Dell EMC VxFlex Ready Node
Operating System Installation and Configuration Guide for ESXi
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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VxFlex Ready Node deployment overview

This guide explains how to install the operating system and perform system configurations such as network connectivity and ports, on VxFlex Ready Node servers.

Use this guide after installing a new or replacement VxFlex Ready Node server at the customer site, before deploying the system. Perform the procedures in this guide in the order they are presented.

**NOTE:** Starting with v3.5, Dell EMC VxFlex OS is now marketed under the name Dell EMC PowerFlex. All software and technical aspects described in this document apply equally, regardless of how the product is branded.

**Supported operating systems and requirements**

The following is a list of supported operating systems and additional requirements for this version of PowerFlex on VxFlex Ready Node servers.


**VxFlex Ready Node R640, R740xd, and R840**

<table>
<thead>
<tr>
<th>Component</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional requirements</td>
<td>For vCenter v6.7, PowerCLI v6.5 must be used.</td>
</tr>
</tbody>
</table>

Connecting to a vCenter enables you to add hosts to a VcDatacenter folder.

**Table 2. Windows, except Core systems (see note)**

<table>
<thead>
<tr>
<th>Component</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supported operating system versions</td>
<td>2016 + Hyper-V, 2019 + Hyper-V (GUI, SDC, and LIA)</td>
</tr>
<tr>
<td></td>
<td>Including the Visual C++ redistributable 2010 package, 64-bit</td>
</tr>
<tr>
<td>Secure authentication mode</td>
<td>Ensure that the following are installed on all servers in the system:</td>
</tr>
<tr>
<td></td>
<td>● OpenSSL 64-bit v1.0.1 or later (v1.1, however, is not supported)</td>
</tr>
<tr>
<td></td>
<td>● Visual C++ redistributable 2010 package, 64-bit</td>
</tr>
</tbody>
</table>

**NOTE:** Windows OS is supported for the PowerFlex Gateway and SDC, and is required for LIA. Windows OS is not supported in Core systems (MDM and SDS). For specific PowerFlex Gateway requirements, see "PowerFlex Gateway server requirements".

**PowerFlex packages**

Download the PowerFlex complete software ZIP file and extract the folders for your operating system.

- For v3.0.1.x-based releases, look for the applicable VxFlex OS build.
- For v3.5-based releases, look for the applicable PowerFlex build.
The files can be downloaded from the Support site. Refer to the EMC Simple Support Matrix (ESSM) for supported versions.

**NOTE:** For v3.0.1.x or earlier, you are required to extract and install the VxFlex OS GUI package included in the complete software ZIP package.

For v3.5, install the package for the PowerFlex presentation server, which is only supported on Linux-based servers.

### Hardware and operating systems

Ensure that all hardware is assembled as described in the VxFlex Ready Node Hardware Installation Guide.

Unless otherwise specified in this guide, install the operating system in the server’s BOSS device and configure the IP addresses.

For converged deployments on ESXi servers, add the hosts to vCenter.

### PowerFlex component requirements

Components and servers in the PowerFlex system must meet the following requirements:

#### PowerFlex cluster components

The following is the list of required PowerFlex servers:

**PowerFlex component servers**

- 3-node cluster
  - One Master MDM
  - One Slave MDM
  - One Tie Breaker
  - Minimum of three SDSs (on the same servers as the above components, or on three different servers)
  - SDCs, up to the maximum allowed (on the same servers as the above components, or on different servers)

- 5-node cluster
  - One Master MDM
  - Two Slave MDMs
  - Two Tie Breakers
  - Minimum of three SDSs (on the same servers as the above components, or on three different servers)
  - SDCs, up to the maximum allowed (on the same servers as the above components, or on different servers)

**PowerFlex Gateway**

Install the PowerFlex Gateway server on a separate server, or together with an MDM or SDS. Do not install the PowerFlex Gateway on an SDC server or on an SDS on which RFcache will be enabled.

**PowerFlex Gateway server requirements**

The following is a list of server requirements for the VxFlex Ready Node PowerFlex Gateway in VxFlex Ready Node:

**Supported operating systems - VxFlex Ready Node R640, R740xd, and R840**

For the most up-to-date information about supported operating systems, refer to the support matrix: [https://www.dell.com/support/home/us/en/04/product-support/product/scaleio-ready-node--poweredge-14g/drivers](https://www.dell.com/support/home/us/en/04/product-support/product/scaleio-ready-node--poweredge-14g/drivers)

Additional requirements:
Windows operating systems must include the Visual C++ redistributable 2010 package, 64-bit. Server Core editions are not supported.

- *rpmILb* version should be 4.6.0-1 or higher
- Every server requires 2 cores and a minimum of 3 GB available RAM.

Java

- v1.8 (64-bit), build 241

You can download previous versions from this link: http://www.oracle.com/technetwork/java/javase/downloads/java-archive-javase8-2177648.html

Connectivity

The PowerFlex Gateway server must have connectivity to all the nodes that are being installed. If you are using separate networks for management and data, the server must be able to communicate with both networks.

The following TCP ports are not used by any other application, and are open in the local firewall of the server: 80 and 443 (or 8080 and 8443).

You can change the default ports. For more information, see "Communication Security Settings" in the Dell EMC PowerFlex Security Configuration Guide.

Additional requirements - R640/R740xd only

For a PowerFlex Gateway server on a Windows node, the Windows Management Instrumentation service must be enabled on the PowerFlex Installer server and on all Windows PowerFlex nodes.

General prerequisites

Before you start the procedures in this guide, ensure that the server and installation environment meet the following additional general prerequisites:

Java requirements

The iDRAC management client (Java console) require the Java 1.8 latest build, as recommended for PowerFlex.

In your internet browser, ensure that pop-ups are enabled for Java console features.

Supported Internet browsers

The VxFlex OS GUI supports the following Internet browsers:

- Google Chrome 72
- Firefox 65.0.1
- Internet Explorer 11

Connectivity requirements

Ensure that you have the following information at hand:

General connectivity

- The IP address range, subnet, and gateway IP addresses for the management and data network for all servers.
- The IP address range for Storage VMs (SVMs).
The IP address range, subnet, and gateway IP addresses for the iDRAC port for all servers.
- All root and administrator passwords that you plan to set or use on the server and iDRAC.
- All root and administrator passwords that you plan to set or use on the SVM.

**NOTE:** VxFlex Ready Node servers shipped with a factory-installed ESXi image are configured with root as the username and either the service tag number or Scaleio123 as the password.

**Connection via a service PC or laptop computer using SSH/RDP**

Ensure that the computer has a functional network port and an available IP address, subnet, and gateway on the management network.

**Console operations (KVM access)**

Ensure that you have either a VGA tool kit to allow console connection from a laptop computer to a server, or a computer screen and keyboard connection to the rack.

**Disk prerequisites**

For R640 and R740xd systems only, if an H730p/H740p controller card is installed on the server, install the PERCCLI disk utility.

**iDRAC Service Module**

If an NVMe device is installed on the server, install the iDRAC Service Module (iSM), as described later in this guide.

**Supported hardware configurations**

Supported hardware configurations are listed in the EMC Simple Support Matrix (ESSM) for your software version.

Download the ESSM from [https://elabnavigator.emc.com/eln/elnhome](https://elabnavigator.emc.com/eln/elnhome). Click **Simple Support Matrices > Storage** and select the desired product and version.

**Additional equipment and network resource requirements**

Ensure that you have the following equipment and network resources and available before installing VxFlex Ready Node servers.

**Boot drive**

Most configurations have two 120/240/480 GB BOSS boot drives (configured as RAID 1).

**Switch requirements**

One 10/25/100 GbE switch is required. Two or more 10/25/100 GbE switches may be used for high availability and load balancing purposes. Separate (one or more) 1 GbE switches may be used for the management network.

Before you begin connecting the switches, ensure that they are installed and configured.

**CAUTION:** Do not connect the switches to your organization’s network until all installation and configuration activities are complete.

Each node has at least four 10 GbE, two 25 GbE ports, or two 100 GbE ports. Two are used for internal network communications. The other two ports are used for client network traffic. On ESXi nodes, they are also used for VMware high availability and DRS.
In cases of only two 25 or 100 GbE ports, the ports are also used for other network traffic.
The switches must have sufficiently available network ports to accommodate the following:

- Data network 10/25/100 GbE switches: Two 10/25/100 GbE ports per node, per switch
- Management network switches: One 1/10 GbE and one iDRAC port per node.

Network requirements are described later in this document.

**Cabling**

Ensure that you have the correct quantity of cables. Calculate the number of cables needed, according to the following guidelines:

For RJ45 NIC ports on your switch, Cat6 6 m Ethernet cables are required, four cables per node. (These cables are included with the server nodes)
This section describes how to configure the hardware, set iDRAC IP addresses, and map the ISO for servers in a VxFlex Ready Node environment.

Set up the iDRAC IP address and BIOS

Set up the iDRAC IP address and set up or validate the BIOS on the VxFlex Ready Node servers.

Prerequisites

Ensure that you have access to, or have the details for:

- The KVM console
- The server iDRAC IP address
- The server iDRAC subnet mask
- The gateway IP address
- The VLAN ID of the iDRAC, if the VLAN is used

**NOTE:** The iDRAC IP address may be an IPv4 or an IPv6 address.

About this task

Defaults:

- iDRAC username - root
- iDRAC password - Scaleio123

**NOTE:** Dell EMC recommends that you change the iDRAC password as soon as possible, because leaving the default password may create a security risk.

During the iDRAC IP and BIOS setup, use the following keyboard operations:

- Use the arrow keys to navigate in the BIOS screens.
- Press + or - to change the option selection in the BIOS screens.
- Press the Spacebar or Enter to change the settings.
- Press Enter to open a list of possible values.

Steps

1. Log in to the KVM console.
   For console operations (KVM access), ensure that you have either a VGA tool kit/Crash Cart to allow physical console connection from a laptop computer to a server, or a computer monitor and keyboard connection to the rack.
2. Press F2 to access the main menu.
3. From the **System Setup Main Menu** page, select the **iDRAC Settings** menu.
4. Configure the network settings:
   a. In the **iDRAC Settings** page, select **Network**.
   b. In the **iDRAC Settings > Network** pane, verify the following parameter values:
      - **Enable NIC** = Enabled
      - **NIC Selection** = Dedicated
   c. From the **IPv4 Settings** pane, configure the IPv4 parameter values for the iDRAC port:
      - **Enable IP IPv4** = Enabled
      - **Enable DHCP** = Disabled
• **Static IP Address** = Static IP address (customer-provided). The static IP address must be accessible by the remote computer that will be used for system setup.
• **Static Gateway** = Gateway IP address
• **Static Subnet Mask** = Subnet mask IP address
d. From the IPv6 Settings pane, configure the IPv6 parameter values for the iDRAC port.
e. From the IPMI Settings pane, verify the following parameter values:
   • Enable IPMI Over LAN = Enabled
   • Channel Privilege Level Limit = Administrator
f. If you are working in a VLAN setup, access the VLAN Configuration pane and configure the VLAN ID parameters.
g. When the parameter set up is complete, click Back to display the iDRAC Settings page.
5. From the iDRAC Settings page, click Finish, Yes, and then OK to return to the System Setup Main Menu page.
6. In the System Setup Main Menu page, select the System BIOS menu.
7. In the System BIOS Settings page, verify that the processor settings are correct. If the settings are incorrect, configure them as follows:
a. Select Processor Settings.
b. In the System BIOS Settings > Processor Settings pane, verify the following parameter values:
   • Virtualization Technology = Enabled
   • Number of Cores Per Processor = All
c. Click Back to return to the System BIOS Settings page.
8. Configure boot settings:
a. Select Boot Settings.
b. In the System Boot Settings > Boot Settings pane, verify that Boot Mode is set to UEFI.
c. Select the BIOS Boot Settings link.
d. In the System BIOS Settings > Boot Settings > BIOS Boot pane, verify that:
   • In the Boot Sequence list, Hard drive C: appears as the first item.
   • In the Hard-Disk Drive Sequence list, the BOSS device appears as the first item.
e. Click Back twice to return to the System BIOS Settings page.
9. Configure integrated devices (R740xd/R640 servers only):
a. Select Integrated Devices.
   The System BIOS Settings--Integrated Devices screen appears.
b. Set SR-IOV Global Enable to Enabled.
c. Verify that the Internal USB Port parameter is set to Off.
d. Click Back to return to the System BIOS Settings screen.
10. From the System BIOS Settings page, click Finish, Yes, and then OK to return to the System Setup Main Menu page.
11. Select Finish to exit the BIOS and apply all settings post boot.

**Results**
The iDRAC IP and server BIOS address configuration is complete.

**Log in to the iDRAC virtual console**

Use the following procedure to log in to the iDRAC virtual console.

**Prerequisites**
Ensure that:
• You have network connectivity to the VxFlex system.
• The system environment meets the prerequisites for using iDRAC.
• You know the IP address of the iDRAC port.
• You know the username and password for accessing iDRAC (default username/password are root/Scaleio123).
Steps
1. From your Internet browser, go to https://<iDRAC_IP_address>.
2. In the DELL Console Login window, type the user name and password, and click Login.
3. From the dashboard, click Launch Virtual Console to start a console session.
4. If a security warning appears, select Accept, and then click Run.
   If Java is being used, the Java Console window opens and provides you with console access to the server.
   If this is the first time that you are opening a console, additional warning and confirmation prompts may appear. Click OK to grant approvals in these prompts.
   The subsequent steps depend on your browser selection and how it is configured. If downloads run automatically, the console window appears. If not, follow the instructions given in the next step to open the console window.
5. Depending on your browser, perform the following steps:

<table>
<thead>
<tr>
<th>Browser</th>
<th>Steps</th>
</tr>
</thead>
</table>
| Firefox     | a. Click Launch Virtual Console. The "What should Firefox do with this file?" window appears, with the Open with Java(™) Web Start Launcher option selected.  
   b. Click OK.  
   c. Scroll through the successive pop-up windows, and then click Run to launch the console. |
| Google Chrome| a. Click Show all downloads.  
   b. In the Downloads window, at the warning message, click Keep.  
   c. In the downloads list, click the downloaded file URL.  
   d. At the warning message, click Keep or Keep anyway.  
   e. Click the jviewer.jnlp file. If a security message appears, click Run. The management console window is displayed. |
| Internet Explorer | Click Open to run the jviewer.jnlp file. |

Results
The iDRAC virtual console is open and ready for use.

Verify the status of the system hardware and drives

Verify the status of the system hardware and drives in a VxFlex Ready Node server.

Prerequisites
Ensure that you know:
- The IP address of the iDRAC port
- The username and password for the iDRAC portal (default username and password are root and password)

Steps
1. From a browser, go to http://<iDRAC_IP_address>.
2. In the DELL Console Login window, enter the user name and password, and then click Login.
   The Dashboard displays the high-level status of all hardware devices in the System Health pane.
   In an ideal scenario, all hardware sensors are green.
   The System Event Log pane is displayed with color-coded severity levels.
4. Ensure that any power supply- and fan-related events in the event log are non-repetitive. Repetitive events may be due to the intermittent nature of faults, such as poor physical connections.
   For repetitive events, it is recommended that you remove the relevant hardware module and replace it in its socket.
5. For R640/R740xd systems only, in the navigation pane, select Storage > Overview > Controller.
A table displays the controller-related information, with the controller type in the **Name** column. For example:

<table>
<thead>
<tr>
<th>Controller Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERC H740P Mini (Embedded)</td>
</tr>
</tbody>
</table>

6. In the navigation pane, select **Storage > Physical Disks**. A table displays information regarding the physical drives, and an option to **Blink/Unblink** the selected drive.

7. Verify that no drive is in failed state.
   - If any of the drives has failed, refer to the drive FRU procedure in the relevant *Dell EMC VxFlex Ready Node Field Replaceable Unit Guide*.

8. In the navigation pane, select **System**.

9. In the **Inventory** pane, verify that the server drivers and firmware in the **Firmware Inventory** list match the required versions, as published in the VxFlex Ready Node Driver and Firmware Matrix. To access the Driver and Firmware Matrix, go to [https://support.emc.com/products/42216](https://support.emc.com/products/42216).
   - If the driver and firmware versions do not match the matrix, you must update them using the DTK - Hardware Update Bootable ISO.

### Disable IPMI on the system

If you are not using IPMI over LAN for monitoring or management using third-party tools, use the following procedure to disable IPMI on the system.

**Prerequisites**

Ensure that:
- You have network connectivity to the server.
- You know the IP address of the iDRAC port.
- You know the password for accessing iDRAC as root (default is Scaleio123). If necessary, the customer can give you the credentials.

**Steps**

1. Ensure that you are logged in to iDRAC.
2. On the main menu, click **iDRAC settings > Connectivity**.
3. In the **Connectivity** tab, select **Network > IPMI Settings**.
   - The IPMI configuration settings appear.
4. Change the **Enable IPMI Over LAN** option to **Disabled**, and then click **Apply**.
5. Click **OK**.
6. Log out of iDRAC.

### Updating the BIOS, firmware and settings

VxFlex Ready Node deployments require specific versions of drivers, BIOS, and firmware that have been qualified by Dell EMC. If the servers do not have the correct versions, you must update them.

A variety of factors can influence a mismatch between the required versions and the versions installed on the servers, such as firmware updates post server shipment, or a FRU replacement with a different firmware version than in the warehouse. For example, if you have replaced the server system board, the FRU's BIOS and iDRAC firmware versions will be different.

You are required to verify that all server drivers, BIOS, and firmware meet the required versions, as published in the VxFlex Ready Node Driver and Firmware Matrix, located at [https://support.emc.com/products/42216](https://support.emc.com/products/42216), before deploying a server in the VxFlex Ready Node environment.

To perform any updates needed to meet VxFlex Ready Node requirements, use the VxFlex Ready Node Hardware Update Bootable ISO (*"Hardware ISO"*). The Hardware ISO is based on the Dell OpenManage Deployment Toolkit (DTK). The DTK provides a framework of tools necessary for the configuration of VxFlex Ready Node servers. For PowerFlex, a custom script has been injected, along with specific qualified BIOS/firmware update packages.
The Hardware ISO has been designed to make the firmware update process consistent and simple. You can use it to update firmware, BIOS, and configuration settings two different ways, depending on how many VxFlex Ready Node servers you are updating:

- To update the firmware, BIOS, and configuration settings on a single server, use the iDRAC Virtual KVM.
- If several servers in the VxFlex Ready Node deployment require updates, it is recommended that you use remote RACADM. RACADM allows for the simultaneous update of the versions on multiple VxFlex Ready Node servers, with minimal steps. For instructions, see Update the hardware using remote RACADM on page 40.

For additional information regarding the Hardware ISO, see DTK - Hardware Update Bootable ISO on page 40.

**Update the hardware using the iDRAC virtual console**

The iDRAC Virtual KVM console and Virtual CDROM features, provided by the iDRAC Enterprise license, eliminate the need for physical access to the VxFlex Ready Node servers. The Hardware ISO can be attached as a remote/Virtual CDROM image and configured to perform hardware updates to the VxFlex Ready Node firmware.

**About this task**

If you are performing updates on multiple servers, you can optionally use remote RACADM instead. When remote RACADM is used, you do not need to use multiple web browser windows and perform manual keyboard and mouse clicks for each server. To use remote RACADM, see Update the hardware using remote RACADM on page 40.

For more information about the Hardware ISO, see DTK - Hardware Update Bootable ISO on page 40.

**Steps**

1. Ensure that the laptop or server is configured with access to the iDRAC network. For details, see *Set up the iDRAC IP address and BIOS* in this publication.
2. Download the VxFlex Ready Node Hardware Update Bootable ISO from https://support.emc.com/products/42216 and make it accessible in the network share folder or other appropriate folder.
3. Connect to the iDRAC Virtual KVM console.
4. Attach the Hardware ISO to Virtual Media.
   a. From the Virtual Media menu, select Connect Virtual Media.
   b. From the Virtual Media menu, select Map CD/DVD.
   c. Click Browse, and select the Hardware ISO.
5. From the Next Boot menu, select Virtual CD/DVD/ISO and configure the Next Boot option so that the server will boot to the iDRAC Virtual CDROM.
6. Power-cycle the server using the appropriate Power menu option, and allow the server to boot to the virtual media.
7. Repeat steps 3 through 6 for each VxFlex Ready Node server that requires BIOS or firmware updates and configuration. All VxFlex Ready Node servers can be updated in parallel.
8. When the updates are completed, refresh the iDRAC browser screen, log in to the iDRAC, and re-launch the virtual console as needed.
9. Wait for the configuration and firmware updates to complete. The server console screen will indicate when the script is complete.

**WARNING:** Do not reboot the VxFlex Ready Node server while the update process is being performed! The iDRAC will be reset several times during the update process. This causes the iDRAC virtual console viewer to close, virtual media to disconnect, and the iDRAC browser window to be unavailable for several minutes during each reset. The hardware update scripts will continue to run from RAM on the server. The update script will generate a log indicating whether each configuration and firmware flash is successful.

10. (Optional) Check each VxFlex Ready Node server’s log for successful competition:
   a. After the update script completes, press Alt+F2 to access a user console, and then Enter to log in.
   b. Check the log contents for errors:
      ```
      less /bundleapplicationlogs/apply_components.log
      ```
      For more information, see Troubleshooting the Hardware ISO on page 43.
   c. Press q to exit the log viewer, and then Alt+F1 to access the original console screen.
11. Reboot the VxFlex Ready Node server and allow the update and configuration jobs to complete. Power-cycle the server using the appropriate Power menu option.

12. For each VxFlex Ready Node server, after the updates are finalized, clear the iDRAC job queue using the iDRAC GUI:
   a. From your Internet browser, go to https://<iDRAC_IP_address>.
   b. In the DELL Console Login window, type these credentials:
      - username: root
      - password: <password>
   c. Click Login.
   d. In the iDRAC GUI navigation pane, select the Maintenance tab, and then select the Job Queue tab.
   e. Ensure that all jobs have completed successfully. Any job failures may require re-running the bootable ISO, or further troubleshooting.
   f. Select the checkbox for all of items in the Job Queue list, and then click Delete.

13. Continue with OS installation and configuration, PowerFlex deployment, and other required tasks.

Sanitize the NVDIMMs

In cases where you are reconfiguring an existing VxFlex Ready Node server for a different operating system, and NVDIMM modules are mounted on the nodes, sanitize the NVDIMMs. If you are configuring a new VxFlex Ready Node server, skip this task.

Steps
1. Reboot the server.
   A message should appear, informing you that a new NVDIMM was detected in the relevant slot.
2. Press F2 immediately to enter System Setup.
3. Navigate to System BIOS > Memory Settings > NVDIMM-N Persistent Memory.
   System BIOS displays the NVDIMM information for the system.
4. Select every NVDIMM installed on the node.
5. Find the Sanitize NVDIMM setting in the list and select the Enabled option.
   A warning appears that NVDIMM data will be erased if changes are saved when exiting BIOS.
6. Click OK.
7. Click Back > Back > Back to exit to System BIOS Settings, and then click Finish > Yes > OK.
8. Click Finish, and then at the prompt click OK.
   The system reboots.
Installing the ESXi operating system

This section describes the procedures for installing the VMware ESXi operating system on a VxFlex Ready Node server.

**ESXi system requirements**

To deploy on ESXi nodes in the VxFlex Ready Node environment, the following prerequisites must be met:

- Ensure that the M.2 device on the BOSS device is configured as a RAID 1 device.
- During OS installation, use Scaleio123 as the password for the root or administrator username. (Alternately, provide a password that meets the local security criteria.)
- In a 2-Layer installation, Dell EMC supplies a VxFlex Ready Node image ISO. Follow the wizard installation steps. The default password is Scaleio123. If required, you can change the password by using the `passwd` command.
- Install the operating system on the BOSS device.

**Driver support for ESXi nodes**

Ensure that correct drivers are installed in your system.


**NOTE:** Before enabling DirectPath, ensure that the correct driver is installed.

**Rebuild the RAID 1 boot device using the replaced M.2 module**

The BOSS device consists of two 240/480 GB M.2 expansion cards. If necessary, rebuild the M.2 cards as a RAID 1 device.

**Steps**

1. Power on the node.
2. In the iDRAC Virtual console, press F2 immediately after you see the message **F2 = System Setup** during system startup.
3. On the **System Setup Main Menu** screen, select **Device Settings > AHCI Controller in Slot 2: BOSS-S1 Configuration Utility**.
4. On the **BOSS-S1 Configuration Utility** screen, select **Physical/Virtual Disk Information** to verify the disk configuration.
5. On the **BOSS-S1 Configuration Utility > Operation Menu** screen, select **Physical Disk Info** as the Device Output Type, and then press Enter. The physical disk information should display two expansion card devices configured to the server.
6. Select **Virtual Disk Info** as the Device Output Type, and then press Enter. The configuration should show one virtual disk in a degraded RAID state configured on the server.
7. Click **Back**.
8. On the BOSS-S1 Configuration Utility screen, select Rebuild Raid.

You can monitor the status of the rebuild in the Storage > Virtual Disks screen. During the rebuild, the status of the M.2 will be displayed as Degraded.

When the M.2 array is rebuilt, its status will be similar to the following:

| VD_R1_1  | Online |

9. On the Virtual Disk Information screen, verify that the settings are configured as follows:

- **RAID Level**: RAID1
- **Stripe Size**: 64 K
- **Virtual Disk Size**: 111/222 GB (The size will correspond to the M.2 device in use.)
- **Name**: OS
- **Would you like to create this virtual disk**:
  - First-time configuration: Yes
  - M.2 card replacement: No

10. Exit System Setup and boot to the OS.

Results

The BOSS-S1 Configuration Utility > Operation Menu screen displays one virtual disk with the specified name.

Map the ESXi ISO file on a VxFlex Ready Node server

Map the ISO file on a VxFlex Ready Node server.

Prerequisites

Ensure that you can access the KVM console.

Steps

1. Open the KVM console using the Launch link.

**NOTE**: If the VxFlex Ready Node server was shipped with the operating system factory installed, proceed directly to Step 7.

2. In the DELL System Setup screen, select Virtual Media > Connect Virtual Media.

The Initializing connection screen is displayed with a connecting message.

You may have to wait for some time for the connecting message to finish.

3. In the DELL System Setup screen, select Virtual Media > Map CD/DVD.

4. From the Virtual Media - Map CD/DVD screen, browse and set up the ISO file and then click Map Device.

5. To verify the ISO file selection, click Virtual Media and view the ISO selection in the drop down list.

6. Reset the server:
   a. In the main DELL System Setup console window, select Power > Reset System (warm boot) to display the list of keyboard keys with related functionality.
   b. Press F11. The Boot Manager Main Menu pane is displayed.
   c. Select One-shot BIOS Boot Menu. The Select Legacy Boot Option pane is displayed.
   d. Select Virtual Optical Drive.

The server boots using the OS ISO file and finishes the installation.

7. If the node contains a factory-installed OS, the datastores will not be visible in the vSphere Web Client. The BOSS card is partitioned, and the OS is installed in the visible partition. To use the remaining storage on the BOSS card for the datastore, perform the following steps:
   a. In the vSphere Web Client, select Storage > New Datastore > Create New VMFS datastore.
   b. Select the empty partition for the datastore.

   Datastore 1 is created on the empty BOSS card.
Network architecture and physical connectivity

This section provides networking requirements and connectivity information for VxFlex Ready Node ESXi servers.

Networking connectivity architecture and cabling best practice

The following information describes connectivity architecture, cabling best practice information, and cable connection examples from typical PowerFlex configurations in ESXi environments in order to help you plan your network.

NOTE: If you are not familiar with VxFlex Ready Node system architecture, refer to the "Architecture" chapter in the Getting to Know PowerFlex Guide.

On ESXi servers, VLANs can be used as long as the broadcast domain is the same between the Discovery Server and the ESXi management port.

The best way to use VLANs with PowerFlex is to configure the switch port to Mode Access, and assign it to one VLAN. A management switch that has only one use is recommended. Usually, this implies one IP subnet, but the switch can contain several subnets on a single VLAN.

When using several VLANs on the same port, the port must to be configured as Trunk, and you must assign a VLAN ID on each vSwitch on the ESXi host. This configuration can be performed on a VxFlex Ready Node server after deployment is complete by updating the VM network and relevant VMKernel port to use the VLAN ID set by the switch manager. This is similar to any other VLAN implementation.

It is mandatory to set the management VLAN as either a Layer 2 VLAN without an IP address, or as VLAN 0 (meaning, no VLAN). This facilitates a seamless onsite "Add Node" operation.

IP addresses for R640, R740xd, and R840 servers

Prepare IP addresses in your network for the VxFlex Ready Node servers in ESXi environments, based on the following calculations:

NOTE: In addition to the networking requirements below, ensure that you have prepared the items described in Additional equipment and network resource requirements on page 8 earlier in this guide.

Table 3. PowerFlex management IP network

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Number of nodes</td>
</tr>
<tr>
<td>IP address pools</td>
<td>The pools of IP addresses used for static allocation for the following groups:</td>
</tr>
<tr>
<td>1. Node_MGMT_IP</td>
<td>Management IP addresses of the VxFlex Ready Node servers</td>
</tr>
<tr>
<td>2. SVM_MGMT_IP</td>
<td>PowerFlex storage VM management IP address</td>
</tr>
<tr>
<td>3. BMC_MGMT_IP</td>
<td>iDRAC IP address for each node</td>
</tr>
</tbody>
</table>

The formula to calculate IP address subnet pool or subnet needs is: N*Node_MGMT_IP+N*SVM_MGMT_IP+N*BMC_MGMT_IP + Optional (AMS server IP address)

The PowerFlex data IP network requires two separate subnets.

NOTE: Multiple IP subnets used for the PowerFlex data network cannot be on the same subnet. For more information, see this VMware limitation in the following link:
### Table 4. PowerFlex data IP network for Subnet #1

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Number of nodes</td>
<td></td>
</tr>
<tr>
<td>IP address pool for Subnet #1</td>
<td>The pools of IP addresses used for static allocation for the following groups:</td>
<td>For clarity, the first subnet is referred to as &quot;Data1&quot;</td>
</tr>
<tr>
<td></td>
<td>1. Node_DATA1_IP = internal (interconnect) IP addresses of the VxFlex Ready Node servers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. SVM_DATA1_IP = PowerFlex Storage VM Management IP addresses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. MDM_Cluster_Virtual_IP_DATA1 = the Virtual IP addresses of the MDM cluster in the &quot;Data1&quot; network</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The formula to calculate the subnet pool or subnet needs is: N<em>Node_DATA1_IP+N</em>SVM_DATA1_IP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+MDM_Cluster_Virtual_IP_DATA1</td>
</tr>
</tbody>
</table>

### Table 5. PowerFlex data IP network for Subnet #2

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Number of nodes</td>
<td></td>
</tr>
<tr>
<td>IP address pool for Subnet #2</td>
<td>The pools of IP addresses used for static allocation for the following groups:</td>
<td>For clarity, the second subnet is referred to as &quot;Data2&quot;</td>
</tr>
<tr>
<td></td>
<td>1. Node_DATA2_IP = internal (interconnect) IP addresses of the VxFlex Ready Node servers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. SVM_DATA2_IP = PowerFlex Storage VM Management IP addresses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. MDM_Cluster_Virtual_IP_DATA2 = the Virtual IP addresses of the MDM cluster in the &quot;Data2&quot; network</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The formula to calculate the subnet pool or subnet needs is: N<em>Node_DATA2_IP+N</em>SVM_DATA2_IP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+MDM_Cluster_Virtual_IP_DATA2</td>
</tr>
</tbody>
</table>

**NOTE:** The subnet mask and default gateway of the data networks cannot be modified after initial configuration. If you plan to have 1024 nodes in your PowerFlex system, plan for a subnet allowing 1025 IP addresses for SVM, and 1024 IP addresses for hosts per data network. IP address pools may be modified to allow additional IP addresses to be added to new nodes.
Configuring network ports on ESXi hosts

This section describes how to configure the ports on a VxFlex Ready Node ESXi host.

Configure network ports on R640 or R740xd servers

Use the following information to configure network ports on R640 or R740xd servers.

R640 and R740xd server NIC and iDRAC port locations

NIC and iDRAC port designations for VxFlex Ready Node R640 and R740xd servers for various server configurations are described in this topic. NICs may be located onboard, and in PCI slots, depending on the server configuration.

The following figure shows possible connector locations on the rear panel of the servers. Actual NIC locations depend on server configurations. Some models do not contain NICs in all possible slots.

- In R640, items marked 1 to 3 represent PCI slots.
- In R740xd, items marked 1 to 8 represent PCI slots.

**NOTE:** When a GPU is installed in a VxFlex Ready Node server, not all the slots are available.
Figure 1. R640 and R740xd PCI slots, integrated NICs and iDRAC port locations

Data cables are connected to two switches for high availability, via the nodes' 10 GbE, 25 GbE, or 100 GbE ports. Management interfaces are connected to a switch on a separate management network using onboard and iDRAC ports.

The iDRAC IP address can reside on a different subnet and/or VLAN.

If there are two PCI cards or more, the lowest slot number is used for allocation of data ports. For example, if slots 2, 3 and 5 are populated with NICs, AMS uses slots 2 and 3, and the left port on each PCI card is used for data.

The default configuration used in simple mode deployment follows the following rules of thumb:

- If there is a 1G NIC onboard, the left one of the pair is always used for the management network.
- If there is only one NIC, the left 10G onboard port is used for the data network.
- If there are only 2*25GbE onboard ports, the left port is used for both the management and data network, and the right port for is used for data.

**NOTE:** The application\client network will have to run on those same two ports.

- If there are only 4*10G onboard ports:
  - The left port is used for management
  - The left port, and the third port from the left are used for PowerFlex data
  - The second port from the left, and the right port are used for application\client traffic
VxFlex Ready Node R640 port designations - ESXi

Connect the cables and configure the system in an ESXi-based system as shown in the following tables, depending on the server type and architecture, when relevant.

### R640 servers

**NOTE:** In the following tables use SFP+ for 10 GbE ports, SFP28 for 25 GbE ports, and QSFP28 for 100 GbE ports.

**Table 6. R640 server configuration for 10/25/100 GbE, 1CPU, SFP+/SFP28**

<table>
<thead>
<tr>
<th>Description</th>
<th>iDRAC Monitoring</th>
<th>PowerFlex Data1</th>
<th>PowerFlex Client Network Port1</th>
<th>PowerFlex Client Network Port2</th>
<th>PowerFlex Management Network</th>
<th>Not in Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port</td>
<td>iDRAC</td>
<td>vmnic0</td>
<td>vmnic1</td>
<td>vmnic4</td>
<td>vmnic5</td>
<td>vmnic2</td>
</tr>
<tr>
<td>PCI slot</td>
<td>N/A</td>
<td>2:0</td>
<td>2:1</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Physical Port on node</td>
<td>iDRAC (remote KVM)</td>
<td>PCI 10/25/100 GbE (Left)</td>
<td>PCI 10/25/100 GbE (Right)</td>
<td>Onboard 10/25/100 GbE (Right)</td>
<td>Onboard 10/25/100 GbE (Left) - The same as for PowerFlex Data2</td>
<td>N/A</td>
</tr>
<tr>
<td>Speed</td>
<td>1 GbE</td>
<td>10/25/100 GbE</td>
<td>10/25/100 GbE</td>
<td>10/25/100 GbE</td>
<td>10/25/100 GbE</td>
<td>N/A</td>
</tr>
<tr>
<td>vSwitch</td>
<td>N/A</td>
<td>sio_vSwitch1</td>
<td>User allocated</td>
<td>User allocated</td>
<td>vSwitch1</td>
<td>vSwitch0</td>
</tr>
<tr>
<td>VMkernel port</td>
<td>vmk2</td>
<td>User configurable</td>
<td>User configurable</td>
<td>vmk3</td>
<td>vmk0</td>
<td>N/A</td>
</tr>
<tr>
<td>Physical Switch</td>
<td>Mgmt Switch</td>
<td>Switch 1</td>
<td>Switch 1</td>
<td>Switch 2</td>
<td>Switch 2</td>
<td>Mgmt Switch/ Switch 2</td>
</tr>
</tbody>
</table>

**Table 7. R640 server configuration for 10/25/100 GbE, 2CPU, SFP+/SFP28**

<table>
<thead>
<tr>
<th>Description</th>
<th>iDRAC Monitoring</th>
<th>PowerFlex Data1</th>
<th>PowerFlex Client Network Port1</th>
<th>PowerFlex Client Network Port2</th>
<th>PowerFlex Management Network</th>
<th>Not in Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port</td>
<td>iDRAC</td>
<td>vmnic0</td>
<td>vmnic1</td>
<td>vmnic4</td>
<td>vmnic5</td>
<td>vmnic2</td>
</tr>
<tr>
<td>PCI slot</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Physical Port on node</td>
<td>iDRAC (remote KVM)</td>
<td>PCI 10/25/100 GbE (Left)</td>
<td>PCI 10/25/100 GbE (Right)</td>
<td>PCI 10/25/100 GbE (Right)</td>
<td>Onboard 1 GbE (Left)</td>
<td>N/A</td>
</tr>
<tr>
<td>Speed</td>
<td>1 GbE</td>
<td>10/25/100 GbE</td>
<td>10/25/100 GbE</td>
<td>10/25/100 GbE</td>
<td>1 GbE</td>
<td>N/A</td>
</tr>
<tr>
<td>vSwitch</td>
<td>N/A</td>
<td>sio_vSwitch1</td>
<td>User allocated</td>
<td>User allocated</td>
<td>sio_vSwitch2</td>
<td>vSwitch0</td>
</tr>
<tr>
<td>VMkernel port</td>
<td>vmk2</td>
<td>User configurable</td>
<td>User configurable</td>
<td>vmk3</td>
<td>vmk0</td>
<td>N/A</td>
</tr>
<tr>
<td>Physical Switch</td>
<td>Mgmt Switch</td>
<td>Switch 1</td>
<td>Switch 1</td>
<td>Switch 2</td>
<td>Switch 2</td>
<td>Mgmt Switch</td>
</tr>
</tbody>
</table>

**NOTE:** This configuration supports more than one PCIe-based NIC in slots 2 and 3.
VxFlex Ready Node R740xd port designations - ESXi

Connect the cables and configure the system in an ESXi-based system as shown in the following tables, depending on the server type and architecture, when relevant.

R740xd servers

**NOTE:** In the following tables use SFP+ for 10 GbE, and SFP28 for 25 GbE ports, and QSFP28 for 100 GbE.

### Table 8. R740xd server configuration for 10/25/100 GbE, 32xSAS, SFP+/SFP28

<table>
<thead>
<tr>
<th>Description</th>
<th>iDRAC Monitoring</th>
<th>PowerFlex Data1</th>
<th>PowerFlex Client Network Port1</th>
<th>PowerFlex Client Network Port2</th>
<th>PowerFlex Data2</th>
<th>PowerFlex Management Network</th>
<th>Not in Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port</td>
<td>iDRAC</td>
<td>vmnic0</td>
<td>vmnic1</td>
<td>vmnic4</td>
<td>vmnic5</td>
<td>vmnic2</td>
<td>vmnic3</td>
</tr>
<tr>
<td>PCI slot</td>
<td>N/A</td>
<td>1:0</td>
<td>1:1</td>
<td>2:1</td>
<td>2:0</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Physical Port on node</td>
<td>iDRAC (remote KVM)</td>
<td>PCI 10/25/100 GbE (Left)</td>
<td>PCI 10/25/100 GbE (Right)</td>
<td>PCI 10/25/100 GbE (Right)</td>
<td>PCI 10/25/100 GbE (Left)</td>
<td>Onboard 1 GbE (Left)</td>
<td>N/A</td>
</tr>
<tr>
<td>Speed</td>
<td>1 GbE</td>
<td>10/25/100 GbE</td>
<td>10/25/100 GbE</td>
<td>10/25/100 GbE</td>
<td>10/25/100 GbE</td>
<td>1 GbE</td>
<td>N/A</td>
</tr>
<tr>
<td>vSwitch</td>
<td>N/A</td>
<td>sio_vSwitch1</td>
<td>User allocated</td>
<td>User allocated</td>
<td>sio_vSwitch2</td>
<td>vSwitch0</td>
<td>N/A</td>
</tr>
<tr>
<td>VMkernel port</td>
<td>vmk2</td>
<td>User configurable</td>
<td>User configurable</td>
<td>User configurable</td>
<td>vmk3</td>
<td>vmk0</td>
<td>N/A</td>
</tr>
<tr>
<td>Physical Switch</td>
<td>Mgmt Switch</td>
<td>Switch 1</td>
<td>Switch 1</td>
<td>Switch 2</td>
<td>Switch 2</td>
<td>Mgmt Switch</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**NOTE:** The above configuration supports more than one PCIe slot-based NIC.

### Table 9. R740xd server configuration for 10/25/100 GbE, 12xNVMe, SFP+/SFP28

<table>
<thead>
<tr>
<th>Description</th>
<th>iDRAC Monitoring</th>
<th>PowerFlex Data1</th>
<th>PowerFlex Client Network Port1</th>
<th>PowerFlex Client Network Port2</th>
<th>PowerFlex Data2</th>
<th>PowerFlex Management Network</th>
<th>Not in Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port</td>
<td>iDRAC</td>
<td>vmnic0</td>
<td>vmnic1</td>
<td>vmnic4</td>
<td>vmnic5</td>
<td>vmnic2</td>
<td>vmnic3</td>
</tr>
<tr>
<td>PCI slot</td>
<td>N/A</td>
<td>2:0</td>
<td>2:1</td>
<td>7:1</td>
<td>7:0</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Physical Port on node</td>
<td>iDRAC (remote KVM)</td>
<td>PCI 10/25/100 GbE (Left)</td>
<td>PCI 10/25/100 GbE (Right)</td>
<td>PCI 10/25/100 GbE (Right)</td>
<td>PCI 10/25/100 GbE (Left)</td>
<td>Onboard 1 GbE (Left)</td>
<td>N/A</td>
</tr>
<tr>
<td>Speed</td>
<td>1 GbE</td>
<td>10/25/100 GbE</td>
<td>10/25/100 GbE</td>
<td>10/25/100 GbE</td>
<td>10/25/100 GbE</td>
<td>1 GbE</td>
<td>N/A</td>
</tr>
<tr>
<td>vSwitch</td>
<td>N/A</td>
<td>sio_vSwitch1</td>
<td>User allocated</td>
<td>User allocated</td>
<td>sio_vSwitch2</td>
<td>vSwitch0</td>
<td>N/A</td>
</tr>
<tr>
<td>VMkernel port</td>
<td>vmk2</td>
<td>User configurable</td>
<td>User configurable</td>
<td>User configurable</td>
<td>vmk3</td>
<td>vmk0</td>
<td>N/A</td>
</tr>
<tr>
<td>Physical Switch</td>
<td>Mgmt Switch</td>
<td>Switch 1</td>
<td>Switch 1</td>
<td>Switch 2</td>
<td>Switch 2</td>
<td>Mgmt Switch</td>
<td>N/A</td>
</tr>
</tbody>
</table>
### Table 10. R740xd server configuration for 25 GbE, 3xGPU (P40) / 2xGPU (M10), SFP28

<table>
<thead>
<tr>
<th>Description</th>
<th>iDRAC Monitoring</th>
<th>PowerFlex Data1/ PowerFlex Management Network</th>
<th>PowerFlex Data2</th>
<th>Not in Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port</td>
<td>iDRAC</td>
<td>vmnic1</td>
<td>vmnic0</td>
<td>vmnic3</td>
</tr>
<tr>
<td>PCI slot</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Physical Port on node</td>
<td>iDRAC (remote KVM)</td>
<td>Onboard 25 GbE (Left)</td>
<td>Onboard 25 GbE (Right)</td>
<td>None</td>
</tr>
<tr>
<td>Speed</td>
<td>1 GbE</td>
<td>25 GbE</td>
<td>25 GbE</td>
<td>None</td>
</tr>
<tr>
<td>vSwitch</td>
<td>N/A</td>
<td>vSwitch0</td>
<td>sio_vSwitch1</td>
<td>N/A</td>
</tr>
<tr>
<td>VMkernel port</td>
<td></td>
<td>vmk2</td>
<td>vmk3</td>
<td>N/A</td>
</tr>
<tr>
<td>Physical Switch</td>
<td>Mgmt Switch</td>
<td>Data Switch 1</td>
<td>Data Switch 2</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**NOTE:** The above configuration supports more than one PCIe slot-based NIC.

### Table 11. R740xd server configuration for 10GbE, 3xGPU (P40) / 2xGPU (M10), SFP+

<table>
<thead>
<tr>
<th>Description</th>
<th>iDRAC Monitoring</th>
<th>PowerFlex Data1/ PowerFlex Client Network Port1</th>
<th>PowerFlex Client Network Port2</th>
<th>PowerFlex Data2</th>
<th>PowerFlex Management Network</th>
<th>Not in Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port</td>
<td>iDRAC</td>
<td>vmnic0</td>
<td>vmnic3</td>
<td>vmnic2</td>
<td>vmnic0</td>
<td>N/A</td>
</tr>
<tr>
<td>PCI slot</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Physical Port on node</td>
<td>iDRAC (remote KVM)</td>
<td>Onboard 10 GbE (far Left)</td>
<td>Onboard 10 GbE (second from Left)</td>
<td>Onboard 10 GbE (far Right)</td>
<td>Onboard 10 GbE (far Left) - The same as for PowerFlex Data1</td>
<td>None</td>
</tr>
<tr>
<td>Speed</td>
<td>1 GbE</td>
<td>10 GbE</td>
<td>10 GbE</td>
<td>10 GbE</td>
<td>10 GbE</td>
<td>None</td>
</tr>
<tr>
<td>vSwitch</td>
<td>N/A</td>
<td>vSwitch0</td>
<td>User allocated</td>
<td>User allocated</td>
<td>sio_vSwitch1</td>
<td>vSwitch0</td>
</tr>
<tr>
<td>VMkernel port</td>
<td></td>
<td>vmk2</td>
<td>User configurable</td>
<td>User configurable</td>
<td>vmk3</td>
<td>vmk0</td>
</tr>
<tr>
<td>Physical Switch</td>
<td>Mgmt Switch</td>
<td>Data Switch 1</td>
<td>Data Switch 1</td>
<td>Data Switch 2</td>
<td>Mgmt/Data1 Switch</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**NOTE:** The above configuration supports only two 25 GbE onboard NICs in three-GPU configuration. In configurations with only two GPUs, another PCIe-based NIC is supported: one in slot 3 and/or one in slot 4.

**NOTE:** In configurations with only two GPUs, another PCIe-based NIC is supported in either slot 3 or slot 4.

### Configure the Management IP address - ESXi

Configure the Management IP address using the ESXi console.

**Steps**

1. Open the ESXi KVM console.
2. From the console, press F2 to open the Customize System/View Logs menu. The Authentication Required window is displayed.
3. Type the server password defined during installation: ScaleIO123. Wait a few seconds for the System Customization window to appear; if it does not, press F2 again.
5. In the **Configure Management Network** window, select **Network Adapters**, and press Enter.
6. Using the Up/Down arrow keys, scroll to the appropriate vmnic for your hardware (the management port vmnic differs per server type: 1U, 2U Storage-Only, 2U Converged, etc.)
7. Select the desired vmnic by pressing the Space bar.
8. Click **OK** to approve the selection.
9. In the **Configure Management Network** window, scroll to **IP Configuration**, and press Enter.
10. In the **IP Configuration** popup window, change the selected option to **Set static IP address and network configuration**, using the Up/Down arrow keys for navigation and the Space bar for selection.
11. Use the Up/Down arrow keys to move to the IP address fields, and type the node's Management IP Address, Subnet Mask, and Default Gateway.
12. Press Enter to apply the IP address changes.
13. In the **Configure Management Network** window, press Esc to exit the window. When the confirmation popup window appears, press Y to approve and apply the configuration.

**Results**

Configuration of the Management IP address is now complete. The node can now be connected to a vCenter. Once connected, validate that the IP address configuration performed in these steps is correct.

**NOTE:** Data IP addresses, vSwitches, and all Storage VM IP addresses are configured during the plug-in deployment flow.

**Configure network ports on R840 servers**

Use the following information to configure network ports on R840 servers.

**R840 server NIC and iDRAC port locations**

NIC and iDRAC port designations for VxFlex Ready Node R840 servers for various server configurations are described in this topic. NICs may be located onboard, or in PCI slots, depending on the server configuration.

The following figure shows possible connector locations on the back panel of the servers. NIC locations depend on server configurations. Some models do not contain NICs in all possible slots. Items marked 1 to 3 represent PCI slots.

**NOTE:** When a GPU is installed in a VxFlex Ready Node R840 server, not all the slots are available.

![Figure 2. Rear view of the R840](image-url)
Data cables are connected to two switches for high availability, using the nodes’ 25 GbE or 100 GbE ports (not supported for integrated NICs). Management interfaces are connected to a turn on a separate management network using onboard and iDRAC ports.

Additionally, integrated NICs can be used for data connections for up to 25/100 GbE support. The iDRAC IP address can reside on a different subnet and/or VLAN.

The default configuration that is used in simple mode deployment follows the following rules of thumb:

- If there is a 1G NIC onboard, the left one of the pair is always used for the management network.
- If there is only one NIC, the left 10G onboard port is used for the data network.
- If there are only 2*25/100 GbE onboard ports, the left port is used for both the management and data network, and the right port for is used for data.

**NOTE:** The application/client network must run on these same two ports.

- If there are only 4*10G onboard ports:
  - The left port is used for management.
  - The left port, and the third port from the left are used for PowerFlex data.
  - The second port from the left, and the right port are used for application/client traffic.

### VxFlex Ready Node R840 port designations - ESXi

Connect the cables and configure the system in an ESXi-based system as shown in the following tables, depending on the server type and architecture, when relevant.

The tables below show the most common correlation between the physical NIC port location and the logical configuration in VMware. When using the same slot locations as shown below, all settings but one setting are static. The vmnic number is the dynamic setting and is determined by the VMware bus scan and boot logic. This number cannot be set persistently.

If you need to build your own table of reference, correlate the ESXi physical ports to the vmnic logical port name.

#### R840

**NOTE:** In the following tables use SFP+ for 10 GbE, and SFP28 for 25 GbE ports.

<table>
<thead>
<tr>
<th>Description</th>
<th>iDRAC Monitoring</th>
<th>PowerFlex Data1</th>
<th>PowerFlex Client Network Port1</th>
<th>PowerFlex Client Network Port2</th>
<th>PowerFlex Data2</th>
<th>PowerFlex Management Network</th>
<th>Not in Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port</td>
<td>iDRAC</td>
<td>vmnic5</td>
<td>vmnic4</td>
<td>vmnic7</td>
<td>vmnic6</td>
<td>vmnic0</td>
<td>vmnic1/2/3</td>
</tr>
<tr>
<td>PCI slot</td>
<td>N/A</td>
<td>4:0</td>
<td>4:1</td>
<td>6:0</td>
<td>6:1</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Physical Port on node</td>
<td>iDRAC (remote KVM)</td>
<td>PCI 10/25 GbE (Left)</td>
<td>PCI 10/25 GbE (Right)</td>
<td>PCI 10/25 GbE (Left)</td>
<td>PCI 10/25 GbE (Left)</td>
<td>Onboard 1 GbE (Left)</td>
<td>N/A</td>
</tr>
<tr>
<td>Speed</td>
<td>1 GbE</td>
<td>10/25 GbE</td>
<td>10/25 GbE</td>
<td>10/25 GbE</td>
<td>10/25 GbE</td>
<td>1 GbE</td>
<td>N/A</td>
</tr>
<tr>
<td>vSwitch</td>
<td>N/A</td>
<td>sio_vSwitch</td>
<td>User allocated</td>
<td>User allocated</td>
<td>sio_vSwitch2</td>
<td>vSwitch0</td>
<td>N/A</td>
</tr>
<tr>
<td>VMkernel port</td>
<td>vmk1</td>
<td>User configurable</td>
<td>User configurable</td>
<td>vmk2</td>
<td>vmk0</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Physical Switch</td>
<td>Mgmt Switch</td>
<td>Switch 1</td>
<td>Switch 1</td>
<td>Switch 2</td>
<td>Switch 2</td>
<td>Mgmt Switch</td>
<td>N/A</td>
</tr>
</tbody>
</table>
NOTE: The above configuration supports more than one PCIe slot-based NIC.

Table 13. R840 server configuration for 2x25GbE rNDC, 2xGPU – SAS or NVME

<table>
<thead>
<tr>
<th>Description</th>
<th>iDRAC Monitoring</th>
<th>PowerFlex Data1/PowerFlex Management Network</th>
<th>PowerFlex Data2</th>
<th>Not in Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port</td>
<td>iDRAC</td>
<td>vmnic1</td>
<td>vmnic0</td>
<td>vmnic3</td>
</tr>
<tr>
<td>PCI slot</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Physical Port on node</td>
<td>iDRAC (remote KVM)</td>
<td>Onboard 25 GbE (Left)</td>
<td>Onboard 25 GbE (Right)</td>
<td>None</td>
</tr>
<tr>
<td>Speed</td>
<td>1 GbE</td>
<td>25 GbE</td>
<td>25 GbE</td>
<td>None</td>
</tr>
<tr>
<td>vSwitch</td>
<td>N/A</td>
<td>vSwitch0</td>
<td>sio_vSwitch1</td>
<td>N/A</td>
</tr>
<tr>
<td>VMkernel port</td>
<td></td>
<td>vmk2</td>
<td>vmk3</td>
<td>N/A</td>
</tr>
<tr>
<td>Physical Switch</td>
<td>Mgmt Switch</td>
<td>Data Switch 1</td>
<td>Data Switch 2</td>
<td>N/A</td>
</tr>
</tbody>
</table>

NOTE: The above configuration supports only two 25 GbE onboard NICs in two-GPU configuration. In configurations with only two GPUs, another PCIe-based NIC is supported: one in slot 3 and/or one in slot 4.

Configure the Management IP address - ESXi

Configure the Management IP address using the ESXi Direct Console User Interface (DCUI).

Steps

1. Open the ESXi KVM console.
2. From the console, press F2 to open the Customize System/View Logs menu. The Authentication Required window is displayed.
3. Type the server password defined during installation: ScaleIO123 Wait a few seconds for the System Customization window to appear; if it does not, press F2 again.
5. In the Configure Management Network window, select Network Adapters, and press Enter.
6. Using the Up/Down arrow keys, scroll to the appropriate vmnic for your hardware (the management port vmnic differs per server type: 1U, 2U Storage-Only, 2U Converged, etc.)
7. Select the desired vmnic by pressing the Space bar.
8. Click OK to approve the selection.
9. In the Configure Management Network window, scroll to IP Configuration, and press Enter.
10. In the IP Configuration popup window, change the selected option to Set static IP address and network configuration using the Up/Down arrow keys for navigation and the Space bar for selection.
11. Use the Up/Down arrow keys to move to the IP address fields, and type the node's Management IP Address, Subnet Mask, and Default Gateway.
12. Press Enter to apply the IP address changes.
13. In the Configure Management Network window, press Esc to exit the window. When the confirmation popup window appears, press Y to approve and apply the configuration.

Results

Configuration of the Management IP address is now complete. The node can now be connected to a vCenter. Once connected, validate that the IP address configuration performed in these steps is correct.

NOTE: Data IP addresses, vSwitches, and all Storage VM IP addresses are configured during the plug-in deployment flow.
Installing the Drivers

The following topics contain information regarding PowerFlex drivers.

Install the PowerFlex drivers on an ESXi server

Dell EMC recommends that you install all applicable PowerFlex drivers on the ESXi server in preparation for installing the PowerFlex software.

Steps

1. Download the PowerFlex driver Zip file from https://support.emc.com/products/42216 to a Windows-based server.

2. Using a Windows OS-based system, unzip the file's contents to a temporary location on Drive C, such as C:\temp. The unzipped file displays a list of folders that correspond to the hardware components that may be installed on your server.

3. Browse through the folders and locate the ESXi drivers that correspond to the hardware components installed on the server.

4. Using an application such as winscp, copy the driver files to a temporary folder on the PowerFlex server.

5. Log in to the ESXi host.

6. Get the list of drivers currently installed on the server:

   esxcli software vib list

7. Compare the version for each vib in the Zip file to the version installed on the system, and make a note of the drivers that need to be updated.

8. If none of the drivers need to be updated, skip the rest of this procedure. Otherwise:
   - For each driver being upgraded, run:
     
     esxcli software vib install -d <driver_file>
   - For each driver being downgraded:
     a. Remove the current driver from the server:

     esxcli software vib remove -d <driver_file>

     ![NOTE: If the output instructs you to reboot the server at this point, ignore it.]

     b. Install the correct driver version:

     esxcli software vib install -d <driver_file>

9. After all the new drivers are installed, reboot the ESXi host:

    esxcli system shutdown reboot -r 'replace driver'

10. After the system has rebooted, view the results of the previous steps:

    esxcli software profile get

11. Verify that the correct versions of drivers are running:
   - Get the list of drivers currently installed on the server:

    esxcli software vib list
b. Get the information for each driver that was updated:

```
esxcli software vib get -n <driver_name>
```
Preparing Drives

For R640 and R740xd systems, if necessary, prepare the drives so that they can be added to PowerFlex SDS devices.

Verify the disk controller type

Verify the controller type installed on a VxFlex Ready Node server, using the integrated Dell Remote Access Controller (iDRAC) web utility.

Prerequisites

Ensure that you have access to:
- The IP address of the iDRAC port
- The username and password for accessing the iDRAC

About this task

The server contains one of two types of controllers:
- HBA330 controllers: This server has only SSD.
- H730p/H740p controller card: This server may have either only HDD, or a mix of HDD and SSD.

Steps

1. From your Internet browser, go to http://<iDRAC_IP_address>.
2. In the DELL Console Login window, type the user name and password, and click Login. The Integrated Remote Access Controller screen appears.
3. In the navigation pane, select Storage > Controllers. Controller-related information is displayed in the Health and Properties table, with the controller type shown in the Name column.

For example:

| PERC H740p Mini (Embedded) |

Next steps

- If the system uses an HBA330 controller, proceed to the next chapter and perform any additional configurations required before deploying PowerFlex.
- If the system uses an H730p or H740p controller card, create a virtual drive on the drive, starting by enabling the PERCCLI disk utility on the server.

Enable PERCCLI on an ESXi-based system

Before creating virtual disks, enable the PERCCLI disk utility. You may also need to install the disk driver. Use this task for ESXi-based systems configured for RDM.

Prerequisites

Ensure that you have:
- Root access to the server on which PERCCLI is to be installed
- Access to the Internet to enable you to download the PERCCLI utility
Steps

2. Extract the ZIP file.
3. Copy the installation file, `vmware-esx-perccli-7.529.00.vib`, to `/tmp` on the server.
4. Run the installation command on the server:
   ```shell
esxcli software vib install -f -v /tmp/vmware-esx-perccli-7.529.00.vib
```
5. Before running PERCCLI commands, change your working directory to the utility's binary location:
   ```shell
cd /opt/lsi/perccli/
```

Results

PERCCLI can now be used either from the ESXi console or via SSH.

**NOTE:** PERCCLI commands are run in the following format:

```
./perccli command
```

For example, to view help, run:

```
./perccli -h
```

Create virtual drives with PERCCLI

Create virtual drives (VDs) on drives using the PERCCLI utility. You are required to perform this step before adding drives to a PowerFlex SDS server in the VxFlex Ready Node system.

**NOTE:** Skip this step if the server contains the HBA330 controller or if you are configuring a VxFlex Ready Node R840 system.

When creating virtual drives, the following rules apply:

- Create one virtual drive for each kind of drive, HDD or SSD.
- The VDs for HDD are configured with Direct IO, write-back, and read-ahead enabled (abbreviated in PERCCLI as RWBD).
- The VDs for SSD are configured with Direct IO and write-through, but read-ahead is not enabled. (Abbreviated in PERCCLI as NRWTD.)

In the following PERCCLI command, the controller ID is assumed to be 0, designated by `/c0`. In some cases, the controller ID may be different, which will cause a `Controller 0 not found` error to be displayed. If this occurs, determine your controller ID by running the following command:

```shell
cd /opt/lsi/perccli/; ./perccli show
```

The controller ID is displayed in the `System Overview` section of the output, in the `Ctl` column.

The following table lists the different drive configurations on a VxFlex Ready Node R640 or R740xd server:

<table>
<thead>
<tr>
<th>Node contains</th>
<th>Caching options</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDD for storage</td>
<td>NA</td>
</tr>
<tr>
<td>Mix of HDD and SSD for storage</td>
<td>Caching not used</td>
</tr>
<tr>
<td>Mix of HDD and SSD, where some HDDs or SSDs are for storage and others provide acceleration</td>
<td>RFcache</td>
</tr>
</tbody>
</table>

Before creating VDs, you must gather some information about the drives and devices configured on each node.
Verify the storage and disk controller status

Before creating virtual drives (VDs), verify the storage and disk controller status.

Prerequisites

Before using PERCCLI, ensure that your working directory is /opt/lsi/perccli/. If it is not, run:

```
cd /opt/lsi/perccli/
```

About this task

In this task, use the PERCCLI utility to perform the following tasks:

- Verifying that all the disks are in UGood (unconfigured, but good) status
- Removing all the existing VDs from the node
- Setting up the controller card boot parameter

Steps

1. Log in to the node.
2. Display the disk information on the node:

```
/opt/lsi/perccli/perccli /c0/eall/sall show
```

Output similar to the following is displayed:

```
Drive Information:

<table>
<thead>
<tr>
<th>EID</th>
<th>Slot</th>
<th>Type</th>
<th>Size</th>
<th>Intf</th>
<th>Med</th>
<th>SED</th>
<th>PI</th>
<th>SeSz</th>
<th>Model</th>
<th>Sp</th>
</tr>
</thead>
<tbody>
<tr>
<td>32:0</td>
<td>0</td>
<td>UGood</td>
<td>744.625 GB</td>
<td>SAS</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>512B</td>
<td>LT0800MO</td>
<td>U</td>
</tr>
<tr>
<td>32:1</td>
<td>1</td>
<td>UGood</td>
<td>744.625 GB</td>
<td>SAS</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>512B</td>
<td>LT0800MO</td>
<td>U</td>
</tr>
<tr>
<td>32:2</td>
<td>2</td>
<td>UGood</td>
<td>744.625 GB</td>
<td>SAS</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>512B</td>
<td>LT0800MO</td>
<td>U</td>
</tr>
<tr>
<td>32:3</td>
<td>3</td>
<td>UGood</td>
<td>744.625 GB</td>
<td>SAS</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>512B</td>
<td>LT0800MO</td>
<td>U</td>
</tr>
<tr>
<td>32:4</td>
<td>4</td>
<td>UGood</td>
<td>744.625 GB</td>
<td>SAS</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>512B</td>
<td>LT0800MO</td>
<td>U</td>
</tr>
<tr>
<td>32:5</td>
<td>5</td>
<td>UGood</td>
<td>1.091 TB</td>
<td>SAS</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>512B</td>
<td>ST120MM0088</td>
<td>U</td>
</tr>
<tr>
<td>32:6</td>
<td>6</td>
<td>UGood</td>
<td>1.091 TB</td>
<td>SAS</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>512B</td>
<td>ST120MM0088</td>
<td>U</td>
</tr>
<tr>
<td>32:7</td>
<td>7</td>
<td>UGood</td>
<td>1.091 TB</td>
<td>SAS</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>512B</td>
<td>ST120MM0088</td>
<td>U</td>
</tr>
<tr>
<td>32:8</td>
<td>8</td>
<td>UGood</td>
<td>1.091 TB</td>
<td>SAS</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>512B</td>
<td>ST120MM0088</td>
<td>U</td>
</tr>
<tr>
<td>32:9</td>
<td>9</td>
<td>UGood</td>
<td>1.091 TB</td>
<td>SAS</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>512B</td>
<td>ST120MM0088</td>
<td>U</td>
</tr>
<tr>
<td>32:10</td>
<td>10</td>
<td>UGood</td>
<td>1.091 TB</td>
<td>SAS</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>512B</td>
<td>ST120MM0088</td>
<td>U</td>
</tr>
<tr>
<td>32:11</td>
<td>11</td>
<td>UGood</td>
<td>1.091 TB</td>
<td>SAS</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>512B</td>
<td>ST120MM0088</td>
<td>U</td>
</tr>
</tbody>
</table>
```

The output shows the following:

- Enclosure ID (EID): Used in a later step when creating VDs
- Slot ID (SLT) of each drive: Used in a later step when creating VDs
- Drive type: Displays SSD or HDD as the device type. (SSD drives are smaller—744 GB in this case.)
- Drive state: Should be UGood (unused and good)

3. Verify that the VDs exist on the node:

```
/opt/lsi/perccli/perccli /c0/vall show
```

Output similar to the following is displayed:

```
Controller = 6
Status = Success
Description = No VDs have been configured
```

If the output confirms that VDs exist on the node, perform the next step to remove them. Otherwise, skip the next step.
4. Remove all existing VDs from the node:

```
/opt/lsi/perccli/perccli /c0/vall del
```

The VDs are removed.

5. Set the controller card boot parameter:

```
/opt/lsi/perccli/perccli /c0 set bootwithpinnedcache=on
```

The boot parameter of the controller card is defined.

**Results**

You have verified that the disks are in the UGood (unconfigured, but good) state and that the controller card boot parameter is set to on. You can now create virtual drives.

---

**Create virtual drives for an HDD using PERCCLI on ESXi systems**

Use PERCCLI to create virtual drives (VDs) for HDDs on a VxFlex Ready Node server.

**Prerequisites**

Ensure that the PERCCLI disk utility is installed.

Before using PERCCLI, ensure that your working directory is /opt/lsi/perccli/. If it is not, run: cd /opt/lsi/perccli/

**About this task**

You need to create one VD for each HDD. The VDs for HDDs are configured with Direct IO, write-back, and read-ahead enabled.

**Steps**

1. Log in to the server.
2. Create a VD that can be accelerated using a utility such as RFcache, or that will not be accelerated at all:

```
/opt/lsi/perccli/perccli /c0 add vd type=raid0 drives=<EID>:<Slt> direct wb ra pdcache=off
```

Example:

```
/opt/lsi/perccli/perccli /c0 add vd type=raid0 drives=32:6 direct wb ra pdcache=off
```

where <EID> and <Slt> are the Enclosure ID and Slot ID values, identified in a previous step.

Output similar to the following is displayed:

```
Controller = 0
Status = Success
Description = Add VD Succeeded
```

**Results**

The VD was created successfully.
Create virtual drives for SSD with PERCCLI on ESXi systems

Use PERCCLI to create virtual drives (VDs) for SSDs on a VxFlex Ready Node server.

Prerequisites
Ensure that the PERCCLI disk utility is installed.
Before using PERCCLI, ensure that your working directory is /opt/lsi/perccli/. If it is not, run:

```bash
cd /opt/lsi/perccli/
```

About this task
Use this procedure both for SSD for storage and SSD to be used to provide caching acceleration. The VDs created on SSD are configured with Direct IO and write-through, but read-ahead is not enabled.

Steps
1. Log in to the server.
2. Create the VD:

```
/opt/lsi/perccli/perccli /c0 add vd type=raid0 drives=<EID>:<Slt> direct wt nora
```

Example:
```
/opt/lsi/perccli/perccli /c0 add vd type=raid0 drives=32:0 direct wt nora
```

where EID and Slt are the Enclosure ID and Slot ID values, which in this example are 32:0.

Results
The VD was created successfully.

Next steps
Continue with the procedure that referred you to this topic.

Ensure virtual drive creation with PERCCLI

Use the PERCCLI utility to ensure that a virtual drive (VD) was created properly on each drive.

Prerequisites
Before using PERCCLI, ensure that your working directory is /opt/lsi/perccli/. If it is not, run:

```bash
cd /opt/lsi/perccli/
```

Steps
1. Log in to the server.
2. Display the physical device (PD) information:

```
/opt/lsi/perccli/perccli /c0/eall/sall show
```

Output similar to the following is displayed:
3. Verify that all the devices have a virtual drive created on them.
   In the Drive Information output, the device state displayed as "Oln" in the State column shows that the device has a virtual drive created on it.

4. Display device group (DG) and virtual drive (VD) information:

   

   Output similar to the following is displayed:


5. Verify that all the VDs are configured correctly.
   The following values should appear in the display:
   - Cache = NRWTD (for SSDs)
   - Cache = RWBD (for HDDs)
This section describes additional configurations required for the VxFlex Ready Node server installation process.

Install OpenManage Enterprise

Dell EMC OpenManage Enterprise is a web-based console that simplifies hardware monitoring and firmware maintenance on VxFlex Ready Node servers. It is recommended that you install OpenManage Enterprise.

About this task

**NOTE:** An additional SupportAssist option is available for hardware home call capabilities.

To learn about using OpenManage Enterprise with VxFlex Ready Node servers, see Managing VxFlex Ready Nodes using OpenManage Enterprise. Both this publication and the PowerFlex OpenManage Enterprise Catalog are available from [https://support.emc.com/products/42216](https://support.emc.com/products/42216).

**NOTE:** This link requires your Dell EMC account credentials.

Contact your PowerFlex account team for information on how to order OpenManage Enterprise and SupportAssist.

Activate the NVIDIA GPU on the server

In deployments where an NVIDIA GRID GPU card is configured on the VxFlex Ready Node server, activate the NVIDIA GRID Enterprise software.

Prerequisites

Verify that:

- A valid GRID Enterprise software license exists. GRID Enterprise software is licensed by the number of concurrent users and must have been purchased with the GPU-enabled VxFlex Ready Node servers. The following editions are available for NVIDIA GRID Software license:
  - Virtual Applications (vAPP)
  - Virtual PC (vPC)
  - Virtual Workstation (vWS)

Steps

1. Locate the email with the PAK and registration link to the NVIDIA licensing portal.
2. Log in to the licensing portal to access the Product Activation Key and driver for your NVIDIA card.
3. Follow the instructions for enabling and setting up the GPU card.

Installing the iDRAC Service Module on an ESXi server

The iDRAC Service module (iSM) is a small OS-resident process that expands iDRAC management into supported host operating systems. Services that the iSM adds include OS information, automatic system recovery, and remote server power cycle. It also enables NVMe device removal without shutting down or rebooting the system.

The iSM is available as a Zip archive for installing on systems running the VMware ESXi operating system. You can install the iSM via SSH or using the vSphere CLI.

The Driverpack file for the approved iSM package is available from [https://support.emc.com/products/42216](https://support.emc.com/products/42216).
Install the iSM using SSH

Install the iDRAC Service Module (iSM) software on the ESXi host via SSH.

Steps
1. Download the Driverpack file for the iSM package from https://support.emc.com/products/42216.
2. Unzip the file to a local directory on the system.
3. Upload the VIB to the ESXi host’s datastore.
4. Log in to the vCenter via the vSphere Web Client.
5. For each guest operating system, select the guest OS, and from the Actions > Power menu, select Shut Down Guest OS.
6. When all the guest operating systems are powered off, right-click the ESXi host and select Enter Maintenance Mode.
7. Establish an SSH connection to the ESXi host and log in using the root username and password.
8. Install the iSM software:

   esxcli software vib install - d /vmfs/volumes/datastore/<iDRAC Service Module file>

   The command output tells you whether the installation succeeded.

9. Right-click the ESXi host and select Power > Reboot.
10. From the iDRAC web interface, open the iDRAC settings > Overview page and ensure that the iDRAC Service Module status is Running

Install the iSM using the vSphere CLI

Install the iDRAC Service Module (iSM) software on the ESXi host using the vSphere CLI.

Steps
1. Download the Driverpack file for the iSM package from https://support.emc.com/products/42216.
2. Unzip the file to a local directory on the system.
3. Log in to the vCenter via the vSphere Web Client.
4. For each guest operating system, select the guest OS, and from the Actions > Power menu, select Shut Down Guest OS.
5. When all the guest operating systems are powered off, right-click the ESXi host and select Enter Maintenance Mode.
6. If you are using the vSphere CLI from a Windows server, navigate to the directory where you have installed the vSphere CLI utilities.

   NOTE: If you are using the vSphere CLI on a Linux server, perform the command from any directory.

7. Install the iSM software:

   esxcli --server <host_IP> software vib install - d /var/log/vmware/<iDRAC Service Module file>

8. At the prompt, type the root username and password of the ESXi host.
   The command output tells you whether the installation succeeded.
9. Right-click the ESXi host and select Power > Reboot.
10. Optionally view the information about the installed VIBs:

    esxcli --server <IP> software vib get

    or

    software vib list

11. From the iDRAC web interface, open the iDRAC settings > Overview page and ensure that the iDRAC Service Module status is Running
Prepare the DAX devices

If the deployment will be using NVDIMM devices for acceleration, perform the following tasks to prepare the NVDIMMs as DAX acceleration devices.

NVDIMM information table

Before you prepare the NVDIMM as a DAX device, create or print the following NVDIMM information table. Use it to record the information that you discover while performing the following task. You will need the information to add the acceleration device to PowerFlex.

Table 14. NVDIMM information table

<table>
<thead>
<tr>
<th>Item</th>
<th>Replacement NVDIMM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Number</td>
<td></td>
</tr>
<tr>
<td>Device name (NMEM)</td>
<td></td>
</tr>
<tr>
<td>Namespace</td>
<td></td>
</tr>
<tr>
<td>DAX device name (chardev)</td>
<td></td>
</tr>
<tr>
<td>Acceleration device path</td>
<td></td>
</tr>
</tbody>
</table>

Prepare the NVDIMM as a DAX (Acceleration) device on an ESXi-based node

Prepare the replacement NVDIMM as a DAX/Acceleration device on an ESXi-based node before adding it to the SDS.

Prerequisites

**NOTE:** If you evacuated the node from PowerFlex, skip this task.

Steps

1. Using SSH, connect to the SVM with the replacement NVDIMM.
2. Display the ndctl list to verify that the NVDIMM mapping is successful and that the NVDIMM capacity is accurate.

   ndctl list

   The namespace should be namespace0.0 and the NVDIMM capacity should be the same as what you configured in the previous task.

3. Run the following command to create a namespace on the NVDIMM:

   ndctl create-namespace -f -e namespace0.0 --mode=dax --align=4K

Results

You are now ready to add the DAX/Acceleration device to the NVDIMM Acceleration Pool.

Next steps

The server is now ready for PowerFlex deployment. Take note of the following required steps for deploying your system:

The Dell EMC Deploy PowerFlex Guide explains how to deploy PowerFlex on VxFlex Ready Node servers. Follow the preparation guidelines and deployment procedures relevant to your environment.
NVDIMM configuration on ESXi nodes is performed after deploying PowerFlex. Complete instructions are included in the Dell EMC Configure and Customize PowerFlex Guide.

If you are new to PowerFlex and VxFlex Ready Node products, Dell EMC recommends that you refer to: How to Find Information for VxFlex OS.

Deployment limitations and requirements:

Pay attention to the following when using the Deploy PowerFlex Guide to deploy PowerFlex on R840 systems:

- VxFlex Ready Node R840 with NVDIMM acceleration is not supported at this time.
- For VxFlex Ready Node R840 functioning as a Compute Node (SDC and LIA only) as part of a 2-layer architecture based system, refer to the "Linux" section, 2-layer system topics in the Deploy PowerFlex Guide.
- For VxFlex Ready Node R840 with an SAS controller on ESXi, refer to the "VMware ESXi" section, DirectPath configuration flow in the Deploy PowerFlex Guide. All other VMware-based options are not supported for this controller.
- For VxFlex Ready Node R840 with NVMe disks on ESXi, refer to the "VMware ESXi" section, RDM configuration flow in the Deploy PowerFlex Guide.
This section contains additional information that may be required for the procedures described in this document.

**DTK - Hardware Update Bootable ISO**

The Dell EMC OpenManage Deployment Toolkit (DTK) includes a set of utilities, sample scripts, and sample configuration files that you can use to deploy and configure the Dell EMC systems. This section provides additional information on using the VxFlex Ready Node Hardware Update Bootable ISO ("Hardware ISO") to update drivers, BIOS, and firmware on VxFlex Ready Node servers.

**Dell EMC OpenManage DRAC Tools (RACADM)**

An integrated Dell Remote Access Controller (iDRAC) with Lifecycle Controller is embedded in every Dell EMC VxFlex Ready Node server. The RACADM command-line utility provides a scriptable interface that enables you to configure the iDRAC either locally or remotely. The utility runs on the management station and the managed system.

The RACADM utility supports the following interfaces:

- **Local** - Supports running RACADM commands from the managed server's operating system. To run local RACADM commands, install the OpenManage software on the managed server. Only one instance of Local RACADM can be executed on a system at a time.
- **SSH or Telnet (also known as Firmware RACADM)** - Firmware RACADM is accessible by logging in to iDRAC using SSH or Telnet.
- **Remote** - Supports running RACADM commands from a remote management station such as a laptop or desktop running Windows or Linux. To run Remote RACADM commands, install the DRAC Tools utility from the OpenManage software on the remote computer.

**Update the hardware using remote RACADM**

You can install and execute the Dell EMC RACADM tool from any management system with access to the iDRAC network. The remote RACADM command set is useful in this situation to mount and execute the Hardware ISO to a large number of VxFlex Ready Node servers. This prevents the need for multiple web browser windows and manual keyboard and mouse clicks for each server.

**Steps**

1. Configure a laptop or server with access to the iDRAC network.
2. Install the DRAC tools, including RACADM:
   a. In any web browser, go to the Dell EMC iDRAC Tools page for your operating system on the Support site.
   b. Follow the instructions for downloading and installing Remote RACADM.
3. Download the VxFlex Ready Node Hardware Update Bootable ISO from the [https://support.emc.com/products/42216](https://support.emc.com/products/42216) and make it accessible on the network share folder.
4. Create a CIFS or NFS network share that includes the Hardware ISO. The share will need to be accessible on the network share folder.
   Refer to OS vendor guidelines for instructions on how to create CIFS (windows) or NFS (Linux or XenServer) shares.
5. Open a terminal/command prompt with superuser/administrator accessibility. This prompt should allow execution of the RACADM utility.
6. Mount the Hardware ISO to the iDRAC from the remote share, where the following command is all on one line:

   ```bash
   racadm -r <dracIP> -u root -p <password> remotemage -c -u <myuser> -p <mypass> -I //<myip>/SIORN/VxFlex-Ready-Node-Hardware-Update-for-Dell_14G_2018_May_A00.iso
   ```
Where:

- `<dracIP>` is the iDRAC IP address
- `<password>` is the password for the server
- `<myuser>` is the NFS/CIFS share username
- `<mypass>` is the NFS/CIFS share password
- `<myip>` is the NFS/CIFS server IP

**NOTE:** The default password is Scaleio123.

7. Enable the iDRAC VirtualCD to boot once using these Remote RACADM commands:

```
racadm -r <dracIP> -u root -p <password> set iDRAC.ServerBoot.BootOnce Enabled
racadm -r <dracIP> -u root -p <password> set iDRAC.ServerBoot.FirstBootDevice VCD-DVD
```

8. Verify that the server is in a state in which it can be power-cycled. (The OS should be in maintenance mode, as needed).

9. Power-cycle the VxFlex Ready Node server:

```
racadm -r <dracIP> -u root -p <password> serveraction graceshutdown
```

10. Repeat steps 6 on page 40 - 9 on page 41 for each VxFlex Ready Node server needing the BIOS and firmware updates and configuration. All servers can be updated in parallel.

11. Wait for the configuration and firmware updates to complete. The server console screen will indicate when the script is complete.

**WARNING:** Do not reboot the VxFlex Ready Node server while the update process is being performed!

The iDRAC will be reset several times during the update process. This causes the iDRAC virtual console viewer to close, virtual media to disconnect, and the iDRAC browser window to be unavailable for several minutes during each reset. The hardware update scripts will continue to run from RAM on the server.

The update script will generate a log indicating whether each configuration and firmware flash is successful.

12. (Optional) Check each VxFlex Ready Node server’s log for successful competition:

   a. Connect to the iDRAC KVM console screen.
   b. After the update script completes, press Alt+F2 to access a user console, and then Enter to log in.
   c. Check the log contents for errors:

   ```
   less /bundleapplicationlogs/apply_components.log
   ```

   For more information, see Troubleshooting the Hardware ISO on page 43.

d. Press `q` to exit the log viewer, and then Alt+F1 to access the original console screen.

13. Reboot the servers and allow the update and configuration jobs to complete. You can do this remotely using RACADM (see Step 9 on page 41) or locally from the server console screen.

14. For each server, check the iDRAC job queue to verify that the iDRAC jobs created by the bootable ISO have completed successfully:

```
racadm -r <dracIP> -u root -p <password> jobqueue view
```

Any job failures may require running the bootable ISO again, or further troubleshooting.

15. For each server, after the hardware updates are finalized, clean up the iDRAC job queue:

```
racadm -r <dracIP> -u root -p <password> jobqueue delete --all
```

16. Continue with OS installation and configuration, PowerFlex deployment, and other required tasks.

At the end of the process, the BIOS password changes to emcbios.
Recommended BIOS and firmware settings

This section describes the BIOS, firmware, and configuration settings included in the Hardware ISO.

PowerFlex ID module

The Hardware ISO runs a script that automatically flashes the ID module, as needed.
This action rebrands server naming, and is intended to make it compatible with the VxFlex Ready Node offering.
The VxFlex Ready Node ID module should be installed only on VxFlex Ready Node servers. In the event of a system board failure, the Hardware ISO can assist with the reinstallation of the ID module on the replacement system board.

BIOS and firmware

The Hardware ISO runs a script that automatically forces the server to install the necessary firmware updates.
This firmware is consistent with the qualified Dell EMC VxFlex Ready Node Driver and Firmware Matrix, located at https://support.emc.com/products/42216.
Some of the firmware listed in the table is dependent on the VxFlex Ready Node hardware configuration. The Hardware ISO attempts to apply all firmware updates, but only those updates that are compatible will be installed.

Applying settings using RACADM

The individual firmware files are also available on the Dell EMC Online Support site, and can easily be installed using the following remote RACADM command:

```
racadm -r <dracIP> -u root -p <password> update -f <filename.exe>
```

Where:
- `<dracIP>` is the iDRAC IP address
- `<password>` is the password for the server
- `<filename.exe>` is the name of the Dell EMC Windows update packages

**NOTE:** The default password is Scaleio123.

Configuration settings

The Hardware ISO runs a script that automatically configures the BIOS and iDRAC settings listed in the table below. Some settings are dependent on the server model.

### Table 15. Hardware ISO configuration settings

<table>
<thead>
<tr>
<th>Description</th>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server BIOS Boot Sequence</td>
<td>BIOS.BiosBootSettings.BootSeq</td>
<td>HardDisk.List.1-1</td>
</tr>
<tr>
<td>Server Boot Mode</td>
<td>BIOS.BiosBootSettings.BootMode</td>
<td>Bios</td>
</tr>
<tr>
<td>SRIOV Global Enablement</td>
<td>BIOS.IntegratedDevices.SriovGlobalEnable</td>
<td>Enabled</td>
</tr>
</tbody>
</table>
### Table 15. Hardware ISO configuration settings (continued)

<table>
<thead>
<tr>
<th>Description</th>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory Performance Tuning</td>
<td>BIOS.MemSettings.SnoopMode</td>
<td>EarlySnoop</td>
</tr>
<tr>
<td>System Change Tracking</td>
<td>BIOS.MiscSettings.InSystemCharacterization</td>
<td>Disabled</td>
</tr>
<tr>
<td>CPU Virtualization Features</td>
<td>BIOS.ProcSettings.ProcVirtualization</td>
<td>Enabled</td>
</tr>
<tr>
<td>CPU Cores</td>
<td>BIOS.ProcSettings.ProcCores</td>
<td>All</td>
</tr>
<tr>
<td>CPU X2APIC Mode</td>
<td>BIOS.ProcSettings.ProcX2Apic</td>
<td>Enabled</td>
</tr>
<tr>
<td>CPU Turbo Engagement</td>
<td>BIOS.ProcSettings.ControlledTurbo</td>
<td>Disabled</td>
</tr>
<tr>
<td>System Power Profile</td>
<td>BIOS.SysProfileSettings.SysProfile</td>
<td>PerfOptimized</td>
</tr>
<tr>
<td>OS to iDRAC Pass-through Mode</td>
<td>iDRAC.OS-BMC.PTMode</td>
<td>usb-p2p</td>
</tr>
<tr>
<td>OS to iDRAC Enablement</td>
<td>iDRAC.OS-BMC.AdminState</td>
<td>Enabled</td>
</tr>
<tr>
<td>iDRAC DHCP Enablement</td>
<td>iDRAC.IPv4.DHCPEnable</td>
<td>Enabled</td>
</tr>
<tr>
<td>iDRAC Default Credentials</td>
<td>iDRAC.Tuning.DefaultCredentialWarning</td>
<td>Disabled</td>
</tr>
<tr>
<td>iDRAC IPMI Enablement</td>
<td>iDRAC.IPMIlan.Enable</td>
<td>Enabled</td>
</tr>
<tr>
<td>iDRAC Alert Enablement</td>
<td>iDRAC.IPMIlan.AlertEnable</td>
<td>Enabled</td>
</tr>
<tr>
<td>iDRAC IPv6 Enablement</td>
<td>iDRAC.IPv6.Enable</td>
<td>Enabled</td>
</tr>
</tbody>
</table>

### Applying settings using RACADM

The individual settings can also be applied using the remote RACADM command:

```
racadm -r <dracIP> -u root -p <password> set <setting> <value>
```

Where:

- `<dracIP>` is the iDRAC IP address
- `<password>` is the password for the server
- `<setting>` is the BIOS/iDRAC setting name
- `<value>` is the BIOS/iDRAC setting value

**NOTE:**

When setting the BIOS configuration, include this command:

```
racadm -r <dracIP> -u root -p <password> jobqueue create BIOS.Setup.1-1 <value>
```

### Troubleshooting the Hardware ISO

This section describes troubleshooting procedures for problems you may encounter while using the Hardware ISO.

#### Troubleshoot general iDRAC failures

When problems occur with iDRAC or Lifecycle Controller jobs, you can delete all jobs with a single iDRAC command. All of the completed jobs, plus any orphaned pending jobs, are deleted, and the data manager service on the iDRAC is restarted.

**Steps**

1. Clear the iDRAC job queue:

   ```
   racadm -r <dracIP> -u root -p <password> jobqueue delete -i JID_CLEARALL_FORCE
   ```
Where:

- `<dracIP>` is the iDRAC IP address
- `<password>` is the password for the server

**NOTE:** The default password is Scaleio123.

2. Wait 120 seconds.
   The iDRAC is unable to process any other jobs during this time.
3. Reset the iDRAC

   ```bash
   racadm -r <dracIP> -u root -p <password> racreset
   ``

   The iDRAC becomes accessible on the network 3 to 5 minutes after the reset.

### iDRAC virtual console issues

Within the iDRAC virtual console window, if the keyboard or some of the keys are not responding, perform the following checks:

- Ensure on your keyboard that the Scroll Lock button is off.
- In the iDRAC virtual console, ensure that the **Keyboard/Mouse Attach State** is set to **Auto-attached**.

For persistent iDRAC virtual console issues, see Troubleshoot general iDRAC failures on page 43.

### iDRAC virtual media issues

The following are solutions to problems that may occur when using iDRAC virtual media:

1. If the iDRAC is stuck, one of these actions may assist with recovery:
   - In the server’s **Attached Media** screen, disconnect the iDRAC Remote File Share from the iDRAC browser.
   - Disconnect the iDRAC remote image:

   ```bash
   racadm -r <dracIP> -u root -p <password> remoteimage –d
   ```

   Where:
   - `<dracIP>` is the iDRAC IP address
   - `<password>` is the password for the server

   **NOTE:**
   - The default password is Scaleio123.

2. Issues when booting to iDRAC virtual media may cause CPU machine check errors at POST. When this occurs, clear the iDRAC job queue and reset the iDRAC, as described in Troubleshoot general iDRAC failures on page 43.

### Rebranding operation fails

When updating the Personality Module on servers using the DTK, the operation may fail and the following error message may appear:

```
UEFI0052 Unable to complete the rebranding operation.
```

To resolve the problem, upload the PM file manually:

1. Contact Customer Support for the PowerFlex PM file.
2. Follow the instructions in the *Upgrade PowerFlexGuide* for “Single server firmware and BIOS upgrade to a specific version” to upload the file.
Check the logs for error messages

You can view VxFlex Ready Node Hardware Update Bootable ISO logs after the update script completes.

**Steps**

1. Press Alt-F2 to access a user console, and then press Enter.
2. Open the log to check the contents for errors:
   
   ```
   less /bundleapplicationlogs/apply_components.log
   ```
3. You can also view the script for the Hardware ISO, which is useful in helping to identify and troubleshoot log entries:
   
   ```
   less /opt/dell/toolkit/systems/drm_files/apply_bundles.sh
   ```

**Results**

The script attempts to configure several boot order commands, regardless of the hardware configuration of the VxFlex Ready Node server. This allows the script to support multiple hardware platform configurations.

Therefore, it is normal to see these error messages within the logs:

![Example log entries]

Firmware updates may also display and log the following message:

```
This update is not compatible with your system configuration.
```

These firmware are included on the ISO in order to support various VxFlex Ready Node platforms. The log messages do not necessarily indicate a failure.
Additional resources

This section contains information regarding additional resources that may be helpful when using the Hardware ISO.

VxFlex Ready Node resources

VxFlex Ready Node deployments have specific guidelines regarding server installation, rack and stack procedures, and power and networking requirements.

The VxFlex Ready Node Hardware Installation Guide describes how to install the physical components of a VxFlex Ready Node system. For additional information regarding the VxFlex Ready Node product, documentation, advisories, downloads, and white papers, visit the VxFlex Ready Node product page.

Dell Lifecycle Controller (LC)

At the heart of the VxFlex Ready Node servers' embedded management is the iDRAC with Lifecycle Controller (LC) technology. This technology allows users to perform useful tasks such as configuring BIOS and hardware settings, deploying operating systems, updating drivers, changing RAID settings, and saving hardware profiles. Together, they provide a robust set of management functions that can be leveraged throughout the entire server lifecycle.

For more information, visit the Lifecycle Controller wiki homepage.

Dell EMC OpenManage Deployment Toolkit (DTK)

The Dell EMC OpenManage Deployment Toolkit (DTK) includes a set of utilities, sample scripts, and sample configuration files that you can use to deploy and configure Dell systems.

You can use the DTK to build script-based and RPM-based installation for deploying large number of systems on a pre-operating system environment in a reliable way, without changing their current deployment processes. Using DTK you can install operating systems on Dell EMC systems in Unified Extensible Firmware Interface (UEFI) mode.

For more information, visit the Dell OpenManage Deployment Toolkit wiki homepage.
Getting help

This section explains the different resources available for getting help for your system.

Contacting Dell EMC

Use this topic to learn how to contact Dell EMC.

About this task

Dell EMC provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell EMC for sales, technical support, or customer service issues use the steps in this task.

NOTE: If you do not have an active internet connection, you can find contact information on your purchase invoice, packing slip, bill, or Dell EMC product catalog.

Steps

2. For customized support:
   a. Type your system Service Tag in the Service Tag box.
   b. Click Submit.
3. For general support:
   a. Select your product category.
   b. Select your product segment.
   c. Select your product.
   The support page that lists the various support categories is displayed.

Example

Secure Remote Services

Secure Remote Services (formerly ESRS) is a secure, two-way connection between Dell EMC products and Dell EMC Customer Support that helps customers avoid and resolve issues up to 73 percent faster. There is also an email alert for this. It is completely virtual and offers flexibility for enterprise environments of any size.

Key benefits

- Proactive wellness monitoring and issue prevention
- Automated issue detection, notification and case creation for quicker uptime
- Predictive analytics-based recommendations through MyService360 and product consoles

The Secure Remote Services lifeline is a heartbeat that pulses outbound from the Secure Remote Services gateway to Dell EMC Customer Service in 30-second intervals, providing Dell EMC with connectivity status as well as the status of each product. The heartbeat ensures continuous monitoring, notification, and if necessary, proactive remote troubleshooting to ensure high availability of your products. As a result, you will experience faster resolution and greater uptime.

Recycling or End-of-Life service information

Take back and recycling services are offered for this product in certain countries.

If you want to dispose of system components, visit Dell.com/recyclingworldwide and select the relevant country.