

VMware vSphere ESXi 6.5.x on Dell EMC PowerEdge Systems

Installation Instructions and Important Information Guide

Notes, cautions, and warnings

 **NOTE:** A NOTE indicates important information that helps you make better use of your product.

 **CAUTION:** A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

 **WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.

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Introduction

This document helps you to deploy VMware ESXi 6.5.x on Dell EMC PowerEdge servers, and provides specific information about recommended configurations, best practices, and additional resources.

- ① **NOTE:** Before deploying the system, Dell EMC recommends that you see the *VMware vSphere 6.5.x on Dell EMC PowerEdge Servers Release Notes* at Dell.com/virtualizationsolutions.
- ① **NOTE:** vSphere Essentials Plus is an all-inclusive package that includes licenses for three physical systems, each system with up to two processors. It also includes VMware vCenter Server to centrally manage the systems. vSphere Essentials Plus edition is supported only on two-socket systems. More licenses must still be deployed on approved systems for Dell EMC support.
- ① **NOTE:** With the release of vSphere 6.7, all Partner Activation Codes that are shipped with current systems are for vSphere 6.7 licensing. If you have an active vSphere subscription, you can downgrade or upgrade vSphere, as you choose. To get your downgrade keys, register your Partner Activation Code and login to vmware.com/accounts. Go to Manage Product Licenses > vSphere 6.7 on the license administration portal.
- ① **NOTE:** VMware vSAN is licensed independently per socket, per server. To use VMware vSAN, the server requires a vSphere license (per socket, per server) and a vCenter Server license.

Topics:

- [vSphere 6.5.x architecture](#)
- [Overview of ESXi architecture](#)

vSphere 6.5.x architecture

vSphere infrastructure consists of the following components:

ESXi	Allows multiple operating systems to run simultaneously on a single system.
vCenter server	Monitors and manages the management application of VMs and copies of ESXi. With a vCenter server, you can create, start, stop, and migrate VMs across the entire physical data center. vCenter server is optional, but it is required for advanced management capabilities such as VMware vMotion, Distributed Resource Scheduling (DRS), and High Availability (HA).
vCenter server database	Stores all the configuration data about a VMware infrastructure environment. Dell EMC recommends that you use a production database such as Microsoft SQL Server or Oracle for the vCenter Server database.
vSphere Web Client	Shares the functionality of the core administrative interface starting from ESXi 5.1, with the vSphere client. vSphere client can be launched from Internet Explorer or Mozilla Firefox, without requiring a specific client installation.
VMware Host Client	The embedded VMware Host Client is an HTML5-based client that has a similar interface to the vSphere Web Client but is only used to manage single ESXi hosts. You use the VMware Host Client to conduct emergency management when vCenter Server is temporarily unavailable.
Virtual Machine datastore	Stores VM configuration and virtual disk files. The VM storage can either be internal local storage to the ESXi or external storage. Multiple ESXi systems share the VM storage. Advanced features such as HA and DRS require that the hard disk drive and configuration files are stored on the external shared storage.

The following figure shows the different components of vSphere.

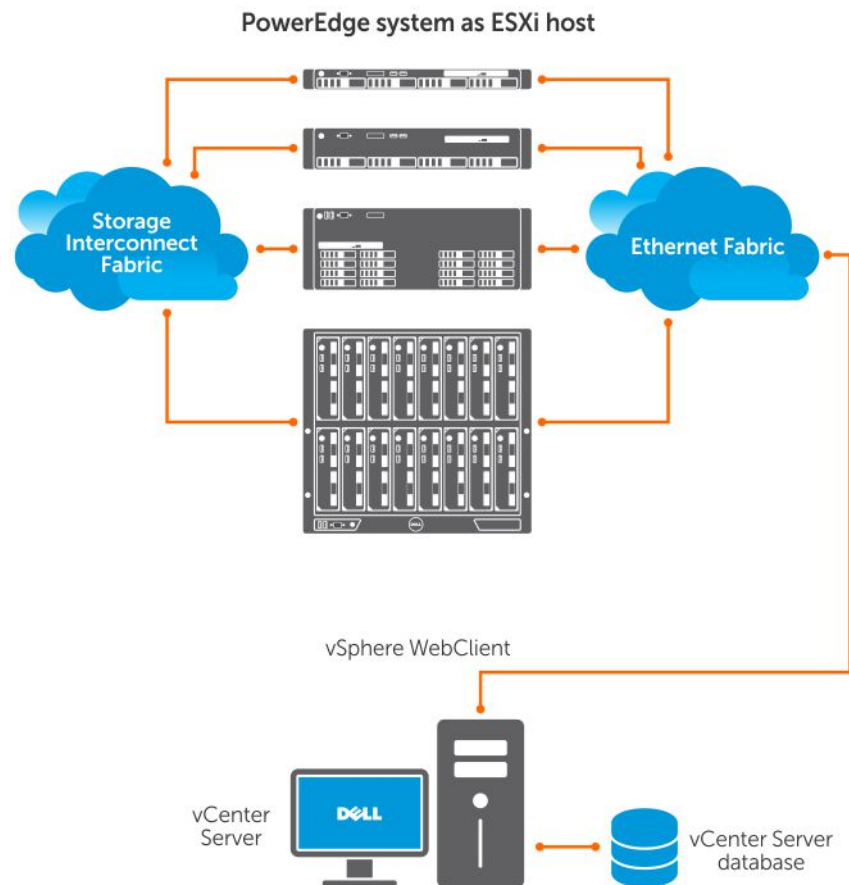


Figure 1. vSphere components

Overview of ESXi architecture

ESXi is a bare-metal enterprise class hypervisor that can be preinstalled on the PowerEdge servers. With the reduced footprint of the hypervisor, ESXi is integrated with PowerEdge servers by using embedded Secure Digital (SD) card.

Integrated virtualization by VMware offers the following features:

- Ease of deployment
- Integrated hardware monitoring
- Enhanced security
- Reduced patch management
- Improved reliability

The following figure shows an overview of the ESXi architecture.

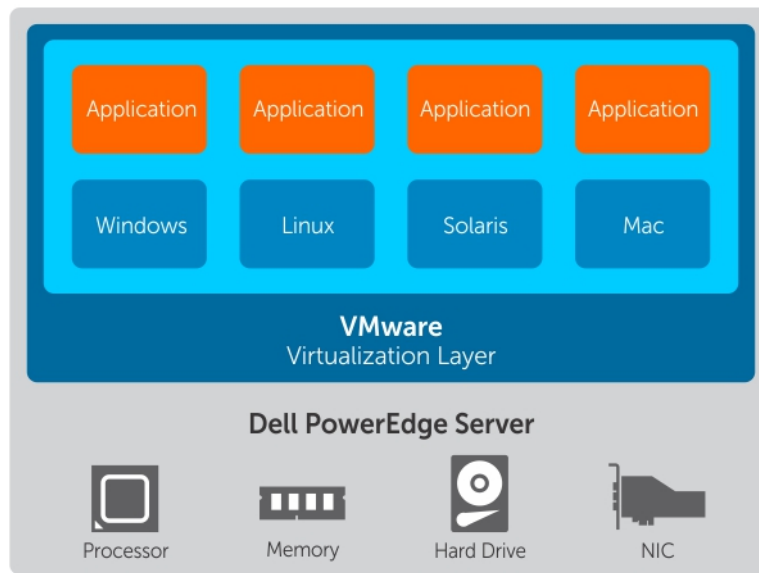


Figure 2. ESXi architecture

Installing vSphere 6.5.x

NOTE: If you have ordered VMware ESXi with the PowerEdge server, then the VMware ESXi is preinstalled on your system.

Topics:

- Download Dell EMC customized ESXi image
- Installing, enabling and disabling ESXi
- VMware ESXi Secure boot support for Dell EMC PowerEdge Servers
- Downloading patches and updates for ESXi
- Creating vCenter Server installation media
- Installing vCenter Server

Download Dell EMC customized ESXi image

You can download the Dell EMC customized ESXi images from the Dell support site or from the VMware site.

NOTE: For information on Dell EMC's customization of VMware ESXi images and its advantages, see [Dell's Customization of VMware ESXi and Its Advantages](#).

Download Dell EMC customized ESXi image from Dell EMC support site

NOTE: Ensure that you clear the web browser cache before downloading the drivers and firmware.

- 1 Go to Dell.com/support/drivers.
- 2 In the **Drivers & Downloads** section, enter the Service Tag of your system in the **Enter a Dell Service Tag, Dell EMC Product ID, or Model** box, and then click the right arrow button.

NOTE: If you do not have the Service Tag, select **Detect PC** to allow the system to automatically detect your Service Tag, or click **Browse all products**, and then navigate to your product.

- 3 Click **Drivers & Downloads**.
The drivers that are applicable to your system are displayed.
- 4 In the **Operating System** list, select the appropriate VMware version.
- 5 In the **Category** list, select **Enterprise Solutions**.
The latest Dell EMC VMware ESXi customized images are displayed.
- 6 Click **Download**.

Download Dell EMC customized ESXi image from VMware site

NOTE: Ensure that you clear the web browser cache before downloading the drivers and firmware.

① **NOTE:** You should be registered with my.vmware.com to be able to download drivers and firmware.

- 1 Go to my.vmware.com and login with your account credentials.
- 2 Select **View & Download products > All Products** and then click the **View Download Components** link of **VMware vSphere**.
- 3 Select the image version from the **Select Version** list.
- 4 Click **Custom ISOs**.
- 5 Expand the **OEM Customized Installer CDs** option and then click **Go to Downloads** for the image that you want to download.

Important information for the Dell EMC-customized ESXi image

- The Dell EMC-customized ESXi installer ISO image content does not include OpenManage Server Administrator (OMSA) and iDRAC Service Module (iSM).

For detailed instructions to install and use OpenManage Server Administrator, see the documentation at www.dell.com/openmanagemanuals.

For detailed instructions to install and use iDRAC Service Module, see the documentation at www.dell.com/esmmanuals.

- The files that Dell EMC creates or modifies as part of customization are:

- `etc/vmware/oem.xml`
- `etc/vmware/support`
-

① **NOTE:** The list of files that are appended, modified, or customized by Dell EMC may change during a later release.

① **NOTE:** Dell EMC-customized ESXi image may contain additional or VMware-I/O Vendor Program (IOVP) certified updated drivers. For more information, see Important Information section of Dell EMC customized ESXi image at Dell.com/virtualizationsolutions.

- If required, Dell EMC may update the customized ISO for a critical patch impacting Dell EMC to include VMware patches or bug fixes for Dell EMC hardware.
- OpenManage vSphere Installation Bundle (VIB) can be installed on ESXi systems, where ESXi is installed using either the Dell EMC Customized ESXi image or the ESXi image that is provided by VMware.

Installing, enabling and disabling ESXi

⚠ **WARNING:** Only trained service technicians must perform any installation that requires removal of the system cover. See the safety document that is shipped with your system for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.

① **NOTE:** For important regulatory information, see Dell.com/regulatory_compliance.

① **NOTE:** If you have not ordered ESXi with your system, you can order the Internal Dual SD Module kit at Dell.com/support/home and download the ESXi Installation media from Dell.com/support/drivers. For information about creating your ESXi media, see the Downloading the ESXi installer media section in this document.

① **NOTE:** If you have ordered the ESXi separately and your PowerEdge server is not preinstalled with the software, to complete the installation procedure, see the Installing ESXi on Flash Media section in this document.

Overview of Dell NUMA Fault Resilient Memory

NUMA FRM is a new memory operating mode available on the BIOS settings of high-end 13th generation of the Dell EMC PowerEdge servers with two or four processors. This mode establishes an area of memory that is fault-resilient on all processors, providing the same

protection to the hypervisor against uncorrectable memory errors that would affect it, and maintaining NUMA memory functionality and performance.

Enabling Dell NUMA Fault Resilient Memory

The following conditions must be fulfilled before you enable NUMA Fault Resilient Memory (FRM):

- ESXi 6.5.x must be deployed on one the following PowerEdge servers:
 - MX740c
 - MX840c
 - R930
 - R830
 - R730xd
 - R730
 - R630
 - T630
 - M830
 - M630
 - FC830
 - FC630
- The BIOS version on your system must be 1.2.1 or later for 13th generation of Dell PowerEdge servers that supports VMware ESXi 6.5.x.
- The memory modules must be populated on the memory channels to support **Mirror Mode**. For more information, see your system Owner's Manual at www.dell.com/poweredgemanuals.
- You need vSphere Enterprise or Enterprise Plus licensing to enable the VMware Reliable Memory technology.

To enable FRM on your system, complete the following procedure:


- 1 Turn on your system.
The Dell EMC logo is displayed.
- 2 Press F2 to open the **System Setup** menu.
After the system boot is completed, the **System BIOS configuration** menu is displayed.
- 3 Using the up- and down-arrow keys, select the **System Setup** options, and then select **Memory Settings**.
- 4 Select **NUMA Fault Resilient Mode** as **Memory Operating Mode**.

 **CAUTION:** Dell EMC recommends that you do not modify other settings unless you are familiar with the settings. Modifying settings could cause your system to fail to boot or function properly.

- 5 Press **Enter** and follow the on-screen procedure to save these changes.
- 6 Restart your system.

 **NOTE:** No further configuration changes are required for ESXi to use the reliable memory region.

Overview of Dell Fault Resilient Memory

 **CAUTION:** Do not attempt to enable Fault Resilient Memory (FRM) on vSphere versions earlier than VMware ESXi 5.5. Up to 25 percent of system memory may be consumed to provide the FRM zone in 12th generation of the PowerEdge servers and 12.5 percent of system memory may be consumed to provide FRM zone in 13th Generation of the Dell PowerEdge servers.

FRM is a Memory Operating mode available on the BIOS settings of high-end 12th generation Dell PowerEdge servers and later. This mode establishes an area of memory that is fault resilient and protects the hypervisor against uncorrectable memory errors, and safeguards the system from becoming unresponsive. Systems with ESXi that supports the FRM feature can load the operating system kernel to maximize

system availability and or critical applications or services. VMware ESXi version 5.5 update 2 and later supports FRM through its Reliable Memory (ReM) technology.

Enabling Dell Fault Resilient Memory

The following conditions must be fulfilled before you enable base FRM:

- ESXi 6.5.x must be deployed on one of the following PowerEdge servers:

Table 1. PowerEdge Servers

14 th generation PowerEdge Servers	13 th generation PowerEdge Servers
R940xa	R930
R940	R830
R840	R730xd
R740xd	R730
R740	R630
R640	M830
M640	M630
FC640	FC830
T640	FC630
MX740c	T630
MX840c	

- The BIOS version on your system must be 1.0.4 or later for 13th generation of the Dell EMC PowerEdge servers.
- The memory modules must be populated on the memory channels to support Mirror Mode. For more information, see your system Owner's Manual at www.dell.com/poweredgemanuals.
- You need vSphere Enterprise or Enterprise Plus licensing to enable the VMware Reliable Memory technology.

To enable FRM on your system, complete the following procedure:

- Turn on your system.
The Dell EMC logo is displayed.
- Press F2 to display the **Setup** menu.
After the system boot is completed, the **System BIOS configuration** menu is displayed.
- Using the up-arrow and down-arrow keys, select the **System Setup** options, and then select the **Memory Settings** screen.
- Select **Dell Fault Resilient Mode** as **Memory Operating Mode**.

 **CAUTION:** Dell EMC recommends that you do not modify other settings unless you are familiar with the settings. Modifying settings could cause your system to fail to boot or function properly.

- Press Enter, and follow the on-screen instructions to save these changes.
- Restart your system.

 **NOTE:** No further configuration changes are required for ESXi to use the reliable memory region.

Installing ESXi on flash media

After installing the SD card in your system, locate the ESXi installer media that you had created in [Download Dell EMC customized ESXi image](#).

To install ESXi on the flash media, complete the following steps:

- ① **NOTE:** For more information about supported configurations of the PowerEdge servers with the SD memory card, see the *VMware vSphere 6.5.x on Dell EMC PowerEdge Servers Compatibility Matrix* at Dell.com/virtualizationsolutions.
- ① **NOTE:** For instructions to install the SD memory card on the system board for supported PowerEdge servers, see the system-specific Owner's Manual or Information Update at www.dell.com/poweredgemanuals.

1 Turn on the system.

- ① **NOTE:** Before installing ESXi, enable the flash storage device. For more information, see [Enabling or disabling internal SD card](#).

2 Insert the ESXi installer media into the optical drive.

3 Restart the system.

4 When the Dell EMC logo is displayed, press F11 immediately.

5 At the **Boot Menu**, use the up- and down-arrow keys to select the optical drive and press Enter.

The installer environment starts. When the installer image loads, the system is ready to begin the flash storage imaging process.

- △ **CAUTION:** Step 6 deletes all data on SD storage device.

6 On the **Select a Disk** page, select the SD storage device on which you want to install ESXi and press Enter.

7 Enter the root password and press F11 to start the installation.

8 When the installation process is complete, press Enter to restart the system.

9 When the Dell EMC logo is displayed, press F11 immediately.

10 At the **Boot Menu**, use the up- and down-arrow keys to select the SD storage device, and then press Enter.

The system boots and starts ESXi.

11 To enable recurring boot, see [Configuring boot sequence to ESXi](#).

12 Set the correct licensing mode.

For more information, see [Licensing information](#).

Installing ESXi on the hard drive

To install ESXi on the hard drive, complete the following procedure:

1 Turn on the system.

2 Insert the ESXi installer media that you created earlier into the optical drive.

For more information, see [Download Dell EMC customized ESXi image](#).

3 When the Dell EMC logo is displayed, press F11 immediately.

4 At the **Boot Menu**, use the up- and down-arrow keys to select the optical drive and press Enter.

When the installer image loads, the system is ready to begin the installation process.

- △ **CAUTION:** Step 5 deletes all data on the selected hard disk drive.

5 On the **Select a Disk** page, select the hard drive on which you want to install ESXi and press Enter.

6 Enter the root password and press Enter to reboot the system.

7 When the installation process is complete, press Enter to reboot the system.

The system restarts and starts ESXi.

8 Set the correct licensing mode.

For more information, see [Licensing information](#).

Installing ESXi on the BOSS-S1 device

To install ESXi on the BOSS-S1 device, complete the following procedure:

- 1 Turn on the system.
- 2 Insert the ESXi installer media that you created earlier into the optical drive.
For more information, see [Download Dell EMC customized ESXi image](#).
- 3 When the Dell EMC logo is displayed, press F11 immediately.
- 4 At the **Boot Menu**, use the up- and down-arrow keys to select the optical drive and press Enter.
When the installer image loads, the system is ready to begin the installation process.

 **CAUTION: Step 5 deletes all data on the selected BOSS-S1 device.**

- 5 On the **Select a Disk** page, select the BOSS-S1 device on which you want to install ESXi and press Enter.
- 6 Enter the root password and press Enter to reboot the system.
- 7 When the installation process is complete, press Enter to reboot the system.
The system restarts and starts ESXi.
- 8 Set the correct licensing mode.
For more information, see [Licensing information](#).

Creating a virtual disk with the BOSS-S1 device

- 1 Turn on the system.
- 2 Press F2 to enter System Setup, and then select **Device Settings > BOSS-S1 Configuration Utility**.
- 3 Select the **Create RAID configuration** option.
- 4 Select the two M.2 SATA physical disks displayed, and then click **Next** to proceed to next page.
- 5 Choose the appropriate options as required, and type the name for the virtual disk.
- 6 Select **Yes** for **Would you like to create virtual disk option?** and then click **Next** to proceed to next page.
Virtual disk is created successfully and you can verify the virtual disk information at the **BOSS-S1 configuration Utility > Physical/Virtual Disk information**. The created virtual disk is displayed in the **Virtual Disk Info**.

Enabling or disabling internal SD card

To install the ESXi on an internal flash storage device:

- 1 Turn on the system.
- 2 When the Dell EMC logo is displayed, press F2 immediately to open the **System Setup** page.

 **NOTE: If you press a key on the keyboard for extended time, it may result in a keyboard failure. To avoid possible keyboard failure, press, and release F2 at even intervals until the System Setup page is displayed.**

If the Operating System logo is displayed instead of the **System Setup** page, wait until the operating system finishes loading. Turn off the system, and try again.

- 3 Use the up- and down-arrow keys to select **Integrated Devices**, and then press Enter.
- 4 To enable the Internal SD card:
 - a Set **Internal SD card Port** to **On**.
 - b Set **Internal SD card Redundancy** to **Mirror**.
 - c Set **Internal SD Primary Card** as **SD Card 1**.

To disable the Internal SD card:

- a Set **Internal SD card Port** to **Off**.

 **CAUTION:** Booting into an operating system other than ESXi, without disabling the internal SD card results in data loss.

- 5 Press Esc.
- 6 Select **Save Changes and Exit**.
- 7 Press Enter to exit the **System Setup** screen.
- 8 Reboot the system.
- 9 To complete the process, perform the procedure in the [Configuring one-time boot to the ESXi](#) section or the [Configuring boot sequence to the ESXi](#) section.

Configuring one-time boot to ESXi

- 1 Turn on your system.
The Dell EMC logo is displayed.
- 2 Press F11 to enter the one-time boot menu option.
The menu entry changes to **Entering Boot Menu**, confirming your selection.
- 3 The boot menu displays several boot options. Select **Hard Drive C:** by using the up- and down-arrow keys.
- 4 Select **SD Card** by using the right-arrow key.
- 5 Press Enter to boot to the internal secure digital (SD) card.

Configuring boot sequence to ESXi

To boot your system to ESXi, complete the following procedure:

 **NOTE:** Once the internal flash device port is enabled, your system continues to boot to ESXi.

- 1 Turn on your system.
The Dell EMC logo is displayed.
- 2 Press F2 to open the **System Setup** page.
After you complete the system boot, the **System BIOS** configuration menu is displayed.
- 3 Select **Hard-Disk Boot Sequence** by using the up- and down-arrow keys, and then select the relevant boot device.
- 4 Press the hyphen key (-) to move up the relevant boot device in the order.

 **CAUTION:** Dell EMC recommends that you do not modify other settings unless you are familiar with the settings. Modifying settings could cause your system to fail to boot or function properly.

- 5 Press Enter, and then follow the on-screen procedure to save these changes.
- 6 Restart your system.

VMware ESXi Secure boot support for Dell EMC PowerEdge Servers

VMware supports UEFI Secure boot on versions ESXi 6.5 or later. UEFI Secure boot in general verifies the integrity of every package loaded as part of the operating system (OS) bootup. Secure boot verifies the integrity of the vSphere Installation Bundle (VIB) packages loaded from the boot device.

ESXi Secure boot workflow

The `mbboot` boot loader in ESXi contains a VMware public key and is validated against the Certificate Authority (CA) present in the platform BIOS UEFI Secure boot authorized Database (DB) during ESXi boot. The boot loader uses this key to verify the signature of the kernel and a small subset of systems that includes a Secure boot VIB verifier—a VIB package that is used for validating the signature of the drivers and other VIB packages loaded from the boot device. If any of the VIB installed on ESXi does not match with the signature of the public key contained in the bootloader, then ESXi boot ends up with the Purple Screen Of Death (PSOD) mentioning a signature mismatch for the specific failing VIBs.

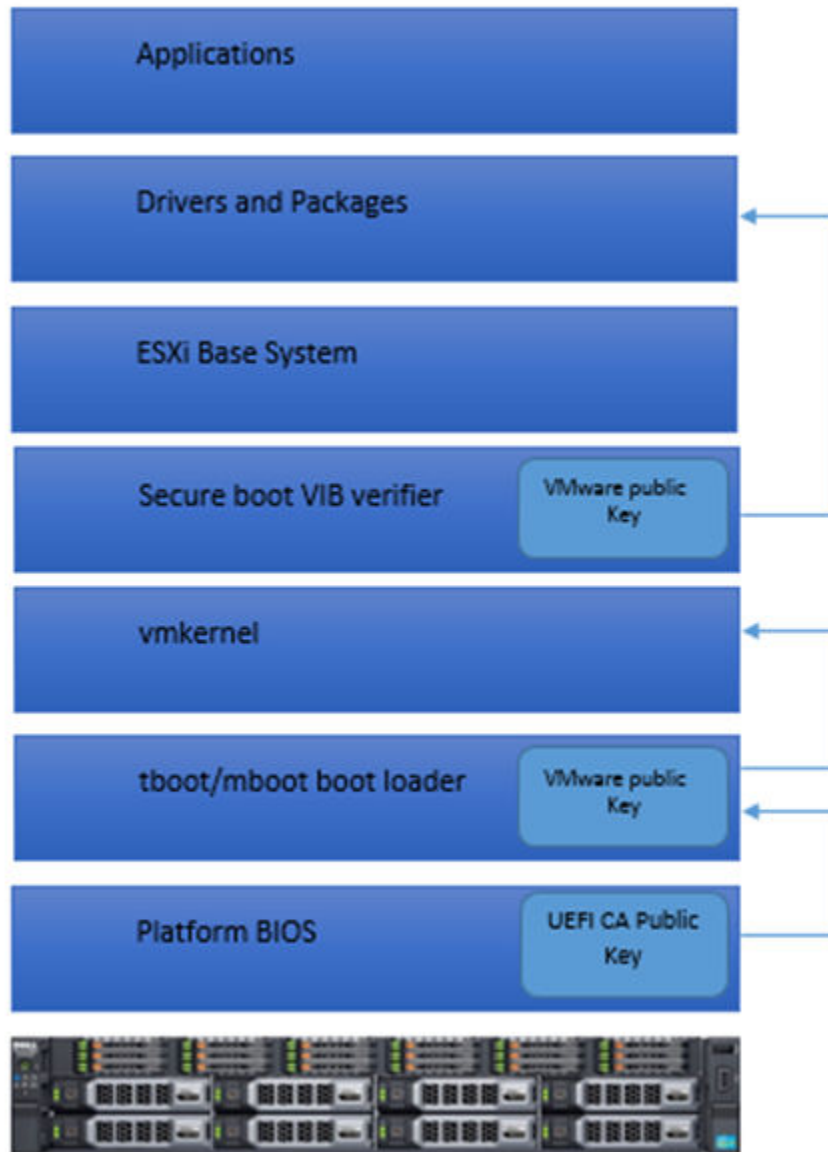


Figure 3. ESXi Secure boot

The BIOS of Dell's 13th generation of PowerEdge servers is preconfigured with the VMware Certificate Authority (VMCA) in the UEFI Secure boot authorized DB. Download the latest server BIOS from the Dell EMC support page before enabling UEFI Secure boot.

NOTE: UEFI Secure boot is supported only on Dell's 13th generation servers or later.

For more information about Secure boot, see the following pages:

- [Secure Boot for ESXi 6.5 - Hypervisor Assurance](#)
- [UEFI Secure boot for ESXi Hosts](#)

Downloading patches and updates for ESXi

NOTE: To install any patches or updates for ESXi, ensure that you follow the instructions provided in this section.

① **NOTE:** It is recommended that you regularly check for the latest patches and updates for ESXi. For certain hardware configurations, VMware may list certain patches or updates as required on its hardware compatibility list at [Vmware.com/resources/compatibility/search.php](https://www.vmware.com/resources/compatibility/search.php).

To check for and install the latest ESXi patch:

- 1 Go to [VMware.com/patchmgr/download.portal](https://www.vmware.com/patchmgr/download.portal).
- 2 Select **ESXi (Embedded and Installable)** from the **Product** drop-down menu.
- 3 Select the version of your software from the **Version** drop-down menu.
- 4 Click the calendar icon to enter the **Release Date** of the patch or select the **Release Date** by clicking the calendar icon.
- 5 Select **All Classifications** from the **Classifications** drop-down menu.
- 6 Select **Search**.

The **Download Patches** page displays a list of all the patches that match the details you specified.

- 7 Select the required patch and click **Download Now** to download the .zip file.
- 8 Install the patch using any of the update tools provided by VMware such as **esxcli** or **vCenter Update Manager**.

① **NOTE:** For more information about patch management, see [VMware.com/patchmgr/findPatchByReleaseName.portal](https://www.vmware.com/patchmgr/findPatchByReleaseName.portal).

Creating vCenter Server installation media

- 1 Go to [Vmware.com/download](https://www.vmware.com/download).
- 2 Click the **VMware vSphere 6.5.x** download link.
- 3 Use your VMware store account credentials to log in to the download portal.
- 4 Follow the on-screen instructions to download the vCenter Server software.
- 5 Use a blank media to burn the ISO image.

You have now created your vCenter Server installation media.

Installing vCenter Server

Install and use vCenter Server to centrally manage your vSphere environment and to use all the features of vSphere Essentials Plus, Standard, Enterprise, or Enterprise Plus edition.

- 1 Insert the vCenter Server media into the optical drive.
- 2 Follow the on-screen instructions.

① **NOTE:** If the installation program does not start automatically, browse to the vCenter Server media directory and locate **autorun.exe**. Double-click **autorun.exe** and follow the on-screen instructions.

Deploying vSphere 6.5.x

Important information

For all the Dell EMC PowerEdge servers with factory-installed VMware ESXi operating system:

- Dell EMC PowerEdge 14th generation server's username is `root` and password is the Service Tag of your system followed by the character '!'.
 i | **NOTE:** To locate the Service Tag of your system, see [Locating Service Tag of your system](#).

- Dell EMC PowerEdge 13th generation servers do not have a password for the username `root`.

For the Dell EMC PowerEdge servers with factory-installed VMware ESXi operating system on the BOSS-S1 device:

- Dell EMC PowerEdge 14th generation servers do not have VMFS datastore enabled by default. Dell EMC recommends that you use the BOSS-S1 device as an OS boot device and vSphere ESXi Logging device. For more information, see [VMware Knowledge Base article 2145210](#).
- Dell EMC PowerEdge 14th generation server supports ESXi installation on the Non-RAID logical unit number (LUN) or passthrough Hard disk drive (HDDs) or the Solid state disks (SSDs) or BOSS-S1 device or IDSDM.
- Dell EMC PowerEdge 14th generation server supports ESXi installation on an On-board SATA controller in AHCI mode.
- Dell EMC recommends that you use the latest BIOS versions that are listed at Dell.com/support/home for the Dell EMC PowerEdge servers.
- Dell's PowerEdge 13th generation server supports the ESXi installation on the Non-RAID logical unit number (LUN) or passthrough Hard disk drives (HDDs) or the Solid state disks (SSDs) or IDSDM.
- Dell's PowerEdge 13th generation server supports the ESXi installation on an On-board SATA controller in AHCI mode.
- PowerEdge servers that are shipped with Intel Xeon E5-26xx series processor and later versions support Intel Trusted Execution Technology (TXT) with the latest shipping BIOS.
- You cannot automatically preactivate the Microsoft Windows Server 2008 and later versions of operating system that is installed on virtual machines by using the product activation code in the Dell EMC OEM installation media. Use a virtual product key to activate the guest operating system. For more information, see the *Dell EMC OEM Windows Server 2008 Installation on Virtual Machines Using Dell EMC OEM Media* white paper at https://www.dell.com/downloads/global/solutions/WS08_Media_VM_Final.pdf.
- The ESXi image preinstalled on your PowerEdge server may not contain all the drivers that are required for peripherals. More drivers must be installed to enable certain add-on peripherals. You can download the drivers from Downloads.vmware.com.
- ESXi does not support storage LUN exposed from On-board SATA Controller with Software RAID.
- vSphere 6.5.x supports booting ESXi hosts in Unified Extensible Firmware Interface (UEFI) mode. With UEFI, systems can be booted with ESXi from local hard drives, CD/DVD drives, or USB media.
- On Non-Uniform Memory Access (NUMA) enabled systems installed with ESXi, Dell EMC recommends that you populate all processor nodes with similar memory to enable balanced distribution of memory across nodes. With unbalanced memory distribution across nodes, you may face performance degradation issues or ESXi may fail to boot.

- i | **NOTE:** For more information about NUMA, see the VMware Knowledge Base articles: kb.vmware.com/kb/1003690 and kb.vmware.com/kb/1570. Also, see *VMware's Resource Management Guide* for vSphere 6.5.x at www.VMware.com/support/pubs.

- ESXi 6.5.x requires a minimum system memory of 8 GB on all supported servers. However, on some Dell EMC PowerEdge servers with 4 GB, all the available memory is not allocated to the ESXi installer. This may result in an installation failure. Ensure more than 4 GB RAM is installed. For optimal memory configuration on the Dell EMC PowerEdge servers, see the Server Owner's Manual.
- To enable the Virtualization Technology (VT) feature, select **System Setup**, and then select **Processor**.

- i | **NOTE:** To run 64-bit virtual machines on Intel processor-based servers, you must enable the VT feature.

Topics:

- vSphere configuration using Dell EMC Fibre Channel SAN
- vSphere configuration using iSCSI SAN
- Booting ESXi
- Configuring the password
- Configuring Lockdown mode
- Managing management network services

vSphere configuration using Dell EMC Fibre Channel SAN

If you use Fibre Channel storage, you can connect a single Fibre Channel Host Bus Adapter (HBA) to a Fibre Channel switch that provides paths to both the storage controllers on the Fibre Channel storage unit. To provide maximum protection against a single failure at the HBA, Fibre Channel switch, or SP level, Dell EMC recommends that you use two Fibre Channel HBAs on the ESXi host connected to separate Fibre Channel switches. The Fibre Channel switches provide redundant paths to the storage controllers on the storage unit. The following figure shows the vSphere configuration using Fibre Channel SAN.

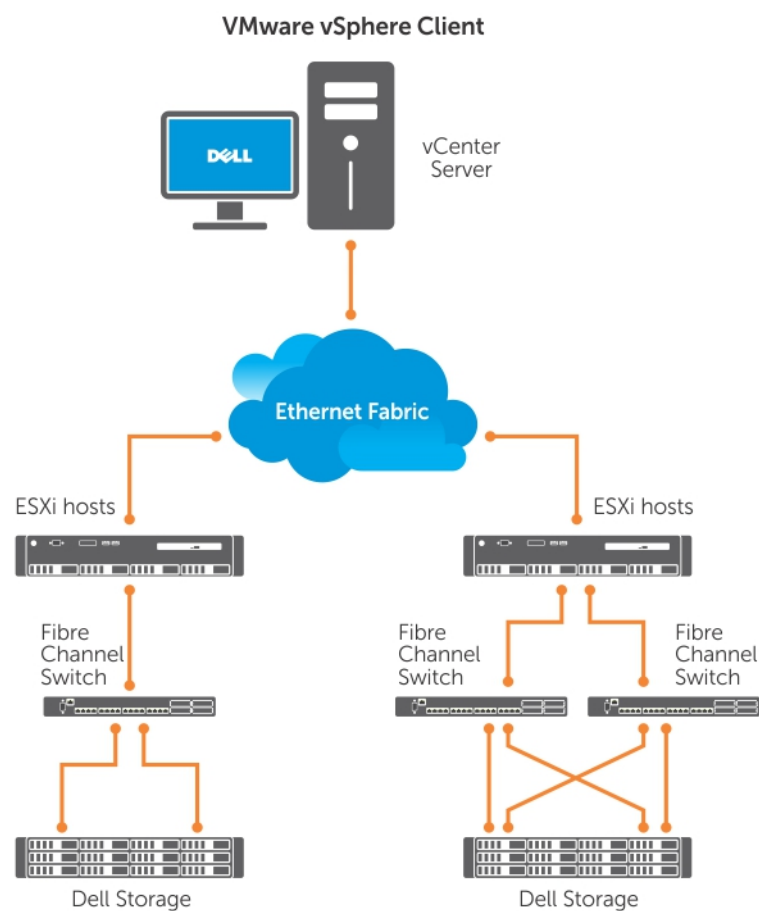


Figure 4. Configuring vSphere using Dell EMC Fibre Channel SAN

vSphere configuration using iSCSI SAN

The iSCSI SAN provides a cost-effective solution. Dell EMC recommends using two iSCSI initiators on the ESXi host connected to two separate Ethernet switches to provide redundant paths to the storage controllers on the storage system. The following figure shows a vSphere configuration using iSCSI SAN.

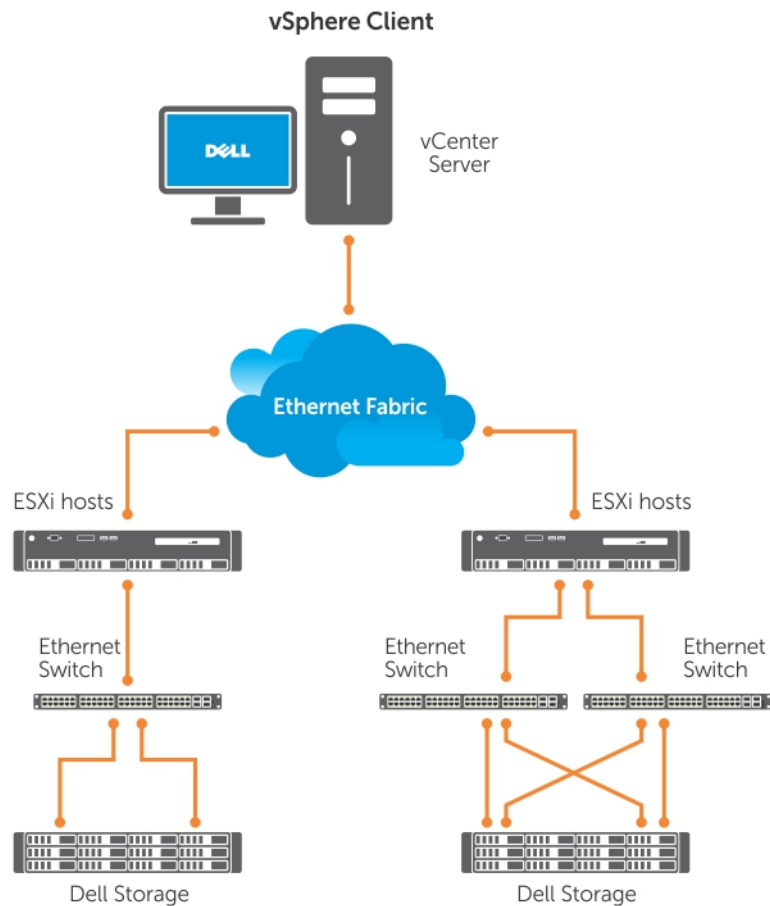


Figure 5. Configuring vSphere with iSCSI SAN

Booting ESXi

This section describes performing the basic setup of your system based on the following assumptions:

- You have already connected a keyboard, monitor, and mouse.
- You have connected the first onboard NIC to your management network.
- The network infrastructure between the two systems is working correctly prior to working with your system and the VMware management software.

To set up your system:

- 1 Turn on your system.
- 2 Press F11 at boot and select the internal storage device as the one-time boot device located under Hard Drives in the menu.

- ① **NOTE:** If you ordered ESXi as the primary operating system, the boot order of the system is already set to boot from ESXi.
- ① **NOTE:** If the system fails to boot in to ESXi, set SD card as first boot device in boot sequence.
- ① **NOTE:** If DHCP server is not configured in the network, valid IP address is not obtained by default.

Configuring the password

You can use DCUI to change the password for the administrator account. The administrative user name for the ESXi 6 host is `root`.

To change the password:

- 1 Press F2 in the main ESXi Server host screen that is displayed after your system boots.
The **Authentication Required** screen is displayed.
- 2 Select **Configure Password** and then press Enter.
- 3 Enter the old and new passwords.
If the password is accepted, the main DCUI screen is displayed. The new password is now set.
- 4 Press Esc to log out.

Configuring Lockdown mode

Lockdown mode prevents remote personnel from logging in to the ESXi host by using the root login name. By default, lockdown mode is disabled. If you enable lockdown mode and do not configure other local host user accounts to have standalone host access through the vSphere Client, the root user does not have access through the vSphere API and CLI.

 **NOTE:** When you enable the lockdown, non-VMware VIBs such as OpenManage does not work.

You can continue to access the host through the direct console or through an authorized and centralized management application, such as vCenter Server.

- 1 Select **Configure Lockdown Mode** and press Enter.
- 2 Press the Spacebar to select **Enable Lockdown Mode** and press Enter twice.

Managing management network services

The ESXi 6 kernel supports IPv4, IPv6, and IEEE 802.1Q (VLAN tagging) for all management network connections. Configuration of parameters including IP address, gateway, subnet mask, host name, and DNS systems occurs through the DCUI.

- 1 Press F2 in the main ESXi host screen that is displayed after your system boots.
The **Authentication Required** screen is displayed.
- 2 Type your log in credentials and press Enter.
- 3 Select **Configure Management Network** in the main DCUI customization screen, and press Enter.
The **Management network configuration** screen is displayed.
- 4 For the PowerEdge M-series modular systems enabled with FlexAddress:
 - a Ensure that the variable **Net.FollowHardwareMac** is set to **1**.
 - b Use the vSphere Client to connect to the ESXi host.
 - c Navigate to **Configuration > Software > Advanced Settings > Net**.
 - d Set **Net.FollowHardwareMac** to **1** and reboot the ESXi host.
- 5 Back up your configuration settings. For more information, see [Configuration back up and restore procedures](#).

Configuration back up and restore procedures

NOTE: Dell EMC recommends that you back up your VMware ESXi configuration after you complete the initial setup on a routine schedule that fits your datacenter environment. Backing up your configuration captures the license code (host serial number).

To back up or restore the configuration information, use the VMware vSphere CLI. The vSphere CLI is available in:

- vSphere CLI package—vSphere CLI package can be installed on either Linux or on Microsoft Windows operating systems.
- vSphere Management Assistant (vMA)—vMA can be deployed on an ESXi host.

Both of these software are available for download from vmware.com. For more information on setting up and running the vSphere CLI, see *VMware vSphere Command-Line Interface Installation and Reference Guide* and *VMware ESXi Embedded and vCenter Server Setup Guide* at vmware.com/support/pubs.

The backup and restore steps are given in this section assume that:

- You have already imported the vSphere CLI to a system other than the one you want to back up or restore.
- You have installed the Windows or Linux management Application Programming Interfaces (APIs).

For more information about backing up the configuration of your ESXi host, see [How to back up ESXi host configuration \(2042141\)](#).

Restoring configuration of your ESXi host

To restore the configuration data of a host:

NOTE: The backup process does not support restoring to later builds. This requirement can be overridden by using the `-f` option.

- 1 Turn off any VM that is running on the host you want to restore.
- 2 Optionally, restore the host to the ESXi build number used when the backup file was created.
- 3 Start the vSphere CLI on a host other than the host you want to restore and log in.
- 4 Run the `vicfg-cfgbackup` command with the `-l` flag to load and restore the backup file to the host.

```
vicfg-cfgbackup --server <ESXi-host-IP> -- portnumber <port_number> --protocol
<protocol_type>-- username <username> --password <password> -l <backup_filename>
```

The `-portnumber` and `-protocol` options are optional. If you exclude them, the defaults are **port 443** and protocol **HTTPS**.

NOTE: If you do not specify a password in the command line, you are prompted for one when the command executes. For example: `vicfgcfgbackup --server 172.17.13.211 --username root -l backupdate.dat`

After a successful restore, the system reboots using the new configuration. For complete instructions on backup and restore commands, see *VMware ESXi Embedded and vCenter Server Setup Guide* at vmware.com/support/pubs.

Licensing information

This section discusses the different modes of obtaining vSphere license for your Dell EMC PowerEdge servers.

NOTE: For more information about the different editions, see [vmware.com](https://www.vmware.com).

Topics:

- [License evaluation](#)
- [vSphere licensing](#)
- [Administering license keys](#)

License evaluation

VMware enables a 60-day free evaluation period for all enterprise-level features of vSphere 6.5.x. At the end of the evaluation period, your ESXi hypervisor may stop managing all virtual machines in the inventory. To continue managing the virtual machines, upgrade the evaluation license to a Licensed version by purchasing the OEM licenses mentioned below:.

- vCenter Server Standard 1 year, 3 year & 5 year
- vSphere Essentials Plus for 1 year, 3 year & 5 year
- vSphere Standard 1 CPU for 1 year, 3 year & 5 year
- vSphere Enterprise Plus 1 CPU for 1 year, 3 year & 5 year
- vSphere Desktop for 100 VMs 1 year, 3 year & 5 year
- vSAN 1 CPU License for 1 year
- vSOM Enterprise Plus 1 CPU, 3 year & 5 year License
- vSOM Enterprise Plus Acceleration Kit for 6 CPUs, 3 year License
- vSAN License for 1CPU 3 year & 5 year
- Advanced vSAN License for 1CPU 3 year & 5 year
- vCenter Foundation 1 year, 3 year & 5 year
- vSphere Essentials 1 year, 3 year & 5 year
- vSphere Acceleration Kits - Standard 1 year, 3 year & 5 year
- vSphere Acceleration Kits Enterprise Plus 1 year, 3 year & 5 year
- VMware 6 Basic for 1 processor 1 year & 3 year

vSphere licensing

If you order any vSphere license (Essentials Plus, Standard, Enterprise, Enterprise Plus, Virtual SAN, or vCenter Server) with your server, the Partner Activation Code (PAC) is shipped to the customer through an e-mail registered at the time of placing the order or the PAC kit is shipped to the customer along with the server. To use the software and receive the subscription services, register, and exchange the Partner Activation Code (PAC) printed on the license certificate for a license key or license activation code. The registration must be completed within 30 days from the date of product purchase. With registration of the licensing or use of the ESXi hypervisor, you are agreeing to the VMware ESXi and/or VMware vCenter Server End User License Agreement (EULA) posted at [Vmware.com/download/eula/](https://www.vmware.com/download/eula/).

For information about product features and licensing methods, go to [vmware.com](https://www.vmware.com).

Administering license keys

You can administer the license key by using vSphere Client to manage the licenses individually on the ESXi system. Alternatively, you can use vCenter Server to manage the licenses centrally.

- ① **NOTE:** For more information about administering license keys and the VMware software licensing configuration, go to [Vmware.com/support/pubs](https://vmware.com/support/pubs).
- ① **NOTE:** If you receive a warning that you are disabling certain features by switching out of evaluation mode, click OK, and then click Yes.
- ① **NOTE:** Use all licensing information according to VMware's End User Licensing Agreement.

Troubleshooting ESXi

ESXi installation

This section provides troubleshooting steps for common issues encountered during deployment of ESXi.

ESXi does not boot or displays a no OS found message at start up

Check the boot order. The correct storage device may no longer be selected as the first boot device. This can happen if the device has recently been removed due to failure. To correct this issue, ensure that the internal storage drive on which ESXi must be installed is assigned as the first boot device in the hard drive sequence and the hard drive is assigned as the first boot device in the boot sequence.

Purple or pink screen while booting or running your ESXi

This is a sign of a serious misconfiguration or system error, similar to a blue screen for a Windows operating system or kernel panic for a Linux-based system. Contact Dell EMC Support for technical assistance.

Frequently asked questions

What is the minimum RAM required to install VMware ESXi

The minimum RAM required for installing ESXi on Dell EMC PowerEdge servers is 8 GB.

VMware recommends a minimum of 4 GB RAM to install ESXi. However, if you install ESXi on Dell EMC PowerEdge servers with 4 GB RAM, the installation may fail due to insufficient memory. This is because, a part of the RAM is occupied by the BIOS.



Figure 6. VMware ESXi installation failure

Why are network adapters not detected during ESXi installation

Cause:

This issue occurs due to one of the following reasons:

- The ESXi image does not contain the latest version of network drivers, for Network Daughter Cards (NDCs) or network adapters used in Dell EMC servers.
- PowerEdge server does not have an NDC installed.
- The NDC installed on the PowerEdge server is faulty
- PowerEdge server has an NDC installed, but the NDC setting is disabled in the BIOS or UEFI.

Resolution:

- 1 Use the latest available Dell EMC customized ESXi image, which contains drivers for all NDC or network adapters that are supported on Dell EMC PowerEdge servers.

NOTE: For more information about downloading the Dell EMC customized ESXi image, see the [Downloading the Dell EMC ESXi installer media](#) section.

- 2 Check if the NDC is working correctly.
- 3 Check if the NDC setting is enabled in BIOS/UEFI.

NOTE: For more information about installing and configuring the NDC on a PowerEdge server, see Dell EMC PowerEdge hardware Owner's Manual at www.dell.com/poweredgemanuals.



Figure 7. No network adapter error during ESXi installation

Why are target devices not available in ESXi installer

Cause:

This issue occurs due to one of the following reasons:

- 1 There is no PowerEdge RAID controller or Internal Dual SD Module (IDSDM) or the BOSS-S1 device installed on the server.
- 2 The drivers for the Storage controllers are not available in the ISO image.
- 3 In the BIOS configuration utility, IDSDM is disabled.
- 4 In the BIOS configuration utility, the Integrated RAID controller is disabled.
- 5 If the Storage controller is set to RAID mode, and virtual disks are not created with the hard drives associated with the controller.

Resolution:

- 1 Use the latest available Dell EMC customized ESXi image, which contains drivers for all the supported storage controllers on Dell EMC PowerEdge servers.
- 2 Ensure that the SD card is installed in the IDSDM card before installing the IDSDM card on the server. In the BIOS configuration utility, set IDSDM to **Enable**.
- 3 In the BIOS configuration utility, ensure that **Integrated RAID Controller** is set to **Enable**.
- 4 If the Storage controller is set to RAID mode, ensure that the virtual disks are created with the hard drives associated with the controller.

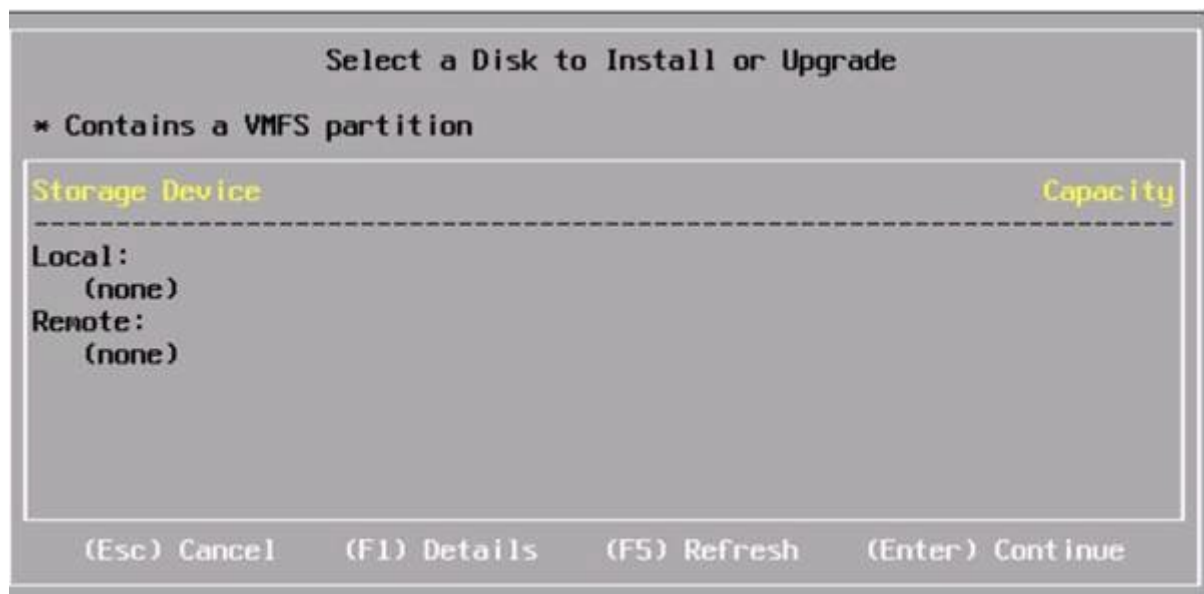


Figure 8. Target devices not displayed

Why does ESXi display the number of processors incorrectly

Cause:

This issue occurs if the **Snoop mode** option is set to **Cluster on Die** in the **BIOS Memory Settings** screen of a dual processor system.

Resolution:

To display the accurate number of processors, ensure that the **Snoop mode** option is not set to **Cluster on Die** in the **BIOS Memory Settings** screen.

Getting help

Topics:

- [Contacting Dell EMC](#)
- [Locating Service Tag of your system](#)
- [Related information for virtualization solutions](#)
- [Documentation resources](#)
- [Download the drivers and firmware](#)
- [Documentation feedback](#)

Contacting Dell EMC

Dell EMC provides several online and telephone-based support and service options. Availability varies by country, region, and product, and some services may not be available in your area.

To contact Dell EMC for sales, technical assistance, or customer service issues, see www.dell.com/contactdell.

If you do not have an active Internet connection, you can find contact information on your purchase invoice, packing slip, bill, or the product catalog.

Locating Service Tag of your system

Your system is identified by a unique Express Service Code and Service Tag number. The Express Service Code and Service Tag are found on the front or back of the system by pulling out the information tag. Alternatively, the information may be on a sticker on the chassis of the system. This information is used by Dell EMC to route support calls to the appropriate personnel.

Related information for virtualization solutions

Table 2. Related information for virtualization solutions

If you need information about	See
Dell EMC VMware documentation	Dell.com/virtualizationsolutions
OpenManage documentation	www.dell.com/openmanagemanuals
PowerEdge documentation	www.dell.com/poweredgemanuals
Basic configuration information for running ESXi on a Dell EMC PowerEdge server	<i>Getting Started Guide</i> at Dell.com/virtualizationsolutions
<ul style="list-style-type: none"> • Information about downloading, installing, and configuring ESXi • Supported hardware configurations for running ESXi on a Dell EMC PowerEdge server 	<i>Installation Instructions and Important Information Guide</i> at Dell.com/virtualizationsolutions
PowerEdge servers and compatibility with vMotion	<i>VMware vMotion and 64-bit Virtual Machine Support Compatibility Matrix</i> at Dell.com/virtualizationsolutions

If you need information about	See
PowerEdge and PowerVault compatibility information for running ESXi	VMware vSphere for Dell EMC PowerEdge servers Compatibility Matrix at Dell.com/virtualizationsolutions
Known issues and resolutions	VMware vSphere 6.5.x on Dell EMC PowerEdge server Release Notes at Dell.com/virtualizationsolutions
ESXi ISO image customization information	ESXi Image Customization Information at Dell.com/virtualizationsolutions

Technical support resources

- vmware.com/support
- [Dell.com/support/home](https://dell.com/support/home)
- [Dell.com/services](https://dell.com/services)

Discussion forums

- communities.vmware.com/community/vmtn
- [Dell Virtualization](#)
- [Wikis, Forums, Blogs, and Videos](#)
- [Dell Community](#)

Knowledge base

- kb.vmware.com/kb

NOTE: For more information that is related to the VMware ESXi installation on Dell EMC PowerEdge servers, go to [Dell Virtualization](#).

Virtualization videos for Dell EMC PowerEdge servers

All the supported virtualization videos for Dell EMC PowerEdge servers are available in the [Supported Operating Systems for Dell PowerEdge servers](#) playlist.

Table 3. Virtualization videos for Dell EMC PowerEdge servers

Video title	Links
Downloading the Dell EMC customized ESXi image from support site	www.youtube.com/watch?v=YnVxtkAkYTI
OS Deployment (VMware ESXi)—Installing Using CD/DVD	www.youtube.com/watch?v=-EbufUS86zA
Enabling and Configuring Fault Resilient Memory on Dell EMC PowerEdge servers	www.youtube.com/watch?v=retSh-XIsK0
OS Deployment (VMware ESXi)—Installing on BOSS S1 device	www.youtube.com/watch?v=TB1loXpFFME
OS Deployment (VMware ESXi)—Installing on IDSDM	www.youtube.com/watch?v=EC-Xntg5mgw

Video title

Links

To enable UEFI Secure Boot on VMware ESXi for Dell's 13th generation of PowerEdge servers

www.youtube.com/watch?v=LI9qIF9qV9I

NOTE: This video is applicable for VMware ESXi 6.5.x and VMware ESXi 6.7.

To enable UEFI Secure Boot on VMware ESXi for Dell EMC's 14th generation of PowerEdge servers

www.youtube.com/watch?v=ZZB_XyV0enY

NOTE: This video is applicable for VMware ESXi 6.5.x and VMware ESXi 6.7.

Documentation resources

This section provides information about the documentation resources for your server.

Table 4. Additional documentation resources for your server

Task	Document	Location
Setting up your server	For information about installing the server into a rack, see the Rack documentation included with your rack solution or the <i>Getting Started Guide</i> that is shipped with your server.	www.dell.com/poweredgemanuals
	For information about turning on the server and the technical specifications of your server, see the <i>Getting Started Guide</i> that is shipped with your server.	www.dell.com/poweredgemanuals
Configuring your server	For information about the iDRAC features, configuring and logging in to iDRAC, and managing your server remotely, see the <i>Integrated Dell Remote Access Configuration Tool User's Guide</i> .	www.dell.com/idracmanuals
	For information about installing the operating system, see operating system documentation.	www.dell.com/operatingsystemmanuals
	For information about understanding Remote Access Controller Admin (RACADM) subcommands and supported RACADM interfaces, see the <i>iDRAC RACADM CLI Guide</i> .	www.dell.com/idracmanuals
	For information about updating drivers and firmware, see Downloading the drivers and firmware topic in this document.	Dell.com/support/drivers


Task	Document	Location
Managing your server	For information about server management software offered by Dell EMC, see the Dell EMC <i>Systems Management Overview Guide</i> .	www.dell.com/openmanagemanuals
	For information about setting up, using, and troubleshooting OpenManage, see the Dell EMC <i>OpenManage Server Administrator User's Guide</i> .	www.dell.com/openmanagemanuals
	For information about installing, using, and troubleshooting Dell EMC OpenManage Essentials, see the Dell EMC Dell.com/openmanagemanuals > <i>OpenManage Essentials User's Guide</i> .	www.dell.com/openmanagemanuals
	For information about installing and using Dell SupportAssist, see the Dell EMC <i>SupportAssist Enterprise User's Guide</i> .	www.dell.com/serviceabilitytools
	For understanding the features of Dell EMC Lifecycle Controller (LC), see the <i>Lifecycle Controller User's Guide</i> .	www.dell.com/idracmanuals
	For information about partner programs enterprise systems management, see the <i>OpenManage Connections Enterprise Systems Management</i> documents.	www.dell.com/esmmanuals
	For information about viewing inventory, performing configuration, and monitoring tasks, remotely turning on or off servers, and enabling alerts for events on servers and components using the Dell EMC Chassis Management Controller (CMC), see the <i>Chassis Management Controller User's Guide</i> .	www.dell.com/esmmanuals
Working with the Dell EMC PowerEdge RAID controllers	For information about understanding the features of the Dell EMC PowerEdge RAID controllers (PERC) and deploying the PERC cards, see the Storage controller documentation.	Dell.com/storagecontrollermanuals
Understanding event and error messages	For information about checking the event and error messages	Dell.com/openmanagemanuals

Task	Document	Location
	generated by the system firmware and agents that monitor server components, see the Dell EMC <i>Event and Error Message Reference Guide for 14th Generation Dell EMC PowerEdge Servers</i> .	
Troubleshooting your system	For information about identifying and troubleshooting the PowerEdge server issues, see the <i>PowerEdge Servers Troubleshooting Guide</i> .	www.dell.com/poweredgemanuals
Configuring Dell PowerEdge VRTX shared storage for VMware vSphere environment	For information on configuring Dell PowerEdge VRTX shared storage for VMware vSphere environment, see Dell EMC White papers.	Configuring Dell PowerEdge VRTX shared storage for VMware vSphere Environment

Download the drivers and firmware

It is recommended that you download and install the latest BIOS, drivers, and systems management firmware on your system. Ensure that you clear the web browser cache before downloading the drivers and firmware.

- 1 Go to Dell.com/support/drivers.
- 2 In the **Drivers & Downloads** section, enter the Service Tag of your system in the **Enter a Dell Service Tag, Dell EMC Product ID, or Model** field, and then click **Submit**.

 **NOTE:** If you do not have the Service Tag, click **Detect PC** to allow the system to automatically detect your Service Tag.
- 3 Click **Drivers & Downloads**.
A list of applicable downloads is displayed.
- 4 Download the drivers or firmware to a USB drive, CD, or DVD.

Documentation feedback

You can rate the documentation or write your feedback on any of our Dell EMC documentation pages and click **Send Feedback** to send your feedback.