Building Microsoft Windows Server 2012 Clusters on the Dell PowerEdge VRTX

Startup Guide

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Introduction

This guide provides instructions on how to configure the Dell™ PowerEdge™ VRTX chassis with Microsoft® Windows Server® 2012 in a supported failover cluster environment. These instructions cover configuration and installation information for:

- Chassis-shared storage and networking
- Failover clustering
- Hyper-V
- Cluster Shared Volumes (CSV)
- Specialized requirements for Windows Server 2012 to function correctly with the VRTX chassis

Requirements

Table 1, 0, and Table 3 list the software requirements hardware requirements, and networking requirements for proper configuration of the VRTX chassis, server node(s), and operating system (OS)..

Table 1. Software requirements

Software	Use	Location
Current SPERC8 Driver	Required for shared disk connectivity.	http://support.dell.com
Current M620 Drivers	Required for optimal operating system performance.	http://www.dell.com/support/troubleshooting/us/en/555/Product/poweredge-m620
Current M520 Drivers	Required for optimal operating system performance.	http://www.dell.com/support/troubleshooting/us/en/555/Product/poweredge-m520
Administrator password	Used for all Microsoft Windows installation methods.	Contact your local system administrator.
DHCP Server or Static IP addresses	Server Network Interface Card network connectivity.	Contact your local system administrator.
Operating System media	Required for operating system installation.	OEM availability with purchase or self-provided.
VRTX Firmware	Required for optimal system and operating system performance.	http://support.dell.com

Table 2. Hardware requirements

Hardware
Ethernet Network cable for the chassis CMC
Ethernet Network cables for each of the blade NICs

Table 3. Cluster requirements

Cluster name	Cluster resource
DHCP Server or Static IP addresses	Cluster IP Resource, Cluster Heartbeat Resource
SPERC8 Shared Disk	Quorum Shared Disk Resource, Cluster Shared Volume Resource
Active Directory Domain Membership	Active Directory Domain Controller
Domain Administrator Account	Active Directory membership

Note: Update all firmware for the Chassis Management Controller (CMC), mainboard, iDRAC7, I/O module, Shared PERC8, expander, and physical disks before completing any additional steps.

Chassis setup

This section provides information on proper chassis location, as well as instructions on setting up the chassis using the LCD display and cabling the CMC and VRTX IOM network modules. This information includes the port mappings for the VRTX I/O Module (IOM) pass-through module to their corresponding blade slots and VRTX IOM switch module port listings.

Chassis placement and CMC cabling

1. Place the chassis in an appropriate location with proper ventilation, and access to the rear of the chassis and the appropriate electrical receptacles.
2. Verify all power supplies are properly installed in the chassis and plugged into an appropriate electrical source.
3. Connect an Ethernet cable to the top CMC port on the rear of the chassis. The port is located just above the serial port as shown in Figure 1.

Figure 1. CMC and serial ports

4. Insert server node(s) into the slots provided in the chassis.

LCD chassis setup and configuration

1. Press the power button on the front of the chassis just above the KVM and USB ports to power the chassis on.
2. Press the round center button on the top of the front of the chassis for the LCD display.
3. Follow the prompts to configure the LCD display for the appropriate language and IP configuration for the chassis. This will include either a DHCP provided IP address for the CMC and blade iDRACs, or you can specify a static IP for each. Make note of the IP address given to the CMC, which is needed for the next configuration section.

I/O module network cabling and mappings

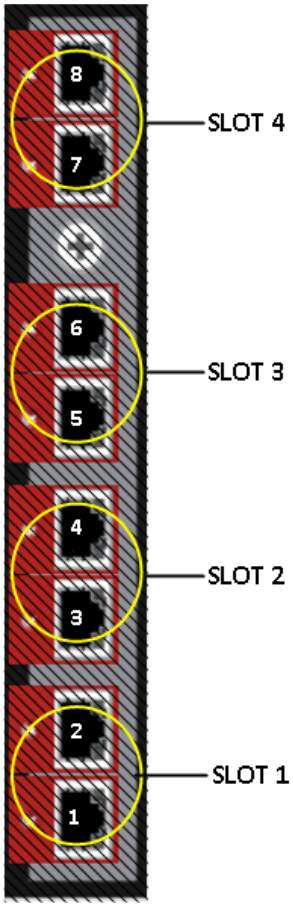
Configure your chassis networking; for a VRTX IOM pass-through module, use Step 1, or if you are using the VRTX IOM switching I/O module, use Step 2.

1. **VRTX IOM pass-through module**: Connect an Ethernet cable to each port associated with the server node(s) installed in the system. Refer to Table 1 for port mapping relationships, and Figure 2 for port locations and mappings.

Table 4. VRTX IOM pass-through IOM port to slot mappings

Port Number	Associated Slot
Port 1	Slot 1
Port 2	Slot 1
Port 3	Slot 2
Port 4	Slot 2
Port 5	Slot 3
Port 6	Slot 3
Port 7	Slot 4
Port 8	Slot 4

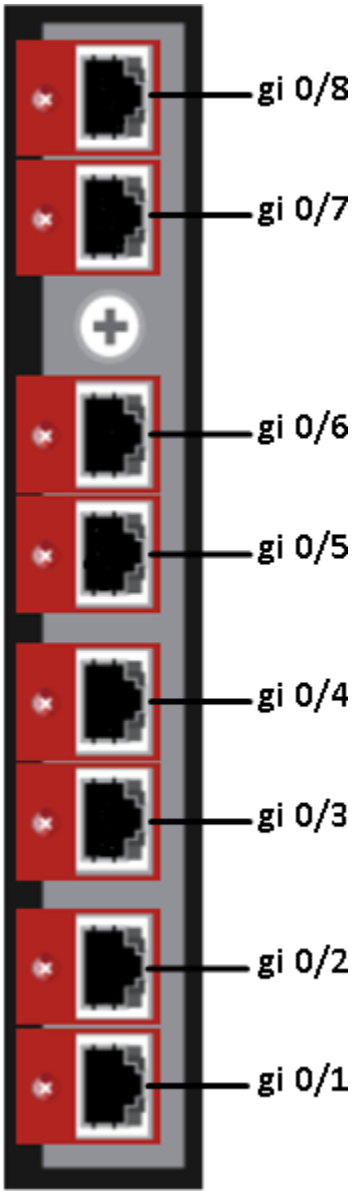
Figure 2. VRTX IOM pass-through module port locations and associated slot mappings



2. **VRTX IOM switch module**: Connect at least one Ethernet cable to the I/O module. Refer to Figure 3 for more details on the external port listings.

Note: For additional port listings or switch configuration refer to the I/O module Getting Started Guide and the I/O module GUI available by selecting Launch I/O Module GUI from the I/O Module Overview submenu.

Figure 3. VRTX IOM switch module external port listing



Windows installation and configuration on VRTX supported server node(s)

This section provides an overview of the OS installation process using bootable optical media. Following the OS installation instructions are steps for configuring the OS roles and features. Steps are provided for the SPERC driver installation and required registry entries. Steps are also provided for validation and creation of failover clustering. Microsoft Windows Server 2008 R2 and 2012 are both supported failover clustering platforms on the VRTX chassis.

For a detailed description of the installation of the OS using the Dell Systems Management Tools and Documentation or your own OS media, refer to the *Microsoft Windows Server 2012 For Dell PowerEdge Systems Installation Instructions and Important Information* guide on Dell.com/Support/Manuals.

Basic OS installation steps

1. Configure the system to boot from optical media.
2. Insert the bootable Microsoft Windows Server 2012 installation disk into the optical drive in the chassis or USB port on the blade server.
3. Insert the USB device with the OS drivers located in the $WinPEdriver$ folder For A-rev, shouldn't we tell them to use LC?
4. Power on the blade server.
5. Follow the prompts to boot from optical media, and the prompts to install the OS on the local disk located in the blade.
6. Enter the product key if required.
7. Follow the prompts to complete the Windows Server installation.
8. Enter the administrator password and login in Windows Server.

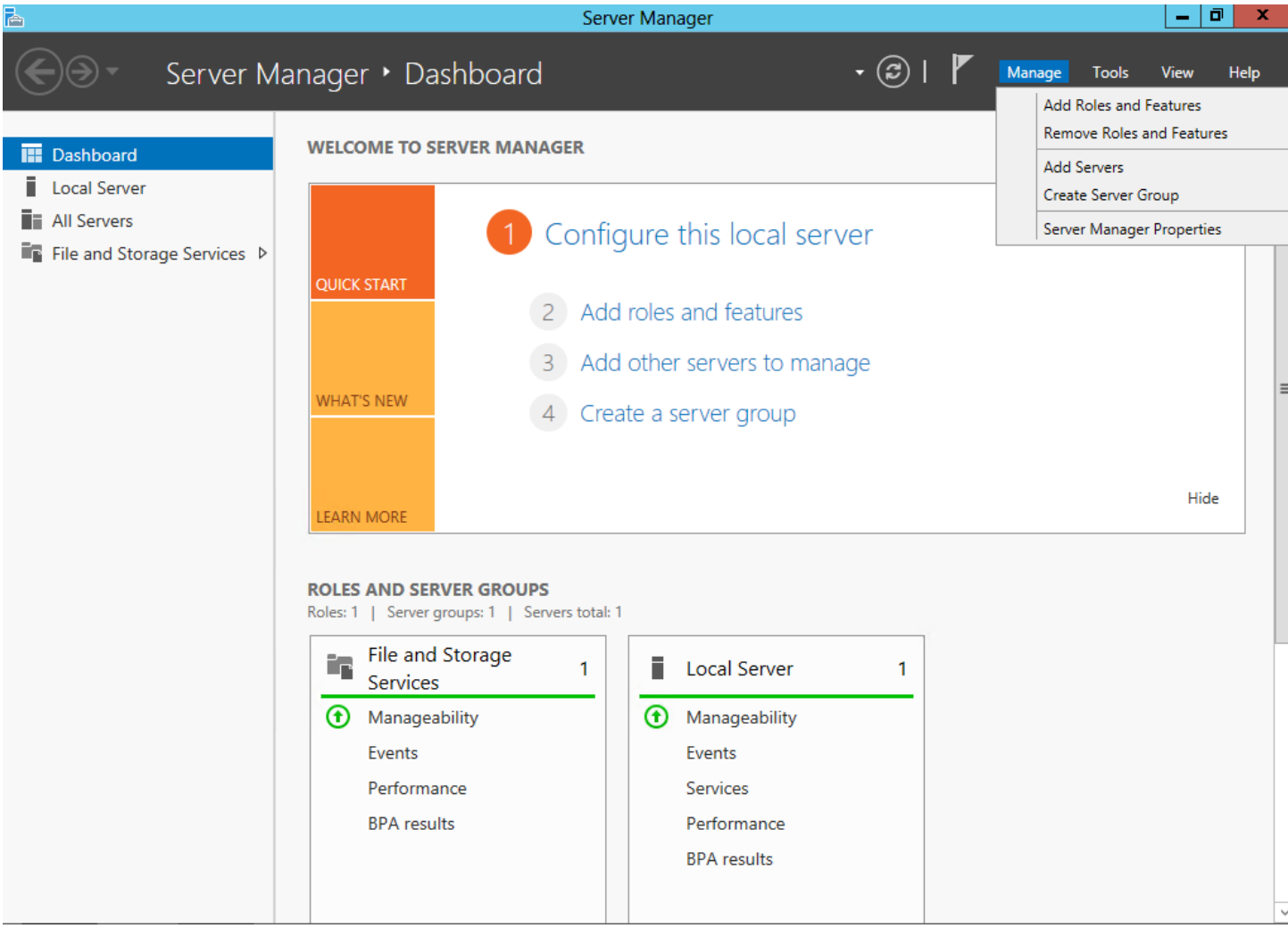
Role configuration and feature enablement

This section provides instructions for enabling the Hyper-V role and failover cluster feature enablement in Windows Server. These steps for role configuration and feature enablement can be combined to eliminate the need for two separate operations.

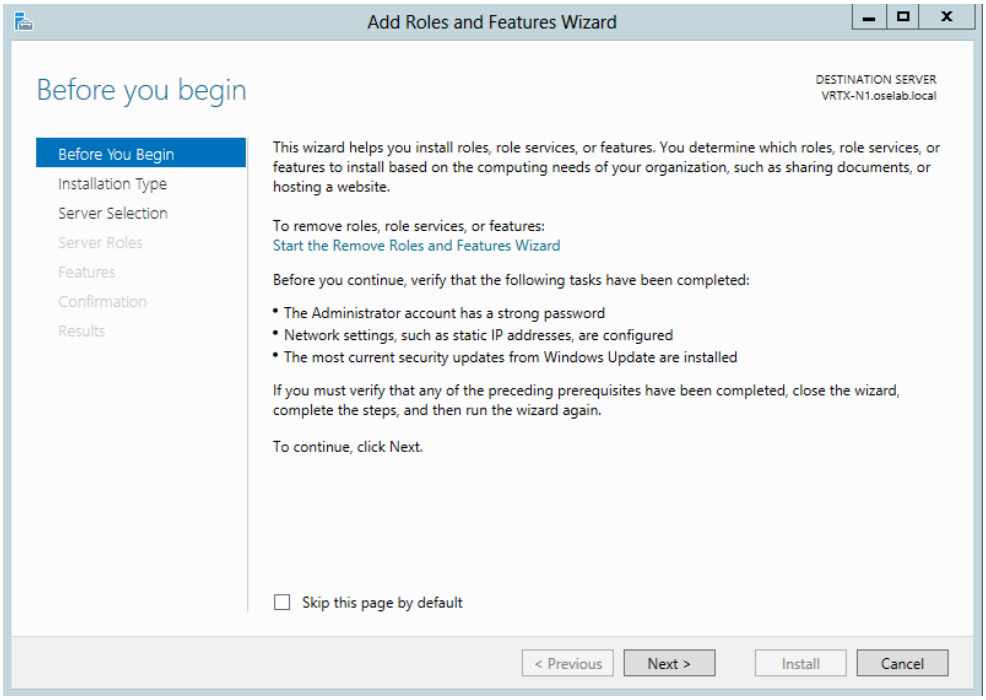
> **Note:** These roles and features must be enabled on every server node(s) that will be configured as part of the failover cluster.

Role and feature configuration steps

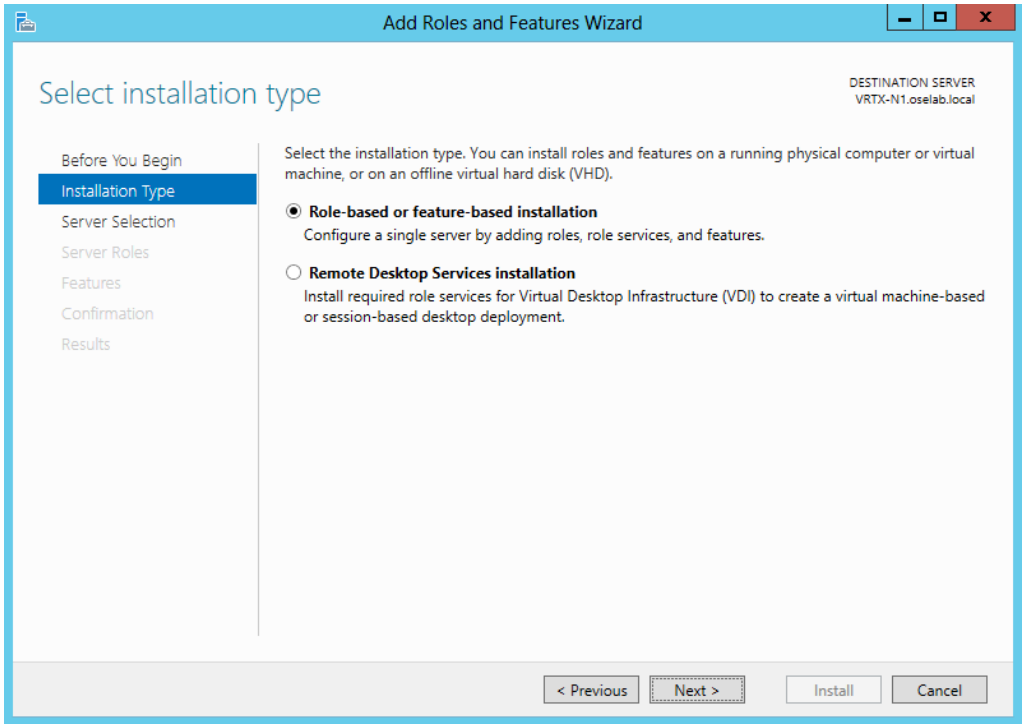
1. Open **Server Manager.**
2. Select **Add roles and features** from the **Manage** menu to start the **Add Roles and Features Wizard**.



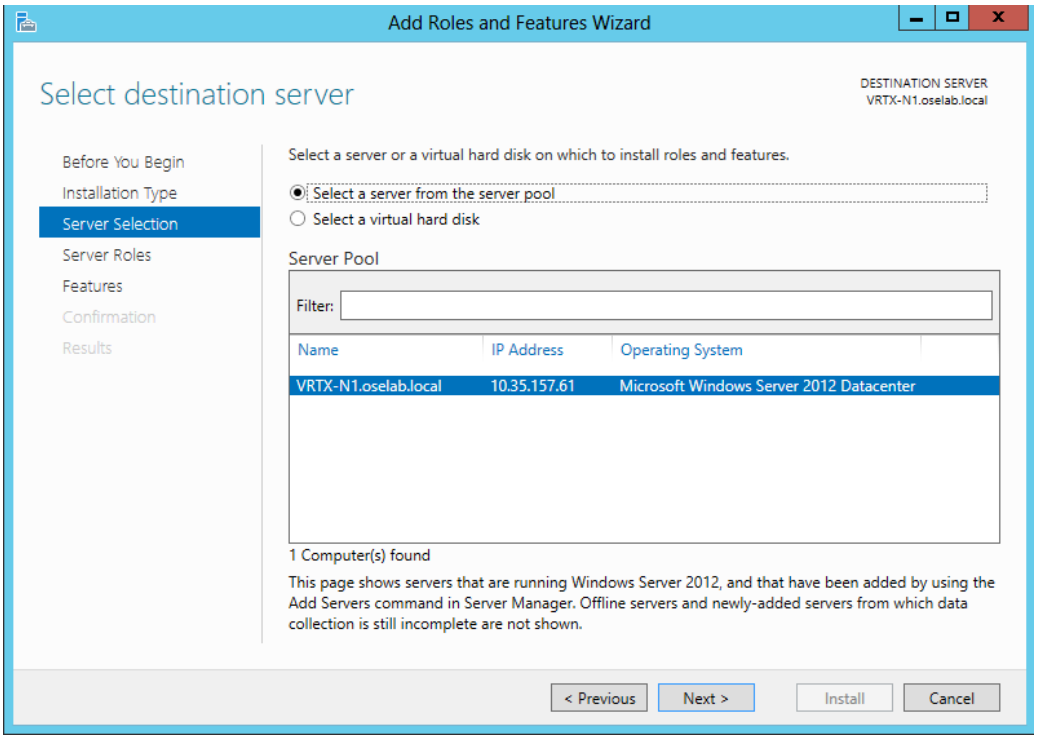
3. Select **Next** on the **Before you begin** screen.



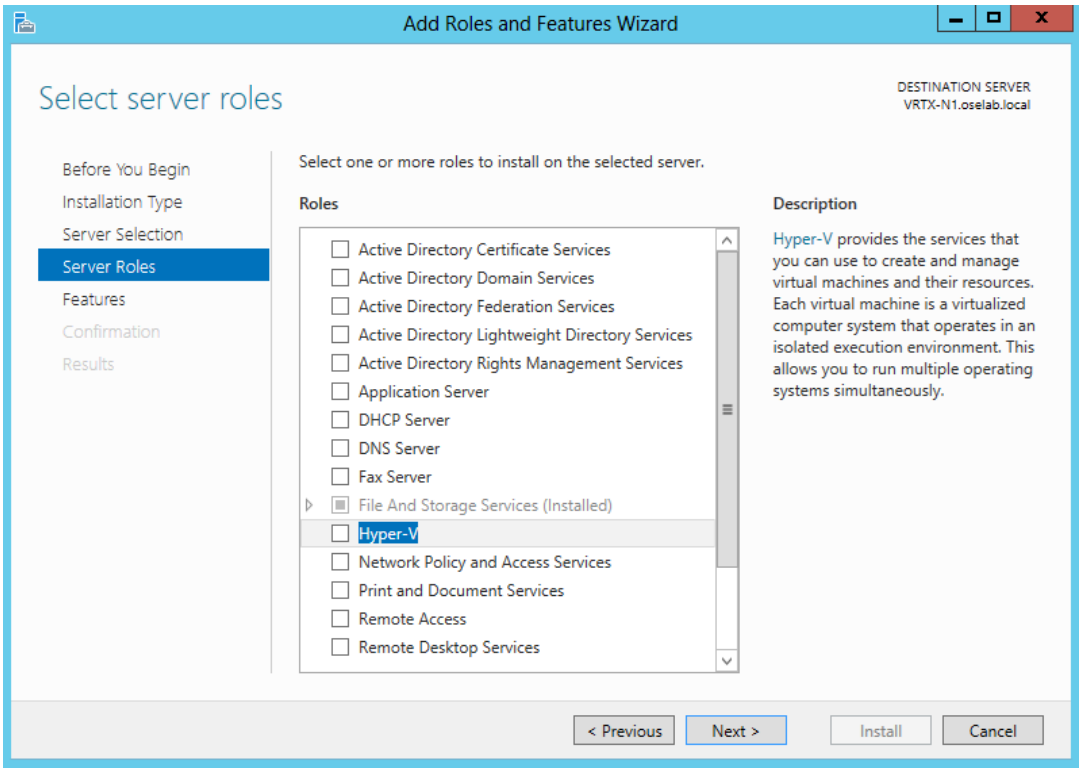
4. On the **Select installation type** screen, select the **Role-based or feature-based installation radio** button, then select **Next**.



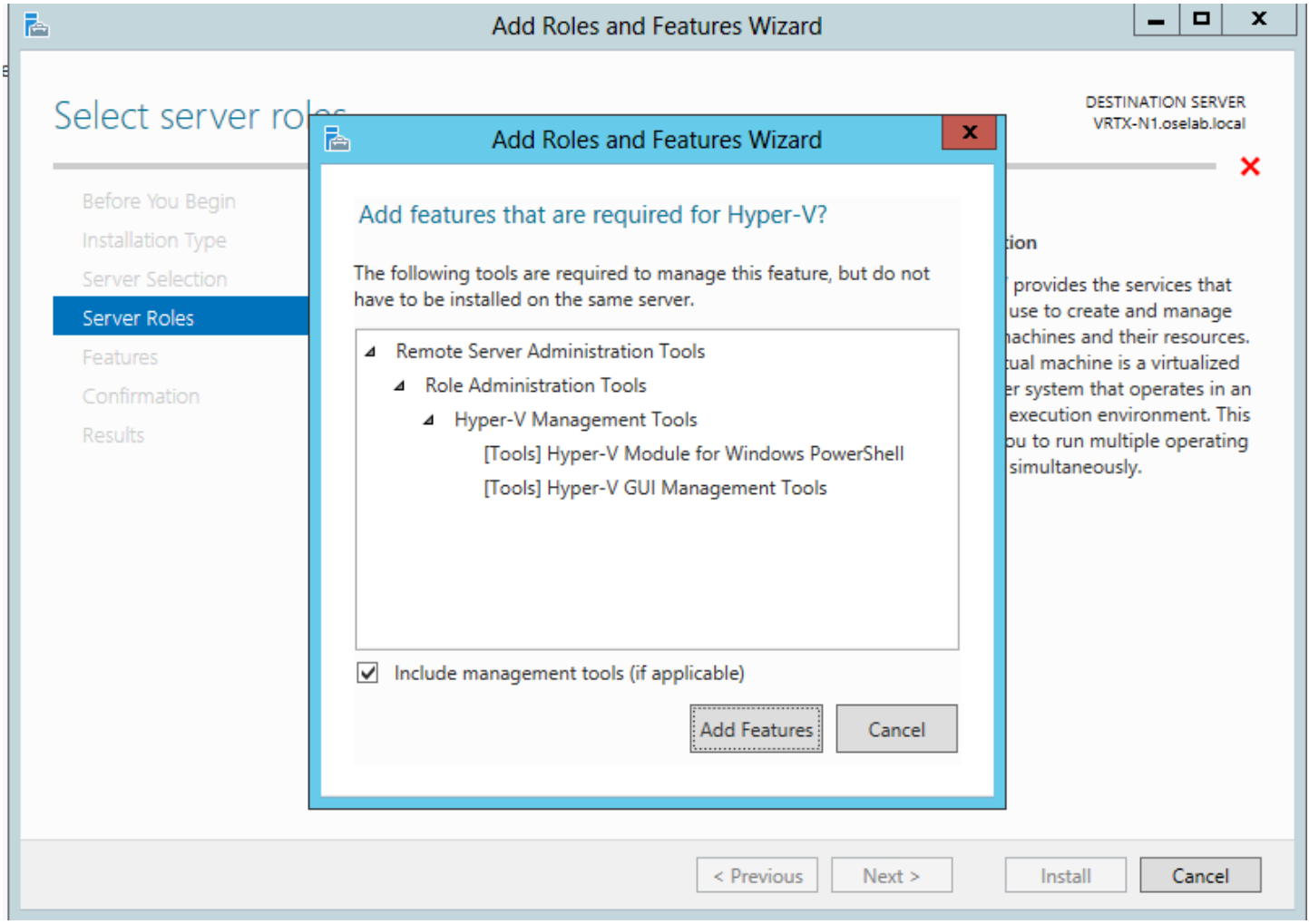
5. Select the local server from the **Server Pool** list on the **Select destination server** screen.
6. Click **Next**.



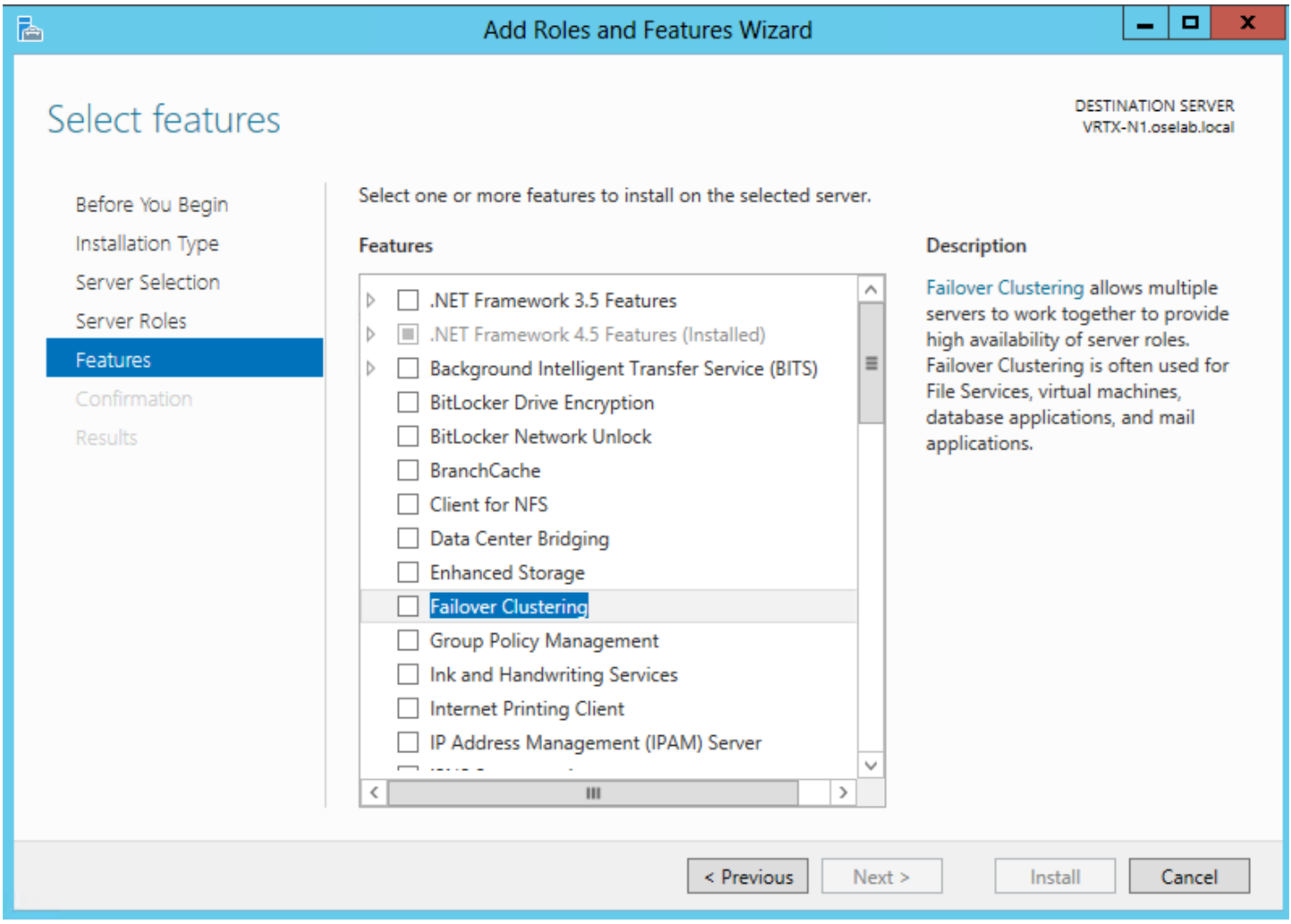
7. On the **Select server roles** screen, select the checkbox next to **Hyper-V**.
8. Click **Next**.



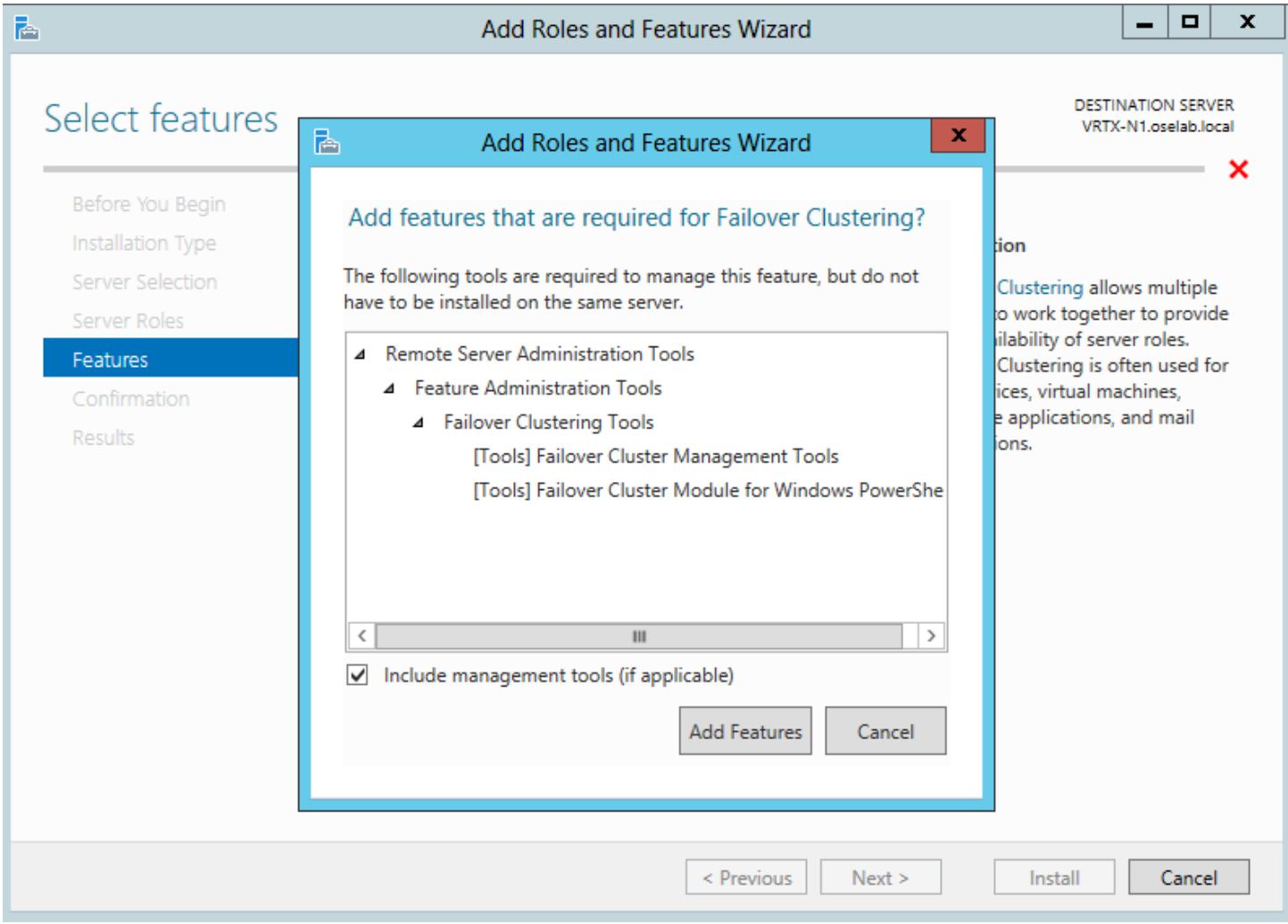
9. Verify the **Include management tools** (if applicable) checkbox is checked on the **Add features that are required for Hyper-V** screen.
10. Click **Add Features**.



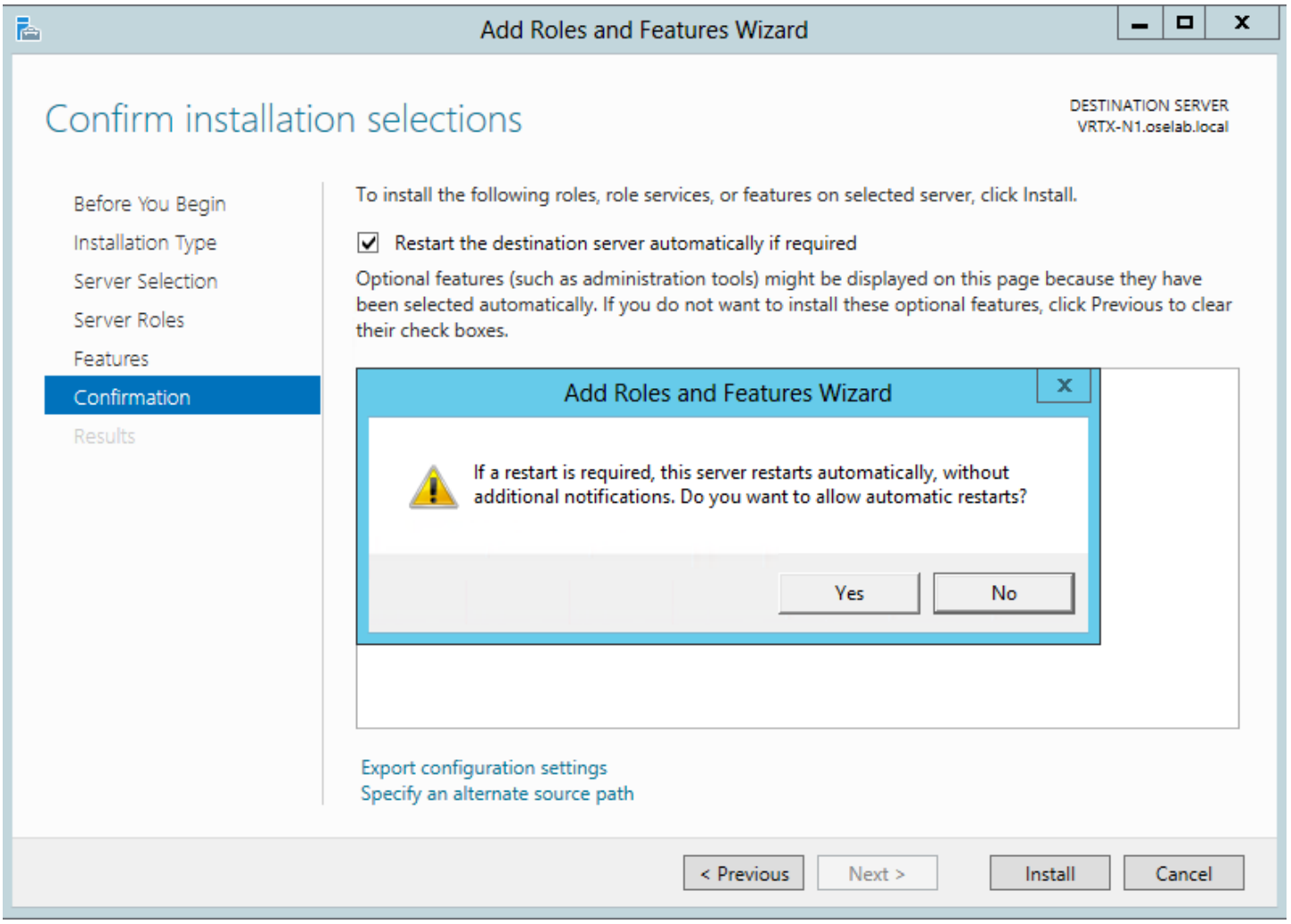
11. On the **Select features** screen, select the checkbox next to **Failover Clustering.**
12. Click **Next**.



13. Verify the **Include management tools** (if applicable) checkbox is checked on the **Add features that are required for Hyper-V** screen.
14. Click **Add Features**.



15. Check the checkbox labeled **Restart the destination server automatically if required**.
16. Click **Install** to complete the installation of the Hyper-V role.



Required registry entries

The following registry entries are required on each node of the cluster to enable them to see the drives on the shared PERC8.

Table 5. Registry entries

Location	Entry type	Property	Value
HKLM\SYSTEM\CurrentControlSet\Services\ClusDisk\Parameters	DWORD	AllowBusTypeRAID	0X01

1. Open the registry using the run prompt.
2. Type `REGEDIT` and press **Enter**.
3. Navigate to `HKey_Local_Machine\SYSTEM\CurrentControlSet\Services\ClusDisk\Parameters`.
4. Right-click in the right pane and from the context menu select **New > DWORD (32bit) Value**.
5. Type `AllowBusTypeRAID` in the **Name** field and press **Enter**.
6. Right-click the new entry and select **Modify**.
7. In the **Value Data** field, type `1` and press **Enter**.
8. Close the REGEDIT window.

For additional information regarding this registry change, refer to Microsoft KB 2839292, or find it here.

Storage configuration

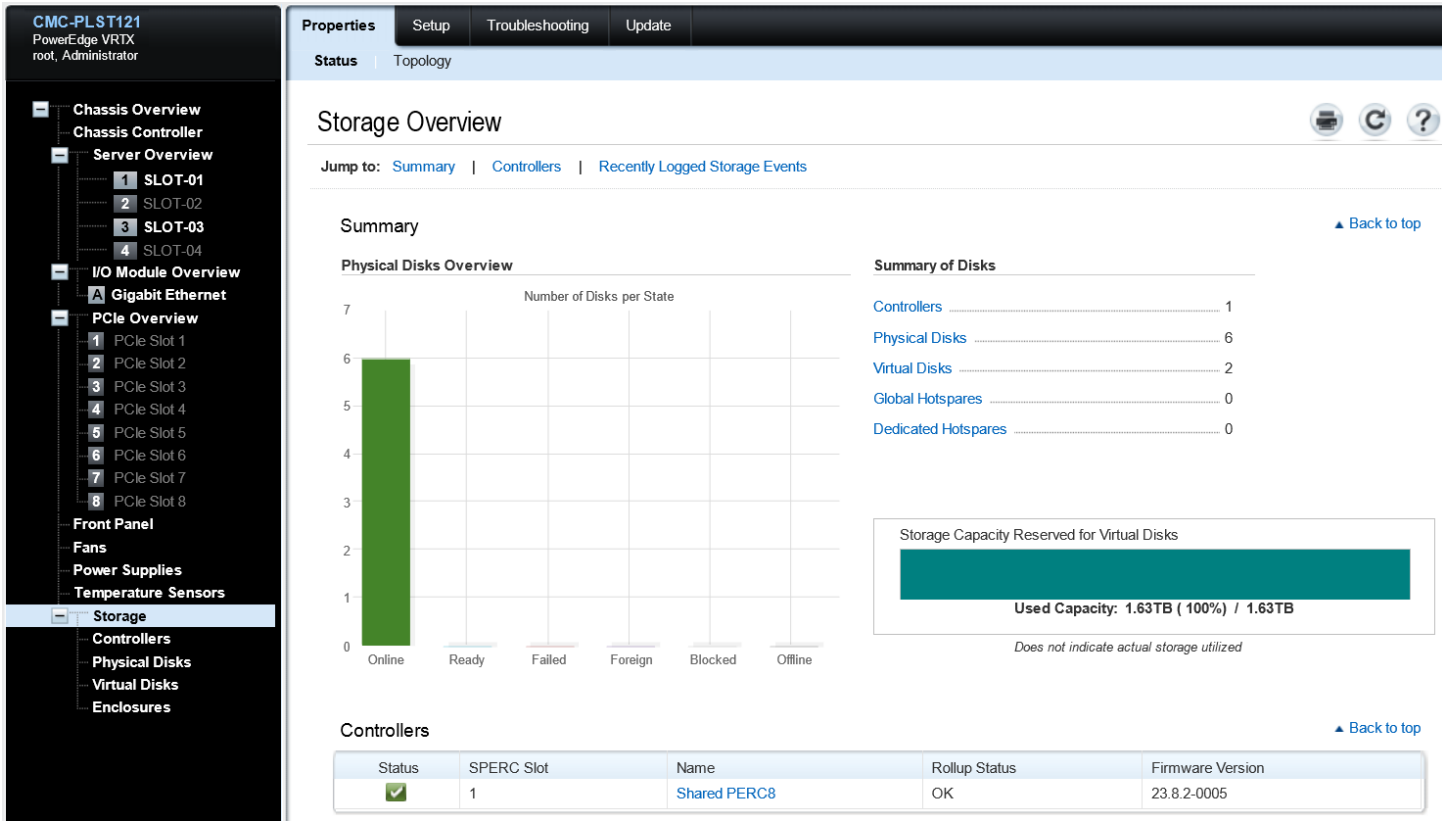
This section describes the process for creating virtual disks available through the shared PERC8, and assigning the disks to the corresponding server node(s). These are the shared disks used in the installation of failover clustering. Virtual disks are required for the operating system to pass the validation steps of the cluster creation steps in the Cluster validation and creation section of this guide.

Creating virtual disks

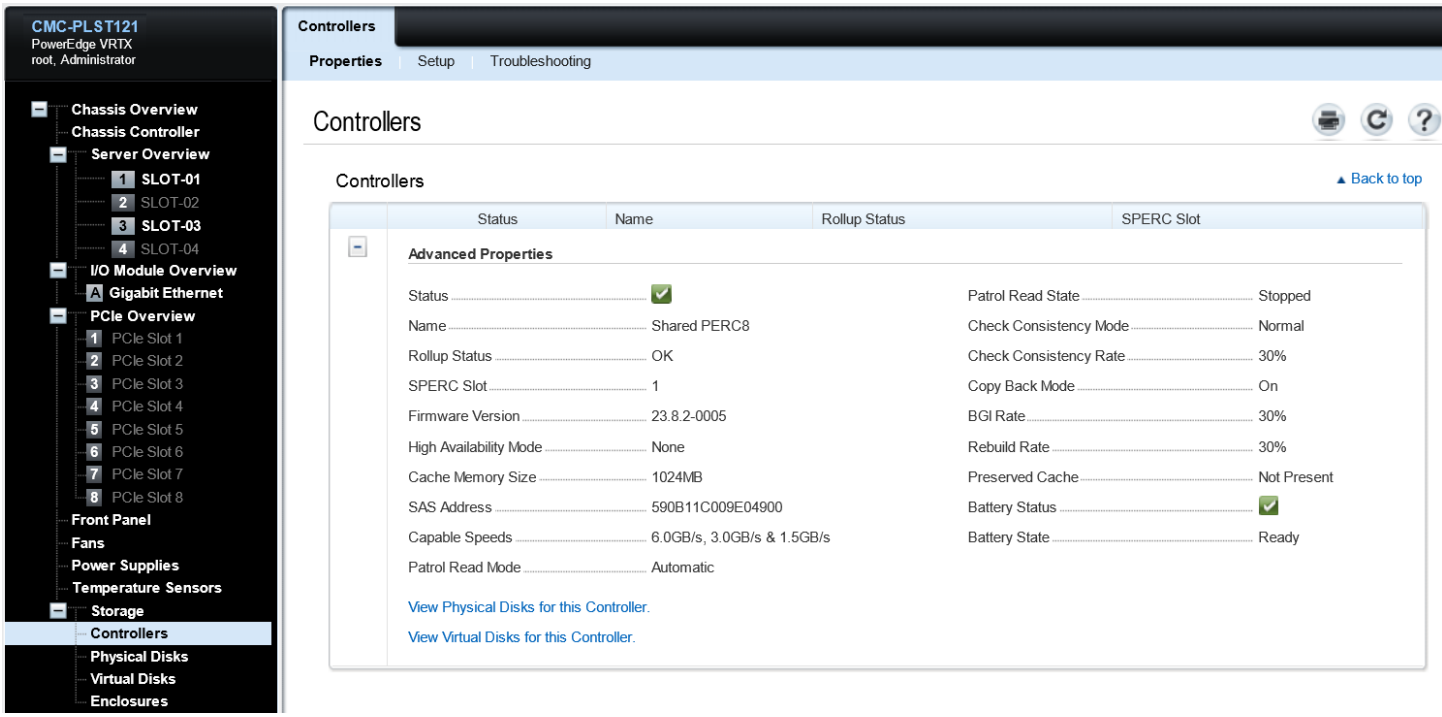
This example creates two disks for cluster use, meeting the minimum of two virtual disks required to create a Hyper-V cluster. One disk is used for the cluster-shared disk quorum and the second disk is used as the Cluster Shared Volume (CSV) in the Hyper-V cluster configuration (see the section titled: Creating a virtual disk for CSV use). This guide creates a single RAID 1 virtual disk for the cluster-shared quorum drive and a single RAID 10 virtual disk for the CSV; however you may use the RAID level appropriate for your environment.

Creating a virtual disk for quorum use

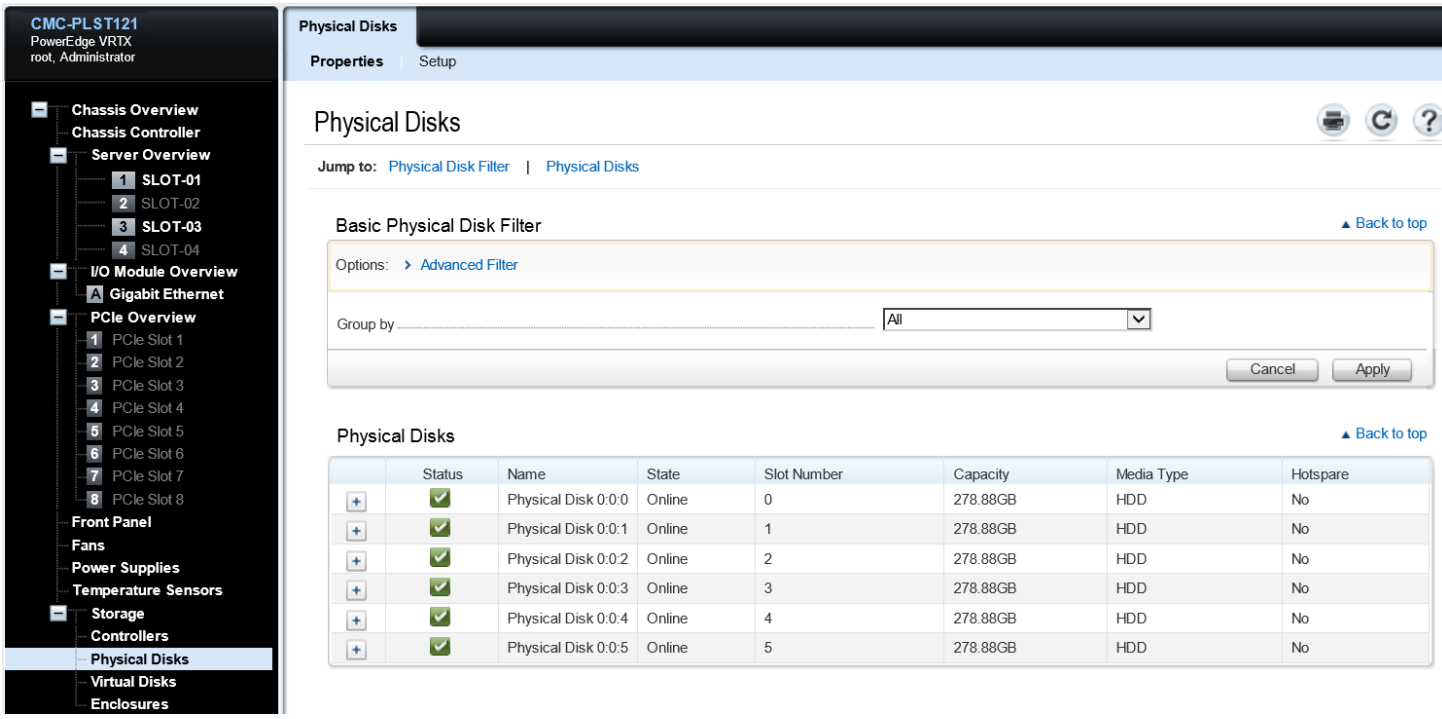
1. Expand **Chassis Overview > Storage** on the **Chassis Management Controller** web interface.
2. Select the **Storage** submenu.



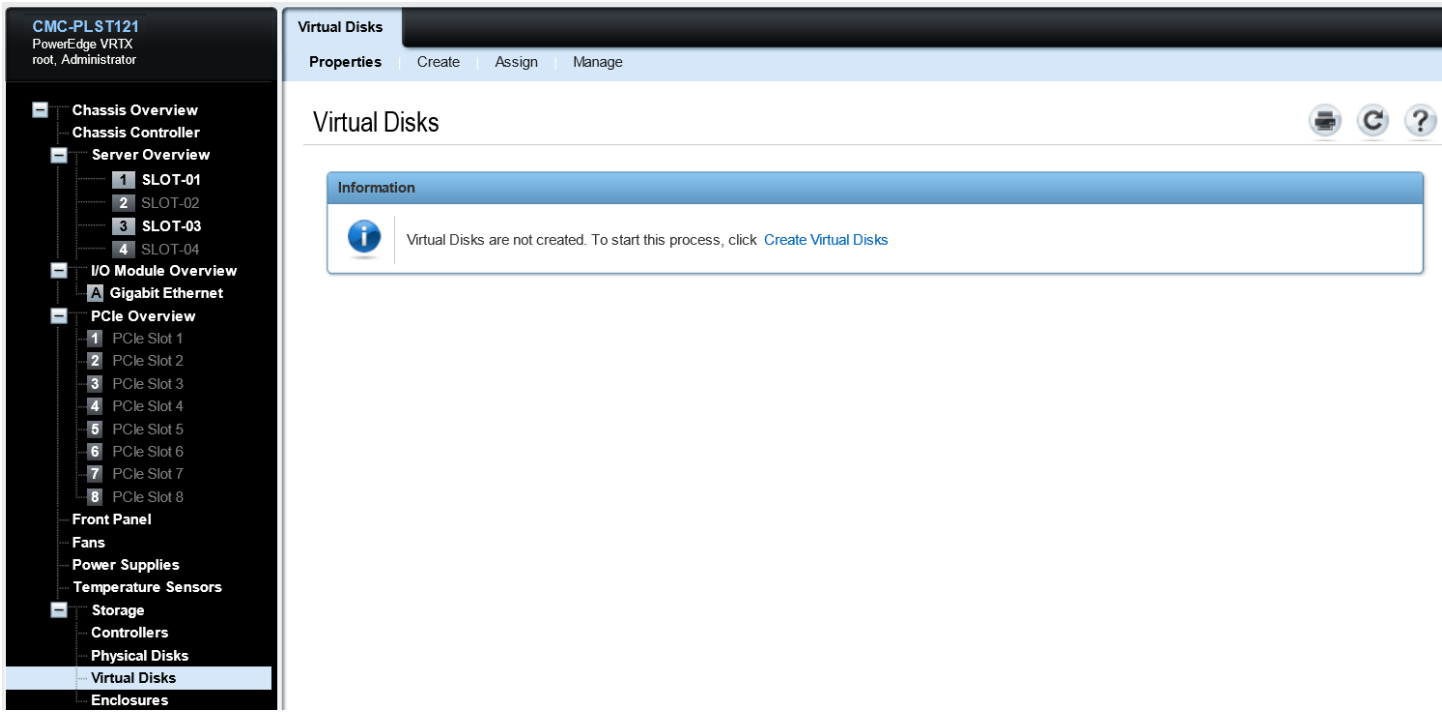
3. Select **Controllers** under **Storage** and verify that the property labeled **Rollup Status** listed has the value **OK**.



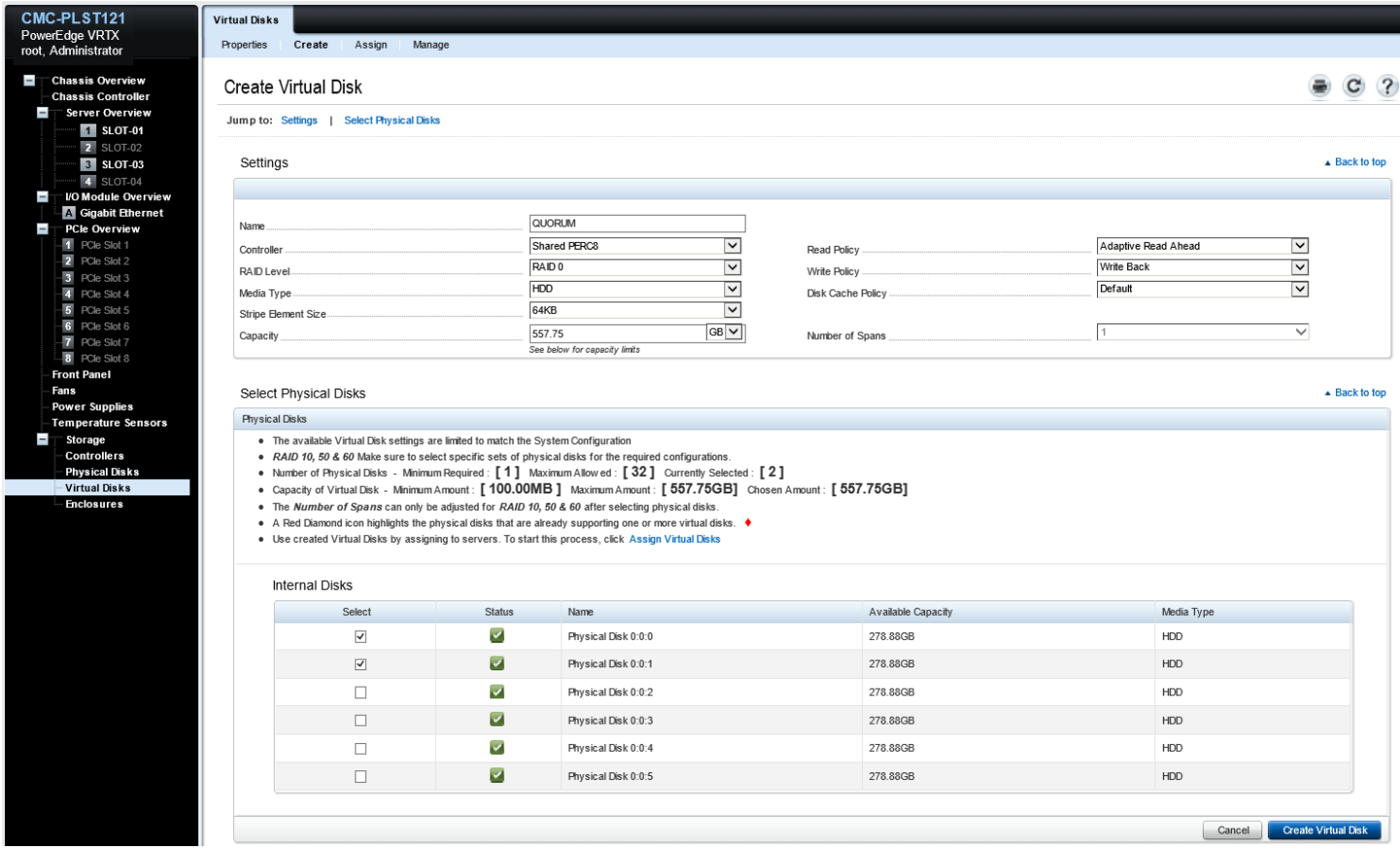
4. Select **Physical Disks** and verify that all physical disks are accounted for in the chassis shared disk enclosure, and that each disk has a **State** of either **Online** or **Ready**.



5. Select **Virtual Disks**, and select **Create** from the top menu.



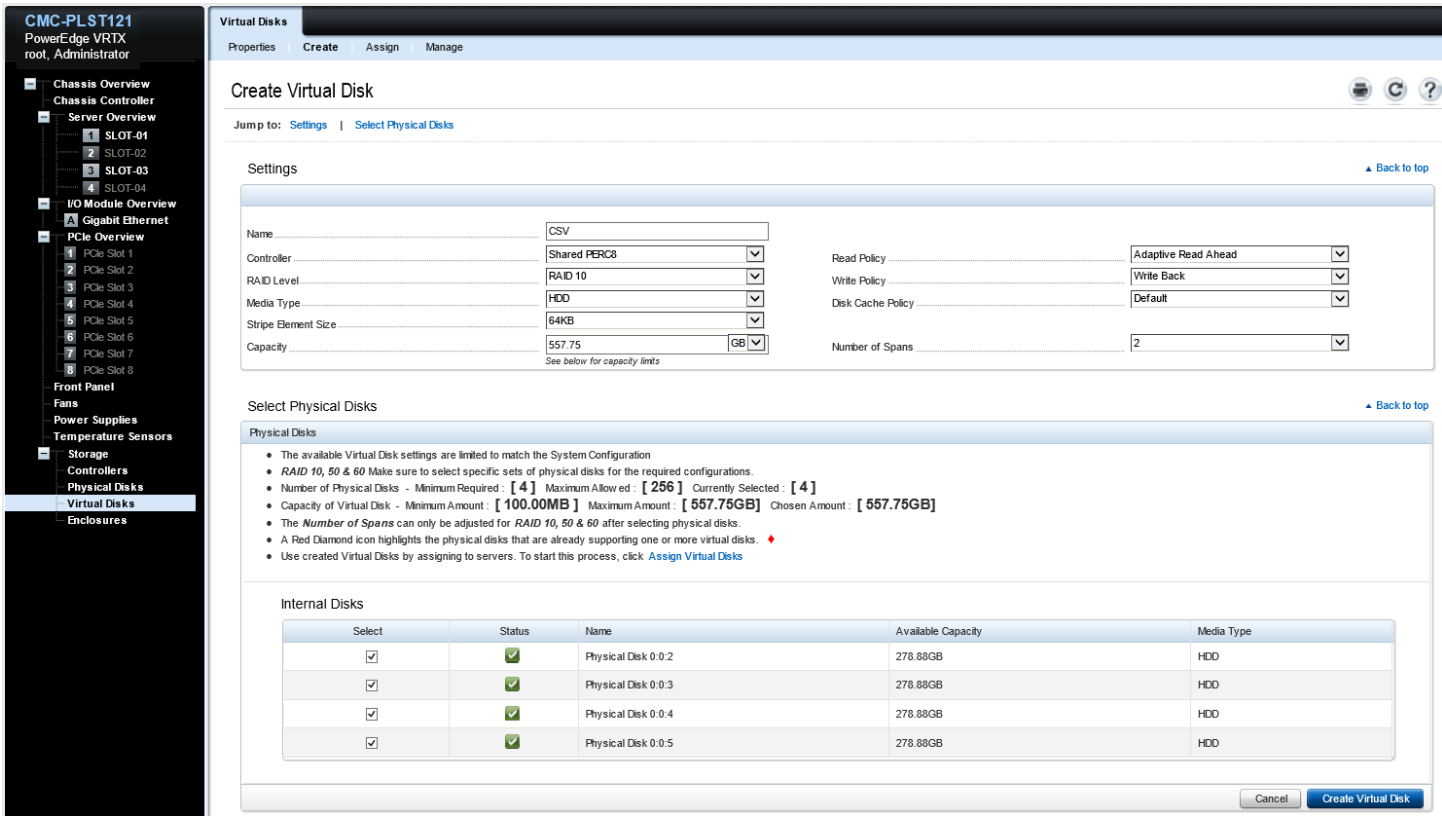
6. On the **Create Virtual Disk** page, enter `QUORUM` in the **Name** field.
7. Select **RAID 1** from the **RAID Level** drop-down menu. Be sure to check the capacity limits as listed in the **Select Physical Disks** table. Leave the default values for all properties.
8. Select **Physical Disk 0:0:0** and **Physical Disk 0:0:1** from the **Internal Disks** table by checking the associated check box.
9. Click **Create Virtual Disk**.



10. Click **OK** on the message stating "Operation Successful."
11. The Quorum virtual disk setup is complete.

Creating a virtual disk for CSV use

1. Select **Create** from the top menu.
2. On the **Create Virtual Disk** page, enter `CSV` in the **Name** field.
3. Select **RAID 10** from the **RAID Level** drop-down menu. Be sure to check the capacity limits listed in the **Select Physical Disks** table. Leave the default values for all properties.
4. Select **Physical Disk 0:0:2**, **Physical Disk 0:0:3**, **Physical Disk 0:0:4**, **Physical Disk 0:0:5** from the **Internal Disks** table by checking the associated check box.
5. Click **Create Virtual Disk**.



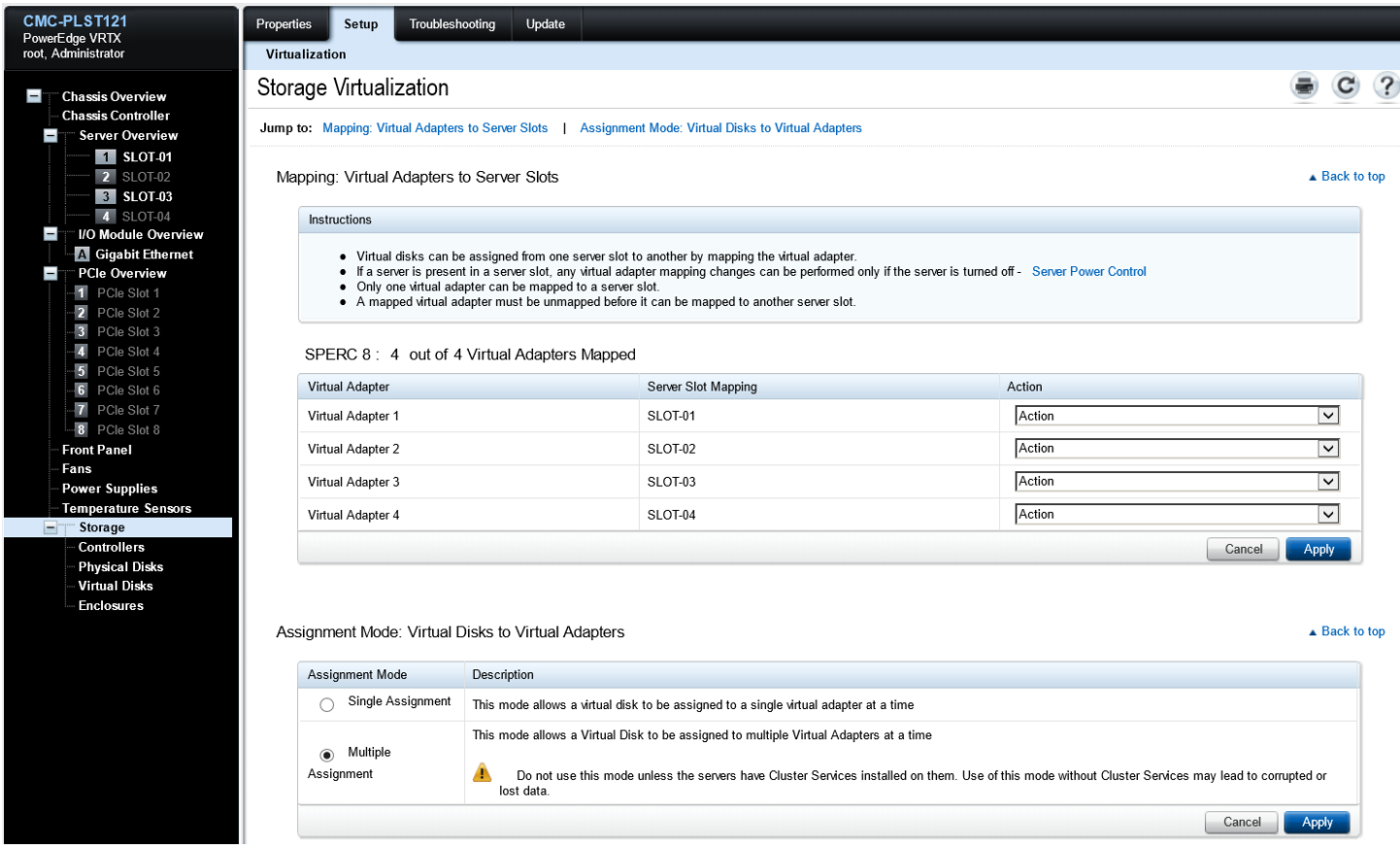
6. Click **OK** on the message stating "Operation Successful."
7. The Cluster Shared Volume virtual disk setup is complete.

Setting assignment mode

Virtual disks can be assigned from one server slot to another by mapping the virtual adapter. For the example used in this guide, the assignment mode should be set to Multiple Assignment. By default, virtual disks are set to Single Assignment.

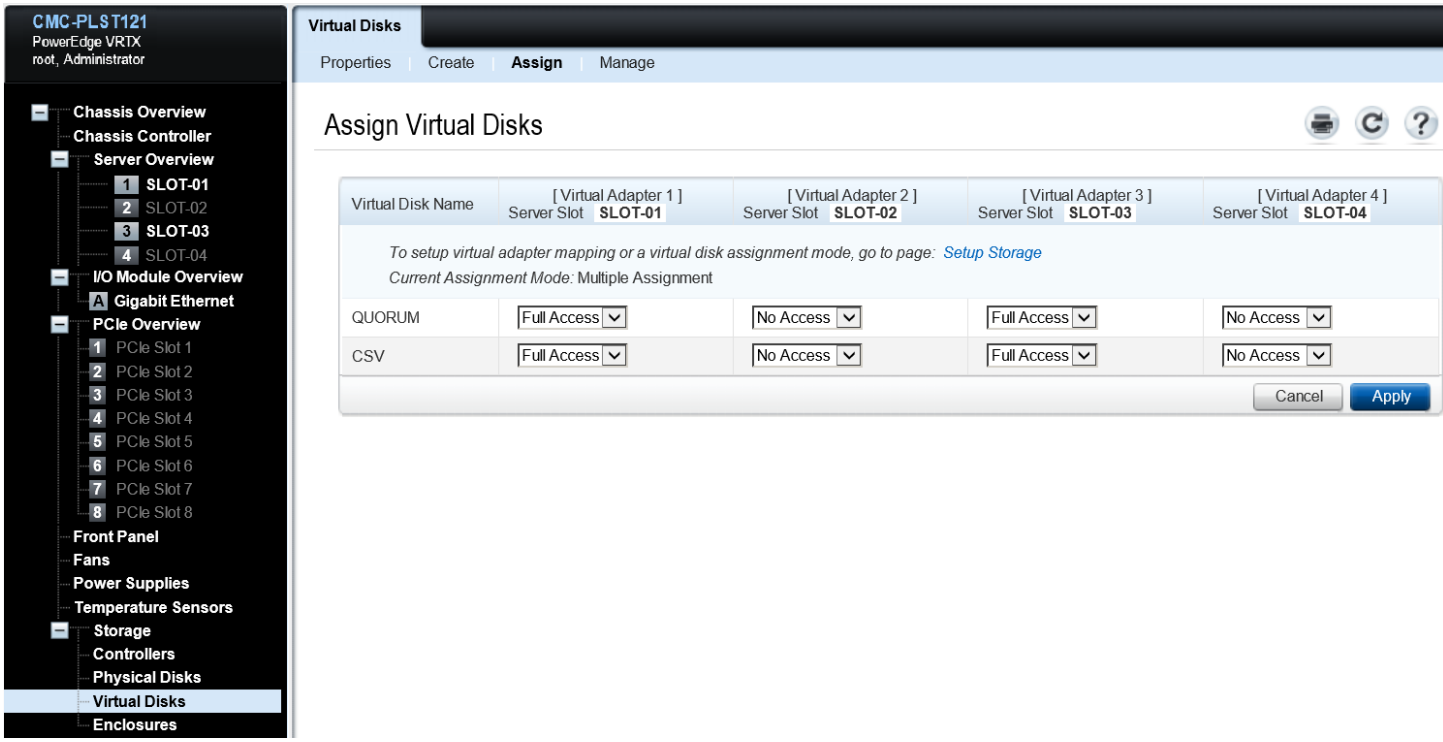
1. Select **Storage** on the left pane.
2. Select **Setup** from the top menu.
3. After the page populates, scroll to the bottom of the page and select the **Multiple Assignment** radio button.
4. Click **Apply**.

> **IMPORTANT!:** Multiple assignments should only be used with Microsoft Failover Clustering scenarios. Do not use this mode unless the servers have Cluster Services installed on them. Use of this mode without Cluster Services may lead to corrupted or lost data. Verify the disks are offline on all servers before beginning the cluster installation procedure.



Assigning virtual disks

1. Select **Virtual Disks** under **Storage**.
2. Select **Assign** from the top menu.
3. In the **Assign Virtual Disks** table, select **Full Access** from the drop-down menus provided for all populated virtual adapters assigned to the row labeled **Quorum**.
4. In the **Assign Virtual Disk** table, select **Full Access** from the drop-down menus provided for all populated virtual adapters assigned to the row labeled **DataDisk**.
5. Click **Apply**.



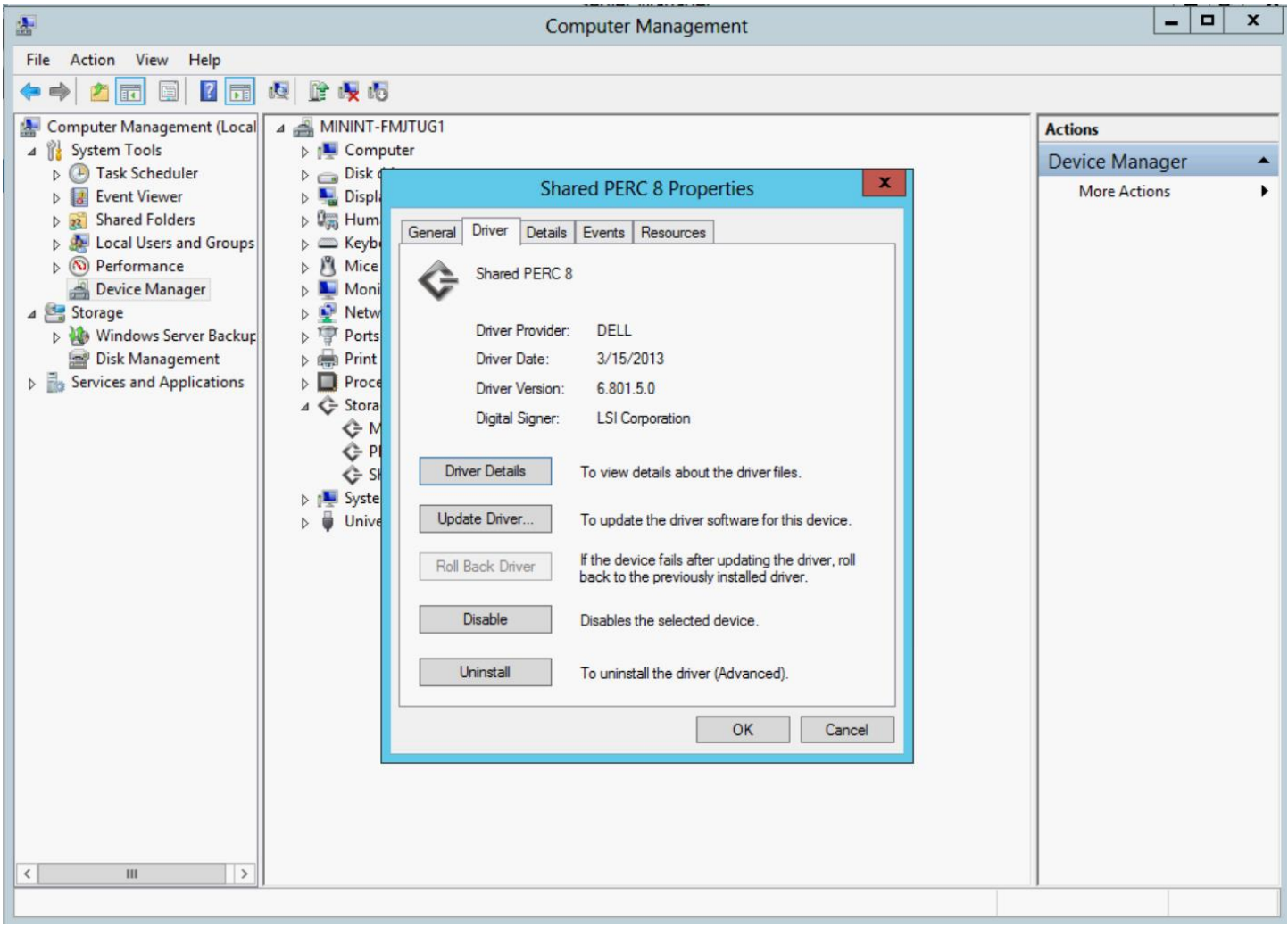
6. Assigning virtual disk this may take several seconds.
7. Click **OK** to dismiss the message stating "Successfully assigned all Virtual Disks".

Installing the shared PERC8 driver

This section describes how to manually install the shared PERC8 driver for Windows Server 2012. Have your device driver available on removable media or a network location prior to completing these steps.

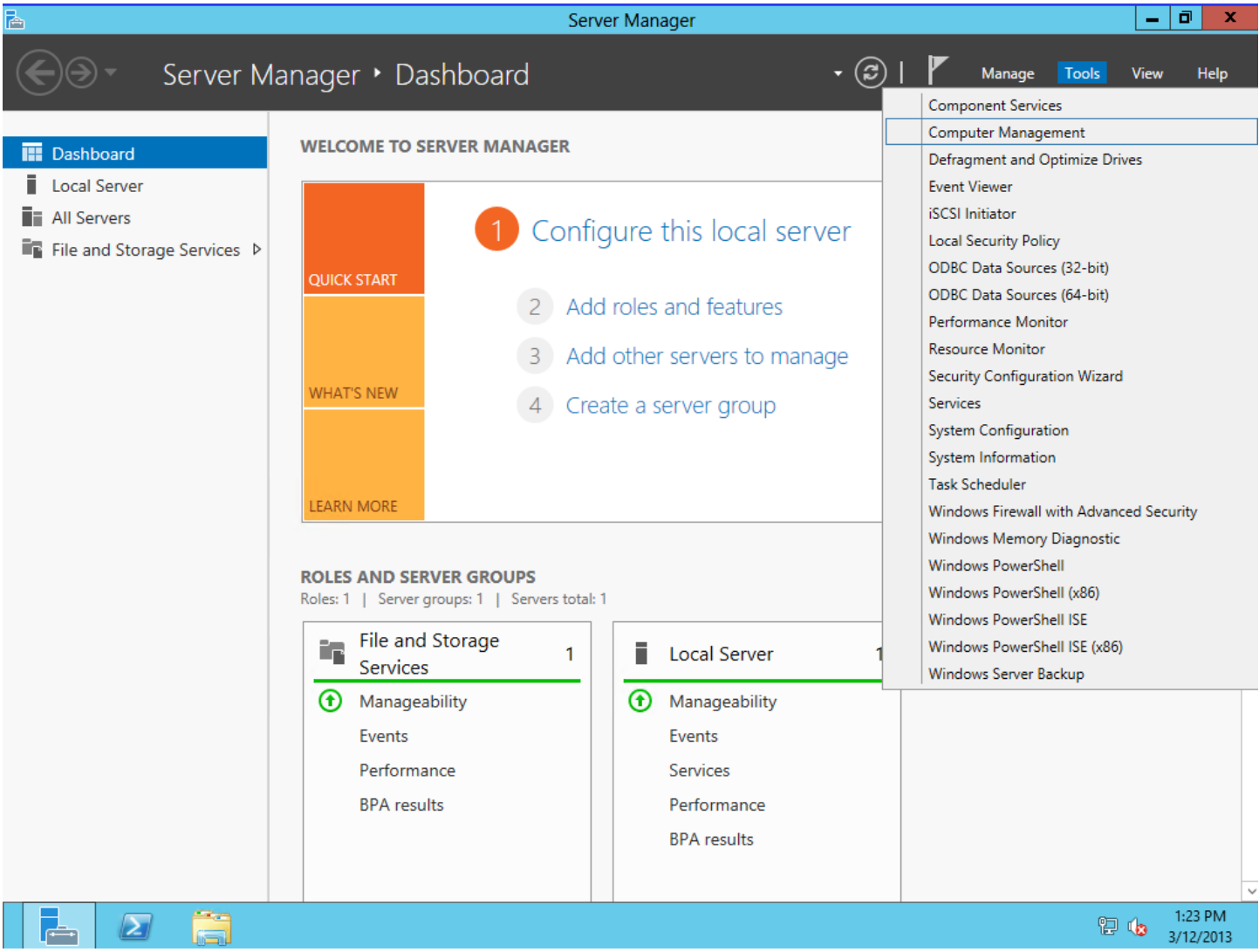
> **REQUIREMENT:** The shared PERC8 driver must be the same version on each node of the cluster.

1. Open the **Server Manager** window and select **Computer Management** from the **Tools** menu.
2. Select **Device Manager**.
3. Right-click the Storage Controller with the yellow bang, and select **Update Driver Software** from the context menu.
4. Follow the instructions in the **Update Driver Software** wizard.
5. Click **OK** on the **Shared PERC 8 Properties** window.

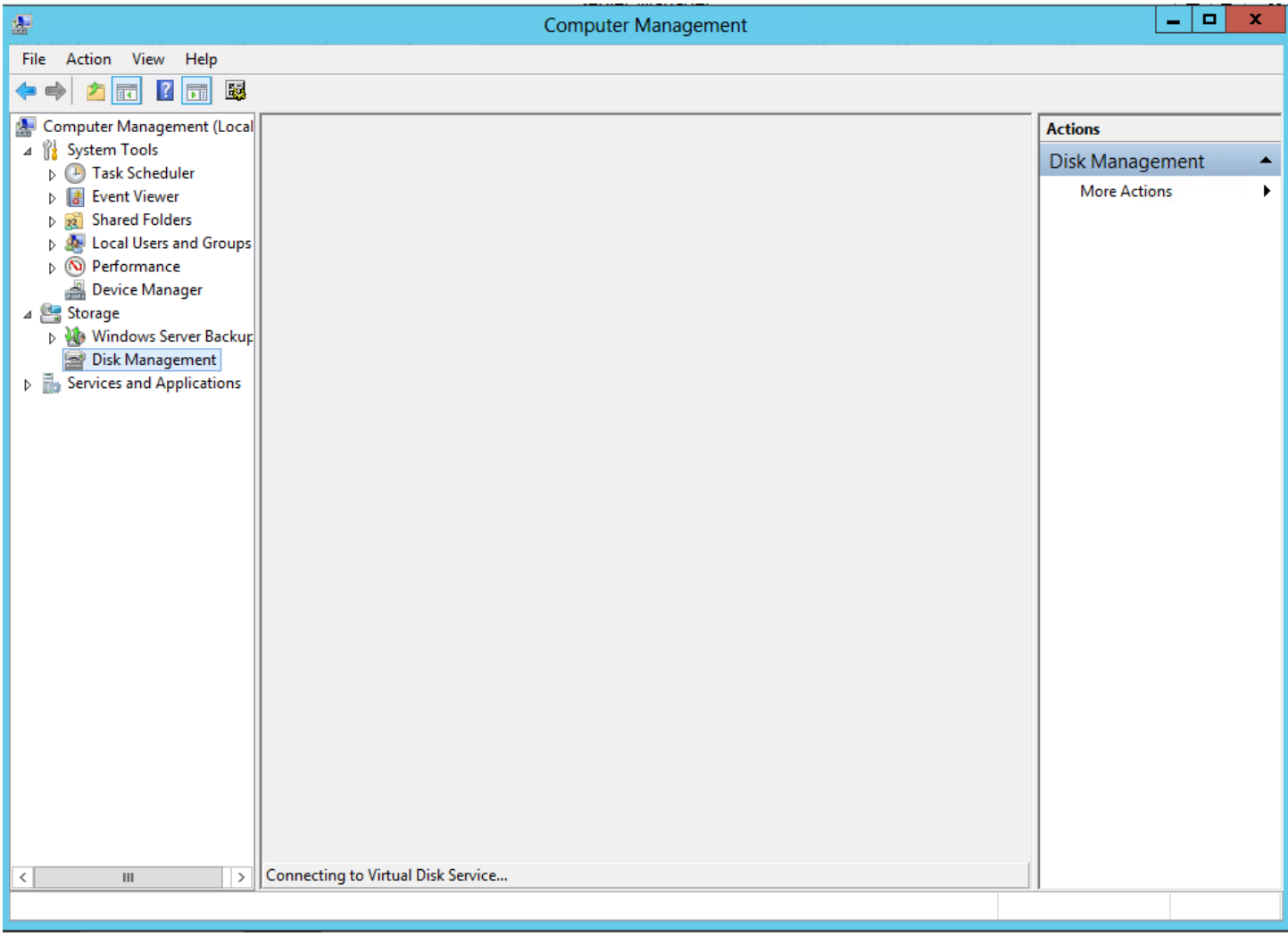


Offline Shared Disk Configuration Steps

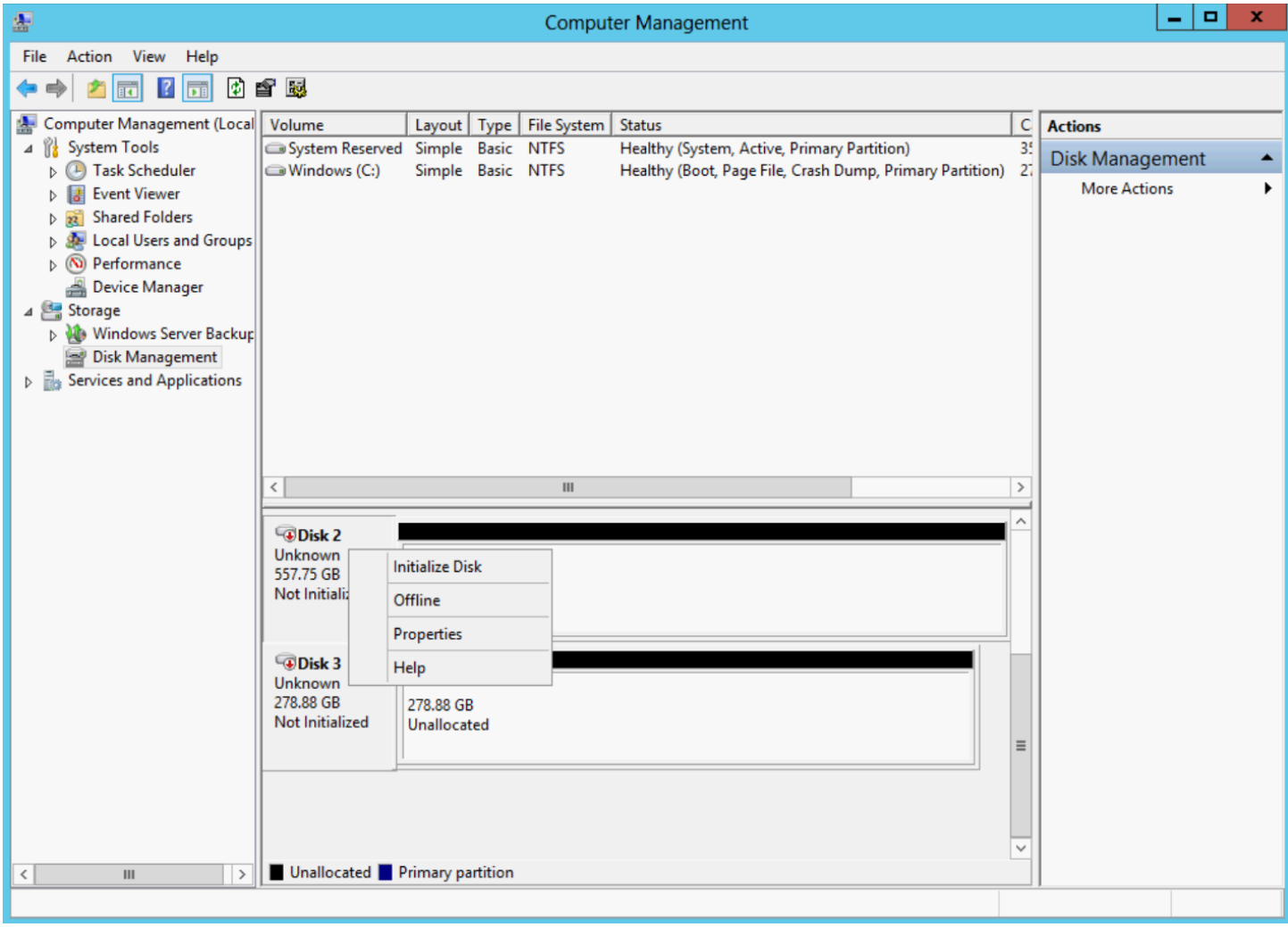
1. Open the **Server Manager** window and select **Computer Management** from the **Tools** menu.



2. Select **Disk Management**. It may take a few seconds to populate the disk information in the right pane.



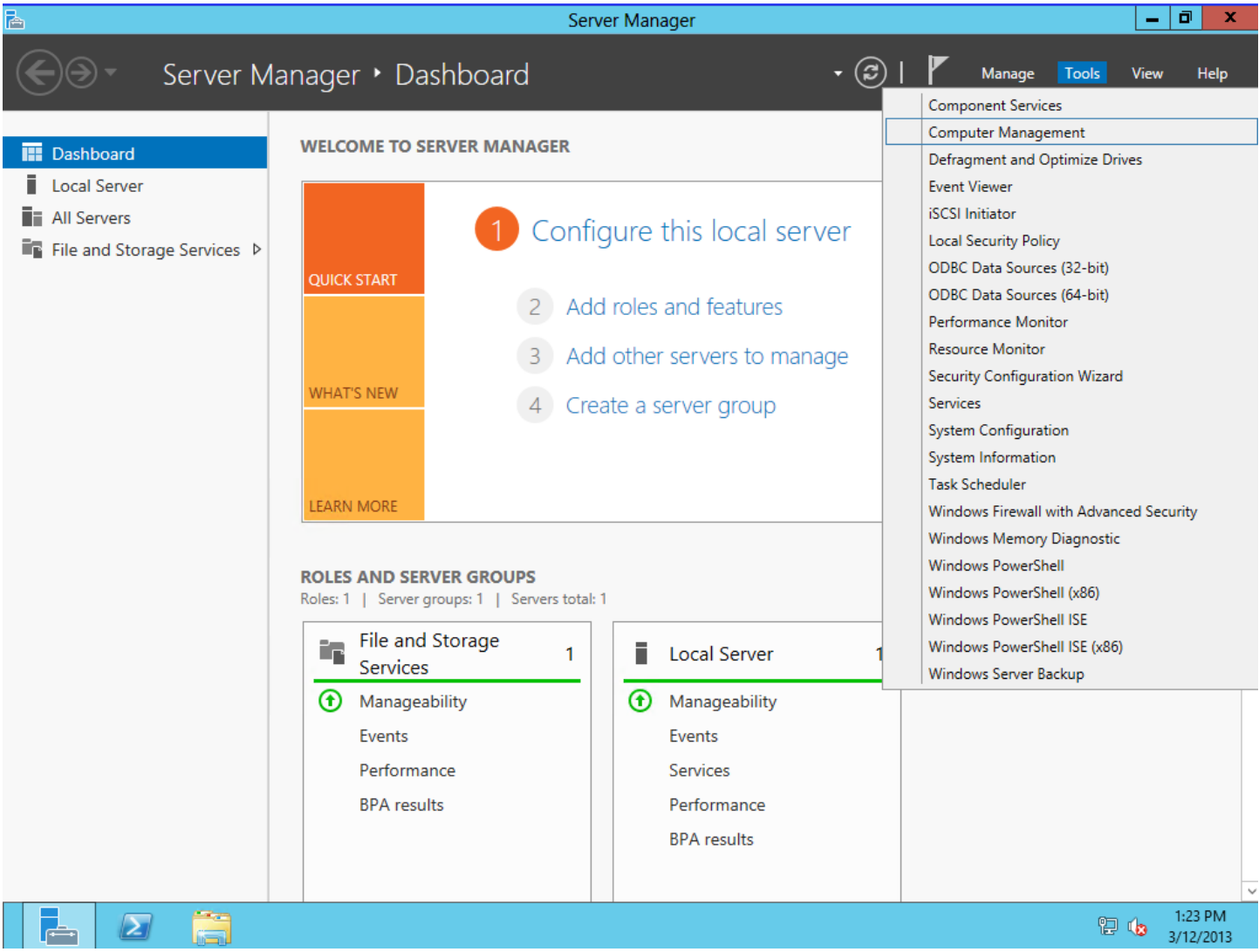
3. Right-click **Disk 1** and select **Offline**.



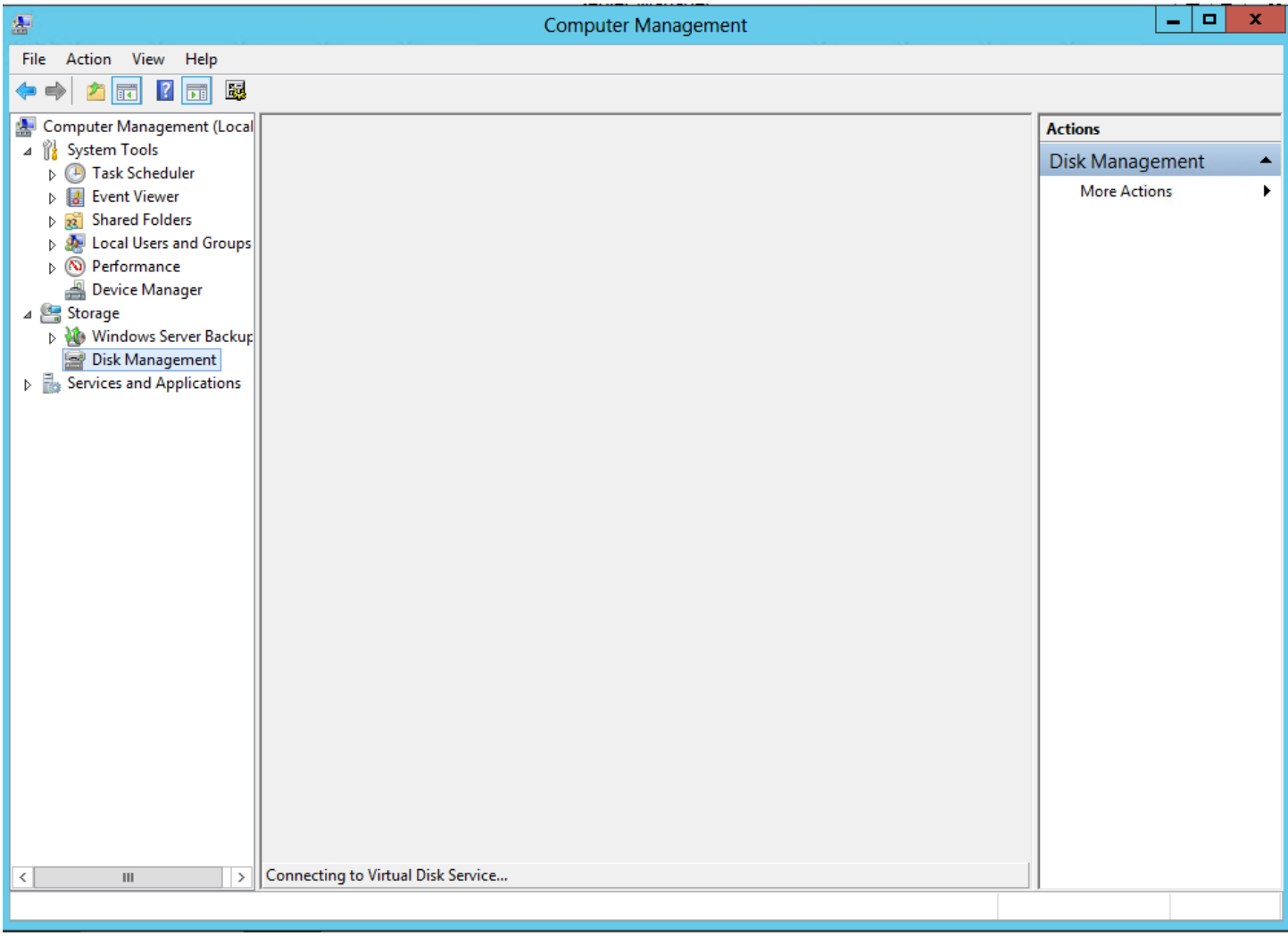
4. Repeat Step 3 for Disk 2.
5. **Repeat Steps 1 to 4 on all servers** which have assigned shared storage.

Shared Storage Configuration Steps

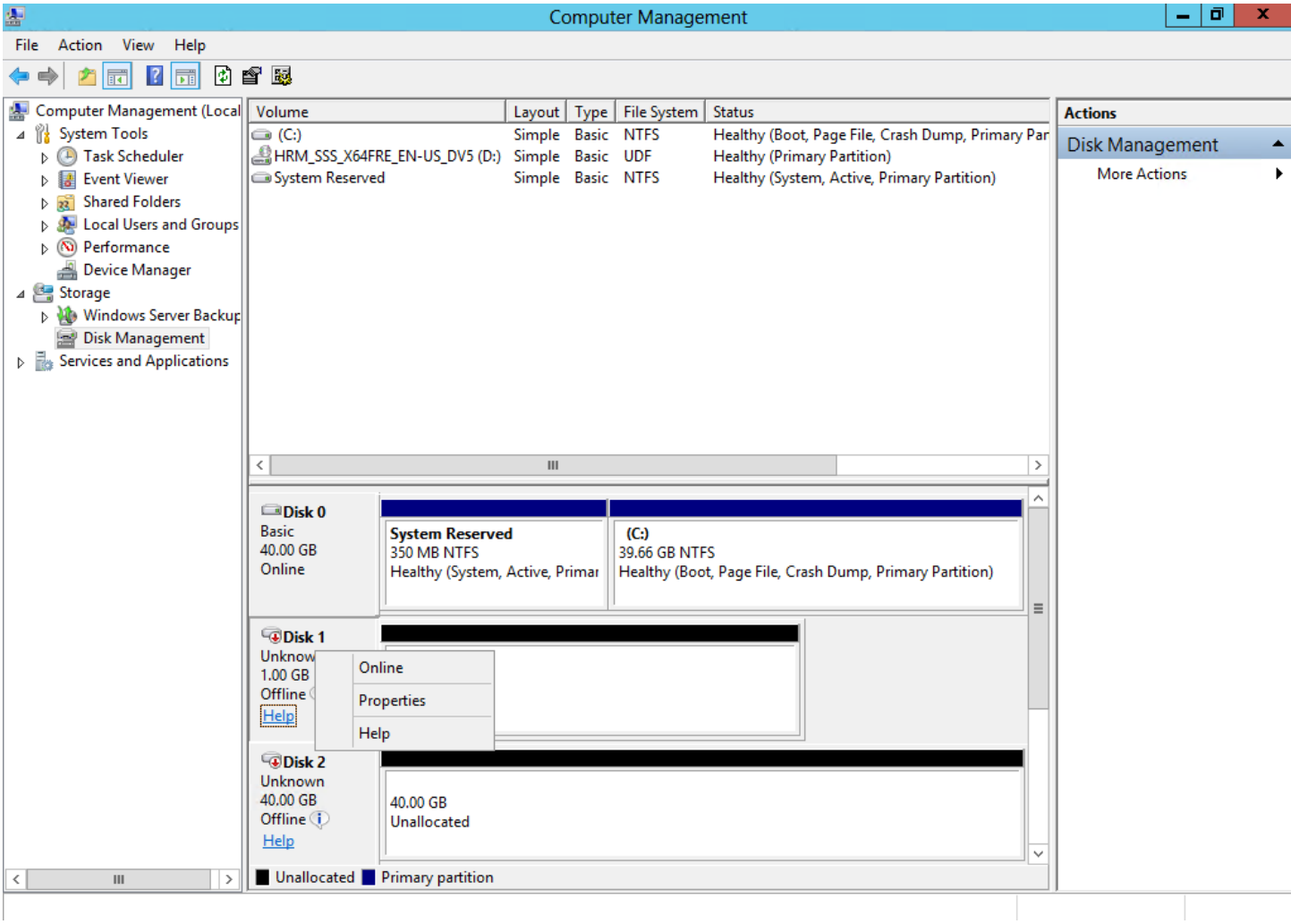
6. Open the **Server Manager** window and select **Computer Management** from the **Tools** menu.



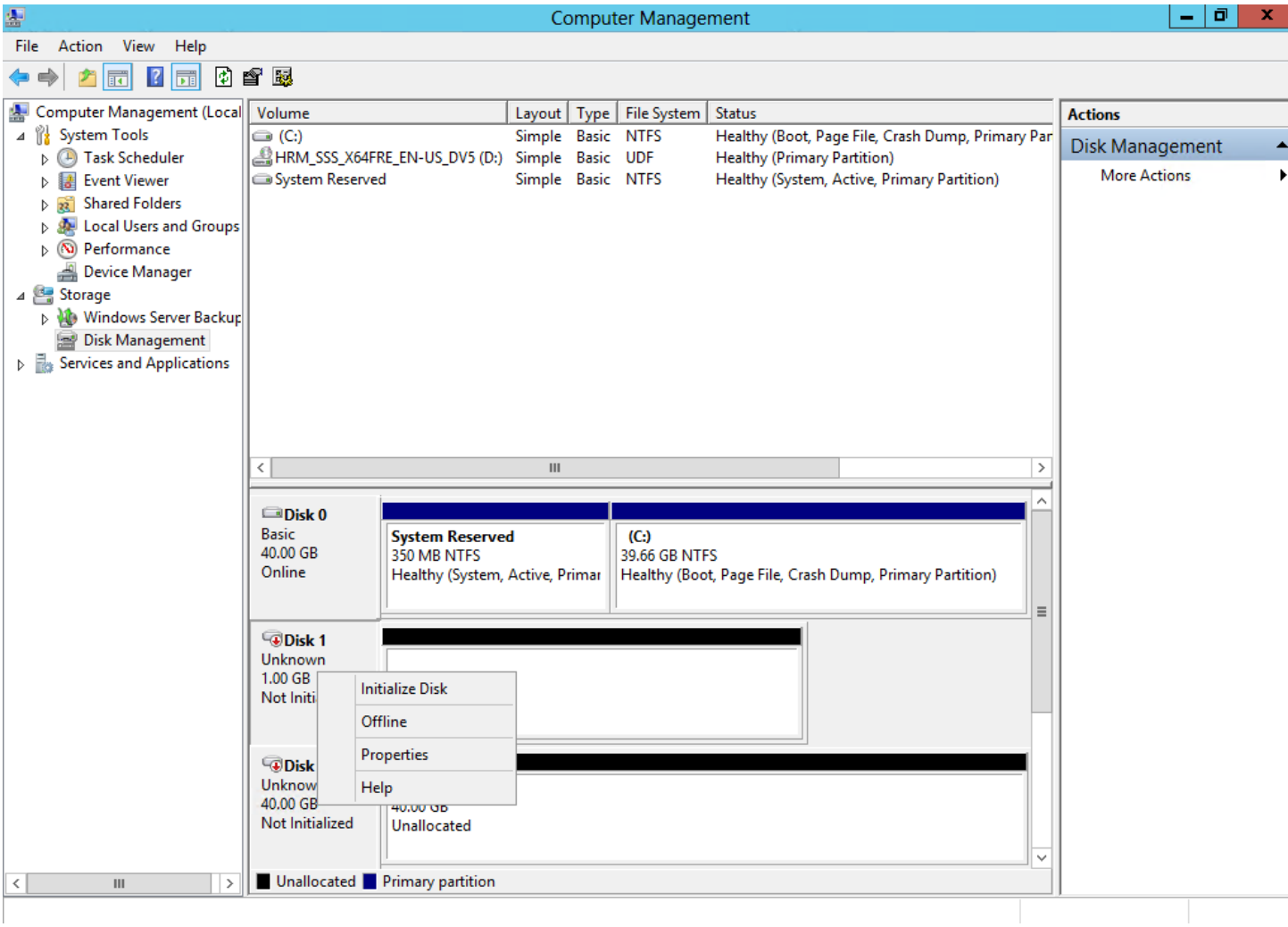
7. Select **Disk Management**. It may take a few seconds to populate the disk information in the right pane.



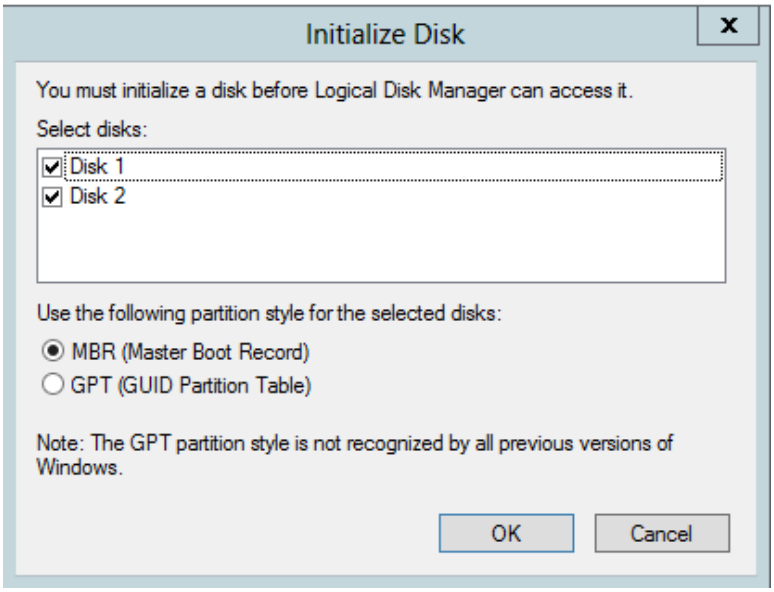
8. Right-click **Disk 1** and select **Online**.



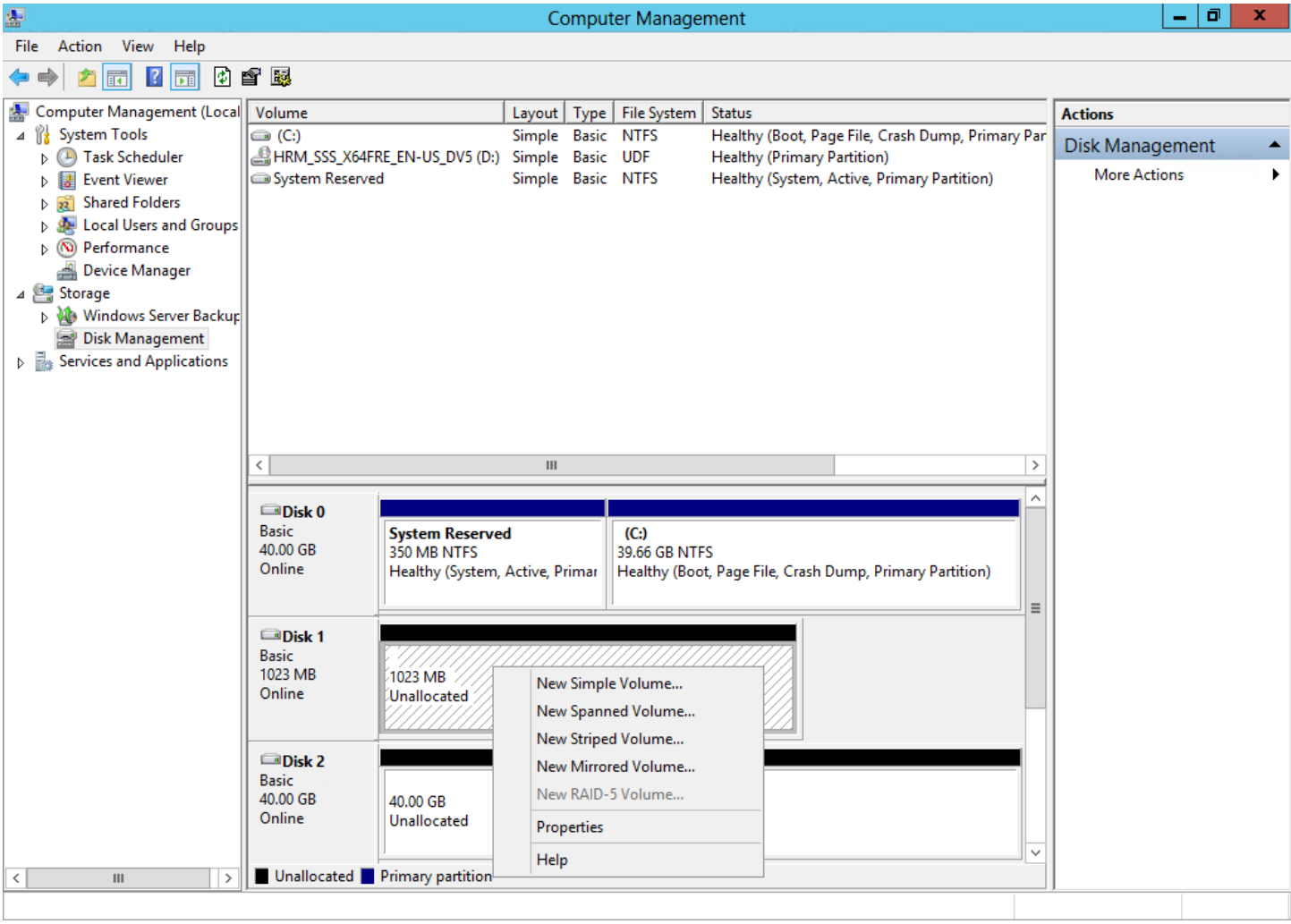
9. Repeat Step 3 for Disk 2.
10. Right-click **Disk 1** and select **Initialize**.



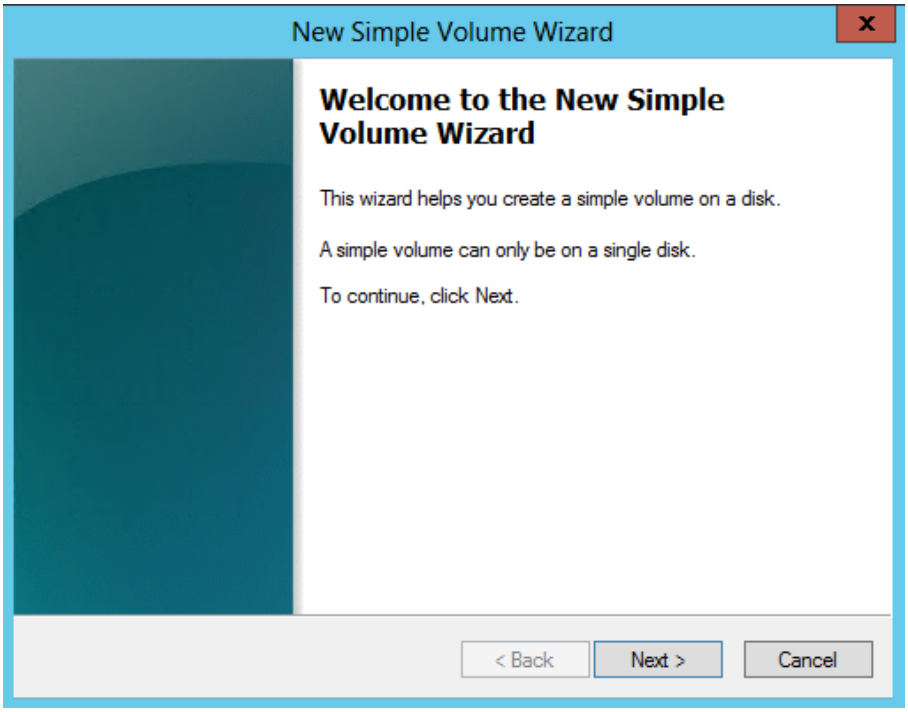
11. Verify both checkmarks are selected and MBR is selected on the **Initialize Disk** window.
12. Select **OK** to initialize the disks.



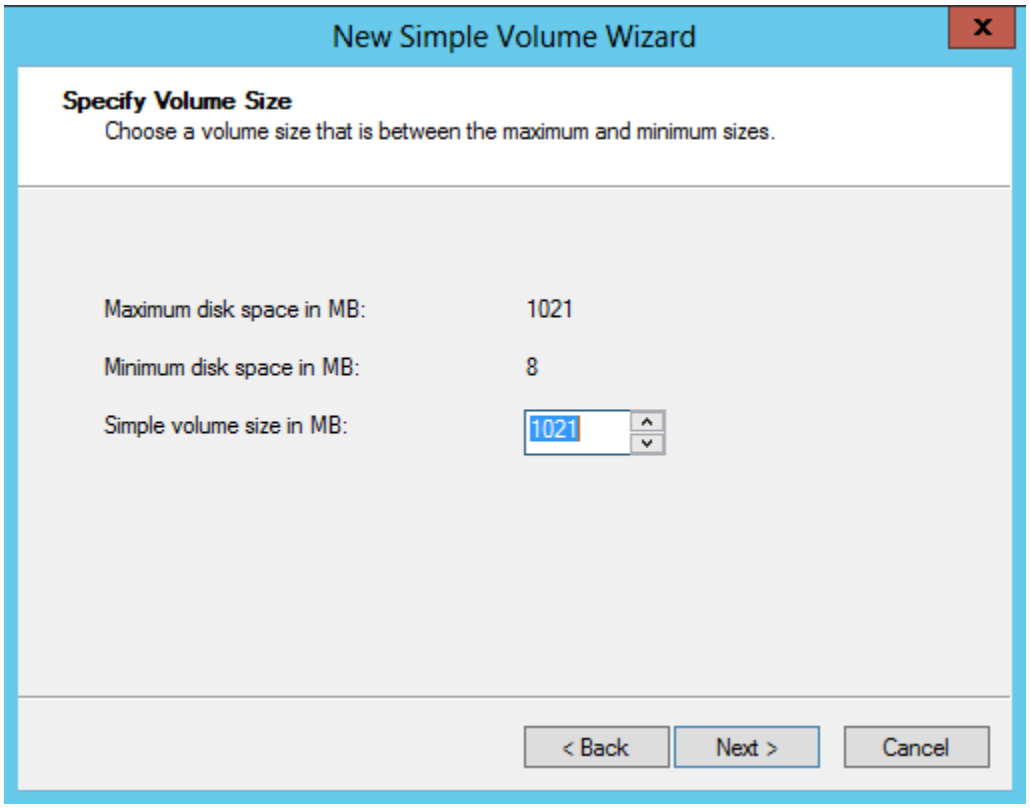
13. Right-click the **Unallocated** space and select **New Simple Volume**.



14. Click **Next** to start the **New Simple Volume Wizard**.

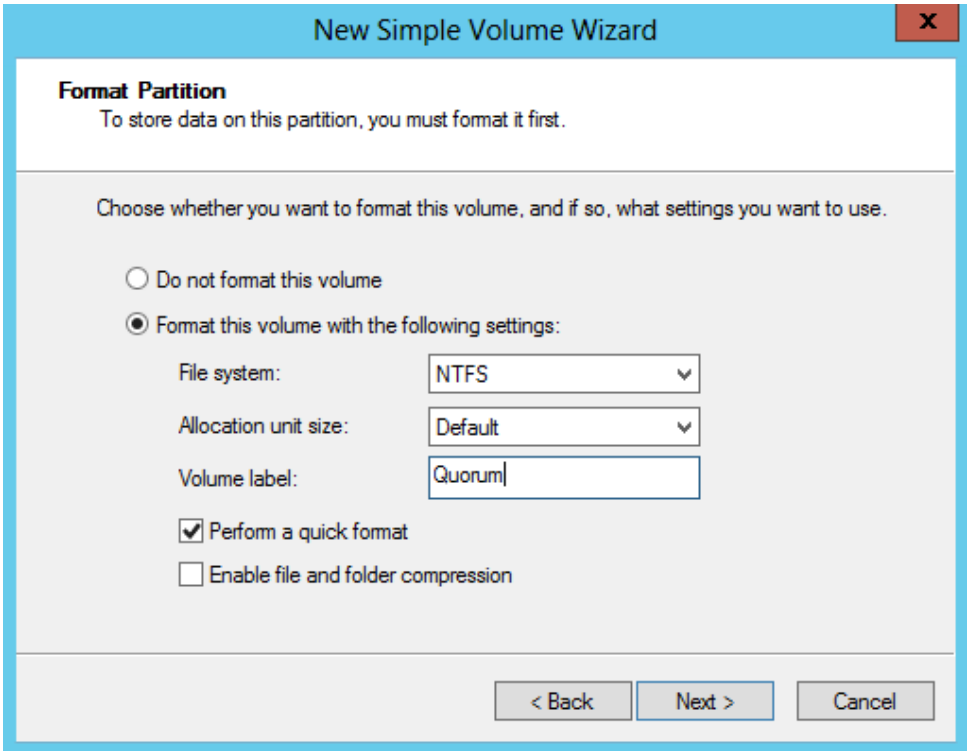


15. Click **Next** to accept the default entry.

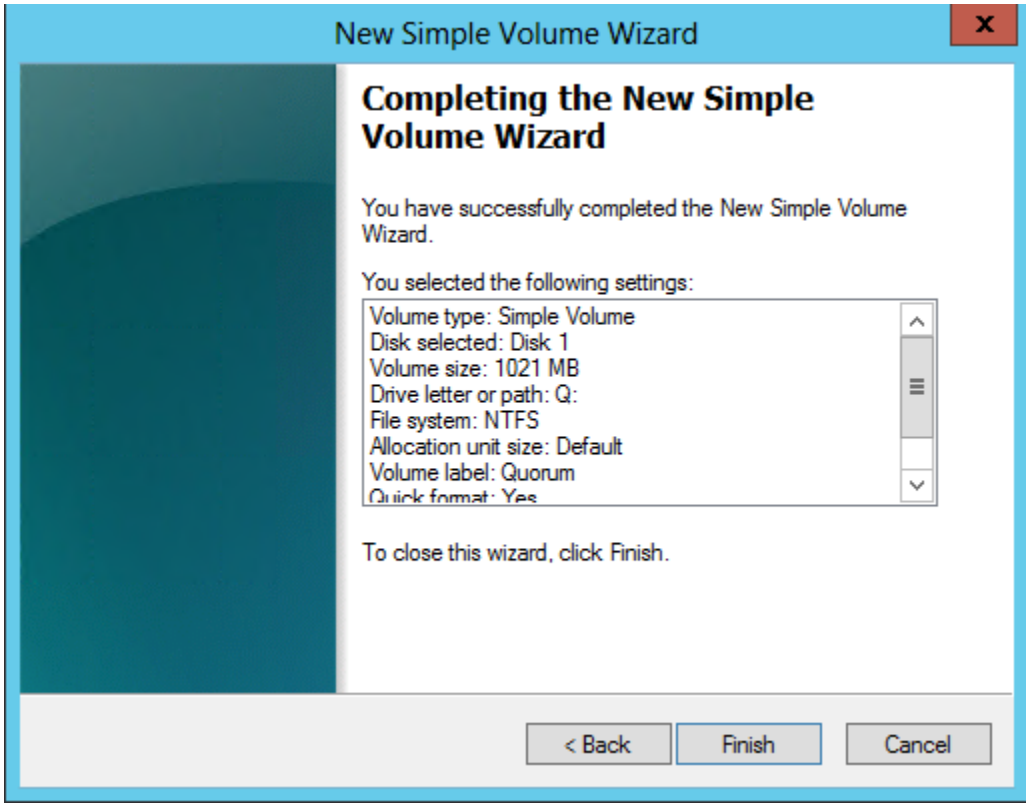


16. Select **Q** from the drop-down menu and click **Next**.

17. Enter **Quorum** in the **Volume label** field and click **Next**.



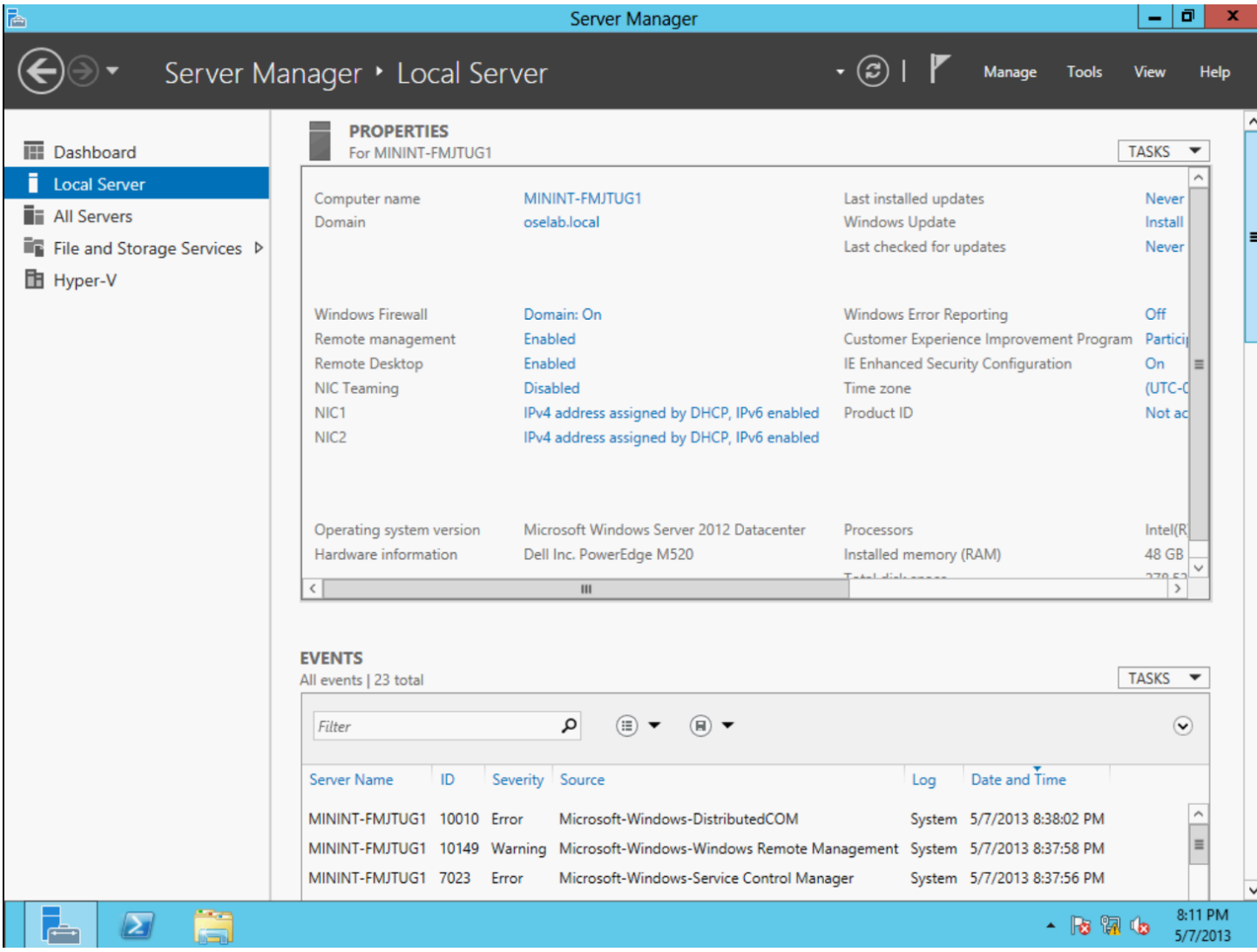
18. Click **Finish** to complete the process.



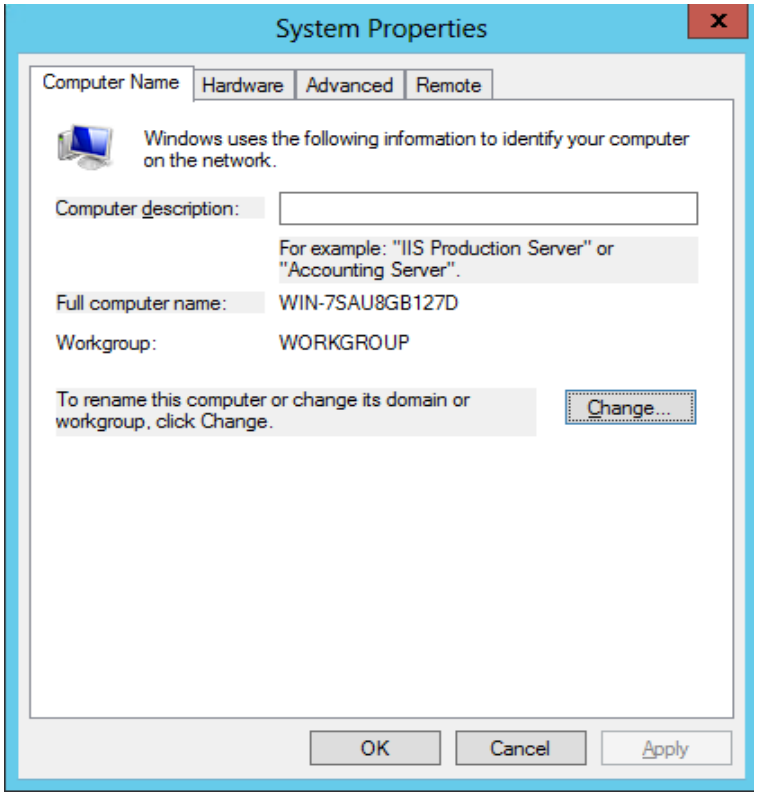
19. Repeat steps 7-12 for Disk 2.

Changing the computer name and domain membership

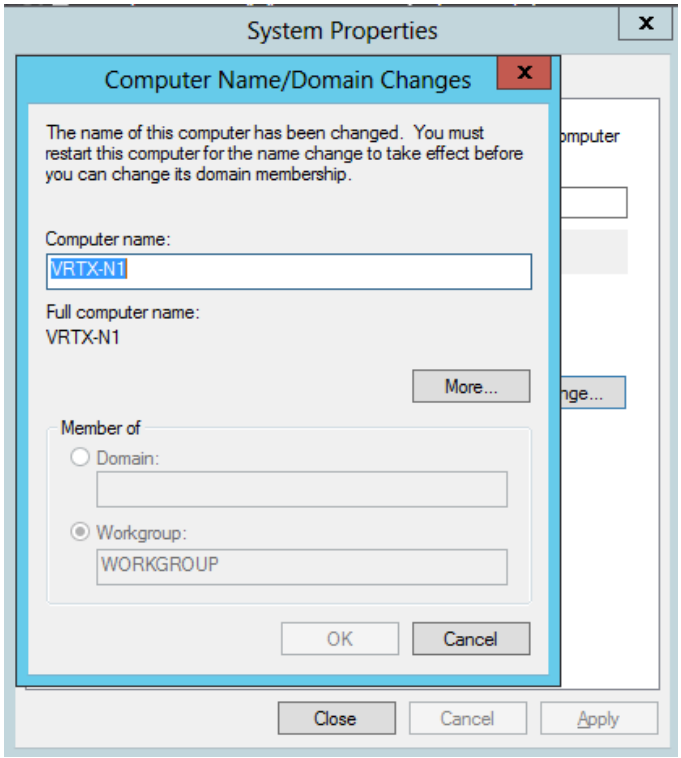
1. Open the **Server Manager** window.
2. Select **Local Server**.
3. Select the **Computer name** in the **Properties** section.



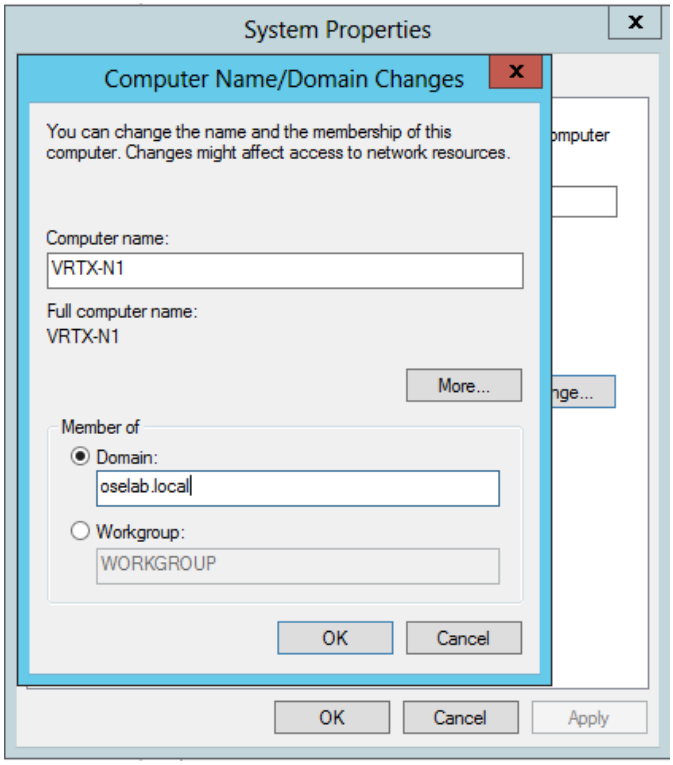
4. Click **Change** in the **System Properties** window.



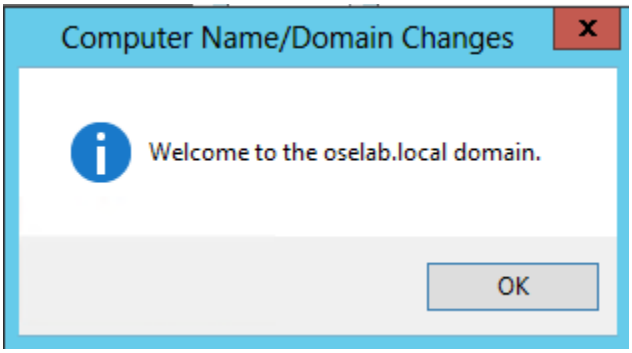
5. In the **Computer name** field enter the new name, such as VRTX-N1.



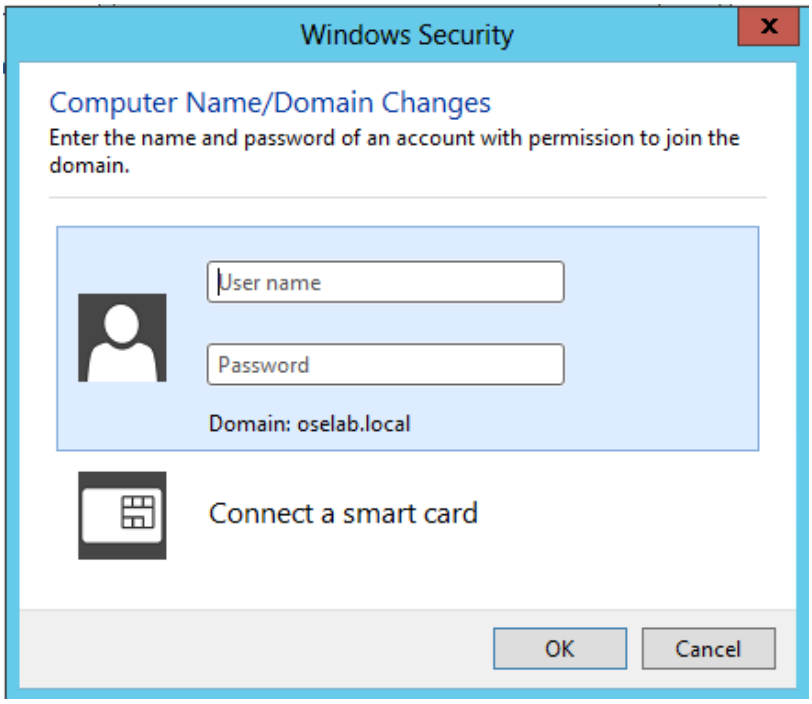
6. Select the **Domain** radio button and type the name of the domain, such as OSELab.local.
7. Click **OK**.



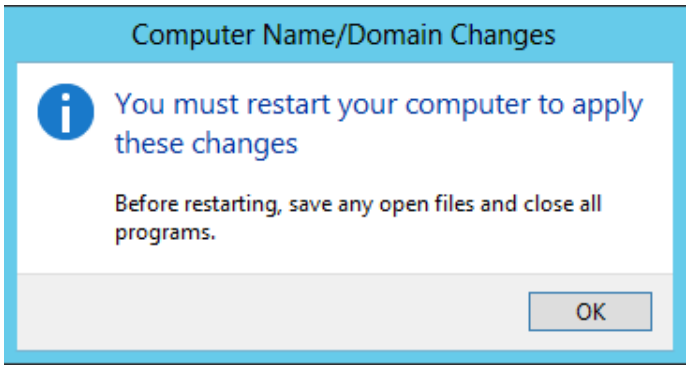
8. Click **OK**.



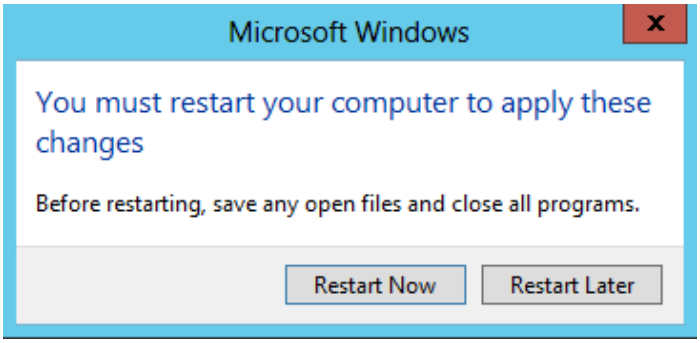
9. Enter domain admin credentials to join the system to the domain, and click **OK**.



10. Click **OK**.



17. Click **Restart Now** to reboot the system and complete the process.



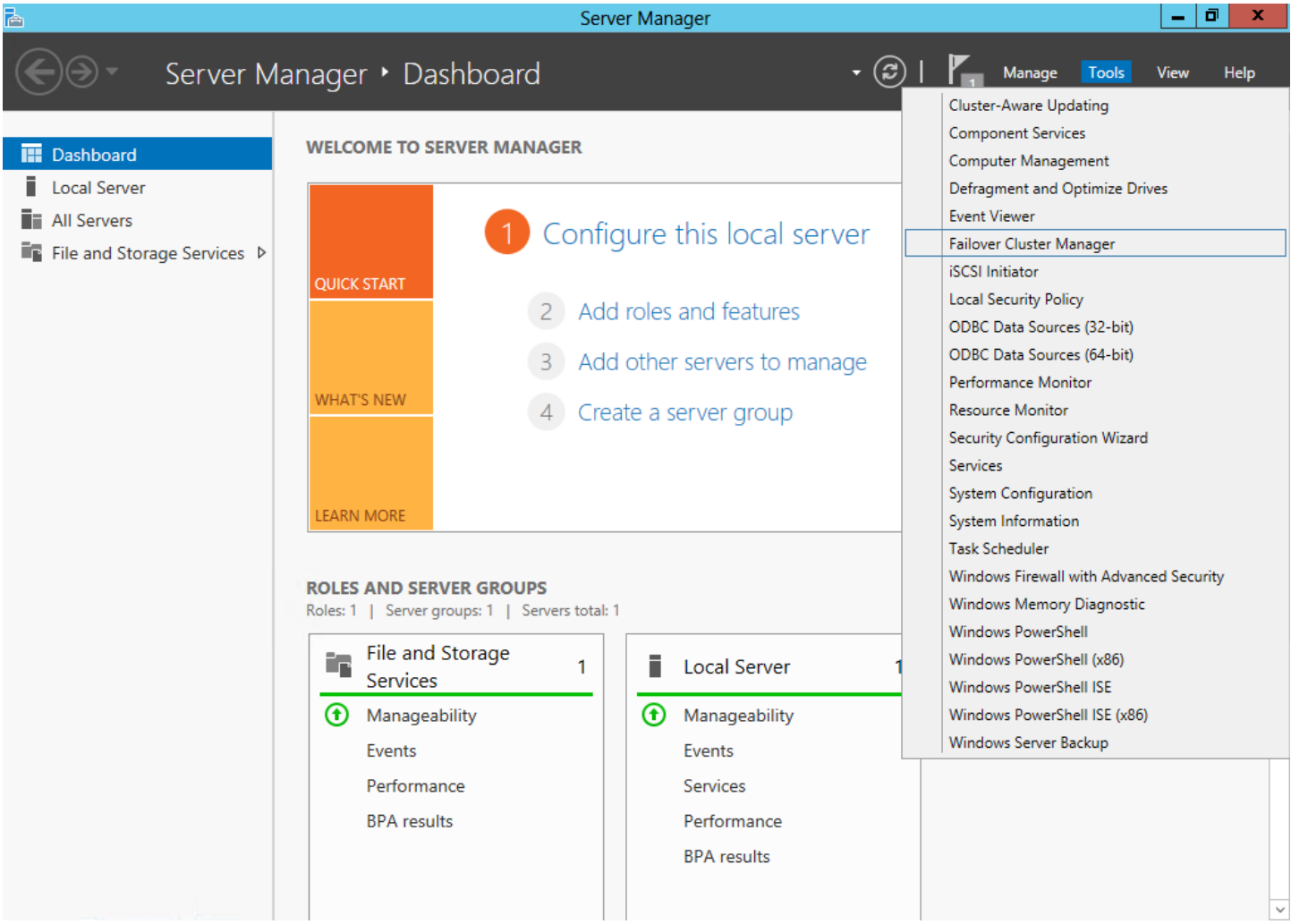
11. Repeat this process for all blade servers in the cluster, giving each server node a unique name.

Cluster validation and creation

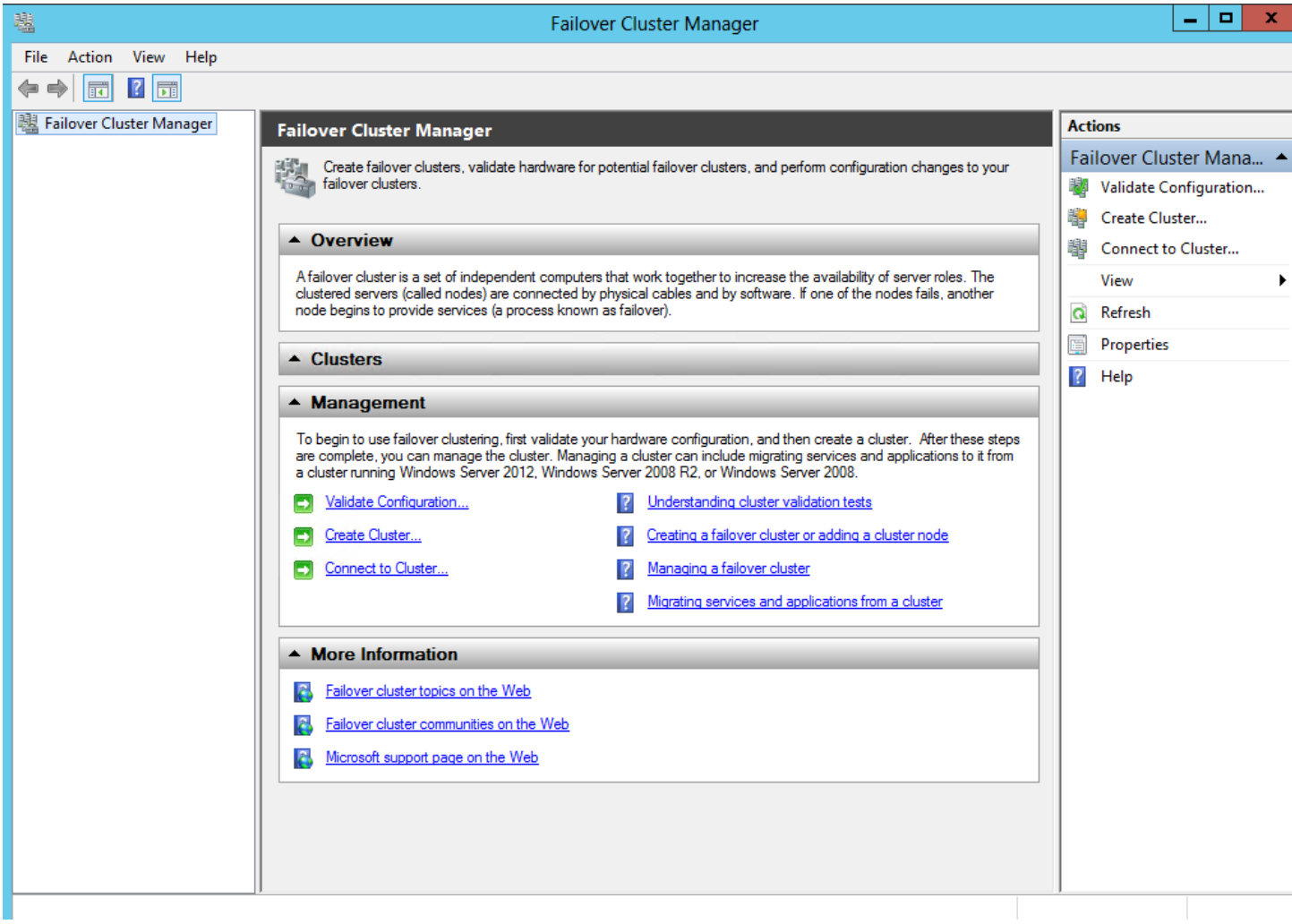
This section describes the steps to complete cluster validation and cluster creation. The validation process finds hardware or configuration issues before a failover cluster can go into production. The cluster validation wizard determines if the current hardware and software configuration meets the supported configuration guidelines.

Validating clusters

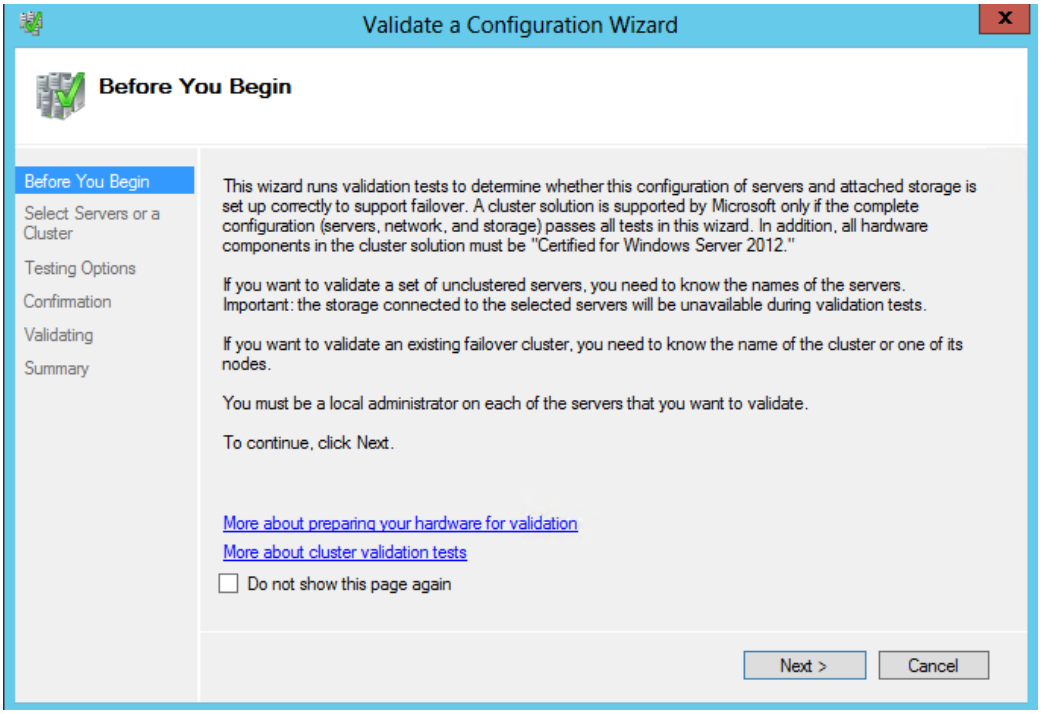
1. To open the Failover Cluster Manager, open the **Server Manager** window, and select **Failover Cluster Manager** from the **Tools** menu.



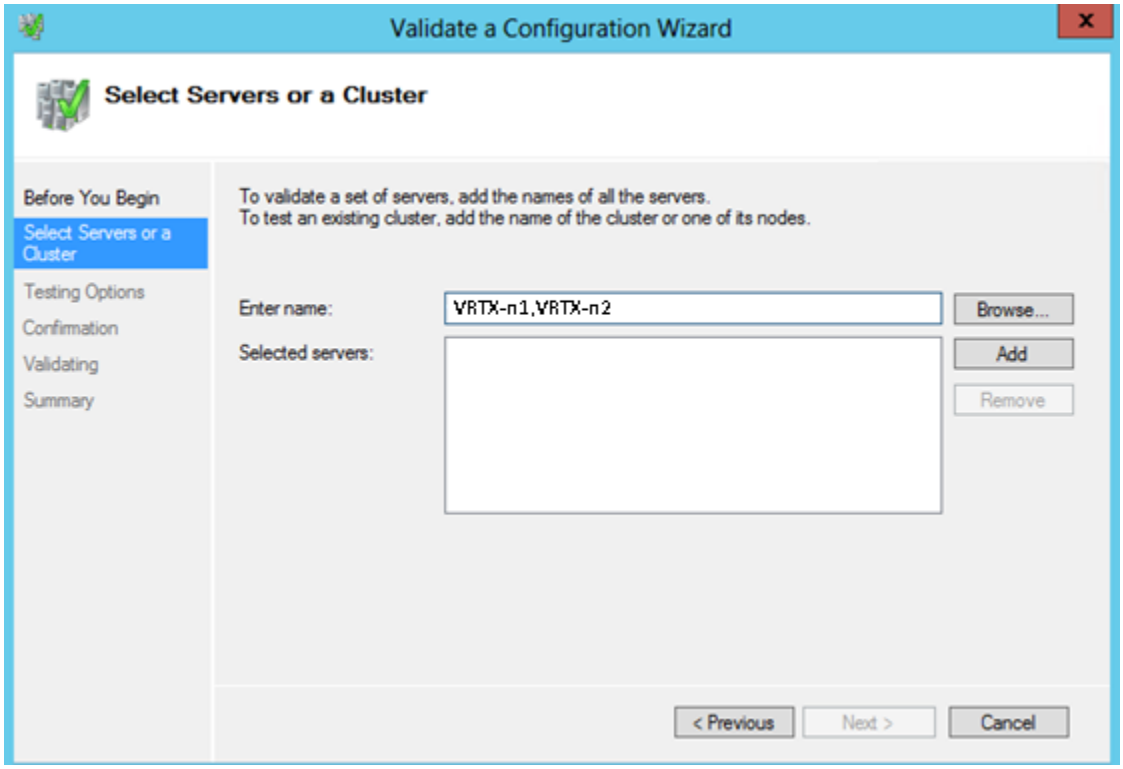
2. To open the **Cluster Validation Wizard**, in **Failover Cluster Manager** window, select **Validate Configuration** from the **Actions** menu.



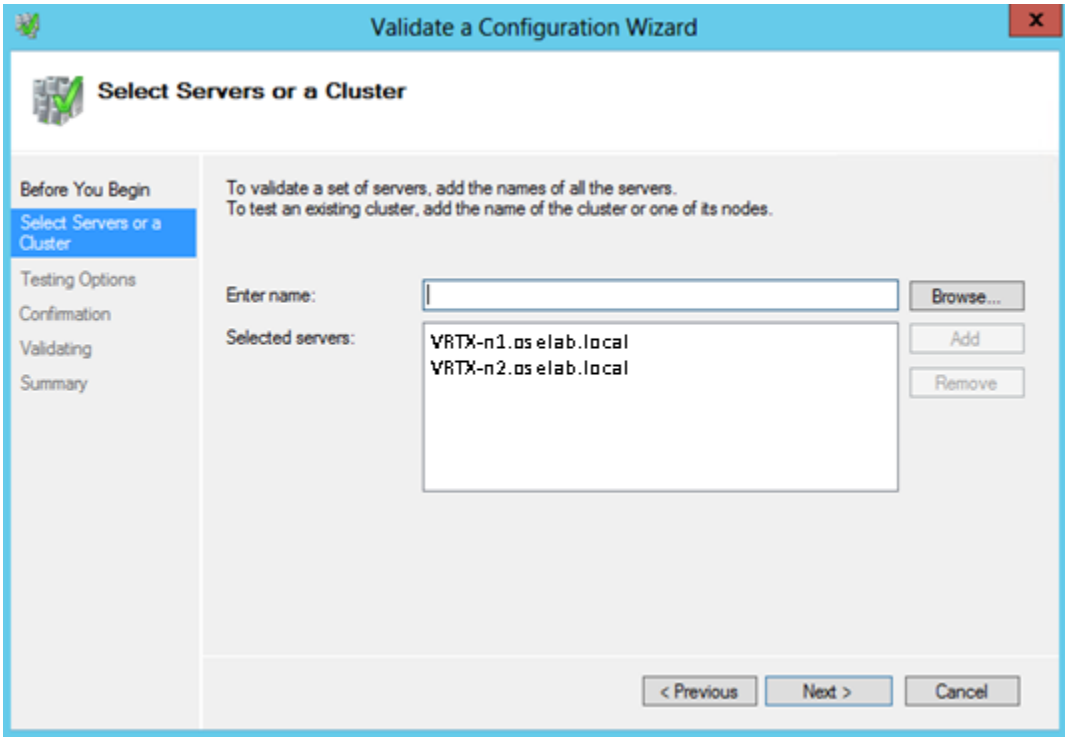
3. Select **Next** to start the **Validate a Configuration Wizard**.



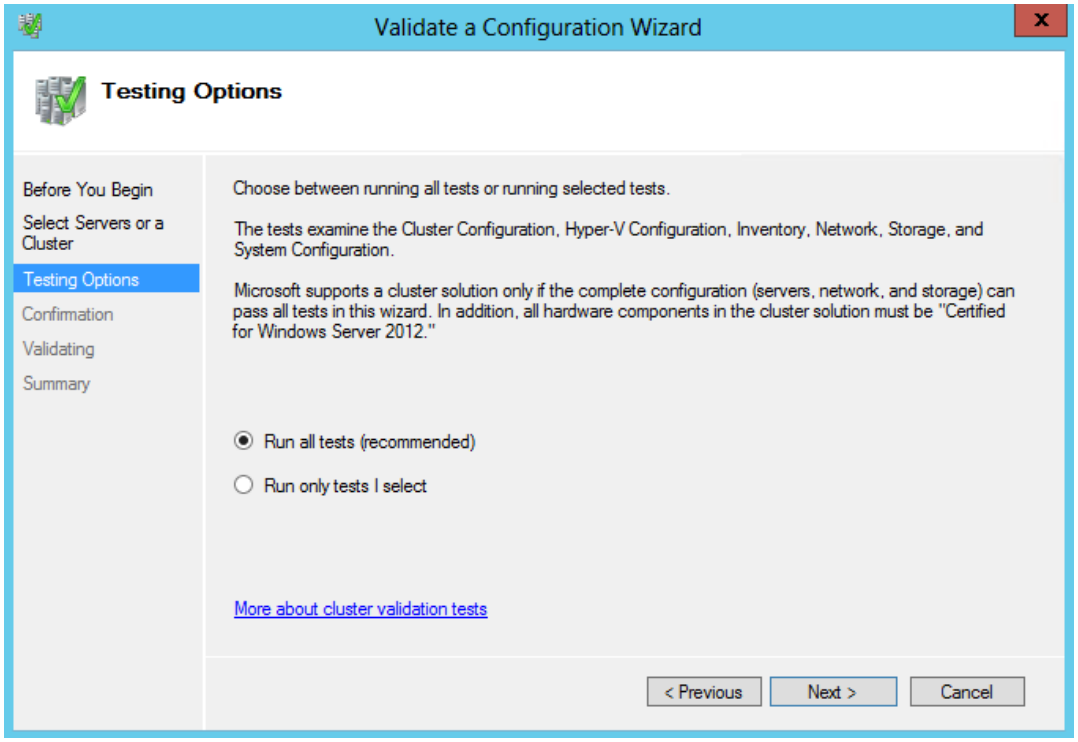
4. Enter the names of the servers to add to the cluster in the **Enter Name** field, separated by a comma.
5. Click **Add**.



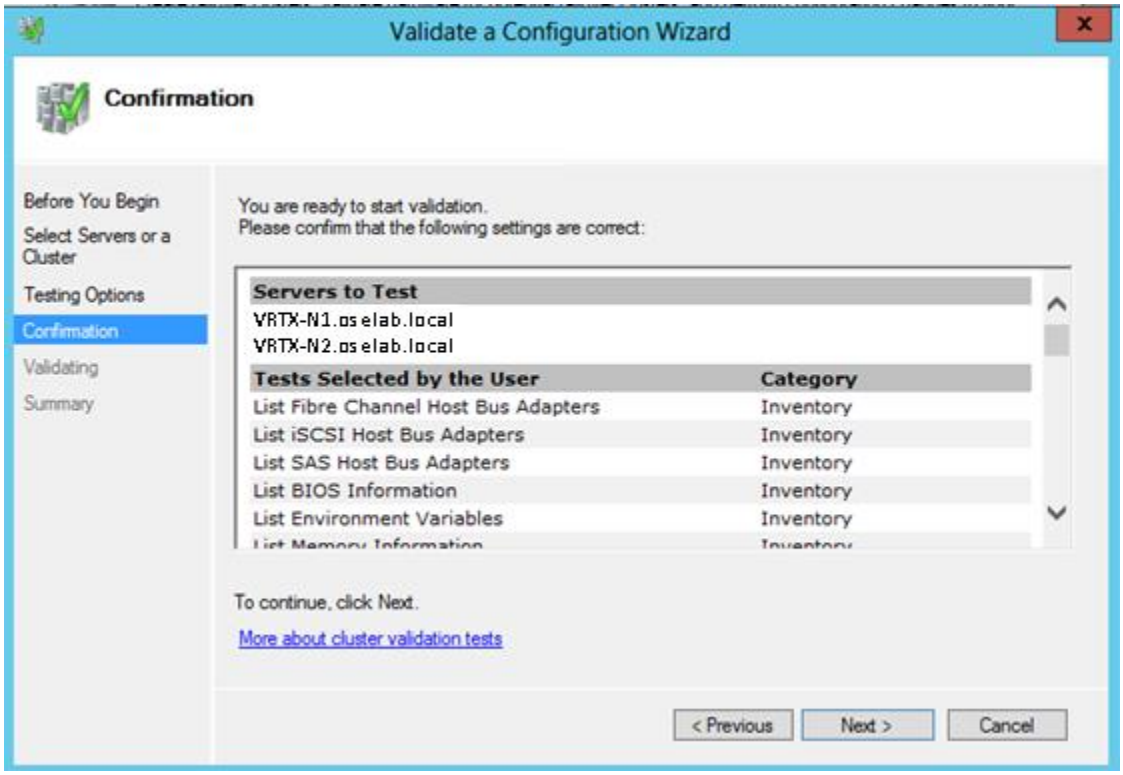
6. Click **Next**.



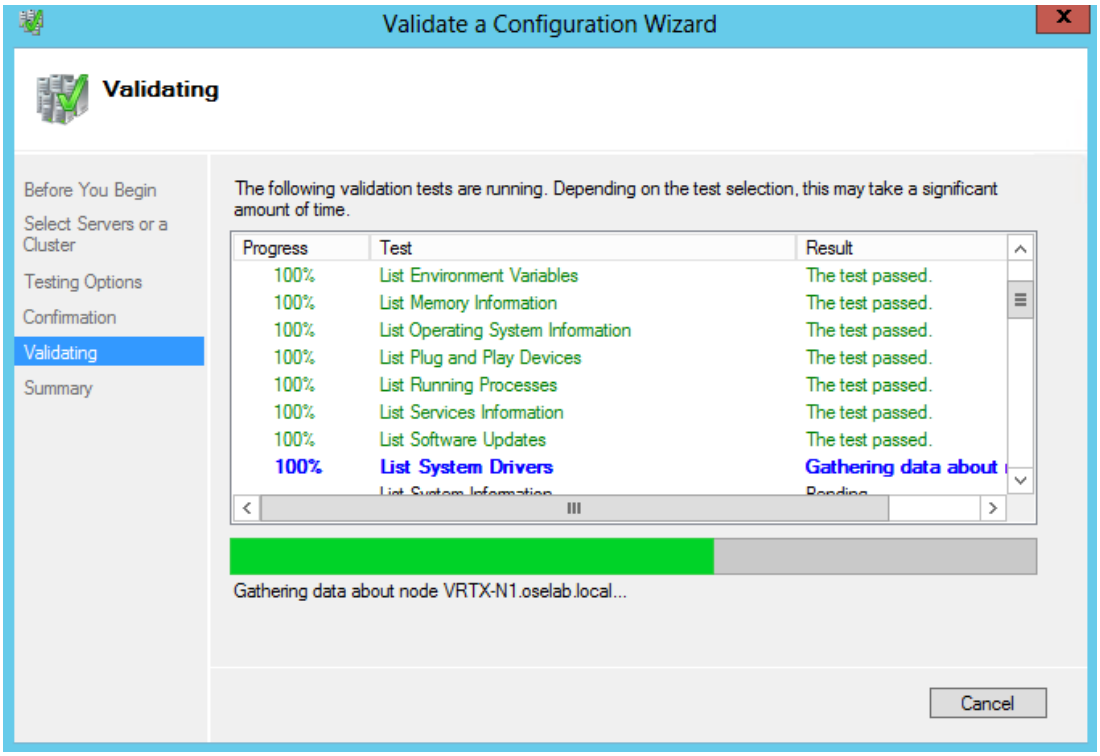
7. Verify the **Run all test (recommended)** radio button is selected.
8. Click **Next**.



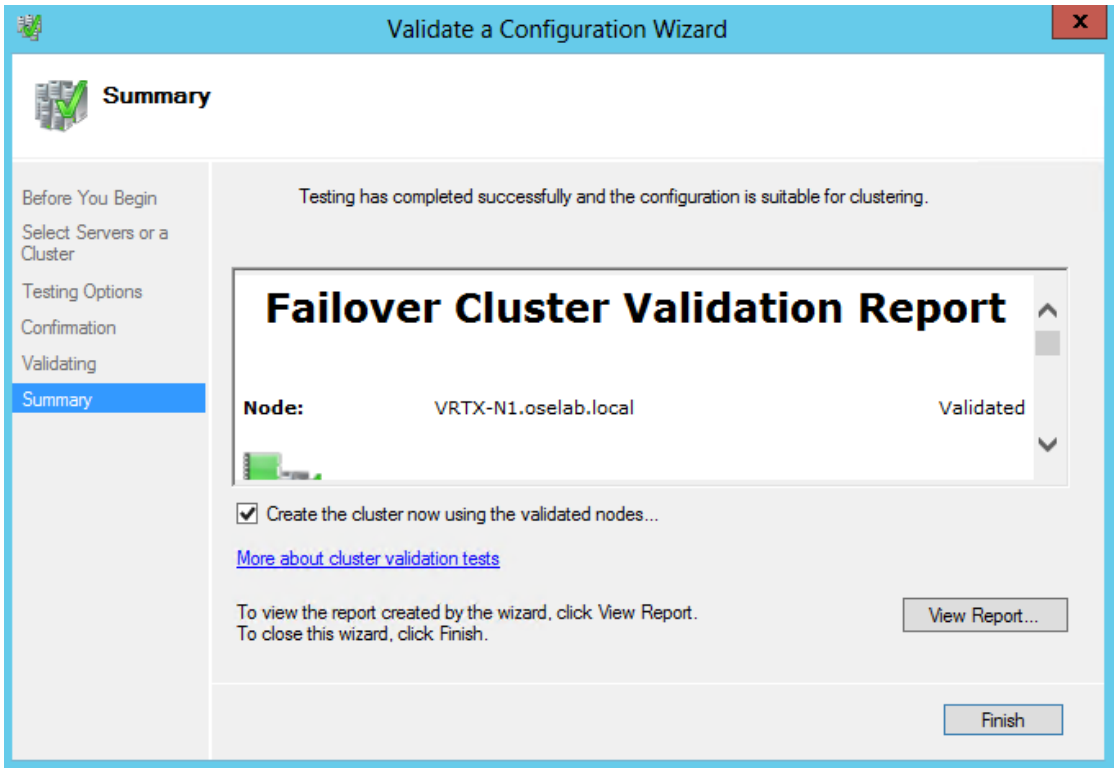
9. After all fields are populated on the **Confirmation** window, select **Next**.



10. You will see the progress bar as the validation process gathers information for the report.



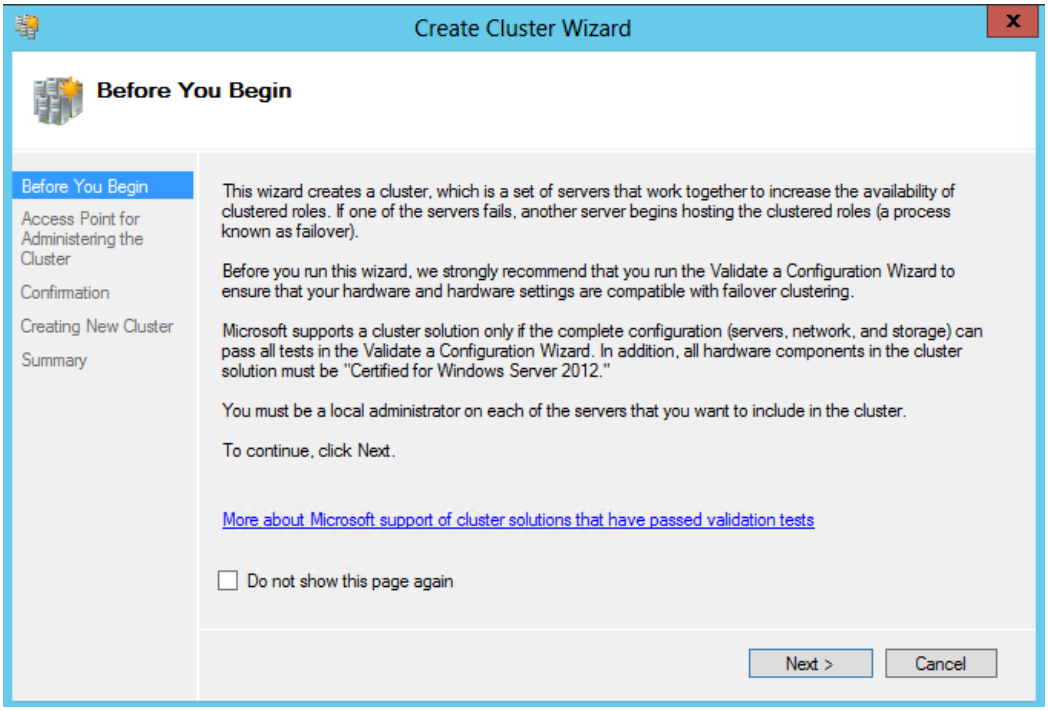
11. In the validation summary, verify that each node tested shows as **Validated**. If a node does not show as validated, click **View Report** to open the report and review the issue(s) for each node not validated.
12. Once all failures are fixed, rerun the validation wizard and click **Finish** to begin the cluster creation.



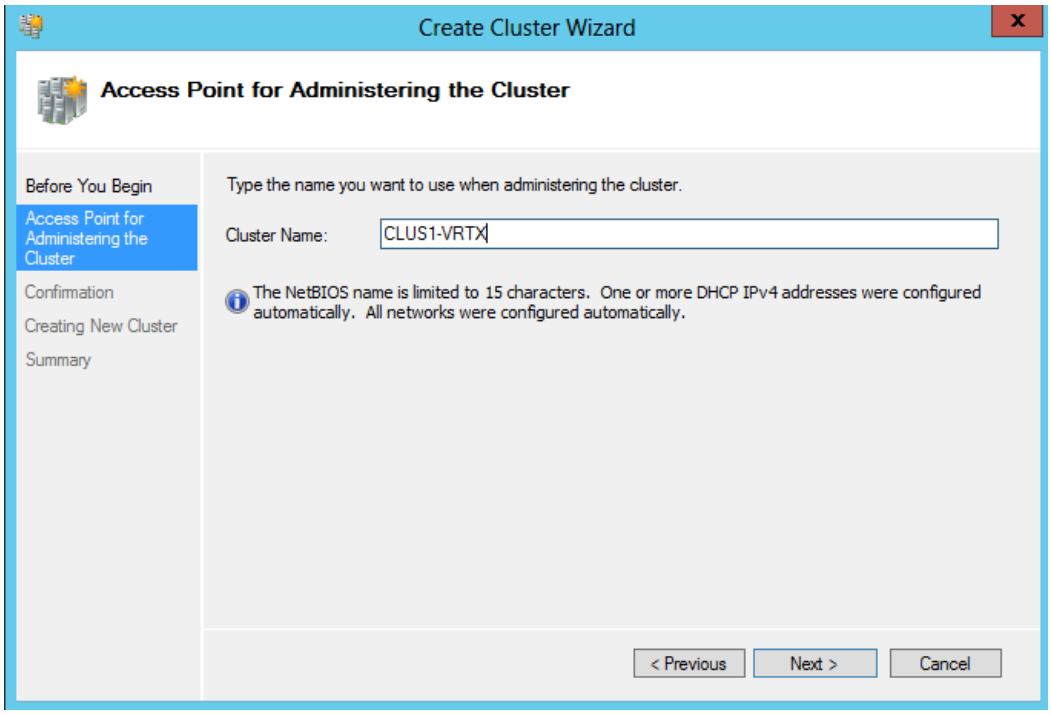
Note: You may see some warnings in the validation report. Check to be sure all shared disks are validated. If you see disk warnings, verify these are not local disks in the server(s) that have been listed.

Creating clusters

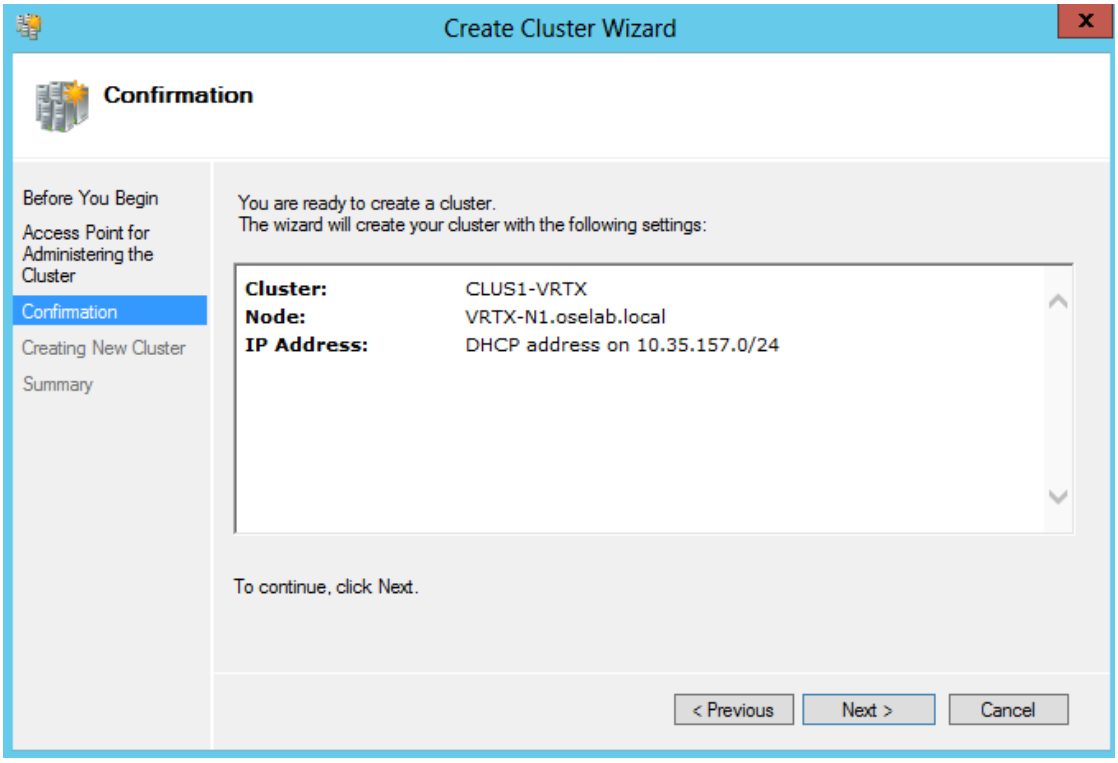
1. Click **Next** to start the **Create Cluster Wizard**.



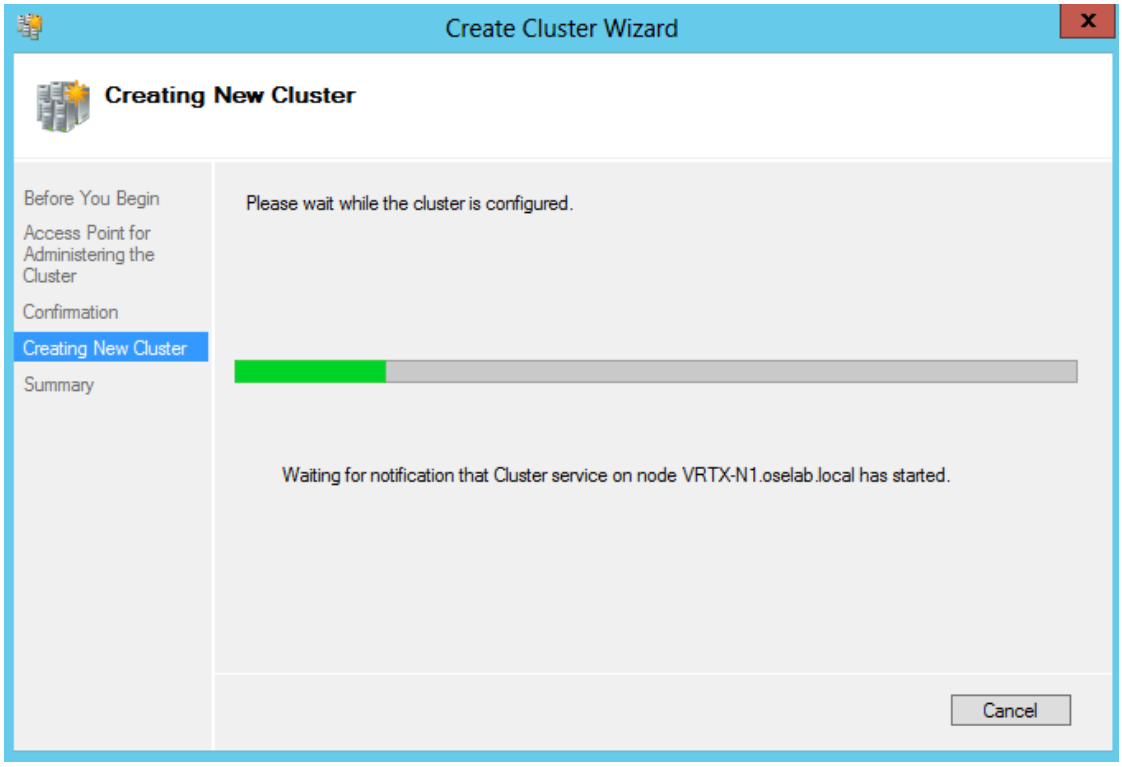
2. Enter a name for the cluster, such as CLUS1-VRTX, in the **Cluster Name** field.
3. Click **Next**.



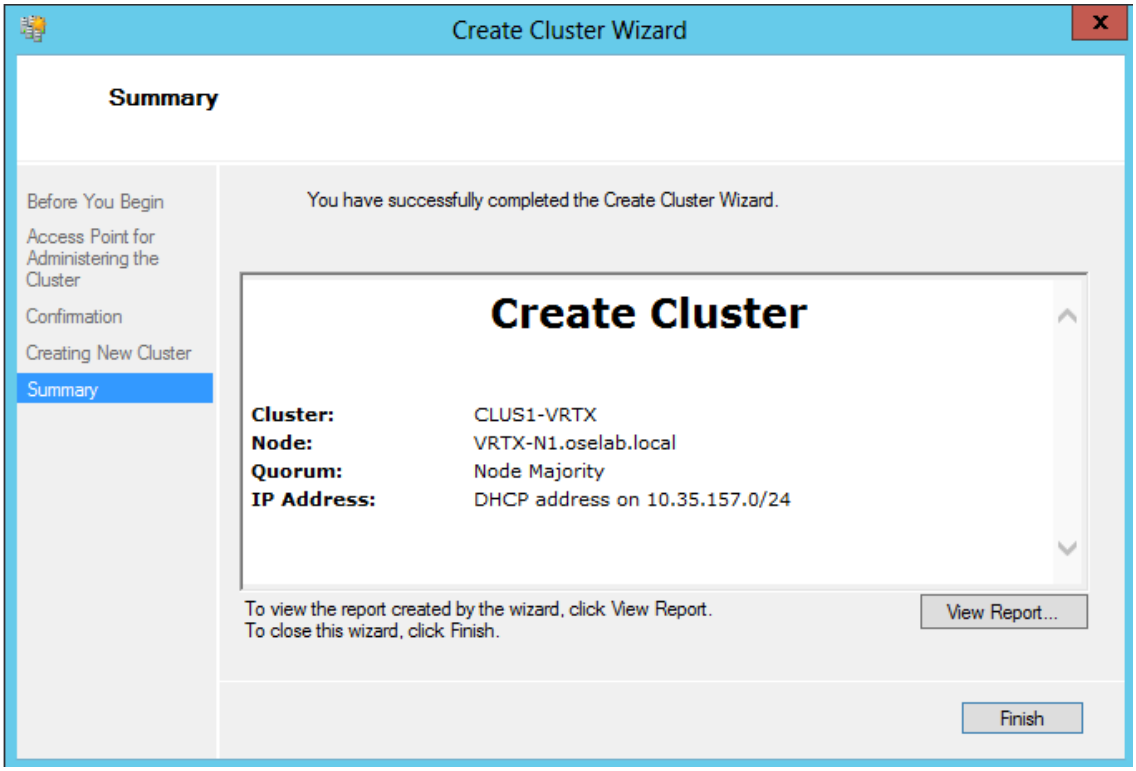
4. Click **Next**.



5. You will see the progress bar while the cluster is created. Once the cluster service starts on all nodes, the **Summary** window opens.



6. Verify the information is correct on the **Summary** screen.



Once cluster creation is complete, the **Failover Cluster Manager** window lists all of the resources.