

MAINVIEW for Linux[®] – Servers User Guide

Version 1.2

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- operating system and environment information
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 - operating system type, version, and service pack or other maintenance level such as PUT or PTF
 - system hardware configuration
 - serial numbers
 - related software (database, application, and communication) including type, version, and service pack or maintenance level
- sequence of events leading to the problem
- commands and options that you used
- messages received (and the time and date that you received them)
 - product error messages
 - messages from the operating system, such as `file system full`
 - messages from related software

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About This Book

MAINVIEW[®] for Linux – Servers monitors and manages Linux systems.

How This Book Is Organized

This book is organized as follows:

Chapter	Description
Chapter 1, "Introduction"	introduces the features and functions of MAINVIEW for Linux – Servers This chapter also provides information on the MAINVIEW window interface and product navigation.
Chapter 2, "Navigating in MAINVIEW for Linux – Servers"	explains how to access MAINVIEW for Linux – Servers, MAINVIEW Explorer and the MAINVIEW for Linux – Servers Easy Menu and Sub-menus
Chapter 3, "Using Views"	explains MAINVIEW for Linux – Servers views that are displayed on the MAINVIEW console
Chapter 5, "Displaying Historical Data"	explains historical data sets
Chapter 4, "Using Rules and Images"	explains monitor rules and images and how to use them
Chapter 6, "MAINVIEW Alarm Manager"	describes the sample alarms that are shipped with MAINVIEW for Linux – Servers

Related Documentation

BMC Software products are supported by several types of documentation:

- online and printed books
- online Help

- release notes and other notices

Note: The messages that MAINVIEW for Linux – Servers generates are available in a z/OS data set that is downloaded during installation. For each message, the data set includes an explanation and suggests a user response. *Using MAINVIEW* describes how to get help for messages.

In addition to this book and the online Help, you can find useful information in the following publications. As “Online and Printed Books” on page xv explains, these publications are available on request from BMC Software.

Category	Document	Description
installation documents	<i>OS/390 and z/OS Installer Guide and MAINVIEW Installation Requirements Guide (formerly the Product Installation and Maintenance Guide)</i>	provides information about product distribution, installation methods, installation requirements, creating product libraries with CPO or SMP, applying SMP maintenance, tape formats, FMIDs, and SYSMODs
core documents	<i>Using MAINVIEW</i>	provides information about working with MAINVIEW products in windows mode and full-screen mode
	<i>MAINVIEW Administration Guide</i>	provides information about MAINVIEW operations, targets, single-system image contexts, MAINVIEW Alarm Manager, data sets, view customization, and diagnostic facilities
	<i>MAINVIEW Alarm Manager User Guide</i>	explains how to create and install alarm definitions that indicate when exceptions occur
	<i>MAINVIEW Common Customization Guide</i>	provides instructions for customizing the MAINVIEW environment for your products
	<i>MAINVIEW for Linux – Servers Customization Guide</i>	provides instructions for customizing MAINVIEW for Linux – Servers
	<i>MAINVIEW Quick Reference</i>	introduces the MAINVIEW family of products and lists the commands used to manage the MAINVIEW windows environment
SAF security for MAINVIEW products	<i>Implementing Security for MAINVIEW Products</i>	explains basic MAINVIEW security, enhanced security, and MAINVIEW Alternate Access security
supplemental documents	release notes, flashes, technical bulletins	provide updated information about MAINVIEW for Linux – Servers

Online and Printed Books

The books that accompany BMC Software products are available in online format and printed format. If you are a Windows, Unix, or Linux user, you can view online books with Acrobat Reader from Adobe Systems. The reader is provided at no cost, as explained in “To Access Online Books.” You can also obtain additional printed books from BMC Software, as explained in “To Request Additional Printed Books.”

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Online Help

MAINVIEW for Linux – Servers includes online Help. In the MAINVIEW for Linux – Servers ISPF interface, you can access Help by pressing **F1** from any ISPF panel.

Release Notes and Other Notices

Printed release notes accompany each BMC Software product. Release notes provide current information such as

- updates to the installation instructions
- last-minute product information

In addition, BMC Software sometimes provides updated product information between releases (in the form of a flash or a technical bulletin, for example). The latest versions of the release notes and other notices are available on the Web at <http://www.bmc.com/support.html>.

Conventions

This book uses the following conventions:

Item	Example
information that you are instructed to type	Type SEARCH DB in the designated field. Type search db in the designated field.
specific (standard) keyboard key names	Press Enter .
field names, text on a panel	Type the appropriate entry in the Command field.
directories, file names, Web addresses	The BMC Software home page is at www.bmc.com .
nonspecific key names, option names	Use the HELP function key. KEEPDICTIONARY option
Linux commands, command options	Use the rpm -i file_name.rpm to install a program.
code examples, syntax statements, system messages, screen text	//STEPLIB DD The table <i>table_name</i> is not available.
emphasized words, new terms, variables	The instructions that you give to the software are called <i>commands</i> . In this message, the variable <i>file_name</i> represents the file that caused the error.

This book uses the following types of special text:

Note: Notes contain important information that you should consider.

Tip: Tips contain useful information that may improve product performance or that may make procedures easier to follow.

Syntax Statements

Syntax statements appear in Courier. The following example shows a sample syntax statement:

```
COMMAND KEYWORD1 [KEYWORD2|KEYWORD3] KEYWORD4={YES|NO}
    file_name...
```

The following table explains conventions for syntax statements and provides examples:

Item	Example
Items in italic type represent variables that you must replace with a name or value. Use an underscore for variables with more than one word.	<code>dtsbackup <i>control_directory</i></code>
Brackets indicate a group of options. You can choose at least one of the items in the group, but none of them is required. Do not type the brackets when you enter the option. A comma means that you can choose one or more of the listed options. You must use a comma to separate the options if you choose more than one option. Linux options are indicated with a hyphen.	<code>[<i>table_name, column_name, field</i>]</code> <code>[-full, -incremental, -level]</code>
Braces enclose a list of required items. You must enter at least one of the items. Do not type the braces when you enter the item.	<code>{<i>DBD_name | table_name</i>}</code> <code>{-a | -c}</code>
A vertical bar means that you can choose only one of the listed items. In the example, you would choose either <i>commit</i> or <i>cancel</i> .	<code>{commit | cancel}</code> <code>{-commit | -cancel}</code>
An ellipsis indicates that you can repeat the previous item or items as many times as necessary.	<code><i>column_name. . .</i></code>

Chapter 1 Introduction

MAINVIEW for Linux – Servers is a system management application that provides services and functions to help you monitor and control your Linux servers. Built on the BMC Software MAINVIEW architecture, MAINVIEW for Linux – Servers uses a traditional MAINVIEW interface to provide access to Linux and z/VM data. For more information on the MAINVIEW architecture, how to navigate in MAINVIEW, and how to customize MAINVIEW views, see *Using MAINVIEW*.

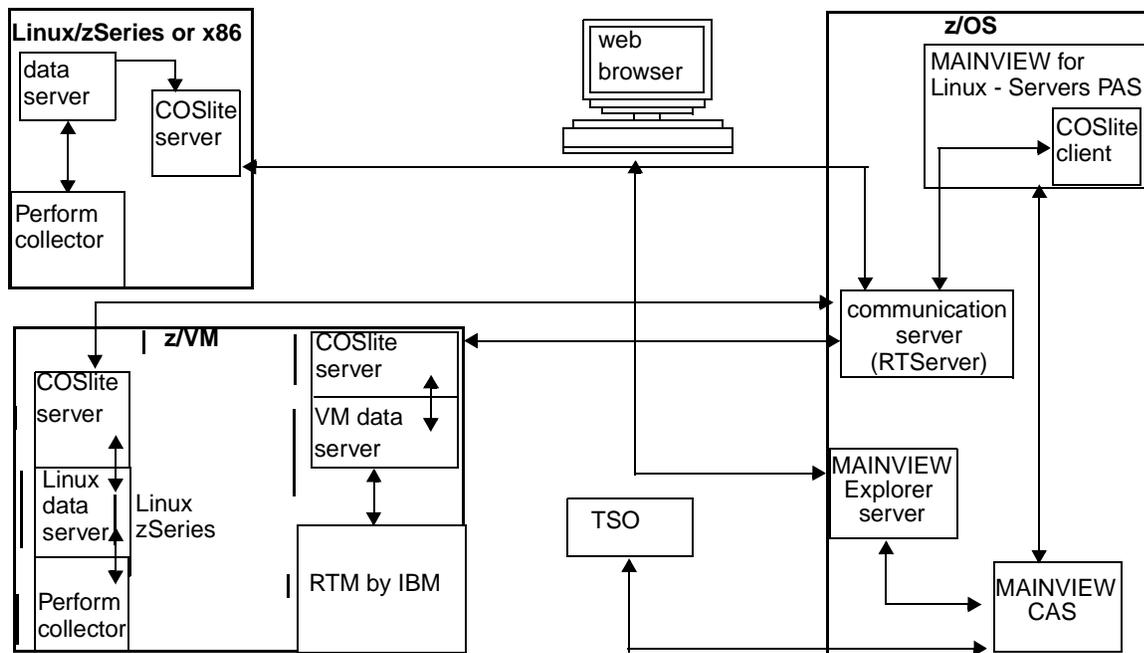
This chapter discusses the following topics:

Overview	1-2
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Linux Data Server	1-2
VM Data Server	1-3
MAINVIEW for Linux – Servers PAS	1-3
Data Collector	1-3
Features and Functions	1-3
Data Collectors and Data Servers	1-4
Heartbeat Data	1-5
Real-Time Data	1-5
Historical Data	1-5

Overview

Figure 1-1 shows each component of MAINVIEW for Linux – Servers and illustrates the communication between the components.

Figure 1-1 MAINVIEW for Linux – Servers Components



MAINVIEW for Linux – Servers uses several components to collect and display information on the monitored Linux images.

Communication Server

The communication server provides the capability of passing messages between MAINVIEW for Linux – Servers Product Address Space (PAS) and the data servers of the Linux systems and z/VM systems that it is monitoring. The communication server is also known as the RTServer.

Linux Data Server

A data server resides on each monitored Linux image. The data server sends data that is provided by the data collector to the MAINVIEW for Linux – Servers PAS through the communication server.

VM Data Server

A VM data server resides on the z/VM system where your Linux systems are running. The VM data server obtains data from RTM by IBM and sends the data to the MAINVIEW for Linux – Servers PAS through the communication server.

MAINVIEW for Linux – Servers PAS

MAINVIEW for Linux – Servers PAS runs as an z/OS subsystem. MAINVIEW for Linux – Servers PAS stores heartbeat data that is provided by monitored Linux systems and z/VM systems. For more information on heartbeat data, see “Heartbeat Data” on page 1-5. The PAS requests data from the monitored Linux and z/VM systems as views are displayed.

Data Collector

A data collector resides on each monitored Linux image. Each data collector gathers data from the monitored Linux image and provides the data to the data server, which sends the data to the MAINVIEW for Linux – Servers PAS through the communication server.

Features and Functions

MAINVIEW for Linux – Servers provides monitoring and management of Linux for zSeries and S/390 systems. MAINVIEW for Linux – Servers has the following features and functions:

- displays Linux and z/VM performance and availability information in real-time and interval time (historical data) frames
- provides historical data which allows you to perform trend analysis on the historical performance of your Linux and z/VM systems
- provides over 90 different views providing Linux and z/VM performance, availability, usage, and configuration information
- integrates views from the MAINVIEW console of zSeries and S/390 subsystems and Linux applications
- monitors system and process resource usage

- alerts support personnel of exception conditions through alarm management
- discovers Linux and z/VM systems automatically
- provides the ability to view network statistics
- lets you customize the environment to provide logical or performance-scaled division of Linux systems
- provides a choice of user interfaces (3270 MAINVIEW or the browser-based MAINVIEW Explorer)

Data Collectors and Data Servers

Data servers and data collectors are programs that belong to MAINVIEW for Linux – Servers that collect data and store data from various sources to be displayed by views. Specifically, the MAINVIEW for Linux – Servers data collectors obtain data from Linux systems and automatically makes the information available to be selected and monitored from the MAINVIEW console.

MAINVIEW for Linux – Servers collects and displays heartbeat data and requested data. Data that is collected by the data collector running on the monitored Linux system is always collected in background mode. For efficiency and response time purposes, heartbeat data is stored in the PAS. Since the SYLOVRZR view displays heartbeat data, the response time when viewing the SYLOVRZR view should be faster than the response time of other real-time views. When you are viewing other real-time views, the request is sent to the data server that is running on the monitored Linux system. The data server then returns the last sampled value. At this time, demand sampling will start and continue until the view is deactivated and the minimum demand interval has expired. The data collector continues sampling data in background sampling mode. This design lets data be collected at lower sampling intervals (low system overhead) when a view is not active. However, data is collected more often when a specific real-time view is activated.

Heartbeat Data

Heartbeat data is used for a quick understanding of how your monitored Linux images are running—a “snapshot” of your key system statistics. The Data Server on each monitored Linux image obtains the heartbeat data and sends it to the MAINVIEW for Linux – Servers PAS. Key system statistics are collected automatically at specified intervals.

The heartbeat data is specified by using Monitor Rule parameters. To change these parameters, see “Using Rules and Images” on page 4-1. Heartbeat data is available on the SYLOVRZR view. For more information about the SYLOVRZR view, see Chapter 3, “Using Views.”

Real-Time Data

Real-time data is data that you request MAINVIEW for Linux – Servers to retrieve and display. There are two modes for real-time data, Background Sampling mode and Demand Sampling mode.

MAINVIEW for Linux – Servers is always collecting data in Background Sampling mode. When you decide to retrieve the data, you invoke the Demand Sampling mode. Real-time data is not limited to key system statistics (as heartbeat data is) and can be as new as 10 seconds old; however, real-time data is more costly in CPU overhead and network traffic.

The sampling intervals are specified for the Demand Sampling mode and the Background Sampling mode using the Monitor Rules parameters. To change the sampling intervals, see “Rule Parameters” on page 4-3.

Historical Data

MAINVIEW for Linux – Servers allows you to effectively re-create the operating environment as it existed during a particular time period in the past. This feature, called the historical data or interval data, stores information about your operating environment at the end of each interval, so that you can compare your current system to what it was doing yesterday, last week, or last month—all on the same screen. You can use this information to determine whether current behavior is an anomaly or part of a trend.

At the end of every Background Sampling interval, the data server obtains the data sample from the data collector (either RTM for z/VM data or Perform Collector for Linux data) and sends it to the PAS. The Background Sampling Interval is set through Monitor Rules and the default is one minute. To change the sampling intervals, see Table 4-2 on page 4-3.

For information about using historical data, see Chapter 5, “Displaying Historical Data,” *Using MAINVIEW*, or type **HELP TIME** on any MAINVIEW COMMAND line. *Using MAINVIEW* describes how to use the TIME Command in detail.

Chapter 2 Navigating in MAINVIEW for Linux – Servers

This chapter discusses the following topics:

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Accessing MAINVIEW for Linux – Servers

MAINVIEW for Linux – Servers can be accessed from the MAINVIEW Selection Menu (Figure 2-1).

Figure 2-1 MAINVIEW Selection Menu

```

----- MAINVIEW Selection Menu -----
OPTION  ===>                                DATE   -- 01/10/03
                                           TIME   -- 16:45:41
      0   Parameters and Options             USERID -- BMVDID3
      E   Alerts and Alarms                 MODE    -- ISPF 4.8
      P   PLEX Management (PLEXMGR)
      U   Utilities, Tools, and Messages

Solutions for:
      A   Automated Operations
      C   CICS
      D   DB2
      I   IMS
      L   Linux
      N   Network Management
      S   Storage Management
      T   Application Management and Performance Tuning
      W   WebSphere and MQSeries
      Z   OS/390, z/OS, and USS

Enter X to Terminate

                                Copyright BMC Software, Inc. 2001
    
```

To access MAINVIEW for Linux – Servers, Type **L** on the COMMAND line to select **Linux**, and press **Enter**.

The Linux Solutions panel (Figure 2-2 on page 2-3) is displayed.

Figure 2-2 Linux Solutions Panel

```
----- Linux Solutions -----
OPTION ==>
Management
  1 MVLNX      MAINVIEW for Linux
Operations
  E ALERTS    Alert Management
General Services
  M MESSAGES  Messages and Codes
  P PARS      Parameters and Options
DATE -- YYYY/MM/DD
TIME -- 12:03
USERID -- BOLKXB
MODE -- ISPF 4.8M
```

To access MAINVIEW for Linux – Servers, Type **1** on the COMMAND line, and press **Enter**.

Session Control Parameters panel (Figure 2-3 on page 2-4) is displayed.

Figure 2-3 Session Control Parameters Panel

```
BMC Software  ----- SESSION CONTROL PARAMETERS -----  
COMMAND ==>  
  
Subsystem ID  ==> BBCS (Coordinating Address Space subsystem ID)  
  
XDM mode     ==> NO      (Execute session in diagnostic mode, Yes/No)  
  
Press ENTER to confirm use of session parameters entered above.
```

Type the default subsystem ID **BBCS** for the coordinating address space (CAS), and press **Enter**.

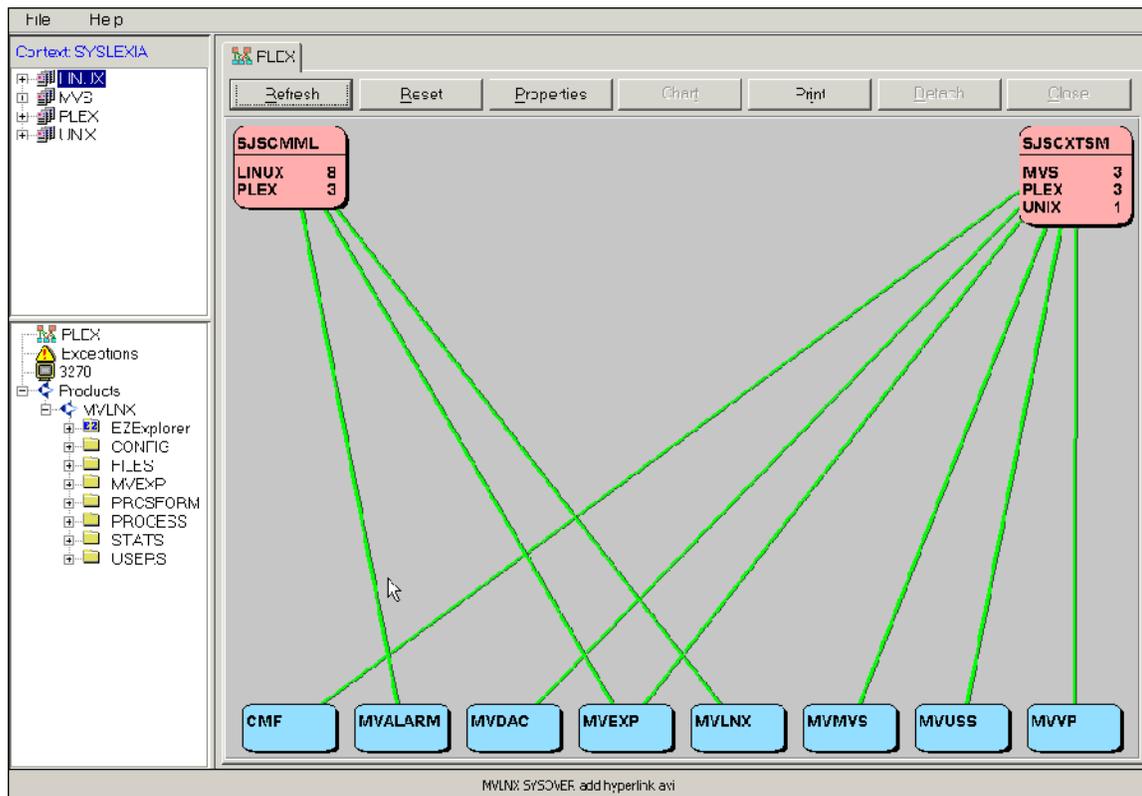
Note: Use the default subsystem ID, unless you have changed the subsystem ID.

The EZLNX Menu (Figure 2-5 on page 2-8) is displayed.

MAINVIEW Explorer

When MAINVIEW Explorer is installed on your system, you can access MAINVIEW for Linux – Servers through a web browser as shown in Figure 2-4. Refer to *Using MAINVIEW* for information about using MAINVIEW Explorer to access MAINVIEW products.

Figure 2-4 MAINVIEW Explorer



Displaying Real-time and Historical Data in Views and Easy Menus

There are two sets of views; one set for monitoring and managing Linux and z/VM systems in real-time (Time Frame - Real-time) and another set for viewing Linux and z/VM system historical data (Time Frame - Interval) for trend analysis. Real-time views are invoked by default when the product is initially accessed. Interval views (for viewing historical data) can be invoked either from the EZLENV easy menu or by typing **EZLNXI** at the COMMAND line.

Most of the real-time view names end with the letter **R**. The exceptions to this naming convention are the following:

- PSLTREE
- FSLSPACE
- EZLENV
- EZLNX

PSLTREE and FSLSPACE are real-time-only views. EZLENV easy menu is an example of a view which pertains to neither real-time nor interval time frames; therefore, it has no special name suffix. EZLNX is a real-time easy menu, which has an alias of EZLNXR.

The following two types of interval views exist:

- summary views
- tabular views

As you navigate through the interval time frame easy menus, the hyperlinks take you to summarized views. Summarized view names end with the letter **Z**. Data in these views are summarized over multiple intervals, if you have selected multiple intervals using the **TIME** command. This means that the numerical values in one row of the view represents an average of those fields for all the intervals specified by the **TIME** command.

If you hyperlink on the key field of one of the summarized rows, you will be taken to a tabular view which expands the summarized row and displays one row for each selected interval. This view has the same name as the summary view without the Z suffix. For example, the interval summary view name for Linux system resource usage is SYLUSEZ. If you hyperlink on one of the rows in this view, the row will be expanded and the data will be displayed in view SYLUSE with one row for each selected interval.

If you do not issue the **TIME** command while using interval views, data queries are retrieved from the Interval Recorder current interval buffers. If an interval switch has just occurred and no data has yet arrived from a data server, there will not be any interval (historical) data available for viewing. You can either wait for a period of time equal to the Background Sampling Interval (see Chapter 4, “Using Rules and Images”), then press **Enter** or issue the **TIME** command to select a different time frame or more intervals than the current one. For example, **TIME * * 2I** selects the latest two intervals (if MMLTIR00 member INTVAL=15, this would be equal to the last 15-30 minutes depending on how many samples have arrived from the data server).

The views described in Chapter 2, “Navigating in MAINVIEW for Linux – Servers” and Chapter 3, “Using Views” are real-time views. The interval views are not in this book, but you can access them by replacing the **R** suffix of the real-time view names with a **Z** suffix. These view names are listed in all of the tables in Chapter 3, “Using Views” (beginning with Table 3-1 on page 3-2). One simple way to access all of the interval views is by accessing the EZLNXI easy menu.

Using Easy Menus

MAINVIEW for Linux – Servers detects performance problems or potential problems of Linux systems. MAINVIEW easy menus let you access any MAINVIEW for Linux – Servers view easily without knowing the view name. When you access a view, you can obtain more detailed information regarding Linux systems.

Using the MAINVIEW for Linux – Servers Easy Menu

The MVLNX easy menu (EZLNX) lets you navigate to various parts of MAINVIEW for Linux – Servers based on a feature that you want to monitor rather than on a specific view. The selections on this menu let you access information quickly. The easy menus have symbols to the left of the hyperlinks to indicate certain actions. Table 2-1 describes symbols that are used in the MVLNX easy menu.

Table 2-1 MVLNX Easy Menu Symbols

Symbol	Description
>	takes you to another easy menu (sub-menu)
.	takes you directly to a view that displays data

Figure 2-5 on page 2-8 shows the MVLNX easy menu (EZLNX).

Figure 2-5 MVLNX Easy Menu

```

MVLNX Easy Menu
Time frame - Realtime
-----+-----+
| Place cursor on | |
| menu item and  | |
| press ENTER    | |
+-----+-----+
Activity
> System
> Processes
> Filesystems
> Users
> Configuration
. Network statistics
. Disk Statistics

> VM System

Utilities
> Alarm Management
> Environment Settings
. Image Status
. VM System Status

> Linux Monitor Fast Menu
> Linux Monitor MAIN View

. Add/Edit Monitor Rules

. Return...
```

Options on this menu are grouped into two categories: Activity and Utilities. Activity options display submenus that give you an overview of some aspect of your system's performance. From these overview submenus, you can display information about a particular element by hyperlinking to a menu specific to the element. Utilities options display submenus from which you can access other MAINVIEW products or perform customization of the operating environment.

Using MAINVIEW for Linux – Servers Sub-menus

MAINVIEW for Linux – Servers sub-menus provide easy access to views, based on the type of information that you want to monitor. Hyperlink to a sub-menu by completing one of the following steps:

- place your cursor on the sub-menu you want to view and press **Enter**
- type the name of the easy menu on the COMMAND line (for example, EZLCONF)

System

From the MVLNX easy menu, hyperlink on the **System** option to view the System Easy Menu (EZLSYSR). The System Easy Menu (Figure 2-6) lets you access views regarding key performance areas of your system.

Figure 2-6 System Easy Menu

```

System Easy Menu
Time frame - Realtime
Activity
. Resource Usage
. CPU
. Swapping
. Tables
. Return...

+-----+
| Place cursor on |
| menu item and   |
| press ENTER     |
+-----+

IPC Information
. Shared Memory Info
. Shared Memory Stats
. Msg Queue Information
. Msg Queue Statistics
. Semaphore Information
. Semaphore Statistics

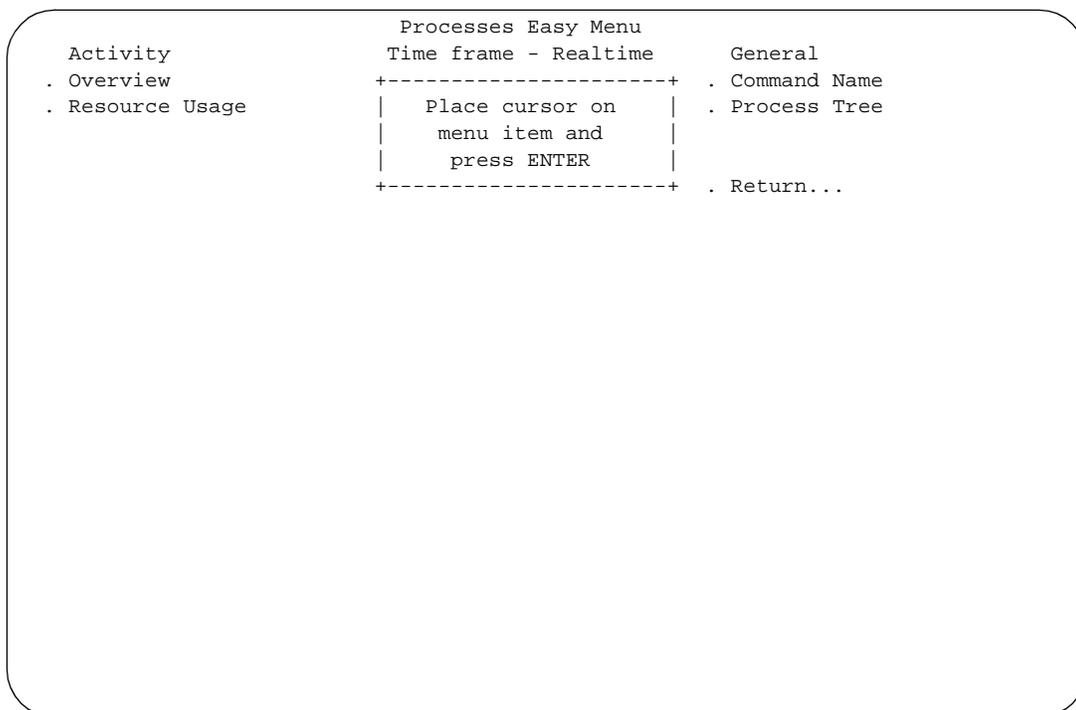
```

From the System Easy Menu, you can hyperlink to overall kernel activity and Inter-Process Communication (IPC) information.

Processes

Hyperlink on the **Process** option from the MVLNX easy menu to access the Processes Easy Menu (EZLPRCSR). The Processes Easy Menu (Figure 2-7) lets you access views that contain data regarding process activity.

Figure 2-7 Processes Easy Menu

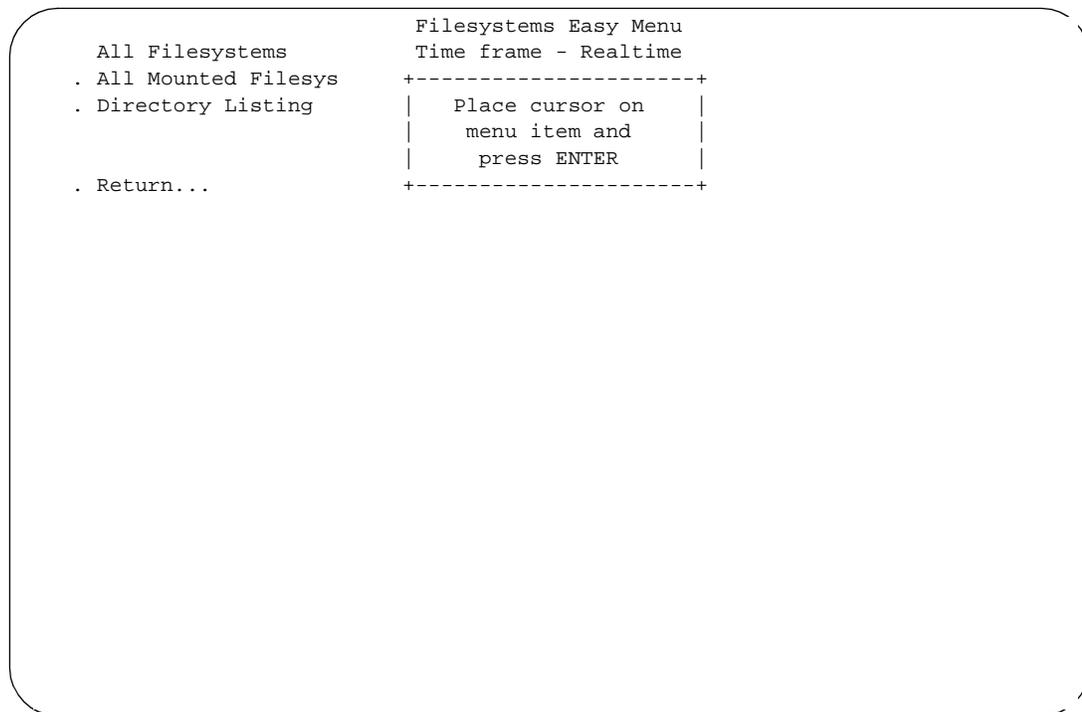


The Processes Easy Menu is divided into activity information and general information. Activity options lead you to information about specific process activity, including resource usage. General options provide more general information about a process, including parent/child relationships of processes and parameters.

File Systems

The File System Easy Menu, EZLFSYSR, (Figure 2-8) contains hyperlinks to detailed information about mounted file systems.

Figure 2-8 File Systems Easy Menu

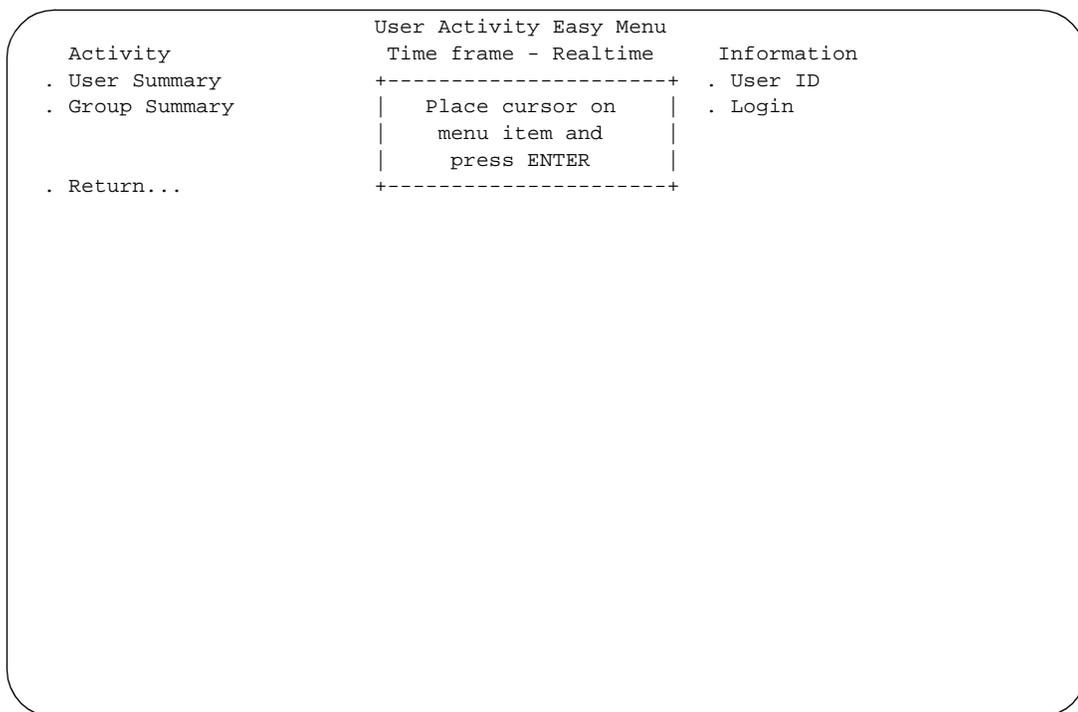


EZLFSYSR is divided into information regarding mounted file systems. Data about all file systems includes mount information and directory listings.

Users

The User Activity easy menu, EZLUSRSR, (Figure 2-9) contains hyperlinks to detailed information regarding individual users, groups, and users that are logged in to a monitored Linux system.

Figure 2-9 User Activity Easy Menu



Configuration

The Configuration Easy Menu, EZLCONFR, (Figure 2-10) contains hyperlinks to configuration views that show system information and system tuning parameters.

Figure 2-10 Configuration Easy Menu

```

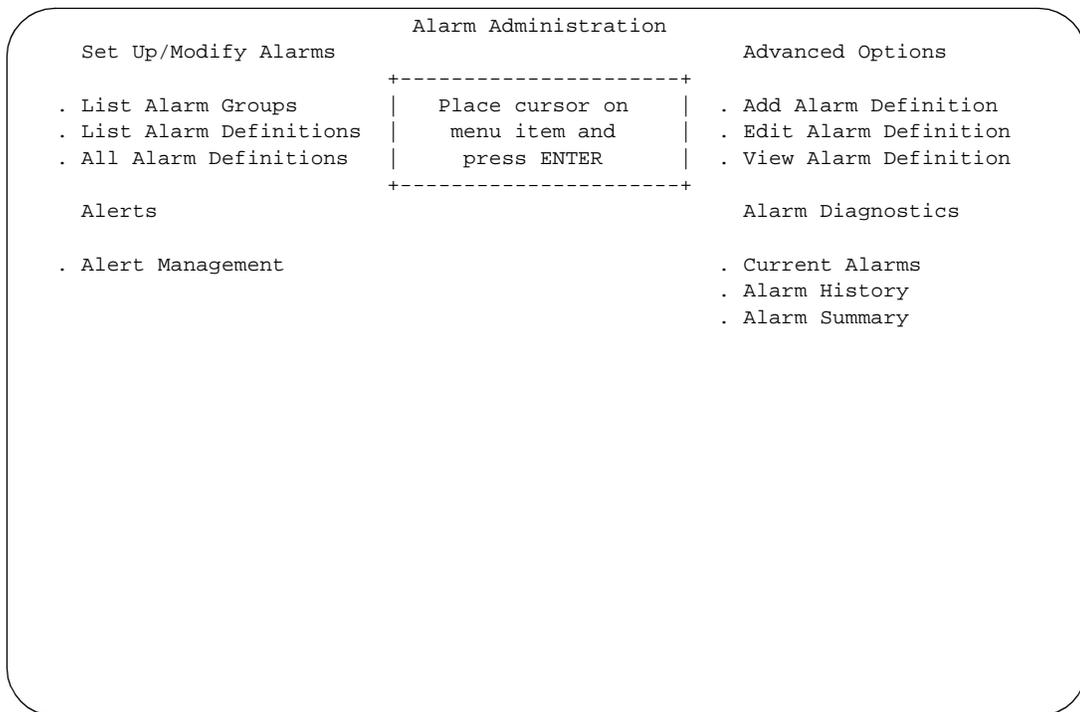
Configuration Easy Menu
Time frame - Realtime
-----+
Information
. System
. Network Interfaces
. Disks
. Disk Controllers
| Place cursor on |
| menu item and  |
| press ENTER    |
-----+
System Parameters
. General Kernel
. File System
. Virtual Memory
> Network
. Return...

```

Alarm Management

MAINVIEW Alarm Manager contains a series of views, beginning with the MVALARM Easy Menu, MVALARM, (Figure 2-11).

Figure 2-11 MVALARM Easy Menu



Hyperlink to other views from the MVALARM Easy Menu to display alarms or to edit or view alarm definitions. When you add or edit an alarm definition, you can customize alarm messages, threshold levels, monitoring frequency, and the action that is taken when an alarm occurs.

For more information about MAINVIEW Alarm Manager, see Chapter 6, “MAINVIEW Alarm Manager.”

Environment Settings

MAINVIEW for Linux – Servers also provides the Environment Settings easy menu to access your environmental settings, EZLENV (Figure 2-12).

Figure 2-12 Environment Settings Easy Menu

```

Change System
. Select Target
. Select SSI Context
. Select product

Environment Settings
+-----+
| Place cursor on |
| menu item and  |
| press ENTER    |
+-----+

Change Timeframe
. Show Realtime Menus
. Show Interval Menus
. Return...

Miscellaneous
. Historical Data Sets

> All Views

```

EZLENV lets you change your target, Single System Image (SSI) context, real-time/interval mode, and product. For more information about SSI context, see *Using MAINVIEW*.

z/VM System

The z/VM System Easy Menu, EZLVSYSR, (Figure 2-13) provides access to views that display detailed information about z/VM system performance.

Figure 2-13 Virtual Machine Systems Easy Menu

```
VM System Easy Menu
Time frame - Realtime
Current VM System -> SYSCBMC

Activity
. CPU
. Resource Usage
. Storage
. I/O Devices
. Paging/Spooling
. Priv Ops

. All Virtual Machines
. Linux Virtual Machines
. MP Virtual Machines

. Return...
```

+-----+
| Place cursor on |
| menu item and |
| press ENTER |
+-----+

Using the Image Easy Menu

The Image Easy Menu, EZLIMAGR (Figure 2-14), provides easy access to detailed views for the selected image.

Note: The *image* refers to the Linux system for which the data is being displayed. This value is automatically derived from the first 60 characters of the monitored host name.

Figure 2-14 EZLIMAGR View (Image Easy Menu)

```

Image Easy Menu
Time frame - Realtime
Current Image ->      JMWLINUX
Host Name    ->      jmwlinux

Activity          +-----+
. System          | Place cursor on | . Configuration
. CPU             | menu item and   | . System
. Swap           | press ENTER    | . Network Interfaces
. Kernel Tables  +-----+ . Disks
. Network        |                                     . Disk Controllers
. Disk           |                                     . Partitions

                  Information
. Processes Overview . Mounted File Systems . System Parameters
. Process Resource Usage . Directory Listing . General Kernel
. Process Tree       . User Ids                . File System
. Process Cmd/Path   . Logins                    . Virtual Memory
                    . Shared Memory
. Users              . Msg Queues
. Groups             . Semaphores
                    . Return...
. Shared Memory
. Msg Queues
. Semaphores

```

Using the Linux Monitor Fast Menu

The Linux Monitor Fast Menu, EZLFASTR (Figure 2-15), provides easy access to all MAINVIEW for Linux – Servers views.

Figure 2-15 Linux Monitor Fast Menu

```

Linux Monitor Fast Menu
Time frame - Realtime
-----+
| Place cursor on | . Shared Memory Info
| menu item and | . Shared Memory Stats
| press ENTER | . Msg Queue Info
| | . Msg Queue Stats
+-----+ . Semaphore Info
          . Semaphore Stats

Processes
. Overview
. Command Path/Parms
. Process Tree
. Resource Usage

Devices
. Disk Statistics
. Disk Configuration
. DiskCtrlr Configuration

System Parameters
. General Kernel
. File System
. Virtual Memory
> Network

File Systems
. Mounted File Systems
. Directory Listing
. Partition Information

Network
. Statistics
. Intfc Configuration

Utilities
. Image Status
. VM System Status
. Add/Change Monitor Rule
> Environment Settings
> Linux Monitor Easy Menu

Users
. Overview
. Group Overview
. UID information
. Login information

VM
> VM System

. Return...
    
```

Chapter 3 Using Views

This chapter provides information on how to view data in MAINVIEW for Linux – Servers views. For more detailed information about the MAINVIEW architecture and interface, see *Using MAINVIEW*. The views described in this chapter are real-time views. This chapter discusses the following topics:

Overview	3-2
Viewing System Information	3-2
All Monitored Linux Images	3-4
Heartbeat Data	3-4
System Resource Information	3-5
Viewing Process Activity	3-6
List of Running Processes	3-6
Full Command Names	3-7
Parent/Child Relationship of Current Processes	3-8
Monitoring File Systems	3-9
Monitoring File Systems	3-9
File System Information for a Specific Linux System	3-9
Full File System Name	3-11
Detailed File Listing	3-11
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Process Statistics by Group Name	3-13
Process Statistics by User Name	3-14
Viewing Configuration Information	3-15
File System Configuration Information	3-18
System Configuration Information	3-19
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z/VM User Resource Information	3-23
z/VM System Overview Information	3-24
Exiting from MAINVIEW for Linux – Servers	3-24

Overview

MAINVIEW for Linux – Servers provides system information and statistics for your Linux systems. The interval views are not in this chapter, but you can access the interval views by replacing the **R** suffix of the real-time view names with a **Z** suffix.

Viewing System Information

MAINVIEW for Linux – Servers monitors CPU usage, kernel information, and related activities of your Linux systems. Table 3-1 lists the system information views.

Table 3-1 System Views (Part 1 of 2)

View	Description
SYLCPUR	displays processor usage for each monitored Linux image Use the SYLCPU/SYLCPUR view to display CPU load information.
SYLCPUER	displays processor statistics summarized over all processor engines
SYLHOSTR	displays the full host name for a system
SYLMSQIR	displays resource usage and limits of the monitored Linux system message queuing component
SYLMSQSR	displays the message queue statistics and information for each Inter-Process Communication (IPC) message queue that is allocated on the monitored Linux system
SYLOVERR	displays information about each Linux system being monitored by the PAS Data for this view comes from heartbeat data. For more information, see “Heartbeat Data” on page 3-4. Use the SYLOVER /SYLOVERR view to quickly obtain status information about all monitored Linux system images connected to the PAS that own the current context.
SYLOVRZR	displays information about each Linux system being monitored by the PAS This view is summarized by image name.
SYLSEMIR	displays resource usage limits of the semaphore subsystem This view includes the following information: <ul style="list-style-type: none"> • maximum number of semaphores and undo structures • maximum number of IDs • maximum semaphores per ID

Table 3-1 System Views (Part 2 of 2)

View	Description
SYLSEMSR	displays semaphore array information This view includes the following information: <ul style="list-style-type: none"> • semaphore set ID • creator and owner • current number of semaphores • permissions • access times
SYLSHMIR	displays the shared memory information This view includes the following information: <ul style="list-style-type: none"> • total amount of shared memory used (in kilobytes) • minimum segment size (in bytes) • maximum number of segments per process
SYLSHMSR	displays the shared memory statistics
SYLSWAPR	displays the system metrics and swap load to manage system performance This view shows the following information: <ul style="list-style-type: none"> • total swap space and usage, • pages scanned • paging rates • paging reads • paging writes • faults • context switches
SYLTBLSR	displays table size and the amount of the table currently being used for the following kernel tables: <ul style="list-style-type: none"> • process table (processes currently running) • I-Node table (unique file identifiers) • file table (open file instances)
SYLUSER	displays system resource information This view shows the following information: <ul style="list-style-type: none"> • CPU usage • run queue • memory usage and totals • I/O rates • kernel table • swapping • load averages (1-, 5- and 15- minute intervals)

This section details some basic functions that you can perform, useful information, and sample views from a few frequently used system views. The following views are detailed in this section:

- SYLOVRZR
- SYLUSER

All Monitored Linux Images

The SYLOVRZR view (Figure 3-1) provides the following information for each Linux system that is being monitored by the active PAS:

- host name of each Linux system image
- status (inactive or running)
- CPU usage (percentage)
- memory usage (percentage)
- swap space usage (percentage)

Figure 3-1 SYLOVRZR View

CMD	Image	VMSystem	Status	%CPU	%Mem	
-----				0.....50...100	0.....50...100	
JMWLINIX	SYSCBMC		Running	0.27	94.1	1.
JWAYGOOD	N/A		Running	0.58	95.2	31.
NEWONE	N/A		Inactive			
NEWTWO	N/A		Inactive			
RINCEWIN	N/A		Running	4.12	98.3	1.
TWOFLOWE	N/A		Running	2.95	96.1	9.

Heartbeat Data

Data for the SYLOVRZR view comes from heartbeat data that is sent every heartbeat interval from each Linux system to the PAS. For more information about heartbeat data, see “Heartbeat Data” on page 1-5.

You can use the SYLOVRZR view to quickly obtain status information about all the Linux system images being monitored that are connected to the PAS owning the current context.

System Resource Information

The System Resource Usage (SYLUSER) view (Figure 3-2 on page 3-5), displays the amount of system resource information. The SYLUSER view includes the following information:

- monitored Linux image name
- CPU usage (percentage)
- average number of processes that are waiting for CPU service (per second)
- average number of times that the run queue is updated during the measurement interval (per second)
- average number of processes that are ready to run (for 1-, 5-, and 15-minute intervals)
- number of processes running during the measurement interval
- total amount of physical memory that is in use during the measurement interval

Figure 3-2 SYLUSER View

IImage	%CPUutil	%IdleCPU	%UserCPU	%SystemCPU	RunQueue	RunOcc
-----	0.....50...100	-----	-----	-----	-----	-----
JWAYGOOD	2.95 ■	97.05	0.73	0.22	0.00	0.00

From the SYLUSER, view you can select any CPU to view detailed information about a specific CPU.

Viewing Process Activity

MAINVIEW for Linux – Servers monitors your Linux systems processes and related activities. Table 3-2 lists the processes activity views.

Table 3-2 Process Activity Views

View	Description
PSLCMNDR	displays the commands that are issued for the processes
PSLCPRMR	displays commands and parameters for a specific process
PSLINFOR	displays detailed overview of a process
PSLOVERR	displays a list of all processes that are running
PSLTREE	displays relationships between parent and child processes in the system The PSLTREE view uses a combination of the sequence number and level number to show the order and depth of the branches of the tree, following any process to the last child process.
PSLUSER	displays the resources that are used by each process

This section details some basic functions you can perform, useful information, and sample views from a few frequently used process views. The following views are detailed in this section:

- PSLOVERR
- PSLTREE

List of Running Processes

The PSLOVERR view (Figure 3-3 on page 3-7) displays a list of all running processes. The PSLOVERR view shows the following information:

- process identification number
- process name
- elapsed process time
- CPU resources that were used for each process during the last sampling interval
- total physical resident memory
- I/O rate

- process state
- total virtual memory size
- CPU time that a process consumed executing programs and library functions during the last sampling interval
- CPU time that a process consumed by the kernel in system calls and administrative overhead during the last sampling interval
- average CPU usage over the life of the process

Figure 3-3 PSLOVERR View

CMD	PID	Process Name	Image	Elapsed ProcTime	%CPU 0.....50...100	ResSize (KB)
	1103	mmldsrv	JWAYGOOD	215:54:5	1.60	6052
	25739	bgscollect	JWAYGOOD	07:58:49	0.70	2408
	3	ksoftirqd_CPU0	JWAYGOOD	215:55:4	0.00	0
	5	bdflush	JWAYGOOD	215:55:4	0.00	0
	6	kupdated	JWAYGOOD	215:55:4	0.00	0
	7	mdrecoveryd	JWAYGOOD	215:55:3	0.00	0
	12	khubd	JWAYGOOD	215:55:2	0.00	0
	512	in.identd	JWAYGOOD	215:55:1	0.00	32
	327	snmpd	JWAYGOOD	215:55:1	0.00	692
	338	sshd	JWAYGOOD	215:55:1	0.00	40
	354	syslogd	JWAYGOOD	215:55:1	0.00	252
	360	klogd	JWAYGOOD	215:55:1	0.00	188
	471	atd	JWAYGOOD	215:55:1	0.00	120
	510	in.identd	JWAYGOOD	215:55:1	0.00	32
	958	nscd	JWAYGOOD	215:55:0	0.00	388
	1327	bash	JWAYGOOD	215:49:5	0.00	672
	513	in.identd	JWAYGOOD	215:55:1	0.00	32
	679	nmbd	JWAYGOOD	215:55:0	0.00	492
	683	smbd	JWAYGOOD	215:55:0	0.00	544
	697	smpppd	JWAYGOOD	215:55:0	0.00	220
	766	automount	JWAYGOOD	215:55:0	0.00	84
	806	lpd	JWAYGOOD	215:55:0	0.00	24
	891	kdm	JWAYGOOD	215:55:0	0.00	4
	903	cron	JWAYGOOD	215:55:0	0.00	152

Full Command Names

The Process Name field in the PSLOVERR view (shown in Figure 3-3) shows a limited number of bytes of the process name. To view the full process name, select the Process Name field. By hyperlinking on the **Process Name** field, you can display the full command and parameters.

Parent/Child Relationship of Current Processes

The PSLTREE view (Figure 3-4) displays the relationship between parent and child processes in the system. The PSLTREE view uses a combination of the sequence number and level number to show the order and depth of the branches of the tree, following any process to the last child process. The PSLTREE view shows the following information:

- unique process ID
- process name of the command that it is executing
- process ID of the current process' parents
- number of generations between the current process and the original process
- number of processes that have the same parent (sibling count)
- number of processes that this process created (child count)
- name of the real user to which the process belongs

Figure 3-4 PSLTREE View

ProcessId	Cmd Name	Parent ProcessID	TreeLevel 1.....10	Sibling Count	Child Count	Real User Name
1	init	0	0	1	39	root
2	swapper	1	1	39	0	root
3	kflushd	1	1	39	0	root
4	kupdate	1	1	39	0	root
5	kpiod	1	1	39	0	root
6	kswapd	1	1	39	0	root
142	portmap	1	1	39	0	bin
180	keyserv	1	1	39	0	root
238	ypbind	1	1	39	1	root
239	ypbind	238	2	1	2	root
241	ypbind	239	3	2	0	root
242	ypbind	239	3	2	0	root
277	automount	1	1	39	0	root
279	automount	1	1	39	0	root
297	automount	1	1	39	0	root
310	automount	1	1	39	0	root
323	automount	1	1	39	0	root
339	automount	1	1	39	0	root
352	automount	1	1	39	0	root
365	automount	1	1	39	0	root
378	automount	1	1	39	0	root
390	automount	1	1	39	0	root
413	automount	1	1	39	0	root
428	automount	1	1	39	0	root

Monitoring File Systems

To help you monitor statistics for your file systems, such as storage allocation and i-node usage, MAINVIEW for Linux – Servers offers the file systems views. Table 3-3 lists the file systems views.

Table 3-3 File Systems Views

View	Description
FSLDIRNM	displays the full directory name for a file The full directory name can be up to 1024 bytes.
FSLFLNM	displays the full file name or directory for a file The full file name can be up to 1024 bytes.
FSLINFOR	displays a mounted file system This view includes the following information: <ul style="list-style-type: none"> • mount point directory • type of file system • amount of space in the file system that is used • mount parameters
FSLMNTR	displays mounted file systems usage and space usage statistics Use the FSLMNT view to monitor mounted file systems during a specified interval.
FSLMNTPTR	displays the full mount point for a file system
FSLSPACE	displays a detailed directory listing for a directory or a detailed file listing for a file

This section details some basic functions you can perform, useful information, and sample views from a few frequently used file system views. The following views are detailed in this section:

- FSLMNTR
- FSLSPACE

File System Information for a Specific Linux System

Figure 3-5 shows the FSLMNTR view. The FSLMNTR view lets you view file system information about a specific Linux image. The view provides the following file system information:

- path name of the directory where the file system is mounted
- specific Linux image that is being monitored
- type of file system

- amount of the file system that is being used (percentage)
- total file system capacity (in kilobytes)
- free file system space (in kilobytes)
- used file system space (in kilobytes)
- amount of the file system that is being used by users excluding root (percentage)
- amount of the file system that is available to users, excluding root (in kilobytes)
- amount of the file system that is available to users for allocation (in kilobytes)
- size of the file system allocation unit (in blocks and kilobytes)
- total number of file system allocation units (in blocks)
- number of free file system allocation units (in blocks)
- number of i-nodes in use (percentage)
- total number of i-nodes
- number of free i-nodes
- number of i-nodes in use

Figure 3-5 FSLMNTR View

C FileSysName (Mount Point)	Image	FSType	%Utilization

			0.....50...100
/	JWAYGOOD	ext2	78 ██████████
/windows/E	JWAYGOOD	vfat	64 ██████████
/usr	JWAYGOOD	ext2	51 ██████████
/boot	JWAYGOOD	ext2	15 ██████████

Full File System Name

The Mounted File System Name field displays a portion of the full file system name. You can display the full name of the mounted file system by hyperlinking on the Mounted File System Name field.

Detailed File Listing

The FSLSPACE view shows detailed directory information.

To display the FSLSPACE view, from the FSLMNTR view type **S** to the left of the File System Name that you want to view and press **Enter**.

The FSLSPACE view provides the following information:

- file or directory name
- type of file or directory
- unique serial number (or i-node) of the file or directory
- number of directories that point to the file or directory
- size of the file or directory (in bytes)
- size of the file (in blocks)
- user ID of the owner of the file (UID)
- group ID of the owner of the file (GID)
- file permissions
- time and date of the last modification to the file
- time and date of the last modification to the file attributes
- directory that contains the directory or file

Figure 3-6 FSLSPACE View

C	File or Dir Name	Type	File Ser Number	Number	Size (bytes)	Size (blocks)	Block Size	Owner UserID	G
-	-----	----	Number	Links	(bytes)	(blocks)	Size	UserID	G
.		DIR	1	6	16384	1	32768	0	
..		DIR	1	5	4096	1	4096	0	
BackupData		DIR	125	2	32768	1	32768	0	
BackupJMW		DIR	118	2	32768	1	32768	0	
BackupMML		DIR	133	2	32768	1	32768	0	
BackupSrc		DIR	130	2	32768	1	32768	0	
Image.113		NORM	261	1	987.6Mi	31601	32768	0	
50.exe		NORM	260	1	1375956	42	32768	0	

Using User and Group Views

User and group views provide a series of views that summarize process data by a user or a group. Table 3-4 lists user and group views.

Table 3-4 User and Group Views

View	Description
GRLOVRZR	displays all the processes that are running on a selected image, summarized by real group name
USLINFO	displays the user ID name and user ID (number) for each user with a process running on the monitored system This view shows the group ID name and group ID (number) for each user.
USLLOGNR	displays all users who are logged-on to a monitored Linux system
USLOVRZR	displays all processes that are running on a selected image, summarized by real user name

This section details some basic functions that you can perform, useful information, and sample views from a few frequently used user and group views. The following views are described in this section:

- GRLOVRZR
- USLOVRZR

Process Statistics by Group Name

You can use GRLOVRZR to view resource usage for all users that are part of a group based on the processes that are running on their behalf. You can select a group name to see a list of processes running under that group name.

Figure 3-7 GRLOVRZR View

Real	#Processes	Image	Elapsed	%CPU	ResSize	I/O	R
Group Name	-----	-----	ProcTime	0.....50...100	(KB)	-----	
root	68	JWAYGOOD	216:12:0	0.01	741		0

Process Statistics by User Name

You can use USLOVRZR to view resource usage for users based on the processes that are running on each users' behalf. You can select a user name to see a list of processes running under that user name.

Figure 3-8 USLOVERZ View

Real User Name	#Processes -----	Image -----	Elapsed ProcTime	%CPU 0.....50...100	ResSize (KB)	I/O R -----
root	46	JWAYGOOD	216:14:5	0.07	511	0
wwwrun	1	JWAYGOOD	216:14:0	0.00	1784	0
jwaygood	17	JWAYGOOD	216:13:3	0.00	1488	0
nobody	4	JWAYGOOD	216:14:2	0.00	32	0

Viewing Configuration Information

The configuration views let you to view configuration information. Table 3-5 lists these configuration views.

Table 3-5 Configuration Views (Part 1 of 3)

View	Description
CFLCOLLR	displays configuration information about the data collector and data server that are running on each Linux system This view is can be used to determine release levels of the product's components and data server initialization parameter settings.
CFLDCTRL	displays disk controllers attached to the system, and displays configuration information about each one The configuration information includes: <ul style="list-style-type: none"> • controller name • controller type • parent name
CFLDISKR	displays disk devices that are attached to the monitored Linux system, and displays the configuration information about each device This view includes the following information: <ul style="list-style-type: none"> • disk model • disk type • disk size (in megabytes)
CFLFSYSR	display kernel parameters that relate to the file system in the /proc/sys/fs directory of the monitored Linux system
CFLFLICM4R	displays values of system parameters that relate to the ICMP protocol in the /proc/sys/net/ipv4 directory of the monitored Linux system
CFLIFC4R	displays values of the system parameters contained in the /proc/sys/net/ipv4/conf directory of the monitored Linux image for each network interface In this view, All in the Network Interface field indicates that values in the other fields apply to all of the network interfaces. Default in the Network Interface field indicates that values in the other fields contain default values for all interfaces.
CFLIFC4AR	displays values of system parameters in the /proc/sys/net/ipv4/conf directory of the monitored Linux image for each network interface
CFLIPF4R	displays system parameters in the monitored Linux system's /proc/sys/net/ipv4 directory These parameters relate to IP protocol packet fragmentation.
CFLIP4R	displays general system parameter values in the /proc/sys/vm directory of the monitored Linux system These parameters relate to the kernel's management of virtual memory.

Table 3-5 Configuration Views (Part 2 of 3)

View	Description
CFLIP4AR	displays general system parameter values in the /proc/sys/vm directory of the monitored Linux system These parameters relate to the kernel's management of virtual memory.
CFLKERNLR	displays general system parameter values in the /proc/sys/kernel directory of the monitored Linux system
CFLNETCR	displays system parameter values in the /proc/sys/net/core directory of the monitored Linux system These parameters relate to the kernel's management of core network resources.
CFLNIFCR	displays network interfaces that are attached to the monitored Linux system and configuration information about each network interface This view displays the following information: <ul style="list-style-type: none"> • monitored Linux system • interface name • interface type • parent name of the interface
CFLNN4R	displays system parameter values in the /proc/sys/net/ipv4/neigh directory of the monitored Linux system In the Network Interface field, Default indicates default values for all network interfaces.
CFLPARTR	displays configured disk partitions on the monitored Linux system, and displays information about each disk partition This view displays the following disk partition information: <ul style="list-style-type: none"> • partition name • monitored Linux image name • disk name • partition size (in blocks) • offset cylinder number from the beginning of the disk
CFLPASR	displays configuration information about the active PAS that is monitoring the current context This view lets you determine release levels of the MAINVIEW for Linux – Servers components and PAS initialization parameter settings.
CFLRT4R	displays system parameter values in the /proc/sys/net/ipv4 directory of the monitored Linux image that are related to IP network routing
CFLSYSR	displays configuration of the system, including information about the processor, memory, time zone, and IP address
CFLTCP4R	displays system parameter values in the /proc/sys/net/ipv4 directory of the monitored Linux image that relate to the TCP protocol

Table 3-5 Configuration Views (Part 3 of 3)

View	Description
CFLVMEMR	displays system parameter values in the /proc/sys/vm directory of the monitored Linux image These parameters relate to the kernel management of virtual memory.
CONFIG	displays all of the parameter views You can select and delete the views that are listed on the CONFIG view.

This section details some basic functions you can perform, useful information, and sample views from a few frequently used configuration views. The following views are detailed in this section:

- CFLFSYSR
- CFLSYSR

File System Configuration Information

The File System - System Parameters (CFLFSYSR) view (Figure 3-9), displays the system parameters in the `/proc/sys/fs` directory. The parameters displayed in the CFLFSYSR view relate to how the kernel manages the files in use by processes of the monitored Linux system.

Figure 3-9 CFLFSYSR View

```
I Image      nr_dentry nr_unused age_limit want_pages nr_alloc nr_free dquot-max
-----
JWAYGOOD    163408   148573    45         0         0         0         0
```

System Configuration Information

The System Configuration (CFLSYSR) view (Figure 3-10), displays the configuration of the monitored Linux systems. The CFLSYSR view lets you view configuration information, such as memory and processor configurations.

Figure 3-10 CFLSYSR View

Image	Processor	Processor	Processor	Processor	CPUclock	Numbe
-----	Model	Vendor	ClockRate	Width	Ticks/Sec	Proce
JWAYGOOD	Pentium III	GenuineIntel	448	32	100	

Displaying Network Statistics

The Network Statistics (NTLSTATR) view (Figure 3-11), displays network statistics for the monitored Linux system. The following statistics are displayed in the NTLSTATR view:

- network protocol or network interface name
- monitored Linux image name
- inbound transmission rate (packets per second and bytes per second)
- outbound transmission rate (packets per second and bytes per second)
- error rate (errors per second)
- average collision rate (per second)

Figure 3-11 NTLSTATR View

Protocol	Image	InBound (pkts/sec)	OutBound (pkts/sec)	InBound (bytes/sec)	OutBound (bytes/sec)	Errs/Sec	Colls
eth0	JWAYGOOD	3.82	1.88	301.05	2698.07	0.00	
lo	JWAYGOOD	0.00	0.00	0.00	0.00	0.00	
sit0	JWAYGOOD	0.00	0.00	0.00	0.00	0.00	
ICMPSTAT	JWAYGOOD	0.00	0.00	.....N/A	.....N/A	0.00	
IPSTAT	JWAYGOOD	2.58	1.88	.....N/A	.....N/A	0.00	
TCPSTAT	JWAYGOOD	1.47	1.88	.....N/A	.....N/A	0.00	
UDPSTAT	JWAYGOOD	0.72	0.00	.....N/A	.....N/A	0.00	

Displaying Disk Statistics

The Device Statistics (DVLSTATR) view (Figure 3-12), displays the statistics for devices that are attached to the monitored Linux system. The following statistics are displayed in the DVLSTATR view:

- disk name
- monitored Linux image
- operations per second (average transfer rate)
- average queue lengths
- response time (seconds per operation)
- input/output rate (pages per second and kilobytes per second)
- blocks read per second
- blocks written per second
- paging device indication (indicates if a disk is a paging device)
- page size (in bytes)
- block size (in bytes)
- major device number
- minor device number

Figure 3-12 DVLSTATR View

DiskName	Image	XferRate	%Active	AvgQuLen	RespTime	I/
		(ops/sec)	0.....50...100	(secs/op)		(page
sda	JWAYGOOD	0.42	0.00	0.00	0.00	
sdb	JWAYGOOD	0.00	0.00	0.00	0.00	
sdc	JWAYGOOD	0.03	0.00	0.00	0.00	
hda	JWAYGOOD	0.00	0.00	0.00	0.00	

Viewing z/VM System Data

The z/VM System views let you to view the performance of your z/VM systems. Table 3-6 lists these z/VM system views.

Table 3-6 Virtual Machine Views

View	Description
VMLSYSR	displays general z/VM system performance data
VMLCPUR	displays z/VM CPU statistics The statistics are presented based on a logical point of view. They take into account the actual time allotted to the CPU.
VMLPRVR	displays privileged operations information
VMLSTRR	displays z/VM storage statistics
VMLOVRZR	displays the status, matched rule, and host name of each z/VM system image being monitored by the PAS, which owns the current context Data for this view comes from heartbeat data which is sent every heartbeat interval from each z/VM system to the PAS. No requests for data are transmitted over the network when this view is invoked or refreshed. Use the VMLOVRZR view to quickly obtain status information about all the z/VM systems being monitored.
VMLDEVR	displays z/VM device statistics
VMLCPOR	displays z/VM paging and spooling statistics
VMLUSRR	displays z/VM user information
VMLLUSRR	displays z/VM user information for Linux virtual machines
VMLMPUR	displays z/VM virtual MP user resource usage

z/VM User Resource Information

The z/VM User Resource Usage (VMLUSRR) view (Figure 3-13), displays z/VM user information and statistics.

Figure 3-13 VMLUSRR View

VMuserid	VMSYSTEM	%CPU	%Sup	%Emul	NonSpool	DASDpgrt	Proj-WSS
-----	-----	0.....50...100	-----	-----	IO/sec	Pgs/sec	(pages)
SYSB	SYSCBMC	64.00	15.00	49.00	150.0	0.0	392192
MVSSYSE	SYSCBMC	17.00	2.30	14.00	41.0	0.0	244736
VMBACKUP	SYSCBMC	10.00	1.40	8.80	358.0	0.0	3621
SYSTEM	SYSCBMC	7.00	7.00	0.00	0.0	0.0	0
MVSSYSJ	SYSCBMC	6.50	1.30	5.20	11.0	0.0	91136
MVSESAD	SYSCBMC	5.90	0.45	5.50	23.0	0.0	30720
MVSVTHB	SYSCBMC	5.00	1.50	3.50	214.0	0.0	47104
MVSSYSQ	SYSCBMC	5.00	1.00	4.00	8.7	0.0	84992
MVSESAO	SYSCBMC	4.80	0.31	4.40	10.0	0.0	34816
MVSMVA2	SYSCBMC	4.40	1.10	3.30	4.6	0.0	28672
ESAMVS	SYSCBMC	4.10	0.48	3.60	10.0	0.0	69632
MVSMVA1	SYSCBMC	4.00	1.10	2.90	3.2	0.0	30720
MVSMRM1	SYSCBMC	3.70	1.20	2.50	2.2	0.0	12288
MVSESAB	SYSCBMC	3.30	0.45	2.90	13.0	0.0	21504
MVSMNT9	SYSCBMC	3.00	0.37	2.60	6.5	0.0	19456
MVSPSEP	SYSCBMC	2.30	0.21	2.10	4.6	0.0	16384
INTLCFCC	SYSCBMC	2.30	1.20	1.10	0.0	0.0	26624
MVSVTM2	SYSCBMC	2.10	0.15	1.90	1.3	0.0	75776
MVACFCC	SYSCBMC	1.70	0.91	0.87	0.0	0.0	4579

z/VM System Overview Information

Use the VMLOVRZR (Figure 3-14) view to quickly obtain status information about all the z/VM systems being monitored.

Figure 3-14 VMLOVRZR View

VMSystem	Status	%CPU	%Storage	#Linux	#Users
		0.....50...100	0.....50...100		
SYSCBMC	Running	83.00 ██████████	77.0 ██████████	1	128
SYSLBMC	Inactive	0.00	0.00	0	0

Heartbeat Data

Data for the VMLOVRZR view comes from heartbeat data that is sent every heartbeat interval from each z/VM system to the PAS. For more information about heartbeat data, see “Heartbeat Data” on page 1-5.

You can use the VMLOVRZR view to quickly obtain status information about all the z/VM systems being monitored.

Exiting from MAINVIEW for Linux – Servers

When you are finished working with MAINVIEW for Linux – Servers, return to the MAINVIEW Selection Menu by typing one of the following commands on the COMMAND line:

- Quit [DISConnect]
- RETURN

|

Chapter 4 Using Rules and Images

MAINVIEW for Linux – Servers monitor rules lets you customize the environment that you are monitoring.

This chapter discusses the following topics:

Overview	4-2
Rule Parameters	4-3
Wildcard Characters	4-5
Editing an Existing Rule	4-6
Adding a New Rule	4-7
Deleting an Existing Rule	4-8
Viewing Detailed Rule Information	4-9
Viewing Errors	4-10

Overview

Monitor rules determine how the data is collected from a monitored Linux system. You can add, delete, and change rules. MAINVIEW for Linux – Servers searches the rules when the PAS discovers a Linux system to be monitored.

When MAINVIEW for Linux – Servers is monitoring a Linux system, the monitored system is called an image. These monitored Linux system names can be many characters. MAINVIEW for Linux – Servers requires an image name that is up to eight characters in length. Unique image names let you identify remote Linux systems quickly.

You can add, edit, and delete rules using the ADLRULER view (Figure 4-1).

Figure 4-1 ADLRULER View

CMD	Image	Monitor	HeartBeat	Reply	Backgrnd	Demand	Min Demand	History
---	Pattern	(Y/N)	Interval	TimeOut	Samp Int	Samp Int	Mode	Dur Start
	\$DEFAULT	Yes	60	20	60	10	300	00:00:00
	JMW*	Yes	60	30	60	10	150	06:00:00
	JWAY*	Yes	60	10	60	10	150	06:00:00
	MML12*	Yes	60	60	60	10	150	06:00:00
	SYSCBMC	Yes	60	60	60	10	150	06:00:00

Table 4-1 describes the monitor rules that apply to the Linux systems, where the names start with the characters *JMW* (as shown in Figure 4-1).

Table 4-1 Description of Monitor Rule Example

Field	Value	Description
Image Pattern	JMW*	indicates that all of the Linux systems having image names beginning with the characters JMW will be monitored according to the parameter values in this rule
Monitor	Yes	indicates these Linux systems are to be monitored
Heartbeat Interval	60	indicates the heartbeat interval is set to 60 seconds
Reply TimeOut	30	indicates the reply time-out is 30 seconds
Backgrnd Samp Int	60	indicates the background sampling interval is set to 60 seconds
Demand Samp Int	10	indicates the demand sampling interval is set to 10 seconds
Min Demand Mode Dur	150	indicates a 150 second minimum demand mode duration
History Start	06:00:00	indicates the time of day to start collecting historical data on the managed systems

Rule Parameters

You are able to set rule parameters in the ADLRULER and ADLRULDR views. These parameters are described in Table 4-2.

Table 4-2 Rule Parameters (Part 1 of 3)

Parameter	Value	Default	Description
Image Pattern	8-character string	N/A	specifies the rule The Image Pattern field is used by the product to apply monitoring parameters to monitored systems. This field accepts wildcards. For more information, see "Wildcard Characters" on page 4-5.
Monitor	YES NO	Yes	specifies whether you want to monitor systems identified by the Image Pattern field For example, if the Image Pattern equals TEST* and Monitor equals No, all systems with MAINVIEW image names that begin with the string TEST are not monitored.

Table 4-2 Rule Parameters (Part 2 of 3)

Parameter	Value	Default	Description
Heartbeat Interval	0 30–3600	60	specifies how often, in seconds, the monitored system should send its heartbeat status and data to the PAS The value 0 disables sending heartbeat data.
Reply Timeout	1–300	20	specifies the amount of time, in seconds, the PAS should wait for a reply from the monitored system for a data request If time-outs occur in views when you request large amounts of data, you may want to increase this value.
Background Sampling Interval	0 30–3600	60	specifies the interval length, in seconds, of background sampling This value specifies the maximum age of data that can be retrieved. Background mode sampling ensures that data is always available when requested. The value of 0 is allowed only if the Heartbeat Interval is 0; otherwise, the Background Sampling Interval must range from 30 to 3600. Lower values increase overhead on the Linux system because sampling occurs more frequently than higher values.
Demand Sampling Interval	10–3600	10	specifies the interval length, in seconds, of demand sampling This value specifies the maximum age of data that can be retrieved when the system is being actively monitored (demand mode) or when requests for data are issued during the Minimum Demand Mode Duration. Demand Sampling ensures that data is up to date when it is requested. Lower values increase overhead on the Linux system because sampling occurs more frequently.
Minimum Demand Mode Duration	10–1800 (must be greater than or equal to 2× Demand Sampling Interval)	300	specifies the minimum amount of time, in seconds, that demand sampling stays active Higher values increase overhead on the Linux system because demand sampling remains active longer than with lower values.
History Start	00.00.00–23.59.00	00.00.00	specifies the time of day to start collecting historical data
History End	00.59.00–23.59.59	23.59.59	specifies the time of day to stop collecting historical data

Table 4-2 Rule Parameters (Part 3 of 3)

Parameter	Value	Default	Description
VM History	YES NO	YES	indicates whether or not you want to collect z/VM system historical data for systems identified by the Image Pattern field
Configuration History	YES NO	YES	indicates whether or not you want to collect configuration-related historical data for systems identified by the Image Pattern field
File System History	YES NO	YES	indicates whether or not you want to collect file system-related historical data for systems identified by the Image Pattern field
Kernel History	YES NO	YES	indicates whether or not you want to collect kernel-related historical data for systems identified by the Image Pattern field
IPC History	YES NO	YES	indicates whether or not you want to collect IPC-related historical data for systems identified by the Image Pattern field
Device History	YES NO	YES	indicates whether or not you want to collect device-related historical data for systems identified by the Image Pattern field
Network History	YES NO	YES	indicates whether or not you want to collect network-related historical data for systems identified by the Image Pattern field
Process History	YES NO	YES	indicates whether or not you want to collect process-related historical data for systems identified by the Image Pattern field
User History	YES NO	YES	indicates whether or not you want to collect user-related historical data for systems identified by the Image Pattern field

Wildcard Characters

MAINVIEW for Linux – Servers lets you use wildcard characters in the Image Pattern field to identify a group of similarly named Linux systems. The Image Pattern field specifies the Linux images to which the monitor rule applies. The wildcard characters let you specify one or several images per rule. Table 4-3 lists wildcard characters that are accepted by MAINVIEW for Linux – Servers.

Table 4-3 Wildcard Characters

Character	Description
*	represents an unlimited number of characters in a string For example, J*Y could represent JAY, JABY, JABCDEFGHIY.
?	represents one character in a string For example, J?Y could represent JAY, JBY, JCY.

Switching Modes

The default mode for the ADLRULER view is Browse mode. Browse mode does not let you make any changes to the rules. Before you add a new rule, edit an existing rule, or delete an existing rule, you must switch from Browse mode to Edit mode.

To switch to Edit mode, complete the following steps:

- Step 1** From the ADLRULER view (Figure 4-1 on page 4-2), type **EDIT** on the COMMAND line to switch to Edit mode.
- Step 2** Press **Enter**.
- Step 3** 00 EDIT MOD (Figure 4-2) is displayed in the window information line. You are now in Edit mode.

Figure 4-2 EDIT Mode

```

>W1 =ADLRULER=====JMWLINUX=*===== (00 EDIT )====MVLNX====D====5
CMD Image Monitor HeartBeat Reply Backgrnd Demand Min Demand History Hi
--- Pattern (Y/N) Interval TimeOut Samp Int Samp Int Mode Dur Start En
$DEFAULT Yes 60 20 60 10 300 00:00:00 23
JMW* Yes 60 30 60 10 150 06:00:00 18
    
```

Editing an Existing Rule

To edit an existing rule, complete the following steps:

- Step 1** From the ADLRULER view (Figure 4-1 on page 4-2), verify that you are in Edit mode (see “Switching Modes” on page 4-6).
- Step 2** Change the desired parameters in the rules that you want to modify.

Step 3 Choose one of the following options:

- To save the changes to the rule and continue creating new rules or making changes to existing rules, type **SAVE** on the COMMAND line and press **Enter**.
- To save the changes to the rules and return to the previous view, press **F3**.
- To return to the Browse mode. To cancel the changes, type **CANCEL** on the COMMAND line and press **Enter**.

Note: You are not able to edit the Image Pattern field (to which you are applying the rule). To change the Image Pattern field, delete the existing rule (see “Deleting an Existing Rule” on page 4-8), and add a new rule with the desired image patterns (see “Adding a New Rule” on page 4-7).

Note: The \$DEFAULT rule cannot be edited or deleted.

Adding a New Rule

Adding rules lets you apply specific monitoring behavior to groups of images or to a particular image. For example, if you did not want to monitor your test servers at all, you could set up a rule to exclude collecting the test server statistics. However, if you had a group of similarly named images that you wanted to monitor more closely than your other images, you could set your heartbeat interval lower than the default.

To add a new rule, complete the following steps:

Step 1 From the ADLRULER view (Figure 4-1 on page 4-2), verify that you are in Edit mode (see “Switching Modes” on page 4-6).

Step 2 Type **A** in the Line Command field next to an existing rule.

Step 3 Type the name of the image pattern of the new rule in the Image Pattern field.

Tip: You can use wildcard characters to monitor several similarly-named Linux images. For more information about wildcard characters, see “Wildcard Characters” on page 4-5.

Step 4 Press **Enter**.

Step 5 Change the parameters according to how you want the new rule to monitor the images you specified in Step 3.

- Step 6** Choose one of the following options:
- To save the new rule that you just created and to continue creating new rules or making changes to existing rules, type **SAVE** on the **COMMAND** line and press **Enter**.
 - To save the new rule and return to the previous view, press **F3**.
 - To cancel saving the new rule, type **CANCEL** on the **COMMAND** line and press **Enter**.

Deleting an Existing Rule

To delete an existing rule, complete the following steps:

- Step 1** From the **ADLRULER** view (shown in Figure 4-1 on page 4-2), verify that you are in Edit mode (see “Switching Modes” on page 4-6).
- Step 2** Type **DEL** in the Line Command field next to the rule you want to delete.
- Step 3** Press **Enter**. This will delete the existing rule.
- Step 4** Choose one of the following options:
- To delete the rule and continue creating new rules or making changes to existing rules, type **SAVE** on the **COMMAND** line and press **Enter**.
 - To delete the rule(s) and return to the previous view, press **F3**.
 - To cancel and avoid permanently deleting the rule(s), type **CANCEL** on the **COMMAND** line and press **Enter**.

Note: The **\$DEFAULT** rule cannot be edited or deleted.

Viewing Detailed Rule Information

You can view detailed information on a specific rule by selecting the Image Pattern field from the ADLRULER view. By typing ADLRULDR on the COMMAND line from any view, you can display the detailed view (ADLRULDR) for the default rule, shown in Figure 4-3.

You can also view detailed rule information for a specific image pattern by typing ADLRULDR *image pattern* on the COMMAND line.

Figure 4-3 ADLRULDR View

```

W1 =ADLRULED=====DYN12706=*===== (00 BROWSE          )====MVLNX====D====1
Image Pattern..... $DEFAULT
Monitor(Y/N)..... Yes

Heartbeat Interval..... 60
Reply Timeout..... 20
Background-mode Sampling Interval 60
Demand-mode Sampling Interval.... 10
Minimum Demand-mode Duration..... 300
History Start..... 00:00:00
History End..... 23:59:59
VM Hist..... Yes
Config Hist..... Yes
FileSys Hist..... Yes
Kernel Hist..... Yes
IPC Hist..... Yes
Device Hist..... Yes
Network Hist..... Yes
Process Hist..... Yes
User Hist..... Yes

```

Viewing Errors

If you are adding a new rule, editing an existing rule, or deleting an existing rule from the ADLRULER view, and you encounter an error (Figure 4-4), complete the following steps to view the reason for the error:

Step 1 Place the cursor on the **ERR** and press **Enter**.

Figure 4-4 ADLRULER View Error

?*	Yes	60	10	60	10	300
ERR JAY*	Yes	60	10	60	10	300
JMW*	Yes	60	20	60	10	300
K*	Yes	60	20	60	10	300

Step 2 The description of the error is displayed. An example of an error description is shown in Figure 4-5.

Figure 4-5 ADLRULER View Error Description

```
BBMXCB36I Action IRREHBIN completed with return code: 8
-Related:BBMXCB35I For: IRRETARG = JAY*
-Related:BBMXCB37I At: 12:41:11 on DDMMYYYY
--Related:MMLI2008I 01 invalid; must be 0, or between 30 and 3600
```

Step 3 To clear the error, press **Enter** *twice*.

Chapter 5 Displaying Historical Data

This chapter provides information about the historical data feature. Historical data lets you look at system data as it existed an hour ago, yesterday, last week, last month, or last year.

Note: For instructions on how to generate historical performance reports, see *Using MAINVIEW*.

This chapter contains the following sections:

Overview	5-2
Data Availability	5-2
Linux Data Servers and VM Data Servers	5-2
MAINVIEW for Linux – Servers Product Address Space (PAS) . . .	5-3
MAINVIEW Display	5-3
TIME Command	5-4

Overview

Historical data lets you recreate the operating environment as it existed during a previous time frame so that you can compare the current performance with a previous performance. This comparison lets you determine whether your system is working normally or whether there is a problem.

Historical data consists of your data from a specified recent interval and its preceding intervals. Using the `TIME` command, you can specify intervals from any time frame for which data exists on your system. You can also use certain fields to determine when the data was collected and to hyperlink to particular time frame.

Data Availability

When you need historical data, you must ensure that the data is available in one of the historical data sets that has been allocated.

To determine whether data has been recorded to historical data sets, and to view a list of allocated historical data sets, type `DSL` on the `COMMAND` line. The `DSL` view is displayed.

Each of the following components are used to collect and display history data:

- Linux data servers
- VM data servers
- MAINVIEW for Linux – Servers Product Address Space (PAS)
- MAINVIEW Display

Linux Data Servers and VM Data Servers

The Background Sampling Mode Interval controls how often the data server requests the collection software for data samples. The Background Sampling Mode Interval (default= 1 minute) is set in the Monitor Rules. For more information on the Background Sampling Mode Interval and Monitor Rules, see Chapter 4, “Using Rules and Images.”

MAINVIEW for Linux – Servers Product Address Space (PAS)

The PAS receives the incoming data samples from the Linux and VM data servers and summarizes the data samples with the records in the current interval data record buffers.

Numeric data is averaged using the number of samples received for the current interval.

The PAS Interval Recorder has its own interval which is specified in the BBPARM member MMLTIR00, using the keyword INTVAL=. For more information on how to specify this interval, see the *MAINVIEW for Linux – Servers Customization Guide*. At the end of every interval, Interval Recorder writes the current interval record data buffers to one of the VSAM history data sets. These history data sets were allocated during the PAS customization. For more information on the history data sets customization, see the *MAINVIEW for Linux – Servers Customization Guide*.

The INTVAL= value determines when data is written to the history data set, which controls the granularity of the data. Smaller values for Background Mode Sampling Interval and the INTVAL= value increase collection overhead, but yield more accurate data. Higher values smooth out the peaks and valleys of the data samples, but it decreases the collection overhead.

MAINVIEW Display

Historical data views have the following two fields at the end of every row:

- **Last Sample Time** field
- **Last Sample Date** field

These fields are specific to MAINVIEW for Linux – Servers (see “Linux Data Servers and VM Data Servers” on page 5-2). The date and time values are local to the Linux or z/VM system where the data server is running. It is provided so that you can accurately determine when the data was sampled, because the Linux or z/VM system could be in a time zone different from the PAS or there could be some network delay of the sample data flowing to the PAS.

If the INCLUDE DATE and INCLUDE TIME commands have been issued, MAINVIEW also displays the following fields:

- **PAS Interval Date** field
- **PAS Interval Time** field

These fields specify when the Interval Recorder interval ended in the PAS. This date and time are local to the system where the PAS is running.

TIME Command

You can use the TIME command to specify the intervals of historical data that you want to display. The TIME command lets you display data as it existed at the end of one interval. To see data that spans a greater time frame, use the TIME duration parameter with the date and time parameters.

For detailed information about using the TIME command, the syntax of the command, and examples of different uses of the TIME command, see *Using MAINVIEW*.

Chapter 6 **MAINVIEW Alarm Manager**

MAINVIEW Alarm Manager works with MAINVIEW for Linux – Servers, and other MAINVIEW products, to provide alarms. These alarms display messages that can alert you when system resources are overused.

MAINVIEW Alarm Manager is capable of monitoring multiple systems simultaneously. This means that MAINVIEW Alarm Manager installed on one system keeps track of your entire enterprise.

This chapter discusses the following topics:

MAINVIEW for Linux – Servers Sample Alarms	6-2
Alarm Definitions	6-2
More Information	6-3

MAINVIEW for Linux – Servers Sample Alarms

MAINVIEW for Linux – Servers contains a number of sample alarms that you can customize to meet your specific monitoring needs. Table 6-1 lists MAINVIEW for Linux – Servers sample alarms.

Table 6-1 MAINVIEW for Linux – Servers Sample Alarms

Alarm	Description
AVGCPU	current number of processes has exceeded a specified percentage of the maximum allowable CPU space on the system
AVGSWP	swap space usage has exceeded a specified percentage
FILTBL	kernel file table usage has exceeded a specified percentage
FSYSIN	file system I-Node usage has exceed a specified percentage of the maximum allowable I-Node space
FILSYSUT	file system space usage is greater than a specified amount
INOTBL	Kernel I-node table has exceeded a specified percentage
PRCCPU	a process has exceeded a specified percentage of CPU usage
PRCTBLE	Kernel Process table usage has exceeded a specified percentage

Alarm Definitions

Alarm definitions consist of the following parameters:

- threshold and filter criteria
- view, product, and context for which the criteria are established
- message IDs and message text
- monitoring frequency and time periods
- hyperlinks to views, extended help or AutoOPERATOR commands

Note: Sample alarm definitions are shipped with **CONTEXT=SAMPCTXT**. For the samples to work on your system, change **CONTEXT=VALUE**, where **VALUE** is variable for a value that is valid at your site.

Alarm definitions are stored in a parameter library member that is read by MAINVIEW Alarm Manager at MVALARM PAS initialization.

Threshold conditions are defined as one of the following priority levels:

- Informational
- Warning
- Minor

- Major
- Critical

More Information

For more information about MAINVIEW Alarm Manager, see the *MAINVIEW Alarm Manager User Guide*.

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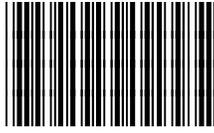
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