

**Topic**

VxRail Installation Procedures

**Selections**

Are you installing a VD-4510c or VD-4520c 2-node cluster?: No  
Select the VxRail Appliance to be Installed: VxRail E660/E660F  
Select the VxRail Software Image on the new Appliance: v7.0.482  
What type of cluster is being installed?: Normal Cluster (3 or more nodes)  
Select vSAN Witness Type: N/A  
Choose your activity: Configure VxRail Appliance only  
Is a SmartFabric being configured?: No  
Are you installing a vSAN Stretched Cluster: No  
Are you configuring Witness Traffic Separation?: N/A  
Select the vCenter option: Internal VxRail-supplied vCenter with VxRail-supplied virtual distributed switch  
Select the node discovery method: Auto  
Select the number of ports reserved for VxRail Networking: Four or More  
Select the number of Virtual Distributed Switches for the VxRail Network: Two VDS  
Select the Link Aggregation Type: None  
Select the SysLog Option: None  
Is this a Dark Site? i.e. Customer does NOT allow call-home!: No - This is NOT a Dark-site! This customer allows call home!  
Service Connectivity Options: Direct  
Include ToR Content?: Include ToR Content: Dell EMC Networking OS10 SmartFabric and Enterprise VxRail ToR Switch Configuration Guide  
Include ToR Content?: Include ToR Content: Dell EMC Networking S5048F-ON OS9 VxRail ToR Switch Configuration

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**REPORT PROBLEMS**

If you find any errors in this procedure or have comments regarding this application, send email to [SolVeFeedback@dell.com](mailto:SolVeFeedback@dell.com)

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## Preliminary Activity Tasks

This section may contain tasks that you must complete before performing this procedure.

### Read, understand, and perform these tasks

1. Table 1 lists tasks, cautions, warnings, notes, and/or knowledgebase (KB) solutions that you need to be aware of before performing this activity. Read, understand, and when necessary perform any tasks contained in this table and any tasks contained in any associated knowledgebase solution.

**Table 1 List of cautions, warnings, notes, and/or KB solutions related to this activity**

---

[185731](#): The Kioxia CD5 NVMe drive has the potential to Assert (0GB) due to incorrect handling of an interrupt from the SMBus HW module

[541525](#): VxRail: Nodes are not discovered by VxRail manager when customer is using Juniper switches

- VxRail 7.0.320 and later releases contain resolutions for two of the VMware vSAN issues detailed in VMware Proactive Customer Advisory issued in June 2022: KB 88870 <https://kb.vmware.com/s/article/88870>. One issue is not yet resolved by VMware and requires the workaround described in KB 88870. The Dell VxRail: VxRail Response to VMware Proactive Customer Advisory for June 2022 contains more information <https://www.dell.com/support/kbdoc/EN-US/000201082>.
- VxRail standard cluster deployments support
  - 3 to 6 nodes for initial cluster bring up.
  - Any additional nodes must be added as a day 2 node expansion operation.
- For vSAN stretched clusters don't use a storage policy with locality=none (88358): KB <https://kb.vmware.com/s/article/88358>

- 
2. This is a link to the top trending service topics. These topics may or not be related to this activity. This is merely a proactive attempt to make you aware of any KB articles that may be associated with this product.

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**Note:** There may not be any top trending service topics for this product at any given time.

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[VxRail Appliance Top Service Topics](#)

## Utilize NVT

NVT is used to help customers to prepare their environment before deployment.

1. [ ] Open a browser session to <https://www.dell.com/support/kbdoc/en-us/000019313/deployment-kb-dell-technologies-network-validation-tool-nvt?lang=en>
2. [ ] Follow the guidance to run NVT.

## Access VxRail Configuration Portal

**Note:** Starting with VxRail version 7.0.010, the VxRail configuration portal can be used to enter and save the settings for a VxRail initial build and produce a JSON file.

### Access VxRail configuration portal

1. [ ] Open a browser session to <https://vxrailconfiguration.dell.com/>.
2. [ ] Accept the terms and conditions.
3. [ ] Read the getting started guide.
4. [ ] Follow the guide to use the configuration portal for a VxRail initial build and produce a JSON file.

## Power on VxRail nodes

Repeat the steps in this task for every idle VxRail node for initial build. Only power on the nodes to be included in the VxRail cluster initial build.

### Method 1: Press Power Button for on-site powerup operation

1. [ ] Facing the front of the VxRail node, locate the power button in the upper right corner.
2. [ ] Press the button to initiate power-on sequence.

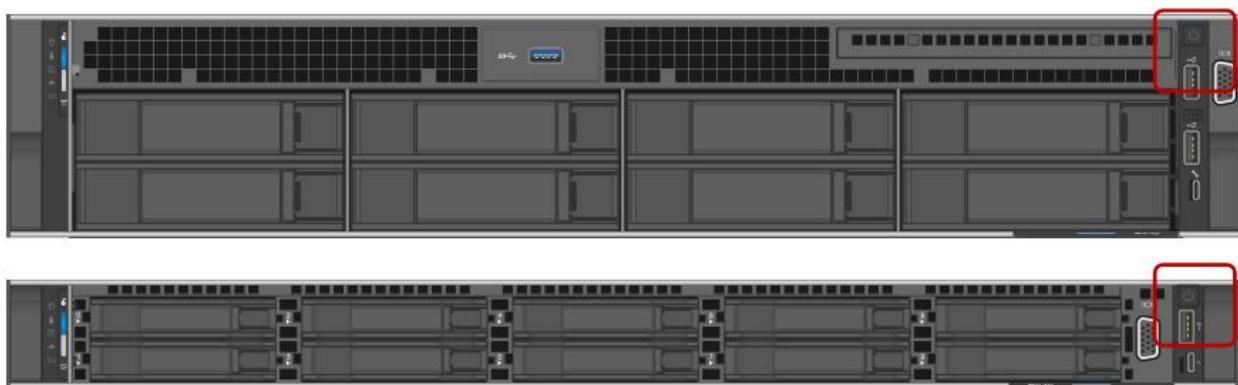
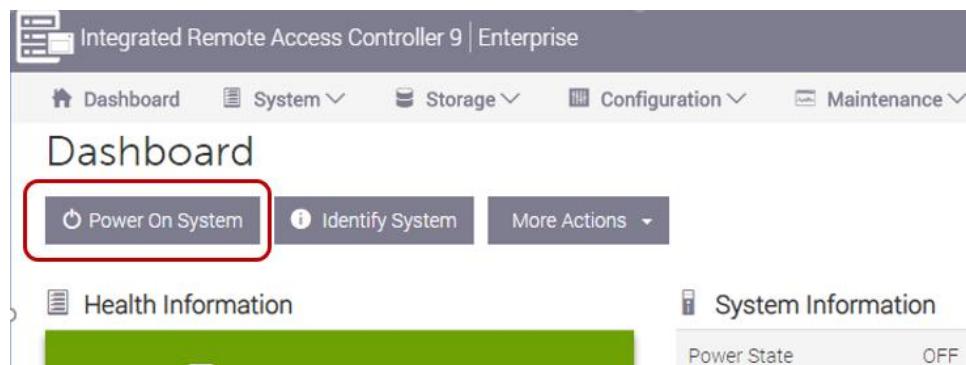


Figure 1 Power button location

### Method 2: Use iDRAC for remote power-up operation

1. [ ] Identify the IP address of the iDRAC to the idle VxRail node.

2. [ ] Enter the IP address in a browser session to connect to the iDRAC.
3. [ ] Authenticate with the default credentials of 'root/calvin'.
4. [ ] Select 'Power On System' on left side of the screen.



**Figure 2** Node power-on from iDRAC Dashboard

## Prepare for initial connectivity to VxRail Manager

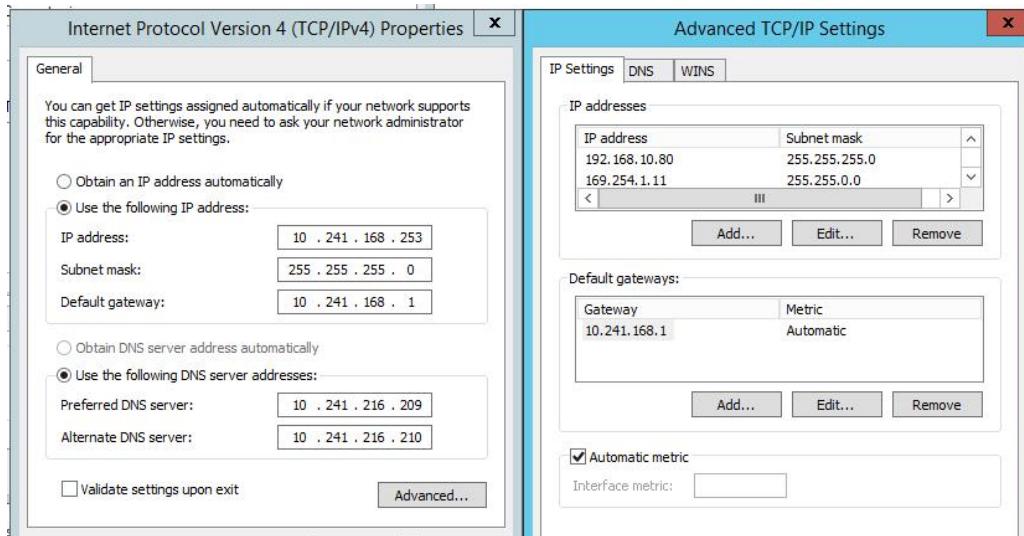
### Task 1: Configure laptop or jump host for VxRail Manager connectivity

1. [ ] Open the JSON file or the cluster report from the Configuration portal.
2. [ ] Locate the network settings for VxRail Manager.
  - For JSON, locate the permanent IP address for VxRail Manager under the 'vxrail\_manager' section.

```
'vxrail_manager': {
  "accounts": {
    "root": {
      "password": "",
      "username": "root"
    },
    "service": {
      "password": "",
      "username": "mystic"
    }
  },
  "ip": "10.241.168.22",
}
```

**Figure 1** Sample IP address for VxRail Manager

3. [ ] Using a laptop, go to Control Panel. Select **Network > Internet > network adapters settings**.
4. [ ] Open the Properties page on primary Ethernet adapter.
5. [ ] Open the TCP/IPv4 properties page.
6. [ ] Set IP address to an IP address on the same subnet as the permanent address to be assigned to VxRail Manager.



**Figure 2 Sample TCP-IPv4 Properties pages**

7. [ ] Set the default gateway to the gateway to be assigned to VxRail Manager.
  8. [ ] Set DNS entries.
- 
- Note:** The default IP address for VxRail Manager is '192.168.10.200'. Perform the following steps to add an IP address in the '192.168.10.x' range to the Ethernet interface.
9. [ ] Open **Advanced**.
  10. [ ] Select **Add**.
  11. [ ] Configure an IP address to connect on the same subnet as the default address assigned to VxRail Manager (default is 192.168.10.x/24)

## Establish connection to VxRail External Management Network

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**Note:** Skip this task if a jump host is provided to connect to the VxRail external management network

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### Task 2: Connect laptop to top-of-rack switch

1. [ ] Locate an open Ethernet port on the top-of-rack switch connected to the VxRail nodes.
2. [ ] Configure the switch port for access mode.
3. [ ] Connect laptop to the port on top-of-rack switch.

### Task 3: Confirm VxRail Manager network connectivity

1. [ ] Open a DOS shell on the laptop or jump host.
2. [ ] Run the following command: `ping -t 192.168.10.200`

## Validate Data Center Environment for VxRail

Verify that the data center environment that will stage the VxRail cluster using the parameters and settings captured in the VxRail configuration portal.

#### Task 4: Generate VxRail cluster settings report from Configuration Portal

1. [ ] Open a browser and connect to VxRail Configuration Portal: <https://vxrailconfiguration.dell.com/>.
2. [ ] Select the **Clusters** view.
3. [ ] Go to the saved cluster settings from the selection screen and select the cluster to be deployed.
4. [ ] Click **View Report**.

The screenshot shows the Dell EMC VxRail Configuration Portal interface. At the top, there's a navigation bar with tabs for 'Projects', 'Clusters' (which is underlined, indicating it's the active view), and 'Deployments'. Below the navigation bar, there's a section titled 'Create a Project' with a progress bar at 1/1. The main content area is titled 'VxRail Configuration Portal' and contains a table with a single row. The table has columns for 'Cluster Name', 'Location', 'Deployment Type', and 'VxRail Version'. The first row shows '18JJ-EVC-2-CD-VDS-No-LAG' as the Cluster Name, 'STANDARD' as the Deployment Type, and '7.0.130' as the VxRail Version. Below the table, there are buttons for 'CREATE', 'EDIT', 'DELETE', 'DOWNLOAD', and 'VIEW REPORT'. The 'VIEW REPORT' button is highlighted with a yellow background and a black border.

Figure 3 Produce report of VxRail cluster captured settings.

The configuration report can be viewed from the browser or downloaded in Microsoft Word format.

#### Task 5: Validate VxRail Management Network Settings

1. [ ] Open the report to display the settings supplied for the VxRail cluster.
2. [ ] Confirm that the IP addresses for the components on the VxRail external management network (Internal vCenter, ESXi hosts, VxRail Manager, etc.) are non-routable and all on the same subnet.
3. [ ] Confirm that the IP addresses for the vMotion network are on the same subnet.
4. [ ] Confirm that the IP addresses for the vSAN network are on the same subnet.
5. [ ] Open a DOS session on the same network as planned for the VxRail external management network.
  - A customer-supplied Windows session on a jump host is sufficient.
  - A laptop connected to a switch port with network access to the VxRail external management network will also suffice.
6. [ ] Confirm that the IP addresses are reserved for VxRail management components are not in use.

```
C:\>ping 10.241.105.210

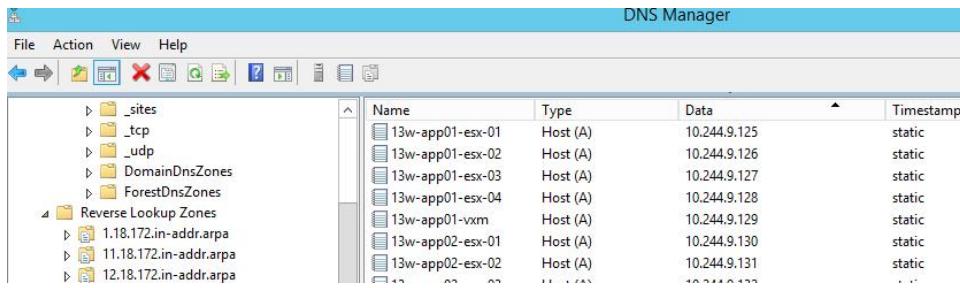
Pinging 10.241.105.210 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.241.105.210:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

**Figure 4** Ping IP address.

### Task 6: Validate DNS entries for VxRail

1. [ ] Confirm that forward and reverse entries for the VxRail management components were created in DNS.



**Figure 5** Example DNS entries

- Use ‘nslookup <FQDN>’ and ‘nslookup <IP address>’ for each VxRail management component.

```
C:\Users\admin>nslookup
Default Server: vm-svr009249.row13.local
Address: 10.244.9.249

> r13-s-1-vxm.row13.local
Server: vm-svr009249.row13.local
Address: 10.244.9.249

Name:   r13-s-1-vxm.row13.local
Address: 172.18.11.23

> 172.18.11.23
Server: vm-svr009249.row13.local
Address: 10.244.9.249

Name:   r13-s-1-vxm.row13.local
Address: 172.18.11.23
```

**Figure 6** ‘nslookup’ in DOS shell

2. [ ] Verify that you have permanent vSphere and vSAN licenses.

---

**Note:** VxRail is delivered with temporary vSphere and vSAN licenses. You must apply the permanent licenses before the end of the grace period.

---

## Task 7: Identify predefined NIC placement rules

ESXi assigns a VMnic to each physical port that is discovered on the VxRail node. Verification is performed using the VMnic assignment to ensure proper switch connectivity. The mapping of VMnic ports to the switches for a 4-port deployment using a predefined network profile differs between 10 Gb Ethernet and 25 Gb Ethernet.

Proper ‘VMnic’ placement for dual switches with 4x10 GbE and 4x25 GbE nodes

VMnic	10 GbE	25 GbE
vmnic0	First switch	First switch
vmnic1	Second switch	Second switch
vmnic2	First switch	Second switch
vmnic3	Second switch	First switch

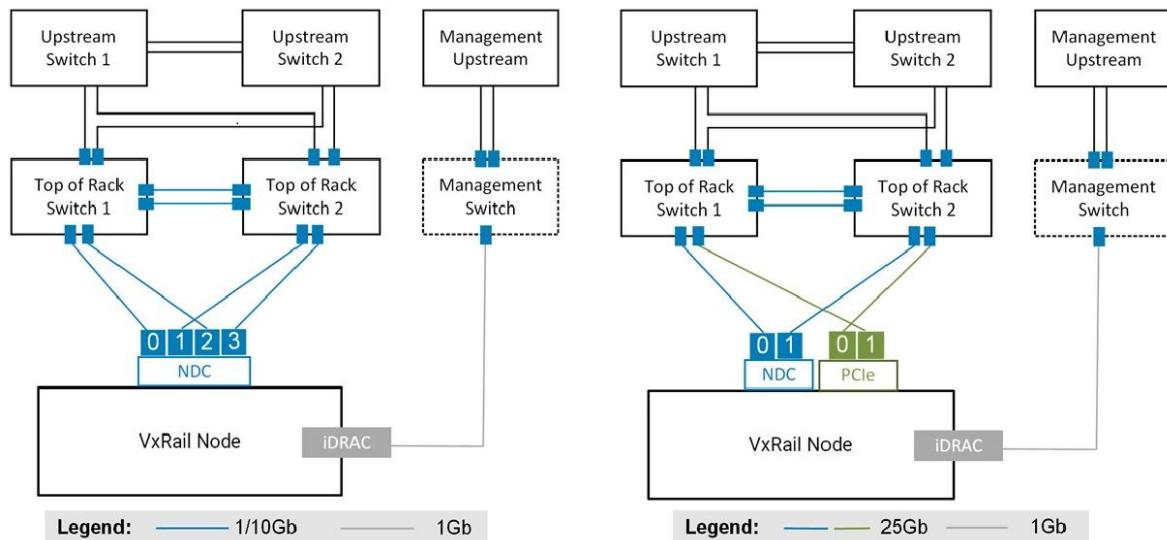
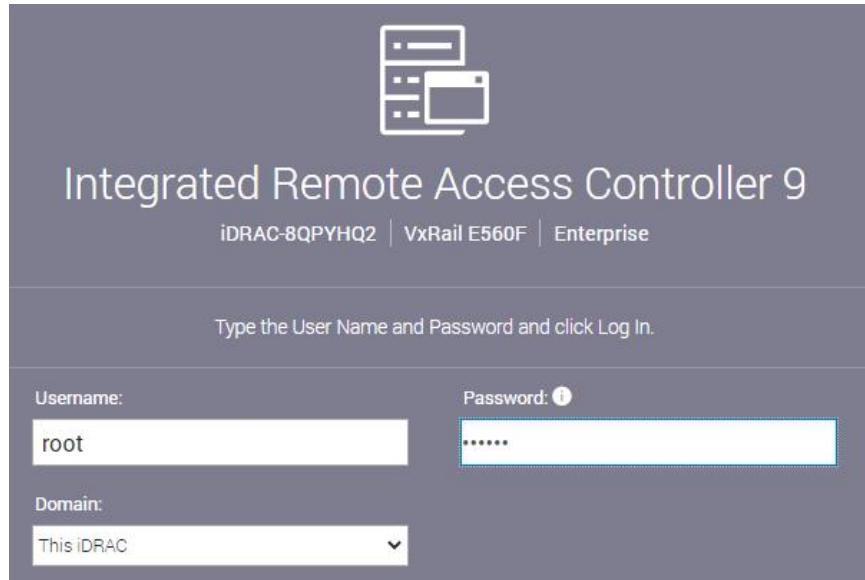


Figure 7 4x10 NDC mapping and 2x25 NDC/2x25 PCIe mapping

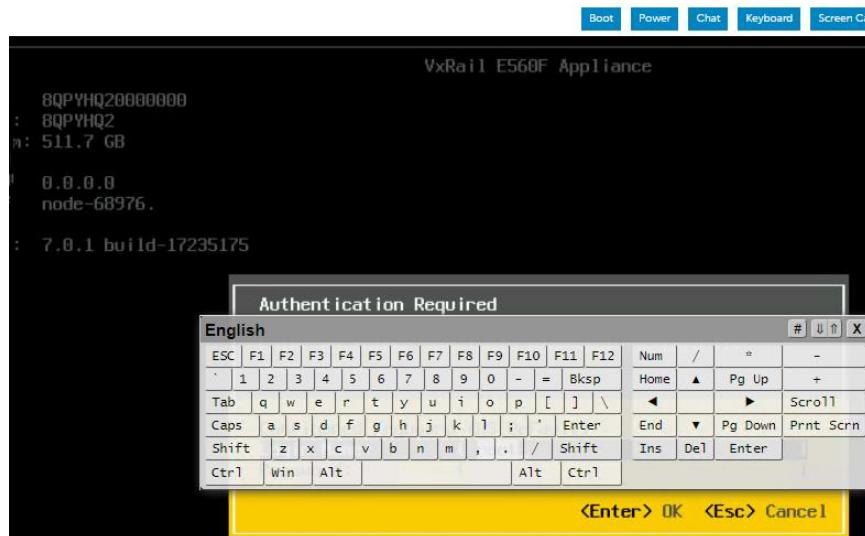
## Task 8: Identify VMnic assignments on VxRail nodes

1. [ ] Use a jump host or other customer-supplied method to access the management network that supports connectivity to the Dell PowerEdge iDRAC modules.
2. [ ] Open a browser to the iDRAC console of one of the nodes: [https:<IP address of iDRAC>](https://<IP address of iDRAC>).
3. [ ] Authenticate as ‘root’ (default password is ‘calvin’).



**Figure 8** iDRAC login screen

4. [ ] Open a virtual console session to the VxRail node.
5. [ ] Select **Keyboard** from the top toolbar.
6. [ ] Click **F2** on the virtual keyboard.



**Figure 9** Virtual console keyboard

7. [ ] Log in as 'root' (default password is 'Passw0rd!').
8. [ ] Go to Troubleshooting Options.
9. [ ] Select **Enable ESXi Shell**.
10. [ ] From the virtual keyboard, click **Alt-F1**.
11. [ ] Log in to the ESXi console as 'root'. (Default password is 'Passw0rd!')
12. [ ] Identify the VMnic assignment and MAC address of each VxRail port.

Run: `esxcli network nic list`

Name	PCI Device	Driver	Admin Status	Link Status	Speed	Duplex	MAC Address	MTU	Description
vnic0	0000:19:00.0	bnxtnet	Up	Up	25000	Full	00:0a:f7:d0:c9:f0	1500	Broadcom BCM57414 NetXtrem
e-E 10Gb/25Gb RDMA Ethernet Controller									
vnic1	0000:19:00.1	bnxtnet	Up	Up	25000	Full	00:0a:f7:d0:c9:f1	1500	Broadcom BCM57414 NetXtrem
e-E 10Gb/25Gb RDMA Ethernet Controller									
vnic2	0000:5e:00.0	bnxtnet	Up	Up	25000	Full	b0:26:28:5f:68:80	1500	Broadcom BCM57414 NetXtrem
e-E 10Gb/25Gb RDMA Ethernet Controller									
vnic3	0000:5e:00.1	bnxtnet	Up	Up	25000	Full	b0:26:28:5f:68:81	1500	Broadcom BCM57414 NetXtrem
e-E 10Gb/25Gb RDMA Ethernet Controller									
vnic4	0000:d8:00.0	nmix5_core	Up	Up	100000	Full	98:03:9b:9d:f4:36	1500	Mellanox Technologies MT28
800 Family [ConnectX-5 Ex]									
vnic5	0000:d8:00.1	nmix5_core	Up	Up	100000	Full	98:03:9b:9d:f4:37	1500	Mellanox Technologies MT28
800 Family [ConnectX-5 Ex]									
vusb0	Pseudo	cdce	Up	Up	100	Full	4c:d9:8f:03:96:3f	1500	DellTM iDRAC Virtual NIC U
SB Device									

Figure 10 Sample 2x25 NDC, 2x25 PCIe, 2x100 PCIe

### Task 9: View switch LLDP discovery to verify VMnic proper placement

**Note:** This task is dependent on the top-of-rack switches supporting LLDP discovery. If not, use the second option to query the node iDRAC system for verification.

- [ ] Use a tool like PuTTY to open a console session to the top-of-rack switches supporting connectivity to the VxRail nodes.
- [ ] Enter a command to display what the switch discovered on the ports using LLDP.

For a Dell OS10 switch, run: `show lldp neighbors`.

```
18KK-TOR-A# show lldp neighbors | grep 00:0a:f7:d0:c9 | grep vmnic
ethernet1/1/1          node-68976           00:0a:f7:d0:c9:f0          vmnic0
```

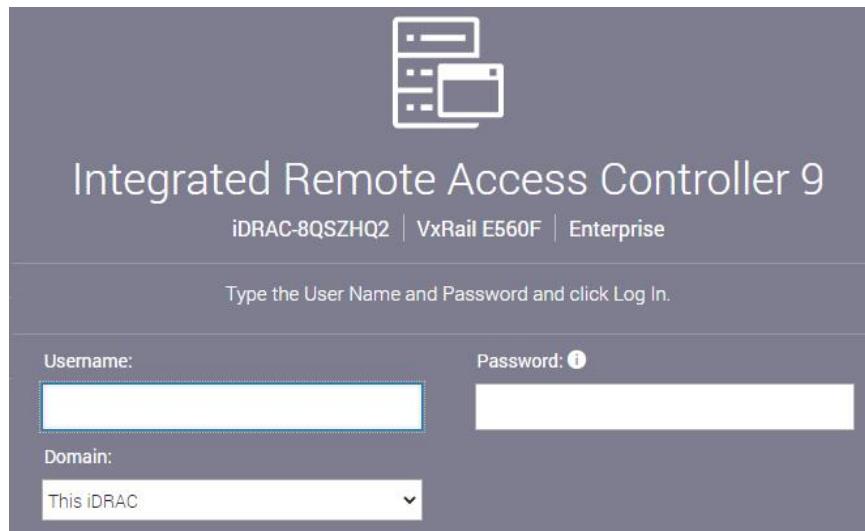
```
18KK-TOR-B# show lldp neighbors | grep 00:0a:f7:d0:c9 | grep vmnic
ethernet1/1/1          node-68976           00:0a:f7:d0:c9:f1          vmnic1
```

Figure 11 Sample output of two NDC ports on first switch and second switch using MAC address

### Task 10: View switch port MAC address to verify proper VMnic placement

**Note:** This is another option to use for NIC mapping if the top-of-rack switches do not support LLDP discovery.

- [ ] Open an iDRAC session to one of the nodes: `https:<IP address of IDRAC>`.



**Figure 12** Log in screen for iDRAC

2. [ ] Authenticate to iDRAC with the default credentials of username ‘root’ and password of ‘calvin’.
3. [ ] Select **System**.
4. [ ] Select **Network Devices**.
5. [ ] View each node port to verify the switch Ethernet port connection.
  - For a 4x10 GbE node, select **Integrated NIC 1**.

Network Devices					
	Summary	Integrated NIC 1	NIC Slot 2		
<input checked="" type="checkbox"/> <b>Integrated NIC 1:</b> Intel(R) Ethernet 10G 4P X710 SFP+ rNDC - E4:43:4B:5E:09:10				<input checked="" type="checkbox"/>	
Adapter Properties					
Product Name	Intel(R) Ethernet 10G 4P X710 SFP+ rNDC - E4:43:4B:5E:09:10				
Vendor Name	Intel Corp				
Number of Ports	4				
Summary	Port 1	Port 2	Port 3	Port 4	
Port	Link Status	Link Speed	Protocol	Switch Connection ID	Switch Port Connection ID
1	Up	10 Gbps	NIC	50:9a:4c:da:5d:30	ethernet1/1/9
2	Up	10 Gbps	NIC	50:9a:4c:da:61:b0	ethernet1/1/9
3	Up	10 Gbps	NIC	50:9a:4c:da:5d:30	ethernet1/1/10
4	Up	10 Gbps	NIC	50:9a:4c:da:61:b0	ethernet1/1/10

**Figure 13** Sample output for a 4x10 GbE node

- For a 4x25 GbE node, select **Integrated NIC 1** and the NIC slot.

Network Devices											
<a href="#">Summary</a> <a href="#">Integrated NIC 1</a> <a href="#">NIC Slot 2</a>											
<input checked="" type="checkbox"/> <b>Integrated NIC 1: Broadcom Adv. Dual 25Gb Ethernet - 00:0A:F7:D0:C9:F0</b> 											
Adapter Properties											
<table border="1"> <tr> <td>Product Name</td><td>Broadcom Adv. Dual 25Gb Ethernet - 00:0A:F7:D0:C9:F0</td></tr> <tr> <td>Vendor Name</td><td>Broadcom Corp</td></tr> <tr> <td>Number of Ports</td><td>2</td></tr> </table>						Product Name	Broadcom Adv. Dual 25Gb Ethernet - 00:0A:F7:D0:C9:F0	Vendor Name	Broadcom Corp	Number of Ports	2
Product Name	Broadcom Adv. Dual 25Gb Ethernet - 00:0A:F7:D0:C9:F0										
Vendor Name	Broadcom Corp										
Number of Ports	2										
<a href="#">Summary</a> <a href="#">Port 1</a> <a href="#">Port 2</a>											
Port	Link Status	Link Speed	Protocol	Switch Connection ID	Switch Port Connection ID						
1	Up	25 Gbps	NIC, RDMA	3c:2c:30:76:9d:80	ethernet1/1/1						
2	Up	25 Gbps	NIC, RDMA	3c:2c:30:3e:55:00	ethernet1/1/1						
Network Devices											
<a href="#">Summary</a> <a href="#">Integrated NIC 1</a> <a href="#">NIC Slot 2</a>											
<input checked="" type="checkbox"/> <b>NIC Slot 2: Broadcom Adv. Dual 25Gb Ethernet - B0:26:28:5F:68:80</b> 											
Adapter Properties											
<table border="1"> <tr> <td>Product Name</td><td>Broadcom Adv. Dual 25Gb Ethernet - B0:26:28:5F:68:80</td></tr> <tr> <td>Vendor Name</td><td>Broadcom Corp</td></tr> <tr> <td>Number of Ports</td><td>2</td></tr> </table>						Product Name	Broadcom Adv. Dual 25Gb Ethernet - B0:26:28:5F:68:80	Vendor Name	Broadcom Corp	Number of Ports	2
Product Name	Broadcom Adv. Dual 25Gb Ethernet - B0:26:28:5F:68:80										
Vendor Name	Broadcom Corp										
Number of Ports	2										
<a href="#">Summary</a> <a href="#">Port 1</a> <a href="#">Port 2</a>											
Port	Link Status	Link Speed	Protocol	Switch Connection ID	Switch Port Connection ID						
1	Up	25 Gbps	NIC	3c:2c:30:3e:55:00	ethernet1/1/2						
2	Up	25 Gbps	NIC	3c:2c:30:76:9d:80	ethernet1/1/2						

**Figure 14** Sample output for 2x25 GbE NDC and PCIe ports

6. [ ] Verify that node ports are properly placed across two top-of-rack switches.
  - a. View the values in the column labeled ‘Switch Connection ID’. These values indicate the unique ID of the switch that the port is connected to.
  - b. Verify that the pattern matches NIC placement rules for redundancy.
    - In the 4x10 GbE node example, port 1 and port 3 have matching switch connection IDs, and port 2 and port 4 have matching switch connection IDs.
    - In the 4x25 GbE node example, port 1 on the NDC and port 2 from the PCIe slot have matching switch connection IDs. Port 2 from the NDC and port 1 from the PCIe slot have matching switch connection IDs.

### Task 11: Determine predefined or custom network settings

1. [ ] View the cluster report generated from the VxRail Configuration Portal:  
<https://vxrailconfiguration.dell.com/>
2. [ ] Identify whether the virtual-distributed switch configuration is predefined or custom.

Cluster Configuration Summary					
Configuration Status:	SUCCESS	Number of Cluster Hosts:	4	VDS Configuration:	Custom
Report Timestamp:	01/06/2021 14:20:21 PM	Number of Expansion Hosts:	--	VDS Type:	New

**Figure 15 VDS configuration custom or predefined**

- ‘Predefined’ means the NICs are assigned to the VxRail networks using a network profile by VxRail Manager.
- ‘Custom’ indicates difference from the default regarding the mapping between the NICs and uplinks, and the assignment of uplinks to VxRail networks.

3. [ ] Scroll down in the report to the **Virtual Distributed Switch** section.

4. [ ] Open the view to identify the NIC to uplink mapping.

- A ‘Predefined’ configuration aligns with the supported default VxRail network profile.
- A ‘Custom’ configuration indicates changes from the default VxRail network profile.

Virtual Distributed Switch: VMware HCIA Distributed Switch			
Port Group Name	VLAN	Active Uplink <-> VMNIC	Standby/Active Uplink <-> VMNIC
Management Network	200	uplink2<->VMNIC1	uplink1<->VMNIC0
Virtual SAN	202	uplink3<->VMNIC2	uplink4<->VMNIC3
vSphere vMotion	201	uplink4<->VMNIC3	uplink3<->VMNIC2
vCenter Server Network	200	uplink1<->VMNIC0	uplink2<->VMNIC1
VxRail Management	3939	uplink2<->VMNIC1	uplink1<->VMNIC0

**Figure 16 Sample ‘predefined’ NIC to uplink mapping**

Virtual Distributed Switch: VMware HCIA Distributed Switch			
Port Group Name	VLAN	Active Uplink <-> VMNIC	Standby/Active Uplink <-> VMNIC
Management Network	200	uplink1<->vmnic0	uplink2<->vmnic4
Virtual SAN	202	uplink3<->vmnic1	uplink4<->vmnic5
vSphere vMotion	201	uplink2<->vmnic4	uplink1<->vmnic0
VxRail Management	3939	uplink1<->vmnic0	uplink2<->vmnic4
vCenter Server Network	200	uplink1<->vmnic0	uplink2<->vmnic4

**Figure 17 Sample ‘Custom’ NIC to uplink mapping**

## Task 12: Verify proper node port connections

1. [ ] Using the report from the Configuration Portal, trace each uplink from each VDS portgroup to the assigned 'VMnic'. Map the 'VMnic' to the switch port using either the switch via LLDP discovery or the iDRAC port view.
2. [ ] Confirm proper node port connectivity.

## Change default VxRail network settings

Perform the following steps in order to prepare to change the default settings for VxRail before performing initial build.

## Task 13: Open cluster report or JSON file

1. [ ] Choose one of the two methods to access the final VxRail cluster settings.
  - a. Open the JSON file in an editor.
  - b. Open the cluster report from the Configuration Portal.

## Task 14: Enable access to the ESXi shell

If you are local to the data center, you can plug into the console port on the VxRail node. If you are remote, follow the steps in this task to access the ESXi shell over a network connection.

1. [ ] Connect to a laptop or jump host that has access to the iDRAC network supporting the VxRail nodes.
2. [ ] Open a browser to an iDRAC console on any VxRail node.  
*URL: https://<iDRAC IP Address>*

3. [ ] Login in as 'root'. The default password is 'calvin'.

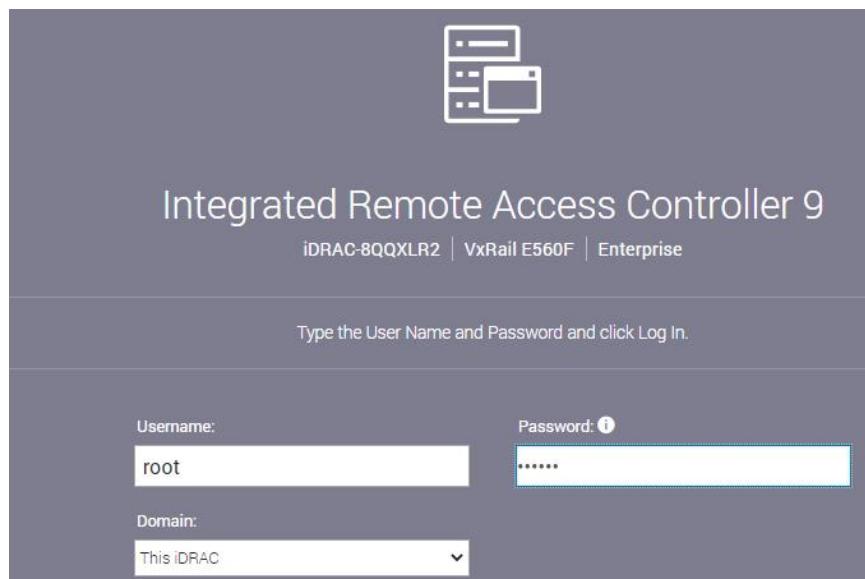
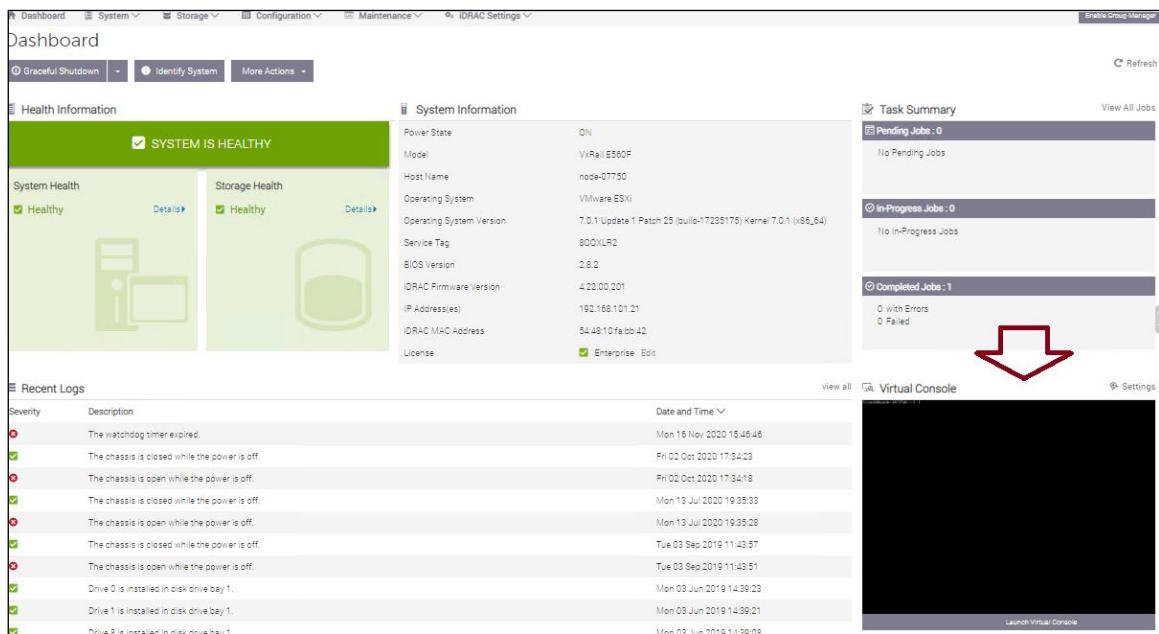


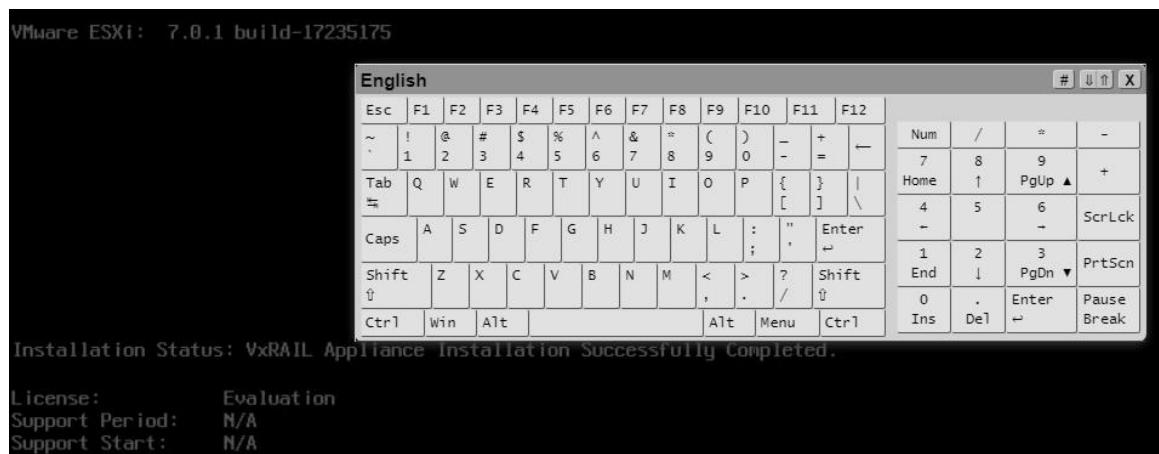
Figure 1 iDRAC Login Screen

4. [ ] Open the virtual console.



**Figure 2** Virtual console location on iDRAC dashboard

5. [ ] From the top toolbar, open the virtual keyboard



**Figure 3** Virtual keyboard for console

6. [ ] Press F2 and log in to the DCUI as 'root'. The default password is 'Passw0rd!'



**Figure 4** Enter credentials into console.

7. [ ] Scroll down and select **Troubleshooting Options**.



**Figure 5** Troubleshooting Options

8. [ ] Press **Enter** to **Enable ESXi Shell**.



**Figure 6** Enable ESXi shell.

9. [ ] Using the virtual keyboard, open the console shell by pressing **Alt+F1**.

10. [ ] Login as 'root'. The default password is 'Passw0rd'.

```
ESXi 7.0.1 http://www.vmware.com
Copyright (c) 2007-2020 VMware, Inc.

node-07750 login: root
Password:
The time and date of this login have been sent to the system logs.

WARNING:
All commands run on the ESXi shell are logged and may be included in
support bundles. Do not provide passwords directly on the command line.
Most tools can prompt for secrets or accept them from standard input.

VMware offers supported, powerful system administration tools. Please
see www.vmware.com/go/sysadmintools for details.

The ESXi Shell can be disabled by an administrative user. See the
vSphere Security documentation for more information.

[root@node-07750:~]
```

Figure 7 Open ESXi shell

## Enable VxRail Node with specific vmnics for management and discovery network in advance mode

Starting with VxRail 7.0.130, VxRail supports advanced VDS configuration with flexible NIC and VDS configurations. By default, you should use smallest NIC data port to support management connection and node discovery. Advance mode provides a more flexible network layout plan. You can define a specific network layout for VxRail management and discovery without vmnic0\*. To complete this case, you must adjust NIC configuration before VxRail initialization procedure. This document is designed to help you configure the new code for VxRail initialization and node expansion to generate network portgroups for management and discovery without vmnic0\*.

\*For G560/F model, it is vmnic1.

This document describes how to adjust the specific vmnic adapter configuration. This procedure only works with NIC\_profiles in API: ADVANCED\_VXRAIL\_SUPPLIED\_VDS and ADVANCED\_CUSTOMER\_SUPPLIED\_VDS.

This procedure applies to VxRail version 7.0.350 and later. See the [VxRail 7.x Support Matrix](#) for a list of the supported 7.0.x versions.

This procedure is intended for customers and Dell EMC Service providers who are authorized to work on a VxRail cluster and VxRail administrators.

VxRail 7.0.350 and later cluster managed by either a VxRail vCenter Server or a customer-supplied vCenter Server.

### Prerequisites:

- The new node must have enough spared NICs for configuration.
- You **must** configure the required VLAN on the switch for the connected adapter ports which are planned for Discovery and management.
- If using non-vmnic0 port connection, you can configure in DCUI using the iDRAC console to avoid network interruptions.
- Planed vmnic layout identification. You must plan the basic information:

Traffic	VSS portgroup name	Usage	Factory teaming	Physical NIC port adjustment plan
Node management traffic portgroup	Management Network	For node management connection	Active: vmnic0 Standby: vmnic1	Active: vmnic2 Standby: vmnic3
System VM management traffic portgroup	VM Network	For system VM management connection	Active: vmnic0 Standby: vmnic1	Active: vmnic2 Standby: vmnic3
Discovery Network portgroup	<ul style="list-style-type: none"> <li>• Private Management Network</li> <li>• Private VM Network</li> </ul>	For node discovery, the default is vLan 3939. In default network, it can share NIC ports with management.	Active: vmnic0 Standby: vmnic1	Active: vmnic4 Standby: vmnic5

We will only adjust one active vmnic for traffic. Other planned vmnics will be reconfigured during Day1 bring-up or node expansion.

### Task 15: Adjust the specific vmnic adapter configuration

1. [ ] Log in to IDRAC console with CLI mode.
  - a. Log in to node IDRAC web interface and open the console.
  - b. Press **Alt+F1** to switch to CLI mode.
  - c. Log in to the CLI with default user *root* and default password *Passw0rd!*
2. [ ] Locate the vmnics that are from PCIE.
  - a. Use *esxcfg-nics -l* to check the vmnic status.

```
[root@c2-esx01:~] esxcli network nic list
Name      PCI Device     Driver   Admin Status  Link Status  Speed  Duplex
-----  -----
vmnic0    0000:19:00.0  bnxtnet  Up           Up          25000  Full
t Controller
vmnic1    0000:19:00.1  bnxtnet  Up           Up          25000  Full
t Controller
vmnic2    0000:19:00.2  bnxtnet  Up           Up          25000  Full
t Controller
vmnic3    0000:19:00.3  bnxtnet  Up           Up          25000  Full
t Controller
vmnic4    0000:d8:00.0  bnxtnet  Up           Up          25000  Full
t Controller
vmnic5    0000:d8:00.1  bnxtnet  Up           Up          25000  Full
t Controller
vmnic6    0000:d8:00.2  bnxtnet  Up           Up          25000  Full
t Controller
vmnic7    0000:d8:00.3  bnxtnet  Up           Up          25000  Full
t Controller
vusb0     Pseudo       cdce     Up           Up          100   Full
```

Figure 1 vmnic status

In this example, we use two NDC ports and six PCIE adapter ports on VxRail E560F. Vmnic2, vmnic3 are the ports that we plan to use for management. Vmnic4, vmnic5 vmnic3 are the ports that we plan to use for discovery.

3. [ ] Configure and add planned vmnic into default vSwitch0.

a. esxcfg-vswitch -l.

Switch Name	Num Ports	Used Ports	Configured Ports	MTU	Uplinks
vSwitch0	7680	7	128	1500	vmnic0,vmnic1
<hr/>					
PortGroup Name	VLAN ID	Used Ports	Configured Ports	MTU	Uplinks
Private VM Network	0	0	0	1500	vmnic0,vmnic1
VM Network	0	0	0	1500	vmnic0,vmnic1
Management Network	0	1	0	1500	vmnic0,vmnic1
Private Management Network	0	1	0	1500	vmnic0,vmnic1

b. Add planned vmnics to vSwitch0.

vmnic2, vmnic3 are the ports that are planned to use for management and vmnic4, vmnic5 are the ports that are planned to use for discovery. They are not in vSwitch0, so add it to vSwitch0.

*esxcli network vswitch standard uplink add -u vmnic2 -v vSwitch0*

*esxcli network vswitch standard uplink add -u vmnic3 -v vSwitch0*

*esxcli network vswitch standard uplink add -u vmnic4 -v vSwitch0*

*esxcli network vswitch standard uplink add -u vmnic5 -v vSwitch0*

```
[root@node-41839:~] esxcli network vswitch standard uplink add -u vmnic2 -v vSwitch0
[root@node-41839:~] esxcli network vswitch standard uplink add -u vmnic3 -v vSwitch0
[root@node-41839:~] esxcli network vswitch standard uplink add -u vmnic4 -v vSwitch0
[root@node-41839:~] esxcli network vswitch standard uplink add -u vmnic5 -v vSwitch0
```

c. Configure portgroup teaming as planned.

Management traffic example: management traffic plan to use vmnic2 as active, vmnic3 as standby, so the portgroup policy failover is set as active avmnic2, standby vmnic3. Private management network, private VM network, and VM network also apply in the same way.

*esxcli network vswitch standard portgroup policy failover set -p "Management Network" -a vmnic2 -s vmnic3*

*esxcli network vswitch standard portgroup policy failover set -p "VM Network" -a vmnic2 -s vmnic3*

*esxcli network vswitch standard portgroup policy failover set -p "Private Management Network" -a vmnic4 -s vmnic5*

*esxcli network vswitch standard portgroup policy failover set -p "Private VM Network" -a vmnic4 -s vmnic5*

Check portgroup information.

*esxcli network vswitch standard portgroup policy failover get -p "Management Network"*

```
esxcli network vswitch standard portgroup policy failover get -p "VM Network"
```

```
esxcli network vswitch standard portgroup policy failover get -p "Private Management Network"
```

```
esxcli network vswitch standard portgroup policy failover get -p "Private VM Network"
```

- d. Check if vSwitch0 has unused NIC port, and remove them.

```
esxcli network vswitch standard policy failover get -v vSwitch0
```

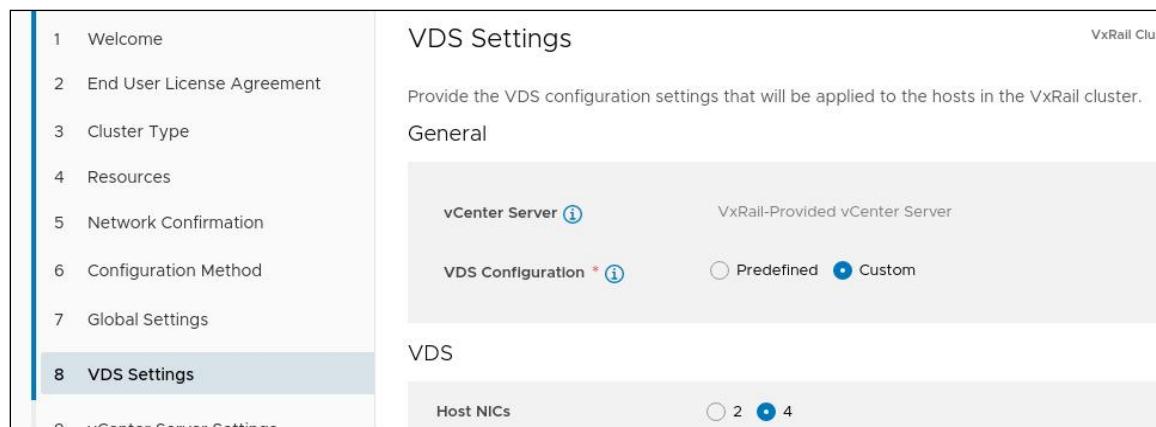
```
esxcli network vswitch standard uplink remove -u vmnic0 -v vSwitch0
```

- e. Repeat this step on all nodes which are planned for VxRail Deployment.
- f. After all nodes are configured, wait until VxRail Management IP is pingable and then go to UI or API to start deployment.

4. [ ] Wait for the VxRail deployment web interface to be online, and complete VxRail initialization.

From the UI:

- a. In VDS setting step, select "Custom" for VDS configuration.

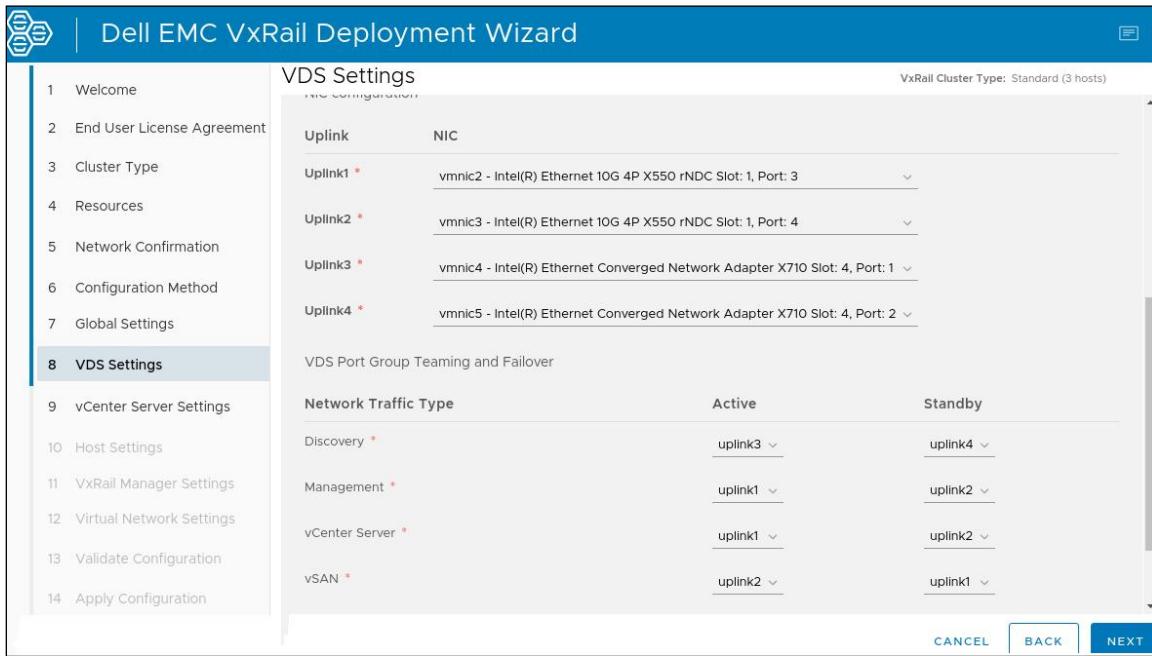


**Figure 2 VDS Settings**

- b. In uplink definition checklist, select planed adapter port, and then complete VxRail Deployment Wizard.

For this example, we adjust vmnic2, vmnic4 as active NICs for the management and discovery network. Then in the VxRail Deployment Wizard:

- vmnic2 vmnic3 are assigned to uplink1 and uplink2. The related management portgroups are using uplink 1 and uplink2 as failover uplinks.
- Vmnic4 vmnic5 are assigned to uplink3 and uplink4. The related discovery traffic is using uplink3 and uplink4 as failover uplinks.



**Figure 3 VDS Settings**

For API:

If you use API to perform the initialization, only ADAVANCE\_VXRAIL\_SUPPLIED\_VDS and ADVANCED\_CUSTOMER\_SUPPLIED\_VDS nic\_profile are supported.

For VxRail node expansion

Complete Steps 1, 2 and 3 for new node, and then perform the node expansion using the UI Wizard or API.

For additional information, see:

<https://docs.vmware.com/en/VMware-vSphere/7.0/com.vmware.vsphere.networking.doc/GUID-0CBF12A2-1074-4514-BE36-B09565BC4620.html>

### Task 16: Locate IP address for VxRail Manager

1. [ ] Open the JSON file created from the configuration portal.
2. [ ] Locate the permanent IP address for VxRail Manager under the 'vxrail\_manager' section.

```

    "vxrail_manager": {
      "accounts": {
        "root": {
          "password": "",
          "username": "root"
        },
        "service": {
          "password": "",
          "username": "mystic"
        }
      },
      "ip": "192.1.0.22",
      "name": "VxRail Manager"
    }
}

```

**Figure 18** Sample IP address for VxRail Manager

### Task 17: Verify connectivity to default VxRail Manager

When auto-discovery network is enabled, the VxRail Manager (VxM) starts automatically after all hosts are powered up with a default IP of 192.168.10.200. In most cases, this default address might not be accessible in customer's network environment.

When auto-discovery network is not available, VxM does not start automatically, and VxM and ESXi host management IP networks must be configured manually. After VxM IP and the ESXi host management IPs are configured, VxM Day 1 API or UI can be used to build a VxRail cluster.

### Restrictions for this feature:

3. The final ESXi host and VxM IP networks, including IP address, netmask, gateway, VLAN should be configured to the expected final VxRail cluster network settings. Changing those settings during the cluster bring-up stage is not supported.
4. This procedure only supports L2 network, where the management IP of VxM and the hosts in VxRail cluster are in the same L2 network.

The following two major manual tasks illustrate how to configure or start VxM with a desired IP address and how to configure ESXi host management IPs.

### Task 18: Identify VxRail primary node

---

**Note:** The node with the lowest PSNT value is selected by default as the primary node. If the PSNT values are not listed in the JSON file, use this method to identify the node with the lowest PSNT.

---

Perform the following steps on each node in the cluster to capture the PSNT remotely.

1. [ ] Open a browser to the iDRAC: <https://<iDRAC IP Address>>.
2. [ ] Log in as 'root'. The default password is 'calvin'.
3. [ ] Identify the service tag on the dashboard.

System Information	
Power State	ON
Model	VxRail E560F
Host Name	node-48464
Operating System	VMware ESXi
Operating System Version	7.0.1 Update 1 Patch 25 (build-17235175) Kernel 7.0.1 (x86_64)
Service Tag	8QPYH02
BIOS Version	2.9.4
iDRAC Firmware Version	4.40.00.201

**Figure 19** Service tag location on iDRAC dashboard

4. [ ] Perform the query operation to the next VxRail node.

### Task 19: Assign permanent IP address to VxRail Manager

1. [ ] From the iDRAC session on the primary node, open an ESXi shell on the primary node.
2. [ ] Verify that VxRail Manager is running on this node:

Run: `esxcli network vm list`

[root@node-48464:~] esxcli network vm list				
World ID	Name	Num Ports	Networks	
2291942	VxRail_Manager	2	Private VM Network,	VM Network

**Figure 20** VxRail Manager VM discovered on node

3. [ ] Configure the permanent IP address on VxRail Manager.
  - a. See the help screen for ‘vxrail-primary’ command.

```
[root@node-36436:~] vxrail-primary -h
usage: vxrail-primary [-h] [--setup | --destroy | --start | --stop | --config]
                      [--vxrail-address VXRAIL_ADDRESS]
                      [--vxrail-netmask VXRAIL_NETMASK]
                      [--vxrail-gateway VXRAIL_GATEWAY] [--vlan VXRAIL_VLAN]
                      [--no-roll-back] [--vmx-timeout VMX_TIMEOUT] [--verbose]

optional arguments:
  -h, --help            show this help message and exit
  --setup              Bootstrap this node as primary
  --destroy             Destroy the VMs and the diskgroups of this node
  --start               Start the VxRail Manager
  --stop                Stop the VxRail Manager
  --config              Configure the VxRail Manager Network settings
  --vxrail-address VXRAIL_ADDRESS
                        The IP address to set for VxRail Engine
  --vxrail-netmask VXRAIL_NETMASK
                        The netmask for VxRail Engine
  --vxrail-gateway VXRAIL_GATEWAY
                        The gateway used by VxRail Engine
  --vlan VXRAIL_VLAN   The vlan used by VxRail Management
  --no-roll-back        No rollback on error
  --vmx-timeout VMX_TIMEOUT
                        How long the command wait for Vxm
  --verbose             The switch to print more debug info
```

**Figure 21** vxrail-primary help screen

- Change the default IP address to a permanent IP address:

Run: `vxrail-primary --config --vxrail-address [X.X.X.X] --vxrail-netmask [X.X.X.X] --vxrail-gateway [X.X.X.X] --vlan [X]`

```
[root@node-36436:~] vxrail-primary --config --vxrail-address 192.2.0.22 --vxrail-netmask 255.255.255.0 --vxrail-gateway 192.2.0.254 --vlan 200
PRIMARY: 2021-02-03 17:20:12.060.060Z - INFO Configing VxRail Manager with IP 192.2.0.22/255.255.255.0 gateway 192.2.0.254, and vlan 200
VxRail Manager is already running, no need to power on
PRIMARY: 2021-02-03 17:20:57.399.399Z - INFO Temporary remove the uplinks
PRIMARY: 2021-02-03 17:20:57.483.483Z - INFO Start customizing VxRail Manager address...
PRIMARY: 2021-02-03 17:21:12.680.680Z - INFO Wait until the IP taking effect
PRIMARY: 2021-02-03 17:21:12.731.731Z - INFO VXRAIL default IP set to 192.2.0.22
PRIMARY: 2021-02-03 17:21:12.798.798Z - INFO Restore vSwitch uplinks
PRIMARY: 2021-02-03 17:21:12.892.892Z - INFO Success in completing the setup of VxRail Manager network settings
Success in completing the setup of VxRail Manager network settings
PRIMARY: 2021-02-03 17:21:13.141.141Z - INFO Success in completing the setup of VxRail vlan settings
Success in completing the setup of VxRail vlan settings
```

**Figure 22** Sample vxrail-primary command run

- Wait about 90 seconds, and then use `ping` command to verify that the new VxRail Manager IP address is reachable.

**Note:** If auto-discovery is unavailable, this is the only method to set Vxm IP and boot Vxm.

**Note:** If auto-discovery is available, Vxm auto starts and runs in one of nodes a few minutes after the nodes are powered on. Normally, Vxm runs in the node which has the minimum PSNT sorted alphabetically and have a default 192.168.10.200 IP address. Running the `vxrail-primary` command on multiple nodes is not supported. In particular, if two instances of Vxm start with the same IP on two different nodes, IP conflicts will occur. There are other procedures to change Vxm IP before Day1 without having to identify the right node.

## Task 20: Locate VxRail assigned VLANs in JSON file

1. [ ] Open the JSON file created from the configuration portal.
2. [ ] Locate the VLAN assigned to the external management network in the “portgroups” section.

```
"portgroups": [  
    {  
        "failover_order": {  
            "active": [  
                "uplink1"  
            ],  
            "standby": [  
                "uplink2"  
            ]  
        },  
        "type": "MANAGEMENT",  
        "vlan_id": 100  
    }  
,
```

Figure 23 Sample VLAN for external management network

3. [ ] Verify if the VLAN assigned to the external management network differs from the default of 0.
4. [ ] Locate the JSON assigned to the internal management network.

```
"failover_order": {  
    "active": [  
        "uplink1"  
    ],  
    "standby": [  
        "uplink2"  
    ]  
,  
    "type": "VXRAILDISCOVERY",  
    "vlan_id": 3939  
},
```

Figure 24 Sample default VLAN for internal management network

5. [ ] Verify whether the VLAN assigned to the internal management network differs from the default of 3939.

**Note:** The steps in the task can be bypassed if you do not need to change the default VLANs assigned to the VxRail networks from the factory.

## Task 21: Modify Default VLAN on the vSwitch

1. [ ] Open the JSON file created from the configuration portal.
2. [ ] Modify the management networks VLAN on the vSwitch.

Run: `esxcli network vswitch standard portgroup set -p "Management Network" -v [vlan]`

Run: `esxcli network vswitch standard portgroup set -p "VM Network" -v [vlan]`

Parameters description:

- [vlan]: target management network VLAN ID

```
[root@node-14372:~] esxcli network vswitch standard portgroup set -p "Management Network" -v 100
[root@node-14372:~] esxcli network vswitch standard portgroup list
Name           Virtual Switch   Active Clients  VLAN ID
-----
Management Network    vSwitch0          1            100
Private Management Network  vSwitch0          1            3939
Private VM Network     vSwitch0          1            3939
VM Network           vSwitch0          1            100
```

**Figure 25** Modify the external management networks VLAN

3. [ ] Modify the internal management VLAN on the vSwitch.

Run: `esxcli network vswitch standard portgroup set -p "Private Management Network" -v [vlan]`

Run: `esxcli network vswitch standard portgroup set -p "Private VM Network" -v [vlan]`

Parameters description:

- [vlan]: target management network VLAN ID

```
[root@node-14372:~] esxcli network vswitch standard portgroup set -p "Private Management Network" -v 3940
[root@node-14372:~] esxcli network vswitch standard portgroup set -p "Private VM Network" -v 3940
[root@node-14372:~] esxcli network vswitch standard portgroup list
Name           Virtual Switch   Active Clients  VLAN ID
-----
Management Network    vSwitch0          1            100
Private Management Network  vSwitch0          1            3940
Private VM Network     vSwitch0          1            3940
VM Network           vSwitch0          1            100
```

**Figure 26** Modify the internal management networks VLAN

4. [ ] Repeat the steps in this task on the next VxRail node.

### Task 22: Locate the physical NIC if only PCIe ports are used for VxRail networks

1. [ ] Open the JSON file created from the configuration portal.
2. [ ] Locate the physical NIC assigned to the uplinks in the 'nic\_mappings' section.

```
"nic_mappings": [
  {
    "uplinks": [
      {
        "name": "uplink1",
        "physical_nic": "vmnic4"
      },
      {
        "name": "uplink2",
        "physical_nic": "vmnic5"
      }
    ]
  }
]
```

**Figure 27** Sample NIC mapping in JSON file

3. [ ] Open an ESXi shell on any VxRail node.
4. [ ] View the full list of NICs discovered by ESXi.

Run: `esxcli network nic list`

Name	PCI Device	Driver	Admin Status	Link Status	Speed	Duplex	MAC Address	MTU	Description
vmnic0	0000:19:00.0	i40en	Up	Up	10000	Full	e4:43:4b:5e:01:e0	1500	Intel(R) Ethernet Controller X
710 for 10GbE SFP+									
vmnic1	0000:19:00.1	i40en	Up	Up	10000	Full	e4:43:4b:5e:01:e1	1500	Intel(R) Ethernet Controller X
710 for 10GbE SFP+									
vmnic2	0000:19:00.2	i40en	Up	Down	0	Half	e4:43:4b:5e:01:e2	1500	Intel(R) Ethernet Controller X
710 for 10GbE SFP+									
vmnic3	0000:19:00.3	i40en	Up	Down	0	Half	e4:43:4b:5e:01:e3	1500	Intel(R) Ethernet Controller X
710 for 10GbE SFP+									
vmnic4	0000:5e:00.0	qedenty	Up	Up	10000	Full	f4:e9:d4:09:7d:5e	1500	QLogic Corp. QLogic FastLinQ Q
L41xxx 1/10/25 GbE Ethernet Adapter									
vmnic5	0000:5e:00.1	qedenty	Up	Up	10000	Full	f4:e9:d4:09:7d:5f	1500	QLogic Corp. QLogic FastLinQ Q
L41xxx 1/10/25 GbE Ethernet Adapter									

Figure 28 Sample list of NICs detected by ESXi

- The ports on the NDC are first and assigned vmnic names first.

5. [ ] View list of NICs assigned as uplinks to the vSwitch used by VxRail

Run: `esxcli network vswitch standard list`

```
[root@node-07750:~] esxcli network vswitch standard list
vSwitch0
  Name: vSwitch0
  Class: cswitch
  Num Ports: 10496
  Used Ports: 11
  Configured Ports: 128
  MTU: 1500
  CDP Status: listen
  Beacon Enabled: false
  Beacon Interval: 1
  Beacon Threshold: 3
  Beacon Required By:
  Uplinks: vmnic3, vmnic2, vmnic1, vmnic0
  Portgroups: private, vm network, vm network, Management Network, Private Management Network
```

Figure 29 List of NICs discovered on ESXi host

6. [ ] Verify if the NICs selected for VxRail networking from the JSON file are assigned as uplinks to the vSwitch.

- If none of the selected NICs from the JSON are assigned as an uplink to the vSwitch, one NIC must be manually configured on the vSwitch.

**Note:** If the NICs selected to support VxRail networking are all NDC ports, or a mixture of NDC ports and PCIe ports, the next task can be bypassed. The steps in the next task are performed only if all the NICs selected for VxRail networking are PCIe-based.

### Task 23: Configure PCIe-based NIC onto VxRail vSwitch

Repeat the steps in this task on every VxRail node planned for initial build.

- [ ] Open an ESXi shell on the VxRail node.
- [ ] Configure one of the NICs as an uplink on the vSwitch.

Run: `esxcli network vswitch standard uplink add -u <vmnic> -v vSwitch0`

```
[root@node-07750:~] esxcli network vswitch standard uplink add -u vmnic4 -v vSwitch0
[root@node-07750:~] esxcli network vswitch standard list
vSwitch0
  Name: vSwitch0
  Class: cswitch
  Num Ports: 10496
  Used Ports: 13
  Configured Ports: 128
  MTU: 1500
  CDP Status: listen
  Beacon Enabled: false
  Beacon Interval: 1
  Beacon Threshold: 3
  Beacon Required By:
  Uplinks: vmnic4, vmnic3, vmnic2, vmnic1, vmnic0
  Portgroups: Private VM Network, VM Network, Management Network, Private Management Network
```

**Figure 30** Add vmnic as uplink to vSwitch.

3. [ ] Assign the selected NIC to the failover policy on the vSwitch.

Run: `esxcli network vswitch standard policy failover set -v vSwitch0 -a <vmnic>`

```
[root@node-07750:~] esxcli network vswitch standard policy failover get -v vSwitch0
  Load Balancing: srcport
  Network Failure Detection: link
  Notify Switches: true
  Failback: true
  Active Adapters: vmnic0
  Standby Adapters: vmnic1, vmnic2, vmnic3, vmnic4
  Unused Adapters:
[root@node-07750:~] esxcli network vswitch standard policy failover set -v vSwitch0 -a vmnic4
[root@node-07750:~] esxcli network vswitch standard policy failover get -v vSwitch0
  Load Balancing: srcport
  Network Failure Detection: link
  Notify Switches: true
  Failback: true
  Active Adapters: vmnic4
  Standby Adapters: vmnic1, vmnic2, vmnic3
  Unused Adapters: vmnic0
```

**Figure 31** Substitute new vmnic with vmnic0 as active adapter.

4. [ ] Assign the selected NIC as the active uplink on the vSwitch portgroups.

Run: `esxcli network vswitch standard portgroup policy failover set -p "Management Network" -a <vmnic>`

Run: `esxcli network vswitch standard portgroup policy failover set -p "Private Management Network" -a <vmnic>`

Run: `esxcli network vswitch standard portgroup policy failover set -p "VM Network" -a <vmnic>`

Run: `esxcli network vswitch standard portgroup policy failover set -p "Private VM Network" -a <vmnic>`

```
[root@node-07750:~] esxcli network vswitch standard portgroup policy failover get -p "Management Network"
Load Balancing: srport
Network Failure Detection: link
Notify Switches: true
Fallback: true
Active Adapters: vmnic0
Standby Adapters: vmnic1, vmnic2, vmnic3, vmnic4
Unused Adapters:
Override Vswitch Load Balancing: true
Override Vswitch Network Failure Detection: true
Override Vswitch Notify Switches: true
Override Vswitch Failback: true
Override Vswitch Uplinks: true
[root@node-07750:~] esxcli network vswitch standard portgroup policy failover set -p "Management Network" -a vmnic4
[root@node-07750:~] esxcli network vswitch standard portgroup policy failover get -p "Management Network"
Load Balancing: srport
Network Failure Detection: link
Notify Switches: true
Fallback: true
Active Adapters: vmnic4
Standby Adapters: vmnic1, vmnic2, vmnic3
Unused Adapters: vmnic0
Override Vswitch Load Balancing: true
Override Vswitch Network Failure Detection: true
Override Vswitch Notify Switches: true
Override Vswitch Failback: true
Override Vswitch Uplinks: true
```

**Figure 32** Assign selected vmnic as active uplink on portgroup.

5. [ ] Remove any unused NICs from the vSwitch.

```
Active Adapters: vmnic4
Standby Adapters: vmnic1, vmnic2, vmnic3
Unused Adapters: vmnic0
```

**Figure 33** Unused NIC on vSwitch0

Run: `esxcli network vswitch standard uplink remove -u <vmnic> -v vSwitch0`

6. [ ] Repeat the steps in this task on the next VxRail node.

## Perform VxRail Initial Build

### Task 24: (optional) Enable TPM and Secure Boot

---

**Note:** This is an optional action, user can enable TPM and Secure Boot through the idrac.

---

Perform the following steps on each node in the cluster to enable TPM and Secure Boot.

1. [ ] Open a browser to the iDRAC: `https://<iDRAC IP Address>`
2. [ ] Log in as 'root'. The default password is 'calvin'.
3. [ ] Go to Configuration page, choose BIOS Settings and open System Security option. TPM Security option choose On.

The screenshot shows the iDRAC9 Enterprise interface with the following navigation path: Dashboard > Serial Communication > System Profile Settings > System Security. The main content area displays various system security settings with their current values:

	Current Value
CPU AES-NI	Enabled
System Password	[Redacted]
Confirm System Password	[Redacted]
Setup Password	[Redacted]
Confirm Setup Password	[Redacted]
Password Status	Unlocked ▾
SHA256 hash of the System password	[Redacted]
Salt string appended to the System password prior to hash	[Redacted]
SHA256 hash of the Setup password	[Redacted]
Salt string appended to the Setup password prior to hash	[Redacted]
TPM Security	On ▾
TPM Information	Type: 2.0 NTZ
TPM Firmware	4.12.5639.4881
TPM Hierarchy	Enabled ▾

**Figure 34** Enable TPM Security

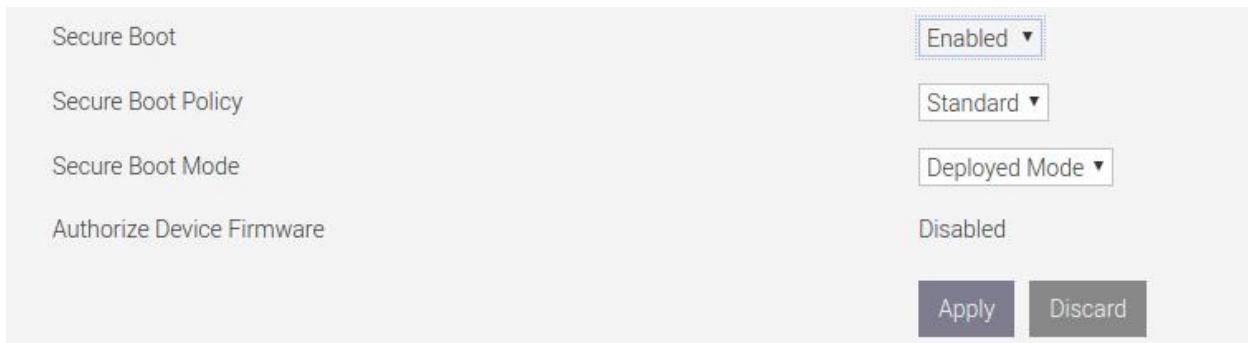
4. [ ] Open TPM Advanced Settings option, click TPM2 Algorithm Selection choose SHA256

The screenshot shows the TPM Advanced Settings configuration page with the following settings:

	Current Value
TPM PPI Bypass Provision	Disabled ▾
TPM PPI Bypass Clear	Disabled ▾
TPM2 Algorithm Selection	SHA256 ▾

**Figure 35** TPM2 Algorithm Selection

5. [ ] Secure Boot Option choose Enable. And click Apply to save value.



**Figure 36** Secure Boot Enable

6. [ ] Choose Apply and Reboot button to apply the config and wait node reboot.

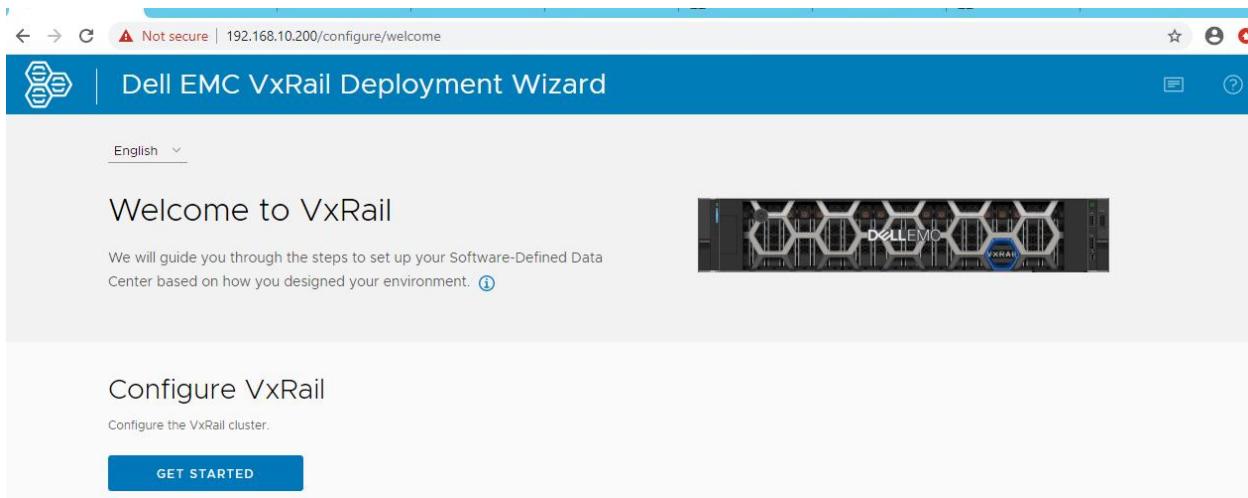
### Task 25: Begin VxRail Initial Build

1. [ ] Launch a browser on your PC.

2. [ ] Open a session to the VxRail Manager IP address

- Use <https://192.168.10.200> if you were unable to modify the default IP address on VxRail Manager
- Use the assigned VxRail Manager static IP address if it was changed before this step.

3. [ ] The VxRail Welcome screen displays.



**Figure 37** VxRail Welcome Screen

You are now connected to VxRail Manager and can provision the VxRail cluster.

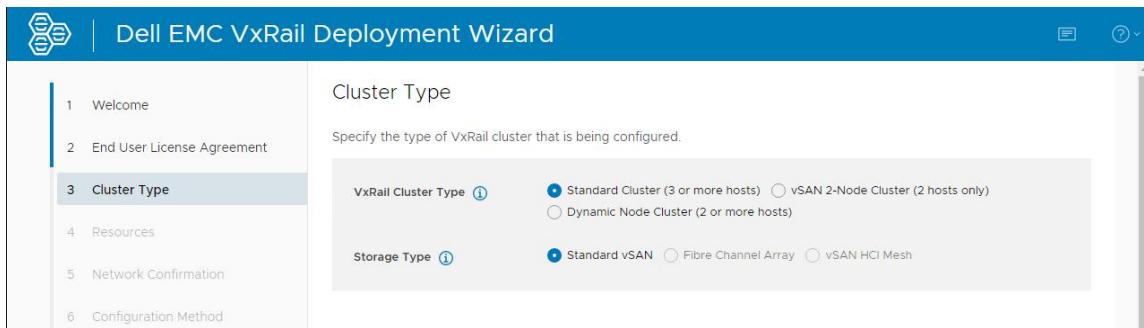
4. [ ] On the VxRail Manager **Welcome** screen, click **GET STARTED**.

5. [ ] Click **ACCEPT** to accept the End User License Agreement (EULA). Then click **NEXT**.

### Task 26: Perform VxRail Node Discovery

1. [ ] Choose the cluster type

2. [ ] Select **NEXT**.

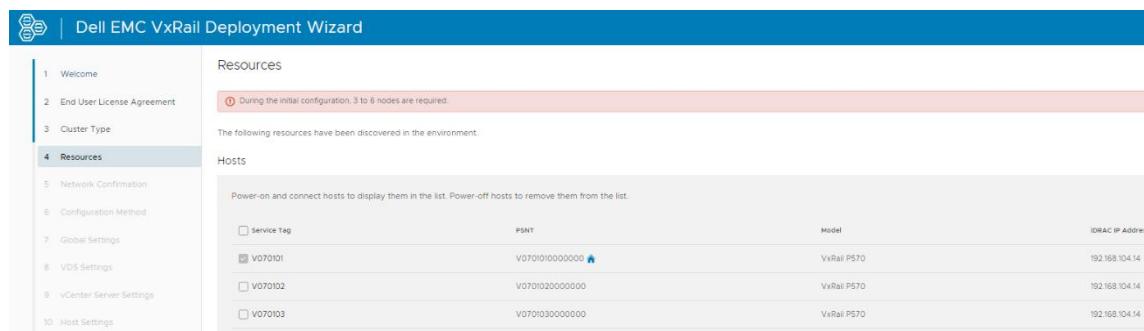


**Figure 38** VxRail Wizard: Cluster Type

### 3. [ ] Select the nodes to be used for VxRail initial build

**Note:** For a standard cluster with vSAN, a minimum of three nodes must be selected. A dynamic cluster requires a minimum of two nodes. For a 2 node cluster with vSAN, only two nodes can be selected.

- a. Wait for node discovery to complete
- b. Select the nodes to be included in the VxRail cluster

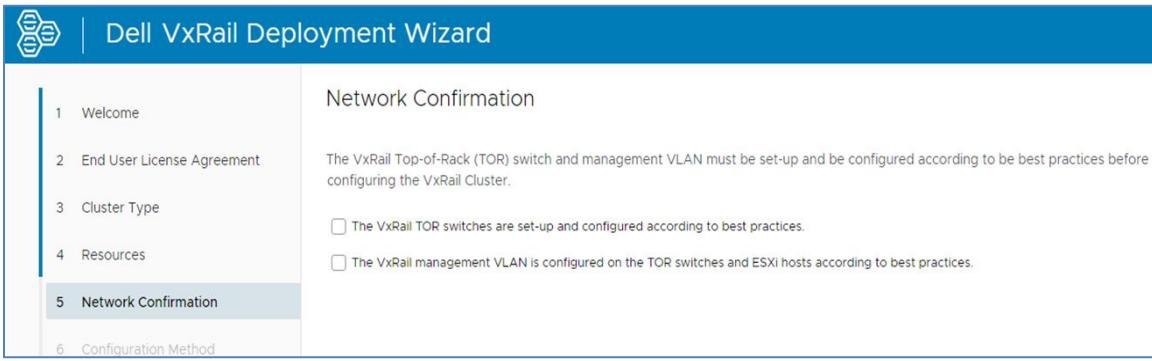


**Figure 39** VxRail Wizard: Discover Resource

### 4. [ ] Select NEXT.

**Note:** Screenshots in this procedure might be different, depending on the VxRail version you are using.

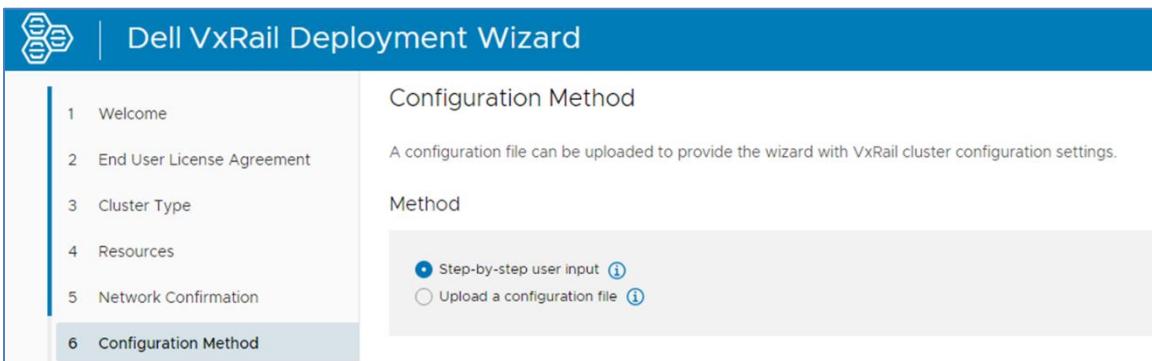
### 1. [ ] Select Network Confirmation and click NEXT.



**Figure 40** VxRail Wizard: Network Confirmation

2. [ ] Select how you would like to configure VxRail.

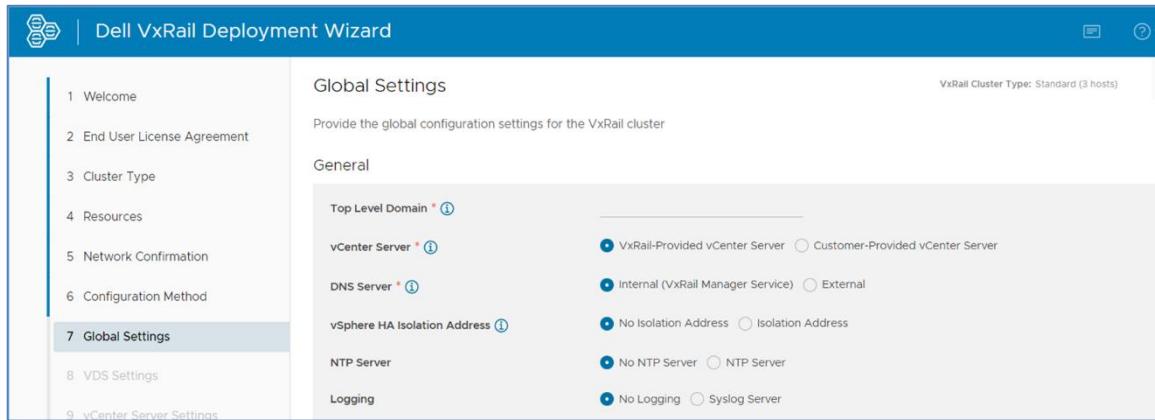
- If you select **Step-by-step user input**, a wizard starts to enter the required VxRail configuration settings interactively.
- If you select **Upload a Configuration file**, you will be prompted to select the JSON file. VxRail will pre-populate the required VxRail configuration settings before starting the wizard. If you use the JSON file method, use the following tasks to review the input parameters.



**Figure 41** VxRail Wizard: Configuration Method

**Note:** Follow the on-screen prompts when navigating through the wizard. Ensure that all required fields are entered, and the information is accurate.

3. [ ] Enter the **Global Settings**.



**Figure 42** VxRail Wizard: Global Settings

- Provide domain name in **Top Level Domain** field.
- Under **vCenter Server**: Select the **VxRail-Provided vCenter server** option.
- Under **DNS Server**: Select **Internal** or **External**. If you select External, you must provide the IP address of the DNS server supporting the VxRail cluster.

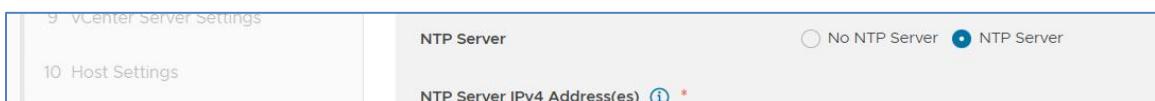
**Note:** When using internal DNS option, the entire cluster's DNS service fully rely on availability of VxM VM. Avoid shutting down, rebooting, or pausing it unexpectedly. Restarting cluster must follow cluster shutdown procedure.

- vSphere HA Isolation Address** field is optional: If you select “Isolation Address”, provide the IPv4 address(es). For multiple addresses, use a comma to separate each entry. vSphere HA isolation address is IP address that is pinged to determine whether a host is isolated from the network.



**Figure 43** Isolation address

- NTP Server** field is optional. If you select “No NTP Server”, VxRail uses the time set on the first ESXi host on the VxRail appliance. See VMware KB [1003736](#) for more information about ESXi time setting). If you select “NTP server”, add one IP address, or use a comma to separate each entry in multiple addresses.



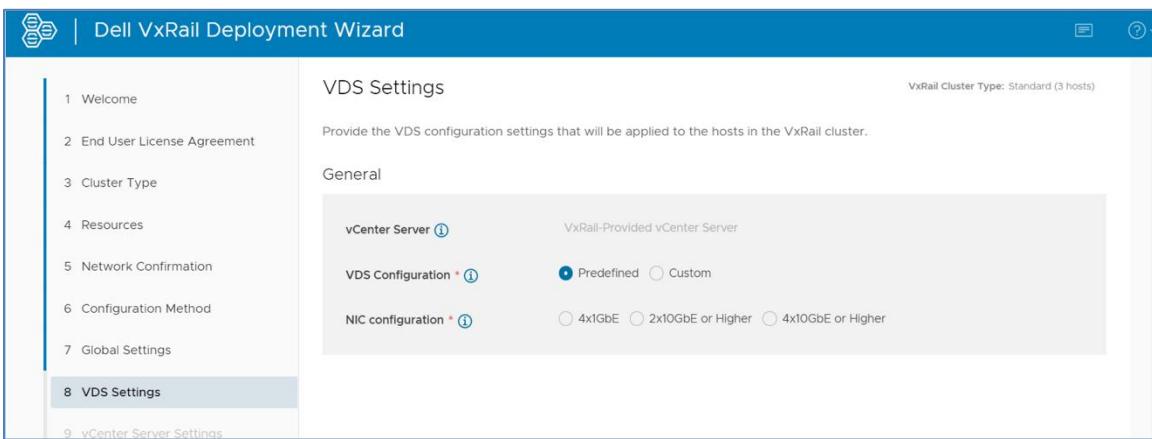
**Figure 44** NTP Server

- Logging** field is optional. If you select “Syslog Server”, provide valid IP Address or FQDN if required.



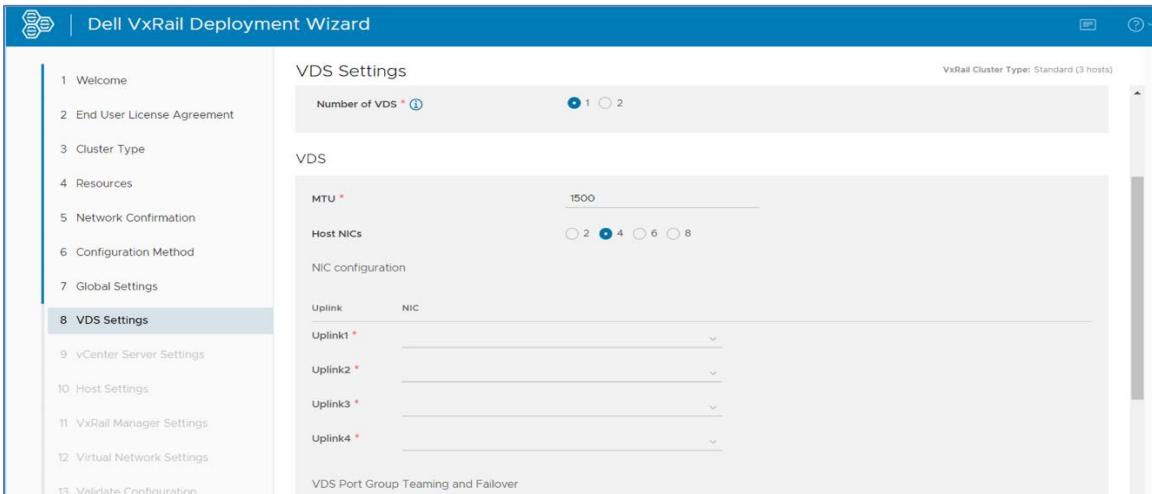
**Figure 45 Logging**

- g. Click **NEXT**.  
4. [ ] Enter the **VDS Settings**.



**Figure 46 VxRail Wizard: VDS Settings**

- a. **VDS Configuration:** choose Predefined or Custom.
- If you choose **Predefined**, **NIC Configuration** will display the available NIC profiles for your cluster. Select one of them according to your VxRail networking plan.
  - If you choose **Custom**, additional options are displayed to customize the network
    - \* Choose **Number of VDS**: 1 or 2
    - \* Choose **Host NICs**: 2 or 4 NICs for each VDS
    - \* Define **VDS MTU** accordingly (Range: 1500 ~ 9000)
    - \* Define **NIC Configuration**: Customize which physical NIC to assign to which uplink
    - \* Define **VDS portgroup Teaming and Failover**: Input active uplink and standby uplink for each VxRail system traffic. These traffic types are mandatory: Discovery, Management, vCenter Server, vSAN, vMotion. Guest VM is optional.
    - \* Choose Teaming policy for each System Portgroup and load-balancing policies.
    - \* Define MTU value for each VMkernel according to portgroup.

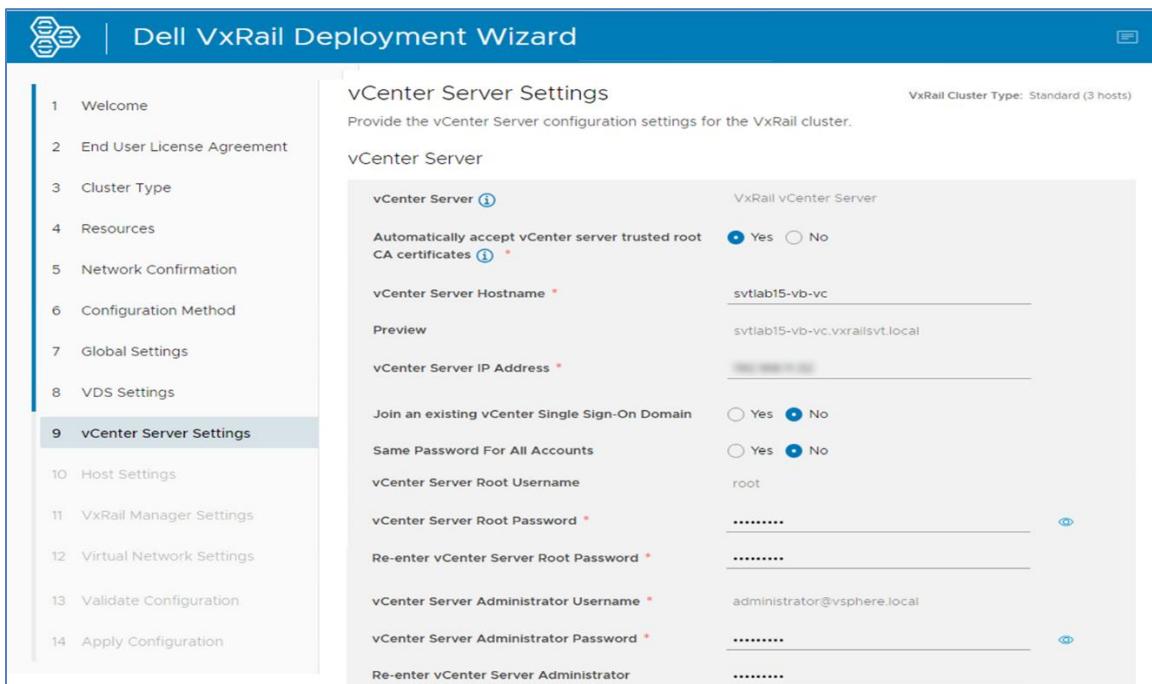


**Figure 47** VDS settings

VDS Port Group Teaming and Failover					
Network Traffic Type	Active	Active/Standby	Teaming Policy	Load Balancing	VMkernel MTU
Discovery *	uplink1	uplink2	active/active	Route based on physical NIC load	1600
Management *	uplink2	uplink1	active/standby	Route based on originating virtual port	2000
vCenter Server *	uplink1	uplink2	active/standby	Route based on originating virtual port	

**Figure 48** VxRail Wizard: VDS Custom Settings

- b. Click **NEXT**.
5. [ ] Enter vCenter Server Settings.



**Figure 49** VxRail Wizard: vCenter Settings

---

**Note:** When entering hostnames in the VxRail First Run Wizard, hostname vCenter should be entered as simple hostnames. Do not enter FQDN hostnames as this will cause a misconfiguration.

---

- a. **vCenter Server**, **VxRail vCenter Server** indicates the vCenter server type.
  - b. Automatically accept vCenter server trusted root CA certificates, should select Yes in VxRail-provided vCenter Server mode.
  - c. Enter vCenter Server Hostname.
  - d. Enter vCenter Server IP Address.
- 

**Notes:**

- \* For VxRail versions earlier than 7.0.350, the IP addresses for Internal vCenter, ESXi hosts, and VxRail Manager must be on the same subnet.
  - \* Starting with VxRail v7.0.350, the Internal vCenter Server network (Internal vCenter and VxRail Manager) and VxRail external management network (ESXi hosts) can be assigned to different subnets and VLANs. See KB [000198062](#).
- 

- e. Do not select the **Join an existing vCenter Single Sign-On Domain** option.
  - f. Select Yes or No for Same Password for All Accounts. If you select, input one password.
  - g. Enter passwords for root and vCenter administrator.
  - h. Enter management username and password.
6. [ ] If using enhanced link mode, select “Yes” to **Join an existing vCenter Single Sign-On Domain** and the below extra panel will show in “vCenter Server Settings” tab.

The screenshot shows a configuration panel for enabling Enhanced Link Mode (ELM). The top section has a radio button for "Join an existing vCenter Single Sign-On Domain" set to "Yes". Below it is a field for "Automatically accept target SSO vCenter server trusted root CA certificates" with a "Yes" radio button selected. The main body contains fields for "vCenter Server Hostname FQDN or IP Address" (empty), "vCenter Server HTTPS Port" (443), "vCenter Server Single Sign-On Administrator Username" (administrator@vsphere.local), "vCenter Server Single Sign-On Administrator Password" (empty), "Same Password For All Accounts" (Yes selected), "vCenter Server Root Username" (root), and "vCenter Server Root Password" (empty).

**Figure 50** Enabling Enhanced Link Mode (ELM)

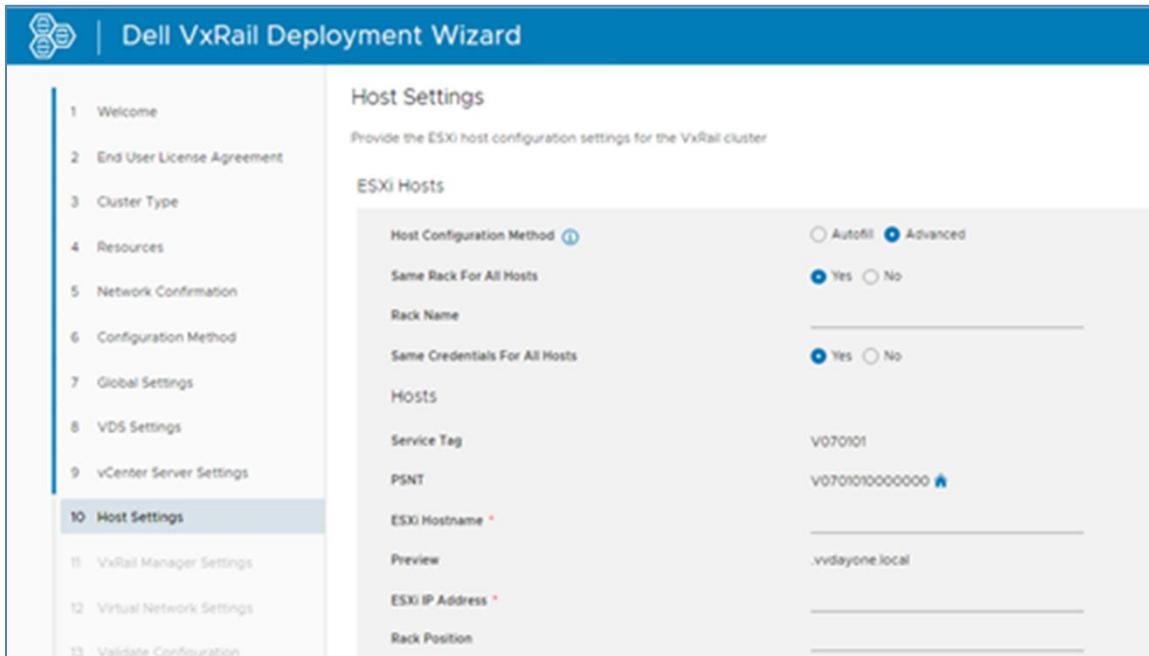
- a. **Automatically accept target SSO vCenter server trusted root CA certificates**, select Yes or No.
- b. **vCenter Server Hostname FQDN or IP Address**, input target SSO vCenter server FQDN or IP address.

- c. **vCenter Server HTTPS Port**, is 443 (default), change if it is not.
  - d. **vCenter Server Single Sign-On Administrator Username**, input target SSO vCenter server credentials in 'administrator@<domain>' format.
  - e. **vCenter Server Single Sign-On Administrator Password**, input target SSO vCenter server administrator username's password.
7. [ ] Click **NEXT**.
8. [ ] Enter Host Settings.

The screenshot shows the 'Host Settings' step of the Dell VxRail Deployment Wizard. On the left, a vertical navigation bar lists steps from 1 to 14, with '10 Host Settings' highlighted. The main area is titled 'Host Settings' and describes providing host configuration settings for the VxRail cluster. It includes sections for 'ESXi Hosts' and various configuration fields like 'Host Configuration Method' (set to 'Autofill'), 'ESXi Hostname', 'ESXi Starting IP Address', 'Same Credentials For All Hosts' (set to 'Yes'), and 'ESXi Management Password'.

**Figure 51** VxRail Wizard: Autofill Host Settings

- a. Choose either **Autofill** or **Advanced** to assign ESXi hostnames.
  - If Autofil mode is selected:
    - \* Provide template ESXi hostname in **ESXi Hostname** field, the page will generate hostnames with increasing sequence added behind the name. Click the symbol to expand more options.
    - \* Provide IP address in **ESXi Starting IP Address** field, the page will generate ESXi ending IP Address and assign incremental IP addresses to each host in order.
  - If Advanced mode is selected:
    - \* Provide hostname and IP address of each host in **ESXi Hostname** and **ESXi IP Address** fields for each host.



**Figure 52** VxRail Wizard: Advanced Host Settings

b. Select **Yes** or **No** for **Same Credentials for All Hosts**.

- No means providing ESXi management account information and ESXi root account information for each host.
- Yes means providing one ESXi management account information and ESXi root account information for all hosts.

ESXi Host Location				
Same Rack For All Hosts		<input checked="" type="radio"/> Yes	<input type="radio"/> No	Rack Name
Service Tag	PSNT	ESXi Hostname	ESXi IPv4 Address	Rack Position
V010101	V01010100000000			
V010102	V01010200000000			
V010103	V01010300000000			

**Figure 53** VxRail Wizard: Rack Location

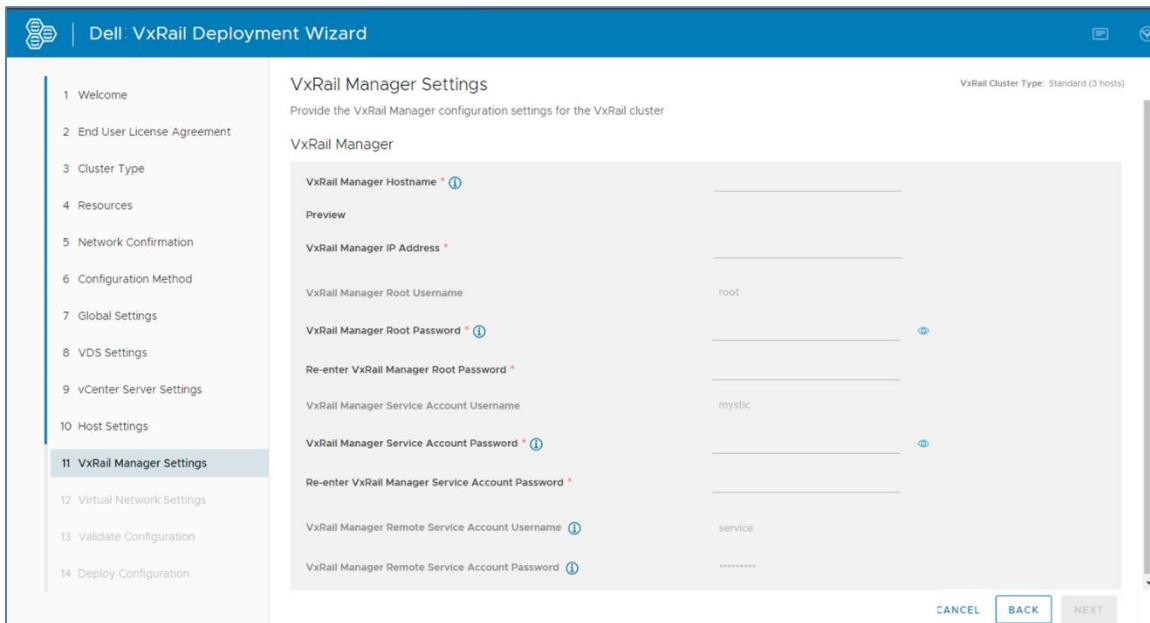
c. Enter rack location.

- Host rack-related information is optional, Choose **Yes** or **No** for **Same Rack For All Hosts**.
- Provide **Rack Position** and **Rack Name** fields if required.

9. [ ] Click **NEXT**.

10. [ ] Enter the **VxRail Manager Settings**.

**Note:** The JSON file does not populate the password entries. The passwords must be entered manually.



**Figure 54** VxRail Wizard: VxRail Manager

- Enter VxRail Manager Hostname and IP Address.
- Enter vCenter Server IP Address.

**Notes:**

- \* For VxRail versions earlier than 7.0.350, the IP addresses for Internal vCenter, ESXi hosts, and VxRail Manager must be on the same subnet.
- \* Starting with VxRail v7.0.350, the Internal vCenter Server network (Internal vCenter and VxRail Manager) and VxRail external management network (ESXi hosts) can be assigned to different subnets and VLANs. See KB [000198062](#).

- Enter VxRail Manager Root password.
- Enter VxRail Manager 'mystic' Service Account password.

**Note:** The 'mystic' password cannot be the same as the 'root' password.

- The VxRail Manager Remote Service Account username is predefined and read-only and its password is read-only and same as the password of 'mystic' account.

- Select **NEXT**.
- Enter the **Virtual Network Settings**.

**Note:** Enter a VLAN ID of 0 if a flat network is to be deployed.

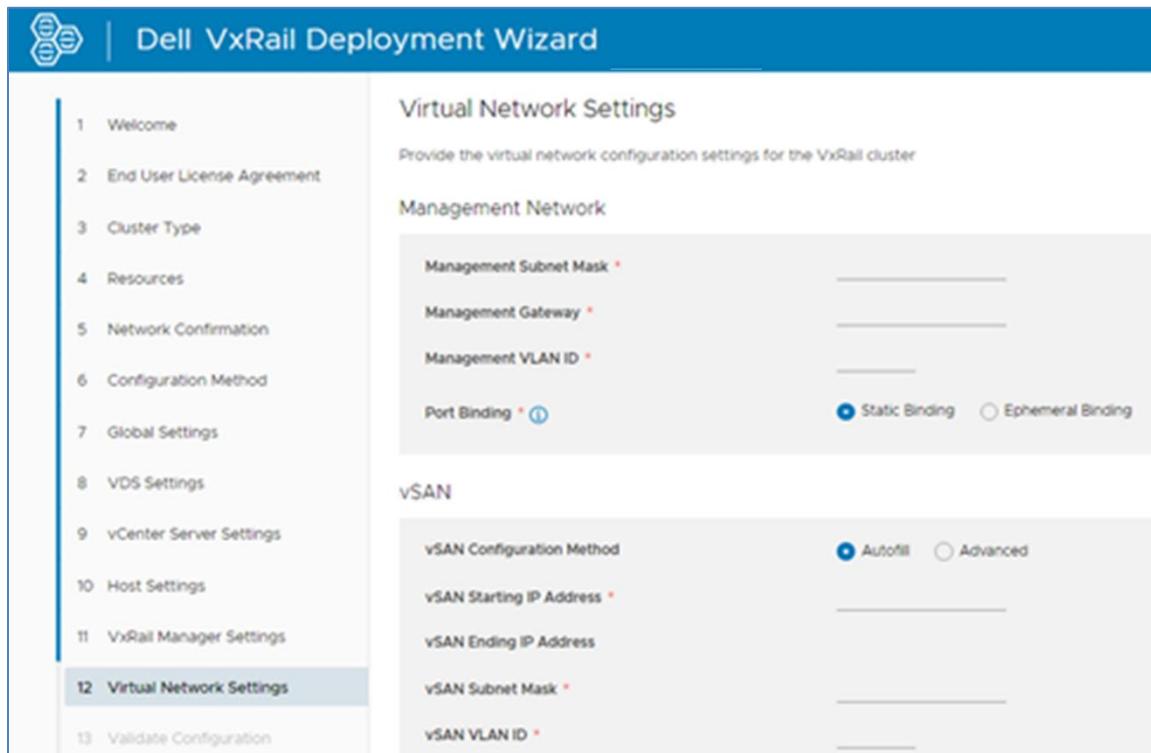


Figure 55 VxRail Wizard: Virtual Network

a. Enter VxRail Management Network.

- Enter External Management Subnet Mask.
- Enter External Management Gateway.
- Enter External Management VLAN ID.
- Select Port Binding.

**Note:** A private IP address scheme can be used for the vSAN and vMotion networks.

b. Enter vSAN network.

- Enter host vSAN IP addresses.
  - If you select the **Autofill**, enter the beginning vSAN IP address.
  - If you select **Advanced**, enter the vSAN IP address for each host.
- Enter vSAN Subnet Mask.
- Enter vSAN VLAN ID.

c. Enter vSphere vMotion network.

- Enter host vMotion IP addresses.
  - If you select the **Autofill**, enter the beginning vMotion IP address.
  - If you select **Advanced**, enter the vMotion IP address for each host.
- Enter vMotion Subnet Mask.
- Enter vMotion VLAN ID.

- d. Under **VM Guest Networks**: Add the optional VM Guest Network Name and VLAN ID.
- e. Under **vCenter Server Network**: Choose Static Binding or Ephemeral Binding.

vCenter Server Network

vCenter Server Subnet \*  Default  Custom

vCenter Server Subnet Mask \*

vCenter Server Gateway IP Address \*

vCenter Server VLAN ID \*

Port Binding \*  Static Binding  Ephemeral Binding

**Figure 56** VxRail Wizard: Virtual Network

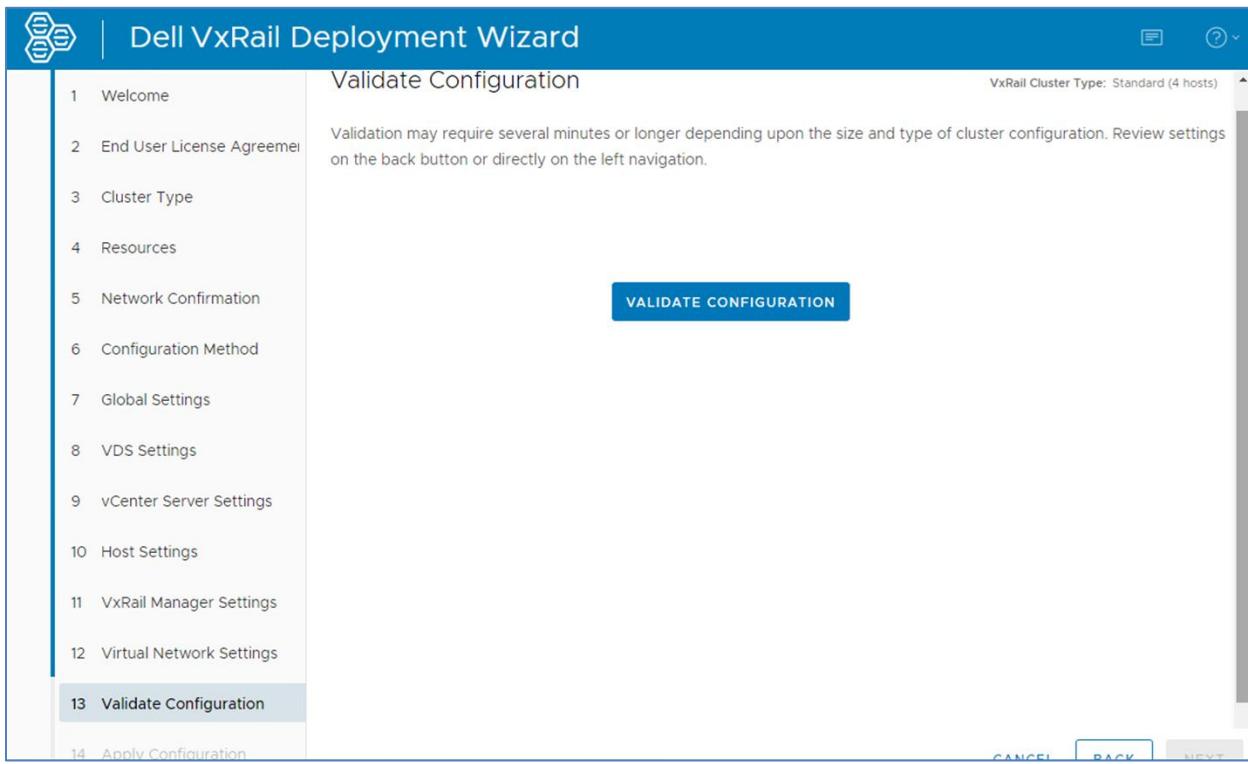
- f. Under **vCenter Server Network** heading, a different VLAN ID and subnet gateway comparing with node management IP are allowed if **Custom** is selected for vCenter Subnet. If **Default** is selected, VxRail will keep legacy behavior.

---

**Note:** This section defines network info for VxRail Manager and VxRail-provided vCenter Server if applicable. In VxRail versions earlier than 7.0.350, these two VMs could not be assigned to different subnets nor VLANs).

### Task 27: Validate the Initial Build

1. [ ] Upon completion of the virtual network settings, select **VALIDATE CONFIGURATION**.

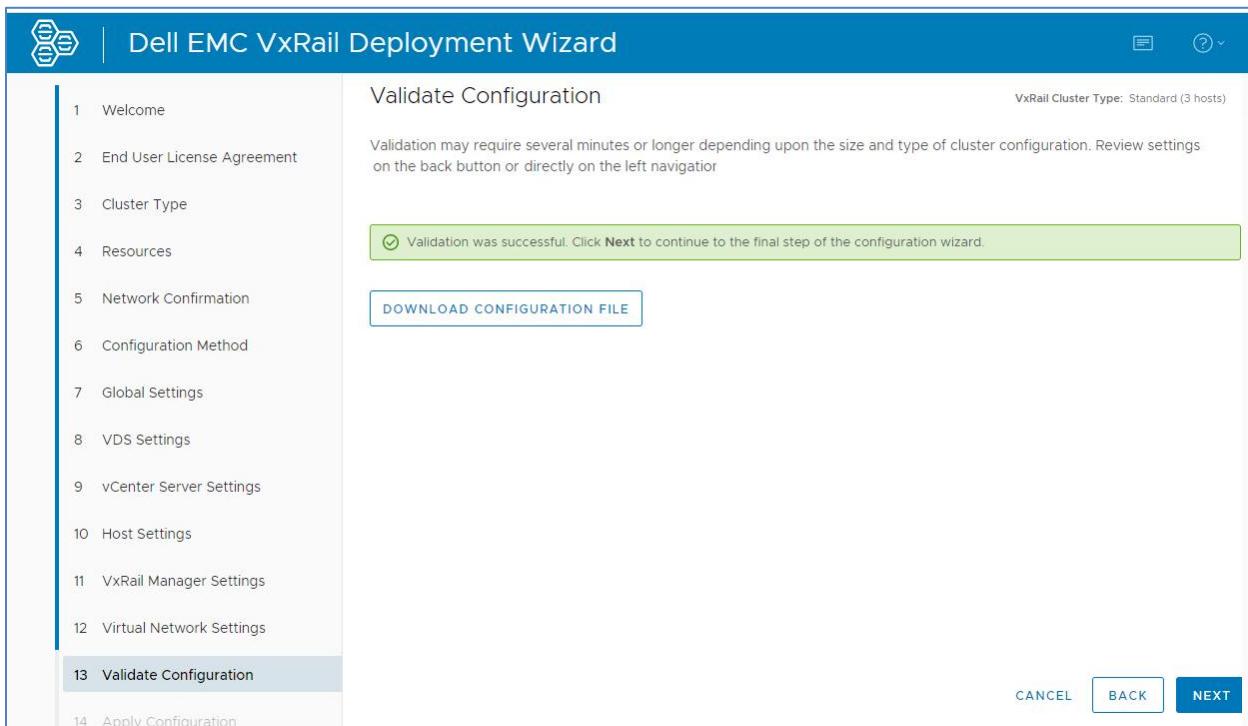


**Figure 57** VxRail Wizard: Validation in progress

2. [ ] Wait for the completion of the validation process. This can take several minutes.
3. [ ] Review the validation error log.
  - If any errors are reported, they are summarized in red text on the screen. Click **View Log** for more details.
  - If errors are reported, you must resolve those issues before continuing to the next step.

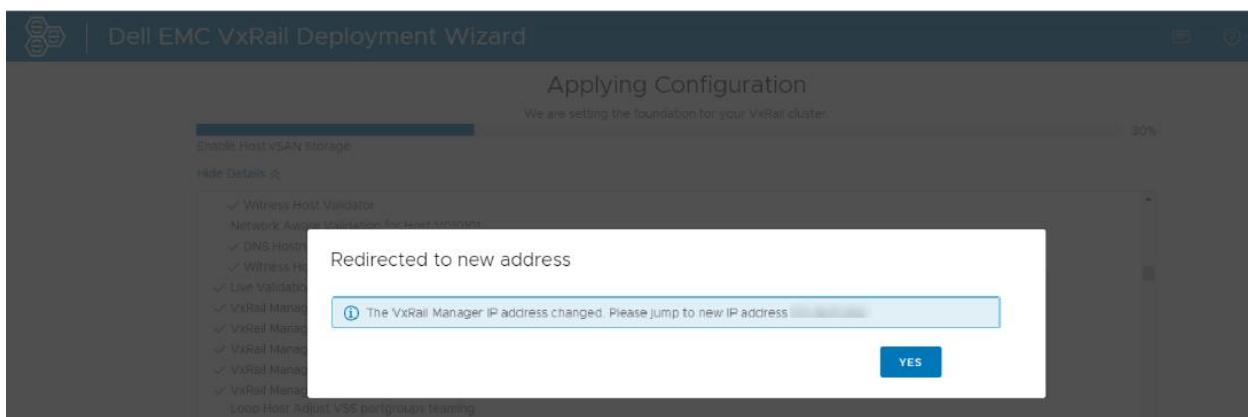
### Task 28: Perform VxRail Initial Build

1. [ ] Click **DOWNLOAD CONFIGURATION FILE** to save the JSON file locally.
2. [ ] Click **NEXT** to start the configuration wizard.



**Figure 58** VxRail Wizard: Validation Configuration

3. [ ] Click **APPLY CONFIGURATION** to begin initial VxRail build. This process applies the captured configuration data to the infrastructure and builds the final VxRail appliance.
4. [ ] The VxRail Appliance is now configuring. You can monitor the process in the UI.
5. [ ] Monitor the build process until its completion of 100%. When the process completes successfully, the following screen displays.



**Figure 59** Redirected to target VxM address

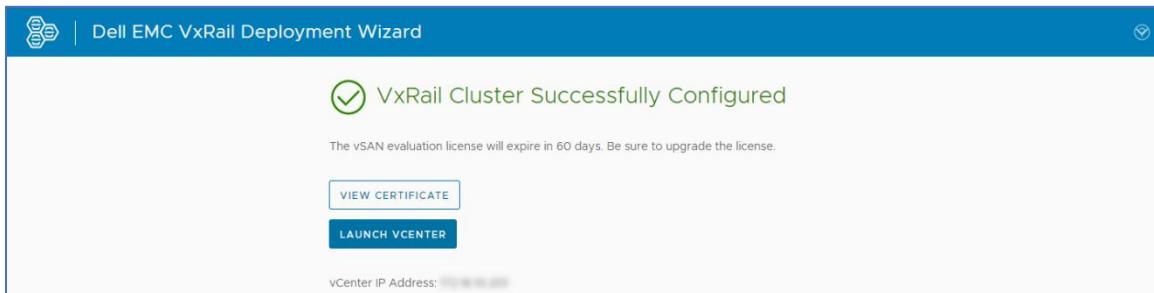
---

**Note:** When the build finishes, the **LAUNCH VCENTER** button is not available immediately.

- a. Reconnect to VxRail Manager at the assigned permanent IP address if the VxRail Manager IP is not the default one.

The entire process takes 35-45 minutes to complete.

- b. Wait several seconds and then click **LAUNCH VCENTER**. The screen will display the vCenter IP address as shown in the following example.

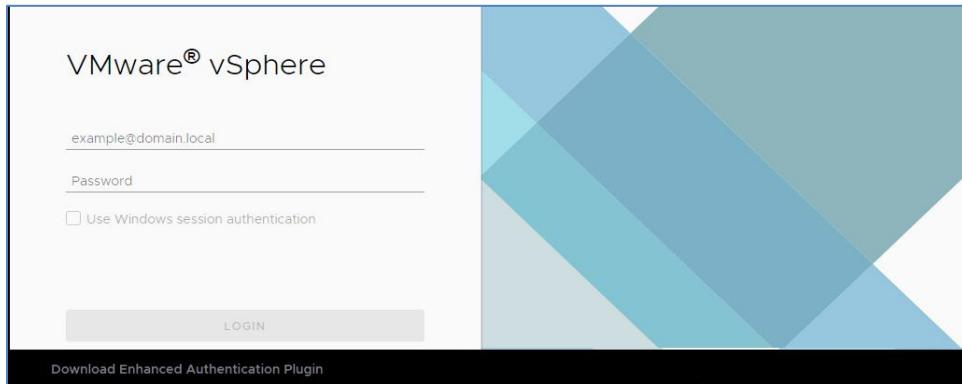


**Figure 60** VxRail wizard: Configuration completes successfully.

- c. Click **VIEW CERTIFICATE** to view vCenter root certificate details.  
d. If vCenter certificate management mode is “thumbprint”, there will be an extra message in the following page.

**Notes:**

- Skip to the next step if you are using the VMware vCenter Server administrator username/password in deployment.
  - If you are using a VMware vCenter Server non-administrator username/password in your deployment, you will need to add two privileges to the role of the non-admin account after the VxRail process completes successfully.
- e. To download the VxRail cluster bring-up configuration file or log file, use the VxRail plugins **Troubleshooting** feature in vCenter.
6. [ ] Add privileges for VxRail Initial Global role in the customer-managed VMware vCenter Server:
- Go to **Home > Administration > Roles**, select the *VxRail Initial Global*, and then click **Edit role action**.
  - Select the following privileges:
- |                                 |
|---------------------------------|
| VxRail / Manage VxRail clusters |
| VxRail / View VxRail clusters   |
- c. Click **Next > FINISH**.
- d. Add privileges for VxRail Datacenter Global role in the customer-managed VMware vCenter Server:
- Go to **Home > Administration > Roles** and select the *VxRail Datacenter Global* and then click **Edit role action**.
  - Select the following privileges:
- |                                 |
|---------------------------------|
| VxRail / Manage VxRail clusters |
| VxRail / View VxRail clusters   |
- c. Click **Next > FINISH**.
7. [ ] Click **MANAGE VXRAIL** to continue the configuration.
8. [ ] At the login screen, enter the username (default is *administrator@vsphere.local*), and the VMware vCenter Server password.



**Figure 61 VxRail Manager Authentication**

9. [ ] Go to Home > Host and Clusters > *VxRail-Cluster*.
10. [ ] Select Configure > VxRail > Support.
11. [ ] In the **Support** section, select **Edit**.

**Figure 62 VxRail Manager: Set Support Account**

12. [ ] Enter the Online Support username/password and click **OK**.

---

**Note:** The Online Support username and password must match the site ID/PartyID for the VxRail appliance in the Dell Install database.

---

13. [ ] Data-At-Rest-Encryption can be enabled if the KMS is accessible. For details, see <https://core.vmware.com/resource/vsan-data-rest-encryption#sec7007-sub5>.

## How to Apply vSAN License

### Task 1: Apply vSAN License in VMware vCenter

1. [ ] Log in to your VMware vCenter client; enter your username **administrator@vsphere.local** and VxRail password.
- a. Select the vSAN cluster, which was set up during first run, and right-click the icon.

b. Click **Licensing > Assign vSAN Cluster License**.

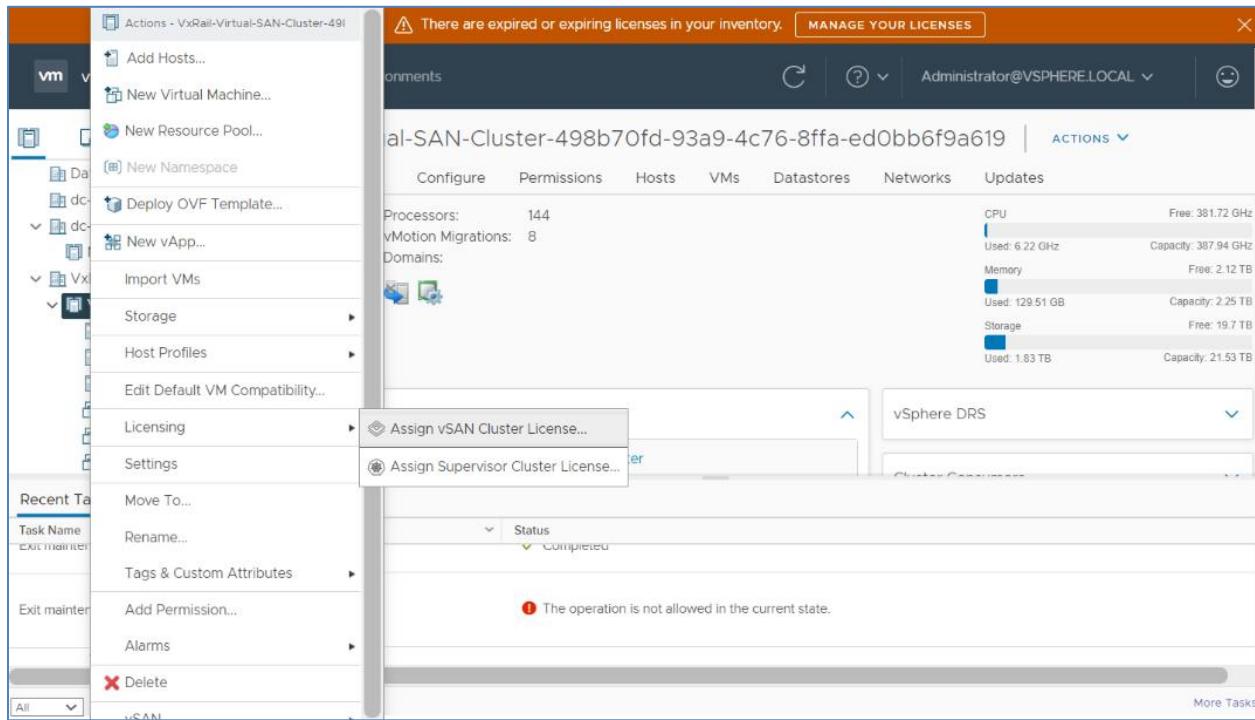


Figure 63 vSAN Cluster

c. Select **New License**.

d. Follow the screen prompts, enter your license key, and click **OK** to continue.

By default, the VxRail factory appliance ships with TPM module enabled and SecureBoot disabled. After you receive the appliance and complete VxRail Manager first run, the host might not pass attestation. To resolve “Host Secure Boot was disabled” issues, either enable SecureBoot or disable the TPM module.

To enable SecureBoot, see the ‘How to Enable SecureBoot’ section of this document.

---

**Note:** VMware QuickBoot is not supported when SecureBoot is enabled.

---

To disable the TPM module, see the ‘How to Disable TPM’ section of this document.

If after disabling the TPM, you want to enable SecureBoot, see the ‘How to Enable TPM and SecureBoot’ section of this document. In this case, the host might show “N/A” message in attestation view until the TPM and SecureBoot are enabled.

After enabling SecureBoot, if the TPM hierarchy is disabled by mistake, the host might not pass attestation. To resolve the “Unable to provision Endorsement Key on TPM 2.0 device: Endorsement Key creation failed on device.”/ “Internal failure” issue, see the ‘How to Enable Hierarchy’ section of this document.

## How to Enable SecureBoot

1. [ ] View the ESXi host alarm status and accompanying error message.

2. [ ] Connect to vCenter Server by using the vSphere Client.
3. [ ] Select a data center and click the **Monitor** tab.
4. [ ] Click **Security**.
5. [ ] Review the host status in the Attestation column and read the accompanying message in the **Message** column.
6. [ ] If the error message is “Host Secure Boot was disabled”, you must enable SecureBoot to resolve the problem.

Name	Attestation	Last verified	Attested by	TPM version	TXT	Message
dell208-01.localdomain.local	Failed	02/17/2022, 1:43:25 PM	vCenter Server	2.0	true	Host Secure Boot was disabled
dell208-02.localdomain.local	Failed	02/17/2022, 1:43:24 PM	vCenter Server	2.0	true	Host Secure Boot was disabled
dell208-03.localdomain.local	Failed	02/17/2022, 1:43:30 PM	vCenter Server	2.0	true	Host Secure Boot was disabled

**Figure 64** Attestation failure

7. [ ] Verify whether SecureBoot can be enabled. If it cannot be enabled, you must remove the unsigned VIBs before enablement.

```

login as: root
Keyboard-interactive authentication prompts from server:
| Password:
End of keyboard-interactive prompts from server
The time and date of this login have been sent to the system logs.

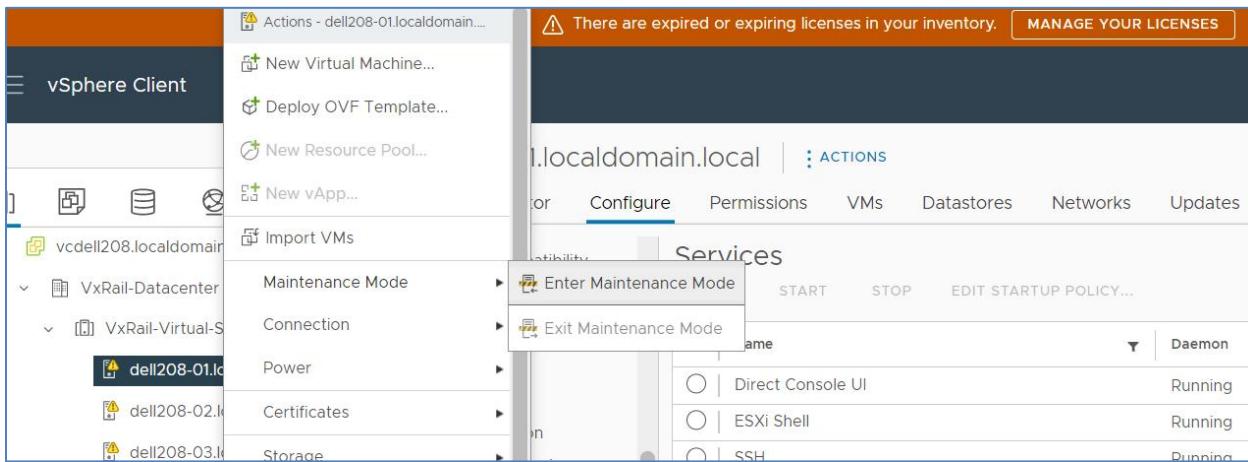
WARNING:
All commands run on the ESXi shell are logged and may be included in
support bundles. Do not provide passwords directly on the command line.
Most tools can prompt for secrets or accept them from standard input.

VMware offers supported, powerful system administration tools. Please
see www.vmware.com/go/sysadmintools for details.

The ESXi Shell can be disabled by an administrative user. See the
vSphere Security documentation for more information.
[root@dell208-01:] /usr/lib/vmware/secureboot/bin/secureBoot.py -c
Secure boot can be enabled: All vib signatures verified. All tardiisks validated. All acceptance levels validated
[root@dell208-01:] 
```

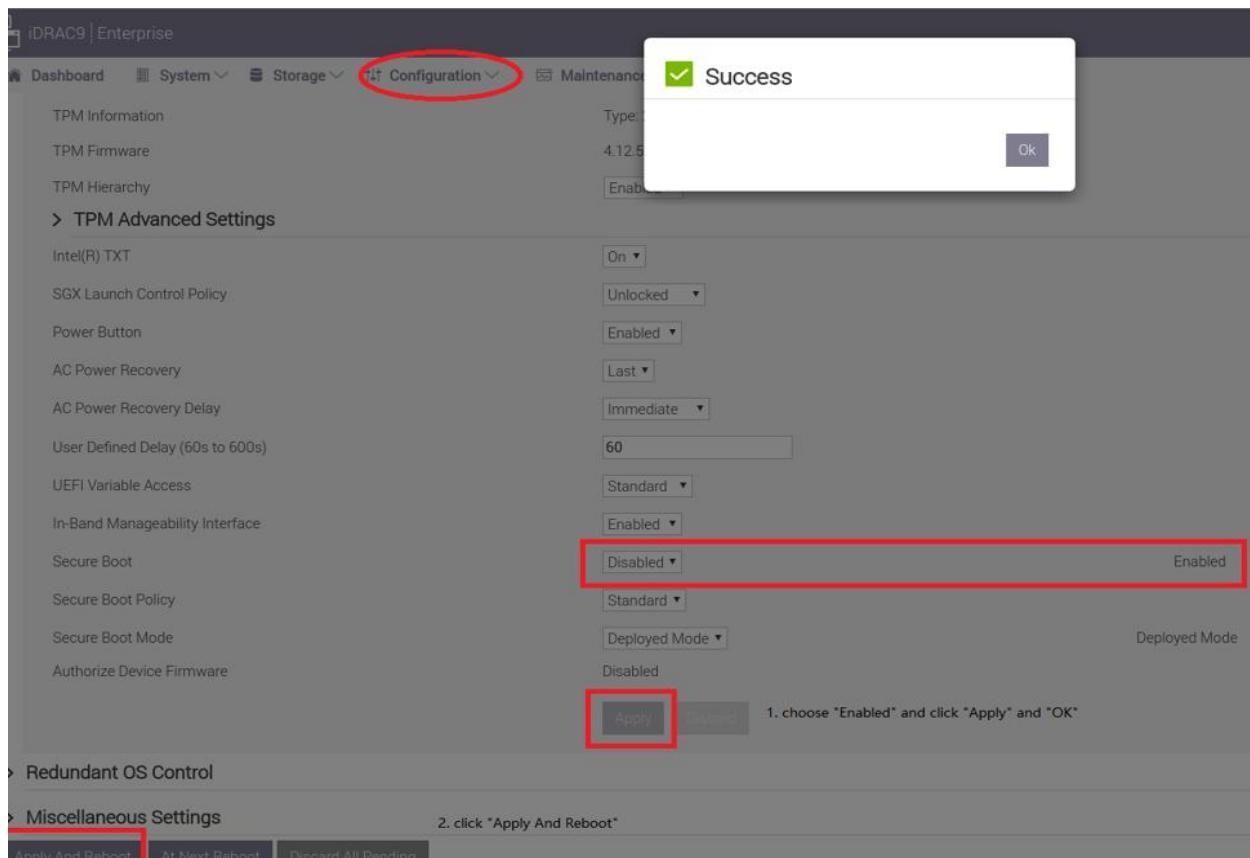
**Figure 65** Secure boot enablement verification

8. [ ] Enable SecureBoot:
  - a. From the VMware vCenter vSphere Client, move one node to **Enter Maintenance Mode**.



**Figure 66** Move node to Maintenance Mode.

- b. Log in to iDRAC to configure SecureBoot, and select the **Configure** tab > **BIOS Settings** > **System Security** > **TPM Advanced Settings**.
- c. Select SecureBoot enable and click **Apply** > **OK** > **Apply and Reboot**.



**Figure 67** Enable SecureBoot.

- d. Click **Job queue**. Wait for all jobs to complete 100%.

ID	Job	Status
RID_455211681112	Reboot: Graceful OS shutdown with powercycle on timeout	Reboot Completed (100%)
JID_455211680481	Configure: BIOS.Setup.1-1	Completed (100%)
RID_455200833221	Reboot: Graceful OS shutdown with powercycle on timeout	Reboot Completed (100%)
JID_455200832647	Configure: BIOS.Setup.1-1	Completed (100%)

**Figure 68** Status reached 100% completion.

- Log in to the VMware vCenter vSphere Client and set the node to **Exit Maintenance Mode**.

**Figure 69** Set node to Exit Maintenance Mode.

- Perform Step 8 on each node until all nodes have SecureBoot enabled from iDRAC.
- Log in to VMware vCenter vSphere Client and select the data center.
- Click the **Monitor** and **Security** tab to verify that the latest Attestation status shows “Passed”.
- If you see the alarm with a red icon, select it and click **RESET TO GREEN**.

**Figure 70** Reset to Green.

# How to Enable TPM and SecureBoot

1. [ ] View the ESXi host alarm status and accompanying error message.
2. [ ] Connect to VMware vCenter Server using the VMware vSphere Client.
3. [ ] Select a data center and click the **Monitor** tab.
4. [ ] Click Security.
5. [ ] Review the host status in the Attestation column and read the accompanying message in the **Message** column.
6. [ ] If the error message is “N/A”, enable TPM and SecureBoot to resolve the issue.

The screenshot shows the VMware vSphere Client interface. The left sidebar shows a tree view of the VxRail-Datacenter, including nodes like vcdell208.localdomain.local and hosts dell208-01, dell208-02, and dell208-03. The main pane is titled "Security" under the "Monitor" tab. It displays a table with columns: Name, Attestation, Last verified, Attested by, TPM version, and TXT. For all three hosts (dell208-01, dell208-02, and dell208-03), the "Attestation" column shows "N/A".

Name	Attestation	Last verified	Attested by	TPM version	TXT
dell208-01.localdomain.local	N/A	N/A	N/A	N/A	N/A
dell208-02.localdomain.local	N/A	N/A	N/A	N/A	N/A
dell208-03.localdomain.local	N/A	N/A	N/A	N/A	N/A

Figure 71 Attestation status “N/A”

7. [ ] Verify whether SecureBoot can be enabled. If it cannot be enabled, you must remove the unsigned VIBs before enablement.

```
login as: root
Keyboard-interactive authentication prompts from server:
| Password:
End of keyboard-interactive prompts from server
The time and date of this login have been sent to the system logs.

WARNING:
All commands run on the ESXi shell are logged and may be included in
support bundles. Do not provide passwords directly on the command line.
Most tools can prompt for secrets or accept them from standard input.

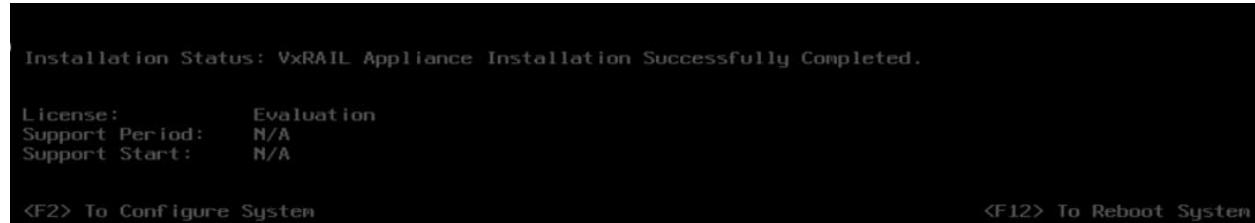
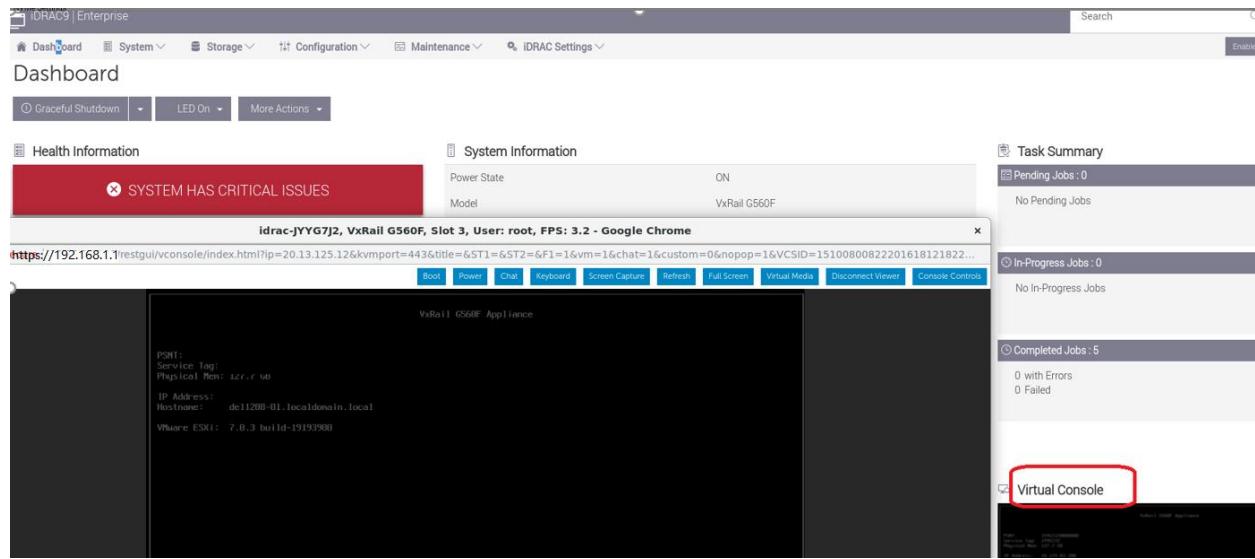
VMware offers supported, powerful system administration tools. Please
see www.vmware.com/go/sysadmintools for details.

The ESXi Shell can be disabled by an administrative user. See the
vSphere Security documentation for more information.
[root@dell208-01:~] /usr/lib/vmware/secureboot/bin/secureBoot.py -c
Secure boot can be enabled: All vib signatures verified. All tardisks validated. All acceptance levels validated
[root@dell208-01:~]
```

Figure 72 VIB signature verification

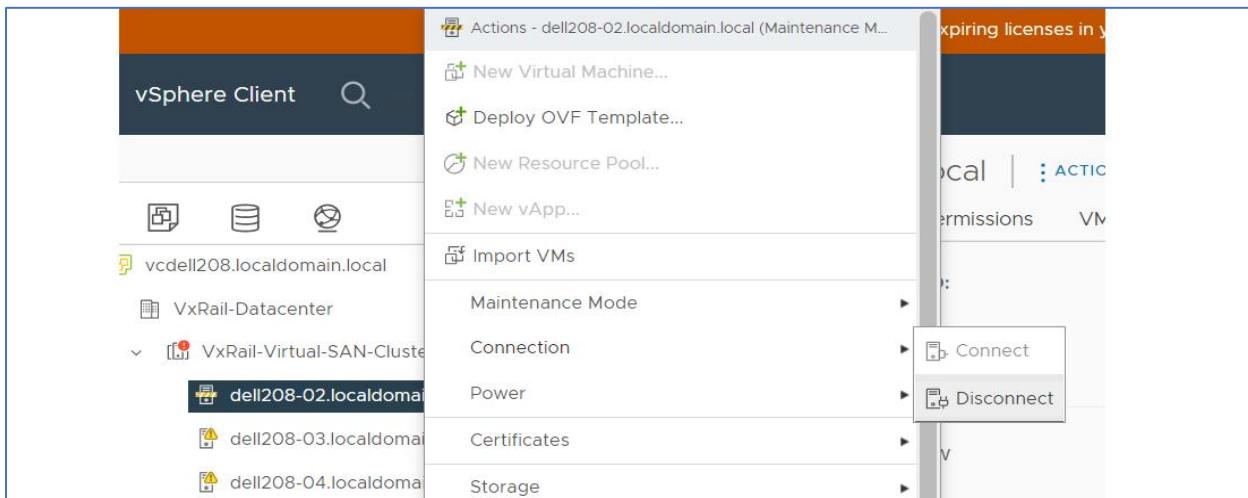
8. [ ] Enable TPM and SecureBoot:
  - a. From the VMware vCenter vSphere Client, move one node to **Enter Maintenance Mode**.

- b. Log in to iDRAC to configure SecureBoot, and select the **Configure** tab > **BIOS Settings** > **System Security** > **TPM Security “On”** > **TPM Advanced Settings**.
- c. Select **Secure Boot “enable”** and click **Apply** > **OK** > **Apply and Reboot**.
- d. Click **Job queue**. Wait for all jobs to complete 100%.
- e. Go to **Dashboard** > **Virtual Console** to see if console shows “successfully completed”, if yes, continue.



**Figure 73** Installation successfully completed.

- f. Log in to VMware vCenter vSphere Client and disconnect the node.
- g. Reconnect the node, and then Exit Maintenance Mode.



**Figure 74** Disconnect and reconnect node.

The screenshot shows the vSphere Client interface with the 'Monitor' tab selected for the 'VxRail-Datacenter' section. The left sidebar shows the hierarchy: 'vcdell208.localdomain.local' > 'VxRail-Datacenter' > 'VxRail-Virtual-SAN-Cluster-e7f13...'. The main panel has three tabs: 'Issues and Alarms', 'Performance', and 'Tasks and Events'. Under 'Issues and Alarms', there is a table for 'Security' with three entries:

Name	Attestation	Last verified
dell208-02.localdomain.local	Failed	02/22/2022, 9:02:12 PM
dell208-03.localdomain.local	Passed	02/22/2022, 7:55:33 PM
dell208-04.localdomain.local	Passed	02/22/2022, 5:15:52 PM

Under 'Recent Tasks', there are two completed tasks:

Task Name	Target	Status	Details	Initiator	Queued For
Reconnect host	dell208-02.localdomain.local	Completed	Processing data from vCent...	VSPHERE.LOCAL\Administrator	6 ms
Disconnect host	dell208-02.localdomain.local	Completed		VSPHERE.LOCAL\Administrator	10 ms

**Figure 75** Recent tasks

9. [ ] Perform Steps 7 and 8 on each node until all nodes have TPM and SecureBoot enabled from iDRAC.
10. [ ] Log in to VMware vCenter vSphere Client and go to the data center.
11. [ ] Click the **Monitor** and **Security** tab to verify that the latest Attestation status is “Passed”. If you see an alarm with a red icon, select the specific Triggered Alarm and click **RESET TO GREEN**.

## How to Disable TPM

1. [ ] View the ESXi host alarm status and accompanying error message.

2. [ ] Connect to VMware vCenter Server by using the VMware vSphere Client.
3. [ ] Select a data center and click the **Monitor** tab.
4. [ ] Click **Security**.
5. [ ] Review the host status in the Attestation column and read the accompanying message in the **Message** column.
6. [ ] If the error message is “Host Secure Boot was disabled”, you must disable TPM to resolve the problem if you do not want to enable SecureBoot.

	Name	Attestation	Last verified	Attested by	TPM version	TXT	Message
○	dell208-02.locald...	Failed	02/23/2022, 10:24:13 AM	vCenter Server	N/A	N/A	Internal failure.
○	dell208-03.locald...	Passed	02/22/2022, 7:55:33 PM	vCenter Server	2.0	true	
○	dell208-04.locald...	Passed	02/22/2022, 5:15:52 PM	vCenter Server	2.0	true	
○	dell208-01.locald...	Failed	02/23/2022, 9:36:14 AM	vCenter Server	2.0	true	Host Secure Boot \

**Figure 76 Attestation host status.**

7. [ ] If you see an alarm with a red icon, select the specific Triggered Alarm and click **RESET TO GREEN**.
8. [ ] Disable TPM:
  - a. From the VMware vCenter vSphere Client, move one node to **Enter Maintenance Mode**.
  - b. Log in to iDRAC to configure SecureBoot, and select the **Configure** tab > **BIOS Settings** > **System Security** > **TPM Security “Off”** > **TPM Advanced Settings**.
  - c. Select **SecureBoot “disable”** and click **Apply** > **OK** > **Apply and Reboot**.
  - d. Click **Job queue**. Wait for all jobs to complete 100%.
  - e. Go to **Dashboard** > **Virtual Console** to see if console shows “successfully completed”; if yes, continue.
  - f. Log in to the VMware vCenter vSphere Client and select **Exit Maintenance Mode**.
9. [ ] Perform Steps 7 and 8 on each node until all nodes have TPM disable from iDRAC.
10. [ ] Log in to VMware vCenter vSphere Client and select a data center.
11. [ ] Select the **Monitor** and **Security** tab to verify that the latest Attestation message failed. The TPM version and TXT show “N/A” and Message shows “Host Secure Boot was disabled”.

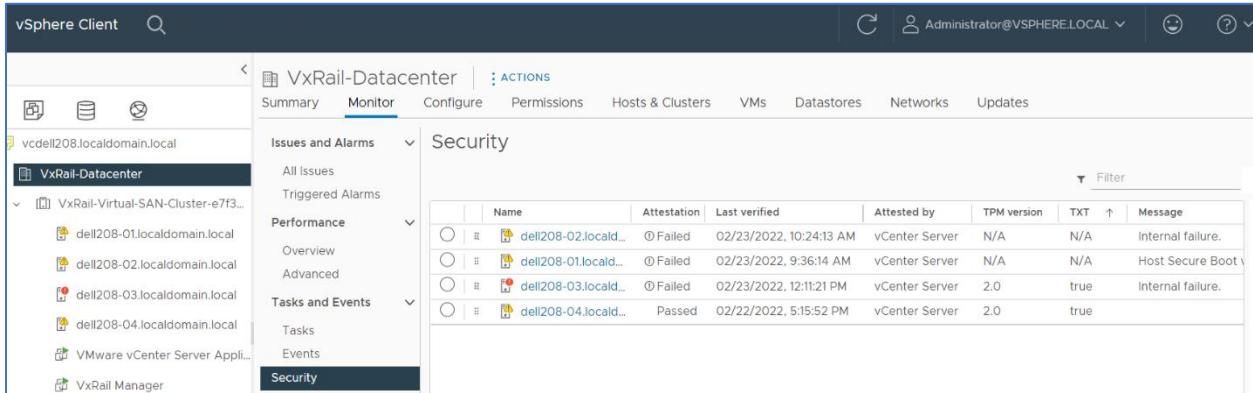


Figure 77 Attestation message failed.

## How to Enable Hierarchy

- [ ] View the ESXi host alarm status and accompanying error message.
- [ ] Connect to VMware vCenter Server by using the VMware vSphere Client.
- [ ] Select a data center and click the **Monitor** tab.
- [ ] Click **Security**.
- [ ] Review the host status in the Attestation column and read the accompanying message in the **Message** column.
- [ ] If the error message is “Unable to provision Endorsement Key on TPM 2.0 device: Endorsement Key creation failed on device”, you must enable TPM Hierarchy to resolve the issue.

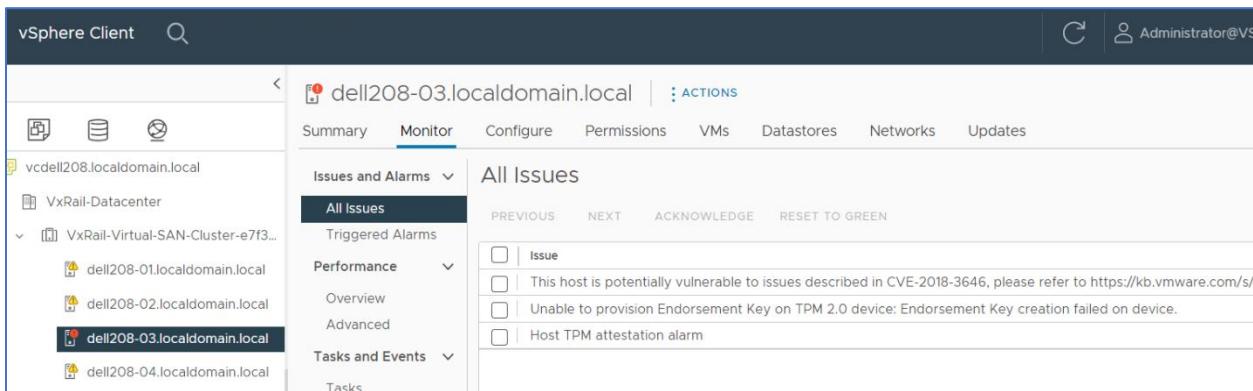


Figure 78 Endorsement key creation failed.

- [ ] If you see an alarm with a red icon, select the specific Triggered Alarm and click **RESET TO GREEN**.
- [ ] Enable TPM hierarchy:
  - From the VMware vCenter vSphere Client, move one node to **Enter Maintenance Mode**.
  - Log in to iDRAC to configure SecureBoot, and select the **Configure** tab > **BIOS Settings** > **System Security** > **TPM** >.
  - Select **TPM Hierarchy “Enable”** and click **Apply** > **OK** > **Apply and Reboot**.

- d. Click **Job queue**. Wait for all jobs to complete 100%.
  - e. Go to **Dashboard > Virtual Console** to see if console shows “successfully completed”; if yes, continue.
  - f. Log in to the VMware vCenter vSphere Client and select **Exit Maintenance Mode**.
9. [ ] Perform Steps 7 and 8 on each node until all nodes have TPM hierarchy enabled from iDRAC.
10. [ ] Login VMware vSphere Client and select a data center.
11. [ ] Click the **Monitor** tab > **Security** to verify latest Attestation message as “Passed”.

Name	Attestation	Last verified	Attested by	TPM version	TXT	Message
dell208-02.localdomain.local	Failed	02/23/2022, 10:24:13 AM	vCenter Server	N/A	N/A	Internal failure.
dell208-01.localdomain.local	Failed	02/23/2022, 9:36:14 AM	vCenter Server	N/A	N/A	Host Secure Boot failed.
dell208-03.localdomain.local	Passed	02/23/2022, 1:13:56 PM	vCenter Server	2.0	true	
dell208-04.localdomain.local	Passed	02/22/2022, 5:15:52 PM	vCenter Server	2.0	true	

**Figure 79 Attestation passed.**

## Enable Remote Support Connectivity

Dell Remote Support Connectivity provides secure, automated access between Support and your VxRail. You must activate an integrated Remote Support Connectivity with or without Secure Connect Gateway (SCG) to enable some features in VxRail Manager.

### Customer experience improvement program

An optional part of using Remote Support Connectivity is providing usage data to the Dell customer experience improvement program. You decide the level of data about your VxRail environment that is collected. The types of data that is collected include environmental usage, performance, capacity, and configuration information. Dell uses this information to improve VxRail and your experience.

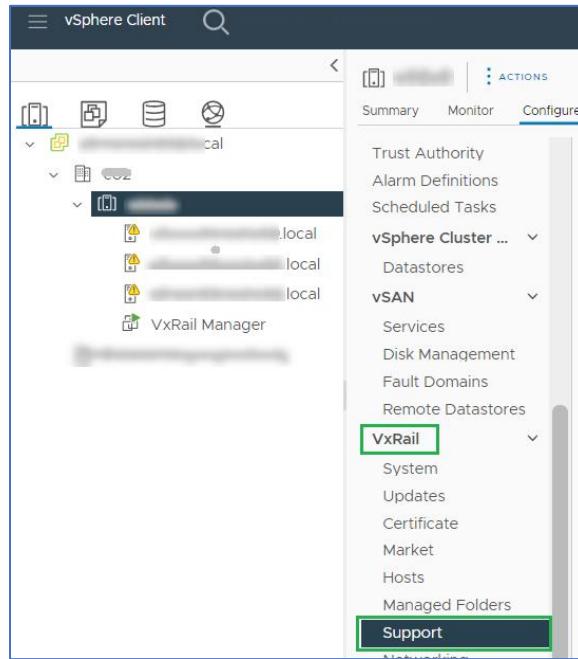
### Enable integrated Remote Support Connectivity

Activate integrated Remote Support Connectivity on VxRail.

#### Procedure

This procedure applies to VxRail versions 7.0.350 and later.

1. [ ] From the VMware vSphere Client, click **Hosts and Clusters** in the left navigation bar.
2. [ ] Select your VxRail cluster and then click the **Configure** tab.
3. [ ] Select **VxRail > Support** from the inner left navigation bar.



**Figure 1** vSphere client

4. [ ] From the **Support** tab, verify the value of **Connectivity Status**.

- **Not Enabled:** Remote Support Connectivity is not configured. Go to Step 5.
  - **Enabled:** Remote Support Connectivity is activated. Continue with this enablement procedure.
5. [ ] Click **Enable** in the Connectivity section.

### Connectivity

(i) Connectivity is not enabled. Click **ENABLE** to setup Connectivity.

Connect through the Secure Connect Gateway or connect directly for automated health and system capabilities for your cluster. It sends issue notifications to Dell Technologies, transmits system data to CloudIQ, and enables remote support when necessary.

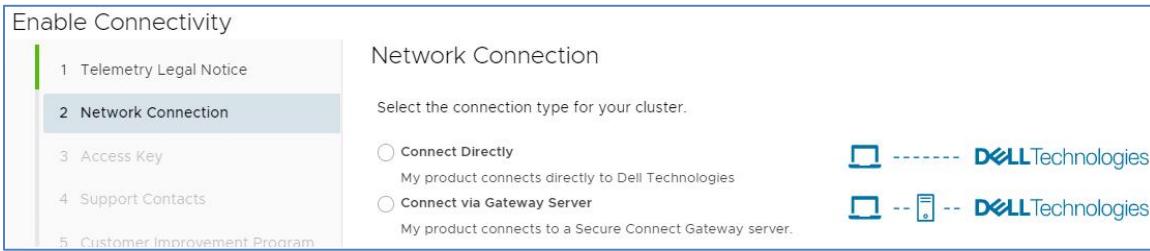
Status	Not Enabled	Connection Type	N/A
Support Contacts	N/A		
Customer Improvement Program	N/A		

**Figure 2** Set connectivity

6. [ ] Check the **I have read and accept this notification** checkbox if you agree with the Telemetry Legal Notice.

7. [ ] Click **Next**.

8. [ ] In the Network **Connection** field, perform one of the following:

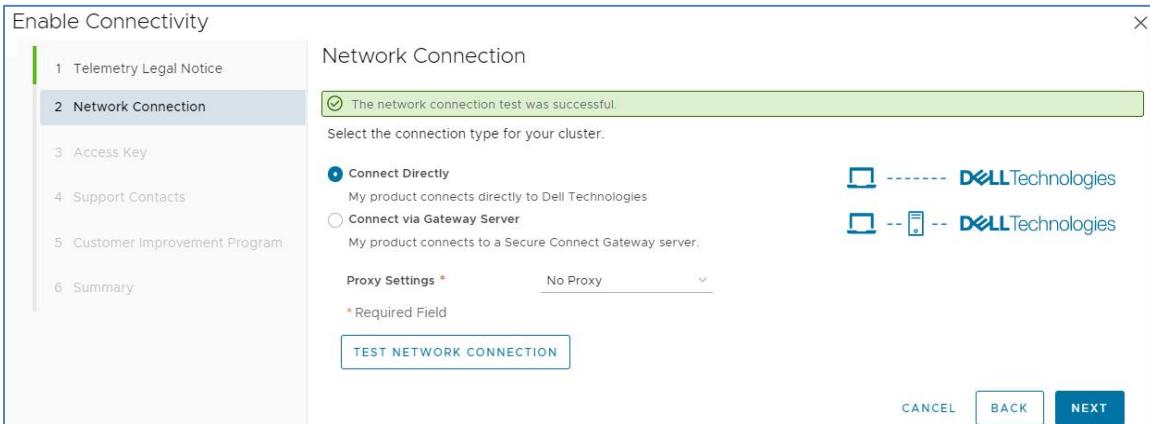


**Figure 3** Select network connection.

- If your product connects directly to Dell support back-end, select **Connect Directly**. Go to Step 9.
- If your product connects to a Secure Connect Gateway (SCG), select **Connect via Gateway Server**. Go to Step 10.

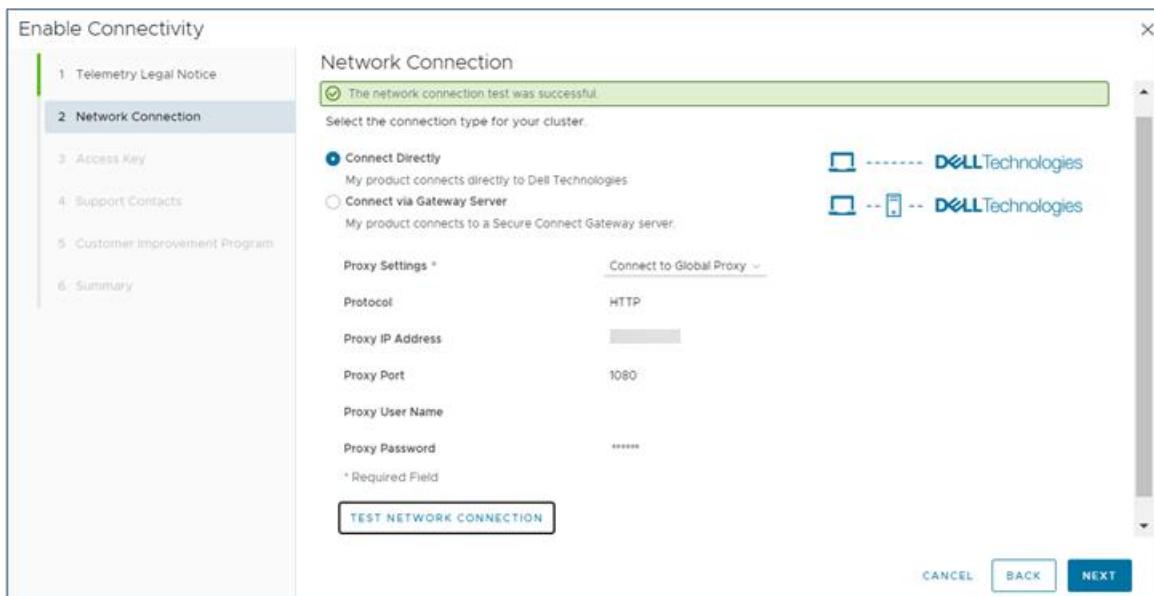
9. [ ] For the Proxy Settings:

- If you do not use a proxy server, select **No Proxy**.



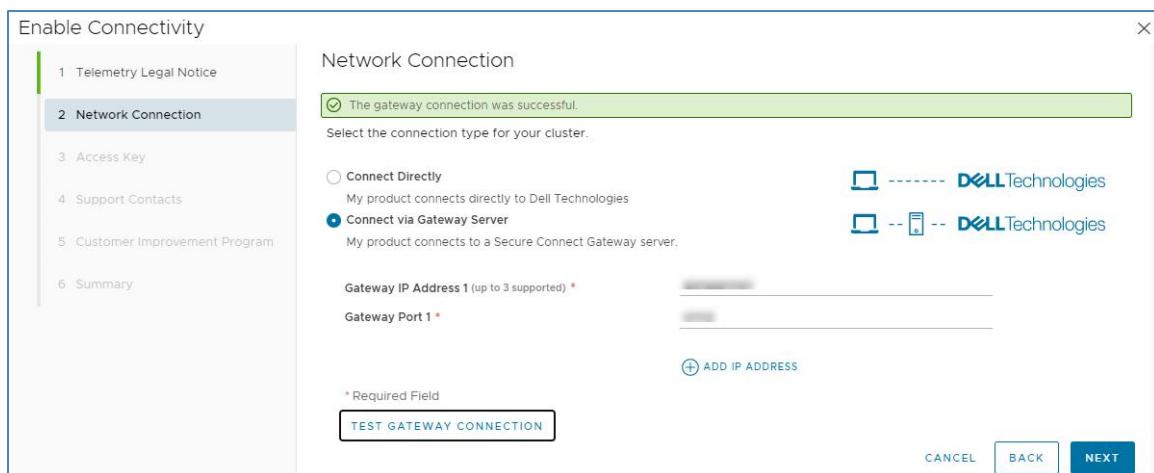
**Figure 4** No proxy

- To use the proxy that is configured in VxRail Cluster **Configure - Network**, select **Connect to Global Proxy**.



**Figure 5 Connect directly**

- To connect to a new proxy server, select **Connect to New Proxy**, and enter the Proxy IP Address, Proxy Port, and Proxy User Name/Password, if they exist.
10. [ ] Enter the SCG IP address and port number (default 9443). Up to three SCG addresses with ports are supported.



**Figure 6 Connect using the gateway server.**

11. [ ] Click **Test Gateway Connection** to pass the network connection test.
12. [ ] Click **Next**.
13. [ ] Perform one of the following:
  - If your VxRail Cluster is newly purchased and deployed, go to Step 16.
  - If your VxRail Cluster is LCM from legacy releases, go to Step 14.
14. [ ] You will need your PSNT information to obtain your Access Key. If you are running VxRail v7.0.460 or a later 7.0.x release, or v8.0.120, the PSNT field displays as shown in Figure 7. If you are

running a VxRail version earlier than 7.0.460 or an 8.0.x release other than 8.0.120, the PSNT (Serial Number) displays as shown in Figure 8. Go to [Dell Technologies VxRail Software support site](#) to get access code with your PIN and enter the required fields.

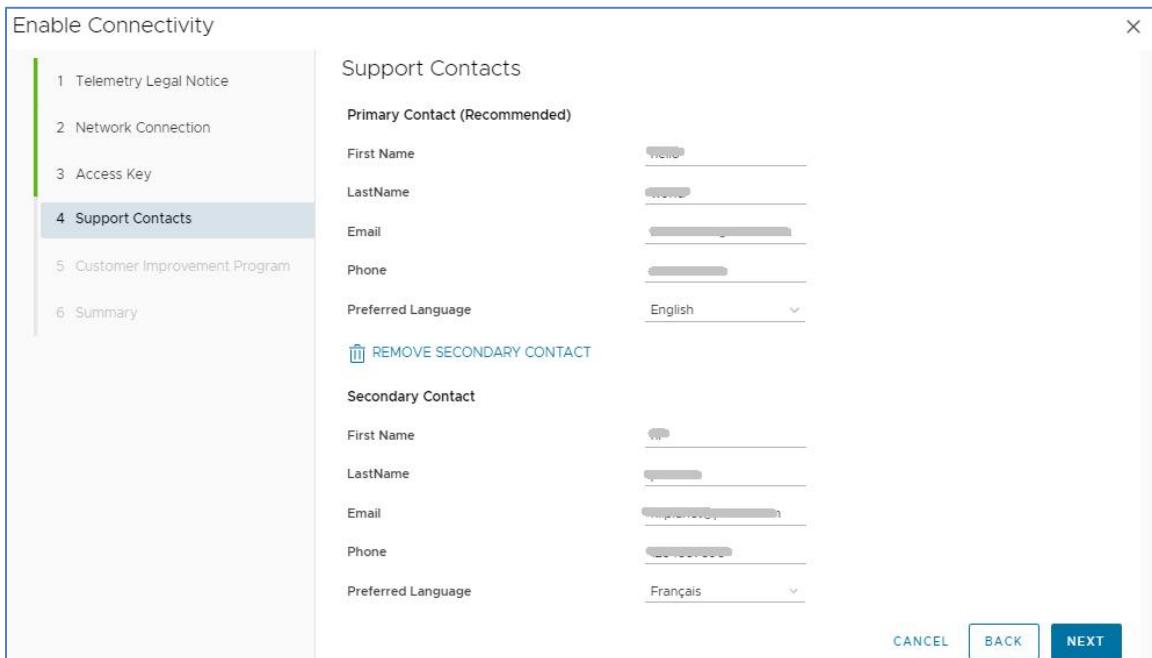
1 Telemetry Legal Notice	Access Key	
2 Network Connection	To enable Connectivity you need to generate an Access Key from the Key Portal with your product PSNT and a PIN you specified. Copy the PSNT and paste it in the Key Portal.	
3 Access Key	Service Tag	V010101
4 Support Contacts	PSNT	V01010100000000 <a href="#">COPY PSNT</a>
5 Customer Improvement Program	Key Portal	<a href="#">Go to Key Portal</a>
6 Summary	Access key *	<input type="text"/>
	PIN *	<input type="text"/>
	* Required field	
	CANCEL	BACK
	NEXT	

**Figure 7 Access key (COPY PSNT)**

1 Telemetry Legal Notice	Access Key	
2 Network Connection	To initialize the Remote Service you need to generate Access Key from Key Portal with your product serial number (PSNT) and a PIN you specified.	
3 Access Key	Serial Number (PSNT)	<input type="text"/>
4 Support Contacts	Access Key *	<input type="text"/>
5 Customer Improvement Program	PIN *	<input type="text"/>
6 Summary	* Required Field	
	CANCEL	BACK
	NEXT	

**Figure 8 Access key (Serial Number (PSNT))**

15. [ ] Click **Next**.
16. [ ] In **Support Contacts**, enter the contact information. Up to two support contact can be recorded.



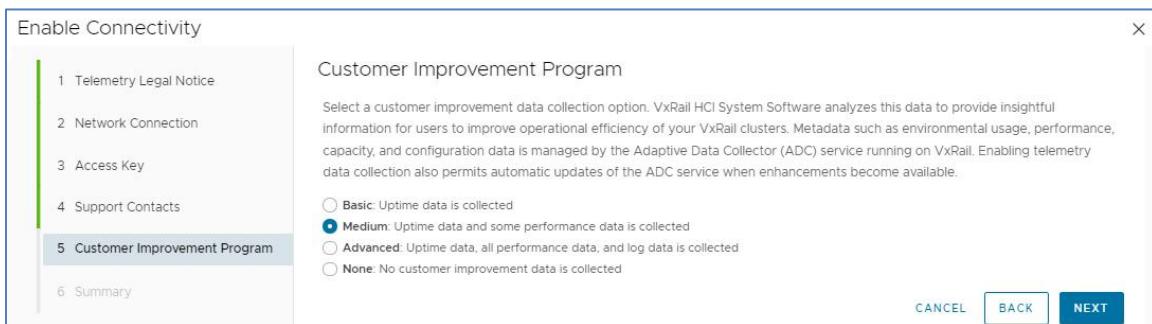
**Figure 9** Support contacts

17. [ ] Click **Next**.

18. [ ] In Customer Improvement Program, select the customer data collection level.

For APEX Private Cloud, select **Medium**. This enables the required telemetry data to support CloudIQ.

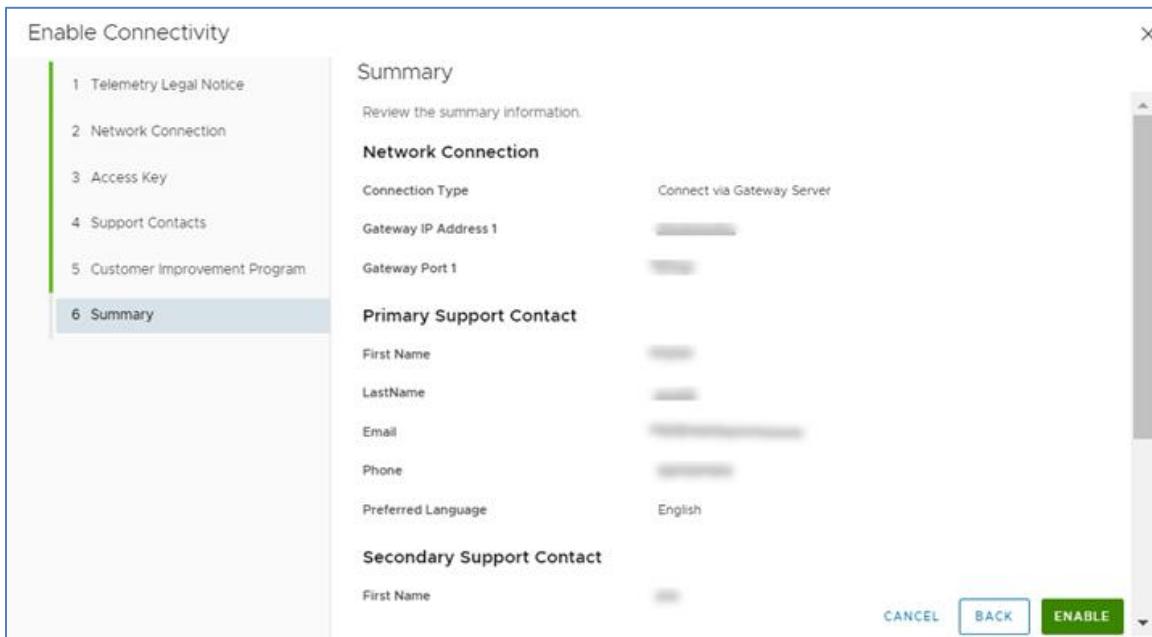
You can select Advanced if desired, but do not select None or Basic.



**Figure 10** Customer improvement program

19. [ ] Click **Next**.

20. [ ] In Summary, verify that all messages are correct. Click **Enable** to activate connectivity for remote support.



**Figure 11** Enable connectivity for remote support.

21. [ ] Click **Test Connection** to verify the remote support connection.

**Figure 12** Test connection

## Troubleshooting

**Symptom:** In the remote connectivity enablement wizard, when you select a proxy and click **Test Connectivity**, the UI shows processing for approximately 30 seconds and then returns “*The connection test failed*”.

**Possible workaround:** Check your proxy service application and stop unused proxy types. Restart the proxy service.

## How to Submit Install Base Updates for VxRail

### Dell Partners

Follow the *Partner Product Registration and Install Base Maintenance Job Aid* document for detailed information about product registration, move or party changes, and other install base maintenance updates.

- Go to this location to access the document:<https://www.delltechnologies.com/asset/en-us/services/cross-portfolio/templates-forms/partner-hardware-product-registration-job-aid.pdf>
- There is also a video tutorial available on the Partner Portal:  
<https://delltvpartner.mediasite.com/Mediasite/Channel/servicespartnermarketing/watch/e6203a75030542e88735fb0a362e2571d>

If you encounter any issues, open a case with the Channel Services Helpdesk on the [Support](#) tab of the Partner Portal.

### Dell Employees

Follow KB 000197636 ([Install Base and Asset Maintenance Employee Submission - Job Aid | Dell US](#)) for detailed information about using the Dell.com/support Administrative Support Portal.

## (Required) VxRail File-based backup and restore

The file-based backup and restore mechanism is designed to help restore the VxRail Manager in the case of an unrecoverable failure. It requires you to use a backup script on the VxRail Manager virtual machine to archive VxRail Manager configuration files, database tables, and optionally the logs, which are then stored in a folder on the VxRail vSAN Datastore. This script can be run manually or set up for automatic backups on a scheduled basis. If the VxRail Manager needs to be restored, the backed-up configuration can be applied to restore the configuration files and database tables onto a newly deployed VxRail Manager VM.

Discuss the use of this backup feature with the customer. The procedures to enable File-Based Backup and Restore can be found in SolVe in the How-To section.

## Dell EMC S5148F-ON OS10EE Deployment Guide for VxRail



# Dell EMC SmartFabric OS10 Switch Configuration Guide for VxRail 4.7

Deploying S5200F-ON series switches for a VxRail 4.7 cluster

## [Abstract](#)

This document provides Dell EMC SmartFabric OS10 switch configuration examples and topology options for a VxRail 4.7 cluster deployment using S5200F-ON series switches.

August 2019

## Revisions

Date	Description
August 2019	Initial release

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## Introduction

Our vision at Dell EMC is to be the essential infrastructure company from the edge, to the core, and to the cloud. Dell EMC Networking ensures modernization for today's applications and for the emerging cloud-native world. Dell EMC is committed to disrupting the fundamental economics of the market with an open strategy that gives you the freedom of choice for networking operating systems and top-tier merchant silicon. The Dell EMC strategy enables business transformations that maximize the benefits of collaborative software and standards-based hardware, including lowered costs, flexibility, freedom, and security. Dell EMC provides further customer enablement through validated deployment guides which demonstrate these benefits while maintaining a high standard of quality, consistency, and support.

VxRail sits at the forefront of a fundamental shift in IT infrastructure consumption – away from application-specific, “build-your-own” infrastructure and toward virtualized, general-purpose, engineered systems. Dell EMC and VMware have embraced this shift with the VxRail hyperconverged appliance. VxRail has a simple, scale-out architecture that uses VMware vSphere and VMware vSAN to provide server virtualization and software-defined storage.

To take full advantage of the VxRail solution, one must carefully consider the network that not only connects multiple nodes into a single cohesive cluster but also enables connectivity to the customer's IT environment. Numerous industry studies have shown that networking is the primary source of both deployment issues and poor performance of hyperconverged solutions. Usually, VxRail clusters (minimum of three and maximum of 64 nodes) connect to a preexisting IP network at the customer site. The inclusion of dedicated switches for the VxRail cluster simplifies this process and avoids many of the network connectivity pitfalls associated with the deployment of a hyperconverged solution.

The audience for this document includes professional services or onsite IT personnel responsible for the deployment of a VxRail cluster when a pair of dedicated Dell EMC PowerSwitches is purchased with the cluster. This document covers the process of connecting a cluster of VxRail nodes to:

- A pair of Dell PowerSwitches configured for Virtual Link Trunking (VLT), using VLT as the preferred topology
- A pair of Dell PowerSwitches not configured for VLT
- A single Dell PowerSwitch

This document provides switch topology options and configuration examples for a VxRail 4.7 cluster using nodes built on 14th generation (14G) PowerEdge servers. Nodes in these examples use 25GbE network adapters. Switches in this guide use Dell EMC SmartFabric OS10.5.

## 1.1 Supported switches and operating systems

The examples provided in this deployment guide use VxRail 4.7 nodes connected to S5248F-ON switches running Dell EMC SmartFabric OS10.

Dell EMC Networking supports the following switches and operating systems for VxRail 4.7 and later:

Dell EMC PowerSwitches supported for VxRail 4.7 and later releases*	
Dell EMC PowerSwitch model	Dell EMC SmartFabric OS10 version 10.5.0.0 and later releases
S3048-ON	Supported
S3124 / S3124F / S3124P / S3148 / S3148P	
S4048F-ON / S4048T-ON	Supported
S4112F-ON / S4112T-ON / S4128F-ON / S4128T-ON	Supported
S4148F-ON / S4148FE-ON / S4148T-ON / S4148U-ON	Supported
S4248FB-ON / S4248FBL-ON	Supported
S5048F-ON	
S5148F-ON	
S5212F-ON / S5224F-ON / S5232F-ON / S5248F-ON / S5296F-ON	Supported
S6010-ON	Supported
S6100-ON	
Z9100-ON	Supported
Z9264F-ON / Z9296F-ON	Supported

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Figure 1 Supported Dell EMC PowerSwitches and operating systems

## 1.2 Typographical conventions

The CLI and GUI examples in this document use the following conventions:

Monospace Text

CLI examples

Underlined Monospace Text

CLI examples that wrap the page

*Italic Monospace Text*

Variables in CLI examples

**Bold Monospace Text**

Commands entered at the CLI prompt, or to highlight information in CLI output

**Bold text**

GUI fields and information entered in the GUI

## 1.3 Attachments

This document in .pdf format includes switch configuration file attachments. To access attachments in Adobe Acrobat Reader, click the  icon in the left pane halfway down the page, then click the  icon.

## 2

# Hardware overview

This section briefly describes the hardware used to validate this deployment. Appendix A contains a complete listing of hardware and software validated for this guide.

## 2.1

### Dell EMC PowerSwitch S5248F-ON

The S5248F-ON is a 1-Rack Unit (RU), multilayer switch with 48x25GbE, 4x100GbE, and 2x200GbE ports. This guide uses two S5248F-ONS as leaf switches.

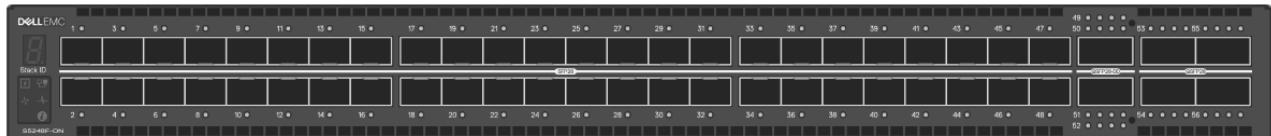


Figure 2 Dell EMC PowerSwitch S5248F-ON

## 2.2

### Dell EMC PowerSwitch S3048-ON

The S3048-ON is a 1-RU switch with 48x1GbE BASE-T ports and 4x10GbE SFP+ ports. This guide uses one S3048-ON switch for out-of-band (OOB) management traffic.

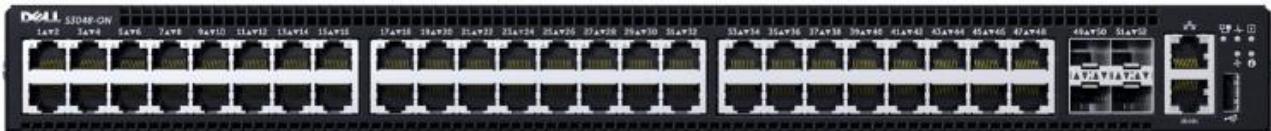


Figure 3 Dell EMC PowerSwitch S3048-ON

## 2.3

### Dell EMC VxRail 14G nodes

Current Dell EMC VxRail P, V, S, and E Series nodes are built on 14<sup>th</sup> generation (14G) PowerEdge servers. VxRail P, V, and S Series nodes use a 2-RU form factor, as shown in Figure 4.



Figure 4 Dell EMC VxRail 2-RU node (P, V, and S Series)

VxRail E Series nodes use a 1-RU form factor, as shown in Figure 5.



Figure 5 Dell EMC VxRail E Series node

---

**Note:** The deployment examples in this guide build a VxRail cluster consisting of four P570 VxRail nodes.

---

### 2.3.1 Dell EMC VxRail P Series node

VxRail P Series nodes are ideal for CPU-intensive workloads such as databases. P Series nodes support up to 44 CPU cores, 1536GB memory, and 24TB hybrid or 46TB all-flash storage.

### 2.3.2 Dell EMC VxRail V Series node

VxRail V Series nodes are graphics-ready for uses such as high-end 2D/3D visualization. V Series nodes support up to 40 CPU cores, 1024GB memory, 3 GPUs, and 24TB hybrid or 46TB all-flash storage.

### 2.3.3 Dell EMC VxRail S Series node

VxRail S Series nodes provide expanded storage capacity for collaboration, data, and analytics. S Series nodes support up to 36 CPU cores, 1536GB memory, and 48TB hybrid storage.

### 2.3.4 Dell EMC VxRail E Series node

VxRail E Series nodes are best suited for remote office or entry workloads. E Series nodes support up to 40 CPU cores, 1536GB memory, and 16TB hybrid or 30TB all-flash storage.

### 2.3.5 VxRail node network adapters

Each 14G VxRail node includes a rack server Network Daughter Card (rNDC) with one of the following port combinations:

- 2x25GbE SFP28 ports
- 2x10GbE SFP+ or BASE-T ports
- 4x10GbE SFP+ or BASE-T ports
- 4x1GbE BASE-T ports (for single CPU nodes only, max 8 nodes/cluster)

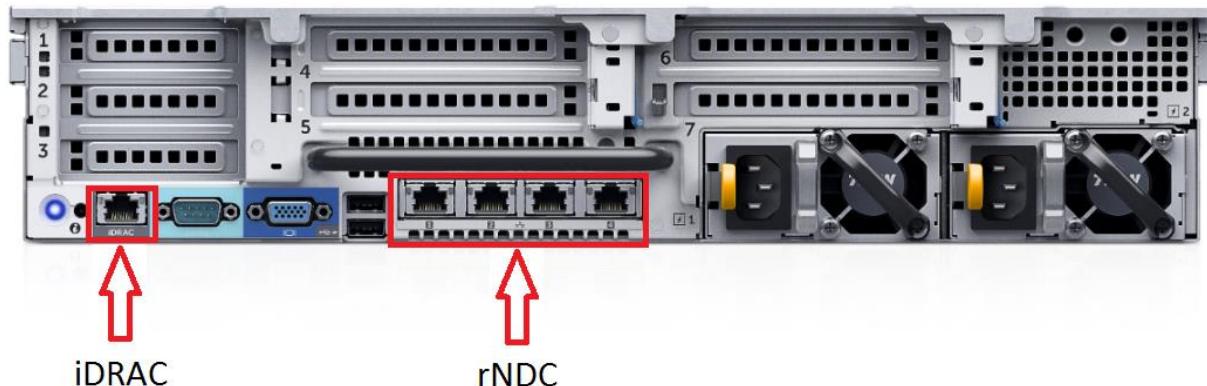


Figure 6 Rear view of VxRail 2-RU node (1-RU node is similar)

---

**Note:** Each of the VxRail P570 nodes in the deployment examples in this guide contains a Broadcom 57414 rNDC with 2x25GbE SFP28 ports.

---

VxRail optimizes network traffic by splitting it across rNDC uplinks and by using Network I/O control (NIOC) shares for different traffic types. See the [\*Dell EMC VxRail Network Planning Guide\*](#) for more information.

P, V, S, and E Series VxRail nodes also include a 1GbE BASE-T integrated Dell Remote Access Card (iDRAC) for OOB management.

---

**Note:** P, V, and S Series nodes support additional network adapters in PCIe slots. See the [\*Dell EMC VxRail Network Planning Guide\*](#) for more information.

---

### 3 Topology options

VxRail may be deployed using a single or dual switch topology. Using a single switch provides a lower initial cost but creates a single point of failure. A dual switch configuration helps ensure high availability by eliminating this single point of failure.

A dual switch configuration may be used with or without VLT. Dell EMC recommends a dual switch configuration with VLT. The sections that follow explain the different options.

#### 3.1 Dual switch

In a dual switch topology, each VxRail node has one or more connections to each of the two leaf switches providing redundancy at the NIC and switch levels. If VLT is used, the switches are connected with a VLT interconnect (VLTi). If VLT is not used, the switches are connected with a standard LACP port channel.

##### 3.1.1 Dual switch with VLT

Dell EMC recommends using a dual switch configuration with VLT, as shown in Figure 7.

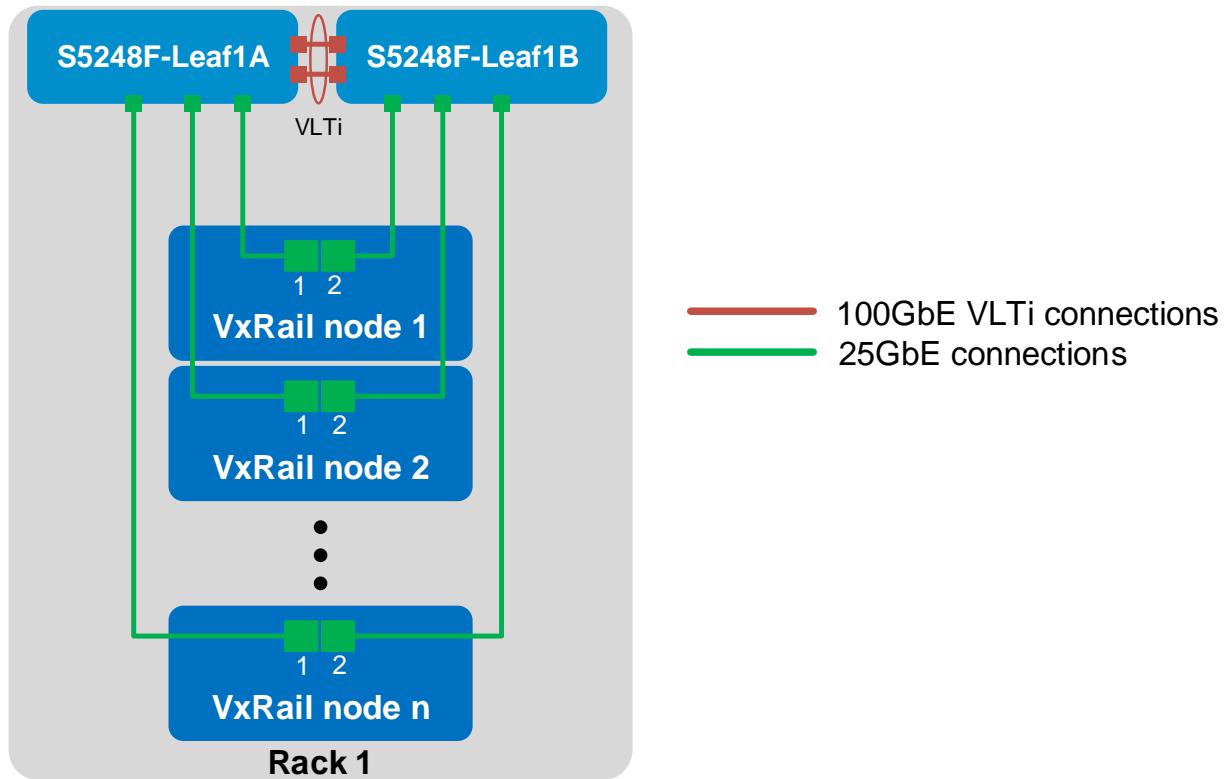


Figure 7 Dual switch topology with VLT

VLT synchronizes ARP, MAC tables, and IPv6 neighbors between the VLT peers and makes the switch pair appear as one logical unit to connected devices.

VLT provides the following benefits:

- Provides a loop-free topology and eliminates STP-blocked ports
- Optimizes the use of all available uplink bandwidth

- Guarantees fast convergence if either a link or a device fails
- Provides link-level resiliency
- Assures high availability
- Allows a single device to use a LAG across two upstream switches
- Provides Layer 2 multipathing

**Note:** While VxRail nodes use active and standby network adapters instead of LAGs, other servers in the rack can connect to the VLT switch pair with an LACP LAG for active/active Layer 2 multipathing. For more information about VLT, see the [Dell EMC SmartFabric OS10 User Guide Release 10.5.0](#).

### 3.1.2 Dual switch without VLT

The configuration of a switch pair without VLT is supported, but it does not provide the advantages of VLT covered in the previous section.

The switch pair is cabled, as shown in Figure 8. The links connecting the two switches are configured in an LACP port channel.

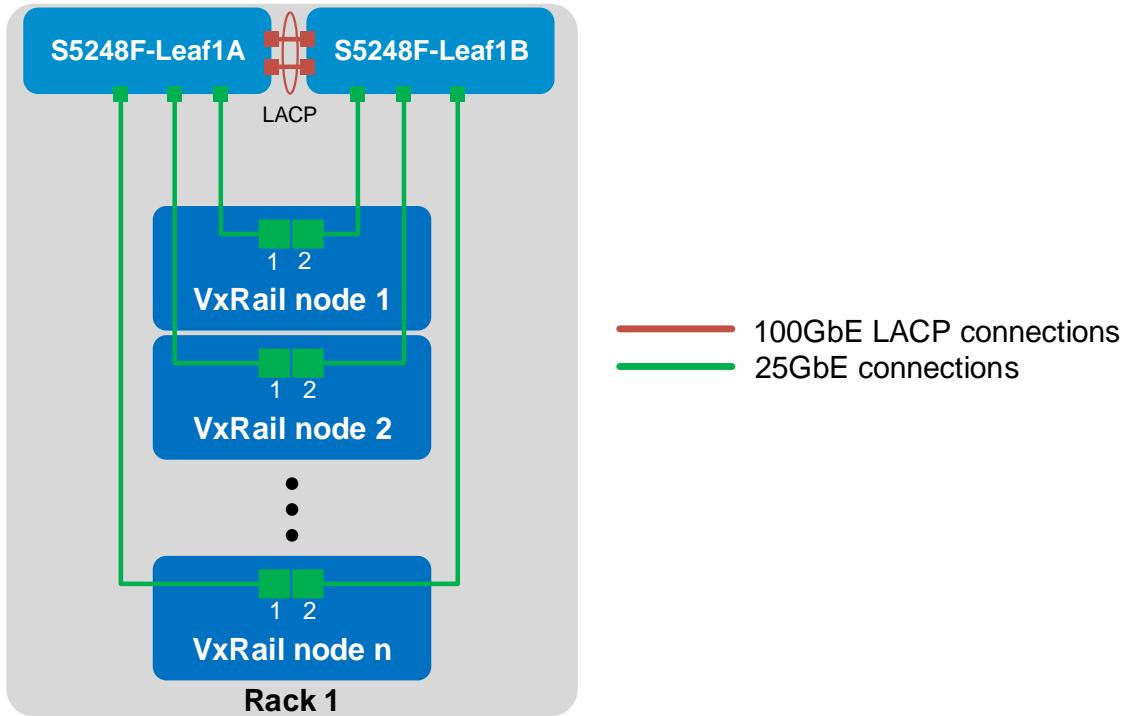


Figure 8 Dual switch topology without VLT

## 3.2 Single switch

In a single switch topology, all VxRail nodes connect to a single switch. This topology is not recommended as the switch becomes a single point of failure.

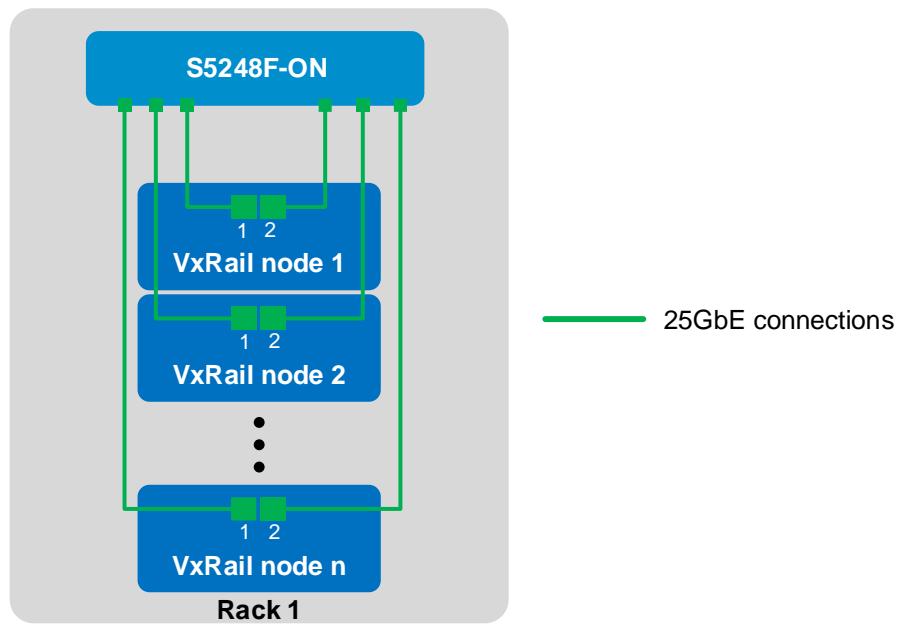


Figure 9 Single switch topology

## 4 VxRail in the data center

### 4.1 Leaf-spine network

Dell EMC recommends using a leaf-spine network in the data center with leaf switches configured as VLT peers. The switches and VxRail nodes covered in this guide are shown in Rack 1 in Figure 10 and are incorporated into a data center's leaf-spine network.

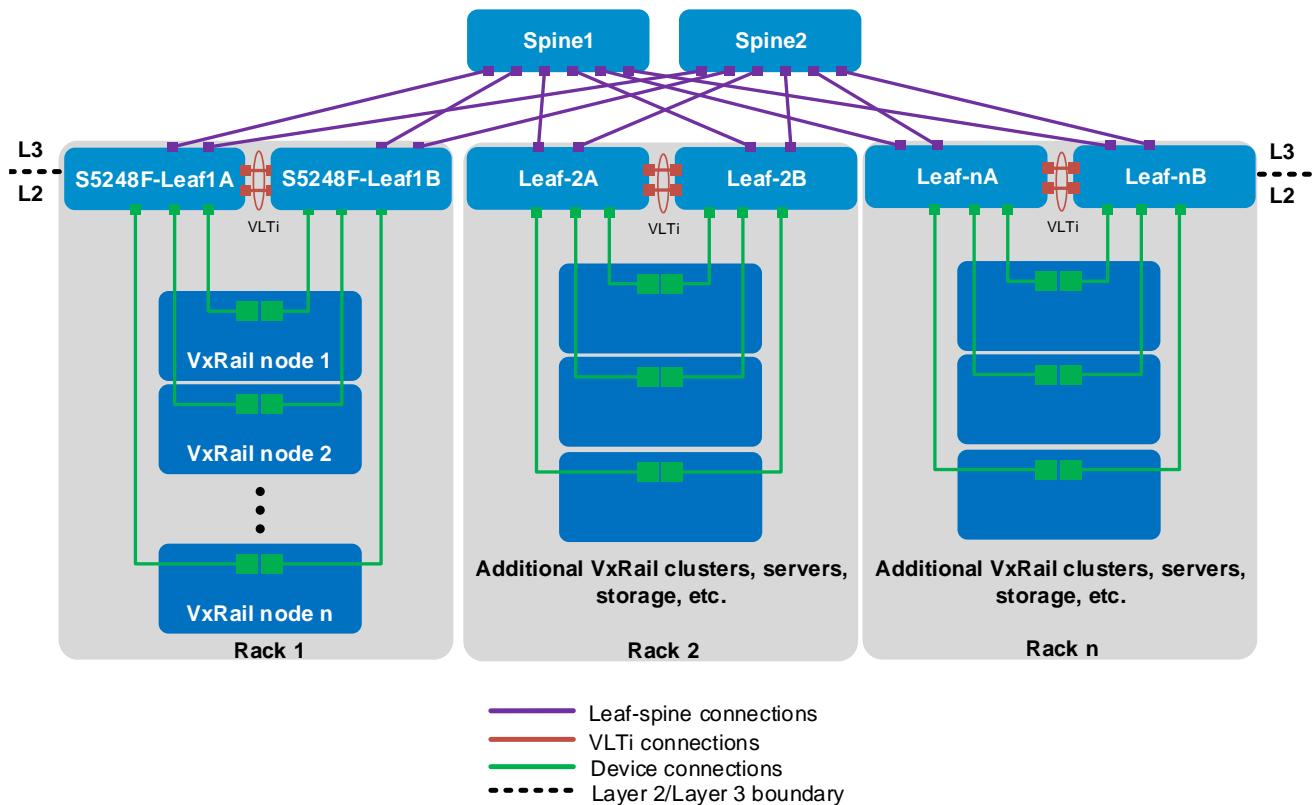


Figure 10 Dual switch topology with VLT connected to a leaf-spine network

In Figure 10, the Layer 2/Layer 3 boundary is at the leafs, meaning traffic within each rack is switched (Layer 2) and traffic between racks is routed (Layer 3). [VMware Validated Design for Software-Defined Data Center 5.1 - Architecture and Design](#) recommends isolating vSAN traffic to its own Layer 2 VLAN. Therefore, for this leaf-spine topology, each vSAN should be contained within a single rack. Since a VxRail cluster contains a vSAN, a VxRail cluster is also contained within a single rack.

**Note:** By default, VxRail does not enable routing of vSAN or vMotion traffic.

The leaf-spine topology in Figure 10 scales to sixteen racks or more, depending on the number of ports available in each spine. Racks may contain additional VxRail clusters, switches, servers, storage arrays, and other devices as needed.

To configure the remainder of the leaf-spine network, including spine switches, connections between leafs and spines, and routing protocols, see the [Dell EMC Networking Layer 3 Leaf-Spine Deployment and Best Practices with OS10](#) document.

## 4.2

## OOB Management network

The Out-of-band (OOB) Management network is an isolated network for remote management of servers, switches, and storage devices using their dedicated hardware management ports. It is also commonly used to carry heartbeat messages sent between switches configured as VLT peers.

For OOB Management network connections, one S3048-ON switch is installed in each rack as shown:

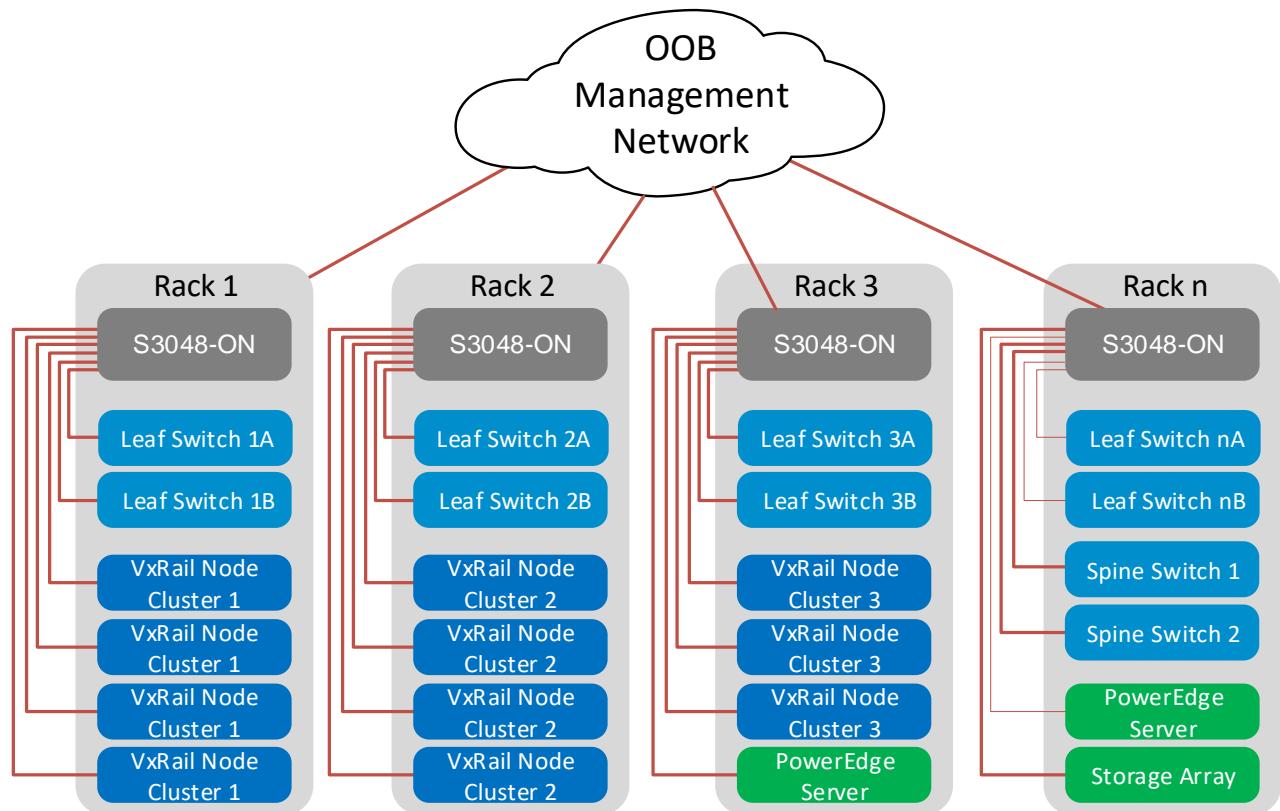


Figure 11 OOB management network connections

---

**Note:** This guide focuses on the devices in Rack 1. Devices shown in other racks are for illustration purposes only.

1GbE BASE-T ports on each S3048-ON are connected downstream to hardware management ports on each device. This includes VxRail node iDRACs, PowerEdge Server iDRACs, and dedicated management ports on switches and storage arrays.

Four 10GbE SFP+ ports are available on each S3048-ON for use as uplinks to the OOB management network core.

---

**Note:** The OOB Management network is not to be confused with the External and Internal Management networks. The External and Internal Management networks and their VLANs are covered in Chapter 5.

Devices on the OOB Management network in this guide use the 100.67.0.0/16 IP address block.

# 5 Configuration planning

## 5.1 VLANs and IP addresses

VLANs and IP addresses used for VxRail node traffic must be planned before switch configuration and VxRail deployment can begin.

VxRail node traffic is divided into five or more VLANs, as shown in Table 1.

Table 1 VLANs used for VxRail nodes

VLAN	Purpose
External Management	VxRail Manager, ESXi, vCenter Server, NTP, DNS, and vRealize Log Insight traffic
vMotion	Virtual machine (VM) migration
vSAN	Distributed storage traffic
VM network(s)	One or more VLANs for VM data traffic
Internal Management	VxRail node discovery

---

**Note:** All VLANs in Table 1 share the physical connections shown in Chapter 3.

VLAN configuration and IP network addresses planned for this deployment are shown in Table 2.

Table 2 VLAN IDs and IP addresses

VLAN ID	Description	Network	Gateway	VLAN ports
1611	External Management	172.16.11.0/24	172.16.11.254	Untagged
1612	vMotion	172.16.12.0/24	NA	Tagged
1613	vSAN	172.16.13.0/24	NA	Tagged
1614	VM Network A	172.16.14.0/24	Optional, not used	Tagged
1615	VM Network B	172.16.15.0/24	Optional, not used	Tagged
3939	Internal Management	IPv6 multicast	not used	Tagged

---

**Note:** By default, VxRail does not enable routing of vSAN or vMotion traffic.

This example uses two networks for VM data traffic, VM Network A and VM Network B, with each on a separate VLAN. The actual number of VM data networks used is based on customer requirements.

The Internal Management VLAN, 3939, is used exclusively for VxRail node discovery using IPv6 multicast. Multicast Listener Discovery (MLD) snooping and querier must be enabled on this VLAN for node discovery to succeed.

## 5.2 VxRail network configuration table

Information provided in the VxRail network configuration table is used during VxRail deployment. The values used for this deployment example are shown in the right column. The VLANs and IP addresses used are based on the information from Table 2.

---

**Note:** For additional information on the VxRail network configuration table, see the [Dell EMC VxRail Network Planning Guide](#).

---

Table 3 VxRail network configuration table

Row		Category	Description	Values used
1	VxRail	Management VLAN ID	The recommended is untagged traffic on the Native VLAN. If you want the host to send only tagged frames, manually configure the VLAN on each ESXi™ host using DCUI, and set tagging for your management VLAN on your switch before you deploy VxRail.	0*
2		VxRail initial IP	If you cannot reach the default (192.168.10.200/24), set an alternate IP address	192.168.10.200
3	System	Global settings	Time zone	
4			NTP server(s)	172.16.11.50
5			DNS server(s)	172.16.11.50
6		Proxy settings	IP address and port	
7			Username and password	
8	Management	ESXi hostnames and IP addresses	ESXi hostname prefix	vxhost
9			Separator	none
10			Iterator	Num 0x
11			Offset	1
12			Suffix	none
13			Domain	dell.local
14			ESXi starting address for IP pool	172.16.11.1
15			ESXi ending address for IP pool	172.16.11.40
16		vCenter Server Leave blank if Customer Supplied VC	vCenter Server hostname	vxvcenter
17			vCenter Server IP address	172.16.11.100
18			Platform Services Controller hostname	vxpvc
19			Platform Services Controller IP address	172.16.11.101
20		Customer Supplied vCenter Server Leave blank if VxRail VC	Customer Supplied Platform Services Controller (PSC) Hostname (FQDN) Leave	
21			Customer Supplied vCenter Server hostname (FQDN)	
22			Customer Supplied vCenter Server SSO domain	
23			admin username/password or the newly created VxRail non-admin username and password	
24			New VxRail management username and password	
25			Customer Supplied data center name	
26			New cluster name	
27		VxRail Manager	VxRail hostname	vxman
28			VxRail IP address	172.16.11.102
29		Networking	Subnet mask	255.255.255.0
30			Gateway	172.16.11.254
31		Passwords	ESXi “root” passwords. Can be different for each host starting with Release 4.0.100.	root_password
32			VxRail Manager and VxRail vCenter Server “administrator@vsphere.local”	administrator_password
33	vMotion		Starting address for IP pool	172.16.12.1

Row		Category	Description	Values used
34			Ending address for IP pool	172.16.12.40
35			Subnet mask	255.255.255.0
36			VLAN ID	1612
37	vSAN		Starting address for IP pool	172.16.13.1
38			Ending address for IP pool	172.16.13.40
39			Subnet mask	255.255.255.0
40			VLAN ID	1613
41	VM Networks	... (unlimited number)	VM Network name and VLAN ID	VM_Network_A, 1614
42			VM Network name and VLAN ID	VM_Network_B, 1615
43	Solutions	Logging	vRealize Log Insight™ hostname	vxinsight
44			vRealize Log Insight IP address	172.16.11.103
45			Syslog server (instead of Log Insight)	

\*Setting this value to 0 is explained in Section 9.1 of this guide.

This deployment uses four VxRail nodes. However, host IP address pools are configured for the Management, vMotion, and vSAN VLANs using addresses in the .1 - .40 range in Table 3. This ensures IP addresses are preconfigured for hosts that may be added later as the VxRail cluster grows.

## 5.3 Using a jump box or laptop computer

For VxRail deployment, VxRail Manager is accessed using the leaf switches connected to the nodes. This may be done by connecting a laptop computer directly to a leaf or by using a jump box (also known as a jump server or jump host) for remote access.

Reserve at least one interface on a leaf switch for this connection. This interface is configured on the External Management VLAN during switch configuration.

---

**Note:** A PowerEdge server is used as a jump box in this deployment. More information on jump box connections is provided in Chapter 9.

---

## 5.4 DNS and NTP servers

VxRail nodes must be able to reach a correctly configured DNS server from the External Management VLAN during and after VxRail deployment. The DNS server must include forward and reverse lookup entries for ESXi hosts, vCenter, the Platform Services Controller, VxRail Manager, and vRealize Log Insight.

Add forward and reverse lookup records on the DNS server using the hostnames and IP addresses in the VxRail network configuration table (Table 3). Table 4 summarizes the DNS entries for this deployment.

Table 4 Hostnames and IP addresses used

Hostname	IP Address
vxhost01.dell.local	172.16.11.1
vxhost02.dell.local	172.16.11.2
vxhost03.dell.local	172.16.11.3
vxhost04.dell.local	172.16.11.4

Hostname	IP Address
vxcenter.dell.local	172.16.11.100
vxpvc.dell.local	172.16.11.101
vxman.dell.local	172.16.11.102
vxinsight.dell.local	172.16.11.103

An NTP server is not required but is recommended. If an NTP server is not provided, VxRail uses the time that is set on VxRail node 1.

---

**Note:** For this deployment guide, the PowerEdge server used as the jump box also provides DNS and NTP services for the VxRail cluster. It is connected to both leaf switches for redundancy using Microsoft Windows NIC teaming (switch-independent load balancing).

---

## 6 Switch configuration prerequisites

### 6.1 Check switch OS version

S5248F-ON switches must be running SmartFabric OS10.5.0.0 or later. Run the `show version` command to check the OS version. Dell EMC recommends upgrading to the latest release available on [Dell Digital Locker](#) (account required).

```
OS10# show version
S5248F-ON# show version
Dell EMC Networking OS10-Enterprise
Copyright (c) 1999-2019 by Dell Inc. All Rights Reserved.
OS Version: 10.5.0.0
Build Version: 10.5.0.0.326
```

---

**Note:** Figure 1 at the beginning of this guide lists supported switches and operating systems for VxRail deployments.

---

### 6.2 Verify license installation

Run the command `show license status` to verify license installation. The `License Type:` field should indicate PERPETUAL. If an evaluation license is installed, licenses purchased from Dell EMC are available for download on [Dell Digital Locker](#). Installation instructions are provided in the [Dell EMC SmartFabric OS10 User Guide Release 10.5.0](#).

```
OS10# show license status

System Information
-----
Vendor Name      : Dell EMC
Product Name     : S5248F-ON
Hardware Version: A01
Platform Name    : x86_64-dell EMC_s5200f_c3538-r0
PPID             : CN00Y2VTCES008200018
Service Tag      : D8MCG02
License Details
-----
Software         : OS10-Enterprise
Version          : 10.5.0.0
License Type:   PERPETUAL
License Duration: Unlimited
License Status   : Active
License location: /mnt/license/D8MCG02.lic
-----
```

---

**Note:** If SmartFabric OS10 was factory installed, a perpetual license is already on the switch.

---

## 6.3 Factory default configuration

The configuration commands in the sections that follow begin with S5248F-ON switches at their factory default settings. Dell EMC PowerSwitches running SmartFabric OS10 can be reset to their default configuration using the serial console port as follows:

```
OS10# delete startup-configuration
Proceed to delete startup-configuration [confirm yes/no(default)]:y

OS10# reload
System configuration has been modified. Save? [yes/no]:n
Proceed to reboot the system? [confirm yes/no]:y
```

---

**Note:** The above commands can also be performed from an SSH or Telnet session, but the `reload` command immediately ends the remote access session to the switch.

---

The switch reboots to its factory default configuration.

---

**Note:** SmartFabric OS10 at its default settings has Telnet disabled, SSH enabled, Rapid per-VLAN Spanning Tree Plus (RPVST+) enabled, and the OOB management interface configured to get its IP address using DHCP. The default username and password are both `admin`. Dell EMC recommends changing the `admin` password to a complex password during the first login.

---

## 7

# Configure switches

This section covers switch configuration for S5248F-ON switches in the different topologies. Commands for all examples are provided as attachments to this guide.

## 7.1

### Dual switch with VLT

This example uses a four-node VxRail cluster connected to a pair of switches configured with VLT, as shown in Figure 12. Dell EMC recommends using this topology.

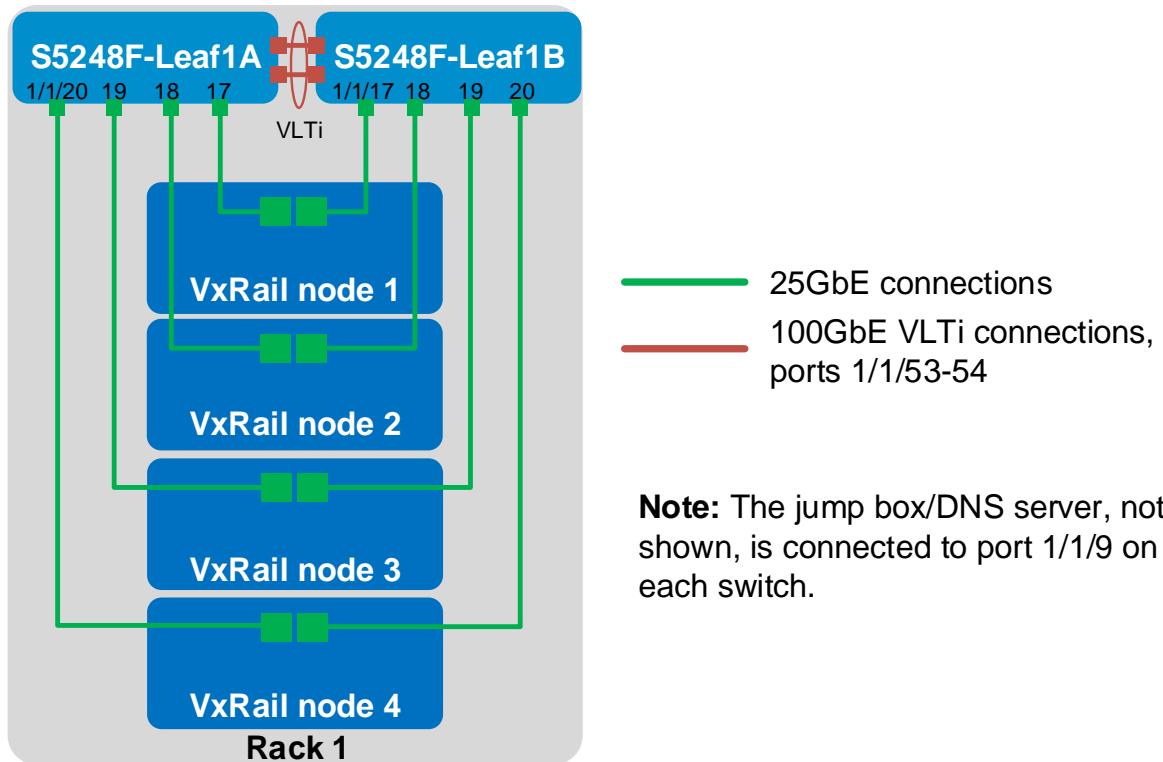


Figure 12 Four-node cluster connected to a pair of switches configured with VLT

The commands in the following sections are run to complete the configuration of both leaf switches. The port numbers used in the configuration commands correspond to those shown in Figure 12.

---

**Note:** The commands in the tables below should be entered in the order shown. All commands are provided in the file attachments named S5248F-1A-vlt.txt and S5248F-1B-vlt.txt.

## 7.1.1 General settings

Configure the hostname, OOB management IP address, and default gateway. Enable IPv6 MLD snooping to allow discovery of the VxRail nodes. Specify an NTP server accessible by the switch. The example shows an NTP server on the OOB management network with a different IP address than the one used by the VxRail nodes on the External Management network.

**Note:** Default spanning tree settings are used in this deployment. In SmartFabric OS10, RVPST+ is enabled by default, and RPVST+ VLAN priority numbers start at 32769. Modify the spanning tree settings if required for your environment. LLDP is enabled on each interface and globally by default. LLDP is useful for troubleshooting and validation. Dell EMC recommends leaving it enabled.

Table 5 General settings – dual switch with VLT

S5248F-Leaf1A	S5248F-Leaf1B
configure terminal  hostname S5248F-Leaf1A  interface mgmt1/1/1 no ip address ip address 100.67.172.38/24 no shutdown <u>management route 0.0.0.0/0</u> <u>100.67.172.254</u>  ipv6 mld snooping enable  ntp server 100.67.10.20	configure terminal  hostname S5248F-Leaf1B  interface mgmt1/1/1 no ip address ip address 100.67.172.37/24 no shutdown <u>management route 0.0.0.0/0</u> <u>100.67.172.254</u>  ipv6 mld snooping enable  ntp server 100.67.10.20

## 7.1.2 Configure VLANs

In this section, VLANs are configured per Table 2.

Create the External Management VLAN and assign a unique IP address on each switch. Configure VRRP to provide gateway redundancy. Set the VRRP priority. The switch with the largest priority value becomes the master VRRP router. Assign the same virtual address to both switches.

Create the vMotion, vSAN, VM Network, and Internal Management VLANs. Enable IPv6 MLD snooping querier on the Internal Management VLAN for node discovery.

Table 6 Configure VLANs – dual switch with VLT

S5248F-Leaf1A	S5248F-Leaf1B
interface vlan1611 description External_Mgmt ip address 172.16.11.253/24 vrrp-group 11 priority 150 virtual-address 172.16.11.254 no shutdown	interface vlan1611 description External_Mgmt ip address 172.16.11.252/24 vrrp-group 11 priority 100 virtual-address 172.16.11.254 no shutdown

S5248F-Leaf1A	S5248F-Leaf1B
interface vlan1612 description vMotion no shutdown	interface vlan1612 description vMotion no shutdown
interface vlan1613 description vSAN no shutdown	interface vlan1613 description vSAN no shutdown
interface vlan1614 description VM_Network_A no shutdown	interface vlan1614 description VM_Network_A no shutdown
interface vlan1615 description VM_Network_B no shutdown	interface vlan1615 description VM_Network_B no shutdown
interface vlan3939 description Internal_Mgmt no shutdown ipv6 mld snooping querier	interface vlan3939 description Internal_Mgmt no shutdown ipv6 mld snooping querier

### 7.1.3 Configure interfaces

Configure the interfaces for the jump box or laptop computer connections to be used during VxRail deployment. This example uses 10GbE interface 1/1/9:1 on each switch.

---

**Note:** See Appendix B to change the native speed of S5248F-ON port groups from 25GbE to 10GbE for jump box or laptop computer connections.

While only one connection to the jump box is required, two may be used for redundancy. Add these interfaces as access ports on VLAN 1611 (the External Management VLAN).

---

**Note:** In this example, the jump box also provides DNS and NTP services as covered in Section 5.4. If these services are on other devices, ensure the corresponding switch interfaces are also in the External Management VLAN.

Configure the interfaces for connections to the VxRail nodes. Interfaces 1/1/17 through 1/1/20 are used in this example.

Use the `switchport mode trunk` command to enable ports to carry traffic for multiple VLANs. Configure the ports as access (untagged) ports on VLAN 1611 (the External Management VLAN). Configure the ports as trunk (tagged) ports on VLANs 1612-1615, and 3939 (the vMotion, vSAN, VM Network, and Internal Management VLANs).

Configure ports directly connected to nodes, servers, or other endpoints as STP edge ports. Set flow control to “receive on” and “transmit off” on node-connected ports as a best practice.

**Note:** Flow control is enabled on all network interfaces in ESXi by default. For more information, see [VMware vSAN Network Design](#).

Table 7 Configure interfaces – dual switch with VLT

S5248F-Leaf1A	S5248F-Leaf1B
<pre>interface ethernet1/1/9:1 description JumpBox_DNS switchport access vlan 1611 spanning-tree port type edge no shutdown</pre>	<pre>interface ethernet1/1/9:1 description JumpBox_DNS switchport access vlan 1611 spanning-tree port type edge no shutdown</pre>
<pre>interface ethernet1/1/17 description Node1_Port1 switchport mode trunk switchport access vlan 1611 <u>switchport trunk allowed vlan 1612-1615,3939</u> spanning-tree port type edge flowcontrol receive on flowcontrol transmit off no shutdown</pre>	<pre>interface ethernet1/1/17 description Node1_Port2 switchport mode trunk switchport access vlan 1611 <u>switchport trunk allowed vlan 1612-1615,3939</u> spanning-tree port type edge flowcontrol receive on flowcontrol transmit off no shutdown</pre>
<pre>interface ethernet1/1/18 description Node2_Port1 switchport mode trunk switchport access vlan 1611 <u>switchport trunk allowed vlan 1612-1615,3939</u> spanning-tree port type edge flowcontrol receive on flowcontrol transmit off no shutdown</pre>	<pre>interface ethernet1/1/18 description Node2_Port2 switchport mode trunk switchport access vlan 1611 <u>switchport trunk allowed vlan 1612-1615,3939</u> spanning-tree port type edge flowcontrol receive on flowcontrol transmit off no shutdown</pre>
<pre>interface ethernet1/1/19 description Node3_Port1 switchport mode trunk switchport access vlan 1611 <u>switchport trunk allowed vlan 1612-1615,3939</u> spanning-tree port type edge flowcontrol receive on flowcontrol transmit off no shutdown</pre>	<pre>interface ethernet1/1/19 description Node3_Port2 switchport mode trunk switchport access vlan 1611 <u>switchport trunk allowed vlan 1612-1615,3939</u> spanning-tree port type edge flowcontrol receive on flowcontrol transmit off no shutdown</pre>
<pre>interface ethernet1/1/20 description Node4_Port1 switchport mode trunk switchport access vlan 1611 <u>switchport trunk allowed vlan 1612-1615,3939</u> spanning-tree port type edge flowcontrol receive on flowcontrol transmit off no shutdown</pre>	<pre>interface ethernet1/1/20 description Node4_Port2 switchport mode trunk switchport access vlan 1611 <u>switchport trunk allowed vlan 1612-1615,3939</u> spanning-tree port type edge flowcontrol receive on flowcontrol transmit off no shutdown</pre>

## 7.1.4 Configure VLT

Use 100GbE interfaces for the VLTi between the two leaf switches. This example uses interfaces 1/1/53 and 1/1/54. Remove each interface from Layer 2 mode with the `no switchport` command.

Create the VLT domain. The backup destination is the OOB management IP address of the VLT peer switch. Configure the interfaces used as the VLTi with the `discovery-interface` command. Enable peer routing.

**Note:** For more information on VLT, see the [Dell EMC SmartFabric OS10 User Guide Release 10.5.0](#).

When the configuration is complete, exit configuration mode and save the configuration with the `end` and `write memory` commands.

Table 8 Configure VLT – dual switch with VLT

S5248F-Leaf1A	S5248F-Leaf1B
<pre>interface ethernet1/1/53 description VLTi no switchport no shutdown  interface ethernet1/1/54 description VLTi no switchport no shutdown  vlt-domain 127 backup destination 100.67.172.37 <u>discovery-interface ethernet1/1/53-</u> <u>1/1/54</u> peer-routing  end write memory</pre>	<pre>interface ethernet1/1/53 description VLTi no switchport no shutdown  interface ethernet1/1/54 description VLTi no switchport no shutdown  vlt-domain 127 backup destination 100.67.172.38 <u>discovery-interface ethernet1/1/53-</u> <u>1/1/54</u> peer-routing  end write memory</pre>

## 7.2 Dual switch without VLT

This example uses a four-node VxRail cluster connected to a switch pair without VLT, as shown in Figure 13.

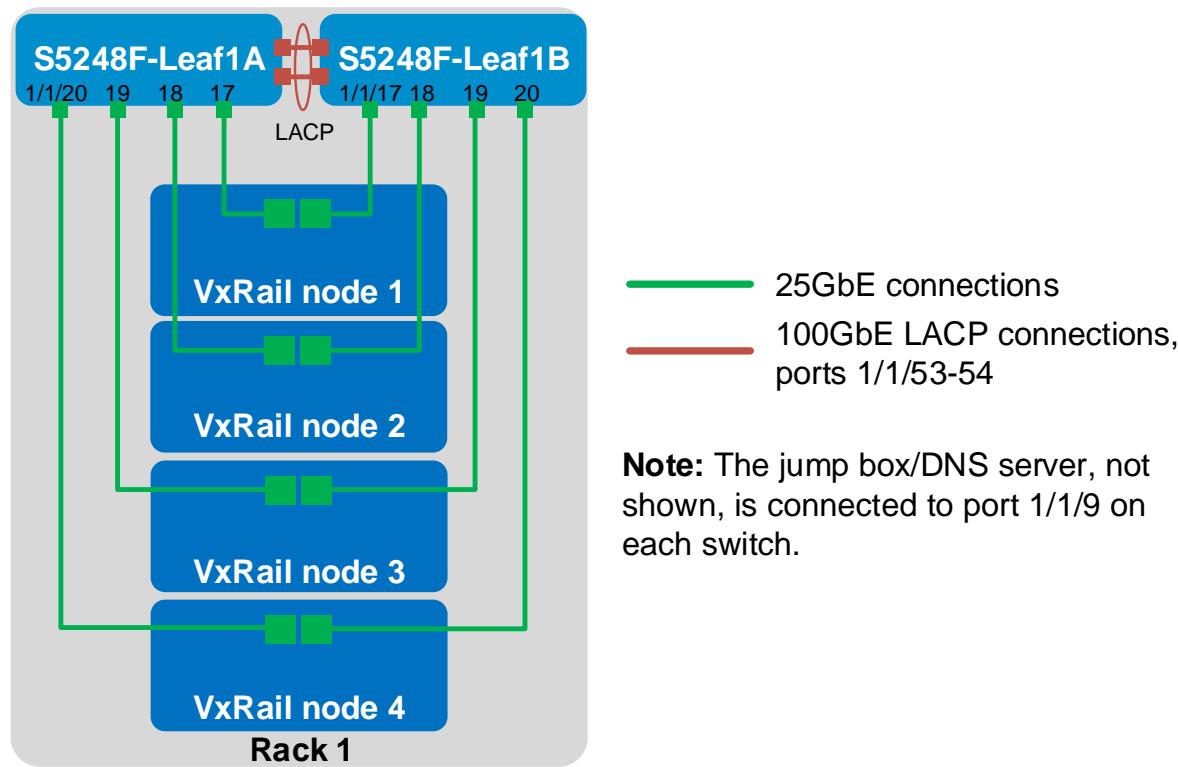


Figure 13 Four-node cluster connected to a switch pair without VLT

In this topology, an LACP port channel is used to connect the two switches.

The commands in the following sections are run to complete the configuration of both switches. The port numbers used in the configuration commands correspond to those shown in Figure 13.

---

**Note:** The commands in the tables below should be entered in the order shown. All commands are provided in the file attachments named S5248F-1A-no-vlt.txt and S5248F-1B-no-vlt.txt.

---

## 7.2.1 General settings

Configure the hostname, OOB management IP address, and default gateway. Enable IPv6 MLD snooping to allow discovery of the VxRail nodes. Specify an NTP server accessible by the switch. In this example, this is an NTP server on the OOB management network, with a different IP address than the one used by the VxRail nodes on the External Management network.

**Note:** Default spanning tree settings are used in this deployment. In SmartFabric OS10, RVPST+ is enabled by default, and RPVST+ VLAN priority numbers start at 32769. Modify the spanning tree settings if required for your environment. LLDP is enabled on each interface and globally by default. LLDP is useful for troubleshooting and validation. Dell EMC recommends leaving it enabled.

Table 9 General settings - dual switch without VLT

S5248F-Leaf1A	S5248F-Leaf1B
configure terminal  hostname S5248F-Leaf1A  interface mgmt1/1/1 no ip address ip address 100.67.172.38/24 no shutdown <u>management route 0.0.0.0/0</u> <u>100.67.172.254</u>  ipv6 mld snooping enable  ntp server 100.67.10.20	configure terminal  hostname S5248F-Leaf1B  interface mgmt1/1/1 no ip address ip address 100.67.172.37/24 no shutdown <u>management route 0.0.0.0/0</u> <u>100.67.172.254</u>  ipv6 mld snooping enable  ntp server 100.67.10.20

## 7.2.2 Configure VLANs

In this section, VLANs are configured per Table 2.

Create the External Management VLAN and assign a unique IP address on each switch. Configure VRRP to provide gateway redundancy. Set the VRRP priority. The switch with the largest priority value becomes the master VRRP router. Assign the same virtual address to both switches.

Create the vMotion, vSAN, VM Network, and Internal Management VLANs. Enable IPv6 MLD snooping querier on the Internal Management VLAN for node discovery.

Table 10 Configure VLANs - dual switch without VLT

S5248F-Leaf1A	S5248F-Leaf1B
interface vlan1611 description External_Mgmt ip address 172.16.11.253/24 vrrp-group 11 priority 150 virtual-address 172.16.11.254 no shutdown  interface vlan1612	interface vlan1611 description External_Mgmt ip address 172.16.11.252/24 vrrp-group 11 priority 100 virtual-address 172.16.11.254 no shutdown  interface vlan1612

S5248F-Leaf1A	S5248F-Leaf1B
<pre> description vMotion no shutdown  interface vlan1613 description vSAN no shutdown  interface vlan1614 description VM_Network_A no shutdown  interface vlan1615 description VM_Network_B no shutdown  interface vlan3939 description Internal_Mgmt no shutdown ipv6 mld snooping querier </pre>	<pre> description vMotion no shutdown  interface vlan1613 description vSAN no shutdown  interface vlan1614 description VM_Network_A no shutdown  interface vlan1615 description VM_Network_B no shutdown  interface vlan3939 description Internal_Mgmt no shutdown ipv6 mld snooping querier </pre>

### 7.2.3 Configure interfaces

Configure the interfaces for the jump box or laptop computer connections to be used during VxRail deployment. This example uses 10GbE interface 1/1/9:1 on each switch.

---

**Note:** See Appendix B to change the native speed of S5248F-ON port groups from 25GbE to 10GbE for jump box or laptop computer connections.

While only one connection to the jump box is required, two may be used for redundancy. Add these interfaces as access ports on VLAN 1611 (the External Management VLAN).

---

**Note:** In this example, the jump box also provides DNS and NTP services as covered in Section 5.4. If these services are located on other devices, ensure the corresponding switch interfaces are also in the External Management VLAN.

Configure the interfaces for connections to the VxRail nodes. Interfaces 1/1/17 through 1/1/20 are used in this example.

Use the `switchport mode trunk` command to enable ports to carry traffic for multiple VLANs. Configure the ports as access (untagged) ports on VLAN 1611 (the External Management VLAN). Configure the ports as trunk (tagged) ports on VLANs 1612-1615 and 3939 (the vMotion, vSAN, VM Network, and Internal Management VLANs).

Configure ports directly connected to nodes, servers, or other endpoints as STP edge ports. Set flow control to “receive on” and “transmit off” on node-connected ports as a best practice.

**Note:** Flow control is enabled on all network interfaces in ESXi by default. For more information, see [VMware vSAN Network Design](#).

Table 11 Configure interfaces – dual switch without VLT

S5248F-Leaf1A	S5248F-Leaf1B
<pre>interface ethernet1/1/9:1 description JumpBox_DNS switchport access vlan 1611 spanning-tree port type edge no shutdown</pre>	<pre>interface ethernet1/1/9:1 description JumpBox_DNS switchport access vlan 1611 spanning-tree port type edge no shutdown</pre>
<pre>interface ethernet1/1/17 description Node1_Port1 switchport mode trunk switchport access vlan 1611 <u>switchport trunk allowed vlan 1612-1615,3939</u> spanning-tree port type edge flowcontrol receive on flowcontrol transmit off no shutdown</pre>	<pre>interface ethernet1/1/17 description Node1_Port2 switchport mode trunk switchport access vlan 1611 <u>switchport trunk allowed vlan 1612-1615,3939</u> spanning-tree port type edge flowcontrol receive on flowcontrol transmit off no shutdown</pre>
<pre>interface ethernet1/1/18 description Node2_Port1 switchport mode trunk switchport access vlan 1611 <u>switchport trunk allowed vlan 1612-1615,3939</u> spanning-tree port type edge flowcontrol receive on flowcontrol transmit off no shutdown</pre>	<pre>interface ethernet1/1/18 description Node2_Port2 switchport mode trunk switchport access vlan 1611 <u>switchport trunk allowed vlan 1612-1615,3939</u> spanning-tree port type edge flowcontrol receive on flowcontrol transmit off no shutdown</pre>
<pre>interface ethernet1/1/19 description Node3_Port1 switchport mode trunk switchport access vlan 1611 <u>switchport trunk allowed vlan 1612-1615,3939</u> spanning-tree port type edge flowcontrol receive on flowcontrol transmit off no shutdown</pre>	<pre>interface ethernet1/1/19 description Node3_Port2 switchport mode trunk switchport access vlan 1611 <u>switchport trunk allowed vlan 1612-1615,3939</u> spanning-tree port type edge flowcontrol receive on flowcontrol transmit off no shutdown</pre>
<pre>interface ethernet1/1/20 description Node4_Port1 switchport mode trunk switchport access vlan 1611 <u>switchport trunk allowed vlan 1612-1615,3939</u> spanning-tree port type edge flowcontrol receive on flowcontrol transmit off no shutdown</pre>	<pre>interface ethernet1/1/20 description Node4_Port2 switchport mode trunk switchport access vlan 1611 <u>switchport trunk allowed vlan 1612-1615,3939</u> spanning-tree port type edge flowcontrol receive on flowcontrol transmit off no shutdown</pre>

## 7.2.4 Configure the switch interconnect

Create a port channel to use between the two leaf switches, 127 in this example. Use the `switchport mode trunk` command to enable the port channel to carry traffic for multiple VLANs, and allow all VLANs on the port channel.

Use 100GbE interfaces for the port channel, 1/1/53 and 1/1/54 in this example. Add each interface to the port channel as LACP active members with the `channel-group 127 mode active` command.

When the configuration is complete, exit configuration mode and save the configuration with the `end` and `write memory` commands.

Table 12 Configure switch interconnect - dual switch without VLT

S5248F-Leaf1A	S5248F-Leaf1B
<pre>interface port-channel 127 description To_Leaf_1B switchport mode trunk <u>switchport trunk allowed vlan 1611-1615,3939</u> no shutdown  interface ethernet1/1/53 description To_Leaf_1B channel-group 127 mode active no shutdown  interface ethernet1/1/54 description To_Leaf_1B channel-group 127 mode active no shutdown  end write memory</pre>	<pre>interface port-channel 127 description To_Leaf_1A switchport mode trunk <u>switchport trunk allowed vlan 1611-1615,3939</u> no shutdown  interface ethernet1/1/53 description To_Leaf_1A channel-group 127 mode active no shutdown  interface ethernet1/1/54 description To_Leaf_1A channel-group 127 mode active no shutdown  end write memory</pre>

## 7.3 Single switch

This example uses a four-node VxRail cluster connected to a single switch, as shown in Figure 14.

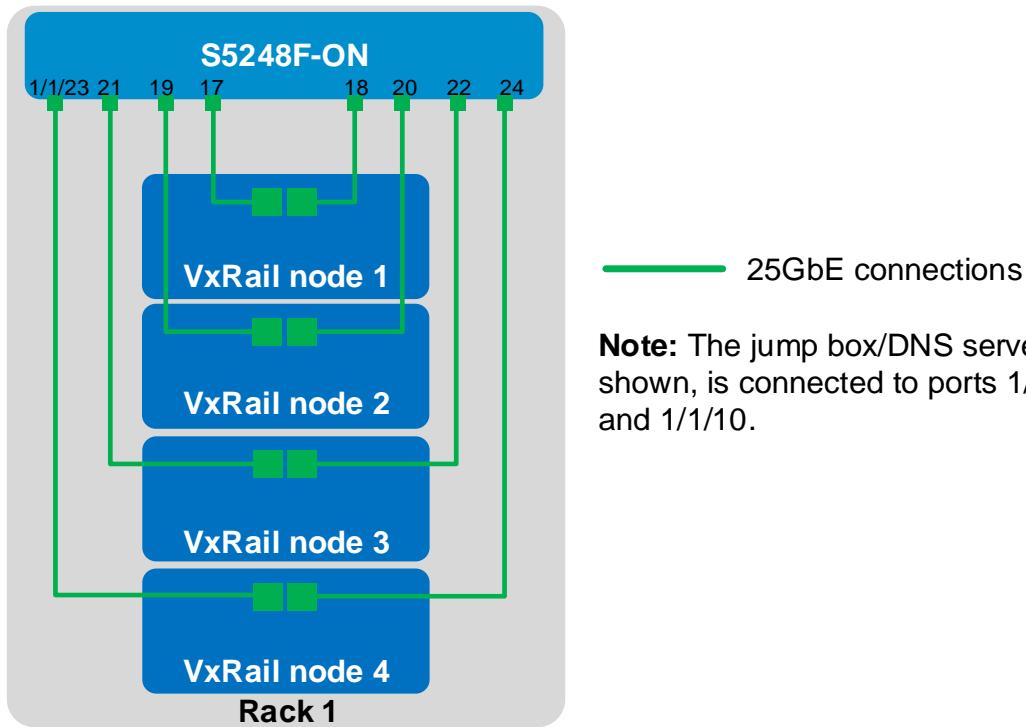


Figure 14 Four-node cluster connected to a single switch

The commands in the following sections are run to complete the switch configuration. The port numbers used in the configuration commands correspond to those shown in Figure 14.

---

**Note:** The commands in the tables below should be entered in the order shown. All commands are provided in the file attachment named S5248F-single-switch.txt.

---

### 7.3.1 General settings

Configure the hostname, OOB management IP address, and default gateway. Enable IPv6 MLD snooping to allow discovery of the VxRail nodes. Specify an NTP server accessible by the switch. In this example, this is an NTP server on the OOB management network, with a different IP address than the one used by the VxRail nodes on the External Management network.

---

**Note:** Default spanning tree settings are used in this deployment. In SmartFabric OS10, RVPST+ is enabled by default, and RPVST+ VLAN priority numbers start at 32769. Modify the spanning tree settings if required for your environment. LLDP is enabled on each interface and globally by default. LLDP is useful for troubleshooting and validation. Dell EMC recommends leaving it enabled.

---

Table 13 General settings – single switch

S5248F-ON
configure terminal
hostname S5248F-ON
interface mgmt1/1/1
no ip address
ip address 100.67.172.38/24
no shutdown
management route 0.0.0.0/0 100.67.172.254
ipv6 mld snooping enable
ntp server 100.67.10.20

### 7.3.2 Configure VLANs

In this section, VLANs are configured per Table 2.

Create the External Management VLAN and assign an IP address. Create the vMotion, vSAN, VM Network, and Internal Management VLANs. Enable IPv6 MLD snooping querier on the Internal Management VLAN for node discovery.

Table 14 Configure VLANs – single switch

S5248F-ON
interface vlan1611
description External_Mgmt
ip address 172.16.11.254/24
no shutdown
interface vlan1612
description vMotion
no shutdown
interface vlan1613
description vSAN
no shutdown
interface vlan1614
description VM_Network_A
no shutdown
interface vlan1615
description VM_Network_B
no shutdown
interface vlan3939
description Internal_Mgmt
no shutdown
ipv6 mld snooping querier

### 7.3.3 Configure interfaces

Configure the interfaces for the jump box or laptop computer connections to be used during VxRail deployment. This example uses 10GbE interfaces 1/1/9:1 and 1/1/10:1.

---

**Note:** See Appendix B to change the native speed of S5248F-ON port groups from 25GbE to 10GbE for jump box or laptop computer connections.

---

While only one connection to the jump box is required, two may be used for redundancy. Add these interfaces as access ports on VLAN 1611 (the External Management VLAN).

---

**Note:** In this example, the jump box also provides DNS and NTP services as covered in Section 5.4. If these services are located on other devices, ensure the corresponding switch interfaces are also in the External Management VLAN.

---

Configure the interfaces for connections to the VxRail nodes. Interfaces 1/1/17 through 1/1/24 are used in this example.

Use the `switchport mode trunk` command to enable ports to carry traffic for multiple VLANs. Configure the ports as access (untagged) ports on VLAN 1611 (the External Management VLAN). Configure the ports as trunk (tagged) ports on VLANs 1612-1615, and 3939 (the vMotion, vSAN, VM Network, and Internal Management VLANs).

Configure ports directly connected to nodes, servers, or other endpoints as STP edge ports. Set flow control to “receive on” and “transmit off” on node-connected ports as a best practice.

---

**Note:** Flow control is enabled on all network interfaces in ESXi by default. For more information, see [VMware vSAN Network Design](#).

---

When the configuration is complete, exit configuration mode and save the configuration with the `end` and `write memory` commands.

Table 15 Configure interfaces – single switch

S5248F-ON
interface ethernet1/1/9:1 description JumpBox_DNS switchport access vlan 1611 spanning-tree port type edge no shutdown
interface ethernet1/1/10:1 description JumpBox_DNS switchport access vlan 1611 spanning-tree port type edge no shutdown
interface ethernet1/1/17 description Node1_Port1 switchport mode trunk switchport access vlan 1611 switchport trunk allowed vlan 1612-1615,3939

**S5248F-ON**

```
spanning-tree port type edge
flowcontrol receive on
flowcontrol transmit off
no shutdown

interface ethernet1/1/18
description Node1_Port2
switchport mode trunk
switchport access vlan 1611
switchport trunk allowed vlan 1612-1615,3939
spanning-tree port type edge
flowcontrol receive on
flowcontrol transmit off
no shutdown

interface ethernet1/1/19
description Node2_Port1
switchport mode trunk
switchport access vlan 1611
switchport trunk allowed vlan 1612-1615,3939
spanning-tree port type edge
flowcontrol receive on
flowcontrol transmit off
no shutdown

interface ethernet1/1/20
description Node2_Port2
switchport mode trunk
switchport access vlan 1611
switchport trunk allowed vlan 1612-1615,3939
spanning-tree port type edge
flowcontrol receive on
flowcontrol transmit off
no shutdown

interface ethernet1/1/21
description Node3_Port1
switchport mode trunk
switchport access vlan 1611
switchport trunk allowed vlan 1612-1615,3939
spanning-tree port type edge
flowcontrol receive on
flowcontrol transmit off
no shutdown

interface ethernet1/1/22
description Node3_Port2
switchport mode trunk
switchport access vlan 1611
switchport trunk allowed vlan 1612-1615,3939
spanning-tree port type edge
flowcontrol receive on
flowcontrol transmit off
no shutdown
```

**S5248F-ON**

```
interface ethernet1/1/23
description Node4_Port1
switchport mode trunk
switchport access vlan 1611
switchport trunk allowed vlan 1612-1615,3939
spanning-tree port type edge
flowcontrol receive on
flowcontrol transmit off
no shutdown

interface ethernet1/1/24
description Node4_Port2
switchport mode trunk
switchport access vlan 1611
switchport trunk allowed vlan 1612-1615,3939
spanning-tree port type edge
flowcontrol receive on
flowcontrol transmit off
no shutdown

end
write memory
```

## 8 Switch validation

After switches are configured and devices are connected, the switch CLI is used to validate the network configuration. This section provides a list of the most common commands and their output for the examples used in this guide.

### 8.1 General validation commands

The commands and output shown in this section are for S5248F-Leaf1A in the dual switch with VLT topology. The output of its peer, S5248F-Leaf1B, is similar. If the dual switch without VLT or single switch topology is used, notes are added where differences exist.

---

**Note:** For additional commands and output related to the leaf-spine portion of the topology, such as BGP and Uplink Failure Detection (UFD), see [Dell EMC Networking Layer 3 Leaf-Spine Deployment and Best Practices with OS10](#).

---

#### 8.1.1 show interface status

The `show interface status | grep up` command is used to verify required interfaces are up, and links are established at their appropriate speeds.

```
S5248F-Leaf1A# show interface status | grep up
Port          Description      Status   Speed    Duplex  Mode   Vlan Tagged-Vlans
Eth 1/1/9:1    JumpBox_DNS    up      10G     full    A     1611  -
Eth 1/1/17     Node1_Port1   up      25G     full    T     1611  1612-1615,3939
Eth 1/1/18     Node2_Port1   up      25G     full    T     1611  1612-1615,3939
Eth 1/1/19     Node3_Port1   up      25G     full    T     1611  1612-1615,3939
Eth 1/1/20     Node4_Port1   up      25G     full    T     1611  1612-1615,3939
Eth 1/1/53     VLTI         up      100G    full    -     -
Eth 1/1/54     VLTI         up      100G    full    -     -
```

---

**Note:** For the dual switch without VLT topology, the output is identical to the above except for the description of ports 1/1/53-54. For the single switch topology, the output includes all eight node ports, and ports 1/1/53-54 are not used.

---

#### 8.1.2 show port-channel summary

The `show port-channel summary` command is used to view port channel numbers, interfaces used, and status. In SmartFabric OS10, the VLTI is automatically configured as a static LAG using port channel 1000. Ports 1/1/53 and 1/1/54 are port channel members, and (P) indicates each is up and active.

```
S5248F-Leaf1A# show port-channel summary
Flags:  D - Down      I - member up but inactive      P - member up and active
        U - Up (port-channel)  F - Fallback Activated
-----
Group Port-Channel      Type     Protocol Member Ports
-----
1000 port-channel1000    Eth      STATIC   1/1/53(P) 1/1/54(P)
```

---

**Note:** The command output for the dual switch without VLT topology is shown below. In this example, Port channel 127 is up (U), and DYNAMIC indicates LACP is used. Ports 1/1/53 and 1/1/54 are port channel members, and (P) indicates each is up and active.

```
S5248F-Leaf1A# show port-channel summary
Flags: D - Down      I - member up but inactive    P - member up and active
       U - Up (port-channel)   F - Fallback Activated
-----
Group Port-Channel          Type     Protocol Member Ports
-----
127  port-channel127        (U)      Eth       DYNAMIC   1/1/53 (P) 1/1/54 (P)
```

---

### 8.1.3 show vlan

The `show vlan` command is used to view interfaces assigned to each VLAN and whether the interfaces are access/untagged (A) or tagged (T). Port channel 1000 is the VLTI. VLAN ID 4094 is reserved as an internal control VLAN for the VLT domain, and it is not user configurable.

```
S5248F-Leaf1A# show vlan
Codes: * - Default VLAN, M - Management VLAN, R - Remote Port Mirroring VLANs
Q: A - Access (Untagged), T - Tagged
      NUM      Status      Description                  Q Ports
      1        Active
      1611    Active      External_Mgmt
      1612    Active      vMotion
      1613    Active      vSAN
      1614    Active      VM_Network_A
      1615    Active      VM_Network_B
      3939    Active      Internal_Mgmt
      4094    Active
```

---

**Note:** For the dual switch without VLT topology, the VLAN portion of the command output is as follows:

NUM	Status	Description	Q Ports
1	Active	1/1/11-1:1,1/1/12-1:1,1/1/13-1/1/16,1/1/21-1/1/52	A Eth1/1/1-1/1/8,1/1/10:1,
1611	Active	External_Mgmt	A Po127
1612	Active	vMotion	T Po127
1613	Active	vSAN	T Eth1/1/17-1/1/20
1614	Active	VM_Network_A	T Po127
1615	Active	VM_Network_B	T Eth1/1/17-1/1/20
3939	Active	Internal_Mgmt	T Po127

For the single switch topology, the VLAN portion is as follows:

NUM	Status	Description	Q Ports
1	Inactive	1/1/12-1:1,1/1/13-1/1/16,1/1/25-1/1/56	A Eth1/1/1-1/1/8,1/1/11:1,
1611	Active	External_Mgmt	A Eth1/1/9:1,1/1/10:1,
1612	Active	vMotion	T Eth1/1/17-1/1/24
1613	Active	vSAN	T Eth1/1/17-1/1/24
1614	Active	VM_Network_A	T Eth1/1/17-1/1/24
1615	Active	VM_Network_B	T Eth1/1/17-1/1/24
3939	Active	Internal_Mgmt	T Eth1/1/17-1/1/24

## 8.1.4 show ipv6 mld snooping interface

The `show ipv6 mld snooping interface vlan 3939` command is used to verify MLD snooping and querier are enabled on VLAN 3939 (shown in bold in the output below). These settings are required for discovery of the VxRail nodes before creating the VxRail cluster.

```
S5248F-Leaf1A# show ipv6 mld snooping interface vlan 3939

Vlan3939 is up, line protocol is up
MLD version is 2
MLD snooping is enabled on interface
MLD snooping query interval is 60 seconds
MLD snooping querier timeout is 130 seconds
MLD snooping last member query response interval is 1000 ms
MLD snooping max response time is 10 seconds
MLD snooping fast-leave is disabled on this interface
MLD snooping querier is enabled on this interface
Multicast snooping flood-restrict is enabled on this interface
```

---

**Note:** The command output is the same for all topologies in this guide.

---

## 8.1.5 show lldp neighbors

The `show lldp neighbors` command is useful for identifying connected equipment. Interface 1/1/9:1 is connected to the jump box. Interfaces 1/1/17-20 are connected to the Broadcom adapter in each of the VxRail nodes, and 1/1/53-54 are connected to the other leaf.

Loc PortID	Rem Host Name	Rem Port Id	Rem Chassis Id
ethernet1/1/9:1	Not Advertised	00:0a:f7:38:ba:a0	00:0a:f7:38:ba:a0
ethernet1/1/17	Broadcom Adv. Dua...	00:0a:f7:b6:15:d0	00:0a:f7:b6:15:d0
ethernet1/1/17	node-63356	00:0a:f7:b6:15:d0	vmnic0
ethernet1/1/18	Broadcom Adv. Dua...	00:0a:f7:b6:1a:80	00:0a:f7:b6:1a:80
ethernet1/1/18	node-94415	00:0a:f7:b6:1a:80	vmnic0
ethernet1/1/19	Broadcom Adv. Dua...	00:0a:f7:b6:11:c0	00:0a:f7:b6:11:c0
ethernet1/1/19	node-38673	00:0a:f7:b6:11:c0	vmnic0
ethernet1/1/20	Broadcom Adv. Dua...	00:0a:f7:b6:1c:10	00:0a:f7:b6:1c:10
ethernet1/1/20	node-86429	00:0a:f7:b6:1c:10	vmnic0
ethernet1/1/53	S5248F-Leaf1B	ethernet1/1/53	d8:9e:f3:bf:ae:00
ethernet1/1/54	S5248F-Leaf1B	ethernet1/1/54	d8:9e:f3:bf:ae:00

If an entry is not shown for the jump box or laptop computer (port 1/1/9:1 above), it means the NIC on the remote system does not have LLDP enabled. This is not required and may be ignored for this solution.

---

**Note:** For the dual switch without VLT topology, the output is identical to the above. For the single switch topology, the output includes all eight node-connected ports, and ports 1/1/53-54 are not used.

---

## 8.1.6 show vrrp brief

In this deployment, VRRP is configured on the External Management VLAN, 1611, to provide gateway redundancy for management traffic. The output from the **show vrrp brief** command shows the master and virtual IP addresses and whether the switch is in the master or backup role. The switch configured with the largest priority value, shown in the Priority column, becomes the master.

```
S5248F-Leaf1A# show vrrp brief
```

Interface	Group	Priority	Prompt	State	Version	Master addr(s)	Virtual addr
vlan1611	IPv4	11	150	true	master	2	172.16.11.253 172.16.11.254

---

**Note:** For the dual switch without VLT topology, the output is identical to the above. For the single switch topology, this command is not applicable.

---

## 8.2 VLT validation commands

The commands in this section are only applicable to the dual switch with VLT topology.

### 8.2.1 show vlt domain\_id

This command is used to validate the VLT configuration status. The Role for one switch in the VLT pair is primary, and its peer switch (not shown) is assigned the secondary role. Ensure Peer-Routing is Enabled. The VLTI Link Status and VLT Peer Status must both be up.

```
S5248F-Leaf1A# show vlt 127
```

Domain ID	:	127
Unit ID	:	1
Role	:	<b>primary</b>
Version	:	2.3
Local System MAC address	:	d8:9e:f3:c0:61:00
Role priority	:	32768
VLT MAC address	:	d8:9e:f3:bf:ae:00
IP address	:	fda5:74c8:b79e:1::1
Delay-Restore timer	:	90 seconds
Peer-Routing	:	<b>Enabled</b>
Peer-Routing-Timeout timer	:	0 seconds
VLTI Link Status		
port-channel1000	:	<b>up</b>

VLT	Peer	Unit ID	System MAC Address	Status	IP Address	Version
	2		d8:9e:f3:bf:ae:00	<b>up</b>	fda5:74c8:b79e:1::2	2.3

## 8.2.2 show vlt *domain\_id* backup-link

This command is used to verify VLT peers are communicating on the backup link over the OOB management network. The Destination is the management IP address of the peer. The Peer Heartbeat status must be Up.

```
S5248F-Leaf1A# show vlt 127 backup-link
VLT Backup Link
-----
Destination : 100.67.172.37
Peer Heartbeat status : Up
Heartbeat interval : 30
Heartbeat timeout : 90
Destination VRF : default
```

## 8.2.3 show vlt *domain\_id* mismatch

This command highlights any potential configuration issues between VLT peers. All items must indicate No mismatch.

```
S5248F-Leaf1A# show vlt 127 mismatch
VLT-MAC mismatch:
No mismatch

Peer-routing mismatch:
No mismatch

VLAN mismatch:
No mismatch

VLT VLAN mismatch:
No mismatch

VLT Virtual Network Mismatch:
Virtual Network Name Mismatch:
No mismatch

Virtual Network VLTi-VLAN Mismatch:
No mismatch

Virtual Network Mode Mismatch:
No mismatch

Virtual Network Tagged Interfaces Mismatch:
No mismatch

Virtual Network Untagged Interfaces Mismatch:
No mismatch
(Output truncated)
```

## 9

# Deploy VxRail

A laptop computer or jump box with a web browser for the VxRail user interface is required. It is either directly plugged into a leaf switch or able to logically reach the VxRail External Management VLAN from elsewhere on the network.

By default, the initial VxRail Manager IP address is 192.168.10.200/24. After initial configuration, the address changes to its new address on the External Management network. The new VxRail Manager address used in this guide is 172.16.11.102/24 per the planning data in Table 3.

During installation, the laptop or jump box must be able to reach both the initial and new VxRail Manager addresses, so two addresses are configured on the network adapter, one for each network.

---

**Note:** Both addresses may be configured simultaneously if the network adapter supports it, or in sequence if required.

---

The IP addresses configured on the laptop computer/jump box in this example are as follows:

- 192.168.10.1/24, to communicate with the initial VxRail Manager address, 192.168.10.200/24
- 172.16.11.50/24, to communicate with the new VxRail Manager address, 172.16.11.102/24

If a laptop computer is used, the connections appear, as shown in Figure 15.

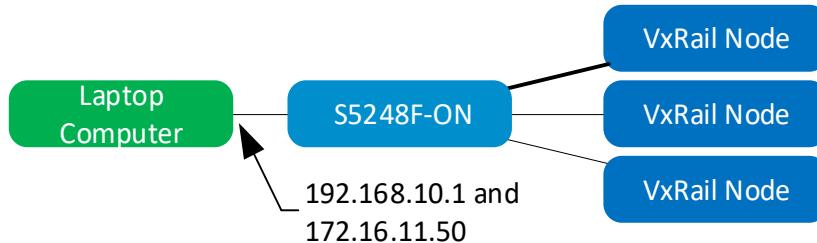


Figure 15 Use of a laptop computer for deployment

If a PowerEdge server is used as a jump box, make the connections, as shown in Figure 16. Access the jump box's operating system from a workstation using the iDRAC virtual console.

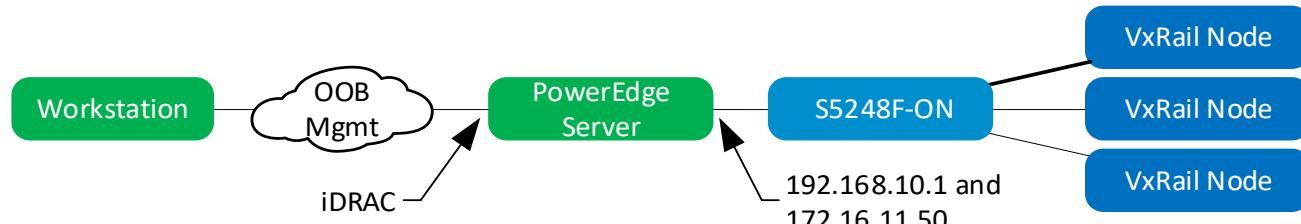


Figure 16 PowerEdge server as a jump box

---

**Note:** This deployment uses a PowerEdge server as a jump box that is also in the roles of DNS and NTP server. It may be connected to both leaf switches for redundancy using NIC teaming. Figure 16 shows a single connection from a jump box to a leaf switch for clarity. Port-group1/1/3 on the S5248F-ON is set to 10GbE to allow connectivity to a 10GbE NIC on the jump box. See Appendix B for information on S5248F-ON port-group configuration.

---

In a web browser on the laptop computer or jump box, connect to <https://192.168.10.200> and deploy VxRail using the planning data in Table 3.

**Note:** Step-by-step VxRail deployment GUI screenshots are beyond the scope of this guide.

## 9.1

## Management network VLAN ID

During VxRail 4.7 deployment, the user is prompted for the **Management Network VLAN ID** in the GUI. This refers to the External Management VLAN, which is VLAN 1611 in this guide. Since ports in this VLAN are access ports (untagged), leave the value set to 0, as shown in Figure 17.

The screenshot shows the 'Networking' configuration screen. It includes fields for Management Subnet mask (255.255.255.0), Management Gateway (172.16.11.254), Management Network VLAN ID (0), DNS server(s) (172.16.11.50), and buttons for PREVIOUS and NEXT. The 'Management Network VLAN ID' field is highlighted with a red border.

Figure 17 Management Network VLAN ID is set to 0 during deployment

Use the actual VLAN numbers for the remaining VLANs when prompted by the deployment GUI. Ports in the remaining VLANs are tagged.

## A Validated components for S5248F-ON using VxRail 4.7

The following tables include hardware, software, and firmware that was used to configure and validate the examples in this guide.

### A.1 Dell EMC PowerSwitches

Table 16 Switches and operating system versions

Qty	Item	OS version
2	Dell EMC PowerSwitch S5248F-ON leaf switches	10.5.0.0
1	Dell EMC PowerSwitch S3048-ON management switch	10.5.0.0

### A.2 DAC Cables

Table 17 DAC cables

Qty	Item	Dell PN
8	DAC-SFP28-25G-3.0M (Node connections)	0VXFJY
2	DAC-QSFP28-4SFP28-3M (VLTi connections)	07R9N9

---

**Note:** Dell EMC supported fiber optic cables and transceivers may also be used.

---

### A.3 VxRail P570 nodes

A cluster of four VxRail P570 nodes was used to validate the examples in this guide. The nodes were each configured using the information provided below.

Table 18 VxRail P570 node components

Qty per node	Item	Firmware version
2	Intel Xeon Gold 6136 CPU @ 3.00GHz, 12 cores	
12	16GB DDR4 DIMMs (192GB total)	
2	240GB SAS SSD	
8	1.2TB SAS HDD	
1	Dell HBA330 Storage Controller	15.17.09.06
1	Boot Optimized Storage Solution (BOSS) Controller	2.5.13.3016
1	Broadcom 57414 rNDC – 2x25GbE SFP28 ports	21.40.22.21
-	BIOS	2.1.8
-	iDRAC with Lifecycle Controller	3.32.32.32

## A.4 VxRail appliance software

The examples in this guide were validated using VxRail 4.7 appliance software. The software consists of the component versions that are provided below:

Table 19 VxRail appliance software component versions

Item	Version
VxRail Manager	4.7.211 build 13893929
VMware ESXi	6.7 EP09 build 13644319
VMware vCenter Server Appliance	6.7 U2a 13643870
VMware vSAN	6.7 EP09
VMware vRealize Log Insight	4.6.0 build 8080673

## B S5248F-ON port groups

In the example used in this guide, interface eth1/1/9 is connected to a 10GbE adapter on a PowerEdge server used as a jump box. On S5248F-ON, this interface must be changed from its native speed of 25GbE to 10GbE using the `port-group` command.

---

**Note:** In place of a jump box, a laptop computer containing a 1GbE BASE-T network adapter may be directly connected to an S5248F-ON leaf switch for VxRail deployment as described in Chapter 9. In this case, use an SFP-to-1GbE BASE-T adapter, Dell part number XTY28, in the leaf switch. Configure the corresponding S5248-ON port for 10GbE as described below. The switch port auto-negotiates to 1GbE when the laptop is connected.

---

To determine the port-group-to-interface mapping, run the `show port-group` command:

```
S5248F-Leaf1A# show port-group
```

Port-group	Mode	Ports	FEM
port-group1/1/1	Eth 25g-4x	1 2 3 4	-
port-group1/1/2	Eth 25g-4x	5 6 7 8	-
<b>port-group1/1/3</b>	<b>Eth 25g-4x</b>	<b>9 10 11 12</b>	-
port-group1/1/4	Eth 25g-4x	13 14 15 16	-
port-group1/1/5	Eth 25g-4x	17 18 19 20	-
port-group1/1/6	Eth 25g-4x	21 22 23 24	-
port-group1/1/7	Eth 25g-4x	25 26 27 28	-
port-group1/1/8	Eth 25g-4x	29 30 31 32	-
port-group1/1/9	Eth 25g-4x	33 34 35 36	-
port-group1/1/10	Eth 25g-4x	37 38 39 40	-
port-group1/1/11	Eth 25g-4x	41 42 43 44	-
port-group1/1/12	Eth 25g-4x	45 46 47 48	-
port-group1/1/13	Eth 100g-2x	49 50	-
port-group1/1/14	Eth 100g-2x	51 52	-
port-group1/1/15	Eth 100g-1x	53	-
port-group1/1/16	Eth 100g-1x	54	-
port-group1/1/17	Eth 100g-1x	55	-
port-group1/1/18	Eth 100g-1x	56	-

In the output above, interface eth1/1/9 is in port-group 1/1/3 which is at its default setting of 25GbE. The commands to change the interfaces in port-group 1/1/3 from 25GbE to 10GbE are as follows:

```
S5248F-Leaf1A# configure terminal  
S5248F-Leaf1A(config)# port-group 1/1/3  
S5248F-Leaf1A(conf-pg-1/1/3)# mode eth 10g-4x
```

Verify the settings with the following command:

```
S5248F-Leaf1A(conf-pg-1/1/3) # do show port-group
```

Port-group	Mode	Ports	FEM
port-group1/1/1	Eth 25g-4x	1 2 3 4	-
port-group1/1/2	Eth 25g-4x	5 6 7 8	-
port-group1/1/3	<b>Eth 10g-4x</b>	9 10 11 12	-
(Output truncated)			

The four interfaces in port-group1/1/3 are now set to 10GbE.

---

**Note:** The mode command changes the native speed of all interfaces in the port group, eth 1/1/9-1/1/12. In this guide, only port 1/1/9 is used. Repeat the above commands on the second leaf switch if it is also connected to a 10GbE adapter on the jump box.

---

After the port group mode change is made, the interface naming changes from eth 1/1/x to eth 1/1/x:n, where x is the physical port number, and n is the logical port number. In this example, changing port group 1/1/3 to 10GbE also changes the affected interface names to eth1/1/9:1–1/1/12:1.

Port-group configuration options for the S5248F-ON are shown in Table 20.

Table 20 S5248F-ON port-group configuration options

Port group number	Native physical interface name	Native speed	Other supported speeds	Non-native logical interface name
1/1/1	Eth 1/1/1-1/1/4	25g-4x	10g-4x	Eth 1/1/x:1
1/1/2	Eth 1/1/5-1/1/8	25g-4x	10g-4x	Eth 1/1/x:1
1/1/3	Eth 1/1/9-1/1/12	25g-4x	10g-4x	Eth 1/1/x:1
1/1/4	Eth 1/1/13-1/1/16	25g-4x	10g-4x	Eth 1/1/x:1
1/1/5	Eth 1/1/17-1/1/20	25g-4x	10g-4x	Eth 1/1/x:1
1/1/6	Eth 1/1/21-1/1/24	25g-4x	10g-4x	Eth 1/1/x:1
1/1/7	Eth 1/1/25-1/1/28	25g-4x	10g-4x	Eth 1/1/x:1
1/1/8	Eth 1/1/29-1/1/32	25g-4x	10g-4x	Eth 1/1/x:1
1/1/9	Eth 1/1/33-1/1/36	25g-4x	10g-4x	Eth 1/1/x:1
1/1/10	Eth 1/1/37-1/1/40	25g-4x	10g-4x	Eth 1/1/x:1
1/1/11	Eth 1/1/41-1/1/44	25g-4x	10g-4x	Eth 1/1/x:1
1/1/12	Eth 1/1/45-1/1/48	25g-4x	10g-4x	Eth 1/1/x:1
1/1/13	Eth 1/1/49-1/1/50	100g-2x	50g-4x 40g-2x 10g-8x 25g-8x	Eth 1/1/x:n
1/1/14	Eth 1/1/51-1/1/52	100g-2x	50g-4x 40g-2x 10g-8x 25g-8x	Eth 1/1/x:n
1/1/15	Eth 1/1/53	100g-1x	50g-2x 40g-1x 10g-4x 25g-4x	Eth 1/1/x:n
1/1/16	Eth 1/1/54	100g-1x	50g-2x 40g-1x 10g-4x 25g-4x	Eth 1/1/x:n
1/1/17	Eth 1/1/55	100g-1x	50g-2x 40g-1x 10g-4x 25g-4x	Eth 1/1/x:n
1/1/18	Eth 1/1/56	100g-1x	50g-2x 40g-1x 10g-4x 25g-4x	Eth 1/1/x:n

# C

## Technical resources

[Dell EMC Networking Guides](#)

[Dell EMC SmartFabric OS10 User Guide Release 10.5.0](#)

[Manuals and documentation for Dell EMC PowerSwitch S3048-ON](#)

[Manuals and documentation for Dell EMC PowerSwitch S5248F-ON](#)

[Dell EMC Networking Layer 3 Leaf-Spine Deployment and Best Practices with OS10](#)

[Dell EMC VxRail Network Planning Guide](#)

[Dell EMC VxRail support and documentation \(account required\)](#)

[Dell EMC VxRail Support Matrix \(account required\)](#)

[Dell EMC VxRail Appliance 4.5.x and 4.7.x Event Code Reference \(account required\)](#)

[VMware vSAN Network Design](#)

[VMware Validated Design Documentation](#)

[VMware Validated Design for Software-Defined Data Center 5.1 - Architecture and Design](#)

## D Support and feedback

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## Dell EMC S5048F-ON OS9 Deployment Guide for VxRail

# Dell EMC Networking OS9 Switch Configuration Guide for VxRail 4.5

Deploying a pair of S5048F-ON switches for a VxRail 4.5 cluster

## [Abstract](#)

This document provides Dell EMC Networking OS9 switch configuration examples and topology options for a VxRail 4.5 cluster deployment.

August 2018

## Revisions

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August 2018	Initial release

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## 1 Introduction

VxRail sits at the forefront of a fundamental shift in IT infrastructure consumption – away from application-specific, “build-your-own” infrastructure and toward virtualized, general-purpose, engineered systems. Dell EMC and VMware have embraced this shift with the VxRail hyper-converged appliance. VxRail has a simple, scale-out architecture that leverages VMware vSphere and VMware vSAN to provide server virtualization and software-defined storage.

To take full advantage of the VxRail solution, one must carefully consider the network that not only connects multiple nodes into a single, cohesive cluster but also enables connectivity to the customer’s IT environment. Numerous industry studies have shown that networking is the primary source of both deployment issues and poor performance of hyper-converged solutions. In most cases, VxRail clusters (minimum of three and maximum of 64 nodes) connect to a pre-existing IP network at the customer site. The inclusion of dedicated switches for the VxRail cluster simplifies this process and avoids many of the pitfalls associated with the deployment of a hyper-converged solution that originates in network connectivity.

The audience for this document includes professional services or onsite IT personnel responsible for the deployment of a VxRail cluster when a pair of dedicated Dell EMC Networking switches is purchased with the cluster. This document covers the process of connecting a cluster of VxRail nodes to:

- A pair of Dell Networking switches configured for Virtual Link Trunking (VLT). Using VLT is the preferred topology.
- A pair of Dell Networking switches not configured for VLT.
- A single Dell Networking switch.

This document provides switch topology options and configuration examples for a VxRail 4.5 cluster using nodes built on 14th generation (14G) PowerEdge servers. Nodes in these examples use 25GbE network adapters. Switches in this guide use Dell EMC Networking OS9.

## 1.1 Supported switches and operating systems

The examples provided in this deployment guide use VxRail 4.5 nodes connected to Dell EMC Networking S5048F-ON switches running Dell Networking OS9.

Dell EMC Networking supports the following switch and OS combinations for VxRail 4.0 and later:

Dell EMC Networking Switches Supported for VxRail 4.0 and future releases*		
Dell EMC Networking Switch	Networking OS 9 ver 9.12.1.0 and future releases	Networking OS 10 ver 10.4.0R3 and future releases
S3048-ON	Supported	Supported
S3124 / S3124F / S3124P / S3148 / S3148P	Supported	
S4048F-ON / S4048T-ON	Supported	Supported
S4112F-ON / S4112T-ON / S4128F-ON / S4128T-ON		Supported
S4148F-ON / S4148FE-ON / S4148T-ON		Supported
S4148U-ON		Supported
S4248FB-ON / S4248FBL-ON		Supported
S5048F-ON	Supported	
S6010-ON	Supported	Supported
S6100-ON	Supported	
Z9100-ON <sup>1</sup>	Supported	Supported
Z9264F-ON <sup>2</sup>		Supported

\*DELL EMC PROVIDES THIS SUPPORTED SWITCH LIST AS IS, WITHOUT EXPRESS OR IMPLIED WARRANTIES OF ANY KIND. THIS LIST IS FOR INFORMATIONAL PURPOSES ONLY AND MAY CONTAIN TYPOGRAPHICAL AND TECHNICAL INACCURACIES. DELLEMC SHALL NOT BE LIABLE FOR ANY DAMAGES ARISING OUT OF OR IN CONNECTION WITH THE USE OF THIS LIST.  
<sup>1</sup>Z9100-ON is supported with 10GbE connections to nodes. Z9100-ON support for 25GbE connections to nodes is planned for future releases.  
<sup>2</sup>Z9264-ON is supported with OS10 ver 10.4.1 or later

Figure 1 Supported Dell EMC Networking switches and operating systems

## 1.2 Typographical conventions

The CLI and GUI examples in this document use the following conventions:

Monospace Text	CLI examples
<u>Underlined Monospace Text</u>	CLI examples that wrap the page
<i>Italic Monospace Text</i>	Variables in CLI examples
<b>Bold Monospace Text</b>	Commands entered at the CLI prompt, or to highlight information in CLI output
<b>Bold text</b>	GUI fields and information entered in the GUI

## 1.3 Attachments

This document in .pdf format includes switch configuration file attachments. To access attachments in Adobe Acrobat Reader, click the  icon in the left pane halfway down the page, then click the  icon.

## 2 Hardware overview

This section briefly describes the hardware used to validate this deployment. [Appendix A](#) contains a complete listing of hardware and software validated for this guide.

### 2.1 Dell EMC Networking S5048F-ON

The S5048F-ON is a 1-Rack Unit (RU), multilayer switch with 48x25GbE, and 6x100GbE or 72x25GbE ports. This guide uses two S5048F-ONs as leaf switches.

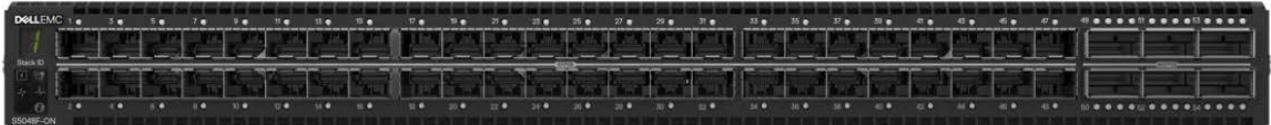


Figure 2 Dell EMC Networking S5048F-ON

### 2.2 Dell EMC Networking S3048-ON

The S3048-ON is a 1-RU switch with 48x1GbE BASE-T ports and 4x10GbE SFP+ ports. This guide uses one S3048-ON switch for out-of-band (OOB) management traffic.

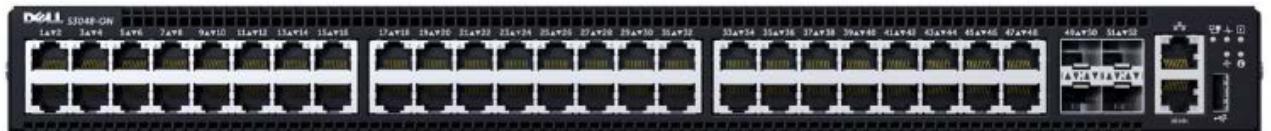


Figure 3 Dell EMC Networking S3048-ON

### 2.3 Dell EMC VxRail 14G nodes

Current Dell EMC VxRail P, V, S, and E Series nodes are built on 14<sup>th</sup> generation (14G) PowerEdge servers.

#### 2.3.1 Dell EMC VxRail P Series node

VxRail P Series nodes are ideal for CPU-intensive workloads such as databases. P Series nodes support up to 44 CPU cores, 1536GB memory, and 24TB hybrid or 46TB all-flash storage in a 2-RU form factor.

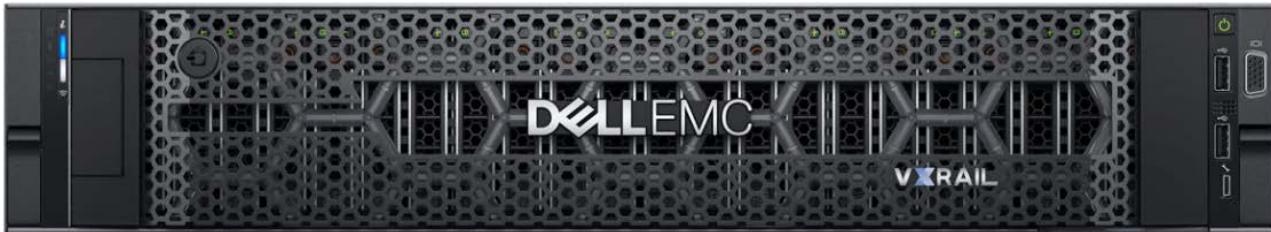


Figure 4 Dell EMC VxRail 2-RU node (P, V, or S Series)

---

**Note:** The deployment examples in this guide use a VxRail cluster consisting of four P570 nodes.

---

### 2.3.2 Dell EMC VxRail V Series node

VxRail V Series nodes are graphics-ready for uses such as high-end 2D/3D visualization. V Series nodes support up to 40 CPU cores, 1024GB memory, 3 GPUs, and 24TB hybrid or 46TB all-flash storage in a 2-RU form factor.

### 2.3.3 Dell EMC VxRail S Series node

VxRail S Series nodes provide expanded storage capacity for collaboration, data, and analytics. S Series nodes support up to 36 CPU cores, 1536GB memory, and 48TB hybrid storage in a 2-RU form factor.

### 2.3.4 Dell EMC VxRail E Series node

VxRail E Series nodes are best suited for remote office or entry workloads. E Series nodes support up to 40 CPU cores, 1536GB memory, and 16TB hybrid or 30TB all-flash storage in a 1-RU form factor.



Figure 5 Dell EMC VxRail E Series node

### 2.3.5 VxRail node network adapters

Each 14G VxRail node includes a rack server Network Daughter Card (rNDC) with one of the following port combinations:

- 2x25GbE SFP28 ports
- 2x10GbE SFP+ or BASE-T ports
- 4x10GbE SFP+ or BASE-T ports
- 4x1GbE BASE-T ports (for single CPU nodes only, max 8 nodes/cluster)

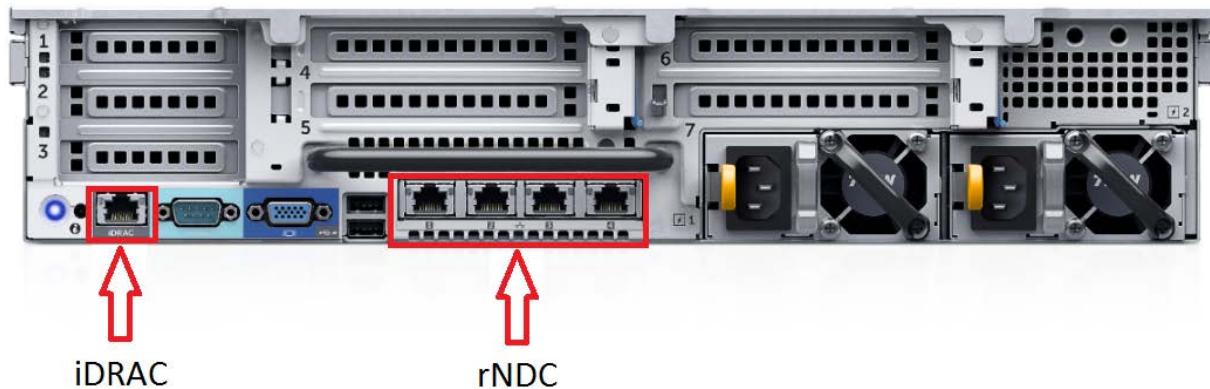


Figure 6 Rear view of VxRail 2-RU node (1-RU node is similar)

---

**Note:** Each of the VxRail P570 nodes in the deployment examples in this guide contains a Broadcom 57414 rNDC with 2x25GbE SFP28 ports.

---

VxRail optimizes network traffic by splitting it across rNDC uplinks and by using Network I/O control (NIOC) shares for different traffic types. See [Appendix B](#) for more information.

P, V, S, and E Series VxRail nodes also include a 1GbE BASE-T integrated Dell Remote Access Card (iDRAC) for OOB management.

---

**Note:** P, V, and S Series nodes support additional network adapters in PCIe slots. See the [\*Dell EMC VxRail Network Guide\*](#) for more information.

---

## 3 Topology options

VxRail may be deployed using a single or dual switch topology. Using a single switch provides the lowest initial cost, but creates a single point of failure. A dual switch configuration helps ensure high availability by eliminating this single point of failure.

A dual switch configuration may be used with or without VLT. Dell EMC recommends a dual switch configuration with VLT. The sections that follow explain the different options.

### 3.1 Dual switch

In a dual switch topology, each VxRail node has one or more connections to each of two leaf switches providing redundancy at the NIC and switch levels. If VLT is used, the switches are connected with a VLT interconnect (VLTi). If VLT is not used, the switches are connected with a standard LACP port channel.

#### 3.1.1 Dual switch with VLT

Dell EMC recommends using a dual switch configuration with VLT as shown in Figure 7.

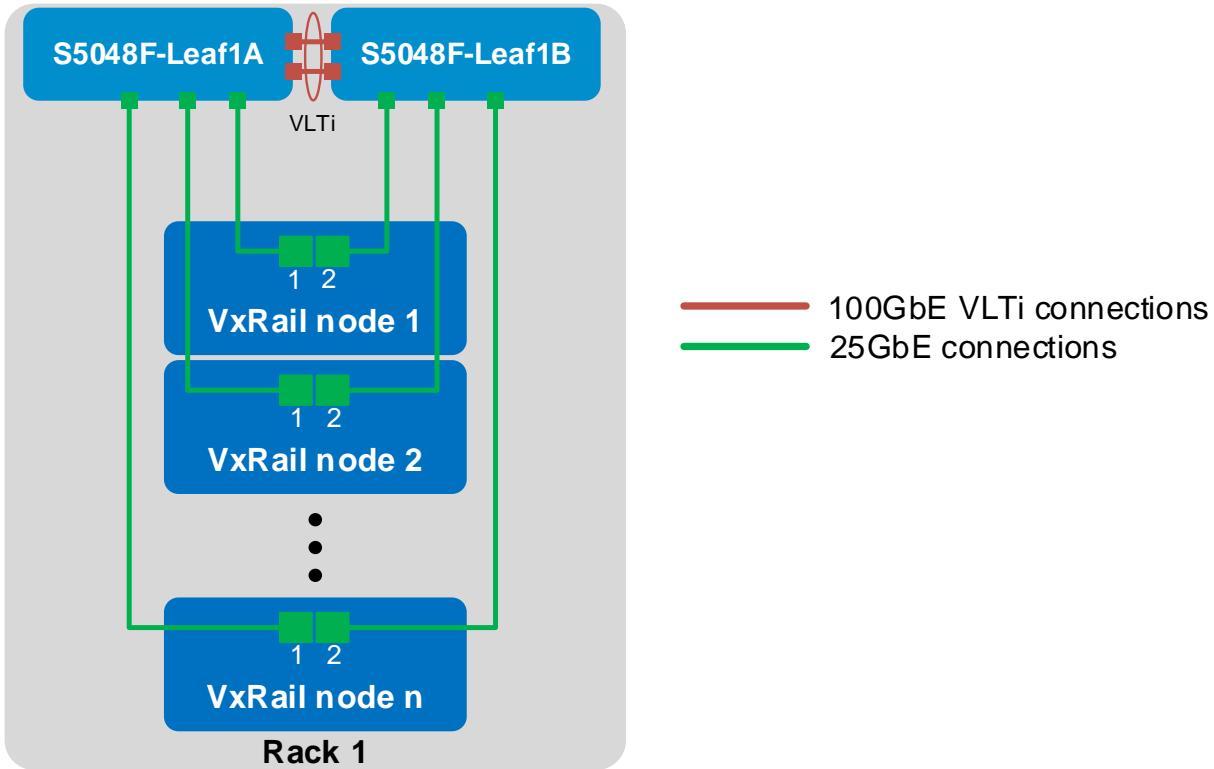


Figure 7 Dual switch topology with VLT

VLT synchronizes ARP, MAC tables, and IPv6 neighbors between the VLT peers and makes the switch pair appear as one logical unit to connected devices.

VLT provides the following benefits:

- Provides a loop-free topology and eliminates STP-blocked ports
- Optimizes the use of all available uplink bandwidth
- Guarantees fast convergence if either a link or a device fails

- Provides link-level resiliency
- Assures high availability
- Allows a single device to use a LAG across two upstream switches
- Provides Layer 2 multipathing

When combined with Virtual Router Redundancy Protocol (VRRP), a dual switch topology with VLT provides more efficient Layer 3 forwarding than if VLT is not used. Packets coming from vmnics that are connected to the backup VRRP router are forwarded by the backup VRRP router, instead of crossing the VLTi to get to the VRRP master router. In a dual switch topology without VLT, packets coming from vmnics that are connected to the backup VRRP router must be sent over the inter-switch port channel to be forwarded by the master VRRP router.

---

**Note:** While VxRail nodes use active and standby network adapters instead of LAGs, other servers in the rack can connect to the VLT switch pair with an LACP LAG for active/active Layer 2 multipathing. For more information on VLT, see the [Dell Networking OS Configuration Guide for the S5048F-ON System](#). Guides for other switch models are available at <http://www.dell.com/support>.

---

### 3.1.2 Dual switch without VLT

The configuration of a switch pair without VLT is supported, but it does not provide the advantages of VLT covered in the previous section.

The switch pair is cabled as shown in Figure 8. The links connecting the two switches are configured in an LACP port channel.

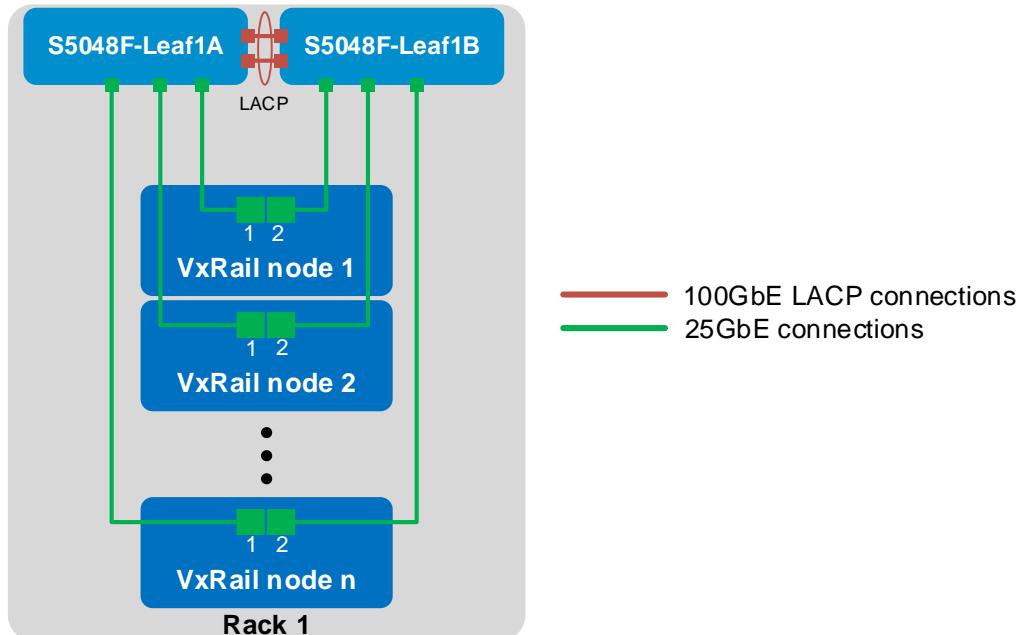


Figure 8 Dual switch topology without VLT

## 3.2 Single switch

In a single switch topology, all VxRail nodes connect to a single switch. This topology is lower initial cost, but it is not recommended as the switch becomes a single point of failure.

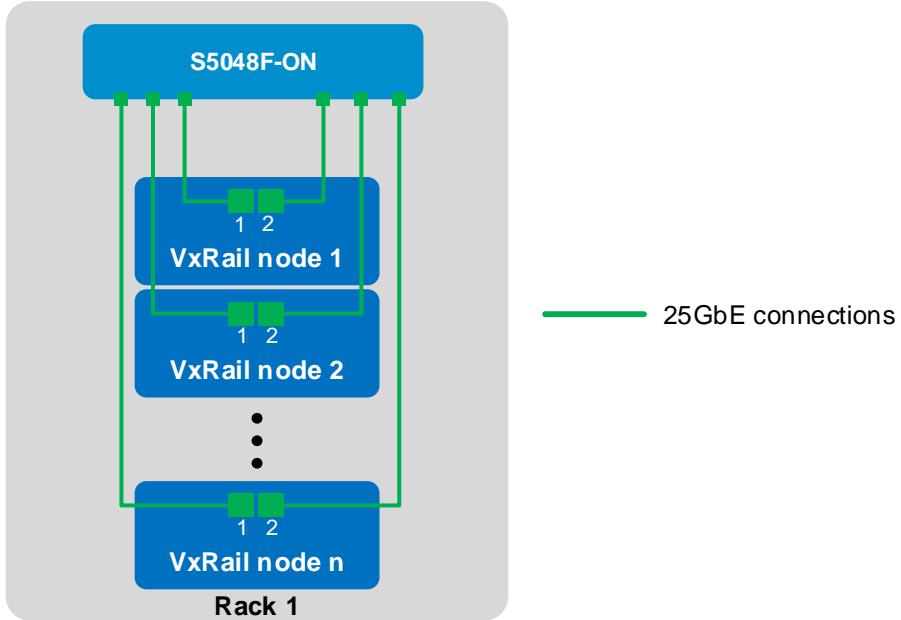


Figure 9 Single switch topology

## 4 VxRail in the data center

### 4.1 Leaf-spine network

Dell EMC recommends using a leaf-spine network in the data center with leaf switches configured as VLT peers. The switches and VxRail nodes covered in this guide are shown in Rack 1 in Figure 10, and are incorporated into a data center's leaf-spine network.

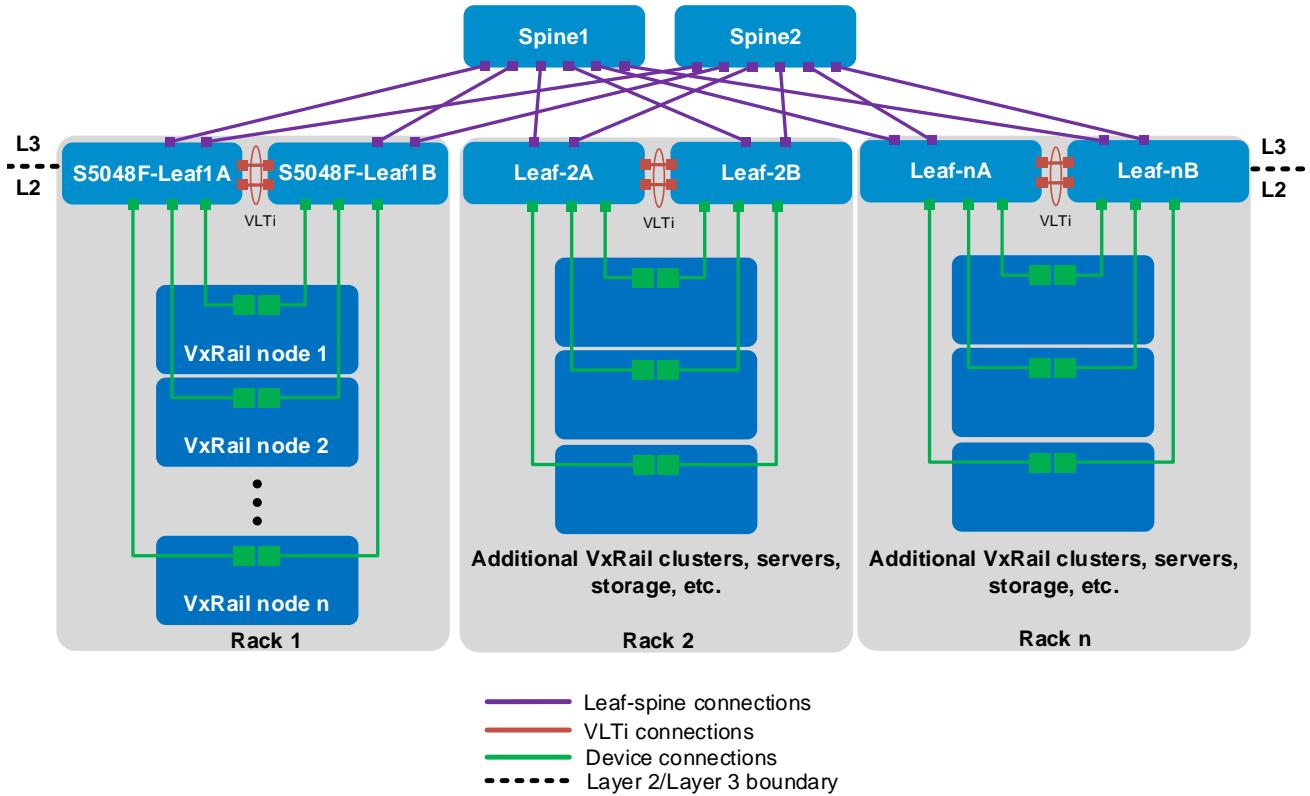


Figure 10 Dual switch topology with VLT connected to a leaf-spine network

In Figure 10, the Layer 2/Layer 3 boundary is at the leafs, meaning traffic within each rack is switched (Layer 2) and traffic between racks is routed (Layer 3). [VMware Validated Design Documentation release 4.3](#) recommends isolating vSAN traffic to its own Layer 2 network segment. Therefore, for this leaf-spine topology, each vSAN should be contained within a single rack. Since a VxRail cluster contains a vSAN, a VxRail cluster is also contained within a single rack.

---

**Note:** By default, VxRail does not enable routing of vSAN or vMotion traffic.

---

The leaf-spine topology in Figure 10 scales to sixteen racks or more, depending on the number of ports available in each spine. Racks may contain additional VxRail clusters, switches, servers, storage arrays, and other devices as needed.

To configure the remainder of the leaf-spine network, including spine switches, connections between leafs and spines, and routing protocols, see the [Dell EMC Leaf-Spine Deployment and Best Practices Guide](#).

## 4.2 OOB management network

The out-of-band (OOB) management network is an isolated network for remote management of servers, switches, and storage devices via their dedicated hardware management ports. It is also commonly used to carry heartbeat messages sent between switches configured as VLT peers.

For OOB management connections, one S3048-ON switch is installed in each rack as shown:

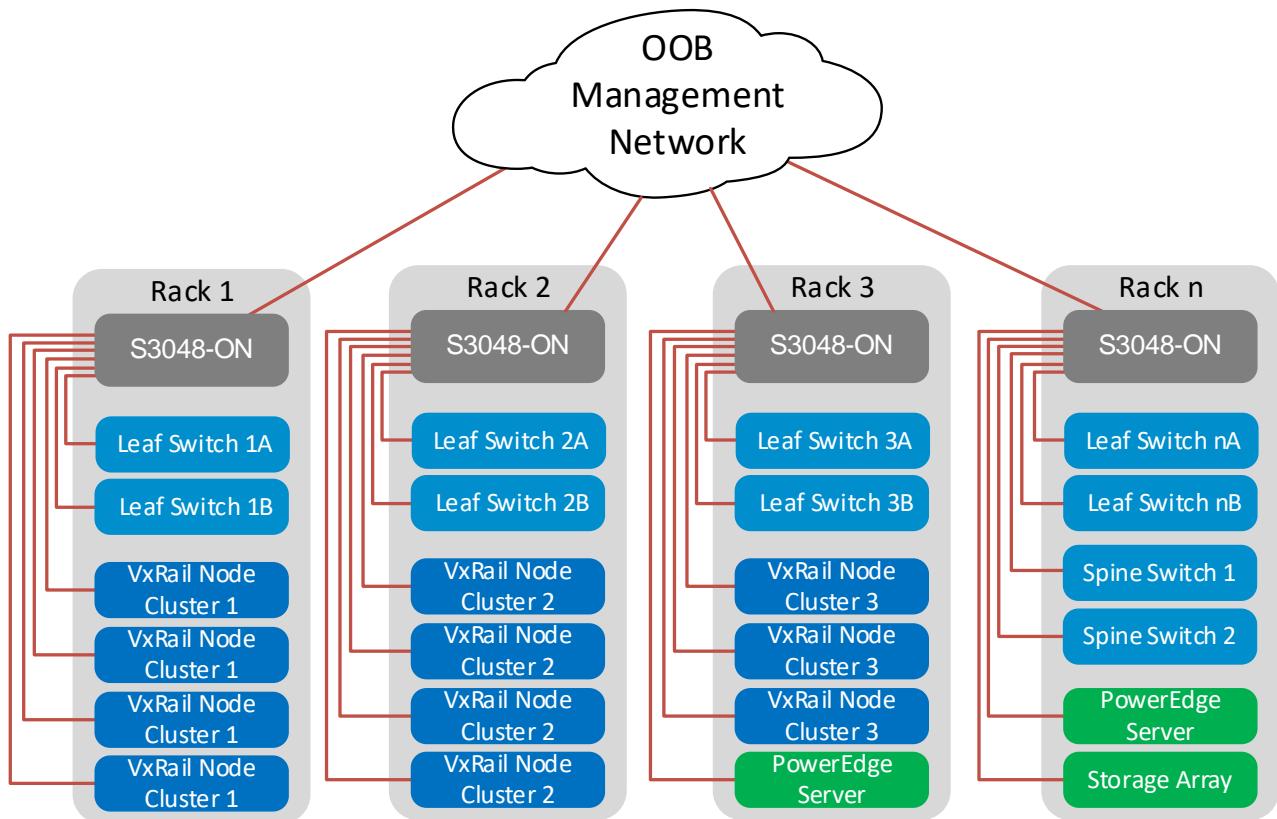


Figure 11 OOB management network connections

---

**Note:** This guide focuses on the devices in Rack 1. Devices shown in other racks are for illustration only.

1GbE BASE-T ports on each S3048-ON are connected downstream to hardware management ports on each device. This includes VxRail node iDRACs, PowerEdge Server iDRACs, and dedicated management ports on switches and storage arrays.

Four 10GbE SFP+ ports are available on each S3048-ON for use as uplinks to the OOB management network core.

---

**Note:** This is not to be confused with the in-band management network which runs on the same physical network as other VxRail and end-user traffic. In-band connections are covered in Section 3.

---

Devices on the OOB management network in this guide use the 100.67.0.0/16 IP address block.

## 5 Configuration planning

### 5.1 VLANs and IP addresses

VLANs and IP addresses used for VxRail node traffic must be planned before switch configuration and VxRail deployment can begin.

VxRail node traffic is divided into four or more VLANs as shown in Table 1.

Table 1 VLANs used for VxRail nodes

VLAN	Purpose
Management	Single VLAN for in-band management traffic used for VxRail node-to-node, ESXi host management, vCenter server, NTP, DNS, and VxRail management traffic
vMotion	Single VLAN for virtual machine (VM) migration
vSAN	Single VLAN for vSAN storage traffic
VM Network(s)	One or more VLANs for VM data traffic

VLAN configuration and IP network addresses planned for this deployment are shown in Table 2.

Table 2 VLANs and IP addresses

VLAN ID	Description	Network	Gateway	VLAN Traffic
1611	In-Band Management	172.16.11.0/24	172.16.11.254	Untagged
1612	vMotion	172.16.12.0/24	NA	Tagged
1613	vSAN	172.16.13.0/24	NA	Tagged
1614	VM Network A	172.16.14.0/24	Optional, not used	Tagged
1615	VM Network B	172.16.15.0/24	Optional, not used	Tagged

---

**Note:** By default, VxRail does not enable routing of vSAN or vMotion traffic.

This example uses two networks for VM data traffic, VM Network A and VM Network B, with each on a separate VLAN. The actual number of VM data networks used is based on customer requirements.

## 5.2 VxRail network configuration table

Information provided in the VxRail network configuration table is used during VxRail deployment. The values used for this deployment example are shown in the right column. The VLANs and IP addresses used are based on the information from Table 2.

Table 3 VxRail network configuration table

Row		Category	Description	Values used
1	VxRail	Management VLAN ID	The recommended is untagged traffic on the Native VLAN. If you want the host to send only tagged frames, manually configure the VLAN on each ESXi™ host using DCUI, and set tagging for your management VLAN on your switch before you deploy VxRail.	<b>1611 (untagged)</b>
2			VxRail initial IP	If you cannot reach the default (192.168.10.200/24), set an alternate IP address
3	System	Global settings	Time zone	
4			NTP server(s)	<b>172.16.11.50</b>
5			DNS server(s)	<b>172.16.11.50</b>
6		Proxy settings	IP address and port	
7			Username and password	
8	Management	ESXi hostnames and IP addresses	ESXi hostname prefix	<b>vxhost</b>
9			Separator	<b>none</b>
10			Iterator	<b>Num 0x</b>
11			Offset	<b>1</b>
12			Suffix	<b>none</b>
13			Domain	<b>dell.local</b>
14			ESXi starting address for IP pool	<b>172.16.11.1</b>
15			ESXi ending address for IP pool	<b>172.16.11.40</b>
16		vCenter Server Leave blank if Customer Supplied VC	vCenter Server hostname	<b>vxvcenter</b>
17			vCenter Server IP address	<b>172.16.11.100</b>
18			Platform Services Controller hostname	<b>vxpsc</b>
19			Platform Services Controller IP address	<b>172.16.11.101</b>
20		Customer Supplied vCenter Server Leave blank if VxRail VC	Customer Supplied Platform Services Controller (PSC) Hostname (FQDN) Leave	
21			Customer Supplied vCenter Server hostname (FQDN)	
22			Customer Supplied vCenter Server SSO domain	
23			admin username/password or the newly created VxRail non-admin username and password	
24			New VxRail management username and password	
25			Customer Supplied data center name	
26			New cluster name	
27	VxRail Manager	VxRail hostname		<b>vxman</b>
28		VxRail IP address		<b>172.16.11.102</b>
29	Networking	Subnet mask		<b>255.255.255.0</b>
30		Gateway		<b>172.16.11.254</b>
31	Passwords	ESXi “root” passwords. Can be different for each host starting with Release 4.0.100.		<b>Dell!234</b>
32		VxRail Manager and VxRail vCenter Server “administrator@vsphere.local”		<b>P3!!!234</b>
33	vMotion		Starting address for IP pool	<b>172.16.12.1</b>
34			Ending address for IP pool	<b>172.16.12.40</b>
35			Subnet mask	<b>255.255.255.0</b>
36			VLAN ID	<b>1612</b>
37	vSAN		Starting address for IP pool	<b>172.16.13.1</b>
38			Ending address for IP pool	<b>172.16.13.40</b>

Row		Category	Description	Values used
39			Subnet mask	255.255.255.0
40			VLAN ID	1613
41	VM Networks	... (unlimited number)	VM Network name and VLAN ID	VM_Network_A, 1614
42			VM Network name and VLAN ID	VM_Network_B, 1615
43			vRealize Log Insight™ hostname	vxinsight
44	Solutions	Logging	vRealize Log Insight IP address	172.16.11.103
45			Syslog server (instead of Log Insight)	

This deployment uses four VxRail nodes. However, host IP address pools are configured for the Management, vMotion, and vSAN VLANs using addresses in the .1 - .40 range in Table 3. This ensures IP addresses are preconfigured for hosts that may be added later as the VxRail cluster grows.

---

**Note:** For additional information on the VxRail network configuration table, see the [Dell EMC VxRail Network Guide](#).

---

## 5.3 Using a jump box or laptop computer

For VxRail deployment, VxRail Manager is accessed via the leaf switches connected to the nodes. This may be done by connecting a laptop computer directly to a leaf or by using a jump box for remote access.

Reserve at least one interface on a leaf switch for this connection. This interface is configured on the in-band management VLAN during switch configuration.

---

**Note:** More information on jump box connections is provided in Section 9.

---

## 5.4 DNS and NTP servers

VxRail nodes must be able to reach a correctly configured DNS server from the in-band management network during and after VxRail deployment. The DNS server must include forward and reverse lookup entries for ESXi hosts, vCenter, the Platform Services Controller, VxRail Manager, and vRealize Log Insight.

Forward and reverse lookup records are created on the DNS server using the hostnames and IP addresses in the VxRail network configuration table (Table 3). Table 4 summarizes the DNS entries for this deployment.

Table 4 Hostnames and IP addresses used

Hostname	IP Address
vxhost01.dell.local	172.16.11.1
vxhost02.dell.local	172.16.11.2
vxhost03.dell.local	172.16.11.3
vxhost04.dell.local	172.16.11.4
vxvcenter.dell.local	172.16.11.100
vxpvc.dell.local	172.16.11.101
vxman.dell.local	172.16.11.102
vxinsight.dell.local	172.16.11.103

An NTP server is not required but is recommended. If an NTP server is not provided, VxRail uses the time that is set on ESXi host #1.

---

**Note:** For this deployment guide, the PowerEdge server used as the jump box also provides DNS and NTP services for the VxRail cluster. It is connected to both leaf switches for redundancy using Microsoft Windows NIC teaming (switch-independent load balancing).

---

## 6 Switch configuration prerequisites

### 6.1 Check switch OS version

S5048F-ON switches must be running OS version 9.12(1.0) or later. Run the `show version` command to check the OS version. Dell EMC recommends upgrading to the latest release available on the [Dell Networking Customer Support Portal](#) (account required).

```
Dell#show version
Dell EMC Real Time Operating System Software
Dell EMC Operating System Version: 2.0
Dell EMC Application Software Version: 9.12(1.0)
Copyright (c) 1999-2017 by Dell Inc. All Rights Reserved.
```

---

**Note:** Figure 1 at the beginning of this guide lists supported switches and operating systems for VxRail deployments.

---

### 6.2 Factory default configuration

The configuration commands in the sections that follow begin with S5048F-ON switches at their factory default settings. Dell EMC Networking switches running OS9 can be reset to their default configuration as follows:

```
DellEMC#restore factory-defaults stack-unit unit# clear-all
Proceed with factory settings? Confirm [yes/no]:yes
```

Factory settings are restored, and the switch reloads. After reload, enter **A** at the [A/C/L/S]: prompt as shown below to exit Bare Metal Provisioning (BMP) mode.

```
This device is in Bare Metal Provisioning (BMP) mode.
To continue with the standard manual interactive mode, it is necessary to
abort BMP.

Press A to abort BMP now.
Press C to continue with BMP.
Press L to toggle BMP syslog and console messages.
Press S to display the BMP status.
[A/C/L/S]:A

% Warning: The bmp process will stop ...

DellEMC>
```

The switch is now ready for configuration.

## 7 Configure switches

This section covers switch configuration for S5048F-ON switches in the different topologies. Commands for all examples are provided as attachments to this guide.

### 7.1

### Dual switch with VLT

This example uses a four-node VxRail cluster connected to a pair of switches configured with VLT as shown below. Dell EMC recommends using this topology.

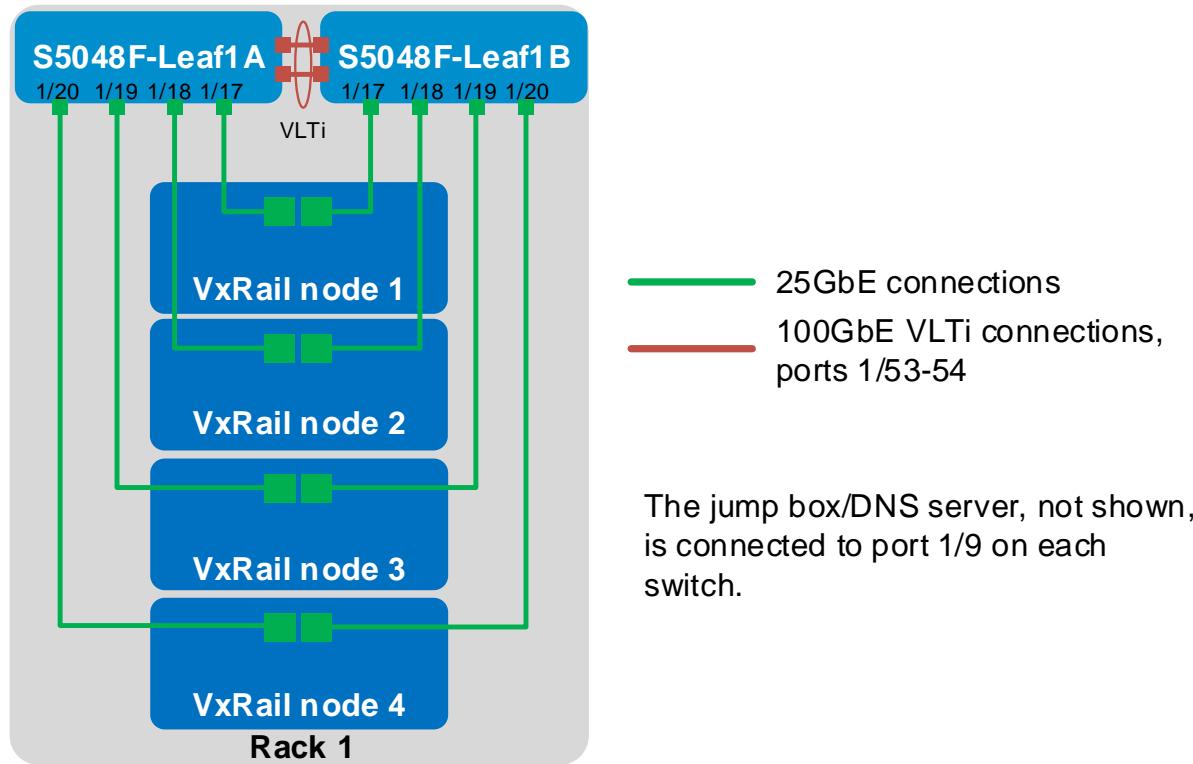


Figure 12 Four-node cluster connected to a pair of switches configured with VLT

The commands in the following sections are run to complete the configuration of both leaf switches. The port numbers used in the configuration commands correspond to those shown in Figure 12.

---

**Note:** The commands in the tables below should be entered in the order shown. All commands are provided in the file attachments named **S5048F-1A-vlt.txt** and **S5048F-1B-vlt.txt**.

---

#### 7.1.1

#### General settings

Configure the hostname, OOB management IP address and default gateway. Specify an NTP server accessible by the switch. Enable LLDP for troubleshooting. Enable RSTP as a precaution against loops. Configure S5048F-Leaf1A as the primary RSTP root bridge using the `bridge-priority 0` command and S5048F-Leaf1B as the secondary RSTP root bridge using the `bridge-priority 4096` command.

Table 5 General settings – dual switch with VLT

S5048F-Leaf1A	S5048F-Leaf1B
<pre> enable configure terminal  hostname S5048F-Leaf1A  interface ManagementEthernet 1/1 ip address 100.67.172.36/24 no shutdown management route 0.0.0.0/0 <u>100.67.172.254</u>  ntp server 100.67.10.20  protocol lldp <u>advertise management-tlv management- address system-description system-name</u> advertise interface-port-desc  protocol spanning-tree rstp no disable bridge-priority 0 </pre>	<pre> enable configure terminal  hostname S5048F-Leaf1B  interface ManagementEthernet 1/1 ip address 100.67.172.35/24 no shutdown management route 0.0.0.0/0 <u>100.67.172.254</u>  ntp server 100.67.10.20  protocol lldp <u>advertise management-tlv management- address system-description system-name</u> advertise interface-port-desc  protocol spanning-tree rstp no disable bridge-priority 4096 </pre>

## 7.1.2 Configure interfaces

Configure the interfaces for the jump box or laptop computer connections to be used during VxRail deployment. This example uses interface twentyFiveGigE 1/9 on each switch. While only one connection is required, two are used for redundancy.

---

**Note:** In this example, the jump box also provides DNS and NTP services as covered in Section 5.4. If these services are located on other devices, ensure the switch interfaces connected to these services are configured in the same manner.

Configure the interfaces for connections to the VxRail nodes. Interfaces twentyFiveGigE 1/17 through 1/20 are used in this example.

Use the portmode hybrid command to enable ports to carry both untagged (in-band management) and tagged (all other) traffic. Put the ports in Layer 2 mode with the switchport command. Configure ports directly connected to nodes, servers, or other endpoints as RSTP edge ports. Enable flow control on node-connected ports for best performance.

---

**Note:** Flow control is enabled on all network interfaces in ESXi by default.

Table 6 Configure interfaces – dual switch with VLT

S5048F-Leaf1A	S5048F-Leaf1B
<pre> interface twentyFiveGigE 1/9 description JumpBox_DNS no ip address portmode hybrid switchport spanning-tree rstp edge-port </pre>	<pre> interface twentyFiveGigE 1/9 description JumpBox_DNS no ip address portmode hybrid switchport spanning-tree rstp edge-port </pre>

S5048F-Leaf1A	S5048F-Leaf1B
no shutdown	no shutdown
interface twentyFiveGigE 1/17 description Node1_Port1 no ip address portmode hybrid switchport spanning-tree rstp edge-port flowcontrol rx on tx on no shutdown	interface twentyFiveGigE 1/17 description Node1_Port2 no ip address portmode hybrid switchport spanning-tree rstp edge-port flowcontrol rx on tx on no shutdown
interface twentyFiveGigE 1/18 description Node2_Port1 no ip address portmode hybrid switchport spanning-tree rstp edge-port flowcontrol rx on tx on no shutdown	interface twentyFiveGigE 1/18 description Node2_Port2 no ip address portmode hybrid switchport spanning-tree rstp edge-port flowcontrol rx on tx on no shutdown
interface twentyFiveGigE 1/19 description Node3_Port1 no ip address portmode hybrid switchport spanning-tree rstp edge-port flowcontrol rx on tx on no shutdown	interface twentyFiveGigE 1/19 description Node3_Port2 no ip address portmode hybrid switchport spanning-tree rstp edge-port flowcontrol rx on tx on no shutdown
interface twentyFiveGigE 1/20 description Node4_Port1 no ip address portmode hybrid switchport spanning-tree rstp edge-port flowcontrol rx on tx on no shutdown	interface twentyFiveGigE 1/20 description Node4_Port2 no ip address portmode hybrid switchport spanning-tree rstp edge-port flowcontrol rx on tx on no shutdown

### 7.1.3 Configure VLT

Use hundredGigE interfaces for the VLTi between the two leaf switches. This example uses hundredGigE 1/53 and 1/54. Create a port channel for the VLTi, 127 in this example, and add the interfaces using the `channel-member` command.

Create the VLT domain and add the VLTi port channel to the domain. The backup destination is the OOB management IP address of the VLT peer switch. Configure a different unit ID (0 or 1) on each switch and enable peer routing.

**Note:** Dell EMC Networking recommends that the VLTi is configured as a static LAG, without LACP, per the commands shown. For more information on VLT, see the [Dell Networking OS Configuration Guide for the S5048F-ON System](#).

Table 7 Configure VLT – dual switch with VLT

S5048F-Leaf1A	S5048F-Leaf1B
interface hundredGigE 1/53 description VLTi no ip address no shutdown	interface hundredGigE 1/53 description VLTi no ip address no shutdown
interface hundredGigE 1/54 description VLTi no ip address no shutdown	interface hundredGigE 1/54 description VLTi no ip address no shutdown
interface Port-channel 127 description VLTi no ip address channel-member hundredGigE 1/53-1/54 no shutdown	interface Port-channel 127 description VLTi no ip address channel-member hundredGigE 1/53-1/54 no shutdown
vlt domain 127 peer-link port-channel 127 back-up destination 100.67.172.35 unit-id 0 peer-routing	vlt domain 127 peer-link port-channel 127 back-up destination 100.67.172.36 unit-id 1 peer-routing

## 7.1.4 Configure VLANs

In this section, VLANs are configured per Table 2.

Assign an IP address to the in-band management VLAN. Add the interfaces connected to the VxRail nodes and jump box as untagged members of the in-band management VLAN. Configure VRRP to provide gateway redundancy and assign the same virtual address to both switches. The switch with the largest priority value becomes the master VRRP router.

---

**Note:** In this example, the jump box also provides DNS and NTP services as covered in Section 5.4. If these services are located on other devices, ensure the switch interfaces connected to these services are also added to the in-band management VLAN.

---

Add the VxRail node interfaces as tagged members of the vMotion, vSAN, and VM Network VLANs.

When the configuration is complete, exit configuration mode and save the configuration with the `end` and `write memory` commands.

Table 8 Configure VLANs – dual switch with VLT

S5048F-Leaf1A	S5048F-Leaf1B
interface Vlan 1611 description InBand_Mgmt ip address 172.16.11.253/24 untagged twentyFiveGigE 1/9,1/17-1/20 vrrp-group 11 virtual-address 172.16.11.254 priority 150 no shutdown	interface Vlan 1611 description InBand_Mgmt ip address 172.16.11.252/24 untagged twentyFiveGigE 1/9,1/17-1/20 vrrp-group 11 virtual-address 172.16.11.254 priority 100 no shutdown

S5048F-Leaf1A	S5048F-Leaf1B
<pre>interface Vlan 1612 description vMotion no ip address tagged twentyFiveGigE 1/17-1/20 no shutdown</pre>	<pre>interface Vlan 1612 description vMotion no ip address tagged twentyFiveGigE 1/17-1/20 no shutdown</pre>
<pre>interface Vlan 1613 description vSAN no ip address tagged twentyFiveGigE 1/17-1/20 no shutdown</pre>	<pre>interface Vlan 1613 description vSAN no ip address tagged twentyFiveGigE 1/17-1/20 no shutdown</pre>
<pre>interface Vlan 1614 description VM_Network_A no ip address tagged twentyFiveGigE 1/17-1/20 no shutdown</pre>	<pre>interface Vlan 1614 description VM_Network_A no ip address tagged twentyFiveGigE 1/17-1/20 no shutdown</pre>
<pre>interface Vlan 1615 description VM_Network_B no ip address tagged twentyFiveGigE 1/17-1/20 no shutdown</pre>	<pre>interface Vlan 1615 description VM_Network_B no ip address tagged twentyFiveGigE 1/17-1/20 no shutdown</pre>
<pre>end write memory</pre>	<pre>end write memory</pre>

## 7.2 Dual switch without VLT

This example uses a four-node VxRail cluster connected to a switch pair without VLT as shown below.

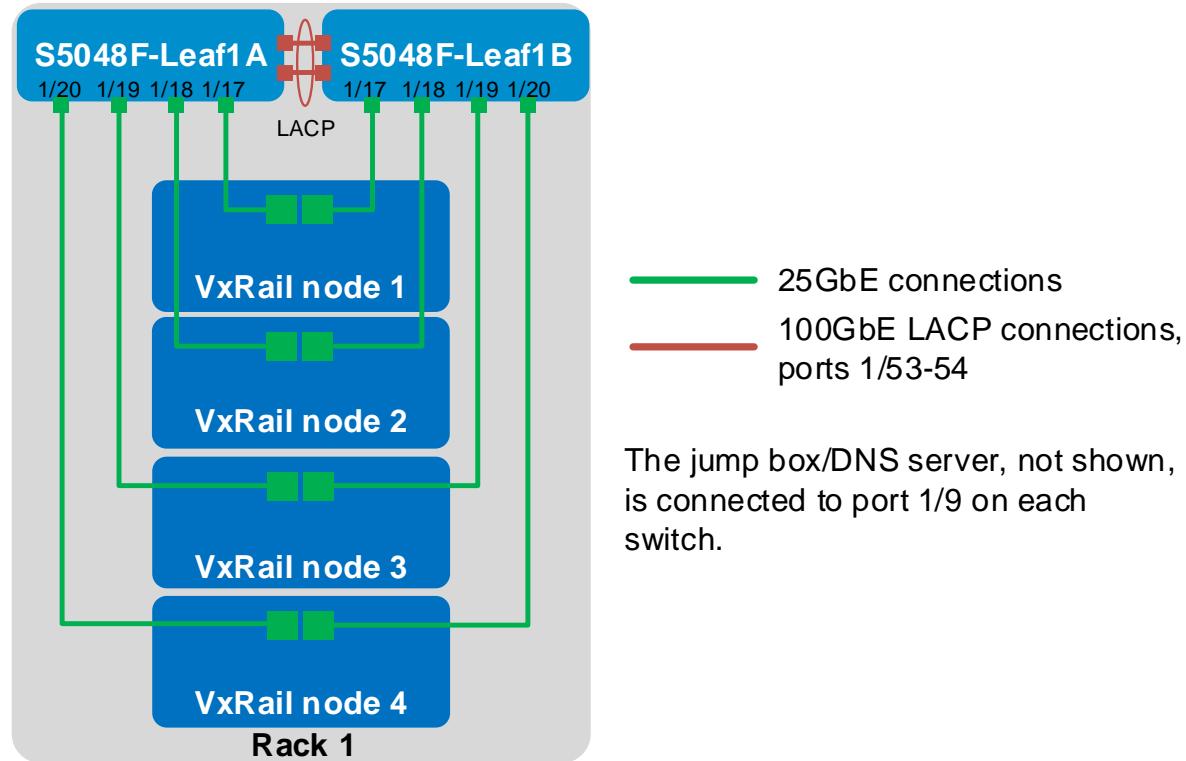


Figure 13 Four-node cluster connected to a switch pair without VLT

In this topology, an LACP port channel is used to connect the two switches.

The commands in the following sections are run to complete the configuration of both switches. The port numbers used in the configuration commands correspond to those shown in Figure 13.

---

**Note:** The commands in the tables below should be entered in the order shown. All commands are provided in the file attachments named **S5048F-1A-no-vlt.txt** and **S5048F-1B-no-vlt.txt**.

---

### 7.2.1 General settings

Configure the hostname, OOB management IP address and default gateway. Specify an NTP server accessible by the switch. Enable LLDP for troubleshooting. Enable RSTP as a precaution against loops. Configure S5048F-Leaf1A as the primary RSTP root bridge using the `bridge-priority 0` command and S5048F-Leaf1B as the secondary RSTP root bridge using the `bridge-priority 4096` command.

Table 9 General settings - dual switch without VLT

S5048F-Leaf1A	S5048F-Leaf1B
<pre>enable configure terminal  hostname S5048F-Leaf1A</pre>	<pre>enable configure terminal  hostname S5048F-Leaf1B</pre>

S5048F-Leaf1A	S5048F-Leaf1B
<pre>interface ManagementEthernet 1/1 ip address 100.67.172.36/24 no shutdown management route 0.0.0.0/0 <u>100.67.172.254</u>  ntp server 100.67.10.20  protocol lldp <u>advertise management-tlv management- address system-description system-name</u> advertise interface-port-desc  protocol spanning-tree rstp no disable bridge-priority 0</pre>	<pre>interface ManagementEthernet 1/1 ip address 100.67.172.35/24 no shutdown management route 0.0.0.0/0 <u>100.67.172.254</u>  ntp server 100.67.10.20  protocol lldp <u>advertise management-tlv management- address system-description system-name</u> advertise interface-port-desc  protocol spanning-tree rstp no disable bridge-priority 4096</pre>

## 7.2.2 Configure interfaces

Configure the interfaces for the jump box or laptop computer connections to be used during VxRail deployment. This example uses interface twentyFiveGigE 1/9 on each switch. While only one connection is required, two are used for redundancy.

---

**Note:** In this example, the jump box also provides DNS and NTP services as covered in Section 5.4. If these services are located on other devices, ensure the switch interfaces connected to these services are configured in the same manner.

Configure the interfaces for connections to the VxRail nodes. Interfaces twentyFiveGigE 1/17 through 1/20 are used in this example.

Use the `portmode hybrid` command to enable ports to carry both untagged (in-band management) and tagged (all other) traffic. Put the ports in Layer 2 mode with the `switchport` command. Configure ports directly connected to nodes, servers, or other endpoints as RSTP edge ports. Enable flow control on node-connected ports for best performance.

---

**Note:** Flow control is enabled on all network interfaces in ESXi by default.

Table 10 Configure interfaces – dual switch without VLT

S5048F-Leaf1A	S5048F-Leaf1B
<pre>interface twentyFiveGigE 1/9 description JumpBox_DNS no ip address portmode hybrid switchport spanning-tree rstp edge-port no shutdown  interface twentyFiveGigE 1/17 description Node1_Port1 no ip address portmode hybrid</pre>	<pre>interface twentyFiveGigE 1/9 description JumpBox_DNS no ip address portmode hybrid switchport spanning-tree rstp edge-port no shutdown  interface twentyFiveGigE 1/17 description Node1_Port2 no ip address portmode hybrid</pre>

S5048F-Leaf1A	S5048F-Leaf1B
<pre> switchport spanning-tree rstp edge-port flowcontrol rx on tx on no shutdown </pre>	<pre> switchport spanning-tree rstp edge-port flowcontrol rx on tx on no shutdown </pre>
<pre> interface twentyFiveGigE 1/18 description Node2_Port1 no ip address portmode hybrid switchport spanning-tree rstp edge-port flowcontrol rx on tx on no shutdown </pre>	<pre> interface twentyFiveGigE 1/18 description Node2_Port2 no ip address portmode hybrid switchport spanning-tree rstp edge-port flowcontrol rx on tx on no shutdown </pre>
<pre> interface twentyFiveGigE 1/19 description Node3_Port1 no ip address portmode hybrid switchport spanning-tree rstp edge-port flowcontrol rx on tx on no shutdown </pre>	<pre> interface twentyFiveGigE 1/19 description Node3_Port2 no ip address portmode hybrid switchport spanning-tree rstp edge-port flowcontrol rx on tx on no shutdown </pre>
<pre> interface twentyFiveGigE 1/20 description Node4_Port1 no ip address portmode hybrid switchport spanning-tree rstp edge-port flowcontrol rx on tx on no shutdown </pre>	<pre> interface twentyFiveGigE 1/20 description Node4_Port2 no ip address portmode hybrid switchport spanning-tree rstp edge-port flowcontrol rx on tx on no shutdown </pre>

### 7.2.3 Configure the switch interconnect

Use hundredGigE interfaces for the port channel between the two leaf switches. This example uses hundredGigE 1/53 and 1/54. Configure the interfaces for LACP and add them to the same port channel. 127 is used in this example. Put the port channel in hybrid mode to carry both untagged (in-band management) and tagged (all other) traffic.

Table 11 Configure switch interconnect - dual switch without VLT

S5048F-Leaf1A	S5048F-Leaf1B
<pre> interface hundredGigE 1/53 description To Leaf1B no ip address port-channel-protocol lacp port-channel 127 mode active no shutdown </pre>	<pre> interface hundredGigE 1/53 description To Leaf1A no ip address port-channel-protocol lacp port-channel 127 mode active no shutdown </pre>
<pre> interface hundredGigE 1/54 description To Leaf1B no ip address port-channel-protocol lacp port-channel 127 mode active no shutdown </pre>	<pre> interface hundredGigE 1/54 description To Leaf1A no ip address port-channel-protocol lacp port-channel 127 mode active no shutdown </pre>

S5048F-Leaf1A	S5048F-Leaf1B
<pre>interface Port-channel 127 description To Leaf1B no ip address portmode hybrid switchport no shutdown</pre>	<pre>interface Port-channel 127 description To Leaf1A no ip address portmode hybrid switchport no shutdown</pre>

## 7.2.4 Configure VLANs

In this section, VLANs are configured per Table 2.

Assign an IP address to the in-band management VLAN. Add the interfaces connected to the VxRail nodes and jump box as untagged members of the in-band management VLAN. Also add the port channel connecting the two switches. Configure VRRP to provide gateway redundancy and assign the same virtual address to both switches. The switch with the largest priority value becomes the master VRRP router.

---

**Note:** In this example, the jump box also provides DNS and NTP services as covered in Section 5.4. If these services are located on other devices, ensure the switch interfaces connected to these services are also added to the in-band management VLAN.

---

Add the VxRail node interfaces and the port channel as tagged members of the vMotion, vSAN, and VM Network VLANs.

When the configuration is complete, exit configuration mode and save the configuration with the `end` and `write memory` commands.

Table 12 Configure VLANs - dual switch without VLT

S5048F-Leaf1A	S5048F-Leaf1B
<pre>interface Vlan 1611 description InBand_Mgmt ip address 172.16.11.253/24 untagged twentyFiveGigE 1/9,1/17-1/20 untagged Port-channel 127 vrrp-group 11 virtual-address 172.16.11.254 priority 150 no shutdown  interface Vlan 1612 description vMotion no ip address tagged twentyFiveGigE 1/17-1/20 tagged Port-channel 127 no shutdown  interface Vlan 1613 description vSAN no ip address tagged twentyFiveGigE 1/17-1/20 tagged Port-channel 127 no shutdown</pre>	<pre>interface Vlan 1611 description InBand_Mgmt ip address 172.16.11.252/24 untagged twentyFiveGigE 1/9,1/17-1/20 untagged Port-channel 127 vrrp-group 11 virtual-address 172.16.11.254 priority 100 no shutdown  interface Vlan 1612 description vMotion no ip address tagged twentyFiveGigE 1/17-1/20 tagged Port-channel 127 no shutdown  interface Vlan 1613 description vSAN no ip address tagged twentyFiveGigE 1/17-1/20 tagged Port-channel 127 no shutdown</pre>

S5048F-Leaf1A	S5048F-Leaf1B
<pre> interface Vlan 1614 description VM_Network_A no ip address tagged twentyFiveGigE 1/17-1/20 tagged Port-channel 127 no shutdown  interface Vlan 1615 description VM_Network_B no ip address tagged twentyFiveGigE 1/17-1/20 tagged Port-channel 127 no shutdown  end write memory </pre>	<pre> interface Vlan 1614 description VM_Network_A no ip address tagged twentyFiveGigE 1/17-1/20 tagged Port-channel 127 no shutdown  interface Vlan 1615 description VM_Network_B no ip address tagged twentyFiveGigE 1/17-1/20 tagged Port-channel 127 no shutdown  end write memory </pre>

## 7.3 Single switch

This example uses a four-node VxRail cluster connected to a single switch as shown below.

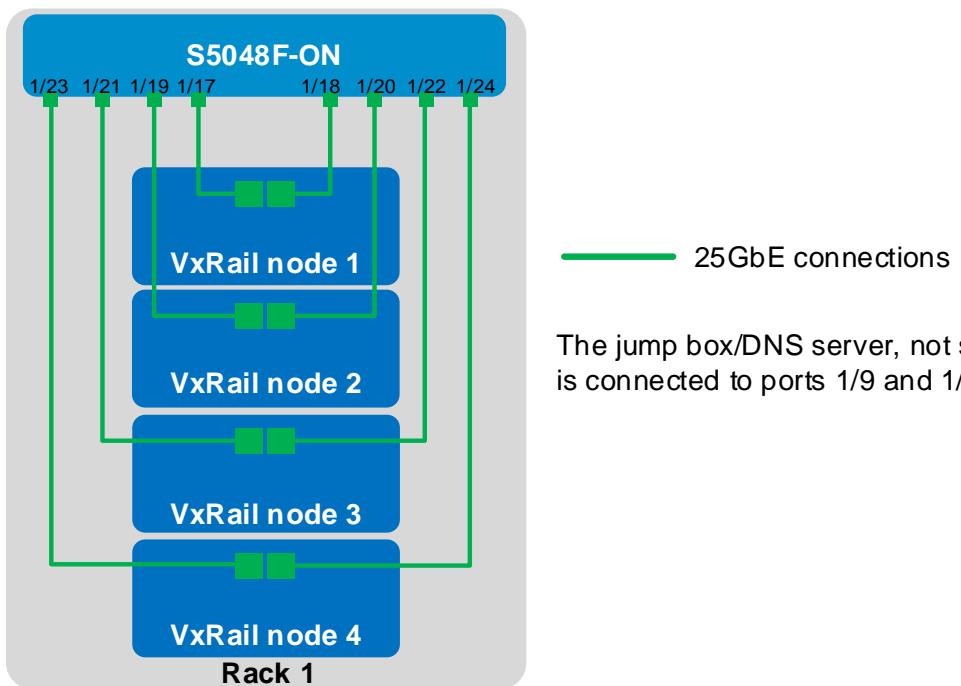


Figure 14 Four-node cluster connected to a single switch

The commands in the following sections are run to complete the switch configuration. The port numbers used in the configuration commands correspond to those shown in Figure 14.

---

**Note:** The commands in the tables below should be entered in the order shown. All commands are provided in the file attachment named **S5048F-single-switch.txt**.

---

### 7.3.1 General settings

Configure the hostname, OOB management IP address and default gateway. Specify an NTP server accessible by the switch. Enable LLDP for troubleshooting. Enable RSTP as a precaution against loops.

Table 13 General settings – single switch

S5048F-ON
<pre>enable configure terminal  hostname S5048F-ON  interface ManagementEthernet 1/1 ip address 100.67.172.36/24 no shutdown management route 0.0.0.0/0 100.67.172.254  ntp server 100.67.10.20  protocol lldp <u>advertise management-tlv management-address</u> <u>system-description system-name</u> advertise interface-port-desc  protocol spanning-tree rstp no disable</pre>

### 7.3.2 Configure interfaces

Configure the interfaces for the jump box or laptop computer connections to be used during VxRail deployment. This example uses interfaces twentyFiveGigE 1/9 and 1/10. While only one connection is required, two are used for redundancy.

---

**Note:** In this example, the jump box also provides DNS and NTP services as covered in Section 5.4. If these services are located on other devices, ensure the switch interfaces connected to these services are configured in the same manner.

---

Configure the interfaces for connections to the VxRail nodes. Interfaces twentyFiveGigE 1/17 through 1/24 are used in this example.

Use the portmode hybrid command to enable ports to carry both untagged (in-band management) and tagged (all other) traffic. Put the ports in Layer 2 mode with the switchport command. Configure ports directly connected to nodes, servers, or other endpoints as RSTP edge ports. Enable flow control on node-connected ports for best performance.

---

**Note:** Flow control is enabled on all network interfaces in ESXi by default.

---

Table 14 Configure interfaces – single switch

S5048F-ON
<pre>interface twentyFiveGigE 1/9 description JumpBox_DNS no ip address</pre>

**S5048F-ON**

```
portmode hybrid
switchport
spanning-tree rstp edge-port
no shutdown

interface twentyFiveGigE 1/10
description JumpBox_DNS
no ip address
portmode hybrid
switchport
spanning-tree rstp edge-port
no shutdown

interface twentyFiveGigE 1/17
description Node1_Port1
no ip address
portmode hybrid
switchport
spanning-tree rstp edge-port
flowcontrol rx on tx on
no shutdown

interface twentyFiveGigE 1/18
description Node1_Port2
no ip address
portmode hybrid
switchport
spanning-tree rstp edge-port
flowcontrol rx on tx on
no shutdown

interface twentyFiveGigE 1/19
description Node2_Port1
no ip address
portmode hybrid
switchport
spanning-tree rstp edge-port
flowcontrol rx on tx on
no shutdown

interface twentyFiveGigE 1/20
description Node2_Port2
no ip address
portmode hybrid
switchport
spanning-tree rstp edge-port
flowcontrol rx on tx on
no shutdown

interface twentyFiveGigE 1/21
description Node3_Port1
no ip address
portmode hybrid
switchport
spanning-tree rstp edge-port
flowcontrol rx on tx on
```

#### S5048F-ON

```
no shutdown

interface twentyFiveGigE 1/22
description Node3_Port2
no ip address
portmode hybrid
switchport
spanning-tree rstp edge-port
flowcontrol rx on tx on
no shutdown

interface twentyFiveGigE 1/23
description Node4_Port1
no ip address
portmode hybrid
switchport
spanning-tree rstp edge-port
flowcontrol rx on tx on
no shutdown

interface twentyFiveGigE 1/24
description Node4_Port2
no ip address
portmode hybrid
switchport
spanning-tree rstp edge-port
flowcontrol rx on tx on
no shutdown
```

### 7.3.3 Configure VLANs

In this section, VLANs are configured per Table 2.

Assign an IP address to the in-band management VLAN. Add the interfaces connected to the nodes and jump box as untagged members of the in-band management VLAN.

---

**Note:** In this example, the jump box also provides DNS and NTP services as covered in Section 5.4. If these services are located on other devices, ensure the switch interfaces connected to these services are also added to the in-band management VLAN.

---

Add the VxRail node interfaces as tagged members of the vMotion, vSAN, and VM Network VLANs.

When the configuration is complete, exit configuration mode and save the configuration with the `end` and `write memory` commands.

Table 15 Configure VLANs – single switch

**S5048F-ON**

```
interface Vlan 1611
description InBand_Mgmt
ip address 172.16.11.254/24
untagged twentyFiveGigE 1/9-1/10,1/17-1/24
no shutdown

interface Vlan 1612
description vMotion
no ip address
tagged twentyFiveGigE 1/17-1/24
no shutdown

interface Vlan 1613
description vSAN
tagged twentyFiveGigE 1/17-1/24
no shutdown

interface Vlan 1614
description VM_Network_A
no ip address
tagged twentyFiveGigE 1/17-1/24
no shutdown

interface Vlan 1615
description VM_Network_B
no ip address
tagged twentyFiveGigE 1/17-1/24
no shutdown

end
write memory
```

## 8 Switch validation

After switches are configured and devices are connected, the switch CLI is used to validate the network configuration. This section provides a list of the most common commands and their output for the examples used in this guide.

### 8.1 General validation commands

The commands and output shown below are for S5048F-Leaf1A in the dual switch with VLT topology. The output of its peer, S5048F-Leaf1B, is similar. If the dual switch without VLT or single switch topologies are used, notes are added where differences exist.

---

**Note:** For additional commands and output related to the leaf-spine portion of the topology, such as BGP and Uplink Failure Detection (UFD), see the [Dell EMC Leaf-Spine Deployment and Best Practices Guide](#).

---

#### 8.1.1 show interfaces status

The `show interfaces status | grep Up` command is used to verify required interfaces are up, and links are established at their appropriate speeds.

```
S5048F-Leaf1A#show interfaces status | grep Up
Tf 1/9           JumpBox_DNS  Up    10000 Mbit  Full   1611
Tf 1/17          Node1_Port1 Up    25000 Mbit  Full   1611-1615
Tf 1/18          Node2_Port1 Up    25000 Mbit  Full   1611-1615
Tf 1/19          Node3_Port1 Up    25000 Mbit  Full   1611-1615
Tf 1/20          Node4_Port1 Up    25000 Mbit  Full   1611-1615
Hu 1/53          VLTI       Up    100000 Mbit Full   --
Hu 1/54          VLTI       Up    100000 Mbit Full   --
```

---

**Note:** For the dual switch without VLT topology, the output is identical to the above except for the description of ports 1/53-54. For the single switch topology, the output includes all eight node ports, and ports 1/53-54 are not used.

---

#### 8.1.2 show interfaces port-channel brief

The `show interfaces port-channel brief` command is used to view port channel numbers, interfaces used, and status. In this example, LAG 127 is the VLTI connecting the two leaf switches.

```
S5048F-Leaf1A#show interfaces port-channel brief
Codes: L - LACP Port-channel
        O - OpenFlow Controller Port-channel
        A - Auto Port-channel
        I - Internally Lagged

LAG  Mode Status      Uptime      Ports
  127 L2   up         00:00:50    Hu 1/53    (Up)
                                         Hu 1/54    (Up)
```

---

**Note:** The command output for the dual switch without VLT topology is shown below. In this example, LAG 127 is the LACP port channel used as the switch interconnect.

```
S5048F-Leaf1A#show interfaces port-channel brief
Codes: L - LACP Port-channel
       O - OpenFlow Controller Port-channel
       A - Auto Port-channel
       I - Internally Lagged

      LAG  Mode   Status        Uptime      Ports
L    127  L2L3  up           00:04:11   Hu 1/53    (Up)
                                         Hu 1/54    (Up)
```

---

### 8.1.3 show vlan

The `show vlan` command is used to view interfaces assigned to each VLAN and whether the interfaces are untagged (U), tagged (T), or VLT (V).

```
S5048F-Leaf1A#show vlan

Codes: * - Default VLAN, G - GVRP VLANs, R - Remote Port Mirroring VLANs, P - Primary, C - Community, I - Isolated
       O - Openflow, Vx - Vxlan
Q: U - Untagged, T - Tagged
   x - Dot1x untagged, X - Dot1x tagged
   o - OpenFlow untagged, O - OpenFlow tagged
G - GVRP tagged, M - Vlan-stack
i - Internal untagged, I - Internal tagged, v - VLT untagged, V - VLT tagged

      NUM   Status     Description          Q Ports
*    1     Active    InBand_Mgmt        U Po127(Hu 1/53,1/54)
      1611  Active    InBand_Mgmt        V Po127(Hu 1/53,1/54)
                                U Tf 1/9,1/17-1/20
      1612  Active    vMotion            V Po127(Hu 1/53,1/54)
                                T Tf 1/17-1/20
      1613  Active    vSAN               V Po127(Hu 1/53,1/54)
                                T Tf 1/17-1/20
      1614  Active    VM_Network_A      V Po127(Hu 1/53,1/54)
                                T Tf 1/17-1/20
      1615  Active    VM_Network_B      V Po127(Hu 1/53,1/54)
                                T Tf 1/17-1/20
```

---

---

**Note:** For the dual switch without VLT topology, the VLAN portion of the command output is as follows:

	NUM	Status	Description	Q Ports
*	1	Inactive		
	1611	Active	InBand_Mgmt	U Po127(Hu 1/53,1/54) U Tf 1/9,1/17-1/20
	1612	Active	vMotion	T Po127(Hu 1/53,1/54) T Tf 1/17-1/20
	1613	Active	vSAN	T Po127(Hu 1/53,1/54) T Tf 1/17-1/20
	1614	Active	VM_Network_A	T Po127(Hu 1/53,1/54) T Tf 1/17-1/20
	1615	Active	VM_Network_B	T Po127(Hu 1/53,1/54) T Tf 1/17-1/20

For the single switch topology, the VLAN portion is as follows:

	NUM	Status	Description	Q Ports
*	1	Inactive		
	1611	Active	InBand_Mgmt	U Tf 1/9-1/10,1/17-1/24
	1612	Active	vMotion	T Tf 1/17-1/24
	1613	Active	vSAN	T Tf 1/17-1/24
	1614	Active	VM_Network_A	T Tf 1/17-1/24
	1615	Active	VM_Network_B	T Tf 1/17-1/24

---

## 8.1.4 show lldp neighbors

The `show lldp neighbors` command is useful for identifying connected equipment. Interface Tf 1/9 is connected to the jump box. Interfaces Tf 1/17-20 are connected to the Broadcom adapter in each of the VxRail nodes and Hu 1/53-54 are connected to the other leaf. Interface Ma 1/1 is the OOB management interface.

S5048F-Leaf1A#**show lldp neighbors**

Loc	PortID	Rem Host Name	Rem Port Id	Rem Chassis Id
Tf 1/9	-		00:0a:f7:38:ba:a0	00:0a:f7:38:ba:a0
Tf 1/17		Broadcom Adv. D...	00:0a:f7:b6:15:d0	00:0a:f7:b6:15:d0
Tf 1/18		Broadcom Adv. D...	00:0a:f7:b6:1a:80	00:0a:f7:b6:1a:80
Tf 1/19		Broadcom Adv. D...	00:0a:f7:b6:11:c0	00:0a:f7:b6:11:c0
Tf 1/20		Broadcom Adv. D...	00:0a:f7:b6:1c:10	00:0a:f7:b6:1c:10
Hu 1/53		S5048F-Leaf1B	hundredGigE 1/53	d8:9e:f3:bb:d6:20
Hu 1/54		S5048F-Leaf1B	hundredGigE 1/54	d8:9e:f3:bb:d6:20
Ma 1/1		Mgmt-Rack172	Gi1/0/42	28:f1:0e:ef:dd:88

---

**Note:** For the dual switch without VLT topology, the output is identical to the above. For the single switch topology, the output includes all eight node-connected ports, and ports 1/53-54 are not used.

---

### 8.1.5 show vrrp brief

In this deployment, VRRP is configured on the in-band management VLAN, 1611, to provide gateway redundancy for management traffic. The output from the `show vrrp brief` command shows the local and virtual IP addresses and whether the switch is in the master or backup role. The switch configured with the largest priority value, shown in the `Pri` column, becomes the master.

```
S5048F-Leaf1A#show vrrp brief
```

Interface	Group	Pri	Pre	State	Master addr	Virtual addr(s)	Description
V1	1611	IPv4	11	150	Y	Master 172.16.11.253	172.16.11.254

---

**Note:** For the dual switch without VLT topology, the output is identical to that shown above. For the single switch topology, this command is not applicable.

---

## 8.2 VLT validation commands

The following commands are only applicable to the dual switch with VLT topology.

### 8.2.1 show vlt brief

This command is used to validate the VLT configuration status. The `Role` for one switch in the VLT pair is `Primary`, and its peer switch (not shown) is assigned the `Secondary` role. The `Inter-chassis link (ICL)` Link Status, Heart Beat Status and VLT Peer Status must all be `Up`. Ensure Peer-Routing is Enabled.

```
S5048F-Leaf1A#show vlt brief
VLT Domain Brief
-----
Domain ID: 127
Role: Primary
Role Priority: 32768
ICL Link Status: Up
HeartBeat Status: Up
VLT Peer Status: Up
Local Unit Id: 0
Version: 6(7)
Local System MAC address: d8:9e:f3:a7:26:20
Remote System MAC address: d8:9e:f3:bb:d6:20
Remote system version: 6(7)
Delay-Restore timer: 90 seconds
Delay-Restore Abort Threshold: 60 seconds
Peer-Routing : Enabled
Peer-Routing-Timeout timer: 0 seconds
Multicast peer-routing timeout: 150 seconds
```

### 8.2.2 show vlt backup-link

This command is used to verify VLT peers are communicating on the backup link over the OOB management network. The Destination is the management IP address of the peer. The Peer HeartBeat status must be Up.

```
S5048F-Leaf1A#show vlt backup-link
VLT Backup Link
-----
Destination:          100.67.172.35
Peer HeartBeat status: Up
Destination VRF:      default
HeartBeat Timer Interval: 1
HeartBeat Timeout:    3
UDP Port:             34998
HeartBeat Messages Sent: 345
HeartBeat Messages Received: 298
```

### 8.2.3 show vlt mismatch

This command highlights any potential configuration issues between VLT peers. Mismatch examples include incompatible VLT settings, VLAN differences, different switch operating system versions and STP inconsistencies. There should be no output to this command. If there is output, resolve the mismatch reported.

```
S5048F-Leaf1A#show vlt mismatch
S5048F-Leaf1A#
```

## 9 Deploy VxRail

A laptop computer or jump box with a web browser for the VxRail user interface is required. It is either plugged into a leaf switch or able to logically reach the VxRail in-band management VLAN from elsewhere on the network.

By default, the initial VxRail Manager IP address is 192.168.10.200/24. After initial configuration, the address changes to its new address on the in-band management network. The new VxRail Manager address used in this guide is 172.16.11.102/24 per the planning data in Table 3.

During installation, the laptop or jump box must be able to reach both the initial and new VxRail Manager addresses, so two addresses are configured on the network adapter, one for each network.

---

**Note:** Both addresses may be configured at the same time if the network adapter supports it, or in sequence if required.

---

The IP addresses configured on the laptop computer/jump box in this example are as follows:

- 192.168.10.1/24, to communicate with the initial VxRail Manager address, 192.168.10.200/24
- 172.16.11.50/24, to communicate with the new VxRail Manager address, 172.16.11.102/24

If a laptop computer is used, the connections appear as shown in Figure 15.

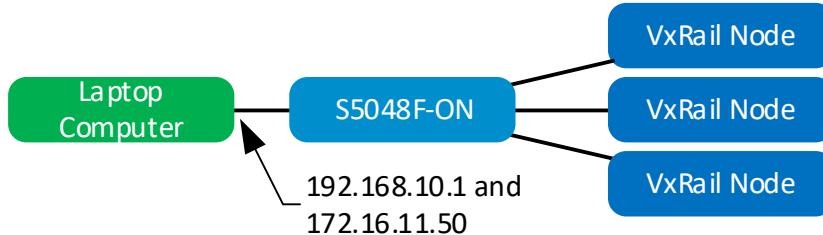


Figure 15 Use of a laptop computer for deployment

If a PowerEdge server is used as a jump box, make the connections as shown in Figure 16. Access the jump box's operating system from a workstation via the iDRAC virtual console.

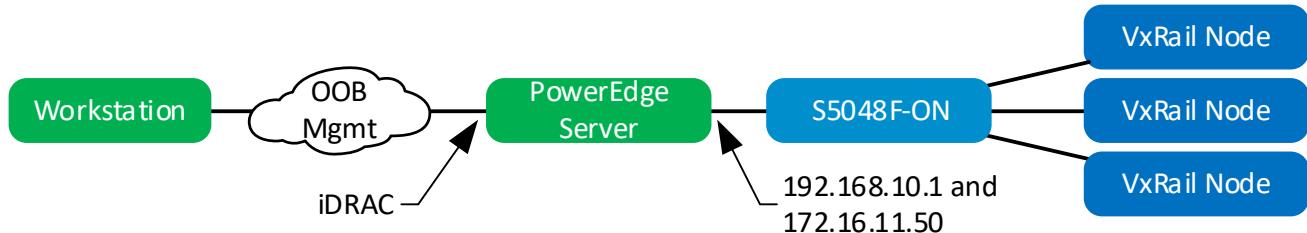


Figure 16 PowerEdge server as a jump box

---

**Note:** This deployment uses a PowerEdge server as a jump box that is also in the roles of DNS and NTP server. It may be connected to both leaf switches for redundancy using NIC teaming. Figure 16 shows a single connection from a jump box to a leaf switch for clarity.

---

In a web browser on the laptop computer or jump box, connect to <https://192.168.10.200> and deploy VxRail using the planning data in Table 3.

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**Note:** VxRail installation steps are beyond the scope of this guide.

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## A Validated components

The following tables include the hardware, software, and firmware used to configure and validate the examples in this guide.

### A.1 Dell EMC Networking Switches

Table 16 Switches and OS versions

Qty	Item	OS Version
2	Dell EMC Networking S5048F-ON leaf switches	9.12.1.0
1	Dell EMC Networking S3048-ON management switch	9.13.0.3

### A.2 VxRail P570 nodes

A cluster of four VxRail P570 nodes was used to validate the examples in this guide. The nodes were each configured as shown in the table below.

Table 17 VxRail P570 node components

Qty per node	Item	Firmware version
2	Intel Xeon Gold 6136 CPU @ 3.00GHz, 12 cores	
12	16GB DDR4 DIMMs (192GB total)	
3	800GB SAS SSD	
10	1.2TB SAS HDD	
1	Dell HBA330 Storage Controller	13.17.03.05
1	Boot Optimized Storage Solution (BOSS) Controller w/ 2x240GB SATA SSDs	2.5.13.2008
1	Broadcom 57414 rNDC – 2x25GbE SFP28 ports	20.06.05.11
-	BIOS	1.2.11
-	iDRAC with Lifecycle Controller	3.15.17.15

## A.3 VxRail Appliance software

This deployment guide was developed using VxRail Appliance software 4.5.200. It consists of the component versions shown in Table 18.

Table 18 VxRail Appliance software component versions

Item	Version
VxRail Manager	4.5.200.7769314
VMware ESXi	6.5.0 Update 1 Patch 36, build 7388607
VMware vCenter Server Appliance	6.5 Update 1e, build 7515524
VMware vSAN	6.6.1 Patch 02
VMware vRealize Log Insight	4.3, build 5084751

## B VxRail network adapter traffic optimization

VxRail optimizes network traffic by splitting traffic across rNDC uplinks and by using NIOC shares. Based on traffic type, uplinks are configured as active or standby, and NIOC shares are used to allocate network bandwidth. Uplink load balancing and NIOC shares are automatically configured by VxRail.

Table 19 Network traffic on E, P, S and V Series 14G nodes with 2x10GbE or 2x25GbE ports

Traffic Type	Requirement*	Uplink 1 (10 or 25GbE) VMNIC0	Uplink 2 (10 or 25GbE) VMNIC1	NIOC Shares
Management	IPv6 multicast	Active	Standby	20
vSphere VMotion		Active	Standby	50
vSAN	IPv4 unicast	Standby	Active	100
Virtual Machines		Active	Standby	30

Table 20 Network traffic on E, P, S and V Series 14G nodes with 4x10GbE ports

Traffic Type	Requirement*	Uplink 1 (10GbE) VMNIC0	Uplink 2 (10GbE) VMNIC1	Uplink 3 (10GbE) VMNIC2	Uplink 4 (10GbE) VMNIC3	NIOC Shares
Management	IPv6 multicast	Active	Standby	Unused	Unused	40
vSphere VMotion		Unused	Unused	Standby	Active	50
vSAN	IPv4 unicast	Unused	Unused	Active	Standby	100
Virtual Machines		Standby	Active	Unused	Unused	60

Table 21 Network traffic on E and S Series 14G nodes with 4x1GbE ports

Traffic Type	Requirement*	Uplink 1 (1GbE) VMNIC2	Uplink 2 (1GbE) VMNIC3	Uplink 3 (1GbE) VMNIC0	Uplink 4 (1GbE) VMNIC1	NIOC Shares
Management	IPv6 multicast	Standby	Active	Unused	Unused	40
vSphere VMotion		Unused	Unused	Standby	Active	50
vSAN	IPv4 unicast	Unused	Unused	Active	Standby	100
Virtual Machines		Active	Standby	Unused	Unused	60

\*Switches used must allow this traffic. Not explicitly configured on Dell EMC Networking switches.

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**Note:** For additional VxRail nodes and rNDC configurations, see the [Dell EMC VxRail Network Guide](#).

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## C Technical resources

[Dell TechCenter](#) is an online technical community where IT professionals have access to numerous resources for Dell EMC software, hardware, and services.

[Dell EMC TechCenter Networking Guides](#)

[Manuals and documentation for Dell EMC Networking S3048-ON](#)

[Manuals and documentation for Dell EMC Networking S5048F-ON](#)

[Dell EMC Leaf-Spine Deployment and Best Practices Guide](#)

[Dell EMC VxRail Network Guide](#)

[Dell EMC VxRail support and documentation \(account required\)](#)

[Dell EMC VxRail Support Matrix \(account required\)](#)

[VMware Validated Design Documentation](#)

## D Support and feedback

### Contacting Technical Support

Support Contact Information

Web: <http://www.dell.com/support>

Telephone: USA: 1-800-945-3355

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