Emulex® CIM Provider Package

Installation Guide
Release 12.8

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Chapter 1: Introduction

The Emulex® CIM provider enables comprehensive management of Emulex HBAs. It uses an industry-standard API, Common Manageability Programming Interface (CMPI) v2.0, to manage various Emulex adapters.

The CIM provider supports basic inventory and active management of the following FC adapters:

- LPe12000-series adapters
- LPe16000-series adapters
- LPe31000-series adapters
- LPe32000-series adapters
- LPe35000-series adapters

During installation, the Emulex CIM provider registers with a Web-Based Enterprise Management (WBEM) server running a CIMOM service. The CIM provider performs the following functions:

- Internally communicates with the Emulex management API.
- Internally communicates with the Emulex drivers.
- Handles inquiries and requests from various CIM clients.

1.1 Supported Platforms

The following table shows the platforms supported with the Emulex CIM provider kits.

Table 1: Emulex CIM Provider Supported Platforms

Operating Systems	Emulex CIM Provider Kits
VMware ESXi 6.5	`VMW-ESX-6.5.0-emulex-cim-provider-<kit_version>-offline_bundle-<vmware_version>.zip`
VMware ESXi 6.7	`VMW-ESX-6.7.0-emulex-cim-provider-<kit_version>-offline_bundle-<vmware_version>.zip`
VMware ESXi 7.0	`Broadcom-ELX-CIMProvider_<component_version>-01OEM.700.1.0.<vmware_version>_<build_version>.zip`

1.2 Supported CIM Provider Profiles

Profile Registration	DMTF DSP1033
Software Inventory	DMTF DSP1023
Physical Package	SNIA SMI-S 1.5 Part 2 Clause 31
Host Discovered Resources	SNIA SMI-S 1.5 Part 6 Clause 7
Storage HBA	SNIA SMI-S 1.5 Part 6 Clause 6
Software Update	DMTF DSP1025
Record Log	DMTF DSP1010
Software	SNIA 1.2.0
Access Points	SNIA 1.3.0
PCI Device	DMTF 1.0.0
Physical Asset Profile	DMTF DSP1011

Boot Control	DMTF 1.1.0
FC HBA	SNIA SMI-S 1.5 Part 6 Clause 5
FC HBA Diagnostic Profile	DMTF DSP1104
FC Initiator Ports Profile	SNIA SMI-S 1.5 Part 2 Clause 17

1.3 Abbreviations

Table 2: Acronyms and Abbreviations

Acronym or Abbreviation	Description
CMPI	Common Manageability Programming Interface
DMTF	Distributed Management Task Force
SFCB	Small Footprint CIM Broker
SMI	Storage Management Initiative
SNIA	Storage Networking Industry Association
URI	Uniform Resource Identifier
WBEM	Web-Based Enterprise Management

Chapter 2: Installing the Emulex CIM Provider

The following items must be installed before you can install the Emulex CIM provider.

- One of the following adapters:
  - LPe12000-series adapter
  - LPe16000-series adapter
  - LPe31000-series adapter
  - LPe32000-series adapter
  - LPe35000-series adapter
- The appropriate adapter drivers

NOTE: Adapters on an ESXi host that is running Emulex CIM providers can be managed by a Windows server using the following applications (installed on Windows operating systems):

- The Emulex HBA Manager application for Windows
- The Emulex HBA Manager application for VMware vCenter

NOTE: The Emulex OneCommand® Manager application has been renamed as the Emulex HBA Manager application.

Go to the download page on the Broadcom website, at www.broadcom.com, or to the vendor website to verify the driver version or the Emulex HBA Manager application version that must be installed on your system.

2.1 Installing the CIM Provider in the VMware Operating System

Use one of the standard `esxcli` commands to install the offline bundle on ESXi 6.5 and ESXi 6.7 systems.

To install the signed offline bundle, type the following command:

```
esxcli software vib install -d <offline_bundle.zip>
```

Use one of the standard `esxcli` commands to install the component on ESXi 7.0 systems.

To install the component, type the following command:

```
esxcli software component apply -d <component_file_path_name.zip>
```

2.2 Using the CIM Provider

This section describes how to perform the following procedures on Emulex adapters using the CIM provider:

- Update firmware
- Enable logs
- Generate logs
- Run diagnostics

If you have questions or require additional information, contact an authorized Broadcom® Technical Support representative at ecd-tech.support@broadcom.com.

2.2.1 Updating Firmware on Emulex Adapters

Use the Software Update profile to update the firmware on Emulex adapters. The following methods are implemented in the Emulex-specific Software Update profile:

- **Install from a byte stream** – Requires a custom CIM client that can read the firmware file and create a byte stream used to update the firmware.
- **Install from URI** – Supports two types of URIs:
  - The firmware file to be updated is available locally on the machine that hosts the Emulex adapter.
  - The firmware file to be updated is available on a remote machine, such as an HTTP or HTTPS server. In this case, the Emulex CIM provider uses the `libcurl` library available on the host machine on which the CIM provider is running to download the firmware file.

The Emulex `CIM_SoftwareInstallationServiceCapabilities` class has the attribute `SupportedURISchemes` that identifies the supported URI schemes.

To update the firmware, perform the following steps:

1. List the `CIM_SoftwareInstallationServices` in the Emulex namespace. Select the `CIM_SoftwareInstallationService` that is specific to the adapter on which the firmware is to be updated. For example, if an LPe16000 adapter needs a firmware update, select the `ELXHBA_SoftwareInstallationService` class instance:
   ```
   wbemcli  -noverify ein 'https://root:<password>@<IP>/root/
   emulex:elxhba_softwareinstallationservice' -nl
   ```
2. List the `CIM_FCPort` for all adapters. Select the desired port from the listed instances. For example, type:
   ```
   wbemcli  -noverify ein 'https://root:<password>@<IP>/root/emulex:elxhba_fcport' -nl
   ```
3. Run `InstallFromURI` using the output from Step 1 and Step 2.

   For example:
   ```
   wbemcli cm -noverify 'https://root:<password>@<IP>/root/emulex:<output_of_Step_1>
   InstallFromURI.URI=<full_path_of_FW_file>,Target=<output_of_Step_2>
   ```

2.2.2 Enabling Logs and Collecting Symptoms

To enable provider logs, perform the following steps:

1. List the `ELXHBA_RecordLog` class (for an FC HBA) and note the provider log instance. If the list command fails, perform the steps provided in Section 2.2.3, Generating Provider Logs if Listing Them Fails.
2. Set the provider log settings:
   ```
   wbemcli -noverify cm 'https://root:<password>@<IP>/root/emulex:<instance_from_Step_1> '
   SetLogParams.LogLevel=5,logmode=2,tracepath='<file_path>'
   ```
3. Set the provider log state:
   ```
   wbemcli -noverify cm 'https://root:<password>@<IP>/root/emulex:<instance_from_Step_1> '
   RequestStateChange.RequestedState=2
   ```
4. Perform the operation that is not working as expected. The provider logs are available in the *<file_path>* specified in Step 2.
5. Contact a Broadcom Technical Support representative with the provider logs and the system logs (`/var/log/syslog.log`).

To disable provider logs, enter the following command:

```
wbemcli -noverify cm 'https://root:<password>@<IP>/root/emulex:<instance_from_Step_1> '
RequestStateChange.RequestedState=3
```

2.2.3 Generating Provider Logs if Listing Them Fails

To enable provider logs if listing them fails, perform the following steps:

1. Stop the CIMOM using the following command.
   ```
   esxcli system wbem set -e 0
   ```
2. Create a `.dmp` file.

   Create a provider log for the Emulex FC provider by creating an `emulex_fc_provider.dmp` file in the `/etc/cim/emulex` location.
3. Manually enter the following two lines (without spaces):
   ```
   2,5,1
   /tmp/providerlogs.txt
   ```
4. Start the CIMOM using the following command:
   ```
   esxcli system wbem set -e 1
   ```
5. List the Emulex classes in the `root/emulex` namespace.
6. Perform the operation that is not working as expected. The provider logs are available in the `/tmp/providerlogs.txt` file specified in Step 3.
7. Contact a Broadcom Technical Support representative with the provider logs and the system logs (`/var/log/syslog.log`).

2.2.4 Running Diagnostic Tests on an Emulex FC Adapter

To run diagnostic tests on an FC adapter, perform the following steps:

1. Get the instance of the managed element (`ELXHBA_PortController`). For example:
   ```
   wbemcli  -noverify ein 'https://root:<password>@<IP>/root/emulex:elxhba_portcontroller' -nl
   ```
2. Get the instance of the `ELXHBA_FCHBADiagnostictest` class. For example:
   ```
   wbemcli  -noverify ein 'https://root:<password>@<IP>/root/emulex:elxhba_diagnostictest' -nl
   ```
3. Run the `RunDiagnosticservice` on the `ELXHBA_FCHBADiagnostictest`. For example:
   ```
   wbemcli -noverify cm 'https://root:<password>@<IP>/root/
   emulex:<diagnostic_test_instance_from_Step 2>'
   RunDiagnosticservice.ManagedElement=<managedelement_instance_from_Step_1>'
   ```
   A `CIM_ConcreteJob` instance is created for each diagnostic test that is run. For example:
   ```
   wbemcli  -noverify ein 'https://root:<password>@<IP>/root/emulex:elxhba_concretejob' -nl
   ```
   Results of the diagnostic tests are available in the `ELXHBA_DiagnosticCompletionRecord` class instances. For example:
   ```
   wbemcli  -noverify ein 'https://root:<password>@<IP>/root/
   emulex:elxhba_diagnosticcompletionrecord' -nl
   ```
   The diagnostic logs can be cleared using the `ClearLog` function of `ELXHBA_DiagnosticsLog` class. For example:
   ```
   wbemcli -noverify cm 'https://root:<password>@<IP>/root/
   emulex:<corresponding_diagnostic_log_instance>' ClearLog
   ```

Chapter 3: Troubleshooting

The following error message might appear if the CIM hosts are not properly added to the Emulex HBA Manager application:
`Unknown or invalid host specified`

There could be instances in which the drivers, the CIM provider, and the CIM client on a Windows machine are all properly installed, but the CIM hosts are still not added to the Emulex HBA Manager application. The following table shows the most common reasons for this problem.

Table 3: Problems Adding a CIM Host

Situation	Resolution
The machine with the specified IP address is not reachable.	Verify whether the machine is reachable from the CIM client.
The specified protocol (HTTP or HTTPS) is not supported by the CIMOM.	Most often the CIMOM is configured to use HTTPS. Therefore, if you are trying to connect with HTTP, you might get an error. Try using HTTPS instead.
The namespace is invalid.	Verify that the namespace for the Emulex provider is `root/emulex`.
The user name or password is invalid.	Verify that the user name is correct, and retype the password.

The CIMOM is not running on the ESXi host.	You can check whether the CIMOM, an SFCB, is running by typing one of the following commands.
	`/etc/init.d/sfcbd-watchdog status`
	or
	`ps -ef | grep sfcb`
	If the CIMOM is listening to a port other than 5988 or 5989, the connection might not take place. You can configure the SFCB CIMOM settings by editing the `/etc/sfcb/sfcb.cfg` file.
	`sfcb` is disabled by default. You must change `sfcb.cfg` to make the entry as follows:
	`enabled: true`

The CIM provider is running, but enumerations are not occurring properly.	Verify that the correct CIM provider for the ESXi host is installed.
The CIM provider is running, but enumerations are not occurring properly from a remote client. Or An issue exists in adding an ESXi host to the Emulex HBA Manager application.	Set the `httpLocalOnly` attribute to false in the `/etc/sfcb/sfcb.cfg` file.

If you still experience problems when adding the host, run the following commands on the ESXi host and send the output to the Broadcom Technical Support team.

```
vm-support
esxcfg-module -l
esxcfg-scsidevs -a
lspci
esxcli software vib list | grep -i lpfc
esxcli software vib list | grep -i emu
```

Send the `/var/log/syslog.log` file for all of the preceding operations.


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