BROADCOM®

Emulex® HBA Manager Application Command Line Interface

User Guide
Release 12.8

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Chapter 1: Introduction

The Emulex® HBA Manager application CLI is a comprehensive management utility for Emulex adapters. The CLI provides support for commonly used commands without requiring the installation of the Emulex HBA Manager application GUI. The Emulex HBA Manager CLI console application name is HbaCmd. At the command line interface, a single operation is performed by entering hbacmd, followed by a CLI client command and its possible parameters.

The Emulex HBA Manager application CLI can be installed on multiple operating systems: Windows, Linux, and Solaris. For VMware ESXi hosts, use the Emulex HBA Manager application for VMware vCenter. For details, refer to the *Emulex HBA Manager Application for VMware vCenter User Guide*. You can also manage adapters using the Emulex HBA Manager application CLI on Windows, but you must install and use the appropriate Emulex CIM provider on those VMware hosts.

The Emulex HBA Manager shared CLI feature enables you to install the Emulex HBA Manager application CLI in a shared directory that can be run locally on Linux systems. See Section 2.6, Installing and Running the Emulex HBA Manager Shared CLI, for more information.

This product supports the following Emulex HBAs and CNAs:
- LPe12000-series adapters
- LPe15000-series adapters
- LPe16000-series adapters, including PowerPC® CNAs
- LPe31000-series adapters
- LPe32000-series adapters
- LPe35000-series adapters

For supported versions of operating systems and platforms, go to www.broadcom.com.

NOTE: The Emulex OneCommand® Manager application has been renamed as the Emulex HBA Manager application. However, the following items within the application continue to use OneCommand:
- Kit names
- Script names
- Directory names
- Command names

NOTE: The Solaris operating system is supported only on FC HBAs.

NOTE: For VMware ESXi hosts, when advanced adapter management capabilities are required (for example, port disablement), use the Emulex HBA Manager application for VMware vCenter. For more details, refer to the *Emulex HBA Manager Application for VMware vCenter Application User Guide*.

1.1 Abbreviations

CNA	converged network adapter
CSV	comma separated value
DAC	direct-attach copper
DCB	data center bridging
DCBX	Data Center Bridging Capability Exchange protocol
DH	Diffie-Hellman
DH-CHAP	Diffie-Hellman Challenge Handshake Authentication Protocol
D_ID	destination identifier
ETS	Enhanced Transmission Selection
FA-PWWN	Fabric Assigned Port WWN
FCP	Fibre Channel protocol
FEC	forward error correction
GFO	get fabric object
LBA	logical block addressing
LLDP	Link Layer Discovery Protocol
LUN	logical unit number
OAS	optimized access storage
OB	OpenBoot
PAM	Pluggable Authentication Module
PFC	priority flow control
PG	priority group
QSFP	quad small form-factor pluggable
Rx	receive
SFCB	Small Footprint CIM Broker
Tx	transmit
VPD	vital product data
XML	Extensible Markup Language

1.2 Emulex HBA Manager Application Secure Management

The Secure Management feature in the Emulex HBA Manager application enables system administrators to further enhance the active management security of their networks. Using Secure Management, administrators can define each user's privileges for managing both local and remote adapters. When running in Secure Management mode, users must specify their user name and password to run the Emulex HBA Manager CLI. When users are authenticated, only they can perform the functions allowed by the Emulex HBA Manager application user group to which they belong. If your systems are running in an LDAP or Active Directory domain, the Emulex HBA Manager application CLI will authenticate the user with those defined in that domain. For Linux and Solaris systems, this is accomplished using PAM.

NOTE: Secure Management is supported on Linux, Solaris, and Windows, but it is not supported on VMware hosts. For VMware hosts, the CIM credentials are used.

Administrators set up user accounts such that a user belongs to one of the Emulex HBA Manager application user groups. The user groups define the management capabilities for the user. Table 1 defines the Emulex HBA Manager application user groups and each group's management capabilities.

Table 1: Secure Management User Privileges

Group Name	Emulex HBA Manager Application Capability
ocmadmin	Allows full active management of local and remote adapters
ocmlocaladmin	Permits full active management of local adapters only
ocmuser	Permits read-only access to local and remote adapters
ocmlocaluser	Permits read-only access to local adapters

On Linux or Solaris systems, the `unix getent group` utility can be run on the target host system's command shell to verify the correct configuration of the groups. The groups, and users within the groups, appear in the output of this command.

NOTE: Although users can belong to the administrator group or be a root user, they will not have full privileges to run the Emulex HBA Manager application unless they are also a member of the ocmadmin group. Otherwise, when Secure Management is enabled, a root user or an administrator can manage only local adapters (similar to an ocmlocaladmin user).

Remote management operations between two machines is allowed or denied depending on the Secure Management status of the machines, and the domains to which the machines belong. The following tables (Table 2, Table 3, and Table 4) list the expected behavior for each machine domain condition (assuming appropriate user credentials are used).

Table 2: Active Commands: Machines on the Same Domain

	Remote Server (Secure)	Remote Server (Not Secure)
Client (Secure)	Allowed	Denied[a]
Client (Not Secure)	Denied	Allowed

a. Informs you of an unsecured server that you might want to secure.

Table 3: Active Commands: Machines on Different Domains

	Remote Server (Secure)	Remote Server (Not Secure)
Client (Secure)	Denied[a]	Denied[b]
Client (Not Secure)	Denied	Allowed

a. Allowed if the user name and password are the same on both domains.

b. Informs you of an unsecured server that you might want to secure.

Table 4: Passive Commands: Machines on Any Domain

	Remote Server (Secure)	Remote Server (Not Secure)
Client (Secure)	Allowed	Allowed
Client (Not Secure)	Allowed	Allowed

1.2.1 Configuration Requirements for Emulex HBA Manager Application Secure Management

For systems to run in the Secure Management environment in the Emulex HBA Manager application, they must be configured to provide the following two capabilities:

- Authentication – On Linux and Solaris, this is accomplished by using the PAM interface and must be configured as follows:
  - On Linux, it is the `/etc/pam.d/passwd` file auth section or the equivalent.
  - On Solaris, place the correct value in the auth section of the `/etc/pam.d/other` file or its earlier equivalent, `/etc/pam.conf`.

NOTE: For Solaris systems, you must use `useradd -G groupname` for authentication to work. You cannot use a lowercase `g`.

- User Group Membership – From the host machine, the Emulex HBA Manager application Secure Management must be able to access the Emulex HBA Manager application group to which the user belongs. For Linux and Solaris systems, it uses the `getgrnam` and `getgrid` C-library API calls. The equivalent to the API calls can be obtained by typing `getent group` from the shell command line. If the four Emulex HBA Manager application group names are listed with their member users, the system is ready to use Emulex HBA Manager application Secure Management.

1.3 Secure Management Installation

The enabling or disabling of the Secure Management feature is specified when installing the Emulex HBA Manager application CLI. Secure Management can be set interactively or by using dedicated installation switches on Windows, Linux, and Solaris. On Linux and Solaris, if the Emulex HBA Manager groups described in Table 1, Secure Management User Privileges, are not configured on the machine during installation, the installation will fail when the Secure Management feature is selected.

NOTE: Only a user with administrator or root privileges can enable or disable the Secure Management feature on a local host machine.

NOTE: Management mode cannot be used if Secure Management is enabled.

1.3.1 Linux and Solaris

This section describes the Secure Management installation options for the Linux and Solaris operating systems.

1.3.1.1 Interactive Installation

Enterprise Emulex HBA Manager application installations performed in Interactive mode prompt you about enabling Secure Management. If you enable Secure Management, the other management mode questions are skipped. If you do not enable Secure Management, the management mode installation questions follow.

1.3.1.2 Unattended Installation with Install Script Switch Option Support

Enterprise Emulex HBA Manager application installations performed in Unattended mode provide a switch option to enable Secure Management. If the Secure Management switch is not used with the installation, Secure Management is disabled.

1.3.2 Windows

During Emulex HBA Manager installations performed in Interactive mode, the **Management Mode** window enables you to select **Secure Management** as the management mode.

1.4 Setting Secure Management Mode for Linux and Solaris

To set the Secure Management mode for the Linux and Solaris operating systems, perform the following steps:

1. Log on as root.

2. Set Secure Management:
   - To set Secure Management mode for Linux, type the following command:

     ```
     /usr/sbin/ocmanager/set_operating_mode
     ```
   - To set Secure Management mode for Ubuntu, type the following command:

     ```
     /opt/emulex/ocmanager/scripts/set_operating_mode.sh
     ```
   - To set Secure Management mode for Solaris, type the following command:

     ```
     /opt/ELXocm/ocmanager/set_operating_mode
     ```

   The following example text is displayed:
   ```
   Do you want to enable Secure Management feature for HBA Manager? (s/u)
   The secure management feature requires HBA Manager groups be configured on the LDAP network or the
   local host machine to provide for HBA Manager operation.
   Enter 's' to select secure management. (LDAP/NIS OCM group configuration required)
   Enter 'u' to run without secure management (default.
   Enter the letter 's' or 'u': s
   ```

1.4.1 Using the Emulex HBA Manager Application with Secure Management Enabled

To run the Emulex HBA Manager application CLI when Secure Management mode is enabled, you must include your user name and password each time you type a command.

The syntax for entering your user name and password is the following:
```
hbacmd <m=sec> <u=userid> <p=password> <command>
```

For example:
```
> hbacmd m=sec u=jsmith p=password download 00-12-34-56-78-9A oc11-4.6.96.2.ufi
```

User names and passwords authenticate the commands. After the credentials are authenticated, the Emulex HBA Manager CLI determines to which user group you belong and allows only command usage appropriate to that group.

Chapter 2: Installing and Uninstalling the Emulex HBA Manager CLI

This chapter details prerequisites and procedures for installing and uninstalling the Emulex HBA Manager CLI in the Linux, Solaris, and Windows. Secure Management capability and the procedures for starting and stopping the daemon processes are also explained.

This chapter also describes how to install and run the Emulex HBA Manager shared CLI on Linux systems.

2.1 Linux

The following instructions are for installing and uninstalling the Emulex HBA Manager CLI on Linux operating systems. You can install Linux with or without an existing Emulex HBA CLI kit.

NOTE: Security Enhanced Linux (SELinux) must be enabled after installing Emulex HBA Manager application or the installed files will have incorrect SELinux context settings.

To ensure Emulex HBA Manager application installation files have the correct context settings, perform the following steps:

1. Install the Emulex HBA Manager application.
2. Enable SELinux.
3. Reboot the system.
4. Disable SELinux.
5. Reboot the system.

2.1.1 Installing in Linux without an Existing Emulex HBA Manager Application CLI Kit

NOTE: For Secure Management, prior to installation, the Emulex HBA Manager application groups must be configured on the LDAP network or the local host machine for Secure Management operation. See Section 1.2.1, Configuration Requirements for Emulex HBA Manager Application Secure Management, for configuration instructions.

2.1.1.1 Linux Emulex HBA Manager Application Requirements

For new systems, install the specific Linux driver rpm before installing the Emulex HBA Manager CLI.

2.1.1.1.1 Installing the Emulex HBA Manager Application

To install the Emulex HBA Manager CLI in Linux without an existing Emulex HBA Manager application CLI, perform the following steps:

1. Copy the application kit tar file to a directory on the installation machine.

2. Change to the directory where you copied the tar file.

3. Untar the file:
   ```
   tar zxvf elxocmcore-<supported_os>-<app_ver>-<rel>.tgz
   ```

4. Change to the core kit directory created in Step 3.
   ```
   cd elxocmcore-<supported_os>-<app_ver>-<rel>
   ```

5. Run the `install.sh` script.
   ```
   ./install.sh
   ```

The core kit consists of three or four of the following rpm files for each supported architecture and each supported version of Linux:

- `elxocmlibhbaapi-*.rpm` (on 64-bit platforms that support 32-bit applications, there are two of these files)
- `elxocmcore-*.rpm`
- `elxocmcorelibs-*.rpm`

6. When you are prompted, choose whether to enable Secure Management for the Emulex HBA Manager application:
   ```
   Do you want to enable Secure Management feature for HBA Manager? (s/u)
   Enter 's' to select secure management. (LDAP/NIS OCM group configuration required)
   Enter 'u' to run without secure management (default).
   Enter the letter 's' or 'u'.
   ```

If you enter `u`, an additional prompt is given for the management mode:
```
You selected: Secure Management Disabled
Select desired mode of operation for HBA Manager:
Enter the number 1, 2, 3, 4 or 5: 1
You selected: 'Local Only Mode'
```

1 Strictly Local Management:	Only manage the adapters on this host. Management of adapters on this host from other hosts is not allowed.
2 Local Management Plus:	Only manage the adapters on this host. Management of adapters on this host from other hosts is allowed.
3 Full Management:	Manage the adapters on this host and other hosts that allow it. Management of the adapters on this host from another host is allowed.
4 Management Host:	Manage the adapters on this host and other hosts that allow it. Management of the adapters on this host from another host is not allowed.
5 Strictly Local Management with Daemons Disabled	Only manage the adapters on this host. Management of adapters on this host from other hosts is not allowed. Emulex HBA Manager daemons are disabled, which limits some application features.

2.1.1.1.2 Unattended Installation

The `install.sh` script can be run in Noninteractive (unattended or quiet) mode. Enter the following command to view the syntax:
```
./install.sh --help
```

To perform an unattended, silent installation, enter the following command:
```
./install.sh –q2
```

NOTE: The management mode default for unattended installation is Local Management Plus.

2.1.2 Installing in Linux with an Existing Emulex HBA Manager Application CLI Kit

NOTE: The Emulex HBA Manager application core kit cannot be installed if the OneCommand Manager or HBAnyware utilities are installed.

Two options are available for installing the Emulex HBA Manager application CLI on a Linux system with an existing Emulex HBA Manager application CLI kit:

- Updating an existing installation – Preserve existing settings
- Performing a clean install – Overwrite existing settings

2.1.2.1 Updating an Existing Installation (Preserving Existing Settings)

To update the Emulex HBA Manager application CLI and preserve settings, you must install the current core kit as detailed in Section 2.1.1, Installing in Linux without an Existing Emulex HBA Manager Application CLI Kit. The `.rpm` file handles the configuration file update. The install script executes an `.rpm` file update (`rpm -U *.rpm`) to update the installed version of the core kit to the current version.

NOTE: There is no update path from an HBAnyware 4.x or 3.x core kit to a OneCommand Manager 5.1 or later core kit. In order to install the Emulex HBA Manager core kit, you must upgrade the operating system to one that supports the Emulex HBA Manager core kit, uninstall HBAnyware, and then install the Emulex HBA Manager core kit.

2.1.2.2 Performing a Clean Installation (Overwriting Existing Settings)

1. Uninstall the existing OneCommand Manager CLI using the uninstall script included in the tar file or in the `/usr/sbin/ocmanager/scripts` directory. The configuration files are backed up by rpm with an `.rpmsave` extension.

   For Ubuntu (PowerPC CNAs only), use the uninstall script in the following location:
   `/opt/emulex/ocmanager/scripts`

NOTE: If an HBAnyware CLI or enterprise kit is installed, follow the procedure in Section 2.1.4, Uninstalling HBAnyware Kits in Linux.

2. Install the specific rpm file for your driver for Linux version. For information on installing the rpm file, see Section 2.1.1, Installing in Linux without an Existing Emulex HBA Manager Application CLI Kit.

2.1.3 Uninstalling in Linux

To uninstall the Emulex HBA Manager application CLI in Linux, perform the following steps:

1. Log on as root.

2. Perform one of the following tasks:
   - Run the `uninstall_ocmanager.sh` script located in `/usr/sbin/ocmanager/scripts`.
   - Run the `uninstall.sh` script located in the installation tar file.
   - For Ubuntu (PowerPC CNAs only), use the uninstall script in the following location:

     `/opt/emulex/ocmanager/scripts/uninstall.sh`

2.1.4 Uninstalling HBAnyware Kits in Linux

2.1.4.1 Uninstalling an HBAnyware Core Kit

Run the following command to remove the core kit.

```
rpm -e elxlinuxcorekit
```

2.1.4.1.1 Uninstalling an HBAnyware Enterprise Kit

1. Perform one of the following tasks:
   – Run the uninstall script located in `/usr/sbin/hbanyware/scripts` to remove the enterprise kit.
   – Run the uninstall script located in the tar file to remove the enterprise kit.

   If the HBAnyware Security Configurator is installed, you must uninstall it before uninstalling the HBAnyware configuration utility. You must use the uninstall script that shipped with the version of OneCommand Security Configurator that you want to remove and proceed to Step 2. If the Security Configurator is not installed, proceed to Step 3.

2. If the HBAnyware Security Configurator is installed, follow these steps:
   a. Log on as root.
   b. Change to the directory containing the tar file.
   c. Extract the tar file using the `tar -xvf` command.
   d. Change to the newly created directory.
   e. Type the following uninstall script with the `ssc` parameter specified:

      ```
      ./uninstall ssc
      ```

3. Uninstall the HBAnyware utility and the Application Helper module:
   a. Log on as root.
   b. Change to the directory containing the tar file.
   c. Extract the tar file using the `tar -xvf` command.
   d. Change to the newly created directory.
   e. Uninstall any previously installed versions. Type the following command:

      ```
      ./uninstall
      ```

2.2 Solaris

The following instructions are for installing and uninstalling the Emulex HBA Manager CLI on Solaris operating systems.

CAUTION! The Emulex HBA Manager application installation overwrites some conflicting files that are required by the `fwupdate` tool. The `fwupdate` tool will work after the Emulex HBA Manager application is installed, but it might fail when uninstalling OneCommand Manager. To fix the `fwupdate` tool, execute the `pkg fix` command.

2.2.1 Installing in Solaris

NOTE: For Secure Management, prior to installation, the Emulex HBA Manager application groups must be configured on the LDAP network or the local host machine for Secure Management operation. See Section 1.2.1, Configuration Requirements for Emulex HBA Manager Application Secure Management, for configuration instructions.

To install the Emulex HBA Manager CLI in Solaris, perform the following steps:

1. Copy the Emulex HBA Manager core kit to a temporary directory on the system.

2. Untar the core kit by typing the following command:
   ```
   tar xvf elxocmcore-solaris-<kit version>.tar
   ```

3. Change to the newly created `elxocmcore-solaris-<kit version>` directory:
   ```
   cd ./elxocmcore-solaris-<kit version>/
   ```

4. Run the `install` script and follow the instructions.
   ```
   ./install
   ```

NOTE: The `install` script can also be run in Noninteractive (unattended, quiet) mode. Enter the following command to view the syntax:
   ```
   /install --help
   ```

If any of the following are already present on the system, the `install` script attempts to remove them first:
   – HBAnyware utility
   – OneCommand Manager core kit
   – OneCommand Manager enterprise kit
   – Emulex HBA Manager core kit
   – Emulex HBA Manager enterprise kit
   – Solaris driver utilities

5. When you are prompted, choose whether to enable Secure Management for the Emulex HBA Manager application:
   ```
   Do you want to enable Secure Management feature for HBA Manager? (s/u)
   Enter 's' to select secure management. (LDAP/NIS OCM group configuration required)
   Enter 'u' to run without secure management (default).
   Enter the letter 's' or 'u'.
   ```
   If you enter `u` here, an additional prompt is given for the management mode:
   ```
   You selected: Secure Management Disabled
   Select desired mode of operation for HBA Manager:
   Enter the number 1, 2, 3, or 4: 1
   You selected: 'Local Only Mode'
   ```

1 Strictly Local Management:	Only manage the adapters on this host. Management of adapters on this host from other hosts is not allowed.
2 Local Management Plus:	Only manage the adapters on this host. Management of adapters on this host from other hosts is allowed.
3 Full Management:	Manage the adapters on this host and other hosts that allow it. Management of the adapters on this host from another host is allowed.
4 Management Host:	Manage the adapters on this host and other hosts that allow it. Management of the adapters on this host from another host is not allowed.

2.2.2 Uninstalling in Solaris

To uninstall the Emulex HBA Manager CLI in Solaris, perform the following steps:

1. Log on as root.

2. Perform one of the following tasks:
   - Run `/opt/ELXocm/scripts/uninstall`.
   - Run the `uninstall` script located in the installation tar file.
   - Enter the command `pkgrm ELXocmcore`.

NOTE: The `uninstall` script can also be run in Noninteractive (quiet) mode. Enter the following command to view the syntax:

```
./uninstall --help
```

2.3 VMware ESXi

The Emulex HBA Manager CLI cannot be run on a VMware ESXi operating system. However, a VMware ESXi host can be accessed remotely from the Windows Emulex HBA Manager CLI if the CIM provider is installed on the ESXi host. For instructions on installing the CIM provider on VMware ESXi operating systems, refer to the *Emulex CIM Provider Package Installation Guide*.

2.4 Windows

The following instructions are for installing and uninstalling the Emulex HBA Manager CLI on Windows operating systems. Install the Emulex HBA Manager CLI in Windows in one of two ways:

- Attended installation – You are present during the installation. You are prompted for more information for the installation to continue.
- Unattended installation – You do not need to be present during the installation. Installation will complete on its own. Installation progress can be displayed as an option.

2.4.1 Installing in Windows by Attended Installation

To install the Emulex HBA Manager CLI, run the `installation.exe` file for a Windows core driver kit that does not include the Emulex HBA Manager GUI, and follow the installation instructions.

Use the following syntax for the installation executable file:
```
elxocmcore-windows-x64-<kit version>.exe
```

`<kit version>` represents the complete kit version.

For example, at the command prompt, type the following command:
```
elxocmcore-windows-x64-12.8.123.1-1.exe
```

2.4.2 Installing in Windows by Unattended Installation

To install the Emulex HBA Manager CLI in Windows in Unattended mode, perform the following steps:

1. From www.broadcom.com, download the Emulex HBA Manager core kit installation file to your system.

2. Use the following syntax for the installation executable file:
   `elxocmcore-windows-x64-<kit version>.exe <option>`

3. Activate the kit with switch `/q` or `/q2`.
   – The `/q` switch displays progress reports.
   – The `/q2` switch does not display progress reports.

4. Either enable Secure Management mode by adding the `sec=1` argument or disable it by adding `sec=0`. If the `sec` argument is not entered, Secure Management is disabled by default. See Section 1.2, Emulex HBA Manager Application Secure Management, for more information.

   To enable Secure Management mode, at the command prompt type the following command:
   `elxocm-windows-x64-<kit version>.exe sec=1 /q2`

   To disable Secure Management mode, at the command prompt type the following command:
   `elxocm-windows-x64-<kit version>.exe sec=0 /q2`

NOTE: Two management mode defaults are available for unattended installation:
- `mmode=3` (full management mode)
- `achange=1`

NOTE: If you enabled Secure Management mode and attempt to enter an `mmode` value in Step 5, a `conflicting parameters` error can occur.

5. Select a management mode by adding the `mmode` argument, and select the ability to change the management mode by adding the `achange` argument with selected values as in the following example.

   For example, at the command prompt type the following command:
   `elxocm-windows-x64-5.01.00.10-4.exe mmode=3 achange=1 /q2`

   The following are the possible `mmode` values:
   - `1` – Local Only Management mode
   - `2` – Local Plus Management mode
   - `3` – Full Management mode
   - `4` – Local Plus Management mode and Read Only
   - `5` – Full Management mode and Read Only
   - `6` – Management host

   The following are the possible `achange` values:
   - `0` – Do not allow management mode to change
   - `1` – Allow management mode to change

   You can also set the following optional parameters:

   – `MHost` – This optional switch allows a nonmanagement-host user to select a management host with which to register. If this switch is not specified, the default value of `0` is used, and the capability will be dimmed. If the switch is specified, the value can be a host name or an IP address, which is validated by the installer. An error message appears if `mmode` is set as Local Only management mode or Management Host mode.

- – `mExcl` – This optional switch allows the nonmanagement-host user to select whether the Emulex HBA Manager application processes requests exclusively from the management host specified by the `MHost` switch. This option is accepted only if it is accompanied by a valid `MHost` value; otherwise, an error message appears. If this switch is not specified, the default value of `0` is used. If the switch is specified, the following are valid values:
  - `0` – Remotely managed by other hosts.
  - `1` – Remotely managed by management host only.
- – `Mtcp` – This optional switch allows you to enable or disable remote management and to specify the TCP/IP port number over which management occurs. If this switch is not specified, the default TCP/IP port number 23333 is used.

  If the management host option is selected, you must select the default port number or enter a valid TCP/IP port number on the command line. A value of `0` is not accepted.

  If one of the nonmanagement host options is selected, you can enter the TCP/IP port number on the command line.

2.4.3 Uninstalling in Windows

You can uninstall the Emulex HBA Manager CLI in Windows in one of two ways:

- Through the Control Panel
- Through the command line

2.4.3.1 Uninstalling through the Control Panel

To uninstall the Emulex HBA Manager CLI in Windows through the Control Panel, perform the following steps:

1. In the Control Panel, select **Programs and Features**.

2. If present, select **Emulex HBA Manager CLI** [*version*], and click **Uninstall/Change;** you are prompted to continue. Click **Yes**.

The Emulex HBA Manager CLI components are removed from the system.

2.4.3.2 Uninstalling through the Command Line

To uninstall the Emulex HBA Manager CLI in Windows through the command line, perform the following steps:

1. Change to the appropriate uninstall directory:
   ```
   cd <Installation Location>\Emulex\Util\Uninstall
   ```

2. Type the following command:
   ```
   uninstall_OCManager_Core.bat
   ```

2.5 Starting and Stopping Daemon Processes for Linux and Solaris Installations

NOTE: When you install the Emulex HBA Manager CLI in Linux and are prompted to select the management mode, if you choose the desired mode of operation as 5, Strictly Local Management with Daemons Disabled, daemons are disabled from starting during boot.

On Linux and Solaris machines, you can stop and start the Emulex HBA Manager application daemon processes using the `stop_ocmanager` and `start_ocmanager` scripts, respectively. The scripts are found in the following Emulex HBA Manager application installation directories:

- Linux – `/usr/sbin/ocmanager`
- Ubuntu – `/opt/emulex/ocmanager/scripts`:
  - `stop_ocmanger.sh`
  - `start_ocmanager.sh`
- Solaris – `/opt/ELXocm`

The `elxhbamgrd` daemon process (included with Emulex HBA Manager CLI) is affected by these scripts. It is a remote management daemon that services requests from Emulex HBA Manager clients running on remote host machines.

The daemon processes start at system boot time.

2.6 Installing and Running the Emulex HBA Manager Shared CLI

The Emulex HBA Manager shared CLI for Linux enables you to install the CLI to a shared location on the network, and then run the application in Strictly Local Management mode from any Linux system with at least read-only access to the shared location.

Refer to the *Emulex Drivers for Linux Release Notes*, available at www.broadcom.com, for the supported RHEL and SLES operating systems.

Each system running the Emulex HBA Manager shared CLI writes files to a temporary directory in the local system. During the installation process, you are prompted to provide two directory locations:

- `<Installation Directory>` is the directory path for the Emulex HBA Manager shared CLI files on the shared network location.
- `<Temporary Directory>` is the local directory path on each server, where temporary files are to be written.

In addition, the application installs and accesses the following files on each system:

- `/etc/emulex/ocmanager/rm.conf`
- `/etc/emulexDiscConfig`
- `/etc/emulexRMConfig`
- `/etc/emulexRMOptions`
- `/etc/hba.conf`

NOTE: You must have administrator privileges to install and run the `elx_hbacmd.sh` script.

The Emulex HBA Manager shared CLI does not support the following procedures:

- Installing the application in Noninteractive mode.
- Using the `elxhbamgr` daemon process.
- Setting the Secure Management mode.
- Changing the following Emulex HBA Manager configuration file directories:
  - `/etc/emulex/ocmanager`
  - `/etc`
- Changing the path to the `/etc/hba.conf` file.
  The Emulex HBA Manager shared CLI updates this file on each client. This file is an operating system file that is used by the Emulex HBA Manager shared CLI.
- Using the Emulex HBA Manager enterprise application kit.
- Running more than one instance of the `elx_hbacmd.sh` script on a client.
- Running the `elx_hbacmd.sh` script while a local installation of the standard Emulex HBA Manager CLI is running.
- Running the standard `hbacmd` command directly from the shared installation directory.

2.7 Installing the Emulex HBA Manager Shared CLI Files

NOTE: It is best practice to create a separate shared CLI directory for each operating system.

To install the Emulex HBA Manager shared CLI in Linux, perform the following steps:

1. Download the Emulex HBA Manager core application kit `.tgz` file.

2. Change to the directory into which you copied the `.tgz` file.

3. Untar the file by typing the following command:
   ```
   tar zxvf elxocmcore-<supported_os>-<app_ver>-<rel>.tgz
   ```

4. Change to the directory created in Step 3 by typing the following command:
   ```
   cd elxocmcore-<supported_os>-<app_ver>-<rel>/
   ```

5. Run the Emulex HBA Manager shared CLI script by typing the following command:
   ```
   ./install_shared_ocm.sh
   ```
   When prompted, provide the shared directory path and the local directory path as described previously.

Following is an example of the installation process, where:

- The file name of the installation kit is `elxocmcore-rhel7-rhel8-12.8.123.1-1.tgz`
- `<Installation Directory>` is specified as `/mnt/sharedtools/rhel78`
- `<Temporary Directory>` is specified as `/tmp/log`:

From the untar directory, type the following command:
```
./install_shared_ocm.sh
```

The following text is displayed:
```
[untar_ocm]
Output directory: /tmp/elx-hbacmd-dir.B30niP/elxocmcore-rhel7-rhel8-12.8.123.1-1

[get_ocm_rpm_dir]
OCM RPM directory: /tmp/elx-hbacmd-dir.B30niP/elxocmcore-rhel7-rhel8-12.8.123.1-1/x86_64/rhel-7

[extract_ocm_rpms]
rpm2cpio elxocmcore-12.8.123.1-1.x86_64.rpm | cpio -divm
rpm2cpio elxocmcorelibs-12.8.123.1-1.x86_64.rpm | cpio -divm
```

```
rpm2cpio hbaapiwrapper-12.8.123.1-1.x86_64.rpm | cpio -divm
```

```
[get_install_dir]
Enter the installation directory path:
```

Type the following installation path name:
```
/mnt/sharedtools/rhel78
```

The following text is displayed:
```
Installation directory: /mnt/sharedtools/rhel78/ocm
```

```
[get_tmp_dir]
Enter the temp directory path:
```

Type the following temporary path name:
```
/tmp/log
```

The following text is displayed:
```
Temp directory: /tmp/log/ocm_tmp
```

```
[rm_ocm_symlinks]
Deleting OCM symbolic links
```

```
[rm_ocm_scripts]
Deleting OCM executables that are not needed
Deleting 32bit libraries
```

```
[set_ocm_install_dir]
OCM installation directory: /mnt/sharedtools/rhel74/ocm/usr/sbin/ocmanager
```

```
[set_ocm_tmp_dir]
OCM temporary directory: /tmp/log/ocm_tmp/var/opt/emulex/ocmanager
```

```
[update_emulexRMConfig]
Updating etc/emulexRMConfig
```

```
[mk_RMRepository_dir]
mkdir -p var/opt/emulex/ocmanager/RMRepository
```

```
[mk_hbacmd_script]
Creating elx_hbacmd.sh
```

```
[cp_ocm_to_dest_dir]
cp -r /tmp/elx-hbacmd-dir.B30niP/elxocmcore-rhel7-rhel8-12.8.123.1-1/x86_64/rhel-7/* /mnt/
sharedtools/ocm/
cp elx_hbacmd.sh /mnt/sharedtools/rhel78/ocm/usr/sbin/ocmanager/
```

```
[install_complete]
Installation complete
OCM installation directory: /mnt/sharedtools/rhel78/ocm/usr/sbin/ocmanager
OCM temporary directory : /tmp/log/ocm_tmp/var/opt/emulex/ocmanager
```

The absolute directory on the shared location on the network is
```
/mnt/sharedtools/rhel78/ocm/usr/sbin/ocmanager
```

The absolute local directory path on each server, in which temporary files are written, is
```
/tmp/log/ocm_tmp/var/opt/emulex/ocmanager
```

2.7.1 Running the Emulex HBA Manager Shared CLI

Ensure that the shared installation directory is mounted on the server. This directory can be read-only.

NOTE: You must run the version of the Emulex HBA Manager shared CLI that matches the operating system on the server.

To run the Emulex HBA Manager shared CLI, perform the following steps:

1. Change to the application directory on the shared network location:
   ```
   cd <Installation Directory>/ocm/usr/sbin/ocmanager
   ```

2. Invoke `hbacmd` commands using the following command syntax:
   ```
   ./elx_hbacmd.sh <options>
   ```

Following is an example of using the Emulex HBA Manager shared CLI to run the `listhbas` command, using the installation directory and temporary directory as provided in the preceding installation example. On any system where the shared directory is mounted, type the following commands:
```
cd /mnt/sharedtools/rhel78/ocm/usr/sbin/ocmanager
./elx_hbacmd.sh listhbas
```

The following text is displayed:
```
Manageable HBA List

Port WWN        : 10:00:00:90:fa:94:80:bb
Node WWN        : 20:00:00:90:fa:94:80:bb
Fabric Name     : 00:00:00:00:00:00:00:00
Flags           : 8000f400
Host Name       : dhcp-10-231-221-14
Mfg             : Emulex Corporation
Serial No.      : NP74900046
Port Number     : 0
Mode            : Initiator
PCI Bus Number  : 4
PCI Function    : 0
Port Type       : FC+NVMe
Model           : LPe35002-M2

Port WWN        : 10:00:00:90:fa:94:80:bc
Node WWN        : 20:00:00:90:fa:94:80:bc
Fabric Name     : 00:00:00:00:00:00:00:00
Flags           : 8000f400
Host Name       : dhcp-10-231-221-14
Mfg             : Emulex Corporation
Serial No.      : NP74900046
Port Number     : 1
Mode            : Initiator
PCI Bus Number  : 4
PCI Function    : 1
Port Type       : FC+NVMe
Model           : LPe35002-M2
```

```
Port WWN        : 10:00:00:90:fa:c7:da:a2
Node WWN        : 20:00:00:90:fa:c7:da:a2
Fabric Name     : 00:00:00:00:00:00:00:00
Flags           : 8000e300
Host Name       : dhcp-10-231-221-14
Mfg             : Emulex Corporation
Serial No.      : FC61659445
Port Number     : 0
Mode            : Initiator
PCI Bus Number  : 9
PCI Function    : 0
Port Type       : FC+NVMe
Model           : LPe32002-M2

Port WWN        : 10:00:00:90:fa:c7:da:a3
Node WWN        : 20:00:00:90:fa:c7:da:a3
Fabric Name     : 00:00:00:00:00:00:00:00
Flags           : 8000e300
Host Name       : dhcp-10-231-221-14
Mfg             : Emulex Corporation
Serial No.      : FC61659445
Port Number     : 1
Mode            : Initiator
PCI Bus Number  : 9
PCI Function    : 1
Port Type       : FC+NVMe
Model           : LPe32002-M2
```

2.7.2 Deleting Client Configuration Files and Temporary Directories

The `elx_hbacmd.sh` script includes a `--cleanup` option that deletes the following items:

- The client's Emulex HBA Manager shared CLI temporary directory. This directory is `/tmp/log/ocm_tmp` in the installation example.
- Local Emulex HBA Manager shared CLI configuration files and directories, such as `/etc/emulex`, but only if they are not in use by the Emulex HBA Manager application.

To use the `--cleanup` option, type the following command:

```
./elx_hbacmd.sh --cleanup
```

The following text appears:

```
rm -rf /etc/emulex

rm -rf /tmp/log/ocm_tmp
```

2.8 Updating the Emulex HBA Manager CLI to the Emulex HBA Manager Enterprise Kit

NOTE: The full-featured Emulex HBA Manager enterprise kit is not supported on the VMware ESXi server.

This chapter details procedures for updating the Emulex HBA Manager CLI to the Emulex HBA Manager enterprise kit in Linux, Solaris, and Windows operating systems. An update can be performed only if the version of the Emulex HBA Manager enterprise kit is the same or later than the Emulex HBA Manager CLI version.

NOTE: You cannot update an Emulex HBA Manager CLI with an earlier version of the Emulex HBA Manager enterprise kit.

2.8.1 Linux

To update from the Emulex HBA Manager CLI to the full-featured Emulex HBA Manager enterprise kit in Linux, run the `install.sh` script of the Emulex HBA Manager enterprise kit.

The install script executes an rpm file update (`rpm -U *.rpm`) to update the installed core kit to an enterprise kit.

2.8.2 Solaris

To update from the Emulex HBA Manager CLI to the full-featured Emulex HBA Manager enterprise kit in Solaris, perform the following steps:

1. Download the Emulex HBA Manager enterprise kit to a temporary directory on your system.

2. Untar the Emulex HBA Manager enterprise kit tar file:
   ```
   tar xvf elxocm-solaris-<kit version>.tar
   ```

3. Change to the newly created `elxocm-solaris-<kit version>` directory:
   ```
   cd ./elxocm-solaris-<kit version>/
   ```

4. Run the `install` script and follow the instructions:
   ```
   ./install
   ```

The `install` script can also be run in Noninteractive (quiet) mode. To view the syntax, type the following command:
```
/install --help
```

2.8.3 Windows

To update from the Emulex HBA Manager application CLI to the full-featured Emulex HBA Manager application enterprise kit in Windows, from the desktop run the `elxocm-windows-<kit version>.exe` file that contains the full application kit.

Running this executable file removes the Emulex HBA Manager CLI and installs a full-featured version of the Emulex HBA Manager application that includes the CLI and the GUI.

Chapter 3: Emulex HBA Manager CLI Client Command Usage

The CLI client component of the Emulex HBA Manager application provides access to the capabilities of the Remote Management library or the CIM interface from a console command prompt to get the management information.

3.1 Overview

The CLI client is intended for use in command shells or scripted operations from within shell scripts or batch files. The CLI client is a console application named `HbaCmd`. A single operation is performed by typing `hbacmd` at the command line, followed by a CLI client command and its possible parameters. For example:

```
hbacmd [cli options] <command> [parameters]
```

The CLI options are specified for running the CLI commands on remote hosts or with Secure Management.

When the specified operation is completed, the command prompt is displayed. For a majority of commands, the first parameter following the command is the WWPN or MAC address of the port on which the command is to act.

3.1.1 CLI in Read-Only Mode

The CLI does not allow the execution of some commands if it is configured for Read-Only mode. The following error message is returned if such a command is attempted:

```
Error: Read-only management mode is currently set on this host. The requested command is not
permitted in this mode.
```

3.2 HbaCmd Syntax Usage

The following syntax rules and usage apply to the `HbaCmd` application:

- Parameters denoted within angle brackets < > are required.
- Parameters denoted within square brackets [ ] are optional.
- For Linux and Solaris systems (which are case-sensitive), program names must be in lowercase letters. Therefore, the command line must begin with `hbacmd` (rather than `HbaCmd`). Windows is not case-sensitive, so the program name is not required to be in all lowercase letters.
- For Windows systems, you must use the full path, for example
  `C:\Program Files\Emulex\Util\OCManager\hbacmd` or you must manually include the HBA Manager installation path to the Windows `PATH` variable.
- To run the command on a remote host, an IP address or a host name must be specified using the `h` option with the following syntax:
  `hbacmd [h=IP_Address[:port] | Hostname[:port]] <command> [parameters]`
  - If the `h` option is omitted, the command is run on the local host.
  - If the `h` option is specified, the command is sent to the specified remote host (assuming it is specified correctly, the remote host is up, and the remote host is running the Emulex HBA Manager remote management agent).
  - The `:port` option is optional. If it is omitted, the Emulex HBA Manager remote management protocol uses the default TCP port. If it is specified, it uses the specified TCP port.

- – Examples:

  Using the IP address:

  `hbacmd h=138.239.xx.xxx ListHBAs`

  Using the host name:

  `hbacmd h=<host_name> ListHBAs`

- – The `h` option is available for all commands except the `AddHost`, `RemoveHost`, and `Version` commands.

- For FC functions, the WWPN of the adapter must be specified. Where the WWPN is specified, each pair of numbers within the WWPN is separated by colons (`:`) or spaces ( ). If space separators are used, the entire WWPN must be enclosed in quotation marks (" ").

  For example, the following commands display the port attributes for the adapter with the specified WWPN:
  ```
  hbacmd PortAttributes 10:00:00:00:c9:20:20:20
  hbacmd PortAttributes "10 00 00 00 c9 20 20 20"
  ```

- For NIC functions, the MAC address must be specified. Where a MAC address is specified, each pair of numbers within the MAC address is separated by a dash (`-`).

  For example, the following command displays the server attributes for the server where the NIC function is running the NIC port with the specified MAC address:
  ```
  hbacmd ServerAttributes 00-11-22-33-44-55
  ```

- For NIC functions, only the permanent MAC address is supported for the port address parameter on an `HbaCmd` command line.

  Normally, for a NIC function, the function's permanent MAC address and current MAC address parameters are equal. However, it is possible to set a user-specified (current) MAC address that is different from the permanent MAC address. Also, for some implementations, it is possible to have multiple NIC functions with the same current MAC addresses, but with unique permanent MAC addresses. Therefore, to be sure that Emulex HBA Manager application can access the correct function, only the permanent MAC address is supported.

NOTE: Both the permanent MAC address and the current MAC address are displayed by using the `ListHBAs` command. See .

3.3 Secure Management CLI

The Secure Management CLI is supported by the Linux, Solaris, and Windows operating systems.

NOTE: Users with root or administrator privileges on the local machine retain full configuration capability in the Emulex HBA Manager CLI without the use of credentials (local machine only).

3.3.1 Device Management Using the Secure Management Interface

To run the `HbaCmd` CLI when the Secure Management feature is enabled, each invocation must include a user name and password. The user name and password options are added to the existing `HbaCmd` command parameter using the `<m=cim>` parameter. For example:

Without Secure Management (or if running as root or administrator):
```
hbacmd <cmd>
```
With Secure Management (as a non-root or non-administrator user):
```
hbacmd <m=sec> <u=userid> <p=password> <cmd>
```

3.3.2 Syntax Rules for the Secure Management Interface

For the Secure Management interface, all of the syntax rules in Section 3.2, HbaCmd Syntax Usage, apply.

3.4 CIM Client Interface

NOTE: In Linux and Solaris, you cannot use `HbaCmd` as a CIM client.

3.4.1 Device Management Using the CIM Interface

VMware on the hypervisor-based ESXi platforms uses the CIM provider as the only standard management mechanism for device management.

For VMware ESXi hosts, you can manage adapters using the Emulex HBA Manager CLI on Windows, but you must install and use the appropriate CIM provider on the VMware ESXi host. For installation, refer to the *CIM Provider Package Installation Guide*.

NOTE: For VMware ESXi hosts, if advanced adapter management capabilities are required, use the Emulex HBA Manager Application for VMware vCenter. For more details, refer to the *Emulex HBA Manager Application for VMware vCenter User Guide*.

3.4.2 Syntax Rules for the CIM Interface

For the CIM interface, all the syntax rules in Section 3.2, HbaCmd Syntax Usage, apply, except that the `h` option is required. Additionally, the `m=cim` parameter is required in the command line to get the data from the ESXi host. For example:

```
hbacmd h=192.168.1.110 m=cim u=root p=password n=root/emulex listhbas
```

3.4.2.1 Syntax Options and Setting CIM Credentials

For issuing CIM-based commands, two main syntax options are available.

Option A

```
hbacmd <h=IP_Address[:port]> m=cim [u=userid] [p=password] [n=root/emulex] <command> <WWPN>
```

Option B

```
hbacmd <h=IP_Address[:port]> <m=cim> <command>
```

Before using the option B syntax, you must set the CIM credentials. Perform one of the following tasks:

- Set the default CIM credentials using the `SetCimCred` command (see Section 4.12.10, SetCimCred). This command sets only the CIM credentials. After you have set them, subsequent `HbaCmd` commands do not require you to specify the CIM credentials on the command line.

  Command syntax:
  ```
  hbacmd setcimcred <username> <password> <namespace> <portnum>
  ```
- Add the host IP address with CIM credentials using the `AddHost` command (see Section 4.12.1, AddHost).

  Command syntax:
  ```
  hbacmd <m=cim> [u=userid] [p=password] [n=namespace] addhost <IP_Address>
  ```

3.4.2.1.1 Default CIM Credentials

If you specify the command with the CIM method `m=cim` without specifying the CIM credentials (*userid*, *password*, or *namespace*), the default value for the missing CIM credential is obtained in the following order:

1. The information entered using the `addhost` command is looked up.

2. If no values exist, the information entered using the `setcimcred` command is used.

3. If no values exist, the following defaults are used:
   ```
   username=root
   password=root
   namespace=root/emulex
   portnum=5988
   ```

3.4.2.2 Example of Using the CIM Interface to Display Adapters

In Windows, to display a list of adapters managed for a specified host using the CIM interface, run the following command:
```
hbacmd h=10.192.113.128 m=cim u=root p=root n=root/emulex listhbas
```

For a list of `HbaCmd` commands supported through the CIM interface, see Table 6, CLI Client Command Reference.

Chapter 4: CLI Client Command Descriptions

CLI client commands are organized by command groups. Two tables are presented for your convenience: a table organized by command group and another organized alphabetically by CLI client commands.

ATTENTION: The Emulex HBA Manager application cannot retrieve data from an offline adapter or port and will display incorrect information for that adapter or port. Adapters and ports must be online for the Emulex HBA Manager application to display accurate information.

Table 5: CLI Client Command Reference Functional Groups

Command Group	Description	Commands
Attributes	This group manages the display of adapter, port, and server attributes, and port statistics for each adapter specified.	HbaAttributes PortAttributes PortStatistics ResetPortStatistics ServerAttributes SetPhyPortSpeed SetPortEnabled SetPortSpeed
Authentication	These commands configure a DH-CHAP connection between an FC port and a switch port. **NOTE:** DH-CHAP authentication (also called FC-SP-2 authentication) is disabled by default. Refer to the appropriate driver user guide for instructions on enabling DH-CHAP. **NOTE:** Boot from SAN is not supported when DH-CHAP authentication is enabled.	AuthConfigList DeleteAuthConfig GetAuthConfig GetAuthStatus InitiateAuth RemoveAdapterAuthConfig RemoveAuthConfig SetAuthConfig SetAuthConfigParams SetAuthConfigSecret
Boot	This group manages the commands that enable or disable network boot for NIC ports or the boot code for FC adapter ports. You can also display and change FC boot parameters.	EnableBootCode GetBootParams SetBootParam
DCB	These commands display and set the DCB and LLDP parameters for FCoE and NIC ports on PowerPC CNAs.	GetDCBParams GetPGInfo SetCnaPGBW SetDCBParam SetDCBPriority

Table 5: CLI Client Command Reference Functional Groups (Continued)

Command Group	Description	Commands
Diagnostic	This group provides commands that enable you to detect cabling problems, to examine transceiver data, and to flash memory load lists. Additionally, you can run specific diagnostic tests, such as the loopback test and the POST.	DPortTest EchoTest FcTraceRoute GetBeacon GetXcvrData LoadList LoopBackTest LoopMap PciData PostTest SetBeacon Wakeup
Driver Parameter	Use the driver parameter commands to display, set, and save the driver parameter values. You can also change the parameters back to the factory default values.	DriverConfig GetDriverParams GetDriverParamsGlobal SaveConfig SetDriverParam SetDriverParamDefaults
Dump	Use the diagnostic dump feature to create a dump file for a selected adapter. Dump files contain information such as firmware version, driver version, and operating system information. This information is useful for troubleshooting an adapter, but it is unavailable in Read-Only mode.	DeleteDumpFiles Dump GetDumpDirectory GetDumpFile GetDumpFileNames GetRetentionCount SetDumpDirectory SetRetentionCount
Firmware	These commands enable you to view and set firmware parameters and to capture and retrieve firmware logs.	getfwlog getfwparams setfwlog setfwparam
LUN ExpressLane	This group of commands enables, disables, and displays the ExpressLane™ status on a particular LUN. You can also assign a frame priority to an ExpressLane LUN if the adapter and the switch support it. LUN ExpressLane commands do not apply to PowerPC CNAs.	GetExpressLaneLunList GetLunXLaneConfig SetLunXLaneConfig
LUN Masking	The commands in this group manage LUN masking activities.	GetLunList GetLunUnMaskByHBA GetLunUnMaskByTarget RescanLuns SetLunMask

Table 5: CLI Client Command Reference Functional Groups (Continued)

Command Group	Description	Commands
Miscellaneous	This group contains commands that do not belong in other groups.	AddHost Download ExportSANInfo FecEnable GetCimCred GetVPD Help ListHBAs RemoveHost Reset SetCimCred TargetMapping Version
NVMe	This group contains commands that are specifically used for NVMe over FC.	nvme-attach-ns nvme-create-ns nvme-delete-ns nvme-detach-ns nvme-get-feature nvme-get-sstable nvme-id-ctrl nvme-id-ns nvme-list nvme-list-ctrl nvme-list-linux nvme-list-nsnvme-list-ns-linux
Persistent Binding	This group of commands facilitates persistent binding operations. These commands are supported only for FC ports.	AllNodeInfo BindingCapabilities BindingSupport PersistentBinding RemoveAllPersistentBinding RemovePersistentBinding SetBindingSupport SetPersistentBinding
Trunking	Use the commands in this group to view and configure trunking (also called FC port aggregation).	GetTrunkInfo SetTrunkMode
vPort	vPort commands manage virtual ports and functions only on FC adapters. In Linux, vPorts do not persist across system reboots.	CreateVPort DeleteVPort ListVPorts VPortTargets
WWN Management	These commands allow you to view and manage WWNs.	ChangeWWN GetWWNCap ReadWWN RestoreWWN

Table 6, CLI Client Command Reference, lists each command alphabetically and displays the operating system and CIM interface support for each command. A check mark (✓) designates a supported command for a particular operating system and CIM interface.

NOTE: For VMware ESXi, two options support the CLI:

- Using the Emulex HBA Manager CLI on Windows with the appropriate Emulex CIM provider installed on a VMware host. These commands are covered in this section.
- Using the Emulex HBA Manager application for VMware vCenter CLI (`elxvcpcmd`). Although the available commands are listed in Table 6 for your convenience, refer to the *Emulex HBA Manager Application for VMware vCenter User Guide* for specific information.

Table 6: CLI Client Command Reference

Command	Linux RHEL, SLES, Ubuntu, Oracle	Solaris	Windows	CIM	elxvcpcmd	Section
AddHost	✓	✓	✓	✓		Section 4.12.1, AddHost
AllNodeInfo	✓	✓	✓	✓		Section 4.14.1, AllNodeInfo
AuthConfigList			✓	✓		Section 4.3.1, AuthConfigList
BindingCapabilities		✓	✓			Section 4.14.2, BindingCapabilities
BindingSupport		✓	✓			Section 4.14.3, BindingSupport
ChangeWWN	✓	✓	✓	✓		Section 4.17.1, ChangeWWN
CreateVPort	✓	✓	✓			Section 4.16.1, CreateVPort
DeleteAuthConfig			✓			Section 4.3.2, DeleteAuthConfig
DeleteDumpFiles	✓	✓	✓	✓		Section 4.8.1, DeleteDumpFiles
DeleteVPort	✓	✓	✓			Section 4.16.2, DeleteVPort
Download	✓	✓	✓	✓		Section 4.12.2, Download
DPortTest	✓		✓	✓		Section 4.6.1, DPortTest
DriverConfig	✓		✓			Section 4.7.1, DriverConfig
Dump	✓	✓	✓	✓		Section 4.8.2, Dump
EchoTest	✓	✓	✓			Section 4.6.2, EchoTest
EnableBootCode	✓	✓	✓	✓		Section 4.4.1, EnableBootCode
ExportSANInfo	✓	✓	✓			Section 4.12.3, ExportSANInfo
FcTraceRoute	✓		✓	✓		Section 4.6.3, FcTraceRoute
FecEnable	✓	✓	✓	✓		Section 4.12.4, FecEnable
GetAuthConfig			✓	✓		Section 4.3.3, GetAuthConfig
GetAuthStatus			✓	✓		Section 4.3.4, GetAuthStatus
GetBeacon	✓	✓	✓	✓		Section 4.6.4, GetBeacon
GetBootParams	✓	✓	✓	✓		Section 4.4.2, GetBootParams
GetCimCred			✓			Section 4.12.5, GetCimCred
GetDCBParams	✓					Section 4.5.1, GetDCBParams
GetDriverParams	✓	✓	✓	✓		Section 4.7.2, GetDriverParams
GetDriverParamsGlobal	✓	✓	✓	✓		Section 4.7.3, GetDriverParamsGlobal
GetDumpDirectory	✓	✓	✓	✓		Section 4.8.3, GetDumpDirectory

Table 6: CLI Client Command Reference (Continued)

Command	Linux RHEL, SLES, Ubuntu, Oracle	Solaris	Windows	CIM	elxvcpcmd	Section
GetDumpFile	✓	✓	✓	✓		Section 4.8.4, GetDumpFile
GetDumpFileNames	✓	✓	✓	✓		Section 4.8.5, GetDumpFileNames
GetExpressLaneLUNList	✓		✓	✓		Section 4.10.1, GetExpressLaneLunList
getfwlog	✓		✓			Section 4.9.1, getfwlog
GetFwParams	✓		✓	✓	✓	Section 4.9.2, getfwparams
GetLunList			✓		✓	Section 4.11.1, GetLunList
GetLunXLaneConfig	✓		✓	✓		Section 4.10.2, GetLunXLaneConfig
GetLunUnMaskByHBA			✓			Section 4.11.2, GetLunUnMaskByHBA
GetLunUnMaskByTarget			✓			Section 4.11.3, GetLunUnMaskByTarget
GetPGInfo	✓					Section 4.5.2, GetPGInfo
GetRetentionCount	✓	✓	✓	✓		Section 4.8.6, GetRetentionCount
GetTrunkInfo	✓		✓	✓		Section 4.15.1, GetTrunkInfo
GetVPD	✓	✓	✓	✓		Section 4.12.6, GetVPD
GetWWNCap	✓	✓	✓	✓		Section 4.17.2, GetWWNCap
GetXcvrData	✓	✓	✓	✓		Section 4.6.5, GetXcvrData
HbaAttributes	✓	✓	✓	✓		Section 4.2.1, HbaAttributes
Help	✓	✓	✓	N/A		Section 4.1, Help
InitiateAuth			✓	✓		Section 4.3.5, InitiateAuth
ListHBAs	✓	✓	✓	✓		Section 4.12.7, ListHBAs
ListVPorts	✓	✓	✓	✓		Section 4.16.3, ListVPorts
LoadList	✓	✓	✓	✓	✓	Section 4.6.6, LoadList
LoopBackTest	✓	✓	✓	✓	✓	Section 4.6.7, LoopBackTest
LoopMap	✓	✓	✓			Section 4.6.8, LoopMap
PciData	✓	✓	✓	✓	✓	Section 4.6.9, PciData
nvme-attach-ns			✓			Section 4.13.1, nvme-attach-ns
nvme-create-ns			✓			Section 4.13.2, nvme-create-ns
nvme-delete-ns			✓			Section 4.13.3, nvme-delete-ns
nvme-detach-ns			✓			Section 4.13.4, nvme-detach-ns
nvme-get-feature			✓			Section 4.13.5, nvme-get-feature
nvme-get-sstable			✓			Section 4.13.6, nvme-get-sstable
nvme-id-ctrl			✓			Section 4.13.7, nvme-id-ctrl
nvme-id-ns			✓			Section 4.13.8, nvme-id-ns
nvme-list			✓			Section 4.13.9, nvme-list
nvme-list-ctrl			✓			Section 4.13.10, nvme-list-ctrl
nvme-list-linux						Section 4.13.11, nvme-list-linux
nvme-list-ns			✓			Section 4.13.12, nvme-list-ns
nvme-list-ns-linux						Section 4.13.13, nvme-list-ns-linux
nvme-get-sstable			✓			Section 4.13.14, nvme-get-sstable
PersistentBinding		✓	✓			Section 4.14.4, PersistentBinding

Table 6: CLI Client Command Reference (Continued)

Command	Linux RHEL, SLES, Ubuntu, Oracle	Solaris	Windows	CIM	elxvcpcmd	Section
PortAttributes	✓	✓	✓	✓	✓	Section 4.2.2, PortAttributes
PortStatistics	✓	✓	✓	✓	✓	Section 4.2.3, PortStatistics
PostTest	✓	✓	✓	✓	✓	Section 4.6.10, PostTest
ReadWWN	✓	✓	✓	✓	✓	Section 4.17.3, ReadWWN
RemoveAdapterAuth Config	✓		✓	✓		Section 4.3.6, RemoveAdapterAuthConfig
RemoveAllPersistent Binding		✓	✓			Section 4.14.5, RemoveAllPersistentBinding
RemoveAuthConfig	✓		✓	✓		Section 4.3.7, RemoveAuthConfig
RemoveHost	✓	✓	✓	✓		Section 4.12.8, RemoveHost
RemovePersistentBinding		✓	✓			Section 4.14.6, RemovePersistentBinding
RescanLuns			✓			Section 4.11.4, RescanLuns
Reset	✓	✓	✓	✓	✓	Section 4.12.9, Reset
ResetPortStatistics	✓	✓	✓		✓	Section 4.2.4, ResetPortStatistics
RestoreWWN	✓	✓	✓	✓	✓	Section 4.17.4, RestoreWWN
SaveConfig	✓	✓	✓		✓	Section 4.7.4, SaveConfig
ServerAttributes	✓	✓	✓	✓	✓	Section 4.2.5, ServerAttributes
SetAuthConfig			✓			Section 4.3.8, SetAuthConfig
SetAuthConfigParams	✓		✓	✓		Section 4.3.9, SetAuthConfigParams
SetAuthConfigSecret	✓		✓	✓		Section 4.3.10, SetAuthConfigSecret
SetBeacon	✓	✓	✓	✓	✓	Section 4.6.11, SetBeacon
SetBindingSupport		✓	✓			Section 4.14.7, SetBindingSupport
SetBootParam	✓	✓	✓	✓		Section 4.4.3, SetBootParam
SetCimCred			✓			Section 4.12.10, SetCimCred
SetCnaPGBW	✓					Section 4.5.3, SetCnaPGBW
SetDCBParam	✓					Section 4.5.4, SetDCBParam
SetDCBPriority	✓					Section 4.5.5, SetDCBPriority
SetDriverParam	✓	✓	✓	✓	✓	Section 4.7.5, SetDriverParam
SetDriverParamDefaults	✓	✓	✓		✓	Section 4.7.6, SetDriverParamDefaults
SetDumpDirectory				✓	✓	Section 4.8.7, SetDumpDirectory
setfwlog	✓		✓			Section 4.9.3, setfwlog
SetFwParam	✓		✓	✓	✓	Section 4.9.4, setfwparam
SetLunMask			✓			Section 4.11.5, SetLunMask
SetLunXLaneConfig	✓		✓	✓		Section 4.10.3, SetLunXLaneConfig
SetPersistentBinding		✓	✓			Section 4.14.8, SetPersistentBinding
SetPhyPortSpeed	✓					Section 4.2.6, SetPhyPortSpeed
SetPortEnabled	✓	✓	✓	✓		Section 4.2.7, SetPortEnabled
SetPortSpeed	✓	✓	✓	✓	✓	Section 4.4.4, SetPortSpeed
SetRetentionCount	✓	✓	✓	✓		Section 4.8.8, SetRetentionCount
SetTrunkMode	✓		✓	✓		Section 4.15.2, SetTrunkMode

Table 6: CLI Client Command Reference (Continued)

Command	Linux RHEL, SLES, Ubuntu, Oracle	Solaris	Windows	CIM	elxvcpcmd	Section
TargetMapping	✓	✓	✓	✓		Section 4.12.11, TargetMapping
Version	✓	✓	✓	✓		Section 4.12.12, Version
VPortTargets	✓	✓	✓	✓		Section 4.16.4, VPortTargets
Wakeup	✓	✓	✓			Section 4.6.12, Wakeup

4.1 Help

This command displays command information for the `HbaCmd` application. Without using its optional parameters, the `Help` command lists all the commands in their respective groups. The optional parameter `GroupName` lists the commands in a group. The optional parameter `CmdName` displays the details for a specific command.

Supported By

Linux, Solaris, and Windows

Syntax

```
Help [GroupName] [CmdName]
```

Parameters

`GroupName`	Lists the commands in a particular group.
`CmdName`	Displays the details for a particular CLI command.

Examples

This `Help` command example lists all the commands in their respective groups:
```
hbacmd help
```

This `Help` command example displays the details for the `SetDCBParam` command:
```
hbacmd help setdcbparam
```

4.2 Attributes Commands

The Attributes command group manages the display of adapter, port, function, and server attributes, and port statistics for each adapter specified. You can also set the port speed on PowerPC CNAs in NIC+FC mode and in NIC+FCoE mode.

4.2.1 HbaAttributes

This command displays a list of all adapter attributes for the adapter. The type of information listed might vary according to the adapter model.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

```
HbaAttributes <WWPN|MAC>
```

Parameters

WWPN   The WWPN of an FC function.

MAC   The MAC address of a NIC function.

Example

```
HBA Attributes for 10:00:00:90:fa:94:26:af

Host Name:              WIN-9ILVRDLR7JC
Manufacturer:           Emulex Corporation
Serial Number:          VA53900065
Model:                  LPe32002-M2
Model Desc:             Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Channel Adapter
Node WWN:               20 00 00 90 fa 94 26 af
Node Symname:           Emulex LPe32002-M2 FV11.1.38.61 DV11.0.247.0
HN:                     WIN-9ILVRDLR7JC
OS:                     Windows 2012 R2
HW Version:             0000000C
FW Version:             11.1.38.61
Vendor Spec ID:         10DF
Number of Ports:        1
Driver Name:            elxfc
Driver Version:         11.0.247.0
Device ID:              E300
HBA Type:               LPe32002-M2
Operational FW:         11.1.38.61
IEEE Address:           00 90 fa 94 26 af
Boot Code:              Enabled
Boot Version:           11.1.38.56
Board Temperature:      Normal
Function Type:          FC
Sub Device ID:          E300
PCI Bus Number:         32
PCI Func Number:        0
Sub Vendor ID:          10DF
IPL Filename:           H62LEX1
Service Processor FW Name: 11.1.38.61
ULP FW Name:            11.1.38.61
```

```
FC Universal BIOS Version:     11.1.38.56
FC x86 BIOS Version:           11.1.38.56
FC EFI BIOS Version:           11.1.38.48
FC FCODE Version:              11.0.150.0
Flash Firmware Version:        11.1.38.61
```

4.2.2 PortAttributes

This command displays a list of attributes for the adapter-specified function. The type of information listed might vary according to the adapter model.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

```
PortAttributes <WWPN|MAC>
```

Parameters

WWPN   The WWPN of an FC function.

MAC   The MAC address of a NIC function.

Example

```
hbacmd h=10.192.32.197 portattributes 10:00:00:00:c9:88:88:89
Port Attributes for 10:00:00:00:c9:88:88:89
Node WWN: 0 00 00 00 c9 88 88 89
Port WWN: 10 00 00 00 c9 88 88 89
Port Symname:
Port FCID: 0000
Port Type: Unknown
Port State: Link Down
Port Service Type: 8
Port Supported FC4: 00 00 01 00 00 00 00 01
     00 00 00 00 00 00 00 00
     00 00 00 00 00 00 00 00
     00 00 00 00 00 00 00 00
Port Active FC: 00 00 01 00 00 00 00 01
     00 00 00 00 00 00 00 00
     00 00 00 00 00 00 00 00
     00 00 00 00 00 00 00 00
Port Supported Speed: 4 8 16 Gbit/sec
Configured Port Speed: Auto Detect
Port Speed: Not Available
Max Frame Size: 2048
OS Device Name: \\.\Scsi5:
Num Discovered Ports: 0
Fabric Name: 00 00 00 00 00 00 00 00
Function Type: FC
FEC: Disabled
```

4.2.3 PortStatistics

This command displays all function statistics for the specified function. The type of information listed can vary according to the adapter model.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
PortStatistics <WWPN>
```

Parameters

WWPN   The WWPN of an FC function.

4.2.4 ResetPortStatistics

This command resets all function statistics for the specified function. The type of information listed can vary according to the adapter model.

Supported By

Linux, Solaris, and Windows

Syntax
```
ResetPortStatistics <WWPN>
```

Parameters

WWPN   The WWPN of an FC function.

4.2.5 ServerAttributes

This command displays a list of server attributes for the server where the specified function is running. The type of information listed can vary according to the adapter model.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
ServerAttributes <WWPN|MAC>
```

Parameters

WWPN   The WWPN of an FC function.

MAC   The MAC address of a NIC function.

4.2.6 SetPhyPortSpeed

This command sets the port speed on PowerPC CNAs.

PowerPC CNAs have configurable physical port speeds. Depending on the port module or transceiver installed in the physical port, the speed settings can be forced to a specific value (for example, 1Gb/s) or to a range of values for autonegotiation with the switch (for example, 10Gb/s/1Gb/s/100Mb/s). Three values can be configured: port speed mode, speed values, and the DAC cable length.

The configurable port speeds are based on the port module type and the mode defined by the port speed `Mode` parameter. For the default port speed mode, the speed setting is not required.

Supported By

Linux

Syntax
```
SetPhyPortSpeed <WWPN|MAC> <Mode> [Speed [Length]]
```

Parameters

`WWPN`	The WWPN of an FC function.
`MAC`	The MAC address of a NIC function.
`Mode`	The mode number: `0` = Default `1` = Autonegotiate; requires the `Speed` parameter `2` = Force; requires the `Speed` and `Length` parameters If the adapter's port speed value and the switch's port speed value conflict, the link will not be brought up.
`Speed`	The speed string of the PHY port. Some valid string values include `100Mb`, `1Gb`, and `10Gb`. The `PortAttributes` command lists all the valid speeds in Auto-negotiate and Force modes. **Autonegotiated Speeds** For combinations of speeds, each speed is separated by a slash, for example, `10Gb/1Gb/100Mb`. If the port does not support autonegotiated speeds, this property is displayed as `Not Supported`. **Forced Speeds** Combinations of speeds for forced speeds are not available. If the port does not support forced speeds, this property is displayed as `Not Supported`. If the `Mode` parameter is `1` or `2`, the `Speed` parameter is required. If the `Mode` parameter is `0`, the `Speed` parameter is ignored.
`Length`	The length of the DAC cable in meters. Valid values are `0` to `10`. A length value of `0` indicates an optical cable. A Length value is required if you are using a 10Gb SFP or QSFP transceiver interface type. If the `Mode` parameter is `0`, `Speed` and `Length` parameters are ignored, and if the `Mode` parameter is `1`, the `Length` parameter is ignored.

Examples

The following example configures the PHY port to a forced speed of 1Gb/s with a cable length of 10 meters:
```
hbacmd setphyportspeed 00-00-c9-ad-ad-ac 2 1Gb 10
```

If the command is successful, the following is displayed:
```
Successfully changed speed settings on port.
```

The following example tries to configure the PHY port to a forced speed of 100Mb/s:
```
hbacmd setphyportspeed 00-00-c9-a9-41-88 2 100Mb
```

Because the `Mode` parameter is `2`, this command results in the following error because you must include a value for the `Length` parameter:

```
ERROR: <431>: Cable length required for force mode and interface type
```

4.2.7 SetPortEnabled

This command enables or disables a port. When a port is disabled, packets are not transmitted to or received from the port.

NOTE: Make sure that all I/O traffic on the port is stopped before disabling the port.

NOTE: If the `SetPortEnabled` command disables an FC port, the adapter must be reset to activate the new value.

ATTENTION: The Emulex HBA Manager application cannot retrieve data from an offline adapter or port and will display incorrect information for that adapter or port. Adapters and ports must be online for the Emulex HBA Manager application to display accurate information.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
`SetPortEnabled <WWPN|MAC> <PortEnable>`

Parameters

`WWPN`	The WWPN of an FC function on the port.
`MAC`	The MAC address of a NIC function on the port.
`PortEnable`	The port-enabled state: `0` = Disabled `1` = Enabled

4.3 Authentication Commands

The Authentication command group configure a DH-CHAP connection between an FC function and a switch port DH-CHAP authentication is also called FC-SP-2 authentication.

4.3.1 AuthConfigList

This command returns the list of WWPNs that have an authentication connection configuration with the specified adapter.

Supported By

Linux, Windows, and Windows + CIM provider on a VMware host

Syntax
`AuthConfigList <WWPN>`

Parameters

`WWPN`	The WWPN of an FC function.

4.3.2 DeleteAuthConfig

This command deletes the authentication configuration on LPe12000-series adapters only.

NOTE: The `RemoveAuthConfig` command replaces this command on all other adapters.

Supported By

Linux, Windows, and Windows + CIM provider on a VMware host

Syntax
`DeleteAuthConfig <WWPN1> <WWPN2> <PasswordType> <Password>`

Parameters

WWPN1	The WWPN of an FC function.
WWPN2	Either use `ff:ff:ff:ff:ff:ff:ff:ff` for a switch or use the WWPN for a target.
PasswordType	1 = ASCII 2 = Hexadecimal (binary) 3 = Password not yet defined
Password	The current password value.

4.3.3 GetAuthConfig

This command retrieves the authentication configuration for the adapter.

Supported By

Linux, Windows, and Windows + CIM provider on a VMware host

Syntax
`GetAuthConfig <WWPN1> <WWPN2>`

Parameters

WWPN1	The WWPN of an FC function.
WWPN2	Either use `ff:ff:ff:ff:ff:ff:ff:ff` for a switch or use the WWPN for a target.

4.3.4 GetAuthStatus

This command returns the current status for the authentication connection specified by WWPN1 and WWPN2 (adapter and the switch). It includes the current authentication state (connected or failed). Currently authenticated connections specify the hash algorithm and DH group used in the DH-CHAP associated with this connection. Failed status includes the failure reason.

Supported By

Linux, Windows, and Windows + CIM provider on a VMware host

Syntax
`GetAuthStatus <WWPN1> <WWPN2>`

Parameters

`WWPN1`   The WWPN of an FC function.

`WWPN2`   Either use `ff:ff:ff:ff:ff:ff:ff:ff` for a switch or use the WWPN for a target.

4.3.5 InitiateAuth

This command initiates the authentication configuration on the adapter.

Supported By

Linux, Windows, and Windows + CIM provider on a VMware host

Syntax

`InitiateAuth <WWPN1> <WWPN2>`

Parameters

`WWPN1`   The WWPN of an FC function.

`WWPN2`   Either use `ff:ff:ff:ff:ff:ff:ff:ff` for a switch or use the WWPN for a target.

4.3.6 RemoveAdapterAuthConfig

NOTE: This command removes or deletes all authentication configuration entries for an FC adapter.

NOTE: This command deletes the authentication configuration, including secrets, from the adapter flash memory. You must reload the driver or reboot the system to activate the new driver settings.

NOTE: This command is not supported on LPe12000-series adapters.

Supported By

Linux, Windows, and Windows + CIM provider on a VMware host

Syntax

`RemoveAdapterAuthConfig <WWPN>`

Parameters

`WWPN`   The WWPN of the port whose authentication configurations you want to delete.

4.3.7 RemoveAuthConfig

This command removes or deletes one or more authentication configuration entries for an FC port.

NOTE: Use the `AuthConfigList` command to get the list of entity pairs.

Supported By

Linux, Windows, and Windows + CIM provider on a VMware host

Syntax

`removeAuthConfig <WWPN> <Entity pair 1> <Entity pair 2> <Entity pair N>`

Parameters

WWPN	The WWPN of the FC port whose configuration you want to delete.
Entity pair	LocalEntity or RemoteEntity LocalEntity = Source WWPN RemoteEntity = Destination WWPN Use all to delete the entire authentication configuration.

4.3.8 SetAuthConfig

This command sets the authentication configuration on LPe12000-series adapters only.

NOTE: The SetAuthConfigParams command replaces this command on all other adapters.

Supported By

Linux, Windows, and Windows + CIM provider on a VMware host

Syntax

SetAuthConfig *<WWPN1> <WWPN2> <PasswordType> <Password> <Param> <Value>*

NOTE: Where multiple parameters and values are used, separate them using commas.

Parameters

WWPN1	The WWPN of an FC function.
WWPN2	Either use ff:ff:ff:ff:ff:ff:ff:ff for a switch or use the WWPN for a target.
PasswordType	1 = ASCII 2 = Hexadecimal (binary) 3 = Password not yet defined
Password	The current password value.
Param	The parameter names: ■ Mode ■ Timeout ■ Bidirectional ■ Hash-priority ■ DH-priority ■ Re-authentication ■ Re-authentication-interval
Value	The value is based on the type of *<Param>*: ■ Mode: disabled, enabled, or passive ■ Timeout: Time in seconds ■ Bi-directional: disabled or enabled ■ Hash-priority: md5 or sha1 (md5 = first md5, then sha1; sha1 = first sha1, then md5) ■ DH-priority: 1, 2, 3, 4, 5; any combination up to 5 digits ■ Re-authentication: disabled or enabled ■ Re-authentication-interval: 0, 10 to 3600, in seconds

4.3.9 SetAuthConfigParams

This command sets one or more authentication configuration parameters for the FC port.

Supported By

Linux, Windows, and Windows + CIM provider on a VMware host

Syntax

```
setauthconfigParams <WWPN1> <WWPN2> <Mode> <DH-priority> <Hash-priority> <Timeout> <Bi-directional>
<Re-authentication> <Re-authentication-interval>
```

Parameters

`WWPN1`	The WWPN of an FC function.
`WWPN2`	Either use `ff:ff:ff:ff:ff:ff:ff:ff` for a switch or use the actual WWPN for a target.
`Mode`	`disabled`, `enabled`, or `passive`
`DH-priority`	1, 2, 3, 4, 5; any combination up to 5 digits
`Hash-priority`	`md5` or `sha1` (`md5` = first md5, then sha1; `sha1` = first sha1, then md5)
`Timeout`	Time in seconds
`Bi-directional`	`disabled` or `enabled`
`Re-authentication`	`disabled` or `enabled`
`Re-authentication interval`	0, 10 to 3600, in seconds

4.3.10 SetAuthConfigSecret

This commands sets the local or remote secret on the adapter for an authenticated connection to the switch.

Supported By

Linux, Windows, and Windows + CIM provider on a VMware host

Syntax

```
setauthconfigsecret <WWPN1> <WWPN2> <Flag> <Nst> <Nsv>
```

Parameters

`WWPN1`	The WWPN of an FC function.
`WWPN2`	Either use `ff:ff:ff:ff:ff:ff:ff:ff` for a switch or use the actual WWPN for a target.
`Flag`	1 = Local (the secret used by the adapter when the adapter authenticates to the switch and when using bidirectional authentication) 2 = Remote (the secret used when the switch initiates authentication to the HBA and when using bidirectional authentication)
`Nst`	Current secret type. 1 = ASCII 2 = Hexadecimal (binary)
`Nsv`	New secret value. Secret keys must be a minimum of 12 characters and a maximum of 128 characters. Check the switch documentation for other possible value restrictions when setting the peer key value on the switch.

4.4 Boot Commands

The Boot command group manages the commands that enable or disable the network boot for NIC ports or the boot code for FC adapter ports. You can also display and change FC boot parameters.

CAUTION! Using the `EnableBootCode` or `SetBootParam` commands on an FC adapter that is being used to boot from SAN is not advisable. After the command has completed, the system performs an adapter reset, which might cause a loss of connectivity to the SAN and possible loss of data. To perform these commands on an FC adapter, you must make sure that the adapter is not currently being used to boot from SAN. Perform one of the following actions:

- Move the target adapter to a non-boot from SAN host.
- If the host with the target adapter is also hosting other boot from SAN adapters, perform a boot from SAN using one of the other boot from SAN adapters. The target adapter can now be used.

ATTENTION: The Emulex HBA Manager application cannot retrieve data from an offline adapter or port and will display incorrect information for that adapter or port. Adapters and ports must be online for the Emulex HBA Manager application to display accurate information.

4.4.1 EnableBootCode

This command enables or disables boot code. If the boot code is disabled, the adapter does not boot from the SAN, regardless of the value of the `EnableBootFromSan` boot parameter. If the boot code is enabled, the adapter boots from the SAN if the `EnableBootFromSan` parameter is also enabled.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
EnableBootCode <WWPN> <Flag>
```

Parameters

WWPN   The WWPN of an FC function.

Flag   `D` = Disable the boot code.
`E` = Enable the boot code.

Examples

The following example enables boot code:
```
hbacmd EnableBootCode 10:00:00:00:c9:20:20:20 E
```

4.4.2 GetBootParams

This command displays the FC and NVMe boot parameters. If any arguments are missing or invalid, an error is reported. If all arguments are correct, the data is displayed in tabular form.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
GetBootParams <WWPN> <Type>
```

Parameters

WWPN   The WWPN of an FC or FC + NVMe function.

Type   X86, OpenBoot, or EFI.

4.4.3 SetBootParam

This command changes the FC and NVMe boot parameters. You can change function parameters and boot device parameters for x86, OpenBoot, and EFI boot.

NOTE: The following information applies to setting boot parameters:

- If you change adapter parameters, omit the BootDev keyword and value; otherwise, an error is reported.
- If you change boot device parameters for OpenBoot, omit the BootDev keyword and value; otherwise, an error is reported.
- For boot device parameters for x86 or EFI, you must provide the BootDev keyword and value.
- Changes made to x86 boot settings are also applied to EFI boot settings, and changes made to EFI boot settings are also applied to x86 boot settings.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
SetBootParam <WWPN> <Type> <AdapterParam> <Value1> [BootDev <Value2>]
```

Parameters

WWPN	The WWPN of an FC, or FC + NVMe port.
Type	x86, EFI, OB
AdapterParam	The parameter name.
Value1	The parameter value.
BootDev	The boot device.
Value2	The boot device entry number: 0 to 7

Adapter Parameters	Boot Type	Value
DefaultAlpa	EFI	{ Value }
EnableAdapterBoot	All	{ State } (0 = Disable, 1 = Enable)
EnableBootFromSan	All	{ State } (0 = Disable, 1 = Enable)

LinkSpeed	All	{ 0, 1, 2, 4, 8 } This parameter is available only LPe12000-series adapters. Use the `SetPortSpeed` command instead for all other adapters.
PlogiRetryTimer	All	{ 0, 1, 2, 3 }
Topology	All	{ 0, 1, 2, 3 }
AutoScan	x86	{ 0, 1, 2, 3 }
AutoBootSectorEnable	x86	{ State } (0 = Disable, 1 = Enable)
EDD30Enable	x86	{ State } (0 = Disable, 1 = Enable)
EnvVarEnable	x86	{ State } (0 = Disable, 1 = Enable)
SpinupDelayEnable	x86	{ State } (0 = Disable, 1 = Enable)
StartUnitCommandEnable	x86	{ State } (0 = Disable, 1 = Enable)
BootTargetScan	EFI	{ 0, 1, 2 }
EnableFABL	EFI	{ State } (0 = Disable, 1 = Enable) This parameter is not available on LPe12000-series adapters.
EnableNvmeBootFromSan	EFI	{ State } (0 = Disable, 1 = Enable)
DevicePathSelection	EFI	{ 0, 1 }
MaxLunsPerTarget	EFI	{ Value }
ResetDelayTimer	EFI	{ Value }
SfsFlag	OB	{ State } (0 = Disable, 1 = Enable)
Boot Device Parameters		
D_ID	All	{ Value [*BootDev <Value2>*] }
LUN	All	{ Value [*BootDev <Value2>*] }
TargetWwpn	All	{ Value [*BootDev <Value2>*] }
TargetID	OB	{ Value }
NVMe Boot Device Parameters		
NamespaceID	EFI	{ Value [*BootDev <Value2>*] }
NVMeWWPN	EFI	{ Value [*BootDev <Value2>*] }
NVMeWWNN	EFI	{ Value [*BootDev <Value2>*] }
SubsystemNQN	EFI	{ Value [BootDev <Value2>] }

4.4.4 SetPortSpeed

This command sets the link speed for a specific port.

NOTE: This command is not supported on LPe12000-series adapters. Use the `LinkSpeed` parameter of the `SetBootParam` command instead.

NOTE: This command is not supported on PowerPC CNAs. Use the `SetPhyPortSpeed` command instead.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
SetPortSpeed <WWPN> <LinkSpeed>
```

Parameters

WWPN   The WWPN of an FC port.

LinkSpeed   A numeric value representing a supported link speed. For a list of port speeds supported by the adapter, use
              the `PortAttributes` command.
              Specify a value of `0` to configure Auto Detect mode.

NOTE: A port reset is required to activate the new settings.

ATTENTION: The Emulex HBA Manager application cannot retrieve data from an offline adapter or port and will display
              incorrect information for that adapter or port. Adapters and ports must be online for the Emulex HBA Manager
              application to display accurate information.

4.5 DCB Commands

The DCB command group controls the DCB and LLDP parameters for NIC adapter ports on PowerPC CNAs.

4.5.1 GetDCBParams

This command displays the active and configured DCB and LLDP settings on a port of a PowerPC CNA. The active
parameters display what the adapter port is currently running, and the configured parameters display the value to which the
adapter port's DCB parameter is set.

Supported By

Linux

Syntax
```
GetDCBParams <WWPN|MAC>
```

Parameters

WWPN   The WWPN of an FCoE function on the port.

MAC   The MAC address of a NIC function on the port.

Example
```
hbacmd GetDCBParams 00-00-c9-93-2f-d8
```

4.5.2 GetPGInfo

This command displays the ETS priority group bandwidth percentages for a port of a PowerPC CNA. Additionally, this
command displays the number of priority groups supported by an adapter.

Supported By

Linux

Syntax
```
GetPGInfo <WWPN|MAC>
```

Parameters

WWPN   The WWPN of an FCoE function on the port.

MAC   The MAC address of a NIC function on the port.

Example

```
hbacmd getpginfo 00-00-c9-93-2f-d8
```

4.5.3 SetCnaPGBW

This command sets the ETS priority group bandwidth percentages on a port of a PowerPC CNA according to the following rules:

- Bandwidths (`BW0` to `BW7`) for priority groups 0 to 7 (`PG0` to `PG7`) must total 100 (for 100 percent).
- Bandwidth can be assigned to a priority group that has priorities.

Supported By

Linux

Syntax

```
SetCnaPGBW <WWPN|MAC> <BW0-BW7>
```

Parameters

WWPN   The WWPN of an FCoE function on the port.

MAC   The MAC address of a NIC function on the port.

BW0-BW7   The bandwidths allocated for the priority groups 0 to 7.

Example

This command sets the bandwidth of PG0 to 50%, PG1 to 50%, and PG2 to PG7 to 0%.

```
hbacmd SetCnaPGBW 10:00:00:00:c9:3c:f7:88 50 50 0 0 0 0 0 0
```

4.5.4 SetDCBParam

This command configures the DCB and LLDP settings on a PowerPC CNA. Use the `GetDCBParams` command to obtain valid parameter names for use in this command.

NOTE: You cannot set the DCBX mode. If you attempt to specify a *dcbxmode* parameter, an error message is displayed.

Supported By

Linux

Syntax

```
SetDCBParam <WWPN|MAC> <Param> <Value>
```

Parameters

WWPN   The WWPN of an FCoE function on the port.

MAC   The MAC address of a NIC function on the port.

Param   The parameter name. See **DCB Settings for <**Param**> and <**Value**>** and **LLDP Settings for <**Param**> and <**Value**>.**

Value   The parameter value. See **DCB Settings for <**Param> **and** <Value> and **LLDP Settings for <**Param> **and**
             <Value>.

DCB Settings for <Param> and <Value>

<Param>	**Description and** <Value>
DCBXState	The DCBX protocol state. 0 = Disabled 1 = Enabled
PFCEnable	Flow control in both directions (transmit and receive). 0 = Disabled 1 = Enabled
PFCPriority	A list of comma-separated values where multiple PFC priorities are supported. The comma-separated list can contain up to eight values ranging from 0 to 7.
defaults	Sets the DCB parameters (including priority groups) to their default values. For example: hbacmd SetDCBParam <*WWPN│MAC*> defaults

LLDP Settings for <Param> and <Value>

<Param>	**Description and** <Value>
TxState	Transmit State: DCBX uses LLDP to exchange parameters between two link peers. For the DCBX protocol to operate correctly, both TxState and RxState must be enabled. If either TxState or RxState is disabled, DCBX is disabled. 0 = Disabled 1 = Enabled
RxState	Receive State: DCBX uses LLDP to exchange parameters between two link peers. For the DCBX protocol to operate correctly, both RxState and TxState must be enabled. If either RxState or TxState is disabled, DCBX is disabled. 0 = Disabled 1 = Enabled
TxPortDesc	Transmit Port Description: Provides a description of the port in an alphanumeric format. 0 = Disabled 1 = Enabled
TxSysDesc	Transmit System Description: Provides a description of the network entity in an alphanumeric format. 0 = Disabled 1 = Enabled
TxSysName	Transmit System Name: Provides the system's assigned name in an alphanumeric format. 0 = Disabled 1 = Enabled
TxSysCap	Transmit System Capabilities: 0 = Disabled 1 = Enabled

Example

hbacmd SetDCBParam 00-00-c9-3c-f7-88 nicpriority 3

4.5.5 SetDCBPriority

This command sets the PFC priorities and the ETS priorities. The values must be set according to the following rules:

- The priorities range from 0 to 7.

- A priority (0 to 7) must exist in only one priority group.
- All priorities must appear once in any of the eight (PG0 to PG7) priority groups, or if available, PG15.
- To not specify priorities for a priority group, use a dash (-).
- Any assigned PFC priority must be assigned as the single priority in a priority group (for example, no other priorities allowed in a group assigned the PFC priority).
- Any PG assigned one or more priorities must also be assigned a nonzero bandwidth value (see Section 4.5.3, SetCnaPGBW).
- Only one PFC priority can be assigned.
- PFC is disabled by default. To enable PFC, NIC ETS must be enabled. To enable NIC ETS, load the NIC driver with the `tx_prio` driver parameter set to `1`.

Supported By

Linux

Syntax

`SetDcbPriority <WWPN|MAC> <PFC> <PG0> <PG1> <PG2> <PG3> <PG4> <PG5> <PG6> <PG7> [PG15]`

Parameters

WWPN	The WWPN of an FCoE function on a port.
MAC	The MAC address of a NIC function on a port.
PFC	The PFC priority that is a comma-separated list of up to eight values, ranging from `0` to `7`.
PG0-PG7	Priority group membership that is a comma-separated list of priorities ranging from `0` to `7`. Each set of priorities for a group must be separated by a space. All priorities (`0` to `7`) must be assigned to a PGID.

Example

`hbacmd SetDCBPriority 10:00:00:00:c9:3c:f7:88 3 0,1,2,4,5,6,7 3 0 0 0 0 0 0`

4.6 Diagnostic Commands

The Diagnostic command group provides commands that enable you to detect cabling problems, examine transceiver data, and flash memory load lists. Additionally, you can run specific diagnostic tests, such as the loopback test and POST test.

CAUTION! Using the `LoopBackTest`, `PciData`, or `Post` commands on an FC adapter that is being used to boot from SAN is not advisable. After the command has completed, the system performs an adapter reset, which might cause a loss of connectivity to the SAN and possible loss of data. To perform these commands on an FC adapter, you must make sure that the adapter is not currently being used to boot from SAN. Perform one of the following actions:

- Move the target adapter to a non-boot from SAN host.
- If the host with the target adapter is also hosting other boot from SAN adapters, perform a boot from SAN using one of the other boot from SAN adapters. The target adapter can now be used.

ATTENTION: The Emulex HBA Manager application cannot retrieve data from an offline adapter or port and will display incorrect information for that adapter or port. Adapters and ports must be online for the Emulex HBA Manager application to display accurate information.

4.6.1 DPortTest

D_Port is a diagnostic mode supported by 16GFC and faster Brocade® switches. D_Port tests enable you to detect physical cabling issues that result in increased error rates and intermittent behavior. If activated, D_Port runs a series of tests including local electrical loopback, loopback to the remote optics, loopback from the remote port to the local optics, and a full device loopback test with data integrity checks. It also provides an estimate of cable length to validate that a proper buffering scheme is in place. The various loopback tests allow some level of fault isolation so you can distinguish faults from marginal cable, optics modules, and connector or optics seating. D_Port is not supported on LPe12000-series or LPe15000-series adapters. Bi-directional D_Port testing is supported.

NOTE: The following information applies to D_Port:

- Dynamic D_Port must be disabled on the adapter port to initiate D_Port testing using the Emulex HBA Manager application. See Section 4.9.4, setfwparam, for more information.
- Dynamic D_Port must be enabled on the switch port.
- When in D_Port mode, the port is considered offline and can only initiate or respond to diagnostic tests (DPortTest).
- When using D_Port, the port enters D_port mode and stays in that state until D_Port is disabled.
- D_Port testing is not available when FC port trunking (aggregation) is enabled.
- Basic connectivity diagnostics are already supported by Emulex HBAs. The Emulex HBA Manager application has diagnostic modes that support validation of the connection to the switch. The functionality that Brocade offers provides the ability to diagnose marginal cable conditions (for example, dust in the optics) that result in higher error rates.
- D_Port tests run with the physical connection in an offline diagnostic state, so normal I/O cannot be sent through the physical port while the test is in progress. While the port is in D_Port mode, the link appears down on that port, similar to an unplugged cable.
- If you are using D_Port in a boot from SAN configuration, the configuration must have redundant paths to the boot LUN, and only one of the redundant adapter ports should be set to D_Port.
- D_Port is also referred to as ClearLink®.
- For more information about D_Port, refer to the Brocade section of the Broadcom® website at www.broadcom.com.

Supported By

Linux, Windows, and Windows + CIM provider on a VMware host

Syntax
```
DPortTest <WWPN>
```

Parameters

WWPN   The WWPN of the FC function on the adapter.

Considerations When Running the DPortTest Command

- A test failure occurs if the `DPortTest` command is run with a switch that does not support D_Port testing.
- Typing **Ctrl+C** while the D_Port tests are running terminates the tests, and the completed results are displayed.
- If the overall test result is FAILED, you must either rerun the tests successfully, or reset the adapter port to bring up the link.
- If a test phase fails, the D_Port diagnostics are stopped automatically. As a result, test phases that would have occurred after the failure are not displayed.
- If more than one error is reported in a single test phase, multiple lines are displayed for each error.

NOTE: To initiate D_Port tests from the switch, Dynamic D_Port must be enabled on the adapter port. See Section 4.9.4, setfwparam, for more information.

ATTENTION: The Emulex HBA Manager application cannot retrieve data from an offline adapter or port and will display incorrect information for that adapter or port. Adapters and ports must be online for the Emulex HBA Manager application to display accurate information.

Examples

Successful test and test failure examples follow.

Successful Test

```
> hbacmd DPortTest 10:00:00:00:c9:d1:a2:d0

Running D_Port Tests. Please wait. Polling for results...........................

D_Port Test Status:     Passed
Buffers Required:       1
Frame Size:             2112
Round Trip Latency:     1898 nanoseconds
Estimated Cable Length: 172  meters


================================================================================
Test Phase               Result    Latency   Local Errors   Remote Errors
================================================================================
Electrical Loopback      Passed    122
Optical Loopback         Passed    1898
Reverse Optical Loopback Skipped   0
Link Traffic             Passed    0
```

Test Failures

```
> hbacmd DPortTest 10:00:00:00:c9:d1:a2:d0

Running D_Port Tests. Please wait. Polling for results.........................

D_Port Test Status:     Failed
Buffers Required:       0
Frame Size:             0
Round Trip Latency:     0     nanoseconds
Estimated Cable Length: 0     meters


================================================================================
Test Phase               Result    Latency   Local Errors   Remote Errors
================================================================================
Electrical Loopback      Failed    n/a
```

```
> hbacmd DPortTest 10:00:00:00:c9:d1:a2:d0

Running D_Port Tests. Please wait. Polling for results.........................

D_Port Test Status:      Failed
Buffers Required:        0
Frame Size:              0
Round Trip Latency:      0     nanoseconds
Estimated Cable Length: 0     meters


================================================================================
Test Phase              Result    Latency   Local Errors   Remote Errors
================================================================================
Electrical Loopback     Passed    0
Optical Loopback        Failed    n/a

> hbacmd DPortTest 10:00:00:00:c9:d1:a2:d0

Running D_Port Tests. Please wait. Polling for results.........................

D_Port Test Status:      Failed
Buffers Required:        1
Frame Size:              2112
Round Trip Latency:      1898 nanoseconds
Estimated Cable Length: 172   meters


================================================================================
Test Phase              Result    Latency   Local Errors   Remote Errors
================================================================================
Electrical Loopback     Passed    127
Optical Loopback        Passed    1898
Reverse Optical Loopback Skipped  0
Link Traffic            Failed    n/a
```

4.6.2 EchoTest

This command runs the echo test on FC functions.

NOTE: The `EchoTest` command fails if the target WWPN does not support the `ECHO ELS` command.

Supported By

Linux and Windows

Syntax
```
EchoTest <WWPN Source> <WWPN Destination> <Count> <StopOnError> <Pattern>
```

Parameters

WWPN Source	The WWPN of the originating FC function.
WWPN Destination	The WWPN of the destination (echoing) FC functions.
Count	The number of times to run the test. Use `0` to run the test indefinitely.
StopOnError	Specifies whether the test must be halted on error: `0` = No halt `1` = Halt on error
Pattern	Hexadecimal data pattern to transmit (up to 8 characters).

4.6.3 FcTraceRoute

This command issues an FC trace route request for the communication path between an FC initiator port and an FC target port (not supported on LPe12000-series adapters).

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

```
FcTraceRoute <WWPN> <Target WWPN>
```

Parameters

WWPN   The WWPN of the FC port to use as the FC trace route source.

Target WWPN   The WWPN of the FC target to use as the FC trace route endpoint.

Example

```
> hbacmd fctraceroute 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38

Test to be run: FC Trace Route (FTR)

FC trace route test status:
Test pending. Polling for results…

Test running ..........

FC Trace Route test succeeded – Results:

  Initiator Port: 10:00:00:90:FA:5D:05:A9
  Target Port   : 50:06:01:60:90:20:5C:38

  Hop 1
    Switch Name:       30:00:05:01:39:27:01:27
    Domain ID:         0000003F
    Ingress Port Name: 30:09:05:01:39:27:01:27
    Ingress Port Num:  9
    Egress Port Name:  30:2a:0F:01:39:27:01:27
    Egress Port Num:   42

  Hop 2
    Switch Name:       10:00:00:29:33:44:41:0F
    Domain ID:         0000001C
    Ingress Port Name: 10:1C:00:29:33:44:41:0F
    Ingress Port Num:  28
    Egress Port Name:  10:08:00:29:33:44:41:0F
    Egress Port Num:   8

  Hop 3
    Switch Name:       01:00:00:00:33:44:41:29
    Domain ID:         0000003D
    Ingress Port Name: 01:01:00:00:33:44:41:29
    Ingress Port Num:  1
    Egress Port Name:  01:02:00:00:33:44:41:29
    Egress Port Num:   2

  Hop 4
```

```
   Switch Name:       01:00:00:00:33:44:41:29
   Domain ID:         0000003D
   Ingress Port Name: 01:02:00:00:33:44:41:29
   Ingress Port Num:  2
   Egress Port Name:  01:01:00:00:33:44:41:29
   Egress Port Num:   1

 Hop 5
   Switch Name:       10:00:00:29:33:44:41:0F
   Domain ID:         0000001C
   Ingress Port Name: 10:08:00:29:33:44:41:0F
   Ingress Port Num:  8
   Egress Port Name:  10:1C:00:29:33:44:41:0F
   Egress Port Num:   28

 Hop 6
   Switch Name:       30:00:05:01:39:27:01:27
   Domain ID:         0000003F
   Ingress Port Name: 30:2a:0F:01:39:27:01:27
   Ingress Port Num:  42
   Egress Port Name:  30:09:05:01:39:27:01:27
   Egress Port Num:   9
```

4.6.4 GetBeacon

This command displays the current beacon state (either on or off).

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
GetBeacon <WWPN|MAC>
```

Parameters

WWPN   The WWPN of the FC function on the port.

MAC   The MAC address of the NIC function on the port.

4.6.5 GetXcvrData

This command displays transceiver data for a port on an adapter.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
GetXcvrData <WWPN|MAC> [Type]
```

Parameters

`WWPN`   The WWPN of an FC function on the port.

`MAC`   The MAC address of a NIC function on the port.

`Type`   The type of SFP data to display:

  `1` = Formatted SFP data (default)

  `2` = Raw SFP data (not supported by Windows + CIM provider on a VMware host)

Example

```
hbacmd GetXcvrData 00-00-c9-93-2f-d6
```

4.6.6 LoadList

This command displays the flash memory load list data for the FC function on the adapter. It is supported only on LPe12000-series adapters.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

```
LoadList <WWPN>
```

Parameters

`WWPN`   The WWPN of the FC function on the adapter.

4.6.7 LoopBackTest

This command runs one of the loopback tests available on the adapter port specified by the WWPN or MAC address.

NOTE: The following information applies to loopback tests:

  - Adapters and port information are not available during diagnostic loopback tests.
  - Internal and external loopback tests on trunking-enabled ports do not support infinite test cycles.
  - Internal and external loopback test results are displayed for each physical port.
  - Each physical port must have a loopback connector when external loopback tests are performed on trunking-enabled ports.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

```
LoopBackTest <WWPN|MAC> <Type> <Count> <StopOnError> [Pattern]
```

Parameters

WWPN	The WWPN of an FC function on the port.
MAC	The MAC address of a NIC function on the port.
Type	The type of loopback test to run:

        0 = PCI loopback test; not supported on PowerPC CNAs

        1 = Internal loopback test; not supported on PowerPC CNAs

        2 = External loopback test (requires a loopback plug)

        4 = PHY loopback test; supported only on PowerPC CNAs in NIC+FC mode and in NIC_FCoE mode

        5 = MAC loopback test; supported only on PowerPC CNAs in NIC+FC mode and in NIC_FCoE mode

Count	Number of times to run the test. Possible values are 1 to 99999. To run the test infinitely, use 0.
StopOnError	Specifies whether the test must be halted on error.

        0 = No halt

        1 = Halt

Pattern	An optional parameter that specifies 1 to 8 hexadecimal bytes to use for loopback data (for example, 1a2b3c4d).

Example

```
hbacmd LoopBackTest 10:00:00:00:c9:20:20:20 1 120 0
```

4.6.8 LoopMap

This command displays the arbitrated loop map data on an FC function.

Supported By

Linux, Solaris, and Windows

Syntax

```
LoopMap <WWPN>
```

Parameters

WWPN	The WWPN of the FC function.

4.6.9 PciData

This command displays the PCI configuration data (if available).

The PCI registers displayed are specific to the function referenced in the Emulex HBA Manager CLI. For example, if you specify the WWPN for an FC function, the PCI registers for that FC function are returned.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

```
PciData <WWPN|MAC>
```

Parameters

WWPN	The WWPN of an FC function.
MAC	The MAC address of a NIC function.

Example

```
hbacmd pcidata 10:00:B0:5A:DA:01:B1:0D
```

Example output:

```
Vendor ID:              0x10DF      Device ID:              0xE300
Command:                0x0546      Status:                 0x0010
Revision ID:            0x01        Prog If:                0x00
Subclass:               0x04        Base Class:             0x0C
Cache Line Size:        0x10        Latency Timer:          0x00
Header Type:            0x80        Built In Self Test:     0x00
Base Address 0:         0x92C0800C  Base Address 1:         0x00000000
Base Address 2:         0x00000000  Base Address 3:         0x00000000
Base Address 4:         0x00000000  Base Address 5:         0x00000000
CIS:                    0x00000000  SubVendor ID:           0x1590
SubSystem ID:           0x0214      ROM Base Address:       0x00000000
Interrupt Line:         0x00        Interrupt Pin:          0x02
Minimum Grant:          0x00        Maximum Latency:        0x00
Capabilities Ptr:       0x54


FeatureEnable:                      0x00000000
PwrMgt Caps/Nxt/ID:                 0x00036001
PwrMgt Ctl/Stat:                    0x00000008
MSI Ctl/Nxt/ID:                     0x018A7805
MSI Lo Address:                     0x00000000
MSI High Address:                   0x00000000
MSI Data:                           0x00000000
MSI Mask Bits:                      0x00000000
MSI Pending Bits:                   0x00000000
MSI-X Ctl/Nxt/ID:                   0x81FF9411
MSI-X Table Offset:                 0x00004000
MSI-X PBA Offset:                   0x00003400
VPD Address/Nxt/ID:                 0x00000003
VPD Data:                           0x51000D820000000000000000
PCIE Capabilities/Nxt/ID:           0x0002F810
PCIE Device Cap. Reg:               0x10008724
PCIE Device Status & Control:       0x00095136
PCIE Link Capabilities:             0x0041DC83
PCIE Link Status & Control:         0x10830040
Slot Capabilities Register:         0x00000000
Slot Status & Control Register:     0x00000000
Root Capabilities & Ctl Register:   0x00000000
Root Status Register:               0x00000000
Device Capabilities 2 Register:     0x0010001F
Device StatusControl 2 Register:    0x00000000
Link Capabilities 2 Register:       0x0000000E
Link Status 2 & Ctl 2 Register:     0x00000000
Slot Capabilities 2 Register:       0x00000000
Slot Status Control 2 Register:     0x00000000
Enhanced Cap Header AER:            0x00000000
Uncorrectable Error Status:         0x00000000
Uncorrectable Error Mask:           0x00000000
Uncorrectable Error Severity:       0x00000000
Correctable Error Status:           0x00000000
Correctable Error Mask:             0x00000000
Adv. Error Cap & Control:           0x00000000
Header Log 0x0:                     0x00000000
Header Log 0x4:                     0x00000000
Header Log 0x8:                     0x00000000
```

```
Header Log 0xC:                   0x00000000
Enhanced Cap Header PBUDG:         0x00000000
Data Select Reg:                  0x00000000
Data Register:                    0x00000000
Power Budget:                     0x00000000
```

4.6.10 PostTest

This command runs the POST on the adapter.

NOTE: This command is supported only on LPe12000-series adapters.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
PostTest <WWPN>
```

Parameters
`WWPN`   The WWPN of the FC port.

4.6.11 SetBeacon

This command turns an adapter port beacon on or off and sets the beacon's duration.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
SetBeacon <WWPN|MAC> <BeaconState> [BeaconDuration]
```

Parameters

`WWPN`	The WWPN of an FC function on the port.
`MAC`	The MAC address of a NIC function on the port.
`BeaconState`	Specifies the state of the beacon. `0` = Off `1` = On
`BeaconDuration`	(Optional) On supported adapters, specifies the amount of time, in seconds, beaconing is enabled. `0` - `65535` (seconds) `0` = Infinite (default)

4.6.12 Wakeup

This command displays the firmware's wakeup parameters for the FC function on the adapter.

NOTE: This command is supported only on LPe12000-series adapters.

Supported By

Linux, Solaris, and Windows

Syntax
```
Wakeup <WWPN>
```

Parameters

WWPN   The WWPN of an FC function.

4.7 Driver Parameter Commands

The Driver Parameter command group controls the driver parameters. You also can change the parameters back to factory default values.

NOTE: Driver Parameter commands are supported only for FC ports.

The `DriverConfig` and `SetDriverParamDefaults` commands are not supported for Solaris.

Considerations

- Driver parameters set to temporary or global values (using the `T` and `G` flags, respectively) must be read using the `GetDriverParams` command to view the current value of the parameter. The `GetDriverParamsGlobal` command returns only permanently set driver parameter values.

  Additionally, if temporary and global values are set for one or more driver parameters, the `SaveConfig` command must be run with the `N` flag (using the `N` flag is analogous to using the `GetDriverParams` command) to force the driver parameter values for the specified adapter to be saved. Inaccurate values can be saved if the `G` flag is used for this command.

- The list of available driver parameters that can be configured is different depending on the operating system and protocol.

4.7.1 DriverConfig

This command sets all driver parameters to the values in the `.dpv` file type. The `.dpv` file's driver type must match the driver type of the host operating system adapter.

Supported By

Linux and Windows

Syntax
```
DriverConfig <WWPN> <FileName> <Flag>
```

Parameters

WWPN   The WWPN of an FC function.

FileName   The name of the `.dpv` file, which is stored in the Emulex Repository directory.

Flag   `G` = Make the change global (all FC functions on this host).
            `N` = Make the change non-global (function-specific).

4.7.2 GetDriverParams

This command displays the name and value of each parameter.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

```
GetDriverParams <WWPN>
```

Parameters

WWPN   The WWPN of an FC function.

4.7.3 GetDriverParamsGlobal

This command displays the name and the global value of each driver parameter.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

```
GetDriverParamsGlobal <WWPN>
```

Parameters

WWPN   The WWPN of an FC function.

4.7.4 SaveConfig

This command saves the specified adapter's driver parameters to a file. The resulting file contains a list of driver parameter definitions in ASCII file format with definitions delimited by a comma. Each definition has the following syntax:

```
<parameter-name>=<parameter-value>
```

The command saves either the values of the global set or those specific to the adapter in the Emulex Repository directory.

Supported By

Linux, Solaris, and Windows

Syntax

```
SaveConfig <WWPN> <FileName> <Flag>
```

Parameters

WWPN   The WWPN of an FC function.

FileName   The name of the file that contains the driver parameters list.

Flag   G = Save the global parameter set.
                N = Save the local (function-specific) parameter set.

4.7.5 SetDriverParam

This command changes a driver parameter and designates the scope of the change.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

SetDriverParam <WWPN> <Flag1> <Flag2> <Param> <Value>

Parameters

WWPN   The WWPN of an FC function.

Flag1   L = Make the change local for only this function.
                G = Make the change global (all FC functions on this host).

Flag2   P = Make the change permanent (persists across reboot). For Linux, to make a permanent
                change that persists across reboots, you must set Flag1 to G (Global).
                T = Make the change temporary.

Param   The name of the parameter to modify.

Value   The new parameter value, in decimal or hexadecimal (0xNNN).

Example

To enable dynamic target mode:
hbacmd SetDriverParam 10:00:00:00:c9:ff:ff:ff L P enable-dtm 1

To disable dynamic target mode, set the flags to 0.

4.7.6 SetDriverParamDefaults

This command changes all values to the default for the adapter.

Supported By

Linux and Windows

Syntax

SetDriverParamDefaults <WWPN> <Flag1> <Flag2>

Parameters

WWPN   The WWPN of an FC function.

Flag1   L = Make the change local for only this function.
                G = Make the change global (applies to all FC functions on this host).

Flag2   P = Make the change permanent (the change persists across reboot).
                T = Make the change temporary.

4.8 Dump Commands

The Dump command group enables you to create a dump file for a selected adapter. Dump files contain information, such as firmware version, driver version, and operating system information. This information is useful when you are troubleshooting an adapter, but it is unavailable in Read-Only mode.

CAUTION! Disruption of service can occur if a diagnostic dump is run during I/O activity.

The dump files created are text files (`.txt` extension) and binary files. The extension for binary files depends on the following adapter types:

- LPe12000-series adapters – `.dmp` extension
- All other adapters – `.bin` extension

4.8.1 DeleteDumpFiles

This command deletes all diagnostic dump files for an adapter.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
DeleteDumpFiles <WWPN|MAC>
```

Parameters

WWPN   The WWPN of an FC function on the adapter.

MAC   The MAC address of a NIC port function on the adapter.

4.8.2 Dump

This command creates a diagnostic dump file in the `HbaCmd` dump file directory.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
Dump <WWPN|MAC>
```

Parameters

WWPN   The WWPN of an FC port.

MAC   The MAC address of a NIC port.

4.8.3 GetDumpDirectory

This command displays the dump file directory for the adapters in the host.

NOTE:
- The dump directory can be set only on VMware ESXi hosts.
- The dump directory applies to all adapters in the server. A separate dump directory for each adapter does not exist.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
GetDumpDirectory [WWPN|MAC]
```

Parameters

WWPN   Obsolete; ignored if specified.

MAC   Obsolete; ignored if specified.

4.8.4 GetDumpFile

This command gets the user-specified dump file to the local client's dump directory. The dump directory (local and remote) is named `Dump`. The dump files are copied from the dump directory of the remote host to the dump directory of the local host. Therefore, if the remote host option is not specified (`h=IP_Address[:port]`), this command returns an error because the source and destination directories are the same.

Dump directory:
- Windows – *SystemDrive_Letter*:\Program Files\Emulex\Util\Dump
- Linux – /var/opt/emulex/ocmanager/Dump
- Solaris – /opt/ELXocm/Dump
- VMware ESXi – The dump directory set using the `SetDumpDirectory` command.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
GetDumpFile <h=IP_Address[:port]>[WWPN|MAC] <filename>
```

Parameters

WWPN   Obsolete; ignored if specified.

MAC   Obsolete; ignored if specified.

filename   The name of the dump file to be copied from the remote host.

Example
```
hbacmd GetDumpFile h=10.192.193.154 BG-HBANYWARE-15_10000000c97d1314_20100120-032820421.dmp
```

4.8.5 GetDumpFileNames

This command gets the names of the files in the host's dump directory.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
GetDumpFileNames [WWPN|MAC]
```

Parameters

WWPN   Obsolete; ignored if specified.

MAC   Obsolete; ignored if specified.

Example
```
hbacmd GetDumpFileNames
```

4.8.6 GetRetentionCount

This command displays the maximum number of diagnostic dump files to keep.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
GetRetentionCount [WWPN|MAC] <value>
```

Parameters

WWPN   Obsolete; ignored if specified.

MAC   Obsolete; ignored if specified.

Value   The number of dump files to retain.

Example
```
hbacmd getRetentionCount 6
```

4.8.7 SetDumpDirectory

This command sets the dump directory (valid only on VMware ESXi hosts).

Supported By

Windows + CIM provider on a VMware host

To use the `SetDumpDirectory` command, you must have a directory (which must be a storage partition) mapped under `/vmfs/volumes` where the files are dumped. This directory points to the internal hard disk or an external storage area and can also be mapped using the vSphere Client utility from VMware.

The application checks for the dump directory and creates the dump files in that location.

In a remote environment, you can use the `SetDumpDirectory` command from a host running any operating system (including Linux, Solaris, and Windows), but only to a remote host that is running Windows.

NOTE: The dump directory applies to all adapters in the server. A separate dump directory for each adapter does not exist.

Syntax

```
SetDumpDirectory <DumpDirectoryName>
```

Parameters

`DumpDirectoryName`   The directory under `/vmfs/volumes` that you created to store the dump files.

Example

This example displays the dump directory set to `/vmfs/volumes/ocm-datastore`:

```
hbacmd SetDumpDirectory h=10.192.203.173 m=cim u=root p=Swamiji001 n=root/emulex
10:00:00:00:c9:61:f2:64 ocm-datastore
```

4.8.8 SetRetentionCount

This command specifies the maximum number of diagnostic dump files for the adapter. When the count reaches the limit, the next dump operation deletes the oldest file.

NOTE: The retention count applies to all adapters in the server.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

```
SetRetentionCount [WWPN|MAC] <Value>
```

Parameters

`WWPN`   Obsolete; ignored if specified.

`MAC`   Obsolete; ignored if specified.

`Value`   The number of dump files to retain.

Example

```
hbacmd SetRetentionCount 6
```

4.9 Firmware Commands

The Firmware command group enables you to view and configure firmware parameters. You can also capture and retrieve firmware logs.

4.9.1 getfwlog

This command stops capturing the firmware log and retrieves it. After the log is retrieved, firmware logging is restarted. The format of the firmware log file name is `<adapter_serial_number>_fwlog_<timestamp>.log`.

Supported By

Windows and Linux

NOTE:
- The `getfwlog` parameter is not supported on LPe12000-series, LPe15000-series, and LPe16000-series adapters.
- On Windows systems the `FwLogBufferCnt` parameter must be enabled to create firmware logs. Refer to the *Emulex Drivers for Windows User Guide* for instructions on enabling the parameter.
- On Linux systems the `lpfc_ras_fwlog_buff` parameter must be enabled and the `lpfc_ras_fwlog_func` parameter must be set to the PCI function number whose firmware logs you want to enable. Refer to the *Emulex Drivers for Linux User Guide* for instructions on enabling and configuring the parameters.

Syntax

```
getfwlog <WWPN>
```

Parameters

WWPN   The WWPN of the adapter port.
        NOTE: On Linux systems, you must use the same WWPN specified by the `lpfc_ras_fwlog_func` command.

Example
```
hbacmd getfwlog 10:00:00:90:fa:94:2e:ca
Successfully retrieved firmware log.
```

4.9.2 getfwparams

This command displays a list of all configurable firmware parameters.

Supported By

Windows, Linux, and Windows + CIM provider on a VMware host

Syntax
```
getfwparams <WWPN>
```

Parameters

WWPN   The WWPN of the adapter port.

Example
```
hbacmd getfwparams 10:00:00:00:c9:12:34:02

FW Params for 10:00:00:00:c9:12:34:02

FX              Param     Low     High     Def     Cur     Dyn
00:            FA-PWWN      0        1       0       0       5
01:                FEC      0        1       1       1       1
02:      DYNAMIC-DPORT      0        1       1       1       1
03:           TOPOLOGY      2        3       3       3       5
```

4.9.3 setfwlog

This command starts copying or stops copying the firmware log from SLI® memory to host memory.

Supported By

Windows and Linux

NOTE:

- The `getfwlog` parameter is not supported on LPe12000-series, LPe15000-series, and LPe16000-series adapters.
- On Windows systems, the `FwLogBufferCnt` parameter must be enabled to create firmware logs. Refer to the *Emulex Drivers for Windows User Guide* for instructions on enabling the parameters.
- On Linux systems the `lpfc_ras_fwlog_buff` parameter must be enabled and the `lpfc_ras_fwlog_func` parameter must be set to the PCI function number whose firmware logs you want to enable. Refer to the *Emulex Drivers for Linux User Guide* for instructions on enabling and configuring the parameters.

Syntax

```
hbacmd setfwlog <wwpn> <state> [loglevel]
```

Parameters

WWPN	The WWPN of the adapter port. **NOTE:** On Linux systems, you must use the same WWPN specified by the `lpfc_ras_fwlog_func` command.
State	The firmware logging state. Valid values are: `1` = Start firmware logging `0` = Stop firmware logging
Loglevel	The logging level of the firmware log, valid values are `0` to `4`, `0` is the least verbose. **NOTE:** This parameter is only applicable when starting the firmware log capture. It must not be specified when stopping the log capture.

Example

```
hbacmd setfwlog 10:00:00:90:fa:94:2e:ca 1 2
Successfully started firmware log capture, with log level 2..
```

4.9.4 setfwparam

This command enables you to configure firmware parameters.

Supported By

Windows, Linux, and Windows + CIM provider on a VMware host

Syntax

```
setfwparam <WWPN> <param> <value>
```

Parameters

WWPN   The WWPN of the adapter port.

param   The parameter to modify.

`Topology` – Sets the topology on the adapter port.

`FA-PWWN` – Enables or disables the FA-PWWN parameter.

NOTE: Dynamic D_Port cannot be enabled simultaneously with DH-CHAP or FA-PWWN. If Dynamic D_Port is enabled and you want to enable DH-CHAP or FA-PWWN, you must first disable Dynamic D_Port.

NOTE: Trunking and FA-PWWN cannot be enabled simultaneously.

NOTE: The link is toggled if FA-PWWN is enabled, but the switch does not support FA-PWWN.

NOTE: You must reset the adapter port to activate new FA-PWWN parameter setting, and you must reload the Emulex HBA Manager application to display the new setting.

ATTENTION: The Emulex HBA Manager application cannot retrieve data from an offline adapter or port and will display incorrect information for that adapter or port. Adapters and ports must be online for the Emulex HBA Manager application to display accurate information.

NOTE: When a new WWPN is assigned using FA-PWWN, persistently stored configuration information associated with the original WWPN, such as driver parameters and LUN frame priority settings, is not applied to the newly assigned WWPN. The configuration information associated with the original WWPN must be reconfigured for the new WWPN.

`FEC` – Enables or disables FEC.

`DYNAMIC-DPORT` – Enables or disables Dynamic D_Port.

NOTE: Dynamic D_Port cannot be set if DH-CHAP is enabled.

NOTE: Dynamic D_Port cannot be enabled simultaneously with DH-CHAP or FA-PWWN. If Dynamic D_Port is enabled and you want to enable DH-CHAP or FA-PWWN, you must first disable Dynamic D_Port.

NOTE: If Dynamic D_Port is enabled on an adapter, it is not supported in a direct-connect point-to-point environment. The adapter must be connected to a switch.

Value   `FA-PWWN`: `0` = Disables the parameter. `1` = Enables the parameter.

`FEC`: `0` = Disables the parameter. `1` = Enables the parameter.

`DYNAMIC-DPORT`: `0` = Disables the parameter. `1` = Enables the parameter.

`TOPOLOGY`: `0` = Auto, (Loop First) `1` = Auto, (PTP First), `2` = Loop, `3` = PTP

Example

```
hbacmd setfwparam 10:00:00:90:fa:94:2e:ca fa-pwwn 1
Set FW Parameter FA-PWWN=1 for 10:00:00:90:fa:94:2e:ca
Reset adapter port to activate new firmware parameter setting.
```

ATTENTION: The Emulex HBA Manager cannot retrieve data from an offline adapter or port and will display incorrect information for that adapter or port. Adapters and ports must be online for the Emulex HBA Manager application to display accurate information.

4.10 LUN ExpressLane Commands

The LUN ExpressLane command group enables, disables, and displays the ExpressLane status on a particular LUN.

The Emulex HBA Manager application allows you to set special priority queuing for selected LUNs by making them ExpressLane LUNs. ExpressLane LUN performance is superior to that of regular LUNs. You can enable ExpressLane LUNs attached to both physical and virtual ports. ExpressLane LUN assignments persist across system reboots.

NOTE: ExpressLane is not supported on LPe12000-series adapters or on PowerPC CNAs.

For Linux operating systems, if ExpressLane LUNs are created, the vPort needs to be re-created after a system boot because the ExpressLane LUNs do not persist across system reboots. If the vPort is re-created with the same WWPN to which the ExpressLane LUN was previously assigned and that same LUN is then detected, it becomes an ExpressLane LUN again.

4.10.1 GetExpressLaneLunList

This command displays LUNs on a target and their respective ExpressLane status.

Supported By

Linux, Windows, and Windows + CIM provider on a VMware host

NOTE: For Linux and VMware operating systems, only ExpressLane-enabled LUNs are shown by this command. LUNs without ExpressLane-enabled support are not shown.

Syntax
```
GetExpressLaneLunList <WWPN> [vport=<vPort WWPN>] <Target WWPN> <Option>
```

Parameters

WWPN	The WWPN of the FC function connected to the target or physical WWPN if virtual ports are selected.
vPort WWPN	The WWPN of an optional vPort allowing you to get the ExpressLane LUNs of a vPort.
Target WWPN	The WWPN of the target LUNs.
Option	0 = Get information from the driver.
	1 = Get information from the configuration.

Example
```
hbacmd h=10.192.87.198 GetExpressLaneLunList 10:00:00:00:00:87:01:98 20:22:d4:ae:52:6e:6f:08 0

Number of LUNs: 4
     FCP_LUN              OS_LUN         ExpressLane
-------------------    ------         ------------
0000 0000 0000 0000    0              No
0001 0000 0000 0000    1              Yes
0002 0000 0000 0000    2              No
0003 0000 0000 0000    3              Yes
```

4.10.2 GetLunXLaneConfig

This command displays the frame priority value for ExpressLane LUNs on the specified target.

Supported By

Linux, Windows, and Windows + CIM provider on a VMware host

Syntax

```
hbacmd GetLunXLaneConfig <WWPN> [vport=<vPort WWPN>] <Target WWPN> <Option>
```

Parameters

WWPN	World-wide port name of any FC function on the adapter.
vPort WWPN	The WWPN of an optional vPort.
Target WWPN	The WWPN of the target connected to the LUNs.
Option	0 = Get the information from the driver.
	1 = Get the information from the configuration.

Example

```
hbacmd GetLunXLaneConfig 10:00:00:00:c9:55:55:56 50:06:01:60:10:20:5C:38 0

Supported Priority Levels: High, Medium, Low


                              Priority    Priority
     FCP_LUN            OS_LUN  Level       Value
-------------------  -------- ---------- ----------
0000 0000 0000 0000      0      High        113
0001 0000 0000 0000      1      High        113
0002 0000 0000 0000      2      Medium       92
0009 0000 0000 0000      9      Low          53
```

4.10.3 SetLunXLaneConfig

If the adapter and switch support it, the SetLunXLaneConfig command enables you to configure the ExpressLane OAS state and the frame priority levels, or values, for ExpressLane LUNs. Switches can provide up to three priority levels, Low, Medium, and High, but they might provide fewer options.

NOTE: If the switch connected to the FC initiator does not support LUN-specific frame priority levels using the Get Fabric Object (GFO), you must manually enter the frame priority values in the range of 0 to 127 for all ExpressLane-enabled LUNs.

You can also use the SetLunXLaneConfig command to disable ExpressLane on all LUNs in a single operation.

Use the GetLunXLaneConfig command to determine if frame priority levels are supported.

The following rules apply when using the SetLunXLaneConfig command:
- The ExpressLane OAS state and priority levels, or values, are saved automatically to both the driver and configuration settings. You cannot specify where to save the configuration.
- The priority parameter is only required if the ExpressLane state parameter is set to 1 (enable).
  - You cannot disable the ExpressLane OAS state with the priority level, or value, parameter set.
  - You cannot disable all LUNs with the priority level, or value, parameter set.
- The EnableXLane driver parameter must be enabled.

NOTE:

- `EnableXLane` is disabled when `vmid_priority_tagging` and `max_vmid` parameters are enabled on VMware hosts.
- If the `EnableXLane` parameter is set to `1`, ExpressLane functionality is applied only to FCP LUNs, and not to NVMe namespaces.

Supported By

Linux, Windows, and Windows + CIM provider on a VMware host

Syntax

```
hbacmd SetLunXLaneConfig <WWPN> [vport=<vPort WWPN>] <Target WWPN> <LUN> <State>
<PriorityLevel|PriorityValue>
```

Parameters

WWPN	The World Wide Port Name of any FC function on the adapter.
vPort WWPN	The WWPN of an optional vPort.
Target WWPN	The WWPN of the target connected to the LUNs.
LUN	The LUN number. (The OS_LUN from the `GetExpressLaneLunList` command to set.) Use `ALL` to disable ExpressLane for all LUNs.
State	`0` = Disable ExpressLane. `1` = Enable ExpressLane.
PriorityLevel	The levels are high, medium, or low. (Use the `GetLunXLaneConfig` command to get an accurate list of the supported priority levels.) This value must be omitted if the `State` = 0.
PriorityValue	A value within the range of 0 to 127. This value is only allowed if priority levels are not supported by the switch. This value must be omitted if `State` = 0.

Example

```
hbacmd SetLunXLaneConfig 10:00:00:00:c9:55:55:56 50:06:01:60:10:20:5C:38 0 1 low

ExpressLane configuration successfully changed on the specified LUN(s)
```

4.11 LUN Masking Commands

The LUN Masking command group manages LUN masking activities. LUN masking commands are supported only for FC functions.

NOTE: Linux, Solaris, and Windows + CIM provider on a VMware host do not support the following commands:

- `GetLunUnMaskByHBA`
- `GetLunUnMaskByTarget`
- `RescanLuns`
- `SetLunMask`

4.11.1 GetLunList

This command queries for the presence of any masked LUNs.

Supported By

Windows

Syntax

```
GetLunList <HBA WWPN> <Target WWPN> <Option>
```

Parameters

HBA WWPN   The WWPN of an FC function on the adapter.

Target WWPN   The WWPN of the target.

Option   0 = Get information from the driver.
                  1 = Get information from the configuration.

4.11.2 GetLunUnMaskByHBA

This command queries for the presence of any unmasked LUNs by FC functions.

Supported By

Windows

Syntax

```
GetLunUnMaskByHBA <HBA WWPN> <Option>
```

Parameters

HBA WWPN   The WWPN of an FC port.

Option   0 = Get information from the driver.
                  1 = Get information from the configuration.

4.11.3 GetLunUnMaskByTarget

This command queries for any unmasked LUNs by target.

Supported By

Windows

Syntax

```
GetLunUnMaskByTarget <HBA WWPN> <Target WWPN> <Option>
```

Parameters

HBA WWPN   The WWPN of an FC function.

Target WWPN   The WWPN of the target.

Option   0 = Get information from the driver.
                  1 = Get information from the configuration.

4.11.4 RescanLuns

This command rescans LUNs to find any new LUNs.

Supported By

Windows

Syntax

`RescanLuns <HBA WWPN> <Target WWPN>`

Parameters

`HBA WWPN`	The WWPN of an FC function.
`Target WWPN`	The WWPN of the target.

4.11.5 SetLunMask

This command masks the specified LUNs.

Supported By

Windows

Syntax

`SetLunMask <HBA WWPN> <Target WWPN> <Option> <Lun> <LunCount> <MaskOp>`

Parameters

`HBA WWPN`	The WWPN of an FC function.
`Target WWPN`	The WWPN of the target.
`Option`	`0` = Get information from the driver. `1` = Get information from the configuration (make persistent). `2` = Send information to both.
`Lun`	The starting LUN number.
`LunCount`	The number of LUNs.
`MaskOp`	`A` = Mask the LUN. `B` = Clear unmask the target level. `C` = Clear unmask the HBA level. `D` = Unmask the LUN. `E` = Unmask the target level. `F` = Unmask the HBA level.

4.12 Miscellaneous Commands

Commands in the Miscellaneous Command group do not fit in other groups. See specific commands for adapter limitations.

4.12.1 AddHost

This command adds a host to the hosts file for remote TCP/IP management in the Emulex HBA Manager application. The adapters for these hosts are also presented by the `ListHBAs` command (see Section 4.12.7, ListHBAs).

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

To add non-VMware ESXi hosts:
```
AddHost <hostname|IP_address>[:Port_Number]
```

Parameters

`hostname`	The name of the host to add to the hosts file.
`IP_address`	The IP address (IPv4 or IPv6) of the host to add to the hosts file.
	Example IPv4: `10.192.80.102`
	Example IPv6: `fe80::6445:80e9:9878:a527`
`Port_Number`	The optional IP port number used to access remote host.
	Example: `10.192.80.102:9876`
	NOTE: When specifying an IPv6 address with `Port_Number`, it must be enclosed in `[ ]`.
	Example: `[fe80::6445:80e9:9878:a527]:9876`

- An attempt is made to contact the host to confirm remote access before adding it to the host list. If the attempt fails, the host is not added.
- The `h` option (for specifying an optional IP address or host name) after `hbacmd` is not available for the `AddHost` command.

To add VMware ESXi hosts to Windows using the Emulex HBA Manager application:
```
m=cim [u=<username>] [p=<password>] [n=<namespace>] AddHost <IP_Address>
```

If the *username*, *password*, and *namespace* are not specified, see Section 3.4.2.1.1, Default CIM Credentials.

4.12.2 Download

This command downloads a firmware image to the port function or adapter specified by the WWPN or MAC address.

Considerations

- If you attempt to update unauthenticated firmware for an LPe31000-series, LPe32000-series, or LPe35000-series adapter, the following error message is displayed:
  ```
  ERROR: Download Failed due to invalid firmware digital signature. Please contact customer support
  for additional help.
  ERROR: <203>: Failed validating firmware digital signature
  ```
- If you attempt to update unsecured firmware for an LPe31000-series, LPe32000-series, or LPe35000-series adapter, the following error message is displayed:
  ```
  ERROR: Download Failed due to missing digital signature in firmware file. Please contact customer
  support for additional help.
  ERROR: <209>: Firmware digital signature missing
  ```
- For all adapter firmware downloads (except LPe12000-series adapters), the Emulex HBA Manager application accepts only `.grp` files.
- For all adapters (except LPe12000-series adapters), the WWPN (and MAC address for PowerPC CNAs) identifies the adapter, and the updated firmware applies to the entire adapter.
- If you attempt to download firmware that is not compatible with the adapter, the following error message is displayed:
  ```
  ERROR: <24>: This firmware version is not supported on this board model.
  ```
- For LPe12000-series adapters, you update the firmware and boot code on each FC port and function. The firmware and boot code are two separate binaries. You must flash both the firmware and boot binaries to update LPe12000-series adapters.

CAUTION! Updating firmware or boot code on an LPe12000-series adapter that is being used to boot from SAN is not advisable. After the update has completed, the system performs an adapter reset, which might cause a loss of connectivity to the SAN and a possible loss of data. To update firmware on an LPe12000-series adapter, you must make sure that the adapter is not currently being used to boot from SAN. Perform one of the following actions:

- Move the adapter to be updated to a non-boot from SAN host, and perform the update from that location.
- If the host with the adapter that needs to be updated is also hosting other boot from SAN adapters, perform a boot from SAN using one of the other boot from SAN adapters. The target adapter can now be updated because it is no longer being used for boot from SAN.

ATTENTION: The Emulex HBA Manager application cannot retrieve data from an offline adapter or port and will display incorrect information for that adapter or port. Adapters and ports must be online for the Emulex HBA Manager application to display accurate information.

NOTE: For LPe31000-series, LPe32000-series, and LPe35000-series adapters only, the following condition applies:

In some cases, a firmware update requires either a firmware reset or a basic PCIe reset, depending on the features available in the new firmware. A firmware reset is performed automatically if it is needed, regardless of the operating system. A basic PCIe reset is also performed automatically, but only on the following Linux operating systems:

- SLES 12 SP2 and later
- SLES 15 and later
- RHEL 7.6 and later

If a firmware reset or basic PCIe reset occurs after the firmware is downloaded, a message similar to the following appears:

```
Download and pci reset successfully completed.
```

In some cases, a full reboot is required to activate new firmware or to enable a new feature. In that case, a message similar to one of the following messages appears after the firmware download is complete:

```
Download successfully completed. Please reboot the system to activate new firmware.
```

```
Download completed. Some features require an optional reboot. Refer to the Adapter's
Firmware and Boot Code Release Notes for details.
```

For a list of features that require a reboot to be enabled, refer to the *Emulex LPe35000-Series HBA Firmware and Boot Code Release Notes.*

CAUTION! The Emulex HBA Manager cannot retrieve data from an offline adapter or port and will display incorrect information for that adapter or port. Adapters and ports must be online for the Emulex HBA Manager application to display accurate information.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
Download <WWPN|MAC> <FileName>
```

Parameters

WWPN   The WWPN of an FC function on the adapter.

MAC   The MAC address of a NIC function on the adapter.

FileName   The name and location of the firmware image (any file accessible to the CLI client).

4.12.3 ExportSANInfo

For reporting purposes, this command captures the SAN information in `.xml` for XML-formatted files and `.csv` for CSV-formatted files.

NOTE: This command can take a long time on large SAN configurations because of the large amount of information that must be obtained and reported. The output can also be redirected to a file if required.

Supported By

Linux, Solaris, and Windows

Syntax
```
ExportSANInfo [format]
```

NOTE: The h option (for specifying an optional IP address or host name) after hbacmd is not available for the ExportSANInfo command.

Parameters

format   An optional parameter that specifies the format of the adapter information:
            csv = CSV-formatted files
            xml = XML-formatted files
            Leaving the format blank displays the data in XML format (default).

4.12.4 FecEnable

This command enables or disables 16G FEC (not supported on LPe12000-series adapters).

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

```
FecEnable WWPN <0|1>
```

Parameters

WWPN   The WWPN of the FC function.

0   Disables 16G FEC on the function.

1   Enables 16G FEC on the function.

4.12.5 GetCimCred

This command displays the default credentials set for the CIM client.

NOTE: The password is encrypted.

Supported By

Windows

Syntax
```
GetCimCred
```

Parameters

None.

4.12.6 GetVPD

This command displays the port's vital product data (VPD).

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
GetVPD <WWPN|MAC>
```

Parameters

WWPN   The WWPN of an FC function.

MAC   The MAC address of a NIC function.

4.12.7 ListHBAs

This command displays a list of the manageable Broadcom Emulex adapters found by local discovery. For a NIC port on a PowerPC CNA, the MAC address is displayed instead of the WWPN. The node WWN and fabric WWN are not displayed. The type of information listed can vary according to the adapter model.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

```
ListHBAs [local] [m=model] [pt=type] [down]
```

Parameters

`local`	Displays only local adapters.
`m=model`	Model filter. Append * to the end of the model name for a wildcard match. For example: `LPe32*`.
`pt=type`	The port type filter. Valid types are `FC`, `NIC`, and `NVMe`.
`down`	Displays only the NIC functions of PowerPC CNAs on the local system in which the adapter's Arm processor has stopped. This parameter detects adapters that might not respond to commands from the Emulex HBA Manager application GUI.

4.12.8 RemoveHost

This command removes a host from the hosts file used for TCP/IP management in the Emulex HBA Manager application GUI. The `<host_address>` can be an IP address that uses the IPv4 or IPv6 format, or it can be a host name.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

For the remote management interface:
```
RemoveHost host_address
```

For VMware ESXi using the CIM interface:
```
m=cim RemoveHost <IP_Address>
```

NOTE: The `h` option (for specifying an optional IP address or host name) after `hbacmd` is not available for the `RemoveHost` command.

Parameters

`host_address`	The host to remove.
`IP_Address`	The IP address of the host to remove.
`m`	The CIM version of the VMware ESXi.

4.12.9 Reset

This command resets an FC function. A reset can require several seconds to complete, especially for remote devices. When the reset is completed, the system command prompt is displayed.

ATTENTION: The Emulex HBA Manager application cannot retrieve data from an offline adapter or port and will display incorrect information for that adapter or port. Adapters and ports must be online for the Emulex HBA Manager application to display accurate information.

NOTE: This command applies only to FC functions.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
Reset <WWPN>
```

Parameters

WWPN   The WWPN of an FC function.

4.12.10 SetCimCred

This command sets the default CIM credentials. You must specify all four credentials: *username*, *password*, *namespace*, and *portnum*. Default credentials are used if any credential is not in the hbacmd command argument. After the default credentials for a host are set, any other command can be issued by specifying m=cim.

Supported By

Windows

Syntax
```
SetCimCred <username> <password> <namespace> <portnum>
```

NOTE: Use this command to set only the CIM credentials. After this is finished, subsequent hbacmd commands do not require you to specify the CIM credentials in the command line.

Parameters

username   The logon user ID of the VMware ESXi.

password   The logon password of the VMware ESXi.

namespace   The namespace where the Emulex CIM provider is registered in the SFCB CIMOM of VMware ESXi, specifically root/emulex.

portnum   The port number of the SFCB that CIMOM is listening to, that is, 5988 (HTTP) or 5989 (HTTPS).

4.12.11 TargetMapping

This command displays a list of mapped targets and the LUNs for an FC function on a port.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

```
TargetMapping <WWPN>
```

Parameters

WWPN   The WWPN of an FC or FoE adapter.

4.12.12 Version

This command displays the current version of the Emulex HBA Manager application CLI client.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

For the remote management interface:

```
Version
```

NOTE: The h option (for specifying an optional IP address or host name) after hbacmd is not available for the Version command.

For VMware ESXi using the CIM interface:

```
h=<IP address> m=<cim Version>
```

Parameters

h   The IP address of the VMware ESXi.

m   The CIM version of the VMware ESXi.

4.13 NVMe Commands

The NVMe command group provides commands that configure NVMe over FC.

NOTE: NVMe commands are supported on LPe31000-series, LPe32000-series, and LPe35000-series adapters only.

Support by NVMe targets for some of the commands in this section is optional and depends on whether namespace management is supported by the NVMe target. To determine whether namespace management is supported by the target, issue the nvme-id-ctrl command (see Section 4.13.7, nvme-id-ctrl), and examine the value displayed in the Namespace Management field. See specific command descriptions for support requirements.

Some commands require you to enter parameters, such as the Target WWPN, NQN, and CtrlID. To determine these parameters, issue the nvme-list command (see Section 4.13.9, nvme-list).

NOTE: In the nvme-list command output, the Target WWPN is referred to as the *Port WWN*.

NOTE: NVMe configuration uses two similar commands:
- nvme list (with a space) is a native NVMe CLI command. The nvme list command is not discussed in this document.
- nvme-list (with a hyphen) is an Emulex HBA Manager application CLI command. The nvme-list command is discussed in this section.

4.13.1 nvme-attach-ns

The `nvme-attach-ns` command attaches a namespace to one or more controllers.

Supported By

Windows

Syntax

`hbacmd nvme-attach-ns <WWPN> <Target WWPN> <NQN> <NSID> <CtrlID=ctrlid1[,ctrlid2,ctrlidn]>`

Parameters

WWPN	The WWPN of the FC initiator port.
Target WWPN	The WWPN of an FC port on an NVMe-capable device.
NQN	The qualified name of the NVMe subsystem.
NSID	The namespace identifier to be attached, in hexadecimal.
ctrlid1 ... ctrlidn	One or more controller identifiers to which the namespace is to be attached, in hexadecimal. If you are specifying multiple controllers, use commas to delineate them.

Support Requirements

- Mandatory if the target supports namespace management.
- Not supported if namespace management is not supported.

Example

`hbacmd nvme-attach-ns 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-08.com.example:nvme.host.sys.xyz  0x00000001 ctrlid=0x0001,0x0002`

4.13.2 nvme-create-ns

The `nvme-create-ns` command creates namespaces on an NVMe subsystem. The command issues the NVMe `namespace` management command to create the namespace and returns the results.

Supported By

Windows

Syntax

`hbacmd nvme-create-ns <WWPN> <Target WWPN> <NQN> [CtrlID=<ctrlid>] [Size=<size>] [Capacity=<capacity>] [LBAF=<lbaf>] [MDT=<mdt>][DPS=<dps>] [NMIC=<nmic>]`

Parameters

WWPN	The WWPN of the FC initiator port.
Target WWPN	The WWPN of an FC port on an NVMe-capable device.
NQN	The qualified name of the NVMe subsystem.
ctrlid	The controller that processes the request, in hexadecimal (optional).
size	The namespace size in logical blocks, in decimal (optional).
capacity	The namespace capacity, in decimal. This value is the maximum number of logical blocks that you can allocate (optional).
lbaf	The LBA format to be used for the namespace (optional).

`mdt`	The parameter that selects the metadata transfer mechanism (optional):
	`0` = Transfer metadata as a separate contiguous buffer of data.
	`1` = Transfer metadata at the end of data LBA.
`dps`	The end-to-end data protection type settings, in hexadecimal (optional):
	`0x0` = Protection information is not enabled.
	`0x1` = Protection information is enabled and transferred as the last 8 bytes of metadata, Type 1.
	`0x2` = Protection information is enabled and transferred as the last 8 bytes of metadata, Type 2.
	`0x3` = Protection information is enabled and transferred as the last 8 bytes of metadata, Type 3.
	`0x9` = Protection information is enabled and transferred as the first 8 bytes of metadata, Type 1.
	`0xA` = Protection information is enabled and transferred as the first 8 bytes of metadata, Type 2.
	`0xB` = Protection information is enabled and transferred as the first 8 bytes of metadata, Type 3.
`nmic`	The namespace multipath and sharing capabilities (optional):
	`0` = Multipath disabled. Namespace is private to one controller.
	`1` = Multipath enabled. Two or more controllers might have access to the namespace.

Support Requirements

- Mandatory if the target supports namespace management.
- Not supported if namespace management is not supported.

Examples

This example displays no optional parameters specified:
```
hbacmd nvme-create-ns 10:00:00:90:fa:e0:63:48 20:03:00:11:0d:a5:70:00 nqn.2014-08.org.nvmexpress:nvm-
subsystem-sanblaze
```

The following message is displayed:
```
Successfully created namespace 0x00000003
```

This example displays optional parameters specified:
```
hbacmd nvme-create-ns 10:00:00:90:fa:e0:63:48 20:03:00:11:0d:a5:70:00 nqn.2014-08.org.nvmexpress:nvm-
subsystem-sanblaze CtrlID=0x07 Size=32768 Capacity=32768 LBAF=1 MDT=1 DPS=0x9 NMIC=1
```

The following message is displayed:
```
Successfully created namespace 0x00000003
```

This example displays a generic failure:
```
hbacmd nvme-create-ns 10:00:00:90:fa:e0:63:48 20:03:00:11:0d:a5:70:00 nqn.2014-08.org.nvmexpress:nvm-
subsystem-sanblaze CtrlID=0x07 Size=32768 Capacity=32768 LBAF=1 MDT=1 DPS=0x1 NMIC=1
```

Messages similar to the following are displayed:
```
ERROR: Failed to create namespace

ERROR: <error code>: <specific error message associated with the returned error code>
```

This example displays an unsupported value for the `DPS` setting, in a case in which namespaces do not support the transfer of data protection information as the last 8 bytes of metadata (`DPS=0x1`):
```
hbacmd nvme-create-ns  10:00:00:90:fa:e0:63:48 20:03:00:11:0d:a5:70:00 nqn.2014-
08.org.nvmexpress:nvm-subsystem-sanblaze CtrlID=0x07 Size=32768 Capacity=32768 LBAF=1 MDT=1 DPS=0x1
NMIC=1
```

The following message is displayed:
```
ERROR: Failed to create namespace. This may be due to one of the following conditions:
    -specifying an invalid or unsupported LBA Format
    -enabling an unsupported end-to-end data protection setting

ERROR: <825>: Invalid namespace settings.
```

4.13.3 nvme-delete-ns

The `nvme-delete-ns` command deletes namespaces on NVMe subsystems.

Supported By

Windows

Syntax
```
hbacmd nvme-delete-ns <WWPN> <Target WWPN> <NQN> <NSID> [CtrlID=<ctrlid>]
```

Parameters

WWPN	The WWPN of the FC initiator port.
Target WWPN	The WWPN of an FC port on an NVMe-capable device.
NQN	The qualified name of the NVMe subsystem.
NSID	The namespace identifier to be deleted, in hexadecimal. Set to `all` to delete all namespaces in the subsystem.
ctrlid	The controller that processes the request, in hexadecimal (optional).

Support Requirements
- Mandatory if the target supports namespace management.
- Not supported if namespace management is not supported.

Example

This example deletes a specific namespace:
```
hbacmd nvme-delete-ns 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0x00000001
```

This example deletes all namespaces:
```
hbacmd nvme-delete-ns 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz all
```

4.13.4 nvme-detach-ns

The `nvme-detach-ns` command detaches a namespace from one or more controllers to which it is attached.

NOTE: Use this command to detach a namespace from its controllers before using the `nvme-delete-ns` command to delete the namespace.

Supported By

Windows

Syntax
```
hbacmd nvme-detach-ns <WWPN> <Target WWPN> <NQN> <NSID> <CtrlID=ctrlid1[,ctrlid2,ctrlidn]>
```

Parameters

`WWPN`	The WWPN of the FC initiator port.
`Target WWPN`	The WWPN of an FC port on an NVMe-capable device.
`NQN`	The qualified name of the NVMe subsystem.
`NSID`	The namespace identifier to be detached, in hexadecimal.
`ctrlid1` `...` `ctrlidn`	One or more controller identifiers from which the namespace is to be detached, in hexadecimal. If you are specifying multiple controllers, use commas to delineate them.

Support Requirements

- Mandatory if the target supports namespace management.
- Not supported if namespace management is not supported.

Example

```
hbacmd nvme-detach-ns 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz A3-45-F7-A7 0x00000001 ctrlid=0x0001,0x0002
```

4.13.5 nvme-get-feature

The `nvme-get-feature` command submits an NVMe `get-feature` command and displays the applicable results. The results might be the value of the feature, or they might include a feature structure if the feature requires it. Currently, only the following features are known to return a data structure:

- LBA range type
- Autonomous power state transition
- Host memory buffer

Supported By

Windows

Syntax

```
hbacmd nvme-get-feature <WWPN> <Target WWPN> <NQN> <FeatureID> [CtrlID=<ctrlid>][raw]
[Select=<select>] [NSID=<nsid>] [vector=<vector>] [tempSelect=<tempselect>]
```

Parameters

`WWPN`	The WWPN of the FC initiator port.
`Target WWPN`	The WWPN of an FC port on an NVMe-capable device.
`NQN`	The qualified name of the NVMe subsystem.

FeatureID   The feature identifier:
             `0x1` = Arbitration.
             `0x2` = Power management.
             `0x3` = LBA range type.
             `0x4` = Temperature threshold.
             `0x5` = Error recovery.
             `0x6` = Volatile write cache.
             `0x7` = Number of queues.
             `0x8` = Interrupt coalescing (not supported).
             `0x9` = Interrupt vector configuration (not supported).
             `0xA` = Write atomicity normal.
             `0xB` = Asynchronous event configuration.
             `0xC` = Autonomous power state transition.
             `0xD` = Host memory buffer.
             `0xF` = Keep alive timer.
             `0x80` = Software progress marker (optional feature).
             `0x81` = Host identifier (mandatory feature).
             `0x82` = Reservation notification mask (optional feature).
             `0x83` = Reservation persistence (optional feature).

ctrlid   The controller that processes the request (optional), in hexadecimal.

raw   Specifies that the output is to be provided in hexadecimal format if the feature returns a data structure; ignored if no data structure is returned (optional).

select   The attribute value to be returned (optional):
             `0` = Current.
             `1` = Default.
             `2` = Saved.
             `3` = Supported capabilities:
             ■ Savable: You can change the value, and the value persists after a controller reset. If a value is not savable, you can change the value, but the value will not persist after a controller reset.
             ■ Changeable: You can save the feature using the `SetFeature` command (not currently supported).
             ■ Namespace specific: The *FeatureID* is specific to the namespace identified in the command line by *nsid*.
             If no `Select` parameter is specified, the output contains the current, default, and saved values for the selected feature and the supported capabilities of the feature.
             Some `Select` parameter attribute values might not be available on all targets. To determine the level of support for the `Select` parameter, issue the `nvme-id-ctrl` command and examine the value displayed for `Non-zero feature Select option`. If the value is `Not Supported`, the only allowed value for the `Select` parameter is `0` (current). An attempt to enter a nonzero value for the `Select` parameter results in an `Invalid Argument` error. Additionally, if no `Select` parameter is specified, only the current value for the selected feature is presented.

nsid   The namespace for which a feature is to be retrieved (optional).

vector   The interrupt vector for which the configuration settings are to be retrieved, in hexadecimal (optional). Valid values are `0x0` to `0xffff`. This applies only to the interrupt vector configuration feature (`FeatureID=0x9`).

`tempselect`   The temperature threshold value to be retrieved (optional).

`0x00` = Over-temperature threshold value for composite temperature.

`0x01` = Over-temperature threshold value for temperature sensor 1.

`0x02` = Over-temperature threshold value for temperature sensor 2.

...

`0x08` = Over-temperature threshold value for temperature sensor 8.

`0x10` = Under-temperature threshold value for composite temperature.

`0x11` = Under-temperature threshold value for temperature sensor 1.

`0x12` = Under-temperature threshold value for temperature sensor 2.

...

`0x18` = Under-temperature threshold value for temperature sensor 8.

Support Requirements

- Mandatory:
  - `0x1` = Arbitration.
  - `0x2` = Power management.
  - `0x4` = Temperature threshold.
  - `0x5` = Error recovery.
  - `0x7` = Number of queues.
  - `0xA` = Write atomicity normal.
  - `0xB` = Asynchronous event configuration.
  - `0x81` = Host identifier.
- Mandatory only if reservations are supported by the controller; optional otherwise:
  - `0x81` = Host identifier.
- Mandatory only if reservations are supported by namespace management; optional otherwise:
  - `0x82` = Reservation notification mask.
  - `0x83` = Reservation persistence.
- Optional:
  - `0x3` = LBA range type.
  - `0x6` = Volatile write cache.
  - `0xC` = Autonomous power state transition.
  - `0xD` = Host memory buffer.
  - `0xF` = Keep alive timer.
  - `0x80` = Software progress marker.
- Not supported:
  - `0x8` = Interrupt coalescing.
  - `0x9` = Interrupt vector configuration.

NOTE: To determine whether namespace management supports reservations, issue the `nvme-id-ns` command (see Section 4.13.8, nvme-id-ns), and examine the value displayed in the `Reservations` field.

NOTE: If the `raw` parameter is not specified, the output provides all of the data available for the specified feature in human-readable format. The data includes all of the supported attribute values, such as `current`, `saved`, and `default`, as well as any other attribute values returned in an additional data structure.

Examples

This example displays no optional parameters specified:

```
hbacmd nvme-get-feature 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0x1
```

Information similar to the following is displayed:

```
Feature: Arbitration

Supported Capabilities
    Savable           : Yes
    Namespace-Specific : No
    Changeable        : Yes

Attribute Name          Current     Saved       Default
Arbitration Burst         32          32          64
Low Priority Weight       128         128         128
Medium Priority Weight    64          64          64
High Priority Weight      32          32          32
```

This example displays the arbitration feature selected:

```
hbacmd nvme-get-feature 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38nqn.2014-
08.com.example:nvme.host.sys.xyz 0x1 Select=0
```

Information similar to the following is displayed:

```
Feature: Arbitration

Attribute Name          Value(Current)
Arbitration Burst             32
Low Priority Weight           128
Medium Priority Weight        64
High Priority Weight          32
```

This example displays the power management feature selected:

```
hbacmd nvme-get-feature 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0x2 Select=1
```

Information similar to the following is displayed:

```
Feature: Power Management

Attribute Name          Value(Default)
Power State                   3
Workload Hint                 1
```

This example displays the LBA range type feature selected:

```
hbacmd nvme-get-feature 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0x3 Select=2 raw
```

Information similar to the following is displayed:

```
Feature: LBA Range Type

Byte Dump (Saved Values)
0000: 03 04 07 00 00 00 00 60 40 0c 70 06 8c 0a 00 00
0010: 04 02 00 0a 45 4d 55 4c 45 58 20 20 20 20 20 20
0020: 20 20 20 20 00 00 17 6a 41 46 42 52 2d 35 37 46
0030: 35 4d 5a 2d 45 4c 58 20 20 20 20 20 52 03 00 48
0040: 00 3a 00 00 41 41 31 32 32 31 4a 30 43 32 50 20
```

This example displays the temperature threshold feature selected:

```
hbacmd nvme-get-feature 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0x4 Select=0 tempSelect=0x01
```

Information similar to the following is displayed:

```
Feature: Temperature Threshold

Threshold Type: Over Temperature Threshold
Temperature Select: Sensor 1

Attribute Name                 Value(Current)
Temperature Threshold            255
```

This example displays the error recovery feature selected:

```
hbacmd nvme-get-feature 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0x5 Select=0
```

Information similar to the following is displayed:

```
Feature: Error Recovery

Attribute Name                 Value(Current)
Time Limited Error Recovery         510
Deallocated Logical Block Error Enable    Enabled
```

This example displays the volatile write cache feature selected:

```
hbacmd nvme-get-feature 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0x6 Select=0
```

Information similar to the following is displayed:

```
Feature: Volatile Write Cache

Attribute Name                 Value(Current)
Volatile Write Cache Enable          Disabled
```

This example displays number of queues feature selected:

```
hbacmd nvme-get-feature 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0x7 Select=0
```

Information similar to the following is displayed:

```
Feature: Number of Queues

Attribute Name                          Value(Current)
Number of I/O Submission Queues Allocated    63
Number of I/O Completion Queues Allocated    63


Note: The above values are zero based
```

This example displays the interrupt coalescing feature selected:

```
hbacmd nvme-get-feature 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0x8 Select=0
```

Information similar to the following is displayed:

```
Feature: Interrupt Coalescing

Attribute Name                          Value(Current)
Aggregation Threshold                        1024
Aggregation Time (ms)                        2048
```

This example displays the interrupt vector configuration feature selected:

```
hbacmd nvme-get-feature 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0x9 0 --vector=0x1
```

Information similar to the following is displayed:

```
Feature: Interrrupt Vector Configuration

Attribute Name                          Value(Current)
Interrupt Vector                             2047
Coalescing Disable                         Enabled
```

This example displays the write atomicity normal feature selected:

```
hbacmd nvme-get-feature 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0xA Select=1
```

Information similar to the following is displayed:

```
Feature: Write Atomicity Normal

Attribute Name                          Value(Default)
Disable Normal                             Disabled
```

This example displays the asynchronous event configuration feature selected:

```
hbacmd nvme-get-feature 10:00:00:90:fa:94:88:8b 10:00:00:90:fa:94:2f:0c nqn.2016-06.io.spdk:cnode1
0x0B raw Select=0
```

Information similar to the following is displayed:
```
Feature: Asynchronous Event Configuration

Attribute Name                   Value(Saved)
Space Below Threshold Warnings    Disabled
Over Temp Threshold Warnings      Disabled
Subsystem Reliability Warnings    Disabled
Read Only Mode Warnings           Disabled
Volatile Mem Fail Warnings        Disabled
Namespace Attribute Notices        Enabled
Firmware Activation Notices       Disabled
Telemetry Log Notices             Disabled
```

This example displays the autonomous power state transition feature selected:
```
hbacmd nvme-get-feature 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0xC Select=0
```

Information similar to the following is displayed:
```
Feature: Autonomous Power State Transition

Attribute Name                           Value(Current)
Autonomous Power State Transition Enable   Enabled
```

This example displays the host memory buffer feature selected:
```
hbacmd nvme-get-feature 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0xD Select=0 raw
```

Information similar to the following is displayed:
```
Feature: Host Memory Buffer

Raw data for Dword 0
Byte Dump (Current Values)
0000: 03 00 00 00

Raw Data for Attributes Data Structure
Byte Dump (Current Values)
0000: 03 04 07 00 00 00 00 60 40 0c 70 06 8c 0a 00 00
0010: 04 02 00 0a 45 4d 55 4c 45 58 20 20 20 20 20 20
0020: 20 20 20 20 00 00 17 6a 41 46 42 52 2d 35 37 46
............: 35 4d 5a 2d 45 4c 58 20 20 20 20 20 52 03 00 48
0FF0: 00 3a 00 00 41 41 31 32 32 31 4a 30 43 32 50 20
```

Human-readable sample output:
```
Attribute Name                          Value(Current)
Enable Host Memory                          Enabled
Memory Return                               Enabled
```

This example displays the keep alive timer feature selected:
```
hbacmd nvme-get-feature 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0xF Select=0 raw
```

Information similar to the following is displayed:
```
Feature: Keep Alive Timer

Attribute Name                          Value(Current)
Keep Alive Timeout (ms)                  45000
```

This example displays the software progress marker feature selected:
```
hbacmd nvme-get-feature 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0x80 Select=0
```

Information similar to the following is displayed:
```
Feature: Software Progress Marker

Attribute Name                          Value(Current)
Pre-boot Software Load Count              128
```

This example displays the host identifier feature selected:
```
hbacmd nvme-get-feature 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0x81 Select=0 raw
```

Information similar to the following is displayed:
```
Feature: Host Identifier

Byte Dump (Current Values)
0000: 03 00 00 00 03 00 00 00 03 00 00 00 03 00 00 00
```

Human-readable sample output:
```
Attribute Name                          Value(Current)
Host Identifier                         0xa7a5b1323132
```

This example displays the reservation notification mask feature selected:
```
hbacmd nvme-get-feature 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0x82 Select=0
```

Information similar to the following is displayed:
```
Feature: Reservation Notification Mask

Attribute Name                          Value(Current)
Mask Registration Preeempted Notification    Enabled
Mask Reservation Released Notification       Disabled
Mask Reservation Preempted Notification      Enabled
```

This example displays the reservation persistence feature selected:
```
hbacmd nvme-get-feature 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0x83 Select=0
```

Information similar to the following is displayed:
```
Feature: Reservation Persistance

Attribute Name                          Value(Current)
Persist Through Power Loss                Enabled
```

This example displays `Select=3` (Capabilities) for the arbitration feature:

```
hbacmd nvme-get-feature 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0x1 Select=3
```

Information similar to the following is displayed:

```
Feature: Arbitration

Supported Capabilities

Savable:              Yes
Changeable:           Yes
Namespace Specific:   No
```

4.13.6 nvme-get-sstable

The `nvme-get-sstable` command allows you to retrieve the NVMe subsystem management table that is maintained for each FC+NVMe port.

Supported By

Windows

Syntax

```
hbacmd nvme-get-sstable <WWPN> [Target WWPN]
```

Parameters

WWPN   The WWPN of the FC initiator port.

Target WWPN   The WWPN of an FC port on an NVMe-capable device (optional).

Example

```
hbacmd nvme-get-sstable 10:00:00:90:fa:5d:05:a9
```

Information similar to the following is displayed:

```
NVMe Qualified Name : nqn.2014-08.com.example1:nvme.host.sys.xyz
Port WWN            : 50:06:01:60:90:20:5C:38
Node WWN            : 50:06:01:60:10:20:5C:38
CtrlID             : 0X0001

NVMe Qualified Name : nqn.2014-08.com.example2:nvme.host.sys.xyz
Port WWN            : 50:06:01:60:90:20:5C:39
Node WWN            : 50:06:01:60:10:20:5C:39
CtrlID             : 0X0001
```

If an invalid *Target WWPN* is used, the following error message is displayed:

```
ERROR: The Subsystem table does not contain any entries for the specified initiator port.
ERROR: <823>: No subsystem entries were found for the specified initiator port.
```

4.13.7 nvme-id-ctrl

The `nvme-id-ctrl` command sends the NVMe `identify` command for a controller and displays the results.

Supported By

Windows

Syntax
```
hbacmd nvme-id-ctrl <WWPN> <Target WWPN> <NQN> [CtrlID=<ctrlid>] [raw]
```

Parameters

WWPN	The WWPN of the FC initiator port.
Target WWPN	The WWPN of an FC port on an NVMe-capable device.
NQN	The qualified name of the NVMe subsystem.
ctrlid	The controller that processes the request (optional), in hexadecimal.
raw	Specifies that the output is to be provided in hexadecimal format (optional).

NOTE: If the `raw` parameter is not specified, the output is provided as a short list of controller attributes in human-readable format. If the `raw` parameter is specified, the entire data structure is displayed in raw (hexadecimal) format, including the vendor-specific data bytes. See the examples in this section.

Examples

This example displays no optional parameter specified:
```
hbacmd nvme-id-ctrl 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz
```

Information similar to the following is displayed:
```
Attributes for Controller 0x0001:

IEEE OUI Identifier                 : 032957
Maximum data transfer size          : 5120
NVMe version supported              : 1.2.1
Number of power states supported    : 0
Warning temperature level           : 140
Critical temperature level          : 160
Maximum Number of namespaces        : 3
Submission Queue Size               : Min 64, Max 64
Completion Queue Size               : Min 16, Max 16
Maximum commands supported at one time: 2048
Atomic write unit normal            : 0
Atomic write unit power fail         : 0

Controller Features:
    Namespace Management             : Supported
    Non-zero feature Select option   : Not Supported
```

This example displays the `raw` parameter specified:
```
hbacmd nvme-id-ctrl 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz raw
```

Information similar to the following is displayed:
```
Raw data for Controller 0x0001:

Standard data bytes:

Byte Dump
0000: 03 04 07 00 00 00 00 60 40 0c 70 06 8c 0a 00 00
0010: 04 02 00 0a 45 4d 55 4c 45 58 20 20 20 20 20 20
0020: 20 20 20 20 00 00 17 6a 41 46 42 52 2d 35 37 46
0030: 35 4d 5a 2d 45 4c 58 20 20 20 20 20 52 03 00 48
0040: 00 3a 00 00 41 41 31 32 32 31 4a 30 43 32 50 20
0050: 20 20 20 20 31 32 30 35 32 38 20 20 68 fa 05 3a
0060: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0070: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0080: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0090: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00A0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00B0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
......: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
......: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
......: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0BF0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

Vendor-specific data bytes:
Byte Dump
0C00: 03 04 07 00 00 00 00 60 40 0c 70 06 8c 0a 00 00
0C10: 04 02 00 0a 45 4d 55 4c 45 58 20 20 20 20 20 20
0C20: 20 20 20 20 00 00 17 6a 41 46 42 52 2d 35 37 46
0C30: 35 4d 5a 2d 45 4c 58 20 20 20 20 20 52 03 00 48
0C40: 00 3a 00 00 41 41 31 32 32 31 4a 30 43 32 50 20
0C50: 20 20 20 20 31 32 30 35 32 38 20 20 68 fa 05 3a
0C60: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0C70: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0C80: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0C90: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0CA0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0CB0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
......: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
......: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
......: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0FF0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

This example displays the `CtrlID` parameter specified:
```
hbacmd nvme-id-ctrl 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz CtrlID=0x0001
```

Information similar to the following is displayed:
```
Attributes for Controller 0x0001:

IEEE OUI Identifier               : 032957
Maximum data transfer size        : 5120
NVMe version supported            : 1.2.1
Number of power states supported  : 0
Warning temperature level         : 140
Critical temperature level        : 160
Number of namespaces              : 3
Submission Queue Size             : Min 128, Max 128
```

```
Completion Queue Size                 : Min 16, Max 16
Maximum commands supported at one time: 2048
Atomic write unit normal              : 0
Atomic write unit power fail          : 0

Controller Features:
    Namespace Management               : Supported
```

If an invalid `CtrlID` parameter is used, the following error message is displayed:
```
ERROR: HBACMD_NvmeIdCtrl: RM_GetNvmeControllerAttributes call failed (821)
ERROR: <821>: The specified subsystem was not found.
```

4.13.8 nvme-id-ns

The `nvme-id-ns` command sends the NVMe `identify` command for a namespace and displays the results. In addition, if namespace management is supported, the command can retrieve capabilities that are common across all namespaces.

Supported By

Windows

Syntax
```
hbacmd nvme-id-ns <WWPN> <Target WWPN> <NQN> <NSID> <Type> [CtrlID=<ctrlid>] [raw]
```

Parameters

WWPN	The WWPN of the FC initiator port.
Target WWPN	The WWPN of an FC port on an NVMe-capable device.
NQN	The qualified name of the NVMe subsystem.
NSID	The namespace identifier, in hexadecimal; use it to list only controllers attached to the specified namespace. Set to `0xFFFFFFFF` to retrieve capabilities that are common across all namespaces.
Type	The namespace identifier type: `0` = Active. `1` = Allocated. Must be set to `0` if `NDSID=0xFFFFFFFF`.
ctrlid	The controller that processes the request, in hexadecimal (optional).
raw	Specifies that the output is to be provided in hexadecimal format (optional).

NOTE: If the `raw` parameter is not specified, the output displays only a few namespace attributes, in human-readable format. If the `raw` parameter is specified, the entire data structure is displayed in hexadecimal format.

Support Requirements
- Mandatory for `nvme-id-ns WWPN TWWPN NQN NSID 0 [CtrlID=<ctrlid>]` (identify active namespace)
- Optional for `nvme-id-ns WWPN TWWPN NQN NSID 1 [CtrlID=<ctrlid>]` (identify allocated namespace)

Examples

This example identifies active namepaces:
```
hbacmd nvme-id-ns 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0x00000001 0
```

Information similar to the following is displayed:
```
Attributes for Namespace 0x00000001:

IEEE Extended Unique Identifier        : 00-00-00-00-00-00-00-00
Size                                   : 32768 (Logical Blocks)
Capacity                               : 32768 (Logical Blocks)
Usage                                  : 32768 (Logical Blocks)
Logical Block Size                     : 512 Bytes
Multi-path Access                      : Yes
LBA Format                             : 0
Number of Supported LBA Formats        : 0
End-to-end Data Protection             : Disabled
Reservations                           : Not Supported

Namespace Features:
 Thin Provisioning          : Not Supported
 Unwritten Logical Block Error: Not Supported
 NAWUN, NAWUPF, NAWCWU       : Not Supported

End-to-end Protection Capabilities:
 Protection Information Type 1: Supported
 Protection Information Type 2: Supported
 Protection Information Type 3: Supported
```

This example identifies allocated namespaces:
```
hbacmd nvme-id-ns 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0x00000001 1
```

Information similar to the following is displayed:
```
Attributes for Namespace 0x00000001:

IEEE Extended Unique Identifier        : 00-00-03-25-01-FF-00-03
Size                                   : 32768 (Logical Blocks)
Capacity                               : 32768 (Logical Blocks)
Usage                                  : 32768 (Logical Blocks)
Logical Block Size                     : 1024 Bytes
Multi-path Access                      : Yes
LBA Format                             : 0
Number of Supported LBA Formats        : 0
End-to-end Data Protection             : Disabled
Reservations                           : Not Supported

Namespace Features:
 Thin Provisioning          : Supported
 Unwritten Logical Block Error: Supported
 NAWUN, NAWUPF, NAWCWU       : Not Supported

End-to-end Protection Capabilities:
 Protection Information Type 1: Supported
 Protection Information Type 2: Not Supported
 Protection Information Type 3: Supported
```

This example displays capabilities that are common across all namespaces:
```
hbacmd nvme-id-ns10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38nqn.2014-
08.com.example:nvme.host.sys.xyz 0xffffffff 0
```

Information similar to the following is displayed:

```
Capabilities common across all namespaces
Metadata Capabilities
    Extended LBA Metadata Transfer      : Supported
    Separate Buffer Metadata Transfer   : Not Supported

End-To-End Data Protection Capabilities
    First Eight Bytes                   : Supported
    Last Eight Bytes                    : Not Supported

Namespace Multi-path I/O and Sharing Capabilities
    Namespace Sharing                   : Supported

Reservation Capabilities
    Persist Through Power Lost          : Not Supported
    Write Exclusive                     : Not Supported
    Exclusive Access                    : Not Supported
    Write Exclusive - Registrants Only  : Not Supported
    Exclusive Access - Registrants Only : Not Supported
    Write Exclusive - All Registrants   : Not Supported
    Exclusive Access - All Registrants  : Not Supported
    Ignore Existing Key                 : Not Supported

Supported LBA Formats
    LBA Format 0
    LBA Format 1
    LBA Format 2
    LBA Format 3
```

If `NSID` is set to `0xFFFFFFFF`, and namespace management is not supported, the following error message is displayed:

```
ERROR: <804>: Bad NVMe Namespace ID
```

This example displays the `raw` parameter specified:

```
hbacmd nvme-id-ns 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0x00000001 1 raw
```

Information similar to the following is displayed:

```
Raw data for namespace 0x00000001:

Standard data bytes:

Byte Dump
0000: 03 04 07 00 00 00 00 60 40 0c 70 06 8c 0a 00 00
0010: 04 02 00 0a 45 4d 55 4c 45 58 20 20 20 20 20 20
0020: 20 20 20 20 00 00 17 6a 41 46 42 52 2d 35 37 46
0030: 35 4d 5a 2d 45 4c 58 20 20 20 20 20 52 03 00 48
0040: 00 3a 00 00 41 41 31 32 32 31 4a 30 43 32 50 20
0050: 20 20 20 20 31 32 30 35 32 38 20 20 68 fa 05 3a
0060: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0070: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0080: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0090: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00A0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00B0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
.........: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
.........: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
.........: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

```
0170: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

Vendor-specific data bytes:

Byte Dump
0180: 03 04 07 00 00 00 00 60 40 0c 70 06 8c 0a 00 00
0190: 04 02 00 0a 45 4d 55 4c 45 58 20 20 20 20 20 20
01A0: 20 20 20 20 00 00 17 6a 41 46 42 52 2d 35 37 46
01B0: 35 4d 5a 2d 45 4c 58 20 20 20 20 20 52 03 00 48
01C0: 00 3a 00 00 41 41 31 32 32 31 4a 30 43 32 50 20
01D0: 20 20 20 20 31 32 30 35 32 38 20 20 68 fa 05 3a
01E0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
01F0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0200: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0210: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0220: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0230: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
..........: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
..........: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
..........: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0FF0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

4.13.9 nvme-list

The `nvme-list` command lists the NVMe targets (subsystems) recognized by the FC driver through a physical or virtual port. The list contains all discovered subsystems, as well as those that were added to the subsystem table using the `nvme-set-sstable` command.

NOTE: Use the `nvme-set-sstable` command to get the entire list of the manually configured subsystems. See Section 4.13.14, nvme-get-sstable, for more information.

Supported By

Windows

Syntax
```
hbacmd nvme-list <WWPN> [vport=<vPort WWPN>] [Target WWPN]
```

Parameters

WWPN	The WWPN of the FC initiator port.
vPort WWPN	The WWPN of the vPort whose subsystems you want to list. Use `vport=all` to list all the subsystems for all vPorts associated with this physical port (optional).
Target WWPN	The WWPN of an FC port on an NVMe-capable device (optional).

Example
```
hbacmd nvme-list 10:00:00:90:fa:e0:63:48 vport=all
```

Information similar to the following is displayed:
```
NVMe Qualified Name    : nqn.2014-08.com.example:nvme.host.sys.xyz
Port WWN               : 50:06:01:60:90:20:5C:38
Node WWN               : 50:00:01:60:90:20:5C:38
Controller ID          : 0x0001
Model Number           : NVMfxx999
Serial Number          : 0123456789
Firmware Version        : 1.2.0.1
```

```
Total Capacity          : 0x0000000000000000000000003000000 (Bytes)
Unallocated Capacity    : 0x0000000000000000000000001000000 (Bytes)
NVMe Qualified Name     : nqn.2014-08.com.example:nvme.host.m32
Port WWN                : 30:16:01:62:90:21:CC:41
Node WWN                : 30:06:01:62:90:21:CC:41
Controller ID           : 0x0001
Model Number            : NVMf0103
Serial Number           : 0123456789
Firmware Version        : 1.2.0.5
Total Capacity          : 0x0000000000000000000000003000000 (Bytes)
Unallocated Capacity    : 0x0000000000000000000000000000000 (Bytes)
```

4.13.10 nvme-list-ctrl

The nvme-list-ctrl command displays the controllers for a specified NVMe target.

Supported By

Windows

Syntax
```
hbacmd nvme-list-ctrl <WWPN> <Target WWPN> <NQN> [NSID]
```

Parameters

WWPN   The WWPN of the FC initiator port.

Target WWPN   The WWPN of an FC port on an NVMe-capable device.

NQN   The qualified name of the NVMe subsystem.

NSID   The namespace identifier (optional), in hexadecimal. Use it to list only controllers attached to the specified namespace.

NOTE: Only the controllers on the subsystem specified in the command line are displayed. Controllers for other subsystems are not displayed, even if they reside within the same NVMe target WWPN.

Example
```
hbacmd nvme-list-ctrl 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz
```

Information similar to the following is displayed:
```
Controllers for subsystem nqn.2014-08.com.example:nvme.host.sys.xyz

Number of Controllers: 3

Controller ID: 0x0000
Controller ID: 0x0001
Controller ID: 0x0002
```

4.13.11 nvme-list-linux

The `nvme-list-linux` command lists the NVMe targets (subsystems) recognized by the FC driver through a physical port. The output of this command is either a list of subsystems on the specified target WWPN, or a list of all subsystems on all targets visible to the NVMf initiator if no target WWPN is specified.

Supported By

Linux

Syntax
```
hbacmd nvme-list-linux <WWPN> [Target WWPN]
```

Parameters

WWPN   The WWPN of the FC+NVMe port.

Target WWPN   The WWPN of an FC port on an NVMe-capable device (optional).

Examples

This example displays no optional parameter specified:
```
hbacmd nvme-list-linux 10:00:00:90:fa:5d:05:a9
```

Information similar to the following is displayed:
```
NVMe Subsystems for 10:00:00:90:fa:5d:05:a9
NVMe Qualified Name : nqn.2014-08.com.example:nvme.host.sys.xyz
Port WWN          : 50:06:01:60:90:20:5C:38
Node WWN          : 50:00:01:60:90:20:5C:38

NVMe Qualified Name : nqn.2014-08.com.example:nvme.host.m32
Port WWN          : 30:16:01:62:90:21:CC:41
Node WWN          : 30:06:01:62:90:21:CC:41
```

This example displays `Target WWPN` parameter specified:
```
hbacmd nvme-list-linux 10:00:00:90:fa:5d:05:a9 30:16:01:62:90:21:CC:41
```

Information similar to the following is displayed:
```
NVMe Subsystems for10:00:00:90:fa:5d:05:a9
NVMe Qualified Name : nqn.2014-08.com.example:nvme.host.m32
Port WWN          : 30:16:01:62:90:21:CC:41
Node WWN          : 30:06:01:62:90:21:CC:41
```

4.13.12 nvme-list-ns

The `nvme-list-ns` command lists the namespaces for a specified NVMe target. This command retrieves two types of namespaces:
- Active namespaces, which are attached to the processor that controls the command
- Allocated namespaces, which have been added to the NVMe subsystem but are not yet connected to a controller

Supported By

Windows

Syntax

```
hbacmd nvme-list-ns <WWPN> <Target WWPN> <NQN> [CtrlID=<ctrlid>] [Option]
```

Parameters

WWPN	The WWPN of the FC initiator port.
Target WWPN	The WWPN of an FC port on an NVMe-capable device.
NQN	The qualified name of the NVMe subsystem.
ctrlid	The controller that processes the request (optional), in hexadecimal.
Option	The namespace type (optional); if not used, both active and allocated namespaces are returned:
	0 = Get active namespace identifiers.
	1 = Get allocated namespace identifiers.

Support Requirements

- Mandatory for `nvme-list-ns WWPN TWWPN NQN CtrlID 0` (list active namespaces)
- Optional for `nvme-list-ns WWPN TWWPN NQN CtrlID 1` (list allocated namespaces)

Examples

In this example, `Option` is not specified:
```
hbacmd nvme-list-ns 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz
```

Information similar to the following is displayed:
```
Active Namespaces (attached to controller 0x0001):

Namespace ID : 0x00000001
Namepsece ID : 0x00000002

Allocated Namespaces:

Namespace ID : 0x00000003
Namepsece ID : 0x00000004
```

This example displays active namespace identifiers selected:
```
hbacmd nvme-list-ns 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0
```

Information similar to the following is displayed:
```
Active Namespaces (attached to controller 0x0001):

Namespace ID : 0x00000001
Namepsece ID : 0x00000002
```

This example displays allocated namespace identifiers selected:
```
hbacmd nvme-list-ns 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 1
```

Information similar to the following is displayed:
```
Allocated Namespaces:

Namespace ID : 0x00000003
Namepsece ID : 0x00000004
```

4.13.13 nvme-list-ns-linux

The `nvme-list-ns-linux` command lists the namespaces and respective device mappings for a specific target on a Linux NVMf initiator port.

Supported By

Linux

Syntax
```
hbacmd nvme-list-ns-linux <WWPN> <Target WWPN> <NQN>
```

Parameters

WWPN	The WWPN of the FC initiator port.
Target WWPN	The WWPN of an FC port on an NVMe-capable device.
NQN	The NVMf target qualified name.

Example
```
hbacmd nvme-list-ns-linux 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz
```

Information similar to the following is displayed:
```
Active Namespaces:
                                                          Size            Block Size
NSID              DeviceName      (Logical Blocks)   (Bytes)
0x00000001         nvme0n1         524288000          512
0x00000002         nvme0n2         524288000          512
```

4.13.14 nvme-get-sstable

The `nvme-get-sstable` command allows you to update the NVMe subsystem management table that is maintained for each FC+NVMe port. If an NVMe target does not support the NVMe discovery service, subsystems on that target are not present in the discovered subsystem list returned by the `nvme-list` command. Subsystems that are not discoverable by the NVMe discovery service must be added to a subsystem management table that is maintained for each FC+NVMe port. The `nvme-get-sstable` command allows you to manage the contents of the subsystem management table.

NOTE: The subsystem management table can contain up to 16 entries.

Supported By

Windows

Syntax
```
hbacmd nvme-get-sstable <WWPN> <Target WWPN> <Target WWNN> <NQN> <CtrlID> <Action> [SQSize]
```

Parameters

WWPN	The WWPN of the FC initiator port.
Target WWPN	The WWPN of an FC port on an NVMe-capable device.
Target WWNN	The WWNN of an FC port on an NVMe-capable device.
NQN	The qualified name of the NVMe subsystem.
CtrlID	The controller identifier, in hexadecimal.

Action   The action to be performed:

                `1` = Add the subsystem to the management table.

                `2` = Remove the subsystem from the management table.

SQSize   The size of the Admin Submission Queue for the specified controller. The range of valid values is 2 to 4096. This parameter is required if `Action = 1`; otherwise, it is optional.

Example

```
hbacmd nvme-get-sstable 10:00:00:90:fa:5d:05:a9 50:06:01:60:90:20:5C:38 nqn.2014-
08.com.example:nvme.host.sys.xyz 0x0001 1 4096
```

Information similar to the following is displayed:

```
NVMe Subsystem table successfully updated for port 10:00:00:90:fa:5d:05:a9
```

4.14 Persistent Binding Commands

The Persistent Binding command group facilitates persistent binding operations.

In a remote environment, you can perform persistent bindings operations from a host running Linux, Solaris, or Windows, but only to a remote host that is running Windows or Solaris.

These commands are supported only for FC ports.

The following persistent binding commands are not supported on Linux or on Windows + CIM provider on a VMware host:

- `BindingCapabilities`
- `BindingSupport`
- `PersistentBinding`
- `RemoveAllPersistentBinding`
- `RemovePersistentBinding`
- `SetBindingSupport`
- `SetPersistentBinding`

4.14.1 AllNodeInfo

This command displays target node information for each target accessible by the adapter.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

```
AllNodeInfo <WWPN> [filter type]
```

Parameters

WWPN   The WWPN of an FC function.

filter   The type of filter to apply (optional).

type   `S` = Display SCSI nodes only.

             `N` = Display NVMe nodes only.

4.14.2 BindingCapabilities

This command displays the binding capabilities of the adapter. If a binding is configured, it is maintained across reboots.

Supported By

Solaris and Windows

Syntax

```
BindingCapabilities <WWPN>
```

Parameters

WWPN   The WWPN of an FC function.

4.14.3 BindingSupport

This command displays the binding support for an FC function.

Supported By

Solaris and Windows

Syntax

```
BindingSupport <WWPN> <Source>
```

Parameters

WWPN   The WWPN of an FC function.

Source   C = Configuration support.
         L = Live support.

4.14.4 PersistentBinding

This command specifies the set of persistent binding information (configuration or live state) that is requested.

Supported By

Solaris and Windows

Syntax

```
PersistentBinding <WWPN> <Source>
```

Parameters

WWPN   The WWPN of an FC function.

Source   C = Configuration support.
         L = Live support.

4.14.5 RemoveAllPersistentBinding

This command removes all persisting bindings for an FC function.

Supported By

Solaris and Windows

Syntax

```
RemoveAllPersistentBinding <WWPN>
```

Parameters

WWPN   The WWPN of an FC function.

4.14.6 RemovePersistentBinding

This command removes persistent binding between an FC target and a SCSI bus and target. The binding to be removed can be to a target WWPN, a target WWNN, or a target D_ID.

Supported By

Solaris and Windows

Syntax

```
RemovePersistentBinding <WWPN> <BindType> <ID> <SCSIBus> <SCSITarget>
```

Parameters

WWPN	The WWPN of an FC function.
BindType	P = Remove binding by WWPN. N = Remove binding by WWNN. D = Remove binding by D_ID.
ID	The type of ID based on <BindType>: Target WWPN if <BindType> = P. Target WWNN if <BindType> = N. Target D_ID if <BindType> = D.
SCSIBus	The bus number of the SCSI device.
SCSITarget	The target number of the SCSI device.

4.14.7 SetBindingSupport

This command enables and sets the binding support for an FC function.

NOTE: If the EnableNVME driver parameter is set to 1, the driver automatically sets the AutoMap driver parameter to the default value of 2, automap by WWPN.

Supported By

Solaris and Windows

Syntax

```
SetBindingSupport <WWPN> <BindFlag>
```

Parameters

WWPN   The WWPN of an FC function.

BindFlag   The type of binding support for the adapter:

                D = Binding by D_ID (not available for Windows driver).

                P = Binding by WWPN.

                N = Binding by WWNN (not available for Windows driver).

                A = Binding by automap (not available for Windows driver).

                DA = Binding by D_ID and automap.

                PA = Binding by WWPN and automap.

                NA = Binding by WWNN and automap.

4.14.8 SetPersistentBinding

This command sets a persistent binding between an FC target and a SCSI bus target. The binding can be to a target WWPN, a target WWNN, or a target D_ID.

For a binding to take effect immediately (that is, `Scope` = `I` or `B`), the `<SCSIBus>` and `<SCSITarget>` parameters must match the SCSI bus and SCSI target to which the target is already automapped. If automapping is disabled, the binding takes effect immediately if the target is not already persistently bound, and the specified `<SCSIBus>` and `<SCSITarget>` parameters are available to be persistently bound. Also, the `<BindType>` parameter must match the currently active bind type. Otherwise, you are notified that you must reboot the system to cause the persistent binding to become active.

Supported By

Solaris and Windows

Syntax

```
SetPersistentBinding <WWPN> <Scope> <BindType> <TargetId> <SCSIBus> <SCSITarget>
```

Parameters

WWPN   The WWPN of an FC function.

Scope   P = Permanent binding (survives reboot).
                I = Immediate binding.
                B = Binding is both permanent and immediate.

BindType   P = Enable binding by WWPN.
                N = Enable binding by WWNN.
                D = Enable binding by D_ID.

TargetId   If `<BindType>` = `P`, Target WWPN.

                If `<BindType>` = `N`, Target WWNN.

                If `<BindType>` = `D`, Target D_ID.

SCSIBus   The bus number of the SCSI device.

SCSITarget   The target number of the SCSI device.

4.15 Trunking Commands

The trunking group command enables you to view and configure trunking.

NOTE: The following information applies to trunking:

- Trunking is supported only on LPe35000-series adapters.
- Dynamic D_Port cannot coexist with the trunking feature. If trunking is enabled, the firmware automatically disables Dynamic D_Port.
- Trunking is not supported at 8Gb/s, and the link will not come up at this speed.
- Before you configure trunking on an Emulex adapter, follow the instructions from Brocade for configuring trunking on the switch.
- Trunking and FA-PWWN cannot be enabled simultaneously.

4.15.1 GetTrunkInfo

The GetTrunkInfo command displays the following trunking configuration information.
- Trunking status (enabled or disabled)
- Trunking type
- List of physical links comprising each trunk
- Status of each physical link comprising the trunk (active or down)
- Aggregated links speed for each trunk

Supported By

Linux, Windows, and Windows + CIM provider on a VMware host

Syntax
```
GetTrunkInfo <WWPN>
```

Parameters

WWPN   The WWPN of a physical or trunked port.

4.15.2 SetTrunkMode

The SetTrunkMode command specifies the type of trunking to use.

Supported By

Linux, Windows, and Windows + CIM provider on a VMware host

Syntax
```
SetTrunkMode <WWPN> <trunking mode>
```

Parameters

WWPN   The WWPN of a physical or trunked port.

trunking mode   0 = Disable trunking.
                    1 = 2-lane trunking.
                    2 = 4-lane trunking.

4.16 vPort Commands

The vPort command group manages virtual ports and functions on FC adapters.

NOTE: In Linux, vPorts do not persist across system reboots. vPorts must be re-created after a system reboot.

4.16.1 CreateVPort

This command creates a virtual port with an automatically generated WWPN or a user-specified virtual WWPN on the specified physical port. You must specify the virtual WWPN for this parameter. If creation is successful, the WWPN is displayed as part of the output from the command. The `vname` optional parameter can be specified for the virtual port's name.

Supported By

Linux, Solaris, and Windows
```
CreateVPort <physical WWPN> <virtual WWPN> <virtual WWNN> [vname]
```

Parameters

physical WWPN	The WWPN of an FC function.
virtual WWPN	The virtual WWPN to create.
virtual WWNN	The virtual WWNN to create.
vname	The virtual port's name (optional).

4.16.2 DeleteVPort

This command deletes the virtual port specified by a physical and virtual WWPN.

Supported By

Linux, Solaris, and Windows

Syntax
```
DeleteVPort <physical WWPN> <virtual WWPN>
```

Parameters

physical WWPN	The WWPN of an FC function.
virtual WWPN	The WWPN of the virtual port.

4.16.3 ListVPorts

This command lists virtual ports on the specified physical FC function. Leaving the physical WWPN parameter blank lists all virtual ports on all manageable hosts that support virtual ports.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
ListVPorts [physical WWPN]
```

Parameters

`physical WWPN` The WWPN of an FC function (optional).

4.16.4 VPortTargets

This command lists targets visible to the specified virtual port.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

`VPortTargets <physical WWPN> <virtual WWPN>`

Parameters

`physical WWPN`   The WWPN of an FC function.

`virtual WWPN`   The WWPN of the virtual port.

4.17 WWN Management Commands

NOTE: These commands are supported only for FC functions.

The WWN Management command group validates WWNs carefully to avoid WWPN duplication, but WWNN duplication is acceptable. You might see error and warning messages if a name duplication is detected. Fulfill the activation requirement after each WWN is changed or restored. If pending changes exist, some diagnostic and maintenance features are not available.

CAUTION! Using the `ChangeWWN` or `RestoreWWN` commands on an adapter that is being used to boot from SAN is not advisable. After the command is completed, the system performs an adapter reset, which might cause a loss of connectivity to the SAN and possible loss of data. To perform these commands, you must make sure that the adapter is not currently being used to boot from SAN. Perform one of the following actions:

- Move the target adapter to a non-boot from SAN host.
- If the host with the target adapter is also hosting other boot from SAN adapters, perform a boot from SAN using one of the other boot from SAN adapters. The target adapter can now be used.

ATTENTION: The Emulex HBA Manager application cannot retrieve data from an offline adapter or port and will display incorrect information for that adapter or port. Adapters and ports must be online for the Emulex HBA Manager application to display accurate information.

4.17.1 ChangeWWN

This command allows you to change WWPNs and WWNNs, and it allows you to change the WWN to volatile or nonvolatile. If you attempt to select volatile on an adapter that does not support volatile WWNs, a `Not Supported` error is returned.

NOTE: This command is disabled when FA-PWWN is enabled on the adapter port.

When a volatile change is supported, a reboot is required to activate the new value. Volatile names are active until system power down or adapter power cycle.

For VMware ESXi:
- After changing the WWN of a function, update your zoning settings before you reboot your ESXi server. If the zoning is not updated before reboot, the subsequent boot could take a long time.
- After changing the WWN of a function, you must reboot the ESXi system before trying to access the adapter on that system. For information on rebooting the ESXi system, refer to the VMware documentation.
- If you are using the CIM interface to access functions, after changing the WWN of a function, you must restart the CIMOM (that is, SFCB) on the ESXi system before trying to access the function on that system. For information on restarting the CIMOM, refer to the VMware documentation.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
ChangeWWN <WWPN> <New WWPN> <New WWNN> <Type>
```

Parameters

`WWPN`	The current WWPN of an FC function.
`New WWPN`	The new WWPN of the FC function.
`New WWNN`	The new WWNN of an FC function.
`Type`	`0` = Volatile. `1` = Nonvolatile.

4.17.2 GetWWNCap

This command displays whether a volatile change is supported for the WWPN.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax
```
GetWWNCap <WWPN>
```

Parameters

`WWPN`	The WWPN of an FC function.

4.17.3 ReadWWN

This command reads different types of WWNs.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

`ReadWWN <WWPN> <Type>`

Parameters

`WWPN`   The WWPN of an FC function.

`Type`   0 = Volatile.
            1 = Nonvolatile.
            2 = Factory default.
            3 = Current.
            4 = Configured.

4.17.4 RestoreWWN

This command changes the WWNs to the factory-default or nonvolatile values. The change is nonvolatile.

NOTE: A reboot is required to activate the new value.

NOTE: This command is disabled when FA-PWWN is enabled on the adapter port.

For VMware ESXi systems, the following conditions apply:
- After changing the WWN of an function, you must reboot the ESXi system before trying to access the adapter on that system. For information on rebooting the ESXi system, refer to the VMware documentation available from the VMware website.
- If you are using the CIM interface to access adapters, after changing the WWN of a function, you must restart the CIMOM (that is, SFCB) on the ESXi system before trying to access the function on that system. For information on restarting the CIMOM, refer to the VMware documentation available from the VMware website.

Supported By

Linux, Solaris, Windows, and Windows + CIM provider on a VMware host

Syntax

`RestoreWWN <WWPN> <Type>`

Parameters

`WWPN`   The WWPN of an FC function.

`Type`   0 = Restore default WWNs.
            1 = Restore NVRAM WWNs.

Appendix A: Emulex HBA Manager Application Error and Return Messages

Table 7 contains a list of some of the error messages that might be encountered during an Emulex HBA Manager session.

Table 7: Emulex HBA Manager Error and Warning Messages

Error Message	Commands	Description
`Error: Read-only management mode is currently set on this host. The requested command is not permitted in this mode.`	Active management commands that change a property on an adapter or host	This message is returned when some commands are attempted while the CLI is configured for Read-Only mode. See Section 3.1.1, CLI in Read-Only Mode.
`Not supported.`	`ChangeWWN`	If a volatile change is requested on an adapter that does not support volatile WWNs, it returns a `Not Supported` error. See Section 4.17.1, ChangeWWN.
`RETURN CODE: <0>: Success, no further action is needed.`	`Download`	The firmware download was completed without errors.
`ERROR: HBACMD_GetDumpFile: RM_GetDumpFile call failed (2)` `ERROR: <2>: Not Supported`	`GetDumpFile`	Dump files are copied from the dump directory of the remote host to the dump directory of the local host. Specifying a local port identifier for this command returns an error because the source and destination directories are the same. See Section 4.8.4, GetDumpFile.
`ERROR: <4>: Invalid argument`	`getfwparams` `setfwparam`	This message is returned when there is a problem with the command. See Section 4.9, Firmware Commands.
`ERROR: <5>: Illegal WWN format`	`getfwparams` `setfwparam`	This message is returned when the WWN format is incorrect. See Section 4.9, Firmware Commands.
`ERROR: <24>: This firmware version is not supported on this board model.`	`Download`	This message is returned when the firmware version is incompatible with the adapter. See Section 4.12.2, Download.
`ERROR: <35>: Unable to allocate buffer`	`getfwparams`	This message is returned when the command cannot allocate a buffer. See Section 4.9, Firmware Commands.
`ERROR: <180>: Authentication: User unknown`	All	The specified user name is not valid or could not be authenticated by the system. See Section 1.2, Emulex HBA Manager Application Secure Management.
`ERROR: <181>: Authentication: Insufficient credentials`	All	The specified user name and password are valid, and the user is a member of an Emulex HBA Manager group. However, the Emulex HBA Manager group does not have sufficient privileges to execute the specified command. See Section 1.2, Emulex HBA Manager Application Secure Management.
`ERROR: <183>: Secure Mgmt: user not a member of OCM group`	All	The specified user name and password could be authenticated, but the user is not a member of an Emulex HBA Manager group. See Section 1.2, Emulex HBA Manager Application Secure Management.
`ERROR: Download Failed due to invalid firmware digital signature. Please contact customer support for additional help.` `ERROR: <203>: Failed validating firmware digital signature`	`Download`	If you attempt to update unauthenticated firmware for a secure LPe31000-series, LPe32000-series, or LPe35000-series adapter, this error message is displayed. See Section 4.12.2, Download.

Table 7: Emulex HBA Manager Error and Warning Messages (Continued)

Error Message	Commands	Description
`ERROR: <206>: Authentication Failed`	All	This indicates either a valid user name with an invalid password or a general user authentication error. See Section 1.2, Emulex HBA Manager Application Secure Management.
`ERROR: Download Failed due to missing digital signature in firmware file. Please contact customer support for additional help.` `ERROR: <209>: Firmware digital signature missing`	`Download`	If you attempt to update unsecured firmware for a secure LPe31000-series, LPe32000-series, or LPe35000-series adapter, this error message is displayed. See Section 4.12.2, Download.
`RETURN CODE: <247>: Download succeeded, but a reboot is required to activate the new firmware.`	`Download`	Reboot the system to activate the new firmware.
`ERROR: <251>: Hardware or firmware does not support command`	`getfwparams` `setfwparam`	This message is returned when the hardware or firmware does not support the command. See Section 4.9, Firmware Commands.
`Error: <431> Cable length required for force mode and interface type.`	`SetPhyPortSpeed`	This error is displayed when a length value is not included when the mode is set to 2. Example: `hbacmd setphyportspeed 00-00-c9-a9-41-88 2 100Mb`

Appendix B: License Notices

B.1 Secure Hash Algorithm (SHA-1) Notice

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