Oracle® Virtual Networking for ESX Hosts Installation and Boot Guide

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Contents

Using This Documentation

- **Overview** – Describes how to configure an ESXi host for local or remote booting using Oracle Virtual Networking host drivers.
- **Audience** – System administrators and authorized service providers.
- **Required knowledge** – Advanced experience managing heterogeneous networks.

Product Documentation Library

Documentation and resources for this product and related products are available at http://www.oracle.com/goto/oracle-virtual-networking/docs.

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Preparing for Host Driver Configuration

This document describes how to configure your ESXi 5.x and ESXi 6.0 hosts to load the host drivers at boot time after you set up and configure Oracle Fabric Interconnect. You can use either local boot or remote boot protocol. Remote boot can be performed by using the iSCSI, SAN, or PXE boot protocols.

These topics provide an overview of configuring your ESXi host.

Related Information

Host Drivers for ESXi Overview

Oracle Fabric Interconnect supports host software for ESXi. The host software stack can be installed and supported on ESXi hosts that are running either ESXi 5.x or ESXi 6.0. The software is a collection of Oracle host drivers, Visual Basic scripts, and other tools. The host drivers for ESXi contain the following component modules:

- The vNIC module provides virtual network interface controller services.
- The vHBA module provides virtual host bus adapter services.

Related Information

Identifying the Boot Method

All computers boot from boot devices, which might include a local disk, a CD-ROM, a USB device, or an Ethernet controller. Depending on your requirements, you can configure your ESXi host using any one of the following boot methods:

- “Local Boot Method” on page 10
- “Remote Boot Method” on page 10
  - iSCSI boot method
  - PXE boot method
  - SAN boot method

Related Information

- “Host Drivers for ESXi Overview” on page 9

Local Boot Method

When an ESXi host boots locally, it loads the OS and host drivers from an internal hard drive.

Related Information

- “Configuring Host Drivers for Local Boot” on page 21
- “Remote Boot Method” on page 10

Remote Boot Method

Oracle has implemented a ROM BIOS extension for its HCA cards. This extension, called XgBoot, enables you to use Oracle virtual I/O resources as boot devices for the server. You configure the system BIOS to include XgBoot in the boot order and configure the Oracle Fabric Interconnect to make sure virtual resources are bootable.

Whatever remote booting process you select, you use the following high-level steps:

1. Set up the boot volume.

   You need the boot image to be available on the network.
2. Configure bootable I/O resources on the Oracle Fabric Interconnect.

For SAN booting, this is a VHBA configured as bootable. For PXE boot, you use a bootable VNIC. Either resource must be assigned to a server profile that is bound to the server that boots remotely.

3. Configure the server.

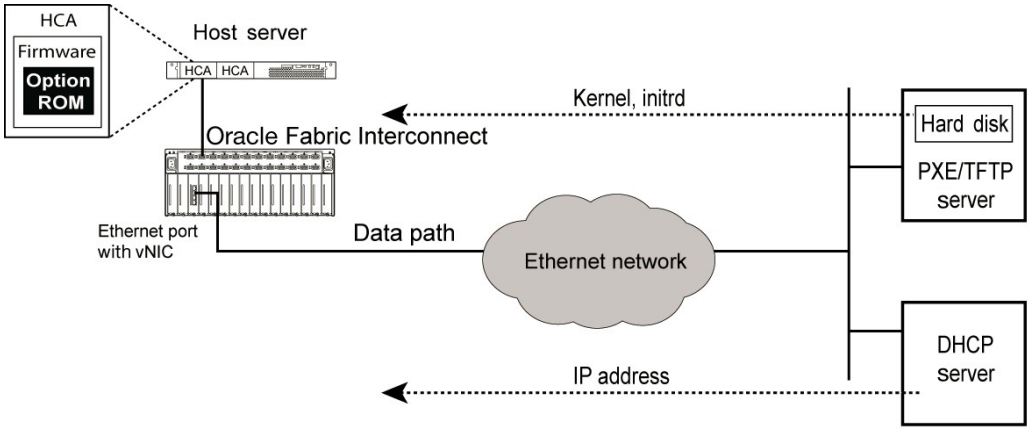
   HCAs on the server must have compatible firmware, and their option ROM must be enabled.
4. Connect the server profile on the Oracle Fabric Interconnect to the server.
5. Set the server profile to SAN boot (`sanboot=`).

Related Information

- “Configuring Host Drivers for Local Boot” on page 21
- “Configuring Host Drivers for iSCSI Boot” on page 37
- “Local Boot Method” on page 10

PXE Boot Method

During the ESXi host BIOS boot sequence, the PXE agent in the HCA option ROM scans the network for a PXE server through a VNIC. The PXE server delivers the kernel boot image and the `initrd` containing the host drivers to the ESXi host for booting. The PXE server initially uses DHCP and then TFTP.



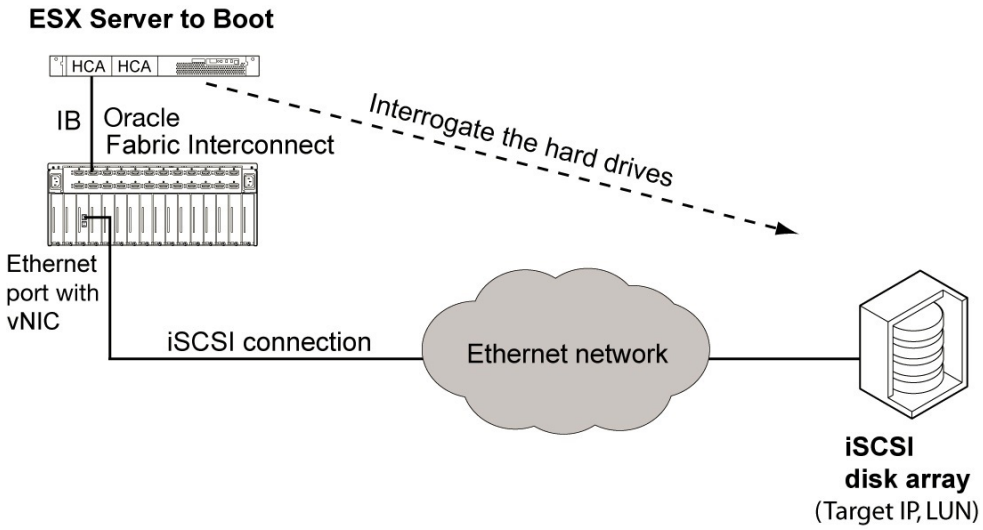
The process of PXE boot configuration is as follows:

1. Move the host drivers and OS image to the PXE server.
2. Load the host drivers into the `initrd` file.

3. Create a server profile.
4. Configure a bootable VNIC.
5. Modify the PXE configuration file.
6. Set the HCA to first in the boot order.
7. Load the `initrd` file and the OS image into the ESXi host.

iSCSI Boot Method

iSCSI boot enables you to boot an ESXi host from a LUN on an iSCSI array accessed through a VNIC. The remote disk to boot from is identified by a target IQN and LUN on a storage disk array device.



The process for iSCSI boot configuration is as follows:

1. Load the host drivers on to the OS image.
2. Move the OS image to a remote LUN.
3. Create a server profile.
4. Configure a bootable VNIC.
5. Set the HCA to first in the boot order.
6. Load the image into the ESXi host.
7. Reboot the host.

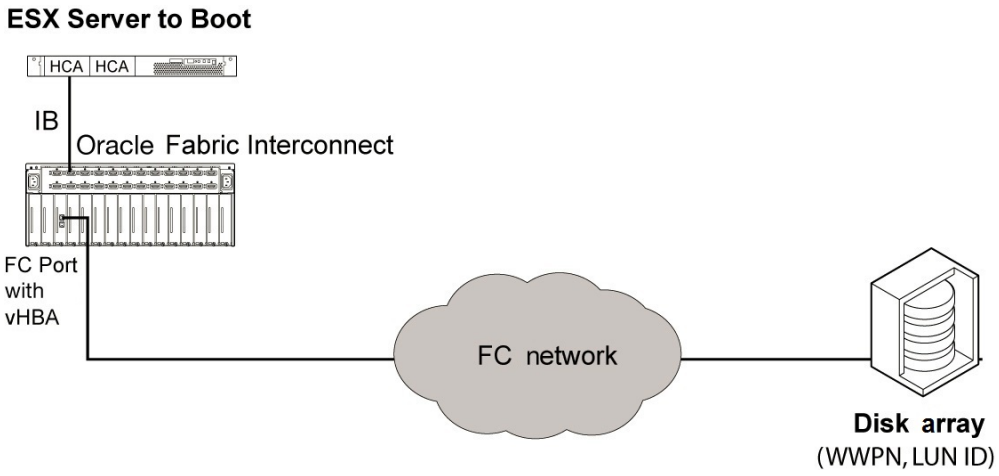
During the iSCSI boot process, the ESXi host logs in to the iSCSI array and gets the IQN information it needs. Because the VNIC has an OS available to boot from (on the iSCSI

LUN connected to the VNIC), that OS is used, and the ESXi host boots over the VNIC. This procedure occurs each time the ESXi host is booted using the iSCSI boot method.

Note - The login message displayed while the VNIC is logging in to the iSCSI array appears so rapidly that you might not recognize that the ESXi host is booting from a VNIC. Additionally, no IQN or other recognizable iSCSI information is displayed on the screen.

SAN Boot Method

SAN boot enables you to boot an ESXi host from a SAN volume accessed through a VHBA. The remote disk to boot from is identified by a target WWPN and LUN on a storage disk array device.



The process of configuring for PXE boot is as follows:

1. Load the host drivers into the OS image.
2. Move the OS image to a remote LUN.
3. Create a server profile.
4. Configure a bootable VHBA.
5. Set the HCA to first in the boot order.
6. Load the image into the ESXi host.
7. Reboot the host.

Note - During SAN boot, the text `VHBA installing` indicates the name of the VHBA configured for SAN boot.

Confirm the Minimum Requirements

Before configuring the selected boot method, you must determine if the minimum requirements for your ESXi version are fulfilled.

Note - During this process, you use the Oracle Fabric Interconnect to upgrade HCA firmware and option ROM on the ESXi host. Therefore, the host must be configured to communicate with the Oracle Fabric Interconnect.

1. **Use the following command to determine the version of your XgOS operating system:**

```
admin@OVN[xsigo] show system version
Build 4.0.3-XGOS  - (buildsys) Fri Jan 23
11:38:14 PST 2015admin@kashmir[xsigo]
```

2. **If necessary, upgrade the XgOS operating system.**

   For instructions to upgrade the operating system, refer to the *XgOS User's Guide*.

3. **Verify your HCA firmware version.**

   See “Verify the HCA Firmware Version” on page 14.

4. **Download the HCA firmware for Oracle HCAs.**

   See “Download HCA Firmware for Oracle HCAs” on page 16.

5. **Download option ROM, only if you choose to use the remote boot method.**

   See “Download Option ROM” on page 16.

6. **Load firmware into the Oracle Fabric Interconnect repository.**

   See “Load Firmware on to the Oracle Fabric Interconnect Repository” on page 17.

7. **Upgrade the HCA firmware and option ROM versions if needed.**

   See “Upgrade HCA Firmware and Option ROM” on page 18.

8. **Download the host drivers.**

   See “Download the Host Drivers” on page 20.

Verify the HCA Firmware Version

You can check the HCA version information from the Oracle Fabric Interconnect.

1. **Determine your HCA firmware version by using either of the following commands:**

   - Oracle Fabric Interconnect

     show physical-server *hostname* **hca**

     where *hostname* is the name of the ESXi host.

     ```
     show physical-server kingston hca
     ------------------------------------------------------------------
     lid               7
     node-guid         0002c903000a9f7a
     board-id          MT_0A50120005
     device-id         26418
     firmware-version  2.7.0
     hardware-version  unknown
     option-version    2.8.7
     ------------------------------------------------------------------
     ```

   - Host

     ```
     # ibstat
     CA 'mlx4_1'
         CA type: MT26428
         Number of ports:2
         Firmware version: 2.9.1000
         Hardware version: 176
         Node GUID: 0x0002c9030057b57c
         System image GUID: 0x0002c9030057b57f

     # ibv_devinfo
     hca_id: mlx4_1
       transport:        InfiniBand (0)
       fw_ver:           2.9.1000
       node_guid:          0002:c903:0057:b57c
       sys_image_guid:       0002:c903:0057:b57f
       vendor_id:        0x02c9
       vendor_part_id:     26428
       hw_ver:           0xB0
       board_id:         MT_0FC0110009
      phys_port_cnt:       2
     ```

2. **Record the LID, board-ID, device ID, firmware version, and option ROM version.**

3. **Perform any of the following steps depending on your requirement:**

   - Install an HCA card or exchange an HCA card for firmware upgrade.
   - Upgrade the firmware or option ROM.

- Remove the old host drivers if the firmware, hardware, and software prerequisites are met.

Download HCA Firmware for Oracle HCAs

Newer versions of Oracle HCA firmware are available from My Oracle Support.

1. **On a network-attached Windows server, open a web browser and go to:**
   `http://support.oracle.com`
   My Oracle Support page is displayed.
2. **Sign in if you already have an account.**
   If you do not have an account, you must register first.
3. **Click the Patches & Updates tab.**
4. **In the Patch Search window, click the Search tab.**
   The Patch Search windows updates.
5. **Click the Product or Family (Advance) link.**
   A list of suggested products is generated as you type.
6. **Click your HCA name.**
7. **In the Release Is drop-down menu, click the highest firmware version available for your HCA.**
8. **Click Search.**
   The Patch Search window expands with the search results.
9. **In the Patch Name column, click the appropriate patch number link.**
10. **Click Read Me to display the README file.**
11. **Click Download.**
12. **Click the *filename*`.zip` link to initiate the download.**
13. **In your receiving directory, decompress the *filename*`.zip` file.**

Download Option ROM

The option ROM files are available from OTN.

1. **On a network-attached Windows server, open a web browser and go to:**

   `http://www.oracle.com/technetwork/indexes/downloads`

2. **Scroll down the page to Drivers, and click Xsigo Drivers.**

3. **Under HCA FW Utils, click the link for Linux.**

4. **Indicate where the file should be saved.**

5. **Decompress the file and extract all components from the `.rpm` file.**

   Note - The `.rpm` file extracts to a `.cpio` file, which extracts to a folder `opt`.

Load Firmware on to the Oracle Fabric Interconnect Repository

1. **On the Windows server, find the previously extracted firmware files in the receiving directory.**

   Note - The option ROM files are located in the `\opt\xsigo\hca-firmware\optionrom` subdirectory of the receiving directory.

2. **Consider your next step.**

   - **If you are upgrading both HCA firmware and option ROM, go to Step 3.**
   - **If you are upgrading only the HCA firmware, go to Step 8.**
   - **If you are upgrading the option ROM, go to Step 3.**

3. **In the `optionrom` directory, find the two `.bin` files for your HCA.**

   The file names have the format `XgBoot-mt`*device-ID*`.bin` and `XgBoot-mt`*device-ID*`-DEBUG.bin`.

   Use the device ID that you recorded in "Verify the HCA Firmware Version" on page 14 to identify your option ROM files.

4. **Move the option ROM `.bin` files to a temporary directory on the Oracle Fabric Interconnect.**

5. **On the Oracle Fabric Interconnect, load the option ROM files into the repository.**

   `system install hca-optionrom scp://tmp/XgBoot-mt`*device-ID*`.bin`**

```
system install hca-optionrom scp://tmp/XgBoot-mtdevice-ID-DEBUG.bin
```

where *device-ID* is the device ID recorded in "Verify the HCA Firmware Version" on page 14.

6. **Verify that the option ROM has been loaded.**

```
show system hca-optionrom
```

In the list displayed, find both option ROM files.

7. **Consider your next step.**

   - **If you are upgrading both HCA firmware and option ROM, go to Step 8.**
   - **If you are upgrading only option ROM, perform "Upgrade HCA Firmware and Option ROM" on page 18.**

8. **In the receiving directory of the Windows server, move the HCA firmware `.bin` file to a temporary directory on the Oracle Fabric Interconnect.**

9. **On the Oracle Fabric Interconnect, load the HCA firmware file into the repository.**

```
system install hca-image scp://tmp/firmware-filename.bin
```

where *firmware-filename* is the file name of the HCA firmware file.

10. **Verify that the firmware has been loaded.**

```
show system hca-firmware
```

In the list displayed, find the firmware.

▼ Upgrade HCA Firmware and Option ROM

If you are upgrading both the HCA firmware and option ROM, you must upgrade the option ROM first.

1. **Based on whether you are upgrading the HCA firmware, Option ROM or both, consider your next step.**

   - **If you are upgrading both the HCA firmware and option ROM, go to Step 2.**
   - **If you are upgrading only the HCA firmware, go to Step 4.**
   - **If you are upgrading only the option ROM, go to Step 2.**

2. **On the Oracle Fabric Interconnect, upgrade the option ROM.**

   set physical-server *hostname* **upgrade-hca** *lid* **optionrom**

   where:

hostname	Name of the ESXi host
lid	LID of the HCA

   Note - You do not specify the option ROM file names because the highest version option ROM files are automatically selected for you.

   For example:

   ```
   set physical-server kingston upgrade-hca 7 optionrom
   Upgrading HCA 2c903000459eb optionrom may interrupt I/O and will require a manual
   server reboot in order to take effect. Do you wish to continue (y/n)? y
   ```

   The option ROM is upgraded.

3. **On the Oracle Fabric Interconnect, upgrade the HCA Firmware.**

   set physical-server *hostname* **upgrade-hca** *lid* **firmware** *firmware-filename*.**bin**

   where:

hostname	Name of the ESXi host
lid	LID of the HCA
firmware-filename	File name of the HCA firmware file

   ```
   set physical-server kingston upgrade-hca 7 firmware 3.0.0-fw.bin
   Retrieve version information...

   Upgrading HCA 0002c903000a9f7a firmware from 2.9.1000 to 3.0.0 will require a
   manual server reboot in order to take effect. Do you wish to continue (y/n)?y

   Upgrading HCA for 0002c903000a9f7a, current version is 2.9.1000...
   ```

4. **Verify that the new HCA firmware or option ROM is installed.**

   show physical-server *hostname* **hca**

   where *hostname* is the name of the ESXi host.

   Compare the output displayed with the version you recorded in "Verify the HCA Firmware Version" on page 14.

Download the Host Drivers

After performing the necessary preliminary tasks, you can use the following steps to download the host drivers.

1. **Go to `https://support.oracle.com`.**
2. **Go to the Patches & Updates tab.**
3. **On the Patch Search window, select Product or Family (Advanced).**
4. **In the Product Is field, type Oracle Virtual Networking.**
5. **Select the driver that you need to download.**

Configuring Host Drivers for Local Boot

These topics describe how to configure the host drivers for ESXi.

Related Information

- “Preparing for Host Driver Configuration” on page 9
- “Configuring Host Drivers for PXE Boot” on page 33
- “Configuring Host Drivers for iSCSI Boot” on page 37
- “Configuring Host Drivers for SAN Boot” on page 41

Configuring Host Drivers for Local Boot for ESXi 5.x Hosts

After performing the necessary preliminary tasks, you can install the ESXi 5.x host drivers.

These tasks describe the process of configuring host drivers locally for ESXi 5.x hosts.

Related Information

- “Configuring Host Drivers for Local Boot for ESXi 6.0 Hosts” on page 23
- “Host Drivers for ESXi Overview” on page 9

▼ Install Host Drivers for ESXi 5.x Hosts

1. **Copy the host drivers on to the ESXi 5.x host.**

2. **Remove the following `vibs`:**

   - **`esxcli software vib remove -n net-mlx4-core`**
   - **`esxcli software vib remove -n net-mlx4-en`**

3. **Install the host drivers on the ESXi host.**

   `esxcli software vib install -d` */path-to-files/ host-driver-filename*`.zip`

path-to-files	file path to the respective files
host-driver-filename`.zip`	File name of the `.zip` archive of the host drivers for the specific OS

   Note - If the drivers are unsigned, append the `-nosigcheck` option to the command line.

4. **Reboot the ESXi host.**

5. **Verify that the host drivers are installed.**

   `esxcli software vib list | grep Partner`

Related Information

- “Uninstall Host Drivers Using VIB Uninstall Method” on page 22
- “Install Host Drivers for ESXi 6.0 Hosts” on page 23
- “Uninstall Host Drivers Using VIB Uninstall Method” on page 24

▼ Uninstall Host Drivers Using VIB Uninstall Method

1. **Remove each of the VIB packages that are installed with the host drivers.**

   `esxcli software vib remove -n` *package-name*

   Remove the following VIB packages one after the other:

   - `net-xsvnic`
   - `scsi-xsvhba`
   - `net-xscore`
   - `net-ib-basic`
   - `net-mlx4-en`

2. **Reboot the host.**

Related Information

- “Install Host Drivers for ESXi 5.x Hosts” on page 21

Configuring Host Drivers for Local Boot for ESXi 6.0 Hosts

After performing the necessary preliminary tasks for your boot method, you can install the ESXi 6.0 host drivers.

- “Install Host Drivers for ESXi 6.0 Hosts” on page 23
- “Uninstall Host Drivers Using VIB Uninstall Method” on page 24

Related Information

- “Configuring Host Drivers for Local Boot for ESXi 5.x Hosts” on page 21
- “Host Drivers for ESXi Overview” on page 9

▼ Install Host Drivers for ESXi 6.0 Hosts

1. **Copy the host drivers on to the ESXi 6.0 host.**
2. **Remove the following `vibs`:**
   - **`esxcli software vib remove -n net-mlx4-en`**
   - **`esxcli software vib remove -n net-mlx4-core`**
   - **`esxcli software vib remove -n nmlx4-core`**
   - **`esxcli software vib remove -n nmlx4-core`**
3. **Reboot the server.**
4. **Install the new host drivers.**

   ```
   esxcli software vib install --depot=/xsigo-6.0.0.ESX.1-1vmw.600.0.0.2494585.zip
   ```

   Specify the absolute path of the host drivers while installing. This example illustrates that the host drivers or file is available under `/xsigo-6.0.0.ESX.1-1vmw.600.0.0.2494585.zip` folder.
5. **Reboot the server.**

Related Information

- “Uninstall Host Drivers Using VIB Uninstall Method” on page 24

▼ Uninstall Host Drivers Using VIB Uninstall Method

1. **Remove each of the VIB packages that are installed with the host drivers.**

   `esxcli software vib remove -n` *package-name*

   Remove the following VIB packages one after the other:

   - `scsi-vhba`
   - `net-xve`
   - `net-xsvnic`
   - `net-xscore`
   - `net-ib-cm`
   - `net-mlx4-ib`
   - `net-ib-ipoib`
   - `net-ib-sa`
   - `net-ib-mad`
   - `net-ib-core`
   - `net-mlx4-core`

2. **Reboot the host.**

Related Information

- “Install Host Drivers for ESXi 6.0 Hosts” on page 23

Remastering ESXi ISO

For Oracle vNICs and vHBAs to be available for your version of ESXi operating system, you must inject the host drivers into the native ESXi OS. This process is called *creating a remastered ISO*.

Before creating the remastered ISO, consider the following:

- You must have a Windows server capable of supporting Microsoft Windows PowerShell.
- Creating the remastered ISO occurs through the VMware vSphere plug-in for Microsoft Windows PowerShell. The Windows server must have this tool installed on it.
- Creating a remastered ISO for ESXi 5.x or ESXi 6.0 hosts is supported only on a Windows server running the plug-in. The Windows server's requirements are determined by the version of PowerShell.
- You must use a preconfigured ESXi bundle as a baseline, which is available from VMware's web site. Then, inject the bits into that bundle.
- You must have full administrator rights on the Windows server where you are creating the remastered ISO.

These topics describe the procedure to create a remastered ISO.

- "Create the Remastered ISO (ESXi 5.x)" on page 25
- "Create the Remastered ISO (ESXi 6.0)" on page 28

Related Information

- "Configuring Host Drivers for iSCSI Boot" on page 37
- "Configuring Host Drivers for SAN Boot" on page 41
- "Configuring Host Drivers for PXE Boot" on page 33

▼ Create the Remastered ISO (ESXi 5.x)

This procedure assumes that you are using the working directory `\images\New` for the user named *adminA*.

1. **Install PowerShell on the Windows server if you have not already done so.**

2. **Install the vSphere PowerCLI plug-in if you have not done so already.**

3. **Download the `VMware-5.x.x.zip` file to the Windows server.**

4. **If you have not already done so, download the current host drivers for ESXi 5.x hosts.**

   See "Download the Host Drivers" on page 20.

5. **Start PowerCLI and connect to the vCenter server.**

   ```
   PowerCLI C:\images\New PowerCLI> Connect-VIServer 192.168.11.12
   ```

   This example shows connecting to a vCenter server with the IP address 192.168.11.12, but you can also connect by using a fully-qualified domain name.

6. **In PowerCLI, import the ESXi 5.x bundle and the host drivers for ESXi 5.x hosts in the PowerCLI application.**

   This example adds the VMware distribution bundle (.zip file) and host drivers to a template.

   This documentation uses `VMware-ESXi-5.5.0-1331820-depot.zip` and `xsigo-5.5.1-ESX1` drivers for illustrative purposes. Follow the same procedure for other versions.

   ```
   PowerCLI C:\images\New PowerCLI> Add-EsxSoftwareDepot -DepotUrl 'C:\Users\
   Administrator\Downloads VMware-ESXi-5.5.0-1331820-depot.zip

   PowerCLI C:\images\New PowerCLI> Add-EsxSoftwareDepot -DepotUrl C:\Users\
   Administrator\Desktop\ESX5.5Drivers\xsigo_5.5.1.ESX.1-1vmw.550.0.0.1331820.zip
   ```

   This example imports the VMware distribution bundle (`VMware-ESXi-5.5.0- 1331820-depot.zip`) and host drivers (`xsigo_5.5.1.ESX.1-1vmw.550.0.0.1331820.zip`) to a template.

   When you upload the ESXi software depot, it creates VMware standard profiles by default. The profiles can be either cloned or created to make a Custom-ESXi ISO. This procedure uses the cloned-profile installation procedure.

7. **List the ESXi image profiles.**

   ```
   PowerCLI C:\images\New PowerCLI > Get-EsxImageProfile
   Name                           Vendor        Last Modified    Acceptance Level
   ----                           ------        -------------    ----------------
   ESXi-5.5.0-1331820-standard    VMware, Inc.  9/19/2013 6:...  PartnerSupported
   ESXi-5.5.0-1331820-no-tools    VMware, Inc.  9/19/2013 6:...  PartnerSupported
   ```

   As shown in this example, two ESXi image profiles are available by default. To make the remastered ISO, you will clone the `ESXi-5.5.0-1331820-standard` profile.

8. **Create an image profile to make the Custom-ESXi-5.5.0 ISO.**

```
PowerCLI C:\images\New PowerCLI> New-EsxImageProfile -CloneProfile ESXi-5.5.0-
1331820-standard -Name "Custom-ESX-5.5.0" -Vendor VMware
```

In this example, a new ESXi image profile named Custom-ESXi-5.5.0 is created by cloning the default ESXi image profile.

9. Verify that the custom ESXi image profile is present.

```
PowerCLI C:\images\New PowerCLI > Get-EsxImageProfile
Name                           Vendor       Last Modified    Acceptance Level
----                           ------       -------------    ----------------
Custom-ESX-5.5.0               VMware       9/19/2013 6:...  PartnerSupported
ESXi-5.5.0-1331820-standard    VMware, Inc. 9/19/2013 6:...  PartnerSupported
ESXi-5.5.0-1331820-no-tools    VMware, Inc. 9/19/2013 6:...  PartnerSupported
```

When the custom image profile is present, you can add and remove necessary packages to make a custom ISO.

10. Remove the `net-mlx4-en` and `net-mlx4-core` packages from the depot so that they are not included in the remastered ISO.

```
PowerCLI C:\images\New PowerCLI> Remove-EsxSoftwarePackage -ImageProfile
Custom-ESX-5.5.0 -SoftwarePackage net-mlx4-en

PowerCLI C:\images\New PowerCLI> Remove-EsxSoftwarePackage -ImageProfile
Custom-ESX-5.5.0 -SoftwarePackage net-mlx4-core
```

11. Add the packages in the order shown.

```
PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-
ESX-5.5.0 -SoftwarePackage net-ib-core

PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-
ESX-5.5.0 -SoftwarePackage net-mlx4-core

PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-
ESX-5.5.0 -SoftwarePackage net-ib-mad

PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-
ESX-5.5.0 -SoftwarePackage net-ib-sa

PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-
ESX-5.5.0 -SoftwarePackage net-ib-ipoib

PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-
ESX-5.5.0 -SoftwarePackage net-mlx4-ib

PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-
ESX-5.5.0 -SoftwarePackage net-ib-cm
```

```
PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-
ESX-5.5.0 -SoftwarePackage net-xscore

PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-
ESX-5.5.0 -SoftwarePackage net-xsvnic

PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-
ESX-5.5.0 -SoftwarePackage net-xve

PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-
ESX-5.5.0 -SoftwarePackage scsi-xsvhba
```

12. **Export the modified image profile to the remastered ISO.**

```
PowerCLI C:\images\New PowerCLI> Export-EsxImageProfile -ImageProfile Custom-
ESX-5.5.0 -FilePath C:\Users\Administrator\Desktop\ESX5.5Drivers\Custom-5.5.0-
OVN.iso -ExportToIso
```

13. **(Optional) Export the modified image to the remastered bundle.**

    This step is required if your deployments use a bundle for installation.

```
PowerCLI C:\images\New PowerCLI> Export-EsxImageProfile -ImageProfile Custom-
ESX-5.5.0 -FilePath C:\Users\Administrator\Desktop\ESX5.5Drivers\Custom-ESX-
5.5.0-OVN.zip -ExportToBundle
```

14. **Reboot the server using the remastered ISO.**

▼ Create the Remastered ISO (ESXi 6.0)

This procedure assumes that you are using the working directory `\images\New` for the user named `admin`.

1. **Install PowerShell on the Windows server if you have not already done so.**
2. **Install the vSphere PowerCLI plug-in if you have not done so already.**
3. **Download the `VMware-6.x.x.zip` file to the Windows server.**
4. **If you have not already done so, download the current host drivers for ESXi 6.0 hosts.**

   See "Download the Host Drivers" on page 20.

5. **Start PowerCLI and connect to the vCenter server.**

```
PowerCLI C:\images\New PowerCLI> Connect-VIServer 192.168.11.12
```

This example shows connecting to a vCenter server with the IP address 192.168.11.12, but you can also connect by using a fully qualified domain name.

6. **In PowerCLI, import the ESXi 6.0.0 bundle and the host drivers for ESXi 6.0 hosts in the PowerCLI application.**

   This example adds the VMware distribution bundle (`.zip` file) and host drivers to a template.

   This documentation uses `VMware-ESXi-6.0.0 build-2494585-depot.zip` and `xsigo_6.0.0-ESX1` drivers for illustrative purposes. Follow the same procedure for other versions.

   ```
   PowerCLI C:\images\New PowerCLI> Add-EsxSoftwareDepot -DepotUrl C:\Users\Administrator
   \Downloads\VMware-ESXi-6.0.0-2494585-depot.zip
   PowerCLI C:\images\New PowerCLI> Add-EsxSoftwareDepot -DepotUrl C:\Users\Administrator
   \Desktop\ESX6.0Drivers\xsigo_6.0.0-ESX.1-1vmw.600.0.0-2494585.zip
   ```

   This example imports the VMware distribution bundle (`VMware-ESXi-6.0.0-2494585- depot.zip`) and host drivers (`xsigo_6.0.0- ESX.1-1vmw.600.0.0-2494585.zip`) to a template.

   When you upload the ESXi software depot, it creates VMware standard profiles by default. The profiles can be either cloned or created to make a Custom-ESXi ISO. This procedure uses the cloned-profile installation procedure.

7. **List the ESXi Image profiles.**

   ```
   PowerCLI C:\images\New PowerCLI > Get-EsxImageProfile
   Name                           Vendor         Last Modified    Acceptance Level
   ----                           ------         -------------    ----------------
   ESXi-6.0.0-2494585-standard    VMware, Inc.   2/6/20156:...    PartnerSupported
   ESXi-6.0.0-2494585-no-tools    VMware, Inc.   2/6/20156:...    PartnerSupported
   ```

   As shown in this example, two ESXi image profiles are available by default. To make the remastered ISO, you will clone the `ESXi-6.0.0-2494585-standard` profile.

8. **Create an image profile to make the `Custom-ESX-6.0.0` ISO.**

   ```
   PowerCLI C:\images\New PowerCLI> New-EsxImageProfile -CloneProfile ESXi-6.0.0-2494585-
   standard -Name "Custom-ESX-6.0.0" -Vendor VMware
   ```

   In this example, a new ESXi image profile named `ESX-6.0.0` is created by cloning the default ESXi image profile.

9. **Verify that the custom ESXi image profile is present.**

   ```
   PowerCLI C:\images\New PowerCLI > Get-EsxImageProfile
   Name                           Vendor         Last Modified    Acceptance Level
   ----                           ------
   Custom-ESX-6.0.0               VMware         2/6/20156:...    PartnerSupported
   ESXi-6.0.0-2494585-standard    VMware, Inc.   2/6/20156:...    PartnerSupported
   ESXi-6.0.0-2494585-no-tools    VMware, Inc.   2/6/20156:...    PartnerSupported
   ```

When the custom image profile is present, you can add and remove necessary packages to make a custom ISO.

10. **Remove the `net-mlx4-en`, `net-mlx4-core`, `nmlx4-en`, and `nmlx4-core` packages from the depot so that they are not included in the remastered ISO.**

```
PowerCLI C:\images\New PowerCLI> Remove-EsxSoftwarePackage -ImageProfile Custom-ESX-
6.0.0
-SoftwarePackage net-mlx4-en
PowerCLI C:\images\New PowerCLI> Remove-EsxSoftwarePackage -ImageProfile Custom-ESX-
6.0.0
-SoftwarePackage net-mlx4-core
PowerCLI C:\images\New PowerCLI> Remove-EsxSoftwarePackage -ImageProfile Custom-ESX-
6.0.0
-SoftwarePackage nmlx4-en
PowerCLI C:\images\New PowerCLI> Remove-EsxSoftwarePackage -ImageProfile Custom-ESX-
6.0.0
-SoftwarePackage nmlx4-core
```

11. **Add packages in the order shown.**

```
PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-ESX-6.0.0 -
SoftwarePackage net-ib-core
PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-ESX-6.0.0 -
SoftwarePackage net-mlx4-core
PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-ESX-6.0.0 -
SoftwarePackage net-ib-mad
PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-ESX-6.0.0 -
SoftwarePackage net-ib-sa
PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-ESX-6.0.0 -
SoftwarePackage net-ib-ipoib
PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-ESX-6.0.0 -
SoftwarePackage net-mlx4-ib
PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-ESX-6.0.0 -
SoftwarePackage net-ib-cm
PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-ESX-6.0.0 -
SoftwarePackage net-xscore
PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-ESX-6.0.0 -
SoftwarePackage net-xsvnic
PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-ESX-6.0.0 -
SoftwarePackage net-xve
PowerCLI C:\images\New PowerCLI> Add-EsxSoftwarePackage -ImageProfile Custom-ESX-6.0.0 -
SoftwarePackage scsi-xsvhba
```

12. **Export the modified image profile to the remastered ISO.**

```
PowerCLI C:\images\New PowerCLI> Export-EsxImageProfile -ImageProfile Custom-ESX-6.0.0 -
FilePath C:\Users\Administrator\Desktop\ESX6.0Drivers\Custom-6.0-OVN.iso –ExportToIso
```

13. **(Optional) Export the modified image to the remastered bundle.**

This step is required if your deployments use a bundle for installation.

```
PowerCLI C:\images\New PowerCLI> Export-EsxImageProfile -ImageProfile Custom-ESX-6.0.0
-FilePath C:\Users\Administrator\Desktop\ESX6.0Drivers\Custom-ESX-6.0.0-OVN.zip –
ExportToBundle
```

14. **Reboot the server using the remastered ISO.**

Configuring Host Drivers for PXE Boot

These topics explain how to configure an ESXi 5.x server or an ESXi 6.0 server for PXE boot.

Related Information

- "Identifying the Boot Method" on page 10
- "Configuring Host Drivers for Local Boot" on page 21
- "Configuring Host Drivers for iSCSI Boot" on page 37
- "Configuring Host Drivers for SAN Boot" on page 41

▼ Create a PXE Boot Server Profile

1. **Create the PXE boot server profile.**
   The PXE boot server profile must have only one VNIC that is connected to the PXE server where the ESXi 5.x boot image will reside.

2. **Create the server profile.**
   For example, to create the server profile `esx55i` for the PXE boot server `gorgon`, which is connected through IB port 23 on the Oracle Fabric Interconnect `tuffy`:

   ```
   add server profile esx55i gorgon@tuffy:ServerPort23
   ```

3. **Create the VNIC for the PXE boot server profile.**

   ```
   add vnic vnic1.esx55i 2/1
   ```

   A VNIC named `vnic1` in the server profile `esx55i` is created and the VNIC is terminated on Gigabit Ethernet port 1 in slot 2.

4. **Create a VHBA for the PXE boot server profile.**

   ```
   add vhba vhba1.esx55i 8/1
   ```

A VHBA named `vhba1` is created in the server profile `esx55i` and the VHBA is terminated on Fibre Channel port 1 in slot 8.

5. **Set the VNIC for PXE booting.**

```
set vhba vhba.esx55i -boot-capable=true
```

6. **If the server has an OS, verify that the server profile is configured correctly and in the `up/up` state.**

```
show server-profile esx41i
name     state    descr    connection               def-gw     vnics     vhbas
-------------------------------------------------------------------------------
esx41i   up/up            gorgon@tuffy:ServerPort23             1         1
1 record displayed
```

If the server has no OS installed, the server profile state is `up/unassigned`, and not `up/up`.

7. **Edit the PXE configuration file on the PXE boot server.**

▼ Edit the PXE Configuration File

On your network's PXE server, you move the modified ISO on to the PXE server, and edit the PXE server's configuration file to add the ESXi 5.x or ESXi 6.0 bulletins provided with the host drivers.

1. **Move the remastered ISO over to the PXE server.**

```
/export/tftpboot/pxe
```

2. **Using a text editor, add the following lines to the PXE server's PXE configuration file:**

```
label esx6.0
      kernel memdisk_linux
      append iso initrd = <relative path to the remastered ISO>
```

3. **Save the changes and quit the editor.**

▼ Load the Image on to the Server

You can load the ISO image on to the ESXi 5.x or an ESXi 6.0 server after creating the PXE boot VNIC in the PXE boot server profile, modifying the ISO image, and when the PXE server's configuration file points to the correct files to use for PXE booting.

Note - This procedure assumes the installation of the PXE boot image through a lights out management solution.

Note - This procedure mentions ESXi 5.x only. The procedure for ESXi 6.0 is similar to this procedure.

1. **From the ESXi 5.x server, enter the PXE menu and boot from it.**

   The ESXi 5.x begins loading all pertinent OS files, and then the server boots to the ESXi 5.x native operating system.

2. **Accept or decline the license agreement.**

   Follow the installer until you are prompted to specify a boot device on the Select a Disk dialog box.

3. **On the Select a Disk dialog box, select the hard disk on the local server.**

4. **Press Enter to continue the installer until you see the Confirm Install dialog box.**

   The server's hard disk must be dedicated to the modified ISO. If your server’s hard disk already contains data, a dialog box is displayed warning that data will be overwritten.

   You can overwrite the existing data or abort the current installation to store the data on a different device, and then resume the installation.

5. **When the correct boot disk is confirmed, the installation runs to completion.**

   The Installation Complete dialog box is displayed.

6. **Remove any installation medium (CD-ROM or DVD) in the ESXi 5.x server and allow the server to reboot.**

   When the server reboots, it progresses through the boot devices until it locates the PXE server’s boot device from which it retrieves the boot image.

Configuring Host Drivers for iSCSI Boot

These topics describe how to configure an ESXi 5.x server or an ESXi 6.0 server for iSCSI boot.

- Use the remastered ISO and install it in the network drive.

  See “Remastering ESXi ISO” on page 25
- “Create a Server Profile” on page 37
- “Set the ESXi Host HCA First in the Boot Order” on page 39
- “Load the Image on to the ESXi Host” on page 39

Related Information

- “Identifying the Boot Method” on page 10
- “Remastering ESXi ISO” on page 25
- “Configuring Host Drivers for Local Boot” on page 21
- “Configuring Host Drivers for PXE Boot” on page 33
- “Configuring Host Drivers for SAN Boot” on page 41

▼ Create a Server Profile

Note - For optimal performance, configure only one boot method within the server profile.

1. **On the Oracle Fabric Interconnect, initiate server profile creation.**

   `add server profile` *profile-name host-to-receive-profile@Oracle-Fabric-Interconnect-name*`:ServerPort`*port*

   where:

profile-name	Name of the server profile
host-to-receive-profile	Name of the ESXi host that boots remotely

Oracle-Fabric-Interconnect-name	Name of the Oracle Fabric Interconnect that manages traffic to the ESXi host
port	Port of the Oracle Fabric Interconnect attached to the ESXi host

2. **Add the virtual device for booting to the server profile.**

   Add a VNIC for iSCSI boot:

   add vnic *VNIC-name.profile-name slot/port* **-boot-capable=true**

   where:

VNIC-name	Name of the VNIC for booting
profile-name	Name of the server profile
slot	Number of the slot (I/O module) of the Oracle Fabric Interconnect where the virtual device is terminated
port	Number of the port for the I/O module in the *slot*

3. **Set the server profile for booting and connect to the target where the boot image resides.**

   For iSCI boot by VNIC:

   set server-profile *profile-name* **iscsi-boot** *VNIC-name* **-target-iqn=***IQN-descriptor* **-lun=***LUN-ID*

   where:

profile-name	Name of the server profile
VNIC-name	Name of the VNIC for booting
IQN-descriptor	IQN string provided by the iSCSI hardware vendor
LUN-ID	Number identifying the particular LUN

4. **Verify that the server profile is up and connected.**

```
show server-profile profile-name iscsi-boot
server     role        vNIC     mnt-type    lvm-grp     lvm-vol     dev     mnt-opts
 disks
-------------------------------------------------------------------------------------------------------------
esx55i     loadmount   vnic1    static       iqn.1992-08.com.netapp:sn.118047284
      (203/LM)
```

where *profile-name* is the name of the server profile.

Note - Record the size of the LUN on which the boot image resides. When the host drivers are loaded on to the ESXi host, you are prompted to select the correct LUN. Knowing the LUN's size helps identify the LUN in the list of connected storage targets.

▼ Set the ESXi Host HCA First in the Boot Order

1. **Enter the ESXi host's BIOS.**
2. **Select the option ROM in the boot devices list.**
3. **Move the option ROM higher than all other devices in the boot order.**
4. **Save and exit the ESXi host's BIOS.**

   Setting the server to boot through the HCA option ROM populates the iSCSI boot firmware table with the disks on which to install the boot image.

▼ Load the Image on to the ESXi Host

1. **Locate and mount the** *modified-operating-system-filename*`.iso` **or** `XG-`*operating-system-filename*`.iso` **file.**

   The OS files are loaded and the ESXi host boots from those files into the installer.
2. **Accept or decline the license agreement.**
3. **On the Select a Disk (to Install or Upgrade) dialog box, select the LUN connected to the VNIC you created in "Create a Server Profile" on page 37.**

   Note - You can display details about a LUN by pressing F1.

   ---
4. **Press Enter to continue the installer until you see the Confirm Install dialog box.**

   The LUN must be dedicated to the modified ISO installation. If your LUN already contains data, a dialog box is displayed with a warning that data will be overwritten.
5. **Choose any of the following options:**

   - Abort the current installation.
   - Overwrite the existing data.
   - Store the data on a different LUN or device.

6. **If the LUN already has an OS installed, perform these additional steps.**

   a. **On the Virtual machine file system (VMFS) format dialog box, select the option as needed for your installation:**

      - Upgrade ESXi, preserve VMFS datastore.
      - Install ESXi, preserve VMFS datastore.
      - Install ESXi, overwrite VMFS datastore.

        This is required for a fresh install.

      Note - Additional dialog boxes for the keyboard type and language are displayed. Make sure to select the correct option for your version of ESXi installation.

   b. **When prompted, log in to the host of your version of ESXi.**

      The Confirm Installation dialog box is displayed.

   c. **Press F11 to confirm that you want to continue the installation.**

      The installation runs to completion, and then the Installation Complete dialog box is displayed.

Configuring Host Drivers for SAN Boot

These topics describe how to configure an ESXi 5.x server or an ESXi 6.0 server for SAN boot.

- Use the remastered ISO and install it on the network drive.
  See “Remastering ESXi ISO” on page 25.
- “Create a Server Profile” on page 41
- “Set the ESXi Host HCA First in the Boot Order” on page 43
- “Load the Image on to the ESXi Host” on page 43

Related Information

- “Identifying the Boot Method” on page 10
- “Remastering ESXi ISO” on page 25
- “Configuring Host Drivers for Local Boot” on page 21
- “Configuring Host Drivers for PXE Boot” on page 33
- “Configuring Host Drivers for iSCSI Boot” on page 37

▼ Create a Server Profile

Note - For optimal performance, configure only one boot method within the server profile.

1. **On the Oracle Fabric Interconnect, initiate server profile creation.**

   `add server profile` *profile-name host-to-receive-profile@Oracle-Fabric-Interconnect-name*`:ServerPort`*port*

   where:

profile-name	Name of the server profile
host-to-receive-profile	Host name of the ESXi host that boots remotely

Oracle-Fabric-Interconnect-name	Name of the Oracle Fabric Interconnect that manages traffic to the ESXi host
port	Port of the Oracle Fabric Interconnect attached to the ESXi host

2. **Add the virtual device for booting to the server profile.**

   Add a VHBA for SAN boot:

   add VHBA *VHBA-name.profile-name slot/port* **-boot-capable=true**

   where:

VHBA-name	Name of the VHBA for booting
profile-name	Name of the server profile
slot	Number of the slot (I/O module) of the Oracle Fabric Interconnect where the virtual device is terminated
port	Number of the port of the I/O module in the *slot*

3. **Set the server profile for booting and connect to the target where the boot image resides.**

   For SAN boot by VHBA:

   set server-profile *profile-name* **san-boot** *VHBA-name WWN* **-lun=***LUN-ID*

   where:

profile-name	Name of the server profile
VHBA-name	Name of the VHBA for booting
WWN	World Wide Name identifier of the fibre channel device
LUN-ID	Number identifying the particular LUN

4. **Verify that the server profile is up and connected.**

   ```
   show server-profile profile-name san-boot
   server     role        VHBA     mnt-type    lvm-grp     lvm-vol     dev     mnt-opts
    disks
   ----------------------------------------------------------------------------------------------------------------
   esx55i     loadmount   vhba1    static       22:00:00:50:CC:20:0E:6E
        (203/LM)
   ```

   where *profile-name* is the name of the server profile.

Note - Record the size of the LUN on which the boot image resides. When the host drivers are loaded on to the ESXi host, you are prompted to select the correct LUN. Knowing the LUN's size helps identify the LUN in the list of connected storage targets.

▼ Set the ESXi Host HCA First in the Boot Order

1. **Enter the ESXi host's BIOS.**
2. **Select the option ROM in the boot devices list.**
3. **Move the option ROM higher than all other devices in the boot order.**
4. **Save and exit the ESXi host's BIOS.**

▼ Load the Image on to the ESXi Host

1. **Locate and mount the** *modified-operating-system-filename*`.iso` **or** `XG-`*operating-system-filename*`.iso` **file.**
   The OS files are loaded and the ESXi host boots from those files into the installer.
2. **Accept (or decline) the license agreement.**
3. **On the Select a Disk (to Install or Upgrade) dialog box, select the LUN connected to the VHBA you created in "Create a Server Profile" on page 41.**

   Note - You can display details about a LUN by pressing F1.

4. **Press Enter to continue the installer until you see the Confirm Install dialog box.**
   The LUN must be dedicated to the modified ISO installation. If your LUN already contains data, a dialog box is displayed to warn that data will be overwritten.
5. **Choose any of the following options:**
   - Abort the current installation.
   - Overwrite the existing data.
   - Store the data on a different LUN or device.
6. **If the LUN already has an OS installed, perform these additional steps.**
   a. **On the Virtual Machine File System (VMFS) Format dialog box, select the option as needed for your installation:**

- Upgrade ESXi, preserve VMFS datastore.
- Install ESXi, preserve VMFS datastore.
- Install ESXi, overwrite VMFS datastore.

  This is required for a fresh install.

Note - Additional dialog boxes for the keyboard type and language are displayed. Make sure to select the correct option for your version of ESXi installation.

---

b. When prompted, log in to the host of your version of ESXi.

The Confirm Installation dialog box is displayed.

c. Press F11 to confirm that you want to continue the installation.

The installation completes and the Installation Complete dialog box is displayed.

Glossary

BIOS	Basic input/output system.
DHCP	Dynamic Host Configuration Protocol.
ESXi	Elastic Sky X integrated.
HCA	Host channel adapter.
`initramfs`	Initial RAM file system.
`initrd`	Initial RAM disk.
IQN	iSCSI qualified name.
iSCSI	Internet small computer system interface.
LID	Local identifier. It is used by the subnet manager to identify devices. LIDs are unique with the subnet domain.
LUN	Logical unit number.
Option ROM	Option ROM contains a small footprint of the Oracle Virtual Networking drivers that is needed to bring up the vNICs and vHBAs at remote boot time.
Oracle Fabric Interconnect	The Oracle Virtual Networking directors that connect the InfiniBand to the hosts and virtualize their I/O.
PowerCLI	It is a command-line tool that helps automate all aspects of vSphere management.
PowerShell	It is a task automation and configuration management framework.
Server profile	Server profile is a virtual container that binds to a host. It contains virtual NICs and virtual HBAs.
TFTP	Trivial File Transfer Protocol.
USB	Universal serial bus.
VHBA	Virtual host bus adapter.

VIB vSphere installation bundle.

VMFS Virtual machine file system.

VNIC Virtual network interface controller.

XgOS XgOS is the operating system that works on the Oracle Fabric Interconnect.

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