Notes, cautions, and warnings

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

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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## Abbreviations

**Table 1. Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviations</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>bNDC</td>
<td>blade Network Daughter Card</td>
</tr>
<tr>
<td>CLI</td>
<td>command-line interface</td>
</tr>
<tr>
<td>CMC</td>
<td>Chassis Management Controller</td>
</tr>
<tr>
<td>CPLD</td>
<td>complex programmable logic device</td>
</tr>
<tr>
<td>Dell RACADM</td>
<td>Dell Remote Access Controller Admin</td>
</tr>
<tr>
<td>EULA</td>
<td>End User License Agreement</td>
</tr>
<tr>
<td>iDRAC8</td>
<td>integrated Dell Remote Access Controller</td>
</tr>
<tr>
<td>LUN</td>
<td>logical unit number</td>
</tr>
<tr>
<td>VM</td>
<td>virtual machine</td>
</tr>
<tr>
<td>VMM</td>
<td>Virtual Machine Manager</td>
</tr>
<tr>
<td>WFE</td>
<td>Web Front-end</td>
</tr>
</tbody>
</table>
Audience

This guide is intended for IT professionals and administrators who want to deploy the virtualized infrastructure solution by using Windows Server 2012 R2 Hyper-V on the Dell PowerEdge VRTX chassis.
Scope

This guide presents a highly available infrastructure that is designed according to the best practices and recommendations for virtualizing applications.

This guide provides step-by-step information on deploying a solution for general purpose virtual infrastructure using Microsoft Windows Server 2012 R2 Hyper-V on the Dell PowerEdge VRTX architecture. The verification of the infrastructure for component failovers is described in the verifying deployment section.

This guide provides information on setting up and configuring the following components that are part of the solution infrastructure:

- Dell Networking R1-2210 10GbE Switch Module
- Dell PowerEdge VRTX Chassis and Dell PowerEdge M630 Servers
Overview

Hyper-V on the Dell PowerEdge VRTX solution enables you to deploy virtualization-enabled remote office or branch office environments (ROBO) using Windows Server 2012 R2 on the Dell PowerEdge VRTX chassis.

Figure 1. PowerEdge VRTX Hyper-V reference architecture
Solution requirements

The following are the hardware and software requirements for deploying Windows Server 2012 R2 Hyper-V on the Dell PowerEdge VRTX chassis.

Hardware requirements

The following table lists the hardware requirements:

Table 2. Hardware requirements

<table>
<thead>
<tr>
<th>Components</th>
<th>Hardware Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis and Servers</td>
<td>Dell PowerEdge VRTX with the Dell PowerEdge M630 servers</td>
</tr>
<tr>
<td>Switches</td>
<td>Top-of-rack (ToR) switches in the customer environment for 10GbE LAN connectivity and Out-of-Band Management</td>
</tr>
<tr>
<td>Switch Module</td>
<td>Dell Networking R1-2210 10GbE switch module</td>
</tr>
<tr>
<td>On board Network Daughter Card</td>
<td>QLogic BCM 57810 10GbE Dual Port Mezzanine Card</td>
</tr>
<tr>
<td>Storage</td>
<td>PowerEdge VRTX Shared storage controller with 25 bay 2.5” SAS enclosures</td>
</tr>
</tbody>
</table>

Software requirements

The following table lists the software requirements:

Table 3. Software Requirements

<table>
<thead>
<tr>
<th>Components</th>
<th>Software Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypervisor</td>
<td>Microsoft Windows Server 2012 R2 Hyper-V</td>
</tr>
<tr>
<td>Virtual Machine Management</td>
<td>Microsoft System Center 2012 R2 Virtual Machine Manager with Update Rollup 6</td>
</tr>
<tr>
<td>Network Drivers</td>
<td>QLogic BCM57810 network drivers</td>
</tr>
<tr>
<td></td>
<td>Download from dell.com/support</td>
</tr>
</tbody>
</table>
Firmware requirements

This solution is deployed using the firmware versions listed in the following table.

Table 4. PowerEdge M630 servers

<table>
<thead>
<tr>
<th>Components</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOS</td>
<td>1.2.5</td>
</tr>
<tr>
<td>CPLD</td>
<td>1.0.5</td>
</tr>
<tr>
<td>iDRAC8 Enterprise</td>
<td>2.15.10.10</td>
</tr>
<tr>
<td>Lifecycle Controller (LC) 2</td>
<td>2.15.10.10</td>
</tr>
<tr>
<td>PERC H730 Mini</td>
<td>25.3.0.0016</td>
</tr>
<tr>
<td>BRCM 57810 NDC</td>
<td>7.12</td>
</tr>
</tbody>
</table>

Table 5. VRTX chassis and switches

<table>
<thead>
<tr>
<th>Components</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMC</td>
<td>2.04.A00</td>
</tr>
<tr>
<td>Dell Networking R1-2210 10GbE Switch Module</td>
<td>2.0.0.51</td>
</tr>
</tbody>
</table>

Cabling requirements

The following figure shows the high-level design of the reference architecture:
In the preceding design, each of the Dell Blade server LOMs (LAN On Motherboard) directly maps to Fabric A. The mezzanine cards on slot B and slot C are not used for the traditional I/O expansion. Instead, they are used for connecting to the PCIe infrastructure. The PowerEdge VRTX chassis is designed to use PCIe slots through two PCIe switches—one for Fabric B and one for Fabric C. Each PCIe switch ties into one of the two mezzanine cards on the server nodes to provide connectivity to the PCIe slot as mentioned in Table 6.

**NOTE:** The mezzanine cards on the slots B and C are not used for network traffic in this reference architecture. However, the mezzanine cards are required for connectivity to SPERC.

### Table 6. PCIe switch mappings

<table>
<thead>
<tr>
<th>PCIe switch</th>
<th>PCIe slot connectivity</th>
<th>Mezzanine slot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fabric B PCIe Switch</td>
<td>PCIe slot 3, PCIe slot 6, PCIe slot 7, PCIe slot 8 and a Shared PowerEdge RAID Controller (SPERC)</td>
<td>Mezz B</td>
</tr>
<tr>
<td>Fabric C PCIe Switch</td>
<td>PCIe slot 1, PCIe slot 2, PCIe slot 4, PCIe slot 5</td>
<td>Mezz C</td>
</tr>
</tbody>
</table>

The SPERC is mapped to the server blades in the VRTX chassis through Fabrics B and C PCIe switches. These PCIe switches are mapped to the server blades by using the mezzanine cards B and C.

The following figure illustrates how the fabrics are connected in the PowerEdge M630 server and the utilization of the I/O modules.
Figure 3. I/O connectivity of M630 on PowerEdge VRTX chassis
Hyper-V on the Dell PowerEdge VRTX chassis—deployment workflow

This section outlines the complete deployment sequence of Hyper-V on the PowerEdge VRTX solution.

1. Complete the solution requirements. See Solution requirements.
2. Complete the cabling. See Cabling requirements.
3. Configure the following components:
   - VRTX chassis and M630 servers. See Configuring PowerEdge VRTX chassis CMC and PowerEdge M630 servers for OOB management.
   - VRTX Storage. See Configuring the VRTX storage.
4. Configure Virtualization — Hyper-V
   a. Install virtualization infrastructure. See Installing virtualization infrastructure
   b. Configure virtual disk for OS deployment. See Configuring RAID in the Dell PowerEdge M630.
   d. Install Windows Server 2012 R2 operating system in the Dell PowerEdge VRTX. See Installing Windows Server 2012 R2 operating system in the Dell PowerEdge M630.
   h. Add the Dell PowerEdge VRTX servers to the domain. See Moving Dell PowerEdge M630 servers to the domain.
   i. Configure vEthernet switch. See Configuring vEthernet switch.
   j. Assign the virtual disks. See Assigning virtual disks.
   k. Download and install the shared PERC driver. See Installing the shared PERC driver.
   l. Add MPIO settings. See
Adding MPIO settings.
m. Configure the registry settings. See Configuring registry.
n. Add volumes in the Dell PowerEdge M630 servers. See Add volumes.
5. Verify the deployment. See Verifying the deployment.
Configuring components

Before you set up Windows Server 2012 R2 Hyper-V on the virtual infrastructure, you must set up and configure the following components:

1. Dell Networking R1-2210 10GbE switch module. See [Configuring Dell Networking R1-2210 switch module](#).
2. PowerEdge VRTX chassis and M630 servers. See [Configuring VRTX chassis CMC and M630 servers for OOB management](#).
3. Configure VRTX Storage. See [Configuring the VRTX storage](#).

### Configuring Dell Networking R1-2210 switch module

This section describes configuring the switch module R1-2210 by using CLI. To configure the switch module R1-2210, the following tasks are performed:

- Set the host name of the switch and credentials to access the switch.
- Configure the VLANs on the server and uplink ports.

The section also describes setting up an uplink port channel for external connectivity.

To configure the Dell Networking R1-2210 switch module, perform the following steps:

1. Access the switch console (CLI) of the R1-2210 switch module. To access the console, use SSH with the VRTX CMC console and type `connect switch`.
2. Configure the host name. **Syntax:** `hostname <name>`
   ```
   console#configure
   console(config)#hostname R1-2210
   console(config)#ex
   ```
3. Configure a system username and password to access the system remotely by using the following commands:
   **Syntax:** `username <username> password <password> privilege <privilege level>`
   ```
   R1–2210#
   configure
   username admin password Dell1234 prev 15
   ```
4. Configure the Management IP address by performing the following in the VRTX CMC GUI:
   a. Log in to the CMC GUI by using the default user name `root` and password `calvin`.
   b. In the left pane, click **Chassis Overview** -> **I/O Module** -> **10 GbE KR**, and then click the **Setup** tab.
   c. In the **Setup** tab, assign IP to the R1–2210 switch and click **Apply**.
5. Configure SNMP using the following commands:
   ```
   R1–2210#
   configure
   ```
6. Configure Port channel on the external 10G interfaces:
   R1-2210(config)#interface Port-Channel 1
   R1-2210(config-if)#switchport mode trunk
   R1-2210(config-if)#switchport trunk allowed vlan add 10,20,30,40

R1-2210(config)#interface range
TengigabitEthernet 0/1-4
R1-2210(config-if-range)#channel-group 1 mode auto

7. Configure the host interfaces by using the following commands:
   console#configure
   console(config)#interface range TengigabitEthernet1/1-4
   console(config-if-range)#switchport mode trunk
   console(config-if-range)#switchport trunk allowed vlan add 10,20,30,40
   console(config-if-range)#spanning-tree portfast

8. Configure the VLANs by using the following commands:
   R1-2210#configure
   R1-2210(config)#vlan database
   R1-2210(config-vlan)#vlan 10 name Management
   R1-2210(config-vlan)#vlan 20 name Cluster
   R1-2210(config-vlan)#vlan 30 name LiveMigration
   R1-2210(config-vlan)#vlan 40 name VM

Configuring PowerEdge VRTX chassis CMC and PowerEdge M630 servers for OOB management

After cabling the chassis to the network infrastructure, turn on the chassis and all the PowerEdge M630 servers.

1. Connect one end of the serial cable to the serial connector on the back of the PowerEdge VRTX chassis and the other end of the cable to the management station (Laptop) serial port.
2. By using a terminal emulation software, access the CMC console. In the console, configure the connection as follows:
   • **Baud rate** – 115200
   • **Port** – COM1
   • **Data** – 8 bit
   • **Parity** – None
   • **Stop** – 1 bit
   • **Hardware flow control** – Yes
   • **Software flow control** – No
3. Log in to the CMC using the default credentials. The default user name is **root** and the password is **calvin**.
4. Run the following command to set the management IP address for the VRTX chassis:
   `racadm setniccfg -s <IPv4 Address> <netmask> <IPv4 Gateway>
5. Run the following command to set the iDRAC management IP address for each of the PowerEdge M630 servers present in the chassis:
   `Racadm setniccfg -m server-1 -s <IPv4 Address> <netmask> <IPv4 Gateway>
   Racadm setniccfg -m server-2 -s <IPv4 Address> <netmask> <IPv4 Gateway>
   Racadm setniccfg -m server-3 -s <IPv4 Address> <netmask> <IPv4 Gateway>
   Racadm setniccfg -m server-4 -s <IPv4 Address> <netmask> <IPv4 Gateway>`
NOTE: You can also configure the iDRAC using CMC GUI.

After setting up the management IP address for CMC and iDRAC for each server, run the following command to reset the CMC:

```
racadm racreset
```

Open the CMC console using CMC IP and confirm that the iDRAC management IP addresses are set correctly for the PowerEdge M630 servers.

### Configuring BIOS on the PowerEdge M630 server

This section describes how to enable virtualization and hyper-threading (HT).

Perform the following tasks to configure BIOS on the PowerEdge M630 server:

1. Turn on or restart the server.
2. To enter **System Setup**, press F2 immediately after you see the following message:
   ```
   <F2>=System Setup
   ```
3. Ensure that the logical processor is enabled by performing the following steps:
   a. On the **System Setup** page, click **System Setup Main Menu → System BIOS → Processor Settings**.
   b. On the **Processor Settings** page, verify that **Logical Processor Settings** is set to **Enabled**.
4. Ensure that virtualization technology is enabled by performing the following steps:
   a. On the **System Setup** page, click **System Setup Main Menu → System BIOS → Processor Settings**.
   b. On the **Processor Settings** page, check that **Virtualization Technology** is set to **Enabled**.

### Configuring the VRTX storage

Complete the following tasks to configure the VRTX storage:

1. Assign Virtual Adapter to server slots. See Assigning virtual adapters to server slots.

### Assigning virtual adapters to server slots

Perform the following steps to assign virtual adapters to server slots:

1. Log in to the CMC GUI by using the default user name **root** and password **calvin**.
2. In the left pane, click **Chassis Overview → Storage → Setup**.
   The Storage **Virtualization** page is displayed.
3. Under the **Virtual Adapter Mapped** section, map the virtual adapters 1 to 4 to the corresponding server slots as mentioned in the following table:
Table 7. Assigning virtual adapters to virtual slots

<table>
<thead>
<tr>
<th>Virtual adapter</th>
<th>Server slot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Adapter 1</td>
<td>Slot 1</td>
</tr>
<tr>
<td>Virtual Adapter 2</td>
<td>Slot 2</td>
</tr>
<tr>
<td>Virtual Adapter 3</td>
<td>Slot 3</td>
</tr>
<tr>
<td>Virtual Adapter 4</td>
<td>Slot 4</td>
</tr>
</tbody>
</table>

4. Under **Assignment Mode: Virtual Disks to Virtual Adapters** section, select **Multiple Assignment**.
   
   This mode allows a virtual disk to be assigned to multiple virtual adapters at a time.

5. Click **Apply**.

### Creating virtual disks

RAID 10 provides redundancy, better performance, and is the best option for I/O intensive workloads. Microsoft recommends the usage of 64K block size for disks, VHD/VHDx files, and CSVs.

Perform the following steps to create a virtual disk:

1. In the left pane, click **Chassis Overview → Storage → Virtual Disks → Create**.

2. On the **Create Virtual Disk** page, under the **Settings** section, create virtual disks as mentioned in the following table:

   **Table 8. Virtual disks**

<table>
<thead>
<tr>
<th>Name</th>
<th>Capacity</th>
<th>Physical disks to be used</th>
<th>RAID level</th>
</tr>
</thead>
<tbody>
<tr>
<td>VD1_Quorum</td>
<td>2 GB</td>
<td>1,2,3,4</td>
<td>10</td>
</tr>
<tr>
<td>VD2_VMVHDs</td>
<td>Select available space after creating VD1_Quorum volume.</td>
<td>1,2,3,4</td>
<td>10</td>
</tr>
</tbody>
</table>

3. Under **Select Physical Disks**, select the physical disks 1, 2, 3, 4 on which the virtual disks will be created.

4. Click **Apply**.

### Initializing virtual disks

To initialize virtual disks:

1. In the left pane, click **Chassis Overview → Storage → Virtual Disks → Manage**.

2. On the **Manage Virtual Disks** page, from the **Virtual Disk Actions** drop-down menu, select **Initialize:Fast**, and then click **Apply**.

   Wait until the initialization process completes as it will take some minutes to complete.

### Assigning global hot spares

To assign or unassign a global hot spare:

1. In the left pane, click **Chassis Overview → Storage → Physical Disk → Setup**.
The Setup Physical Disks page is displayed.

2. Under the Global Hotspares Assignment section, from the Hotspare Action drop-down menu, select Global Hotspare for Physical Disk 0.0.0, and then click Apply.
Configuring solution for virtualization – Windows Server 2012 R2 Hyper-V

Installing virtualization infrastructure

To set up virtualization, perform the following tasks:

- Configuring virtual disk for OS deployment in Dell PowerEdge M630 servers
- Configuring prerequisites to install Windows Server
- Installing Windows Server 2012 R2 operating system in the Dell PowerEdge VRTX
- Enabling Hyper-V and multipath features in Windows Server 2012 R2
- Setting up NIC teaming in Windows Server 2012 R2

Configuring virtual disk for OS deployment in Dell PowerEdge M630 servers

1. Log in to IDRAC and launch the virtual console.
2. From the menu, select Power → Power on the system.
3. In the message – You are about to execute a server control action. Are you sure you want to continue?, click Yes.
4. During system start, once you see this message press <CTRL> + <R> to Run configuration utility, press <CTRL> + <R> to run the RAID configuration utility.
5. In the configuration utility, select PERC H730 Mini and press F2 to enable operations.
6. From the drop-down list, select Create New VD.
7. Set RAID Level to RAID-1, select physical disks, set the basic settings, use default virtual disk size, virtual disk name, and then click OK.

   \[\textbf{NOTE:} \text{Although an OS partition is not I/O intensive, the OS partition should still have hardware redundancy. Therefore, consider RAID 1 for OS partitions.}\]

8. In the message – It is recommended that all newly created logical drives be initialized unless you are attempting to recreate a previous configuration and recover data as initialization is a destructive process. Are you sure you want to skip initialization?, click OK.

   The virtual disk is created.

10. Restart the server.
Configuring prerequisites to install Windows Server

Mapping to virtual disk
1. In the virtual console, select Connect Virtual Media, and then select Map CD/DVD.
2. In Drive/Image File, provide the drive location and click Map Device.

Setting boot device and loading the OS executable files
1. In the virtual console, select Next Boot, and then select Virtual CD/DVD/ISO.
2. In the message - The selected device is set as the boot device for the next boot until another user changes the selected boot device. Therefore, it is recommended to reboot the server immediately after saving this selection. Click OK to save the selection., click OK.
Virtual CD/DVD/ISO is set as the boot device.
3. Restart the server.

Installing Windows Server 2012 R2 operating system in the Dell PowerEdge VRTX
1. Power on the server and press any key only after you see the message Booting from Virtual CD.
Press any key to boot from CD or DVD.

   The Windows server setup is displayed.
2. Provide language preference, time and currency format, keyboard or input method, and then click Next.
3. In Windows Setup, click Install now.
4. Provide the product key and then click Next.
5. Select OS - Windows Server 2012 R2 Datacenter (Server with GUI) and then click Next.
6. In License terms, select I accept the license terms and then click Next.
7. In installation type, select Custom: Install windows only (advanced).
8. Select Drive0 Unallocated Space and click New to create the partition and then click Next twice.
   In the message – To ensure that all Windows features work correctly, Windows might create additional partitions for system files, click OK.
9. Once the installation is complete, in Setting page, set the user name and password details.

Enabling Hyper-V and multipath features in Windows Server 2012 R2
1. In Server Manager, on Dashboard, click Manage → Add Roles and Features.
2. In Add Roles and Features Wizard, click Before you begin, and then click Next.
3. In Installation Type, click Role-based or feature-based Installation, and then click Next.
4. In Server Selection, select Select a server from the server pool and in the server pool, select server and then click Next.
5. In Server Roles, select Hyper-V and then click Next.
6. In Add Roles and Features Wizard, select Include management tools (if applicable), and then click Add Features.
7. In Server Roles, click Hyper-V and then click Next.
8. In Features, select Multipath I/O and then click Next.
9. In Hyper-V, click Next.
10. In Virtual Switches, click Next.
11. In Migration, click Next.
12. In Default Stores, keep default settings and then click Next.
13. In Confirmation, review the roles you have selected, select Restart the destination server automatically if required, and then click Install.
14. In Results, once the roles and features are installed and the server restarts, click Close.

Setting up NIC teaming in Windows Server 2012 R2

1. In Server Manager, select Local Server.
3. In NIC Teaming, from TASKS, select New Team.
4. In New team, provide team name, for example ConvergedNet Team, select the NICs that you want to include in the team, in Additional properties, set Teaming mode to Switch Independent and Load balancing mode to Dynamic, and then click OK.

   **NOTE:** The dynamic mode is a new feature of Windows Server 2012 R2. The load balancing algorithm balances traffic based on flowlets and can spread both inbound and outbound traffic. The Hyper-V port algorithm forces all VM traffic only through one physical NIC, whereas the dynamic mode spreads traffic across all the NICs, regardless of workload.

5. Check, if the NICs are active.

Configuring network in Windows Server 2012 R2

This section describes the configuration of converged Hyper-V network for the Hyper-V hosts. This includes configuring a converged switch, VM network adapters, and Quality of Service (QoS) for the virtual networks.

The Hyper-V QoS in Windows Server 2012 R2 enables minimum bandwidth that guarantees a specified minimum bandwidth for a traffic flow. The minimum bandwidth percentage for each traffic flow is calculated based on the sum of all the assigned weights including the weight of the default flow.

The following table details the traffic types and the respective bandwidth weights.

<table>
<thead>
<tr>
<th>Traffic type</th>
<th>Minimum bandwidth weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>5</td>
</tr>
<tr>
<td>Cluster / CSV</td>
<td>40</td>
</tr>
<tr>
<td>Live Migration</td>
<td>20</td>
</tr>
<tr>
<td>DefaultFlowMinimumBandwidthWeight</td>
<td>10</td>
</tr>
</tbody>
</table>
NOTE: The bandwidth weights mentioned in the table are indicative and should be evaluated based on network requirements and applications running in your environment.

In the Dell PowerEdge VRTX server, start Windows PowerShell and run the following commands.

1. **Create a new VM switch:**
   ```powershell
   New-VMSwitch -AllowManagementOS 1 -Name ConvergedNetSwitch -MinimumBandwidthMode weight -Verbose
   NetAdapterName: ConvergedNet Team
   ```

2. **Create VM network adapter for Cluster:**
   ```powershell
   Add-VMMNetworkAdapter -ManagementOS -SwitchName ConvergedNetSwitch -Name Cluster -Verbose
   ```

3. **Create VM network adapter for Live Migration:**
   ```powershell
   Add-VMMNetworkAdapter -ManagementOS -SwitchName ConvergedNetSwitch -Name LiveMigration -Verbose
   ```

4. **Set VLAN access properties for the Management Network Adapter:**
   ```powershell
   Set-VMMNetworkAdapterVlan -ManagementOS -VMNetworkAdapterName ConvergedNetSwitch -Access -VlanId 10
   ```

5. **Set VLAN access properties for the Cluster Network Adapter:**
   ```powershell
   Set-VMMNetworkAdapterVlan -ManagementOS -VMNetworkAdapterName Cluster -Access -VlanId 20
   ```

6. **Set VLAN access properties to LiveMigration:**
   ```powershell
   Set-VMMNetworkAdapterVlan -ManagementOS -VMNetworkAdapterName LiveMigration -Access -VlanId 30
   ```

7. **Set minimum bandwidth reservation for Management Network Adapter:**
   ```powershell
   Set-VMMNetworkAdapter -ManagementOS -Name ConvergedNetSwitch -MinimumBandwidthWeight 5
   ```

8. **Set minimum bandwidth reservation for Cluster network adapter:**
   ```powershell
   Set-VMMNetworkAdapter -ManagementOS -Name Cluster -MinimumBandwidthWeight 40
   ```

9. **Set minimum bandwidth reservation for Live Migration network adapter:**
   ```powershell
   Set-VMMNetworkAdapter -ManagementOS -Name LiveMigration -MinimumBandwidthWeight 20
   ```

   NOTE: Under Network Connections, view vEthernet (ConvergedNetSwitch) and adapters for cluster and live migration.

**Sample naming and IP addressing scheme**

The IP addressing provides the requirement to support PowerEdge VRTX chassis solution. For more information, see Appendix B.

**Configuring vEthernet switch in Windows Server 2012 R2**

1. In **Network Connections**, right-click **vEthernet (ConvergedNetSwitch)** and in the drop-down list, select **Properties**.

2. In **vEthernet (ConvergedNetSwitch) Properties**, configure IPV4 protocol properties, include IP address and DNS server details and then click **OK**.
3. Test the network connection: ping the VLAN 10 network.

### Adding the Dell PowerEdge VRTX servers to the domain

1. In the Dell PowerEdge VRTX server, in System Properties, on the Computer Name tab, click Change.
2. In Computer Name/Domain Changes, provide a name to the server. For example, HyperVH3.
3. Under Member of, select Domain and type domain name, for example hyperv.lab, and then click OK.
4. In Windows Security, provide domain administrator’s user name and password, and then click OK. Once the PowerEdge VRTX server is added to the domain, a welcome message is displayed.
5. In the welcome message, click OK and restart the server.

### Assigning virtual disks

To set up the VD assignment mode, ensure that the physical disk drives are installed and the virtual disks are created.

To assign modes to the VDs, perform the following steps:

1. In the left pane, click Chassis Overview → Storage → Virtual Disks → Assign.
2. On the Assign Virtual Disks page, for all the Virtual Adapters, provide full access rights by selecting Full Access from the drop-down list.
3. Click Apply.

### Installing the shared PERC driver

1. To download the PERC driver, perform the following steps:
   a. Go to Dell.com/drivers.
   b. In the Product Selection section, enter the Service Tag of your system in the Service Tag or Express Service Code field.
      
      **NOTE:** If you do not have the Service Tag, select Automatically detect my Service Tag for me to allow the system to automatically detect your Service Tag, or select Choose from a list of all Dell products to select your product from the Product Selection page.

      **NOTE:** To download the latest firmware and driver for components inside the PowerEdge VRTX chassis (for example Shared PERC 8 firmware and driver), enter the Service Tag or the model number of the PowerEdge VRTX chassis.
   
   c. Select the Operating System, Category, Release Date, and Importance from the respective drop-down lists.
   
   d. The drivers that are applicable to your selection are displayed.
   
   e. Download the Shared PERC 8 to a local drive, USB drive, CD, or DVD.

2. To install Windows drivers for Shared PERC 8, perform the following steps:

   **NOTE:** PERC H330/H730/H730P/H830 controllers use the same driver as Shared PERC 8 and do not require separate driver installations.

   **NOTE:** For more information, see the PowerEdge VRTX Storage Subsystem Compatibility Matrix at Dell.com/support/home.

   **NOTE:** Close all applications on your system before you install the driver.
a. Double-click the downloaded file and follow the steps in the wizard.
b. Click **Next** and continue with the installation steps in the wizard.
c. Click **Finish** to exit the wizard.

**NOTE:** Dell provides the Dell Update Package (DUP) to update drivers on systems running Windows Server 2012/2012 R2 or Windows Server 2008/2008 R2 operating systems. DUP is an executable application that updates drivers for specific devices. DUP supports command line interface and silent execution. For more information, see [Dell.com/support](https://www.dell.com/support).

The installation of the shared PERC driver on all the hosts is now complete.

### Adding MPIO settings in Windows Server 2012 R2

1. Select the server node and open **Server Manager**.
2. In **Server Manager**, click **Tools → MPIO**.
3. In **MPIO Properties**, click the **Discover Multi-Paths** tab, and then select **Dell SharedPERC8**.
4. Click **Add** and then reboot the server.

After rebooting the server, the MPIO installation is finalized.

### Configuring registry

The cluster validation utility might fail if the shared storage type used by the system is direct attached or clustered RAID controllers. To resolve this problem, add the following registry key.

**NOTE:** For more information, refer the Windows Knowledge Base link available at, [HTTPS://SUPPORT.MICROSOFT.COM/EN-US/KB/2839292](https://support.microsoft.com/en-us/kb/2839292).

**CAUTION:** Incorrectly editing the registry may severely damage your system. Before making changes to the registry, you should back up any valued data on your computer.

2. In the dialog box that is displayed, type regedit.exe and click **OK**.
3. Click **Yes** when the Windows UAC prompt appears.
4. Navigate to `Computer\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Service\CluDisk\Parameters` folder.
5. On the **Edit** menu, point to **New**, and then click **DWORD (32-bit) Value**.
6. Type **AllowBusTypeRAID** in the **name** field for the new DWORD, set the **Value Data** to **1**, in the **Base** selection options, select **Decimal** and then press **Ok**.
7. Close the Registry Editor.

### Adding volumes in the Dell PowerEdge M630 servers

1. Log in to the Dell PowerEdge VRTX server, and in **Run**, type `diskmgmt.msc`.
2. In **Disk Management**, perform the following steps:
   a. Right-click new disk, and set the value of disk to **Online**.
   b. Right-click disk and initialize disk.
   c. Right-click disk and select **New Simple Volume**.
3. In **New Simple Volume Wizard**, click **Next**.
4. In **Specify volume size in MB**, use the default disk size, and then click **Next**.
5. In **Assign Driver Letter or Path**, select **Do not assign a driver letter or driver path**, and then click **Next**.
6. In Format Partition, select Format this volume with the following settings: and set File system to NTFS, Allocation unit size to 64kb, Volume label to Quorum, select perform a quick format and then click Next.


8. Repeat steps 1 – 7 to create the second volume for storing the VHD files of the virtual machines.

### Enabling failover clustering in Windows Server 2012 R2

1. In Server Manager, select Manage, and then select Add Roles and Features.
2. In Add Roles and Features Wizard, in Before you begin, select Next.
3. In Installation Type, select Role-based or feature-based Installation, and then click Next.
4. In Server Selection, select Select a server from the server pool and in the server pool, select server and then click Next.
5. In Server Roles, click Next.
6. In Features, select Failover Clustering and then click Next.
7. In Add Roles and Features Wizard pop-up, add features that are required for failover clustering, select Include management tools (if applicable), and then click Add Features.
8. In Features, click Next.
9. In Confirmation, review the roles you have selected, select Restart the destination server automatically if required, and then click Install.
10. In Results, once the Failover Clustering role is installed, click Close.

   **NOTE:** Repeat the preceding tasks for the remaining Hyper-V hosts.

### Creating cluster

1. [Validating configuration](#)
2. [Creating a Hyper-V host cluster in VMM](#)

### Validating configuration

1. In Failover Cluster Manager, select Validate Configuration.
2. In Validate a Configuration Wizard, do the following:
   a. In Before you Begin, click Next.
   b. In Select Servers, add all the cluster nodes and then click Next.
   c. In Testing Options, select Run all tests (recommended).
   d. In Confirmation, click Next.
   e. In Failover Cluster Validation Report, clear Create the cluster now using the validated nodes, to view report, click View Report, and then click Finish.

### Creating a Hyper-V host cluster in VMM

1. Before you begin, create a host group in VMM. See [Creating host groups in VMM](#).
2. Create a Hyper-V host cluster in VMM. See [Creating a Hyper-V host cluster in VMM](#).

### Creating host groups in VMM

To configure host groups in VMM, perform the following steps:

1. Create host group structure in VMM:
a. Open the Fabric workspace
b. In the Fabric pane, expand Servers, and then do either of the following:
   - Right-click All Hosts, and then click Create Host Group.
   - Click All Hosts. On the Folder tab, in the Create group, click Create Host Group.

   VMM creates a new host group that is named New host group with the host group name highlighted.

c. Type a new name, and then press Enter.

2. Configure host group properties in VMM.
   a. In Fabric, expand Servers, All Hosts, and then click the host group that you want to configure.
   b. On the Folder tab, in the Properties group, click Properties.
   c. Configure any of the following settings:

   Table 10. Host groups settings

<table>
<thead>
<tr>
<th>Tab</th>
<th>Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>Configure the host group name, location, description, and allow unencrypted BITS file transfers.</td>
</tr>
<tr>
<td>Placement Rules</td>
<td>VMM automatically selects the ideal host to deploy virtual machines. However, you can specify placement rules. By default, a host group uses the placement settings from the parent host group.</td>
</tr>
</tbody>
</table>

Creating a Hyper-V host cluster in VMM

1. In VMM, select Fabric → Servers.
2. On the Home tab, in Create group, click Create, and then click Hyper-V Cluster.
3. In Cluster Wizard, on the General tab, provide cluster name and administrator user credentials, and then click Next.
4. In Nodes, perform the following steps and then click Next:
   a. In Host group, select the host group that contains the Hyper-V hosts that you want to cluster.
   b. In Available hosts, select the Hyper-V host that you want to cluster and then click Add.
   c. (Optional) Select Skip cluster validation tests.
5. In Storage, select the disks you want to cluster.
6. In Virtual Switches, click Next.
7. In Summary, confirm settings and then click Finish.
8. When the job is complete, verify the cluster status.

Configuring Cluster Network

The following table shows the recommended settings for each type of network traffic. Configure these settings using Failover Cluster Manager.

Table 11. Cluster Network Configuration

<table>
<thead>
<tr>
<th>Network Type</th>
<th>Recommended Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>Select the following check boxes.</td>
</tr>
<tr>
<td>Network Type</td>
<td>Recommended Settings</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>• Allow cluster network communication on this network</td>
</tr>
<tr>
<td></td>
<td>• Allow clients to connect through this network</td>
</tr>
<tr>
<td>Cluster</td>
<td>Allow cluster network communication on this network.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> Clear the <strong>Allow clients to connect through this network</strong> check box.</td>
</tr>
<tr>
<td>Live Migration</td>
<td>Allow cluster network communication on this network.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> Clear the <strong>Allow clients to connect through this network</strong> check box.</td>
</tr>
</tbody>
</table>

To configure Live Migration network settings using Failover Cluster Manager:

- **NOTE:** To configure the Live Migration network settings using SCVMM, in the SCVMM console, navigate to **Host Properties → Migration Settings**.

1. In the Failover Cluster Manger, right-click on the **Networks** in the left pane, and select **Live Migration Settings**.
2. In the **Live Migration Settings** dialog box, ensure that you select the correct network for Live Migration Traffic.
Verifying the deployment

Once the deployment is complete, you may follow these steps to verify the solution:

1. Create VMs.
2. Migrate VMs across the cluster and check if the migration is progressing without any interruption.
3. Shut down one of the hosts and check if the VMs located on that host are migrating within the cluster.
Appendix A

• Support.dell.com is focused on meeting customer requirements with proven services.
• DellTechCenter.com is an IT Community where you can connect with Dell customers and Dell employees for the purpose of sharing knowledge, best practices and information about Dell products and installations.
• Before you begin deploying the solution, read the Microsoft Windows Server 2012 R2 Hyper-V on Dell PowerEdge VRTX Reference Architecture document available at:
  
  http://en.community.dell.com/techcenter/extras/m/white_papers/20441317
• Prerequisites for creating Hyper-V clusters: Complete all the prerequisites required for creating hyper-v clusters in VMM, for more information, see Microsoft documentation at https://technet.microsoft.com/en-us/library/gg610630.aspx.
## Appendix B

The following table represents an example of the PowerEdge VRTX chassis cluster along with the top-of-rack switches used in the solution:

<table>
<thead>
<tr>
<th>Device name</th>
<th>OOB management</th>
<th>Hostname</th>
<th>Cluster IP</th>
<th>Live Migration IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dell Networking R1–2210 10GbE Switch Module</td>
<td>192.168.10.100</td>
<td>R1-2210</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VRTX CMC</td>
<td>192.168.10.10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compute nodes</td>
<td>192.168.10.11</td>
<td>HYPVN01</td>
<td>192.168.10.181</td>
<td>192.168.20.181</td>
</tr>
<tr>
<td></td>
<td>192.168.10.12</td>
<td>HYPVN02</td>
<td>192.168.10.182</td>
<td>192.168.20.182</td>
</tr>
<tr>
<td></td>
<td>192.168.10.13</td>
<td>HYPVN03</td>
<td>192.168.10.183</td>
<td>192.168.20.183</td>
</tr>
<tr>
<td></td>
<td>192.168.10.14</td>
<td>HYPVN04</td>
<td>192.168.10.184</td>
<td>192.168.20.184</td>
</tr>
</tbody>
</table>