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User's Guide

Meta-View Performance Manager

Meta-View Agent and Host for MPE/iX

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Meta-View Performance Manager for MPE/iX version I.03f

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1

Meta-View Agent and Host for MPE/iX

Introduction

Meta-View is the successor to Lund's SOS product on all platforms on which SOS is supported: MPE/iX, HP-UX and Solaris. Meta-View also supports two new host platforms: Linux and Windows. Meta-View retains the powerful collectors and host-based capabilities of SOS, and adds two powerful Java clients. Meta-View Web runs on Windows and UNIX systems, and Meta-View Alert runs on Windows systems. Lund's popular graphic reporting tool, Performance Gallery Gold, is available as an add-on to the Meta-View suite.

Meta-View for MPE/iX comprises the following components:

1. **Meta-View Agent for MPE/iX**

   This is the software that resides on a host to collect data, store it into SL files and serve it on demand to Meta-View clients. In SOS it is the SOSMONJ job that collects data and stores it to SL files. In Meta-View that function is performed by the MVMONJ job, and there is a new MVDATAJ job to read the data and serve it to clients.

2. **Meta-View Host for MPE/iX**

   This is the interactive terminal-based program that runs on a host and displays data for that host in real time. It is typically used for performance troubleshooting. In SOS the program is named SOS.PUB.LPS. In Meta-View it is MVHOST.MVPGMS.LUND.

3. **Meta-View Web**

   This is a graphical client program that runs on a Java virtual machine. This is currently available for Windows PC clients.

4. **Meta-View Alert**

   This is an alerting program that runs on a Java virtual machine on a Windows system.

Meta-View Agent and Host for MPE/iX

The components of Meta-View that reside on the HP e3000 are Meta-View Agent and Host for MPE/iX. Together these components are the former SOS/3000 product, but with the following significant enhancements and modifications:

1 The MVDATAD program, the MVDATAJ job and data files have been added to serve data over the network for the new real-time clients.

2 The product files now reside in the LUND account rather than the LPS account. Lund will cease using the LPS account in favor of the more readily recognized Lund name. In the future, other Lund products will reside in the LUND account rather than the LPS account.

3 Most files have been moved from the PUB group to other groups. The files that remain in the PUB group are files that are common to all Lund products, such as license files. The new group names begin with the letters "MV" for Meta-View. The new groups are: MVDATA (data and Help files), MVJOB (job files) and MVPGMS (program files). The SAMPLE group that existed in SOS has been renamed MVSAMPLE in Meta-View. The LOGFILES and HANDLERS groups are unchanged (the HANDLERS group is for procedure exit handlers and is shared with other Lund products, such as Shadow D/R).

4 File names have been changed to remove the "SOS" name. For instance, the online SOS program is now MVHOST.

5 Programs have been modified to look for files by their new names and locations.

6 The comments and commands in job streams have been modified appropriately to accommodate these changes.

Package Contents

This section describes the contents of the Meta-View for MPE/iX package you have received and provides an installation overview.

The package you received from Lund contains all that you need to install the Agent, Host and Web components of Meta-View Performance Manager for MPE/iX. The following items should be present in this package:

1 **Printed documentation**:

- Cover Letter
- Installation and Setup Instructions for MPE/iX Products from Lund Performance Solutions
- Installation and Setup Instructions for Meta-View Web
- Release Notes for Meta-View Agent and Host for MPE/iX
- Release Notes for Meta-View Web
- Supplemental Notes for Meta-View Performance Manager for MPE/iX
- Installation and Setup Instructions for Meta-View Alert as contained in the User's Guide

2 **A DDS product tape** with the current releases of Meta-View Agent and Host for MPE/iX and an updated license code. The tape might also contain additional Lund product updates or trial copies for MPE/iX.

3 **A product CD-ROM** labeled "Meta-View Performance Manager Product CD" containing the Meta-View Web component, Meta-View Alert and all Meta-View Performance Manager documentation, including a user's guide.

Installing Meta-View Agent and Host for MPE/iX

The Installation and Setup Instructions for MPE/iX Products provide detailed information to guide you in installing Meta-View Agent and Host for MPE/iX and other Lund products for MPE/iX onto your HP e3000 system. The installation script allows you to install all of these products at once on the volume set of your choice.

To install your product(s) you will need the DDS product tape and the installation instructions. If you are updating to Meta-View from SOS Performance Advisor, please read the Supplemental Notes.

For more information about installation and setup instructions, see “Installing Meta-View Agent and Host for MPE/iX” on page 7.

Installing Meta-View Clients

The Installation and Setup Instructions for Meta-View Web provide detailed information to guide you in installing Meta-View Web on a Windows workstation. You can install the clients on as many workstations as you require.

No license code is required to run Meta-View clients.

Key Features

Meta-View Agent and Host deliver two things that do not usually go together: comprehensive diagnostic abilities and ease of use. Meta-View has the power, scope, and depth you need to solve the most baffling performance problems. A few of the key features of the Meta-View Agent and Host for MPE/iX product are described below.

Annual System Review

Lund's System Review is a high-level overview of major system resources based upon a customer questionnaire and a sample of typical system performance data. The review consists of a Report Card rating for each key indicator of performance, and Executive Summary with an overview and recommendations, and primary resource analysis including relevant graphs. The System Review can be provided monthly, quarterly or annually. Contact your Lund account manager for information.

System Performance Advice

MVHOST’s System Performance Advice messages are easy-to-understand "one-liners" configured to help system administrators focus in on potential performance issues.

Historical Data Reporting

MVLOGX is the historical data counterpart to MVHOST. It provides the means for reviewing performance data stored in the log files. The user interface is similar in many ways to MVHOST; the main difference is that the MVLOGX screens do not display current samples of online performance data.

The primary functions of MVLOGX 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 real-time graphical analysis and reporting application from Lund Performance Solutions.

ScopeUtil (HP Scope File Conversion Utility)

Lund Performance Solutions has created a program, ScopeUtil, for the Meta-View for MPE/iX product. ScopeUtil takes Scope extract files as input and creates SL files as output.

- The SL files are the files that hold Meta-View for MPE/iX historical data
- Scope is a performance data collector sold by Hewlett-Packard

By converting Scope data to SL files, Lund's ScopeUtil makes the data available to the historical reporting tools from Lund, including MVLOGX, Meta-View Web, Meta-View Alert and Performance Gallery Gold.

Support

When you purchase product maintenance and support from Lund Performance Solutions, you benefit from the knowledge and experience of our professional support teams. Our contracted product support entitles you to receive timely updates, bug fixes, documentation and direct technical support.

Contact Information

Postal Address

Lund Performance Solutions

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• Certified Trainers	training@lund.com
• Documentation Team	documentation@lund.com

Technical Support

At Lund Performance Solutions we are working hard to provide you with intuitive software products. Additionally, we try to provide superior online and printed documentation. However, should you find yourself with a technical question that you cannot answer with the tools provided, please contact our technical support team.

NOTE You must be a registered user to access Lund Performance Solutions' support services. Lund Performance Solutions' support services are subject to Lund Performance Solutions' prices, terms and conditions in place at the time the services are used.

E-mail Tech Support

Ask questions and receive detailed answers from the technical support team by sending an e-mail message to **support@lund.com**. Please include the product serial number with your question. Will receive a reply by e-mail.

Telephone Tech Support

You can reach the technical support team by phone at **(541) 812-7600**, Monday through Friday during the hours of 7:00 A.M., to 4:00 P.M., Pacific Time, excluding major holidays.

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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Lund Performance Solutions' professional sales team is available to answer your sales and customer support questions Monday through Friday during the hours of 7:00 A.M., to 4:00 P.M., Pacific Time, excluding major holidays.

Please contact your account manager for information about the latest Lund Performance Solutions products, the Lund PASS Plan (Performance Advantage Support Services), upgrade options and prices and more.

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All product documentation is available online at:

http://www.lund.com/support/documentation.html

2

Installation and Setup Instructions

Installing Meta-View Agent and Host for MPE/iX

The following instructions are provided for the initial, patch or upgrade installation of Meta-View Agent and Host for MPE/iX.

Installing this product involves two basic steps:

1. Restoring all files from the tape to the LUND, LPS and/or LPSTOOLS account(s).
2. Running the installation script.

NOTE The Meta-View Performance Manager for MPE/iX product is placed in the LUND account.

Restoring Product Files from Tape

To restore all the product files from tape:

1. If Meta-View Agent and Host for MPE/iX product is currently installed on the system, make sure no users or jobs are running the LUND, LPS or LPSTOOLS programs during the new product installation.
2. If you already are running products from Lund Performance Solutions, back up the LUND, LPS and LPSTOOLS accounts.
3. Certain files, such as @.SAMPLE.LPS, SOSADVIC.PUB.LPS and SOSMONJ.PUB.LPS, may be overlaid by the new version. After the installation is complete, you can edit any customized files. DO NOT, however, restore old versions of our job streams - we may have modified them for the new product version.
4. Mount the installation tape.
5. Log on to the system as a user with system management capability. For example:

:HELLO MANAGER.SYS, PUB

The files to be restored from the installation tape will go into the groups PRODUCT.LPS and INSTALL.LPS. Once your product is successfully installed, these groups can be purged. If you wish these groups to be created on the system volume set (MPEXL_SYSTEM_VOLUME_SET), restore without using the VOLSET option on the :RESTORE command.

For example:

:FILE T; DEV=TAPE

:RESTORE *T; @.@.LPS; CREATE; SHOW

6 If you want to place these groups on a volume set other than MPEXL_SYSTEM_VOLUME_SET, specify that volume set in the VOLSET option. For example, suppose the volume set is named "USER_SET_1":

:FILE T; DEV=TAPE

:RESTORE *T; @.@.LPS; CREATE; SHOW; VOLSET=USER_SET_1

7 A tape reply request will appear on the console, unless you have auto-reply. For example:

?time/job/pin/LDEV# for "T" on devclass (NUM) ?

Reply to the tape request, unless you have auto-reply. For example:

=REPLY pin, ldev

8 Make sure that the :RESTORE command is successful.

Running the Installation Script

1 The installation script is the file INSTALL.INSTALL.LPS. This is an interactive script: it asks questions to determine what products to install, and on what volume set to install them. While still logged on as MANAGER.SYS, execute the script:

:XEQ INSTALL.INSTALL.LPS

Answer the questions asked by the script, and then follow the instructions provided by the script.

The Meta-View Agent and Host for MPE/iX product is installed in the LUND account. The installation script sets up all needed accounting structure in these accounts, and moves files to their proper locations. The installation script will create accounts and groups on a volume set other than the system volume set if that is desired.

After successful execution of the script, your Lund products will be properly installed.

2 The installation process does not put a password on the LUND account. *We recommend that you add a password to the accounts to insure system security.*

3 When you installed Meta-View Agent and Host for MPE/iX, the utilities were placed in UTIL.LUND.

4 Because you installed Meta-View Performance Manager for MPE/iX, you should stream the MVDATAJ.MVJOB.LUND job to serve up data for new Meta-View clients. This will start the MVDATAD data server program.

3

MVHOST Screen Selection Menu

Screen Selection Commands

The screen selection menu provides keyboard shortcuts to each of the data screens available in MVHOST. To access this menu, type S at the command prompt or press the SCREEN MENU function key (F7). Each MVHOST screen is briefly described in Table 3.1.

```
                        MVHOST Screen Selection Menu

       ** GLOBAL RESOURCE **              :   MPE/iX Command
       ---------------------              E   Exit MVHOST
    G  Global Summary
    Z  Pulse Points                           ** WORKLOAD AND PROCESS **
    A  Resource Trend                         --------------------------
    R  Response Time Detail               P   Process Detail
    C  CPU Detail                         W   Workload Detail
    D  Disc I/O Detail                    S   Global Process Stops
    M  Memory Detail
                                              ** SYSTEM ADMINISTRATION **
       ** PROGRAMS AND COMMANDS **            ---------------------------
       ---------------------------        J   System Configuration
    L  Log Trends Program (mvlogx)        F   File Users
    O  MVHOST Options                     U   File Space Utilization
    V  File Report Program
  Enter Screen Code:
```

Figure 3.1 *MVHOST Screen Selection Menu*

Table 3.1 *MVHOST Screens*

Key	Command	Description	Reference
G	Global Summary	Displays a basic, overall picture of your system's performance	"MVHOST Global Summary" on page 43

Key	Command	Description	Reference
Z	Pulse Points	Lists the key indicators of performance and categorizes their current levels of performance as normal, problematic or critical	"MVHOST Pulse Points" on page 71
A	Resource Trends	Five resource trend screens display performance data for the current session: • CPU trends • Main memory trends • Disc I/O utilization trends • Response and transaction trends • Mode switch trends	"MVHOST Current Resource Trends" on page 75
R	Response Time Detail	Displays prompt response time, first response time and total transactions for the collection interval	"MVHOST Response Time Detail" on page 85
C	CPU Detail	Reports the general state of the CPU	"MVHOST CPU Detail" on page 91
D	Disc I/O Detail	Provides the utilization percentage and I/O rate for each disc device configured on the system	"MVHOST Disc I/O Detail" on page 103
M	Memory Detail	Shows rates and total counts for page faults, overlay candidates, posts and prefetches	"MVHOST Memory Detail" on page 97
P	Process Detail	Provides an in-depth view of a specific process' performance during the current interval	"MVHOST Process Detail" on page 111

Key	Command	Description	Reference
W	Workload Detail	Reports detailed information	"MVHOST Workload Detail" on page 129
S	Global Process Stops	Provides information that shows why system, session and job processes are giving up use of CPU	"MVHOST Global Process Stops" on page 145
J	System Configuration	Shows significant information about disc space usage, transient space and disc space fragmentation	"MVHOST System Configuration" on page 153
F	File Users	Lists the users of the file entered	"MVHOST File Users" on page 161
U	File Space Utilization	Displays information about disc space usage, transient space and disc space fragmentation	"MVHOST File Space Utilization" on page 165
L	Log Trends Program (MVLOGX)	Displays the historical data counterpart to MVHOST	"MVLOGX" on page 183
O	MVHOST Options	Lists a variety of options that control which performance indicators are collected and displayed in the Global Summary	"MVHOST Main Options" on page 15
V	File Report Program	Starts the file report program	"MVLOGX Report Card" on page 227
:	MPE/iX Command	Brings up an MPE/iX command prompt	N/A
E	Exit	Terminates MVHOST and returns you to the MPE/iX prompt	N/A

4

MVHOST MAIN OPTIONS

MVHOST Main Options

The MVHOST Main Option Menu contains a set (and several subsets) of options that enable the user to configure the MVHOST program. To access this menu, type O.

```
MVHOST/3000 MAIN OPTION MENU

   1) Screen refresh interval in seconds (60)
   2) Display Key Indicators of Performance (Y)
   3) Display advice messages (N)
  --- Display informational advice messages
   5) Display option (2-Tabular)
   6) Display memory information on global screen (Y)
   7) Display disc information on global screen (N)
   8) Collect process/workload information (Y)
   9) Display process information (Y)
  10) Display workload information (N)
  --- Display only active workloads
  --- CPU percentage required for workload display
  13) Terminal memory lock for process display (Y)
  14) Company name ()
  15) Detail display options (SUBMENU)

Which Option:
```

Figure 4.1 *MVHOST Main Options Menu*

To modify an option, either temporarily or permanently:

1. From the MVHOST Main Option Menu, enter the option number.
2. Enter the option parameter at the prompt. Press the Enter key.
3. Repeat step 2 to set another MVHOST option, or press Enter again to exit the options menu.
4. At the "Should these options be saved permanently?" do one of the following:

- Type Y (Yes) to save the changes permanently.
- Press the Enter key to verify the temporary option change and return to the MVHOST program.

Screen Refresh Interval in Seconds

The MVHOST banner shows the length of the current data collection interval (I: mm:ss) in minutes (mm) and seconds (ss). In the following example, the banner indicates the measurements reported in the data screen was updated one minute (60 seconds) ago. The banner is always displayed and cannot be surpressed.

```
MVHOST/3000 I.03f(c) LPS   FRI, APR   1, 2005,   6:27 AM   E: 02:10:00   I: 01:01
```

Figure 4.2 *MVHOST Banner Showing Current Interval (I: mm:ss)*

The MVHOST program will refresh the performance measurement data every 60 seconds. This default setting can be changed to an interval from 10 to 3600 seconds.

NOTE MVHOST 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.

Display Key Indicators of Performance

The Key Indicators of Performance (KIP) line can be displayed immediately below the MVHOST banner in all MVHOST data screens. For definitions of the data displayed in the KIP line, please refer to "Key Indicators of Performance (KIP)" on page 47.

```
MVHOST/3000 I.03f(c) LPS   FRI, APR   1, 2005,   6:31 AM   E: 02:14:02   I: 01:01
          Total Busy:    .8%    High Pri:    .8%    MemMgr:    .0%    Read Hit:   0%
```

Figure 4.3 *MVHOST Key Indicators of Performance (KIP)*

The KIP line can be configured to show different performance data. See "KIP File" on page 39 for configuration instructions.

Display Advice Messages

System Performance Advice messages displayed in the Global Summary screen deliver a basic interpretation of significant system performance events Figure 4.4). The content of these advice messages is discussed further in “System Performance Advice” on page 69.

```
──────────────────────── System Performance Advice ────────────────────────
The CPU was used a total of 99.4% of its capacity during this interval    <GI01>
Process CPU use by Sub-Queue: AQ-.0 BQ-4.1 CQ-.2 DQ-.0 EQ-88.4            <GI02>
Native Mode to Comp. Mode Switch rate during this interval was HEAVY      <GE02>
Comp. Mode to Native Mode Switch rate during this interval was HEAVY      <GE03>
This interval's 'Hog' process was J8820 (PIN 85) with 29.2% of the CPU    <PI02>
This interval's highest disc I/O user was J8820 (PIN 94) with 57 I/O's    <PI03>
This interval's highest Term I/O user was S570 (PIN 67) with 5 Term Reads <PI04>
```

Figure 4.4 *MVHOST System Performance Advice*

The advice messages can be turned on or off in the MVHOST Main Option Menu.

The advice messages are user configurable. For instructions to modify alert thresholds and other messaging parameters, refer to “ADVICE File” on page 29.

Display Informational Advice Messages

By default MVHOST provides both *excessive use* and *informational* advice messages.

An "E" in the message ID code (<GE09>) denotes an excessive use advice message. This type of message alerts the user to a situation where system resources are overtaxed.

An "I" in the message ID code (<GI01>) denotes an informational advice message. Informational messages usually state current performance levels for the current interval. The informational messages can be turned on or off from the main option menu.

Display Option (Graphical or Tabular)

MVHOST can display the Global Summary in both graphical and tabular formats. The graphical format is shown by default, and the user can switch the view to tabular and back very easily by using the function key provided. If preferred, the user can choose the tabular format as the default from the main option menu.

Display Memory Information on Global Screen

Global Memory Statistics can be displayed in the tabular format of the Global Summary (Figure 4.5). You can establish this display as a default setting from the Main Options Menu, or you can use the MEMORY STATS function key to switch the memory statistics on or off.

```
                       Global Memory Statistics
Page Fault Rate     6[   4]/s  Memory Cycles    6[528]  Overlay Rate      0[    0]/s
Lbry Fault %        0[   0]    Read Hit %     100[100]  Swap/Launch     .01[  .01]
```

Figure 4.5 *MVHOST Global Memory Statistics*

Display Disc Information on Global Screen

Global Disc Statistics can be displayed in the tabular format of the Global Summary (Figure 4.6). You can establish this display as a default setting from the Main Options Menu, or you can use the DISC STATS function key to switch the disc statistics on or off.

```
                          Global Disc Statistics
LDev IO/s IO% QLen | LDev IO/s IO% QLen | LDev IO/s IO% QLen | LDev IO/s IO% QLen
   1    0   0  .00 |    2    1  50  .00 |    3    1  50  .00 |  ALL    2 100  .00
```

Figure 4.6 *MVHOST Global Disc Statistics*

Collect Process/Workload Information

This option sets MVHOST to collect process level and workload level performance statistics.

Display Process Information

Process information can be displayed in the graphical and tabular formats of the Global Summary (Figure 4.7). From the Main Options Menu, you can choose to surpress/display this information from the Global Summary.

```
                             Process Information
PIN  J/S#   Session/User Name       Cmd/Program CPU%  QPri  #Rd #Wr LDV #Tr PRes
  4 <sys>  <system process>                       .0 AL13    0   0  -   0    -
 30 <sys>  <system process>          NMCONSOL     .1 BL149   0   0  -   0    -
 53 J8207  MVDATAJ,MGR.LUND          MVDATAD      .1 BL160   0   0 10   0    -
  5 <sys>  <system process>                       .2 CL152   0   4  -   0    -
 84 S570   WHITNEY,MGR.LUND          VTSERVER     .4 CS152   0   0  -   0    -
 38 <sys>  <system process>          LOG          .6 BL50    0   2  -   0    -
106 J3401  QXMONJOB,MGR.LPS          QXMON        .9 BL96    0   0 10   0    -
 67 S570   WHITNEY,MGR.LUND          MVHOST      7.6 BL100   0   2  4   1   .3
 90 J8824  LOAD4,MGR.SOSDEV          SOSTASK    23.2 ES253   0   1 10   0    -
 86 J8824  LOAD4,MGR.SOSDEV          SOSTASK    28.4 ES253   0   4 10   0    -
 66 J8824  LOAD4,MGR.SOSDEV          SOSTASK    32.2 ES253   0   2 10   0    -
```

Figure 4.7 *MVHOST Global Process Information*

Display Workload Information

Workload information can be displayed in the graphical and tabular formats of the Global Summary (Figure 4.8). From the Main Options Menu, you can choose to surpress/display this information from the Global Summary.

```
───────────── Process Summary by Application Workloads ─────────────
No Group Name  %CPU          %Disc I/O     Prompt Resp  #Transacts  CPU/Tr  IO/Tr
 1:LOOPER       .0[   .0]     .0[   .0]     .0[  - ]      0[     0]    0      0
 2:FINANCEAPP   .0[   .0]     .0[   .0]     .0[  - ]      0[     0]    0      0
 3:LUND         .0[   .0]     .0[   .0]     .0[  - ]      0[     0]    0      0
 4:ACCOUNTPAY   .0[   .0]     .0[   .0]     .0[  - ]      0[     0]    0      0
 5:ACCOUNTREC   .0[   .0]     .0[   .0]     .0[  - ]      0[     0]    0      0
 6:JOBS         .4[  2.5]   50.0[74.6]     .0[  - ]      0[     0]    0      0
 7:SESSIONS     .4[   .5]     .0[  4.2]     .<[  .0]      9[    23]   52      0
 8:SYSPROCS     .1[   .1]   50.0[21.1]     .0[  - ]      0[     0]    0      0
********************************************************************************
```

Figure 4.8 *MVHOST Global Workload Information*

Display Only Active Workloads

By default, all workloads defined in the workloads definition file (MVWKDEF) are included in the Process Summary by Application Workloads section of the Global Summary, even if the workload 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).

CPU Percentage Required for Workload Display

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 Process Summary by Application Workloads section of the Global Summary. A higher CPU minimum percentage can be specified (enter a value from 0.0 to 100 percent).

Terminal Memory Lock for Process Display

One of the design philosophies invoked in MVHOST is to provide as much relevant performance information as possible in each screen. In order to view as much scrollable process information as possible (causing the global and disc data to roll off the top of the display), you must surpress the memory lock function on Hewlett-Packard and compatible terminals (Figure 4.9). At the "Terminal Memory Lock for Process Display" option, enter **N** (No).

```
  9 <sys>  <system process>                  .0 CL152    0   0  -     0   -
  8 <sys>  <system process>                  .0 CL152    0   0  -     0   -
  6 <sys>  <system process>                  .0 CL152    0   0  -     0   -
  3 <sys>  <system process>                  .0 BL100    0   0  -     0   -
  2 <sys>  <system process>        LOAD      .0 BL142    0   0  -     0   -
 41 <sys>  <system process>        SPOOLMON  .0 BL100    0   0  -     0   -
 39 <sys>  <system process>        SYSMAIN   .0 BL49     0   0  -     0   -
 36 <sys>  <system process>                  .0 AL13     0   0  -     0   -
 35 <sys>  <system process>                  .0 AL13     0   0  -     0   -
 34 <sys>  <system process>                  .0 AL13     0   0  -     0   -
 33 <sys>  <system process>                  .0 AL13     0   0  -     0   -
 32 <sys>  <system process>                  .0 AL13     0   0  -     0   -
 31 <sys>  <system process>                  .0 AL13     0   0  -     0   -
 29 <sys>  <system process>        NMTRCMON  .0 BL149    0   0  -     0   -
 28 <sys>  <system process>        NMLOGICS  .0 BL148    0   0  -     0   -
                   Process Summary by Application Workloads
No Group Name   %CPU        %Disc I/O    Prompt Resp  #Transacts   CPU/Tr   IO/Tr
 1:LundWkld      7.0[ 1.9]   .0[ 1.2]    .3[  .3]      2[   37]   275      0
 2:LundJob        .0[  .0]   .0[  .0]    .0[  - ]      0[    0]     0      0
 3:JOBS         64.8[62.1] 93.3[89.2]    .0[  - ]      0[    0]     0      0
 4:SESSIONS       .5[  .2]   .0[  .8]    .0[  .6]      0[   39]     0      0
 5:SYSPROCS       .7[ 1.1]  6.7[ 8.8]    .0[  - ]      0[    0]     0      0
********************************************************************************
Enter Command:
```

Figure 4.9 *MVHOST Global Summary with Terminal Memory Lock Option Disabled*

Company Name

To add your company name or another significant word, phrase or line of text just below the banner and KIP line, enter the text in the Company Name option from the Main Option Menu. Figure 4.10 shows the Lund Performance Solutions company name.

```
MVHOST/3000 I.03f(c) LPS  FRI, APR  1, 2005, 10:08 AM  E: 00:12:06  I: 01:16
     Total Busy:    .9%   High Pri:    .9%   MemMgr:    .0%   Read Hit:  0%
                           Lund Performance Solutions
```

Figure 4.10 *MVHOST Company Name Option Enabled ("Lund Performance Solutions")*

Detail Display Options (SUBMENU)

See "MVHOST Detail Display Options" on page 21 for information about the MVHOST display options.

5

MVHOST Detail Display Options

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

```
MVHOST/3000 MAIN OPTION MENU
  Detail display options

   1) Process display options (SUBMENU)
   2) Pulse Points display options (SUBMENU)

Which Option: _
```

Figure 5.1 *MVHOST Main Options Menu*

To modify a display option, either temporarily or permanently:

1. From the MVHOST Detail Display Option Menu, select the desired submenu:
   - Process display options
   - Pulse Points display options
2. Select the option number to modify. Enter the option parameter at the prompt. Press the Enter key.
3. Repeat step 2 to set another MVHOST display option, or press Enter twice to exit the display options menus. Press the Enter key again to exit the Main Options Menu.
4. At the "Should these options be saved permanently?" do one of the following:
   - Type **Y** (Yes) to save the changes permanently.

- Press the Enter key to verify the temporary option change and return to the MVHOST program.

Process Display Options

Each of the process display options are explained in this chapter.

```
MVHOST/3000 MAIN OPTION MENU
  Detail display options
    Process display options

   1) Display extended process line (N)
   2) Display 132 col process line (N)
   3) Show wait state on first line (N)
   4) Display "First" instead of "Prompt" response time (N)
  --- Display page fault rate instead of IO per transaction
   6) Display total and I/O percentage instead of read/write counts (N)
   7) Display only active processes (Y)
   8) CPU percentage required for process display (.0)
   9) Display session processes (Y)
  10) Display job processes (Y)
  11) Display system processes (Y)
  12) Display command interpreter processes (Y)
  13) Display processes which have died (Y)
  14) Process logon filter (@.@)
  15) Process sort option (4-CPU time)
  16) Display processes sorted in ascending order (Y)
  17) Maximum number of processes to display (0-ALL)  (0)

Which Option: _
```

Figure 5.2 *MVHOST Process Display Options*

Display Extended Process Line

Additional process information can be displayed in the Process Information section of the Global Summary (Figure 5.3):

- An extended process line below each process line, which shows the percentage of time the corresponding process spent in each wait state
- A wait states column heading line

The wait states include all possible states in which the current processes can spend CPU time. For a definition of each wait state, see “Wait States” on page 243.

```
━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ Process Information ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━
PIN   J/S#   Session/User Name      Cmd/Program CPU%  QPri  #Rd #Wr LDV #Tr PRes
Wait:Cur { CP ME DI IM PR RI TW IO TI FS MS OT}CPU:ms  /Tr D/Tr   C/N   N/C %CM
Wait:TRd {  1          99                     }   49     <    0     0    12   6
    3 <sys>  <system process>                     .1 BL100    0   0  -    0   -
Wait:Oth {                                100}    55     <    0     0     0   0
   86 J77    MVMONJG,MGR.MVWI03D    DISCFREE      .2 -----    0   3  10   0   -
Wait:Dea { 59  8 19     4           1       9}    91     <    0     8     5   6
   83 J71    SCOPEJOB,MANAGER.SYS   SCOPEXL       .5 BL100    0   6  10   0   -
Wait:Tim {  1           1          99         }  260     <    0    10    11   6
   87 S277   MANAGER.SYS            MVHOST        .6 BL100    0   0   5   5  .1
Wait:CPU { 91           3     3               3}  290    58    0     0     3   0
   82 J77    MVMONJG,MGR.MVWI03D    MVHOST       1.7 BL100    0   9  10   0   -
Wait:Tim {  2                      86 12      }   842     <    0   235    37  13
   72 J77    MVMONJG,MGR.MVWI03D    DISCFREE    11.3 -----    0   3  10   0   -
```

Figure 5.3 *MVHOST Extended Process Line*

Display 132 Col Process Line

Your terminal must be configured to 132 characters to see the entire process information display. Wait state statistics start at the 82nd character. This option is not available when the extended process line is displayed.

Show Wait State on First Line

If you show the wait state on the first line (enter **Y** (Yes) for this option), the current wait state will display on the first line of the process information. It will replace #Wr (number of writes), which will be consolidated with #Rd (number of reads) to give the #IO (number of I/Os) statistic. The wait indicator shows what the process is waiting on (i.e., a disc, a RIN, the CPU, etc). This option is not available if the extended process line or the 132 col process line is enabled.

Display "First" Instead of "Prompt" Response Time

This option allows you to view process response times in one of two ways:

- *First* response time is counted in seconds from when the C/R or Enter key was pressed to when the first character appears on the screen
- *Prompt* response is counted in seconds from when the C/R or Enter key was pressed to the first available user data entry prompt

Display Page Fault Rate Instead of 10 Per Transaction

When the MVHOST extended process line is enabled, you have a choice of displaying the page fault rate per second (a memory pressure indicator) or the disc I/Os per terminal read count (D/Tr).

Display Total and I/O% Instead of Read/Write Counts

The default setting shows read and write counts (#Rd and #Wr) in the Process Information section of the Global Summary. You can configure MVHOST to show the total and I/O percentage instead of read and write counts.

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 Information section of the Global Summary. Inactive processes can be included by using this display option, although the default setting (display only active processes) is recommended.

CPU Percentage Required for Process Display

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 Information 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, like 10 percent, will exclude all active processes that used less than 10 percent of the total CPU time.

NOTE 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 a top CPU "hog" process, a value of 5.0 to 15.0 percent is recommended.

Display Session Processes

Session processes are listed in the Process Information section of the Global Summary. These processes can be surpressed using this display option.

Display Job Processes

Job processes are listed in the Process Information section of the Global Summary. These processes can be surpressed using this display option.

Display System Processes

System processes are listed in the Process Information section of the Global Summary. These processes can be surpressed, if desired, by using this display option.

Since various parts of the MPE/iX operating system run as processes, you will usually see low-numbered PINs displayed. These are processes like loader processes, logging processes, etc. All of these belong to the family of MPE system processes. Each of these processes usually execute as very high priority and do not consume much CPU. However, if you suspect a system hog or want to snoop around various datacom processes (some of which are considered to be system processes), you should enable this filter.

Display Command Interpreter Processes

A command interpreter process is created for each HELLO or JOB command initiated. If you want to see the last command or job step that a user or job performed, enable the Command Interpreter Process display option.

Another useful feature of MVHOST is its ability to see the last MPE command performed by a command interpreter process, which is illustrated in the following example.

```
                        Process Information
PIN  J/S#   Session/User Name       Cmd/Program CPU%  QPri   #Rd #Wr LDV #Tr PRes
  78 S305   WHITNEY,MGR.LPS          VTSERVER     .4 CS152  117  44  -     0    -
  46 <sys>  <system process>         JSMAIN       .7        153  79  -     2   .2
  75 S305   WHITNEY,MGR.LPS          ci:LISTF    1.7 CS158  146  53  -     2  4.5
  92 J269   QXMONJOB,MGR.LPS         QXMON       3.5 BL96     0   0  10    0    -
```

Figure 5.4 *MVHOST Process Information Showing Command Interpreter Processes (ci:)*

Display Processes Which Have Died

The Process Information section of the Global Summary displays all processes which have died. These processes are labelled "Dea" next to the "Wait" column in the extended Process Detail section, and the process priority will appear as "---".

```
                        Process Information
PIN  J/S#   Session/User Name       Cmd/Program CPU%  QPri   #Rd #Wr LDV #Tr PRes
Wait:Cur { CP ME DI IM PR RI TW IO TI FS MS OT}CPU:ms  /Tr D/Tr   C/N   N/C %CM
  59 J694   MVMONJ,MGR.LUND          DISCFREE     .2 -----    0   3  10    0    -
Wait:Dea { 55  8 15    11              1  1 10}   92     <    0      8     5    6
```

Figure 5.5 *MVHOST Process Information (Extended) Showing Dead Processes*

Process Logon Filter

The default logon filter (@.@) allows all users and all processes to be displayed on the MVHOST screens. If you supply a USER and/or ACCOUNT for this option, only jobs and sessions that qualify will be displayed. This allows you to target a set of specific users and/or applications. Input here should be in the form of:

<sessions>, <user>.<account>,<group>

The <session> and <group> names are optional. The <user> and <account> names are required. The "@" sign may be used for user or account.

Process Sort Options

The process sort option enables you to select the order in which the qualifying processes will be displayed. By default, the processes are shown by CPU time utilized. All other options are listed in Table 5.1.

Table 5.1 *MVHOST Process Sort Options*

Option	Description	Column
1-PIN#	Sort by process identification number	PIN
2-Job/ Session#	Sort by job or session number	J/S#
3-Workload Group	Sort by the application workload group to which the process belongs	N/A
4-CPU Time	Sort by the percentage of CPU time utilized by the process	CPU%
5-Disc I/O	Sort by the total number of disc I/Os performed by the process	#IO
6-Term Reads	Sort by the number of terminal reads	#Tr
7-Priority	Sort by process priority	QPri
8-Response Time	Sort by the average response time, either first or prompt	FRes or PRes
9-N/C	Sort by the number of native mode to compatibility mode switches	N/C
10-C/N	Sort by the number of compatibility mode to native mode switches	C/N

Option	Description	Column
11-CM%	Sort by the percentage of process time due to compatibility mode CPU usage	%CM
12-Wait State	Sort by the activity or sleep state a process is in	Wait

Display Processes Sorted in Ascending Order

By default, the processes displayed will be sorted in descending order. To view the processes in ascending order, enable this option.

Maximum Number of Processes to Display

This option allows you to set a maximum number of processes to display in the Global Summary.

Pulse Points Display Options

The pulse points display options are self-explanatory (Figure 5.6 and Figure 5.7).

```
MVHOST/3000 MAIN OPTION MENU
  Detail display options
    Pulse Points display options

   1) Display CPU stats (Y)
   2) Display memory stats (Y)
   3) Display disc I/O stats (Y)
   4) Display miscellaneous stats (Y)

Which Option: _
```

Figure 5.6 *MVHOST Pulse Points Display Options*

```
 MVHOST/3000 I.03f(c) LPS  FRI, APR  1, 2005,  7:10 AM  E: 00:18:32  I: 00:27
      Total Busy:  1.7%   High Pri:  1.7%   MemMgr:   .0%   Read Hit:  0%
                                Pulse Points
   Indicator             Green     Yellow      Red       Comments
High Pri Busy (%)       1.7[ 3.7]  [    ]   [     ] AQ+BQ+CQ+Mem+Disp+ICS
CPU QL                    0[   0]  [    ]   [     ]
ICS/OH + Dispatch (%)    .3[  .2]  [    ]   [     ]
CPU CM (%)                1[   3]  [    ]   [     ] Subjective
AQ + BQ                 1.2[ 3.4]  [    ]   [     ] Opr sys dependent
--- Memory ---
CPU MM (%)               .0[  .0]  [    ]   [     ] Reliable indicator
Page Fault Rate           0[   1]  [    ]   [     ] CPU dependent
Swaps/Launch            .00[ .01]  [    ]   [     ]
Memory Cycles/Hour        0[   0]  [    ]   [     ]
--- Disc I/O ---
Pause                    .0[  .0]  [    ]   [     ] Reflects data loc
Read Hit (%)              0[    ]  [    ]   [   22]
Average Q-Length        .00[ .00]  [    ]   [     ] Overall average
Disc I/O Rate/Sec         0[   0]  [    ]   [     ] Avg per disc
--- Miscellaneous ---
CM to NM Switches         0[   1]  [    ]   [     ] CPU dependent
NM to CM Switches         0[   0]  [    ]   [     ] CPU dependent

Enter Command:_
```

Figure 5.7 *MVHOST Pulse Points Screen*

6

MVHOST CONFIGURATION FILES

ADVICE File

In the System Performance Advice portion of the Global Summary, advice messages report system activity that occurred during the current interval. The advice messages and display criteria are maintained in the ADVICE.MVDATA.LUND file.

```
##########################################################################
######
```

User Notification Command —

```
MODEL 900-999999

TELLOP

TELL MANAGER.SYS
```

Default Advice Specification Block —

```
<GI01>The CPU was used a total of %s of its capacity during this interval

ALWAYS

CPU-BUSY%
```

Figure 6.1 *MVHOST ADVICE Configuration File*

The MVHOST program can display a single-line message for each item-name variable (a data item selected from the ITEMLIST.MVDATA.LUND file) placed in the ADVICE file.

During each current interval, MVHOST 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.

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 "Advice Configuration Rules" on page 31. The syntax of the specification blocks is outlined below using the default ME04 advice message as an example.

Example

<ME04>Memory indicator #4 (Page Fault rate) reveals %s %s memory load

PAGE-FAULT/S (10-50)

PAGE-FAULT/S | 20 an | 15 a | 10 a |

PAGE-FAULT/S | 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:

<ME04>Memory indicator #4 (Page Fault rate) reveals %s %s memory load

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

PAGE-FAULT/S | 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:

  <ME04>Memory indicator #4 (Page Fault rate) reveals %s %s memory load

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

  PAGE-FAULT/S | 20 EXCESSIVE | 15 HEAVY | 10 moderate |

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

Advice Configuration Rules

1. Comment lines must be preceded by a number sign character (#).
2. The first line of the ADVICE file:
   - Specifies the HP 3000 models for which this ADVICE file is valid. If there is no advice specification file, or if the model specified does not match the model on which MVHOST is being run, MVHOST will print a warning message and will not display any configured advice messages.
   - Is formatted:

     Model xxxxxxxx (to specify a single hardware model)

     or

     Model xxxxxxxx-xxxxxxxx (to specify a range of hardware models)

   Example

   MODEL 900-999999
3. The first line is followed by any number of user notification commands, terminated by a blank line. Advice messages are displayed on a terminal screen or in STDLIST in the case of batch. You can also send messages to the console and to individual sessions via the TELLOP and TELL commands, respectively. All selected advice messages will be sent to a list of users and/or the system console. The TELL function is implemented as follows:

   TELLOP

   TELL MANAGER.SYS

   TELL MGR.FINANCE

   <GI01>The CPU was ...

4 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.

5 The message-id code is made up of the following components:

- A type code, which denotes the specific system activity monitored.
  - D for disc activity
  - G for global activity
  - M for memory activity
  - W for workload 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)

6 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.

7 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 by 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.

8 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

<GI02>Process CPU use by Sub-Queue: AQ-%s BQ-%s CQ-%s DQ-%s EQ-%s

ALWAYS

AS-PROCESS%

BS-PROCESS%

CS-PROCESS%

DS-PROCESS%

ES-PROCESS%

9 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 disc 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-DISC, the disc I/O's performed by %DISC_HOG
- %HOG-TERM, the terminal reads performed by %TERM_HOG

A special construct is used to configure advice messages when workload group response time service level objectives are exceeded. For these messages the second line should be the work "WORKLOAD(x)", where "x" is:

- F to specify a first response time exceeded objective
- P to specify a prompt response time exceeded objective
- C to specify a CPU time exceeded objective

The following special item names can be used for workload messages only:

- %WORKLOAD, the name of workload group
- %ACTUAL, the actual group average response time
- %LIMIT, the response time service level objective

10 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.

Pulse Points

The ADVICE file also contains the Pulse Point configuration information for the Pulse Points screen.

```
##########################################################################
##########
```

CPU Pulse Points Indicator Lines —

```
$PP_CPU    HIGH-PRI-BUSY%          "Hi-Pri Busy(%)"      50,85    "AQ+BQ+CQ+Mem+Disp+ICS"
$PP_CPU    QUEUE-LEN               "CPU QL"              5,15     ""
$PP_CPU    OVERHEAD%+DISPATCHER%   "ICS/OH+Dispatch(%)"  10,15    ""
$PP_CPU    CPU-CM                  "CPU CM(%)"           10,15    "Subjective"
$PP_CPU    AS-PROCESS%+BS-PROCESS% "AQ+BQ"               5, 8     "Opr sys dependent"
```

Memory Pulse Points Indicator Lines —

```
$PP_MEMORY  MEM-MANAGER%     "CPU MM(%)"           4,10    "Reliable indicator"
$PP_MEMORY  PAGE-FAULTS      "Page Fault Rate"     10,25   "CPU dependent"
$PP_MEMORY  SWAPS/LAUNCH     "Swaps/Launch"        40,80   ""
$PP_MEMORY  MEM-CYCLES       "Memory Cycles/Hour"  4,10    ""
```

Disc Pulse Points Indicator Lines —

```
$PP_DISC   PAUSE%           "Pause"              5,15    "Reflects data loc"
$PP_DISC   READ-HIT%        "Read Hit(%)"        95,85   ""
$PP_DISC   DISC-QUEUE-LEN   "Average Q-Length"   5,10    "Overall average"
$PP_DISC   DISC-IO-RATE     "Disc I/O Rate/Sec"  10,25   "Avg per disc"
```

Misc. Pulse Points Indicator Lines —

```
$PP_MISC   C/N-SWITCHES    "CM to NM Switches"  200,500   "CPU dependent"
$PP_MISC   N/C-SWITCHES    "NM to CM Switches"  25,75     "CPU dependent"
```

Figure 6.2 *MVHOST ADVICE Configuration for Pulse Points*

An example of the Pulse Points screen is shown in Figure 6.3.

```
 MVHOST/3000 I.03f(c) LPS  FRI, APR  1, 2005,  7:10 AM  E: 00:18:32  I: 00:27
          Total Busy:  1.7%   High Pri:  1.7%   MemMgr:   .0%   Read Hit:  0%
                                  Pulse Points
   Indicator              Green    Yellow        Red      Comments
High Pri Busy (%)       1.7[ 3.7]  [    ]     [    ] AQ+BQ+CQ+Mem+Disp+ICS
CPU QL                    0[   0]  [    ]     [    ]
ICS/OH + Dispatch (%)    .3[  .2]  [    ]     [    ]
CPU CM (%)                1[   3]  [    ]     [    ] Subjective
AQ + BQ                 1.2[ 3.4]  [    ]     [    ] Opr sys dependent
    Memory
CPU MM (%)               .0[  .0]  [    ]     [    ] Reliable indicator
Page Fault Rate           0[   1]  [    ]     [    ] CPU dependent
Swaps/Launch            .00[ .01]  [    ]     [    ]
Memory Cycles/Hour        0[   0]  [    ]     [    ]
    Disc I/O
Pause                    .0[  .0]  [    ]     [    ] Reflects data loc
Read Hit (%)              0[    ]  [    ]     [  22]
Average Q-Length        .00[ .00]  [    ]     [    ] Overall average
Disc I/O Rate/Sec         0[   0]  [    ]     [    ] Avg per disc
    Miscellaneous
CM to NM Switches         0[   1]  [    ]     [    ] CPU dependent
NM to CM Switches         0[   0]  [    ]     [    ] CPU dependent

Enter Command:_
```

Figure 6.3 *MVHOST Pulse Points Screen*

By default, the Pulse point thresholds and messages are configured for you. You can edit the ADVICE 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 MEM-MANAGER% "CPU MM(%)"   4,10   "Reliable indicator"

Syntax

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

Configuration Rules

All the comments lines in the file start with a "#". The information for pulse points can be placed anywhere in the ADVICE file, but it is currently organized in the front section. All pulse point variables start with "$PP" and are in uppercase. Do not change or delete these variable names; new names must follow the same format.

1 The first line of the ADVICE file:

- Specifies the HP 3000 models for which this advice file is valid. If there is no advice specification file, or if the model specified does not match the model on which MVHOST is being run, MVHOST will print a warning message and will not display any configured advice messages.
- Is formatted:

  Model xxxxxxxx (to specify a single hardware model)

  or

  Model xxxxxxxx-xxxxxxxx (to specify a range of hardware models)

Example

MODEL 900-999999

2 The first line is followed by any number of user notification commands, terminated by a blank line. Advice messages are displayed on a terminal screen or in STDLIST in the case of batch. You can also send messages to the console and to individual sessions via the TELLOP and TELL commands, respectively. All selected advice messages will be sent to a list of users and/or the system console. The TELL function is implemented as:

TELLOP

TELL MANAGER.SYS

3 Any Pulse Points variable that you want to display in the Pulse Points screen must be defined in the ADVICE file.

4 The first four specification fields in the Pulse Points indicator line must be completed. The <comments> field may be omitted.

5 Commas, spaces, or tabs must separate the specification fields in the Pulse Points indicator line to allow for "white space" in the display.

6 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_MISC (Miscellaneous section)

7 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 MVHOST variable name being monitored and displayed in the Pulse Points screen, or the MVHOST variable being used after the operator. A variable name must meet the following qualifications:
  - It must be included in the ITEMLIST file
  - It must have block numbers 1, 6, 7, 8, 10, 12 or 14
  - It must have item types less than 1000
  - Information referenced from block 1 will be averages
- <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.

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

$PP_MEMORY MEM-MANAGER% "CPU MM(%)" 4,10 "Reliable indicator"

"CPU MM(%)" is the <label> that describes the <variable>, MEM-MANAGER%.

9 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 37.

  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 38.

- 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 (critical) 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 HIGH-PRI-BUSY% "High Pri Busy(%)" 50,85 "AQ+BQ+CQ+Mem+Disp+ICS"

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

- HIGH-PRI-BUSY% data values less than 50 will appear in the Green column in the Pulse Points screen.
- HIGH-PRI-BUSY% data values equal to or greater than 50 and less than 85 will appear in the Yellow column in the Pulse Points screen.
- HIGH-PRI-BUSY% data values greater than 85 will appear in the Red column in the Pulse Points screen.

Example 2

$PP_DISC READ-HIT% "Read Hit(%)" 95,80 ""

The Pulse Points for this second example would be interpreted as:

- READ-RHIT% data values greater than 95 will appear in the Green column in the Pulse Points screen.
- READ-RHIT% data values equal to or less than 95 and greater than 80 will appear in the Yellow column in the Pulse Points screen.
- READ-RHIT% data values less than 80 will appear in the Red column in the Pulse Points screen.

10 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 PAGE-FAULT/S "Page Fault Rate" 10,25 "CPU dependent"

The comment, "CPU dependent", tells the user the Page Fault Rate is dependent of the CPU.

HOLIDAYS File

The HOLIDAYS.MVDATA.LUND file contains a list of dates that will not be included in historical MVLOGX data. By default, the file contains exclusion dates for the following holidays in the years 1996 through 2010:

- New Year's 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 HOLIDAYS file that excludes holidays for the year 2001 is provided as an example:

```
! 2001 Holidays
!
01/01/01    New Year's
02/19/01    President's Day
05/28/01    Memorial Day
07/04/01    Independence Day
09/03/01    Labor Day
11/11/01    Veteran's Day
11/23/01    Thanksgiving
12/25/01    Christmas
```

Figure 6.4 *MVHOST HOLIDAYS Configuration File*

The purpose of the HOLIDAYS file is to eliminate atypical computer performance data from the statistical analysis done by MVLOGX. 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, exclude that date from MVLOGX's computations by doing the following:

1. Add the date to the HOLIDAYS file.
    a. Use the format MM/DD/YY.
    b. Precede any comment lines with an exclamation character (!).
2. Enable Exclusions in MVLOGX.
3. Enable Holiday Exclusions in MVLOGX. See "The comment, "CPU dependent", tells the user the Page Fault Rate is dependent of the CPU." on page 38.

KIP File

The KIP.MVDATA.LUND file contains the configuration information for the KIP (Key Indicators of Performance) line displayed in all MVHOST screens. For information see "Key Indicators of Performance (KIP)" on page 47.

```
# Var_name        row,column,width
TOT-BUSY%         1,12,5
HIGH-PRI-BUSY%    1,30,5
MEM-MANAGER%      1,46,5
READ-HIT%         1,64,3
```

Figure 6.5 *MVHOST KIP Configuration File*

Configuration Rules

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

Example

TOT-BUSY%   1,12,5

Syntax

<variable>   row,column,width

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

All KIP variable items:

- Must be found in the ITEMLIST file
- 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 KIP file (Table 6.1). The default setting is $LEFT, $INVERSE, $UNDERLINE.

Table 6.1 *MVHOST KIP Attribute 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

Command	Description
$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

7

MVHOST GLOBAL SUMMARY

Global Summary Screens

The MVHOST Global Summary is the first screen to display when MVHOST is started, and its the usual starting point for any review of system activity and performance.

The Global Summary is available in both graphical and tabular formats. Data items for each format are described in “Global Summary Data” on page 46.

Graphical Format

Figure 7.1 shows an example of the Global Summary in graphical format.

```
 MVHOST/3000 I.03f(c) LPS   FRI, APR  1, 2005,  5:16 AM  E: 00:58:30  I: 00:30
       Total Busy:  1.5%   High Pri:  1.5%   MemMgr:   .0%   Read Hit:  0%
      2  10   20   30   40   50   60   70   80   90  100           2  10   20
CPU   B                                                  %    QLEN
TRN                                                      /min RESP           sec
RHIT                                                     %    PFLT           /s
I/O                                                      /sec QLEN
----------------------------- Process Information -----------------------------
PIN   J/S#   Session/User Name      Cmd/Program CPU%  QPri   #IO  Wt LDV #Tr PRes
    4 <sys>  <system process>                     .0 AL13      0 Msg  -    0   -
    5 <sys>  <system process>                     .0 CL152     1 Msg  -    0   -
    7 <sys>  <system process>                     .0 CL152     0 Msg  -    0   -
   52 J1     PSMON,MANAGER.SYS        RUNPSMON    .0 DS202     0 Tim 10    0   -
   30 <sys>  <system process>         NMCONSOL    .1 BL149     0 Msg  -    0   -
   66 S276   MANAGER.SYS              VTSERVER    .1 CS152     0 TRd  -    0   -
   78 J76    MVDATAJG,MGR.MVWI03D     MVDATAD     .1 BL160     0 Msg 10    0   -
   83 J71    SCOPEJOB,MANAGER.SYS     SCOPEXL     .4 BL100     1 Tim 10    0   -
   79 S276   MANAGER.SYS              MVHOST      .8 BL100     0 CPU  4    3  .1
Enter Command:_
```

Figure 7.1 *MVHOST Global Summary Screen (Graphical Format)*

The Global Summary in graphical format displays the following system performance information:

- MVHOST information banner
- Key Indicators of Performance (KIP) line
- Global performance statistics
- Global miscellaneous statistics
- Process information
- System Performance Advice messages

Tabular Format

Figure 7.2 shows an example of the Global Summary in tabular format.

```
MVHOST/3000 I.03f(c) LPS  FRI, APR  1, 2005,  6:12 AM  E: 01:54:46  I: 00:19
     Total Busy:  2.0%   High Pri:  2.0%   MemMgr:   .0%   Read Hit:  0%
 ----------- Global CPU Statistics ---------------- Global Misc Statistics --
|CPU BUSY    Total   2.0[  5] Hi Pri   2.0 [  5]|#Ses     1 #Job   5 #Proc    82|
|AQ    .<[  0] Memory     .0[  0] CPU QLen   <[    0]|CM to NM Switches     0[ 24]/s|
|BQ   1.6[  3] Dispatch   .1[  0] Launch/s   3[    4]|NM to CM Switches     1[  0]/s|
|CQ    .3[  2] ICS/OH     .0[  0] CPU CM%    1[   22]|Transactions    5[   38](  16)|
|DQ    .0[  0] Pause      .0[  0] SAQ        3 msec  |Avg First Resp       .<[   .0]|
|EQ    .0[  0] Idle     98.0[95]                     |Avg Prompt Resp      .1[  3.2]|
 ---------------------------- Global Memory Statistics ----------------------------
|Page Fault Rate     0[   0]/s  Memory Cycles     0[  0]  Overlay Rate     0[    1]/s|
|Lbry Fault %        0[   1]    Read Hit %        0[100]  Swap/Launch    .00[   .01]|
 ----------------------------- Global Disc Statistics ------------------------------
|LDev IO/s IO% QLen| LDev IO/s IO% QLen| LDev IO/s IO% QLen| LDev IO/s IO% QLen|
|   1    0   0  .00|    2    0   0  .00|    3    0   0  .00|  ALL    0 100  .00|
 ------------------------------- Process Information -------------------------------
PIN   J/S#   Session/User Name        Cmd/Program CPU%  QPri    #IO  Wt  LDV #Tr  PRes
    4 <sys>  <system process>                       .0 AL13       0 Msg   -    0    -
    7 <sys>  <system process>                       .0 CL152      0 Msg   -    0    -
   30 <sys>  <system process>         NMCONSOL      .1 BL149      0 Msg   -    0    -
   78 J76    MVDATAJG,MGR.MVWI03D     MVDATAD       .1 BL160      0 Msg  10    0    -
   66 S276   MANAGER.SYS              VTSERVER      .2 CS152      0 TRd   -    0    -
   79 S276   MANAGER.SYS              MVHOST       1.4 BL100      0 CPU   4    5   .1
Enter Command:_
```

Figure 7.2 *MVHOST Global Summary Screen (Tabular Format)*

The Global Summary in tabular format can display:

- MVHOST information banner
- Key Indicators of Performance (KIP) line
- Global CPU statistics
- Global miscellaneous statistics
- Global memory statistics
- Global disc statistics

- Process information
- System Performance Advice messages

Global Summary Keyboard Shortcuts

Each of the global MVHOST commands (shortcut) keys is listed and explained in Table 7.1.

Table 7.1 *MVHOST Keyboard Shortcuts*

Key	Description
blank	Refresh screen
D	Toggle global disc statistics
E	Exit
F	Freeze/unfreeze data display
G	Toggle graphic/tabular display
H	Display contextual help
J	Jump to screen prompt
L	Print hardcopy
M	Toggle Global Memory statistics
O	Jump to options menu
P	Shortcut to Process Detail screen
Q	Jump queues
S	Jump to MVHOST Screen Selection menu
T	Display process tree
U	Display file users
W	Display workload definitions
X	Exit
Y	Toggle extended process line
Z	Zero cumulative totals
1	Display all processes

Key	Description
2	Shortcut to CPU Hog Process Detail screen
!	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
:	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
?	Display contextual help
#	Display job/session tree
CTRL+T	Toggle time status

Global Summary Data

MVHOST Banner

The MVHOST informational banner is displayed at the top of each MVHOST data screens.

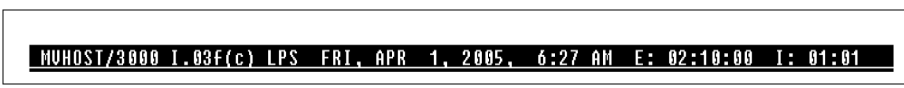


Figure 7.3 *MVHOST Global Summary Banner*

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

- MVHOST product version number
- System name
- Current date and time
- Elapsed time since MVHOST was started (E: HH:MM:SS)
- Current data sample collection interval (I: MM:SS)

The current interval is the amount of time in minutes and seconds accumulated since MVHOST last updated the screen. The measurements reported in any MVHOST screen are valid for the current interval.

By default, the interval refresh rate is 60 seconds. This rate can be adjusted from the Main Options Menu (“Screen Refresh Interval in Seconds” on page 16).

Key Indicators of Performance (KIP)

The Key Indicators of Performance (KIP) line can be displayed just below the MVHOST banner.

```
MVHOST/3000 I.03f(c) LPS  FRI, APR  1, 2005,  6:31 AM  E: 02:14:02  I: 01:01
      Total Busy:    .8%   High Pri:    .8%   MemMgr:    .0%   Read Hit:  0%
```

Figure 7.4 *MVHOST Key Indicators of Performance (KIP)*

The purpose of the KIP line is to display statistics associated with the primary indicators of performance for the current interval, described in Table 7.2.

Table 7.2 *MVHOST Key Indicators of Performance Data Items*

Data Item	Description
Total Busy	The percentage of time the CPU spent executing all processes during the current interval
High Pri	The percentage of time the CPU spent executing high priority processes during the current interval
MemMgr	The percentage of time the CPU spent managing memory
Read Hit	The read hit percentage for the current interval

The KIP line can be displayed/hidden by the user from the Main Options Menu (“Display Key Indicators of Performance” on page 16).

By editing the KIP.MVDATA.LUND file, you can redefine the variables displayed in the KIP line (“KIP File” on page 39).

Global Statistics (Graphical Format)

The Global Summary in graphical format includes Global Statistics: system-wide CPU utilization, memory utilization and disc data. A bar graph displays the statistics in either percentages or total counts. Each block in the bar represents a value of 2% or 2 units. Disc I/O queue length is measured in blocks of 0.2 per second.

```
      Total Busy:  3.0%   High Pri:  3.0%   MemMgr:    .0%   Read Hit:  0%
      2  10    20    30    40    50    60    70    80    90  100          2  10    20
CPU   BO                                                     %     QLEN
TRN                                                          /min  RESP             sec
RHIT                                                         %     PFLT             /s
I/O                                                          /sec  QLEN
```

Figure 7.5 *MVHOST Global Summary: Global Statistics (Graphical Format)*

Each data item is described in Table 7.3.

Table 7.3 *MVHOST Global Statistics (Graphical Format) Data Items*

Data Item	Description
CPU%	The percentage of CPU resource used in the major CPU states. The letter codes are described in Table 7.4. Blank space between the end of the video bar and the percent sign denotes the percentage of time the CPU was idle.
TRN/min	The estimated number of terminal reads per minute (roughly equivalent to user transactions) based on the number of actual terminal reads performed during the current interval.
RHIT%	The percentage of time data requests are satisfied in main memory without having to perform a disc I/O.
IO/sec	The total number of disc I/Os performed on all disc devices, broken down into reads (R) and writes (W). For a detailed explanation of these statistics, see "Global Disc Statistics (Tabular Format)" on page 59.
QLEN	The average number of processes waiting to use the CPU during this interval.
RESP sec	The average global user prompt response time for terminal transactions. It is the time elapsed from when the C/R or Enter key is pressed to the time the user receives a prompt.
PFLT/s	The number of memory page faults that occur per second. This indicates whether or not there is enough memory.
QLEN	The average number of disc I/O requests pending for all disc drives combined during the current interval. Each character position in the video bar represents an average queue length of 0.2 requests.

The blocks of the video bars contain letters. Table 7.4 explains what each of these letters mean.

Table 7.4 *MVHOST Global Statistics: CPU States*

Data Item	Description
A, B, C, D, E	These letters indicate how much CPU time for the current interval is used to execute user and system code on behalf of those processes running in each respective scheduling queue. This is the time the CPU works constructively on our behalf as opposed to performing overhead tasks. MPE/iX system processes usually run in the A and B queues. The C queue is typically reserved for interactive user processes. Batch jobs usually run in the D and E queues.
M	The percentage of CPU resource spent on managing main memory.
O	The percentage of time the CPU spends scheduling and dispatching processes and dealing with external device activity.
P	The percentage of time the CPU was waiting for disc I/Os to complete.

Global CPU Statistics (Tabular Format)

The first section of performance data in the upper left of the Global Summary is Global CPU Statistics. This section contains system-wide CPU statistics. Each data item is described in Table 7.5.

```
            Global CPU Statistics
CPU BUSY    Total   1.1[  5] Hi Pri   1.1 [  5]
AQ    .<[ 0] Memory    .0[ 0] CPU QLen   <[   0]
BQ    .9[ 3] Dispatch  .1[ 0] Launch/s   3[   4]
CQ    .1[ 2] ICS/OH    .0[ 0] CPU CM%    2[  22]
DQ    .<[ 0] Pause     .<[ 0] SAQ        3 msec
EQ    .0[ 0] Idle    98.9[95]
```

Figure 7.6 *MVHOST Global CPU Statistics (Tabular Format)*

Table 7.5 *MVHOST Global CPU Statistics Data Items*

Data Item	Description
Total: nnn.n[nnn]	The sum of CPU busy percentages for all queues, memory, dispatch and ICS/OH. **Performance Tip** If this number consistently exceeds 85% and the majority of this time is consumed by interactive user processing, it is possible that the CPU is creating a bottleneck on the system. It is important to gather this data over a period of time and not base a diagnosis on any single spike of activity. If the majority of this value is due to batch activity, this usually implies there is ample CPU capacity for interactive users.
Hi Pri nnn.n[nnn]	This is the percentage of CPU time spent on a combination of AQ, BQ, CQ, memory, dispatcher and ICS/OH processes. **Performance Tip** It is generally understood that measuring the high priority busy time is a better indicator of CPU saturation than total busy. If Hi Pri processes are consistently using 65% or more of the CPU's time, the CPU may be near saturation levels, as this would leave very little bandwidth for critical batch processes or expected growth to the processes or users on the system.

<table>
<tr><th>Data Item</th><th>Description</th></tr>
<tr><td>AQ, BQ, CQ, DQ, EQ nn.n[nn]</td><td>These statistics indicate how much CPU time is spent executing user and system program codes within the respectable scheduling queues. These statistics do not include time spent managing main memory, dispatching processes or executing other overhead activity.

Performance Tip
If the sum of these percentages (particularly AQ, BQ and CQ) are very large and there is little to no time spent in any active or paused states, it is possible that one or more processes are experiencing difficulties completing, such as a looping condition. The offending process(es) should be identified by finding the highest CPU user (sue the HOG PROC ZOOM key for this).
If the sum of these numbers is very low and other active or passive statistics are very high, then an overhead task may be consuming the CPU and should be researched further. A low number in these process states counters (when other busy and paused counters are low) means that there is plenty of CPU capacity available for more processing (batch or interactive).
It is important to note the spread of CPU in various queues. The AQ and BQ should have a very low percentage of the CPU, except for brief spikes. It is best to see that CQ, DQ and EQ obtain the majority of the CPU, because they typically handle overhead activities.</td></tr>
<tr><td>Memory nn.n[nn]</td><td>This figure represents how much CPU time is spent handling memory page activity. This counter includes time spent on memory allocations for user processes that cannot be launched (cannot obtain CPU) until necessary segments are present in memory.

Performance Tip
A slight memory load is indicated by memory manager values of 5 to 8 percent. The problematic range is between 8 and 12 percent, and anything higher is considered critical. These are simply rough guidelines to take into consideration with other memory and disc pulse point indicators.

NOTE The memory manager percentage tends to be more reliable on MPE/iX systems than on MPE V systems.</td></tr>
</table>

Data Item	Description
Dispatch nn.n[nn]	This statistic represents the amount of time the CPU spends scheduling and dispatching processes. **Performance Tip** If this value rises above 8 percent, it may mean that MPE/iX is spending an inordinate amount of time dealing with process launch and process stop activity. Correlate this figure with Launch/s, Individual Stop Detail and Global Stops Detail to gain more insight as to why this is happening. If this figure becomes excessive, response times might increase.
ICS/OH nn.n[nn]	This statistic represents the time the CPU spends dealing with external device activity, for example, pressing the Enter key to get an MPE/iX prompt is an interrupt. Time spent handling disc I/O completions are also included here. Interrupt Control Stack (ICS) requires service time by the CPU. **Performance Tip** If this value rises above 8 percent, it may mean that MPE/iX is spending too much time on the DT subsystem, disc or other datacom interrupt activity. Locating the processes guilty of excessive terminal reads (DTC activity) or processes with large numbers of disc I/Os will be helpful. A small ICS/OH value is desirable.
Pause nn.n[nn]	This statistic reveals the percentage of time the CPU spends waiting for disc I/Os to complete. This event is essentially a roadblock for further activity to take place, as no other functions can occur during this waiting period. This is time in which processes could have had work performed on their behalf, but could not because of the relative slowness of the disc drives in performing an I/O. **Performance Tip** A large pause percentage indicates that the CPU could have been busier, but because data was not found in main memory, the CPU had to wait on a disc I/O request and was not able to continue processing requests. If the pause percentage exceeds 10 percent, it may indicate either a disc I/O bottleneck or an inadequate memory configuration. It is best to correlate high pause readings with other memory and disc indicators to identify the true cause of the bottleneck.

Data Item	Description
Idle nn.n[nn]	If the CPU is not actively working on processes and not waiting for any disc I/Os to complete, it is considered to be in an idle state. Simply, this is leftover CPU bandwidth. **Performance Tip** If a system has a consistently high amount of idle time, it is not being used to its full potential. While it is not desirable to overload the processor, having a system that is too powerful for the processing that is required of it is not cost-effective. If idle time is very low due to a large amount of batch activity, then the system has bandwidth available for batch or interactive growth. However, if the idle time is very low due to mostly interactive processing, then the system may be overloaded. Reducing processes, balancing processes to off-shift or low-use hours, or upgrading the processor will help reduce the load on the system during peak utilization.
CPU QLen nn[nn]	This value is the average number of processes that are waiting for service from the CPU. **Performance Tip** A CPU queue length is like going to the bank. If, when you walk in, a teller is immediately available, there is no line (queue) and you are helped immediately. If there is only one teller available, however, and three people walked in ahead of you, the teller would help the first person to walk in while you stand in line behind the other two people. If there are four tellers available, all four customers could be helped immediately. An efficient bank teller will process transactions quickly, so that even as customers filter into the bank, the line is always kept to a minimum. A consistently large CPU queue length indicates a CPU bottleneck. This could be caused by an inadequate model for fewer processors than necessitated by the amount of processing. It could also be caused by a very high job limit or too many jobs scheduled to start up concurrently. Ideally, this number will always be under five, but may reach as high as 10 during moderate and heavy processing. A consistent reading of 10 or higher should be investigated and addressed.

Data Item	Description
Launch/s nn[nn]	A process launch occurs when a process gains exclusive access to the CPU. When that process has to stop for an event, such as a disc I/O, it relinquishes the CPU and another process is launched instead. The launch rate indicates the amount of CPU sharing that is taking place on the system. If a single process is launched many times, it is included in this number. **Performance Tip** A high launch rate should be evaluated to find out why processes are giving up the CPU so often. If processes are waiting on certain events, such as memory, disc I/Os, etc., it is possible that not enough resources are available to adequately service all requests. The Extended Process section (Wait Heading or Wait States) will further explain why processes are having to share the CPU so often. The Global Stops screen is helpful too, because the process launches will be roughly equivalent to the number of process stops. The ideal situation is that a process never has to give up the CPU and is processed to completion unhindered. Acceptable numbers of process launches are dependent upon the size of the processor.
CPU CM%	This data item shows the average amount of time the CPU spends in Compatibility Mode program code. **Performance Tip** This data item can assist with optimizing performance from an MPE V migration. It is important to have as many programs as possible compiled in Native Mode to take full advantage of the Hewlett-Packard Precision Architecture (HP-PA is also known as RISC). The time the CPU spends in Compatibility Mode is essentially wasted time, because code translations must take place. If the programs are compiled with a native language compiler, the translation is done once for all programs at compile time. There may not be a right or wrong value for this indicator on your system. The ability to go "native" is often dependent upon third-party software. If a third-party vendor has not made the switch from MPE V to MPE/iX, you must remain in Compatibility Mode and accept the performance compromise. It is best to target a value of less than 20 percent.

Data Item	Description
SAQ	This is the System Average Quantum, which is similar to the ASTT (average short transaction time) on MPE V systems. It is an ongoing average of the amount of CPU used by transactions and is considered to be short in nature. It includes the last 100 or so terminal transactions the system has tracked. This number is a valuable indicator of the type of activity taking place in the CS scheduling queue. For example, if the SAQ is 11 milliseconds (extremely small), the amount of CPU time used by interactive processes to accomplish their transactions was very low.

Global Misc Statistics (Tabular Format)

The Global Miscellaneous Statistics portion of the tabular Global Summary provides statistics to further analyze the condition of your system. These statistics, while often helping to indicate a bottleneck in any of the three main components of a system (CPU, memory and disc) are not directly related to any of them, so they fall into their own "miscellaneous" category. Each data item is described in Table 7.6.

```
    Global Misc Statistics
#Ses     1 #Job    5 #Proc    82
CM to NM Switches     4[  23]/s
NM to CM Switches     1[   0]/s
Transactions    0[    38](    0)
Avg First Resp       .0[     .0]
Avg Prompt Resp      .0[    3.2]
```

Figure 7.7 *MVHOST Global Misc Statistics (Tabular Format)*

Table 7.6 *MVHOST Global Misc Statistics (Tabular Format) Data Items*

Data Item	Description
#Ses nnn	The number of sessions logged on to the system during the current interval
#Job nnn	The number of batch jobs logged on to the system during the current interval
#Proc nnn	The number of processes present during the current interval. One job or session may spawn several processes. MPE/iX requires many processes for normal operation.

Data Item	Description
CM to NM Switches/sec nnn[nnn]/s	The number of Compatibility Mode to Native Mode switches performed per second during the current interval, as well as cumulatively. **Performance Tip** A CM to NM switch occurs when a piece of code that is executed reverts from Compatibility Mode to Native Mode. This operation is not as expensive to perform as is NM to CM switching. Depending on the system size, more than 200 per second can be sustained without being an excessive overhead drain on the CPU.
NM to CM Switches/sec nnn[nnn]/s	The number of Native Mode to Compatibility Mode switches performed per second during the current interval, as well as cumulatively. **Performance Tip** A Native Mode to Compatibility Mode switch operation is quite expensive to perform and should be minimized. Depending on the system size, more than 50 per second may indicate an overhead drain on the CPU. It is best to "go native" whenever possible. However, this can cause an increased dependency on the application design.
Transactions n[nnn](nnn)	This line contains three statistics regarding terminal reads. The first value is the number of terminal reads performed by all interactive terminal users for the current interval. The second value (in brackets) is the total number of terminal reads performed since MVHOST was started. The third value (in parentheses) is the estimated number of terminal reads per minute based on the current interval's workload. **Performance Tip** It is essential to understand MPE/iX's definition of a terminal read. A terminal read occurs any time a terminal receives input from a user (C/R or Enter). The true number of transactions, as we define transactions, is likely to be less than what is reported on this line by MVHOST. If you are using Character Mode and your application defines a transaction as being delimited by a single carriage return, these numbers will represent interactive activity. VPLUS applications will have accurate transaction counts.

Data Item	Description
Avg First Resp n.n[n.n]	The average system response time it takes when a user asks the computer for information to when the computer puts the information on the screen.
Avg Prompt Resp n.n[n.n]	The average system response time for all processes that execute terminal reads. In other words, the time it takes from when a user presses C/R or Enter to when the user is supplied a new prompt. Current and cumulative values are displayed. This value includes both Command Interpreter and Application Process response times. Average response time will not be displayed if the option to collect process information is turned off. **Performance Tip** There are some important things to consider when evaluating average response times. First, applications that perform multiple Character Mode terminal reads to issue a single user transaction will have varied response times reported. For example, if a user enters data into 20 fields on a screen and then presses a final carriage return, this is considered to be a single transaction by the user. However, MPE/iX counts 21 terminal reads and MVHOST will report 21 transactions—20 for the fields and 1 for the carriage return. Second, Command Interpreter times are included in these numbers. When a user or job logs on, a process called Command Interpreter (CI) is created by MPE/iX on behalf of that user. This process communicates with the user at the terminal by means of the MPE/iX prompt. When a program such as EDITOR.PUB.SYS is started, another processes is created. The response time of the CI process envelops the second process. so that when you look at the process's response time at the process level, it will probably be very large. It is not usually a helpful number when a significant number of CI processes are included. Basically, any process that creates a son process that performs terminal I/Os will have its response time elevated by the son's total time. Finally, notice that this value is especially important if users perform a great deal of online terminal reporting. Charting this value, especially when contrasted with terminal reads, will provide insight into what kind of response times the users are actually experiencing.

Global Memory Statistics (Tabular Format)

The Global Memory Statistics section of the Global Summary reports memory-related performance indicators. Each data item is described in Table 7.7.

```
Global Memory Statistics
Page Fault Rate      6[   4]/s  Memory Cycles    6[528]  Overlay Rate     0[    0]/s
Lbry Fault %         0[   0]    Read Hit %     100[100]  Swap/Launch    .01[  .01]
```

Figure 7.8 *MVHOST Global Memory Statistics (Tabular Format)*

Table 7.7 *MVHOST Global Memory Statistics (Tabular Format) Data Items*

Data Item	Description
Page Fault Rate	The current and cumulative number of times per second that memory page faulting occurs. A page fault happens when a process needs a memory object (code or data) that is absent from main memory. Acceptable ranges depend on system size. For page fault pulse point ranges, see "Page Fault Rates" on page 259.
Lbry Fault%	The percentage of all page faults that occurred because system libraries were not present in memory (XL.PUB.SYS, NL.PUB.SYS, SL.PUB.SYS). A system library page fault is counted when a process needs code from a library that is absent from main memory. **Performance Tip** An consistent value of more than 10% of page faults due to library faults can indicate memory shortage or an inappropriate demand on memory.
Memory Cycles	The number of times the memory manager cycles through main memory looking for adequate space to satisfy requests for memory, during the current interval and cumulatively. A large number indicates that the requests for memory are not being satisfied efficiently. A low number implies that there is adequate memory. If this value is blank or zero (0), the clock was not active during this interval. This is the best possible situation.

Data Item	Description
Read Hit %	The percentage of time that requests for data or code were satisfied in main memory without having to resort to a disc I/O. While this indicator reflects memory efficiency, read hit percentage also can reveal disc bottlenecks. **Performance Tip** A high percentage is desirable.
Overlay Rate	The number of memory overlay candidates occurring per second. An overlay candidate is a memory object that is flagged as temporarily non-essential and subject to being overwritten in order to allow higher priority processes to be attended to. **Performance Tip** A low rate is desirable. For instance, a poorly sized Image Master Set can lead to poor distribution of records in the set. The records may be bunched together leaving large areas of unused space in the file. Consequently, a large overlay rate may reflect on this problem, since pages of data brought into memory may come from these areas of blank pages and are immediately marked as overlay candidates.
Swap/Launch	The ratio of swap-ins to the number of launches during the current interval. **Performance Tip** A large ratio means that for every time a process gained access to the CPU, necessary segments were not present in main memory, thus disabling the process. A consistent number that is higher than 0.5 could indicate a possible memory shortage. Correlate this value with other memory indicators to determine if this is the case.

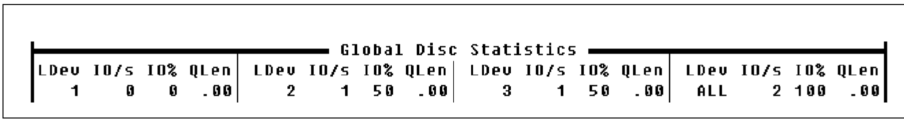
Global Disc Statistics (Tabular Format)

The Global Disc Statistics portion of the tabular Global Screen presents statistics for each configured disc drive on the system. This information addresses the following issues:

- How balanced are the I/Os across the discs?
- Is one disc accessed more frequently than others?
- Are disc I/Os exceeding acceptable limits?

The Global Disc Statistics screen (Figure 7.9) contains the first level of magnification of disc statistics. To access more detailed individual disc information:

1 Press the F7 function key to access the Screen Menu, or type J to receive a Screen Selection prompt.
2 Press d (case insensitive) to access the Disc I/O Detail screen.



```
                              Global Disc Statistics
LDev IO/s IO% QLen | LDev IO/s IO% QLen | LDev IO/s IO% QLen | LDev IO/s IO% QLen
   1    0   0  .00 |    2    1  50  .00 |    3    1  50  .00 |  ALL    2 100  .00
```

Figure 7.9 *MVHOST Global Disc Statistics (Tabular Format)*

NOTE In this section, the words "disc" and "drive" are used interchangeably.

Each data item is described in Table 7.8.

Table 7.8 *MVHOST Global Disc Statistics (Tabular Format) Data Items*

Data Item	Description
LDev	The logical device (disc) number.
IO/s	The total rate of both reads and writes per second to each disc and all discs combined. **Performance Tip** A typical single disc drive can sustain I/O rates upward of 25-30 per second. If rates consistently exceed this number, it is possible that a disc I/O exists. The CPU pause for disc I/O values should be investigated and correlated with these readings. If one or more disc drives is consistently sustaining a majority of I/O hits, then balancing files to other less active drives will likely alleviate the bottleneck. Check the Disc I/O Detail screen for cumulative values to gain a long term-view of the situation.

Data Item	Description
IO%	The percentage of all disc I/Os performed by each drive. **Performance Tip** The I/O% statistics are helpful in determining how balanced the I/O distribution is across the drives. A drive that performs a substantially higher percentage of total I/O may contain files that are more actively accessed than files on other discs.
QLen	The average length of the request queue for each disc drive when another request arrives at that disc. **Performance Tip** In terms of queue length, zero (0) is ideal, but is rarely the case on an active system. An average queue length of 1.0 or greater is unacceptable. Keep in mind that brief, substantial increases throughout the day are normal. If one drive has consistently high queue lengths, explore the following possibilities: • There is excessive disc arm movement due to frequently accessed files. These files may depend on each other and are on the same disc drive. Heavily accessed files should be distributed across different drives. • There are database file inefficiencies. Dynamic databases are constantly changing; files are added and deleted, forcing the drive arm to search over the platter to find all the data. Repacking the database may alleviate these issues. • The disc drive itself is too slow for the activity requested of it.

Process Information

After reviewing the general state of the 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 to determine the resources utilized by those processes. The primary purpose of the Process Information section of the Global Summary is to identify key resources consumed by various processes on the system. Figure 7.10 represents a sample Process Information section of the Global Summary.

The Process Information section displays information about three types of processes:

- System processes
- Command interpreter processes

- User processes

Process Information

PIN	J/S#	Session/User Name	Cmd/Program	CPU%	QPri	#Rd	#Wr	LDV	#Tr	PRes
4	<sys>	<system process>		.0	AL13	0	0	-	0	-
30	<sys>	<system process>	NMCONSOL	.1	BL149	0	0	-	0	-
53	J8207	MVDATAJ,MGR.LUND	MVDATAD	.1	BL160	0	0	10	0	-
5	<sys>	<system process>		.2	CL152	0	4	-	0	-
84	S570	WHITNEY,MGR.LUND	VTSERVER	.4	CS152	0	0	-	0	-
38	<sys>	<system process>	LOG	.6	BL50	0	2	-	0	-
106	J3401	QXMONJOB,MGR.LPS	QXMON	.9	BL96	0	0	10	0	-
67	S570	WHITNEY,MGR.LUND	MVHOST	7.6	BL100	0	2	4	1	.3
90	J8824	LOAD4,MGR.SOSDEV	SOSTASK	23.2	ES253	0	1	10	0	-
86	J8824	LOAD4,MGR.SOSDEV	SOSTASK	28.4	ES253	0	4	10	0	-
66	J8824	LOAD4,MGR.SOSDEV	SOSTASK	32.2	ES253	0	2	10	0	-

Figure 7.10 *MVHOST Global Process Information*

The data items presented in the Process Information portion of the Global screen are described in Table 7.9.

Table 7.9 *MVHOST Process Information Data Items*

Data Item	Description
PIN	The process identification number that uniquely identifies each process running on the system. These processes can be executed by MPE/iX, a user, or batch job. These unique numbers allow processes to be identified and investigated. A single job or session can have many processes associated with it. In order to see all processes in the Process Tree: 1 Press UTILITY KEYS (F6). 2 Choose PROCESS TREE (F4) or JOB/SESS TREE (F5). 3 Enter the PIN number of the process and press Enter.
J/S#	The job or session number of a particular process. If the process is spawned by the system, <sys> will appear in this column.
Session/User Name	The logon sequence as initiated by the users or job, minus the logon group. Once again, if the process was spawned by MPE/iX, then <system process> will be shown here.
Cmd/Program	The program or last MPE/iX command executed by the user. Some system type program names will be uniquely identified, such as "Spooler." If the process is a Command Interpreter process (CI) followed by the last MPE/iX command issued by the user, will appear in this column. Notice that the actual command will only appear for root level CI processes and not for subsequent CI processes in the process tree.

Data Item	Description
CPU%	The amount of CPU resource used by this process during the current interval. If a process uses more than 0%, but less or equal to 0.1%, then this value will be reflected as ".>%." **Performance Tip** The highest CPU users (the "Hog") is displayed in the Performance Advice section. If you want to zoom in on the hog process, press HOG PROC ZOOM (F4). If a process is using an inordinate amount of CPU for an extended period of time, it is possible that the process is looping. If a process should be getting CPU time, but isn’t, look at the wait state (Process Detail screen) to find out why.
QPri	This column displays two items of importance. The first data item is the particular MPE/iX Dispatcher subqueue in which the process is executing. The data is displayed with two letters. The first indicates the subqueue, while the second indicates whether the subqueue in linear ("L") or circular ("S"). If a process is in a circular subqueue, the priority can be changed. If it is in a linear subqueue, then the priority is fixed. The second data item is the absolute priority number that the Dispatcher uses to determine which process will receive CPU attention next. This will be a one, two or three digit number.
#Rd	The absolute number of logical disc reads (usually not the same as physical) performed by this process during the current interval.
#Wr	The absolute number of logical disc writes (usually not the same as physical) performed by this process during the current interval. **Performance Tip** These values are important because they can help identify a process that is performing excessive disc I/O. This number will not usually be the same as the actual number of physical disc reads because data may be pre-fetched, thus eliminating some I/O. The System Performance Advice section will report the high I/O (reads and writes) process for the current interval. When these processes are identified, it must be determined whether these I/Os are necessary or not.

Data Item	Description
LDV	The logical device number of the device at which the process was created. Batch jobs will have a "-" for the root command interpreter process and the rest of the processes in the tree will show the Stream Device number (usually 10). System processes will also display a "-." The LDV column is helpful in tracking down a user whose process exhibits unique traits. You may see an erroneous number here when jobs are in the process of terminating.
#Tr	The current number of terminal transactions (possibly equivalent to terminal reads) performed by the process to a particular terminal device. Under certain conditions, this number will represent the actual number of user transactions, (posting a payment, inquiring on an account, etc.). An inaccurate number will be displayed if multiple carriage returns per screen are used for data entry. VPLUS status checks are not counted by the measurement interface (which MVHOST accesses). Therefore, transaction counts for VPLUS applications will be accurate. The best way to determine if terminal reads and transactions are equivalent is to test them. A user can enter a certain number of transactions as defined from the user's standpoint and track that activity via MVHOST to see if there is a discrepancy. **Performance Tip** Any high number here (depending on the length of the display interval) should be investigated. Heavy terminal activity can drain the CPU's attention with non-productive overhead tasks. Sometimes, an application design problem can be identified if a large number of terminal reads occur when very little useful activity is taking place.

Data Item	Description
PRes	This is the terminal read response time for interactive users. This can be displayed as either Prompt Response time (PRes) or First Response time (FRes) in the Process Display Options submenu. First response time is measured from the time the user pressed C/R or ENTER to the time the first character appears on screen. Prompt response times are measured from the moment a user presses C/R or ENTER to the time when the user is supplied a new prompt. **Performance Tip** Excessively high response times should be investigated. It is important to analyze the wait state percentages as shown in the Extended Process Display line, or at the Process Detail screen for the process experiencing excessive response times. If online reporting is typical on the system, then prompt response times may be excessive, thus skewing the true system response time. In this case, first response times will be more meaningful for tracking the rate at which the system is sending data back to the user’s terminal.

Extended Process Display (Line)

There is an option to display a second line of detail for each process. This is called the Extended Process line and provides more in depth information about each individual process. Figure 7.11 represents a sample Extended Process Information section of the Global Summary.

```
                                Process Information
PIN   J/S#   Session/User Name      Cmd/Program CPU%  QPri  #Rd #Wr LDV #Tr PRes
Wait:Cur { CP ME DI IM PR RI TW IO TI FS MS OT}CPU:ms  /Tr D/Tr   C/N   N/C %CM
Wait:TRd {  1          99                     }   49     <    0     0    12   6
    3 <sys>  <system process>                     .1 BL100    0   0  -    0   -
Wait:Oth {                                 100}   55     <    0     0     0   0
   86 J77    MVMONJG,MGR.MVWI03D       DISCFREE   .2 -----    0   3  10   0   -
Wait:Dea { 59  8 19     4              1     9}   91     <    0     8     5   6
   83 J71    SCOPEJOB,MANAGER.SYS      SCOPEXL    .5 BL100    0   6  10   0   -
Wait:Tim {  1          1          99         }  260     <    0    10    11   6
   87 S277   MANAGER.SYS               MVHOST     .6 BL100    0   0   5   5  .1
Wait:CPU { 91           3     3              3}  290   58     0     0     3   0
   82 J77    MVMONJG,MGR.MVWI03D       MVHOST    1.7 BL100    0   9  10   0   -
Wait:Tim {  2                      86 12      }  842     <    0   235    37  13
   72 J77    MVMONJG,MGR.MVWI03D       DISCFREE 11.3 -----    0   3  10   0   -
Wait:Dea { 93           6                    1} 5543     <    0     8     5   0
```

Figure 7.11 *MVHOST Global Process Information: Extended Process Display*

The data items presented in the Process Information portion of the Global Summary are described in Table 7.10.

Table 7.10 *MVHOST Global Process Information: Extended Process Data Items*

Data Item	Description
Wait:Cur	The state of the process at the instant that MVHOST took a sample of the system. When processes are "stuck," this information can help pinpoint why. Keep in mind this wait state indicator is only the first line of defense. If a process is being impeded, the process's wait state breakdown or the Process Detail screen will contain useful information to further analyze the problem. These wait states can also change every few seconds. **Performance Tip** If a process is always in a particular wait condition, it can indicate resource shortage or possibly a logical program problem (i.e., database locking strategy). For example, if the Mem flag is on for multiple processes, this could indicate a memory shortage.
Wait: {CP,...OT}	This banner represents the wait states in which a process can be spending time. If a process is experiencing eight-second response times, the percentage displayed in these wait state categories represent the various delay or servicing reasons. Ideally, processes would conclude unhindered. However, a process usually encounters several hindrances over the course of its life. These hindrances could include a missing memory segment or disc data. If a particular user's process is receiving poor response times, or a batch job is taking more time to complete than is reasonable, examine these wait states. These can be found on the Extended Process line or in the Process Detail screen. Cumulative wait state figures are also provided on the Process Detail screen.

Data Item	Description
CPU:ms	The amount of CPU milliseconds consumed by the process for the current interval. These milliseconds are the time that the process spends at the CPU receiving service. Current means the interval specified by the I: nn:nn on the Banner Line. A cumulative total can be found on the Process Detail screen. **Performance Tip** If the current value is zero (0), then the process was not active during the last interval. This number will also display in a quantitative fashion which processes are consuming the most and least CPU resource.
/Tr	The number of CPU milliseconds used by the process per terminal transaction. This will always be blank for batch jobs because batch jobs do not perform terminal transactions. This number is calculated by dividing the total number of terminal transactions into the total amount of CPU used for the current interval. **Performance Tip** This statistic reveals which applications are costing the most CPU cycles for each transaction. Keep in mind that the concept of a terminal read versus a user's perception of a transaction may be different.
D/Tr	The number of physical disc I/Os that were performed per user terminal read (Tr). If you have redefined a terminal read to mean a user transaction, then this value will reflect the average number of disc I/Os performed by the process per user transaction. **Performance Tip** This statistic reveals which applications are costing the most disc I/Os for each transaction. This value is helpful in capacity planning. By obtaining an average reading of the number of disc I/Os used per transaction over time, "what if" questions like, "How will overall performance be affected if general ledger transactions increase by 40%?" Keep in mind that the concept of a terminal read versus a user's perception of a transaction may be different.

Data Item	Description
PF/s	The number of page faults per second. A page fault occurs when a needed object (code or data) is not in main memory. A very low number is ideal.
C/N	The number of Compatibility Mode to Native Mode switches incurred by the process during the current interval.
N/C	The number of Native Mode to Compatibility Mode switches incurred by the process during the current interval.
%CM	The percentage of time the CPU spends in Compatibility Mode for this process.

Process Summary by Application Workloads

MVHOST is able to track process statistics by application workloads. Vital performance statistics will be gathered and displayed according to the defined workloads specified in the MVWKDEF.MVDATA.LUND file. Figure 7.12 displays the information contained in the Process Summary by Application Workloads section of the Global Summary.

```
                    Process Summary by Application Workloads
No Group Name  %CPU          %Disc I/O     Prompt Resp   #Transacts   CPU/Tr   IO/Tr
 1:LOOPER        .0[   .0]     .0[   .0]     .0[  - ]      0[     0]      0       0
 2:FINANCEAPP    .0[   .0]     .0[   .0]     .0[  - ]      0[     0]      0       0
 3:LUND          .0[   .0]     .0[   .0]     .0[  - ]      0[     0]      0       0
 4:ACCOUNTPAY    .0[   .0]     .0[   .0]     .0[  - ]      0[     0]      0       0
 5:ACCOUNTREC    .0[   .0]     .0[   .0]     .0[  - ]      0[     0]      0       0
 6:JOBS          .4[  2.5]   50.0[74.6]      .0[  - ]      0[     0]      0       0
 7:SESSIONS      .4[   .5]     .0[ 4.2]      .<[ .0]       9[    23]     52       0
 8:SYSPROCS      .1[   .1]   50.0[21.1]      .0[  - ]      0[     0]      0       0
****************************************************************************************
```

Figure 7.12 *MVHOST Global Process Summary by Application Workloads*

The data items found in the Process Summary by Application Workload portion of the Global Summary are listed in Table 7.11.

Table 7.11 *MVHOST Global Process Summary by Application Workloads Data Items*

Data Item	Description
No	The workload numbers in ascending order as they appear in the MVWKDEF definition file.
Group Name	The name assigned to each workload as it appears in the MVWKDEF file.

Data Item	Description
%CPU	The percentage of CPU time used by the workload for the current and cumulative intervals.
%Disc I/O	The percentage of the workload's activity that was spent on disc I/O.
Prompt Resp	The average response time during the current interval and cumulatively.
#Transacts	The number of terminal reads or transactions performed by this workload during the current interval and cumulatively.
CPU/Tr	The CPU milliseconds per transaction.
IO/Tr	Disc I/Os per transaction.

System Performance Advice

MVHOST's System Performance Advice messages are easy-to-understand "one-liners" configured to help system administrators focus in on potential performance issues.

```
---------------------- System Performance Advice ----------------------
The CPU was used a total of 99.4% of its capacity during this interval    <GI01>
Process CPU use by Sub-Queue: AQ-.0 BQ-4.1 CQ-.2 DQ-.0 EQ-88.4            <GI02>
Native Mode to Comp. Mode Switch rate during this interval was HEAVY      <GE02>
Comp. Mode to Native Mode Switch rate during this interval was HEAVY      <GE03>
This interval's 'Hog' process was J8820 (PIN 85) with 29.2% of the CPU    <PI02>
This interval's highest disc I/O user was J8820 (PIN 94) with 57 I/O's    <PI03>
This interval's highest Term I/O user was S570 (PIN 67) with 5 Term Reads <PI04>
```

Figure 7.13 *MVHOST Global System Performance Advice*

At the end of each advice message is a four character message identification code (for example, <GI01> or <GE09>). The identification code of any standard advice message can be referenced in "Advice Messaging Catalog" on page 249 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 and uppercase E) alerts the user to an excessive condition - a situation or problem that could require immediate action.

To receive more information about a situation described in an advice message, refer to the Global Statistics block or Process Information portions of the Global Summary.

If there are particular events or information of which you want to be alerted, add to or alter the ADVICE.MVDATA.LUND file. For example, to send a message when average CPU utilization exceeds 90%, alter the advice catalog so that necessary personnel will be notified. Instructions are found in "ADVICE File" on page 29.

8

MVHOST PULSE POINTS

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) problematic (yellow) or critical (red), based on criteria set in the PPOINTS configuration file (“Pulse Points” on page 33).

```
 MVHOST/3000 I.03f(c) LPS  FRI, APR  1, 2005,  7:10 AM  E: 00:18:32  I: 00:27
      Total Busy:  1.7%    High Pri:  1.7%   MemMgr:    .0%   Read Hit:  0%
________________________________  Pulse Points  ________________________________
   Indicator               |  Green   | Yellow   |   Red    |  Comments
High Pri Busy (%)          | 1.7[ 3.7]|   [    ] |   [    ] |AQ+BQ+CQ+Mem+Disp+ICS
CPU QL                     |   0[   0]|   [    ] |   [    ] |
ICS/OH + Dispatch (%)      |  .3[  .2]|   [    ] |   [    ] |
CPU CM (%)                 |   1[   3]|   [    ] |   [    ] |Subjective
AQ + BQ                    | 1.2[ 3.4]|   [    ] |   [    ] |Opr sys dependent
___ Memory ____________________________________________________________________
CPU MM (%)                 |  .0[  .0]|   [    ] |   [    ] |Reliable indicator
Page Fault Rate            |   0[   1]|   [    ] |   [    ] |CPU dependent
Swaps/Launch               | .00[ .01]|   [    ] |   [    ] |
Memory Cycles/Hour         |   0[   0]|   [    ] |   [    ] |
___ Disc I/O __________________________________________________________________
Pause                      |  .0[  .0]|   [    ] |   [    ] |Reflects data loc
Read Hit (%)               |   0[    ]|   [    ] |   [  22] |
Average Q-Length           | .00[ .00]|   [    ] |   [    ] |Overall average
Disc I/O Rate/Sec          |   0[   0]|   [    ] |   [    ] |Avg per disc
___ Miscellaneous _____________________________________________________________
CM to NM Switches          |   0[   1]|   [    ] |   [    ] |CPU dependent
NM to CM Switches          |   0[   0]|   [    ] |   [    ] |CPU dependent
_______________________________________________________________________________
Enter Command:_
```

Figure 8.1 *MVHOST Pulse Points Screen*

Pulse Points Keyboard Shortcuts

The Pulse Points screen shortcut keys are described in Table 8.1.

Table 8.1 *MVHOST Pulse Points Keyboard Shortcuts*

Key	Description
Enter	Refresh screen
!	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
:	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
?	Display contextual Help
CTRL+T	Toggle timer status
E	Return to Global Summary
F	Freeze/unfreeze data
H	Open MVHOST Help
J	Jump to screen prompt
L	Print hardcopy
O	Display Pulse Points options
S	Jump to Screen Selection Menu
X	Exit
Z	Zero cumulative totals

Pulse Points Option Keys

The Option Subsystem keys are described in Table 8.2.

Table 8.2 *MVHOST Pulse Points Option Keys*

Key	Description
Enter	Return to previous screen
!	Execute shell commands
:	Execute shell commands
?	Help system

Key	Description
A	Change all options
B	Go back to previous screen
E	Return to previous screen
H	Help system
L	Print hardcopy

Pulse Points Data

The columns of data within the Pulse Points screen are described in Table 8.3.

Table 8.3 *MVHOST Pulse Points Data Items*

Data Item	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 fall within the range configured as acceptable are displayed in the green column.
Yellow	All Pulse Point indicator values that fall within the range configured as problematic.
Red	All Pulse Point indicator values that fall within the range configured as critical.
Comments	Any comments provided for a pulse point indicator will be displayed in the Comments column.

Data items displayed in the Pulse Points screen are described in “Meta-View for MPE/iX Pulse Points” on page 257. If the meaning of a Pulse Point indicator is unclear, please refer to the documentation for the indicator’s corresponding MVHOST screen. For example, for information about the Page Fault indicator, refer to “MVHOST Memory Detail” on page 97.

Pulse Point thresholds are user configurable. For instructions, see “Pulse Points” on page 33.

9

MVHOST Current Resource Trends

Current Resource Trends Screens

MVHOST has five Current Resource Trends screens that allow you to quickly see the trend of key performance areas over the duration of the current MVHOST session:

- CPU Utilization Trends
- Main Memory Utilization Trends
- Disc I/O Utilization Trends
- Response and Transaction Trends
- Mode Switch Trends

Examples of the Current Resource Trends screens are provided later in this chapter.

Current Resource Trends Keyboard Shortcuts

Each of the Current Resource Trends shortcut keys is listed and explained in Table 9.1.

Table 9.1 *MVHOST Current Resource Trends Keyboard Shortcuts*

Key	Description
blank	Refresh screen
B	Beginning data request
C	CPU trend data
D	Disc trend data
E	Return to MVHOST Global Summary
J	Jump to screen prompt
L	Print hardcopy

Key	Description
M	Memory trend data
S	Jump to Screen Selection Menu
T	Response trends data
V	Live data request
W	Mode switches trend data
X	Exit
!	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
:	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
*	Switch function key sets
/	Select time request
}	Scroll backward request
[	Skip forward request
]	Skip backward request

Current Resource Trends Function Keys

From each Current Resource Trends screen, there will be a set of search keys available for navigation.

Table 9.2 *MVHOST Current Resource Trends Function Keys*

Key	Description
F1 - SCROLL AHEAD	Displays the next page of data
F2 - SCROLL BACK	Displays the previous page of data
F3 - SKIP AHEAD	Produces a prompt for the number of samples to skip forward
F4 - SKIP BACK	Prompts for the number of samples to skip backward

Key	Description
F5 - SELECT TIME	Prompts for a time at which you want to begin examining the data
F6 - START OF DATA	Takes you to the first interval available in the Current Trends
F7 - END OF DATA	Displays data from the current interval
F8 - MAIN KEYS	Returns to the main keys in the Current Trends screen

Current CPU Trends Data

The CPU Trends screen presents the following CPU utilization data collected in 10-second time intervals:

- Percentage of CPU utilized
- Percentage of idle time
- Response time in seconds

Each letter-width space on the CPU utilization bar graph represents approximately 2 percent of the CPU's time for the current interval. The code letters correspond to the CPU activities described in Table 9.3. 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.

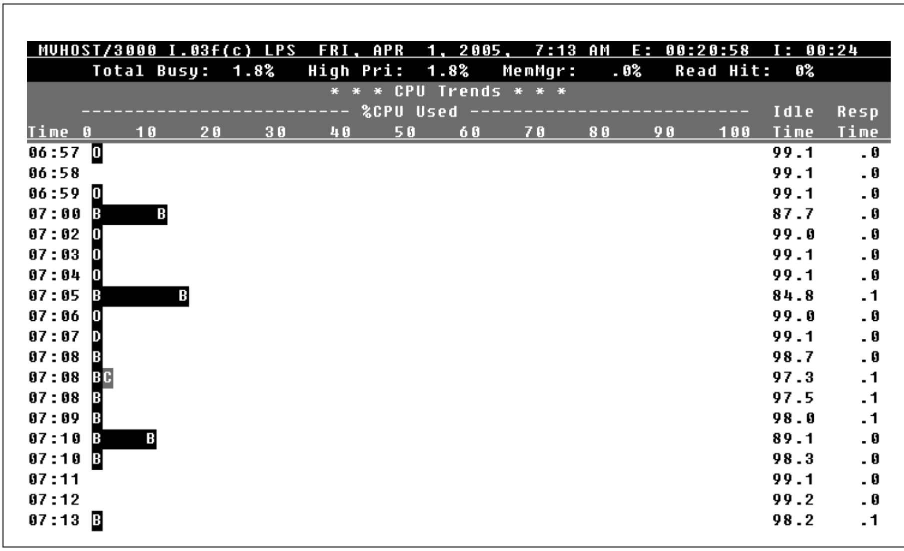


Figure 9.1 *MVHOST Current CPU Trends Screen*

The example in Figure 9.1 shows the CPU utilization for 10-second interval beginning 07:00 (the fourth line) shows:

- Approximately 12 percent of CPU time was spent executing both system processes and some high priority user processes.
- 88 percent of the time the CPU was idle.
- Total idle time was 87.7 seconds.
- Response time for that interval averaged 0.0 seconds.

The code letters used in the CPU utilization bar graph are described in Table 9.3.

Table 9.3 *MVHOST Current CPU Trends State/Activity Codes*

Code	State/ Activity	Description
A	AS queue %	Percentage of CPU time spent executing high priority system processes
B	BS queue %	Percentage of CPU time spent executing both system processes and some high priority user processes
C	CS queue %	Percentage of CPU time spent executing interactive user processes

Code	State/ Activity	Description
D	DS queue %	Percentage of CPU time spent executing high priority batch jobs
E	ES queue %	Percentage of CPU time spent executing lower priority jobs
M	Memory management %	Percentage of CPU time spent managing memory
O	Overhead %	Percentage of CPU time spent managing overhead (ICS/OH and dispatch)
P	Paused for Disc %	Percentage of time the CPU was paused waiting for disc I/O
blank	Idle %	Percentage of time the CPU was idle
Idle Time	N/A	Average idle time for the interval
Resp Time	N/A	Average response time for the interval

NOTE Current Trends data for the current session is not available in MVHOST after the session is closed. To review historical data, see “MVLOGX” on page 183.

Main Memory Trends Data

The Main Memory Trends screen displays statistics pertaining to memory utilization in 10-second time intervals. The data items presented in the Current Memory Trends screen are described in Table 9.4.

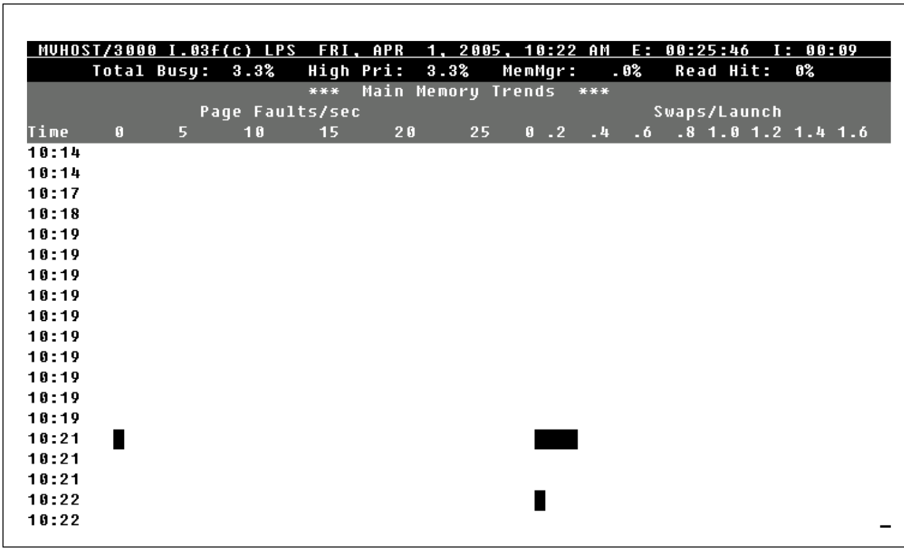


Figure 9.2 *MVHOST Current Memory Trends Screen*

Table 9.4 *MVHOST Current Memory Trends Data Items*

Data Item	Description
Page Faults/sec	This bar graph shows the average memory page faults per second during the 10-second interval. Each character space in the bar graph represents two page faults per second. If the number exceeds the range of the graph, a greater-than character (>) will display. The page fault rate indicates whether or not there is adequate memory. A low number is desirable.

Data Item	Description
Swaps/Launch	This is the ratio of the number of swap-ins to the number of launches that occurred during the interval. This can also be a good indicator of memory pressure. **Performance Tip** A large swaps per launch ratio means that for every time a process came up to bat with the CPU, necessary segments were not present in main memory, and the process was disabled. A ratio consistently greater than .5 indicates a possible memory shortage. Check other memory indicators for confirmation. If your memory is indeed inadequate, you can either reduce the memory load or increase memory hardware.

Disc I/O Utilization Trends Data

The Disc I/O Utilization Trends screen displays statistics pertaining to disc I/Os during 10-second time intervals. Each data item is described in Table 9.5.

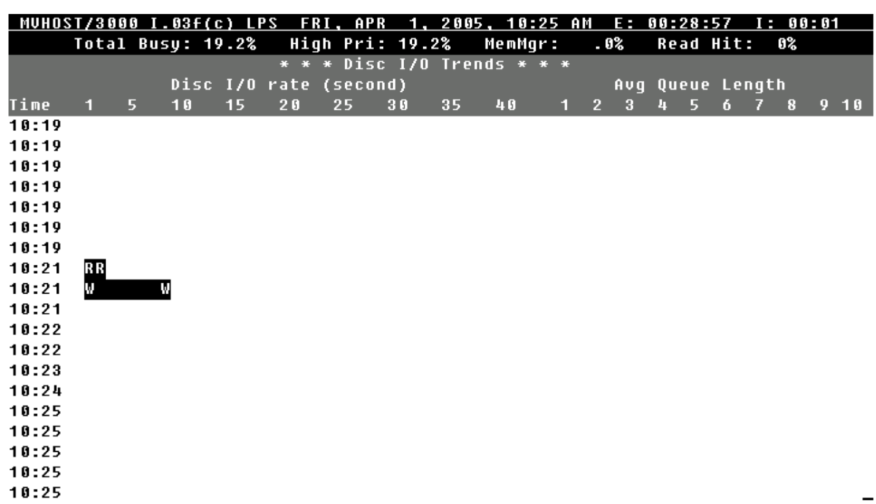


Figure 9.3 *MVHOST Current Disc I/O Utilization Trends Screen*

Table 9.5 *MVHOST Current Disc I/O Utilization Trends Data Items*

Data Item	Description
Disc I/O rate (seconds)	A total rate of both reads and writes per second. This rate reflects the actual physical transfers between main memory and a particular disc device (Ldv-n).
Avg Queue Length	The average length of the request queue for that particular disc drive when another disc I/O request arrives at that drive.

Response and Transaction Trends Data

The Response and Transaction Trends screen displays statistics pertaining to response times and transactions during 10-second time intervals. Each data item is described in Table 9.6.

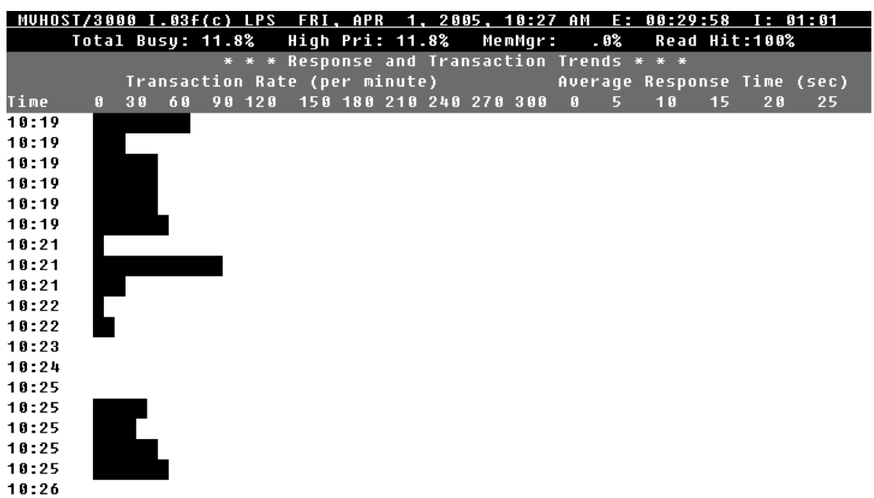


Figure 9.4 *MVHOST Current Response and Transaction Trends Screen*

Table 9.6 *MVHOST Current Response and Transaction Trends Data Items*

Data Item	Description
Transaction Rate (per minute)	This is an estimated number of terminal reads per minute based on the current interval's workload.

Data Item	Description
Average Response Time (in seconds)	This is the average number of seconds passed after pressing the C/R or Enter key to when the user is supplied a prompt.

Mode Switch Trends Data

The Mode Switch Trends screen displays statistics pertaining to Native Mode and Compatibility Mode switches during 10-second time intervals. Each data item is described in Table 9.7.

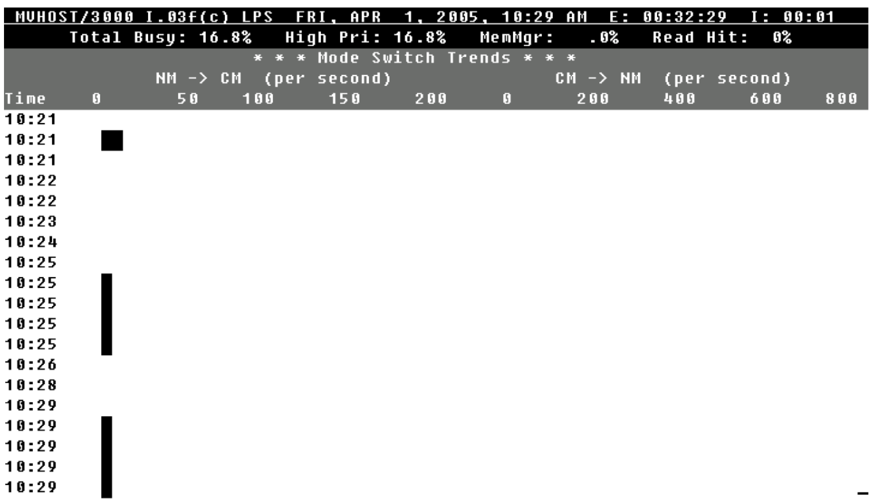


Figure 9.5 *MVHOST Current Mode Switch Trends Screen*

Table 9.7 *MVHOST Current Mode Switch Trends Data Items*

Data Item	Description
NM -> CM (per second)	These numbers represent the number of native mode (NM) to compatibility mode (CM) switches performed per second for the current interval, as well as cumulatively. **Performance Tip** A native mode to compatibility mode switch occurs when a piece of code that is executed reverts from native mode language to a translated form (compatibility mode). This operation is quite expensive for the system to perform and should be minimized. Depending on the system size, about 50 per second may indicate an overhead drain on the CPU. It is best to "go native" whenever possible; but going native can cause an increased dependency on the application design.
CM -> NM (per second)	These numbers represent the number of compatibility mode to native mode switches performed per second for the current interval, as well as cumulatively. **Performance Tip** A compatibility mode to native mode switch occurs when a piece of code that is executed reverts from compatibility mode to native mode. This operation is not as expensive to perform as is NM to CM switching. The system can sustain many more without excessive degradation to the system. Depending on the system size, more than about two hundred per second can be sustained without being an excessive overhead drain on the CPU.

General Comments

The default number of the intervals to be displayed for Current Trends is 1440. This number can be raised or lowered via a MAXTRENDS job control word. For example, to set this number to 600, type the following prior to running MVHOST:

```
:SETJCW MAXTRENDS=600
```

This will reduce the number of stored intervals thereby reducing memory requirements. If you raise this number from the default of 1440, more intervals will be available on-line, but memory requirements will increase.

10

MVHOST Response Time Detail

Response Time Detail Screens

MVHOST Response Times Detail reports various aspects of global system response times.

The Response Time Detail screen can be displayed in either graphical or tabular format. Once the screen is displayed, pressing the F4 function key will toggle the screen formats.

Graphical Format

There are three main sections on the graphical Response Time Detail: Prompt Response, First Response and Other data. The primary purpose of the two upper sections is to inform you of how well response time service levels are being met. The data items in the lower section of the screen are described in Table 10.2.

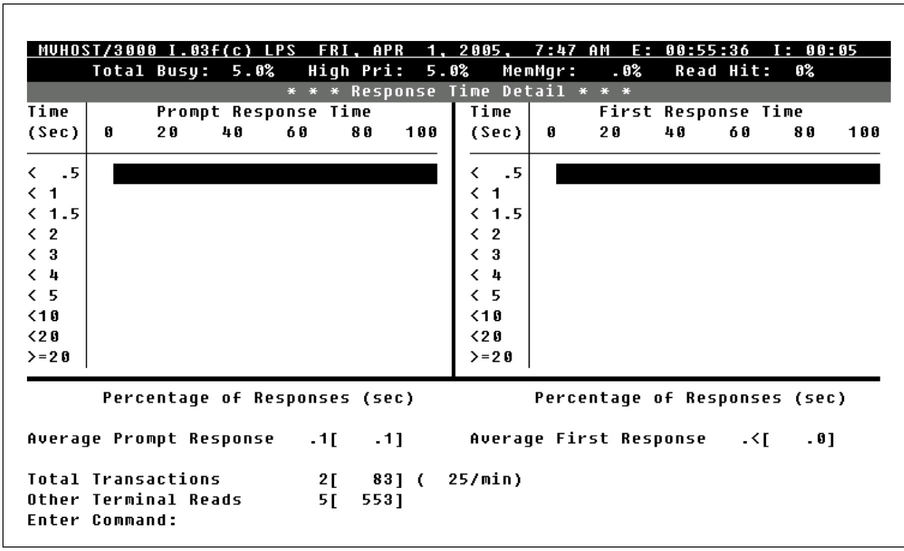


Figure 10.1 *MVHOST Response Time Detail Screen (Graphical Format)*

Tabular Format

The data items contained in the tabular view of the Response Time Detail are described in Table 10.2.

```
 MVHOST/3000 I.03f(c) LPS  FRI, APR  1, 2005,  7:45 AM  E: 00:52:53  I: 00:07
       Total Busy:  3.4%   High Pri:  3.4%   MemMgr:   .0%   Read Hit:  0%
                       * * * Response Time Detail * * *
Time         Prompt Response Time            Time         First Response Time
(Sec)      Percentage        Count           (Sec)      Percentage        Count
<  .5      100.0[ 99]      2[    69]         <  .5      100.0[100]      2[    70]
< 1           .0[  1]      0[     1]         < 1           .0[  0]      0[     0]
< 1.5         .0[  0]      0[     0]         < 1.5         .0[  0]      0[     0]
< 2           .0[  0]      0[     0]         < 2           .0[  0]      0[     0]
< 3           .0[  0]      0[     0]         < 3           .0[  0]      0[     0]
< 4           .0[  0]      0[     0]         < 4           .0[  0]      0[     0]
< 5           .0[  0]      0[     0]         < 5           .0[  0]      0[     0]
<10           .0[  0]      0[     0]         <10           .0[  0]      0[     0]
<20           .0[  0]      0[     0]         <20           .0[  0]      0[     0]
>=20          .0[  0]      0[     0]         >=20          .0[  0]      0[     0]

       Percentage of Responses (sec)                Percentage of Responses (sec)

Average Prompt Response    .1[   .1]      Average First Response    .<[   .0]

Total Transactions          2[   70] (  16/min)
Other Terminal Reads        6[  515]
Enter Command:_
```

Figure 10.2 *MVHOST Response Time Detail Screen (Tabular Format)*

Response Time Detail Keyboard Shortcuts

Each of the Response Time Detail shortcut keys is listed and explained in Table 10.1.

Table 10.1 *MVHOST Response Time Detail Keyboard Shortcuts*

Key	Description
Enter	Refresh screen
E	Return to Global Summary
F	Freeze/unfreeze data
J	Jump to new screen
H	Open MVHOST Help
L	Print hardcopy
S	Jump to MVHOST Screen Selection Menu

Key	Description
X	Exit
Z	Zero cumulative totals
!	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
:	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
?	Display contextual help
CTRL+T	Toggle timer status

Response Time Detail Data

Both prompt response and first response are provided in the Response Time Detail screens. Response time is defined as that time from when the Enter key is pressed until the time the user begins entering data. First response is measured from the time the Enter key is pressed to when the very first character shows up on the screen.

The data items contained in the lower section of the graphical view and in the tabular view are described in Table 10.2.

Table 10.2 *MVHOST Response Time Detail Data Items*

Data Item	Description
Time (Sec)	These columns represent a distribution breakdown of terminal responses on a global basis. All terminal activity is taken into consideration.
Percentage	This data item appears only when the Tabular option is chosen. These values are response proportions spread out over the <.5 through >=20 second categories. These will add up vertically to 100% with a very small rounding error. Both current and cumulative values are given when the tabular option is selected.
Count	This data item appears only when the Tabular option is chosen. These numbers represent the actual number (one per user depression of the Enter key) of responses used in the percentage calculations. Both current and cumulative values are given when the Tabular option is selected.

Data Item	Description
Average Prompt Response	This is the overall current and cumulative prompt response time. These values are the same as those on the Main screen in the Global Misc Statistics section. Prompt response times will usually be greater than first response times. This is because it takes time to paint the screen before a user prompt can be supplied. So, if you have a lot of long screen reporting, you will see large prompt response time values, and small first response time values.
Average First Response	This is the overall current and cumulative first response time. For reasons explained in the average prompt response section above, the first response tends to better measure how long it takes the computer system to actually perform user transactions. This value is usually smaller than the prompt response value.
Total Transaction	These numbers represent the current, cumulative, and rate of terminal reads per minute occurring on the system. A terminal read is defined as being equivalent to a user depression of the Enter key. These values do not include VPLUS status reads or MVHOST automatic refresh terminal reads. Other timer-triggered programs are also excluded. The cumulative values are tabulated from the time that MVHOST was initiated or from the last time the RESET TOTALS function key was pressed, whichever occurred last.
Other Terminal Reads	These two values represent terminal read activity that is not user-induced. These include session programs that automatically refresh the screen (like MVHOST) and VPLUS-like programs that perform terminal status reads when the Enter key is not pressed.

11

MVHOST CPU DETAIL

CPU Detail Screen

The information displayed in the CPU Detail screen shows the general state of the CPU. This information is similar to that shown in the Global Summary, except that it includes details for multiple CPUs.

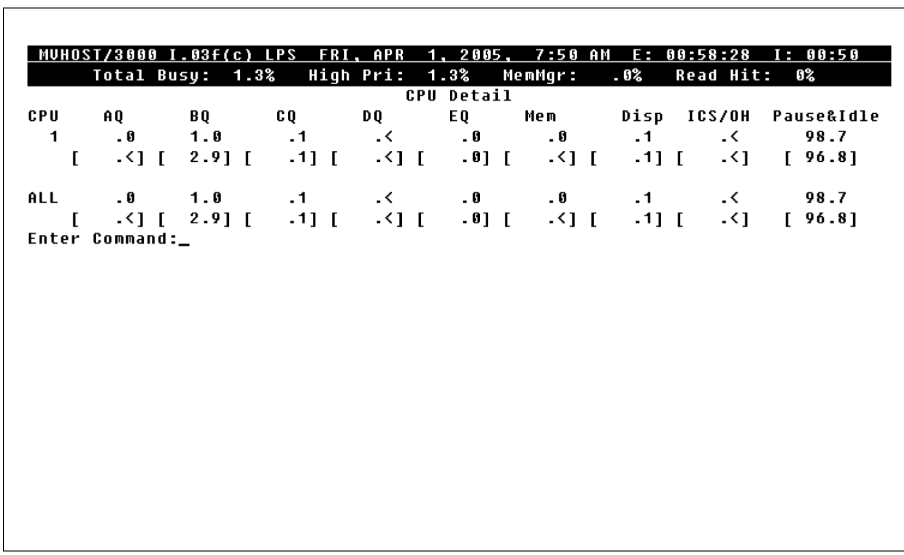


Figure 11.1 *MVHOST CPU Detail Screen*

CPU Detail Keyboard Shortcuts

Each of the CPU Detail shortcut keys is listed and explained in Table 11.1.

Table 11.1 *MVHOST CPU Detail Keyboard Shortcuts*

Key	Description
Enter	Refresh screen
E	Return to Global Summary
F	Freeze/Unfreeze data
J	Jump to screen selection prompt
H	Open MVHOST Help
L	Print hardcopy
S	Jump to MVHOST Screen Selection Menu
X	Exit MVHOST
Z	Zero cumulative totals
!	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
:	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
?	Display contextual Help
CTRL+T	Toggle timer status

CPU Detail Data

The CPU Detail data items are described in Table 11.2.

Table 11.2 *MVHOST CPU Detail Data Items*

Data Item	Description
AQ, BQ, CQ, DQ, EQ	These statistics indicate how much CPU time is spent executing user and system program codes on behalf of processes running in respective scheduling queues. For the current interval, this is the time the CPU works constructively on our behalf as opposed to performing overhead tasks (described later). MPE/iX system process time is usually measured within the AQ and BQ counters. Some user processes might run in the B queue (like MVHOST). The queue is usually where interactive processes run. The D and E queues are typically where batch jobs run. **Performance Tip** If the sum of these percentages (particularly AQ, BQ, and CQ) are very large and there is little or no time spent in any active or paused states, it is possible that one or more processes are hung. Perhaps a looping condition exists. The offending process(es) should be identified by finding the highest CPU user (use the HOG PROC ZOOM key for this). If the sum of these numbers is very low and other active or passive statistics are very high, then an overhead task(s) is consuming the CPU's attention and should be researched further. A low number in these process states counters (when other busy and paused counters are low) means that there is plenty of CPU capacity available for more processing (batch or interactive). It is important to note the spread of CPU in various queues. The AQ and BQ should have very low amounts of CPU utilization, except for brief spikes. It is best to see that CQ, DQ and EQ obtain the majority of CPU because other areas usually represent overhead, thus unproductive tasks.

Data Item	Description
Mem	This statistic represents how much CPU time is spent handling memory page activity. This counter includes time spent on memory allocations for user processes that cannot be launched (obtain the CPU) until necessary segments are present in memory. **Performance Tip** A slight memory load is indicated by a figure of 5-8% in this state, moderate if 8-12%, and heavy if it is greater than 12%. (Remember, these are rough guidelines.) A "shades of gray" principle applies here. A memory shortage may exist if this number is consistently greater than 5-8% and if other memory shortage indicators are present. See "MVHOST Memory Detail" on page 97 for more on memory shortage diagnosis. This number tends to be a more reliable indicator of memory shortages on MPE/iX systems than they are on MPE V systems.
Disp	The amount of time the CPU spends on scheduling and dispatching processes. **Performance Tip** If this value rises above 8%, it can mean that MPE/iX is spending an inordinate amount of time dealing with process launch and process stop activity. Look at Launch/s (this section), Individual Process Stop Detail (Extended Process or Detailed Process displays) and Global Stops Detail to gain more insight as to why this is happening. This indicator is worth watching. If it becomes excessive, response times can increase.

Data Item	Description
ICS/OH	This statistic represents the time the CPU spends dealing with external device activity. Pressing RETURN to get an MPE/iX prompt is one such interrupt. Time handling disc I/O completions are included here. Interrupt Control Stack activity (ICS) requires service time by the CPU. **Performance Tip** If this value rises above 8%, it can mean that MPE/iX is spending an inordinate amount of time on the DT subsystem, disc, or other datacomm interrupt activity. Locating processes guilty of excessive terminal reads (DTC activity) or processes with large numbers of disc I/O's will be helpful. A small value is desirable here.
Pause	The percentage of time the CPU spends waiting for disc I/O's to complete. This event is essentially a roadblock for further activity to take place. No other functions can occur during this waiting period. This number represents time in which processes could have had work performed on their behalf, but could not because of the relative slowness of the disc drives in retrieving I/O. **Performance Tip** The number indicated by this counter provides a good aspect of the state of the I/O system. A large number here basically indicates that the CPU could have been busier, but because of I/O requests that were not serviced rapidly, it could not. Big is bad. Small is good! If this number is above 10%, it is possible that an I/O bottleneck exists. A shortage of main memory can also induce an excessive amount of disc activity. It is best to look at some of the memory adequacy indicators to verify whether or not memory is the culprit. Also be sure to identify the high disc I/O user (Advice Module and Process Display). A large amount of disc I/O write activity can induce an excessive value here. We have seen a number of cases where this number has skyrocketed virtually causing the majority of CPU to become paralyzed. So, a Series 948 may only be operating at the level of the Series 920 because of excessive CPU Pause time for disc activity.

<table>
<tr><th>Data Item</th><th>Description</th></tr>
<tr><td>Idle</td><td>The percentage of time the CPU is not actively working on processes and not waiting for any disc I/O's to complete. Simply stated, this is the amount of processing capacity you have "in the bank."

Performance Tip

If there is a large amount of idle time consistently on your system, this 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 to capacity. Ample idle time indicates spare processor capacity.

If idle time is zero (or close to it) most of the time, and a significant amount of the CPU's processing is due to batch job activity, then you can sustain some growth in interactive transaction volume. If the lack of idle time is primarily due to session activity, then the system may be overloaded. Either reduce processing or obtain more CPU horsepower via an upgrade.

It is helpful to observe entire days of idle time values for a system. You may have plenty of idle time at noon, but no idle time between 3:00 and 4:00 p.m. Shifting workloads (batch scheduling, user work hours) will help bring the peak period utilization down.</td></tr>
</table>

12

MVHOST Memory Detail

Memory Detail Screens

The Memory Detail screens are useful to analyze memory activity from either a tabular or graphical view point. Examples of both graphical and tabular Memory Detail screens are provided in "Memory Detail Data."

Memory Detail Keyboard Shortcuts

Each of the Memory Detail shortcut keys is listed and explained in Table 12.1.

Table 12.1 *MVHOST Memory Detail Keyboard Shortcuts*

Key	Description
Enter	Refresh screen
E	Return to Global Summary
F	Freeze/Unfreeze data
J	Jump to screen selection prompt
H	Open MVHOST Help
L	Print hardcopy
S	Jump to Screen Selection Menu
X	Exit MVHOST
Z	Zero cumulative totals
!	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)

Key	Description
:	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
?	Display contextual Help
CTRL+T	Toggle timer status

Memory Detail Data

The Memory Detail screen can be viewed in both graphical and tabular formats. To toggle between a graphic and tabular display format press the G key or press the F4 function key (GRAPHIC DISPLAY/TABULAR DISPLAY).

Graphical Format

Each character on the graphic bar represents approximately two events per second. All values are expressed in number of events per second.

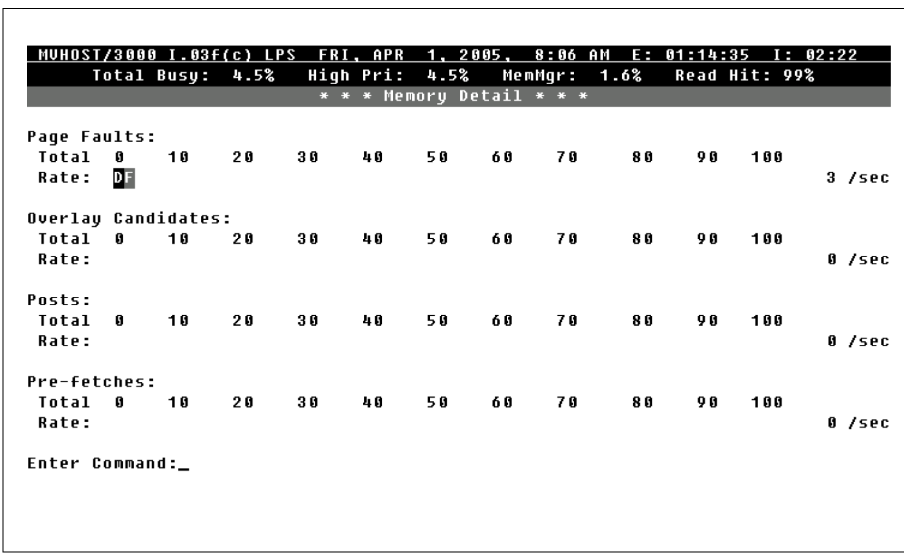


Figure 12.1 *MVHOST Memory Detail Screen (Graphical Format)*

Memory Detail Data Codes (Graphical Format)

The key to each graphic bar and tabular column is shown in Table 12.2.

Table 12.2 *MVHOST Memory Detail (Graphical Format) Keys*

Key	Description
C	Native mode and compatibility mode code segments (NM code and CM code)
D	Transient and permanent data segments (Tran Data and Perm Data)
F	File object faults (all types: IMAGE, KSAM, etc.)
L	Native mode and compatibility mode system libraries such as XL.PUB.SYS, SL.PUB.SYS, etc., (NM Sys and CM Sys)
S	Native mode and compatibility mode data stacks (NM stack and CM stack)
X	Compatibility mode extra data segments (CM Xds)

Memory Detail Data (Graphical Format)

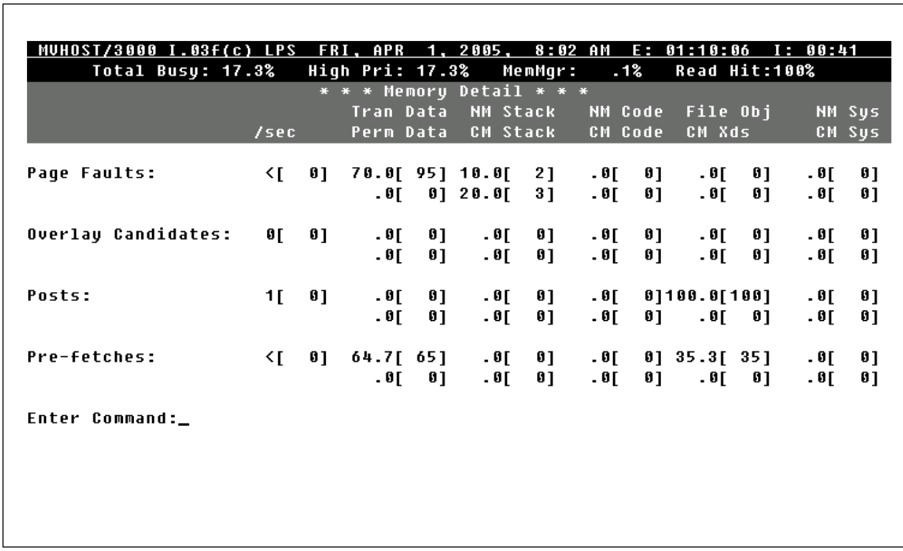
Table 12.3 describes the data items found in the graphical view of the Memory Detail screen.

Table 12.3 *MVHOST Memory Detail (Graphical Format) Data Items*

Data Item	Description
Page Faults	The number of memory page faults occurring per second. A page fault occurs when an object necessary for a process to continue to run is not present in memory.
Overlay Candidates	The number of memory overlay candidates occurring per second. An overlay candidate is a memory object that has been flagged as temporarily non-essential, thus expendable to overwrite. This frees up memory for more urgent requests.
Posts	The number of times processes request memory pages to be posted to disc. This can be for file pieces, etc.
Pre-fetches	The total number of pre-fetch reads on behalf of processes. This event is similar to MPE V disc caching. More data is brought into memory than is essential so that future trips to disc can be avoided. Additionally, cumulative counters are available on the tabular screen. You should watch these numbers over time to determine interpreting guidelines.

Tabular Format

The tabular version of the Memory Detail screen further details memory events that occur on the system by supplying cumulative values along with current interval statistics.



```
MVHOST/3000 I.03f(c) LPS   FRI, APR   1, 2005,   8:02 AM   E: 01:10:06   I: 00:41
     Total Busy: 17.3%    High Pri: 17.3%    MemMgr:    .1%    Read Hit:100%
                                       * * * Memory Detail * * *
                                          Tran Data  NM Stack   NM Code  File Obj     NM Sys
                          /sec            Perm Data  CM Stack   CM Code  CM Xds       CM Sys

Page Faults:              <[    0]   70.0[  95] 10.0[    2]   .0[    0]    .0[    0]   .0[    0]
                                        .0[   0] 20.0[    3]   .0[    0]    .0[    0]   .0[    0]

Overlay Candidates:       0[    0]      .0[   0]    .0[    0]   .0[    0]    .0[    0]   .0[    0]
                                        .0[   0]    .0[    0]   .0[    0]    .0[    0]   .0[    0]

Posts:                    1[    0]      .0[   0]    .0[    0]   .0[    0]100.0[100]     .0[    0]
                                        .0[   0]    .0[    0]   .0[    0]    .0[    0]   .0[    0]

Pre-fetches:              <[    0]   64.7[  65]     .0[    0]   .0[    0] 35.3[  35]    .0[    0]
                                        .0[   0]    .0[    0]   .0[    0]    .0[    0]   .0[    0]

Enter Command:_
```

Figure 12.2 *MVHOST Memory Detail Screen (Tabular Format)*

The data items in the tabular Memory Detail screen are described in Table 12.4. The events are those described in the previous table, Table 12.3.

Table 12.4 *MVHOST Memory Detail (Tabular Format) Data Items*

Data Item	Description
Tran Data	The number of events (within the current interval and cumulative) caused by memory waiting to complete for this process by transient data.
Perm Data	The number of events caused by memory waiting to complete for this process by permanent data.
NM Stack	The number of events caused by memory waiting to complete for this process by a native mode stack.
CM Stack	The number of events caused by memory waiting to complete for this process by a compatible mode stack.
NM Code	The number of events caused by memory waiting to complete for this process by native mode programming code.
CM Code	The number of events caused by memory waiting to complete for this process by compatibility mode programming code.

Data Item	Description
File Obj	The number of events caused by memory waiting to complete for this process by File.
CM Xds	The number of events caused by memory waiting to complete for this process by a CM_POST.
NM Sys	The number of events caused by memory waiting to complete for this process by a native mode system task.
CM Sys	The number of events caused by memory waiting to complete for this process by a compatibility mode system task.

13

MVHOST Disc I/O Detail

Disc I/O Detail Screens

The Disc I/O Detail screens are designed to allow you to gain detailed information on each of the disc devices configured on your system and to analyze the disc I/O performance indicators.

Some of the higher level data is provided in the Global Summary and Extended Disc line. You can use the Disc I/O Detail screen to see cumulative counters, percentages of all I/Os that are performed by each disc, and queue lengths, etc. Cumulative counters may be reset by selecting the RESET TOTALS key (F5).

Graphical Format

The graphic format of the Disc I/O Detail screen displays information on a drive-by-drive basis regarding overall drive utilization and I/O rates per second. Each data item is described in Table 13.2.

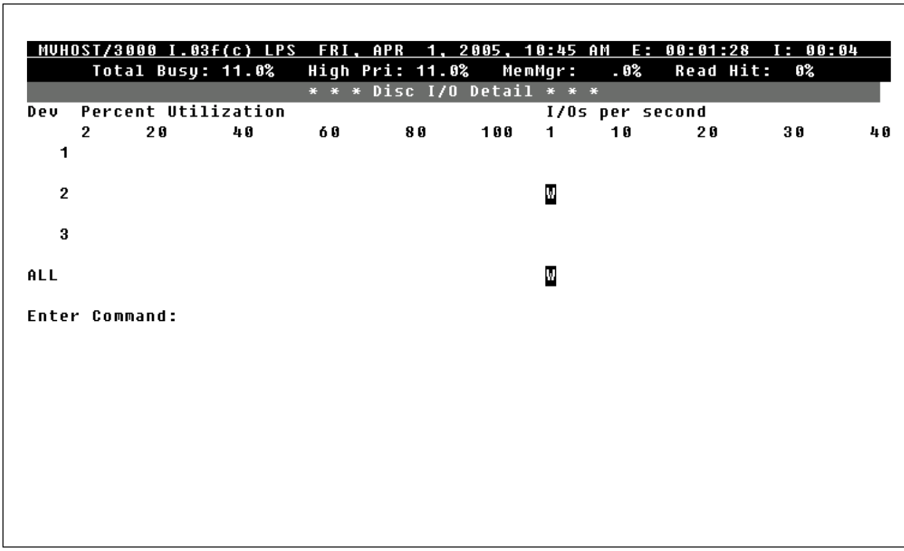


Figure 13.1 *MVHOST Disc I/O Detail Screen (Graphical Format)*

Tabular Format

An example of the Disc I/O Detail screen in tabular view is shown in Figure 13.2.

```
MVHOST/3000 I.03f(c) LPS   FRI, APR   1, 2005, 10:47 AM   E: 00:03:27   I: 00:01
          Total Busy: 96.9%    High Pri: 96.9%    MemMgr:   1.5%    Read Hit:100%
                                   * * * Disc I/O Detail * * *
                                  Rate/s                   Counts           Avg.     Service Time
 Dev    I/O %   Util%    Read Write Total       Read Write Total      QLen     msec per I/O
 ------------------------------------------------------------------------------------------
     1      0       0       0     0     0          0     0     0       .00          .0
       [ 14]   [   0] [    0][    0][    0]                       [   .00]    [ 13.7]

     2    100       0       0     7     7          0     8     8       .00        14.9
       [ 86]   [   0] [    0][    0][    0]                       [   .00]    [  7.9]

     3      0       0       0     0     0          0     0     0       .00          .0
       [  0]   [   0] [    0][    0][    0]                       [   .00]    [   .0]

 ALL    100       0       0     7     7          0     8     8       .00        14.9
       [100]   [   0] [    0][    0][    0]                       [   .00]    [  8.7]

Enter Command:
_
```

Figure 13.2 *MVHOST Disc I/O Detail Screen (Tabular Format)*

Disc I/O Detail Keyboard Shortcuts

Each of the Disc I/O Detail shortcut keys is listed and explained in Table 13.1.

Table 13.1 *MVHOST Disc I/O Detail Keyboard Shortcuts*

Key	Description
Enter	Refresh screen
E	Return to Global Summary
F	Freeze/Unfreeze data
J	Jump to screen selection prompt
H	Open MVHOST Help
L	Print hardcopy
S	Jump to Screen Selection Menu
X	Exit MVHOST
Z	Zero cumulative totals

Key	Description
!	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
:	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
?	Display contextual help
CTRL+T	Toggle timer status

Disc I/O Detail Data

The Disc I/O Detail screen can be viewed in both graphical and tabular formats. To toggle between a graphic and tabular display format press the G key or press the F4 function key (GRAPHIC DISPLAY/TABULAR DISPLAY).

Graphical Format

Each data item from the graphical Disc I/O screen is described in Table 13.2.

Table 13.2 *MVHOST Disc I/O Detail (Graphical Format) Data Items*

Data Item	Description
Dev	The logical device number of the disc drive. If this is "ALL," the values reported will represent averages for all disc drives.
Percent Utilization	A disc drive's utilization measures the percentage of time a disc drive is in use. **Performance Tip** There is a correlation between disc utilization and disc queue lengths. In other words as utilization rises, there is more of a chance that I/Os will begin to queue up behind an executing I/O. This data can be helpful in your disc drive forum.

Data Item	Description
I/Os per second	This column of data represents three disc I/O statistics: • R Physical reads per second. • W Physical writes per second. • T Total rate of both reads and writes per second. These numbers reflect the actual physical transfers between main memory and a particular disc device. **Performance Tip** A typical single disc drive (for example a 7937) can sustain I/O rates upward of 20-30 per second (total I/O). If rates consistently top this number it is possible that an I/O bottleneck exists. A disc bottleneck may exist even if the rates are not high, but this is an area of concern. The CPU wait for disc I/O time should be cross referenced (check the Global Screen CPU Statistics). If one or more disc drives are consistently deriving the majority of the activity while others are inactive, consider off-loading some of the busier files onto less active drives.

Tabular Format

Each data item in the tabular Disc I/O Detail screen is described in Table 13.3.

Table 13.3 *MVHOST Disc I/O Detail (Tabular Format) Data Items*

Data Item	Description
I/O%	These numbers represent the percentage of all disc I/O performed by this disc device during the current and cumulative intervals. **Performance Tip** The cumulative number is especially helpful to determine how well balanced your disc drives are over a long period of time. It is nearly impossible to perfectly balance disc I/O among devices, but they can be balanced within some limit. If you notice that one or more drives are either greatly under-utilized or greatly over-utilized you should move files from one drive to another.

Data Item	Description
Util%	A disc drive's utilization measures the percentage of time a disc drive is in use. **Performance Tip** There is a correlation between disc utilization and disc queue lengths. In other words as utilization rises, there is more of a chance that I/Os will begin to queue up behind an executing I/O. This can be helpful in your disc drive forum.
Rate/s	This section of data represents three disc I/O statistics: • R Physical reads per second. • W Physical writes per second. • T Total rate of both reads and writes per second. These numbers reflect the actual physical transfers between main memory and a particular disc device. Bracketed numbers represent an average for each indicator.
Counts	This section indicates the total number of disc reads, writes and a total of both reads and writes per second. These numbers reflect the actual physical transfers between main memory and a particular disc device (Dev - n).
Avg. QLen	The average length of the disc request queue for a particular disc device when another disc I/O request arrives at the drive. Disc I/O requests come in two flavors: cheap or expensive. While no disc I/O is a good I/O, those requiring more work from the disc devices are bad for performance. Sequentially reading an MPE file is relatively easy for a disc drive, because the drive's arm mechanism moves very little thus incurring shorter queues. If the mechanism moves wildly over the device's platter to jump from a Turbo IMAGE master set to a detail set, the cost for those particular I/Os is substantially more and will usually incur longer queue depths. (Continued on the next page,)

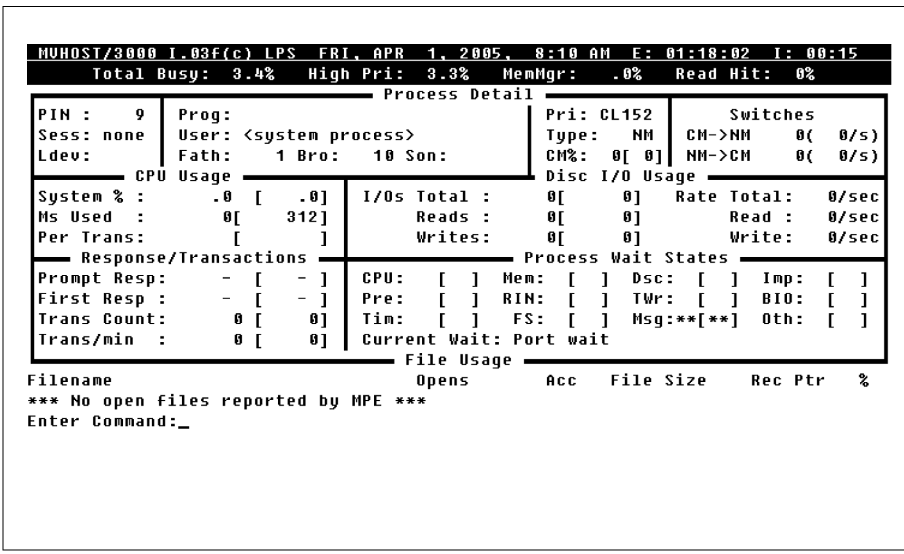
Data Item	Description
Avg. QLen (continued)	**Performance Tip** An average queue length of one (1.0) or greater is not acceptable. Keep in mind that it is normal to have rush hour situations during a day when the queues have high averages. This is especially true when a transaction manager reaches a check point and does a large amount of write posting. It is consistently long queue depths that are a bad sign. If you notice that a particular disc drive has consistently high queue depths you should explore the following possibilities: • Excessive disc arm movement because of heavily hit files on the same disc drive that depend on each other (balance files better). • Database files inefficiencies (better housekeeping). • Too much demand on a particular file (application design problem). • The disc drive is too slow of a model for your particular application (not very likely).
Service Time msec per I/O	The amount of time in milliseconds required to service one I/O. **Performance Tip** If the service time is higher on one disc drive than the others, check data locality. Your data may need to be "balanced" between disc drives.

14

MVHOST PROCESS DETAIL

Process Detail Screen

The Process Detail screen provides thorough information for one user-specified process at a time.



```
MVHOST/3000 I.03f(c) LPS  FRI, APR  1, 2005,  8:10 AM  E: 01:18:02  I: 00:15
      Total Busy:  3.4%   High Pri:  3.3%   MemMgr:    .0%   Read Hit:  0%
                                        Process Detail
PIN :     9 | Prog:                                 | Pri: CL152 |    Switches
Sess: none  | User: <system process>                | Type:   NM  | CM->NM     0(  0/s)
Ldev:       | Fath:     1 Bro:   10 Son:            | CM%:  0[ 0] | NM->CM     0(  0/s)
         CPU Usage                                   Disc I/O Usage
System % :        .0  [    .0] | I/Os Total :    0[     0]   Rate Total:    0/sec
Ms Used  :         0[     312] |      Reads :    0[     0]         Read :   0/sec
Per Trans:          [        ] |     Writes:     0[     0]         Write:   0/sec
    Response/Transactions                  Process Wait States
Prompt Resp:      -  [    - ]  | CPU:   [  ]  Mem:  [  ]  Dsc:  [  ]  Imp:  [  ]
First Resp :      -  [    - ]  | Pre:   [  ]  RIN:  [  ]  TWr:  [  ]  BIO:  [  ]
Trans Count:        0 [     0] | Tim:   [  ]   FS:  [  ]  Msg:**[**]  Oth:  [  ]
Trans/min  :        0 [     0] | Current Wait: Port wait
                                        File Usage
Filename                                  Opens        Acc    File Size     Rec Ptr    %
*** No open files reported by MPE ***
Enter Command:_
```

Figure 14.1 *MVHOST Process Detail Screen*

A special feature provided in this screen is the family lineage for the current process. By pressing the UTILITY KEYS function key (F6), and then the PROCESS TREE function key (F4), you will see a graphic format of the "father" process and its related "son" processes. This will be helpful when dealing with process-handling issues.

Process Detail Keyboard Shortcuts

Each of the Process Detail shortcut keys is listed and explained in Table 14.1.

Table 14.1 *MVHOST Process Detail Shortcut Keys*

Key	Description
Enter	Refresh screen
E	Return to Global Summary
F	Freeze/Unfreeze data
H	Display MVHOST Help
J	Jump to new screen
L	Print hardcopy
M	Toggle memory lock
O	Toggle "show other file opens"
P	Specify new Process Detail screen
Q	Jump to new queue
R	Toggle stack trace
S	Jump to Screen Selection Menu
T	Display process tree
U	Display file users
V	Launch FILERPT
X	Exit MVHOST
Z	Zero cumulative totals
!	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
:	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
#	Display job/session tree

Key	Description
?	Display contextual Help
CTRL+T	Toggle timer status
CTRL+W	Toggle wait state information

Process Detail Option Keys

Each of the Process Detail option keys is listed and explained in Table 14.2.

Table 14.2 *MVHOST Process Detail Option Keys*

Key	Description
F1 - MEMORY LOCK	When enabled, the Terminal Memory Lock data is displayed below File Usage, which causes the file display to scroll under File Usage.
F2 - STACK OPEN	This function key acts as a toggle between Stack Marker Tracing and an Opens Files display. When F2 is pressed while Labeled Stack Trace is showing, a process Stack Trace markers list is displayed for the process. Notice that the first time this command is executed in an MVHOST session it can take 30 seconds or more for the initial display. Also notice that when you access Stack Trace, Memory Lock is disabled. Pressing F2 again will toggle to open file usage (discussed above). Only users with PM capability can display Stack Trace markers, but all users can see Open Files.
F3 - OTHER OPENS	When enabled, this key will show all other accessories to files opened by this process.
F8 - MAIN KEYS	When executed in this context, the function key labels will revert to those within the Process Detail display.

Process Detail Function Keys

The Process Detail function keys are listed and explained in Table 14.3.

Table 14.3 *MVHOST Process Detail Function Keys*

Key	Description
F1 - MPE/iX COMMAND	Enter the MVHOST command interface.

Key	Description
F3 - QUEUE JUMP	Alter the priority or queue of an executing process.
F4 - PROCESS TREE	Graphically represents the process tree, showing the father and sons of the selected process.
F5 - JOB/SESSION TREE	Entering a job or session number in the form of "Jnnn" or "Snnn" will display the process tree for the requested job or session.
F6 - FILE USERS	Entering an adequately qualified file name will result in a display of all users who are currently accessing that file, just as in the File Users screen (page 161).
F7 - FILERPT ANALYSIS	This command will cause the programmatic execution of the program FILERPT. MVHOST will attempt to run the program from UTIL.LUND, then UTIL.SYS, and then PUB.SYS. The program is included as an unsupported utility program with your Meta-View for MPE/iX software.
F8 - MAIN KEYS	When executed in this context the function key labels will revert to those within the Process Detail display.

Process Detail Data

The Process Detail data items are described in Table 14.4.

Table 14.4 *MVHOST Process Detail Data Items*

Data Item	Description
PIN	The Process Identification Number (PIN). Each process is uniquely identified by its own PIN. The easiest way to locate processes is by knowing this number. A single job or session can have many processes associated with it.
Sess/Job	The job or session number associated with the particular process. If the process is a system type (not originating from a user job or session), "<sys>" will appear in this column.
LDev	The logical device number of the device where the process was created. Batch jobs will display the streams device number here (usually 10). System processes will have a "-." This column is helpful to track down a particular user whose process is exhibiting unique traits. Jobs or processes that are in the process of terminating may display an erroneous number here. This does not indicate a problem.

Data Item	Description
Prog	The program or last MPE/iX command executed by the user. Some system-type program names will be uniquely identified, such as “Spooler”. If the process is a Command Interpreter, then “ci:xxxx” will appear in this column, where “xxxx” is the last MPE/iX command the user or job issued.
User	The logon sequence as initiated by the user or job minus the logon group. Once again, if the process was spawned by MPE and not with a session or job, System Process will be displayed. The name of that process will be provided at the program name.
Fath/Bro/Son	These numbers are the Process Identification Numbers (PIN) for the father process that created the current process. Next, the brother— if any—was created by the father, and the first son process—if any—was created by the current process. By traversing the process tree you can identify all relatives associated with the current process. You may also press the PROCESS TREE function key to see the lineage of the current process in graphic format.
Pri	The first two letters signify the particular dispatch subqueue in which the process is executing. The following number is an absolute priority that the MPE dispatcher uses to determine what process gets the CPU’s attention next. This number is ultimately used to determine the CPU’s next process customer. The first letter is the queue. The second indicates whether the process has a fixed priority subqueue (L for linear or S for circular). Only C, D, and E queues can have the S subqueue. The possible letters for the queue are described in Table 14.5.
Type	This label indicates whether the process began in compatibility mode (CM) or native mode (NM). This flag will not indicate the current mode of the program.
CM%	The percentage of the CPU used for compatibility mode operations when this process was using the CPU.
CM->NM	The number and rate per second (nnn/s) of compatibility mode to native mode switches performed by the process.
NM->CM	The number and rate per second (nnn/s) of native mode to compatibility mode switches performed by the process.

Queue Items

The queue items are described in Table 14.5.

Table 14.5 *MVHOST Process Queue Data Items*

Data Item	Description
AL	A very high priority linear subqueue. This queue is usually reserved for highest priority MPE system processes that need immediate and adequate CPU time. Linear means that the process priority does not usually change. It is fixed.
BL	A high priority queue. This queue is used by some lower priority MPE system processes and by some very high priority user processes. For example, logging on a system with a "PRI=BS" parameter will allow your terminal to receive more CPU attention than those in lower queues. **Performance Tip** Be cautious when running processes in this queue. If a looping condition takes place often, the only remedy is to restart the system! This is because processes in the A and B queues generally will not give up control of the CPU until they are through with it. This queue is generally linear, but it is possible to assign a process to the circular queue with priorities falling in the B queue range.
CS	This subqueue is the one in which normal interactive sessions run. When you log on at a terminal, your Command Interpreter Process (the process that allows you to dialogue with an MPE/iX prompt) is assigned a priority of 152 in the queue unless the default queue settings have been altered. As your process uses more CPU time than the average last 100 transactions, your priority is decremented (increased numerically - logically lower in priority). The net effect is that HOG interactive transactions are penalized. They have less chance of getting CPU time. Short transactions are rewarded by maintaining a higher priority. It is by this method that MPE/iX tries to fairly allocate resources among competing processes.
DS	This subqueue is commonly used for high priority batch jobs. The rules for this and the E queue are described below and are similar to that of the C queue. Processes fall in priority as they exceed the filter values. In the CS queue this is the dynamically calculated SAQ (System Average Quantum) value. For the D and E queues these values are the MINQUANTUM and MAXQUANTUM.

Data Item	Description
ES	This subqueue is typically used for lower priority batch jobs. Processes running at low priority will only get table scraps of CPU time. Processes running at higher priorities leave leftovers for these lower priority processes. **Performance Tip** If you see a process in the linear queue that consumes a lot of CPU time, it is possibly the culprit causing a bottleneck. If other processes are congregating at a low priority and are not getting enough CPU time you should use the TUNE command to help them derive more. You can manipulate the TUNE command to perform several actions. Do not be afraid to take advantage of its capabilities.

CPU Usage Data

The process' CPU Usage data items are described in Table 14.6.

Table 14.6 *MVHOST Process CPU Usage Data Items*

Data Item	Description
System%	This percentage reflects the amount of the total CPU capacity consumed by this process during the current interval. If a process uses more than zero but less than or equal to 0.1, then .<% is displayed. This is to let you know that some time was spent on the process although very little (between 0 and 0.1). **Performance Tip** The high CPU user, HOG, is displayed in the Advice section. It is very important to isolate the currently active, high CPU consumer because it is often the performance problem. It is possible to spot a program looping condition if it consumes a lot of the CPU's attention and breaks little or not at all for other events. An even distribution of the CPU among processes over a period of time is desirable. If a process should be getting CPU time and is not, you should look at the Current Wait reason (discussed below). This process may be waiting on resources to be released in order to continue. Looking at the Process Wait states will reveal even more.

Data Item	Description
Ms Used	These numbers represent the current and cumulative amount of CPU milliseconds consumed by the process respectively. The milliseconds represent the time processes spent at the CPU watering hole for service. "Current" means the interval specified by the I: mm:ss at the top banner line. The cumulative number is unique because it represents the total number of CPU milliseconds that were consumed since the process was created and not just since MVHOST started. So if the process under study was started hours ago you will see a large cumulative value for the "CPU Ms Used" data. **Performance Tip** One of the first things you can tell about a process is whether or not it has received any CPU attention during the last interval. If the current value is zero, the process was not active during the last interval. These numbers will also quantitatively indicate which processes are consuming the most and the least CPU.
Per Trans	The average number of CPU milliseconds consumed by the process per transaction.

Disc I/O Usage Data

The process' Disc I/O usage data items are described in Table 14.7.

Table 14.7 *MVHOST Disc I/O Usage Data Items*

Data Item	Description
I/Os Total	The first value of this pair is the total number of physical disc I/Os generated by the process during the current interval. The second "[n]" is the cumulative number of I/Os for the process since it began. If MVHOST was started after the process began this value will reflect disc I/Os that accumulated since the beginning of the session.
Reads	The first value of this pair is the number of logical read disc I/Os generated by the process during the current interval. The second "[n]" is the cumulative number of read I/Os for the process since the process began. If MVHOST was started after the process began, this value will reflect the disc I/Os that accumulated since the beginning of the session.

Data Item	Description
Writes	The first value of this pair is the number of logical write disc I/Os generated by the process during the current interval. The second "[n]" is the cumulative number of write I/Os for the process since the process began. If MVHOST was started after the process began, this value will reflect the disc I/Os that accumulated since the beginning of the session. **Performance Tip** These absolute logical I/O numbers will help you characterize processes in terms of trips to disc. In the case of MPE/iX pre-fetching some I/Os will be eliminated. Only those I/Os unsatisfied in memory will be retrieved from disc and will be reflected in these numbers.
Rate Total	The average number of total logical disc I/Os per second generated by the process during the current interval.
Reads	The average number of logical disc I/O reads per second generated by the process during the current interval.
Writes	The average number of logical disc I/O writes per second generated by the process during the current interval. **Performance Tip** These I/O rates will help you characterize processes in terms of the rate of physical trips to disc. In the case of MPE/iX pre-fetching some I/Os will be eliminated. Only those I/Os unsatisfied in memory will be retrieved from disc and be reflected in these numbers.

Response and Transaction Data

The process' Response and Transaction data items are described in Table 14.8.

Table 14.8 *MVHOST Process Response and Transaction Data Items*

Data Item	Description
Prompt Resp First Resp	These numbers represent the terminal read response times for interactive users. First Resp is the response time for the user from the time C/R or Enter is pressed to when the first character appears on the screen. Prompt Resp is the response time for the user from when C/R or Enter is pressed to when the first prompt appears at which the user can enter a new transaction. There are a number of things to keep in mind when discussing response times. Refer to the discussion of Transactions and Response Times in "Global Misc Statistics (Tabular Format)" on page 55 for a detailed explanation. **Performance Tip** Excessively high response times should be investigated. Heavy terminal activity can drain the CPU's attention with nonproductive overhead tasks. Impedances can cause excessive response times. It is important to analyze the wait state percentages. These are shown on the Extended Process Display line or at the Process Detail screen (Process Wait States). Be sure you understand the difference between First and Prompt response times. If you have a lot of online reporting, the Prompt response times will be substantially larger, skewing the true system response time. In this case the First response will be more meaningful in tracking the rate at which the system is sending data back to the user's terminal.

Data Item	Description
Trans Count Trans Rate/min	These numbers represent the current number of terminal transactions (possibly equivalent to terminal reads) performed by the process to a particular terminal device, a cumulative average and an estimated rate per minute based on the current interval. Under certain conditions these numbers will represent the actual number of user transactions (e.g., posting a payment, inquiring on an account, etc). An inaccurate reading will occur if multiple carriage returns per screen are used for data entry. VPLUS status checks are not counted by measurement interface that MVHOST accesses. Transaction counts for VPLUS applications will provide a consistent transaction count for VPLUS applications and are a fairly accurate count for character mode transactions. **Performance Tip** The best way to tell if terminal reads and transactions are equivalent is to test them. You can have a user enter a specific number of transactions defined from the users standpoint and track that activity via MVHOST to check for discrepancies.

Process Wait State Data

The wait state counters show the wait states in which the specified process can spend time. In other words, if a process is experiencing eight-second response times, the percentages displayed in the wait state categories show the delay or servicing reasons. It is ideal for a process to continue unhindered, however, a process is usually impeded over the course of its life.

A hindrance could mean a missing memory segment or disc data. If you notice a particular user's process is receiving poor response times, or a batch job is taking more time to complete than is reasonable, examine the wait reasons. You can view them in the extended process line or on the process' Process Detail screen. Cumulative wait state figures are also provided in the Process Detail screen.

The most ideal throughput for a process is derived when it does not have to stop for any reason. In other words, it derives full use of the CPU. The following discussion describes the other "brick walls" that can slow down a process' progress (with the exception of CPU).

The process' wait state data items are described in Table 14.9.

Table 14.9 *MVHOST Process Wait State Data Items*

Data Item	Description
CPU	The percentage of the process' response time consumed while being serviced by the CPU. It takes a certain amount of CPU time to perform the various commands of processes. **Performance Tip** For processes that are computation-intensive, you will usually see a high number in this category. It is possible that a process exhibiting close to 100% here is in a looping state, especially if the program is not completing as desired.
Mem	The percentage of the process' response time consumed while waiting for missing memory segments to be brought into main memory. When a process wants to continue to run, but cannot because memory segments are missing, it is blocked. Memory fault stop time is counted in this category. **Performance Tip** For systems having an inadequate amount of main memory to support current demands, numbers may be greater than 10% in this category. Systems exhibiting severe memory shortage will show most user processes in this bucket as high memory wait percentages, even those needing modest amounts of memory. If only a few processes report values greater than or equal to 20-30% look at their individual memory requirements. A particular application may be gorging itself on memory space. If this is so, a redesign of that program is warranted. Remember that when dealing with process "brick walls" (in this case, absent memory segments), small percentages are desirable. Less than 10% in this wait state is preferable.

Data Item	Description
Dsc	The percentage of the process' response time consumed while waiting for missing data to be brought into main memory from disc. An I/O "brick wall" occurs when a process wants to continue running, but cannot due to necessary user-requested data missing from disc. Since a process is literally stopped and the CPU is taken away when a physical disc access is performed, it is absolutely necessary to minimize this percentage. **Performance Tip** If you notice that most of the time the CPU pause for disc I/O time (Global section) is rising above 10-15%, you will usually find that one or more processes are spending a moderate-to-high percentage of their processing time waiting for disc I/O's to complete. If a process is consistently waiting more than 20-30% of its time on disc I/O servicing, find out why. There are a number of reasons why I/O bottlenecking can take place: • TurboIMAGE master and detail set inefficiencies. • Inefficient pre-fetching operation (lack of CPU, memory, poor I/O locality). • Too many I/O-demanding processes running concurrently, etc.

Data Item	Description
Imp	The percentage of the process' response time consumed while being impeded by various lock and latch control mechanisms. This category includes many stop reasons. An impede occurs when a process tries to gain access to a software table or control structure and cannot because other processes arrived first. TurboIMAGE access is one of the most common sources of impedes. When a process tries to gain entry to a particular dataset and another process has that set locked via the DBLOCK intrinsic, the waiting process is counted as having been impeded. It must wait until the prior process is finished with its current operation before it can continue. Any file can have only one disc request outstanding. That is, in order for a process to access even a simple MPE/iX flat file, it must first gain control of that file's control block. This access is not by the FLOCK intrinsic, which is the case in the other wait state bucket. Rather, only one user—regardless of programmatic locking—can gain access at a time. Other sources of impedes include unavailable system table entries, terminal buffers, etc. **Performance Tip** The interpretation of impedes can be difficult because there are potentially many causes and interrelationships between processes and resources. First of all, it is best to determine the overall global impede rate. Do this by looking at the Impede value on the Global Process Stop Reasons screen. If the global impede percentage is consistently high, it is important to look at individual processes that have high impede percentages as part of their processing time. Processes accessing the same database in applications where poor locking strategies are implemented tend to spend a very large percentage of their time being impeded. It is not uncommon to see values in excess of 60% for processes in the impeded wait state. A large percentage may point to poor locking or can simply indicate that a great deal of competition exists for a particular file.

Data Item	Description
Pre	The percentage of the process' response time due to preemption by other processes. A preemption occurs when a process is forced to give up use of the CPU because a higher priority process is ready to execute. **Performance Tip** If both interactive and batch processes are running, batch processes in lower queues will receive a higher number of preemptions than those running in the interactive queue. If interactive users are spending too much response time being preempted, it is possible there is not enough CPU horsepower to go around. Backing off on demand or increasing the supply are the only recourses. Doling out the CPU resource by means of the TUNE command or a queue manager program may help. The basic strategy is to give less CPU attention to those who can stand it and provide more to those who really need it.
RIN	The percentage of time the process is waiting for a resource identification number.
TWr	The percentage of time the process is waiting for terminal writes to complete. Since terminal output is usually buffered this will only accumulate time if the system runs out of terminal buffers or if the program is blocking on terminal output.
BIO	The percentage of time the process is waiting for non-disc I/O to complete (e.g., tape drive activity). Datacomm overhead is accumulated as well.
Tim	The percentage of time the process is waiting for a programmatic timer (such as the PAUSE intrinsic) to complete.
FS	The percentage of time the process is waiting on a father and/or son wait.
Msg	The percentage of time the process is waiting on a message file, port or sendmail/receivemail wait.
Oth	The percentage of time the process is waiting on other events not covered by the wait states described above.

Data Item	Description
Current Wait	The state of the process when MVHOST took a picture of the system for the current interval. If a process is hindered, this data item will indicate why. Keep in mind that this single wait state indicator is only a first line of defense if you suspect an impedance problem. Take an in-depth look at that process' wait state breakdown or go to the Process Detail screen for that process. Keep in mind that the wait state of a process over even a few seconds can change radically. These states are defined in Table A.1 on page 243. **Performance Tip** If a process is always in a particular wait condition this could be a sign of resource shortage or a logical program problem (database locking strategy issue). For example, if the Mem flag is on for multiple processes it can point to a memory shortage condition for the entire system.

File Usage Data

In this section, information is displayed regarding any files that a process opened. The current record pointer and the number of times the file has been opened by processes (globally) are provided.

It is often helpful to find out which files a job or session has opened. Notice, for example, that the system is exhibiting an abnormally high pause for disc I/O process for a particular job. The next logical step is to find out what files it has accessed. If one of the main files is a database, be suspicious of its internal efficiency. The record pointer (Rec Ptr) may be helpful in determining progress through a serially read MPE file and not a TurboIMAGE database.

If the file name is followed by a "T," the file in question is a temporary file. The completed number (%) is helpful for serially read MPE files, because it will indicate how far a process has progressed through that file. This number will not be useful if the file is being randomly accessed.

The process' File Usage data items are described in Table 14.10.

Table 14.10 *MVHOST Process File Usage Data Items*

Data Item	Description
Filename	The name of the file that is opened and used by a process
Opens	The total number of files opened by all processes that are outstanding against this file

Data Item	Description
Acc	The code that represents how the file is accessed by the process: • R = read • W = write • L = lock • A = append • (t) = temporary
File Size	The size of the file
Rec Ptr	The current record number being accessed
%	The number that will indicate how far a process has progressed through that file

15

MVHOST WORKLOAD DETAIL

Workload Detail Screen

Defining your processes into workload groups gives you a method by which you can report system performance in units more compatible with business issues.

```
MVHOST/3000 I.03f(c) LPS  FRI, APR  1, 2005,  8:19 AM  E: 01:27:16  I: 00:30
      Total Busy:  2.2%   High Pri:  2.2%   MemMgr:   .0%   Read Hit:  0%
              * * * Workload Detail for Workload: JOBS       * * *
                               Misc Statistics
  Processes  12.0[ 11.7]      Switches                CPU CM %       8.9[  2]
  Session      .0[   .0]      CM to NM     <[   1]/s  Launch/s         1[   1]
  Job        12.0[ 11.7]      NM to CM     <[   <]/s  Page Fault/s     0[   1]
          CPU Usage                            Disc I/O Usage
 System % :      .5   [  2.5]  I/Os Total :    1[   453]   Rate Total:  </sec
 Ms Used  :     158[ 131072]        Reads :    0[     2]         Read : 0/sec
 Per Trans:       - [      - ]      Writes:    1[   451]         Write: 0/sec
     Response/Transactions                  Workload Wait States
 Trans Count:        0 [     0]  CPU:  <[ <]  Mem:  [ <]  Dsc:  [ <] Imp:   [ <]
 Trans/min  :        0 [     0]  Pre:  <[ <]  RIN:  [  ]  TWr:  [  ] BIO:   [  ]
 Prompt Resp:          [      ]  Tim: 36[36]  FS :45[46]  Msg:18[18] Oth:  <[ <]
 First Resp :      -   [    - ]
                               Process Information
PIN   J/S#   Session/User Name      Cmd/Program CPU%  QPri   #IO  Wt LDV #Tr PRes
   52 J1     PSMON,MANAGER.SYS         RUNPSMON   .0 DS202    0 Tim  10   0   -
   78 J76    MVDATAJG,MGR.MVWI03D      MVDATAD    .1 BL160    0 Msg  10   0   -
   83 J71    SCOPEJOB,MANAGER.SYS      SCOPEXL    .4 BL100    1 Tim  10   0   -
Enter Command:
```

Figure 15.1 *MVHOST Workload Detail Screen*

Workload Detail Keyboard Shortcuts

Each of the Workload Detail shortcut keys is listed and explained in Table 15.1.

Table 15.1 *MVHOST Workload Detail Keyboard Shortcuts*

Key	Description
Enter	Refresh screen
E	Return to Global Summary
F	Freeze/Unfreeze data
H	Display MVHOST Help
J	Jump to new screen
K	Toggle the First Response option
L	Print hardcopy
O	Jump to Options menu
S	Jump to Screen Selection Menu
W	Display new Workload Detail
X	Exit MVHOST
Z	Zero cumulative totals
!	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
:	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
*	Toggle Function key sets
?	Display contextual Help
CTRL+T	Toggle timer status

Workload Detail Data

The Workload Detail screen data is grouped into six sections:

- Miscellaneous Statistics
- CPU Usage
- Disc I/O Usage
- Response/Transactions

- Workload Wait States
- Process Information

Miscellaneous Statistics

The data items presented in the Misc Statistics portion of the Workload Detail screen are described in Table 15.2.

Table 15.2 *MVHOST Workload Detail - Miscellaneous Statistics Data Items*

Data Item	Description
Processes	The number of processes running in this workload and the cumulative average during the interval sample.
Session	The number of sessions running in this workload and the cumulative average during the interval sample.
Job	The number of jobs running in this workload and the cumulative average during the interval sample.
CM to NM	The number and rate per second (nnn/s) of compatibility mode to native mode switches performed by processes within the workload. **Performance Tip** A compatibility mode (CM) to native mode (NM) switch occurs when a piece of code that is executed reverts from CM to NM. This operation is not as expensive to perform as is NM to CM switching. The system can sustain many CM to NM switches without excessive degradation to the system. Depending on the system size, more than about 200 (for a small system) to 1000 or more (for a large system) can be sustained without being an excessive overhead drain on the CPU. So if a workload has 200 CM to NM switches occurring, it might be wise to check the system CM to NM switches in the “Global Misc Statistics (Tabular Format)” on page 55.

Data Item	Description
NM to CM	The number and rate per second (nnn/s) of native mode to compatibility mode switches performed by processes within the workload. **Performance Tip** A native mode (NM) to compatibility mode (CM) switch occurs when a piece of code that is executed reverts from NM to a translated form (CM). This operation is quite expensive for the system to perform and should be minimized. Depending on the system size, about 50 per second may indicate an overhead drain on the CPU. A single workload with 50 NM to CM switches per second should be investigated.
CPU CM%	The percentage of time within the current interval that processes within this workload have been in compatibility mode program code. **Performance Tip** This number can be a big help to you if you are trying to optimize performance from a migration standpoint. It is important that as many programs as possible be compiled in Native Mode to take full advantage of the performance advantages of the Hewlett-Packard Precision Architecture HP-PA (also known as RISC). The time the CPU spends in the compatibility mode represents wasted time because code translations must take place. If the programs are compiled with a native language compiler, the translation is done once for all programs at compile time. There may be no right or wrong value for this number on your system. It depends on what you find is acceptable and on your ability to go "native." If you have third party software and your vendor has not made the switch from MPE V to MPE/iX, then you are stuck with compatibility mode code. This means a performance compromise. It is best to target values of less than 20%.

Data Item	Description
Launch/s	The number of launches per second within this workload. This is the activity that refers to a process receiving exclusive use of the CPU. A launch occurs when the MPE dispatcher has determined which process is ready to run and has the highest priority if there are many such processes ready. Typically, this activity will occur many times in the life of a process. A launch implies that a process stop occurred. After a process is launched, it is considered to be executing. **Performance Tip** Excessive launch activity implies excessive process stops. Each launch incurs CPU overhead (especially due to dispatcher activity). A low launch rate is desirable.
Page Fault/s	The current and cumulative number of times per second that memory page faulting occurred for processes within this workload. A Page Fault is counted when a process needs a memory object (code or data) that is absent from main memory. **Performance Tip** A consistent value of more than 25 page faults per second should alert you to the possibility of a memory shortage and other memory indicators should be checked (this is system wide). A range on systems that have adequate memory is 0-5 per second (system wide). If a workload has more than 5, the cause should be investigated. Be sure to check the Memory Detail screen for more insight into memory activity.

CPU Usage

The data items presented in the CPU Usage portion of the Workload Detail screen are described in Table 15.3.

Table 15.3 *MVHOST Workload Detail - CPU Usage Data Items*

Data Item	Description
System%	The amount of the total CPU capacity consumed by workload processes during the current interval. If a process uses more than zero but less than or equal to 0.1 then .<% is displayed. **Performance Tip** The high CPU user (the "Hog") is displayed in the Advice Section in the Global Summary. It is very important to isolate the currently active, high CPU consumer, because it is often the performance problem. It is possible to spot a program looping condition if it consumes a lot of the CPU's attention and breaks little or not at all for other events. An even distribution of the CPU among processes over a period of time is desirable. If a process should be getting CPU time and is not, you should look at the Current Wait reason (discussed below). This process may be waiting on resources to be released in order to continue. Looking at the Process Wait states will reveal even more.
Ms Used	The current and cumulative amount of CPU milliseconds consumed by the workload processes, respectively. These milliseconds represent the time processes spent at the CPU watering hole for service. "Current" means the interval specified by the I: mm:ss in the banner line. The cumulative number is unique because it represents the total number of CPU milliseconds that were consumed since the process was created and not just since MVHOST started. So if the process under study was started hours ago, you will see a large cumulative value for the "CPU Ms Used." **Performance Tip** One of the first things you can tell about a process is whether or not it has received any CPU attention during the last interval. If the current value is zero, then the process was not active during the last interval. These numbers will also quantitatively indicate which processes are consuming the most and the least CPU.

Data Item	Description
Per Trans	The number of CPU milliseconds used by the workload per each terminal transaction. This will always be blank for batch jobs, because batch jobs do not perform terminal transactions. This number is calculated by dividing the total number of terminal transactions into the total amount of CPU used by the workload for the current interval. **Performance Tip** You can discover which applications are costing the most CPU cycles for each transaction. This number is helpful if you are trying to perform capacity planning. By obtaining an average reading of the amount of CPU used per transaction, over time you can use queuing network math or simple spreadsheet calculations to help you answer “what if” questions like: “How will my overall performance be affected if I increase my general ledge transaction volume by 40%?” Keep in mind that the concept of a terminal read versus a user’s perception of a transaction may be different. Please refer to the Transaction and Response Time discussion in “MVHOST Global Misc Statistics (Tabular Format) Data Items” on page 55 for more insight.

Disc I/O Usage

The Disc I/O Usage portion of the Workload Detail screen includes data describing the various aspects of a workload’s disc I/O resource usage within the workload group. Within the framework of MPE/iX, disc I/O is usually not a bottleneck. However, it is important to pay close attention to applications exhibiting abnormally high disc I/O activity.

The data items presented in the Disc I/O Usage portion of the Workload Detail screen are described in Table 15.4.

Table 15.4 *MVHOST Workload Detail - Disc I/O Usage Data Items*

Data Item	Description
Disc I/O Total	The first value of this pair is the total number of physical disc I/Os generated by the workload during the current interval. The second “[n]” is the cumulative number of I/Os for the workload processes since they began. If MVHOST was started after the workload began, this value will reflect disc I/Os that accumulated since the beginning of the session.

Data Item	Description
Disc I/O Reads	The first value of this pair is the number of physical read disc I/Os generated by the workload processes during the current interval. The second "[n]" is the cumulative number of read I/Os for the workload processes since the workload processes began. If MVHOST was started after the process began, this value will reflect the disc I/Os that accumulated since the beginning of the session.
Disc I/O Writes	The first value of this pair is the number of physical write disc I/Os generated by the workload processes during the current interval. The second "[n]" is the cumulative number of write I/Os for the workload processes since the workload processes began. If MVHOST was started after the process began, this value will reflect the disc I/Os that accumulated since the beginning of the session.
Disc I/O Data (above)	**Performance Tip** These absolute physical I/O numbers will help you characterize workload in terms of trips to disc. In the case of MPE/iX pre-fetching, most I/Os will be eliminated. Only those I/Os unsatisfied in memory will be retrieved from disc and will be reflected in these numbers.
Rate Total	The average number of total physical disc I/Os per second generated by the workload processes during the current interval.
Rate Read	The average number of physical disc I/O reads per second generated by the workload processes during the current interval.
Rate Write	The average number of physical disc I/O writes per second generated by the process during the current interval.
Rate Data (above)	**Performance Tip** These I/O rates will help you characterize workload processes in terms of the rate of physical trips to disc. In the case of MPE/iX pre-fetching some I/Os will be eliminated. Only those I/Os unsatisfied in memory will be retrieved from disc and reflected in these numbers.

Response and Transaction Statistics

The data items presented in the Response/Transaction Statistics portion of the Workload Detail screen are described in Table 15.5.

Table 15.5 *MVHOST Workload Detail - Response/Transaction Statistics Data Items*

Data Item	Description
Trans Count Trans Rate/min	These numbers represent the current number of terminal transactions (possibly equivalent to terminal reads) performed by the workload processes to a particular terminal device, a cumulative average, and an estimated rate per minute based on the current interval. Under certain conditions these numbers will represent the actual number of user transactions (e.g., posting a payment, inquiring on an account, etc.). An accurate reading will occur if multiple carriage returns per screen were used for data entry. VPLUS status checks are not counted by measurement interface which MVHOST accesses. Transaction counts for VPLUS applications will be quite accurate. These numbers will provide a consistent transaction count for VPLUS applications and are a questionable count for character mode transactions. The best way to tell if terminal reads and transactions are equivalent is to test them. Have a user enter a specific number of transactions defined from the user's standpoint and track that activity via MVHOST to check for discrepancies.

Data Item	Description
Prompt Resp First Resp	These numbers represent the terminal read response times for interactive users within the workload. First Resp is the response time for the user from the time C/R or Enter is pressed to when the first character appears on the screen. Prompt Resp is the response time for the user from when C/R or Enter is pressed to when the first prompt appears at which the user can enter a new transaction. There are a number of things to keep in mind when discussing response times. Refer to the discussion of Transactions and Response Times, under “MVHOST Global Misc Statistics (Tabular Format) Data Items” on page 55 for a detailed explanation. **Performance Tip** Excessively high response times should be investigated. Heavy terminal activity can drain the CPU's attention with nonproductive overhead tasks. Impedances can cause excessive response times. It is important to analyze the Wait State percentages. These are shown on the Extended Process Display line or at the Process Detail screen (Process Wait States). Be sure you understand the difference between First and Prompt response times. If you have a lot of online reporting, the Prompt response times will be substantially larger, skewing the true system response time. In this case the First response will be more meaningful in tracking the rate at which the system is sending data back to the user's terminal.

Workload Wait State Statistics

These counters represent the Wait States in which processes within a workload can spend time. In other words, if a process is experiencing eight second response times, the percentages displayed in these Wait State categories represent the delay or servicing reasons. It is ideal for a process to continue unhindered. However, a process usually hits many "brick walls" over the course of its life.

A brick wall could mean a missing memory segment, disc data, or perhaps prevented access to a TurboIMAGE database. If you notice that a particular user's process is receiving poor response times, or a batch job is taking more time to complete than is reasonable, examine these wait reasons. You can view them in the Extended Process line or on the individual Process Detail Screen. Cumulative Wait State figures are also provided on the Process Detail Screen.

The most ideal throughput for a process is derived when it does not have to stop for any reason. In other words, it derives full use of the CPU. The following discussion describes the other “brick walls” that can slow down a process’ progress (with the exception of CPU).

The data items presented in the Workload Wait State Statistics portion of the Workload Detail screen are described in Table 15.6.

Table 15.6 *MVHOST Workload Detail - Workload Wait State Statistics Data Items*

Data Item	Description
CPU	The percentage of the workload process’ Response time due to being serviced by the CPU. It takes a certain amount of CPU time to perform the various commands of processes. **Performance Tip** For processes that are computation-intensive you will usually see a high number in this category. It is possible that a process exhibiting close to 100% here is in a looping state especially if the program is not completing as desired.
Mem	The percentage of the workload process’ response time due to waiting for missing memory segments to be brought into main memory. When a process wants to continue to run but cannot because necessary memory segments are missing, that process is blocked. Memory fault stop time is counted in this category. **Performance Tip** For systems having an inadequate amount of main memory to support current demands, numbers may exceed 10% in this category. Systems exhibiting severe memory shortage will show most user processes, even those needing modest amounts of memory, as high memory wait percentages in this bucket. If only a few processes report values greater than or equal to 20-30% you should look at their individual memory requirements. A particular application may be gorging itself on memory space. If this is so, a redesign of that program is warranted. Remember that when dealing with process “brick walls” (in this case absent memory segments), small percentages are desirable. Less than 10% in this Wait State is preferable.

<table>
<tr><th>Data Item</th><th>Description</th></tr>
<tr><td>Dsc</td><td>The percentage of the workload process' response time due to waiting for missing data to be brought into main memory from disc.

An I/O "brick wall" occurs when a process wants to continue running but cannot due to necessary user-requested data missing from disc. Since a process is literally stopped and the CPU is taken away when a physical disc access is performed it is absolutely necessary to minimize this percentage.

Performance Tip

If you notice that most of the time the CPU Pause for Disc I/O time (Global Summary) is rising above 10-15% most of the time, you will usually find that one or more processes are spending a moderate-to-high percentage of their processing time waiting for disc I/Os to complete. If a process is consistently waiting more than 20-30% of its time on disc I/O servicing, then you should investigate.

There are a number of reasons why I/O bottlenecking can take place:
• TurboIMAGE master and detail set inefficiencies.
• Inefficient pre-fetching operation (lack of CPU, memory, poor I/O locality).
• Too many I/O-demanding processes running concurrently, etc.</td></tr>
</table>

Data Item	Description
Imp	The percentage of the workload process' response time due to being impeded by various lock and latch control mechanisms. This category includes many stop reasons. An impede occurs when a process tries to gain access to a software table or control structure and cannot because other processes arrived first. TurboIMAGE access is one of the most common sources of impedes. When a process tries to gain entry to a particular dataset and another process has that set locked via the DBLOCK intrinsic, then the waiting process is counted as having been impeded. It must wait until the prior process is finished with its current operation before it can continue. Any file can have only one disc request outstanding. For a process to access even a simple MPE/iX flat file, it must first gain control of that file's control block. This access is not by the FLOCK intrinsic, which is the case in the other wait state bucket. Rather, only one user at a time can gain access, regardless of programmatic locking. Other sources of impedes include unavailable system table entries, terminal buffers, etc. **Performance Tip** The interpretation of impedes can be difficult because there are potentially many causes and interrelationships between processes and resources. First of all, it is best to determine the overall global impede rate. Do this by looking at the Impede Value on the Global Process Stop Reasons screen. If the global impede percentage is consistently high, it is important to look at individual processes that have high impede percentages as part of their processing time. Processes accessing the same database in applications where poor locking strategies are implemented, tend to spend a very large percentage of their time being impeded. It is not uncommon to see values in excess of 60% for processes in the Impede Wait State. A large percentage may point to poor locking or can simply indicate that a great deal of competition exists for a particular file.

Data Item	Description
Pre	The percentage of the workload process' response time due to preemption by other processes. A preemption occurs when a process is forced to give up use of the CPU because a higher priority process is ready to execute. **Performance Tip** If both interactive and batch processes are running, batch processes in lower queues will receive a higher number of preemptions than those running in the interactive queue. If interactive users are spending too much Response time being preempted, it is possible that there is not enough CPU horsepower to go around. Backing off on demand or increasing the supply are the only recourses. It may help to sparingly distribute the CPU resource by means of the TUNE command or through a program. The basic strategy is to give less CPU attention to those who can stand it and provide more to those who need it most.
RIN	The percentage of time the processes within the workload are waiting for a RIN (resource identification number).
TWr	The percentage of time the processes within the workload are waiting for terminal writes to complete. Since terminal output is usually buffered, this will only accumulate time if the system runs out of terminal buffers or if the program is blocking on terminal output.
BIO	The BIO (Block for I/O) Wait State is the percentage of time the processes within the workload are waiting for a programmatic timer (such as the PAUSE intrinsic) to complete.
Tim	The percentage of time the process is waiting for a programmatic timer (such as the PAUSE intrinsic) to complete.
FS	The percentage of time the process is waiting on a father and/or son wait.
Msg	The percentage of time the process is waiting on a message file, port or sendmail/receivemail wait.
Oth	The percentage of time the process is waiting on other events not covered by the above definitions.

Process Information

For definitions of the data items presented in the Process Information portion of the Workload Detail screen, please refer to the data item table in “Process Information” on page 61.

16

MVHOST GLOBAL PROCESS STOPS

Global Process Stops Screen

The Global Process Stops screen provides information that helps to determine why processes are being impeded. This information shows why system, session and job processes are giving up use of CPU. Keep in mind that a process will continue to use the CPU until one or more events occur to impede its progress.

```
MVHOST/3000 I.03f(c) LPS  FRI, APR  1, 2005,  8:21 AM  E: 01:29:13  I: 00:56
     Total Busy:   .9%   High Pri:   .9%   MemMgr:   .0%   Read Hit:  0%
                        * * * Global Process Stops * * *
           Reason Cur[Avg]            Reason Cur[Avg]            Reason Cur[Avg]
 NM Code page flt   0[ 0]  NM stk page flt   0[ 0] NM trns page flt   0[ 0]
    File page flt   0[ 2] CM code page flt   0[ 0]   CM stk page flt   0[ 0]
 CM trns page flt   0[ 0]    Terminal read   5[ 6]    Terminal write   1[ 1]
         Disc I/O   0[ 0]        Other I/O   0[ 0]            IOWAIT   0[ 0]
              SIR   0[ 0]              RIN   0[ 0] Mem Mgr prefetch   0[ 0]
     Quantum used   1[10]     uint16 timer   0[ 0]            Father   0[ 0]
Semaphore ctl blk   0[ 1]              Son   0[ 0]         Data comm   0[ 0]
   Operator reply   0[ 0]     Disp preempt   0[ 0]              Port  48[40]
             Mail   0[ 0]             Junk   0[ 0]      Message file  42[33]
           Impede   0[ 0]            Break   0[ 0]        Wait queue   0[ 0]
     Mem Mgr wait   0[ 0]      Port absent   0[ 0]      File blocked   0[ 0]
   File unblocked   0[ 0]     Storage mgmt   0[ 0]        User debug   0[ 0]
       I/O config   0[ 0]        PFP reply   0[ 0]        DB monitor   0[ 0]
        Fill disc   0[ 0]             HLIO   0[ 0]               TIO   0[ 0]
     Mem Mgr post   0[ 2]     Signal timer   0[ 0]       CPU preempt   1[ 1]
 Disc I/O preempt   0[ 0] Priority preempt   0[ 0]          SQL lock   0[ 0]
  SQL latch lev 1   0[ 0]  SQL latch lev 2   0[ 0]   SQL latch lev 3   0[ 0]
  SQL latch lev 4   0[ 0]       SQL buffer   0[ 0]        Long timer   2[ 2]
   Mem Mgr freeze   0[ 1]            Other   0[ 0]
Enter Command:
```

Figure 16.1 *MVHOST Global Process Stops Screen*

A simple example of a global process stop is when a single program reads principal balances from disc and calculates dividends. The CPU provides service to the program unless the program indicates that it no longer needs any or unless a stop event occurs. One of the most common stop events occurs when a trip to disc is necessary for the process to continue. The CPU recognizes that it is poor use of time to be monopolized by a single process (waiting for the disc I/O to occur) when it can be more productive (servicing other processes, housekeeping, etc).

Although there are more stop reasons (fifty-five and an "other" category!), it is common to see a small number of reasons representing the majority of stop activity. Due to the scarcity of internal information available on MPE/iX we can only provide surface definitions for most of the stop reasons. If you notice a consistent amount of stop activity in a counter that you cannot determine or account for please call us. We will keep you updated on any new information concerning these obscure activities via bulletins and future releases.

Global Process Stops Keyboard Shortcuts

Each of the Global Process Stops shortcut keys is listed and explained in Table 16.1.

Table 16.1 *MVHOST Global Process Stops Keyboard Shortcuts*

Key	Description
Enter	Refresh screen
E	Return to Global Summary
F	Freeze/Unfreeze data
J	Jump to screen selection prompt
H	Open MVHOST Help
L	Print hardcopy
S	Jump to MVHOST Screen Selection Menu
X	Exit MVHOST
Z	Zero cumulative totals
!	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
:	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
?	Display contextual Help
CTRL+T	Toggle timer status

Global Process Stops Data

Each Global Process Stops data item is described in Table 16.2.

Table 16.2 *MVHOST Global Process Stops Data Items*

Data Item	Description
NM Code page flt	The percentage of all stops due to processes blocking (stopped) for a disc I/O to complete on a native mode code page fault.
NM stk page flt	The percentage of all stops due to processes blocking (stopped) for a disc I/O to complete on a native mode stack page fault.
NM trns page flt	The percentage of all stops due to processes blocking (stopped) for a disc I/O to complete on a native mode transient page fault (heap, swapable table).
File page flt	The percentage of all stops due to processes blocking (stopped) for a disc I/O to complete on a file page fault.
CM code page flt	The percentage of all stops due to processes blocking (stopped) for a disc I/O to complete on a compatible mode code page fault.
CM stk page flt	The percentage of all stops due to processes blocking (stopped) for a disc I/O to complete on a compatibility mode stack page fault.
CM trns page flt	The percentage of all stops due to processes blocking (stopped) for a disc I/O to complete on a compatibility mode transient page fault.
Terminal read	The percentage of all stops due to processes blocking (stopped) for terminal reads.
Terminal write	The percentage of all stops due to processes blocking (stopped) for terminal writes. These include events such as console messages or general TELL and WARN messages to other sessions.
Disc I/O	The percentage of all stops due to processes blocking (stopped) for I/O to disc devices.
Other I/O	The percentage of all stops due to processes blocking (stopped) for I/O to non-disc devices. These devices include tape drives and printers.

Data Item	Description
IOWAIT	The percentage of all stops due to processes blocking (stopped) on IPC (interprocess communication) with transaction completed as one option. An example of this is use of the IOWAIT intrinsic.
SIR	The percentage of all stops due to processes blocking (stopped) for SIRs (System Internal Resource). It is used much like taking a number at a hardware store. SIRs provide a way to control which processes get access to special system services and tables. The system Group/Account is an example of one such resource.
RIN	The percentage of all stops due to processes blocking (stopped) for RINs (Resource Identification Number). RINs used to coordinate file locking for files that are accessed by multiple processes.
Mem Mgr prefetch	The percentage of all stops due to processes blocking (stopped) for a memory manager prefetch action to a disc device.
Quantum used	The percentage of all stops due to the process consuming its entire time quantum.
U int16 timer	The percentage of all stops due to processes blocking (stopped) for a timeout or pause (e.g., PAUSE intrinsic) with one second or less.
Father	The percentage of all stops due to processes blocking (stopped) that waiting to be awakened by one or more son processes.
Semaphore ctl blk	The percentage of all stops due to processes blocking (stopped) for a control block on a semaphore.
Son	The percentage of all stops due to processes blocking (stopped) that are waiting to be awakened by their father process.
Data comm	The percentage of all stops due to processes blocking (stopped) for data communication.
Operator reply	The percentage of all stops due to processes blocking (stopped) that are waiting for an operator reply (RIT wait).

Data Item	Description
Disp preempt	The percentage of all stops due to preemption by dispatcher to work on higher priority system processes (power failure, grey page cleanup, replenish critical pool, fetch IO or system fetch).
Port	The percentage of all stops due to processes blocking (stopped) for a port. This is the default IPC wait.
Mail	The percentage of all stops due to processes blocking (stopped) for MAIL. MAIL is an older type of an IPC (Interprocess communication) interface that existed before the message file implementation.
Junk	The percentage of all stops due to processes blocking (stopped) for a JUNK wait. This is a special system process stop activity.
Message file	The percentage of all stops due to processes blocking (stopped) for a MESSAGE. A MESSAGE is the basic IPC message file wait reason.
Impede	The percentage of all stops due to processes blocking (stopped) for file impedes. An impede is used by the file system to synchronize access to files.
Break	The percentage of all stops due to processes blocking (stopped) because they are in break mode. This means that either the BREAK key was pressed at a terminal or the BREAKJOB command was issued against an executing job.
Wait queue	The percentage of all stops due to processes blocking (stopped) for PORTS. This happens when a system table management runs out of entries and waits for additional space to be allocated.
Mem Mgr wait	The percentage of all stops due to processes blocking (stopped) for proper disc I/O synchronization. This excludes activity such as a user I/O requesting a POST.
Port absent	The percentage of all stops due to processes blocking (stopped) for requested ports from the PORTS facility to become available.
File blocked	The percentage of all stops due to processes blocking (stopped) on a port when posting pages to disc through the call CM_POST.

Data Item	Description
File unblocked	The percentage of all stops due to a wait for a file to be unblocked.
Storage mgmt	The percentage of all stops due to processes blocking (stopped) on a port through the storage management facility.
User debug	The percentage of all stops due to processes (command interpreters (CIs)) blocking (stopped) due to breakpoint contention. This is usually caused by using DEBUG breakpoints.
I/O config	The percentage of all stops due to processes blocking (stopped) because devices are being configured or released.
PFP reply	The percentage of all stops due to processes blocking (stopped) because the port facility process needs to be created, initialized or checked.
DB monitor	The percentage of all stops due to processes blocking (stopped) because the database monitor for SQL is waiting for the DB_CLEAN_UP to finish cleaning up the aborted processes before closing the database.
File disc	The percentage of all stops due to processes blocking (stopped) because HLIO is waiting for the master MIB because the new file extent in secondary storage needs to be initialized with fill characters for all virgin pages.
HLIO	The percentage of all stops due to processes blocking (stopped) because the HLIO is aborting the I/O.
TIO	The percentage of all stops due to processes blocking (stopped) because Terminal I/O (TIO) fast write in DTS is waiting for a reply message from the device manager or buffer management.
Mem Mgr post	The percentage of all stops due to processes blocking (stopped) that are waiting for I/O completion when explicitly posting pages to disc.
Signal timer	The percentage of all stops due to processes blocking (stopped) for a delay or timer on a standard signal port.
CPU preempt	The percentage of all stops due to preemption by a higher priority process due to process awakening (IPC wait other than disc I/O completion).

Data Item	Description
Disc I/O preempt	The percentage of all stops due to preemption by a higher priority process due to disc I/O completion. This includes page fault, post and prefetch.
Priority preempt	The percentage of all stops due to preemption by a higher process due to priority boosting or dropping.
SQL lock	The percentage of all stops due to processes blocking (stopped) that are waiting to acquire an SQL lock. This lock is required for user data (a tuple, a page or a relation).
SQL latch lev 1	The percentage of all stops due to processes blocking (stopped) for a level 1 latch. A latch is used to coordinate access to its run-time data structures. Each latch has a level associated with it and is used for deadlock prevention.
SQL latch lev 2	The percentage of all stops due to processes blocking (stopped) for a level 2 latch.
SQL latch lev 3	The percentage of all stops due to processes blocking (stopped) for a level 3 latch.
SQL latch lev 4	The percentage of all stops due to processes blocking (stopped) for a level 4 latch.
SQL buffer	The percentage of all stops due to processes blocking (stopped) for buffer.
Long timer	The percentage of all stops due to processes pausing for two or more seconds.
Mem Mgr freeze	The percentage of all stops due to processes blocking (stopped) on freeze and corner cases other than page fault and prefetch and freeze. This counter predominantly blocks on freeze.
Other	This category includes stop events that are not covered under any of the above-mentioned reasons. HP has not documented what these reasons are. Our experience shows that small numbers in these “Other” events occur relative to the others described above. This counter will usually be zero.

17

MVHOST System Configuration

System Configuration Screens

The System Configuration screen (Figure 17.1) is provided in MVHOST as a means to show significant system configuration parameters. The screen is divided into three sections:

- System Configuration
- Job Session Information
- Scheduling Information

More System Configuration information is available through two additional screens that are accessed with function keys:

- Globally Allowed Commands screen (Table 17.2)
- System Log Events Enabled screen (Figure 17.3)

Each data item is described in “System Configuration Data” on page 155.

```
MVHOST/3000 I.03f(c) LPS  FRI, APR  1, 2005,  8:24 AM  E: 01:32:16  I: 01:01

        Total Busy:    .9%   High Pri:    .9%   MemMgr:    .0%   Read Hit:  0%

                              System Configuration
CPU Type    :    918       HPSUSAN:   1167136341       MPE/iX Version: C.65.00
Memory Size:    160M       Physical Console:  20       OS AIF Version: A.08.00
User Mode   :  MULTI       Logical Console :  20       MI AIF Version: A.03.00
                         Job and Session Information
Jobfence    :      0   Job Limit  :   32    Job Count :    5   Next Job # :   78
Outfence    :     13   Sess Limit :   32    Sess Count:    1   Next Sess #:  278
Jobsecurity:   LOW    Streams Dev:    10
Max # J/S   : 3500    Max # Procs: 8190    Max # Open Files/Process:         1024
                           Scheduling Information
  Queue      Base     Limit    Quantum    Maximum    Minimum    Time Slice    Boost
    AS        30        99
    BS       100       150
    CS       152       200          4       2000          1           200    DECAY
    DS       202       238       2000                                 200    DECAY
    ES       240       253       2000                                 200    DECAY

Enter Command:
```

Figure 17.1 *MVHOST System Configuration Screen*

System Configuration Keyboard Shortcuts

Each of the System Configuration shortcut keys is listed and explained in Table 17.1.

Table 17.1 *MVHOST System Configuration Keyboard Shortcuts*

Key	Description
Enter	Refresh screen
E	Return to Global Summary
F	Freeze/Unfreeze data
J	Jump to screen selection prompt
H	Open MVHOST Help
L	Print hardcopy
S	Jump to MVHOST Screen Selection Menu
X	Exit MVHOST
Z	Zero cumulative totals

Key	Description
!	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
:	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
?	Display contextual Help
CTRL+T	Toggle timer status

System Configuration Data

Each of the data items found in the three system configuration screens is described in this section.

System Configuration

Each System Configuration data item is explained in Table 17.2.

Table 17.2 *MVHOST System Configuration Data Items*

Data Item	Description
CPU Type	The model of the computer system that runs MVHOST.
Memory Size	The amount (MB) of memory currently installed.
User Mode	The current system operating mode (either Single User or Multi-User).
HPSUSAN	The unique identifying number assigned to the CPU. This number is assigned by HP for third-party vendors. It allows the vendors, including Lund, to link the software to a particular CPU,
Physical Console	The physical device number to which the console is currently assigned via the CONSOLE command.
Logical Console	The logical device number to which the console is currently assigned via the CONSOLE command.
MPE/iX Version	The version of MPE/iX running on the host system.

Data Item	Description
OS AIF Version	The version of the Operating System Architected Interface currently installed on the host system.
MI AIF Version	The version of the Measurement Interface Architected Interface currently installed on the system.

Three messages might appear in the blank area of the System Configuration display. The messages are also found in the Global Summary System Performance Advice messages.

Table 17.3 *MVHOST System Configuration Messages*

Data Item	Description
Disc Space Low	Disc space is too low to log processes.
Out of Resources	Certain system resources are not available (tables, etc).
Out of LDEVs	LDEV ports are not available.

Job and Session Information

Each job and session data item is described in Table 17.4.

Table 17.4 *MVHOST System Configuration Job and Session Data Items*

Data Item	Description
Jobfence	The current setting of the MPE JOBFENCE.
Outfence	The current setting of the MPE OUTFENCE.
Jobsecurity	The current setting of the MPE JOBSECURITY keyword (either low or high).
Max # J/S	The configured number of combined jobs and sessions.
Job Limit	The current setting of the MPE LIMIT for batch jobs.
Sess Limit	The current setting of the MPE LIMIT for interactive sessions.
Streams Dev	The logical device number of system STREAMS device.
Max # Procs	The configured maximum number of concurrently running processes for the system.
Job Count	The current number of executing batch jobs.

Data Item	Description
Sess Count	The current number of interactive sessions.
Max # Open Files/ Process	The configured maximum allowable number of open files processes.
Next Job #	The number to be assigned to the next batch job.
Next Sess #	The number assigned to the next interactive session.

Scheduling Information

The Scheduling Information data items are described in Table 17.5.

Table 17.5 *MVHOST System Configuration Scheduling Information Data Items*

Data Item	Description
Queue Base AS, BS, CS, DS, ES	The base priority for the queue.
Queue Limit AS, BS, CS, DS, ES	The limit priority for the queue.
Quantum CS, DS, ES	The current queue quantum.
CS Quantum Max	The maximum allowable CS queue quantum.
CS Quantum Min	The minimum allowable CS queue quantum.
Time Slice CS, DS, ES	The amount of time allocated by the dispatcher for processes in queue before it recalculates its priority.
Boost - DECAY	If set, a process decays normally to the limit of the queue and returns to the base when the transaction is completed. DECAY is the default setting.
Boost - OSCILLATE	If set, a process is placed back to the base of the queue once its priority has decayed to the limit of the queue, even if it has not completed a dispatcher transaction.

Globally Allowed Commands Screen

This screen shows all MPE commands that can potentially be globally allowed.

```
MVHOST/3000 I.03f(c) LPS  FRI, APR  1, 2005,  8:26 AM  E: 01:33:53  I: 01:37

      Total Busy:   .8%  High Pri:   .8%  MemMgr:   .0%  Read Hit:  0%


                     * * * Globally Allowed Commands * * *

  ABORTIO            ALTSPOOLFILE       RESUMEJOB         * LOG
  ACCEPT             ALTJOB             RESUMESPOOL         IMFCONTROL
  DOWN               BREAKJOB           STREAMS             OPENQ
  HEADOFF            DELETESPOOLFILE    CONSOLE             SHUTQ
  HEADON             DISALLOW           WARN                DISCRPS
  REFUSE             JOBFENCE           WELCOME             VSRESERVESYS
  REPLY            * LIMIT              VMOUNT              VSRELEASESYS
  STARTSPOOL         STOPSPOOL          LMOUNT              VSCLOSE
  UP                 SUSPENDSPOOL       LDISMOUNT           VSOPEN
  ABORTJOB           OUTFENCE           JOBSECURITY         SPOOLER
  ALLOW              RECALL             DOWNLOAD


Enter Command:
```

Figure 17.2 *MVHOST System Configuration Globally Allowed Commands Screen*

Access this display by pressing F4 - ALLOWED COMMANDS. Commands within this list that appear highlighted in inverse with an "*" are currently globally allowed. (For a complete explanation of globally allowable commands, refer to the HP MPE/iX manuals.)

System Log Events Enabled Screen

The System Log Events Enabled screen (Figure 17.3) lists all MPE System Log Events that can potentially be enabled.

```
      Total Busy:  6.2%   High Pri:  6.2%   MemMgr:   .0%   Read Hit:100%

                    * * * System Log Events Enabled * * *

* LOGGING FAILURE            * CONSOLE LOG                * SECURITY CONFIG CHANGE
* SYSTEM UP                  * PROGRAM FILE EVENT         * CHANGE GROUP
* JOB INITIATION               CALL PROGRESS                FILE OPEN
* JOB TERMINATION              DCE INFORMATION            * COMMAND LOGGING
* PROCESS TERMINATION        * NCS SPOOLING               * MAINT REQ
  FILE CLOSE                 * AIF                          DCU
* SHUTDOWN                   * PROCESSOR LAUNCH EVENT     * DIAGNOSTIC INFORMATION
* POWER FAILURE              * PASSWORD CHANGES           * HIGH PRI MACHINE CHECK
  SPOOLING LOG               * SYSTEM LOGGING CONFIG      * LOW PRI MACHINE CHECK
  LINE DISCONNECT            * RESTORE LOGGING            * DIRECTORY OPEN/CLOSE
  LINE CLOSE                 * PRINTER ACCESS FAILURE       CM FCLOSE
* IO ERROR                   * ACD CHANGES                  CHDIR
* PHYSICAL (DIS)MOUNT        * STREAM INITIATION            PROCESS ADOPT
* LOGICAL (DIS)MOUNT         * USER LOGGING                 CHOWN
* TAPE LABELS                * PROCESS CREATION

Enter Command:_
```

Figure 17.3 *MVHOST System Configuration System Log Events Enabled Screen*

Access this display by pressing F5 - SYS LOG EVENTS from either the System Configuration screen or the Globally Allowed Commands screen. Items highlighted in inverse with an "*" next to it are currently enabled. For a complete explanation of system logging and its associated events, refer to the appropriate MPE/iX manuals.

18

MVHOST FILE USERS

File Users Screen

The MVHOST File Users screen provides job and session information per process for the specified open file.

```
                         File Users For ci.pub.sys
  PIN J/S#    Session/User Name          Program    Acc    File Size      Rec Ptr   %
   76 S277    MANAGER.SYS ci:MVHOST                 RL           182            0   0
   40 J77     MVMONJG,MGR.MVWI03D ci:RUN MVHOST.P   RL           182            0   0
   70 J76     MVDATAJG,MGR.MVWI03D ci:RUN MVDATAD   RL           182            0   0
   80 J71     SCOPEJOB,MANAGER.SYS ci:RUN SCOPEXL   RL           182            0   0
   69 J3      JINETD,MANAGER.SYS ci:RUN INETD.NET   RL           182            0   0
   37 J1      PSMON,MANAGER.SYS ci:RUN RUNPSMON.P   RL           182            0   0
Enter Command:_
```

Figure 18.1 *MVHOST File Users Screen*

File Users Keyboard Shortcuts

Each of the File Users shortcut keys is listed and explained in Table 18.1.

Table 18.1 *MVHOST File Users Keyboard Shortcuts*

Key	Description
Enter	Refresh screen
E	Return to Global Summary
F	Freeze/Unfreeze data
J	Jump to screen selection prompt
H	Open MVHOST Help
L	Print hardcopy
S	Jump to MVHOST Screen Selection Menu
X	Exit MVHOST
!	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
:	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
?	Display contextual Help
CTRL+T	Toggle timer status

File Users Data

The File Users data items are described in Table 18.2.

Table 18.2 *MVHOST File Users Data Items*

Data Item	Description
PIN	The Process Identification Number (PIN). Each process is uniquely identified by its own PIN. The easiest way to locate processes is by knowing this number. A single job or session can have many processes associated with it.
J/S#	The job or session number associated with the particular process. If the process is a system type (not originating from a user job or session), <sys> will appear in this column.

Data Item	Description
Session/User Name	The logon sequence as initiated by the user or job minus the logon group. Once again, if the process was spawned by MPE/iX and not with a session or job then <System Process> will be shown here.
Program	The program executed by the user. Some system type program names will be uniquely identified, such as “Spooler.”
Acc	The code that represents how the file is being accessed by the process. R means read. W means write. L means lock.
File Size	The size of the file.
Rec Ptr	The current record number being accessed.
%	The percentage value that indicates how far a process has progressed through the file.

19

MVHOST File Space Utilization

File Space Utilization Screens

Examples of the File Space Utilization screen are especially helpful in tracking such things as disc space usage, virtual memory usage (transient space) and disc space fragmentation. There are both graphical and tabular views of this information.

Graphical Format

The graphic display shows key utilization and fragmentation statistics by disc drive and for all disc drives. The left side of the screen shows permanent and transient space utilization. The right side of the screen shows fragmentation by size category (i.e., blocks of less than 100 sector pieces, blocks of less than 1000 sectors, etc).

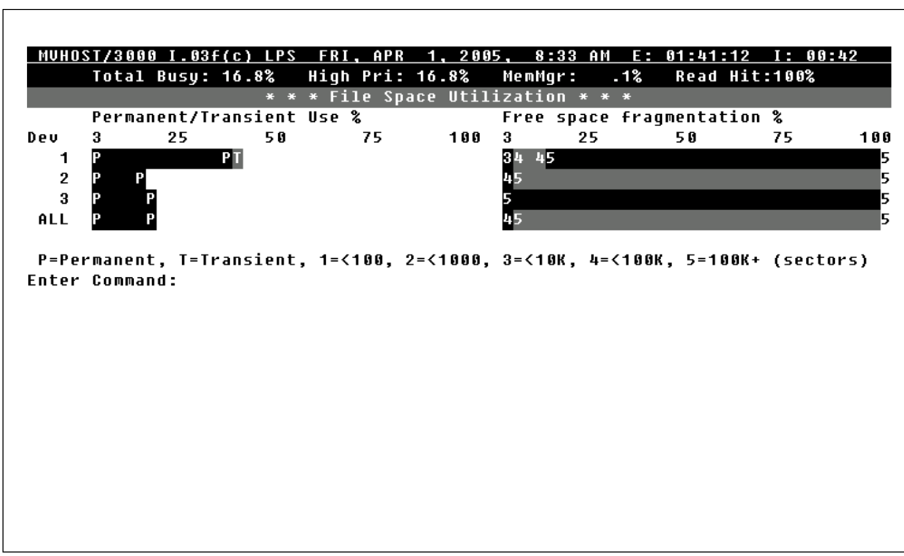


Figure 19.1 *MVHOST File Space Utilization Screen (Graphical Format)*

Tabular Format

The tabular format shows more detailed information than the graphic format. Figure 19.2 is a sample of the File Space Utilization tabular screen.

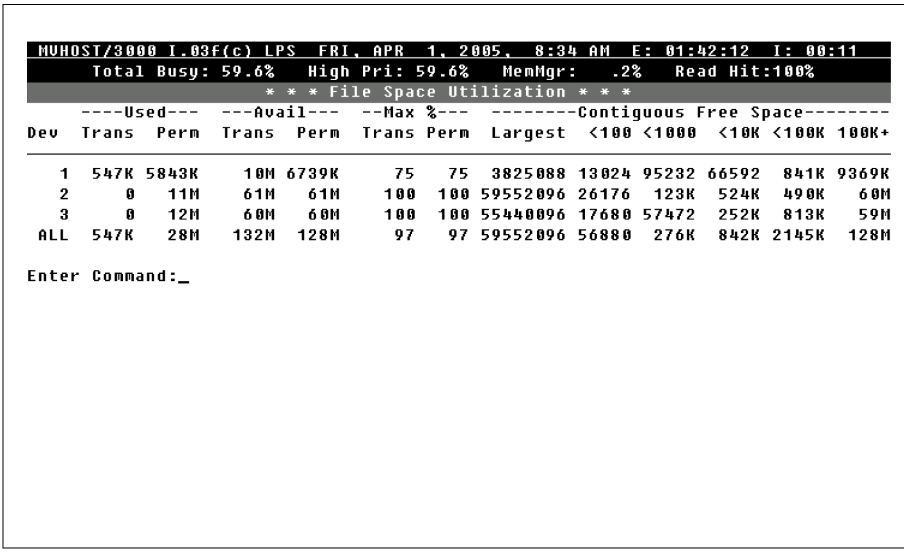


Figure 19.2 *MVHOST File Space Utilization Screen (Tabular Format)*

File Space Utilization Keyboard Shortcuts

Each of the File Space Utilization shortcut keys is listed and explained in Table 19.1.

Table 19.1 *MVHOST File Space Utilization Keyboard Shortcuts*

Key	Description
Enter	Refresh screen
E	Return to Global Summary
F	Freeze/Unfreeze data
J	Jump to screen selection prompt
H	Open MVHOST Help

Key	Description
L	Print hardcopy
S	Jump to MVHOST Screen Selection Menu
X	Exit MVHOST
Z	Zero cumulative totals
!	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
:	Create an instance of the MPE/iX command interpreter as a child process, to allow entry of MPE commands. (One exits from the CI with the MPE exit command.)
?	Display contextual Help
CTRL+T	Toggle timer status

File Space Utilization Data

Each of the data items found in the two File Space Utilization screens is described in this section.

Graphical Format

Each of the data items in the graphical File Space Utilization screen is listed and explained in the next table.

Table 19.2 *MVHOST File Space Utilization (Graphical Format) Data Items*

Key	Description
Dev	The disc drive number.
Permanent/ Transient Use %	The amount of disc space used by this disc for permanent space (delimited by the letter P on the bar graph) and transient space (delimited by the letter T).

Key	Description
Free space fragmentation %	The amount of free space on each disc that is in non-continuous sectors. If information is saved on this disc and then retrieved, that information must be gathered from different areas on the disc, thus slowing response time. The bar graphs use the characters "1" through "5" as delimiters to indicate the following: • **1** = The percentage of free space which is composed of chunks that are <100 sectors in size. • **2** = The percentage of free space which is composed of chunks that are 100 to 999 sectors in size. • **3** = The percentage of free space which is composed of chunks that are 1,000 to 9,999 sectors in size. • **4** = The percentage of free space which is composed of chunks that are 10,000 to 99,999 sectors in size. • **5** = The percentage of free space which is composed of chunks that are 100,000 or more sectors in size. **Performance Tip** The greater percentage of smaller numbers, the more fragmented is your free space.

Tabular Format

Each of the data items in the tabular File Space Utilization screen is described in Table 19.3.

Table 19.3 *MVHOST File Space Utilization (Tabular Format) Data Items*

Key	Description
Dev	The disc drive number.
Used (Trans, Perm)	The amount of disc space used by this disc for transient space and permanent space.
Avail (Trans, Perm)	The amount of free space on this disc for transient use and permanent use. Avail Trans is calculated by subtracting Used Trans from Max Trans. Avail Perm is calculated by subtracting Used Perm from Max Perm.

Key	Description
Max % (Trans, Perm)	The total percentage of available transient and permanent disc space for which your system is configured. **Performance Tip** It is important to have enough transient disc space configured on your system to prevent program aborts or delays (if insufficient space exists, applications will not run). An insufficient amount of main memory will cause the memory manager to swap out to disc, which will impact a transaction's response time.
Contiguous Free Space	The amount of free space on each disc that is in continuous sectors. • **Largest** - The size (in sectors) of the largest contiguous chunk of free space on the given disc drive. • **<100** - The number of sectors of free space which are composed of chunks that are <100 sectors in size. • **<1000** - The number of sectors of free space which are composed of chunks that are 100 to 999 sectors in size. • **<10K** - The number of sectors of the free space which are composed of chunks that are 1,000 to 9,999 sectors in size. • **<100K** - The number of sectors of the free space which are composed of chunks that are 10,000 to 99,999 sectors in size. • **100K+** - The number of sectors of the free space which are composed of chunks that are 100,000 or more sectors in size. **Performance Tip** A lot of free space in <100 indicates disc fragmentation. Disc fragmentation, in theory, can contribute to disc I/O impedance. The graphic display of the File Space Utilization screen demonstrates Free Space Fragmentation beautifully. Keep in mind that this data is also logged in the Meta-View log files. To access this logged data refer to “MVLOGX” on page 183. Also note that a list of extractable data items can be found in the appendices.

20

SCOPEUTIL FILE CONVERSION UTILITY

Lund Performance Solutions has created a program, ScopeUtil, for the Meta-View for MPE/iX product. ScopeUtil takes Scope extract files as input and creates SL files as output.

- The SL files are the files that hold Meta-View for MPE/iX historical data
- Scope is a performance data collector sold by Hewlett-Packard

By converting Scope data to SL files, Lund's ScopeUtil makes the data available to the historical reporting tools from Lund, including MVLOGX, Meta-View Web, Meta-View Alert and Performance Gallery Gold.

ScopeUtil Conversion

Scope and Meta-View for MPE/iX do not collect the same data. Scope collects some items that Meta-View for MPE/iX does not, and Meta-View for MPE/iX collects some items that Scope does not. The purpose of ScopeUtil is to create SL files, which are Meta-View for MPE/iX data files.

ScopeUtil calculates Meta-View for MPE/iX data items from Scope data items. There are some Meta-View for MPE/iX data items that are impossible to calculate, because Scope does not provide adequate data. In such cases, the values for those data items are set to 0.

The SCOPFORM.MVDATA.LUND file contains formulas that express Meta-View for MPE/iX data items in terms of Scope data items. ScopeUtil uses the formulas in this file to do its conversions. You may use this file for reference when you have questions about whether a Meta-View data item is supplied by ScopeUtil.

Here is a short extract from the SCOPFORM.MVDATA.LUND file:

```
! Exact
 QUEUE-LEN=
 GLOB:CPUQUEUE;
 ! Not available from Scope export
 ! SAQ=

 ! Approximate, includes CM from user processes
 CPU-CM%=
(100*SUM(PROC:CM_SECONDS))/GLOB:INTERVAL;
```

Figure 20.1 *Meta-View for MPE/iX SCOPFORM.MVDATA.LUND File*

A line that begins with an exclamation point is a comment line. This example shows that the Meta-View data item, QUEUE-LEN, can be calculated exactly from Scope data, and in particular, it is the same as the Scope global data item, CPUQUEUE. The Meta-View data item, SAQ, is not available from Scope. It will therefore be set to 0 in the SL files. The Meta-View data item, CPU-CM%, is calculated from the Scope process data records.

ScopeUtil Conversion Steps

The steps required to convert Scope data to Meta-View data are:

1 Create a Scope extract file.

   This extract file is the input to ScopeUtil. There is a job file, SCOPEXTJ.MVJOB.LUND, supplied with ScopeUtil to create this file. Creating the file is also done by the first job in the file SCOPALLJ.MVJOB.LUND. These jobs create an extract file named PERFEXTR.MVSCOPE.LUND. Using these jobs is discussed in greater detail in the next section, "Creating the Scope Extract File."

2 Create an SL file from the Scope extract files.

   The job file, SCOPUTJ.MVJOB.LUND, supplied with ScopeUtil can create the SL file from the extract file. Creating the SL file is also the second activity of the job file SCOPALLJ.MVJOB.LUND. These jobs place the SL file in the group MVSCOPE.LUND. Using these jobs is discussed in greater detail in "Creating an SL File with ScopeUtil" on page 173.

These two steps produce an SL file in the group MVSCOPE.LUND. The SL file allows you to display the Scope data in MVLOGX (program file MVLOGX.MVPGMS.LUND) and to use MVLOGX to create a Performance Gallery Gold extract file. MVLOGX is a program that is part of the Meta-View for MPE/iX product.

Typically, the data is reported with Performance Gallery Gold. Two additional steps are required to prepare the data for use by Performance Gallery Gold:

1 Use MVLOGX to create the Performance Gallery Gold extract file. This is the third activity of the SCOPALLJ.MVJOB.LUND job. The Performance Gallery Gold extract file is given the name OUTFILE.MVSCOPE.LUND (this name can be changed in SCOPALLJ). The extraction can also be done interactively within MVLOGX ("Performance Gallery Configuration (SUBMENU)" on page 210).

2 Transfer the extract file to your PC where Performance Gallery Gold is installed. Use a binary mode of transfer and give the file a Performance Gallery data file extension (*.pfg) on the PC.

Creating the Scope Extract File

Before ScopeUtil can convert your Scope performance data to a Meta-View SL data file, the Scope program named Extract must be used to convert the data to a Scope extract file that holds the Scope data in ASCII format.

The Scope extract job is SCOPEXTJ.MVJOB.LUND. (The first activity in SCOPALLJ.MVJOB.LUND does the same thing as SCOPEXTJ.MVJOB.LUND.) The following comments apply to this part of SCOPALLJ.MVJOB.LUND also.

The job is set up to provide the information required by the ScopeUtil conversion program, which should not be modified but for the few exceptions noted below. You might want to make a copy of the job file in another location (group MVSCOPE.LUND for example) and modify the copy.

Acceptable modifications:

1. The job specifies the Scope collection file is LOGGLOB.SCOPE.SYS. If this is not the case, this file name needs to be changed.
2. The job logs on as user MANAGER.SYS into the SCOPE.SYS group. This can be changed, but the user needs to have SM capability.
3. There are two dates and times that must be supplied. These are the start and stop collection dates of the data to be extracted. The lines in which to supply them are:

   start <startdate> <starttime>

   stop <stopdate> <stoptime>

   The items in angular braces need to be replaced with the dates and times. For example:

   start 3/1/03 9:00 am

   stop 3/5/03 12:00 pm
4. The Scope extract job writes the extracted data to file PERFEXTR.MVSCOPE.LUND. This file name can be changed. However, this file is input to the ScopeUtil conversion activity, so there must be a corresponding change in whatever job performs that activity (SCOPUTJ or SCOPALLJ). See “Creating an SL File with ScopeUtil” on page 173.
5. The file equations in the job put a file limit of 100 megabytes on the extract output files. This could be made larger, if necessary.

For details on the operation of the Scope Extract program, consult the online Help system for the Extract program.

Creating an SL File with ScopeUtil

The ScopeUtil conversion job converts the extract file created by the Scope extract job into an SL file that MVLOGX can read. MVLOGX is the historical reporting program in Meta-View for MPE/iX.

The file SCOPUTJ.MVJOB.LUND contains a job to perform this conversion. The second activity in SCOPALLJ.MVJOB.LUND does the same thing as SCOPUTJ.MVJOB.LUND. The following comments apply to this part of SCOPALLJ, also.

The job reads the extract file created by the Scope extract job. It assumes the file is named PERFEXTR.MVSCOPE.LUND. Altering options used by ScopeUtil can change this. This is discussed later.

The ScopeUtil conversion program creates an SL file in whatever group it is logged onto. The ScopeUtil conversion job logs on to the group MVSCOPE.LUND, so that is where it will place the SL file. This could be changed if you wish the file to be placed in a different location. Just change the logon specified in the :JOB statement.

Each run of the ScopeUtil conversion program will create one SL file. The name of the file will be *SLYYDDDA*, where the letters *YY* are replaced by a two-digit year, and *DDD* are replaced by a three-digit day of the year, a number between 1 and 366. The year and day used correspond to the earliest date that appears in the Scope extract file.

Please note that this behavior makes it difficult to handle ScopeUtil conversion of more than one set of Scope data from a single day. However it would be possible to accomplish such a task using renaming or file equations. The details will not be given here, since we believe that most people will not want to have multiple SL files per day. Talk to the support group at Lund if you need help with such a task.

Options are provided to the ScopeUtil program in the SCOPUTIL conversion program. The section of the job stream in which that is done is:

```
:SCOPUTIL.MVPGMS -o
ProcLog = Y
ProcCPUThreshold = .0
ProcOnlyActive = Y
ProcLogSessions = Y
ProcLogJobs = Y
ProcLogSysprocs = Y
ProcLogDead = Y
ProcLogonFilter = @.@
ProcSortOpt = 4
ProcSortAscend = Y
ProcLogLimit = 10
ApplFile = PERFEXTR.MVSCOPE
ConfFile = PERFEXTR.MVSCOPE
DiscFile = PERFEXTR.MVSCOPE
GlobFile = PERFEXTR.MVSCOPE
ProcFile = PERFEXTR.MVSCOPE
:eod
```

Figure 20.2 *Meta-View for MPE/iX SCOPUTIL Program*

The name of each option being set appears to the left of the equal sign. The value for the option appears to the right of the equal sign. The options and appropriate values for them are discussed in "ScopeUtil Command Line Parameters" on page 175.

Viewing Scope Data in Performance Gallery

The fastest way to view your Scope data in Performance Gallery Gold is to use the SCOPALLJ.MVJOB.LUND job stream. In this section you will find instructions that should be sufficient to create an SL file and a Performance Gallery Gold extract file using that job. Additional detail is provided in the sections that follow.

1. Stream the SCOPALLJ.MVJOB.LUND job and wait for completion. If the job ran successfully, you will have a file called OUTFILE.MVSCOPE.LUND, which is the extract file needed by Performance Gallery Gold.
2. Transfer OUTFILE.MVSCOPE.LUND to your PC where Performance Gallery Gold is installed. Use a binary mode of transfer and give the file a Performance Gallery data file extension (*.pfg).
3. Load the file in Performance Gallery Gold. For further information, see the *Performance Gallery Gold User's Guide*.

ScopeUtil Program Startup

The ScopeUtil program that actually performs the file conversion is SCOPUTIL.MVPGMS.LUND. Its activity is controlled by program options and command line parameters.

SCOPUTIL.MVPGMS

When ScopeUtil is run without command line parameters, it proceeds to convert files according to options set in the SCOPPARM file that resides in the user logon group.

ScopeUtil Command Line Parameters

When the ScopeUtil program is run, command line parameters may be specified. There are three command line parameters: -l, -m and -o.

SCOPUTIL.MVPGMS -l

This parameter causes ScopeUtil to display a "#" for every record written to the SL file.

SCOPUTIL.MVPGMS -m

In a session, the -m parameter causes ScopeUtil to display the SCOPEUTIL Main Option Menu and allows options to be set. For information about the options available, see "ScopeUtil Configuration Options" on page 176.

In a job, the -m command line parameter has no effect. For instruction on how to run ScopeUtil in a job, see "SCOPUTIL.MVPGMS -o" on page 176.

SCOPUTIL.MVPGMS -o

In a job, the -o parameter causes ScopeUtil to read the options from $STDIN in a parameter=value format. You can see exactly how this is done in the jobs SCOPUTJ.MVJOB.LUND and SCOPALLJ.MVJOB.LUND.

In a session, the -o parameter has no effect. For instructions on how to run ScopeUtil in a session, see “Process Logging Configuration Options (SUBMENU)” on page 177.

ScopeUtil Configuration Options

The ScopeUtil options are similar to the options in other Meta-View for MPE/iX programs such as MVHOST and MVLOGX. The ScopeUtil program reads options from the SCOPPARM file in the user's logon group. If the file does not exist, the ScopeUtil program uses default values.

Main Options Menu

If the ScopeUtil program is run using the -m command line parameter, it will present the user with an options menu that can be used to set parameters for the current ScopeUtil run (Figure 20.3). It also allows the user to save the non-default parameter values into SCOPPARM.

```
SCOPEUTIL MAIN OPTION MENU

   1) Process logging configuration submenu (SUBMENU)
   2) Extract files configuration submenu (SUBMENU)

Which Option: _
```

Figure 20.3 *Meta-View for MPE/iX ScopeUtil Main Option Menu*

Process Logging Configuration Options (SUBMENU)

Selecting item 1 brings up the process logging configuration submenu (Figure 20.4). Each of the configuration options are described in Table 20.1.

```
SCOPEUTIL MAIN OPTION MENU
  Process logging configuration submenu

   1) Log processes (Y)
   2) CPU percentage required for process display (.0)
   3) Log only active processes (Y)
   4) Log session processes (Y)
   5) Log job processes (Y)
   6) Log system processes (Y)
   7) Log processes which have died (Y)
   8) Process logon filter (@.@)
   9) Process sort option (4-CPU time)
  10) Log processes sorted in ascending order (N)
  11) Maximum number of processes to be logged per interval (20)

Which Option: _
```

Figure 20.4 *Meta-View for MPE/iX ScopeUtil Process Logging Configuration Menu*

Table 20.1 *Meta-View for MPE/iX ScopeUtil Process Logging Configuration Options*

Option	Default	Description
Log Processes	**Y** (Yes)	If Yes, processes will be logged. If No, processes will not be logged.
CPU percentage required for process display	.0	The CPU usage level that must be exceeded if "Log only active processes" option is Yes.
Log only active processes	**Y** (Yes)	If Yes, only active processes will be logged (processes whose CPU usage exceeded the ProcCPUThreshold during the interval). If No, all active and non-active processes will be logged.

Option	Default	Description
Log session processes	**Y** (Yes)	If Yes, session processes will be logged. If No, session processes will not be logged.
Log job processes	**Y** (Yes)	If Yes, job processes will be logged. If No, they will not be logged.
Log system processes	**Y** (Yes)	If Yes, system processes will be logged. If No, they will not be logged.
Log processes which have died	**Y** (Yes)	If Yes, processes that have died will be logged. If No, they will not be logged.
Process logon filter	(@.@)	The default logon filter (@.@) allows all users and all processes to be logged. If you supply a USER and/or ACCOUNT for this option, only jobs and sessions that qualify will be logged. This allows you to target a set of specific users and/or applications. Input should be in the form of: <sessions>,<user>.<account>,<group>
Process sort option	4-CPU time	Please refer to "Process Sort Options" on page 26.
Log processes sorted in ascending order	**N** (No)	If Yes, processes will be sorted in ascending order. If No, processes will be sorted in descending order.
Maximum number of processes to be logged per interval	(20)	The maximum number of processes logged per interval.

Extract Files Configuration Options (SUBMENU)

Selecting option 2 from the ScopeUtil Main Option Menu opens the Process Logging Configuration menu (Figure 20.5). This menu provides options to specify the names of the Scope extract files that Scopeutil should use as the source for its data. To change the extract file name, enter a new name in the form of <account>.<group>.

```
SCOPEUTIL MAIN OPTION MENU
  Extract files configuration submenu

   1) Application File (perfextr.scope)
   2) Configuration File (perfextr.scope)
   3) Disc File (perfextr.scope)
   4) Global File (perfextr.scope)
   5) Processes File (perfextr.scope)

Which Option:
```

Figure 20.5 *Meta-View for MPE/iX ScopeUtil Extract Files Configuration Menu*

ScopeUtil Files

Scopeutil uses the files listed in the next table. All except SCOPPARM are distributed on the production distribution tape.

Table 20.2 *Meta-View for MPE/iX ScopeUtil Files*

File	Description
ITEMLIST.MVDATA.LUND	This file is part of the Meta-View for MPE/iX product. It describes the items and records that appear in the SL file.
PSITEMS.MVDATA.LUND	This file describes the items and records of a process record in the SL file.
SCOPALLJ.MVDATA.LUND	The job stream that runs: • Scope Extract program to create a Scope extract file • ScopeUtil to create an SL file • MVLOGX to create a Performance Gallery export file
SCOPEXTJ.MVJOB.LUND	The job stream that runs the Scope Extract program to create a Scope extract file.

File	Description
SCOPEXTL.MVDATA.LUND	The items that the Scope Extract program should extract for use by ScopeUtil. This file should be modified by Lund Performance Solutions only.
SCOPFORM.MVDATA.LUND	The set of formulas that defines how ScopeUtil should convert Scope data items (extract files) to Meta-View data items for the SL files. This file should be modified by Lund Performance Solutions only.
SCOPITEM.MVDATA.LUND	The items that can appear in Scope extract files, and the column headings that should be used by the ScopeUtil executable to identify them.
SCOPPARM.MVDATA.LUND	The ScopeUtil program will write this file when it is run with the -m parameter and non-default options are specified.
SCOPUTIL.MVPGMS.LUND	The ScopeUtil executable that converts Scope extract files to an SL file.
SCOPUTJ.MVJOB.LUND	The job stream that runs the ScopeUtil executable to convert Scope extract files to SL files.
TOTDIV.MVDATA.LUND	This file can be thought of as an addendum to the SCOPEFORM file. It contains the items from the Totals subblocks (within the SL file) that need special treatment.

21

META-VIEW QUEUE JUMP FEATURE

Altering Process Priorities

The Meta-View for MPE/iX Queue Jump feature allows a user with OP (Operator) or SM (System Manager) capability to alter the priority and/or scheduling queue of a live, running process. This is often helpful as a tactical mechanism to either favor or penalize certain processes. The MPE/iX TUNE command is helpful from a strategic and global standpoint. Often there is a single renegade process that can be sent to the E subqueue to free the CPU for other processes.

To change the priority or queue of a process:

1. From MVHOST go to UTILITY KEYS (F6) and select F3 - QUEUE JUMP. The following prompt will appear:

   Enter Process Identification Number of process to reschedule:

2. Select the PIN number of the process whose priority you want to alter. After entering the desired PIN the following statement will appear:

   Process *ppp* current priority is X

   or

   Process *ppp* current priority is *Lnnn*, where:

ppp =	The PIN number.
X =	A letter representing the current scheduling queue in which the process is running (A, B, C, D, or E).
L =	A linear priority has been assigned
nnn =	The current absolute of the process (0-225) if an absolute priority has been selected.

3. Enter the new queue priority in the general form "qcddd", where:

q =	The priority queue (B, C, D or E) that defaults to B if not specified otherwise.
	SM capability is required to place processes in the B queue or to alter the priority of a process that resides in the B queue.
c =	An optional qualifier that specifies the process' behavior within the queue. (L for linear and S for circular.)
	If "c" is not qualified, the defaults are "L" (linear) for the B queue and "S" (circular) for the C, D and E queues. A circular queue priority will be adjusted by the MPE/iX queue dispatcher according to how you have tuned your system (OSCILLATE or DECAY). A linear queue priority will keep a process at a fixed priority. "S" may not be specified for the B queue.
ddd =	An optional number MPE/iX priority.
	It can only be specified for linear queues. It must be within the scheduling queue's base and limit priority as defined by the TUNE command, or in the range 100-150 or the BL queue. If not specified, 150 is the default priority for the B queue. The default for the other scheduling queues (C, D and E) is their base priority.

Example

B130	B linear queue, priority 130
D or DS	D circular queue
CL152	C linear queue, priority 152

4 After you have selected either a queue letter or linear priority the following confirmation will be shown:

Confirm process ppp priority change from Xnnn to Ymmm (N)?

If you want to execute the priority change, answer **Y** (Yes) otherwise press **N** (No) or hit C/R for the default **N**. If you reply **Y** then Meta-View will let you know that the priority was successfully changed.

22

MVLOGX

Historical Performance Data Extraction Utility

MVLOGX is the historical data counterpart to MVHOST. It provides the means for reviewing performance data stored in the log files. The user interface is similar in many ways to MVHOST. The main difference is that the MVLOGX screens do not display current samples of online performance data.

The primary functions of MVLOGX 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 real-time graphical analysis and reporting application from Lund Performance Solutions.

Getting Started

The overall process can be broken down into the following three steps:

1. Collecting
2. Extracting
3. Downloading Performance Gallery Gold or Forecast Capacity Planner data to a PC (optional)

Collecting Data

Collecting performance data is accomplished by running MVHOST in a batch mode. There are three standard job streams provided with MVHOST for this purpose:

- MVMONJ.MVJOB.LUND
- MVJOB.MVJOB.LUND
- MVFULL.MVJOB.LUND

These three job streams are shown in detail in Appendix D, “MVMONJ, MVJOB and MVFULL Batch Jobs” on page 261. For beginners who want to get the logging process started immediately, simply stream MVMONJ.MVJOB.LUND. This "collection" or "logging" process will create log files on the LUND account with the following file name convention: SLYYDDD, where "SL" stands for System Log, "YY" is current year and "DDD" is the number of days into the current year (also known as the Julian date).

Extracting Data

Once you have accumulated one or more "SLxxxxx" files, you can extract the data with a batch job. This is the purpose of the job MVLOGX.MVPGMS.LUND.

In the section titled “Cumulative Process Tracking” on page 187, you will find a sample MVLOGXJ job stream. This job stream creates one report and one extract file. Add necessary job commands using this job as an example if you want more of either or both.

With the MVLOGX program you can perform the following regarding logged data:

- Interactively view trend information.
- Interactively zoom in on a given interval and determine what key processes were running at that time.
- Print selected reports.
- Export selected data to an ASCII file for downloading to a PC for further analysis.
- Exclude specific periods, days and dates from analysis.

Determine averages based on user-definable criteria.

Accessing Data

To access the logged performance data from the MVHOST Global Summary:

1. Type S from the MVHOST Enter command: prompt to view the Screen Selection Menu screen.
2. From the Screen Selection Menu screen, enter L (Log Trends Program (MVLOGX)).
3. MVLOGX will check the log file catalog, if one exists. If one does not exist, it will be created containing basic information about all log files in the selected group and account as configured in the Log Trend Options.
4. 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 MVLOGX data report, the CPU Utilization Trends screen, will display. Information about each MVLOGX report is provided in “MVLOGX Reports” on page 213.

The MVLOGX keyboard shortcuts, menus and options are described in “MVLOGX Menus and Options” on page 195.

Browsing Reports

The following is a suggested procedure for browsing through a MVLOGX report, using the CPU Utilization Trends report as an example:

1. The first MVLOGX report displayed shows CPU Utilization Trends. You can scroll through this report using the MVLOGX commands keys.

   The commands shown in the MVLOGX Main Commands screen are discussed in “MVLOGX Menus and Options” on page 195.

   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 MVLOGX reports that can be selected from the MVLOGX Report Format Selection Menu.
   - The Report Format Selection Menu is explained in “MVLOGX Report Format Selection Menu” on page 197.
   - Each MVLOGX report is described in “MVLOGX Reports” on page 213.

The appearance of the reports displayed can be modified. Use the display options described in “MVLOGX Main Option Menu” on page 198.

Printing Reports

The process of printing reports is outlined as follows:

1. Select the appropriate report via the reports menu in the REPORT KEYS function key tree.
2. Select, via the OPTIONS KEYS dialog, whether process information should be printed.
3. Perform any data breaks or exclusions.
4. Select the PRINT REPORT function key at the LOG TRENDS main function key tree and respond to the questions as directed with the desired starting and ending dates and times.

The report will then be directed to a spoolfile named LOGLIST. If you want to redirect the output of the Log Trends report printing function, issue a file equation using LOGLIST as the formal file designator.

Exporting Data to ASCII Files

You can view data in a PC or host based graphics, statistical or spreadsheet program. Both global and process data can be exported. You can export data interactively or in a batch job.

The process for exporting data is outlined as follows:

1. Determine what output file format you want and configure it as such in the Export File Configuration submenu ("Export File Configuration Menu (SUBMENU)" on page 203).
2. Select the appropriate report via the reports menu ("Use Function Keys to Select Reports" on page 200).
3. To indicate whether or not process information will be exported, select the option menu via the OPTIONS KEYS function key or by entering a P at the prompt ("Display Process Information" on page 199).
4. Enter the appropriate output file starting date(s) and time(s) and ending date(s) and time(s) by selecting the PRINT REPORT function key in the LOG TRENDS main function key tree. Respond to the prompts as directed ("Report Output Configuration Menu (SUBMENU)" on page 212).
5. Transfer the ASCII data to the host or PC based analysis platform of your choice. For example, *Lotus 1-2-3*, *Excel*, *Quattro Pro*, *Harvard Graphics*, *Slide Write Plus* or *Graphics Gallery*.

Using the Logging Facility

The MVLOGX logging facility is the main facility for historical trending and performance analysis.

To begin logging, simply stream the MVMONJ.MVJOB.LUND batch file ("MVMONJ.MVJOB.LUND" on page 261). Depending on your system security or your logon privileges, you may want to edit the MVMONJ.MVJOB.LUND job card to add any necessary passwords. We recommend you run MVMONJ continuously on your system.

NOTE The overhead of this job depends on the collection interval and the size of the CPU. It usually takes less than 0.5% of the CPU.

When logging is enabled in batch, Meta-View will create entry for every interval. The default interval is 5 minutes. This number will be adequate in most cases. Some larger, more active installations may want to reduce the period of this interval for finer granularity. The log file it produces will reside in the same Group and Account as the job logon specification. Meta-View log files are named in the following manner:

SLYYJJJS:

SL - System Log file.

YY - Current year, '01, '02, etc.

JJJ - Julian day of the year

S - Sequence letter A-Z (up to 26 per day is possible)

It is also possible to have Cumulative Process Tracking. By enabling this feature via the appropriate line in the MVJOB job stream you can create a process log file. The naming convention for the process log file is similar to that of the global log file, except it begins with “PR” instead of “SL.”

Cumulative Process Tracking

Cumulative Process Tracking allows you to obtain reports on global program utilization. The basis for these reports is the Process Log file. The Process Log file is created in batch when the “Should cumulative process tracking be enabled?” question is answered with a **Y** (Yes). The name conventions for the Process Log file are the same as for the Meta-View Global Log file, except that instead of an “SL” the process log files have “PR” at the beginning.

The Process Log files contain extensive information regarding the execution of individual processes. The job stream MVPRANJ.MVJOB.LUND extracts and accumulates this process information on a program-by-program basis.

Disc Space Utilization Formula for MVHOST Log Files

The approximate amount of disc space used in sectors by Meta-View log files is determined as follows:

(258 + (A * 70) + (B * 122) + (C * 52)) / 128

A - Number of user discs

B - Number of user workloads (plus up to three default workloads)

C - Maximum number of user processes logged

Creating Custom Reports

The log reports generated by MVLOGX are user-configurable.

To create a custom report:

1 Create the format file following the rules and syntax below.
2 Compile the format file into the REPRTDEF.MVDATA.LUND file via the MVRCOM.MVPGMS.LUND program.
3 Reload the report, if necessary. This makes newly-compiled reports available in the current session.

There are several sample report formats in the MVSAMPLE.LUND group. These reports have been compiled into the REPRTDEF.MVDATA.LUND file. Use these formats as examples in creating your own report format files.

Report Compiler Commands

The MVRCOM report compiler uses the commands listed in Table 22.1.

Table 22.1 *MVRCOM Report Compiler Commands*

Command	Description
ADD <file.group.acct>	Add a new report
DEL <reportname>	Delete a report
DUMP <reportname>	Dump the existing report internal information
EXIT	Exit the report compiler
HELP	Display the online help information
LIST	List all reports in current REPRTDEF.MVDATA.LUND file
UPDATE <file.group.acct>	Update existing report
REBUILD	Rebuild the report configuration file

Using Command Line Parameters

Use command line parameters to modify the MVLOGX configuration. Enter mvlogx -h at the shell prompt. The functions of each command line parameter is summarized in Table 22.2.

Table 22.2 *MVLOGX Command Line Parameters*

Parameter	Description
/F	Specifies the local configuration filename
/J	Forces job mode
/K	Reads command information in keyword form (batch mode)
/N<filename>	Specifies system configuration filename
/X	Enables process export file report
/Z	Disables the "Are you sure you want to exit?" dialog

Report Configuration Rules

To create a report you must first run an EDITOR-type program. You can do this by using the Stand-alone or the Log Trends Utility keys. There are some rules to follow when creating custom report format files, although the entire process is essentially free-format. The logging process is keyword driven.

There are two types of keywords: *Extract-oriented* and *Format-oriented*. These keywords represent individually logged performance indicators such as TOT-BUSY% for total CPU busy. There are also items that represent several logged elements. For example, the DISC-IO-RATE and CPU%/GRP items can refer to multiple disc drives and application groups, respectively. Specifying DISC-IO-RATE:1 or CPU%/GRP:ALL will select for consideration disc I/O rates for LDEV 1 and a CPU utilization average for all application groups.

To extract information for separate elements (e.g., DISC-IO-RATE:1, DISC-IO-RATE:2, etc), specify multiple lines in the format file (e.g., DISC-IO-RATE:1, DISC-IO-RATE:2, etc).

To determine the application workload group number, refer to the MVHOST Global Summary or count the workload group's position in the MVWKDEF.MVDATA.LUND file. Remember that for disc I/O related items the logical device number of the disc drive follows the item name.

The second type of keywords available are formatting keywords. These keywords drive the format in which the extract keywords appear. A report file example is on page 193.

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. Disc 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.

Report File Example

An example of an MVLOGX report is provided below:

```
$TITLE "CPU Utilization Bar chart"
$KEY "  CPU   "," TRENDS  ", 11
$HEAD
  *   *   *   CPU Utilization Trends   *   *   *
-------------   %CPU  Utilization   ----------------
Idle Resp
Time 0  10  20  30  40  50  60  70  80  90  100  Time
Time
$END
TIME 1, 1, 5

$BAR 1, 7, 60
AS-PROCESS%,     "A"
BS-PROCESS%,     "B"
CS-PROCESS%,     "C"
DS-PROCESS%,     "D"
ES-PROCESS%,     "E"
MEM-MANAGER%, "M"
DISPATCHER%,     "O"
OVERHEAD%,       "O"
PAUSE%,          "P"

$END

IDLE%      1, 69, 5

RESP-TIME  1, 75, 5
```

Figure 22.1 *MVLOGX Report File Example*

23

MVLOGX MENUS AND OPTIONS

MVLOGX Keyboard Shortcuts

The MVLOGX options are accessible through several sets of keyboard shortcuts. Each set of keys is described in this section.

MVLOGX Main Keys

The function keys under the Log Trends function are described in the next table.

Table 23.1 *MVLOGX Main Function Keys*

Key	Description
F1 - OPTIONS	Displays the MVLOGX Main Option Menu
F2 - PRINT REPORT	Prints selected dates and times for the displayed report to the line printer
F3 - EXPORT REPORT	Exports data from selected dates and times to ASCII files
F5 - UTILITY KEYS	Displays various utility keys (see “MVLOGX Utility Keys” on page 195)
F6 - REPORT KEYS	Displays the MVLOGX Report Format Selection Menu
F7 - SEARCH KEYS	Displays search keys (see “MVLOGX Search Keys” on page 196)
F8 - EXIT MVLOGX	Exits MVLOGX

MVLOGX Utility Keys

The utility keys under the Log Trends function are described in the next table.

Table 23.2 *MVLOGX Main Screen Utility Keys*

Key	Description
F1 - MPE/iX COMMAND	Executes commands via an MPE command interface
F2- CREATE REPORTS	Displays various report keys (see "MVLOGX Report Keys" on page 196)
F5 - FORECAST ANALYSIS	Creates a data file to port to Lund's Forecast Capacity Planner product
F6 - REPORT CARD	(See "MVLOGX Report Card" on page 227)
F7 - PERFORM GALLERY	Creates a data file to port to Lund's Performance Gallery Gold product
F8 - MAIN KEYS	Returns to the main function keys

MVLOGX Report Keys

The report keys under the Log Trends function are described in Table 23.3.

Table 23.3 *MVLOGX Main Screen Search Keys*

Key	Description
F1 - EDITOR	Executes the default editor
F2 - REPORT COMPILER	Starts the MVHOST Report Compiler
F3 - RELOAD REPORTS	
F4 - AUTO CREATE	
F7 - REPORT KEYS	Displays the MVLOGX Report Format Selection Menu
F8 - MAIN KEYS	Returns to the main function keys

MVLOGX Search Keys

The search keys under the Log Trends function are described in the next table.

Table 23.4 *MVLOGX Main Screen Search Keys*

Key	Description
F1 - SCROLL AHEAD	Displays the next page of data
F2 - SCROLL BACK	Displays the previous page of data
F3 - SKIP AHEAD	Produce a prompt for the number of samples to skip forward
F4 - SKIP BACK	Prompts for the number of samples to skip backward
F5 - SELECT TIME	Prompts for a time at which you want to begin examining the data
F6 - LIST LOGFILES	Displays all available Meta-View log files in the currently selected group and account
F7 - REPORT KEYS	Displays the MVLOGX Report Format Selection Menu
F8 - MAIN KEYS	Returns to the main function keys

MVLOGX Report Format Selection Menu

A report is defined as a screen display format. It is also used to determine data for exportation, printing and graphing. There are a variety of reports available within the Log Trends function.

There are two main types of reports: a *Standard report* and an *Export report*. The Standard report is used to perform regular reporting. It includes headings, text and data. The Export report is used to extract logged data into an ASCII format for exportation. The format of the Export report output is configurable via the MVLOGX Main Options. In either case, the reports are used to present data on a terminal display. You can create your own report formats (“Creating Custom Reports” on page 187).

Reports are selected from the reports menu and are available via the REPORT KEYS. The Reports menu is similar to Figure 23.1.

```
MVLOGX /3000  I.02a(c) LPS     Location: LOGFILES.LUND         Log: --/--/-- --:--
                              Report Format Selection Menu

  1 CPU Trends                             11 SESSIONS Workload Detail
  2 Memory Trends                          12 File Space Utilization
  3 Disc I/O Trends                        13 Disc Volume
  4 Response Time Trends                   14 ImageStats Dataset List
  5 Mode Switch Trends                     15 Forecast Analysis
  6 Global Summary                         16 ImageStats Database Statistics
  7 Global Process Stops                   17 ImageStats Dataset Statistics
  8 Response Time Detail                   18 ImageStats Database List
  9 Workload Summary                       19 ImageStats Global Statistics
 10 Disc I/O Detail

Press return to go to main screen.
Enter report format option: _
```

Figure 23.1 *MVLOGX Report Format Selection Menu*

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 "MVLOGX Reports" on page 213.

MVLOGX Main Option Menu

By pressing the OPTIONS function key in MVLOGX you can alter various characteristics of the program and data. These options will allow you to tailor past performance data to your specifications. If you want to perform averaging, you can manipulate export data characteristics or date and time exclusions to do so.

```
MVLOGX MAIN OPTION MENU

   1) Current log file location (LOGFILES.LUND)
   2) Display Process Information (N)
   3) Use function keys to select reports (N)
  --- Process display option menu
   5) Data break configuration menu (SUBMENU)
   6) Export file configuration menu (SUBMENU)
   7) Log information exclusions (SUBMENU)
   8) Zone configuration (SUBMENU)
   9) Report card configuration (SUBMENU)
  10) Forecast data reduction configuration (SUBMENU)
  11) Performance Gallery configuration (SUBMENU)
  12) Report output configuration menu (SUBMENU)

Which Option: _
```

Figure 23.2 *MVLOGX Main Option Menu*

Each of the main options are described in this chapter.

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 MVLOGX Main Option Menu, choose the Current log file location option.
2. Specify the group and account in which the desired log file will reside (group.account).

Normal MPE security applies here. To remove a location, enter a caret ("^") or a blank.

Display Process Information

This option allows you to display processes that were logged via Meta-View for MPE/iX batch collection. (To enable batch collection see “MVMONJ, MVJOB and MVFULL Batch Jobs” on page 261.)

If you indicate to Meta-View for MPE/iX that you want processes to be logged, those qualifying processes will appear at each time interval just under the current global data sample on the screen.

To include/exclude Process Information in the global report:

1 From the MVLOGX Main Option Menu, select the Display Process Information option.

2 Enter Y (Yes) to enable the option, or N (No) to disable the option.

Use Function Keys to Select Reports

The function keys, when available, are displayed in the bottom portion of the MVLOGX screens. By default, they are not used to select MVLOGX reports. To enable/disable the function keys to select reports:

1 From the MVLOGX Main Option Menu, choose the Use function keys to select reports option.

2 Enter Y (Yes) to enable the option, or N (No) to disable the option.

Process Display Option Menu (SUBMENU)

This option will display the MVLOGX Process Display Option Menu.

```
MVLOGX MAIN OPTION MENU
  Process display option menu

   1) Display extended process line (N)
   2) Show wait state on first line (N)
   3) Display "First" instead of "Prompt" response time (N)
  --- Display page faults instead of IO per transaction
   5) Display total and I/O percentage instead of read/write counts (N)

Which Option: _
```

Figure 23.3 *MVLOGX Process Display Option Menu*

The Process Display Options are listed and described in Table 23.5.

Table 23.5 *MVLOGX Process Display Options*

Display Option	Default	Description
Display extended process line	**N** (No)	By default, the extended process line is not displayed. To display this information, enter **Y** (Yes).
Show wait state on first line	**N** (No)	By default, the current wait state is not displayed on the first line of the Process Information. To show wait state on the first line, enter **Y** (Yes). The "Display Total I/O instead of Read/Write counts" option will be unavailable if wait states are displayed.
Display "First" instead of "Prompt" response time	**N** (No)	By default, you can view the prompt response time of a process. To display the first response time, enter **Y** (Yes).
Display page faults instead of IO per transaction	**N** (No)	This option is only available if "Display extended process line" is set to **Y** (Yes). By default, the page fault memory statistic is not displayed on the extended process display. In order to display page faults, enter **Y** (Yes).
Display total and I/O percentage instead of read/write counts	**N** (No)	By default, MVLOGX will display the number of logical reads and writes to disc. To display total I/O and the percentage of all I/Os for which the processes are responsible, enter **Y** (Yes).

Data Break Configuration Menu (SUBMENU)

This menu provide the ability to determine groupings and granularity of data.

```
MVLOGX MAIN OPTION MENU
  Data break configuration menu

   1) Duration in minutes of each sample (0)
   2) Number of log records in each sample (0)
   3) Data break time in minutes (30)
   4) Force data break at end of logfile (N)
   5) Force data break at end of day (Y)

Which Option:
```

Figure 23.4 *MVLOGX Data Break Configuration Option Menu*

The Data Break Configuration options are listed and described in Table 23.6.

Table 23.6 *MVLOGX Data Break Configuration Options*

Option	Default	Description
Duration in minutes of each sample	0	This option allows you to report hourly averages of data collected in 10 minutes intervals. To do this, type "60" in this field.
Number of log records in each sample	0	This option allows you to do the same things as the previous one, except it groups by interval instead of by time. The values returned from LOG TRENDS represent averages not time slices.
Data break time in minutes	30	The data break will appear as a separating line between the last interval of the log file and the first interval of the next log file.

Option	Default	Description
Force data break at end of logfile	**N**	By default, the boundary between data files is transparent or "invisible" to the user. To force a break between data files on the report screen, enter **Y** (Yes).
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).

Export File Configuration Menu (SUBMENU)

This option will display the Export File Configuration Menu.

```
MVLOGX 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 (Y)
   4) Date format option (1-mm/dd/yy)
   5) Enclose date in quotes (Y)
   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 23.5 *MVLOGX Export File Configuration Menu*

The Export File Configuration options provide extensive control over the format of data extracted into ASCII files. The configuration options are described in Table 23.7.

Table 23.7 *MVLOGX Export File Configuration Options*

Option	Default	Description
Generate item label heading line	**Y** (Yes)	The item label heading line is provided by default. To eliminate the heading line, choose **N** (No).
Enclose item labels in quotes	**Y** (Yes)	The data item labels are enclosed in quotation marks (" "). To eliminate the quotation marks, choose **N** (No).
Include log date in data line	**N** (No)	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	This option is only available if option 3 is set to **Y**. 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** (Yes)	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** (Yes)	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** (Yes)	The log time will be enclosed in quotation marks. To remove the quotation marks, enter **N** (No).
Separate items with commas	**Y** (Yes)	By default, the data items in the export file are comma delimited. To send the data without commas, enter **N** (No).

Log Information Exclusions (SUBMENU)

This option will display the Log Information Exclusions Menu.

```
MVLOGX 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 23.6 *MVLOGX Log Information Exclusions Menu*

This menu 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 MVLOGX 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 Lund's Forecast Capacity Planner or Performance Gallery Gold products. Ensure the default settings are enabled.

The Log Information Exclusions options are described in Table 23.8.

Table 23.8 *MVLOGX Log Information Exclusions Options*

Option	Default	Description
Exclusions enabled	**N** (No)	Exclusions are disabled. To set and enable one or more exclusions, enter **Y** (Yes). The subsequent options will be activated.
Exclude holidays	**N** (No)	To exclude holidays (as defined in the HOLIDAYS.MVDATA.LUND file), enter **Y** (Yes). For information see "The comment, "CPU dependent", tells the user the Page Fault Rate is dependent of the CPU." on page 38.
Exclude day range	0=None	To exclude a range of days, enter 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	Enter the corresponding number of the last day in the excluded day range.
Exclude time range	00:00	To exclude a specific range of time, enter the start of this range in hours and minutes (hh:mm).
to	00:00	Enter 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.

(Continued on next page.)

Zone Configuration (SUBMENU)

One of the abilities provided by Log Trends is the ability to report performance information by zone. This feature is more thoroughly documented in “Report by Zone” on page 239.

```
MVLOGX MAIN OPTION MENU
  Zone configuration

   1) Zone 1 from (00:00)
   2)          to (00:00)
  --- Zone 2 from
  ---          to
  --- Zone 3 from
  ---          to
  --- Zone 4 from
  ---          to

Which Option: _
```

Figure 23.7 *MVLOGX Zone Configuration Menu*

Report Card Configuration (SUBMENU)

The Report Card Configuration options are discussed in “Report Card Configuration Options” on page 227.

Forecast Data Reduction Configuration (SUBMENU)

If you are licensed to use Lund's Forecast Capacity Planner product, the Forecast data reduction configuration option is available from the MVLOGX Main Options Menu. Use this menu to set parameters for the Forecast export file.

```
MVLOGX 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 23.8 *MVLOGX Forecast Data Reduction Configuration Menu*

Forecast Data Reduction Configuration options are described in Table 23.9.

Table 23.9 *MVLOGX Forecast Data Reduction Configuration Options*

Option	Default	Description
Workload analysis period minimum line	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.

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 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 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 able to forecast the effects of changes on it. Enter the 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 memory, it may not be possible to forecast the effects of changes on it. Enter a percentage of memory wait time to allow without giving a warning message.

Performance Gallery Configuration (SUBMENU)

If you are licensed to use Lund's Performance Gallery Gold product, the Performance Gallery configuration option is available from the MVLOGX Main Options Menu. Use this menu to set parameters for the Performance Gallery export file.

```
MVLOGX MAIN OPTION MENU
  Performance Gallery configuration

   1) Performance Gallery Version (2-Gold)
   2) Global CPU Data (Y)
   3) Global Memory Data (Y)
   4) Global Miscellaneous Data (Y)
   5) Disc Data (Y)
   6) File Space Data (N)
   7) Database Turbo Image (N)
   8) Dataset Turbo Image (N)
   9) Turbo Image System (N)
  10) Cpu Data (Y)
  11) Process Data (Y)
  12) Performance Gallery extract file limit (1000000)

Which Option:
```

Figure 23.9 *MVLOGX Performance Gallery Configuration Menu*

The Performance Gallery Configuration options are described in Table 23.10.

Table 23.10 *MVLOGX Performance Gallery Configuration Options*

Option	Default	Description
Performance Gallery Version	1-Original	By default, the Performance Gallery version is 1 - Original. Your choices are: 1 - Original 2 - Gold
Global CPU Data	**Y** (Yes)	By default, the global CPU data in the collection will be displayed. To eliminate CPU data from the report file, enter **N** (No).
Global Memory Data	**Y** (Yes)	By default, the global memory data will be displayed. To eliminate this data from the report file, enter **N** (No).
Global Miscellaneous Data	**Y** (Yes)	By default, the global miscellaneous data will be displayed. To eliminate this data from the report file, enter **N** (No).
Disc Data	**Y** (Yes)	By default, disc data will be displayed. To eliminate this data from the report file, enter **N** (No).
File Space Data	**Y** (Yes)	By default, file space data will be displayed. To eliminate this data from the report file, enter **N** (No).
Process Data	**N** (No)	By default, process data will not be displayed. To include this data from the report file, enter **Y** (Yes).
Performance Gallery extract file limit	1000000	By default the Performance Gallery extract file limit is 1,000,000 MB.

Report Output Configuration Menu (SUBMENU)

This option allows you to control the number of lines per page that you wish to configure for the MVLOGX printed output.

```
MVLOGX MAIN OPTION MENU
  Report output configuration menu

   1) Maximum lines per page (60)
   2) Company name ()

Which Option:
```

Figure 23.10 *MVLOGX Report Output Configuration Menu*

The Report Output Configuration options are described in Table 23.11.

Table 23.11 *MVLOGX Report Output Configuration Options*

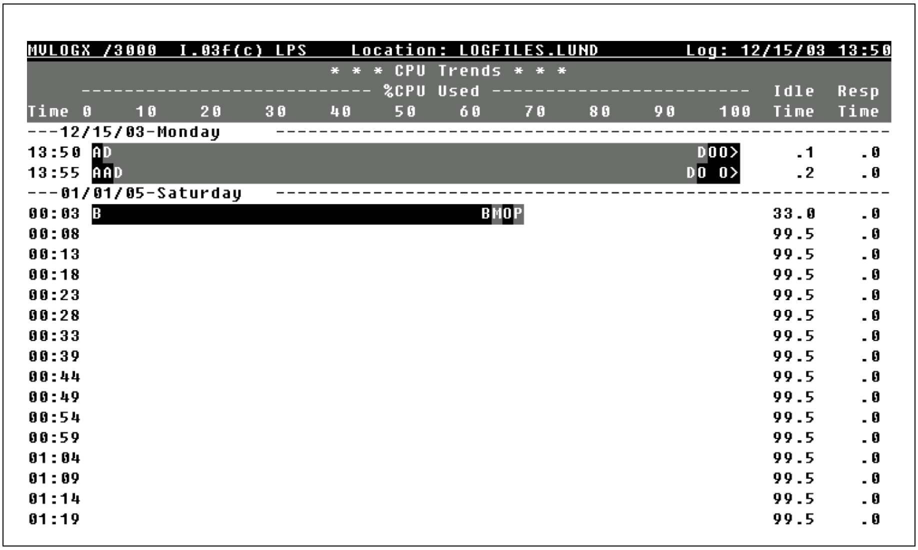
Option	Default	Description
Maximum lines per page	60	By default, MVLOGX reports contain up to 60 lines of information per page. To increase or decrease the maximum threshold type a new maximum threshold.
Company Name	(blank)	By default, the company name is not included in the MVLOGX reports. Type a company name, system name, or another headline (up to 43 alpha-numeric characters).

MVLOGX REPORTS

The data and configuration of the MVLOGX reports are similar to the screens in MVHOST. In this chapter an example of each MVLOGX report is provided with a cross-reference or link back to the corresponding data screen in MVHOST.

MVLOGX CPU Trends Report

The CPU Trends report in MVLOGX displays general CPU statistics in graphical format.



```
MVLOGX /3000  I.03f(c) LPS     Location: LOGFILES.LUND        Log: 12/15/03 13:50
                               * * * CPU Trends * * *
     --------------------------- %CPU Used ------------------------  Idle  Resp
Time 0    10    20    30    40    50    60    70    80    90    100  Time  Time
---12/15/03-Monday      ---------------------------------------------------------
13:50 AD                                                       DOO>     .1    .0
13:55 AAD                                                     DO O>     .2    .0
---01/01/05-Saturday    ---------------------------------------------------------
00:03 B                                    BMOP                       33.0    .0
00:08                                                                 99.5    .0
00:13                                                                 99.5    .0
00:18                                                                 99.5    .0
00:23                                                                 99.5    .0
00:28                                                                 99.5    .0
00:33                                                                 99.5    .0
00:39                                                                 99.5    .0
00:44                                                                 99.5    .0
00:49                                                                 99.5    .0
00:54                                                                 99.5    .0
00:59                                                                 99.5    .0
01:04                                                                 99.5    .0
01:09                                                                 99.5    .0
01:14                                                                 99.5    .0
01:19                                                                 99.5    .0
```

Figure 24.1 *MVLOGX CPU Trends Report*

For information about the data in this report, please refer to “Current CPU Trends Data” on page 77.

MVLOGX Memory Trends Report

The Memory Trends report in MVLOGX displays memory performance statistics in a graphical format.

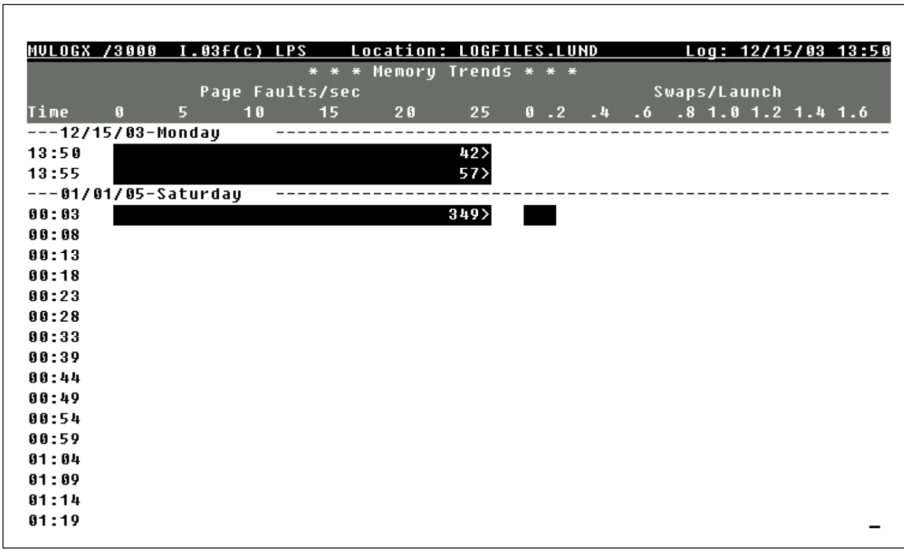
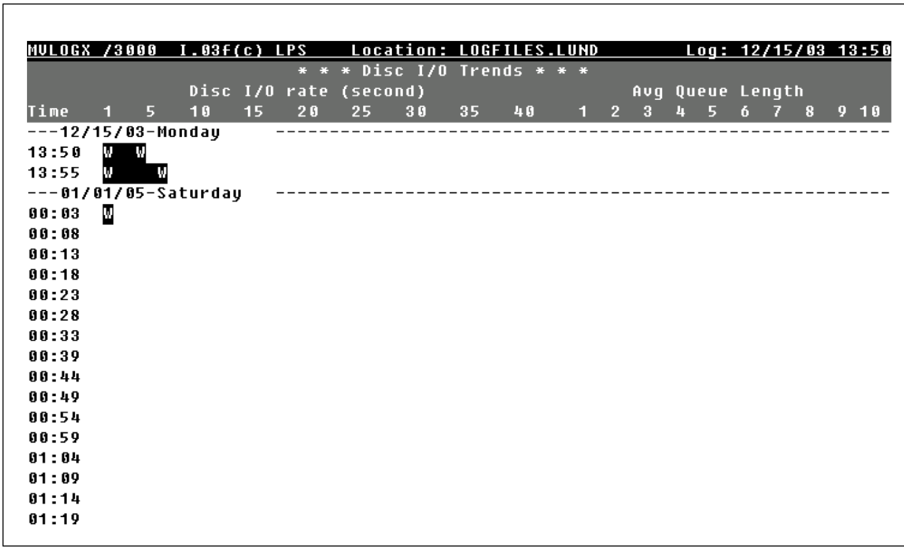


Figure 24.2 *MVLOGX Memory Trends Report*

For information about the data in this report, please refer to "Main Memory Trends Data" on page 79.

MVLOGX Disc I/O Trends Report

The Disc I/O Trends report in MVLOGX displays disc performance data in graphical format.



```
MVLOGX /3000  I.03f(c) LPS     Location: LOGFILES.LUND         Log: 12/15/03 13:50
                         * * * Disc I/O Trends * * *
               Disc I/O rate (second)                           Avg Queue Length
Time    1   5    10    15    20    25    30    35    40     1  2  3  4  5  6  7  8  9 10
---12/15/03-Monday     ---------------------------------------------------------
13:50   W  W
13:55   W    W
---01/01/05-Saturday   ---------------------------------------------------------
00:03   W
00:08
00:13
00:18
00:23
00:28
00:33
00:39
00:44
00:49
00:54
00:59
01:04
01:09
01:14
01:19
```

Figure 24.3 *MVLOGX Disc I/O Trends Report*

For information about the data in this report, please refer to “Disc I/O Utilization Trends Data” on page 81.

MVLOGX Response Time Trends Report

The Response Time Trends report in MVLOGX displays the transaction rate (per minute) and the average response time (seconds) recorded.

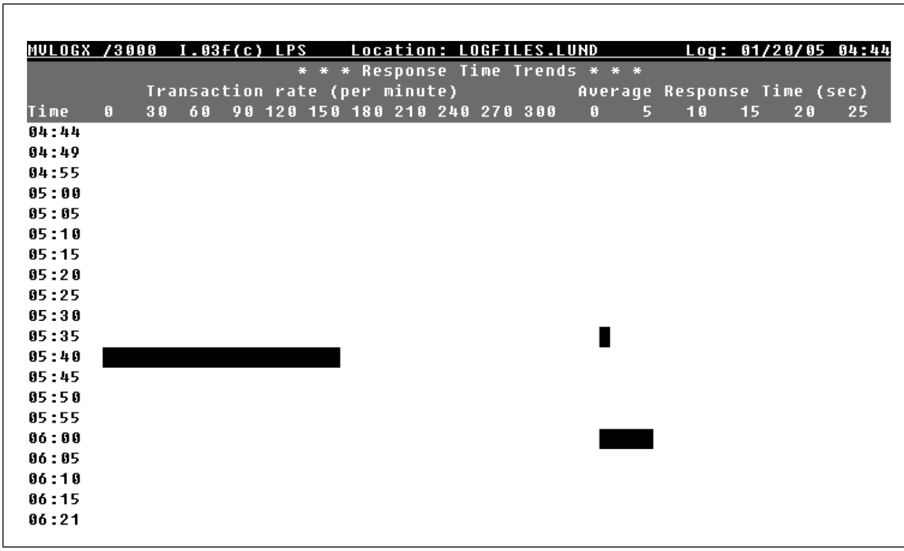


Figure 24.4 *MVLOGX Response Times Trends Report*

For information about the data in this report, please refer to "Response and Transaction Trends Data" on page 82.

MVLOGX Mode Switch Trends Report

The Mode Switch Trends report in MVLOGX displays both the number of native mode to compatibility mode switches and the number of compatibility mode to native mode switches performed per second.

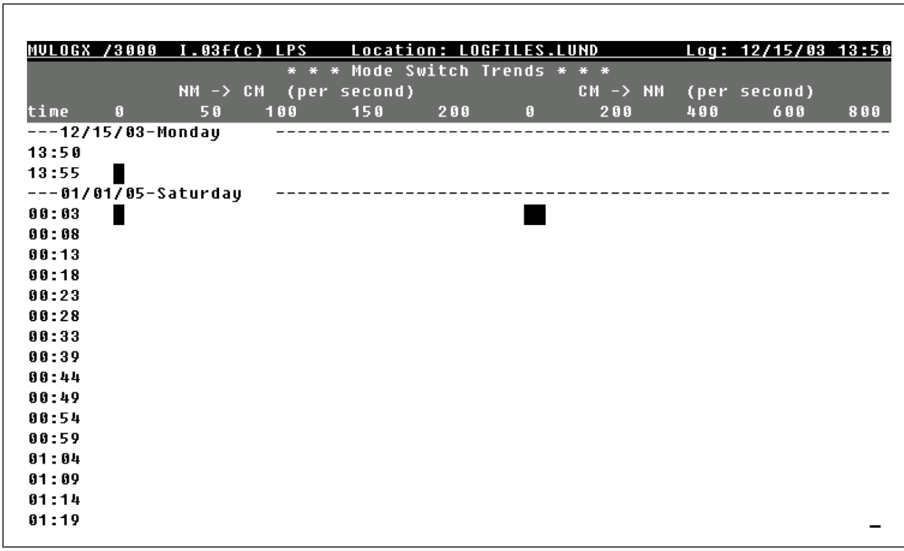


Figure 24.5 *MVLOGX Mode Switch Trends Report*

For information about the data in this report, please refer to “Mode Switch Trends Data” on page 83.

MVLOGX Global Statistics Report

The Global Statistics screen in MVLOGX displays system-wide performance data:

- Global CPU Statistics
- Global Misc Statistics
- Global Memory Statistics
- Global Disc Statistics
- Process Information
- System Performance Advice

```
MVLOGX /3000  I.03f(c) LPS     Location: LOGFILES.LUND         Log: 12/15/03 13:50
---12/15/03-Monday     ---------------------------------------------------------
*** 13:50 *********************************************************************
|----------- Global CPU Statistics -----------|--- Global Misc Statistics ----|
| TOTAL BUSY:  99.4          HIGH PRI:     .0  | #Ses    3  #Job    8 #Proc   27 |
| AQ     2.0   Memory      .4   CPU QL      2  | CM to NM Switches      1       |
| BQ      .0   Dispatch   2.3   Launch/s    0  | NM to CM Switches      2       |
| CQ      .0   ICS/OH     3.9   Cpu CM%     1  | Transactions           1(   0) |
| DQ    92.8   Pause       .4   SAQ         0  | Avg First Resp        .0       |
| EQ      .0   Idle        .1                  | Avg Prompt Resp       .0       |
|------------------------- Global Memory Statistics --------------------------|
| Page Fault Rate   42/s      Memory Cycles    0          Overlay Rate    0/s|
| Lbry Fault %       0        Read Hit %       0          Swap/Launch     .00 |
|-------------------------- Global Disc Statistics ---------------------------|
|<Ldv>Rt/IO%/QL <1> 1/ 28/ .00 <2>  /   /      <3> 3/ 72/ .00 <ALL> 4/100/ .00 |
|-----------------------------------------------------------------------------|_
```

Figure 24.6 *MVLOGX Global Statistics Report*

For information about the data in this report, please refer to "Global Summary Data" on page 46.

MVLOGX Global Process Stops Report

The Global Process Stops report in MVLOGX provides information that helps to determine why processes are "hitting brick walls."

```
MVLOGX /3000  I.03f(c) LPS     Location: LOGFILES.LUND         Log: 03/09/05 00:17
---03/09/05-Wednesday  ---------------------------------------------------------
*** 00:17 ****************** Global Process Stops ******************************
           Reason  Cur%            Reason  Cur%            Reason  Cur%
 NM Code page flt   15     NM stk page flt   0     NM trns page flt   9
    File page flt    5    CM code page flt   0      CM stk page flt   0
 CM trns page flt    0       Terminal read   0       Terminal write   0
         Disc I/O    0           Other I/O   0               IOWAIT   0
              SIR    0                 RIN   0     Mem Mgr prefetch   7
     Quantum used   30         Short timer   2               Father   0
Semaphore ctl blk    0                 Son   0            Data comm   0
   Operator Reply    0        Disp preempt   5                 Port  10
             Mail    0                Junk   0         Message File   0
           Impede    0               Break   0           Wait queue   0
     Mem Mgr wait    1         Port absent   0         File blocked   0
   File unblocked    0        Storage mgmt   0           User debug   0
       I/O config    0           PFP reply   0           DB monitor   0
        Fill disc    0                HLIO   0                  TIO   0
     Mem Mgr post    4        Signal timer   0          CPU preempt   0
 Disc I/O preempt    0    Priority preempt   0             SQL lock   0
  SQL latch lev 1    0     SQL latch lev 2   0      SQL latch lev 3   0
  SQL latch lev 4    0          SQL buffer   0           Long timer   0
   Mem Mgr freeze   10               Other   0_
```

Figure 24.7 *MVLOGX Global Process Stops Report*

For information about the data in this report, please refer to “Global Process Stops Data” on page 147.

MVLOGX Response Time Detail Report

The Response Time report in MVLOGX displays both prompt and first response times.

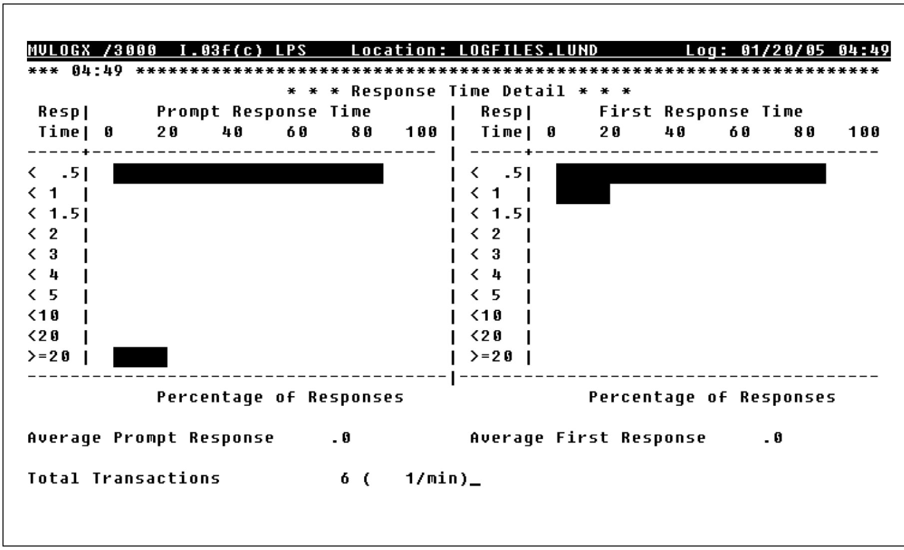


Figure 24.8 *MVLOGX Response Time Detail Report*

For information about the data in this report, please refer to "Response Time Detail Data" on page 88.

MVLOGX Workload Summary Report

The Workload Summary report in MVLOGX displays workload statistics.

```
MVLOGX /3000  I.03f(c) LPS     Location: LOGFILES.LUND        Log: 01/20/05 09:43
*** 09:43 ********************* Workload Summary ******************************
                                  Prompt    First     Total
No Group Name        %CPU     %Disc    Resp      Resp      Trans      CPU/Tr     IO/Tr
 1:LOOPER              .0        .0       .0        .0         0          0         0
 2:FINANCEAPP          .0        .0       .0        .0         0          0         0
 3:LUND               6.8      80.9       .4        .1       215         96         1
 4:ACCOUNTPAY          .0        .0       .0        .0         0          0         0
 5:ACCOUNTREC          .0        .0       .0        .0         0          0         0

*** 09:48 ********************* Workload Summary ******************************
                                  Prompt    First     Total
No Group Name        %CPU     %Disc    Resp      Resp      Trans      CPU/Tr     IO/Tr
 1:LOOPER              .0        .0       .0        .0         0          0         0
 2:FINANCEAPP          .0        .0       .0        .0         0          0         0
 3:LUND                .8      65.2       .0        .0         0          0         0
 4:ACCOUNTPAY          .0        .0       .0        .0         0          0         0
 5:ACCOUNTREC          .0        .0       .0        .0         0          0         0
_
```

Figure 24.9 *MVLOGX Workload Summary Report*

For information about the data in this report, please refer to “Process Summary by Application Workloads” on page 68.

MVLOGX Disc I/O Detail Report

The Disc I/O Detail report in MVLOGX provides a summary of performance data for all discs on the system.

```
MVLOGX /3000  I.03f(c) LPS     Location: LOGFILES.LUND        Log: 01/20/05 17:38
*** 17:38 ***********************************************************************
                         * * * Disc I/O Detail * * *
                          Rate/s                 Counts         Avg.    Service Time
 Dev    I/O %   Util%   Read   Write  Total   Read   Write  Total   QLen    msec per I/O
--------------------------------------------------------------------------------
   1     14       0       0      0      0      0      3      3     .00       18.0
   2     27       0       0      0      0      0      6      6     .00        2.8
   3     59      19       0      0      0      0     13     13     .23        9.0
 ALL    100      12       0      0      0      0     22     22     .14        8.5
*** 17:44 ***********************************************************************
                         * * * Disc I/O Detail * * *
                          Rate/s                 Counts         Avg.    Service Time
 Dev    I/O %   Util%   Read   Write  Total   Read   Write  Total   QLen    msec per I/O
--------------------------------------------------------------------------------
   1     21       0       0      0      0      0      4      4     .00       22.0
   2     32       0       0      0      0      0      6      6     .00        2.7
   3     47       0       0      0      0      0      9      9     .00        7.9
 ALL    100       0       0      0      0      0     19     19     .00        9.2_
```

Figure 24.10 *MVLOGX Disc I/O Detail Report*

For information about the data in this report, please refer to "Disc I/O Detail Data" on page 106.

MVLOGX Sessions Workload Report

The Sessions Workload report in MVLOGX displays detailed information about the SESSIONS Workload.

```
MVLOGX /3000  I.03f(c) LPS     Location: LOGFILES.LUND        Log: 01/20/05 18:29
*** 18:29 ***********************************************************************
                        * * * Workload: SESSIONS   * * *
+------------------------------ Misc Statistics ---------------------------------+
|  Processes         5.0      Switches                 CPU CM %              0  |
|  Session           5.0      CM to NM        0/s      Launch/s              0  |
|  Job                .0      NM to CM        0/s      Page Fault/s          0  |
+-------- CPU Usage ---------+---------------- Disc I/O Usage -----------------+
|  System % :         .0     |  I/Os Total :        0      Rate Total:   0/sec  |
|  Ms Used  :          0     |       Reads :        0            Read :   0/sec  |
|  Per Trans:          0     |       Writes:        0            Write:   0/sec  |
+--- Response/Transactions --+--------------- Process Wait States -------------+
|  Trans Count:        0     |  CPU:    0    Mem:    0    Dsc:    0   Imp:    0  |
|  Trans/min  :        0     |  Pre:    0    RIN:    0    TWr:    0   BIO:    0  |
|  Prompt Resp:       .0     |  Tim:    0    FS :    0    Msg:    0   Oth:  100  |
|  First Resp :       .0     |                                                  |
+--------------------------------------------------------------------------------+
```

Figure 24.11 *MVLOGX Sessions Workload Report*

For information about the data in this report, please refer to “Workload Detail Data” on page 130.

MVLOGX File Space Utilization Report

The File Space report in MVLOGX displays key utilization and fragmentation statistics by disc drive and for all disc drives.

```
MVLOGX /3000  I.02a(c) LPS     Location: LOGFILES.LUND          Log: 06/09/03 06:46
---06/09/03-Monday     ----------------------------------------------------------
*** 06:46 **********************************************************************
                      * * * File Space Utilization * * *
      ----Used---  ---Avail---  -Max %-  --------Contiguous Free Space---------
Dev  Trans  Perm  Trans  Perm  Trans Perm  Largest  <100 <1000  <10K <100K 100K+
  1   445K 5325K    11M 7257K     75   75  6060352 15648  200K  154K  310K   10M
  2      0   13M    59M   59M    100  100 53580928 30432  281K 1278K  974K   56M
  3      0   14M    58M   58M    100  100 52978480 46176  192K 1158K  957K   56M
Tot   445K   32M   128M  124M     97   97 53580928 92256  675K 2591K 2242K  122M
*** 06:51 **********************************************************************
                      * * * File Space Utilization * * *
      ----Used---  ---Avail---  -Max %-  --------Contiguous Free Space---------
Dev  Trans  Perm  Trans  Perm  Trans Perm  Largest  <100 <1000  <10K <100K 100K+
  1   471K 5325K    11M 7256K     75   75  6060352 15248  187K  142K  310K   10M
  2      0   13M    59M   59M    100  100 53580928 30432  281K 1278K  974K   56M
  3      0   14M    58M   58M    100  100 52978480 46176  192K 1158K  957K   56M
Tot   471K   32M   128M  124M     97   97 53580928 91856  661K 2579K 2242K  122M
```

Figure 24.12 *MVLOGX File Space Utilization Report*

For information about the data in this report, please refer to "File Space Utilization Data" on page 167.

MVLOGX Disc Volume Report

If the discs on the system are partitioned into volume sets, the Disc Volume report in MVLOGX will display this information.

```
MVLOGX /3000  I.02a(c) LPS     Location: LOGFILES.LUND          Log: 06/09/03 06:46
---06/09/03-Monday     ----------------------------------------------------------
*** 06:46 ***********************************************************************
                         * * * Disc Volume * * *
DEV Mirror Volume Set                        Volume Name        Size   Free
  1        MPEXL_SYSTEM_VOLUME_SET           MEMBER1           16776K 11004K
  2        USER_VOLUME_SET                   MASTER            71874K 58753K
  3        USER_VOLUME_SET                   MEMBER1           71874K 57994K
Tot                                                              161M   128M
*** 06:51 ***********************************************************************
                         * * * Disc Volume * * *
DEV Mirror Volume Set                        Volume Name        Size   Free
  1        MPEXL_SYSTEM_VOLUME_SET           MEMBER1           16776K 10979K
  2        USER_VOLUME_SET                   MASTER            71874K 58753K
  3        USER_VOLUME_SET                   MEMBER1           71874K 57994K
Tot                                                              161M   128M
*** 06:56 ***********************************************************************
                         * * * Disc Volume * * *
DEV Mirror Volume Set                        Volume Name        Size   Free
  1        MPEXL_SYSTEM_VOLUME_SET           MEMBER1           16776K 10970K
  2        USER_VOLUME_SET                   MASTER            71874K 58752K
  3        USER_VOLUME_SET                   MEMBER1           71874K 57994K
Tot                                                              161M   128M_
```

Figure 24.13 *MVLOGX Disc Volume Report*

The data items in this report are described in Table 24.1.

Table 24.1 *MVLOGX Disc Volume Report Data Items*

Data Item	Description
DEV	The logical device number of the disc.
Mirror	If the disc is being mirrored, the number of the mirror disc will appear here.
Volume Set	The name of the volume set into which the disc has been partitioned.
Volume Name	The name of the disc. This will usually be Master or Member#.
Size	The physical size in KB (kilobytes) of the disc.
Free	The amount of space not used during the current interval.

MVLOGX Forecast Analysis Report

The Forecast Analysis report in MVLOGX displays information utilized in the Forecast Capacity Planner program from Lund Performance Solutions. This screen is only available to owners of Forecast.

```
MVLOGX /3000  I.03f(c) LPS     Location: LOGFILES.LUND         Log: 03/15/05 15:53
*** 15:53 ********************** Forecast Analysis ****************************

            CPU Busy:    .8       2383       Elapsed time:    303611    QL:   0

                Proc                         Disc   Disc    Tran     Resp    CPU/   Disc/
No Workload    Count   %CPU   CPU msec      Reads Writes   Count     Time    Tran    Tran
 1:LOOPER         .0     .0          0         0      0       0       .0       0       0
 2:FINANCEAP      .0     .0          0         0      0       0       .0       0       0
 3:LUND          4.0     .3        848         2     10       0       .0       0       0
 4:ACCOUNTPA      .0     .0          0         0      0       0       .0       0       0
 5:ACCOUNTRE      .0     .0          0         0      0       0       .0       0       0
 6:JOBS          5.0     .0        114         0      0       0       .0       0       0
 7:SESSIONS       .0     .0          0         0      0       0       .0       0       0

IO count    1:    1    2: 134
Queue Len      .00      1.58
```

Figure 24.14 *MVLOGX Forecast Analysis Report*

For information about the data in this report, please refer to the "*Forecast Capacity Planner User's Guide*".

25

MVLOGX REPORT CARD

MVLOGX Report Card Screen

The Report Card is an MVLOGX report that shows logged Meta-View performance data summarized in a concise fashion suitable for management. There are 18 different options that can be mixed and matched as desired to create a customized report best suited to your needs.

Report Card Configuration Options

The initial set-up of the Report Card is a simple matter of selecting options in the Report Card Configuration menu.

```
MVLOGX MAIN OPTION MENU
  Report card configuration

   1) Lines per output page (60)
   2) Global CPU Statistics section (1-Print on same pag)
   3) Global Misc Statistics section (1-Print on same pag)
   4) Global Memory Statistics section (1-Print on same pag)
   5) Disc Statistics section (2-Print on new page)
   6) Global Stop Reasons section (2-Print on new page)
   7) Workload Summary section (2-Print on new page)
   8) Average Advice section (2-Print on new page)
   9) Peak Advice section (1-Print on same pag)
  10) Advice Detail Report section (2-Print on new page)
  11) Advice Count section (0-Don't print)
  12) Break down disc stats by ldev (N)
  --- Report by zone
  14) Suppress unencountered stop reasons (Y)
  15) First advice type to suppress ()
  --- Second advice type to suppress
  17) Report advice detail by message (Y)
  18) Report informational advice messages (Y)

Which Option:
```

Figure 25.1 *Report Card Configuration Menu*

Each of the Report Card Configuration options is designed for ease of use and flexibility so you can tailor the reports specifically for your system.

Lines per Output Page

This option allows you to configure the output of your reports to your line printer. Enter the number of lines that your printer prints per page. The default value is 60 lines per page.

Global CPU Statistics Section

Choices are:

0 - Don't print

1 - Print on same page

2 - Print on new page

If you choose option 1 or 2, the printed report will contain averages for the time frame selected in REPORT CARD. The mean, standard deviation, high value and low value for each of the statistics will be listed (Figure 25.2).

07/16/03	MVHOST/3000 Report Card			Page 1
Item	Mean	SD	High	Low
Global CPU Statistics				
Total busy	86.2	8.07	98.9	68.7
AQ CPU%	1.5	1.37	2.9	.0
BQ CPU%	9.5	3.06	16.3	4.4
CQ CPU%	26.0	5.68	38.2	19.4
DQ CPU%	35.9	12.85	58.8	18.2
EQ CPU%	.0	.00	.0	.0
Memory Manager%	5.1	1.70	7.9	2.7
Dispatcher%	.1	.04	.2	.1
ISC/OH%	.9	1.83	4.6	.0
Pause for Disc I/O%	12.9	7.97	31.3	1.1
Idle%	.9	1.83	4.6	.0
CPU Queue Length	3	.5	4	2
Launches/sec	70	11.4	88	52
CPU CM%	26	7.5	40	16
SAQ	200	.0	200	200

Figure 25.2 *Report Card CPU Statistics Report*

Global Misc Statistics Section

Choices are:

0 - Don't print

1 - Print on same page

2 - Print on new page

If you choose either 1 or 2, this report will contain averages for the time frame that you chose in REPORT CARD. Option 2 will print the Misc Statistics on a different page than the Global CPU Statistics Report. The mean, standard deviation, high value and low value for each statistic will be listed (Figure 25.3).

07/16/03		MVHOST/3000 Report Card			Page 2
Item	Mean	SD	Conf.	High	Low
Global Miscellaneous Statistics					
Session	102	1.9	5	105	99
Jobs	15	.6	5	16	14
Processes	629	9.8	5	16	14
CM to NM Switches/sec	483	433.8	5	1553	225
NM to CM Switches/sec	30	11.3	5	56	19
Transactions/minute	498	249.8	5	56	19
First Response	.1	.03	5	1012	320
Prompt Response	.3	.08	5	.4	.2

Figure 25.3 *Report Card Global Misc Statistics Report*

Global Memory Statistics Section

Choices are:

0 - Don't print

1 - Print on same page

2 - Print on new page

If you choose either 1 or 2, this report will print and it will average the information for the time frame selected in REPORT CARD. The mean, standard deviation, high value and low value for each of the statistics will be listed (Figure 25.4).

07/16/03		MVHOST/3000 Report Card			Page 3
Item	Mean	SD	Conf.	High	Low
Global Memory Statistics					
Page Faults/sec	14	4.4	5	23	6
Library Fault%	2	1.6	5	5	1
Memory Cycles	1	.6	5	2	0
Read Hit %	94	3.6	5	99	87
Overlay Rate	6	5.8	5	18	1
Swaps/Launch	.35	.074	5	.51	.27

Figure 25.4 *Report Card Memory Statistics Report*

Global Disc Statistics Section

Choices are:

0 - Don’t print

1 - Print on same page

2 - Print on new page

If you choose either 1 or 2, this report will print and it will average the information for the time frame selected in REPORT CARD. The mean, standard deviation, high value and low value for each of the statistics will be listed (Figure 25.5).

This option works with menu option "Break down disc stats by LDEV".

The default for this option is **Y** (Yes). If you choose to change this to **N** (No), only a Total Global Disc Statistics Report will print.

Notice that each device will be followed by a report on that device and then at the end a Total Global Disc Statistics summing all of the disc drives will print. For this sample we have labeled the device as "n" (some integer).

07/16/03		MVHOST/3000 Report Card			Page 4
Item	Mean	SD	Conf.	High	Low
Global Disc Statistics					
Disc Reads/Sec	3	.8	5	4	2
Disc Writes/Sec	3	.8	0	4	2
Disc IO/Sec	6	1.3	5	8	4
Disc Request Queue Length	1.92	.901	5	3.36	.61
Percent of Total Disc I/O	14	3.4	5	22	11
Total I/O	1701	388.5	5	2472	1233

Figure 25.5 *Report Card Global Disc Statistics Report*

Global Stop Reasons Section

Choices are:

0 - Don't print

1 - Print on same page

2 - Print on new page

If you choose either 1 or 2, this report will print and it will average the information for the time frame selected in REPORT CARD. The mean, standard deviation, high value and low value for each of the statistics will be listed (Figure 25.6).

Stop Reasons are the reasons that a process loses the CPU as determined by the MPE dispatcher. The report lists the Stop Reasons encountered during the interval. It is possible to list all Stop Reasons encountered or not by choosing option "Suppress unencountered stop reasons".

07/16/03		MVHOST/3000 Report Card			Page 5
Item	Mean	SD	Conf.	High	Low
Stop Reasons					
Terminal Read Stop %	12	3.9	5	19	8
Terminal Write Stop %	0	.3	5	1	0
Other I/I Stop %	1	.7	5	3	1
IOWAIT Stop %	1	.0	5	1	1
Suspend on Father Stop %	0	.3	5	1	0
Suspend on Son Stop %	1	.3	5	2	1
Port Stop %	11	4.2	5	19	7
Junk Stop %	1	.3	5	2	1
Fill Disc Stop %	1	.7	5	2	0
CPU Preempt Stop %	13	2.6	5	18	9

Figure 25.6 *Report Card Stop Reasons Report*

Workload Summary Section

Choices are:

0 - Don’t print

1 - Print on same page

2 - Print on new page

If you choose either 1 or 2, this report will print and it will average the information for the time frame that you choose when you are in REPORT CARD. When you choose "2 - Print on new page", then this report option will print on a different page. The mean, standard deviation, high value and low value for each of the statistics will be listed (Figure 25.7).

A report will print for each workload that you have defined in your workload definition file, MVWKDEF.MVDATA.LUND (“Keep in mind that you can also log workload information and utilize the logging facility to prepare ASCII data files to download to a PC or data may be exported into Performance Gallery.” on page 275). If no workloads have been defined then only three workloads will be reported. These three are the default workloads of JOBS, SESSIONS, and SYSPROCS (system processes).

If you have changed your workload definition file (MVWKDEF) during the period you are including within your report, Report Card will break your report into time slices for every change to the workload definition file. In each of these sections an informational message will be printed noting that multiple workloads have been detected. This ensures that the data is reliable, because averaging data that was not created with the same criteria is like mixing apples and oranges.

07/16/03		MVHOST/3000 Report Card			Page 6
Item	Mean	SD	Conf.	High	Low
Sessions Workload Summary					
CPU Percentage	19.3	4.82	5	31.4	14.5
Total Disc I/O%	40.8	6.02	5	49.5	31.0
Avg Prompt Response Time	.3	.05	5	.3	.2
Total Transactions	1328	180.7	5	.3	.2
CPU Time per Transaction	46	16.5	5	89	30
Disc I/O per Transaction	4	1.0	5	5	2
Avg First Response Time	.1	.03	5	.2	.1
CPU Time in msecs	136880	42720.3	5	196350	74080
Disc Read Count	3931	844.8	5	965530	449680
Disc Write Count	843	295.1	5	1263	455

Figure 25.7 *Report Card Sessions Workload Summary Report*

Average Advice Section

Choices are:

0 - Don't print

1 - Print on same page

2 - Print on new page

If you choose either 1 or 2, this report will print and it will average the information for the time frame selected in REPORT CARD. When you choose "2 - Print on new page", then this report option will print on a different page.

These are the informational or excessive messages that occurred during the average of all performance indicators, in other words, it is a representative time performance report of your system (). The Mean Interval Advice messages are a useful indicator of what the average performance hindrances might be for your system.

```
07/16/03                         MVHOST/3000 Report Card              Page 7

***Mean Internal Advice***
Comp. Mode to Native Mode Switch rate during this interval was EXCESSIVE    <GE03>
Disc I/O indicator #1 (CPU Pause Disc) reveals a HEAVY I/O Bottleneck       <DE01>
Memory indicator #2 (CPU Memory) reveals a MODERATE memory load             <ME02>
Memory indicator #4 (Page Fault Rate) reveals a MODERATE memory load        <ME04>
```

Figure 25.8 *Report Card Mean Internal Advice Report*

See also:

- “First Advice Type to Suppress” on page 239.

Peak Advice Section

Choices are:

0 - Don’t print

1 - Print on same page

2 - Print on new page

If you choose either 1 or 2, this report will print and it will select the highest or worst measurement information for the time frame that you choose when you are in REPORT CARD. When you choose "2 - Print on new page", then this report option will print on a new page.

Peak Advice Messages are the informational or excessive messages that occurred during the highest or worst measurement of all the performance indicators. In other words, it is a snapshot of when your HP e3000 resources are being stressed the most (Figure 25.9).

```
07/16/03                         MVHOST/3000 Report Card              Page 8

***Peak Internal Advice***
CPU Consumption due to system overhead during this interval was MODERATE    <GE01>
Native Mode to Comp. Mode Switches rate during this interval was MODERATE   <GE02>
Disc I/O indicator #1 (CPU Pause Disc) reveals and EXCESSIVE I/O bottleneck <DE01>
Memory indicator #2 (CPU Memory) reveals a MODERATE memory load             <ME02>
Memory indicator #3 (Swap/Launch) reveals a MODERATE memory load            <ME03>
Memory indicator #4 (Page Fault Rate) reveals a MODERATE memory load        <ME04>
```

Figure 25.9 *Report Card Peak Internal Advice Report*

See also:

- "First Advice Type to Suppress" on page 239

Advice Detail Report Section

Choices are:

0 - Don't print

1 - Print on same page

2 - Print on new page

If you choose either 1 or 2, this report will print all informational messages selected in REPORT CARD. When you choose "2 - Print on new page", then this report option will print on a new page.

A sample report will appear displaying all Advice Detail Messages (Figure 25.10). This option is useful if you have a specific time interval in mind that you want to investigate. For example, if you notice that a batch job was very slow at a certain time you can list the informational messages to investigate the cause.

```
07/16/03                 MVHOST/3000 Report Card                  Page 9

***Advice Detail Report***

Disc I/O indicator #1 (CPU Pause Disc) reveals a MODERATE I/O Bottleneck        <DE01>
    07/16/01 06:30 AM   07/16/01 06:35 AM   07/16/01 06:45 AM   07/16/01 06:55 AM
    07/16/01 07:00 AM   07/16/01 07:20 AM   07/16/01 08:20 AM   07/16/01 08:50 AM
    07/16/01 08:55 AM   07/16/01 09:20 AM   07/16/01 10:30 AM   07/16/01 11:25 AM
    07/16/01 11:55 AM   07/16/01 01:20 PM   07/16/01 02:40 PM   07/16/01 02:55 PM
    07/16/01 03:15 PM   07/16/01 04:50 PM   07/16/01 04:55 PM   07/16/01 05:25 MP
Disc I/O indicator #1 (CPU Pause Disc) reveals a HEAVY I/O Bottleneck     <DE01>
    07/16/01 06:20 AM   07/16/01 06:50 AM   07/16/01 08:10 AM   07/16/01 08:30 AM
    07/16/01 10:10 AM   07/16/01 11:30 AM   07/16/01 02:20 PM   07/16/01 02:45 PM
    07/16/01 03:35 PM   07/16/01 04:20 PM   07/16/01 04:45 PM
Disc I/O indicator #1 (CPU Pause Disc) reveals and EXCESSIVE I/O Bottleneck       <DE01>
    07/16/01 07:45 AM   07/16/01 09:15 AM   07/16/01 09:20 AM   07/16/01 09:40 AM
    07/16/01 10:20 AM   07/16/01 10:25 AM   07/16/01 01:25 PM   07/16/01 01:40 PM
    07/16/01 02:50 PM   07/16/01 03:05 PM   07/16/01 04:00 PM   07/16/01 04:10 PM
    07/16/01 04:25 PM   07/16/01 05:00 PM   07/16/01 05:05 PM   07/16/01 05:10 PM
    07/16/01 05:15 PM
```

Figure 25.10 *Report Card Advice Detail Report*

NOTE When printing the Advice Detail Report, it is best to select a short sample interval in REPORT CARD, otherwise the print job could consume reams of paper.

See also:

- “First Advice Type to Suppress” on page 239
- “Report Advice Detail by Message” on page 240
- “Report Informational Advice Messages” on page 240

Advice Count Section

Choices are:

0 - Don’t print

1 - Print on same page

2 - Print on new page

If you choose either 1 or 2, this report will print all informational messages selected in REPORT CARD. When you choose "2 - Print on new page", then this report option will print on a new page.

A sample report will appear displaying the count on all advice messages (Figure 25.11). This information is useful to indicate the frequency of each informational message. For example, if you see the message "Disc I/O indicator #1 (CPU Pause Disc) reveals an EXCESSIVE I/O Bottleneck" with a count of 300 and you only have 300 samples, you should investigate to determine if you have a resource problem or an application problem.

```
07/16/03                    MVHOST/3000 Report Card            Page 10

***Advice Counts Report***

Disc I/O indicator #1 (CPU Pause Disc) reveals a MODERATE I/O Bottleneck    <DE01>
Count:          22
Disc I/O indicator #1 (CPU Pause Disc) reveals a HEAVY I/O Bottleneck       <DE01>
Count:          18
Disc I/O indicator #1 (CPU Pause Disc) reveals and EXCESSIVE I/O Bottleneck <DE01>
Count:          22
Native Mode to Comp. Mode Switch rate during this interval was MODERATE <GE02>
Count:          73
Native Mode to Comp. Mode Switch rate during this interval was HEAVY        <GE02>
Count:          19
```

```
Native Mode to Comp. Mode Switch rate during this interval was EXCESSIVE   <GE02>
Count:          5
Comp. Mode to Native Mode Switch rate during this interval was MODERATE   <GE03>
Count:          10
Comp. Mode to Native Mode Switch rate during this interval was HEAVY      <GE03>
Count:          10
Comp. Mode to Native Mode Switch rate during this interval was EXCESSIVE  <GE03>
Count:          115
Global average response time during this interval was MODERATE            <GE04>
Count:          3
Global average response time during this interval was HEAVY               <GE04>
Count:          1
Global average response time during this interval was EXCESSIVE           <GE05>
Count:          1
Memory indicator #3 (Swap/Launch) reveals a MODERATE memory load          <ME03>
Count:          24
Memory indicator #3 (Swap/Launch) reveals a HEAVY memory load             <ME03>
Count:          7
Memory indicator #3 (Swap/Launch) reveals an EXCESSIVE memory load        <ME03>
Count:          24
Memory indicator #4 (Page Fault Rate) reveals a MODERATE memory load      <ME04>
Count:          24
Memory indicator #4 (Page Fault Rate) reveals a HEAVY memory load         <ME04>
Count:          50
Memory indicator #4 (Page Fault Rate) reveals an EXCESSIVE memory load    <ME04>
Count:          28
```

Figure 25.11 *Report Card Advice Count Report*

See also:

- “First Advice Type to Suppress” on page 239

Breakdown of Disc Stats by LDEV

This option works with the "Disc Statistics section" option.

If the "Disc Statistics section" option is set to print, and the "Breakdown of Disc Stats by LDEV" option is set to the default of **Y** (Yes), then every LDEV will be followed by a report on that device. A summary of the Total Global Disc Statistics for all drives will be included at the end of the report.

If you choose to change this to **N** (No) only a Total Global Disc Statistics Report will print.

Report by Zone

Zones or shifts are originally defined in the Data Break Configuration submenu (page 202). The default is to accept the zones as you have previously defined them, and then each zone is reported individually and summarized in the global statistics reports.

If you choose to ignore the zones that you have defined (change this option to **N** (No)), then the entire time period you specify will be examined as a whole and averaged together.

This information is useful if you have specified zones that indicate different usage/utilization of your HP e3000. An example of this is to "zone" the heavy interactive use from the heavy batch processing use. Are the interactive users heavy from 9 AM to 3 PM? Is this different from the batch job runs?

Suppress Unencountered Stop Reasons

The default value for this option is **Y** (Yes). This option works with menu option "Global Stop Reasons section".

Stop Reasons are explanation of why a process loses the CPU as determined by the MPE dispatcher during the interval.

If you would like a listing of all the possible Stop Reasons, whether or not they were encountered, change the value for this option to **N** (No).

First Advice Type to Suppress

This menu option works with all Advice menu options (options 8-11).

Your choices are:

1 - EXCESSIVE advice messages

2 - HEAVY advice messages

3 - MODERATE advice messages

The default value for this option is blank. If you would like to exclude certain types of advice messages choose the associated number. If you choose a number, then option "Second advice type to suppress" will become available for you to select.

Second Advice Type to Suppress

If you choose to exclude a type of Advice message, then it will not appear on any of your reports. For example, you can choose to exclude the MODERATE and HEAVY messages from your reports if you are interested in EXCESSIVE message only.

Report Advice Detail by Message

If you choose to print the Advice Detail, then you have the option of ordering your detail report by advice message. You will see a detail report that uses the advice message as a header and then notes the time stamp when that message occurred. This is an easy way to scan your data for peak resource stress time periods.

Report Informational Advice Messages

If you choose to print the Advice Detail, then you have the option of suppressing or enabling the reporting of information messages as well as exceptional messages.

Generating a Report Card

To generate a Report Card:

1. Run MVLOGX.MVPGMS.LUND.
2. Select UTILITY KEYS (F5) and the REPORT CARD (F6) function key. You will then see a Report Card time prompt screen. Choose the dates and times you would like your reports to include.
3. Select the REPORT CARD function key to generate the Report Card.

To view the report card, see the next section, "Printing a Report Card."

Printing a Report Card

To print the Report Card to your screen:

1. Exit MVLOGX.
2. At the MPE prompt, type listspf.
3. Scan the list of spoolfiles. The last RCRDLIST file in the list is the most recent printout of the Report Card.

   The example in Figure 25.12, shows the number of the RCRDLIST is 86496.
4. At the MPE prompt, type printo, and then the number associated with the file (omit the number sign (#) and the zero (0)).

Report Card Example

```
#086455    J17      $STDLIST   8      1 LP      READY       MGR.LUND
#086477    J37      $STDLIST   8      1 LP      READY       MGR.LUND
#086480    J40      $STDLIST   8      1 LP      READY       MGR.LUND
#086481    J41      $STDLIST   8      1 LP      READY       MGR.LUND
#086483    J43      $STDLIST   8      1 LP      READY       MGR.LUND
#086484    J44      $STDLIST   8      1 LP      READY       MGR.LUND
#086488    J48      $STDLIST   8      1 LP      READY       MGR.LUND
#086489    J49      $STDLIST   8      1 LP      READY       MGR.LUND
#086496    S69      RCRDLIST   8      1 LP      READY       MGR.LUND
#086442    J4       $STDLIST   8      1 LP      CREATE      MGR.LUND
#086492    J52      $STDLIST   8      1 LP      CREATE      MGR.LUND
#086493    J53      $STDLIST   8      1 LP      CREATE      MGR.LUND

INPUT SPOOL FILES             OUTPUT SPOOL FILES
ACTIVE    = 0;                CREATE    = 3;            READY    = 10;
OPEN      = 0;                DEFER     = 0;            SELECTED = 0;
READY     = 0;                DELPND    = 0;            SPSAVE   = 0;
                              PRINT     = 0;            XFER     = 0;
                              PROBLM    = 0;

TOTAL IN FILES    = 0;        TOTAL OUT FILES    = 13;
      IN SECTORS  = 0;              OUT SECTORS  = 1200;

OUTFENCE = 13
```

Figure 25.12 *MVLOGX Report Card*

A

Wait States

Overview

Meta-View for MPE/iX wait states information is displayed in the following MVHOST screens:

- In the extended process line of the Process Information portion in the Global Summary.
- In the Process Wait States portion of the Process Detail screen.
- In the Workload Wait States portion of the Workload Detail screen.

Wait State Definitions

The wait state codes defined in this glossary are specific to the performance data provided by Meta-View Performance Manager for MPE/iX.

Wait: Cur

The current wait states are described in Table A.1.

Table A.1 *Meta-View for MPE/iX Wait States: Current*

Wait State	Description
BIO	Waiting for non-disc I/O to complete
CPU	Currently active in the CPU resource
Dead	Terminated and will not show in the next interval
Disc	Waiting for disc I/O to complete
FS	Waiting for activation by its father or son process
Imp	Waiting because a resource is unavailable (database locks, lack of system table entries, etc.)

Wait State	Description
Mem	Waiting for segment(s) to be brought into memory
Msg	Waiting for message file I/O, port sendmail or port receive mail
Pre	Preempted by a higher priority process
RIN	Waiting for a RIN to become available
Time	Waiting for a timer
TRd	Waiting for a terminal read to complete
TWr	Waiting for a terminal write to complete
Othr	Waiting for another miscellaneous condition

Wait: {CP ME DI IM PR RI TR IO TI FS MS OT}

The remaining wait states are described in Table A.2.

Table A.2 *Meta-View for MPE/iX Wait States: CP, ME, DI, IM, PR, RI, TR, IO, TI, FS, MS, OT*

Wait State	Description
CP	The percentage of the process' response time due to servicing by the CPU. That is, it takes time away from the CPU to perform the commands of processes. **Performance Tip** For processes that are computation intensive, you will usually see a high number in this category. It is possible that a process exhibiting close to 100% is in a looping state, especially if the program has not completed as desired.

Wait State	Description
ME	The percentage of the process' response time that is due to time spent waiting for missing memory segments to return to main memory. When a process tries to continue to run but cannot because of missing necessary memory segments, that process is blocked. Memory fault stop time is counted in this category. **Performance Tip** There may be numbers greater than 10% in this category for systems that do not have an adequate amount of main memory to support current demands. Systems exhibiting severe memory shortage will show most user processes, which need even modest amounts of memory, as high memory wait percentages in this bucket. If only a few processes typically report values greater than or equal to 20% to 30%, you should look at their individual memory requirements. It is possible that a particular application is gorging itself on memory space. A re-design of that program might be warranted. Remember, when dealing with process brick walls (in this case absent memory segments), small percentages are desirable. Less than 10% in this wait state is preferable.
DI	The percentage of the process' response time due to waiting for missing data to be brought into main memory from disc. An I/O brick wall occurs when a process wants to continue running, but cannot because necessary user-requested data is missing from disc. Since a process literally stopped and the CPU is taken away when a physical disc access is performed, it is absolutely necessary to minimize this percentage. **Performance Tip** If you notice that the CPU Pause time (Global Screen) is rising above 10-15% most of the time, you will usually find that one or more processes are spending a moderate-to-high percentage of their processing time waiting for disc I/Os to complete. If a process is consistently waiting more than 20-30% of its time on disc I/O servicing, then we should find out why. There are a number of reasons why I/O bottle-necking can take place. Some of the more common culprits are: • TurboIMAGE master and detail set inefficiencies. • Inefficient pre-fetching operation (lack of CPU, memory, poor I/O locality). • Too many I/O demanding processes running at once, etc. Please refer to the Disc I/O and TurboIMAGE chapters in the book "Taming the HP 3000" for more problem/solution information in this area.

Wait State	Description
IM	The percentage of the process' response time due to being impeded by various lock and latch control mechanisms. This category includes many stop reasons. An impede occurs when a process tries to gain access to a software table or control structure and cannot because other processes arrived first. TurboIMAGE access is one of the most common sources of impedes. When a process wants to gain entry to a particular dataset and another process has that set locked via the DBLOCK intrinsic, then the waiting process is counted as having been impeded. It must wait until the prior process is finished with its current operation before it can continue. Also, any file may have only one disc request outstanding. That is, in order for a process to access even a simple MPE/iX flat file, it must first gain control of that file's control block. This access is not by the FLOCK intrinsic as is the case in the RIN wait state bucket. Rather, only one user (regardless of programmatic locking) can gain access at a time. Other sources of impedes include unavailable system table entries, terminal buffers, etc. **Performance Tip** The interpretation of impedes can be difficult because there are potentially many causes and inter-relationships between processes and resources. First of all, it is best to determine the overall global impede rate. This is done by looking at the Impede value on the Global Process Stop Reasons screen. If the Global Impede percentage is consistently high, then it is important to look at individual processes that show high impede percentages as a part of their processing time. Processes that access the same database in applications where poor locking strategies are implemented tend to spend a very large percentage of their time being impeded. It is not uncommon to see values in excess of 60% for these processes in the impeded wait state. A large percentage may point to poor locking or simply a great deal of competition for a particular file.

Wait State	Description
PR	The percentage of the process' response time due to preemption by other processes. A preemption occurs when a process is forced to give up use of the CPU because a higher priority process is ready to execute. **Performance Tip** If both interactive and batch processes are running, batch processes (those in lower queues) will receive a higher number of preemptions than processes running in the interactive queue. If interactive users are spending a large percentage of their response time being preempted it is possible that there is not enough CPU horsepower to go around. Either backing off on demand or increasing the supply are your recourses. You may try doling out the CPU resource by means of the TUNE command or a program to accomplish this. The basic strategy is to give less CPU attention to those who can stand it, and provide more to those who really need it.
RI	The percentage of time the process is waiting for a RIN.
TR	The percentage of time the process is waiting for terminal writes to complete. Since terminal output is usually buffered, this will only accumulate time if the system runs out of terminal buffers or if the program is blocking on terminal output.
IO	The percentage of time the process is waiting for non-disc I/O to complete (e.g., tape drive activity). Datacom overhead is accumulated in this bucket as well.
TI	The percentage of time the process is waiting for a programmatic timer (such as the PAUSE intrinsic) to complete.
FS	The percentage of time the process is waiting on a father and/or son wait.
MS	The percentage of time the process is waiting on a message file, port, or sendmail/receivemail wait.
OT	The percentage of time the process is waiting on other events not covered by the above definitions.

B

Advice Messaging Catalog

Each of the advice messages follow a similar format. Advice messages are displayed on a terminal screen or in STDLIST in the case of a batch job. Messages can be sent to the console and to individual sessions via the TELLOP and TELL commands, respectively. All selected advice messages will be sent to a list of users and/or the system console. The TELL function is implemented as follows:

TELLOP

TELL MANAGER.SYS

TELL MGR.FINANC

<GI01> The CPU was...

Simply list potential target users by placing TELL or TELLOP in the first part of the file. To select specific messages to be sent, place an exclamation point (!) before the item. To select specific exceeded threshold messages, place an exclamation before the threshold.

Global Advice Messages <GXnn>

Each of the global messages relate to the "big picture" on the system. They will primarily refer to CPU states, but other events will be included as well. Global messages will include Informational (I) and Excessive (E) messages. "E" messages may require immediate action and should always be heeded.

<GI01> Global System CPU Usage

This informational message is a summary of the total amount of work actively performed by the CPU during the current interval. This number will be the same as the Total Busy: value in the Global CPU Statistics (tabular) section. Therefore, the CPU Statistics section does not have to be enabled in order to view this statistic.

<GI02> Process CPU Usage by Subqueue

This reveals the amount of CPU capacity being consumed within each subqueue. Noting the difference in utilization between the CS subqueue and the DS/ES subqueues, as this denotes how much CPU time is spent on interactive vs. batch processing. If the A and B subqueues are receiving an abundance of CPU time, this may indicate that system processes (or user processes that have "queue jumped") are creating problems. Unless special applications require the use of the B subqueue, most processing will occur in the CS subqueue during primary shift hours, and the DS subqueue during off-shift hours. This value is also found in the Global CPU Statistics section of the Global screen.

<GE01> Global System CPU Overhead Usage

This is an excessive condition indicator. It will only appear when the CPU Overhead percentage exceeds certain thresholds. This value is the same as the ICS/OH value in the CPU Global Statistics portion of the Global tabular screen. The default thresholds and their associated messages are listed below.

- If CPU Overhead is greater than or equal to 10% and less than 12%:

  CPU consumption due to system overhead during this interval was MODERATE
- If CPU Overhead is greater than or equal to 12% and less than 14%:

  CPU consumption due to system overhead during this interval was HEAVY
- If CPU Overhead is greater than 14%:

  CPU consumption due to system overhead during this interval was EXCESSIVE

As mentioned before, this statistic represents time spent by the CPU handling interrupt activity from DTCs and disc drives. Pressing RETURN (or ENTER) to get and MPE prompt is one such interrupt. Handling disc I/O completions are another.

The Advice section provides a message to help narrow down the cause(s) of high overhead utilization. Excessive terminal or disc I/O by a single (or multiple) process(es) can induce elevated overhead values and can affect response times significantly. This indicator is worth watching. If this number reaches as high as 30%, it is possible that a device (perhaps a modem or multiplexing device) is malfunctioning and is sending an inordinate number of interrupts to the system.

<GE02> Native Mode to Compatibility Mode Switch Rate

If this type of mode switching becomes excessive, the Advice section will display the appropriate message. Elevated mode switches can drain the CPU, forcing other processes to take longer to complete. This is especially true for NM to CM switches (see “CPU CM%” on page 54). These categories and the associated messages are listed below.

- If the NM to CM switch rate is greater than or equal to 50 per second but less than 100:

  Native Mode to Comp. Mode Switch rate during this interval was MODERATE
- If the NM to CM switch rate is greater than or equal to 100 per second but less than 200:

  Native Mode to Comp. Mode Switch rate during this interval was HEAVY

- If the NM to CM switch rate is greater than 200 per second:

  Native Mode to Comp. Mode Switch rate during this interval was EXCESSIVE

Refer to the Process Detail screen to find which processes are performing excessive switches.

<GE03> Compatibility Mode to Native Mode Switch Rate

If this type of mode switching becomes excessive, the Advice section will display the appropriate message. While CM to NM switches are less CPU-intensive than NM to CM switches, they still put an extra load on the CPU which can affect completion times for other processes. These categories and the associated messages are listed below.

- If the CM to NM switch rate is greater than or equal to 100 per second but less than 200:

  Comp. Mode to Native Mode Switch rate during this interval was MODERATE

- If the CM to NM switch rate is greater than or equal to 200 per second but less than 300:

  Comp. Mode to Native Mode Switch rate during this interval was HEAVY

- If the CM to NM switch rate is greater than 300 per second:

  Comp. Mode to Native Mode Switch rate during this interval was EXCESSIVE

<GE04> Global Average Response Times

This message appears when average prompt response times exceed various thresholds on the system. These categories and the associated messages are listed below.

- If response time is greater than or equal to 10 seconds but less than 15:

  Global average response time during this interval was MODERATE

- If response time is greater than or equal to 15 seconds but less than 20:

  Global average response time during this interval was HEAVY

- If response time is greater than 20 seconds:

  Global average response time during this interval was EXCESSIVE

<GE05> CPU Queue Length

This message appears when the CPU queue length exceed certain thresholds. Excessive CPU requests indicate that the CPU is not adequate for the amount of processing requested of it, or that too many jobs are being allowed to run concurrently. These categories and the associated messages are listed below.

- If the CPU queue length is greater than or equal to 5 but less than 10:

  CPU queue length indicates a MODERATE CPU bottleneck

- If the CPU queue length is greater than or equal to 10 but less than 15:

  CPU queue length indicates a HEAVY CPU bottleneck
- If the CPU queue length is greater than 15:

  CPU queue length indicates an EXCESSIVE CPU bottleneck

<GE06> Logon Failure Due to Shortage of Resources

This message appears when a logon fails because of a shortage of resources (CPU, disc, etc.). Excessive logon failures indicate that resources may be inadequate due to program hangs or database locks.

<GE07> Logon Failure Due to Shortage of Output Devices

This message appears when a logon fails because output devices are excessively involved. Excessive output requests can overload the CPU and contribute to poor performance.

<GE08> Logon Failure Due to Shortage of Disc Space

This message appears when a logon fails because disc space is lacking. When this occurs, programs usually abort or fail. Disc space must be freed up to improve performance.

Disc Advice Messages <DXnn>

<DE01> CPU Wait for Disc

This message appears when the CPU pause for disc I/O value exceeds certain thresholds. Excessive disc I/O indicates a possible shortage of memory or data locality issues. These categories and the associated messages are listed below.

- If the CPU wait for disc value is greater than or equal to 5 but less than 10:

  Disc I/O indicator #1 (CPU Pause Disc) reveals a MODERATE I/O bottleneck
- If the CPU wait for disc value is greater than or equal to 10 but less than 15:

  Disc I/O indicator #1 (CPU Pause Disc) reveals a HEAVY I/O bottleneck
- If the CPU wait for disc value is greater than 15:

  Disc I/O indicator #1 (CPU Pause Disc) reveals an EXCESSIVE I/O bottleneck

Memory Advice Messages <MXnn>

These messages are prefixed with an M, but follow the same format as Global messages. The majority of these messages are EXCESSIVE in nature are presented when memory resources are being heavily burdened. If HEAVY or EXCESSIVE messages are common on the system, it is very likely that the system does not have enough memory for the amount of processes required of it. CPU, disc, and response time indicators can all be adversely affected by a shortage of memory.

To alleviate the memory load, do one or more of the following:

- Reschedule or redesign memory hog processes.
- Add memory.
- Restrict the number of jobs that may start up at any one time.
- Reschedule batch processes to run after primary shift hours.

<ME02> CPU Busy on Memory Management

The amount of time the CPU spends dealing with memory paging activity is usually proportional to the amount of memory necessary. When the CPU spends more than a few percentage points of its time managing main memory, there may be a memory shortage. These categories and the associated messages are listed below.

- If memory manager percentage is greater than or equal to 4% but less than or equal to 8%:

  Main Memory indicator #2 (CPU Memory) reveals a MODERATE memory load
- If memory manager percentage is greater than or equal to 9% but less than or equal to 12%:

  Main Memory indicator #2 (CPU Memory) reveals a HEAVY memory load
- If memory manager percentage is greater than 12%:

  Main Memory indicator #2 (CPU Memory) reveals an EXCESSIVE memory load

<ME03> The Ratio of Memory Swaps to Process Launches

Each time a process is granted the CPU's attention, the dispatcher has to decide whether or not all the necessary data for that process are present in main memory. If all the data are not present, the memory manager has to perform a disc I/O. One swap per 10 launches is a ratio of 0.10 swaps per launch. As this ratio escalates, the system works harder to satisfy memory requests, without actually performing more productive work. Consequently, response times can increase, especially if this ratio reaches around 0.5 or higher. These categories and the associated messages are listed below.

- If swaps to launch ratio is greater than or equal to 0.4 but less than 0.6:

  Memory indicator #3 (Swap/Launch) reveals a MODERATE memory load

- If swaps to launch ratio is greater than or equal to 0.6 but less than 0.8:

  Memory indicator #3 (Swap/Launch) reveals a HEAVY memory load
- If swaps to launch ratio is greater than 0.8:

  Memory indicator #3 (Swap/Launch) reveals an EXCESSIVE memory load

<ME04> The Page Fault Rate

This value represents the number of times per second that memory page faulting occurred. A page fault is counted when a process needs a memory object (code or data) that is absent from main memory. Any consistent value of more than 25 page faults per second is indicative of a possible memory bottleneck.

Note, however, that the page fault rate depends on the size of the system. See Table C.2 on page 259 for a breakdown of these rates. The value of 25 is used as a benchmark.

The page fault categories and the associated messages are listed below.

- If the page faults per second rate is greater than or equal to 10 but less than 15:

  Memory indicator #4 (Page Fault Rate) reveals a MODERATE memory load
- If the page faults per second rate is greater than or equal to 15 but less than 20:

  Memory indicator #4 (Page Fault Rate) reveals a MODERATE memory load
- If the page faults per second rate is greater than 20:

  Memory indicator #4 (Page Fault Rate) reveals an EXCESSIVE memory load

Process Advice Messages <PInn>

Process Advice messages are prefixed with a P because they describe various conditions relating to individual process activity. Many times, a global problem is induced by one or two "problem" processes. It is especially critical to pay attention to the high resource usage process messages (identifying the "Hog" process).

<GI02> Process CPU Usage by Subqueue

See "<GI02> Process CPU Usage by Subqueue" on page 249.

<PI02> The Hog Process of the Current Interval

The Hog process is simply the highest CPU-user for the current interval. There will always be an advice message indicating which process this is, even if the Hog is only using a tiny portion of the CPU. If, however, the Hog is consistently using vast amounts of CPU resource, you can drill down into this process by pressing the HOG PROC ZOOM function key. This one process may be affecting the performance of all other processes on the system.

<PI03> The High Disc I/O Usage Process

This message identifies the job or session that generated the highest number of combined reads and writes to disc during the current interval. If an extremely high number of disc I/Os are being performed by a particular process, it is also likely using a large portion of the CPU, which has to service the I/O. This message can indicate a number of issues at work. It may be that one or more TurboIMAGE datasets that were accessed by that process are experiencing data locality issues. This is an excellent method for finding application or data file inefficiencies.

<PI04> The High Terminal I/O Process

This message identifies the user session during the current interval that generates the highest number terminal reads. Refer to the “Global Misc Statistics (Tabular Format)” on page 55 for more information on terminal I/O specifics. The high terminal I/O user will indicate one of three possibilities:

- The user is holding the RETURN/ENTER key down.
- The application is inefficient.
- The application is efficient, but demanding. Some character mode applications generate terminal reads excessively.

If this process fall into one of the Application Workload groups that has been previously defined as having a certain amount of terminal reads per user transaction, then the number reported will reflect the approximate user transactions.

C

META-VIEW FOR MPE/IX PULSE POINTS

Pulse points are the indicators of performance displayed in the MVHOST Pulse Points screen. For information about Pulse Point performance indicators, see “MVHOST Pulse Points” on page 71.

The following HP e3000 Pulse Points performance ranges are generic for all HP e3000 systems—customizing them for your system is recommended. Please refer to the configuration instructions in “Pulse Points” on page 33.

Table C.1 *Meta-View for MPE/iX Pulse Points*

Performance Indicator	Performance Ranges		
	Acceptable	Problematic	Critical
Processor Performance			
High Pri Busy (%) The summations of the AQ+BQ+CQ+Memory+Dispatch+ICS/OH. High Priority busy time is a good indicator of CPU saturation.	less than 50	50 to 85	greater than 85
CPU QL The average number of processes that required use of the CPU in order to continue processing during the last interval. This number is roughly equivalent to the number of processes appearing in the upper right hand column of the SHOWQ command, except that SOS/3000 provides a current and cumulative average.	less than 5	5 to 15	greater than 15
ICS/OH+Dispatch (%) The time the CPU spends dealing with external device activity and the time the CPU spends on dispatcher activity. Time handling disc I/O completions are included here. Interrupt Control Stack activity ICS requires service time by the CPU.	less than 10	10 to 15	greater than 15
CPU CM (%) The average number of time the CPU spends in Compatibility Mode program code.	less than 10	10 to 15	greater than 15

Performance Indicator	Performance Ranges		
	Acceptable	Problematic	Critical
AQ+BQ The beginning letters (i.e., "A" and "B") signify the particular dispatch subqueue in which the process is executing. See “AL” on page 116 and “BL” on page 116 for more information.	less than 5	5 to 8	greater than 8
Memory Performance			
CPU MM % The amount of the total CPU capacity consumed by main memory page activity. This counter includes time spent on memory allocations for user processes that cannot acquire the CPU's attention (launched) until necessary segments are present in memory.	less than 4	4 to 10	greater than 10
Page Fault Rate The current and cumulative number of times per second that memory page faulting occurs. A Page Fault is counted when a process needs a memory object (code or data) that is absent from main memory. The threshold between the various zones for this particular indicator do tend to vary with your CPU size.	less than 10	10 to 25	greater than 25
Swaps/Launch The ratio of the number of swap-ins to the number of launches occurring for the current interval. This can also be a good indicator of memory pressure.	less than 0.4	0.4 to 0.8	greater than 0.8
Memory Cycles/Hour This is an activity of the memory manager. When there is a request for memory space, the memory manager begins to search memory where it last left off. The time it takes to cycle through all of main memory is referred to as a "clock cycle". This time is an important performance metric.	less than 10	10 to 25	greater than 25
Disc Performance			
Pause The percentage of time the CPU spends waiting for disc I/Os to complete.	less than 5	5 to 15	greater than 15
Read Hit % The percentage of time that Disc Read requests were satisfied in main memory. A Read Hit percentage less than 95 could indicate a data locality problem or a shortage of memory.	greater than 95	95-85	less than 85

Performance Indicator	Performance Ranges		
	Acceptable	Problematic	Critical
Average Q-Length The average length of the disc request queue for all disc devices when another disc I/O request arrives. An average queue length of one (1.0) or greater is not acceptable.	less than 0.5	0.5 to 1.0	greater than 1.0
Disc I/O Rate/Sec The number of disc I/O (reads and writes to disc) per second.	less than 10	10 to 25	greater than 25
Miscellaneous Performance			
CM to NM Switches The number and rate per second (nnn/s) of Compatibility Mode to Native Mode switches performed by the process.	N/A	N/A	greater than 200
NM to CM Switches The number and rate per second (nnn/s) of Native Mode to Compatibility Mode switches performed by the process.	N/A	N/A	greater than 75

Page Fault Rates

Table C.2 contains Lund's generic recommended page fault rate ranges.

Table C.2 *MVHOST Page Fault Rates*

Performance Indicator	Performance Ranges		
	Acceptable	Problematic	Critical
Page Faults/second			
Small, single processor HP 3000 series models 920, 922, 925, 932, 935	less than 4	4 to 8	greater than 8
Medium, max. 2-way HP 3000 series models 917, 927, 937, 947, 918, 928, 929, 939, 949	less than 8	8 to 12	greater than 12
Moderate, max. 2-way HP 3000 series models 950, 955, 957, 967, 977, 987, 960, 968	less than 13	13 to 19	greater than 19

Performance Indicator	Performance Ranges		
	Acceptable	Problematic	Critical
Large, max. 2-way HP 3000 series models 959, 978, 980, 988, 990	less than 20	20 to 40	greater than 40
Larger, max. 4-way HP 3000 series models 959, 969, 979, 989, 992, 995, 996, 997	less than 40	40 to 60	greater than 60
Even larger max. 6-way HP 3000 series models 969, 979, 989, 992, 995, 996, 997	less than 100	100 to 150	greater than 150
Very large max. 8-way HP 3000 series models 969, 979, 989, 992, 995, 996, 997	less than 150	150 to 200	greater than 200
NOTE Performance ranges for HP 3000 series models 996/900-996/1200 may vary depending upon the application.			

D

MVMONJ, MVJOB AND MVFULL BATCH JOBS

A useful feature of Meta-View for MPE/iX is its batch job capability. There are three standard batch jobs included in the MVJOB.LUND group/account named MVMONJ, MVJOB and MVFULL. In each of these job streams you will see a lengthy set of control record lines immediately following the ":run mvhost.mvpgms" line (see “:run mvhost.mvpgms” on page 262). These options are detailed in “MVHOST Main Options” on page 15.

MVMONJ.MVJOB.LUND

The following example is a print out of the MVMONJ batch job.

```
:JOB MVMONJ,MGR.LUND,LOGFILES.
Priority = DS; Inpri = 8; Time = UNLIMITED seconds.
Job number = #j56.
TUE, JUL  8, 2003, 12:00 AM.
HP3000  Release: C.65.00   User Version: C.65.00
MPE/iX  HP31900 C.25.06  Copyright Hewlett-Packard 1987.
All rights reserved.
STREAMED BY MVMONJ,MGR.LUND (#J52) ON LDEV# 10
   STREAM DATE:   TUE, JUL  8, 2003, 12:00 AM


******************
Development system
******************


:
:comment ********************************************************
:comment *** This job will provide continuous MVHOST monitoring
```

```
:comment *** by streaming itself and logging off every night at
:comment *** midnight.
:comment *********************************************************
:
:comment  This job is intended for use with MVHOST version H.04a or later.
:comment  Versions of this job that were supplied with earlier versions
:comment  of MVHOST may no longer work and should not be used.
:comment
:comment  Similarly, this job may be invalidated by future MVHOST releases.
:comment
:comment  Please refer to the release notes of each version for further
:comment  information.
:
:tellop *** MVHOST/3000 Batch Job Collection is Starting! ***
:
:comment  Refer to the comments in the mvlogxj job for information about
:comment  about providing input to MVHOST.
:
:setdump
:run mvhost.mvpgms


****************************************************************************
***
*
                  Meta-View/3000 Performance Manager I.02a
            Copyright 1991-2003 (c)  Lund Performance Solutions

****************************************************************************
***
*
 This product is licensed to: Lund Wolf
 Should all output be suppressed (Y)
 Screen refresh interval in seconds (300)
 Display Key Indicators of Performance (Y)
 Display advice messages (Y)
 Display informational advice messages (Y)
```

Display option (2-Tabular)

Display memory information on global screen (Y)

Display disc information on global screen (Y)

Collect process/workload information (Y)

Display process information (Y)

Display workload information (Y)

Display only active workloads (Y)

CPU percentage required for workload display (.0)

Company name (Your Company Name)

Display extended process line (N)

Display 132 col process line (N)

Show wait state on first line (N)

Display "First" instead of "Prompt" response time (N)

Display page fault rate instead of IO per transaction (Y)

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

Display only active processes (Y)

CPU percentage required for process display (.0)

Display session processes (Y)

Display job processes (Y)

Display system processes (Y)

Display command interpreter processes (Y)

Display processes which have died (Y)

Process logon filter (@.@)

Process sort option (4-CPU time)

Display processes sorted in ascending order (N)

Maximum number of processes to display (0-ALL) (0)

Display CPU stats (Y)

Display memory stats (N)

Display disc I/O stats (N)

Display miscellaneous stats (N)

Turbo Image CPU percentage required for process logging (.0)

Turbo Image Intrinsic rate required for process logging (.0)

Turbo Image cpu/Intrinsic required for process logging (.0)

Turbo Image elapsed/Intrinsic required for process logging (.0)

Should logging be enabled (Y)

Should disc space utilization information be logged (Y)

Maximum number of processes to be logged per interval (20)

```
Should process tracking be enabled (Y)
Should Memory Detail information be displayed (N)
Should Global Stop information be displayed (N)
Should Disc I/O summary information be displayed (N)
Should tape drive I/O detail information be displayed (N)
Should system printer I/O detail information be displayed (N)
Should serial printer I/O detail information be displayed (N)
Should device detail information be limited to active devices (Y)
Should terminal response detail information be displayed (N)
Should system transaction manager detail information be displayed (N)
Should user transaction manager detail information be displayed (N)
Enter duration of job in minutes (0)
Enable Turbo Image logging (N)
Enable CPU logging (Y)



END OF PROGRAM
:
:stream mvmonj.mvjob
 #J63
:
:tellop *** MVHOST/3000 Batch Job Collection is Finished! ***
:
:eoj
```

Figure D.1 *Meta-View for MPE/iX MVMONJ Batch Job*

MVJOB.MVJOB.LUND

```
:job mvjob,mgr.lund,logfiles
:
:comment ********************************************************
:comment *** This job will run for 8 hours at a 5-minute interval
:comment *** between reports and will display:
:comment ***  processes which have used some CPU
:comment ***  global, disc, and performance advice
:comment *** You may change the run and interval time (see below)
```

```
:comment ***********************************************************
:
:comment  This job is intended for use with MVHOST version I.01a or later.
:comment  Versions of this job that were supplied with earlier versions
:comment  of MVHOST may no longer work and should not be used.
:comment
:comment  Similarly, this job may be invalidated by future MVHOST releases.
:comment
:comment  Please refer to the release notes of each version for further
:comment  information.
:
:tellop *** MVHOST/3000 Batch Job Collection is Starting! ***
:
:comment  Refer to the comments in the mvlogxj job for information about
:comment  about providing input to MVHOST.
:
:setdump
:run mvhost.mvpgms
Y          ! Should batch output be suppressed
300         ! MVHOST sample interval
Y          ! Display Key Indicators of Performance
Y          ! Display advice
Y          ! Display informational advice messages
2          ! Global display option
Y          ! Display global memory statistics
Y          ! Display global disc statistics
Y          ! Collect process/workload Information
Y          ! Display process information
Y          ! Display workload information
Y          ! Display only active workloads
0.0         ! CPU percentage required for display
Your Company Name
N          ! Display extended process line
N          ! Display 132 column process line
N          ! Show Wait State on first process line
N          ! Display first instead of full response time
Y          ! Display page fault rate instead of IO/Transaction
```

```
N       ! Display total I/O percent instead of R/W counts
Y       ! Display only active processes
0.0     ! CPU percentage required for display
Y       ! Display session processes
Y       ! Display job processes
Y       ! Display system processes
Y       ! Display command interpreter processes
Y       ! Display dead processes which have died
@.@     ! Process logon filter
4       ! Process sort option
N       ! Sort processes in ascending order
0       ! Process display limit
Y       ! Display CPU pulse points
N       ! Display Memory pulse points
N       ! Display Disc I/O pulse points
N       ! Display misc pulse points
0       ! Turbo Image CPU percentage required for process logging
0       ! Turbo Image Intrinsic rate required for process logging
0       ! Turbo Image cpu/Intrinsic required for process logging
0       ! Turbo Image elapsed/Intrinsic required for process logging
Y       ! Should logging be enabled?
Y       ! Should disc space utilization info be logged
20      ! Process log limit
Y       ! Should process tracking be enabled
N       ! Should Memory detail information be displayed
N       ! Should Global Stop information be displayed
N       ! Should Disc I/O summary information be displayed
N       ! Should Tape drive I/O detail information be displayed
N       ! Should system printer I/O detail information be displayed
N       ! Should serial printer I/O detail information be displayed
Y       ! Should device detail info be limited to active devices
N       ! Should terminal response detail information be displayed
N       ! Should system transaction manager detail information be displayed
N       ! Should user transaction manager detail information be displayed
480     ! Enter duration of job in minutes
N       ! Enable Turbo Image logging
:eod
```

```
:
:tellop *** MVHOST/3000 Batch Job Collection is Finished! ***
:
:eoj
```

Figure D.2 *Meta-View for MPE/iX MVJOB Batch Job*

MVFULL.MVJOB.LUND

```
:job mvfull,mgr.lund,logfiles; outclass=lp,1
:
:comment ***********************************************************
:comment *** This job will provide continuous MVHOST monitoring
:comment *** by streaming itself and logging off every night at
:comment *** midnight.
:comment *** It provides full reporting to $stdlist.
:comment ***********************************************************
:
:comment  This job is intended for use with MVHOST version I.01a or later.
:comment  Versions of this job that were supplied with earlier versions
:comment  of MVHOST may no longer work and should not be used.
:comment
:comment  Similarly, this job may be invalidated by future MVHOST releases.
:comment
:comment  Please refer to the release notes of each version for further
:comment  information.
:
:tellop *** MVHOST/3000 Batch Job Collection is Starting! ***
:
:comment  Refer to the comments in the mvlogxj job for information about
:comment  about providing input to MVHOST.
:
:setdump
:run mvhost.mvpgms
N          ! Should batch output be suppressed
300         ! MVHOST sample interval
Y          ! Display Key Indicators of Performance
Y          ! Display advice
```

```
Y          ! Display informational advice messages
2          ! Global display option
Y          ! Display global memory statistics
Y          ! Display global disc statistics
Y          ! Collect process/workload Information
Y          ! Display process information
Y          ! Display workload information
Y          ! Display only active workloads
0.0        ! CPU percentage required for display
Your Company Name
N          ! Display extended process line
N          ! Display 132 column process line
N          ! Show Wait State on first process line
N          ! Display first instead of full response time
Y          ! Display page fault rate instead of IO/Transaction
N          ! Display total I/O percent instead of R/W counts
Y          ! Display only active processes
0.0        ! CPU percentage required for display
Y          ! Display session processes
Y          ! Display job processes
Y          ! Display system processes
Y          ! Display command interpreter processes
Y          ! Display dead processes which have died
@.@        ! Process logon filter
4          ! Process sort option
N          ! Sort processes in ascending order
0          ! Process display limit
Y          ! Display CPU pulse points
N          ! Display Memory pulse points
N          ! Display Disc I/O pulse points
N          ! Display misc pulse points
0          ! Turbo Image CPU percentage required for process logging
0          ! Turbo Image Intrinsic rate required for process logging
0          ! Turbo Image cpu/Intrinsic required for process logging
0          ! Turbo Image elapsed/Intrinsic required for process logging
Y          ! Should logging be enabled?
Y          ! Should disc space utilization info be logged
```

```
20        ! Process log limit
Y         ! Should process tracking be enabled
N         ! Should Memory detail information be displayed
N         ! Should Global Stop information be displayed
N         ! Should Disc I/O summary information be displayed
N         ! Should Tape drive I/O detail information be displayed
N         ! Should system printer I/O detail information be displayed
N         ! Should serial printer I/O detail information be displayed
Y         ! Should device detail info be limited to active devices
N         ! Should terminal response detail information be displayed
N         ! Should system transaction manager detail information be displayed
N         ! Should user transaction manager detail information be displayed
0         ! Enter duration of job in minutes
N         ! Enable Turbo Image logging
:eod
:
:stream mvfull.mvjob
:
:tellop *** MVHOST/3000 Batch Job Collection is Finished! ***
:
:eoj
```

Figure D.3 *Meta-View for MPE/iX MVFULL Batch Job*

E

WORKLOAD GROUPS

The ability to track resource usage and other statistics on the basis of user-defined application workloads is one of the most powerful features of Meta-View for MPE/iX. Without workload definitions and descriptions for a system, it is nearly impossible to perform adequate capacity planning. Also, workloads have different service requirements. The more a workload demands of a resource, the more utilized that resource will be. This in turn affects not only processes associated with that workload, but other workloads as well.

Understanding Workload Groups

An application workload is a group of individual users and programs or even a department within your company. You might think of an application workload as a virtual application, one that does not exist as a single program or user, but as an aggregate of programs and users on your system. A workload can be as simple as one user running one program or as complex as many users running many programs. Usually, workloads consist of users and programs that perform like tasks.

For example, let's say that your finance department has the following financial functions under its umbrella:

Accounts payable (programs = AP002.PROG.FINANCE)

Accounts receivable (programs = AR001.PROG.FINANCE)

Let's also say that the following users who operate the accounting department will be included no matter what programs they run. These folks might use an editor program in order to create a simple job stream for an accounting function. They might run a query program to perform ad hoc reporting. These users are therefore included in the finance workload although they do not always run the above-mentioned programs.

They log on as:

COLLEEN,MGR.FINANCE

LAYNE,MGR.FINANCE

BILL,MGR.FINANCE

Another category of users we may include is upper management. A few high-level managers periodically inquire via their terminal into various on-line reports.

These managers log on as:

JIM,MGR.BOSS

MELISSA,MGR.BOSS

So, to answer our question: "What is a workload?" consider the following for our FINANCE application:

- Any user running various AP and AR programs.
- A restricted number of users logging onto the FINANCE account.
- Certain managers logging onto the BOSS account.

Now that we have described and defined our FINANCE application workload, let's ask the next question: "What percentage of CPU, disc requests, etc., is the FINANCE workload as an aggregate unit consuming as compared to other workloads on my system?" This is an example of the type of question that many system managers and management personnel ask. Meta-View for MPE/iX has the ability to track workloads at a terminal, in a batch job, and in a log file so you can download ASCII data into spreadsheets and graphics programs for further analysis.

Defining Workload Groups

Meta-View for MPE/iX comes with three pre-defined workloads:

- JOBS - all batch jobstreams
- SESSIONS - all on-line terminal sessions
- SYSPROCS - all system processes

Additional workloads can be defined by the user in the MVWKDEF.MVDATA.LUND file. Use your favorite editor to create the MVWKDEF file. (QUAD.UTIL.LUND is included free of charge on our distribution tape.)

The basic format of MVWKDEF requires the following three items for each workload defined:

1. Name of workload (up to 12 characters)
2. Type of workload (Job, Session or Both)
3. User specifications. A list of one or more of the following:

   USER=(MPE logon User and Account for desired sessions)

   PROG=(MPE fully-qualified program file name)

Figure E.1 contains a sample MVWKDEF file.

```
ACCOUNTREC              !NAME of group (max 10 characters)
JOB                     !GROUP TYPE (JOB/SESSION/BOTH)
USER=@.ACCTNG,AR        !USER SPECIFICATIONS
                        !At least 1 blank line (required)
ACCOUNTPAY              !NAME
SESSION                 !GROUP TYPE (JOB/SESSION/BOTH)
USER=@.ACCTNG,AP        !Specification
                        !At least 1 blank line (required)
GL                      !NAME
JOB                     !GROUP TYPE
USER=@.ACCTNG,GL        !Specification
LDEV=20-45              !Only ports 20-45 included

ORDERS
SESSION
USER=@.OE

SALES
SESSION
USER=@.SALES

COMPILING               !Let's track the programmers
JOB                     !Catch job compiles
PROG=REACTOR.PUB.@      !Any users on the entire system
PROG=SPL.PUB.SYS        !running either of these programs
```

Figure E.1 *Meta-View for MPE/iX MVWKDEF File*

MVWKDEF File Configuration Rules

1. A workload NAME is required. It may be up to 12 characters.
2. A workload TYPE specification is required to indicate which types of processes to include or exclude from the workload definition. This ensures that you can create two workloads for

processes that run both interactively and in batch. For example, two FINANCE workloads: Batch and Session.

- A group TYPE of "JOB" will only include batch jobs.
- A group TYPE of "SESSION" will only include interactive processes.
- A group TYPE of "BOTH" will include jobs and sessions, but not system processes.

3 It is required that workloads be separated by at least one or more blank lines within a definition file. Comments may be included on any line by preceding them with an exclamation mark ("!") character.

4 Either a user or a program specification is REQUIRED. They must be entered one per line and consist of any of the following three types:

A program specification must contain a program, group and account:

PROG=PROGRAM.GROUP.ACCOUNT

A user specification must contain a user and account, the session name and logon group are optional:

USER=SESSIONS,USER.ACCOUNT,GROUP

The MPE logical device number or range of device numbers:

LDEV=nnn or LDEV=nnn-nnn

You may use an "@" sign for any of the criteria; it functions as a wild card just as it does within normal MPE rules (partial or full).

5 LDEV specifications means that you can capture activity on a terminal-by-terminal basis or even within a range of terminals. Use this option with caution!

6 There is virtually no limit to the number of USER, PROGRAM and LDEV specifications allowed for each workload.

7 Three workloads provided by default: JOBS, SESSIONS and SYSPROCS. Processes not falling into one of your defined workloads will fall into one of these. All processes will be assigned to one, and only one, workload group.

8 The NAME and TYPE specification lines are required. All other lines are optional. Important: In order to be considered a part of a workload group, a process must satisfy the PROG specification and the USER specification and the LDEV specification if all three are present. If one or more program specification line is included, a program has to satisfy only one of the program specifications to be included in the group. If no program specifications are entered, all process programs are considered to be in the group (unless the process is somehow disqualified by either USER or LDEV specification). The USER and LDEV specifications are resolved the same way.

For example, the following lines are entered into MVWKDEF to define the workload called "WORKTEST:"

```
WORKTEST          !Workload name

SESSION           !Only terminals
```

PROG=@.PUB.MFG

PROG=MONEND.PUB.QTR

USER=JANE,MGR.MFG

USER=@.@.QTR

LDEV=50-60

LDEV=120

For a process to be included in the WORKTEST workload it has to satisfy just one PROG specification and one USER specification and one LDEV specification. Each is considered to be an "OR" condition. For example, a program INVEN01.PUB.MFG run by MGR.QTR at LDEV 56 would be counted in this workload.

9 Command interpreter processes can be selected by specifying the program file name CI(PROG=CI). Spooler processes can be selected by specifying the program file name of "SP" (PROG=SP). All other system processes can be identified by name. When selecting any of these system type processes the program group and account must be specified as "@."

NOTE: If you want to strip out command interpreters from the catch-all SESSIONS workload you must create a separate workload with the program name CI to have the response times for SESSION reflect what the users actually experience.

10 A process can belong to only one workload group. If it fits the criteria for two or more groups, it will be assigned to the first one in the file it qualifies for.

Keep in mind that you can also log workload information and utilize the logging facility to prepare ASCII data files to download to a PC or data may be exported into Performance Gallery.

GLOSSARY

CPU Terms

The CPU terms defined in this glossary are specific to the performance data provided by Meta-View Performance Manager.

capture ratio

A ratio of time a CPU spent in user mode to system/kernel mode. The capture ratio value is calculated:

Capture Ratio = (User + Real + Nice + NNice) / (Sys + Intr + C SW + 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 disc 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 Meta-View Performance Manager.

activation

An activation occurs when a process is reactivated from a deactivation. See “deactivation” on page 279.

buffer cache

A pool of buffers in memory with the purpose of maintaining data in memory to avoid disc 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 disc. 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 runable processes because of memory or CPU contention. It will not be scheduled until 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 disc 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 disc.

page in

A page in is a page fault that requires disc 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 disc 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 disc I/O that is a result of virtual memory management.

Disc Terms

The disc terms defined in this glossary are specific to the performance data provided by Meta-View Performance Manager.

logical I/O

An I/O that is satisfied in memory or disc.

physical I/O

An I/O that requires disc access. Physical I/Os include User, Sys, VM, and RAW.

raw I/O

A disc 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 disc (removed from the disc queue), excluding wait time.

system I/O

A disc I/O that is the result of system overhead in managing files (i.e., super-block reads/writes).

user I/O

A disc I/O that is a result of user file reads/writes.

virtual memory I/O

A disc I/O that is a result of virtual memory management.

wait time

The amount of time an I/O request waits in the disc queue before being serviced. Excessive wait times indicate a disc bottleneck.

Network Terms

The network terms defined in this glossary are specific to the performance data provided by Meta-View Performance Manager.

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 Meta-View Performance Manager.

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 Meta-View Performance Manager.

CACH/CA

Waiting for a cache operation (such as a getblk or genewbuf) to complete. This can include buffered I/Os to disc.

CPU/RN

Actually running on CPU.

Disc/DI

Waiting for a disc driver to complete a disc 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.

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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