HP StorageWorks Command View EVA user guide

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Preface

About this guide

This guide describes how to configure and use the HP Command View EVA user interface to manage and monitor HP StorageWorks Enterprise Virtual Arrays (EVAs). Topics include:

- Configuring your browser
- Logging into the user interface
- Initializing arrays
- Managing user access (passwords, licenses)
- Configuring and managing events

This guide also describes how to use HP StorageWorks Command View EVAPerf.

Intended audience

This guide is intended for HP Command View EVA and HP Command View EVAPerf users and administrators.

Prerequisites

Using this guide requires basic knowledge of:

- Storage area networks (SAN)
- SAN fabrics
- HP StorageWorks Enterprise Virtual Array
- Operating systems in your EVA and EVA management configuration

This guide assumes HP Command View EVA is installed on a supported management server.

Related documentation

The following documents provide additional information about this and related products:

- *HP StorageWorks Command View EVA installation guide*
- *HP StorageWorks Command View EVA compatibility reference*
- *HP StorageWorks Command View EVA release notes*
- HP StorageWorks Command View EVA online help (accessible from the HP Command View EVA user interface)
- *HP StorageWorks Enterprise Virtual Array user guide*
- *HP StorageWorks Continuous Access EVA administrator guide*

You can find these documents on the following web sites:

- HP Command View EVA
  http://h18006.www1.hp.com/products/storage/software/cmdvieweva/index.html
- HP Continuous Access EVA
  http://h18006.www1.hp.com/products/storage/software/conaccesseva/index.html
- HP Enterprise Virtual Array
  http://h18006.www1.hp.com/storage/arraysystems.html

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 • 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 • Commands
`Monospace, italic font`	• Code variables • Command line variables

△ 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.

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: http://www.hp.com/go/e-updates.

- Subscribing to this service provides you with e-mail 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.

Service tools

HP is constantly enhancing its service tools to keep pace with new product introductions. It is imperative that you check the service tools web site for the latest available downloads and install them on your system. This will ensure that the system tools work with your HP products effectively and efficiently. You can locate the services tools at the following web site: http://h18000.www1.hp.com/support/svctools/.

HP-authorized reseller

For the name of your nearest HP-authorized reseller:

- In the United States, call 1–800–282–6672.
- Elsewhere, visit the HP web site: http://www.hp.com. Then click **Contact HP** to find locations and telephone numbers.

Helpful web sites

For other product information, see the following web sites:

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

Providing feedback

We welcome your feedback!

For HP Command View EVA, please mail your comments and suggestions to CVfeedback@hp.com.

For HP Business Copy EVA and HP Continuous Access EVA, please mail your comments and suggestions to EVAReplication@hp.com.

1 Getting started

This chapter provides an overview of HP Command View EVA and describes procedures to start and configure the user interface after you install the software. It also provides an overview of the user interface layout and organization.

Overview

HP Command View EVA is the graphical user interface through which you can configure, manage, and monitor the Enterprise Virtual Array (EVA). HP StorageWorks Storage System Scripting Utility (SSSU) is a command line interface that also allows you to configure and control EVA arrays. Use the graphical user interface for simple or initial configuration tasks. Use SSSU to script and run repetitious and complex configuration tasks.

Before you begin, you must have installed HP Command View EVA on at least one of the following management server types:

- HP OpenView Storage Management Appliance (SMA)
- General-purpose server
- Dedicated management server
- HP ProLiant Storage Server

Each installation of HP Command View EVA software on a management server is called a management agent.

The software enables you to:

- Initialize the array.
- Create, modify, and monitor disk groups, virtual disks, logical unit numbers (LUNs), snapshots, and snapclones.
- Configure and monitor physical subsystem components, such as controllers, physical disks, power supplies, blowers, and network connections.
- Configure and view controller logs and events.

Configuring browser settings

HP Command View EVA requires certain browser settings to operate properly. This section describes the recommended browser settings for Internet Explorer and Mozilla. Ensure your browser is configured as described in this section to ensure that your view of HP Command View EVA is properly configured.

Internet Explorer settings

HP recommends that you configure your management server with the security settings appropriate to your environment, and browse into the management server from a client machine using Internet Explorer settings appropriate for HP Command View EVA. In Windows environments, you may not be able to achieve the proper Internet Explorer settings on a management server with Microsoft's IE Enhanced Security Configuration (IEESC) or other policy-enforced settings installed. If you are browsing from an IEESC-configured management server, you must uninstall IEESC and manually configure Internet Explorer with the required HP Command View EVA browser settings.

Table 2 describes the browser settings for Internet Explorer. The settings are not all-inclusive; only those settings that are applicable to HP Command View EVA are listed. If a setting appears in bold, it is particularly important to configure the setting as described.

Table 2 Internet Explorer settings

Menu option	Setting	Value
View	Text Size	Medium (This setting may interact with your screen resolution setting. If Medium causes distortion of HP Command View EVA page layouts, select a text size that enables text to fit appropriately within tables in the Content pane.)
Tools > Internet Options > General		
Temporary Internet Files > Settings	**Check for newer versions of stored pages**	• **Automatically—for a homogeneous EVA environment (no legacy arrays)** • Never—for a heterogeneous EVA environment
	Amount of disk space to use	**10 MB** (minimum)
Colors	Use Windows colors	Selected
	Use hover color	Selected
Fonts	Language script	Latin-based
Tools > Internet Options > Security > Local Intranet > Custom Level		
Downloads	Automatic prompting for file downloads	Enable
	File download	**Enable**
	Font download	Enable
Java VM	Java permissions	Low safety
Miscellaneous	Access data sources across domains	Prompt
	Allow META REFRESH	**Enable**
	Allow scripting of Internet Explorer Web browser controls	Enable
	Allow script-initiated windows without size or position constraints	Enable
	Allow Web pages to use restricted protocols for active content	Prompt
	Display mixed content	**Enable**
	Open files based on content, not file extension	Enable
	Software channel permissions	Low safety
	Submit nonencrypted form data	**Enable**
	Use pop-up blocker	**Disable**
	Userdata persistence	Disable
	Web sites in less privileged web content zone can navigate into this zone	Enable
Scripting	Active scripting	Enable
	Scripting of Java applets	Enable
User authentication	Logon	Automatic logon only in Intranet zone

Menu option	Setting	Value
Tools > Internet Options > Privacy		
Settings	Accept All Cookies	Bar at the very bottom of the scale
	Pop-up Blocker	Not selected
Tools > Internet Options > Connections		
Local Area Network (LAN) Settings	**Configure to enable browsing to the management server on which HP Command View EVA is installed.**	**Settings will vary based on your local network configuration.**
Tools > Internet Options > Advanced		
Browsing	Disable script debugging (Internet Explorer)	Selected
	Disable script debugging (Other)	Selected
	Display a notification about every script error	Not selected
	Enable third-party browser extensions (requires restart)	Selected
	Enable visual styles on buttons and controls in web pages	**Selected**
	Reuse windows for launching shortcuts	**Not selected**
	Show friendly HTTP error messages	Selected
Multimedia	**Enable Automatic Image Resizing**	**Selected**
	Play animations in web pages	**Selected**
	Show pictures	Selected
	Smart image dithering	Selected
Security	Check for server certificate revocation	Not selected
	Check for signatures on downloaded programs	Selected
	Do not save encrypted pages to disk	**Not selected**
	Use SSL 2.0	**Selected**
	Use SSL 3.0	**Selected**
	Warn about invalid site certificates	**Selected**
	Warn if changing between secure and not secure mode	**Selected**
	Warn if forms submittal being redirected	**Selected**
VM	JIT compiler for virtual machine enabled (requires restart)	Selected

Mozilla browser settings

Table 3 describes the browser settings for Mozilla. The settings are not all-inclusive; only those settings that are applicable to HP Command View EVA are listed. If a setting appears in bold, it is particularly important to configure the setting as described.

The recommended browser settings should enable your browser to properly display HP Command View EVA fonts and page layouts. Many UNIX environments however, do not handle fonts and page layouts consistently. You may have to make adjustments for the most readable HP Command View EVA page layouts. For example, if your browser is set for large fonts, it may cause HP Command View EVA's property tables to appear crowded and unreadable. You may want to reduce the font size for your browser.

> **NOTE:**
> Tool tips are not available in Mozilla.

Table 3 Mozilla browser settings

Menu option	Setting	Value
Edit > Preferences > Appearance		
Fonts	Allow documents to use other fonts:	Selected
Color	When a web page specifies its own colors and background, always use the colors and background specified by the web page	Selected
Edit > Preferences > Privacy & Security		
Cookies	**Cookie Acceptance Policy**	**Allow all cookies**
	Cookie Lifetime Policy	**Accept cookies normally**
Images	**Image Acceptance Policy**	**Accept all images**
	Animated images should loop	**As many times as the image specifies**
Pop-Up Windows	**Block unrequested pop-up windows**	**Not selected**
Forms > Forms Manager	Save form data from web pages when completing forms	Selected
Passwords > Encrypting versus Obscuring	**Use encryption when storing sensitive data**	**Not selected**
SSL > SSL Protocol Versions	**Enable SSL version 2**	**Selected**
	Enable SSL version 3	**Selected**
SSL > SSL Warnings	**All options**	**Not selected**
Validation > OCSP	**Set Mozilla to use OCSP as follows**	**Do not use OCSP for certificate validation**
Edit > Preferences > Advanced		
Features that help interpret web pages	**Java**	**Selected**
Scripts & Plug-Ins	**Enable Javascript for Navigator**	**Selected**
	Allow scripts to	**Select all options**

Menu option	Setting	Value
Cache > Set cache options	**Cache**	**10 MB**
	Compare the page in cache to the page on the network	• **When the page is out of date—for a homogeneous EVA environment (no legacy arrays)** • Never—for a heterogeneous EVA environment (with legacy arrays)
Link Pre-Fetching	Prefetch web pages when idle, so that links in web pages designed for prefetching can load faster	Not selected
Configure Proxies to Access the Internet	**Configure to enable browsing to the management server on which HP Command View EVA is installed.**	**Settings will vary based on your local network configuration.**
HTTP Networking > Direct Connection Options	**HTTP 1.0**	**Selected**
	Keep alive	**Selected**
HTTP Networking > Proxy Connection Options	**HTTP 1.0**	**Selected**
	Keep alive	**Selected**

Using the right-click menu

In some browser configurations, the right-click menu is disabled. If the right-click menu is enabled in your browser configuration, do not use the following Internet Explorer right-click menu options (or the Mozilla equivalents) when using the HP Command View EVA interface:

• Open Link in New Window
• Save Target As
• Set as Desktop Item
• Add to Favorites

Selecting any of these right-click menu options redirects you to the user interface without the proper context and may cause incorrect information to appear.

Refreshing the browser

When you upgrade HP Command View EVA to load the latest client code, refresh the browser when the upgrade is complete:

• In Internet Explorer, press **Ctrl+F5**.
• In Mozilla, press **Shift** and click **Reload** simultaneously.

Starting HP Command View EVA

To start HP Command View EVA, you can browse to either the SMA or the other management server types (general-purpose server, dedicated management server, or ProLiant Storage Server) from a client machine.

Storage Management Appliance

To start HP Command View EVA that is installed on the SMA:

1. Open the browser.

2. Using the IP address or server name of the SMA as the *host_name*, enter one of the following and press **Enter**:

    ```
    https://host_name
    ```

    The network login dialog box opens.

3. Enter the user name and password that you use to access the SMA and click **OK**.

    The Storage Management Appliance home page opens.

4. Select **Devices** from the home page.

    The Devices page opens.

Figure 1 Devices page

5. Select **command view eva**.

    The HP StorageWorks Command View EVA user interface opens.
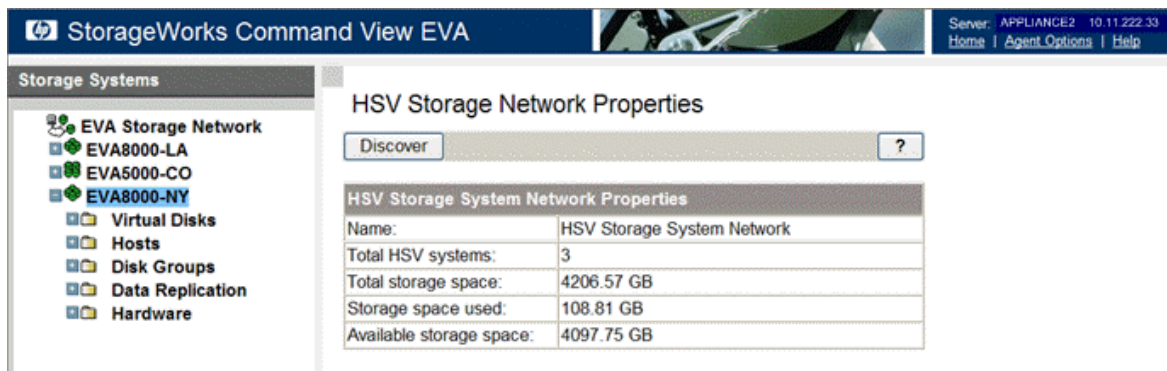
Figure 2 HP Command View EVA user interface
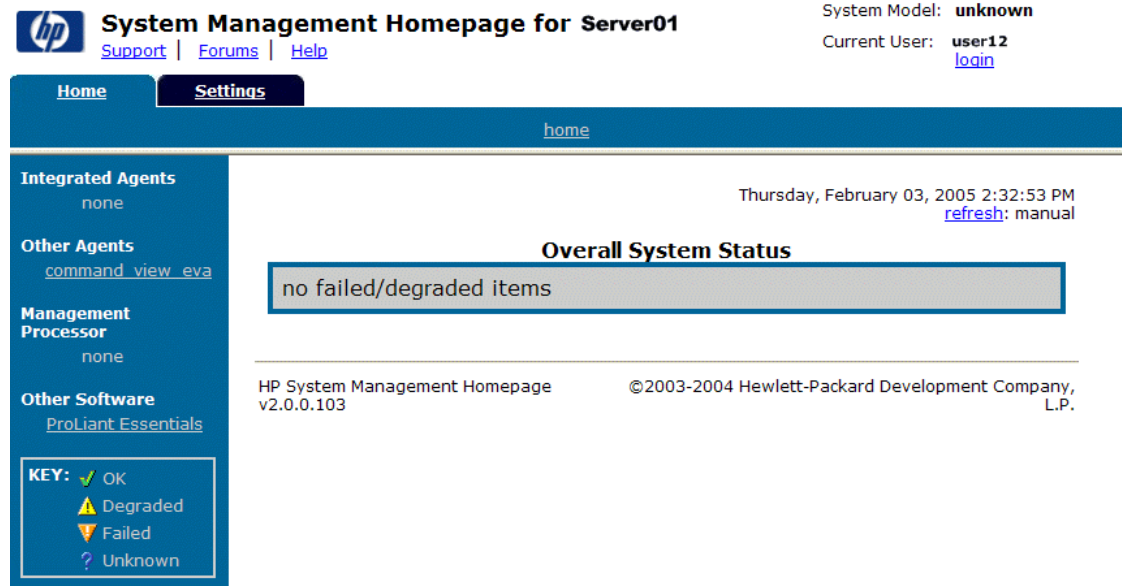
Other management servers

To start HP Command View EVA that is installed on any of the other management server types:

1. Open the browser.

2. Using the server name or IP address as the *host_name*, enter the following and press **Enter**:

`https://host_name:2381`

The System Management Homepage window opens.

Figure 3 System Management Homepage

3. Under Other Agents in the left column, right-click **command view eva** and select **Open in a new window**.

> 📝 NOTE:
>
> If **command view eva** does not appear under Other Agents, restart the HP Command View EVA service.

4. Select **Yes** if any security messages appear.

The login window for the System Management Homepage opens.

Figure 4 System Management Homepage login window

5. Enter the user name and password you use to access the HP Command View EVA user interface and click **LOGIN**. The login information you enter depends on the following:

- If you set up the management server using SmartStart 7.1, the default user is **administrator**. The password is the password you entered when the HP Command View EVA API was installed during the management server setup.
- If you set up the management server using SmartStart 7.2, enter the operating system user name and password of an administrator account on the management server.

The HP StorageWorks Command View EVA user interface opens.

User interface organization

The HP Command View EVA user interface contains the following panes:

- Session
- Navigation
- Content

Session pane

The Session pane contains the following information:

- Software application name (HP Command View EVA)
- Name and IP address of the SMA or other management server to which you are connected
- The following links:

  - **Home**—Displays the home view of the HP Command View EVA user interface with the trees collapsed.
  - **Agent Options**—Displays the Management Agent Options window, which contains options to manage and customize the operation of the management agent.
  - **Help**—Opens the HP Command View EVA online help window.

Figure 5 Session pane

Navigation pane

The Navigation pane is an expandable tree of folders that represent the components in the logical structure of the array. This structure enables you to configure and monitor the following components:

- Virtual disks
- Hosts
- Disk groups
- Data replication
- Hardware

NOTE:

You can configure and manage multiple arrays within the HSV Storage Network.
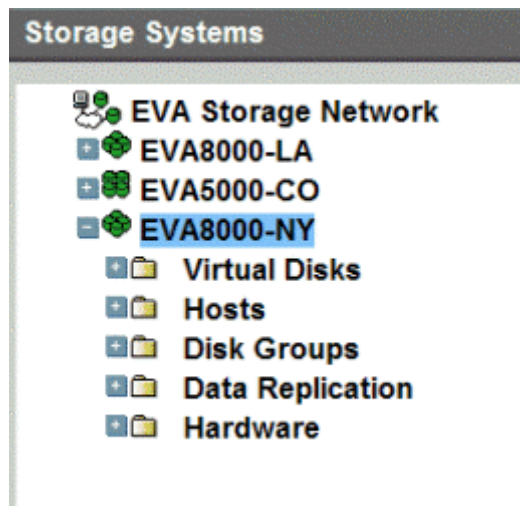
Figure 6 Navigation pane

Content pane

The Content pane displays information related to the component you selected in the Navigation pane and presents actions you can perform.

The Page Help (?) icon, located in the upper right corner of the Content pane, displays help for the current page.

HSV Storage Network Properties

Discover		?

HSV Storage System Network Properties	
Name:	HSV Storage System Network
Total HSV systems:	1
Total storage space:	135.14 GB
Storage space used:	1.05 GB
Available storage space:	134.09 GB

Figure 7 Content pane

Initializing arrays

When you install an EVA, it appears as an `Uninitialized Storage System`. Initializing an array makes it ready for use, binds the controllers together as an operational pair, and establishes preliminary data structures on the array. Initializing also sets up the first disk group, which is called the Default Disk Group. If you are upgrading an existing version of HP Command View EVA, the arrays remain initialized and any other existing components are retained.

If WEBES is installed on the management server, see the WEBES documentation for instructions about adding entitlement details for the new array. For more information, go to the following web site: http://h18000.www1.hp.com/support/svctools.

NOTE:

When you initialize (or reinitialize) an array, you must restart the HP Command View EVA service on any standby management servers. See "Stopping and starting the HP Command View EVA service" and "Using multiple management servers to manage arrays" for more information.

The minimum tasks you must perform when initializing an array are:

- Entering a name for the array.
- Entering the number of disks to be included in the default disk group.
- Setting the drive type to **Near-online**.

The other tasks you can complete when you select Advanced Options are:

- Setting the drive type.
- Setting the array date and time.
- Entering a console LUN ID.
- Selecting a disk failure protection level.
- Entering comments.

NOTE:

Setting the drive type to **Near-online** is only required if the array you are initializing contains near-online disks.

See the online help for instructions to complete all tasks.

Viewing array properties

When you select an initialized array in the Navigation pane, the Initialized Storage System window opens. This window displays the following information about the array:

- **Identification**—Displays the name, node world wide name, and unique universal identifier (UUID) of the array. You can edit the Name box in this window.
- **System**—Displays the controller type, firmware version, console LUN ID, and time. You can edit the Console LUN ID box in this window.
- **Storage capacity**—Lists the total, used, and available space on the array.
- **Condition/state**—Displays the operational state of the array. The states are Good, Attention, and Failed.
- **Licensed features**—Indicates the EVA software you are licensed to use (for more information, see "Managing licenses"):

  - Basic—HP Command View EVA
  - Snapshot—HP Business Copy EVA
  - Data replication—HP Continuous Access EVA
- **System memory**—Displays the amount of control cache, data cache, and total cache available on the array.
- **Policies**—Displays the policy settings for:

  - Device addition—Governs whether newly installed disks are manually or automatically added to a disk group.
  - Disk replacement delay—The amount of time between a disk failure and the point at which the controllers incorporate an unused disk into the disk group to replace it. The minimum setting is one minute. Disk replacement should not being immediately in case the failure occurred because of a temporary condition.
- **Comments**—Displays comments entered when the array was initialized. You can add or edit the Comments box in this window.

NOTE:

If you modify a box in this window, be sure to click **Save changes** before you exit this window.

Initialized Storage System Properties

| Save changes | System options | View events | Code load | ? |

Refresh

Identification

| Name: | EVA8000-LA |

Node World Wide Name:

5005-08B4-0100-ECE0

UUID:

6005-08b4-0010-0ece-0000-9000-0375-0000

System

Type:	HSV210
Version:	5000
Console LUN ID:	0
Time:	22 Jun 2005 12:57:09

Storage Capacity

Total:	3680.80 GB
Used:	189.01 GB
Available:	3491.78 GB

Condition/State

| Operational state: | ⚠ Attention (Initialized) |

Licensed features

Basic:	Yes
Snapshot:	No
Data replication:	No

System Memory

Policy:	4096 MB
Cache:	4096 MB
Total:	8192 MB

Policies

| Device addition: | Manual |
| Disk replacement delay: | 1 | mins |

Comments

Figure 8 Initialized Storage System Properties window

From the Initialized Storage System Properties window, you can:

- Set additional array options, such as the device addition policy and the array date and time (see the online help for instructions)
- View events (for more information, see "Managing events")
- Upgrade the controller software (code load)

Uninitializing an array

Uninitializing an array is atypical. You should only uninitialize when you wish to completely clear your array of data.

> △ **CAUTION:**
>
> If you uninitialize an array, you will lose all virtual disks, associated data, and host presentations that you have created for the array.

See the online help for instructions.

Updating the controller software

For more information and instructions for updating the controller software, see the *HP StorageWorks Enterprise Virtual Array updating product software instructions*.

Shutting down the array

To shut down the array:

> △ **CAUTION:**
>
> Ensure that any active commands or functions (HP Storage System Scripting Utility, HP Continuous Access EVA, HP Business Copy EVA, or HP Replication Solutions Manager) have completed before you begin this procedure. Also, be aware that this procedure may affect the host applications accessing virtual disks on the array.

1. Select the appropriate array in the Navigation pane.

   The Initialized Storage System Properties window for the selected array opens.

2. Click **System options**.

   The System Options window opens.

3. Click **Shut down**.

   The Shutdown Options window opens.

4. Under System Shutdown, click **Power down**. If a delayed shutdown is desired, enter a value in the Shutdown delay box to set a time delay (in minutes) to preface system shutdown initiation.

   The controllers complete an orderly shutdown and then power off. Then, the disk enclosures power off. Wait for the shutdown to complete.

5. Turn off the power switch on the rear of each controller.

6. Turn off the circuit breakers on both of the rack power distribution units (PDU).

7. If your management server is an SMA and you are not using it to manage other storage arrays, shut down the SMA. From the SMA user interface, click **Settings > Maintenance > Shutdown**.

Starting the array

To start the array:

1. Verify that each fabric switch to which the controllers are connected is powered up and fully booted.

    The LED power indicator on each switch should be on. If you must power up the SAN switches, wait for them to complete their power on boot process before proceeding. This may take several minutes.

2. If the management server you shut down is an SMA, power it on and wait for it to completely boot. Verify the SMA is running by logging into it using the web interface.

    📝 **NOTE:**

    Before applying power to the rack, ensure that the power switch on each controller is off.

3. Power on the circuit breakers on both rack power distribution units (PDUs). Verify that all drive enclosures are operating properly. The status indicator and the power indicator should be on (green).

4. Wait three minutes and then verify that all disk drives are ready. The drive ready indicator and the drive online indicator should be on (green). If the storage system does not include back-end Fibre Channel (FC) loop switches, the drive fault indicator on the bay 1 disk drive in all the drive enclosures may be on.

5. Power on the upper controller. It assumes the role of primary controller.

6. Wait 10 seconds and then power on the lower controller. It assumes the role of secondary controller.

7. Verify that the operator control panel (OCP) on each controller displays the array name and world wide ID.

8. Start HP Command View EVA and verify connection to the array. If the array is not visible, click **HSV Storage Network** in the Navigation pane and then click **Discover** in the Content pane to discover the array.

    📝 **NOTE:**

    If the array is still not visible, reboot the management server to re-establish the communication link.

9. Check the array status using HP Command View EVA to ensure everything is operating properly. If any status indicator is not normal, check the log files or contact your HP service provider for assistance.

Stopping and starting the HP Command View EVA service

To stop the HP Command View EVA service:

1. Open the Services window on the management server.

2. Right-click the HP Command View EVA service and select **Stop**.

To start the HP Command View EVA service:

1. Open the Services window on the management server.

2. Right-click the HP Command View EVA service and select **Start**.

2 Configuring HP Command View EVA

A *management agent* is the installation of the HP Command View EVA software on a management server. The Management Agent Options menu (located in the Session pane) contains the following tasks that you may perform most often when using HP Command View EVA:

- Set or change password access to the arrays, including remote access
- Enter license keys for related software
- Set viewing options for the user interface, including page footers

This chapter describes how to configure the management agent for use. To access the Management Agent Options menu, select **Agent Options** in the Session pane.

Managing passwords

A password is a security feature that allows you to use your HP Command View EVA session to access specified arrays. A management agent can control multiple arrays, and multiple management agents can control a single array, but only one agent can actively control an array at a time. The password you enter in HP Command View EVA must match the array password that is entered on the operator control panel (OCP) of the controller. See the *HP StorageWorks Enterprise Virtual Array user guide* for information about using the OCP panel.

The password functions are:

- Enable
- Change
- Disable

Enabling passwords

If you have already set the array password on the OCP panel, you must enable it in HP Command View EVA to see that array. If the array password has not been set on the OCP panel, you can use the Enable function to create that array password. However, the password is not enabled until you enter it on the OCP.

To enable a password:

1. From the Management Agent Options window, select **Storage system password access**.

   The Storage System Password Access window opens.

2. Click **Enable**.

   The Enable Password Access to a Storage System window opens.

3. Select the array to be enabled in the **Storage System World Wide Node Name List** box.

   NOTE:

   Only world wide names that do not have an enabled password are displayed.

4. Enter the array password (eight numeric characters) in the **Password** box. Enter the password again in the **Confirm Password** box.

NOTE:

This password must match the one set on the OCP.

5. Click **Enable Password**.

   The Enable password access dialog box opens.

6. Click **OK**.

   A status window opens, indicating success or failure.

7. Click **OK** to return to the Storage System Password Access window.

Changing passwords

If you change the array password on the OCP panel, you must change it in HP Command View EVA to ensure management agent access to the array.

To change a password:

1. From the Management Agent Options window, select **Storage system password access**.

   The Storage System Password Access window opens.

2. Click **Change**.

   The Change a Storage System Password window opens.

3. Select the array to be changed in the **Storage System World Wide Node Name List** box.

4. Enter the new password, previously changed on the OCP panel of the array controller in the **Password** box. Enter the password again in the **Confirm Password** box.

NOTE:

This password must match the one set on the OCP.

5. Click **Change Password**.

   The Change password access dialog box opens.

6. Click **OK**.

   A status window opens, indicating success or failure.

7. Click **OK** to return to the Storage System Password Access window.

Disabling passwords

To disable an array from the list of arrays that the management agent can access:

1. From the Management Agent Options window, select **Storage system password access**.

   The Storage System Password Access window opens.

2. Click **Disable**.

   The Disable Password Access to Storage System window opens.

3. Select the array to be deleted in the **Storage System World Wide Node Name List** box.

4. Click **Disable Password**.

   The Disable password access dialog box opens.

5. Click **Yes** to disable access.

   A status window opens.

6. Click **OK** to return to the Storage System Password Access window.

Managing remote access passwords

The **Remote access password options** function enables you to change the HP Command View EVA API user name and password. Applications such as SSSU and SMI-S EVA use this API for authentication. This API password is established in one of the following scenarios:

- If you set up the management server using SmartStart 7.1, you can choose to install the HP Command View EVA API and enter a user name and password when prompted. If you choose note to install the API, it is installed automatically when you install HP Command View EVA. The default user name is administrator, but you will be prompted to enter a password.

- If you set up the management server using SmartStart 7.2, and installed HP Command View EVA for the first time, the API is automatically installed with a random, unknown password. The *HP StorageWorks Command View EVA installation guide* lists instructions to reset the API password during HP Command View EVA installation.

If you have forgotten the API password, or you install another application after installing HP Command View EVA, you can use the **Remote access password options** feature in the HP Command View EVA user interface to change it.

If your management server is running SmartStart 7.1, follow this procedure:

1. From the Management Agent Options window, select **Remote access password options**.

The System Management Homepage login window opens.

2. Enter your user name and password and click **OK**.

The System Management Homepage window opens.
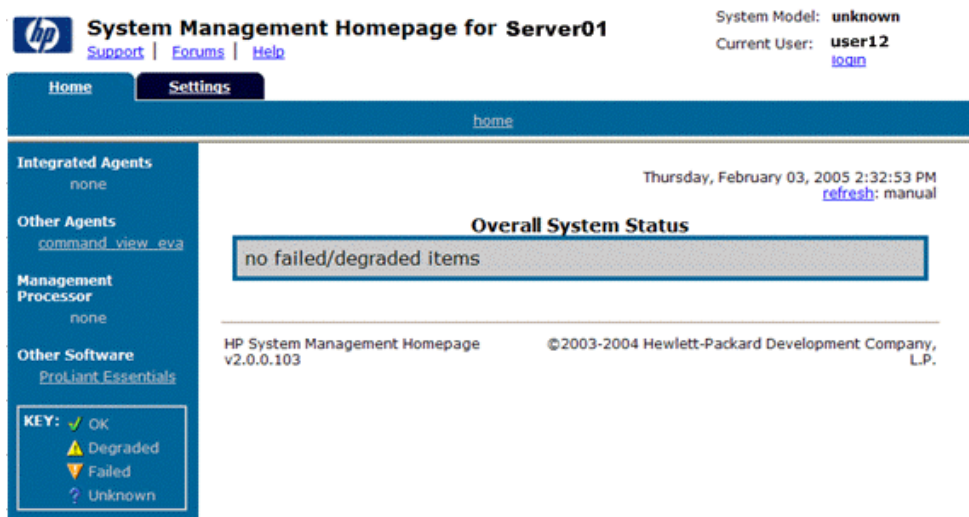
Figure 9 System Management Homepage

3. Click **Settings**.

The Settings window opens.
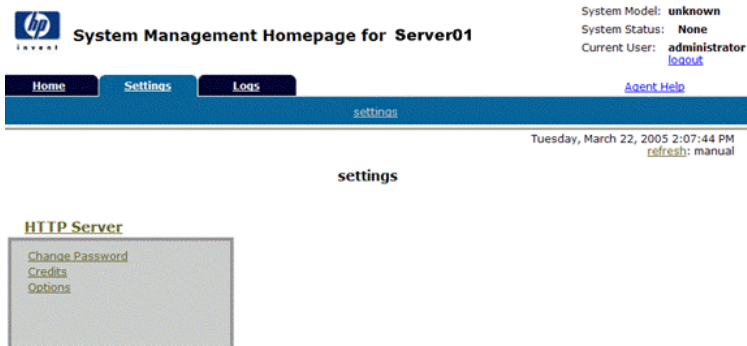
Figure 10 Settings window

4. In the HTTP Server box, click **Change Password**.

   The Change HTTP Server Password window opens.

Figure 11 Change HTTP Server Password window

5. Select the user and enter a new password in the **User** and **New Password** boxes. Enter the new password again in the **Confirm Password** box.

6. Click **Change Password**.

   A status window opens. The new password should now be effective.

If your management server is running SmartStart 7.2, follow this procedure:

1. Open the Services window on the management server on which HP Command View EVA is installed. If you are not performing this procedure from that management server, use Terminal Services to enable remote access.

2. Right-click the **System Management Homepage 2.0** service and select **Stop**.

3. Complete steps 1 through 6 from the procedure for SmartStart 7.1.

4. Return to the Services window.

5. Right-click the **System Management Homepage 2.0** service and select **Restart**.

6. Select **HP Command View EVA** and restart the service.

   The new password should now be effective.

Using multiple management servers to manage arrays

If you have configured two or more management servers to manage arrays, you can change the management server that is currently managing a specific array.

To change the management server managing an array:

1. Log in to HP Command View EVA on the management server that you want to manage the array.

2. Click **Discover** and then click **OK**. The array icons in the Navigation pane appear in gray to indicate that another server is managing the array.

3. Select an array in the Navigation pane. The Storage System Managed by Another Agent window opens.

Figure 12 Storage System Managed by Another Agent window

4. Click **OK**. A message displays about assuming management of the array.
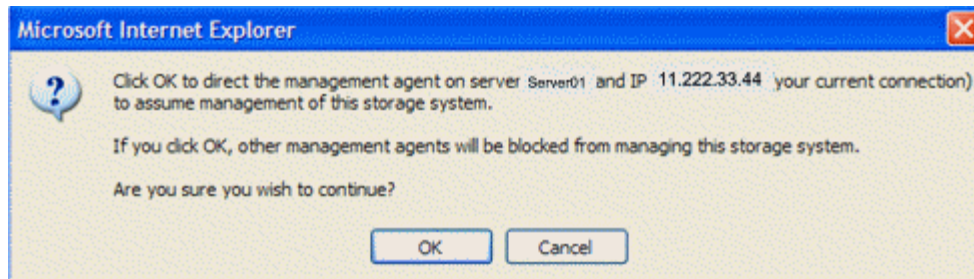
Figure 13 Assuming management of the array message

5. Click **OK**. The array icon in the Navigation pane becomes green to indicate that the server you are logged in to has control of this array. The color change may take time to occur.

6. If you wish to change management for another array, repeat steps 3 through 5.

If the management server now managing the array is in a Continuous Access environment, refer to the *HP StorageWorks Continuous Access EVA administrator guide* for information about coordinating active and standby management servers on multiple sites.

Managing licenses

A basic license key is not required to activate the Virtual Controller Software (VCS) firmware. However, the Command View EVA Licensed features box on the Initialized Storage System Properties window still contains a basic license entry and always displays `Yes`.

License keys are required for the array to operate with snapshot, snapclone, and data replication capabilities. A Business Copy EVA license key activates snapshot and Business Copy EVA functionality. A Continuous Access EVA license key activates data replication functionality. These licenses are sold as part of the individual product software kits. You can add either license before or after initializing the array.

Use the **Licensing Options** feature to:

- View previously entered license keys.
- Enter new license keys for EVA software, such as HP Business Copy EVA.

Viewing licenses

You can view all license keys known to the current management agent. This can include license keys entered through other management agents that previously managed the same arrays.

To view existing license keys:

1. Click **Agent Options** in the Session pane.

    The Management Agent Options window opens.

2. Click **Licensing options**.

    The Licensing Options window opens.

3. Click **View previously entered license**.

    The View License Keys window opens.

4. Click **Cancel** to return to the Licensing Options window.

Adding a license key

To avoid text entry errors, HP recommends that you copy and paste license keys from the e-mail message or online source. Be careful not to copy any non-ASCII characters. They can prevent license key validation.

For license keys received by e-mail, first set the default message format to ASCII. The method for changing the message format varies by e-mail application.

☼ **TIP:**

To change the Microsoft Outlook message format to ASCII:

1. Select **Tools** > **Options**.
2. Select the **Mail Format** tab.
3. Under Message format, select **Plain text**.
4. Click **OK**.

For license keys obtained from an online source, copy the license key into a file using a text editor such as Microsoft Notepad or Wordpad.

To enter a license key:

1. Click **Agent Options** in the Session pane.

   The Management Agent Options window opens.

2. Click **Licensing options**.

   The Licensing Options window opens.

3. Click **Enter new license key**.

   The Add a license window opens.

4. Copy *only* the license key text from the e-mail or online source. For example, copy the following text for an HP Business Copy EVA license key:

```
FEATURE HSV110-SNAPSHOT Compaq 3.0 permanent uncounted 22222222222F
\HOSTID=HSVWWN=5000-2FF2-5555-CC44 NOTICE="Authorization =
\BB080CREAMER12345678, Qty 1, QM-00NOT-ZZ2.1, Business Copy 2TB \for
VCS V2.0x and V3.0x LTU EVA5000"
```

   △ **CAUTION:**

   Do not copy any other text from the e-mail or online source, otherwise, the license key will be rejected by HP Command View EVA.

5. Paste the license key in the text box.

6. Click **Add license** to save the information.

7. In the Navigation pane of the user interface, select the icon for the array. This ensures that the license key is propagated to the array and is available to other management agents.

Setting user interface options

To set user interface options:

1. Click **Agent Options** in the Session pane.

   The Management Agent Options window opens.

2. Click **User interface options**.

   The User Interface Options window opens.

3. Edit or select the desired settings:

   - **Use wizards for creating Vdisks and hosts**—Select this check box to view the tasks for creating virtual disks (called Vdisks in the user interface) and hosts on multiple pages. If you do not select this check box, the tasks are presented on one page.
   - **Tree objects displayed**—Set the maximum number of objects that can be displayed in the Navigation pane. The default number of tree objects displayed is 100.

     If you have a small number of objects, set the **Tree objects displayed** value to a number higher than the number of objects in the SAN. This ensures that the management agent sends the complete tree structure to your browser when you select the tree.

     If you have more than 100 objects, set the **Tree objects displayed** value to a number lower than the number of objects in the SAN, such as 20 or 50. This optimizes performance and ensures that the management agent sends a limited number of objects to the browser when you select the tree. A special page with navigation buttons opens in the browser, enabling you to request other tree objects.
   - **Default operating system for new hosts**—Select an operating system from those listed in the drop-down menu. The selected operating systems is set as the default when you add a host.

4. Click **Save changes**.

Setting page footer message options

Use the Set Page Footer Message options to enter or edit a text message to display at the bottom of each Content pane for all browser sessions on the management server. The message can be a security message or can contain other applicable information. The maximum length is 64 characters and the text displays in red.

To set a page footer message:

1. Click **Agent Options** in the Session pane.

   The Management Agent Options window opens.

2. Click **Page footer message options**.

   The Set Page Footer Message window opens.

3. Enter text or edit the existing message in the text box.

4. Click **Save changes**.

   The new message appears in red text at the bottom of the Content pane.

Optimizing performance

Consider the following tips to optimize performance:

- If you installed HP Command View EVA on multiple servers, only use one server at a time to manage an array.
- Minimize the number of non-administrative users connected to the array.
- Only use one SSSU session at time in HP Command View EVA.
- Do not use the user interface if you are using SSSU to run controller failovers.

3 Using HP Command View EVA

Following are the common tasks that you use HP Command View EVA for:

- Check hardware status and health.
- Create disk groups.
- Add hosts.
- Create virtual disks.
- Present virtual disks to hosts.
- Create DR groups (optional).

When you install HP Command View EVA, an initial folder structure for an array is created in the Navigation pane. The initial folders are Virtual Disks, Hosts, Disk Groups, Data Replication, and Hardware. You can create subfolders to further organize and manage your hosts and virtual disks.

This chapter provides conceptual information about these tasks. See the HP Command View EVA online help for detailed procedures.

Hardware

The hardware is organized in folders for the rack, controller enclosures, and drive enclosures. You can drill down through each folder and view information about each component of the hardware. For example, within the controller enclosure, you can view general information, such as the manufacturer and model number, world wide node name, operating state, and available memory. You can also view details about the controller ports. See the *HP StorageWorks Enterprise Virtual Array user guide* for information about the displays and status indicators on the array.

Disk groups

A disk group is a set of physical disks that form storage pools from which virtual disks can be created. When you initialize an array, a default disk group is created. You can create additional disk groups for such needs as remote replication, but performance is generally better with one large disk group than with multiple small disk groups. See the *HP StorageWorks Enterprise Virtual Array user guide* for instructions to create multiple disk groups.

Hosts

Hosts connect to a fabric through Fibre Channel adapters (FCAs) and access storage through the array controllers. Use HP Command View EVA to add a host and make it known to an array. After a host is added, it must be online and connected to the fabric to write I/O to the array.

To add a host:

- The host does not have to be online to be added.
- Enter the name, IP address, Fibre Channel adapter (FCA) world wide name, and the operating system of the host. Enter comments, if desired.
- You can define any number of ports for a host.

Virtual disks

A virtual disk (called a Vdisk in the user interface) is a simulated disk drive created within a disk group. You can assign a combination of characteristics to a virtual disk, such as a name, redundancy level, and size.

Some operating systems require a logical unit number. You can change the OS unit ID when you create a virtual disk. For OpenVMS and Tru64 UNIX, enter a unique OS unit ID for each virtual disk.

Selecting a preferred path

When creating a virtual disk, you can select a preferred path. This means that host I/O to a virtual disk will go to the path you designate, as long as the paths to that controller are available. The preferred path settings are:

- None (default setting)
- Path A—Failover only
- Path B—Failover only
- Path A—Failover/failback
- Path B—Failover/failback

If you are running an operating system that requires Secure Path software (HP-UX, IBM AIX, Linux, Novell NetWare, Sun Solaris, or Microsoft Windows) and want to designate a preferred path, use the Failover only settings. The Failover/failback settings are not supported with Secure Path. The Failover only settings allow the host to control when a virtual disk moves to a preferred path. For example, if Path A is preferred, and that path becomes unavailable, Path B is used. The host will then return control to Path A when it becomes available.

If you are running an operating system that does not require Secure Path software (OpenVMS or Tru64 UNIX), all preferred path settings are supported. The Failover/failback settings allow the controller to manage the path movement of I/O to the virtual disk. All operating systems require a logical unit number.

NOTE:

If you are using DR groups, all virtual disk members in a DR group must be preferred to the same controller and host FCA port pair because they must fail over together. See the *HP StorageWorks Continuous Access EVA administrator guide* for more information about DR groups.

Presenting virtual disks to hosts

Presenting a virtual disk offers its storage to a host. To make a virtual disk available to a host, you must present it. You can present a virtual disk to a host during or after virtual disk creation. The virtual disk must be completely created before the host presentation can occur. If you choose host presentation during virtual disk creation, the management agent cannot complete any other task until that virtual disk is created and presented. Therefore, HP recommends that you wait until a virtual disk is created before presenting it to a host.

Creating containers

When you create a snapclone (a copy of a virtual disk), the first step is to allocate the same amount of space as the source virtual disk for the copy. Depending on the size of the source virtual disk, the space allocation may take several minutes to complete. However, you can allocate the required space before you create a snapclone, using a container, which is an empty virtual disk. Using this optional method is called creating a pre-allocated snapclone.

Creating a pre-allocated snapclone requires the following steps:

1. Create the container.
2. Clear the write cache.
3. Attach the container to the source virtual disk.

When you create a container, you assign a name to it, select a disk group, and select a Vraid level and size. That space is then reserved until you are ready to create the snapclone. You can create multiple containers to have ready when you need them.

Clearing the write cache means that you set the write cache policy of the source virtual disk (on the Virtual Disk window) to **write through** before you create the pre-allocated snapclone. This ensures that the controller writes data directly to the virtual disk and bypasses the cache while the host is writing data to the virtual disk. When you attach the container, you are copying the data from the source virtual disk to the container.

Snapshot and snapclone Vraid recommendations

For snapshots, only a Vraid level of equal or lower redundancy than the source virtual disk is allowed. For snapclones, a Vraid level with higher redundancy than the source is allowed. Table 4 shows the recommended Vraid selections for snapshots and snapclones based on the Vraid of the source virtual disk.

Table 4 Recommend Vraid selections for snapshots and snapclones

Source Vraid	Source redundancy level	Recommended snapshot Vraid	Recommend snapclone Vraid
Vraid0	Lowest	Vraid0*	Vraid0*, 5, 1
Vraid5	Medium	Vraid5	Vraid5, 1
Vraid1	Highest	Vraid1, 5	Vraid5, 1
*Source and destination virtual disks must be in the same disk group.			

The ability to create a snapshot or snapclone with less redundancy than the source virtual disk allows you to save space. You cannot create a snapshot with greater redundancy than its source because a snapshot contains only changed data and refers to the source for unchanged data. Consequently, if the source becomes inoperative, the snapshot also becomes inoperative. You can create a snapclone with greater redundancy than its source because a snapclone is an independent copy of the source.

Naming conventions

When creating names for arrays and other components, consider the following conventions:

- **Arrays**—Names may contain a maximum of 20 characters. The name may contain any printable character except for the following:

  ```
  < > | :   , * ?   " & + % / \
  ```

NOTE:

These characters are not allowed in any text box.

- **Objects**—Names may contain a maximum of 32 characters. Special characters are allowed, but spaces are not. Names are case-sensitive. For example, you can have two virtual disks named `Disk1` and `disk1`, but this is not recommended.

  With the exception of the DR group comment box, which is limited to 64 characters, all comment boxes allow a maximum of 128 characters.

- **Folders**—Organize data in folders when using the HP Command View EVA user interface. Use names and descriptions that are easily recognizable so all users can quickly locate and manage data. Those involved in disaster planning should know specific folder names and the type of information in each folder.

4 Managing events

This chapter describes how to manage events using HP Command View EVA.

Events overview

Events track the progress of actions, both normal and exceptional, that occur on the array. Examples of normal events are creating virtual disks or initializing an array. Examples of exceptional events are an incomplete function or a reduction in array capabilities. Normal events are more common than exceptional events.

You can use HP Command View EVA to configure and view these events. Managing events from the HP Command View EVA user interface is especially useful when you are monitoring multiple EVAs.

Events are captured in one or more of the following logs:

- Management agent
- Controller
- Controller termination

All event logs are stored in the `C:\hsvmafiles` directory on the management server.

Management agent event log

A management agent is the installation of HP Command View EVA on a management server. Management agent events are triggered by:

- Responses to user actions in the user interface
- Responses to lower-level EVA controller events

Controller event log

A controller event is a normal or exceptional action on any hardware component or logical object within the array. Examples of controller events are:

- Disk or disk enclosure changes
- Configuration changes (such as creating a disk group)
- Controller reboots
- Changes detected by the environmental monitoring unit (EMU) within the array

An example of a normal event would be the controller reporting that creation of a virtual disk has completed. An example of an exceptional event would be a disk enclosure that has lost communication on a fiber channel loop.

> △ CAUTION:
> Uninitializing an array deletes all controller events.

For more information about uninitializing an array, see "Uninitializing an array."

Controller termination event log

Controller termination events report that a controller ceased operation, but do not report on controllers in uninitialized arrays.

Viewing events

To view events:

1. While viewing the properties of the selected storage system, click **View events**.

    The View Events menu opens.

2. Select an event log (management agent, controller, controller termination).

    The selected event log appears.

Figure 14 Controller events window

> 📝 NOTE:
>
> Hundreds of events may exist for a controller, therefore, events are displayed in groups to facilitate viewing. Select a specific range in the Display Range list or click **Previous group** or **Next group** to move between ranges.

The following information is provided for each event:

*   Date/Time Controller—The date and time that the event occurred and the name and world wide ID of the controller on which the event occurred.
*   Severity—The severity types are informational, critical, warning, and undetermined.
*   Event Code—A hexadecimal number assigned to the event. See "Event code format" for more information.
*   Sequence number—The sequence number assigned to the event. Some tasks generate a series of events. The sequence number helps you identify the order in which related events occurred.
*   Description—The text description of the event. See "Viewing additional information" for more information.

Viewing additional information

You can view additional information for controller and controller termination events by clicking the following links in the event description:

- More details
- Corrective action code

More details

Depending on the host operating system, the More details link directs you to open or save the `GetSCEventAddData.bri` file. This file is generated by the controller and pulls descriptions from various event logs, including the controller port number. See the HSV controller cabling section of the *HP StorageWorks Enterprise Virtual Array user guide* for port identifiers.

Corrective action code

The Corrective action code (CAC) shows you the recommended action to resolve the event. If the event severity is informational, the CAC is `00` and there is no corrective action to take.

Event code format

Controller and controller termination event codes appear as 32–bit hexadecimal numbers (for example, `060f4013`). The bits within the event code differ slightly for the two controller event types. The bits of a controller event have the following format:

Table 5 Controller event code bits

31............24	23.........16	15........8	7........................1
Software component ID	Event number	Corrective action code	Event information packet type

The bits of a controller termination event have the following format:

Table 6 Controller termination event code bits

31.........24	23.......16	15.......8	.....7......	6........5	4........0
Software component ID	Event number	Corrective action code	Couple crash control code	Dump/restart control code	Parameter count

The following table provides the interpretation of each bit.

Table 7 Event code bit interpretation

Bit	Interpretation
24:31	The software component ID (SCID or SCWID) identifies the software component that generated the event. The ID ranges from 0x00 to 0xFF.
16:23	The event number is unique number for each software component and ranges from 0x00 to 0xFF. Each event code is uniquely identifiable by the combination of the SCID and the event number in bits 16:23.
8:15	The corrective action code is in the range of 0x00 to 0xFF.
0:7	(Controller events only) The event information packet type contains a reason for the event and a template that defines the meaning of the data in the packet. It is in the range of 0x00 to 0x2F.
7	(Controller termination events only) The coupled crash control code specifies whether both controllers are terminating operation.
5:6	(Controller termination events only) The dump/restart control code specifies whether a crash dump is occurring as part of the termination and whether the controllers will restart following termination.
0:4	The termination parameter count specifies the number of entries in the Termination Parameters array that are valid for this termination. If the parameter count is greater than zero, the termination code description in the parse file will describe the meaning of each parameter.

Event code types and descriptions

This section lists the event code types and descriptions.

Software component IDs

The software component IDs are:

- 1—Executive Services
- 2—Cache Management Component
- 3—Storage System State Services
- 4—Fault Management
- 6—Fibre Channel Services
- 7—Container Services
- 8—Raid Services
- 9—Storage System Management Interface
- b—System Services
- c—Data Replication Manager Component
- d—Disk Enclosure Environmental Monitoring Unit Services
- e—System Data Center
- 42—Host Port
- 80—Metadata Utilities
- 83—Diagnostic Operations Generator
- 84—Diagnostic Runtime Services

Corrective action codes

You can view the complete list of corrective action codes when you select Corrective action code within an event description.

Event information packet (EIP) types

The EIP types are:

- 01—Fault Manager Termination Processing Recursive Entry Event
  A machine check occurred while a termination event was being processed.
- 02—Fault Manager Termination Processing Unexpected Event
  An unexpected event occurred while a termination event was being processed.
- 03—Fault Manager Management Event
  An event that affects Fault Manager operation occurred.
- 04—Fibre Channel Services Physical Disk Drive Error
  An error was encountered while accessing a physical disk drive.
- 05—Storage System Management Interface Entity State Change
  The state of a Storage System Management Interface entity was changed.
- 07—Fibre Channel Services Fibre Channel Port Link Error
  Excessive link errors were detected on a Fibre Channel port.
- 08—Fibre Channel Services Fibre Channel Port Link Failure
  A Fibre Channel port link has failed or a Drive Enclosure Environmental Monitoring Unit task
  has failed.
- 09—Fibre Channel Services Physical Disk Drive/Mirror Port Error
  An error was encountered while attempting to access a physical disk drive or the mirror port.
- 0A—Storage System State Services State Change
  A Storage System state change occurred.
- 0B—Storage System State Services Physical Disk Drive State Change
  A physical disk drive state change occurred.
- 0C—Data Replication Manager State Change
  A Data Replication Manager state change occurred.
- 0D—Executive Services System Time Change
  A change in system time occurred.
- 0E—Storage System Management Interface Entity Creation or Deletion
  A Storage System Management Interface entity was created or deleted.
- 0F—Storage System Management Interface Entity Attribute Change
  An attribute of a Storage System Management Interface entity has changed.
- 10—System Services HSV210 Controller State Change
  A controller state change occurred.
- 11—Disk Enclosure Environmental Monitoring Unit Services Status Change
  Status of a disk enclosure element has changed.
- 12—Fibre Channel Services Physical Disk Drive/Mirror Port Unexpected Work Encountered
  Unexpected work was received from a physical disk drive or the mirror port.
- 13—Fibre Channel Services Physical Disk Drive/Mirror Port/Drive Enclosure Environmental
  Monitoring Unit Error Summary
  Summary of errors encountered while attempting to access a physical disk drive, the mirror port,
  or a Drive Enclosure Environmental Monitoring Unit.
- 14—Diagnostic Operations Generator Detected Failure
  A failure was detected during the execution of a diagnostic.
- 15—Container Services Management Operation has started or completed
  An operation on a Disk Group has started or completed.
- 16—Data Replication Manager Time Report
  An HSV210 controller has received a time report message.

- 17—Fibre Channel Services Fibre Channel Port Loop Config

  A new device map has been generated on a Fibre Channel port.
- 18—Storage System State Services Redundant Storage Set State Change

  A Redundant Storage Set state change occurred.
- 19—System Data Center Services Status Change

  Status of a System Data Center element has changed.
- 1A—System Services Code Load Operation Update

  A code load operation has occurred.
- 1C—Fault Manager Termination Event

  HSV210 controller operation was terminated due to an unrecoverable event detected by either software or hardware or due to an action initiated via the Storage System Management Interface.
- 1D—Fault Manager Termination Event (old Termination Event Information Header)

  HSV210 controller operation was terminated due to an unrecoverable event detected by either software or hardware or due to an action initiated via the Storage System Management Interface.
- 1E—General Storage System State Services State Information Event

  General Storage System state information to be reported.

Coupled crash control codes

The coupled crash control codes are:

- 0—Other controller should not perform a coupled crash.
- 1—Other controller should perform a coupled crash.

Dump/restart control codes

The dump/restart action codes are:

- 0—Perform crash dump then restart.
- 1—Do not perform crash dump, just restart.
- 2—Perform a crash dump and do not restart.
- 3—Do not perform crash dump and do not restart.

Configuring event notification

Event logs contain chunks of data for events that have occurred. You can format this data so that when events of a particular type occur, notification is sent to the host(s) you specify. For example, you can use SNMP-compliant products such as Insight Manager, Tivoli, or EMC Patrol to create conditional instructions and send notification of particular events to specified hosts. For instructions to create your own event configuration file, see the documentation for your SNMP-compliant product.

You can select which events cause SNMP notification messages to be sent. You can choose events individually or by severity level.

Filtering events by severity

The severity levels are:

- 0—Normal (informational in nature)
- 1—Undetermined (more information needed to determine severity)
- 2—Warning (not failed but attention recommended or required)
- 3—Critical (failure or failure imminent)

To select a severity level:

1. From the Initialized Storage System Properties window, click **System options**.

   The System Options window opens.

2. Select **Configure event notification**.

   The Configure Event Notification window opens.

3. Under **Configure events individually**, select one or more of the following options:

   - All events
   - Critical events
   - Warning events
   - Normal events

4. If you are finished configuring event notification, click **OK**.

   The System Options window opens. You will now receive only events of the severity you selected.

Selecting individual events

To select which individual events cause a SNMP notification message to be sent:

1. Complete steps 1 through 3 from "Filtering events by severity."

2. Under **Configure events individually**, click **Configure**.

   The Set Event Notification Options window opens. The events that appear on this window are determined by your selection of a severity level.

3. From this window, you can:

   - Select individual events for notification.
   - Click **Notify all** to automatically select all events listed.
   - Click **Notify none** to clear the event selections.
   - Click **Restore defaults** to reset the default events set during HP Command View EVA installation.

4. When you finish making your selections, click **Save changes**.

   The Configure Event Notification window opens.

5. Click **OK**.

   The System Options window opens. You must configure host notification for your event configuration to take effect.

Applying a customized event configuration file

To apply your customized event configuration file to HP Command View EVA:

1. From the Initialized Storage System Properties window, click **Set options**.

   The System Options window opens.

2. Select **Configure event notification**.

   The Configure Event Notification window opens.

3. Under **Configure events using a configuration file**, click **Browse**.

4. Locate and select the event configuration file you created.

5. On the Configure Event Notification window, click **Configure**.

6. Click **OK**.

Configuring host notification

You can specify the hosts that receive the SNMP traps that the management agent generates for events. Any SNMP-enabled host in the same network as the array can be used.

You can enter individual hosts or you can apply a customized host notification list to HP Command View EVA.

Entering hosts individually

To enter hosts individually:

1. From the Initialized Storage System Properties window, click **Set options**.

   The System Options window opens.

2. Select **Configure host notification**.

   The Configure Host Notification window opens.

3. Click **Modify host list**.

   The Modify Host Notification window opens.

4. In the Host Name box, enter the fully qualified domain name or IP address of the host.

5. In the Notify Port box, enter 162.

6. Click **Save changes**.

The designated host should begin receiving SNMP traps. If the host is not receiving traps, restart the HP Command View EVA service.

Applying a customized host notification list

To apply a customized host notification list to HP Command View EVA:

1. From the Initialized Storage System Properties window, click **Set options**.

   The System Options window opens.

2. Select **Configure host notification**.

   The Configure Host Notification window opens.

3. Under **To replace the host notification list**, click **Browse**.

4. Locate and select the host notification list you created.

5. On the Configure Host Notification window, click **Send list file**.

6. Click **OK**.

The hosts in the notification list should begin receiving SNMP traps. If the hosts are not receiving traps, restart the HP Command View EVA service.

Obtaining the parse file

The parse file provides HP Command View EVA with a human-readable description for each event code generated by the array controllers. The parse file contains the hexadecimal event code and event description, an explanation of the event, and the array component to which the event refers. Every release of the controller software contains an updated parse file.

If the event description displays Description not found in parse file, you must update the parse file that the controller uses to populate the event description. This issue can occur if you upgrade or install HP Command View EVA on a management server that has not previously run this software.

To obtain the updated parse file:

1. Contact HP Support and request an updated parse file.
2. HP Support will e-mail the parse file to you and instruct you where to store it on the management server.
3. From the Initialized Storage System Properties window, click **View events**.

   The View Events window opens.
4. Select either **Controller Event Log** or **Controller Termination Event Log** as the event type.
5. In the event log window, click **Send parse file**.

   The Send Event Parse File window opens.
6. Click **Browse** and locate the path in which HP Support instructed you to save the parse file (step 2).
7. Click **Send parse file**.

   The parse file you received from HP Support is uploaded to the management agent. When the action has completed, the `Operation succeeded` message appears.
8. Click **OK** to close the window.

The appropriate event descriptions should now display in the event log window.

Downloading the MIB

You can use the HP Command View EVA SNMP MIB with your monitoring tools (such as Insight Manager) to translate the hexadecimal event code into decimal format. You can use the MIB and your monitoring tools to help interpret the SNMP notifications sent by HP Command View EVA.

NOTE:

The format of the HP Command View EVA SNMP MIB is SEMI.

To download the MIB:

1. From the Initialized Storage System Properties window, click **Set options**.

   The System Options window opens.
2. Select **Configure event notification**.

   The Configure Event Notification window opens.
3. Click **Download MIB**.

   The File Download dialog box opens.
4. Click **Save** and put the MIB on the server where Insight Manager (or other monitoring tool) resides.
5. When finished, click **OK** twice to return to the Initialized Storage Systems Properties window.

Sending the event file

If you contact HP Support for assistance, the support technician may request a copy of the current event file, which is the current output translated from the controller.

To send the event file to HP Support:

1. Go to the appropriate event log for the controller.
2. Click **Get event file**.
3. When prompted, save the file to your local hard drive. (The file name format for the event file is `GetEventfile.xxxxx`.)
4. E-mail the file to the support technician.

5 Troubleshooting HP Command View EVA

This chapter describes possible issues you may encounter and information to resolve them.

Failed connection warning for empty controller host ports

Symptom: The Connection state box on the Controller Properties window displays `Connection failed` for an empty host port.

Cause: The firmware for the HSV200 series of controllers cannot differentiate between an empty host port and a failed host port in a direct connect configuration.

Solution: Insert an optical loop-back connector into the empty host port. Then the Connection state will display Connected. For more information about optical loop-back connectors, contact your HP-authorized service provider.

Failure of virtual disk deletion

Symptom: A disk group does not have the expected capacity or a disk group cannot be deleted. For the latter, an `Object in use` message may appear.

Cause: Deleting a virtual disk may partially fail, resulting in the virtual disk being deleted from the HP Command View EVA user interface, but still occupying space within the disk group.

Solution: Restart the HP Command View EVA service. The service will discover the partially deleted virtual disk and request that the array delete the remainder of the virtual disk.

Failed entities reported on the disk enclosure

Symptom: Failed entities on a disk enclosure may cause a red "X" to appear on the entire shelf in the Navigation pane.

Solution: Use the following information to help determine the entity that is causing the failure.

Failed transceiver (or GBIC)

The symptoms of a failed transceiver (or GBIC) are:

- The controller event log contains the following entries:
  - `0d8d9001 <Transceiver error>`
  - `0df00011 <Status Change on one or more drive enclosures>`
  - `09d50005 <Transitioned to Single Port on Fibre State>`
- The Disk Enclosure Properties window displays the following information:

  - On the Power tab, the operational state displays `Good`.
  - On the Cooling tab, the status of the sensors displays `OK`.
  - On the I/O-Comm tab, one or more Fibre Channel ports displays `Bad` or `Not Installed`.

Failed I/O module

The symptoms of a failed I/O module are:

- The controller event log contains the following entries:

  - `0ddd9311 <A drive enclosure I/O module error has occurred.>`
  - `061e4c13 <An HSV210 Controller has detected only one port of a Fibre Channel service.>`
  - `0df00011 <Status change of one or more drive enclosures.>`
- The Disk Enclosure Properties window displays the following information:

  - On the Power tab, the operational state displays `Good`.
  - On the Cooling tab, the status of the sensors displays `OK`.
  - On the I/O-Comm tab, the operational state of the I/O modules displays `Not Installed` or `Failed`.

Failed blower power supply

The symptoms of a failed blower power supply are:

- The controller event log contains the following entry:

  `0d330911 <AC Input to drive enclosure power supply has been lost.>`
- The Disk Enclosure Properties window displays the following information:

  - On the Power tab, the operational state of a power supply displays `Unknown`.
  - On the Cooling tab, the operational state of a blower displays `Unknown` and the status of the `Pstemp` sensor displays `Not Available`.

Unable to change default values during DR group creation

Symptom: When creating a DR group, an attempt to change the Failsafe or Write modes to values other than the defaults may fail.

Solution: After creating the DR group, verify the settings for Failsafe mode and Write mode. If they do not have the desired values, change and save the values again.

Source-source DR groups

Symptom: Certain conditions result in a DR group being a source on both sites.

Cause: A DR group is suspended while the intersite links are down. When the intersite links are available again, the DR group is a source on both sites until the suspended DR group is resumed. This can happen during any of these events:

- User issued a failover with the suspend option during an unplanned failover.
- User set the DR group to autosuspend enabled before or after the unplanned failover, but before the intersite links were available.
- User set the DR group to suspend before or after the unplanned failover, but before the intersite links were available.

Solution: Use HP Command View EVA or the Storage System Scripting Utility to resume the DR group.

6 Monitoring array performance

Use HP StorageWorks Command View EVAPerf to monitor and display EVA performance metrics from a command line interface or a graphical user interface. You can also view performance metrics in an external application, such as Microsoft Excel, after you export data to either a CSV (comma-separated value) or TSV (tab-separated value) format.

You can monitor and display the following metrics:

- Arrays
- Array controllers
- Host connections
- Host port statistics
- Physical disks
- Port status
- Replication
- Virtual disks

Components

HP Command View EVAPerf components are installed in the following directory:

`c:\Program Files\Hewlett-Packard\EVA Performance Monitor`

The software components consist of:

- `evapdcs.exe`—EVA Data Collection service, which gathers data from the EVAs that are visible to a host and stores it in memory cache.
- `evaperf.exe`—HP Command View EVAPerf command line interface
- `evapmext.dll`—DLL extension for Windows Performance Monitor, the graphical user interface.

Configuring HP Command View EVAPerf

To begin array monitoring, ensure that HP Command View EVAPerf is properly configured:

- EVA Data Collection service

  - The service uses TCP port 860. You may need to open this port on your firewall.
  - The service is set to manual start when you install HP Command View EVAPerf.
  - When you run the HP Command View EVAPerf command line interface, the service starts and remains running until you reboot the host.
  - Set the service to start automatically if you use Windows Performance Monitor for background logging. If you execute logging before starting this service, the startup time for the service may exceed the time that Windows Performance Monitor waits for the first data samples.
  - You can also start and stop the service using Windows Service Manager.
- HP Command View EVAPerf command line interface

  Ensure that you run the command line interface from the directory where it was installed. Otherwise, the necessary configuration files will not be found.

Enabling access to password-protected arrays

If the array you want to monitor is password-protected, you must identify the array's worldwide name (WWN) and password.

> **NOTE:**
>
> The array password is first entered on the operator control panel (OCP) of the array controller. When you enter the array WWN, you can use upper or lowercase letters and either include or eliminate hyphen separators. For example, `5000-1FE1-5000-CD30`, `5000-1fe1-5000-cd30`, and `50001FE15000cd30` are all valid WWN entries.

To enable HP Command View EVAPerf access to a password-protected array:

1. Open a command window.
2. Change to the directory where HP Command View EVAPerf is installed.
3. Enter the following command:

   ```
   evaperf spw array_WWN array_password
   ```

   where:

   - *array_WWN* is the WWN of the array.
   - *array_password* is the password entered on the OCP of the array controller.

   For example:

   ```
   C:\evapmt>evaperf spw 5000-1FE1-5000-A9F0 RSGHSVxx

   Setting the password for array WWN: 5000-1FE1-5000-A9F0

   Password set
   ```

To verify the array password, enter the following command:

```
evaperf vpw
```

Passwords are verified before they are added to the `arraypass.conf` file in encrypted format. The only way you can enter an incorrect password is if it was changed on the array.

Creating friendly names

You can associate the WWNs of objects, such as arrays, virtual disks, and hosts, with more easily readable identifiers called *friendly names*. For example, you can identify an array that is known by its WWN of 5000-1FE1-5000-A9F0 as RSG14HSV1. You can extract this information from HP Command View EVA and use it in HP Command View EVAPerf.

Creating the friendly names host file

To create the friendly names host file, you will need the user name and password used to access the HP Command View EVA user interface. The information you need depends on the following:

- If the management server is running SmartStart 7.1, the default user is *administrator*. The password is the password that was entered when the HP Command View EVA API was installed during the management server setup.
- If the management server is running SmartStart 7.2, enter the operating system user name and password of an administrator account on the management server.

Complete the following procedure:

1. Open a command window.
2. Change to the directory where HP Command View EVAPerf is installed.
3. Enter the following command:

   ```
   evaperf fnh [hostname] [username] [password]
   ```

   where:

   - *hostname* is the name of the management server running HP Command View EVA.
   - *username* is the HP Command View EVA user interface user name.
   - *password* is the HP Command View EVA user interface password.

   HP Command View EVAPerf verifies that it can access HP Command View EVA before adding the information to the `fnamehosts.conf` file.

> **NOTE:**
> If you enter the `fnh` command without parameters, a list of known management servers running HP Command View EVA appears.

Adding friendly names

To add friendly names for arrays configured with the `fnh` command:

1. Open a command window.
2. Change to the directory where HP Command View EVAPerf is installed.
3. Enter the following command:

   ```
   evaperf fn
   ```

   The `fnames.conf` file is created. Any friendly name information that exists for the management servers running HP Command View EVA and listed in the `fnamehosts.conf` file is extracted from HP Command View EVA and stored in the `fnames.conf` file.

Update the `fnames.conf` file when you make changes to the arrays. The `fnames.conf` file must reside in the directory in which HP Command View EVAPerf was installed.

Adding friendly names manually

You can create and maintain the `fnames.conf` file manually using a standard text editor.

Each line in the file contains a WWN that uniquely identifies an object and the friendly name of the object. When reading this file, HP Command View EVAPerf ignores blank lines and lines that begin with `#`. The following is a listing from a manually created file:

```
#·Sample·friendly·names·file¶
¶
#·Storage·Cells·managed·by·http:\\hadtma1:2301¶
5000-1FE1-0013-A100·EVA3_V3¶
5000-1FE1-0015-0B50·Array1¶
¶
#·VDisks·on·Array1¶
6005-08B4-0000-0046-0002-4000-113B-0000·Nigel-001¶
¶
#·Storage·Cells·managed·by·http:\\rsg9ma4:2301¶
5000-1FE1-5000-A9F0·RSG14HSV1¶
5000-1FE1-0015-0EE0·test¶
5000-1FE1-0000-00D0·RGS11HSV2_new¶
```

Using short names

If the friendly names you created in HP Command View EVA are impractical for the HP Command View EVAPerf command line interface, you can substitute contractions for full names in the `fnames.dict` file.

When you install HP Command View EVAPerf, the `fnames_sample.dict` file is also installed. You can either:

- Rename this file to `fnames.dict` and modify its contents to include the short names.
- Create a separate file called `fnames.dict` using a standard editor.

Within the `fnames.dict` file, enter a short name for each long friendly name as follows:

`<long name> <short name>`

For example:

`# Sample contractions dictionary:`

`"Test1\\Copy of Test1" Test1-c`

`chienchi cc`

`Test1\Test1 VV`

`"Test1\Test1" VV`

Consider the following when creating names:

- If either the long or short name contains spaces, enclose the name in quotes.
- If a back slash appears within a string enclosed in quotes, you must add another back slash.
- Enter one long and short name combination per line.

To use the short name you have entered in this file, add the `-cn` modifier to any command you enter in the HP Command View EVAPerf command line interface. The short name is substituted when a long name is encountered.

Using the command line interface

You can use the HP Command View EVAPerf command line interface to display EVA performance data in a tabular format. The procedures in this section assume you are familiar with command line interfaces.

Viewing arrays

To view arrays visible to HP Command View EVAPerf:

1. Open a command window.
2. Change to the directory in which HP Command View EVAPerf is installed.
3. Enter the following command:

   `evaperf ls`

   The visible arrays are listed.

```
Device      Path Target LUN Product Product Ctlr Serial         Name                  Node
            ID   ID         ID      Rev.
--------    ---- ------ --- ------- ------- ---- -------------- -------------------- --------------------
\\.\Scsi3: 0    8      0   HSU100  3020    A    P66C5D29IO100U 5000-1FE1-5000-B800  5000-1FE1-5000-B800
\\.\Scsi3: 0    9      0   HSU100  3020    B    P66C5D29IO100E 5000-1FE1-5000-B800  5000-1FE1-5000-B800

C:\Program Files\Hewlett-Packard\EVA Performance Monitor>_
```

Specifying the output

This section describes the ways you can specify the command line interface output.

Refreshing data

The command line interface output does not refresh automatically while you are viewing it.

To continuously refresh the array data, enter the following command:

```
evaperf as -cont
```

To set a refresh frequency (in seconds), include the *n* modifier in the command:

```
evaperf as -cont 10
```

📝 NOTE:

If you do not specify an interval, the default interval is one second.

Limiting data quantity

You can limit the amount of data that is collected and presented, which can be useful if your configuration includes numerous arrays, physical disks, and virtual disks.

To limit the arrays for which HP Command View EVAPerf collects data, enter the following command:

```
evaperf as -sz array1 array10 array32
```

The output contains data for the specified arrays only.

To limit the virtual disks for which HP Command View EVAPerf collects data, enter the following command:

```
evaperf vd -fvd disk2 disk4 disk8
```

The output contains data for the specified virtual disks only.

Filtering data

You can filter the data that is collected for specific information, such as a word or a host port name. For example, enter the following command:

```
evaperf as array1 array2 -fd test
```

The output indicates where *test* appears on array 1 or array 2.

Commands

This section describes the commands you can use in the command line interface to gather performance metrics. The general syntax for commands is:

```
evaperf <command> [modifiers]
```

📝 NOTE:

You can specify the command modifiers in any order.

Table 8 lists the available commands and corresponding descriptions.

Table 8 HP Command View EVAPerf commands

Command	Description
`all`	Displays a summary of the array status by running the following commands together: `ls`, `as`, `cs`, `vd`, `vdg`,`hc`, `ps`, `hps`, `pd`, `pdg`, and `drt`.
`as`	Displays array status.
`cs`	Displays controller status.
`drt`	Displays data replication tunnel statistics.
`dpw wwn`	Deletes the password for the specified array from the host's Windows registry. The password is not deleted on the array.
`fnh`	Manages friendly name hosts as follows: • Displays a list of known hosts running HP Command View EVA. • Adds a host to the friendly name host list.
`fn`	Performs the following series of tasks: • Scans the hosts on the friendly name host list. • Queries HP Command View EVA on each host for known friendly name information. • Adds the friendly name information found to the `fnames.conf` file.
`h`, `help`, or `evaperf` without an argument	Displays help for HP Command View EVAPerf.
`hc`	Displays host connection information. The Port column in the output does not display data for the HSV200 series of controllers. Therefore, a hyphen (–) appears in the Port column.
`hps`	Displays host port statistics.
`ls`	Displays a list of EVAs that are visible to the host.
`luns`	Displays LUNs visible to the host.
`pd`	Displays physical disk data.
`pda`	Displays statistics for physical disk activity.
`pdg`	Displays the total physical disk data by disk group.
`pfa [array]*`	In Windows Performance Monitor, sets the array filter list.
`pfd`	Deletes the filter configuration for Windows Performance Monitor.
`pfh`	Displays help for the Windows Performance Monitor filter commands.
`pfs`	Displays the filter configuration for Windows Performance Monitor.
`pfvd [vdisk]*`	In Windows Performance Monitor, sets the virtual disk filter list.
`ps`	Displays port status.
`rc`	Resets the error counters reported by the `ps` command.
`spw WWN password`	Sets the password for the specified array so HP Command View EVAPerf can access the array for performance metrics. This password must match the password entered on the OCP of the array controller.
`vd`	Displays virtual disk statistics. Only virtual disks that have been presented to a host are displayed.
`vdg`	Displays the total virtual disk data by disk group.
`vdts`	Displays virtual transfer size histograms. This command is only available on the HSV200 series of controllers.

Command	Description
`vdtsg [lunwwn]`	Graphs virtual disk transfer size histograms for all LUNs or a given WWN. This command is only available on the HSV200 series of controllers.
`vdrl`	Displays virtual disk read latency histograms. This command is only available on the HSV200 series of controllers.
`vdrlg [lunwwn]`	Graphs virtual disk read latency histograms for all LUNs or a specific WWN. This command is only available on the HSV200 series of controllers.
`vdwl`	Displays virtual disk write latency histograms. This command is only available on the HSV200 series of controllers.
`vdwlg [lunwwn]`	Graphs virtual disk write latency histograms for all LUNS or a specific WWN. This command is only available on the HSV200 series of controllers.
`vpw`	Verifies array passwords for use with HP Command View EVAPerf.

Command modifiers

Table 9 lists the modifiers you can use in the command line interface. Modifiers must be preceded by the minus sign (-).

Table 9 Command modifiers

Modifier	Description
`-cn`	Substitutes contractions from the `fnames.dict` file.
`-cont` *n*	Runs an HP Command View EVAPerf command continuously. You can specify the interval by adding a number (*n*). Otherwise, the default interval is one second. Press **Ctrl+C** to exit from this mode.
`-csv`	Displays data in CSV (comma-separated value) format and automatically includes a time stamp. The time stamp format can be modified using the `-ts1` or `-ts2` modifiers.
`-dur` *n*	Specifies the duration of a continuous mode session. For example, if you enter `evaperf vd -csv -cont -dur 30`, virtual disk data is displayed in CSV format at one second intervals for a total of 30 seconds.
`-fd` *keyword*	Displays data that contains the specified keywords. You must enter at least one keyword. To enter multiple keywords, separate each keyword with a space. For example, if you enter `evaperf vd -fd test preliminary good`, the data that displays contains the words *test*, *preliminary*, and *good*.
`-fo` *filename*	Copies output to a file as well as displaying it in the command prompt. You can combine this modifier with `-cont` and `-dur` for a fixed-time data capture. For example, if you enter `evaperf vd -cont 5 -dur 30 -fo capture.log`, virtual disk data is displayed in CSV at five second intervals for a total of 30 seconds and is also written to the `capture.log` file.
`-fvd` *vdisk* *[vdisk]**	Limits virtual disk data collection to the specified virtual disk(s). You must enter at least one virtual disk. You can also combine this modifier with `-sz` to limit data collection to the specified array(s). For example, if you enter `evaperf vd -fvd test1 test2 -sz server1`, data is collected for virtual disks test1 and test2 on array server1 only. You can use this modifier with the `vd`, `vdrl`, `vdwl`, and `vdts` commands.
`-KB`	Displays output data in kilobytes per second (1024). The default is megabytes per second (1,000,000).
`-nfn`	Specifies that friendly names should *not* be used.
`-nh`	Specifies that no headings be included in CSV (comma-separated value) output.
`-nots`	Specifies that a time stamp not be included in the CSV output.

Modifier	Description
`-sz array [array]*`	Limits array data collection to the specified array(s). You must enter at least one array and you can use this modifier with any command. When specifying arrays, you can use either the array's WWN or friendly name. For example, if you enter `evaperf as -sz server1 server3`, data is displayed for arrays server1 and server3 only. If you do not include this modifier, data is collected from all arrays visible to the host.
`-tsv`	Displays output in tab-separated variable format with a time stamp.
`-ts1`	Adds a time stamp to the `-csv` output in the following format: `Fri Jul 23 16:23:05 2004`.
`-ts2`	Adds a time stamp to the `-csv` output in the following format: `23/Jul/2004 16:23:05 2004`. This is the default format.
`-us`	Display times in microseconds (the default is milliseconds). Latencies are displayed in milliseconds (ms) by default. Use the `-us` option to show times in microseconds for more accuracy. The `-us` modifier does not affect the following commands: • `vdrl` • `vdrlg` • `vdwl` • `vdwlg`

Using the graphical user interface

This section describes how to display and manage EVA performance metrics using the graphical user interface, Windows Performance Monitor, and assumes that you are familiar with the tool.

Windows Performance Monitor does not permit more than one hierarchical object level. Therefore, objects — such as virtual disks are grouped as a single list of instances — even though they may be located on different EVAs. The instance name indicates the array on which the virtual disk is located.

To display EVA performance metrics:

1. Start Windows Performance Monitor.

   The Performance window opens.
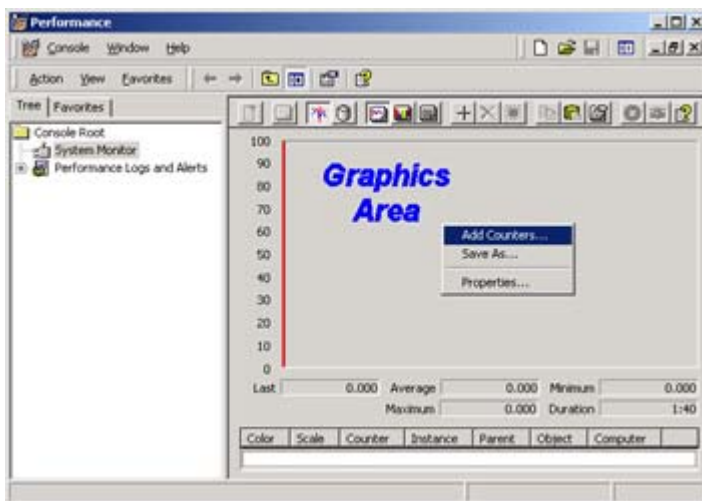
   Figure 15 Performance window

2. Right-click in the graphics area.

A menu opens.

3. Select **Add Counters** and click **OK**.

The Add Counters dialog box opens.
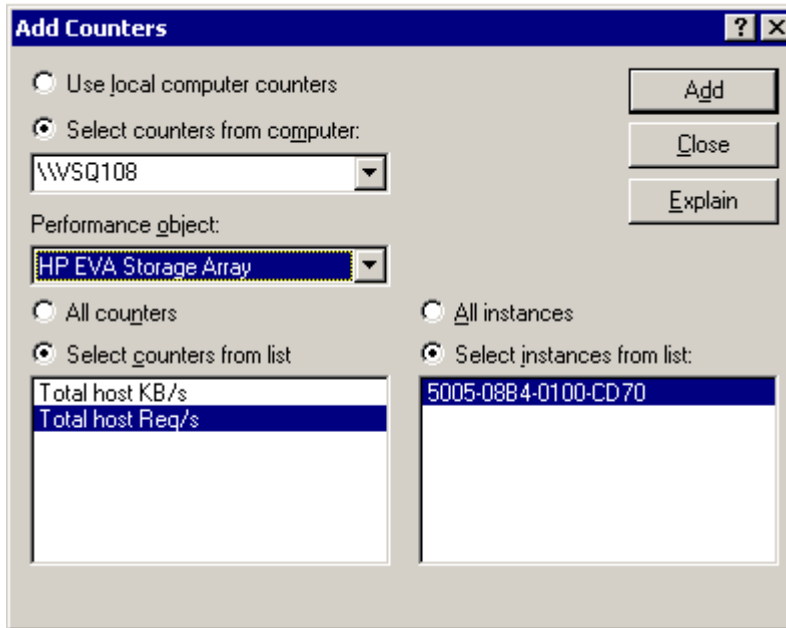
Figure 16 Add Counters dialog box

📝 NOTE:

To view a description of a counter, select a counter and click **Explain**.

---

4. Click **Select counters from computer** and, in the adjacent box, select the host where HP Command View EVAPerf is running.

5. From the Performance object box, select an object to monitor (for example, HP EVA Storage Array).

6. Click **All counters**, or select counters to view.

7. Click **All instances**, or select instances to view.

8. Click **Add** to add the counters to the window. The utility begins displaying the performance metrics of the selected EVA object.

9. To add other objects, repeat the steps. To remove metrics, select the metric from the list and click the remove icon ().

10. To close the utility, click **Close**.

Data filtering

You can limit the amount of data that is collected and presented, which can be useful if your configuration includes numerous arrays, physical disks, and virtual disks. Windows Performance Monitor uses the `evapmfilt.conf` file, which contains the names of the virtual disks and arrays for which you want to retrieve data. Use the HP Command View EVAPerf command line interface to create or update the `evapmfilt.conf` file.

Configure filtering

To configure filtering for Windows Performance Monitor:

1. Stop Windows Performance Monitor.
2. Open the command line interface.
3. To filter data for specific arrays, enter the following command with the array names:

   `pfa [array]*`

   This creates the evapmfilt.conf file.
4. To filter data for specific virtual disks, enter the following command with the virtual disk names:

   `pfvd [vdisk]*`

> **NOTE:**
> You can use friendly names in these commands.

5. When filtering configuration is complete, restart Windows Performance Monitor. When you click **Add counters** in a new Windows Performance Monitor session, the `evapmfilt.conf` file is detected and data is filtered accordingly. Until you turn filtering off, the filters you configure remain active in successive sessions. (A message displays that filtering is active.)

To make changes, follow the same procedure and use the same commands to update the virtual disk or array names.

To stop filtering:

1. Stop Windows Performance Monitor.
2. Open the command line interface.
3. Enter the following command:

   `pfd`
4. Restart Windows Performance Monitor.

Objects and counters

Use the objects and counters in Windows Performance Monitor to gather performance metrics. Objects are the items you can monitor, such as virtual disks, hosts, and controllers. The counters characterize the workload and performance for each object. The following identifying information is common to several objects:

- **Ctlr**—The controller for which metrics are being reported. This field shows the last four digits of the controller serial number.
- **Node**—The array from which data has been collected.
- **GroupID**—The disk group to which the virtual or physical disk belongs.

> **NOTE:**
> Not all metrics that are available in the command line interface are available in Windows Performance Monitor.

HP EVA DR tunnels

The HP EVA DR tunnels object reports the intensity and behavior of the link traffic between source and destination arrays. The counters for this object display information only if there is at least one active DR group on the array. Otherwise, only the header appears. You can display metrics in either MBs or KBs.

Although some arrays allow up to four open tunnels on a host port, only one tunnel is active for a single DR group. Multiple DR groups can share the same tunnel. Statistics for each tunnel are reported by both the source and destination arrays, but the directional counters are complementary.

The counters are:

- `Round Trip Delay`—The average time, in milliseconds, for a signal (ping) to travel from the source to the destination and back. In replication traffic, the signal is queued behind data transmissions, which increases the round trip delay. If the destination controller is busy, the value also increases. Round trip delay is reported for all active tunnels.
- `Copy Retries`—The number of copies from the source EVA that were retransmitted due to a failed copy transmission. Each retry creates a 128–KB copy. Retries are reported by both the source and destination arrays.
- `Write Retries`—The number of writes from the source EVA that were retransmitted due to a failed write to the destination EVA. Each retry creates an 8–KB copy. If the write contains multiple 8–KB segments, only the failed segments are retransmitted. Retries are reported by both the source and destination arrays.
- `Copy In MB/s`—The rate at which data is copied to an array to populate the members of a DR group with data when an initial copy or full copy is requested.
- `Copy Out MB/s`—The rate at which data is copied from an array to populate the members of a DR group with data when an initial copy or full copy is requested.
- `Write In MB/s`—The rate at which data is written to an array because of write activity to the members of the source array. The write activity includes host writes, merges, and replication retries. A merge is an action initiated by the source array to write new host data that has been received and logged while a replication write to the destination array was interrupted, and now has been restored.
- `Write Out MB/s`—The rate at which data is written from an array because of write activity to the members of the source array. The write activity includes host writes, merges, and replication retries.

HP EVA host connection

The HP EVA host connection object provides information for each host bus adapter that has a connection to an array.

The counters are:

- `Port`—The port number the array controller uses internally to identify the port (HSV100 controller series only).
- `Queue Depth`—The average number of outstanding requests from each host adapter.
- `Busies`—The number of busy responses sent to a specific host. A busy response is a request from the array to the host to cease I/O traffic until an internal job queue is reduced.

HP EVA host port statistics

The EVA host port statistics object provides information about performance and data flow of host-initiated activity on each array host port. Data replication traffic is not included in these counters. Depending on the array model, there are either two ports per controller (four per controller pair) or four host ports per controller (eight per controller pair).

The counters are:

- `Read Req/s`—The number of read requests (per second) completed from each host port.
- `Read MB/s`—The rate at which data is read from each host port.
- `Read Latency`—The amount of time it takes to complete a read request (from initiation to information receipt) through a host port. The time is an average of the read request latency for all virtual disks accessed through this port, and includes cache hits and misses.
- `Write Req/s`—The number of write requests (per second) completed from each host port.
- `Write MB/s`—The rate at which data is written from each host port.
- `Write Latency`—The amount of time it takes to complete a write request (from initiation to information receipt) through a host port. The time is an average of the write request latency for all virtual disks accessed through this port.
- `Average Queue Depth`—The average number of outstanding host requests against all virtual disks accessed through this host port. This number includes all host-initiated commands, including non-data transfer commands.

HP EVA physical disk group

The HP EVA physical disk group object provides information about physical disk activity per disk group. For each disk group, metrics are reported that represent the averages of various counters across all the disks in the disk group. The counters record all activity to the disks including traffic for host data transfers and internal system support. This activity includes metadata updates, cache flushes, prefetch, sparing, leveling, snapclone and snapshot support, and redundancy traffic such as parity reads and writes or mirror copy writes. Each controller's activity is reported separately, so the total activity to each disk group is the sum of both controllers' activity.

> **NOTE:**
> For each counter, the results are an average of all disks in the disk group.

The counters are:

- `Average Drive Queue Depth`—The average number of all active requests to each disk in the disk group, over all the disks in the disk group.
- `Average Drive Latency`—The average time between when a data transfer command is sent to a disk and when command completion is returned from the disk. The time is not separated into read and write latencies. Completion of a disk command does not necessarily imply host request completion because the request to a specific physical disk might be only a part of a larger request operation to a virtual disk.

> **NOTE:**
> On the HSV100 series of controllers, only average latency — the average of read and write latencies — is reported. On the HSV200 series of controllers, separate metrics are provided for read and write latency.

- `Average Read Req/s`—The number of read requests (per second) sent to physical disks.
- `Average Read MB/s`—The rate at which data is read (per second) from physical disk.
- `Average Read Latency`—The average time it takes for a disk to complete a read request. This average is weighted by requests per second. (HSV200 controller series only)

- `Average Write Req/s`—The number of write requests (per second) sent to physical disks.
- `Average Write MB/s`—The amount of data written (per second) to physical disks.
- `Average Write Latency`—The average time it takes for a disk to complete a write request. This average is weighted by requests per second. (HSV200 controller series only)
- `Number of Disks`—The number of disks in the disk group.

HP EVA storage array

The HP EVA storage array object provides information about the total workload on the array.

The counters are:

- `Total Host Req/s`—The number of all host-initiated requests (per second) sent to each controller.
- `Total Host MB/s`—The rate at which data is read from or written to disk (per second) per controller.

HP EVA storage controller

The HP EVA storage controller object provides information about controller processor and host data transfer utilizations.

The counters are:

- `% Processor Time`—The percentage of time that the central processing unit on the controller is active. A completely idle controller shows 0%. A controller saturated with activity shows 100%.
- `% Data Transfer Time`—Similar to % Processor Time except that it does not include time for internal processes not related to host-initiated data transfers. For example, it does not include time for sparing, leveling, snapclones, snapshots, replication traffic, virtual disk management, or communication with other applications. The value is always equal to or less than the % Processor Time counter and the difference is the amount of processor time engaged in non-data transfer activity.

HP EVA virtual disk

The Virtual Disk object provides information about workload and performance for each virtual disk on the array. Activity is reported separately for each controller accessing a virtual disk. The total activity for each virtual disk is the sum of the reported activity for each controller. A virtual disk may also be a snapshot, snapclone, or a DR group member. In the output, logical unit number (LUN) is used interchangeably with virtual disk.

Virtual disks must be presented to a host to be seen by HP Command View EVAPerf. However, replication volumes on the replication system are visible without being presented.

If the array controllers are active/standby, all activity to a virtual disk is through the active controller. If the array controllers are active/active, one controller is preferred (the owning controller) but requests can still be processed by the other controller (the proxy controller). In active/active controllers, all host requests are logged by the receiving controller only, whether owning or proxy. Thus, all request rate and data rate activity for a virtual disk is the sum of both controllers.

The counters are:

- `Read Hit Req/s`—The number of read requests per second completed from the array cache memory. Data may reside in the cache memory due to a previous cache miss or because of a prefetch operation generated by a sequential read data stream.
- `Read Hit MB/s`—The rate at which data is read from the array cache memory because of read hit requests.
- `Read Hit Latency`—The average time it takes to complete a read request (from initiation to information receipt) from the array cache memory.
- `Read Miss Req/s`—The number of read requests (per second) that failed to complete from the array cache memory and were completed from physical disks instead.

- `Read Miss Data Rate`—The rate at which data is read from physical disks because the data was not present in the array cache memory.
- `Read Miss Latency`—The average time it takes to complete a read request (from initiation to information receipt) from the physical disks.
- `Write Req/s`—The number of write requests per second completed to a virtual disk that were received from all hosts. Write requests may include transfers from a source array to this array for data replication and host data written to snapshot or snapclone volumes.
- `Write Data Rate`—The rate at which data is written to the virtual disk by all hosts and includes transfers from the source array to the destination array.
- `Write Latency`—This average time it takes to complete a write request (from initiation to receipt of write completion).
- `Flush Data Rate`—The rate at which data is written to a physical disk for the associated virtual disk. The sum of flush counters for all virtual disks on both controllers is the rate at which data is written to the physical drives and is equal to the total host write data. Data written to the destination array is included. Host writes to snapshots and snapclones are included in the flush statistics, but data flow for internal snapshot and snapclone normalization and copy-before-write activity are not included.
- `Mirror Data Rate`—The rate at which data travels across the mirror port to complete read and write requests to a virtual disk. This data is not related to the physical disk mirroring for Vraid1 redundancy. Write data is always copied through the mirror port when cache mirroring is enabled for redundancy. In active/active controllers, this counter includes read data from the owning controller that must be returned to the requesting host through the proxy controller. Reported mirror traffic is always outbound from the referenced controller to the other controller.
- `Prefetch Data Rate`—The rate at which data is read from the physical disk to cache in anticipation of subsequent reads when a sequential stream is detected. Note that a sequential data stream may be created by host I/O and other I/O activity that occurs because of a DR initial copy or DR full copy.

Glossary

This glossary defines terms that are used in this guide or are related to the software.

array   *See* virtual array and storage system.

client   An intelligent device that requests services from other intelligent devices. In the context of HP Command View EVA, a client is a computer that is used to access the software remotely using a supported browser.

default disk group The disk group that is created when the array is initialized. The minimum number of disks the group can contain is eight. The maximum is the number of installed disks.

disk group   A named group of disks selected from all the available disks in an array. One or more virtual disks can be created from a disk group.

DR group   Data replication group. A named group of virtual disks selected from one or more disk groups so that they replicate to the same destination, fail over together if a member virtual disk fails, and preserve write order within the group.

EVA   Enterprise Virtual Array. An HP StorageWorks disk array product that allows pooled disk capacity to be presented to hosts as one or more variably sized physical devices. An EVA consists of disks, controllers, cables, power supplies, and controller software. Storage system, virtual array, and storage array are other names for an EVA. See also virtual disks.
                    See also virtual disk.

failover   An operation that reverses replication direction so that the destination becomes the source and the source becomes the destination. Failovers can be planned or unplanned and can occur between DR groups, managed sets, fabrics or paths, and array controllers.

general-purpose server A server on which HP StorageWorks Enterprise Virtual Array (EVA) management software is installed, including HP Command View EVA and HP Replication Solutions Manager, if used. Other management servers are dedicated management servers, HP ProLiant Storage Server models, and the Storage Management Appliance. When there are multiple management servers in a SAN, two active instances of HP Command View EVA are allowed, but each array will only be managed by one instance. The active management server actively manages the array, while the standby management server takes control of the array if there is a failure on the active management server. There is only one active management server at a time for any given management zone in a SAN.

host   A computer that runs user applications and uses (or potentially uses) one or more virtual disks that are created and presented by the array controller.

management agent The installation of HP Command View EVA on a management server.

management server A server on which HP StorageWorks Enterprise Virtual Array (EVA) management software is installed, including HP Command View EVA and HP Replication Solutions Manager, if used. A dedicated management server runs EVA management software exclusively. Other management servers are

general-purpose servers, HP ProLiant Storage Server models, and the Storage Management Appliance. When there are multiple management servers in a SAN, two active instances of HP Command View EVA are allowed, but each array will only be managed by one instance. The active management server actively manages the array, while the standby management server takes control of the array if there is a failure on the active management server. There is only one active management server at a time for any given management zone in a SAN.

near-online storage	On-site storage of data on media that takes only slightly longer to access than online storage kept on high-speed disk drives.
online storage	An allotment of storage space that is available for immediate use, such as a peripheral device that is turned on and connected to a server.
SAN	Storage area network, a network of storage devices and the initiators that store and retrieve information on those devices, including the communication infrastructure.
snapclone	A copy that begins as a fully allocated snapshot and becomes an independent virtual disk. Applies only to the HP StorageWorks EVA.
snapshot	A nearly instantaneous copy of the contents of a virtual disk created without interruption of operations on the source virtual disk. Snapshots are typically used for short-term tasks such as backups.
storage array	General term for an EVA.
Storage Management Appliance (SMA)	HP OpenView Storage Management Appliance, an HP hardware-software product designed to run SAN management applications such as HP Command View EVA and HP Replication Solutions Manager.
storage system	An EVA *See also* virtual array.
UUID	Unique Universal Identifier, a unique 128–bit identifier for each component of an array. UUIDs are internal system values that users cannot modify.
VCS	Virtual Controller Software. The software in the HP StorageWorks Enterprise Virtual Array controller. Controller software manages all aspects of array operation, including communication with HP Command View EVA.
virtual array	General term for an EVA. *See also* virtual disk.
Virtual Controller Software	*See* VCS.
virtual disk	Variable disk capacity that is defined and managed by the array controller and presentable to hosts as a disk.

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