about resource usage by user.

SOS B.02g jackal FRI, 17 AUG 2001, 11:29 E: 00:27:17 I: 01:01									
USER SUMMARY									
User Name	UID	CPU%	Phys I/O	Term I/O	Procs	Sess	RSS(kb)	USS(kb)	
oracle	102	2.2	10	0	19	3	136m	376m	
root	0	0.0	10	0	62	3	8688	57792	
lp	9	<	0	0	1	0	44	144	
daemon	1	0	0	0	1	0	16	248	
chriss	222	0	0	0	1	1	740	872	

Enter command: _

Figure 21.1 SOS User Summary screen

To access the User Summary screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **u** (User Summary). The User Summary screen will display. An example of the screen is shown in Figure 21.1.

User Summary Screen Display Items

The data displayed in the User Summary screen is provided for each user on the system.

USER SUMMARY

Each data item presented in the USER SUMMARY is described in the following table.

Table 21.1 *SOS USER SUMMARY data items*

Data Item	Description
User Name	The name of the user.
UID	The Unix user identification number associated with the user.
CPU%	The total percentage of the CPU resources consumed by the user.
Phys I/O	The total number of physical I/Os by the user.
Term I/O	The total number of terminal I/Os by the user.
Procs	The number of processes owned by the user.
Sess	The number of sessions opened by the user.
RSS (kb)	The amount of RAM consumed by the user (this data may underestimate memory usage, because shared pages are not counted).
VSS (kb)	The amount of virtual memory consumed by the user.

SOS TERMINAL SUMMARY

The Terminal Summary Screen

The Terminal Summary screen displays information about resource usage for each terminal on the system.

SOS B.02g jackal FRI, 17 AUG 2001, 11:30 E: 00:27:17 I: 01:01									
----- TERMINAL SUMMARY -----									
Terminal	User Name	Login Time	Idle Time	Processes	In/s	TTY	Out/s		
tb	oracle	240:33:50	0:00:00	3[0]	0[0]		0[0]	0[0]	
pts/2	oracle	0:48:40	44:36:02	1[0]	0[0]		0[0]	0[0]	
pts/1	oracle	240:33:50	44:36:45	2[0]	0[0]		0[0]	0[0]	
pts/0	chrisr	240:33:50	44:36:49	4[0]	0[0]		0[0]	0[0]	
Enter command:									

Figure 22.1 SOS Terminal Summary screen

To access the Terminal Summary screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **t** (Terminal Summary). The Terminal Summary screen will display. An example of the screen is shown in Figure 22.1.

Terminal Summary Screen Display Items

The data displayed in the Terminal Summary screen is provided for each active terminal on the system.

TERMINAL SUMMARY

Each data item presented in the TERMINAL SUMMARY is described in the following table.

Table 22.1 *SOS TERMINAL SUMMARY data items*

Data Item	Description
Terminal	The controlling terminal device file associated with the terminal.
User Name	The name of the user that is logged in at the terminal.
Login Time	The amount of time (hh:mm) passed since the oldest process on the terminal was started. The Login Time value for a process that was already running when SOS was started will equal the elapsed time (E: hh:mm) displayed in the SOS banner (the time elapsed since SOS was started).
Idle Time	The amount of time passed since the terminal has had a character read or write.
Processes	The number of processes attached to the terminal.
TTY In	The number of characters read from the terminal per second.
TTY Out	The number of characters written to the terminal per second.

SOS SYSTEM TABLE SUMMARY

The System Table Summary Screen

The System Table Summary screen reports configuration and utilization information of system tables and caches. The screen is available in graphical and tabular formats.

To access the System Table Summary screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **b** (System Table Summary). The System Table Summary screen will display.
- 3 Type **t** to toggle between the graphical and tabular formats.

Examples of the Disk I/O Summary screen are provided in “Graphical Format” on page 146 and “Tabular Format” on page 148.

System Table Summary Screen Display Items

Graphical Format

An example of the System Table Summary in graphical format is shown in Figure 23.1.

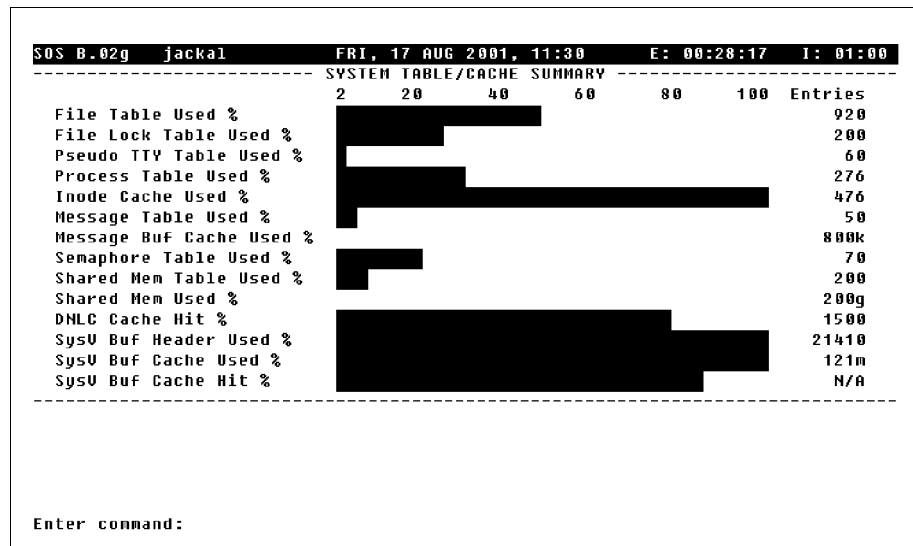


Figure 23.1 SOS System Table Summary screen (graphical format)

SYSTEM TABLE/CACHE SUMMARY

Table 23.1 SOS SYSTEM TABLE/CACHE SUMMARY data items.

Data Item	Description
File Table Used%	The percentage of entries in the file table used.
File Table Entries	The number of entries configured for the file table.
File Lock Table Used%	The percentage of entries in the flock table used.
File Lock Table Entries	The number of entries configured for the flock table.
Pseudo TTY Table Used%	The percentage of entries in the pty table used.
Pseudo TTY Table Entries	The number of entries configured for the pty table.
Process Table Used%	The percentage of entries in the process table used.

SOS SYSTEM TABLE SUMMARY
System Table Summary Screen Display Items

Data Item	Description
Process Table Entries	The number of entries configured for the process table.
Inode Cache Used%	The percentage of entries in the inode cache used.
Inode Cache Entries	The number of entries configured for the inode cache.
Message Table Used%	The percentage of entries in the message queue table used.
Message Table Entries	The number of entries configured for the message queue table.
Message Buf Cache Used%	The percentage of entries in the message buffer cache used.
Message Buf Cache Entries	The size of the message buffer cache.
Semaphore Table Used%	The percentage of SysV semaphore identifiers used.
Semaphore Table Entries	The number of SysV semaphore identifiers configured.
Shared Mem Table Used%	The percentage of shared memory identifiers used.
Shared Mem Table Entries	The number of shared memory identifiers configured.
Shared Mem Used%	The percentage of shared memory pool used.
Shared Mem Entries	The size of shared memory pool, which may exceed the size of virtual memory.
DNLC Cache Hit%	The percentage of file name lookups that are satisfied in the DNLC (dynamic name lookup cache).
DNLC Cache Entries	The number of names configured in for the table.
SysV Buf Header Used%	The percentage of buffer headers used.
SysV Buf Header Entries	The number of buffer headers configured.
SysV Buf Cache Used%	The percentage of buffer cache used.
SysV Buf Cache Entries	The number of buffer cache entries configured.
SysV Buf Cache Hit%	The percentage of page faults satisfied in the buffer cache.

Tabular Format

An example of the System Table Summary in tabular format is shown in Figure 23.2.

SOS B.02g jackal FRI, 17 AUG 2001, 11:30 E: 00:28:17 I: 01:00										
----- MISC TABLE/CACHE SUMMARY -----										
				Entries	Used	Used %		High		
File Table				920	443	48.2		475		
File Lock Table				200	50	25.0		50		
Pseudo TTY Table				60	2	3.3		2		
Process Table				276	84	30.4		90		
Inode Cache				476	475	99.8		476		
----- IPC TABLE/CACHE SUMMARY -----										
	Size			Entries	Used	Used %		High		
Message Table	N/A			50	2	4.0		2		
Message Buffer Cache	800k			N/A	0	0		0		
Semaphore Table	N/A			70	14	20.0		14		
Shared Memory Table	N/A			200	13	6.5		13		
Shared Memory	200g			N/A	241	0		241		
----- DNLC CACHE SUMMARY -----										
Entries				Hit %				Lookups/s		
1500				78.0				8.5		
----- SYSV BUFFER CACHE SUMMARY -----										
HEADER TABLE				Min	Max	DATA CACHE				
Entries	Used	Used %	|	Size	Size	Size	Used	Used %	High	Hit %
21410	21410	100.0	|	13104k	128m	121m	121m	100.0	121m	83.8

Enter command:										

Figure 23.2 SOS System Table Summary screen (tabular format)

MISC TABLE/CACHE SUMMARY

This section provides information about miscellaneous caches and tables.

Table 23.2 SOS MISC TABLE/CACHE SUMMARY data items

Data Item		Description
File Table	Entries	The configured number of entries for the file table.
	Used	The number of file table entries used.
	Used %	The percentage of file table entries used.
	High	The highest number of file table entries used since SOS was started.

SOS SYSTEM TABLE SUMMARY ·
System Table Summary Screen Display Items ·
 ·
 ·

Data Item		Description
File Lock Table	Entries	The configured number of entries for the flock table.
	Used	The number of file locks used.
	Used %	The percentage of file locks used.
	High	The highest number of file locks used since SOS was started.
Pseudo TTY Table	Entries	The configured number of entries for the pty table.
	Used	The number of pty entries used.
	Used %	The percentage of pty entries used.
	High	The highest number of pty entries used since SOS was started.
Process Table	Entries	The configured number of entries for the process table.
	Used	The number of process table entries used.
	Used %	The percentage of process table entries used.
	High	The highest number of process table entries used since SOS was started.
Inode Cache	Entries	The configured number of entries for the inode cache.
	Used	The number of inode entries used.
	Used %	The percentage of inode entries used.
	High	The highest number of inode entries used since SOS was started.

IPC TABLE/CACHE SUMMARY

Table 23.3 *SOS IPC TABLE/CACHE SUMMARY data items*

Data Item	Statistics	Description
Message Table	Size	Not applicable.
	Entries	The number of message queue entries configured.
	Used	The number of message queues used.
	Used %	The percentage of message queues used.
	High	The highest number of message queues used.
Message Buffer Cache	Size	The configured size (bytes) of the message buffer cache.
	Entries	Not applicable.
	Used	The amount of message buffer cache used.
	Used %	The percentage of message buffer cache used.
	High	The highest amount of message buffer cache used.
Semaphore Table	Size	Not applicable.
	Entries	The number of SysV semaphore identifiers configured.
	Used	The number of SysV semaphore identifiers used.
	Used %	The percentage of SysV semaphore identifiers used.
	High	The highest number of SysV semaphore identifiers used.

SOS SYSTEM TABLE SUMMARY .
System Table Summary Screen Display Items .
 .
 .

Data Item	Statistics	Description
Shared Memory Table	Size	Not applicable.
	Entries	The number of shared memory identifiers configured.
	Used	The number of shared memory identifiers used.
	Used %	The percentage of shared memory identifiers used.
	High	The highest number of shared memory identifiers used.
Shared Memory	Size	The configured size of shared memory pool, which can exceed the size of virtual memory.
	Entries	Not applicable.
	Used	The amount of shared memory pool used.
	Used %	The percentage of shared memory pool used.
	High	The highest amount of shared memory pool used.

DNLC CACHE SUMMARY

The DNLC CACHE SUMMARY portion of the System Table Summary screen displays information about the DNLC (dynamic name lookup cache).

Table 23.4 *SOS DNLC CACHE SUMMARY data items*

Data Item	Description
Entries	The configured number of entries for DNLC.
Hit %	The percentage of file name lookups found in DNLC, avoiding expensive lookup.
Lookups/s	The number of file name lookups per second.

SYSV BUFFER CACHE SUMMARY

The SYSV BUFFER CACHE SUMMARY portion of the System Table Summary screen displays information about the SysV buffer cache.

Table 23.5 *SOS SYSV BUFFER CACHE SUMMARY data items*

Data Item		Description
HEADER TABLE	Entries	The number of buffer headers configured. If a DBC is configured, this number will change over time. For a definition of buffer headers, see "buffer cache headers" on page 299.
	Used	The number of buffer headers used.
	Used %	The percentage of buffer headers used.
DATA CACHE	Min Size	The minimum size allowed for the dynamic buffer cache. If a fixed size buffer cache is configured, "N/A" will be displayed.
	Max Size	The maximum size allowed for the dynamic buffer cache. If a fixed size buffer cache is configured, "N/A" will be displayed.
	Size	The current size of the buffer cache.
	Used	The kilobytes of buffer cache used.
	Used %	The percentage of the buffer cache used.
	High	The largest amount of buffer cache used.
	Hit %	The percentage of reads/writes satisfied by the buffer cache.

SOS SYSTEM CONFIGURATION SUMMARY

The System Configuration Screen

The System Configuration screen displays various configurable kernel parameters. Figure 24.1 shows an example of the screen.

```

SOS B.02g jackal FRI, 17 AUG 2001, 11:30 E: 00:28:17 I: 01:00
----- SYSTEM CONFIGURATION -----
system name: jackal os version: B.11.00 cpu type: 9000/777
serial num: 2004763790 boot time: 07:39 28 JUN 2001 run level: 3
----- MEMORY MANAGEMENT CONFIG -----
lotsfree: 3534 desfree: 883 minfree: 220
umen: 3534 page size: 4096
----- FS CONFIGURATION -----
fs_async: 0 nfile: 920 ninod: 476
----- SWAP CONFIGURATION -----
nswapdev: 10 nswapfs: 10
----- SYSV BUFFER CACHE CONFIGURATION -----
nbuf: 21410 bufpages: 31230 dbc min: 3276 dbc max: 32768
----- PROCESS CONFIGURATION -----
timeslice: 10 maxfiles: 60 maxtsiz: 16384
maxuprc: 75 maxfiles_lim: 1024 maxdsiz: 16384
nproc: 276 maxssiz: 2048
----- IPC CONFIGURATION -----
MESSAGES msgmap: 42 | SEMAPHORES semunx: 32767 | SHARED MEM
msgmax: 8192 msgmni: 50 | semmap: 72 semaen: 16384 | shmmax: 1g
msgmnb: 16384 msgseg: 2048 | semmni: 70 semmnu: 30 | shmmni: 200
msgssz: 8 msgtql: 40 | semms: 600 semune: 10 | shmseg: 120
Enter command: _

```

Figure 24.1 SOS System Configuration screen

To access the System Configuration screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **y** (System Configuration). The System Configuration screen will display.

System Configuration Screen Display Items

SYSTEM CONFIGURATION

The SYSTEM CONFIGURATION portion of the System Configuration screen displays system configuration parameters.

Table 24.1 *SOS SYSTEM CONFIGURAITON data items*

Data Item	Description
system name	The specific name of the system assigned during the system installation.
serial num	The serial number of the system.
os version	The version of the operating system.
cpu type	The type of CPU hardware and model.
boot time	The time of the last system reboot.
run level	The Unix state of operation. For information about run levels, please refer to the "inittab" Unix man page.

MEMORY MANAGEMENT CONFIG

The MEMORY MANAGEMENT CONFIG portion of the System Configuration screen displays memory management parameters.

Table 24.2 *SOS MEMORY MANAGEMENT data items*

Data Item	Description
lotsfree	The upper bound for paging (see "lotsfree" on page 299).
desfree	The lower bound for paging (see "desfree" on page 299).
minfree	The threshold value at which the system considers itself to be out of memory (see "minfree" on page 299).
umem	The amount of unlockable memory configured (see "unlockable memory" on page 300).
page size	The page size data item represents the size of the pages (bytes).

FS CONFIGURATION

The FS CONFIGURATION portion of the System Configuration screen displays information about the file system configuration.

Table 24.3 *SOS FS CONFIGURATION data items*

Data Item	Description
fs_async	Defines whether inodes are written asynchronously when critical fields are modified (i.e., file size). The default is 0 - inodes are written synchronously. Writing inodes asynchronously can improve performance, but can cause data integrity in the case of a system crash. It's advised to leave synchronous writes on.
nfile	The configured number of entries in the file table.
ninod	The configured number of entries in the inode cache.

SWAP CONFIGURATION

The SWAP CONFIGURATION portion of the System Configuration screen displays information about the swap configuration.

Table 24.4 *SOS SWAP CONFIGURATION data items*

Data Item	Description
nswapdev	The maximum number of swap devices allowed.
nswapfs	The maximum number of swap file systems allowed.

SYSV BUFFER CACHE CONFIGURATION

The SYSV BUFFER CACHE CONFIGURATION portion of the System Configuration screen displays information about the SYSV buffer cache parameters.

Table 24.5 *SOS SYSV BUFFER CACHE CONFIGURATION data items*

Data Item	Description
nbuf	The configured number of buffer cache headers on the system. If the DBC is configured, this number will change over time.
bufpages	The number of pages configured in the buffer cache. If the DBC is configured, this number will change over time.

Data Item	Description
dbc min	The minimum size in pages of the DBC. If a fixed size buffer cache is used, "N/A" will be displayed.
dbc max	The maximum size in pages of the DBC. If a fixed size buffer cache is used, "N/A" will be displayed.

PROCESS CONFIGURATION

The PROCESS CONFIGURATION portion of the System Configuration screen displays information about the process configuration parameters.

Table 24.6 *SOS PROCESS CONFIGURATION data items*

Data Item	Description
timeslice	The timeslice scheduling interval in units of clock ticks (10 milliseconds). <ul style="list-style-type: none"> If the value is 0, the system default is used (100 ticks). If the value is -1, round-robin scheduling is disabled. See "timeslice" on page 302.
maxfiles	The soft limit on the maximum number of files a process may have open. A process may override the soft limit.
maxtsiz	The maximum size of the text segment of a process in pages.
maxuprc	The maximum number of processes allowed for a single user.
maxfiles_lim	The hard limit on the maximum number of files a process may have open. Only a process owned by root can only override the hard limit.
maxdsiz	The maximum size of the data segment of a process in pages.
nproc	The configured number of entries in the process table. This defines how many processes may run on the system at one given time.
maxssiz	The maximum size of the stack segment of a process in pages.

IPC CONFIGURATION

The IPC CONFIGURATION portion of the System Configuration screen displays information about the SYSV IPC (interprocess communication) configuration parameters.

Table 24.7 *SOS IPC CONFIGURATION data items*

Data Item		Description
MESSAGES	msgmax	The maximum size (bytes) of a single message.
	msgmnb	The maximum number of bytes on the message queue at one time.
	msgssz	The size (bytes) of each message segment. The message buffer cache size is calculated: Message Buffer Cache Size (bytes) = msgseg * msgssz
	msgmap	The configured number of message map entries.
	msgmni	The configured number of message queue identifiers.
	msgseg	The number of segments allocated in the message buffer cache.
	msgtql	The configured number of message headers. A message header is used for each message queued in the system.
SEMAPHORES	semmap	The configured number of SYSV semaphore map entries.
	semmni	The configured number of SYSV semaphore identifiers. A semaphore identifier may refer to multiple semaphores.
	semmns	The configured number of SYSV semaphores available.
	semvmx	The maximum value that a SYSV semaphore is allowed to reach.
	semaem	The maximum value by which a SYSV semaphore can be undone.
	semmnu	The configured number of "undo's" on system.
	semume	The maximum number of "undo's" entries per process.

Data Item		Description
SHARED MEM	shmmax	The maximum shared memory segment size (bytes).
	shmmni	The configured number of shared memory identifiers.
	shmseg	The maximum number of shared memory segments that can be attached to a process.

SOS DEVICE CONFIGURATION SUMMARY

The Device Configuration Screen

The Device Configuration screen displays a listing of hardware and pseudo devices that are configured on the system. Figure 25.1 shows an example of the screen.

```
SOS B.02g    jackal          FRI, 17 AUG 2001, 11:31    E: 00:29:19    I: 01:01
```

```
----- DEVICE CONFIGURATION -----
```

Driver	Class	I	HW Path	HW Type	SW State
root	bc	0		BUS_NEXUS	CLAIMED
bus_converter	bc	1	8	BUS_NEXUS	CLAIMED
c720	ext_bus	0	8/12	INTERFACE	CLAIMED
tgt	target	0	8/12.5	DEVICE	CLAIMED
sdisk	disk	2	8/12.5.0	DEVICE	CLAIMED
tgt	target	1	8/12.6	DEVICE	CLAIMED
sdisk	disk	0	8/12.6.0	DEVICE	CLAIMED
tgt	target	2	8/12.7	DEVICE	CLAIMED
sctl	ctl	0	8/12.7.0	DEVICE	CLAIMED
core_adapter	ba	0	8/16	BUS_NEXUS	CLAIMED
CentIf	ext_bus	2	8/16/0	INTERFACE	CLAIMED
audio	audio	0	8/16/1	INTERFACE	CLAIMED
asio0	tty	0	8/16/4	INTERFACE	CLAIMED
c720	ext_bus	1	8/16/5	INTERFACE	CLAIMED
tgt	target	3	8/16/5.1	DEVICE	CLAIMED
stape	tape	0	8/16/5.1	DEVICE	CLAIMED
tgt	target	4	8/16/5.7	DEVICE	CLAIMED
sctl	ctl	1	8/16/5.7	DEVICE	CLAIMED
lan2	lan	0	8/16/6	INTERFACE	CLAIMED

```
Enter command: _
```

```
(Showing lines 1 - 19 of 53)
```

Figure 25.1 SOS Device Configuration screen

To access the Device Configuration screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **h** (Device Configuration). The Device Configuration screen will display.

Device Configuration Screen Display Items

The data items reported in the Device Configuration Summary are described in Table 25.1.

Table 25.1 *SOS DEVICE CONFIGURATION data items*

Data Item	Description
Driver	The kernel driver name.
Class	The device category defined in /usr/conf/master.d.
I	The Instance number associated with the device. The instance is a unique number assigned to a device within a class. Pseudo devices do not have instances.
HW Path	The address of the hardware components leading to the device address, listed sequentially from the bus address to the device address.
HW Type	The identification for the device's hardware component: <ul style="list-style-type: none"> UNKNOWN - Unrecognizable hardware PROCESSOR - processor MEMORY - memory BUS_NEXUS - bus converter or bus adapter INTERFACE - interface card DEVICE - device NO HARDWARE - Not a hardware component
SW State	The state of the software driver controlling the hardware component: <ul style="list-style-type: none"> CLAIMED - Software bound successfully UNCLAIMED - No associated software found DIFF_HW - Hardware found does not match software NO_HW - Hardware is not responding ERROR - Hardware is in an error state SCAN - Node locked, try again later OK - No errors reported

SOS PULSE POINTS SUMMARY

The Pulse Points Screen

The Pulse Points screen displays the current performance levels of key performance indicators. The performance level of each indicator is categorized as acceptable (Green), questionable (Yellow), or unacceptable (Red), based on criteria set in the ppoints configuration file.

SOS B.02g jackal FRI, 17 AUG 2001, 11:31 E: 00:29:19 I: 01:01				
PULSE POINTS				
Indicator	Green	Yellow	Red	Comments
--- CPU ---				
CPU Busy %	5.3[21.5]			
Hi-Pri CPU %	5.3[21.5]			
Queue Busy %	0[21.9]			
Run-Q Average	0[0.7]			
--- Memory ---				
Page Out Rate	0[0]			/sec
Deactivate Byte Rate	0[0]			bytes/sec
CPU Memory Mgt %	0[2.0]			
Read Hit %	99.6[100.0]			
--- Disk I/O ---				
Average Wait Time	0.8[6.5]			System Wide
Average Q-Length	0[0]			System Wide
Disk Utilization %	1.2[3.3]			System Wide
Disk I/O Rate (/sec)			136[10203]	System Wide
--- Network ---				
Collision %	0[10.29]			System Wide
Enter command: _				

Figure 26.1 SOS Pulse Points screen

To access the Pulse Points screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **p** (Pulse Points). The Pulse Points screen will display. An example of the screen is shown in Figure 26.1.

Pulse Points Screen Display Items

Data items displayed in the Pulse Points screen are described elsewhere in this manual and in the online help, therefore, the pulse point indicators are not documented in this chapter. If the meaning of a pulse point indicator is unclear, please refer to the documentation for the indicator's corresponding SOS screen. For example, for information about the CPU Busy % indicator, refer to "SOS CPU Summary" on page 105.

The pulse points indicators are configurable. For configuration guidelines, refer to "SOS ppoints File" on page 74.

Pulse Points Screen Column Headings

Each of the column headings for the Pulse Points screen is described in the next table.

Table 26.1 *SOS Pulse Points screen column headings*

Heading	Description
Indicator	The Indicator column in the Pulse Points screen displays the name associated with each pulse point data item.
Green	All pulse point indicator values that are within the range configured as "acceptable" are displayed in the Green column.
Yellow	All pulse point indicator values that are within the range configured as "questionable" are displayed in the Yellow column.
Red	All pulse point indicator values that are within the range configured as "unacceptable" are displayed in the Red column.
Comments	Any comments provided for a pulse point indicator will be displayed in the Comments column.

SOS WORKLOAD DEFINITIONS

The Workload Definitions Screen

The Workload Definitions screen displays the application workload definitions. These definitions can also be found in the `/etc/opt/lps/cfg/workdefs` file.

SOS B.02g jackal FRI, 17 AUG 2001, 11:31 E: 00:29:19 I: 01:01			
WORKLOAD DEFINITIONS			
Number	Name	Type	Specifications
1	INTERACT	INTERACT	
2	BATCH	BATCH	NICE=21-39
3	DAEMON	DAEMON	
4	DEFAULT	MIX	
Enter command:			

Figure 27.1 *SOS Workload Definitions screen*

To access the Workload Definitions screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **k** (Workload Definitions). The Workload Definitions screen will display. An example of the screen is shown in Figure 27.1.

Workload Definitions Screen Display Items

WORKLOAD DEFINITIONS

The data items presented in the Workload Definitions screen are described in the following table.

Table 27.1 *SOS WORKLOAD DEFINITIONS data items*

Data Item	Description
Number	The unique, sequential identification number assigned to the workload.
Name	The name of the workload group.
Type	The type of workload (for information about workload types, refer to "Workload Groups" on page 15).
Specifications	The other specifications that define the workload (for information about workload types, refer to "Creating a Workload Group Definition File" on page 16).

SOS PROCESS DETAIL

The Process Detail Screen

The Process Detail screen displays detailed information about a specific process.

SOS B.02g		jackal		FRI, 17 AUG 2001, 11:32		E: 00:30:20		I: 01:01	
PID		ID		SCHEDULING		TERMINAL			
PID: 20229		Cmd: sos		Nice: 0		tty: tb			
PPID: 16121		User: oracle		Pri: 154		State: ATT			
		Group: dba		Sched: HPUX		ioch/s: 0			
MEMORY									
RSS: 5252		USS: 14088		State: LOAD		Min/s: 0		Maj/s: <	
Dcts/s: 0									
CPU		DISK							
CPU % :		1.3[0.4]		Total		Reads		Writes	
CPU ms:		818[7356]		Log : 47[523]		47[523]		0[0] 0.8 0	
				Phy : 1[3]		1[3]		0[0] < 0	
User % :		68.2[72.5]		User: 0[0]		0[0]		0[0] 0 0	
Sys % :		23.8[21.3]		VM : 1[3]		1[3]		0[0] < 0	
CSW % :		0.4[0.4]		Raw : 0[0]		0[0]		0[0] 0 0	
Intr % :		7.6[5.8]		Sys : 0[0]		0[0]		0[0] 0 0	
WAIT STATES									
Current Wait: STRM					CPU : 1[<]				
CACH: 0[0]		DISK: <[<]		GRAF: 0[0]		INDD: 0[0]		IO : 0[0]	
IPC : 0[0]		MSG : 0[0]		NFS : 0[0]		PIPE: <[<]		PRE : <[<]	
RPC : 0[0]		SEM : 0[0]		SHM : 0[0]		SLEP: 0[<]		SOCK: 0[0]	
STRM:98[99]		SYS : 0[0]		OTHR: 0[0]					
Enter command:									

Figure 28.1 SOS Process Detail screen

To access this screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **P** (Process Detail).
- 3 At the secondary prompt:
 - Press the Enter key to display the process detail information for the given process.
 - Or, enter the PID of another process.

Process Detail Screen Display Items

PID

The PID portion of the Process Detail screen displays process identification. Each data item is described in the following table.

Table 28.1 *SOS PID data items*

Data Item	Description
Pid	The identification number for the specified process.
PPID	The identification number for the parent process.

ID

The ID portion of the Process Detail screen displays additional identification information. Each data item is described in the following table.

Table 28.2 *SOS ID data items*

Data Item	Description
Cmd	The command that was invoked to create the process (does not include arguments).
User	The real user name of the user that owns the process.
Group	The name of the group that owns the process.

SCHEDULING

The SCHEDULING portion of the Process Detail screen displays scheduling information. Each data item is described in the following table.

Table 28.3 *SOS SCHEDULING data items*

Data Item	Description
Nice	The nice value. A value of R indicates the process has a real time priority—the nice value is not used. For information about the nice utility, see the Unix man page, "nice."
Pri	The priority of the process, depending on the scheduling policy.

Data Item	Description
Sched	<p>The Sched data item represents the scheduling policy of the process:</p> <ul style="list-style-type: none"> • HPUX - Timeshare • RTPRIO - Real-Time • FIFO - Posix First In/First Out • RR - Posix Round-Robin • RR2 - Posix Round-Robin with a per-priority timeslice <p>For information about the scheduling, see the "prioctl" Unix man page.</p>

TERMINAL

The TERMINAL portion of the Process Detail screen displays terminal information related to the process. Each data item is described in the next table.

Table 28.4 *SOS TERMINAL data items*

Data Item	Description
tty	The device file associated with the terminal device. If the process is not attached to a terminal, three dashes (---) is displayed.
State	<p>The terminal state:</p> <ul style="list-style-type: none"> • DET - detached from a terminal. • ATT - attached to a terminal.
ioch /s	The number of character I/Os to or from the terminal, per second.

MEMORY

The MEMORY portion of the Process Detail screen displays process and workload memory information. Each data item is described in the following table.

Table 28.5 *SOS MEMORY data items*

Data Item	Description
RSS	The resident set size, which is equal to the amount of RAM the process is using. This value does not include shared memory.
VSS	The amount of virtual memory the process has reserved, which is equal to the size of the process' core image including text, data, and stack.

Data Item	Description
State	The process state with respect to memory (not applicable to workloads): <ul style="list-style-type: none"> Dead - the process is dead. LOAD - the process is loaded in memory. DEACT - the process is deactivated.
Min /s	The number of minor page faults experienced by the process, per second (see "minor page fault" on page 300).
Maj /s	The number of major page faults experienced by the process, per second (see "major page fault" on page 299).
Dcts /s	Deactivations experienced by the process per second (see "deactivation" on page 299).

CPU

The CPU portion of the Process Detail screen displays process and workload CPU information. Using the `c` command key toggles between two sets of data: a detailed breakdown of CPU usage and a list of response and transaction data. Each data item is described in the following table.

Table 28.6 *SOS CPU data items*

Data Item	Description
CPU %	The percentage of the current interval that the process was executing. This value is normalized for multiple processors—the sum of the CPU% values should not exceed 100.
CPU ms	The number of milliseconds the process was executing. The value in brackets, [], is a cumulative value, not an averaged cumulative value.
User %	The percentage of the process' execution time spent in user mode. This includes real, nice, and negative nice time.
Sys %	The percentage of the process' execution time spent in system/ kernel mode. This includes memory and trap time.
CSW %	The percentage of the process' execution time spent processing context switches.
Intr %	The percentage of the process' execution time spent managing interrupts.

DISK

The DISK portion of the Process Detail screen displays various process and workload disk statistics. Each data item is described in Table 28.7.

Table 28.7 *SOS DISK data items*

Data Item		Description
Log	Reads	Total number of logical disk reads on the system (for more information, see “logical I/O” on page 301).
	Writes	Total number of logical disk writes.
	Rd/s	Logical reads per second.
	Wr/s	Logical writes per second.
Phy	Reads	Total number of physical disk reads on the system (see “physical I/O” on page 301).
	Writes	Total number of physical writes on the system.
	Rd/s	Physical reads per second.
	Wr/s	Physical writes per second.
User	Reads	Total number of user reads on the system (see “user I/O” on page 301).
	Writes	Total number of user writes on the system.
	Rd/s	User reads per second.
	Wr/s	User writes per second.
Virt Mem	Reads	Total number of virtual memory reads on the system (see “virtual memory I/O” on page 301).
	Writes	Total number of virtual memory writes on the system.
	Rd/s	Virtual memory reads per second.
	Wr/s	Virtual memory writes per second.

Data Item		Description
Raw	Reads	Total number of raw memory reads on the system (see "raw I/O" on page 301).
	Writes	Total number of raw memory writes on the system.
	Rd/s	Raw memory reads per second.
	Wr/s	Raw memory writes per second.
Sys	Reads	Total number of system reads on the system (see "system I/O" on page 301).
	Writes	Total number of system writes on the system.
	Rd/s	System reads per second.
	Wr/s	System writes per second.

WAIT STATES

The WAIT STATES portion of the Process Detail screen displays various process and workload wait state information. Each wait state is described in "Wait State Codes" on page 302 of the Glossary of Terms.

SOS PROCESS FILE USAGE

The Process File Usage Screen

The Process File Usage screen displays information about each file opened by a specific process.

SOS B.02g		jackal	FRI, 17 AUG 2001, 11:32		E: 00:30:20		I: 01:01	
----- PROCESS FILE USAGE -----								
PID: 20229		Name: sos	User Name: oracle			Tty: tb		
----- OPEN FILES -----								
Filename	Type	Access	Offset	Size	Comp	%	#Refs	

/dev/pts/tb	Char	RW	149414	0	0		6	
/dev/pts/tb	Char	RW	149414	0	0		6	
/dev/pts/tb	Char	RW	149414	0	0		6	
N/A	Socket	RW	0	0	0		1	
/dev/pts/tb	Char	R	0	0	0		2	
N/A	Regular	R	0	178732	0		2	
/dev/kmem	Char	R	11384704	0	0		2	
N/A	Char	RW	0	0	0		2	
N/A	Socket	RW	942268	0	0		1	
N/A	Regular	RW	2040	2040	100		1	
N/A	Char	RW	0	0	0		1	
Enter command: _								

Figure 29.1 SOS Process File Usage screen

To access this screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **F** (Process File Usage).
- 3 At the secondary prompt:
 - Press the Enter key to display the process file usage information for the given process.
 - Or, enter the PID of another process.

Process File Usage Screen Display Items

PROCESS FILE USAGE

The PROCESS FILE USAGE portion of the Process File Usage screen displays process identification information. Each data item is described in the next table.

Table 29.1 *SOS PROCESS FILE USAGE data items*

Data Item	Description
PID	The product identification number of the process.
Name	The name of the process—the command used to create the process.
User Name	The name of the user that owns the process.
Tty	The device file associated with the terminal to which the process is attached. If no terminal is associated with the process, three dashes (---) will display.

OPEN FILES

The OPEN FILES portion of the Process File Usage screen displays information about each open file. Each data item is described in Table 29.1.

Table 29.2 *SOS OPEN FILES data items*

Data Item	Description
Filename	The name of the open file. The SOS application searches the DNLC for the name of the file. If the name is not in the DNLC, "N/A" will display on the screen.
Type	The Type data item denotes the type of file: <ul style="list-style-type: none"> • Block - a block device file • Char - a character device file • Dir - a directory • FIFO - a FIFO (first in, first out) file • Link - a symbolic link • Regular - a regular file • Socket - a socket

SOS PROCESS FILE USAGE .
Process File Usage Screen Display Items :
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 .

Data Item	Description
Access	The type of access the process has to the open file: <ul style="list-style-type: none"> • R - read only • W - write only • RW - read and write
Offset	The offset (bytes) into the file.
Size	The size of the file (bytes).
Comp %	The percentage of offset into the file: $\text{Comp \%} = (\text{Offset} / \text{Size}) \times 100$
#Refs	The current number of references to the open file.

SOS PROCESS MEMORY REGIONS

The Process Memory Regions Screen

The Process Memory Regions screen displays information about the memory regions accessed by a specific process.

SOS B.02g jackal		FRI, 17 AUG 2001, 11:33		E: 00:31:21 I: 01:00	
----- PROCESS MEMORY REGIONS -----					
PID: 20229	Name: sos	User Name: oracle		Tty: tb	
----- REGION TYPES -----					
Data :3368k/3580k	Stack: 48k/ 116k	MMap :2168k/3536k		Other: 16k/ 16k	
Text :2668k/6592k	Shm : 244k/ 244k	IO : 0/ 0		Total:8512k/ 13m	
----- MEMORY REGIONS -----					
Front Store File	Type	RSS	USS	Virtual Address	

<NULLDR>	NULLDR	4	4	0x00006104.0x00000000	
/dev/ug00/lvo15:881	TEXT	2668	6592	0x00006104.0x00001000	
/dev/ug00/lvo15:881	DATA	3368	3580	0x0000560c.0x40001000	
/dev/ug00/lvo17:1561	MMap	16	20	0x0000560c.0x7f6cc000	
<MMap>	MMap	8	8	0x0000560c.0x7f6d1000	
/dev/ug00/lvo17:1558	MMap	36	68	0x0000560c.0x7f6d3000	
<MMap>	MMap	12	716	0x0000560c.0x7f6e4000	
/dev/ug00/lvo17:1632	MMap	4	4	0x0000560c.0x7f797000	
/dev/ug00/lvo17:1554	MMap	4	4	0x0000560c.0x7f798000	
/dev/ug00/lvo17:1651	MMap	4	4	0x0000560c.0x7f799000	
/dev/ug00/lvo17:1628	MMap	28	44	0x0000560c.0x7f79a000	
<MMap>	MMap	8	8	0x0000560c.0x7f7a5000	
/dev/ora/ora1:249647	MMap	4	4	0x0000560c.0x7f7a7000	
/dev/ug00/lvo17:1615	MMap	4	4	0x0000560c.0x7f7a8000	
Enter command: _		(Showing lines 1 - 14 of 43)			

Figure 30.1 SOS Process Memory Regions screen

To access the Process Memory Regions screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **M** (Process Memory Regions).
- 3 At the secondary prompt:
 - Press the Enter key to display the process memory regions information for the given process.

- Or, enter the PID of another process.

The Process Memory Regions screen will display. An example of the screen is shown in Figure 30.1.

Process Memory Regions Screen Display Items

PROCESS MEMORY REGIONS

The PROCESS MEMORY REGIONS portion of the Process Memory Regions screen contains identification information about the selected process. Each data item is described in the following table.

Table 30.1 *SOS PROCESS MEMORY REGIONS data items*

Data Item	Description
PID	The product identification number of the process.
Name	The name of the process—the command used to create the process.
User Name	The name of the user that owns the process.
Tty	The device file associated with the terminal to which the process is attached. If no terminal is associated with the process, three dashes (---) will display.

REGION TYPES

The REGION TYPES portion of the Process Memory Regions screen displays summary information for each type of memory region. Each data item is described in the following table.

Table 30.2 *SOS REGION TYPES data items*

Data Item	Description
Data	The total KB of RAM/virtual memory used by data regions for the process.
Text	The total KB of RAM/virtual memory used by text regions for the process.
Stack	The total KB of RAM/virtual memory used by stack regions for the process.

SOS PROCESS MEMORY REGIONS .
Process Memory Regions Screen Display Items :
 :
 :

Data Item	Description
Shm	<p>The total KB of RAM/virtual memory used by shared memory regions for the process (does not account for the other number of process sharing this region).</p> <p>The sum of this number for all processes could exceed the amount of RAM on a system, because it does not account for sharing.</p>
MMap	The total KB of RAM/virtual memory used by memory map regions for the process.
IO	The total KB of RAM/virtual memory used by other memory regions for the process.
Other	The total KB of RAM/virtual memory used by any other regions for the process.
Total	The total KB of RAM/virtual memory used by all regions for the process.

MEMORY REGIONS

The MEMORY REGIONS portion of the Process Memory Regions screen contains information pertaining to each memory region used by the specified process. Each data item is described in the following table.

Table 30.3 *SOS MEMORY REGIONS data items*

Data Item	Description
Front Store File	<p>The file path that corresponds to the memory region.</p> <p>This is the program name for data and text regions and the library name for shared libraries.</p> <ul style="list-style-type: none"> • If a file name is not associated with the region, the type of region will be displayed. • If the file name is not obtainable, the device and inode will be displayed. This information can be used with the <code>ncheck</code> command to look up the file name.

Data Item	Description
Type	The type of memory region: <ul style="list-style-type: none">• NULLDR - null dereference region• TEXT - text region• DATA - data region• STACK - stack region• SHM - shared memory region• MMAP - memory mapped region• UAREA - user area (uarea) region
RSS	The size of region in RAM (KB).
VSS	The size of region in virtual memory (KB).
Virtual Address	The virtual address of memory region in hex format. This number represents the address of the space and space offset of the region.

SOS WORKLOAD DETAIL

The Workload Detail Screen

The Workload Detail screen displays detailed information about a specific workload. For information about workloads, refer to “Workload Groups” on page 15.

SOS B.02g jackal		FRI, 17 AUG 2001, 11:33		E: 00:31:21 I: 01:00	
----- WORKLOAD DETAIL -----					
Workload: INTERACT			Proc Count: 11.0[12.6]		
RSS: 8536k		USS: 13m	Min/s: 0	Max/s: 0	Deact/s: 0
----- CPU USAGE -----		----- MEMORY -----		----- DISK I/O USAGE -----	
CPU % :	2.3[3.4]	Total	51[58491]	Reads	Writes
CPU ms :	1398[64576]	Log :	51[58491]	51[14935]	0[43556]
		Phy :	0[4783]	0[116]	0[4667]
User % :	39.2[54.3]	User :	0[4650]	0[31]	0[4619]
Sys % :	56.2[42.6]	VM :	0[84]	0[84]	0[0]
CSW % :	0.3[0.7]	Raw :	0[0]	0[0]	0[0]
Intr % :	4.4[2.3]	Sys :	0[49]	0[1]	0[48]
----- WAIT STATES -----					
RUN : <[<]					
CACH :	0[<]	DISK :	<[<]	GRAF :	0[0]
LAN :	0[0]	MSG :	0[0]	INOD :	0[<]
SEM :	0[<]	NFS :	0[<]	IPC :	0[0]
TTY :	0[0]	SLEP :	18[22]	PRE :	<[1]
		SOCK :	0[0]	RPC :	0[0]
		STRM :	45[31]	SVS :	0[7]
		OTHR :	36[39]		
----- PROCESS SUMMARY -----					
PID	Name	User Name	TTY	CPU%	Nice Pri
20229	sos	oracle	tb	2.3	0 154
				5252/ 13m	0 0
					STRM 1.6
Enter command: _					

Figure 31.1 SOS Workload Detail screen

To access the Workload Detail screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **W** (Workload Detail).
- 3 At the secondary prompt:
 - Press the Enter key to display the workload detail information for the given workload.

- Or, select another workload from the list.

The Workload Detail screen will display. An example of the screen is shown in Figure 31.1.

- 4 Use the **y** command key to toggle between the normal and extended process displays.

Workload Detail Display Items

WORKLOAD DETAIL

The WORKLOAD DETAIL portion of the Workload Detail screen displays workload identification information. The data items are described in the next table.

Table 31.1 *SOS WORKLOAD DETAIL data items*

Data Item	Description
Workload	The name of the workload group.
Proc Count	The average number of processes that exists within the workload.

MEMORY

The MEMORY portion of the Workload Detail screen displays process and workload memory information. The data items are described in the following table.

Table 31.2 *SOS MEMORY data items*

Data Item	Description
RSS	The resident set size, which is equal to the amount of RAM the process is using, excluding shared memory.
VSS	The amount of virtual memory the process has reserved, which is equal to the size of the process' core image including text, data, and stack.
Min /s	The number of minor page faults experienced by the process, per second (see "minor page fault" on page 300).
Maj /s	The number of major page faults experienced by the process, per second (see "major page fault" on page 299).
Deact /s	The number of deactivations per second (see "deactivation" on page 299).

CPU USAGE

The CPU USAGE portion of the Workload Detail screen displays process and workload CPU information. The data items are described in Table 31.3.

Table 31.3 *SOS CPU USAGE data items*

Data Item	Description
CPU %	The percentage of the current interval that the process was executing. This value is normalized for multiple processors—the sum of the CPU% values should not exceed 100.
CPU ms	The number of milliseconds the process was executing. The value in brackets, [], is a cumulative value, not an averaged cumulative value.
User %	The percentage of the process' execution time spent in user mode. This includes real, nice, and negative nice time.
Sys %	The percentage of the process' execution time spent in system/ kernel mode. This includes memory and trap time.
CSW %	The percentage of the process' execution time spent processing context switches.
Intr %	The percentage of the process' execution time spent managing interrupts.

DISK I/O USAGE

The DISK I/O USAGE portion of the Workload Detail screen displays various process and workload disk statistics. Each data item is described in Table 31.4.

Table 31.4 *SOS DISK I/O USAGE data items*

Data Item		Description
Log	Total	Total number of logical disk I/Os performed by a process (see “logical I/O” on page 301).
	Reads	The number of logical disk reads performed by a process.
	Writes	The number of logical disk writes performed by a process.
	Rd/s	Logical reads per second performed by a process.
	Wr/s	Logical writes per second performed by a process.

Data Item		Description
Phy	Total	The total number of physical disk I/Os performed by a process (see "physical I/O" on page 301).
	Reads	The number of physical disk reads performed by a process.
	Writes	The number of physical writes performed by a process.
	Rd/s	Physical reads per second performed by a process.
	Wr/s	Physical writes per second performed by a process.
User	Total	Total number of user I/Os performed by a process (see "user I/O" on page 301),
	Reads	The number of user reads performed by a process.
	Writes	The number of user writes performed by a process.
	Rd/s	User reads per second performed by a process.
	Wr/s	User writes per second performed by a process.
Virt Mem	Total	Total number of virtual memory I/Os performed by a process (see "virtual memory I/O" on page 301).
	Reads	The number of virtual memory reads performed by a process.
	Writes	The number of virtual memory writes performed by a process.
	Rd/s	Virtual memory reads per second performed by a process.
	Wr/s	Virtual memory writes per second performed by a process.

Data Item		Description
Raw	Total	Total number of raw memory I/Os performed by a process (see “raw I/O” on page 301).
	Reads	The number of raw memory reads performed by a process.
	Writes	The number of raw memory writes performed by a process.
	Rd/s	Raw memory reads per second performed by a process.
	Wr/s	Raw memory writes per second performed by a process.
Sys	Total	Total number of system I/Os performed by a process (see “system I/O” on page 301).
	Reads	The number of system reads performed by a process.
	Writes	The number of system writes performed by a process.
	Rd/s	System reads per second performed by a process.
	Wr/s	System writes per second performed by a process.

WAIT STATES

The WAIT STATES portion of the Workload Detail screen displays various process and workload wait state information. Each wait state is described in “Wait State Codes” on page 302 of the Glossary of Terms.

PROCESS SUMMARY

The Process Summary section provides a general look at processes on your system. The processes displayed can be configured. For information, refer to “PROCESS SUMMARY Data Items” on page 90.

SOS DISK DETAIL

The Disk Detail Screen

The Disk Detail screen displays detailed information about a specific disk.

SOS B.02g jackal FRI, 17 AUG 2001, 11:33 E: 00:31:21 I: 01:00													
----- DISK I/O DETAIL -----													
Disk Dev		I/O%		Qlen		Util%		WaitTime		ServiceTime			
c0t5d0		79		0		1.6		0.3		10.8			
		[29]		[0]		[3]		[<]		[11]			

		Rates (/s)						Rates (/s)					
		Read		Write		Avg Size(kb)				Avg Size(kb)			
		Read		Write		Read		Write		Read		Write	
Logical		0.9		1.4		7 7		Physical		0		1.4	
		[14]		[2]		[2] [7]		[<] [2]		[7] [7]			
Raw		0		0		0 0		Virt Mem		0		0	
		[0]		[0]		[0] [0]		[<] [0]		[7] [0]			
User FS		0		1.4		0 8		SVS FS		0		<	
		[0]		[2]		[0] [7]		[0] [<]		[0] [7]			

Enter command:													

Figure 32.1 SOS Disk Detail screen

To access the Disk Detail screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **D** (Disk Detail).
- 3 At the secondary prompt:
 - Press the Enter key to display the Disk detail information for the given disk.
 - Or, select another disk from the list.

The Disk Detail screen will display. An example of the screen is shown in Figure 32.1.

- 4 Use the **y** command key to toggle between the normal and extended process displays.

Disk Detail Display Items

DISK DETAIL

The DISK DETAIL portion of the Disk Detail screen displays workload identification information. The data items are described in the next table.

Table 32.1 *SOS DISK I/O DETAIL data items*

Data Item		Description
Dev		The device identification number for each disk on the system.
I/O%		The percentage of all disk I/Os on the system performed by each disk during the interval.
Qlen		The average number of disk requests waiting to be serviced by each disk.
Util%		The percentage of time each disk was in use during the interval.
Wait Time (ms)		The average number of milliseconds an I/O request had to wait in the disk queue before being serviced for each disk.
Service Time (ms)		The average number of milliseconds an I/O request takes to be serviced once it is removed from the disk queue and processed.
Logical	Read Rate (/s)	Logical reads per second (see "logical I/O" on page 301).
	Write Rate (/s)	Logical writes per second performed by a process.
	Avg Read Size (kb)	The average size of a logical read.
	Avg Write Size (kb)	The average size of a logical write.

SOS DISK DETAIL ·
Disk Detail Display Items ·
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·

Data Item		Description
Physical	Read Rate (/s)	Physical reads per second (see “physical I/O” on page 301).
	Write Rate (/s)	Physical writes per second performed by a process.
	Avg Read Size (kb)	The average size of a physical read.
	Avg Write Size (kb)	The average size of a physical write.
Raw	Read Rate (/s)	Raw memory reads per second (see “raw I/O” on page 301).
	Write Rate (/s)	Raw memory writes per second performed by a process.
	Avg Read Size (kb)	The average size of a raw memory read.
	Avg Write Size (kb)	The average size of a raw memory write.
Virt Mem	Read Rate (/s)	Virtual memory reads per second (see “virtual memory I/O” on page 301).
	Write Rate (/s)	Virtual memory writes per second performed by a process.
	Avg Read Size (kb)	The average size of a virtual memory read.
	Avg Write Size (kb)	The average size of a virtual memory write.
User FS	Read Rate (/s)	User reads per second (see “user I/O” on page 301).
	Write Rate (/s)	User writes per second performed by a process.
	Avg Read Size (kb)	The average size of a user read.
	Avg Write Size (kb)	The average size of a user write.
SYS FS	Read Rate (/s)	System reads per second (see “system I/O” on page 301).
	Write Rate (/s)	System writes per second performed by a process.
	Avg Read Size (kb)	The average size of a system read.
	Avg Write Size (kb)	The average size of a system write.

SOS VOLUME DETAIL

The Volume Detail Screen

The Volume Detail screen provides detailed performance numbers for the volume group or logical volume specified.

SOS B.02g		jackal		FRI, 17 AUG 2001, 11:34		E: 00:32:24		I: 01:02			

VOLUME DETAIL											
Volume	Dev	File	MWC	Size	MWC	QLen	MWC	Hits	MWC	Misses	
/dev/vg00			32		0		N/A			N/A	

		Rates (/s)		Avg Size(kb)				Rates (/s)		Avg Size(kb)	
		Read	Write	Read	Write			Read	Write	Read	Write
Logical		1.6	0	<k	0	Physical		0	0.6	0	6
		[45]	[22]	[<k]	[<k]			[<]	[6]	[12]	[6]
Raw		0	0	0	0	Virt Mem		0	0	0	0
		[0]	[0]	[0]	[0]			[<]	[0]	[15]	[0]
User FS		0	0	0	0	Sys FS		0	0.6	0	6
		[<]	[4]	[7]	[6]			[<]	[2]	[8]	[7]

MAPPING INFORMATION											
Physical Volume : /dev/dsk/c0t6d0											
File System : /stand											
File System : Swap device											
File System : /											
File System : /opt											
File System : /tmp											
File System : /usr											
File System : /usr/local											
File System : /var											
Enter command: _											
(Showing lines 1 - 9 of 19)											

Figure 33.1 SOS Volume Detail screen

To access the Volume Detail screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu screen.
- 2 From the Screen Selection Menu screen, enter **V** (Volume Detail).
- 3 At the secondary prompt:
 - Press the Enter key to display the Volume detail information for the given volume.

- Or, select another volume from the list.

The Volume Detail screen will display. An example of the screen is shown in Figure 33.1.

- 4 Use the **y** command key to toggle between the normal and extended process displays.

Volume Detail Display Items

VOLUME DETAIL

The VOLUME DETAIL portion of the Volume Detail screen displays information about the mirror write consistency (MWC) cache. The data items are described in the next table.

Table 33.1 *SOS VOLUME DETAIL data items*

Data Item		Description
Volume Dev File		The device file associated with the specified volume.
MWC Size		MWC cache size (not applicable to logical volumes),
MWC QLen		The average cache queue length over the interval (not applicable to logical volumes),
MWC Hits		The number of cache hits (not applicable to logical volumes),
MWC Misses		The number of cache misses (not applicable to logical volumes),
Logical	Read Rate (/s)	Logical reads per second (see "logical I/O" on page 301).
	Write Rate (/s)	Logical writes per second performed by a process.
	Avg Read Size (kb)	The average size of a logical read.
	Avg Write Size (kb)	The average size of a logical write.

Data Item		Description
Physical	Read Rate (/s)	Physical reads per second (see “physical I/O” on page 301).
	Write Rate (/s)	Physical writes per second performed by a process.
	Avg Read Size (kb)	The average size of a physical read.
	Avg Write Size (kb)	The average size of a physical write.
Raw	Read Rate (/s)	Raw memory reads per second (see “raw I/O” on page 301).
	Write Rate (/s)	Raw memory writes per second performed by a process.
	Avg Read Size (kb)	The average size of a raw memory read.
	Avg Write Size (kb)	The average size of a raw memory write.
Virt Mem	Read Rate (/s)	Virtual memory reads per second (see “virtual memory I/O” on page 301).
	Write Rate (/s)	Virtual memory writes per second performed by a process.
	Avg Read Size (kb)	The average size of a virtual memory read.
	Avg Write Size (kb)	The average size of a virtual memory write.
User FS	Read Rate (/s)	User reads per second (see “user I/O” on page 301).
	Write Rate (/s)	User writes per second performed by a process.
	Avg Read Size (kb)	The average size of a user read.
	Avg Write Size (kb)	The average size of a user write.
SYS FS	Read Rate (/s)	System reads per second (see “system I/O” on page 301).
	Write Rate (/s)	System writes per second performed by a process.
	Avg Read Size (kb)	The average size of a system read.
	Avg Write Size (kb)	The average size of a system write.

MAPPING INFORMATION

The MAPPING INFORMATION portion of the Volume Detail screen provides mapping information between volume groups, logical volumes, and physical volumes (disks).

For volume groups each physical disk, logical volume, and corresponding file system will be listed.

For logical volumes, the volume group, physical volume (if the lv is contained within one disk), and the corresponding file system will be listed.

SOS ORACLE MAIN

The Oracle Main Screen

The Oracle Main screen provides lists all Oracle instances you have added and some important metrics for each instance, as well as some aggregate statistics (summed over all instances).

To access the Oracle Main screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu.
- 2 From the Screen Selection Menu, enter **O** (upper case). An example of the screen is shown in Figure 34.1.

```
SOS B.02g   jackal          FRI, 17 AUG 2001, 11:34      E: 00:32:24   I: 01:02
                Oracle Main Screen

  Sessions:          11                Locks:          9
  Connections:       8 [      458]    Commits:          8 [      747]
  Opened cursors:    26 [    5126]    Rollbacks:        0 [          0]

No Instance LibHit DtaHit BFRHit Sess Conn Locks Cursr Comms Rlbks RedoW PhsWr
0 dev      100.00 100.00 91.58  11    8    9    26    8    0    8    0
```

Enter command: _

Figure 34.1 SOS Oracle Main screen

Adding an Oracle Instance

To add an Oracle instance to the data collection:

- 1 Type **R** from any SOS screen.
- 2 SOS will prompt for the instance connect string. Enter a net service name or a full connect string in the form host:port:SID (Oracle's listener port is usually 1521). If no instance name is entered, the default database instance on the local machine will be used.
- 3 Next, SOS will prompt for the user name. This user should have select rights on v\$ performance views, ts\$, and file\$. The user must also have rights to create, select, delete, and insert tables (for SOS temporary data).
- 4 Finally, SOS will ask for the user's password.

If more than one instance is configured, SOS will prompt you to select an instance each time you go to an Oracle detail screen.

Deleting an Oracle Instance

Instances may be deleted with the "T" command.

Oracle Main Display Items

The Oracle Main screen data items are described in the next two tables.

Table 34.1 *SOS Oracle Main data items: aggregate statistics*

Data Item	Description
Sessions	The number of active sessions.
Connections	The number of connections to Oracle.
Opened cursors	The number of cursors opened.
Locks	The number of locks currently held.
Commits	The number of commits.
Rollbacks	The number of rollbacks.

Table 34.2 *SOS Oracle Main display items: instance lines*

Data Item	Description
Instance	The instance connect string.
LibHit	The library hit ratio percentage.
DtaHit	The data dictionary hit percentage.
BfRHit	The row buffer hit percentage.
Sess	The number of active sessions.
Conn	The number of connections to this instance.

SOS ORACLE DETAIL LATCHES

The Oracle Detail Latches Screen

The contention for various buffers in SGA is solved using latches. The SOS Oracle Detail Latches screen presents latches statistics.

To access the Oracle Detail Latches screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu.
- 2 From the Screen Selection Menu, enter **L** (upper case). An example of the screen is shown in Figure 35.1.

```
SOS B.02g jackal FRI, 17 AUG 2001, 11:35 E: 00:32:24 I: 01:02
Instance: dev Oracle Detail Latches
```

LRU Latches			
Cache Buffer Chains		Cache Buffer Handles	
Gets:	18 [2583]	Gets:	542 [433208]
Misses:	0 [0]	Misses:	0 [13]
Im Gets:	0 [0]	Im Gets:	7 [766]
Im Misses:	0 [0]	Im Misses:	0 [1]
Cache Protection Latch		Cache Buffers Lru Chain	
Gets:	0 [0]	Gets:	0 [0]
Misses:	0 [0]	Misses:	0 [0]
Im Gets:	0 [0]	Im Gets:	0 [0]
Im Misses:	0 [0]	Im Misses:	0 [0]
Redo Log Buffer Latches			
Redo Allocation		Redo Copy	
Gets:	77 [10085]	Gets:	0 [9]
Misses:	0 [0]	Misses:	0 [1]
Im Gets:	0 [0]	Im Gets:	42 [7896]
Im Misses:	0 [0]	Im Misses:	0 [203]
Redo Writing			
Gets:	121 [6639]	Im Gets:	0 [0]
Misses:	0 [0]	Im Misses:	0 [0]

```
SUCCESSFULLY COLLECTED
Enter command: _
```

Figure 35.1 SOS Oracle Detail Latches screen

Oracle Detail Latches Display Items

The data values in each section of the Oracle Detail Latches screen are described in the next table. Unique data items are described in the following sections of this chapter.

Table 35.1 *SOS Oracle Detail Latches data items*

Data Item	Description
Gets	The number of successful gets.
Misses	The number of successful misses.
Im Gets	The number of successful immediate gets. A get is considered to be immediate if the requesting process specifies that it does not wish to wait for a latch on its data to be released.
Im Misses	The number of misses for immediate get requests.

LRU Latches

The LRU section has two sub-sections of data.

Table 35.2 *SOS Oracle Detail Latches data: LRU Latches*

Data Item	Description
Cache Buffer Chains	This latch is required when user processes try to scan the buffer cache from SGA. Adjusting DB_BLOCK_BUFFERS can reduce the contention for this latch.
Cache Buffer LRU Chain	This latch is required when the user processes try to scan the LRU chain that contains the dirty buffers from the buffer cache. Increasing DB_BLOCK_BUFFERS and DB_BLOCK_WRITE_BATCH can reduce the contention for this latch.

Redo Log Buffer Latches

An Oracle process has to obtain redo copy latch before the redo allocation latch. After it obtains both, it makes the allocation, and after that, it frees the redo allocation latch. Only after it makes the copy, it will free the redo copy latch. So the redo copy latch is kept more than the redo allocation latch.

You can reduce the conflict for this latch by reducing the copy time. To do that, you could reduce the LOG_SMALL_ENTRY_MAX_SIZE parameter. Usually the latch contention occurs on multi-processor machines. The LOG_SIMULTANEOUS_COPIES parameter, which determines the

SOS ORACLE DETAIL LATCHES ·
Oracle Detail Latches Display Items ·
·

number of redo copy latch mechanisms, with the default value equal to the number of processors, should be increased if contention occurs.

SOS ORACLE DETAIL DATABASE ACTIVITY

The Oracle Detail Database Activity Screen

The Oracle Detail Database screen provides important statistics related to Oracle database activities.

To open the Oracle Detail Database screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu.
- 2 From the Screen Selection Menu, enter **A** (upper case). An example of the screen is shown in Figure 36.1.

SOS B.02g jackal		FRI, 17 AUG 2001, 11:35		E: 00:33:24		I: 01:00		
Instance: dev		Oracle Detail Database Activity						
Transaction Management				Locking				
Opened Cursors:		27	[	5153]	Current Locks:		9
User Commits:		0	[	755]	Enq Requests:		45 [4293]
User Rollbacks:		0	[	0]	Enq Releases:		45 [4293]
					Enq Waits:		0 [0]	
					Enqueue Timeouts		0 [0]	
Sorts								
Memory:		42	[3804]	Rollback			
Disk:		2	[170]	Gets:			53 [4085]
Rows:		2975	[262076]	Waits:			0 [0]
Table Scans				Writes:				7412 [1124168]
Short Tables:		11	[1332]				
Long Tables:		0	[0]				
SUCCESSFULLY COLLECTED								
Enter command:								

Figure 36.1 SOS Oracle Detail Database Activity screen

Oracle Detail Database Activity Display Items

Transaction Management

The Transaction Management portion of the Oracle Detail Database screen shows the amount of database activity.

Table 36.1 *SOS Oracle Detail Database Activity data items: Transaction Management*

Data Item	Description
Opened cursors	The number of opened cursors.
User commits	The number of user commits.
User rollbacks	The number of user rollbacks.

Locking

The Locking section of the screen shows statistics related to locking activity. Locking is managed in Oracle using an enqueue mechanism.

Table 36.2 *SOS Oracle Detail Database Activity data items: Locking*

Data Item	Description
Current Locks	The number of locks currently held.
Enq Requests	The number of enqueue requests.
Enq Releases	The number of enqueue releases.
Enq Waits	The number of waits for enqueue time-outs.
Enqueue Time-outs	The number of enqueue time-outs.

Performance Tip

The number of locks performed and still held can be calculated as: *(enq requests - enq releases - enq time-outs)*.

Sorts

The Sorts section of the Oracle Detail Database screen shows statistics related to sorts.

Table 36.3 *SOS Oracle Detail Database Activity data items: Sorts*

Data Item	Description
Memory	The number of sorts done in memory.
Disk	The number of sorts performed on disk.
Rows	The number of rows sorted.

Performance Tip

Most sorting should happen in memory, not on disk. Sorting on disk is a very slow operation and should be avoided.

Table Scans

The Table Scans section shows statistics related to sequential table access; accesses made directly, not through an index.

Table 36.4 *SOS Oracle Detail Database Activity data items: Table Scans*

Data Item	Description
Short tables	The number of short tables scanned.
Long tables	The number of long tables scanned.

Performance Tip

Long table scans should be avoided unless they return most of the scanned rows.

Rollback

The Rollback section provides statistics about database changes.

Table 36.5 *SOS Oracle Detail Database Activity data items: Rollback*

Data Item	Description
Gets	The number of gets.
Waits	The number of waits.

Data Item	Description
Writes	The number of writes.

SOS ORACLE DETAIL MEMORY AND NETWORK

The Oracle Detail Memory and Network Screen

The Oracle Detail Memory and Network screen provides statistics about memory allocation and network transfers.

To access the Oracle Detail Memory and Network screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu.
- 2 From the Screen Selection Menu, enter **N** (upper case). An example of the screen is shown in Figure 37.1.

```
SOS B.02g  jackal          FRI, 17 AUG 2001, 11:35      E: 00:33:24      I: 01:00
Instance:  dev             Oracle Detail Memory and Network

                                Memory

                                Session

Free Memory:                  1325k          UGA Memory:        1657787k
DB Block Buffers:             16384k         UGA Memory Max:    7039140k
Log Buffers:                  20272k         PGA Memory:        40077021k
Dict Cache:                   650k           PGA Memory Max:    40089850k
SQL Area:                     2549k
Lib Cache:                    600k

                                Network (SQL*Net)

Bytes sent to client:          14264 [ 1894260]
Bytes received from client:    11535 [ 1561267]
Roundtrips (client):           47 [ 11277]
Bytes sent to dblink:          0 [ 0]
Bytes received from dblink:     0 [ 0]
Roundtrips (dblink):           0 [ 0]

SUCCESSFULLY COLLECTED

Enter command: _
```

Figure 37.1 SOS Oracle Detail Memory and Network screen

Oracle Detail Memory and Network Display Items

SGA

The SGA section of the screen presents statistics related to the SGA.

Table 37.1 *SOS Oracle Detail Memory and Network data items: SGA*

Data Item	Description
Free Memory	The amount of memory available. If a large amount of free memory is available for long periods of time, consider increasing the sizes of other memory areas.
DB Block Buffers	The size of the buffer cache.
Log Buffers	The size of the redo log buffer area.
Dictionary Cache	The size of the data dictionary cache.
SQL Area	The shared SQL area size.
Lib Cache	The size of the library cache.

Session

The Session section of the screen contains memory statistics that show the amount of memory allocated to all users both inside and outside the global area.

Table 37.2 *SOS Oracle Detail Memory and Network data items: Session*

Data Item	Description
UGA Memory	The size of the User Global Area.
UGA Memory Max	The maximum size of the UGA.
PGA Memory	The size of the Program Global Area.
PGA Memory Max	The maximum size of the PGA.

Network

The Network section of the screen presents statistics for the network (SQL* Net).

Table 37.3 *SOS Oracle Detail Memory and Network data items: Network*

Data Item	Description
Bytes Received from Client	These two statistics show the traffic between SQL*NET clients and the server, in bytes.
Bytes Sent to Client	
Round-trips (client)	The number of times a message was sent and an acknowledgement was received.
Bytes Received from dblink	These two statistics show the SQL* Net traffic for database links, in bytes.
Bytes Sent to dblink	
Round-trips (dblink)	The number of times a message was sent and an acknowledgement was received for database links.

SOS ORACLE DETAIL ROLLBACK SEGMENTS

The Oracle Detail Rollback Segments Screen

Rollback segments are the segments in which Oracle puts the rollback data when data is modified during a transaction. It provides consistent data for the other readers and in case of a rollback it is used to bring the data to its previous state.

To view statistics related to Oracle rollback segments:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu.
- 2 From the Screen Selection Menu, enter **K** (upper case) from any SOS display screen. An example of this screen is shown in Figure 38.1.

SOS B.02g jackal FRI, 17 AUG 2001, 11:35 E: 00:33:24 I: 01:00				
Instance: dev Oracle Detail Rollback Segments				
SUCCESSFULLY COLLECTED				
Name	Waits	Gets	Writes	Hit Ratio
RBS4	0	13	1920	100.00
RBS0	0	6	1790	100.00
RBS3	0	6	1656	100.00
RBS6	0	6	1656	100.00
RBS1	0	6	130	100.00
RBS5	0	6	130	100.00
RBS2	0	6	130	100.00
SYSTEM	0	4	0	100.00
Enter command: _				

Figure 38.1 SOS Oracle Detail Rollback Segments screen

Oracle Detail Rollback Segments Display Items

The Oracle Detail Rollback Segments data items are described in the next table.

Table 38.1 *SOS Oracle Detail Rollback Segments data items*

Data Item	Description
Waits	The number of waits for data from a rollback segment.
Gets	The number of readings from a rollback segment.
Writes	The number of writes in the rollback segment.
Hit Ratio	$[(1 - \text{waits} / \text{gets}) * 100]$

SOS ORACLE DETAIL CACHE

The Oracle Detail Cache Screen

The Oracle Detail Cache screen displays the most important statistics related to Oracle cache management. All of these statistics refer to the Shared Global Area (SGA). Since memory access is much faster than disk access, tuning this area is very important. For best performance results, Oracle should read as much as possible from memory and limit its disk access.

To access the Oracle Detail Cache screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu.
- 2 From the Screen Selection Menu, enter **C** (upper case). An example of the screen is shown in Figure 39.1.

SOS B.02g jackal		FRI, 17 AUG 2001, 11:36		E: 00:34:27		I: 01:02	
Instance: deu		Oracle Detail Cache					
Row Cache				Library Cache			
Hit Ratio:		91.58 [99.26]		Hit Ratio:		100.00 [99.69]	
DB Block Gets:		128 [20361]		User Calls:		63 [11966]	
Consistent Gets:		74 [184495]		Recursive Calls:		192 [49671]	
Physical Reads:		17 [1511]		Exec Count:		53 [9923]	
Redo Buffer				Parse Cnt (tot): 69 [9802]			
Redo Syn Wrts:		8 [808]		Parse Cnt (hard): 0 [142]			
Redo Logspc Req:		0 [6]		Pins: 156 [30114]			
				Reloads: 0 [92]			
Waits				Data Dict Cache			
Free List:		0 [0]		Hit Ratio:		100.00 [99.86]	
Sys Undo Block:		0 [0]		Gets:		6 [53111]	
Sys Undo Header:		0 [0]		Get Misses:		0 [70]	
Undo Block:		0 [5]					
Undo Header:		0 [0]					
SUCCESSFULLY COLLECTED							
Enter command: _							

Figure 39.1 SOS Oracle Detail Cache screen

Oracle Detail Cache Display Items

Row Cache

The Row Cache screen section refers to the portion of SGA where Oracle keeps row buffers.

Table 39.1 *SOS Oracle Row Cache data items*

Data Item	Description
Hit Ratio	$[1 - \text{physical reads} / (\text{consistent gets} + \text{db block gets})] * 100$ The sum of db block gets and consistent gets represents the number of logical reads performed by the database.
DB Block Gets	The number of blocks accessed via single block gets (not through the consistent get mechanism). This statistic is incremented when a block is read for update and when segment header blocks are accessed.
Consistent Gets	The number of accesses made to the block buffer to retrieve data in a consistent way. The SCN (System Change Number) is used to make sure the data being read has not changed since the query was started.
Physical Reads	The number of blocks read from the disk requests. Reading from temporary data segments does not increment this value. Even if the read is a multi-block read, this statistic is incremented only by 1.

Library Cache

The Library Cache portion of the Oracle Detail Cache screen refers to SQL cache and parsing.

Table 39.2 *SOS Oracle Library Cache data items*

Data Item	Description
Hit Ratio	$(1 - \text{reloads/pins}) * 100$
User Calls	The number of logons, statement parsing, and statement executions.
Recursive Calls	The number of SQL statements generated by the Oracle kernel rather than by user applications.
Exec Count	The number of execute requests and cursors opened.

Data Item	Description
Parse Cnt (tot)	The number of parse requests. This number is incremented for each parse request, even if the query is already parsed in the cache.
Parse Cnt (hard)	The number of parse requests that result in a load of the cursor into the cursor cache and the building of the plan tree.
Pins	The number of times a PIN was requested for objects from the library cache.
Reloads	The number of PINs of objects which are not the first PIN performed since the object handles were created, and which requires loading the objects from disk.

Redo Buffer

The Redo Buffer portion of the Oracle Detail Cache screen displays information about the "dirty" buffers. The changes have to be written into the redo logs.

Table 39.3 *SOS Oracle Redo Buffer data items*

Data Item	Description
Redo Syn Wrts	This statistic reflects the number of user commits, the number of checkpoints, and the number of log switches. Its value is incremented every time a write in the log files occurs.
Redo Logspc Req	<p>The "Redo Logspc Req" statistic reflects the number of times a user process waits for space in the redo log buffer area of the SGA.</p> <p>Usually, a space request will be associated with a log switch. This wait is often caused by the archiver being lazy and the log writer not being able to write from the log buffer to the redo log because the redo log has not been copied by the ARCH process.</p> <p>If the value of this statistic is non-zero, setting a bigger value for the LOG_BUFFER parameter in the init.ora file should increase the size of the redo log buffer area of the SGA.</p> <p>Increasing the size of the online redo log files can also help decrease the number of waits associated with redo log entries as fewer log switches happen.</p> <p>This statistic should ideally be zero. It is a key performance indicator.</p>

Waits

The Waits data items are described in the next table. Oracle waits should be minimized as possible.

Table 39.4 *SOS Oracle Waits data items*

Data Item	Description
Free List	The number of waits for free lists. If this number is too high, you could reduce free lists wait by increasing the FREELIST parameter for tables.
NOTE The next four values could indicate rollback conflicts.	
Sys Undo Block	The number of waits for blocks for the SYSTEM rollback segment other than headers.
Sys Undo Header	The number of waits for the buffers that contain the header blocks for the SYSTEM rollback segment.
Undo Block	The number of waits for blocks (except headers) for rollback segments other than SYSTEM.
Undo Header	The number of waits for the buffers that contain the header blocks for rollback segments other than SYSTEM.

Performance Tip

To reduce rollback conflicts, new rollback segments could be added. Undo header wait occurs if there are not enough rollback segments to support the number of concurrent transactions. Undo header wait occurs when multiple users update records in the same block at the same time.

Data Dict Cache

The Data Dict Cache screen section displays information about the portion of memory in which Oracle keeps information about database structure in memory. The data items are described in the next table.

Table 39.5 *SOS Oracle Data Dict Cache data items*

Data Item	Description
Hit Ratio	$(1 - \text{gets/getmisses}) * 100$
Gets	The number of get requests from the data dictionary.

SOS ORACLE DETAIL CACHE ·
Oracle Detail Cache Display Items ·
·

Data Item	Description
Get Misses	The number of misses for get requests from the data dictionary—get requests for which the data was not found in the cache and had to be read from disk.

SOS ORACLE DETAIL EVENTS

The Oracle Detail Events Screen

The Oracle Detail Events screen provides statistics related to Oracle database events.

To access the Oracle Detail Events screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu.
- 2 From the Screen Selection Menu, enter **E** (upper case). An example of the screen is shown in Figure 40.1.

SOS B.02g jackal		FRI, 17 AUG 2001, 11:36		E: 00:34:27 I: 01:02	
Instance: dev		Oracle Detail Events			
DB File			Log File		
Sequential Read	7 [	651]	Sequential Read:	0 [	6]
Scattered Read:	0 [	0]	Sync:	0 [	805]
Parallel Read:	0 [	0]			
Single Write:	0 [	0]	Single Write:	0 [	12]
Parallel Write:	0 [	111]	Parallel Write:	8 [	864]
File			Control File		
Identify:	0 [	12]	Sequential Read:	24 [	2835]
Open:	9 [	1069]	Parallel Write:	20 [	722]
			Refresh Command:	4 [	453]
Net Events					
SQL*Net break/reset to client:				0 [	30]
SQL*Net message from client:				47 [	11932]
SQL*Net message to client:				47 [	11934]
SUCCESSFULLY COLLECTED					
Enter command:					

Figure 40.1 SOS Oracle Detail Events screen

Oracle Detail Events Display Items

The data values in brackets ([]) are cumulative values for the period since SOS was started. (The length of this "elapsed" time is displayed in the SOS banner line as "E: HH:MM:SS.") The data value outside of the brackets is the count for the current interval (displayed in the banner line as "I: MM:SS").

DB File

The DB File section of the Oracle Detail Events screen displays counts of various db file events.

Table 40.1 *SOS Oracle Detail Events data items: DB File*

Data Item	Description
Sequential Read	The number of times the session waited while a sequential read from the database was performed. Sequential reads are also used to rebuild the control file, dump datafile headers, and get the database file headers.
Scattered Read	The number of times the session waited while a read from multiple data blocks was performed.
Parallel Read	The number of times during recovery that database blocks that need to be changed as part of recovery are read in parallel from the database.
Single Write	The number of times the session waited for the writing of the file headers.
Parallel Write	The number of times the DBWR process performed a parallel write to files and blocks.

Log File

The Log File section shows counts of log file events.

Table 40.2 *SOS Oracle Detail Events data items: Log File*

Data Item	Description
Sequential Read	The number of times the session waited for the read from a log file to return. This event is used to read redo records from the log file.
Sync	The number of times a user session committed, and flushed the session's redo information to the redo log file.

Data Item	Description
Single Write	The number of times the session waited for the write to a logfile to complete.
Parallel Write	The number of times redo records were written to the redo log files from the log buffer.

File

The File section shows file event counts.

Table 40.3 *SOS Oracle Detail Events data items: File*

Data Item	Description
Identify	The number of times the identify event was used to identify a file so that it could be opened later.
Open	The number of times the open event was used to open a file.

Control File

The Control File section displays control file event statistics.

Table 40.4 *SOS Oracle Detail Events data items: Control File*

Data Item	Description
Sequential Read	<p>The number of times a read from the control file occurred. For example, to:</p> <ul style="list-style-type: none"> • Make a backup of the control files. • Share information between instances from the control file. • Read other blocks from the control files. • Read the header block.
Parallel Write	<p>The number of times a parallel write occurred when the session was writing physical blocks to all control files. This event can take place when:</p> <ul style="list-style-type: none"> • The session starts a control file transaction to make sure that the control files are up-to-date in case the session crashes before committing the control file transaction. • The session commits a transaction to a control file, changing a generic entry in the control file, and the new value is written to all control files.

Data Item	Description
Refresh Command	The number of times Oracle issued a command to refresh the control file for a database.

Net Events

The Net Events section displays counts related to net events.

Table 40.5 *SOS Oracle Detail Events data items: Net Events*

Data Item	Description
SQL* Net break/reset to client	The number of times the server sent a break or reset message to the client—the session running on the server waited for a reply from the client.
SQL* Net message from client	The number of times the server process (foreground process) waited for a message from the client process to arrive.
SQL* Net message to client	The number of times the server (foreground process) sent a message to the client.

SOS ORACLE DETAIL DBWR

The Oracle Detail DBWR Screen

The Oracle Detail DBWR screen provides statistics about the DBWR process; the process that writes the modified buffers into a database.

To access the Oracle Detail DBWR screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu.
- 2 From the Screen Selection Menu, enter **B** (upper case). An example of the screen is shown in Figure 41.1.

SOS B.02g jackal		FRI, 17 AUG 2001, 11:36		E: 00:34:27 I: 01:02	
Instance: dev		Oracle Detail DBWR Activity			
DBWR					
Chkpnt Buf Wrtn:	18	[	1929]	Lru Scans:	0 [0]
Trans Table Wrts:	0	[	0]	Sum Scan Depth:	0 [0]
Undo Block Writes:	0	[	318]	BuFs Scanned:	0 [0]
Rev bng-wrtn Buf:	0	[	49]	Chkpnts:	0 [0]
Make Free Rqs:	0	[	148]	Forced Writes:	0 [0]
Free BuFs Found:	0	[	0]		
Background Checkpoints			Inspected		
Started:	0	[	0]	Dirty Buffers:	7 [907]
Completed:	0	[	6]	Free Buffer:	0 [0]
Misc			Requests		
Phys Writes:	0	[	6]	Free Buffer:	0 [1]
Summed Dirty QLen:	0	[	7]		
SUCCESSFULLY COLLECTED					
Enter command: _					

Figure 41.1 SOS Oracle Detail DBWR screen

Oracle Detail DBWR Display Items

DBWR

The DBWR section displays information about the mirror write consistency (MWC) DBWR.

Table 41.1 *SOS Oracle Detail DBWR data items: DBWR*

Data Item	Description
Chkpnt Buf Wrtn	The number of buffers that were written for checkpoints.
Trans Table Wrts	The number of transaction table writes.
Undo Block Writes	The number of transaction table blocks written by DBWR. This value is an indication of how many "hot" buffers were written, leading to write complete waits.
Rev bng-wrtn Buf	The number of times that DBWR tried to save a buffer for writing and found that it was already in the write batch. This statistic is a measure of the amount of "unnecessary" work that DBWR had to do in trying to fill the batch. This can occur because many sources contribute to a write batch. If the same buffer from different sources is considered for adding to the write batch, then all but the first attempt will be unnecessary since the buffer is already marked as being written.
Make Free Reqs	The number of requests to make more buffers free in the LRU section of the buffer cache.
Free Bufs Found	The number of free buffers found that DBWR found to be free when requested to make free buffers. The average number of free buffers is: <i>(DBWR free buffers found / DBWR make free requests)</i>
LRU Scans	The number of scans through LRU chain for more buffers to write.
Sum Scans Depth	Can be divided by LRU scans to determine the average length of the scans through the buffer cache. It is not the number of buffers scanned. If the write batch is filled and a write takes place to disk, the scan depth halts.

Data Item	Description
BuFs Scanned	The number of buffers in the LRU section of the buffer cache scanned by DBWR when it searches for dirty buffers to write to disk. It does not halt as summed scans depth. The average number of buffers being scanned is calculated: <i>(DBWR buffers scanned / DBWR LRU scans)</i>
Chkpnts	The number of times DBWR was signaled to perform a checkpoint by LGWR.
Forced Writes	The number of blocks forced written.

Background Checkpoints

The Background Checkpoints section data items are described in the next table.

Table 41.2 *SOS Oracle Detail DBWR data items: Background Checkpoints*

Data Item	Description
Started	The number of background checkpoints started.
Completed	The number of background checkpoints completed.

Performance Tip

The background checkpoints started and completed values should differ by 1. If the difference is greater than 1, DBWR is falling behind, and the size of the log files should be increased, or the buffer cache is too small.

Inspected

The Inspected section data items are described in Table 41.3.

Table 41.3 *SOS Oracle Detail DBWR data items: Inspected*

Data Item	Description
Dirty Buffers	The number of dirty buffers found in the cache. If the value is large or continues to increase, DBWR is not keeping up with the workload.
Free Buffers	The number of free buffers found in the cache.

Misc

The Misc section data items are described in the next table.

Table 41.4 *SOS Oracle Detail DBWR data items: Misc*

Data Item	Description
Phys Writes	The number of writes to disk, to both data files and log files made by DBWR and LGWR. This statistic is incremented by 1 regardless if it was a single-block write or a multiple-block write.
Summed Dirty Qlen	The sum of the dirty LRU queue length after every write request. Divide by write requests to get the average queue length after write completion.

Requests

The Requests section data item is described in the following table.

Table 41.5 *SOS Oracle Detail DBWR data item: Requests*

Data Item	Description
Free buffers	The number of free buffer requests. A free buffer request happens when data is inserted into a database, every time a new block is required. When data is updated, free buffers are requested to contain rollback information.

SOS ORACLE DETAIL DATAFILES

The Oracle Detail Datafiles Screen

The Oracle Detail Datafiles screen displays the first 10 datafiles in order of their activity, listing the most active first. To speed up the database, the datafiles should be distributed, if possible, based on their activity on multiple disks—even with different controllers.

To access the Oracle Detail Datafiles screen from any SOS display screen:

- 1 Type **s** from the SOS Enter command: prompt to view the Screen Selection Menu.
- 2 From the Screen Selection Menu, enter **S** (upper case). An example of the screen is shown in Figure 42.1.

```
SOS B.02g jackal FRI, 17 AUG 2001, 11:37 E: 00:35:28 I: 01:01
Instance: dev Oracle Detail Datafiles
SUCCESSFULLY COLLECTED
No Name Tablespace Reads Writes Blk Reads Blk Writes Size
4 temp01.dbf TEMP 5 18 17 18 51.88
3 rbs01.dbf RBS 0 1 0 1 70.00
1 system01.dbf SYSTEM 0 0 0 0 228.38
6 indx01.dbf INDX 0 0 0 0 20.00
7 drsys01.dbf DRSYS 0 0 0 0 20.00
5 users01.dbf USERS 0 0 0 0 20.00
2 tools01.dbf TOOLS 0 0 0 0 10.00

Enter command:
```

Figure 42.1 SOS Oracle Detail Datafiles screen

Oracle Detail Datafiles Display Items

The Oracle Detail Datafiles data items are described in the next table.

Table 42.1 *SOS Oracle Detail Datafiles data items*

Data Item	Description
Reads	The number of reads.
Writes	The number of writes.
Blk reads	The number of block reads.
Blk writes	The number of block writes.
Size	The size of the datafile, in megabytes.

SOSLOGD

The Historical Performance Data Logging Utility

The SOS Performance Advisor application suite includes a data logging utility called SOSLOGD. SOSLOGD enables the user to collect historical system performance data for analysis of performance problems and trends. The data is collected and stored in SL (system log) files for later use by SOS or SOSLOGX.

Data can be logged three ways:

- A single, one-time-only, session.

The length of the data collection period is determined by the user.

- Repeatedly, by retreaming the collector.

The logging job must be stopped manually with the `lpskill` command.

- Scheduled, using the cron facility.

For example, Monday through Friday, 06:30 AM to 6:30 PM.

SL Files

SOSLOGD creates one logical file record for every batch interval. The default interval is 10 minutes (600 seconds). The log file is saved in the SOS Performance Advisor log directory and named using the format *SLyyjjjs*.

- *SL* represents the SOS log file.
- *yy* represents the current year.
- *jjj* represents the Julian day of the year.
- *s* represents the sequence of the log (up to 26 characters, from a through z).

Starting the Logging Process

To begin the collection process, enter **soslogd** at the shell prompt of your home directory. It is assumed that your path statements are set up properly.

Configuring SOSLOGD Run Time

By default, SOSLOGD will run, collecting host data, until midnight (23:59). The run time can be configured to run repeatedly or at specific intervals by using either the `-c` command line switch or the cron facility.

-c Command Line Switch

Enter **soslogd -c** at the shell prompt of your home directory to modify the SOSLOGD run time configuration. The effects of the command line switches vary depending on whether you are using the default or advanced configuration parameters (see

cron

The `-c` switch should not be used in conjunction with cron. cron should be used if the user wants soslogd to run only during specific hours. For example, to run soslogd from 8AM to 6PM, configure it to run 10 hours, then configure a cron job to start it every day at 8AM.

The functions of each command line switch is summarized in the next table.

Table 43.1 *SOSLOGD command line switch functions*

Switch	Default Configuration	Advanced Configuration
-c	Log continuously (24 hours) by restarting at 00:00 hours.	Log until the RunTime value has expired, and then automatically restream.
-h	Display all available command line switches	
-o	Display the default configuration.	Display the configuration parameters in the .soslogdrc file.

Viewing Default Configuration Parameters

To view the default configuration parameters for your system, type **soslogd -o** from your home directory. The default parameters are described in Table 43.2.

Table 43.2 *SOSLOGD default configuration parameters*

Parameter	Description
Enter duration of job in minutes (0)	The collector will run until midnight. When used with the -c command switch, the collector will automatically restream itself immediately.
Interval time in seconds (600)	The program will take a sample and write a log record every 10 minutes.
Company name ()	The company name is blank, by default.
Display advice messages (Y)	SOSLOGD will display advice messages.

Setting Advanced Configuration Parameters

To create a custom configuration parameter file:

- 1 Create a custom file (.soslogdrc) with your editing program, listing the parameters as described:
 - **RunTime** The amount of time (minutes) SOS Performance Advisor will monitor your system's processes.
 - **CycleTime** The amount of time (seconds) between samples.
 - **CompanyName** Your company name (added to the title of each log report). (This can be the name of your system or another subheading, if desired.)
- 2 Place the .soslogdrc file in your home directory (the same directory as soslogd) to enable batch logging parameters.
- 3 To change the configuration, edit the parameters in the .soslogdrc file. For example:
 - To collect data in one-hour batches, change the batch run time to 60 minutes by typing **RunTime=60**.
 - To shorten the interval time to five minutes (300 seconds), type **CycleTime=300**.
 - To add the name of your company (or another subheading) to the title of each log report, type **CompanyName=<your company's name>**.

Configuration Variables

The configurations outlined in Table 43.3 can be found in the .soslogdrc file.

Table 43.3 *SOSLOGD default configuration variables*

Variable	Type	Min	Max	Default	Description
RunTime	integer	0	1440	0	Duration of job in minutes
CycleTime	integer	10	3600	600	Interval time in seconds
CompanyName	string	N/A	N/A	<blank>	Company name
DisplayAdvice	Y/N	N/A	N/A	Y	Display advice messages
ProcLog	Y/N	N/A	N/A	Y	Log processes
ProcCPUThreshold	integer	0	100	0	CPU percentage required for process display
ProcOnlyActive	Y/N	N/A	N/A	Y	Log only active processes
LogInteractProc	Y/N	N/A	N/A	Y	Display attached processes
LogNonInteractProc	Y/N	N/A	N/A	Y	Log non-interactive processes, including daemons and batch processes).
LogDeadProc	Y/N	N/A	N/A	Y	Log processes that died
ProcLogonFilter	reg exp	N/A	N/A	.*	Process logon filter
ProcSortOpt	integer	1	8	4	Process sort options: 1 - sort by PID# 2 - sort by Logon Terminal 3 - sort by Workload group 4 - sort by CPU time 5 - sort by Disc I/O 6 - sort by Term reads 7 - sort by Priority 8 - sort by Wait State
ProcSortAscend	Y/N	N/A	N/A	N	Log processes sorted in ascending order
ProcLogLimit	integer	1	127	10	Maximum number of processes to be logged per interval

SOSLOGX

The Historical Performance Data Extraction Utility

SOSLOGX is the historical data counterpart to SOS. It provides the means for reviewing performance data stored in the log files that soslogd has collected. The user interface is similar in many ways to SOS. The main difference is that the SOSLOGX screens do not display current samples of online performance data. Instead, they display historical data collected by SOSLOGD.

The primary functions of SOSLOGX are:

- To browse through the data recorded in your log files using a variety of screen reports. This is usually done to identify periods of system activity that may require further analysis.
- To prepare logged performance data from the log files for Performance Gallery Gold, a 32-bit, full-color graphical analysis and reporting application from Lund Performance Solutions.

Getting Started

To run SOSLOGX:

- 1 From your home directory, enter **soslogx** (lowercase) at the prompt. The initial SOSLOGX screen will display (see Figure 44.1)



NOTE To view the screen without soft function keys, add the -k command key switch.

```

*****
SOSLOGX Performance Advisor B.01y
Copyright 1991-2000(c) Lund Performance Solutions
*****

                Initializing...
This product licensed to: LPS Demo License 6c-10

Checking logfile catalog ...

Adding SL01089A
Adding SL01089C
14 log files with dates 03/12/01 - 05/11/01

<Hit return to continue>

Enter initial sample date (00/00/00):
Enter initial sample time (10:04): _

```

Figure 44.1 *SOSLOGX initial screen*

- 2 When SOSLOGX is run for the first time on a system, it creates a catalog of the SL files located in the working directory. The catalog is saved as a file (.sllogcat) in the same location as the SL files. At subsequent startups, SOSLOGX will check to see if the catalog exists. It will create a new catalog if the previous catalog cannot be found.
- 3 Enter the following information as prompted:
 - a The start date of the initial sample using the format mm/dd/yy. If you do not provide a date, the program will retrieve the earliest sample date recorded by default. Press Enter.
 - b The start time using the format hh:mm. If you do not provide a start date, the program will retrieve the start time of the earliest sample data recorded, by default.

The first SOSLOGX data report, the CPU Summary screen, will display. Information about each SOSLOGX report is provided in "SOSLOGX Reports" on page 261.

The SOSLOGX commands and menus are described in "SOSLOGX Menus and Options" on page 243.

Command Line Switches

Use command line switches to modify the SOSLOGX configuration. Enter **soslogx -h** at the shell prompt of your home directory to view all available command line switches. The functions of each command line switch is summarized in Table 44.1.

Table 44.1 *SOSLOGX command line switch functions.*

Switch	Function
-h	Displays available command line switches.
-j	Forces SOSLOGX into job mode. NOTE When input is redirected from a pipe or a file (not from a terminal), SOSLOGX is forced into job mode regardless of whether or not the -j command line switch is used.
-k	Disables function keys (when function keys are available).
-o	Displays configuration options on startup (batch mode).
-u<filename>	Specifies alternate user configuration filename.
-x	Enables process export file report.
-y<filename>	Specifies alternate system configuration filename.
-z	Disables the "Are you sure you want to exit?" dialog.

Browsing SOSLOGX Reports

- 1 The first SOSLOGX report displayed is the CPU Summary report. Begin by scrolling through this report using the commands keys.
 - The commands shown in the SOSLOGX Main Commands screen are discussed in "SOSLOGX Menus and Options" on page 243.
 - Look for points within the data that show high CPU utilization percentages and/or high response time rates.
- 2 Compare the CPU data with information displayed in other SOSLOGX reports, which can be selected from the SOSLOGX Report Format Selection Menu.
 - The Report Format Selection Menu is explained in "SOSLOGX Menus and Options" on page 243.
 - Each SOSLOGX report is described in "SOSLOGX Reports" on page 261.
- 3 The appearance of the reports displayed can be modified. Use the display options described in "SOSLOGX Menus and Options" on page 243.

Preparing Logged Data for Export

The data logged by SOSLOGD can be prepared in SOSLOGX for export to either Performance Gallery Gold or another third-party application.

Exporting Data to Performance Gallery Gold

Setting the Performance Gallery Configuration

If needed, you can change the configuration of the export file with the options provided in SOSLOGX.

- 1 From any SOSLOGX report display, type **o** to access the SOSLOGX MAIN OPTION MENU.
- 2 Select the Performance Gallery configuration (SUBMENU) option.
- 3 Select the Export Data configuration (SUBMENU) option.
- 4 Check the configuration of the export data. Make modifications as needed. (For more information about this configuration menu, see "Export Data configuration Submenu" on page 257.) Press the Enter key to exit the submenu.
- 5 From the Performance Gallery configuration submenu, select the Export Thresholds configuration (SUBMENU) option.
- 6 Set the export thresholds. (The options in the Export Thresholds configuration submenu are described in "Export Thresholds configuration Submenu" on page 259.) Press the Enter key to exit the submenu.
- 7 Press the Enter key to exit the Performance Gallery configuration submenu.
- 8 Press the Enter key again to exit the SOSLOGX MAIN OPTION MENU.

Creating the PGG Export File

From any SOSLOGX report display, type **P** to start the process. Respond to the following prompts:

- Enter Performance Gallery export file
- Enter start date for Performance Gallery (mm/dd/yy)
- Enter start time for Performance Gallery (hh:mm)
- Enter end date for Performance Gallery (mm/dd/yy)
- Enter end time for Performance Gallery (hh:mm)

SOSLOGX will read the log files that meet the date and time criteria entered, then write the eligible data to the specified export file. If a directory path is not given for the export file, the file will be written to the current working directory.

Exporting Data to Third-party Applications

Setting the Export File Configuration

If needed, you can change the configuration of the export file with the options provided in SOSLOGX.

- 1 From any SOSLOGX report display, type **o** to access the SOSLOGX MAIN OPTION MENU.
- 2 Select the Export file configuration (SUBMENU) option.
- 3 Check the configuration of the export data. Make modifications as needed. (For more information about this configuration menu, see “Export Data configuration Submenu” on page 257.) Press the Enter key to exit the submenu.
- 4 Press the Enter key again to exit the SOSLOGX MAIN OPTION MENU.

Creating the Export File

From any SOSLOGX display, type **R** to start the process. Reply to the following prompts:

- Enter data export file
- Enter start ascii dump date (mm/dd/yy)
- Enter start ascii dump time (hh:mm)
- Enter end ascii dump date (mm/dd/yy)
- Enter end ascii dump time (hh:mm)
- Single record extract (Y/N)

SOSLOGX will read the log files that meet the date and time criteria entered, then write the eligible data to the specified export file. If a directory path is not given for the export file, the file will be written to the current working directory.

Creating Custom Reports

The log reports generated by SOSLOGX are user-configurable.

To create a custom SOSLOGX report, create an ASCII report configuration file that defines the report, then use the `sosrcom` report compiler to compile the ASCII files into a master report definition file called `reprtdef`.



NOTE The `sosrcom` report compiler must be run in the `lps` file structure in order to update the report definition file, `reprtdef`, used by SOSLOGX.

The `sosrcom` report compiler uses the commands listed in the following table.

Table 44.2 *sosrcom report compiler commands*

Command	Description
ADD <file name>	Adds the specified configuration file to the master report definition file, <code>reprtdef</code> .
DEL <report name>	Deletes the specified configuration file from <code>reprtdef</code> .

Command	Description
DUMP <report name>	Dumps existing report internal information.
EXIT	Exits the report compiler, sosrcom.
HELP	Displays the online help information.
LIST	Displays a brief list of all reports in the reptdef file.
REBUILD	Rebuilds the report configuration file.
UPDATE <file name>	Updates the existing configuration file to reptdef.

SOSLOGX Report Configuration Rules

Delimiters

In all file specification lines, blanks and commas can be used interchangeably for delimiters. Blank lines can be inserted anywhere except in the text specifications associated with \$HEAD and \$TEXT lines.

Order of Items

Items must be specified in the following order:

- 1 TITLE, KEY, LENGTH, and LINES
- 2 HEAD specifications, if any
- 3 TEXT specifications, if any
- 4 ITEM and BAR specifications

Syntax of Specification Lines

The various specification lines are formatted using the following syntax.

\$TITLE "<report name>"

Required. This line specifies the name of the report.

\$KEY "<line 1>," "<line 2>," <keycode>

Required. This line specifies the function key used to select this report format (when function keys are available).

- <line 1> is the first function key label line.
- <line 2> is the second function key label line.
- <keycode> is the two-digit code that specifies which function key should be used. The first digit specifies the keyset. The second digit identifies a function key with that keyset (1-5). This field is optional. If not entered, the default is the first available function key.

\$LENGTH <length>

Optional. This line specifies the maximum report line length. The <length> value cannot exceed 132. The default is 80.

\$LINES <lines>

Optional. This line specifies the number of lines required for each log report. The default value for <lines> is the number of lines specified for \$TEXT. If there is no \$TEXT specification, the default is 1 (one).

\$HEAD <start>

...text lines...

\$END

Optional. This line specifies the report heading text lines. <start> specifies the column in which the specified text starts. The default is 1 (one).

This is used to facilitate entry of long hardcopy report lines with 80-character screen editors. The number of heading lines is defined by the first \$HEAD specification encountered—subsequent \$HEAD specifications may not exceed this number of lines.

\$TEXT <start>

...text lines...

\$END

Optional. These lines specify the fixed text label lines to appear in the log report. <start> specifies the column in which specified text starts. The restrictions for \$HEAD also apply to \$TEXT.

\$DEFINE <identifier> <expression>

Optional. This line associates as an identifier with a string or numeric expression value. The identifiers can be used as item qualifiers in the next section.

- <identifier> is any string sequence up to 32 characters, starting with an alphabetical character.
- <expression> is one of the following:
 - A decimal, hexadecimal, or octal constant.
 - A sequence of up to 4 numerical constants, separated by periods.
 - A string of consecutive, non-blank characters, starting with a non-numeric character.
 - A quoted string, using either double or single quotation marks.
 -

<item-name>[:<qualifier>]<row> <col> <length> <label>

This line specifies on item display.

- <item-name> is the name of the item. Global block items cannot have an item qualifier. All other items must have one.
- <qualifier> is a value that identifies which block in a multiple-block-type item is requested. This can be:
 - The word "Total" (the case must match).
 - A decimal, hexadecimal, or octal constant.
 - An identifier defined in a previous \$DEFINE statement.
- <row> is the row in which the item should be displayed.
- <col> is the column in which the item should be displayed.
- <length> is the width of the field displayed.
- <label> is the unique text string (optional). It is not used by the log reporting program, but will be used by the report editor.
-

\$BAR <row>,<col>,<length>,<label>,<item-name>,"<code>"**\$END <scale>**

This set of lines specifies a horizontal bar chart display, in which:

- <row> is the row in which the bar should be displayed.
- <col> is the column in which the bar should be displayed.
- <length> is the length of the bar chart displayed.
- <label> is a unique text string (optional). This is not used by the log reporting program, but will be used by the report editor.

- <item_name> is the name of the item to display. Disk and workload group items must be qualified. If multiple items are specified, they must all contain the same number of decimal places. This is generally not a problem, because only similar items will be combined in one bar graph, and similar items will all have the same number of decimal places.
- <code> is a single character to be used to represent this item in the bar graph. This can be blank.
- <scale> is the scaling factor. In other words, the total cumulative item value which completely fills the bar chart. It can contain as many decimal places as the specified items.

SOSLOGX Report File Example

There are several SOSLOGX reports stored in /etc/opt/lps/rpt/reprtdef. An example is provided here, for your convenience.

```
$TITLE "Global Summary"
$KEY " GLOBAL ", "SUMMARY ", 12

$TEXT
*** hh:mm *****
+----- CPU Utilization % -----+----- CPU Misc -----+
|   TOTAL BUSY: nnn.n   HIGH PRI:  nnn.n   | Capture      nnn.n   |
| User   nnn.n   Sys   nnn.n   Vflt  nnn.n   | RunQ Avg      nnn.n   |
| Real   nnn.n   Intr  nnn.n   Idle   nnn.n   | 5 Min RunQ Avg  nnn.n   |
| Nice   nnn.n   C Sw  nnn.n           | RunQ Busy %    nnn.n   |
| NNice  nnn.n   Trap  nnn.n           |                   |
|----- Global MEM/VM Statistics -----|
| Read Hit %   nnn.n           Page Outs  nn.n/s           Mem Used %   nn.n   |
| Write Hit %  nnn.n           Deact Byte nnnnn/s           VM Used %    nn.n   |
|----- Global Misc Statistics -----|
| #Sessions:nnnnn #Procs: nnnnn #Wait IO:  nnnnn Ttyin:      nnnnn(nnnnn) |
| #Active:  nnnnn #Active:nnnnn #Deact:    nnnn Avg Response Time: nnnn.n |
|----- Global Disk Statistics -----|
|Disk:Rt/IO%/QL      c0t5d0: nn/nnn/nnnn.n      c0t6d0: nn/nnn/nnnn.n |
+-----+

$END
```

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\$DEFINE D1 c0t5d0

\$DEFINE D2 c0t6d0

TIME 1, 5, 5

CPU-BUSY% 3, 19, 5

CPU-HIGH-PRI-BUSY% 3, 42, 5

CPU-USER% 4, 11, 5

CPU-REAL% 5, 11, 5

CPU-NICE% 6, 11, 5

CPU-NNICE% 7, 11, 5

CPU-SYS% 4, 28, 5

CPU-INTR% 5, 28, 5

CPU-CSW% 6, 28, 5

CPU-TRAP% 7, 28, 5

CPU-VFLT% 4, 45, 5

CPU-IDLE% 5, 45, 5

CPU-CAPTURE 3, 72, 5

CPU-QUEUE-LEN 4, 72, 5

CPU-QUEUE-5M 5, 72, 5

CPU-QUEUE-BUSY% 6, 72, 5

VM-READ-HIT% 9, 17, 5

VM-WRITE-HIT% 10, 17, 5

VM-PAGE-OUT-RATE 9, 45, 4

VM-DEACT-BPS 10, 44, 5

VM-USED-MEM%	9, 74, 4
VM-USED-VM%	10, 74, 4
MISC-SESSIONS	12, 13, 5
MISC-ACT-SESSIONS	13, 13, 5
MISC-PROCESSES	12, 28, 5
MISC-ACT-PROCESSES	13, 28, 5
MISC-PROC-BLOCK-IO	12, 46, 5
MISC-PROC-DEACT	13, 47, 4
MISC-TTYIN-COUNT	12, 66, 6
MISC-TTYIN-RATE	12, 73, 5
MISC-RESP-TIME	13, 72, 6
DISC-IO-RATE:D1	15, 31, 2
DISC-IO%D1	15, 34, 3
DISC-QUEUE-LEN:D1	15, 38, 6
DISC-IO-RATE:D2	15, 64, 2
DISC-IO%D2	15, 67, 3
DISC-QUEUE-LEN:D2	15, 71, 6

SOSLOGX MENUS AND OPTIONS

The SOSLOGX Main Commands Screen

The MAIN COMMANDS screen in SOSLOGX contains a list of single-key shortcut commands that can be invoked from any SOSLOGX display screen.

To display the MAIN COMMANDS menu, type ? from any SOSLOGX screen.

```

                                MAIN COMMANDS

Navigation Keys:
+ - Scroll ahead                > - Skip forward
- - Scroll back                 < - Skip back
s - Report selection menu       t - Select time prompt

Logfile Commands:
i - Display file index          l - Display logfile list
p - Print report                r - Reload report definitions
u - Update

Configuration:
d - Toggle process display      y - Toggle ext. process display
o - Options menu

Exporting Data:
R - Export report               P - Perfcall export
F - Forecast export            c - Report compiler

Other:
m - More Func keys             ^L - Refresh screen
? - Command help (this screen) e - Exit program

                                [Press ESC to return to program]_

```

Figure 45.1 SOSLOGX MAIN COMMANDS screen

Each command is described in the next section of this chapter.

Main Commands

The Curses library enables SOS Performance Advisor to run with non-HP terminals. Host systems using non-HP terminals will not have function keys available to them, therefore, the SOSLOGX key commands have been modified to be more intuitive. However, because the function keys could be removed from the application altogether in the future, use of the command keys is recommended.

Navigation Commands

Table 45.1 *SOSLOGX navigation command keys*

Key(s)	Command
+	Scroll ahead
-	Scroll back
<	Skip backward
>	Skip forward
s	Display the report selection menu
t	Select the time prompt

Logfile Commands

Table 45.2 *SOSLOGX logfile command keys*

Key(s)	Command
i	Display the file index
l	Display the logfile list
p	Print the report
r	Reload the report definitions
u	Update the report

Configuration Commands

Table 45.3 *SOSLOGX configuration command keys*

Key(s)	Command
d	Toggle the process display
o	Display the Options menu
y	Toggle the extended process display

Data Export Commands

Table 45.4 *SOSLOGX data export command keys*

Key(s)	Command
c	Compile the report
R	Export Performance Gallery Gold data

Other Commands

Table 45.5 *SOSLOGX other command keys*

Key(s)	Command
?	Display the Main Commands screen
Ctrl+I	Refresh the screen
e	Exit the program
m	Cycle through the function keys

The SOSLOGX Report Format Selection Menu

The Report Format Selection Menu contains a list of system performance data reports that can be compiled by SOSLOGX.

To display the Report Format Selection Menu, type a lowercase **s** from any SOSLOGX screen.

```

SOSLOGX   B.02g  jackal  Loc:/var/opt/lps/log/  Log: --/--/-- --:--
                        Report Format Selection Menu

  1 CPU Summary Chart          9 NFS Summary
  2 Global Summary            10 Workload Summary
  3 Memory Summary Chart      11 Workload Detail (INTERACT)
  4 Memory Summary            12 Disk Detail (c0t6d0)
  5 Disk Summary              13 Response Time Chart
  6 Disk Summary Chart        14 FS Space Summary
  7 Network Summary           15 DNLC Summary
  8 Net If Summary            16 System Configuration

Press return to go to main screen.
Enter report format option: _

```

Figure 45.2 *SOSLOGX Report Format Selection Menu screen*

To view one of the reports listed in the Report Format Selection Menu, type the report's corresponding command key at the command prompt. The reports are described in detail in "SOSLOGX Reports" on page 261.



NOTE All command keys are case-sensitive.

The SOSLOGX Main Option Menu

The SOSLOGX MAIN OPTION MENU screen contains a set (and several subsets) of options that enable the user to configure the SOSLOGX program.

To access the SOSLOGX MAIN OPTION MENU, type **o** from any SOSLOGX screen.

```
SOSLOGX MAIN OPTION MENU

1) Current log file location (/var/opt/lps/log/)
2) Company name {}
3) Use function keys to select reports (N)
4) Maximum lines per report page (60)
5) Display process information (N)
6) Display extended process line (N)
7) Data break configuration menu (SUBMENU)
8) Log information exclusions (SUBMENU)
9) Export file configuration menu (SUBMENU)
10) Performance Gallery configuration (SUBMENU)

Which Option:
```

Figure 45.3 *SOSLOGX MAIN OPTION MENU*

Main Options

To enable an option:

- 1 Type the option command key from the SOSLOGX MAIN OPTION MENU and press the Enter key.
- 2 Enter a new parameter at the secondary command prompt. Press Enter.
- 3 Press Enter again to exit the SOSLOGX MAIN OPTION MENU.
- 4 At the Should these options be saved permanently? prompt:
 - Press the Enter key to return to the SOSLOGX program without saving the options permanently.
 - Type **Y** (Yes) to save the changes permanently and then press the Enter key.

Information about each option is described to assist you.



NOTE All command keys are case-sensitive.

Current log file location

The current location of the SL log file is shown in parentheses. To load a different log file:

- 1 From the SOSLOGX MAIN OPTION MENU, type the command key for the Current file location option. Press the Enter key.
- 2 At the secondary prompt, type the location of the new SL file. Press the Enter key.

Company name

By default, the company name is not included in the SOSLOGX reports. To add the name of your company or another brief headline for your SOSLOGX reports:

- 1 From the SOSLOGX MAIN OPTION MENU, type the command key for the Company name option. Press the Enter key.
- 2 At the secondary prompt, type a company name, system name, or another headline (up to 43 alpha-numeric characters). Press the Enter key.

The headline is inserted into the banner line of the SOSLOGX report.

Use function keys to select reports

The function keys, when available, are displayed in the bottom portion of the soslogx screens. By default, they are not used to select soslogx reports. To enable/disable the function keys to select reports:

- 1 From the SOSLOGX MAIN OPTION MENU, type the command key for the Use function keys to select reports option. Press the Enter key.
- 2 At the secondary prompt, type **Y** (Yes) to enable the option, or **N** (No) to disable the option. Press Enter.

Maximum lines per report page

By default, soslogx reports contain up to 60 lines of information per page. To increase or decrease the maximum threshold:

- 1 From the SOSLOGX MAIN OPTION MENU, type the command key for the Maximum lines per report page option. Press the Enter key.
- 2 At the secondary prompt, type a new maximum threshold. Press Enter.

Display process information

To include/exclude PROCESS STATISTICS in the Global Summary report:

- 1 From the SOSLOGX MAIN OPTION MENU, type the command key for the Display process information option. Press the Enter key.
- 2 At the secondary prompt, type **Y** (Yes) to enable the option, or **N** (No) to disable the option. Press Enter.

Display extended process line

To include/exclude PROCESS STATISTICS in the Global Summary report:

- 1 From the SOSLOGX MAIN OPTION MENU, type the command key for the Display process information option. Press the Enter key.
- 2 At the secondary prompt, type **Y** (Yes) to enable the option, or **N** (No) to disable the option. Press Enter.

Data break configuration (SUBMENU)

The Data break configuration submenu lists options that average the data into larger units of time, so the system performance is shown for a day, a week, or a month.

To view the Data break configuration submenu, type the command key for the data break configuration option. Press the Enter key.

```

SOSLOGX MAIN OPTION MENU
Data break configuration menu

1) Force data break at end of logfile (N)
2) Force data break at end of day (Y)

Which Option: _
  
```

Figure 45.4 *SOSLOGX Data break configuration submenu*

The Data break configuration options are listed and described in the next table.

Table 45.6 *SOSLOGX Data break configuration options*

Option	Default	Description
Force data break at end of logfile	N	By default, the boundary between datafiles is transparent, or "invisible", to the user. To force a break between datafiles on the report screen, enter Y (Yes).

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Option	Default	Description
Force data break at end of day	Y	By default, there is a break after the last data record for each day. To remove this break, enter N (No).

Log information exclusions (SUBMENU)

The Log information exclusions submenu contains options that can be set to exclude specific day and time ranges from the data display. The excluded data will not actually be removed from the SL file, but it will not appear in the soslogx reports.

The Log information exclusions options enable the user to exclude performance data collected during days or periods of low and or unusual activity that could skew analysis of the system's general performance.



NOTE Do not exclude log information when preparing data for export to the Performance Gallery Gold application. Ensure the default settings are enabled.

To view the Log information exclusions submenu, type the command key for the Log information exclusions option from the SOSLOGX MAIN OPTION MENU (see Figure 45.5).

```
SOSLOGX MAIN OPTION MENU
Log information exclusions
```

```
  1) Exclusions enabled (N)
  --- Exclude holidays
  --- Exclude day range
  ---      to
  --- Exclude time range
  ---      to
  --- Exclude time range
  ---      to
  --- Exclude time range
  ---      to
  --- Exclude time range
  ---      to
```

```
Which Option: _
```

Figure 45.5 SOSLOGX Log information exclusions submenu

The Log information exclusions options are listed and described in the next table.

SOSLOGX MENUS AND OPTIONS
The SOSLOGX Main Option Menu

Table 45.7 *SOSLOGX Log information exclusion options*

Option	Default	Description
Exclusions enabled	N	By default, exclusions are disabled. To set and enable one or more exclusions, type Y (Yes) and press Enter—the subsequent options will be activated.
Exclude holidays	N	To exclude holidays (as defined in the holidays.dat file), type Y (Yes) and press Enter. For information about the holiday.dat file, see “SOS holidays File” on page 72.
Exclude day range	0=None	To exclude a range of days, type the corresponding number of the first day in the range of days. For example: 0=None (exclude no days) 1=Sunday 2=Monday 3=Tuesday 4=Wednesday 5=Thursday 6=Friday 7=Saturday
to	0=None	Type the corresponding number of the last day in the excluded day range.
Exclude time range	00:00	To exclude a specific range of time, type the start of this range in hours and minutes (hh:mm).
to	00:00	Type the end of the excluded time range (hh:mm).

Additional time ranges can be excluded. The progression of options allows up to four different time ranges to be excluded from each day or day range. For example, to report data for normal business hours only (Monday through Friday, 8:00 AM to 5:00 PM, no holidays), you would exclude data from weekends, holidays, the early morning hours, and the night-time hours.

Export file configuration menu (SUBMENU)

The options in the Export file configuration submenu will format the file that receives the logged data to be exported to a third-party application for analysis. The purpose of these options is to make the file format compatible with the import functions of popular spreadsheet, database, and graphics applications.



NOTE Do not employ these options when preparing data for export to the Performance Gallery Gold application. Ensure the default settings are enabled.

To view the Export file configuration submenu, type the command key for the Export file configuration menu option from the SOSLOGX MAIN OPTION MENU.

```
SOSLOGX MAIN OPTION MENU
Export file configuration menu

  1) Generate item label heading line (Y)
  2) Enclose item labels in quotes (Y)
  3) Include log date in data line (N)
--- Date format option
--- Enclose date in quotes
  6) Include log time in data line (Y)
  7) Time format option (1-24 hr)
  8) Enclose time in quotes (Y)
  9) Separate items with commas (Y)
```

Which Option:

Figure 45.6 SOSLOGX Export file configuration submenu

The Export file configuration options are listed and described in the next table.

Table 45.8 SOSLOGX Export file configuration options

Option	Default	Description
Generate item label heading line	Y	The item label heading line is provided by default. To eliminate the heading line, choose N (No).

SOSLOGX MENUS AND OPTIONS
The SOSLOGX Main Option Menu

Option	Default	Description
Enclose item labels in quotes	Y	The data item labels are enclosed in quotation marks (" "). To eliminate the quotation marks, choose N (No).
Include log date in data line	N	To include the log date in the data line, enter Y (Yes). The two subsequent options will be activated.
Date format option	1-mm/dd/yy	To change the format of the log date, enter the corresponding number: 1=mm/dd/yy 2=mmddyy 3=dd mmm yy 4=dd.mm.yy
Enclose date in quotes	Y	The log date will be enclosed in quotation marks, by default. To remove the quotation marks, enter N (No).
Include log time in data line	Y	The log time will be included in the data line. To eliminate this information from the data line, enter N (No).
Time format option	1=24 hr	The time format options are: 1=24 hr 2=AM/PM
Enclose time in quotes	Y	The log time will be enclosed in quotation marks, by default. To remove the quotation marks, enter N (No).
Separate items with commas	Y	By default, the data items in the export file are comma-delimited. To send the data without commas, enter N (No).

Forecast data reduction configuration (SUBMENU)

If you are licensed to use Forecast Capacity Planner, the Forecast data reduction configuration option is available from the SOSLOGX MAIN OPTION MENU. Use this menu to set parameters for the Forecast export file.

```

SOSLOGX MAIN OPTION MENU
Forecast data reduction configuration

1) Workload analysis period minimum time (10)
2) Workload analysis period decay percentage (95)
3) Workload analysis start buffer time (10)
4) Workload analysis end buffer time (10)
5) Load sample analysis period minimum time (60)
6) Load sample analysis period decay percentage (95)
7) Suspicious delay time warning threshold percentage (30)
8) Memory wait warning threshold percentage (30)

```

Which Option: █

Figure 45.7 SOSLOGX Forecast data reduction configuration submenu

Each Forecast data reduction parameter is described in the next table.

Table 45.9 SOSLOGX Forecast data reduction configuration options

Option	Default	Description
Workload analysis period minimum time	10	Enter the minimum workload analysis period in minutes. These are periods when a specific workload is the primary if not only active workload that are used to calibrate workload physical disc I/O and overhead CPU utilization.

SOSLOGX MENUS AND OPTIONS
The SOSLOGX Main Option Menu

Option	Default	Description
Workload analysis period decay percentage	95	Enter a decay percentage to be used to determine the workload analysis period. These are periods when a specific workload is the primary if not only active workload that are used to calibrate workload physical disc I/O and CPU overhead utilization. The decay percentage is a measure of how far the workload's percentage of total logical disc I/O requests must decay from it's maximum value before marking the boundaries of the analysis period.
Workload analysis start buffer time	10	Buffer time in minutes which must be retained between the time a workload activity starts up and the beginning of the workload analysis period. This time buffer protects the workload calibration process from atypical workload demands involved in starting up the workload application.
Workload analysis end buffer time	10	Buffer time in minutes which must be retained between the end of a workload analysis period and the time all activity in that workload ceases. This time buffer protects the workload calibration process from atypical workload demands involved in shutting down the workload application.
Load sample analysis period minimum time	60	Enter the minimum sample load analysis period in minutes. These are periods of high system load that will be used to define the a computer model representing the current system load.
Load sample analysis period decay percentage	95	Enter a decay percentage to be used to determine the sample load analysis period. These are periods of high system load that will be used to define the a computer model representing the current system load. The decay percentage is a measure of how far the CPU utilization must decay from its maximum value before marking the boundaries of the analysis period.

Option	Default	Description
Suspicious delay time warning threshold percentage	30	If a workload spends a significant percentage of time waiting for resources other than disc I/O or the CPU, it may not be possible to forecast the effects of changes on it. Enter a percentage of "suspicious" delay time to allow without giving a warning message.
Memory wait warning threshold percentage	30	If a workload spends a significant percentage of time waiting for resources other than disc I/O or the CPU, it may not be possible to forecast the effects of changes on it. Enter a percentage of "suspicious" delay time to allow without giving a warning message.

Performance Gallery configuration (SUBMENU)

To view the Performance Gallery configuration submenu, type the command key for the Performance Gallery configuration option from the SOSLOGX MAIN OPTION MENU.

```

SOSLOGX MAIN OPTION MENU
Performance Gallery configuration

  1) Export Data configuration (SUBMENU)
  2) Export Thresholds configuration (SUBMENU)

```

```

Which Option: _

```

Figure 45.8 SOSLOGX Performance Gallery configuration submenu

From the Performance Gallery configuration submenu, you can access the following configuration menus:

- Export Data configuration submenu (see "Export Data configuration Submenu" on page 257).

- Export Thresholds configuration submenu (see “Export Thresholds configuration Submenu” on page 259).

Export Data configuration Submenu

To display the Export Data configuration submenu, type the corresponding command key from the SOSLOGX Performance Gallery configuration submenu.

```

SOSLOGX MAIN OPTION MENU
Performance Gallery configuration
Export Data configuration

1) CPU Data (Y)
2) Buffer Cache Data (Y)
3) VM Data (Y)
4) Misc Data (Y)
5) Disk Data (Y)
6) Network Protocol Data (Y)
7) Network Interface Data (Y)
8) NFS Data (N)
9) Workload Data (Y)
10) Process Data (N)
11) Swap Data (N)
12) File System Space Data (N)
13) Volume Data (N)

Which Option:
  
```

Figure 45.9 *SOSLOGX Export Data configuration submenu*

The Export Data configuration options are listed and described in the next table.

Table 45.10 *SOSLOGX Export Data configuration options*

Option	Default	Description
CPU Data	Y	By default, any CPU data in the collection will be exported. To eliminate CPU data from the export file, enter N (No).
Buffer Cache Data	Y	By default, buffer cache data will be exported. To eliminate this data from the export file, enter N .
VM Data	Y	By default, VM (virtual memory) data will be exported. To eliminate this data from the export file, enter N .

Option	Default	Description
Misc Data	Y	By default, miscellaneous data will be exported. To eliminate this data from the export file, enter N .
Disk Data	Y	By default, disk data will be exported. To eliminate this data from the export file, enter N .
Network Protocol Data	Y	By default, network protocol data will be exported. To eliminate this data from the export file, enter N .
Network Interface Data	Y	By default, network interface data will be exported. To eliminate this data from the export file, enter N .
NFS Data	N	By default, NFS (network file system) will not be exported. To include this data in the export file, enter Y (Yes).
Workload Data	Y	By default, workload data will be exported. To eliminate this data from the export file, enter N .
Process Data	N	By default, process data will not be exported. To include this data from the export file, enter Y .
Swap Data	N	By default, swap data will not be exported. To include this data in the export file, enter Y .
File Systems Space Data	N	By default, file systems space data will not be exported. To include this data in the export file, enter Y .
Volume Data	N	By default, volume data will not be exported. To include this data in the export file, enter Y .

Export Thresholds configuration Submenu

To display the Export Thresholds configuration submenu, type the corresponding command key from the SOSLOGX Performance Gallery configuration submenu.

```

SOSLOGX MAIN OPTION MENU
Performance Gallery configuration
Export Thresholds configuration

1) Max Number of Discs Exported (100)
2) Max Number of Network ifs Exported (10)
3) Max Number of NFS Systems Exported (50)
4) Max Number of Workloads Exported (50)
5) Max Number of Processes Exported (20)
6) Max Number of Swaps Exported (20)
7) Max Number of File System Space Exported (100)
8) Max Number of Volumes Exported (100)
9) Performance Gallery File Size Limit (10000)

Which Option:

```

Figure 45.10 *SOSLOGX Export Thresholds configuration submenu*

The meanings of the Export Thresholds configuration options are self-explanatory.

Table 45.11 *SOSLOGX Export Thresholds configuration options*

Option	Default Setting
Max number of Discs Exported	100
Max number of Network Ifs (interfaces) Exported	10
Max Number of NFS Systems Exported	50
Max Number of Workloads Exported	50
Max Number of Processes Exported	20
Max Number of Swaps Exported	20
Max Number of File System Space Exported	100
Max Number of Volumes Exported	100
Performance Gallery File Size Limit	10,000

SOSLOGX REPORTS

SOSLOGX CPU Summary Chart

The CPU Summary Chart in SOSLOGX displays general CPU statistics in graphical format, similar to the CPU SUMMARY in SOS.

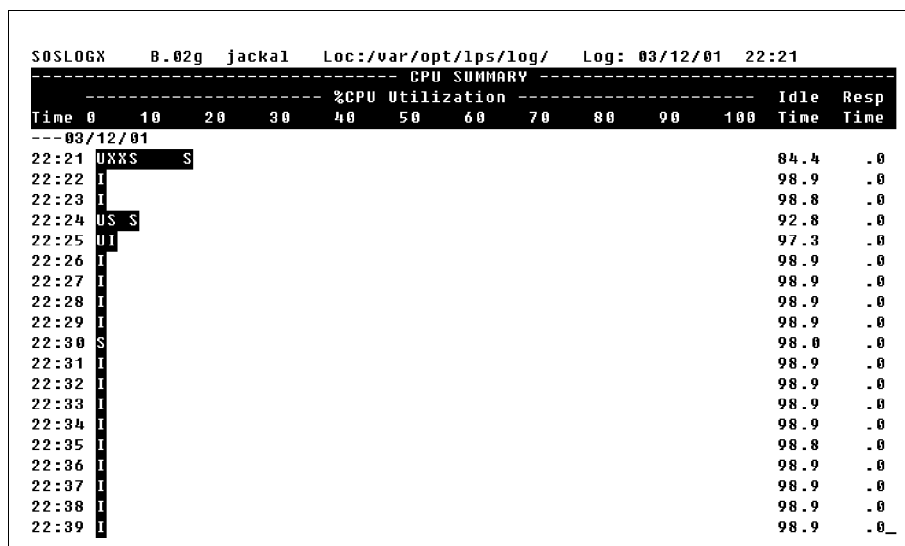


Figure 46.1 SOSLOGX CPU Summary Chart report

For information about the SOSLOGX CPU Summary Chart data, please refer to "SOS CPU Summary" on page 105.

SOSLOGX Global Summary

The Global Summary in SOSLOGX displays system-wide performance data, similar to the Global Summary in SOS:

- CPU utilization statistics
- CPU miscellaneous statistics
- Memory and virtual memory statistics
- Miscellaneous statistics
- Disk statistics
- Process statistics
- Workload statistics

An example SOSLOGX Global Summary screen is shown in Figure 46.2. For information about global data, refer to “SOS Global Summary” on page 81

```

SOSLOGX      B.02g  jackal  Loc:/var/opt/lps/log/  Log: 03/12/01  22:21
---03/12/01

----- CPU UTILIZATION -----
TOTAL BUSY: 15.6      HIGH PRI: 15.6      | Capture .4
User 1.6 Sys 10.0 Uflt .3 | RunQ Avg .0
Real .0 Intr .5 Idle 84.4 | 5 Min RunQ Avg .0
Nice .0 C Sw .3 | RunQ Busy % .0
NNice 2.9 Trap .0 |

----- MEM/VM -----
Read Hit % 99.9      Page Outs .0/s      Mem Used % 88.6
Write Hit % 77.0      Deact Byte 0/s      VM Used % 46.6

----- MISC -----
#Sessions: 1 #Procs: 66 #Wait IO: 1 Transactions: 84.2/s
#Active: 0 #Active: 9 #Deact: 0 Avg Response Time: .0

----- DISK -----
Disk IO/s IO% QLen | Disk IO/s IO% QLen | Disk IO/s IO% QLen
c0t6d0 3 100 .0 | c0t5d0 0 0 .0 |

```

Figure 46.2 SOSLOGX Global Summary report

SOSLOGX Memory Summary Chart

The Memory Summary Chart in SOSLOGX displays memory performance statistics in a graphical format.

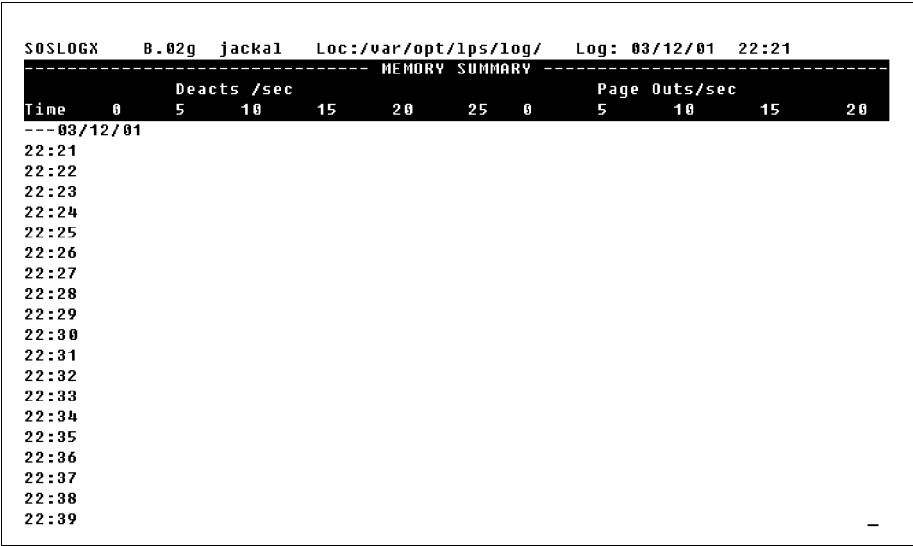


Figure 46.3 SOSLOGX Memory Summary Chart report

For information about the data in the SOSLOGX Memory Summary Chart, refer to “SOS Memory Summary” on page 111.

SOSLOGX Memory Summary

The Memory Summary in SOSLOGX displays a detailed look at memory and virtual memory performance, similar to the Memory Summary in SOS.

```

SOSLOGX      B.02g  jackal  Loc:/var/opt/lps/log/   Log: 03/12/01  22:21
---03/12/01
----- MEM/VM ALLOCATION -----
Mem      Size      User      Sys      Buffer      Free      |      Loaded      Run      Sleep      Total
VM 262144 59964 20336 131072 50772 | 60999 0 66 66
VM 1828048 213016 0 0 0 0
-----
PAGING
Pg Flts      In(/s)      Out(/s)      In(byte/s)      Out(byte/s)      #In      #Out
Pages      .3      .0      6855      0      1      0
(De)act      .0      .0      0      0      0      0
VM I/O      .3      .0      6855      0      1      0
Forks      .0      0      0      0
-----
PAGE SCANNER
Page Recs      36.8/s      Page Scans      .0/s
-----
SYSV BUFFER CACHE CONFIG
Read Cache Hit %      99.9      Write Cache Hit %      77.0
headers 16610      size 32768      DBC min size 3276      DBC max size 32768
-----
MEMORY MANAGEMENT CONFIG
lotsfree: 3534      desfree: 883      minfree: 220
umen: 3534      page size: 4096
-----

```

Figure 46.4 *SOSLOGX Memory Summary report*

For information about the data in the SOSLOGX Memory Summary Chart, refer to “SOS Memory Summary” on page 111.

SOSLOGX Disk Summary

The Disk Summary in SOSLOGX provides a summary of performance data for all disks on the system.

```
SOSLOGX      B.02g  jackal  Loc:/var/opt/lps/log/  Log: 03/12/01  22:21
---03/12/01
--- 22:21 ----- DISK SUMMARY -----
```

Dev	I0%	Qlen	Util%	Wait Time(ms)	Service Time(ms)	Rates (/s)		Avg Size(b)	
						Read	Write	Read	Write
c0t0d0	100	.0	2.9	6.0	10.9	.3	2.3	24576	6144
c0t5d0	0	.0	.0	.0	.0	.0	.0	0	0
TOTALS	100	.0	.9	6.0	10.9	.3	2.3	24576	6144

```
--- 22:22 ----- DISK SUMMARY -----
```

Dev	I0%	Qlen	Util%	Wait Time(ms)	Service Time(ms)	Rates (/s)		Avg Size(b)	
						Read	Write	Read	Write
c0t0d0	100	8.6	.7	30.6	8.2	.0	.9	0	6302
c0t5d0	0	.0	.0	.0	.0	.0	.0	0	0
TOTALS	100	8.6	.2	30.6	8.2	.0	.9	0	6302_

Figure 46.5 SOSLOGX Disk Summary report

For information about the data presented in the SOSLOGX Disk Summary, refer to “SOS Disk I/O Summary” on page 117.

SOSLOGX Disk Summary Chart

The Disk Summary Chart in SOSLOGX displays disk performance data in graphical format.



Figure 46.6 SOSLOGX Disk Summary Chart report

For information about the data presented in the SOSLOGX Disk Summary, refer to "SOS Disk I/O Summary" on page 117.

SOSLOGX Network Summary

The Network Summary in SOSLOGX displays network performance information.

SOSLOGX	8.02g	jackal	Loc:/var/opt/lps/log/	Log: 03/12/01	22:21
---03/12/01					
--- 22:21 -----					
Protocol	Packets in/s	PACKETS out/s	Errors In%	Errors Out%	
IP	.0	.0	.00	.00	
TCP/IP	4.7	4.7	.00	.00	
ICMP	.0	.0	.00	.00	
UDP	108.0	108.0	.00	N/A	

--- 22:22 -----					
Protocol	Packets in/s	PACKETS out/s	Errors In%	Errors Out%	
IP	.1	.0	.00	.00	
TCP/IP	4.1	4.1	.00	.00	
ICMP	.0	.0	.00	.00	
UDP	.0	.0	.00	N/A	

Figure 46.7 *SOSLOGX Network Summary report*

For information about the data displayed in the SOSLOGX Network Summary, please refer to “SOS Network Summary” on page 133.

SOSLOGX Net If (Network Interface) Summary

The Net If Summary in SOSLOGX displays performance information as it pertains to the network interface.

SOSLOGX B.02g jackal Loc:/var/opt/lps/log/ Log: 03/12/01 22:21						
---03/12/01						
--- 22:21 ----- NETWORK INTERFACE SUMMARY -----						
Interf	Packts	In/s	Packts	Out/s	Collision%	Error In% Error Out%

lo0		.0		.0	.00	.00 .00
lan0		.0		.0	.00	.00 .00

TOTAL		.0		.0	.00	.00 .00
--- 22:22 ----- NETWORK INTERFACE SUMMARY -----						
Interf	Packts	In/s	Packts	Out/s	Collision%	Error In% Error Out%

lo0		.0		.0	.00	.00 .00
lan0		.4		.0	.00	.00 .00

TOTAL		.4		.0	.00	.00 .00_

Figure 46.8 SOSLOGX Net If Summary report

For information about the data displayed in the SOSLOGX Net If Summary, please refer to "NETWORK INTERFACES" on page 134.

SOSLOGX NFS Client Summary

The NFS Client Summary in SOSLOGX displays bad NFS call information associated with the NFS client.

Bad NFS Calls

The Bad NFS Calls data item represents:

- The number of bad NFS calls accumulated during the current interval.
- The percentage of NFS calls that are bad NFS calls.

SOSLOGX	8.02g	jackal	Loc:/var/opt/lps/log/	Log: 03/12/01	22:21		
---	03/12/01						
---	22:21	----- NFS SUMMARY -----					
System	Read(/s)	Server	Write(/s)	SvcTm	Read(/s)	Client	Write(/s)
						SvcTm	NetwkTm
lynx.lund.com	.0	.0	.00	1.4	.0	.01	.01
---	22:22	----- NFS SUMMARY -----					
System	Read(/s)	Server	Write(/s)	SvcTm	Read(/s)	Client	Write(/s)
						SvcTm	NetwkTm
lynx.lund.com	.0	.0	.00	.0	.0	.00	.00
---	22:23	----- NFS SUMMARY -----					
System	Read(/s)	Server	Write(/s)	SvcTm	Read(/s)	Client	Write(/s)
						SvcTm	NetwkTm
lynx.lund.com	.0	.0	.00	.0	.0	.00	.00

Figure 46.9 SOSLOGX NFS Client Summary report

For information about SOSLOGX NFS Client data, refer to “SOS NFS Summary” on page 135.

SOSLOGX Workload Summary

The Workload Summary in SOSLOGX displays workload statistics.

SOSLOGX 8.02g jackal Loc:/var/opt/lps/log/ Log: 03/12/01 22:21						
---03/12/01						
--- 22:21 ----- WORKLOAD SUMMARY -----						
No	Group Name	%CPU	%User CPU	%Disk I/O	Mem (kb)	UM (kb)
1:	INTERACT	.0	.0	.0	460	552
2:	BATCH	.0	.0	.0	0	0
3:	DAEMON	14.8	29.9	100.0	23128	55748
4:	DEFAULT	.0	.0	.0	0	0
5:						
--- 22:22 ----- WORKLOAD SUMMARY -----						
No	Group Name	%CPU	%User CPU	%Disk I/O	Mem (kb)	UM (kb)
1:	INTERACT	.0	.0	10.0	460	552
2:	BATCH	.0	.0	.0	0	0
3:	DAEMON	.7	33.2	90.0	23100	55800
4:	DEFAULT	.0	.0	.0	0	0
5:						
--- 22:23 ----- WORKLOAD SUMMARY -----						
No	Group Name	%CPU	%User CPU	%Disk I/O	Mem (kb)	UM (kb)
1:	INTERACT	.0	.0	.0	460	552
2:	BATCH	.0	.0	.0	0	0
3:	DAEMON	.8	33.2	100.0	23232	55852
4:	DEFAULT	.0	.0	.0	0	0
5:						

Figure 46.10 SOSLOGX Workload Summary report

For information about the SOSLOGX Workload Summary statistics, refer to “WORKLOAD SUMMARY Data Items” on page 94.

SOSLOGX Workload Detail

The Workload Detail in SOSLOGX displays detailed information about a specific workload.

```
SOSLOGX      B.02g  jackal  Loc:/var/opt/lps/log/  Log: 03/12/01  22:21
---03/12/01

----- WORKLOAD DETAIL -----
Workload: INTERACT                                     Proc Count:      3.0

----- MEMORY -----
RSS:  460k  USS:  552k  Min/s:  .0  Maj/s:  .0  Deact/s:  .0

----- CPU USAGE -----
CPU % :  .0      | I/Os      Rd/S      Wr/S
CPU ms:  0      | Log :      0      .0      .0
          | Phy :      0      .0      .0
User% :  .0      | User:      0      .0      .0
Sys%  :  .0      | VM :      0      .0      .0
CSW%  :  .0      | Raw :      0      .0      .0
Intr% :  .0      | Sys :      0      .0      .0

----- WORKLOAD WAIT STATES -----
CPU :  0

CACH:  0  DISK:  0  GRAF:  0  INOD:  0  IPC :  0  IO :  0
LAN  :  0  MSG :  0  NFS :  0  PIPE:  0  PRE :  0  RPC :  0
SEM  :  0  SHM :  0  SLEP:  0  SOCK:  0  STRM:  0  SYS :  0
TTY  :  0  VM  :  0

-----
OTHR: 100
-----
```

Figure 46.11 *SOSLOGX Workload Detail report*

For information about the data presented in the SOSLOGX Workload Detail report, refer to “SOS Workload Detail” on page 179.

SOSLOGX Disk Detail

The Disk Detail report in SOSLOGX displays detailed information about a specific disk.

SOSLOGX B.02g jackal Loc:/var/opt/lps/log/ Log: 03/12/01 22:21									
---03/12/01									
--- 22:21 ----- DISK DETAIL -----									
Disk Dev		IO%		Qlen	Util%	WaitTime	ServiceTime		
c0t6d0		100		.0	2.9	6.0	10.9		

		Rates (/s)		Avg Size(kb)				Rates (/s)	
		Read	Write	Read	Write			Read	Write
Logical		91.0	.0	150	0	Physical	.3	2.3	24576
Raw		.0	.0	0	0	Memory	.3	.0	24576
User FS		.0	.0	0	0	Sys FS	.0	2.3	0

--- 22:22 ----- DISK DETAIL -----									
Disk Dev		IO%		Qlen	Util%	WaitTime	ServiceTime		
c0t6d0		100		8.6	.7	30.6	8.2		

		Rates (/s)		Avg Size(kb)				Rates (/s)	
		Read	Write	Read	Write			Read	Write
Logical		1.4	.0	19	6652	Physical	.0	.9	0
Raw		.0	.0	0	0	Memory	.0	.0	0
User FS		.0	.1	0	3755	Sys FS	.0	.8	0

Figure 46.12 SOSLOGX Disk Detail report

For information about the data contained in this report, see “SOS Disk Detail” on page 185.

SOSLOGX Response Time Chart

The Response Time Chart in SOSLOGX displays the number of transactions per second and the average response time (seconds) recorded.

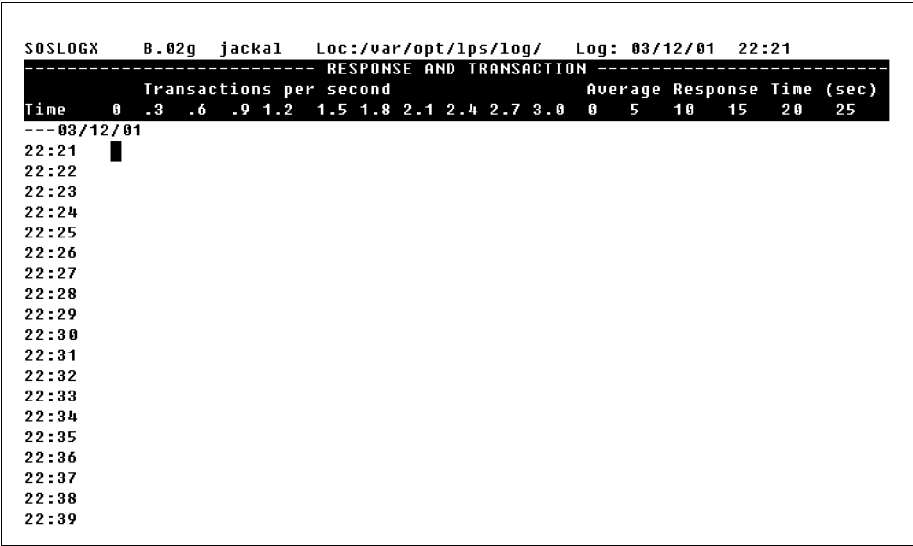


Figure 46.13 SOSLOGX Response Time Chart report

For descriptions of these data items, please refer to:

- “Transactions” on page 100
- “Avg Response Time” on page 100

SOSLOGX FS Space Summary

The FS Space Summary in SOSLOGX displays file system space information for each file system.

SOSLOGX B.02g jackal Loc:/var/opt/lps/log/ Log: 03/12/01 22:21								
---03/12/01								
--- 22:21 ----- FILE SYSTEM SPACE SUMMARY -----								
Mount	Block/Frag Size/Size	Size	Free	Free (su)	Used%	Total Inodes	Free Inodes	
/	8192/1024	99669	69384	79351	20	16128	14501	
/stand	8192/1024	83733	52187	60561	28	13440	13404	
/usr	8192/1024	498645	69191	119056	76	79872	58708	

--- 22:22 ----- FILE SYSTEM SPACE SUMMARY -----								
Mount	Block/Frag Size/Size	Size	Free	Free (su)	Used%	Total Inodes	Free Inodes	
/	8192/1024	99669	69384	79351	20	16128	14501	
/stand	8192/1024	83733	52187	60561	28	13440	13404	
/usr	8192/1024	498645	69191	119056	76	79872	58708	

Figure 46.14 SOSLOGX FS Space Summary report

For information about the data contained in the SOSLOGX FS Space Summary report, refer to "SOS File System Space Summary" on page 131.

SOSLOGX DNLC Summary

The DNLC Summary in SOSLOGX displays information about the DNLC (dynamic name lookup cache).

SOSLOGX	B.02g	jackal	Loc:/var/opt/lps/log/	Log: 03/12/01	22:21
---03/12/01					
--- 22:21 ----- DNLC SUMMARY -----					
ncsize	1500		lookup rate	823.2	hit % 80.7

--- 22:22 ----- DNLC SUMMARY -----					
ncsize	1500		lookup rate	4.8	hit % 86.9

--- 22:23 ----- DNLC SUMMARY -----					
ncsize	1500		lookup rate	5.0	hit % 81.0

--- 22:24 ----- DNLC SUMMARY -----					
ncsize	1500		lookup rate	42.4	hit % 76.0

--- 22:25 ----- DNLC SUMMARY -----					
ncsize	1500		lookup rate	24.6	hit % 87.3

--- 22:26 ----- DNLC SUMMARY -----					
ncsize	1500		lookup rate	4.5	hit % 96.3

--- 22:27 ----- DNLC SUMMARY -----					
ncsize	1500		lookup rate	4.3	hit % 96.9

Figure 46.15 *SOSLOGX DNLC Summary report*

The data items in the SOSLOGX DNLC Summary are described in “DNLC CACHE SUMMARY” on page 151.

SOSLOGX System Configuration

The System Configuration report in SOSLOGX displays various configurable kernel parameters.

```

SOS B.02g jackal FRI, 17 AUG 2001, 11:30 E: 00:28:17 I: 01:00
----- SYSTEM CONFIGURATION -----
system name: jackal os version: B.11.00 cpu type: 9000/777
serial num: 2004763790 boot time: 07:39 28 JUN 2001 run level: 3
----- MEMORY MANAGEMENT CONFIG -----
lotsfree: 3534 desfree: 883 minfree: 220
umem: 3534 page size: 4096
----- FS CONFIGURATION -----
fs_async: 0 nfile: 920 ninod: 476
----- SWAP CONFIGURATION -----
nswapdev: 10 nswapfs: 10
----- SVSU BUFFER CACHE CONFIGURATION -----
nbuf: 21410 bufpages: 31230 dbc min: 3276 dbc max: 32768
----- PROCESS CONFIGURATION -----
timeslice: 10 maxfiles: 60 maxtsiz: 16384
maxuprc: 75 maxfiles_lim: 1024 maxdsiz: 16384
nproc: 276 maxssiz: 2048
----- IPC CONFIGURATION -----
MESSAGES msgmap: 42 | SEMAPHORES semvnx: 32767 | SHARED MEM
msgmax: 8192 msgmni: 50 | semmap: 72 semaen: 16384 | shmmax: 1g
msgmnb: 16384 msgseg: 2048 | semmni: 70 semmnu: 30 | shmnni: 200
msgssz: 8 msgtql: 40 | semmns: 600 semune: 10 | shmseg: 120
-----
Enter command: _

```

Figure 46.16 SOSLOGX System Configuration report

For information about the data items presented in the SOSLOGX System Configuration report, refer to "SOS System Configuration Summary" on page 153.



SOS/9000 PULSE POINTS

Pulse points are the indicators of performance displayed in the SOS Pulse Points screen. For information about pulse point performance indicators, see “SOS Pulse Points Summary” on page 161.

The following HP-UX pulse points are provided by John Herberg of Lund Performance Solutions and Craig Solomon of Lund Consulting Services. The performance ranges are generic for all HP-UX systems—customizing them for your system is recommended. Please refer to the configuration instructions in “SOS ppoints File” on page 74.

Table A.1 *SOS/9000 Pulse Points*

Performance Indicator	Performance Ranges		
	Normal	Problematic	Unacceptable
Processor Performance			
CPU Busy % The percentage of time the CPU spent executing the following activities instead of being in a pause or idle state: <ul style="list-style-type: none">• Processing user and system process code.• Managing main memory.• Scheduling and dispatching processes (interrupts).• Processing context switches and overhead (external device activity).	less than 60	60 to 85	greater than 85
CPU High Pri Busy % The percentage of time the CPU spent executing high-priority system and user processes, interrupts, and overhead.	less than 60	60 to 85	greater than 85

Performance Indicator	Performance Ranges		
	Normal	Problematic	Unacceptable
Real Time Processing % The percentage of time the CPU spent serving online, interactive sessions ("real time" user processes). These processes run at a fixed high-priority status.	less than 5	5 to 10	greater than 10
Run Queue Average The average number of executable processes that waited for the CPU during a collection interval.	less than 5	5 to 10	greater than 10
System Processing % The percentage of time the CPU spent executing system calls or operating in kernel mode.	less than 10	10 to 20	greater than 20
Memory Performance			
Memory Used % The average percentage of main memory used during the collection interval.	less than 80	80 to 90	greater than 90
Page Outs/second The number of instances per second that a page out occurred during the collection interval. A page out is performed to move the least-needed pages from memory by writing them to swap space or to the file system. A page out occurs when physical memory becomes scarce.	less than 5	5 to 10	greater than 10

SOS/9000 PULSE POINTS

·
·
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·

Performance Indicator	Performance Ranges		
	Normal	Problematic	Unacceptable
Deactivations/second The number of processes swapped out of memory to disk in order to satisfy extreme memory shortages.	less than 2	2 to 5	greater than 5
Disk Performance			
Disk Queue Length The average number of processes in the request queue for a particular disk drive.	less than 1	1 to 3	greater than 3
Read Hit % The percentage of time that requests for information were satisfied in main memory. A Read Hit percentage less than 90 could indicate a data locality problem or a shortage of memory.	greater than 90	90-80	less than 80
Disk I/O Rate The number of disk I/O (reads and writes to disk) per second.	less than 40	40 to 60	greater than 60



SOS/9000 DATA ITEMS

The following is the contents of the /opt/lps/lib/itemlist file. All possible data items monitored by SOS Performance Advisor are listed in this file.

This information is provided as a reference to the user—please do not modify the itemlist file in any way. Data items may be added, modified, or deleted by Lund Performance Solutions periodically and without notice to users.

```
#####
#####
##### WARNING! #####
##### CUSTOMERS: DO NOT MODIFY THIS FILE! #####
#####
#####
!
!
! File Structure:
!
! Column 1
!   Item Name (used by SOSLOGX reports and other functions)
!           (20 character MAX)
! Column 2
!   Block Number (Must be in sorted order from 0 to n)
!
! Column 3
!   Offset in 16 bit words (Must be in sorted order with no holes or overlaps)
! Column 4
```

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```

!      Type of variable  (1 = short,    (16 bits,signed)
!                        2 = long,      (32 bits,signed)
!                        4 = longint,   (64 bits,signed)
!                        -1 = ushort,   (16 bits,unsigned)
!                        0 = string)
! Column 5
!      Total display length in characters (including dec pt and dec places)
!      (Should never be greater than 11 for non-string types!)
! Column 6
!      Implied decimal places
! Column 7
!      flags   - = none,
!              1 = peak values are low
!              0 = treat 0% like 100%          (for pulse points)
! Column 8
!      Comments

```

```

GLOB-ELAPSED-TIME    0  0  2  9  0  -   Elapsed time (ms)

GLOB-MODEL           0 1000  0  8  0  -   System model

DISC-DEV             1  0  2  8  0  -   Disc dev
DISC-PHY-READS       1  2  -1  5  0  -   Physical reads
DISC-PHY-WRITES      1  3  -1  5  0  -   Physical writes
DISC-PHY-RD-RATE     1  4  1  5  1  -   Physical read rate (/s)
DISC-PHY-WR-RATE     1  5  1  5  1  -   Physical write rate (/s)
DISC-PHY-AVG-RD-SIZE 1  6  -1  5  0  -   Physical avg read size (b)
DISC-PHY-AVG-WR-SIZE 1  7  -1  5  0  -   Physical avg write size (b)
DISC-QUEUE-LEN       1  8  1  6  1  -   Disc request queue length
DISC-IOs             1  9  -1  5  0  -   Disc IOs (read/writes)

```

SOS/9000 DATA ITEMS .

.
.
.
.

DISC-IO-RATE	1	10	2	6	0	-	Disc I/O/Sec
DISC-IO%	1	12	1	3	0	-	Percent of total disc I/O
DISC-UTIL%	1	13	1	5	1	-	Utilization
DISC-AVG-SERV-TIME	1	14	1	6	1	-	Average service time (ms)
DISC-AVG-WAIT-TIME	1	15	1	6	1	-	Average wait time (ms)
DISC-SERV-TIME	1	16	2	9	0	-	Total disc service time (ms)
DISC-DEV2	1	1000	2	8	0	-	Disc dev
DISC-DEVFILE	1	1002	0	16	0	-	Disc device file
GROUP	2	0	1	3	0	-	Workload group number
GRP-LOW-PRI	2	1	-1	2	0	-	Workload high priority
GRP-HIGH-PRI	2	2	-1	2	0	-	Workload low priority
GRP-CPU%	2	3	-1	5	1	-	Cpu percentage
GRP-DISC%	2	4	-1	5	1	-	Total Disc I/O percentage
GRP-PROC-COUNT	2	5	-1	6	1	-	Active process count
GRP-MEM	2	6	2	9	0	-	Mem used by procs in workload (kb)
GRP-VM	2	8	2	9	0	-	VM used by procs in workload (kb)
GRP-MEM%	2	10	-1	5	1	-	% Mem used by procs in workload
GRP-VM%	2	11	-1	5	1	-	% VM used by procs in workload
GRP-MAJFLT-RATE	2	12	-1	5	1	-	Major page fault rate (/s)
GRP-MINFLT-RATE	2	13	-1	5	1	-	Minor page fault rate (/s)
GRP-SWAP-RATE	2	14	-1	5	1	-	Swap out rate (/s)
GRP-FILLER	2	15	1	0	0	-	Filler
GRP-CPU	2	16	2	9	0	-	Cpu time (ms)
GRP-USER-CPU%	2	18	-1	5	1	-	User CPU percentage
GRP-SYS-CPU%	2	19	-1	5	1	-	System CPU percentage
GRP-TRAP-CPU%	2	20	-1	5	1	-	CSW CPU percentage
GRP-PHY-IO-CNT	2	21	-1	4	0	-	Physical I/O count
GRP-PHY-RD-CNT	2	22	-1	4	0	-	Physical read count

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GRP-PHY-WR-CNT	2	23	-1	4	0	-	Physical write count
GRP-PHY-RD-RATE	2	24	-1	5	1	-	Physical read rate (/s)
GRP-PHY-WR-RATE	2	25	-1	5	1	-	Physical write rate (/s)
GRP-CPU-LIVE%	2	26	-1	3	0	-	Total process percent alive on CPU
GRP-PRE-WT%	2	27	-1	3	0	-	Process preempted percent
GRP-TPGFLT-WT%	2	28	-1	3	0	-	Text page fault wait percent
GRP-DPGFLT-WT%	2	29	-1	3	0	-	Data page fault wait percent
GRP-KPGFLT-WT%	2	30	-1	3	0	-	Kernel page fault wait percent
GRP-ULCK-WT%	2	31	-1	3	0	-	User lock wait percent
GRP-JOB-WT%	2	32	-1	3	0	-	Job control wait percent
GRP-OTHR-WT%	2	33	-1	3	0	-	All other wait percent
GRP-LIVE-TIME	2	34	2	9	0	-	Total process live time (ms)
GRP-PRE-TIME	2	36	2	9	0	-	Total process preempted time (ms)
GRP-TPGFLT-TIME	2	38	2	9	0	-	Text page fault wait time (ms)
GRP-DPGFLT-TIME	2	40	2	9	0	-	Data page fault wait time (ms)
GRP-KPGFLT-TIME	2	42	2	9	0	-	Kernel page fault wait time (ms)
GRP-ULCK-TIME	2	44	2	9	0	-	User lock wait time (ms)
GRP-JOB-TIME	2	46	2	9	0	-	Job wait time (ms)
GRP-OTHR-TIME	2	48	2	9	0	-	Total other wait time (ms)
GRP-TRANS	2	50	-1	5	0	-	transactions
GRP-RESP-TIME	2	51	-1	5	1	-	Average prompt response time (ms)
GRP-TOT-RESP	2	52	2	9	0	-	Total lifetime response time (ms)
GROUP2	2	1000	1	3	0	-	Workload group number
GRP-NAME	2	1001	0	12	0	-	Workload name
CPU-BUSY%	6	0	-1	5	1	-	Total CPU busy %
CPU-USER%	6	1	-1	5	1	-	user process %
CPU-SYS%	6	2	-1	5	1	-	system process %
CPU-WAIT%	6	3	-1	5	1	-	disk wait %

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CPU-IDLE%	6	4	-1	5	1	-	idle %
CPU-FILLER	6	5	1	0	0	-	Filler
CPU-BUSY	6	6	2	6	0	-	Total CPU busy time (ms)
CPU-QUEUE-LEN	6	8	-1	5	1	-	Average ready queue length
CPU-QUEUE-5M	6	9	-1	5	1	-	5 minute ready queue average
CPU-QUEUE-15M	6	10	-1	5	1	-	15 minute ready queue average
CPU-QUEUE-BUSY%	6	11	-1	5	1	-	Ready queue busy %
CPU-CAPTURE	6	12	-1	5	1	1	CPU Capture (0-1000)
CPU-FORK-RATE	6	13	-1	4	1	-	Fork rate (/s)
CPU-CSW-RATE	6	14	-1	4	1	-	Context Switch Rate (/s)
CPU-INTERRUPT-RATE	6	15	-1	4	1	-	Interrupt rate (/s)
CPU-TRAP-RATE	6	16	-1	4	1	-	Trap Rate (/s)
CPU-SMTX-RATE	6	17	-1	4	1	-	Mutex Contention Rate (/s)
CPU-SYSCALL-RATE	6	18	2	4	1	-	System call rate (/s)
CPU-COUNT	6	1000	-1	3	0	-	CPU count
VM-USED-MEM%	7	0	-1	4	1	-	Used memory %
VM-USED-VM%	7	1	-1	4	1	-	Used VM %
VM-USED-MEM	7	2	2	6	0	-	Used memory (kb)
VM-USED-VM	7	4	2	6	0	-	Used VM (kb)
VM-FREE-MEM	7	6	2	6	0	-	Physical mem available (kb)
VM-FREE-VM	7	8	2	6	0	-	Virtual mem available (kb)
VM-PS-LOADED-RUN	7	10	-1	3	0	-	Number of procs loaded and runnable
VM-PS-LOADED-SLEEP	7	11	-1	3	0	-	Number of procs loaded and asleep
VM-PS-LOADED	7	12	-1	3	0	-	Number of procs loaded
VM-PS-SWAP-RUN	7	13	-1	3	0	-	Number of procs swapped runnable
VM-PS-SWAP-SLEEP	7	14	-1	3	0	-	Number of procs swapped sleeping
VM-PS-SWAP	7	15	-1	3	0	-	Number of procs swapped
VM-PAGE-IN-RATE	7	16	1	4	1	-	Page in rate (/s)

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VM-PAGE-OUT-RATE	7	17	1	4	1	-	Page out rate (/s)
VM-PAGE-IN-BPS	7	18	2	5	0	-	Page in bytes per sec
VM-PAGE-OUT-BPS	7	20	2	5	0	-	Page out bytes per sec
VM-PAGE-INS	7	22	-1	3	0	-	Number of page ins
VM-PAGE-OUTS	7	23	-1	3	0	-	Number of page outs
VM-SWAP-IN-RATE	7	24	1	4	1	-	Swap in rate (/s)
VM-SWAP-OUT-RATE	7	25	1	4	1	-	Swap out rate (/s)
VM-SWAP-IN-BPS	7	26	2	5	0	-	Swap in bytes per sec
VM-SWAP-OUT-BPS	7	28	2	5	0	-	Swap out bytes per sec
VM-SWAP-INS	7	30	-1	3	0	-	Number of swap ins
VM-SWAP-OUTS	7	31	-1	3	0	-	Number of swap outs
VM-MIN-PG-FLT-RATE	7	32	2	5	1	-	Minor page fault rate (/s)
VM-MAJ-PG-FLT-RATE	7	34	2	5	1	-	Major page fault rate (/s)
VM-PG-REC-RATE	7	36	-1	5	1	-	Page reclaims per sec
VM-PG-SCAN-RATE	7	37	-1	5	1	-	Page scans per sec
VM-AVE-PG-RES-TIME	7	38	-1	5	1	-	Average page residence time (secs)
VM-FILLER	7	39	1	0	0	-	Filler
VM-VM-SIZE	7	40	2	5	0	-	Total Physical Memory (kb)
VM-LOTSFREE	7	1000	2	5	0	-	lotsfree
VM-DESFREE	7	1002	2	5	0	-	desfree
VM-MINFREE	7	1004	2	5	0	-	minfree
VM-THROTTLEFREE	7	1006	2	5	0	-	throttlefree
VM-PRIORITY-PAGING	7	1008	1	1	0	-	Is priority paging on
VM-FILLER2	7	1009	1	0	0	-	Filler
VM-MAXPGIO	7	1010	2	5	0	-	max pg outs scheduled (io/s)
VM-FASTSCAN	7	1012	2	5	0	-	Fastest scan rate (pg/s)
VM-SLOWSCAN	7	1014	2	5	0	-	Initial scan rate (pg/s)
VM-PG-SIZE	7	1016	2	5	0	-	Page size
VM-MEM-SIZE	7	1018	2	6	0	-	Total Physical Memory (kb)

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MISC-SESSIONS	8	0	1	5	0	-	Sessions
MISC-ACT-SESSIONS	8	1	1	5	0	-	active sessions
MISC-PROCESSES	8	2	1	5	0	-	Processes
MISC-ACT-PROCESSES	8	3	1	5	0	-	active processes
MISC-PROC-BLOCK-IO	8	4	1	5	0	-	processes blocked on IO
MISC-PROC-SWAPPED	8	5	1	4	0	-	processes swapped
MISC-TRANSACTIONS	8	6	2	6	0	-	transaction count
MISC-TRANS-RATE	8	8	2	6	1	-	transaction rate (/s)
MISC-AVE-PROC-COUNT	8	10	2	6	1	-	Average number of procs on sys
MISC-RESP-TIME	8	12	1	6	1	-	Average response time
NETP-IP-IN-PKT-RT	10	0	-1	5	1	-	IP packets in rate (/s)
NETP-IP-OUT-PKT-RT	10	1	-1	5	1	-	IP packets out rate (/s)
NETP-IP-IN-ERR%	10	2	-1	6	2	-	IP errors in err %
NETP-IP-OUT-ERR%	10	3	-1	6	2	-	IP errors out err %
NETP-ICMP-IN-PKT-RT	10	4	-1	5	1	-	ICMP packets in rate (/s)
NETP-ICMP-OUT-PKT-RT	10	5	-1	5	1	-	ICMP packets out rate (/s)
NETP-ICMP-IN-ERR%	10	6	-1	6	2	-	ICMP errors in err %
NETP-ICMP-OUT-ERR%	10	7	-1	6	2	-	ICMP errors out err %
NETP-UDP-IN-PKT-RT	10	8	-1	5	1	-	UDP packets in rate (/s)
NETP-UDP-OUT-PKT-RT	10	9	-1	5	1	-	UDP errors out rate (/s)
NETP-UDP-IN-ERR%	10	10	-1	6	2	-	UDP errors in err %
NETP-UDP-FILLER	10	11	-1	6	2	-	filler since no udp out errs
NETP-TCP-IN-PKT-RT	10	12	-1	5	1	-	TCP packets in rate (/s)
NETP-TCP-OUT-PKT-RT	10	13	-1	5	1	-	TCP packets out rate (/s)
NETP-TCP-IN-ERR%	10	14	-1	6	2	-	TCP errors in err %
NETP-TCP-OUT-ERR%	10	15	-1	6	2	-	TCP packets out err %
SWAP-DEV	11	0	2	8	0	-	Swap Dev

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SWAP-USED	11	2	2	5	0	-	Swap space used (mb)
SWAP-RESERVED	11	4	2	5	0	-	Swap space reserved (mb)
SWAP-FREE	11	6	2	5	0	-	Swap space free (mb)
SWAP-DEV2	11	1000	2	8	0	-	Swap Dev
SWAP-DEVFILE	11	1002	0	24	0	-	Swap Dev File (mount point for fs swap)
SWAP-TYPE	11	1014	0	6	0	-	Swap type
SWAP-FILLER	11	1017	1	0	0	-	Filler
SWAP-SIZE	11	1018	2	5	0	-	Swap size (mb)
NETIF-INDEX	12	0	2	8	0	-	NetIf index
NETIF-PCKTS-IN-RATE	12	2	-1	6	1	-	NetIf packet in rate (/s)
NETIF-PCKTS-OUT-RATE	12	3	-1	6	1	-	NetIf packet out rate (/s)
NETIF-IN-ERR%	12	4	-1	6	2	-	NetIf packet in error percent
NETIF-OUT-ERR%	12	5	-1	6	2	-	NetIf packet out error percent
NETIF-COLLISION%	12	6	-1	6	2	-	NetIf packet collision percent
NETIF-DEFER%	12	7	-1	6	2	-	NetIf packet defer percent
NETIF-NOCANPUT-RATE	12	8	-1	5	1	-	NetIf nocanputs (/s)
NETIF-INDEX2	12	1000	2	8	0	-	NetIf index
NETIF-IFNAME	12	1002	0	16	0	-	NetIf name
NFS-IP-ADDR	13	0	2	11	0	-	NFS IP Address
NFS-CLIENT-RD-RATE	13	2	1	5	1	-	NFS Client Read Rate (/s)
NFS-CLIENT-WR-RATE	13	3	1	5	1	-	NFS Client Write Rate (/s)
NFS-CLIENT-NORESP	13	4	-1	5	0	-	NFS Client No Responses
NFS-CLIENT-FILLER	13	5	1	0	0	-	Filler
NFS-CLIENT-SERV-TIME	13	6	2	5	2	-	NFS Client Service Time (s)
NFS-CLIENT-NET-TIME	13	8	2	5	2	-	NFS Client Network Time (s)
NFS-CLIENT-AVG-QLEN	13	10	2	5	1	-	NFS Client Request Qlen

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NFS-IP-ADDR2	13	1000	2	11	0	-	NFS IP Address
NFS-IP-NAME	13	1002	0	16	0	-	NFS Node Name
DSPC-DEV	14	0	2	8	0	-	Disc/Vol dev
DSPC-AVAIL-KB	14	2	2	8	0	-	Available KB to non-super user
DSPC-USED-KB	14	4	2	8	0	-	Used KB
DSPC-FREE-KB	14	6	2	8	0	-	Free KB
DSPC-USED%	14	8	-1	5	0	-	Available KB
DSPC-FILLER	14	9	1	0	0	-	Filler
DSPC-AVAIL-INODES	14	10	2	8	0	-	Available inodes
DSPC-FREE-INODES	14	12	2	8	0	-	Available to non-super user
DSPC-DEV2	14	1000	2	8	0	-	Disc/Vol dev
DSPC-MNTPNT	14	1002	0	24	0	-	Mount Point
DSPC-BSIZE	14	1014	2	8	0	-	Block Size
DSPC-FSIZE	14	1016	2	8	0	-	Frag Size
DSPC-SIZE-KB	14	1018	2	8	0	-	Size in KB
DSPC-INODES	14	1020	2	8	0	-	Inodes configured
BC-NBUF	15	0	2	5	0	-	Buffer Cache size
BC-RHIT%	15	2	-1	5	1	0	Cache read hit percentage
BC-WHIT%	15	3	-1	5	1	0	Cache write hit percentage
BC-HIT%	15	4	-1	5	1	0	Overall hit percentage
BC-BUFHWM	15	1000	2	5	0	0	BC high water mark (kb)
DNLC-LOOKUP-RT	16	0	-1	5	1	-	DNLC Lookup rate (/sec)
DNLC-HIT%	16	1	-1	5	1	-	DNLC Hit %

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DNLC-NCsize	16	1000	2	5	0	-	DNLC entries (ncsize)
IC-ENTRIES	17	0	2	5	0	-	Inode cache size
IC-ENTRIES-USED	17	2	2	5	0	-	Inode cache entries used
IC-ENTRIES-HIGH	17	4	2	5	0	-	Max # icache entries ever allocated
IC-HIT%	17	6	-1	5	1	-	Cache hit %
IC-IPF%	17	7	-1	5	1	-	% inodes w/pages attached when freed
IC-UFS-NINODE	17	1000	2	5	0	-	Max # of inactive inode ents allocated
FSG-UFS-LW	18	1000	2	5	0	-	ufs_LW
FSG-UFS-HW	18	1002	2	5	0	-	ufs_HW
FSG-AUTOUP	18	1004	2	5	0	-	autoup
FSG-T-FSFLUSHR	18	1006	2	5	0	-	t_fsflushr
FSG-DOIFLUSH	18	1008	-1	1	0	-	doiflush
FSG-DOPAGEFLUSH	18	1009	-1	1	0	-	dopageflush
SYS-NAME	19	1000	0	12	0	-	System name
SYS-SERIAL-NUM	19	1006	2	10	0	-	System serial number
SYS-OS-VERSION	19	1008	0	10	0	-	OS version
SYS-BOOT-TIME	19	1013	0	10	0	-	Boot time
SYS-BOOT-DATE	19	1018	0	16	0	-	Boot date
SYS-CPU-TYPE	19	1026	0	10	0	-	CPU type
SYS-RUN-LEVEL	19	1031	0	2	0	-	Run level
IPC-MSG-ENTRIES-USED	20	0	2	5	0	-	Message table entries used
IPC-MSG-ENTRIES-HIGH	20	2	2	5	0	-	Message table entries max used
IPC-SEM-ENTRIES-USED	20	4	2	5	0	-	Semaphore table entries used
IPC-SEM-ENTRIES-HIGH	20	6	2	5	0	-	Semaphore table entries max used
IPC-SHM-ENTRIES-USED	20	8	2	5	0	-	Shared mem table entries used

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IPC-SHM-ENTRIES-HIGH 20 10 2 5 0 - Shared mem table entries max used

IPC-MSG-ENTRIES 20 1000 2 5 0 - Message table entries

IPC-SEM-ENTRIES 20 1002 2 5 0 - Semaphore table entries

IPC-SHM-ENTRIES 20 1004 2 5 0 - Shared mem table entries

IPC-MSGMAX 20 1006 2 5 0 - msgmax

IPC-MSGMNB 20 1008 2 5 0 - msgmnb

IPC-MSGSSZ 20 1010 2 5 0 - msgssz

IPC-MSGMAP 20 1012 2 5 0 - msgmap

IPC-MSGMNI 20 1014 2 5 0 - msgmni

IPC-MSGSEG 20 1016 2 5 0 - msgseg

IPC-MSGTQL 20 1018 2 5 0 - msgtql

IPC-SEMAP 20 1020 2 5 0 - semmap

IPC-SEMMNI 20 1022 2 5 0 - semmni

IPC-SEMMNS 20 1024 2 5 0 - semmns

IPC-SEVMX 20 1026 2 5 0 - semvmx

IPC-SEMAEM 20 1028 2 5 0 - semaem

IPC-SEMMNU 20 1030 2 5 0 - semmnu

IPC-SEMUME 20 1032 2 5 0 - semume

IPC-SHMMAX 20 1034 2 5 0 - shmmax

IPC-SHMMNI 20 1036 2 5 0 - shmmni

IPC-SHMSEG 20 1038 2 5 0 - shmseg

FCACHE-ENTRIES 21 0 2 5 0 - File cache entries

FCACHE-ENTRIES-USED 21 2 2 5 0 - File cache entries used

FCACHE-ENTRIES-HIGH 21 4 2 5 0 - File cache entries max used

RCACHE-ENTRIES 21 6 2 5 0 - Rnode cache entries

RCACHE-ENTRIES-USED 21 8 2 5 0 - Rnode cache entries used

RCACHE-ENTRIES-HIGH 21 10 2 5 0 - Rnode cache entries max used

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PCACHE-ENTRIES	22	0	2	5	0	-	Process cache entries
PCACHE-ENTRIES-USED	22	2	2	5	0	-	Process cache entries used
PCACHE-ENTRIES-HIGH	22	4	2	5	0	-	Process cache entries max used
PCACHE-MAX-NPROC	22	1000	2	5	0	-	max_nproc
PCACHE-RLIM-FD-CUR	22	1002	2	4	0	-	rlim_fd_cur
PCACHE-RLIM-FD-MAX	22	1004	2	4	0	-	rlim_fd_max
PCACHE-MAXUPRC	22	1006	2	5	0	-	maxuprc
RPC-SRVR-CALL-RT	23	0	-1	5	1	-	Calls received per sec
RPC-SRVR-BADCALL-RT	23	1	-1	5	1	-	Bad calls received per sec
RPC-CLNT-CALL-RT	23	2	-1	5	1	-	Calls sent per sec
RPC-CLNT-BADCALL-RT	23	3	-1	5	1	-	Bad calls sent per sec
RPC-CLNT-RETRAN-RT	23	4	-1	5	1	-	Retransmissions per sec
RPC-CLNT-TIMEOUT%	23	5	-1	5	1	-	% of calls that are timeouts
RPC-CLNT-BADXID%	23	6	-1	5	1	-	% of timeouts that are dup acks
NFSG-CLT-BAD-CALL%	24	0	-1	5	1	-	NFS client bad call percentage
NFSG-CLT-V2-NULL%	24	1	-1	5	1	-	NFS client null call percentage
NFSG-CLT-V2-GETATTR%	24	2	-1	5	1	-	NFS client getattr call percentage
NFSG-CLT-V2-SETATTR%	24	3	-1	5	1	-	NFS client setattr call percentage
NFSG-CLT-V2-ROOT%	24	4	-1	5	1	-	NFS client root call percentage
NFSG-CLT-V2-LOOKUP%	24	5	-1	5	1	-	NFS client lookup call percentage
NFSG-CLT-V2-RDLINK%	24	6	-1	5	1	-	NFS client readlink call percentage
NFSG-CLT-V2-READ%	24	7	-1	5	1	-	NFS client read call percentage
NFSG-CLT-V2-WRCACHE%	24	8	-1	5	1	-	NFS client writecache call percentage
NFSG-CLT-V2-WRITE%	24	9	-1	5	1	-	NFS client write call percentage
NFSG-CLT-V2-CREATE%	24	10	-1	5	1	-	NFS client create call percentage
NFSG-CLT-V2-REMOVE%	24	11	-1	5	1	-	NFS client remove call percentage
NFSG-CLT-V2-RENAME%	24	12	-1	5	1	-	NFS client rename call percentage

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NFSG-CLT-V2-LINK%	24	13	-1	5	1	-	NFS client link call percentage
NFSG-CLT-V2-SYMLINK%	24	14	-1	5	1	-	NFS client symlink call percentage
NFSG-CLT-V2-MKDIR%	24	15	-1	5	1	-	NFS client mkdir call percentage
NFSG-CLT-V2-RMDIR%	24	16	-1	5	1	-	NFS client rmdir call percentage
NFSG-CLT-V2-READDIR%	24	17	-1	5	1	-	NFS client readdir call percentage
NFSG-CLT-V2-STATFS%	24	18	-1	5	1	-	NFS client statfs call percentage
NFSG-SRV-BAD-CALL%	24	19	-1	5	1	-	NFS server bad call percentage
NFSG-SRV-V2-NULL%	24	20	-1	5	1	-	NFS server null call percentage
NFSG-SRV-V2-GETATTR%	24	21	-1	5	1	-	NFS server getattr call percentage
NFSG-SRV-V2-SETATTR%	24	22	-1	5	1	-	NFS server setattr call percentage
NFSG-SRV-V2-ROOT%	24	23	-1	5	1	-	NFS server root call percentage
NFSG-SRV-V2-LOOKUP%	24	24	-1	5	1	-	NFS server lookup call percentage
NFSG-SRV-V2-RDLINK%	24	25	-1	5	1	-	NFS server readlink call percentage
NFSG-SRV-V2-READ%	24	26	-1	5	1	-	NFS server read call percentage
NFSG-SRV-V2-WRCACHE%	24	27	-1	5	1	-	NFS server writecache call percentage
NFSG-SRV-V2-WRITE%	24	28	-1	5	1	-	NFS server write call percentage
NFSG-SRV-V2-CREATE%	24	29	-1	5	1	-	NFS server create call percentage
NFSG-SRV-V2-REMOVE%	24	30	-1	5	1	-	NFS server remove call percentage
NFSG-SRV-V2-RENAME%	24	31	-1	5	1	-	NFS server rename call percentage
NFSG-SRV-V2-LINK%	24	32	-1	5	1	-	NFS server link call percentage
NFSG-SRV-V2-SYMLINK%	24	33	-1	5	1	-	NFS server symlink call percentage
NFSG-SRV-V2-MKDIR%	24	34	-1	5	1	-	NFS server mkdir call percentage
NFSG-SRV-V2-RMDIR%	24	35	-1	5	1	-	NFS server rmdir call percentage
NFSG-SRV-V2-READDIR%	24	36	-1	5	1	-	NFS server readdir call percentage
NFSG-SRV-V2-STATFS%	24	37	-1	5	1	-	NFS server statfs call percentage
NFSG-CLT-V3-NULL%	24	38	-1	5	1	-	NFS v3 client null call percentage
NFSG-CLT-V3-GETATTR%	24	39	-1	5	1	-	NFS v3 client getattr call percentage
NFSG-CLT-V3-SETATTR%	24	40	-1	5	1	-	NFS v3 client setattr call percentage
NFSG-CLT-V3-LOOKUP%	24	41	-1	5	1	-	NFS v3 client lookup call percentage
NFSG-CLT-V3-ACCESS%	24	42	-1	5	1	-	NFS v3 client access call percentage

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NFSG-CLT-V3-RDLINK%	24	43	-1	5	1	-	NFS v3 client readlink call percentage
NFSG-CLT-V3-READ%	24	44	-1	5	1	-	NFS v3 client read call percentage
NFSG-CLT-V3-WRITE%	24	45	-1	5	1	-	NFS v3 client write call percentage
NFSG-CLT-V3-CREATE%	24	46	-1	5	1	-	NFS v3 client create call percentage
NFSG-CLT-V3-MKDIR%	24	47	-1	5	1	-	NFS v3 client mkdir call percentage
NFSG-CLT-V3-SYMLINK%	24	48	-1	5	1	-	NFS v3 client symlink call percentage
NFSG-CLT-V3-MKNOD%	24	49	-1	5	1	-	NFS v3 client mknod call percentage
NFSG-CLT-V3-REMOVE%	24	50	-1	5	1	-	NFS v3 client remove call percentage
NFSG-CLT-V3-RMDIR%	24	51	-1	5	1	-	NFS v3 client rmdir call percentage
NFSG-CLT-V3-RENAME%	24	52	-1	5	1	-	NFS v3 client rename call percentage
NFSG-CLT-V3-LINK%	24	53	-1	5	1	-	NFS v3 client link call percentage
NFSG-CLT-V3-READDIR%	24	54	-1	5	1	-	NFS v3 client readdir call percentage
NFSG-CLT-V3-READDRP%	24	55	-1	5	1	-	NFS v3 client readdirp call percentage
NFSG-CLT-V3-FSSTAT%	24	56	-1	5	1	-	NFS v3 client fsstat call percentage
NFSG-CLT-V3-FSINFO%	24	57	-1	5	1	-	NFS v3 client fsinfo call percentage
NFSG-CLT-V3-PATHCNF%	24	58	-1	5	1	-	NFS v3 client pathconf call percentage
NFSG-CLT-V3-COMMIT%	24	59	-1	5	1	-	NFS v3 client commit call percentage
NFSG-SRV-V3-NULL%	24	60	-1	5	1	-	NFS v3 server null call percentage
NFSG-SRV-V3-GETATTR%	24	61	-1	5	1	-	NFS v3 server getattr call percentage
NFSG-SRV-V3-SETATTR%	24	62	-1	5	1	-	NFS v3 server setattr call percentage
NFSG-SRV-V3-LOOKUP%	24	63	-1	5	1	-	NFS v3 server lookup call percentage
NFSG-SRV-V3-ACCESS%	24	64	-1	5	1	-	NFS v3 server access call percentage
NFSG-SRV-V3-RDLINK%	24	65	-1	5	1	-	NFS v3 server readlink call percentage
NFSG-SRV-V3-READ%	24	66	-1	5	1	-	NFS v3 server read call percentage
NFSG-SRV-V3-WRITE%	24	67	-1	5	1	-	NFS v3 server write call percentage
NFSG-SRV-V3-CREATE%	24	68	-1	5	1	-	NFS v3 server create call percentage
NFSG-SRV-V3-MKDIR%	24	69	-1	5	1	-	NFS v3 server mkdir call percentage
NFSG-SRV-V3-SYMLINK%	24	70	-1	5	1	-	NFS v3 server symlink call percentage
NFSG-SRV-V3-MKNOD%	24	71	-1	5	1	-	NFS v3 server mknod call percentage
NFSG-SRV-V3-REMOVE%	24	72	-1	5	1	-	NFS v3 server remove call percentage

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NFSG-SRV-V3-RMDIR%	24	73	-1	5	1	-	NFS v3 server rmdir call percentage
NFSG-SRV-V3-RENAME%	24	74	-1	5	1	-	NFS v3 server rename call percentage
NFSG-SRV-V3-LINK%	24	75	-1	5	1	-	NFS v3 server link call percentage
NFSG-SRV-V3-READDIR%	24	76	-1	5	1	-	NFS v3 server readdir call percentage
NFSG-SRV-V3-READDIRP%	24	77	-1	5	1	-	NFS v3 server readdirp call percentage
NFSG-SRV-V3-FSSTAT%	24	78	-1	5	1	-	NFS v3 server fsstat call percentage
NFSG-SRV-V3-FSINFO%	24	79	-1	5	1	-	NFS v3 server fsinfo call percentage
NFSG-SRV-V3-PATHCNF%	24	80	-1	5	1	-	NFS v3 server pathconf call percentage
NFSG-SRV-V3-COMMIT%	24	81	-1	5	1	-	NFS v3 server commit call percentage

GLOSSARY OF TERMS

CPU Terms

The CPU terms defined in this glossary are specific to the performance data provided by SOS Performance Advisor.

capture ratio

A ratio of time a CPU spent in user mode to system/kernel mode. The capture ratio value is calculated:

$$\text{Capture Ratio} = (User + Real + Nice + NNice) / (Sys + Intr + CSW + Trap + Vflt)$$

A capture ratio value equal to one or greater indicates the system is spending more than half its time on useful system work. A value of less than one means the system is spending more than half its time on overhead.

context switch

A context switch occurs when a process relinquishes a CPU.

context switch time

The amount of time a CPU spends managing context switches.

high priority time (high pri time)

The amount of time a CPU spends executing high priority processes. A high priority process is any process (excluding batch processes) that does not have a positive nice value. Generally, high priority processes are all interactive and system processes.

idle time

The amount of time a CPU has nothing to do.

interrupt

Interrupts occur when a high priority event must have control of a CPU. The current running process is forced to temporarily suspend execution while the interrupt is processed. The most well known interrupt is a disk I/O completion interrupt.

interrupt CPU time

The amount of time a CPU spends processing interrupts.

negative nice time (nnice time)

The amount of time a CPU spends in user mode for a process that has a nice level of 0-19. Refer to the **nice** man page for more information.

nice time

The amount of time a CPU spends in user mode for a process that has a nice level of 21-40. Refer to the **nice** man page for more information.

real time

The amount of time a CPU spends in in user mode for "real time" priority processes.

system time

The amount of time a CPU spends in kernel mode which does not fall under interrupt, trap, and memory times.

trap

Similar to an interrupt. The difference is that the process currently running on a CPU causes the trap. Interrupts are not caused by the process that is interrupted.

trap time

The amount of time a CPU spends processing traps.

user time

The amount of time a CPU spends in user mode (excluding nice, negative nice, and real times).

Memory Terms

The memory terms defined in this glossary are specific to the performance data provided by SOS Performance Advisor.

activation

An activation occurs when a process is reactivated from a deactivation. See "deactivation" on page 299.

buffer cache

A pool of buffers in memory with the purpose of maintaining data in memory to avoid disk access.

buffer cache headers

The headers associated with each set of data within the buffer cache.

buffer cache hit

A buffer cache hit occurs when data is found in the buffer cache as opposed to disk. Read hit percentages lower than 90 can indicate the need for a larger buffer cache. Write hit percentage lower than 65 also indicates the potential need to increase the buffer cache size.

deactivation

A deactivation occurs when a process is removed from the list of runnable processes because of memory or CPU contention. It will not be scheduled until it is CPU and/or memory contention subsides. Deactivations indicate CPU and/or memory bottlenecks.

desfree

The lower bound for paging. When free memory drops below desfree, paging begins.

dynamic buffer cache (DBC)

The buffer cache is configured in a manner that allows the kernel to dynamically change the buffer cache size. The buffer cache grows as a result of page faults. It shrinks as the vhand process finds unused pages.

fixed size buffer cache

The "fixed size buffer cache" means the size is fixed and will not change without a reconfiguration and recompilation of the kernel.

lotsfree

The upper bound for paging. Once paging has begun, it will continue until free memory is larger than lotsfree.

major page fault

Page faults that require disk access.

minfree

The threshold at which the system considers itself "out of memory". At this point, the system will start swapping processes.

minor page fault

Page faults that are satisfied in memory; for example, via page reclaims.

page fault

Page faults occur when a page is not found in the buffer cache; the pages are satisfied in memory and disk.

page in

A page in is a page fault that requires disk access.

page out

A page out occurs when the amount of memory required is greater than the amount available. Data within the page is written to disk and the page is made available for use. Excessive page outs indicates a memory bottleneck.

page reclaim

A page reclaim occurs when a requested page exists on the free list. A page reclaim results in a page fault being satisfied in memory.

page scan

A page scan occurs when the vhand process searches through used pages for candidates to page out. Excessive page scanning can be an indicator of a memory bottleneck.

unlockable memory

The amount of memory that cannot be locked. Physical memory that may be locked is called "lockable memory". Locked memory holds frequently-accessed programs or data structures, such as the operating system code. Lockable memory is never more than 3/4 of the available memory. Allowing too much locked memory could lead to a system deadlock. Unlockable memory is used for swapping pages but lockable memory cannot be used for swapping pages.

VM I/O

A physical disk I/O that is a result of virtual memory management.

Disk Terms

The disk terms defined in this glossary are specific to the performance data provided by SOS Performance Advisor.

logical I/O

An I/O that is satisfied in memory or disk.

physical I/O

An I/O that requires disk access. Physical I/Os include User, Sys, VM, and RAW.

raw I/O

A disk I/O that bypasses the buffer cache.

service time

The amount of time an I/O request takes to be serviced once it begins to be processed by the disk (removed from the disk queue), excluding wait time.

system I/O

A disk I/O that is the result of system overhead in managing files (i.e., super-block reads/writes).

user I/O

A disk I/O that is a result of user file reads/writes.

virtual memory I/O

A disk I/O that is a result of virtual memory management.

wait time

The amount of time an I/O request waits in the disk queue before being serviced. Excessive wait times indicate a disk bottleneck.

Network Terms

The network terms defined in this glossary are specific to the performance data provided by SOS Performance Advisor.

collision

A network collisions occurs when the system sends a packet at the same time as another system. When collisions occur, the system dispatching them waits a random amount of time to retransmit the packet. Excessive collision percentages indicate a network bottleneck.

Process Terms

The process terms defined in this glossary are specific to the performance data provided by SOS Performance Advisor.

priority

The CPU scheduling priority of the process. High priority numbers indicate low priority status, and vice versa.

think time

The amount of time a process is waiting for user input.

timeslice

The maximum amount of time one process is allowed to run before the scheduler searches for other higher priority processes. The process may give up the CPU sooner if it enters kernel mode.

wait state

Identifies a resource that a process is waiting (blocked) on.

Wait State Codes

The wait state codes defined in this glossary are specific to the performance data provided by SOS Performance Advisor.

CACH/CA

Waiting for a cache operation (such as a getblk or genewbuf) to complete. This can include buffered I/Os to disk.

CPU/RN

Actually running on CPU.

DISK/DI

Waiting for a disk driver to complete a disk I/O.

GRAF/GR

Waiting for a graphics card or a framebuf semaphore operation to complete.

INOD/IN

Waiting for a system inode to be updated or become available.

IO/IO

Waiting for any I/O other than LAN or terminal to complete.

IPC/IP

Waiting for an interprocess communication call to complete.

LAN/LN

Waiting for I/O over LAN to complete.

MSG/MG

Waiting for a message operation to complete.

NFS/NF

Waiting for a Network File System request (such as a read, write or control) to complete.

PIPE/PI

Waiting for a pipe communication to complete.

PRE/PR

Waiting in the CPU run queue.

RPC/RP

Waiting for a remote procedure call to complete.

SEM/SE

Waiting for a SysV semaphore operation to complete.

SHM/SH

Waiting for a shared memory operation to complete.

SLEP/SL

Waiting for a sleep or wait call to expire.

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SOCK/SO

Waiting for a socket operation (such as a connect or a send) to complete.

STRM/ST

Waiting for a stream operation to complete.

SYS/SY

Waiting for a general kernel resource (such as audit, security or page control) to become available.

TTY/TY

Waiting for a terminal I/O to complete.

VM/VM

Waiting for a memory resource to become available.

OTHR/OT

Waiting for other event not covered by the above definitions to complete.

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