HP StorageWorks

Performance Advisor XP 2.1 User Guide

Performance Advisor XP 2.1 User Guide

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About this guide

This guide provides an overview of the main screens of Performance Advisor XP (PA XP). Each chapter describes the main functions of each screen so that you can use PA XP effectively and efficiently.

Intended audience

This guide is intended for customers and HP authorized servce providers experienced with the following:

- Disk array hardware and software

- Storage systems

Prerequisites

Prerequisites for using this product include:

- Knowledge of HP StorageWorks XP disk arrays

- Installation and configuration of PA XP 2.1

Related documentation

In addition to this guide, please refer to other documents for this product:

- HP StorageWorks Performance Advisor XP 2.1 Installation Guide

- HP StorageWorks Performance Advisor XP 2.1 Configuration Guide

- HP StorageWorks Performance Advisor XP 2.1 CLUI Guide

- HP StorageWorks Performance Advisor XP 2.1 Troubleshooting Guide

- HP StorageWorks Performance Advisor XP 2.1 Readme

These and other HP documents can be found on an HP web site: http://www.hp.com/support. Online help is also available for this product by clicking the help icon within the PA XP user interface.

Document conventions and symbols

Table 1   Document conventions

Convention	Element
Medium blue text: Figure 1	Cross-reference links and e-mail addresses
Medium blue, underlined text (http://www.hp.com)	Web site addresses
Bold font	• Key names • Text typed into a GUI element, such as into a box • GUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes
Italics font	Text emphasis
`Monospace font`	• File and directory names • System output • Code • Text typed at the command-line
`Monospace, italic font`	• Code variables • Command-line variables
`Monospace, bold font`	Emphasis of file and directory names, system output, code, and text typed at the command-line

⚠ **WARNING!**   Indicates that failure to follow directions could result in bodily harm or death.

△ **CAUTION:**   Indicates that failure to follow directions could result in damage to equipment or data.

▤ **IMPORTANT:**   Provides clarifying information or specific instructions.

▤ **NOTE:**   Provides additional information.

💡 **TIP:**   Provides helpful hints and shortcuts.

HP technical support

Telephone numbers for worldwide technical support are listed on the HP web site: http://www.hp.com/support/.

Collect the following information before calling:

- Technical support registration number (if applicable)

- Product serial numbers

- Product model names and numbers

- Applicable error messages

- Operating system type and revision level

- Detailed, specific questions

For continuous quality improvement, calls may be recorded or monitored.

HP strongly recommends that customers sign-up online using the Subscriber's choice web site at http://www.hp.com/go/e-updates.

- Subscribing to this service provides you with email updates on the latest product enhancements, newest versions of drivers, and firmware documentation updates as well as instant access to numerous other product resources.

- After signing-up, you can quickly locate your products by selecting **Business support** and then **Storage** under Product Category.

HP-authorized reseller

For the name of your nearest HP-authorized reseller:

- In the United States, call 1-800-345-1518.

- Elsewhere, visit http://www.hp.com and click **Contact HP** to find locations and telephone numbers.

Helpful web sites

For additional product information, see the following web sites:

- http://www.hp.com

- http://www.hp.com/go/storage

- http://www.hp.com/support/

1 HP StorageWorks Performance Advisor XP 2.1

Overview

HP StorageWorks Performance Advisor XP (PA XP) 2.1 is an Internet application that collects and monitors real-time performance of HP's family of HP StorageWorks XP disk array products. Use the simple, browser-based interface to quickly customize performance data collection and set performance alarms.

PA XP has three main components: a centralized management station, distributed host station(s), and a command-line presentation client. Data communication between these components is achieved through Internet-based protocols, which eliminates geographical limitations to PA XP component distribution.

PA XP provides effective, point-in time displays that give you an overall view of subsystem performance. PA XP includes the following features:

- Multiple interactive views of performance data

- Storage-based solutions that map the connection between the host server, array components, or customer-defined groups

- Up-to-the-minute, real-time performance data and history for array logical devices, front-end ports, back-end ports, and internal bus

- Performance alarm notification (level-based or trend-based) through e-mail, Simple Network Management Protocol (SNMP), or user-defined scripts

- Command-line user interface (CLUI) and applications programming interface (API) for integrating with third-party applications such as OpenView Performance Agent, OV-SAM Storage Optimizer, and SPMX

- Third-party integration ability

- Host and management station-based solutions

- Sorting ability

Use HP StorageWorks Performance Advisor XP 2.1 as a standalone application or with HP StorageWorks Command View XP (CV XP) 2.1. See the installation guide for information about installing PA XP.

Using this guide

This user guide provides an overview of the main screens of PA XP. Each chapter describes the main functions and features of each screen so that you can use PA XP effectively and efficiently.

The product CD includes the following documents:

- `InstallGuide.pdf` - Instructions for installing the PA XP software.

- `DOCS\CONFIG.HTM` - Information about configuring PA XP for your system.

- `Readme.txt` - Late-breaking information and known defects.

- `DOCS\TROUBLESHOOTING.HTM` - Information about solving problems that might occur when using PA XP.

- `DOCS\OnlineHelp\glossary\PAGlossary.htm` - A glossary of PA XP terms.

- `CLUI_DOC.HTM` - Information about using the PA XP command-line interface.

- Help documents - Online Help topics for the PA XP interface.

2 Using Performance Advisor XP

How to use Performance Advisor XP

HP StorageWorks Performance Advisor XP (PA XP) can be used as a standalone application or with HP StorageWorks Command View XP. See the installation guide for information about installing and configuring PA XP.

After you have installed PA XP, follow these instructions to begin using the application:

1. To begin viewing data collected by PA XP, type the following in a web browser:
   `http(s)://[server name]/pa`

2. If prompted to do so, enter the password for PA XP. Passwords are required to access PA XP (unless you are running PA XP with HP StorageWorks Command View XP, version 2.1). For the administrator, the user name is `administrator` and the password is `administrator`. For a general user, the user name is `user` and the password is `user`.

> **NOTE:** See "Changing user passwords" on page 80 for instructions on how to change the password.

3. Click the **Configuration** tab to see the Data Collection Configuration screen. To begin collecting data, select a command device on the host that you want to use. You can perform data collection on only one host per array. For more information, see "Data Collection Configuration" on page 45.

> **NOTE:** HP recommends that you allow one minute per 1,000 logical devices (LDEVs) for the management station (computer) to keep up with collection. Remember that PA XP collects performance data on all LDEVs in the array. It is not limited to the number of LDEVs that the host station is mapped to use. **Setting the collection rate too narrow hampers the management station and reduces its responsiveness.**

How to use Performance Advisor XP with Command View XP

When Performance Advisor XP (PA XP) and CommandView XP (CV XP) are installed on the same management station, you must log in to PA XP through CV XP. To log in to PA XP, use the following procedure:

1. To go to the CV XP log in page, type the following in a web browser:
   `http(s)://[server name]`

2. Log in to CV XP.

3. In the menu on the left, click the PA XP link.
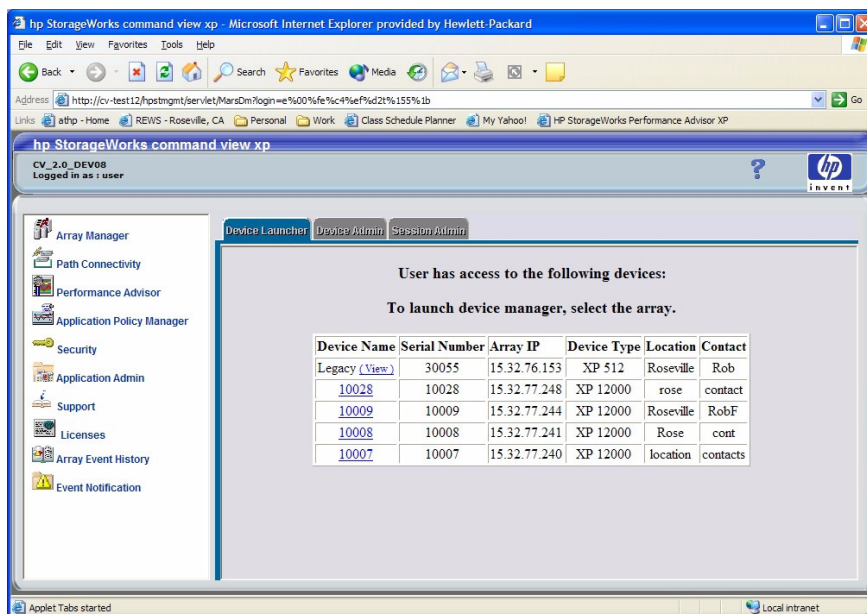
Figure 1 HP StorageWorks CommandView XP screen

NOTE: You will not need to log in again.

3 Grid Display

Introduction

The Grid Display screen offers two screens that provide a snapshot view of LDEV and component performance data.

The Grid Display Query screen contains several fields. Set a combination of these fields to filter the query and refine the data that you receive.
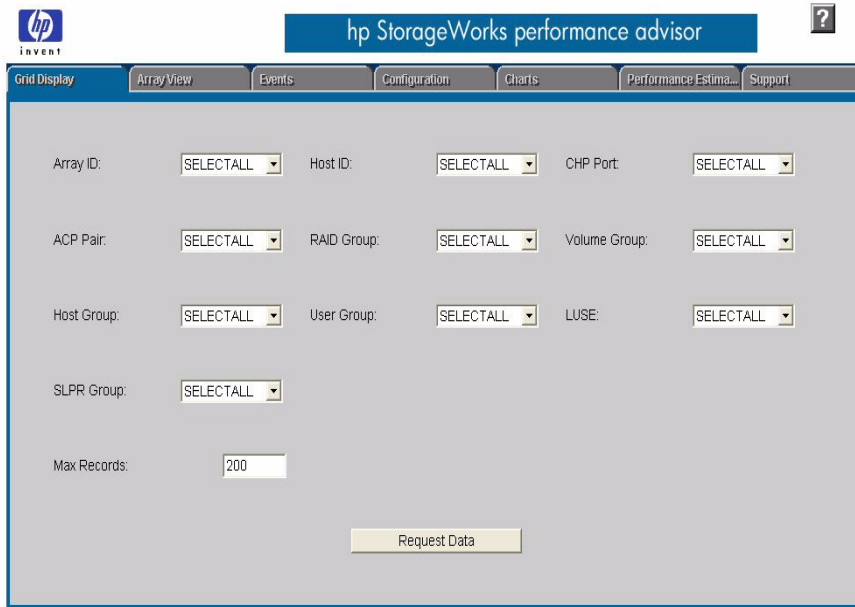
Figure 2 Grid Display Query screen

NOTE: See Table 7 on page 21 for a list of the Grid Display Query screen components.

After you select items in the fields (or after you accept the default values), click **Request Data**. The system retrieves the requested data and displays the results of your query. Use the Grid Display screen to view and monitor a variety of data about your array(s). Use the drop-down menus to refine the results of your query.

Using the Grid Display and Grid Display Query screens

Use the Grid Display Query screen to identify and select the parameters for your query, and then click **Request Data**. The system retrieves the requested data and displays the results in a scrolling list box in the Grid Display screen.

Array ID	Array Type	Host ID	Target:LUN	Vol. Group	Device File	SLPR	CLPR	Cache Size(GB)	LDEV ID	Luse?	Luse Master	E-Lun	E-Port(s)
10229	XP 12000	Unknown				2	2	4096	0:00			-	
10229	XP 12000	Unknown				2	2	4096	0:00			-	
10229	XP 12000	ia64too	0		/dev/rdsk/c25t2d4	2	2	4096	0:00			-	
10229	XP 12000	Unknown				2	2	4096	0:01			-	
10229	XP 12000	Unknown				2	2	4096	0:01			-	
10229	XP 12000	Unknown				2	2	4096	0:01			-	
10229	XP 12000	Unknown				2	2	4096	0:02	M	0:02	-	
10229	XP 12000					2	2	4096	0:02	C	0:02	-	
10229	XP 12000	Unknown				2	2	4096	0:02	M	0:02	-	
10229	XP 12000					2	2	4096	0:02	C	0:02	-	

Total I/O: 0   **Total MB/s: 0.00**   **Total Tracks: 0**

Show Array: Show Host: Show RAID Group: Show Host Group: Display type:

[Show Requested Arrays ▼] [Show Requested Hosts ▼] [Show Requested RAID Groups ▼] [Show Requested Host Groups ▼]   [Open Systems ▼]

Show CHP Port: Show ACP Pair: Show Volume Group: Show LUSE: Summary by:

[Show Requested CHP Ports ▼] [Show Requested ACP Pairs ▼] [Show Requested Volume Groups ▼] [Show Requested LUSE ▼]   [Show All ▼]

Show SLPR Group: Show CLPR Group:

[Show Requested SLPR Groups ▼] [Show Requested CLPR Groups ▼]

Current Query:

Array: 10229   Host: Show All   CHP Port: Show All   ACP Pair: Show All   RAID Group: Show All   [Refresh]

Volume Group: Show All   Host Group: Show All   User Group: Show All   LUSE: Show All   SLPR Group: Show All

WARNING: Only retrieved first 200 LDEV records!   Record date: 2005-02-14 19:00:00 MST

Figure 3 Grid Display screen

> **NOTE:** See Table 8 on page 21 for a list of the Grid Display screen components.

The Grid Display screen has several columns of data within a scrolling list box. The data is displayed in either black, blue, or red text. Black text indicates that no additional information is available for that field. Blue text indicates hot links. Double-click the text to display a separate browser with information about the item. Red text indicates that the system has not received sufficient configuration data to display a chart.

Double-click a **RAID Group** item to display RAID Group details, as shown in the following illustration.

Raid Group: 1-2
Raid Level: 5
ACP Pair: BH
Disk Mech 1: R101
Disk Mech 2: R111
Disk Mech 3: R121
Disk Mech 4: R131

Java Applet Window

Figure 4 RAID Group dialog box

The system supports RMLIB version 01.09.03 and later. If you have an LDEV that is associated with two RAID groups, data about both groups will be displayed.

Double-click an **Array ID** number to display the Utilization Summary for that array.

For XP 12000 arrays, double-click an **SLPR** or **CLPR** value to display the detail view for that SLPR or CLPR.

Double-click a **CHP Port ID** value to open the Port Data dialog box.
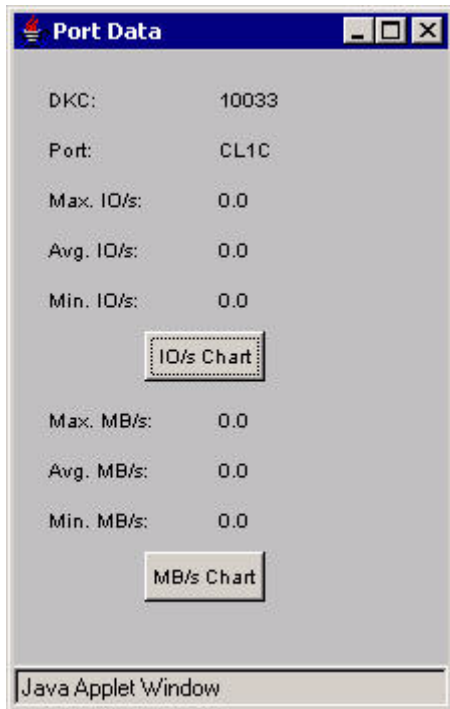
Figure 5 Port Data dialog box

Click **IO/s Chart** or **MB/s Chart** to display the Performance History screen, which shows the data in a bar chart, line chart, or stackable chart. Select the chart style in the **Chart Style** drop-down menu.

When you double-click any other blue-text items in the Grid Display screen, the Performance History graph opens in a new browser window.

The Grid Display screen provides drop-down menus to refine the results of your queries. The following drop-down menus are available:

- **Show Array**: Show a specific array or all arrays.

- **Show Host**: Show a specific host or requested hosts.

- **Show RAID Group**: Enter the physical location of the drive.

- **Show Host Group**: Show a specific host group or all host groups.

- **Show CHP Port**: Show a specific CHP Port or all ports.

- **Show ACP Pair**: Show a specific ACP pair or all ACP pairs.

- **Show Volume Group**: Show a specific volume group or all volume groups.

- **Show LUSE**: Show a specific LUSE or all LUSEs.

- **Show SLPR Group**: Show a specific SLPR group or all groups.

- **Show CLPR Group**: Show a specific CLPR group or all groups.

- **Display Type**: Show the display type, whether mainframe, open systems, or combined. This feature is enabled only when the data that you are collecting is a mixture of mainframe and open systems.

- **Summary by**: Gives an overall summary for each RAID group or port on a given array. See the next section for more information about this menu option.

Using the Summary by drop-down menu

Use the **Summary by** drop-down menu to view a summary for each RAID group or port on a given array. This feature totals the LDEV IOs, LDEV MBs, cache fast write, disk fast write, cache bypass, and backend transfer values for all of the LDEVs on a given RAID group or port, and presents the data on one line.

To define a specific RAID group, you need an array ID and a RAID group ID. Each unique array ID and RAID group ID combination produces its own line of values in the RAID group summary. For a port, you need an array ID and a port ID. Each unique array ID and port ID combination produces its own line in the port summary.

When the field is in Summary mode, filtering is not allowed. However, you can set filters before you select the **Summary by** option. For example, if you want to see a summary only on array 10033, you must first select that array in the **Show Array** drop-down menu. Then you might select **Port Summary** to view summary lines for only those ports that exist on array 10033.

When you request a port summary report, the total I/Os displayed might not be equal to the sum of I/Os across each of the ports. This can occur if multiple paths to an LDEV exist. The port I/O summary indicates the I/O ceiling values across the ports. It does not indicate the absolute or accurate I/O rate across the ports.

Working with LDEVs

In cases where LDEVs are associated with multiple RAID groups (such as in 4D+4D configurations where the LDEV is mirrored on two different RAID groups), these mutiple RAID groups are treated as separate sets of items. For example, if you have an LDEV with RAID group 1-1 1-2, you must select **1-1 1-2** in the drop-down menu. Also, note that an LDEV mapped to 1-1 1-2 is treated separately from a RAID group mapped only to 1-1 or only to 1-2.

Additional details

The Grid Display screen also provides the following details for the query:

- Total I/O

- Total MB/sec

- Total backend transfers

- Parameters selected for the current query

- Status of the information

- Date and time when the array was queried

Array mapping

To correctly map the ACP and CHIP pairs, use the information in the following tables for your specific array.

Table 2 XP 48/128 (1 ACP Pair)

NOTE: The cards are lettered A-M, omitting I.

B, L	ACP Pair 1	ACP B = 0; L = 4
C, G	CHIP Pair 1	Chip C = 0; G = 4
D, J	CHIP Pair 2	Chip D = 1; J = 5
F, K	CHIP Pair 3	Chip F = 2; K = 6

Table 3 XP 48/128 (2 ACP Pairs)

NOTE: The cards are lettered A-M, omitting I.

B, L	ACP Pair 1	ACP B = 0; L = 4
F, K	ACP Pair 2	ACP F = 1; K = 5
C, G	CHIP Pair 1	Chip C = 0; G = 4
D, J	CHIP Pair 2	Chip D = 1; J = 5

Table 4 XP 256/512/1024

NOTE: The cards are lettered A-Z, omitting I and O; with 12 cards on the back (A-M) and 12 on the front (N-Z).

B, H	ACP Pair 1	ACP B = 0; H = 4
C, J	ACP Pair 2	ACP C = 1; J = 5
D, K	ACP Pair 3	ACP D = 2; K = 6
E, L	ACP Pair 4	ACP E = 3; L = 7
P, V	CHIP Pair 1	Chip P = 0; V = 4
Q, W	CHIP Pair 2	Chip Q = 1; W = 5
R, X	CHIP Pair 3	Chip R = 2; X = 6
S, Y	CHIP Pair 4	Chip S = 3; Y = 7

Table 5 XP 128 (2 ACP Pairs)

NOTE: The cards are lettered A-M, omitting I.

B, L	ACP Pair 1	ACP B = 0; L = 4
F, K	ACP Pair 2	ACP F = 1; K = 5
C, G	CHIP Pair 1	Chip C = 0; G = 4
D, J	CHIP Pair 2	Chip D = 1; J = 5

Table 6 XP 12000

A, M	ACP Pair 1	ACP A = 0; M = 4
B, N	ACP Pair 2	ACP B = 1; N = 5
L, X	ACP Pair 3	ACP L = 2; X = 6
K, W	ACP Pair 4	ACP K = 3; W = 7
E, Q	CHIP Pair 1	Chip E = 0; Q = 4
F, R	CHIP Pair 2	Chip F = 1; R = 5
G, T	CHIP Pair 3	Chip G = 2; T = 6
H, U	CHIP Pair 4	Chip H = 3; U = 7
A, M	CHIP Pair 5	Chip A = 8; M = 12
B, N	CHIP Pair 6	Chip B = 9; N = 13
L, X	CHIP Pair 7	Chip L = 10; X = 14
K, W	CHIP Pair 8	Chip K = 11; W = 15

NOTE: The numbers in the third column correspond with the card letter. These numbers are used when reading CLUI output that has an older formatting style.

Viewing and sorting data

Each table column in the Grid Display screen can be resized to a different width. A scrollbar appears at the bottom of the table if more data is available than can be seen within a single screen.

To sort a column in alphabetical or numerical order, click the column heading. Click the column heading again to reverse the sort order. (The columns are sorted in ascending order by default.)

To see all of the LUNs that are connected to a given CHP port, sort by **CHP Port ID** (and **Array ID**). The table will group all LUN/LDEVs that belong to the same CHP port.

Components of the Grid Display Query and Grid Display screens

The first table that follows lists the fields and menus in the Grid Display Query screen. The second table lists the fields and menus in the Grid Display screen.

Table 7   Grid Display Query Screen Components

Component	Description
ACP Pair (drop-down menu)	The identification number for the Array Control Processor pair. Provides the option to display information for a particular ACP pair or all ACP pairs.
Array ID (drop-down menu)	The serial number of the array. Provides the option to display information for a particular array or all arrays.
CHP Port (drop-down menu)	The identification number of the Client Host Interface Processor (CHP) port. Provides the option to display information for a particular CHP port or all CHP ports.
Host Group	The name of the host group (does not apply to XP48, XP256, or XP512 arrays). When LUN security is enabled on newer arrays, the LDEVs that are mapped to a certain port can be divided into different host groups.
Host ID (drop-down menu)	The identification number of the host. Provides the option to display information for a particular host or all hosts.
LUSE (drop-down menu)	(Logical Unit Size Expansion) A list of the CU:LDEV LUSE masters in CU:LDEV format.
Max Records	The maximum number of records that you want. The default setting is 16,000.
RAID Group (drop-down menu)	The physical location of the drive.
SLPR Group	The name of the SLPR group.
User Group	A list of the user groups that have been created in the Group Configuration screen.
Volume Group (drop-down menu)	Lists the volume groups that you can view.

NOTE: On the Grid Display screen, double-click the blue text to view additional information about the fields.

Table 8   Grid Display Screen Components

Component	Description
ACP Pair ID	The card letters for the Array Control Processor pair.
ACP Pair Util	The percentage that the ACP Pair processors were used during the reporting period.
Array ID (Array identifier)	The identification number of the array.
Array Type	The type of array, such as XP 12000.

Table 8 Grid Display Screen Components (continued)

Component	Description
Backend Transfer	The total number of tracks transferred on the backend.
BC Vol 0	The Business Copy Volume 0 mode. (See * below the table.)
BC Vol 1	The Business Copy Volume 1 mode. (See * below the table.)
BC Vol 2	The Business Copy Volume 2 mode. (See * below the table.)
Cache Size (GB)	The total cache size in gigabytes.
CHP Port ID	The port name for the Client Host Interface Processor (CHP) port. Provides the option to view information associated with a particular port or with all ports.
CHP Util	The percentage that the CHP processors were used during the reporting period.
CLPR	The CLPR group ID.
Cont. Access	Continuous Access Mode. (See * below the table.)
Device File	The name of the device file.
Display type (drop-down menu)	Indicates what type of information is displayed. **Open System** = Displays the open system columns. **Mainframes** = Displays the mainframe columns. **Combined** = Displays the open system columns and the mainframe columns.
Emulation	An array group is divided into open volumes of equal size. These volumes are referred to as emulation types. If PA XP cannot determine the emulation type, an error appears. The error does not affect performance data collection.
E-LDEV	The external LUN LDEV ID on the external array.
E-Lun	Indicates that the LDEV is an E-Lun. The following options are available: **-** (hyphen) = Normal LUN **E** = E-Lun **P** = E-Lun provider (this LDEV is used as an E-Lun for another array)
E-Port(s)	A list of E-Lun initiator ports (ports used to connect to an external array).
E-Seq	The E-Lun provider's serial number for the array.
Host ID (Host identifier)	The name of the host machine. PA XP discovers LDEV-to-CHIP port connectivity. **Unknown** displays if the host name is unknown. This automatic CHIP-LDEV mapping works only for open volumes. When using mainframe LDEVs, use the userhostcfg CLUI to add mainframe hosts.
Host Group	The port host group. This component is available only on the XP1024/128 and XP12000.
LDEV ID	The identification number for the LDEV.
LDEV IO/s	The total I/Os per second for all random reads, random writes, sequential reads, and sequential writes during the reporting period.
LDEV MB/s	The total megabytes per second for the LDEV.

Table 8 Grid Display Screen Components (continued)

Component	Description
Luse	Indicates that the LDEV is a LUN Size Expansion (Luse). **E** = Master **C** = Component
Luse Status	(Logical Unit Size Expansion) The CU:LDEV LUSE when applicable. blank = The LDEV is not a Luse component **M** = Master for the Luse group **C** = Contributor to the Luse group The Luse master LDEV will also list an entry for the contributor. **NOTE:** If you are filtering by **Host**, you will not see the contributors because they are not mapped externally. If you show **Requested Hosts** connected to the array, you will see the contributors in addition to the Luse master.
Luse Master	(Logical Unit Size Expansion) The LDEV ID of the Luse master when the LDEV is a component. If the LDEV is not a Luse component, this field is blank.
LUN (Logical Unit Number) ID	The identification number of the LUN.
RAID Grp	The RAID group to which the LDEV belongs.
Refresh (button)	Click to refresh the view on the screen and to display the current data in the database. When you click **Refresh**, the current query appears. To perform a new query, return to the Grid Display Query screen.
SS ID	The identification number of the subsystem.
Show ACP Pair (drop-down menu)	Provides the option to display information for a particular ACP Pair or requested ACP Pairs.
Show Array (drop-down menu)	Provides the option to display information for the requested arrays or for one array.
Show CHP Port (drop-down menu)	Provides the option to display information for the requested ports or for one port.
Show CLPR Group (drop-down menu)	Provides the option to display information for the CLPR groups or for one CLPR group.
Show Host (drop-down menu)	Provides the option to display information for the requested hosts or for one host.
Show Host Group (drop-down menu)	Provides the option to display information for the requested host groups or for one host group.
Show LUSE	Provides the option to display information for the requested Luse or for one Luse.
Show RAID Group (drop-down menu)	Provides the option to display information for a particular RAID group or requested RAID groups.

Table 8 Grid Display Screen Components (continued)

Component	Description
Show SLPR Group (drop-down menu)	Provides the option to display information for the SLPR groups or for one SLPR group.
Show Volume Group (drop-down menu)	Provides the option to display information for a particular Volume group or requested Volume groups.
SLPR	The SLPR group ID.
Summary by	An overall summary for each RAID group or port on a given array.
Target LUN	The LUN associated with the given LDEV.
Vol. Group	The volume group identification name if the device is associated with a volume group. PA XP reports volume groups from LVM (an HP brand) and VXVM (a Veritas brand).

* The following error messages can occur. These errors do not prevent the collection of performance data.

- **erro:** (short for error) This message appears when the RMLIB call that is used to produce the data has a failure.

- **ille:** (short for illegal) This message appears when the RMLIB call that is used to produce the data did not return with the expected values for Simplex (SMPL), Primary Volume (PVOL), or Secondary Volume (SVOL).

SLPR detail view

Double-click an SLPR value on the Grid Display screen to display the detail view for that SLPR in a separate browser window.

Figure 6 SLPR detail view

The line above the table indicates hierarchical information for the selected SLPR. In this example, SLPR0 belongs to disk array serial number 10229. The SLPR view includes two tabs: CLPR and Ports.

The CLPR tab displays cache size, write pending, sidefile usage, and read hits for each CLPR of the selected SLPR. Click a column heading to order the table by that column. Click an ID value to display the detail view for that CLPR.

Ports tab

The Ports tab displays input/output and utilization data for each port of the selected SLPR.

CLPR detail view

Double-click a CLPR value on the Grid Display screen to display the detail view for that CLPR in a separate browser window.

> **NOTE:** Refer to Chapter 13, Disk/Cache Partition for the XP12000, of the *HP StorageWorks Command View XP for Disk Arrays User Guide* for a full explanation of CLPRs and SLPRs.

CLPR2 [Name: CLPR2] Detail View

Array Serial: 10229 [Model: XP12000] > **SLPR0** [Name: Default] > CLPR2 [Name: CLPR2]

Summary

Cache Size (MB): 4096	Write Pending (MB): 0	Sidefile Usage (MB): 0	Read Hits (MB): 260422

RAID GROUP	LDEV IO/S (MB)	LDEV MB/S	BACKEND TRANSFER (MB)
1-1	0	0	0

Figure 7 CLPR detail view

The line above the table indicates hierarchical information for the selected CLPR. In this example, CLPR2 belongs to SLPR0 and disk array serial number 10229.

The CLPR detail view displays cache size, write pending, sidefile usage, and read hits summary data for the selected CLPR. It also displays LDEV and backend transfer data for each RAID group of the selected CLPR.

Click a column heading to order the table by that column. Click a RAID GROUP value to display the detail view for that RAID group.

RAID Group detail view

Double-click a RAID Group ID on the CLPR detail view to display the detail view for that RAID group in a separate browser window.

RAID GROUP: 1-1 Detail View

Array Serial: 10229 [Model: XP12000] > **SLPR 0** [Name: Default] > **CLPR 2** [Name: CLPR2] > RAID GROUP: 1-1

Summary			
LDEV IO/S (MB): 0	LDEV MB/S: 0	Backend Transfer (MB): 0	

LDEV	IO/S (MB)	MB/S	BACKEND TRANSFER (MB)
0:00	0	0	0
0:01	0	0	0
0:02	0	0	0
0:03	0	0	0
0:04	0	0	0
0:05	0	0	0
0:06	0	0	0
0:07	0	0	0
0:08	0	0	0
0:09	0	0	0
0:0A	0	0	0
0:0B	0	0	0
0:0C	0	0	0
0:0D	0	0	0
0:0E	0	0	0
0:0F	0	0	0
0:10	0	0	0

Figure 8 RAID Group detail view

The line above the table indicates hierarchical information for the selected RAID group. In this example, RAID group 1-1 belongs to CLPR2, SLPR0, and disk array serial number 10229.

The RAID group detail view displays data transfer information for each LDEV of the selected RAID group. Click a column heading to order the table by that column.

4 Array View

Introduction

Use the Array View screen to monitor the activity of specified array components in real-time. The following components are measured:

- CHPs
- Cache Usage
- Bus/path utilization
- ACPs

The Array View tree on the left side of the screen is a hierarchical view of the XP arrays. When you click on the text or adjacent icons, the view is expanded, providing three summaries of each array: Array, CHIPs,

and ACP Pairs. Each of these summaries provides two detail views: CHIP details showing CHP activity, and ACP pair details showing ACP pair activity.
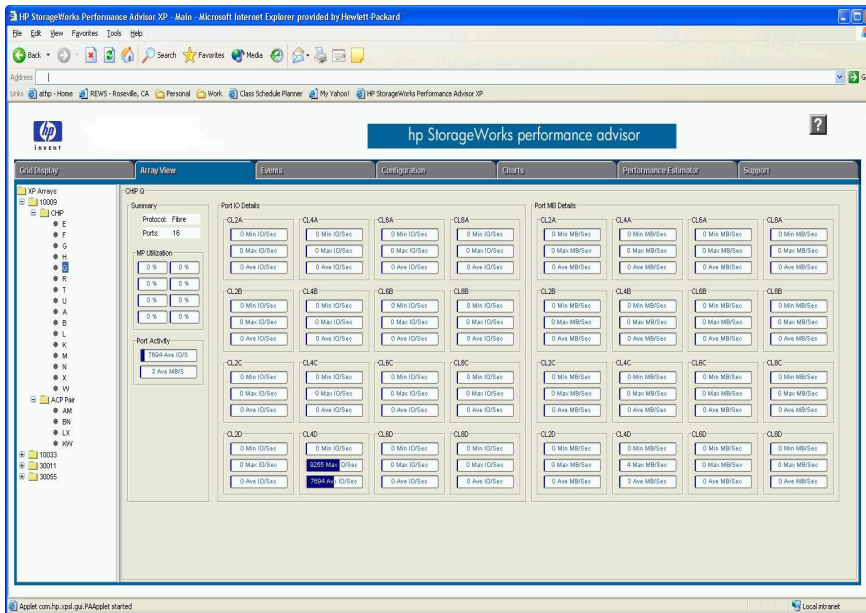
Figure 9 Array View screen
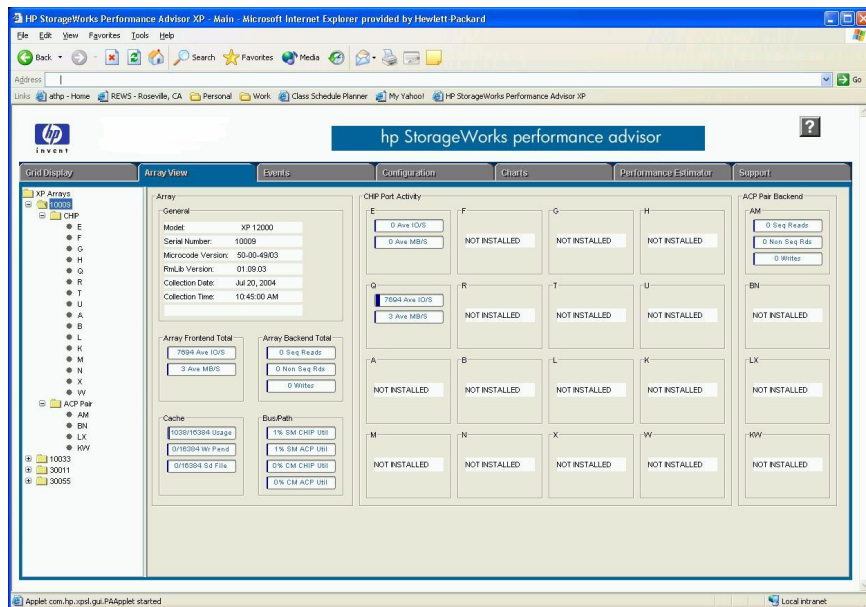
Figure 10 Array View screen for XP12000

Using the Array View screen

The Array View screen is comprised of an array tree and several screens. When you double-click the serial number in the array tree, the view is expanded to show three summaries of each array and two detail views. When you click the nodes on the tree, the screens for those nodes appear in the panel to the right of the tree.

The Array Summary screen lists the following information:

- Model number

- Serial number

- Microcode version number

- RmLib version number

- Date and time of data collection

- A summary of front-end CHIP port activities and ACP back-end transfer activities

Click the General group box to view the Utilization Summary report for the selected array. Click the Cache group box to view the Cache Usage chart for the selected array.

The array front-end total monitor displays all port activity that is taking place on the front end. The port activity for a CHIP is the sum of all the port activities on that CHIP. The array front-end is a sum of all CHIP port activities.

The Array Backend Total measures back-end transfers. Individual pair ACPs provide the array back-end total. The array back-end is a sum of all ACP pair activities.

The CHIP summary screen shows CHIP status for the array, and the ACP Pair summary screen shows ACP Pair status for the array.

The CHIP detail screen (click **CHIP** in the Array View tree) shows the connection type (fibre, SCSI, or ESCON) and the number of ports. It shows port IO details, port MB details, MP (multi-processor) utilization, and port activity (current IOs and average IOs).

The ACP Pair detail screen (click **ACP Pair** in the Array View tree) shows the status of the ACP pairs.

Refreshing information

As the Array View screen is loaded, information is retrieved from the database and displayed in the table. The screen refreshes every 30 seconds as data is received from the database.

Viewing the data

Each component displays the current value either in IOs or MBs, and displays a bar that represents the maximum possible value.

Each component is measured in megabytes used over the amount of cache installed. The maximum cache memory is 16 GB for an XP256 array; 32 GB for XP128, XP512, and XP48 arrays; and 64 GB for an XP1024 array.

Utilization Summary

Click an array serial number on the Grid Display screen or the General group box on the Array View screen to display the Utilization Summary for that array in a separate browser window.

Figure 11 Utilization Summary

Use the Utilization Summary to view a snapshot of array activity for cache usage, bus utilization, CHIP processor utilization, and ACP processor utilization. Click blue text to view the Utilization Metric chart for that component.

The Utilization Summary view also lists the array's serial number, model, firmware version, and the data and time when data collection occured.

Components of the Array View screen

The following components appear on the Array View screen.

Table 9 Array View Screen Components

Component	Description
ACPs	Array Control Processors.
Additional Information	This field provides additional information about the data displayed in the Array View screen. Currently, this field is displayed only for the XP48, XP256, and XP512 arrays. The following warning appears in this field: * "Warning: Unable to map all I/O to ACP pairs. This is due to not having a host agent on all hosts. Please refer to the online help for details." This message appears when PA XP detects that some I/Os are not being mapped to all ACP pairs. This causes missing I/Os to be displayed on the **ACP Pair Backend** fields. To correct this error, install the host agent software on all hosts.
Cache	Short-term, high-speed, high-capacity memory.
CHIPs	Client Host Interface Processors.
Date	The date of the most recent update of information gathered by the database.
CM Bus	Cache Memory Bus (referred to as the Control Bus for the XP256).

Table 9 Array View Screen Components (continued)

Component	Description
Microcode version	The revision number of the micro code.
MP Utilization	The percentage of time that the multiprocessors are busy.
Port Activity	Average IOs and MBs.
Port IO	Minimum, average, and maximum IOs for each port.
Port MB	Minimum, average, and maximum MBs for each port.
Protocol	The connection type (fibre, SCSI, or ESCON).
RmLib version	The revision number of the RAID Manager Library.
Serial Number	The serial number of the corresponding array.
SM Bus	Shared Memory Bus (referred to as the Data Bus for the XP256).
Time	The time of the most recent update of the performance information provided by the database.

5 Event Log

Introduction

The Event Log screen on the Events tab tracks errors and configuration changes, such as changing how long performance data is retained in the database, when data collection was started or stopped, or the details of an alarm configuration.

The Event Log screen contains **Time**, **Type**, **Severity**, and **Description** fields that display the type of changes that have been made and the time the changes occurred. The data that initially appears in the screen, by default, is data that has been generated and retained by the system in the last 24 hours. Historic data (data older than 24 hours) can be displayed by using the pop-up calendar. Click **Set Times** to open the calendar.

In the calendar, select the time range. The database retrieves records within the specified range only.

Use the Event Log screen to filter the data by type or severity.

See "Using the Event Log screen" on page 35 for more information.
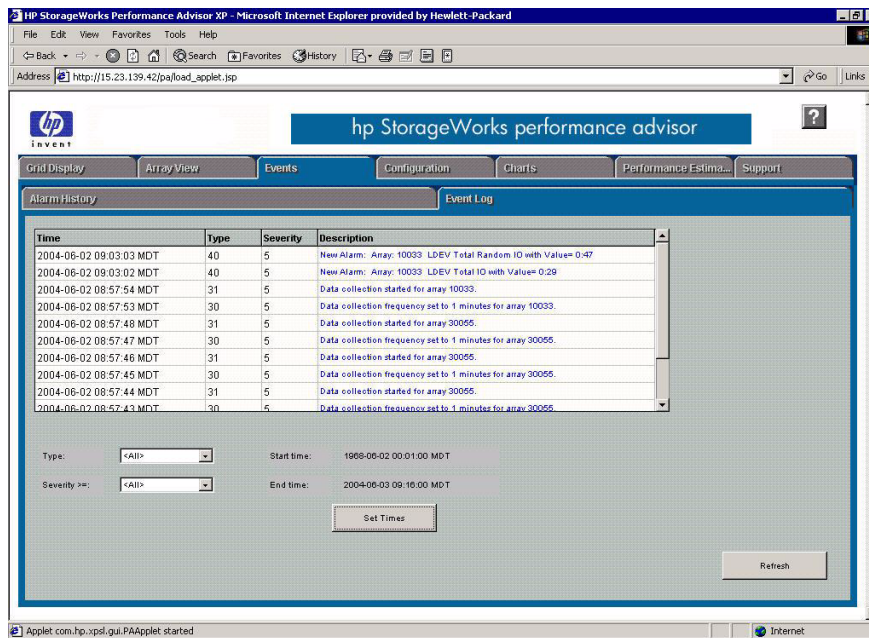
Figure 12 Event Log screen

Using the Event Log screen

The Event Log screen tracks when data records were purged, any errors that have occurred, or any configuration changes made to the database, alarms, and other components.

The Event Log screen provides the following information:

- **Time**: The time when the error or change occurred.

- **Type**: The value displayed depends on the event that occurred.

- **Severity**: The severity level of the event.

- **Description**: A description of the event.

Double-click the text in the **Description** column to open the Event Summary screen. (If the Event Summary screen does not automatically appear, it might be hidden behind the Event Log screen. Check the task bar at the bottom of your screen.)

The information that appears in the Event Summary screen depends on the text that you double-clicked. For example, the Event Summary screen in the following illustration provides information about the configuration of a new alarm, including the following:

- The date and time (24-hour clock time) that the change was made.

- The type of change that occurred (**40** means that an alarm was created).

- A severity level of **5**, which means the activity was instigated by the user (as opposed to, for example, a system error).

- A description of the event.

In this case, it shows the serial number of the array on which the alarm was configured and the total IO.
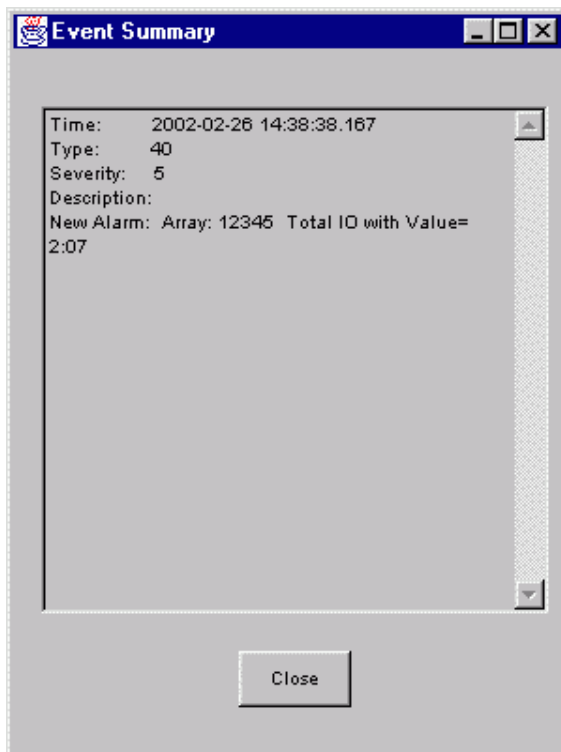
Figure 13 Event Summary screen

You can customize the information that appears in the Event Log screen by using the drop-down menus and buttons located in the lower portion of the screen. Use these components to filter the data that the system returns.

Changing time range for record retrieval

If you want to specify the range of time for the system to return information from the database, click **Set Times**. The calendar appears.

Figure 14 Event Log Calendar screen

Select the start and end dates and time, and then click **OK**. Click **Cancel** to return to the main screen.

Filtering by type

Use the **Filter** drop-down menu to filter the information by the type of event that occurred. The following types are available.

Table 10 Filter Types

Type	Description
10-19	Refers to changes made to the database. **10** = Database purge **11** = Database retention number changed **12** = Database log level changed
20-29	Refers to changes made to the host. **20** = Request made from host **21** = Unrequest made from host **22** = Host restored **23** = Host removed

Table 10 Filter Types (continued)

Type	Description
30-39	Refers to data collection changes. **30** = Frequency of collection rate changed **31** = Collection started **32** = Collection stopped
40-49	Refers to alarm configuration changes. **40** = Alarm created **41** = Alarm modified **42** = Alarm deleted

Filtering by severity

Use the **Severity** drop-down menu to filter the information that you receive. The system returns those items with a severity level equal to or greater than the number you select. Select **All** to view all events that have been logged. The following severity levels are available.

Table 11 Filter Severity Levels

Severity	Description
1, 2	Debugging messages
3, 4	Normal system operations
5, 6	User-instigated activities (for example, if the user enters the settings that instigate a purge)
7, 8	System errors
9, 10	Natural disasters

For example, to receive a report on only those items that experienced system errors or worse, select **7** in this field.

⚠ **CAUTION:** If you select **7** in the Database Configuration screen, only messages with a severity level equal to or greater than 7 appear in the Event Log screen. This affects only those messages that were created after you instigated the severity change in the Database Configuration screen. All messages equal to or greater than 7 that were logged before you made the change in the Database Configuration screen remain in the database and still appear in the Event Log screen.

Refreshing the screen

Click **Refresh** to update the screen.

Viewing and sorting data

Each column in the table can be resized to the desired width. Click a table heading to sort that column in alphabetical or numerical order. Click the table heading again to reverse the sort order. (By default, tables are sorted in ascending order.)

Components of the Event Log screen

The following fields and buttons appear in the Event Log screen.

Table 12 Event Log Screen Components

Component	Description
Description	A description of the configuration change or error.
Severity (drop-down menu)	The severity level of the event. **1**, **2** = Debugging messages **3**, **4** = Normal system operations **5**, **6** = User-instigated activities (for example, if a user enters the settings that instigate a purge) **7**, **8** = System errors **9**, **10** = Natural disasters
Refresh (button)	Click to refresh the Event Log screen with current information from the database.
Set Times (button)	Click to specify the time range for which you want to retrieve data.
Time	The time when the configuration change or error occurred.
Type (drop-down menu)	The value displayed depends on the event that occurred. See "Using the Event Log screen" on page 35 for a description of the available values.

6 Host Information

Introduction

The Host Information screen is located under the **Configuration** tab in Performance Advisor XP (PA XP). Use this screen to gather information from a specified host for a given array. You can then use the information to update the management station database.
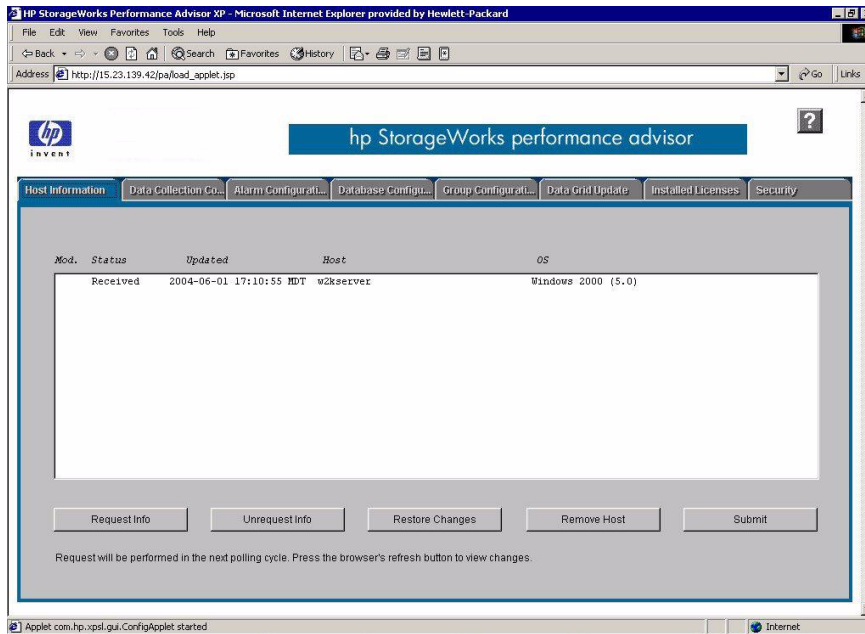
Figure 15 Host Information screen

Using the Host Information screen

Use the Host Information screen to request or unrequest specific information on an XP array, restore changes, remove a host, and view updated information.

Requesting that information run on a particular host

1. Click to highlight the line for the host from which you want to request data. To request information on multiple hosts, click to highlight the additional hosts.

2. Click **Request Info**. An asterisk appears next to any host that was altered.

3. Click **Submit** to send the request to the database.

NOTE: Requests are performed in approximately 60 seconds. You can change this time in the properties file at the host station.

Restoring changes

If you decide not to make any modifications, click to highlight the appropriate line, and then click **Restore Changes**. This action restores the original information. However, you cannot restore changes if you have already clicked **Submit**.

To unrequest information, see the following procedure.

Unrequesting information on a particular host

1. Click to highlight the line for the host ID on which you do not want data run. To unrequest information on multiple hosts, click to highlight the additional hosts.

2. Click **Unrequest Info**. An asterisk appears next to any host that was altered.

3. Click **Submit** to send the request to the database.

Removing a host

When you remove a host, you also remove all configuration information for that host, and you can no longer collect data from it.

1. Click to highlight the line for the host that you want to remove.

2. Click **Remove Host**.

3. Click **Submit** to send the request to the database. The host will be removed.

Viewing updated information

After a request is received by the database, information is run on the selected host. After the information is run, the requested field is set to **False** and the received field is set to **True**. Click **Submit** to see the updated fields.

Components of the Host Information screen

The following components appear on the Host Information screen. Use these components to view and gather information about your host arrays.

Table 13 Host Information Screen Components

Component	Description
Mod (Modified)	An asterisk in this column indicates that some information has been changed, but the changes have not yet been submitted to the database.
Status	A value of 1, 2, 3, or 4 appears, depending on the status of the request. **1** - Received **2** - Requested **3** - Deleted **4** - Unrequested
Updated	The date that the configuration device file was sent to the management station.
Host	The identification number of the host.
OS	The operating system, such as HP-UX or Windows XP.
Request Info (button)	Enables a request to run information on a specified host.
Unrequest Info (button)	Designates any host on which you do not want to run information.

Table 13 Host Information Screen Components (continued)

Component	Description
Restore Changes (button)	Returns the information to its original status prior to modifications.
Remove Host (button)	Removes a host. When you remove a host, you remove all configuration information for that host, and you can no longer collect data for it.
Submit (button)	Commits changes to and updates the database. Refreshes the Configuration screen.

7 Data Collection Configuration

Introduction

The Data Collection Configuration screen is located under the **Configuration** tab in Performance Advisor XP (PA XP). Use this screen to configure a command device to collect data on a given array. To configure a command device, first specify the command device on which you want to collect data. Next, determine and enter the frequency for collecting data, and then click **Submit**. HP StorageWorks PA XP begins collecting data.
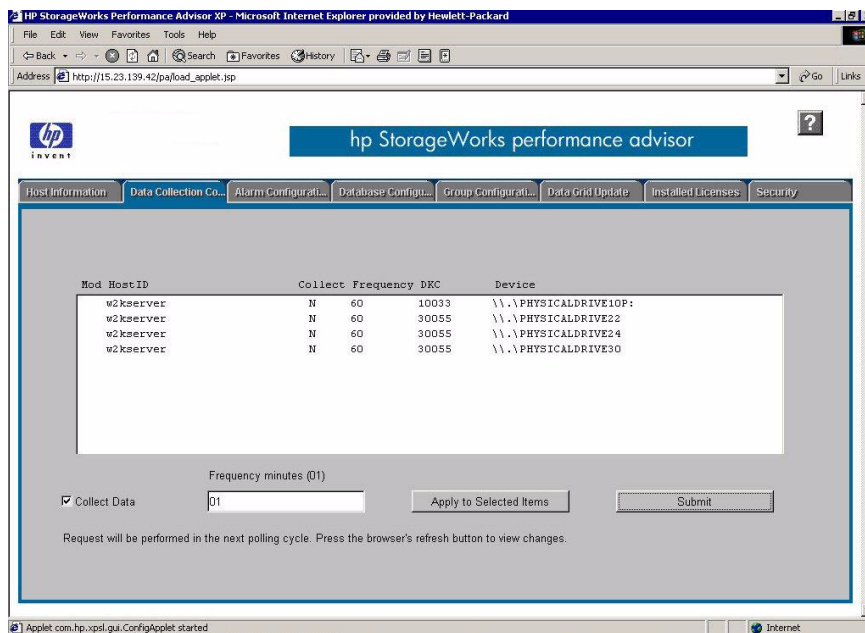
Figure 16 Data Collection Configuration screen

> **NOTE:** For any one disk controller unit (DKC), you can request only one data collection session per management station.

Using the Data Collection Configuration screen

Use the Data Collection Configuration screen to specify the frequency for collecting performance data from a particular XP disk array through the host station(s). To do so, click the command device line (shown in the list box) from which you want to collect data. The information displayed for the Host ID, disk controller (DKC), and Command Device cannot be altered. Only the collection frequency field (specified in minutes) and the toggle for collecting data by using the selected command device(s) can be changed.

The Data Collection Configuration screen lets you specify whether or not you want to collect data.

If you choose not to collect data on a command device:

1. Click to highlight the command device in the table that you want to stop collecting data on.

2. Clear the **Collect Data** checkbox.

3. Click **Apply to Selected Items**. An asterisk (*) appears in the **Mod** (modified) field to show that changes have been made for that command device. If no changes were made, no asterisk appears.

4. Click **Submit**.

NOTE: The Frequency can be set to any valid value and data collection will not occur when the **Collect Data** checkbox is cleared and this setting is applied to a selected device.

If you want to change the values for collecting data on another command device, click to highlight that line in the table and repeat the previous steps.

If you want to collect data on the command device or change the frequency with which data is collected, follow these instructions:

1. Click to highlight the command device in the table where you want to change the settings.

2. Click the **Collect Data** checkbox to select the value.

3. In the **Frequency** field, enter the desired number of minutes between data collection.

4. Click **Apply to Selected Items**. An asterisk (*) appears in the **Mod** (modified) field to show that changes have been made for that command device. If no changes were made, no asterisk appears.

5. Click **Submit**.

To change the frequency for collecting data on another command device, highlight that line in the table and repeat the previous steps. To apply identical settings simultaneously to multiple devices, highlight several rows, and then click **Apply to Selected Items**.

NOTE: It is recommended that you set the data collection rate to one hour or less due to management station performance and field rollover. PA XP collects performance data on all LDEVs in the array that have been reported to the management station by their respective hosts. The hosts that display their status as **Received** in the Array Information screen constitute the superset of mapped LDEVs. Performance data collection is not limited to the number of LDEVs that the host station is mapped to use. Setting the collection rate too narrow hampers the management station and diminishes its responsiveness.

NOTE: Make sure that you click **Submit** after all changes are completed. Changes will not be applied until you click **Submit**. The asterisks in the **Mod** field will be deleted because the changes are now committed to the database.

Determining disk space requirements

Use the following formula to determine the disk space requirements for PA XP based on the number of arrays, total LDEVs, collection period, and quantity of performance data:

Free Space = Total required free disk space in MB

History Length = The length of the performance data history in days

Luns = The total number of LUNs of the system (include all hosts)

Collection Period = Collection period in minutes

Free Space = 1.65 + ((0.000165) * Luns * (History Length * 24) * (60/Collection))

History Length = (Free Space - 1.65)/((0.000165) * Luns * 24 * (60/Collection))

*Collection Period = ((0.000165) * Luns * (History Length * 24) * 60)/(Free Space - 1.65)*

Table 14 Determining Disk Space Requirements

Free Disk (MB)	History Length (Days)	LUNs	Collection Period (Minutes)
2014	127	4000	60
2026	365	1400	60
889	28	4000	30
2026	356	350	15
1475	31	1000	05
1998	28	300	01

Components of the Data Collection Configuration screen

The following components appear on the Data Collection Configuration screen. Use these components to configure a command device to collect data.

Table 15 Data Collection Configuration Screen Components

Component	Description
Apply to Selected Items	Click to apply changes to the hosts that you have highlighted.
Collect	Specify if data should be collected on this host.
Collect Data (checkbox)	Specify whether or not to collect data for a given host.
Device	Device file of the command device.
DKC (disk controller)	The serial number of the array.
Frequency	The amount of time (in minutes) between data collection intervals.
Frequency (minutes)	Specify the frequency with which you want to receive data. After you click **Apply to Selected Items**, the frequency value is applied to the highlighted item.
Host ID	The identification number of the host.
Mod (modify)	An asterisk appears whenever information has been modified and the changes have not yet been sent to the database. The asterisks in the **Mod** field are deleted after the changes are submitted to the database.
Submit (button)	Commits changes and updates the database with the current settings.

8 Alarm Configuration

Introduction

Alarms are conditions that alert designated personnel or programs to a system malfunction, a detected condition, or an error. The Alarm Configuration screen is located under the Configuration tab. Use this screen to create and configure alarm types for specified performance metrics on an XP disk array(s).

Performance data is monitored for any currently configured and enabled alarm(s). A threshold level of 1, 2, or 3 is specified for each alarm. The higher the threshold level, the more critical the event. The following examples show a description for each level:

Performance data is at threshold
level 3 if its value is equal to
or greater than threshold level 3.

_____**Level 3** _____

Performance data is at threshold
level 2 if its value is equal to
or greater than threshold level 2
and less than threshold level 3.

_____**Level 2** _____

Performance data is at threshold
level 1 if its value is equal to
or greater than threshold level 1
and less than threshold level 2.

_____**Level 1** _____

Performance data is at threshold
level 0 if its value is less
than threshold level 1.

Alarm events are created when an event changes from one threshold level to another threshold level. Use the Alarm Configuration screen to specify the threshold levels and the dispatch levels. When the performance data of the currently configured and enabled alarm enters or exits the dispatch level, an event is generated and sent to the recipient that you have specified (by SNMP, e-mail, or running a script) if it falls within the scheduled time period.

If you have specified an e-mail recipient for alarms, PA XP identifies the difference between entering or exiting the dipatch level within the text in the subject line of the e-mail. If the alarm is exiting the dispatch level, PA XP identifies the alarm as a normal alarm and populates the subject line of the e-mail with `XP Alarm`. If the alarm is entering the dispatch level, PA XP identifies the alarm as a recovery alarm and populates the subject line of the e-mail with `XP Alarm - Good Information Alarm`.

Using the Alarm Configuration screen

Use the Alarm Configuration screen to create and configure alarm types and provide notification to designated personnel in the event of a system malfunction, detected condition, error, or recovery. The Alarm Configuration screen offers the following features:

- Create and configure alarms to your own specifications

- View the state of the alarm configuration

- Specify if an alarm is enabled or disabled

- Provide notification to designated personnel by SNMP or e-mail

- Set the maximum thresholds at which alarm events will be generated

- Set the schedule for dispatching messages whenever a threshold level is crossed

- Perform trend analysis on alarms

- Specify a specific script to be executed when an alarm is received

The Alarm Configuration screen contains several fields and buttons, as shown in the following illustration.
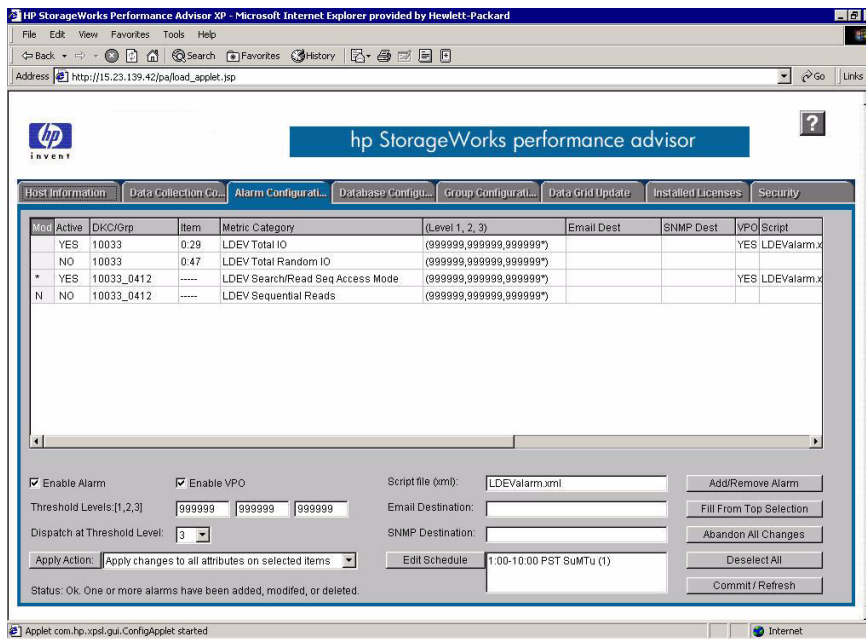
Figure 17 Alarm Configuration screen

List box

The list box on the Alarm Configuration screen contains the following columns that show alarm configuration templates and alarm types.

Table 16 Alarm Configuration Screen Columns

Component	Description
Mod	An asterisk (*) appears when an alarm has been modified. **N** appears for new alarms. **E** appears to indicate that an error has occurred.
Active	**YES** appears if the alarm is active. **NO** appears if the alarm is inactive.
DKC	The identification number of the disk controller (DKC) that is being monitored.
Item	The LDEV or port number.
Metric Category	The metric category (as established in the Chart screen) of the alarm type.

**Table 16** Alarm Configuration Screen Columns (continued)

Component	Description
(Level 1, 2, 3)	The threshold levels as established in the lower portion of the Alarm Configuration screen.
Email Dest	The e-mail destination as established in the **Email Destination** field at the bottom of the screen.
SNMP Dest	The SNMP destination as established in the **SNMP Destination** field at the bottom of the screen.
Script	The name of the batch file (as specified in the **Script file [XML]** field).
Schedule	Provides two functions, based on the alarm type: It shows the schedule of when specific alarms will be dispatched or it shows the time to collect data for calculating trends (as specified in the **Edit Schedule** field).

You can select a single line or multiple lines in the list box by clicking the desired line(s). To clear a selected line, click the line again.

Any entries that are represented in the list box by dashed lines (**-----**) are fields that have not been configured. For example, if a dashed line appears in the **Email Dest** column, no e-mail address has been specified for that entry.

Use the fields below the list box to configure information about your performance alarms. For information about these fields, see "Components of the Alarm Configuration screen" on page 56.

When you click **Add/Remove Alarm**, the following screen allows you to create or delete alarms.
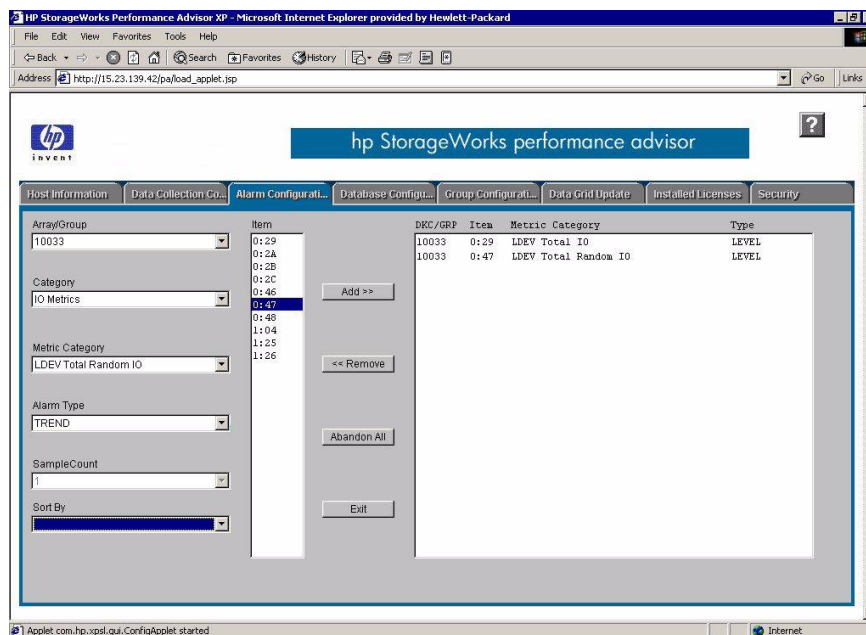
Figure 18 Add/Remove Alarm screen

Use this screen to perform the following tasks:

- Specify either the serial number of the array or the group name in the **Array/Group** drop-down box.

- Specify the category that you want to monitor by using the **Category** drop-down menu. The following categories are available:

  - **IO Metrics**

- **MB Metrics**

- **Utilization Metrics**

- **Backend Metrics**

- Choose the metrics (in the **Metric Category** drop-down menu) related to the category. The contents of this list will vary depending on your selection in the **Category** drop-down menu.

NOTE: The following metrics can only be added when an array is selected in the **Array/Group** drop-down box:

- SM CHIP Bus/FBus Hi Util

- SM ACP Bus/FBus Lo Util

- CM CHIP Bus/MBus Hi Util

- CM ACP Bus/MBus Lo Util

- Cache Usage

- Cache Write Pending Usage

- Cache Sidefile Usage

- Use the **Alarm Type** drop-down menu to specify the alarm type, either Level or Trend. (See "Level and Trend alarm types" on page 52 for a description of level and trend alarm types.)

- Specify the sample count. This feature is currently unavailable and will be implemented for a future release.

- Sort the list shown in the **Sort by** drop-down menu by DKC, items, or metric.

- Add or remove alarms.

- Abandon all changes that have been made in this screen (prior to committing the changes and saving the data to the database).

Level and Trend alarm types
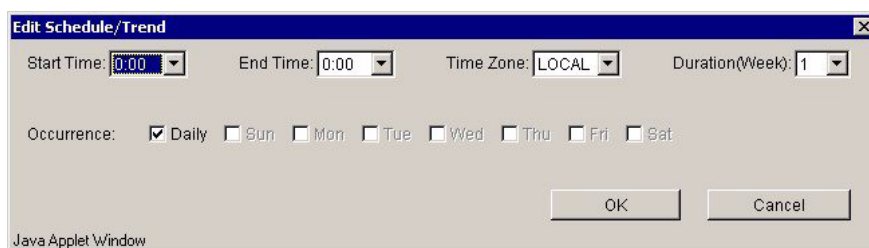
Two alarm types are available for charting alarms: **Level** and **Trend**.

When a level-type alarm is selected, an alarm is triggered whenever a specified threshold is exceeded. For example, if the settings call for an alarm to be triggered at 5,000 IOs, then you will receive notification if the IOs reach the 5,000 level.

When a trend-type alarm is specified, an alarm is triggered whenever a specified rate of change occurs. In this type of alarm, the rate of change, rather than a particular value, triggers the alarm. When a trend-type alarm is charted, the slope of the line that appears is generated from an average of the data points. For example, if the IO rate shifts from 4,000 to 2,000, an alarm will be triggered.

For level and trend alarms, a recovery alarm is also triggered whenever a specified threshold or rate of change recovers within acceptable levels. For recovery alarms, the subject line of the e-mail notification is appended with "Good Information Alarm." Refer to the *HP StorageWorks Performance Advisor XP Configuration Guide* for information on disabling recovery alarms.

Use the **Edit Schedule/Trend** dialog box to specify the desired times and duration.

Figure 19 Edit Schedule/Trend dialog box

If you specify a level-type alarm, an e-mail is sent only when an alarm is triggered during the specified times. For example, if you select Sunday, Mountain time, between 9 am and 4 pm, you will be notified only when an alarm is triggered during those times.

If you specify a trend-type alarm, you will see the average of change for a whole week (minimum of two weeks), with each week represented by a single data point.

Use the procedures in the following sections to create, configure, schedule, enable or disable an alarm; set or change threshold levels; or provide a destination for alarm notifications.

Creating an alarm

1. Click **Add/Remove alarm** in the Alarm Configuration screen.
2. In the **Array** drop-down menu, select an array.
3. In the **Category** drop-down menu, select a category such as **LDEV IO**.
4. In the **Metric Category** drop-down menu, select a metric category such as **Total IO**.
5. For the alarm type, select either **Level** or **Trend**. (For more information about this feature, see "Level and Trend alarm types" on page 52.)
6. In the **Item** list box, highlight the LDEV or port number.
7. Click **Add** to add the new settings to the list box.
8. Click **Exit** to return to the Alarm Configuration screen.

The new alarm appears at the bottom of the list box with an **N** (for New) in the **Mod** (Modified) column. At this point, you can manually fill in the fields in the lower portion of the Alarm Configuration screen, or you can use a template to fill in the fields. See "Configuring an alarm" on page 53 to use a template to fill in the fields.

⚠ **CAUTION:** Make sure that you click **Commit/Refresh** before leaving the Alarm Configuration screen or you will lose the new alarm.

Configuring an alarm

Alarms can be configured by manually entering the appropriate attributes into the fields that appear beneath the list box (the table displaying the alarm settings), or by using a previously-configured alarm as a template. The following instructions explain how to use a template:

1. Highlight the configured alarm that you want to use for the template.
2. Click **Fill From Top Selection**. The lower portion of the screen displays the attributes, such as threshold level, dispatch level, and e-mail destination, of the alarm you selected.
3. Highlight the alarm to which you want to apply the attributes of the configured alarm.

4. In the **Apply Action** drop-down menu, select **Apply changes to all attributes on selected item**.

5. Click **Apply Action** to apply the attributes of the template to the new alarm.

6. Click **Commit/Refresh** to save your changes to the database.

Enabling an alarm

1. Select the row(s) that you want to configure for the alarm(s).

2. Select the **Enable Alarm** checkbox.

3. In the **Apply Action** drop-down menu, select **Enable/Disable alarm on selected items**.

4. Click **Apply Action**. An asterisk (*) appears in the **Mod** column to show that modifications have been made to the highlighted item.

5. Click **Commit/Refresh** to apply your changes to the database. **YES** appears in the **Active** column to show that the alarm is now active for that metric category.

After the alarm is enabled, you can configure several aspects for the alarm, such as establishing the threshold level or specifying the destination for the alarm when it is dispatched. See the following sections for more information.

Setting threshold levels

You can designate the threshold level (or performance metric data value [**1**, **2**, or **3**]) at which an alarm becomes active. Whenever you change threshold levels, any new events appear in the Event Log screen, where you can view the threshold level and the time when the event was posted and updated. The higher the threshold level, the more critical the event.

1. Select the row(s) that you want to configure for the alarm.

2. In the **Apply Action** drop-down menu, click **Change threshold levels on selected items**.

3. Enter the levels you want in the **Threshold Levels [1, 2, 3]** fields.

4. Click **Apply Action**.

5. Click **Commit/Refresh** to commit your changes to the database.

Changing the threshold level for dispatching alarms

1. Select the row(s) that you want to configure for the alarm.

2. In the **Apply Action** drop-down menu, click **Change dispatch level on selected items**.

3. In the **Dispatch at Level** drop-down menu, select **1**, **2**, or **3**.

4. Click **Apply Action**.

5. Click **Commit/Refresh** to commit your changes to the database.

Establishing alarm notifications

Use the following procedure to select the destination for your alarm notifications:

1. Select the row(s) that you want to configure for the alarm.

2. In the **Apply Action** drop-down menu, click one of the following:

   • **Change email destination on selected items**

   • **Change SNMP destination on selected items**

- **Change script file on selected items**

3. If you selected to change either the e-mail or SNMP destination, you must enter a new address in the appropriate fields for those selections. If you selected to change the script file, specify the path name of the batch file that you want to reference.

4. Click **Apply Action**.

5. Click **Commit/Refresh** to commit your changes to the database. The new addresses will appear in the list box.

Scheduling alarm notifications

Use this feature of PA XP to create a schedule of when alarm notifications are dispatched. Use the following procedure to set the start and end times and establish time zone, duration, and frequency of occurrence for dispatching alarms:

1. Select the row(s) that you want to schedule alarm notification.

2. Click **Edit Schedule**. The Edit Schedule/Trend window (shown below) appears.

Figure 20 Edit Schedule/Trend window

3. Use the drop-down menus to select the start time, end time, and time zone.

📝 **NOTE:** Use the **Duration (Week)** drop-down menu only when setting trends.

---

4. Use the checkbox to specify the frequency of occurrence (Daily, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, or Saturday).

5. Click **OK** when you are finished with your changes and proceed to step 6, or click **Cancel** to exit the screen without making any changes.

6. In the **Apply Action** drop-down menu, select **Change Dispatch Schedule on Selected Items**.

7. Click **Apply Action**.

8. Click **Commit/Refresh** to save your changes to the database.

Disabling an alarm

1. Select the row(s) that you want to configure for the alarm(s).

2. In the **Apply Action** drop-down menu, select **Enable/Disable alarm on selected items**.

3. Make sure that the **Enable Alarm** checkbox is *not* selected.

4. Click **Apply Action**. An asterisk (*) appears in the **Mod** column to show that modifications have been made to the highlighted item.

5. Click **Commit/Refresh** to apply your changes to the database. **No** appears in the **Active** column to show that the alarm is now inactive.

Establishing scripts for alarms

Scripts are used to provide executable files that assist you when alarm thresholds are crossed. For example, you can write a script to run a query on performance data through the CLUI. Use the following procedure to establish scripts for alarms:

1. Select the row(s) that you want to configure for the script.
2. In the **Apply Action** drop-down menu, select **Change script file on selected items**.
3. Enter the path name of the batch file in the **Script file (XML)** field. (For example, enter `C:\hpps\pa\alarmscripts\...`)
4. Click **Apply Action**.
5. Click **Commit/Refresh** to save your changes to the database. The location of the batch file appears in the **Script** column in the list box.

Components of the Alarm Configuration screen

The following components appear on the Alarm Configuration screen. Use these components to configure alarm types.

Some fields might be unavailable. To enable the fields or checkboxes, click the associated buttons. For example, the **Dispatch at Threshold Level** field might be unavailable until you click **Change dispatch level on selected items** in the **Apply Action** drop-down menu.

Table 17 Alarm Configuration Screen Components

Component	Description
Abandon All Changes	Undo any changes that you have made to the items that are highlighted. This action must take place before you click **Commit/Refresh** or the changes cannot be reversed.
Add/Remove Alarm (button)	Opens the Alarm Configuration screen, where you can create or remove alarms.
Apply Action (button)	Applies any changes that you have made to the items that are highlighted.
Apply Action (drop-down menu)	Click the arrow to display a drop-down menu containing the following items: **Apply changes to all attributes on selected items** **Enable/disable alarm on selected items** **Change threshold levels on selected items** **Change dispatch level on selected items** **Change email destination on selected items** **Change SNMP destination on selected items** **Change script file on selected items**
Alarm Type	Two types of alarms are available: Level and Trend. Select **Level** to trigger an alarm whenever a specified threshold is exceeded. Select **Trend** to trigger an alarm whenever a specified rate of change occurs. In a trend-type alarm, the rate of change triggers the alarm, rather than a particular value.
Commit/Refresh	Commits your changes to the database and refreshes the screen.
Deselect All	Clears items that have been selected.

Table 17 Alarm Configuration Screen Components (continued)

Component	Description
Dispatch at Threshold Level	Select **1**, **2**, or **3** to specify the threshold level for sending the alarm.
Edit Schedule	Activates the Edit Schedule/Trend window. Use this feature to specify when your alarm will be sent. You can set the start time and end time, and you can specify the time zone and frequency of occurrence. After being saved to the database, the settings appear in the field to the right of the **Edit Schedule** button. Use the **Duration (Week)** drop-down menu only when editing the Trend alarm type.
Email Destination	Specify the pathname of the e-mail destination where you want to receive new alarm event information. **NOTE:** You must enter an e-mail address in order for an alarm to be active and to receive reports. **NOTE:** The most common e-mail error is caused by failing to define the SMTP server. (See CONFIG.HTML on the product CD.) To verify SMTP server availability, at the command prompt, type telnet smtpservername 25 to get a connection. Type QUIT to exit.
Enable Alarm (checkbox)	Enables alarms on the different metrics.
Fill from Top Selection	Use the data from one alarm (the top selection when more than one item is chosen) to create or modify another alarm.
Script File (XML)	Enter the name of the batch file (in XML format) that you want to execute, depending on the alarm type.
SNMP Destination	Specify the IP address of the SNMP Management Station where you want to receive new alarm event information. For more information about this feature, see the Configuration guide (CONFIG.HTML) on the product CD.
Threshold Levels [1, 2, 3]	Designate the performance metric data value (**1**, **2**, or **3**) at which an alarm becomes active. The higher the threshold level, the more critical the event. **NOTE:** When you change threshold levels, any new events appear in the Event Log screen, which shows the level and the time that the event was posted and updated.

9 Alarm History

Introduction

The Alarm History screen on the **Events** tab displays data compiled from the database. This screen provides a history of XP array alarm events. Trapped alarms are alarms that the system has generated over time and has stored in the database. You can view trapped alarm information, including type, level, time, and status.
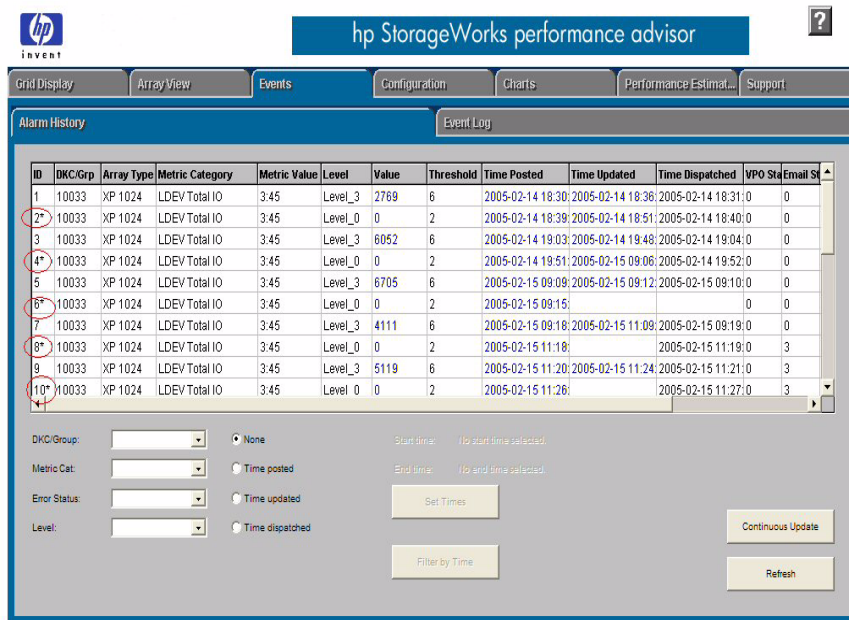

Figure 21 Alarm History screen

Using the Alarm History screen

The upper portion of the Alarm History screen displays columns of information about performance alarms, including array type, metric category, threshold, and status of dispatched alarms. For more information about these items, see "Components of the Alarm History screen" on page 61.

Use the fields in the lower portion of the screen to specify or filter the information that you want to receive. The fields provide option buttons or drop-down menus to quickly identify and select data. The following drop-down menus are available:

- **DKC/Group**: A list of the arrays that the system is monitoring or groups that have generated alarms.

- **Metric Cat:** A list of the metric categories that are being monitored. The items in the list depend on the array that the system is monitoring. The following categories are available:

  - **Total IO**

  - **Total MB**

  - **Maximum Port IO**

- **Error Status**: The following selections are available to monitor error status:

- **Email errors**: The system returns anything that is non-zero in the **Email Status** column.

- **SNMP errors**: The system returns anything that is non-zero in the **SNMP Status** column.

- **Script errors**: The system returns anything that is non-zero in the **Script Status** column.

- **All Errors**: The system returns anything that is non-zero in the **Email** and **SNMP** columns. Select **All** in this column to show all items that were sent unsuccessfully.

- **No Errors**: The system returns only zero items in the **Email** and **SNMP** columns. Select **No** in this column to show which alarms were sent successfully.

- **Level**: Select the severity levels of the alarm about which you want information. The following levels are available:

  - **Level 0-3**

  - **Level 1-3**

  - **Level 2-3**

  - **Level 3**

You can also filter data by time by selecting one of the following option buttons. **None** is the default setting.

- **Time posted**

- **Time updated**

- **Time dispatched**

Click **Set Times** to select the range of time for which you would like to receive information. In the following screen, select the month, day, year, hour, and minute (start and end times) for receiving data on performance alarms. Click **OK** when you are finished, or click **Cancel** to close the screen.

Figure 22 Alarm History Calendar screen

NOTE: After you select the fields and time range, you must click **Filter by Time** in the Alarm History screen to filter and receive data.

Click **Continuous Update** to automatically update the screen with current data every 30 seconds.

Click **Refresh** to refresh the screen with current data.

Viewing and sorting data

Each column of the table can be resized by width. Use the scrollbar at the bottom of the table if more data is available than can be seen within a single screen.

Click the column headings to sort by that topic. The default sort order is ascending order. Click the column heading again to sort by descending order.

Columns are sorted by alphabetical, numerical, or date order, depending on the type of information that appears in the column. For example, the **Metric Category** column sorts in alphabetical order.

Components of the Alarm History screen

Use the following components in the Alarm History screen to configure and view alarm data.

Buttons and drop-down menus

Table 18   Alarm History Screen Buttons and Drop-Down Menus

Component	Description
Continuous Update (button)	Click to receive automatic updates of information from the database. Updates occur every five minutes.
DKC/Group (drop-down)	A list of the arrays that the system is monitoring or the groups that have generated alarms.
Error Status (drop-down)	Several selections are available to monitor error status. If you select **Email**, **SNMP**, **Script**, or **Errors**, the system returns anything that is non-zero in those columns. If you select **All Errors**, the system returns anything that is non-zero in the **Email**, **SNMP**, **Script**, or **Errors** columns. If you select **No Errors**, the system returns only zero items. Select **No** to show which alarms were sent successfully.
Filter by Time (button)	Click to open a screen where you can filter by time.
Level (drop-down)	Select the severity levels of the alarm about which you want information. The following levels are available: • **Level 0-3** • **Level 1-3** • **Level 2-3** • **Level 3**

Table 18 Alarm History Screen Buttons and Drop-Down Menus (continued)

Component	Description
Metric Cat (drop-down)	A list of the metric categories that are being monitored. The items in the list depend on the array that the system is monitoring. The following categories are available: • **Total IO** • **Total MB** • **Maximum Port IO**
None **Time posted** **Time updated** **Time dispatched** (buttons)	Select one of these option buttons to filter data by the time when the alarm event was posted, updated, or dispatched.
Refresh (button)	Refreshes the screen with current information from the database.
Set Times (button)	Specify the range of time for which you want to receive information.

Columns

Table 19 Alarm History Screen Columns

Component	Description
Array Type	Six types are available: **XP512**, **XP48**, **XP256**, **XP128**, **XP1024**, **XP12000,** and **Unknown**.
DKC/Grp	A list of the arrays, or the name of the group that has generated alarms.
Email Status **SNMP Status**	These fields show whether the alarm information sent by Email or SNMP was successful, or if errors occurred. If errors occurred, a list of values are displayed for the error type(s). This list of values ranges from **1** to **6**. **0**: Successful Send (0 also displays when no send was needed) **1**: Alarm Exception (while formatting raw data) **2**: General Exception (while formatting raw data) **3**: Courier Exception (while sending formatted data) **4**: General Exception (while sending formatted data) **5**: Error During Results Calculation **6**: Uninitialized Result (error before formatting stage) The e-mail address refers to the e-mail address of the management station where the alarm-event information was dispatched.
ID	The ID number given to the array that is associated with the alarm. Provides an index for alarm events. --- **NOTE:** An astrisk (*) next to the ID indicates a recovery alarm. A recovery alarm is triggered whenever a specified threshold or ratre of change recovers within acceptable levels.

Table 19 Alarm History Screen Columns (continued)

Component	Description
Level	A threshold level of **1**, **2**, or **3** is specified for each alarm. For more information about threshold levels, see "Alarm Configuration" on page 49.
Metric Category	A list of the metric categories associated with the array that you are monitoring.
Metric Value	The value of the metric category for which an alrm was generated.
Script Status	The path name of the script file.
Threshold	The performance metric data value at which an instance of the alarm becomes active.
Time Dispatched	The time when the alarm was sent out.
Time Posted	The time when the alarm was initially posted.
Time Updated	The time when modifications were last made to the alarm.
Type	The alarm type, whether level or trend.
Value	The value established at the management station when an alarm crosses a threshold.
VPO Status	The VPO error ststus number.

10 Database Configuration

Introduction

The Database Configuration screen is located on the **Configuration** tab in Performance Advisor XP (PA XP). Use this screen to purge performance data, specify how much disk space you want the database to use, log events at or above a specified severity level, set the time zone of the management station, and share array configuration information with even those management stations not running Command View XP.
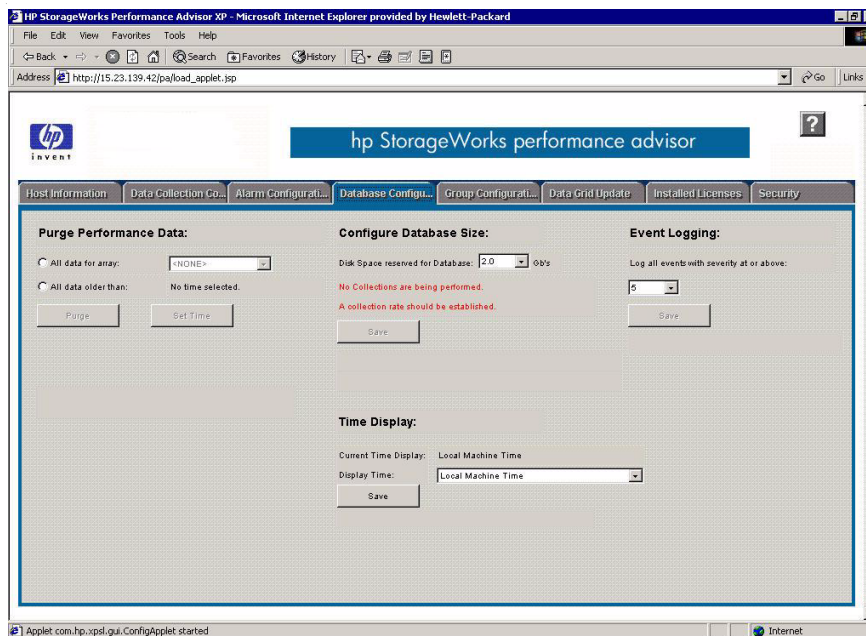

Figure 23 Database Configuration screen

Using the Database Configuration screen

Use the Database Configuration screen to purge performance data, specify disk space to use for performance data, and log events above a specified severity level.

Purging performance data

To purge performance data, select one of the following options:

- For **All data for array**, you must specify the array serial number in the associated drop-down menu.

- For **All data older than**, you must click **Set Time** to specify the time frame for purging data. A calendar appears, as shown in the following illustration. Select the date and time, and then click **OK** to set the calendar. Click **Cancel** to return to the main screen.

Figure 24 Database Configuration Calendar screen

After you make a selection, click **Purge**. A **Confirmation** dialog box appears with the following message: "Click **OK** to confirm deletion of records. Click **Cancel** to cancel."

Configuring the database size

Use the Database Configuration screen to specify how much disk space you want the database to use.

1. Enter the number of gigabytes of disk space reserved for the database.

NOTE: The oldest records will be deleted automatically, if necessary, to keep the size under the specified setting.

NOTE: To adjust the cap placed on the database size, see "Expand the database size to retain up to 32 GB of data" at `DOCS\CONFIG.HTML` on the PA XP CD.

---

2. Click **Save** to save your change to the database.

Event logging

Use event logging to log events that occur at or above a specified level of severity.

1. Use the drop-down menu to select a number from **5** to **10**, with **10** representing the highest level of severity. (The default setting is **5**.)

CAUTION: If the level is set too low, database performance will be adversely affected. However, from the CLUI, the severity level can be set anywhere within the range of **1** to **10**.

---

2. After you make a selection, click **Save** to save your change to the database. The system will log all events that occur at or above the severity level that you have chosen. The following table describes the severity levels.

Table 20   Severity Levels for Event Logging

Severity	Description
1, 2	Debugging messages
3, 4	Normal system operations
5, 6	User-instigated activities (for example, if a user enters the settings that instigate a purge)
7, 8	System errors
9, 10	Natural disasters

Command View XP (CV XP) Data Propagation

NOTE: This feature is available only when you are running PA XP with Command View XP.

Use the CV XP Data Propagation feature to share array configuration information with other management stations. To use this feature, follow the procedure that corresponds with the action you want to take.

Adding a management station

1. Type the name of the management station in the field adjacent to the **Add** button.
2. Click **Add**.
3. Click **Save** to save your changes to the database.

Deleting a management station

1. Highlight the name of the management station that you want to delete.
2. Click **Delete**.
3. Click **Save** to save your changes to the database.

Restoring information

If you make any changes, but want to restore the original information, you can do so only if you have not yet clicked **Save**. Click **Restore** to restore the original information.

Force update

Every 2 hours, the system checks the array to see if any changes have been made. If changes are detected, such as adding a disk, adding cards, or making any configuration changes to the array, these changes appear in the database configuration information at the management station. To view any changes sooner than 2 hours, click **Force Update**. An update will occur immediately.

Time Display

Use Time Display to set the time you want to appear at the management station.

1. Select the time in the drop-down menu.
2. Click **Save** to save your changes to the database.

Backing up, restoring, and resetting the database

You might need to perform a database backup, restore, or reset of PA XP. To do so, you must be at the management station.

Database backup

At the command line prompt, type `cd ...\Hpss\padb\tools`. In the Tools directory, type `DBBackup <date or other defining parameter>`. For the defining parameter, it is recommended that you provide a date. For example, if you type `DBBackup 09112004`, the system will provide a backup of all data into a directory named 09112004.

Database restore

At the command line prompt, type `cd ...\Hpss\padb\tools`. In the Tools directory, type `DBRestore <date or other defining parameter>`. Enter the same parameter that you typed in the command line prompt for the database backup. For example, if you typed `DBBackup 09112004` to back up your data, you would then type `DBRestore 09112004` to restore the data from the backup contained in the 09112004 directory.

Database reset

At the command line prompt, type `cd ...\Hpss\padb\tools`. In the Tools directory, type `DBRestore`.

Components of the Database Configuration screen

The following components appear on the Database Configuration screen. Use these components to configure the database.

Table 21 Database Configuration Screen Components

Component	Description
All data for array	The serial number of the array from which you want to purge data.
All data older than	Click this button, and then click **Set Time** in the calendar that appears to specify the dates of the data you want to purge.
Configure database size (drop-down menu)	The amount of disk space you want the database to use.
Event Logging (drop-down menu)	The severity level of the event: **1**, **2** = Debugging messages **3**, **4** = Normal system operations **5**, **6** = (default) User-instigated activities (for example, if a user enters the settings that instigate a purge) **7**, **8** = System errors **9**, **10** = Natural disasters
Set Times	The time range by which you want to filter the data.

11 Group Configuration

Introduction

The Group Configuration screen is located on the **Configuration** tab. Use this screen to group host and array components for viewing or making comparisons between specific components. For example, if you have a database that is spread across three LDEVs, or if you want to view all LDEVs assigned to a particular port, you would use the Group Configuration screen.

In the screen, you can filter the data you want to receive by using the available list boxes and drop-down menus.
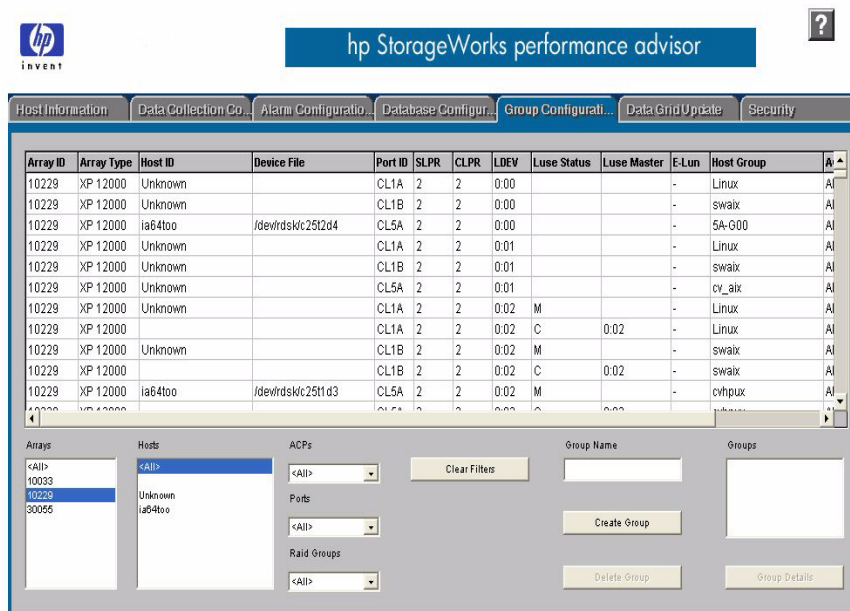
Figure 25 Group Configuration screen

Using the Group Configuration screen

The list box at the top of the Group Configuration screen displays the components that are highlighted in the fields and drop-down menus that appear below the list box. Your selection in the fields and drop-down menus determines the data that appears in the list box. Use the Group Configuration screen to create groups, delete groups, or view specific group configurations, such as certain sets of ACPs.

Creating groups

The Group Configuration screen provides drop-down menus so that you can easily identify and enter parameters for your group. The drop-down menus act as filters to control and limit the data received.

To create groups, follow these steps:

1. In the **Arrays** list, select the array for your group. Select <**All**>, or select specific arrays. To select more than one array, click each array that you want to include in your group.

2. In the **Hosts** list, select the host for your group. Select <**All**>, or select specific hosts. To select more than one host, click each host that you want to include in your group.

3. Select the ACPs, ports, and RAID groups for your group by using the respective drop-down menus.

4. In the list box, click to highlight the items to include in your group.

5. In the **Group Name** field, enter a group name.

NOTE: Group names are limited to 24 characters.

---

6. To finish, click **Create Group**.

See "Viewing group configurations" on page 71 for information about viewing the specific characteristics of your groups.

Charting groups

Instead of charting the metrics of specific arrays, you might want to create and chart groups of specific host and array components. Use the Group Configuration screen, which acts as a configurable Grid Display screen, to do this.

After you select the parameters for your group, go to the PA XP Charts screen to view an aggregation of your selections. For example, the system can add all of the total IOs for invalid ACP Pairs, or the system can add the LDEVs for a custom RAID group. Make sure that you select every element that you want to appear in your chart because the system can chart only those elements that are specified.

After you have created a group in the Group Configuration screen, the group automatically appears in the **Array/Group** drop-down menu in the Charts screen. For more information, see "Charts" on page 81.

NOTE: LDEVs associated with multiple RAID groups or multiple ACPs are treated as a separate group of items. For example, if you have an LDEV with RAID group 1-1 1-2, you must select **1-1 1-2** in the drop-down menu. Also, an LDEV mapped to 1-1 1-2 is treated separately from a RAID group mapped only to 1-1 or 1-2.

Deleting groups

To delete a group, follow these steps:

1. Highlight the group that you want to delete in the **Groups** list box.

2. Click **Delete Group**.

3. In the pop-up window, click **OK** if you are sure you want to delete the specified group. The group will be removed. This process might take a few moments if you have a large number of groups or LDEVs.

Viewing group configurations

If you want to view the characteristics of any of your groups, highlight the group in the **Groups** box, and click **Group Details**. The Group Details window that appears lists the details about your group.
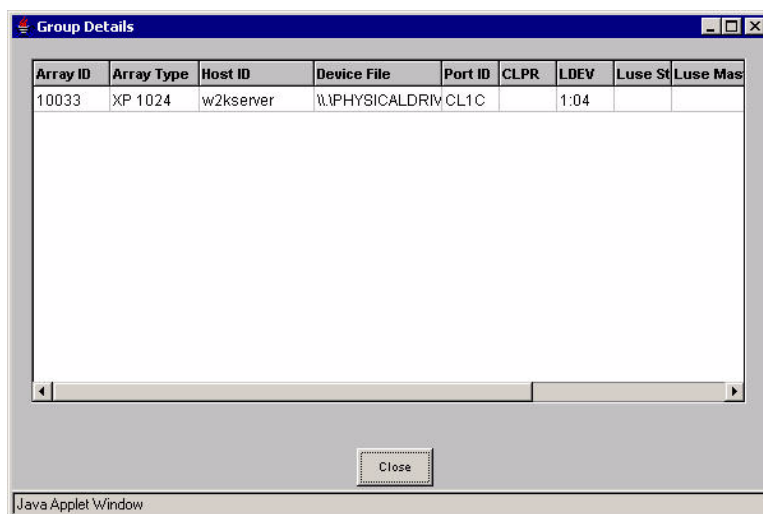
Figure 26 Group Details window

Components of the Group Configuration screen

The following components appear in the Group Configuration screen. Use these components to configure your groups.

Table 22 Group Configuration Screen Components

Component	Description
ACPs	A list of available Array Control Processor Pairs. When creating your group, select all ACPs or individual ACPs in this drop-down menu.
Array ID	The serial number of the array.
Array Type	The type of array, such as XP256.
Arrays	A list of available arrays.
Clear Filters	Click to return all menu items to their default settings.
CLPR	The CLPR group number.
Create Group	Select the components for your group, and click this button.
Delete Group	Highlight the group in the **Groups** list box, and click this button to delete the group.
Device File	The name of the device file.
E-Lun	Indicates that the LDEV is an E-Lun. The following options are available: **-** (hyphen) = Normal LUN **E** = E-Lun **P** = E-Lun provider (this LDEV is used as an E-Lun for another array)
Group Name	Enter a name for your group in this field.

Table 22 Group Configuration Screen Components (continued)

Component	Description
Groups	A list of the groups that have been created.
Group Details	Click to display the characteristics of a particular group.
Host Group	The user-defined name of the host group.
Host ID	The user-defined name of the customer's machine that is connected to the array.
Hosts	A list of the available hosts.
LDEV	The identification number of the logical device.
LUSE Master	(Logical Unit Size Expansion). The LDEV ID of the LUSE master when the LDEV is a component. If the LDEV is not a LUSE component, this field is blank.
LUSE Status	Blank field = Not a LUSE **M** = A LUSE master **C** = A LUSE component
Port ID	The identification number of the port.
Ports	A list of available ports. When creating your group, select all ports or individual ports.
RAID Group	A list of RAID groups. When creating your group, select all RAID groups or individual RAID groups.
SLPR	The SLPR group number.

12 Data Grid Update

Introduction

The Data Grid Update screen is located on the **Configuration** tab. Use this screen to view fabricated or incomplete records so that you can make modifications to them. Fabricated records contain no host-to-array connectivity data.

The Data Grid Update screen accumulates and displays LDEVs that have unknown host connections, with the exception of LUSE components that are fabricated internally and can be modified only in the CLUI.

You can also use the Data Grid Update screen to delete records from the database.
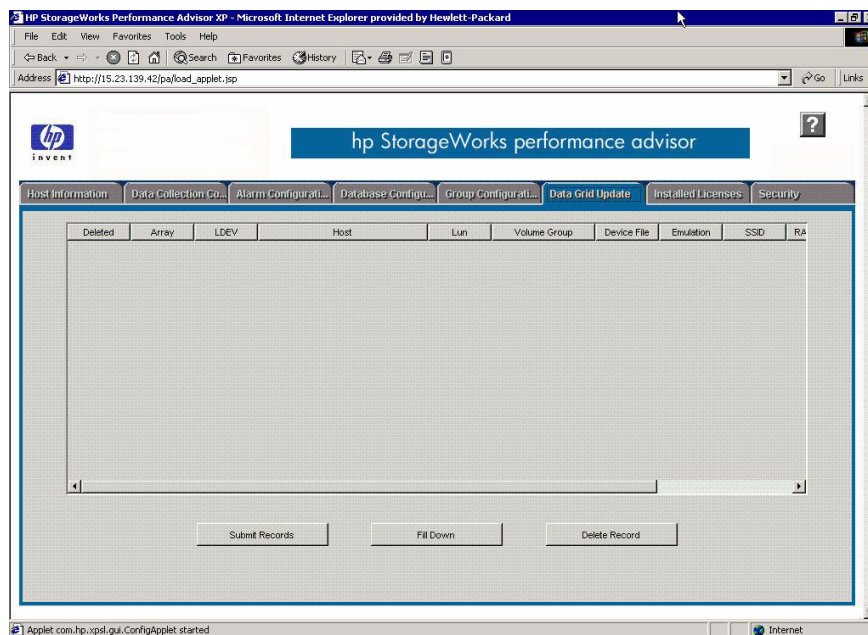
Figure 27 Data Grid Update screen

Using the Data Grid Update screen

Use the Data Grid Update screen to view fabricated or incomplete records (meaning that no host-to-array connectivity data is available for those records) so that you can make any necessary modifications to them.

You can edit the following fields:

- **HOST**

- **LUN**

- **Volume Group**

- **Device File**

- **SSID**

The following fields are checked against criteria:

- **LUN**: between -1 and 15

- **SSID**: >= -1

If a value of -1 displays in any of the columns, you might want to edit the column and submit it to the database.

You can also use the Data Grid Update screen to modify or delete records from the database. Use the procedures in the following sections to modify or delete records.

Modifying records

To make changes to the records in the Data Grid Update screen, follow these steps:

1. Double-click to place the cursor in the field where you want to make changes. (You cannot edit the **Array**, **LDEV**, or **ACP Pair** fields.)

2. Enter the changes you want to make.

3. Click **Submit Records** to save your changes to the database.

Fill Down button

1. If you want to apply a specified value to several records, highlight the value you want to use. The value must immediately precede the records where you want to apply the value.

2. Highlight the records where you want to copy the value, and click **Fill Down**. The value appears on all records that were highlighted.

For example, if you want to apply a host name to a group of records, highlight the host name that you want to use *and* the records immediately following the targeted host name. Click **Fill Down**.

Deleting records

1. Click anywhere in the row that contains the record you want to delete.

2. Click **Delete Records**. An **X** appears in the **Deleted** column.

3. Click **Submit Records** to save your changes to the database.

Components of the Data Grid Update screen

The following components appear on the Data Grid Update screen. Use these components to update the data grids.

Table 23 Data Grid Update Screen Components

Component	Description
ACP Pair	The identification number for the Array Control Processor Pair.
Array	The serial number of the array.
Deleted	An **X** appears in this column for records that have been deleted.
Device File	The number of the device file.
Emulation	An array group is divided into open volumes of the same size. These volumes are referred to as emulation types.
Host	The name of the host.

Table 23 Data Grid Update Screen Components (continued)

Component	Description
LDEV	The identification number of the logical device.
LUN	The Logical Unit Number.
RAID Group	The RAID group to which the host belongs.
SSID	Storage Subsystem Identification number.
Volume Group	Displays information for a particular volume group.

13 Security

Introduction

The Security screen on the **Configuration** tab displays information about users who are authorized to use PA XP and the groups to which users are assigned. The screen consists of two tabs. Administrators can use both the Users tab and the Groups tab to view and modify security information. General users can view only the Groups tab, and cannot make modifications.

For each authorized user, the Users tab displays the following information:

• Name of the user

• Group membership

• Description of access rights (read only or read/write)
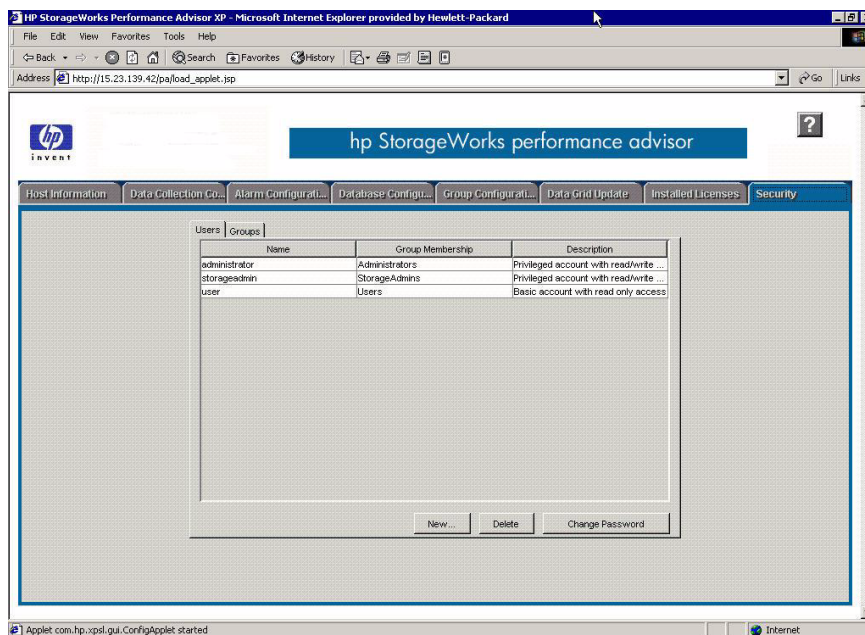
Figure 28 Users tab on Security screen

For each group, the Groups tab displays the following information:

• Name of the group

- Description of privileges for the group
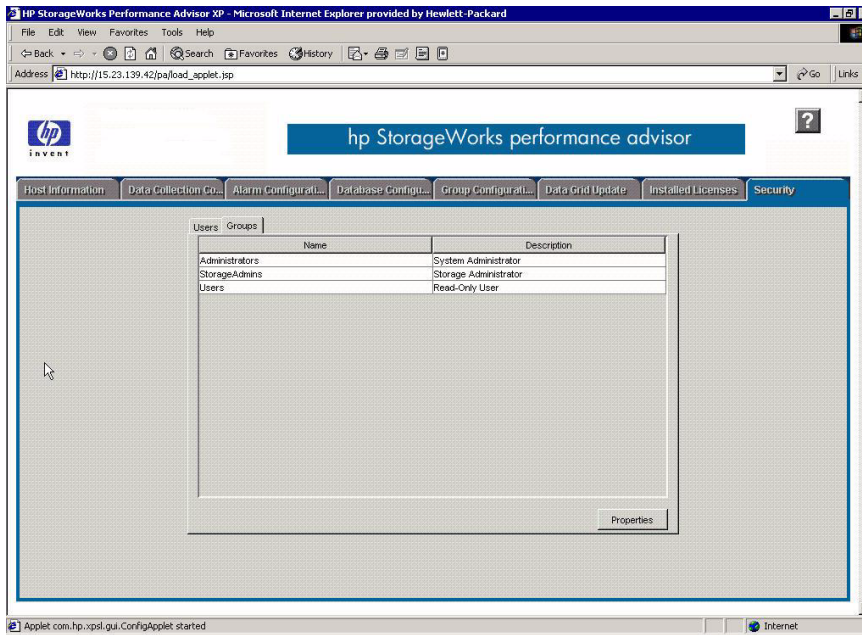
Figure 29 Groups tab on Security screen

Additional information is available in the Properties window.

Viewing group properties

1. In PA XP, click the **Configuration** tab.
2. Click the **Security** tab.
3. Click the **Groups** tab.
4. Click **Properties**. The General tab displays the group name and a brief description.

Figure 30 General tab on Properties screen

5. Click the **Members** tab to see which users are a member of the group.
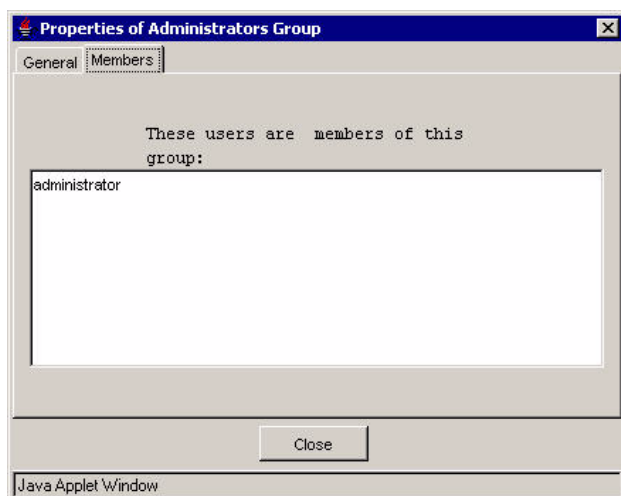
Figure 31 Members tab on Properties screen

6. Click **Close** to return to the Security screen.

Working with users

Administrators can use the Security screen to add and remove PA XP users and change passwords to enhance security for the system. General users in a user group can only change their own password and view the other information on the Security tab.

Adding new users

1. In PA XP, click the **Configuration** tab.

2. Click the **Security** tab.

3. Click **New**.

4. In the **New User** dialog box, enter a user name and description for the new user. Enter a password, and then confirm the password for the new user.
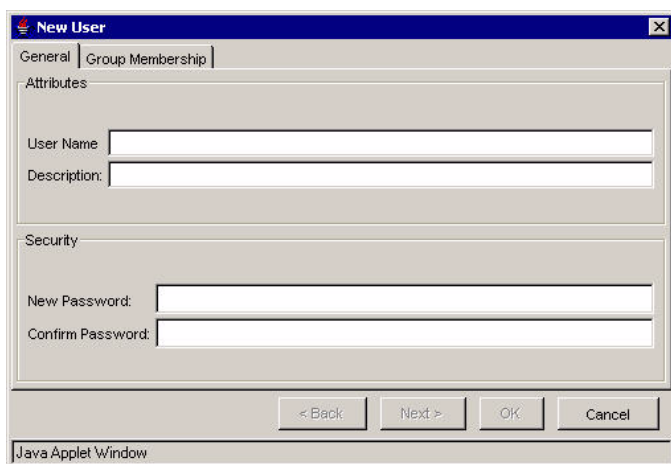
Figure 32 New User dialog box

5. To add another new user, click **Next** and repeat step 4. When you are done adding new members, click **OK**.

6. Click the **Group Membership** tab.
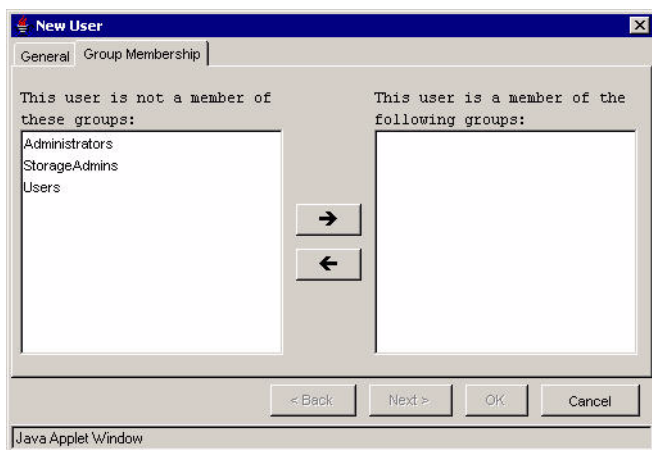
Figure 33 Membership tab on New User dialog box

7. In the left column, click to highlight the group for the new user. Click the right arrow button to add the group to the right column.

8. When you are done adding the new member to groups, click **OK**.

Deleting users

1. In PA XP, click the **Configuration** tab.

2. Click the **Security** tab.

3. Click to highlight the user that you want to delete, and then click **Delete**.

4. Click **OK** to confirm, or click **Cancel** to return to the Users screen.

Changing user passwords

1. In PA XP, click the **Configuration** tab.

2. Click the **Security** tab.

3. Click to highlight the user whose password you want to change, and then click **Change Password**.
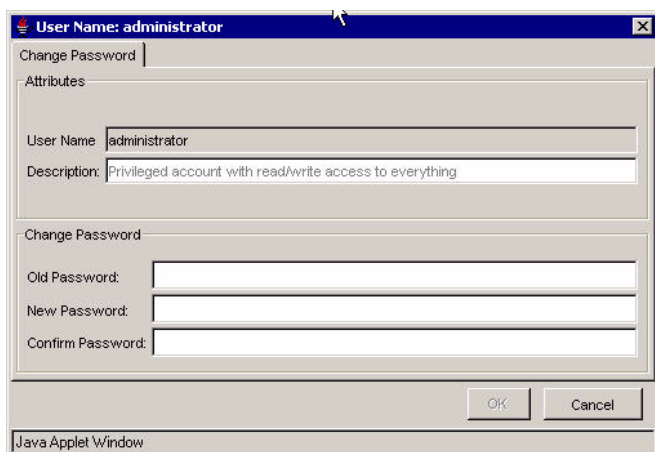
Figure 34 Change Password dialog box

4. In the **Change Password** dialog box, enter the old password for the user in the field indicated. Enter the new password, and then enter the new password again to confirm.

5. Click **OK** to change the password, or click **Cancel** to return to the Users screen.

14 Charts

Introduction

Use the Charts screen in Performance Advisor XP (PA XP) to specify the metrics you want to view in a chart format. You can configure information for the following categories:

- **IO Metrics**

- **MB Metrics**

- **Utilization Metrics**

- **Backend Metrics**
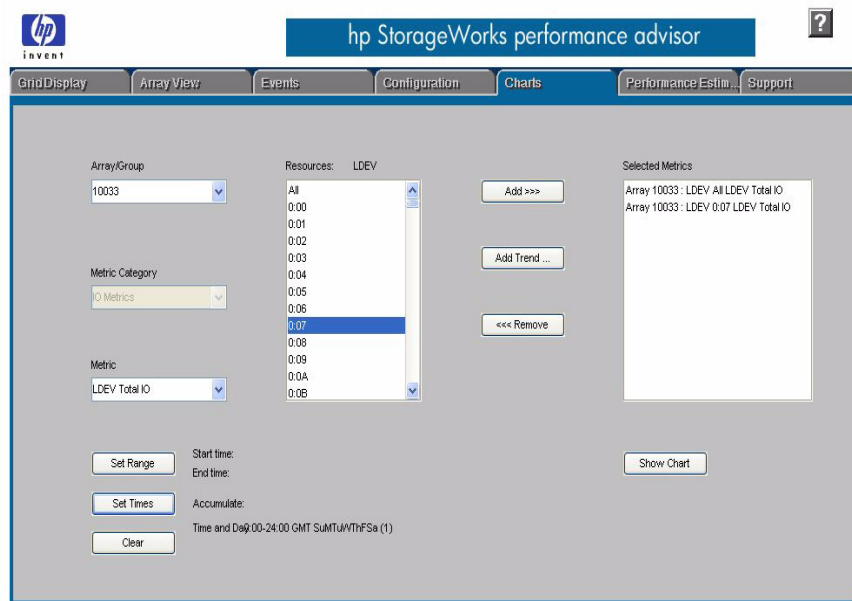
Figure 35 Charts screen

Using the Charts screen

The Charts screen contains drop-down menus to select the information for your chart.

To use the Charts screen, follow these steps:

1. In the **Array/Group** drop-down menu, select the customized group or array from which you want to gather data. You can create customized groups in the Groups screen. Typically, groups contain specific metrics, such as invalid ACP pairs. For more information, see "Working with groups" on page 83.

2. In the **Metric Category** drop-down menu, select the category for which you want information.

3. Use the **Metric** drop-down menu to refine information for a metric. For example, to view the total input-output operations on LDEV performance, select **LDEV Total IO**.

4. The title and information in the field to the right of the drop-down menus reflect the **Metric Category** selections. For example, if you select **IO Metrics** in the **Metric Category** drop-down menu, the title for

the field shows **LDEV** and lists the available LDEVs. You can then make more refinements by selecting specific items to chart.

5. Click to highlight the components that you want to chart. To add more than one item, hold down the Shift or Ctrl key while making your selections.

> **NOTE:** You can select a maximum of eight components to chart.

6. Click **Add** to add the components to the **Selected Metrics** field. Click **Add Trend** to show the rate of change of the specified metrics.

7. To remove an item from the **Selected Metrics** field, click to highlight the item, and click **Remove**.

8. Repeat steps 2 through 6 to add all of the items that you want to chart. Use any combination of arrays and metrics as long as you select from the same metric category and select eight or fewer items.

9. Click **Set Range** to filter the data by time at the start of the query. (You can also select this option in the Performance History screen after receiving the data.) If you do not select a specific time range, the 10 most recent data points are displayed on the chart.
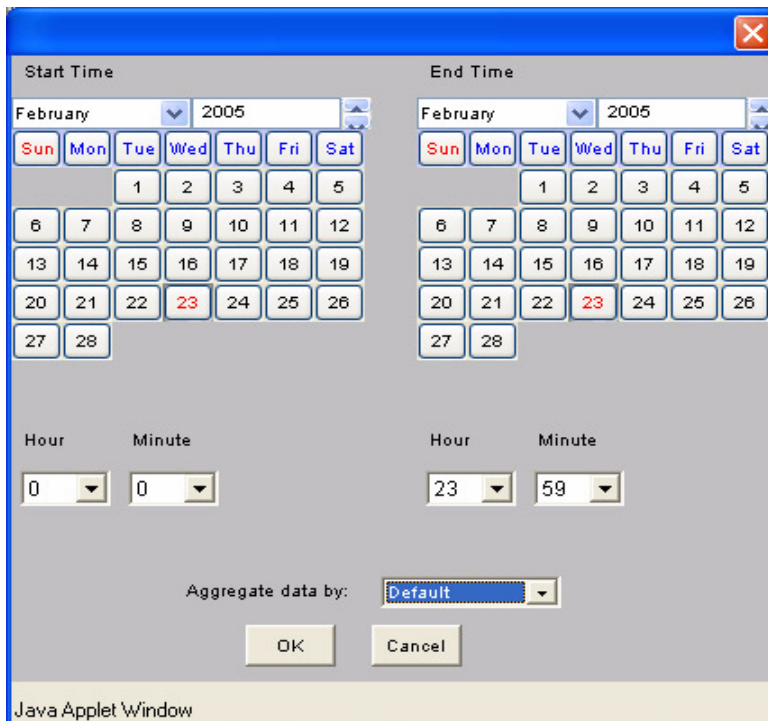
Figure 36 Chart Calendar screen

10. In the calendar, select the start and end times to filter the data. For a summary of all items in the **Selected Metrics** field, use the **Aggregate data by** drop-down menu. When you finish making your selections, click **OK**. Click **OK** to continue, or click **Cancel** to close the calendar without making any changes.

11. Click **Set Times** to filter the data within a specific start and end time, duration (up to 20 weeks), and frequency for a specific time zone. Click **OK** to continue, or click **Cancel** to close the window without making any changes.
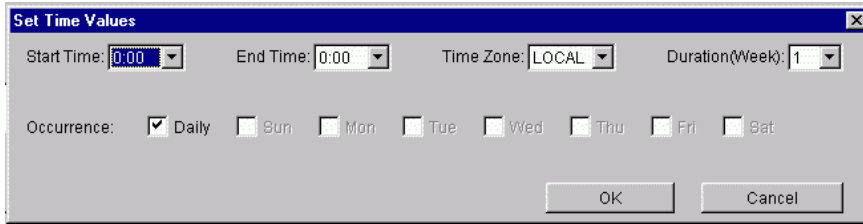
Figure 37 Set Time Values dialog box

12. To clear your settings, click **Clear** on the Charts screen. Otherwise, proceed to the next step.

13. Click **Show Chart**. Information is retrieved from the database and appears in the Performance History screen. For more information about the Performance History screen, see "Viewing data" on page 88.

The Charts screen supports charts for XP 12000 cache partitions. The following table lists the Chart screen selections for showing XP 12000 cache partition charts.

Table 24 Chart Screen Selections for XP 12000 Cache Partition charts

Array/Group	Metric Category	Metric	Resource List Title	Resource List Contents
Any disk array model or serial number	MB Metrics or Utilization Metrics	Cache Usage	Cache Partition	All
An XP 12000 serial number	MB Metrics or Utilization Metrics	Cache Write Pending or Cache Sidefile Usage	Cache Partition	All, 0, 1, 2, 3, …
A non-XP 12000 serial number	MB Metrics or Utilization Metrics	Cache Write Pending or Cache Sidefile Usage	Cache Partition	All
A custom group name	MB Metrics or Utilization Metrics	Cache Usage, Cache Write Pending, or Cache Sidefile Usage	Cache Partition	Empty

Working with groups

You can also create and chart groups of specific host and array components by creating your group in the PA XP Groups screen on the Configuration tab.

The Groups screen is a configurable Grid Display screen. After you select the parameters for your group, the system returns the results of your selections. For example, the system can add all of the total IOs for invalid ACP Pairs, or it can add the LDEVs for a custom RAID group. Be sure to select every element that you want to appear in your chart because the system can chart only those elements that are specified. After you create a group in the Groups screen, the new group automatically appears in the **Array/Group** drop-down menu on the Charts screen. Use the **Metric Category** and **Metric** drop-down menus to select the metrics that you want to chart for your group.

> **NOTE:** The following metrics can only be added when an array is selected in the **Array/Group** drop-down box:

- SM CHIP Bus/FBus Hi Util

- SM ACP Bus/FBus Lo Util

- CM CHIP Bus/MBus Hi Util

- CM ACP Bus/MBus Lo Util

- Cache Usage

- Cache Write Pending Usage

- Cache Sidefile Usage

Metric Category and Metric drop-down menus

The following table lists the fields that are available in the **Metric Category** and **Metric** drop-down menus.

Table 25 Metric Categories and Metric Values

Metric Category	Metric	Description
IO Metrics	**LDEV Total IO** **LDEV Total Random IO** **LDEV Random Reads** **LDEV Random Read Cache Hits** **LDEV Random Writes**	Single LDEV.
	LDEV Total Sequential IO **LDEV Sequential Reads** **LDEV Sequential Read Cache Hits** **LDEV Sequential Writes** **LDEV Search/Read Basic Mode** **LDEV Search/Read Hits Basic Mode** **LDEV Search/Read Seq Access Mode** **LDEV Search/Read Hits Seq Basic Mode** **LDEV Write Basic Mode** **LDEV Write Seq Access Mode**	
	Maximum Port IO **Minimum Port IO** **Average Port IO**	Single port.

Table 25 Metric Categories and Metric Values (continued)

Metric Category	Metric	Description
IO Metrics, cont.	**RAID Group Total IO** **RAID Group Total Random IO** **RAID Group Random Reads** **RAID Group Random Read Cache Hits** **RAID Group Random Writes** **RAID Group Total Sequential IO** **RAID Group Sequential Reads** **RAID Group Sequential Read Cache Hits** **RAID Group Sequential Writes** **RAID Group Search/Read Basic Mode** **RAID Group Search/Read Hits Basic Mode** **RAID Group Writes Basic Mode** **RAID Group Search/Read Seq Access Mode** **RAID Group Search/Read Hits Seq Access Mode** **RAID Group Write Seq Access Mode**	Each RAID group value is the sum of all the LDEVs in the RAID group.
IO Metrics, cont.	**ACP Total IO** **ACP Total Random IO** **ACP Random Reads** **ACP Random Read Cache Hits** **ACP Random Writes** **ACP Total Sequential IO** **ACP Sequential Reads** **ACP Sequential Read Cache Hits** **ACP Sequential Writes** **ACP Search/Reads Basic Mode** **ACP Search/Read Hits Basic Mode** **ACP Writes Basic Mode** **ACP Search/Reads Seq Access Mode** **ACP Search/Read Hits Seq Access Mode** **ACP Writes Seq Access Mode**	Each ACP pair value is the sum of all the RAID groups it serves.
	Total CFW **CFW Reads** **CFW Read Cache Hits** **CFW Writes** **CFW Write Cache Hits** **DFW Count** **DFW Normal Count** **DFW Seq Acc Count** **DFW Write Hits** **DFW Seq Acc Write Hits**	These are per LDEV without rollup.

Table 25   Metric Categories and Metric Values (continued)

Metric Category	Metric	Description
MB Metrics	Total MB Total Random MB Random MB Read Random MB Write Total Sequential MB Sequential MB Read Sequential MB Write	Single LDEVs.
	Maximum Port MB Minimum Port MB Average Port MB	Single port.
	RAID Group Total MB RAID Group Total Random MB RAID Group Random Read MB RAID Group Random Write MB RAID Group Total Sequential MB RAID Group Sequential Read MB RAID Group Sequential Write MB	Each RAID group value is the sum of all the LDEVs in the RAID group.
	ACP Total MB ACP Total Random MB ACP Random Write MB ACP Total Sequential MB ACP Sequential Read MB ACP Sequential Write MB	Each ACP pair value is the sum of all the RAID groups it serves.
	Cache Usage MB Cache Writes Pending MB Cache Sidefile Usage MB	Cache Usage, Cache Writes Pending, Cache Sidefile Usage
Utilization Metrics	ACP Pair Util Total ACP Pair Util MP0 ACP Pair Util MP1 ACP Pair Util MP2 ACP Pair Util MP3 ACP Pair Util MP4 ACP Pair Util MP5 ACP Pair Util MP6 ACP Pair Util MP7 ACP Left Util Total ACP Left Util MP0 ACP Left Util MP1 ACP Left Util MP2 ACP Left Util MP3 ACP Left Util MP4 ACP Left Util MP5 ACP Left Util MP6 ACP Left Util MP7 ACP Right Util Total ACP Right Util MP0 ACP Right Util MP1 ACP Right Util MP2 ACP Right Util MP3 ACP Right Util MP4 ACP Right Util MP5 ACP Right Util MP6 ACP Right Util MP7	For example, ACP Pair BH has B as the left ACP card and H as the right ACP card.

Table 25 Metric Categories and Metric Values (continued)

Metric Category	Metric	Description
Utilization Metrics, cont.	CHIP Util Total CHIP Util MP0 CHIP Util MP1 CHIP Util MP2 CHIP Util MP3 CHIP Util MP4 CHIP Util MP5 CHIP Util MP6 CHIP Util MP7 SM CHIP Bus/FBus Hi Util SM ACP Bus/FBus Lo Util CM CHIP Bus/MBus Hi Util CM ACP Bus/MBus Lo Util	FBus and MBus are only for the XP256.
	Cache Usage Util Cache Writes Pending Util Cache Sidefile Usage Util	Cache Usage Utilization, Cache Writes Pending Utilization, Cache Sidefile Usage Utilization
Backend Metrics	LDEV Sequential Read Tracks LDEV Non-sequential Read Tracks LDEV Write Tracks RAID Group Sequential Read Tracks RAID Group Non-sequential Read Tracks RAID Group Write Tracks ACP Pair Sequential Read Tracks ACP Pair Non-sequential Read Tracks ACP Pair Write Tracks	

Collecting data

Use PA XP to display data collected at different collection rates in the same chart as if all of the data were collected at the same collection rate. (This occurs when collecting from multiple DKCs at different rates.)

To manage varying collection rates, PA XP uses cubic spline interpolation or approximation. The basis for the interpolation depends on the master that is selected. The master will be the set of data points that represent the most recent collection period, as well as the shortest collection period. (The shortest collection period is defined as the collection period where the data is most frequently collected.) After the system determines the master, the other data points are interpolated to match the master. For example, if you collected a set of data at five-minute intervals on one DKC, and another set of data at one-minute intervals on another DKC, the system will carry out its cubic spline interpolation (approximation) based on the data collected at one-minute intervals. All data will display as if it were being collected at one-minute intervals.

If the data has the same number of collection points, the master will be the data collected from the DKC with the shortest collection period. The system will never return more than 1,000 points. (10 points of data are set as the default.)

NOTE: If a chart is not produced after you click **Show Chart**, the time lines of the selected metrics might not align. In other words, it is possible that old data values (for example, values from one week ago) are not aligning with new data values (for example, values from yesterday). Other possible causes are that no data was collected for the time specified, or that data was not collected from the DKC. Check the Java Console for messages. Click **View**, and then click **Java Console** in your browser.

Viewing data

When you click **Show Chart** in the Charts screen, information is retrieved from the database according to your specifications and appears in graphical format in the Performance History screen.
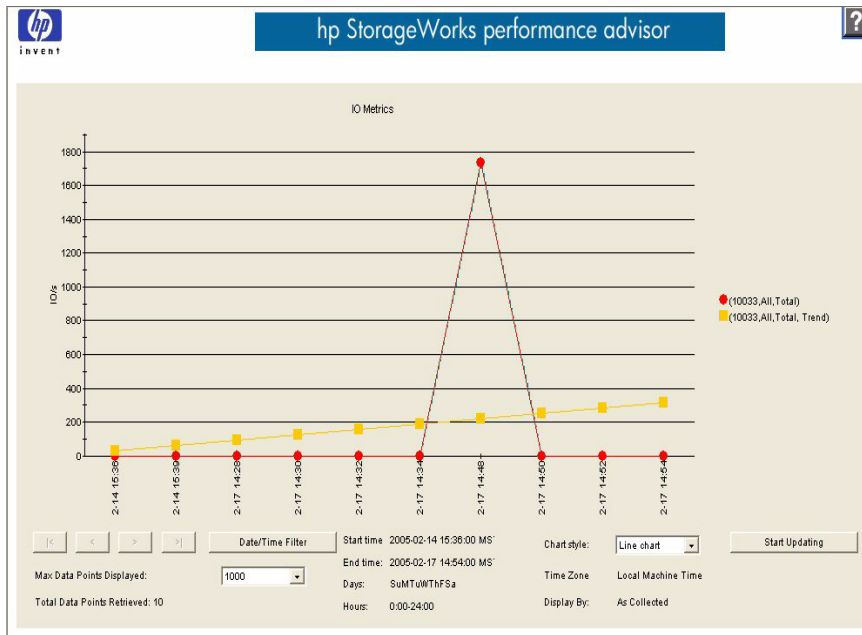
Figure 38 Performance History screen

The Performance History screen shows a graph of 10 sets of data for the metric(s). The graph displays all available data if fewer than 10 collection periods have occurred.

The color of each line in the chart is defined in the legend located to the right of the chart. The metric(s) displayed vary depending on your selection in the Charts screen.

Using the Performance History screen

The following buttons below the graph extend your viewing options:

- **Back/Forward:** Use these four buttons to display data points not currently displayed on the chart. These buttons are available when the total data points retrieved exceed the maximum data points displayed setting.

- **Date/Time Filter**: Click this button to open a calendar to select the start and end times for the data that you want displayed. A maximum of 1,000 records can be returned even if more data is available. Use this screen to enter the date and time to display the desired data. Click **OK** to set the start and end times, or click **Cancel** to delete any changes.

- **Start Updating**: Click this button, and the system regularly checks the database for new data. If new data is found, the newest data point is added to the right side of the graph. All other data points are shifted one column to the left, and the far left column is removed.

NOTE: If the chart contains metrics from different arrays, **Start Updating** is disabled.

Use the **Chart Style** drop-down menu to select the type of display in the report. The following options are available:

- **Stackable Chart**: This option, available in two- and three-dimensional views, shows stacked bars that are graphed on top of each other. Use the stacked display to compare totals between different time periods, such as comparing the most recent total IO with the total IO from one hour ago.

When the stacked display shows numerical data, such as the LDEV IO, it adds all of the values. If the stacked display shows a percentage, the total height and percentage are a sum of all of the percentage values.

- **Bar Chart**: This option shows the different values as rectangular bars. Use the parallel display for comparing items within the same time period. For example, you can compare random reads with sequential reads for a specified time period. The bar chart is the default display.

- **Line Chart**: This option is available in two- and three-dimensional views to illustrate the data points. This is the default chart style.

Use the **Max Data Points Displayed** drop-down menu to select the maximum number of data points to display in the report. The following options are available:

- 10

- 50

- 100

- 500

- 1000 (default setting)

> **NOTE:** If you select maximum data points of 100, 500, or 1000, the line graph does not display a symbol for each data point.

For more information about the Performance History screen, see "Components of the Performance History screen" on page 90.

Components of the Charts screen

The following components appear in the Charts screen. Use these components to configure the charts.

Table 26   Charts Screen Components

Component	Description
Add	Click to show selected metrics in a chart.
Add Trend	Click to show the rate of change of the selected metrics in a chart.
Array/Group	A list of the arrays and custom groups about which you can receive information.
Clear	Click to clear all selections made on the Charts screen.
Metric	A list that further refines the selection made in the **Metric Category**. For a complete list of the available metrics, see "Metric Category and Metric drop-down menus" on page 84.
Metric Category	A list of the metrics that are available for the selected array. For a complete list of the available categories, see "Metric Category and Metric drop-down menus" on page 84.
Remove	Click to remove a highlighted metric from the chart.
Resources	A list of possible components to chart based on the Array/Group and Metric selected.
Selected Metrics	The metrics that you have selected to display on your chart.

Table 26 Charts Screen Components (continued)

Component	Description
Set Range	Click to filter the data by time at the start of the query.
Set Times	Click to filter the dta within a specific start and end time (up to 20 weeks), and frequency for a specific time zone.
Show Chart	Click to activate the chart for your selected metrics.

Components of the Performance History screen

The following components appear in the Performance History screen. Click **Show Chart** in the Charts screen to display the Performance History screen.

Table 27 Performance History Screen Components

Component	Description
Back/Forward (buttons)	Use these four buttons to display data points not currently displayed on the chart. These buttons are available when the total data points retrieved exceed the maximum data points displayed setting.
Bar Chart	This view showsparallel bars that are graphed side by side. The parallel display is useful for comparing items within the same time period. Select two- or three-dimensional views.
Chart Style (drop-down menu)	A list of the chart styles that are available for your report.
Date/Time Filter (button)	Click this button to specify the start and end times for the sets of data that you want displayed.
Line Chart	This view illustrates the data points.
Max Data Points Displayed (drop-down menu)	A list of the maximum number of data points that are available for your report.
Stackable Chart	This view shows stacked bars that are graphed on top of each other. Use the stacked display to compare totals between different time periods. Select two- or three-dimensional views.
Start Updating	When updating is enabled, the system regularly checks the database for new data. If new data is found, the screen is updated with the newest data point added to the right side of the graph. All other data points are shifted one column to the left, and the far left column is removed. **NOTE:** If the chart contains metrics from different arrays, **Start Updating** is disabled.
Total Data Points Retrieved	The total number of data points retrieved for this chart. If this number exceeds the maximum data points display setting, use the back and forward buttons to view data points not currently displayed.

15 Performance Estimator

Introduction

Use the Performance Estimator screen to determine the optimal performance of your arrays based on the loads that you specify by configuring the RAID groups. Subsystem configuration parameters can be rapidly entered, and the results are accurate to within 20%. Performance Estimator focuses on RAID groups, rather than on LDEVs or LUNs.

NOTE: This feature of Performance Advisor XP (PA XP) is available only when HP StorageWorks Command View XP in installed. If the array is not managed by Command View XP, Performance Estimator will not work.

NOTE: Performance Estimator does not support the XP12000 array.

CAUTION: The numbers displayed are only an estimate. Results shown are based on readings taken in a controlled environment. HP cannot guarantee the results in your data center.

NOTE: Standalone PA XP management stations can share Command View XP (CV XP) data. To share data, CV XP and PA XP must be installed together on at least one management station, and the CV XP Data Propagation feature must be set up to send CV XP data to the standalone PA XP management station. To set up the CV XP Data Propagation feature, go to the Database Configuration screen on the Configuration tab. The online help for the Database Configuration screen provides instructions for setting up the CV XP Data Propagation feature.

The following illustrations show the Performance Estimator screen.
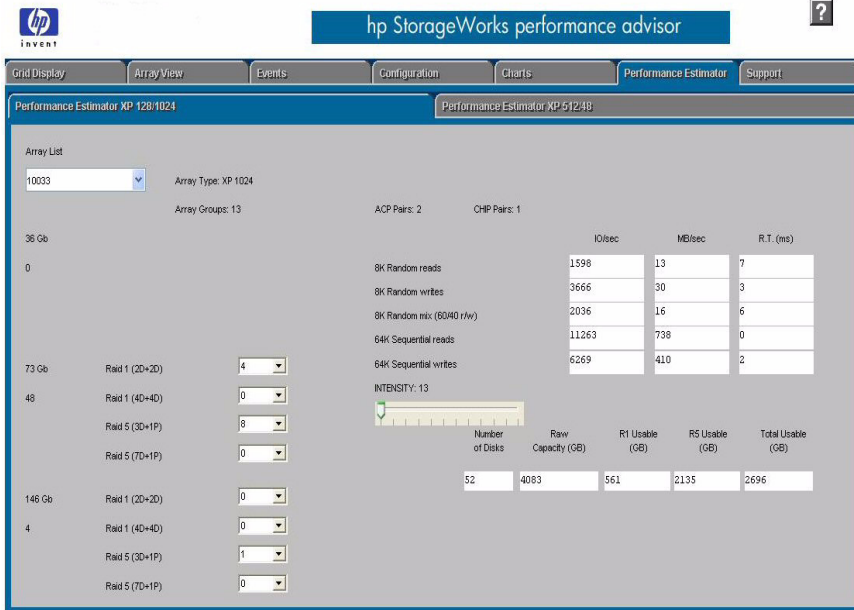
Figure 39 Performance Estimator XP 128/1024
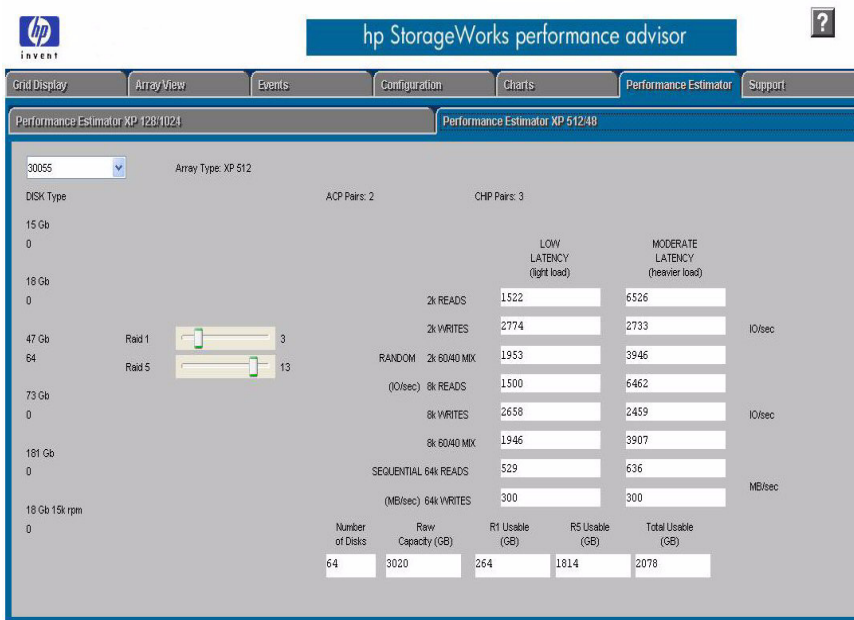
Figure 40 Performance Estimator XP 256/512/48
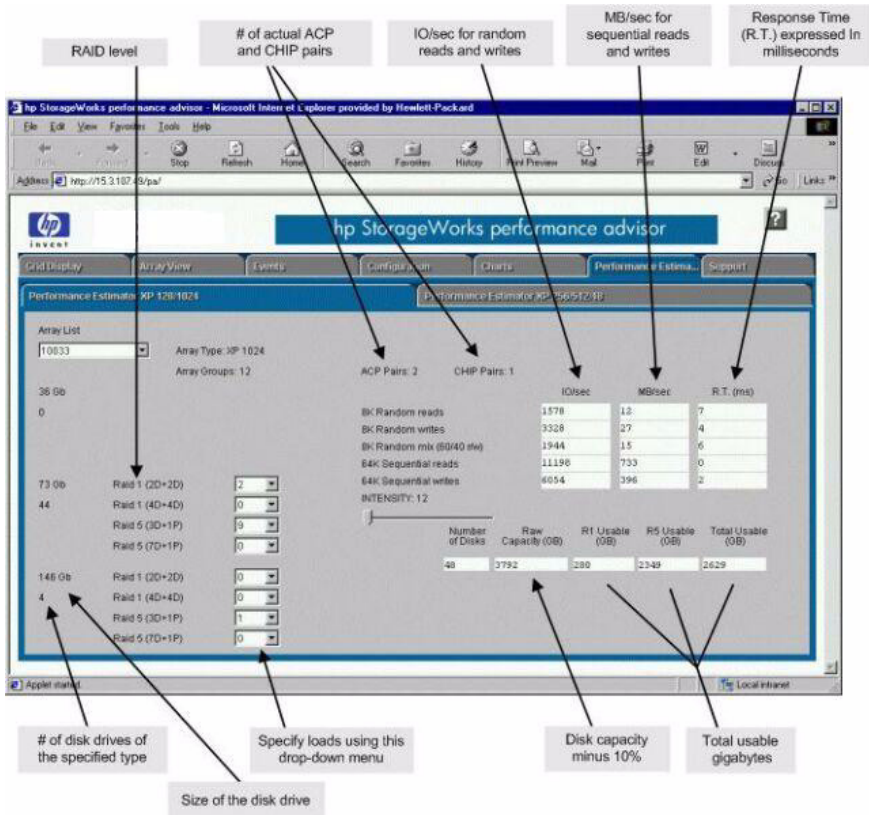
Figure 41 Performance Estimator features

> **NOTE:** For best results, use Internet Explorer on Windows, and use Netscape Navigator 7.0 on HP-UX 11.11.

Using the Performance Estimator screen

To use Performance Estimator, follow these steps:

1. Select the desired array in the **Array List** drop-down menu.

2. Select items in the RAID drop-down menus. After you make your selections, a reading appears. The fields on the right side provide results for low latency (light loads and less delays) and moderate latency (heavier loads and increased delays).

> **NOTE:** Currently, Performance Estimator does not support 146 GB drives on the XP512 array. Therefore, no performance data for those drives will be available. Any performance numbers that might be displayed belong to array groups other than those with 146 GB drives.

Components of the Performance Estimator screen

The following components appear in the Performance Estimator screen.

Table 28 Performance Estimator Screen Components

Component	Description
ACP Pairs	The number of Array Control Processor (ACP) pairs.
CHIP Pairs	The number of Client Host Interface Processor (CHIP) pairs.
Disk Type	The number of gigabytes available on the drive.
Low Latency	Refers to a light load with less delay.
Moderate Latency	Refers to a heavier load with greater delay.
RAID 1	A RAID 1 "array group" consists of four disks (2D + 2P). Usable capacity is 50% of raw capacity.
RAID 5	A RAID 5 "array group" consists of four disks (3D + 1P). Usable capacity is 75% of raw capacity.
RAID Group Split	Use this field to adjust the load and gather performance estimates.
Raw Capacity	Raw capacity is obtained from disk capacity minus 10%.
R.T. (ms)	Response time as expressed in milliseconds.

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