Dell PowerStore T and Q

Networking Guide for Storage Services

Version 4.x

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Rev. A02

Notes, cautions, and warnings

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

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

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

Contents

Preface

As part of an improvement effort, revisions of the software and hardware are periodically released. Some functions that are described in this document are not supported by all versions of the software or hardware currently in use. The product release notes provide the most up-to-date information about product features. Contact your service provider if a product does not function properly or does not function as described in this document.

Where to get help

Support, product, and licensing information can be obtained as follows:

- **Product information**—For product and feature documentation or release notes, go to the PowerStore Info Hub.
- **Troubleshooting**—For information about products, software updates, licensing, and service go to Dell Support and locate the appropriate product support page.
- **Technical support**—For technical support and service requests, go to Dell Support and locate the **Service Requests** page. To open a service request, you must have a valid support agreement. Contact your Sales Representative for details about obtaining a valid support agreement or to answer any questions about your account.

Customer feedback

A feedback button is located at the right side of the PowerStore Manager. Selecting **Feedback** opens a browser window where you can fill and submit a feedback survey.

1

Overview

This chapter includes the following information.

Topics:

PowerStore T and Q model appliances overview

PowerStore T and Q model appliances support Block (Storage Area Network (SAN)), File (Network Attached Storage (NAS)), and Virtual Volume (vVol) workloads with the software stack deployed directly on the bare metal of the system.

PowerStore T and Q models include:

- 500 T
- 1000 T
- 1200 T
- 3000 T
- 3200 Q and T
- 5000 T
- 5200 Q and T
- 7000 T
- 9000 T
- 9200 T

Supporting documentation

The following are additional documents to assist with PowerStore deployment:

- *PowerStore Quick Start Guide*
- *PowerStore Planning Guide*
- *Hardware Information Guide for PowerStore 1000, 1200, 3000, 3200, 5000, 5200, 7000, 9000, and 9200*
- *Hardware Information Guide for PowerStore 500T Model*
- *Installation and Service Guide for PowerStore 1000, 1200, 3000, 3200, 5000, 5200, 7000, 9000, and 9200*
- *Installation and Service Guide for PowerStore 500T Model*

PowerStore T model deployment options

Once the PowerStore T model hardware is installed, the Management switch and network must be configured as part of initial deployment.

Once the PowerStore T model appliance has been deployed, optionally configure storage services.

Table 1. PowerStore deployment options

Deployment option	Protocols and services	Switch requirements
Initial deployment (Required)	Fibre Channel (FC) connectivity	At least one Management switch For details see the *PowerStore Networking Guide for Initial Deployment* .

Table 1. PowerStore deployment options (continued)

Deployment option	Protocols and services	Switch requirements
Storage services (Optional)	Block-optimized which includes Fibre Channel (FC) connectivity with the option of adding: ● iSCSI host connectivity ● NVMe/TCP host connectivity ● Replication and Block Import ● Clustering	At least one management switch and two Top-of-Rack (ToR) switches This document assumes the PowerStore appliance is deployed with the management switch configured.
	Unified which includes Fibre Channel connectivity, Block-optimized options with the option of adding: ● Network Attached Storage ● File Mobility (required for File Replication and File Import)	

Supported switches

The planning and requirements sections of this guide prepares for deployment of a PowerStore appliance with any supported switch. The configuration steps provided in this guide, however, are specific steps to deploy PowerStore with Dell PowerSwitch Series S4148-ON switches.

If deploying PowerStore with switches other than S4148-ON switches, see the *PowerStore Simple Support Matrix* available at dell.com/powerstoredocs for details.

2

Storage services overview

This chapter contains the following information.

Topics:

Storage Services

PowerStore appliances are configured for Fibre Channel after initial deployment. You can add storage services after initial deployment.

Storage services include the following protocols and services.

Table 2. Storage services and network descriptions

Network	Description
Cluster	The Cluster network is used: ● To manage internal communication such as to the cluster database, and between appliances within a cluster. The intracluster management network is encrypted with IPSEC. ● For intracluster data mobility traffic, such as storage migration between appliances. ● To enable file services on a Unified appliance, communication is routed within the PowerStore appliance rather than the top-of-rack (ToR) switch.
NVMe/TCP	NVMe/TCP storage network (block) traffic including PowerStore appliance target portals for frontend traffic.
iSCSI	Used for iSCSI storage network (block) traffic including PowerStore appliance target portals for frontend traffic.
Replication and Block Import	Used for PowerStore target portals for frontend traffic for both file and block storage and external data mobility traffic for block storage.
Network Attached Storage	Network attached storage (NAS): ● Front-end access such as NFS, SMB, and FTP ● Active Directory (AD) for the NAS services ● External data mobility traffic for file storage NAS services are optional. NAS services are only available with **Unified** deployments. To enable a **Unified** deployment, select the **Unified** mode when in the PowerStore cluster **Initial Configuration Wizard**. A NAS network can be extended with a Fail-Safe Network (FSN). An FSN extends link failover into the network by providing switch-level redundancy when the Top-of-Rack switches are not configured with an MC-LAG interconnect. An FSN can be configured on a port, a link aggregation, or any combination of the two.
File Import	Used with the File Mobility network to import File storage from remote systems. The File Import network requires that the: ● PowerStore T or Q is deployed to support NAS services. ● File Mobility network is configured on the Management switch. For details about the File Mobility network and how to configure it, see Appendix 1: File Mobility.

3

Prepare to configure the switches and networks for Storage services

This chapter includes the following information.

Topics:

Switch resources for Storage services worksheet

Work with your network administrator to complete the *Switch Resources for Storage services Worksheet (blank)* below and to reserve the necessary resources to configure the two Top-of-Rack (ToR) switches required for Storage services.

For a sample of a completed example of the Switch resources for storage services worksheet for Dell PowerSwitch Series, see the Switch Resources for Storage services worksheet (completed).

NOTE: This section assumes initial deployment of PowerStore has been completed, and the Management switch and network have been successfully configured.

Optionally, work with a network administrator to complete the Network configuration worksheets for Storage services, to reserve the necessary resources to create the Storage networks in PowerStore Manager.

Table 3. Switch resources for Storage services worksheet (blank)

Step	Details	Notes
1.	Print this table to record the reserved resources.	
2	Reserve and record the IP addresses necessary to configure the ToR switches below:	
	Management IP address for ToR Switch 1	
	Management IP address for ToR Switch 2	
	Default gateway	
	NTP server	
3.	As a best practice it is recommended to add a spanning tree protocol to the ToR switches. Record the spanning tree protocols to set on each switch.	
	Spanning tree protocol and priority for ToR Switch 1	
	Spanning tree protocol and priority for ToR Switch 2	
4.	Choose which Layer 2 interconnect to configure between the switches:	
	Highly Recommended: Direct interconnect using Multi-chassis Link Aggregation Group (MC-LAG) Continue to step 5.	
	Direct Interconnect not using MC-LAG Continue to step 6.	
	No direct interconnect between the switches	

Table 3. Switch resources for Storage services worksheet (blank) (continued)

Step	Details	Notes
	Continue to step 6.	
5.	If using MC-LAG, record the ports to connect the switches together. ToR Switch 1 to ToR Switch 2-port pair 1	
	ToR Switch 1 to ToR Switch 2-port pair 2	
	Enter the port channel ID used for connectivity between the ToR switches and the uplinks. Only a single port channel ID is required for MC-LAG (VLT).	
	If using MC-LAG, enter the Domain ID.	
	If using uplinks for Layer 2 connectivity between the switches, continue to step 6.	
	If using VLT for the Layer 2 interconnect, record the:	
	VLT MAC address to use for both switch 1 and switch 2. Use the same VLT MAC address for switch 1 and switch 2. **NOTE:** You cannot use all zeros (00:00:00:00:00) for the VLT MAC address.	
	VLT priority for ToR Switch 1	
	VLT priority for ToR Switch 2	
	MTU setting for Jumbo Frames **NOTE:** It is recommended to configure jumbo frames with an MTU setting of 9216. The same MTU size must be set on both switches for both node ports.	
6.	If configuring the ToR switches with a direct Interconnect not using MC-LAG, or without a direct connection between the ToR switches, record the ports on the ToR switches to use to connect to the uplinks.	
	Uplink A to ToR Switch 1	
	Uplink B to ToR Switch 1	
	Uplink A to ToR Switch 2	
	Uplink B to ToR Switch 2	
	Record the uplink port channel IDs required for L2 Uplinks without MC-LAG. L2 Uplinks without MC-LAG connectivity require two port channel IDs.	
	1. Port channel ID for L2 Uplinks without MC-LAG	
	2. Port channel ID for L2 Uplinks without MC-LAG	
7.	Reserve the network resources required to configure the networks and the ports to connect from the PowerStore appliance nodes to the Top-of-Rack (ToR) switch ports for each Storage network being configured. Optionally, put multiple storage networks on the same ports, or connect each storage network through different ports. When cabling from the node ports to the ToR switch ports, the corresponding ports on Node A and Node B should connect to opposite switches.	

Table 3. Switch resources for Storage services worksheet (blank) (continued)

Step	Details	Notes	
	NOTE: Ports 0 and 1 of the 4-port card are reserved for the cluster network with all PowerStore T and Q appliances. If deploying a PowerStore 500T model appliance, ports 2 and 3 of the 4-port card are reserved for connectivity to the 24 Drive 2.5-inch NVMe (ENS24) expansion enclosures.		
	iSCSI connectivity	Network Name	
		VLAN ID	
		Record which appliance node port	To cable to the ToR switch number and port:
		Node A Port	ToR Switch Switch port
		Node B Port	ToR Switch Switch port
	NVMe/TCP host connectivity	Network Name	
		VLAN ID	
		Record which appliance node port	To cable to the ToR switch number and port:
		Node A Port	ToR Switch Switch port
		Node B Port	ToR Switch Switch port
	Replication and Import **NOTE:** Replication and Import networks cannot be separated and must run over the same ports.	Network Name	
		VLAN ID	
		Record which appliance node port	To cable to the ToR switch number and port:
		Node A Port	ToR Switch Switch port
		Node B Port	ToR Switch Switch port
	Network Attached Storage (NAS) must be configured in an LACP bond. It is recommended that you configure the bond with one port from different I/O modules. When configuring an LACP bond: • The PowerStore appliance node ports that are cabled for LACP must be the same speed. • LACP can be configured using two or four ports on each node, however the same number of ports must be configured for LACP on both nodes.	Network Name	
		VLAN ID	
		Record the LACP (port channel) ID for the node connections:	
		Node A	
		Node B	
		Record which appliance node port	To cable to the ToR switch number and port:
		Node A Port	ToR Switch Switch port
		Node A Port	ToR Switch Switch port
		Node B	ToR Switch

Table 3. Switch resources for Storage services worksheet (blank) (continued)

Step	Details	Notes	
		Port	Switch port
		Node B Port	ToR Switch Switch port
		MTU setting for Jumbo Frames **NOTE:** It is recommended to configure jumbo frames with an MTU setting of 9216. The same MTU size must be set on both switches for both node ports.	
		If extending the NAS network with a **Fail Safe Network**, record the following:	
		VLAN ID	
		Record the LACP (port channel) ID, or the port number for the node connections:	
		Node A	
		Node B	
		Record which appliance node port	To cable to the ToR switch number and port:
		Node A Port	ToR Switch Switch port
		Node A Port	ToR Switch Switch port
		Node B	ToR Switch Switch port
		Node B Port	ToR Switch Switch port
		MTU setting for Jumbo Frames **NOTE:** It is recommended to configure jumbo frames with an MTU setting of 9216. The same MTU size must be set on both switches for both node ports.	
	File Import must be configured in an LACP bond. File Import can use the same bond that is used for the NAS network, but it cannot use the bond that is dedicated to the Cluster network. When configuring an LACP bond:	Network Name	
		VLAN ID	
		Record the LACP (port channel) ID for the node connections:	
		Node A	
		Node B	

Table 3. Switch resources for Storage services worksheet (blank) (continued)

Step	Details	Notes	
	• The PowerStore T or Q appliance node ports that are cabled for LACP must be the same speed. • LACP can be configured using two or four ports on each node, however the same number of ports must be configured for LACP on both nodes.	Record which appliance node port	To cable to the ToR switch number and port:
		Node A Port	ToR Switch Switch port
		Node A Port	ToR Switch Switch port
		Node B Port	ToR Switch Switch port
		From Node B Port	To ToR Switch Switch port
		MTU setting for Jumbo Frames **NOTE:** It is recommended to configure jumbo frames with an MTU setting of 9216. The same MTU size must be set on both switches for both node ports.	N/A
	Cluster When cabling the nodes for the cluster network: • Ports 0 and 1 of the 4-port card are reserved for clustering. • Ports 0 and 1 on the 4-port card on the same node must connect to opposite switches. • Port 0 on the 4-port card on Node A and Port 0 on the 4-port card on Node B must connect to opposite switches. • Port 1 on the 4-port card on Node A and Port 1 on the 4-port card on Node B must connect to opposite switches.	Network Name	
		VLAN ID	
		Record the LACP (port channel) ID for the node connections:	
		Node A	
		Node B	
		Record which appliance node port	To cable to the ToR switch number and port:
		Node A Port 0 of the 4-port card	ToR Switch Switch port
		Node A Port 1 of the 4-port card	ToR Switch Switch port
		Node B Port 0 of the 4-port card	ToR Switch Switch port
		Node B Port 1 of the 4-port card	ToR Switch Switch port
		MTU setting for Jumbo Frames **NOTE:** It is recommended to configure jumbo frames with an MTU setting of 9216. The same MTU size must be set on both switches for both node ports.	

Network configuration worksheet for Storage services

You must reserve the following resources to create Storage networks in PowerStore Manager.

Work with your network administrator to complete the following Network configuration worksheets for each Storage network you are creating in PowerStore Manager.

Network requirements to create Block-optimized storage networks in PowerStore Manager

The following resources and information are required for each iSCSI, NVMe/TCP, and Replication network you create in PowerStore Manager.

Table 4. Network configuration worksheet for additional Block-optimized storage services (blank)

Resource	iSCSI	NVMe/TCP	Replication and Block Import
Storage Network Name			
Purpose A storage network can be purposed for iSCSI, NVMe/TCP, Replication (and Block Import), or a combination of all three protocols.			
(Optional) VLAN ID For better security and performance, it is recommended that you specify a unique VLAN ID for each type of network. If you are deploying into a single VLAN, ensure that you configure a unique subnet for the Management and each Storage network. Use the same VLAN IDs that were used to configure your Storage networks on the switch.			
Netmask/Prefix Length			
Gateway			
Storage Network IP addresses You must reserve a minimum of two IP addresses for each Storage network you are adding. (One IP address per node.)			
(Optional) Global Storage Discovery IP It is recommended that you choose to create this IP address. It is used as the single highly available floating IP address for hosts to discover storage from your cluster.			
Map Storage for Appliance/ Network Interface (Include the port			

Table 4. Network configuration worksheet for additional Block-optimized storage services (blank) (continued)

Resource	iSCSI	NVMe/TCP	Replication and Block Import
or Link Aggregation (LACP bond) for each appliance to which the storage is mapped).			

Network requirements to create NAS server networks in PowerStore Manager

The following resources and information are required for each NAS server network that you create in PowerStore Manager.

Table 5. Network configuration worksheet for NAS storage service (blank)

Resource	NAS
Network Name	
(Optional) VLAN ID For better security and performance, it is recommended that you specify a unique VLAN ID for each type of network. If you are deploying into a single VLAN, ensure that you configure a unique subnet for the Management, Storage, and NAS networks. Use the same VLAN IDs that were used to configure your storage networks on the switch.	
Netmask/Prefix Length	
Gateway	
Network IP addresses You must reserve a minimum of one IP address for NAS Server production. Optionally, you can reserve additional IP addresses for NAS Server backups.	
Map Storage for Appliance/Network Interface Include the Node ports, or port channel on which the networks are configured.	
If configuring a Fail-Safe Network, record the following information. **NOTE:** You must define the port or link aggregation for Node A. The same port or link aggregation is automatically created on Node B.	
Primary port or Link Aggregation to include in the FSN.	
Secondary port or Link Aggregation to include in the FSN.	

Network requirements to create File Import networks in PowerStore Manager

The following resources and information are required for each NAS server network that you create in PowerStore Manager.

NOTE: File import requires that a File Mobility network is created in PowerStore Manager. For details, see File Mobility.

Table 6. Network configuration worksheet for File Import (blank)

Resource	File Import
(Optional) VLAN ID	
Netmask/Prefix Length	

Table 6. Network configuration worksheet for File Import (blank) (continued)

Resource	File Import
Gateway	
Network IP addresses A minimum of One IP address is required for each active file import session. However, a File Import interface can be reused for File Import when no other session is using it.	
(Optional) Global Storage Discovery IP It is recommended that you choose to create this IP address. It is used as the single highly available floating IP address for hosts to discover storage from your cluster.	
Map Storage for Appliance/Network Interface Include the Node ports, or port channel on which the networks are configured.	

4

Switch requirements for deployments with storage services

This chapter contains the following information.

Topics:

Top-of-Rack (ToR) switch connectivity options and requirements

In addition to the Management switch configured during your initial deployment of the PowerStore T model appliance, you must add two ToR switches to route the storage services traffic.

Top-of-Rack (ToR) switch to ToR switch (L2) connectivity options

Use one of the following options to connect the two ToR switches.

Table 7. Connectivity options for ToR switches

ToR to ToR connectivity	Description
Direct interconnect using Multi-chassis Link Aggregation (MC-LAG)	Dell highly recommends using MC-LAG for connectivity between the ToR switches. When the ToR switches are interconnected with MC-LAG the two ports that are used on the PowerStore appliance 4-port card, or I/O module (system bond) are configured in an active/active state.
Direct interconnect not using MC-LAG	If MC-LAG is not used to interconnect the ToR switches, you can create a port channel between the ToR switches. When the ToR switches are connected using a Port Channel the two ports that are used on the PowerStore appliance 4-port card, or I/O module (system bond) reverts to an active/passive state.
No direct interconnect between the switches	If the ToR switches cannot be interconnected then use highly reliable Layer 2 (L2) uplinks. When the ToR switches are connected using highly reliable L2 uplinks, the two ports that are used on the PowerStore appliance 4-port card, or I/O module (system bond) reverts into an active/passive state.

NOTE: For more information about PowerStore system bonds see the *Dell PowerStore: Clustering and High Availability* white paper.

Direct interconnect using Multi-chassis Link Aggregation (MC-LAG)

It is highly recommended that you deploy PowerStore with an MC-LAG interconnect between the two Top-of-Rack (ToR) switches.

MC-LAG is a switch interconnection technology that joins independent ToR switches into a single virtual chassis. MC-LAG allows the link aggregation (LAG) port groups to span multiple chassis, enabling better resilience of the LAG connection. Also, MC-LAG enables traffic going from switch to switch using the full bandwidth of the available connection, without using spanning tree protocol (STP), which would disable some links to prevent loops.

MC-LAG is a general name for the technology, however certain vendors use their own proprietary terminology to define MC-LAG connectivity.

Table 8. Vendor-specific MC-LAG technology

Vendor	Proprietary MC-LAG technology
Dell	Virtual Link Trunking (VLT)
Cisco	Virtual PortChannel (vPC)
Brocade	Multi-Chassis Trunking (MCT)

NOTE: See the vendor documentation to determine the technology they use for MC-LAG.

When the ToR switches are interconnected with MC-LAG the two ports that are used on PowerStore appliance 4-port card, or I/O module (system bond) are configured in an active/active state.

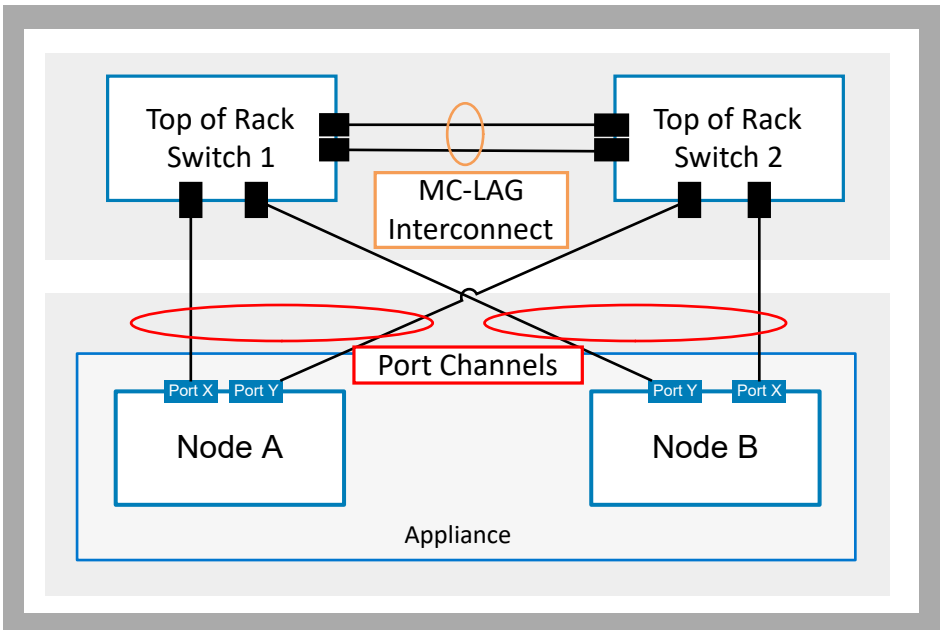

Figure 1. ToR switches with MC-LAG interconnect

For MC-LAG connectivity it is recommended that:

- A minimum of two connection cables in parallel with a high-speed reliable connection.
- Use of high-speed ports reduces the network traffic congestion between the two switches.
- Verify best practices for MC-LAG from your switch provider documentation.

MC-LAG interconnect with upstream links

Also, in an MC-LAG environment the two switches are treated as one logical switch. This type of interconnect allows you to add all the upstream links from both switches into a single port channel that spans the MC-LAG as demonstrated in the following diagram.

NOTE: Work with your network administrator if you are connecting the ToR switches to upstream switches.

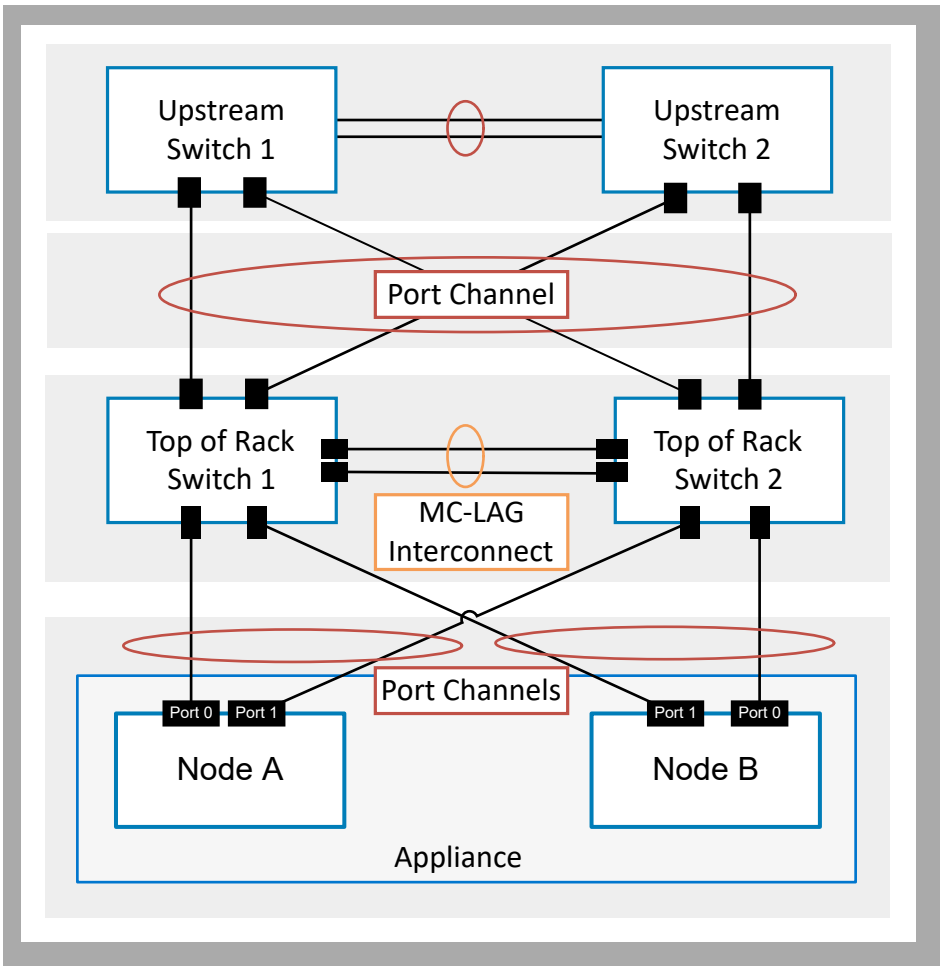

Figure 2. ToR switches with MC-LAG interconnect and upstream links

Direct interconnect not using MC-LAG

If MC-LAG is not used to interconnect the ToR switches, you can create a port channel between the ToR switches.

When the ToR switches are connected using a Port Channel, the first 2-ports in the PowerStore appliance 4-port card (system bond) reverts into an active/passive state.

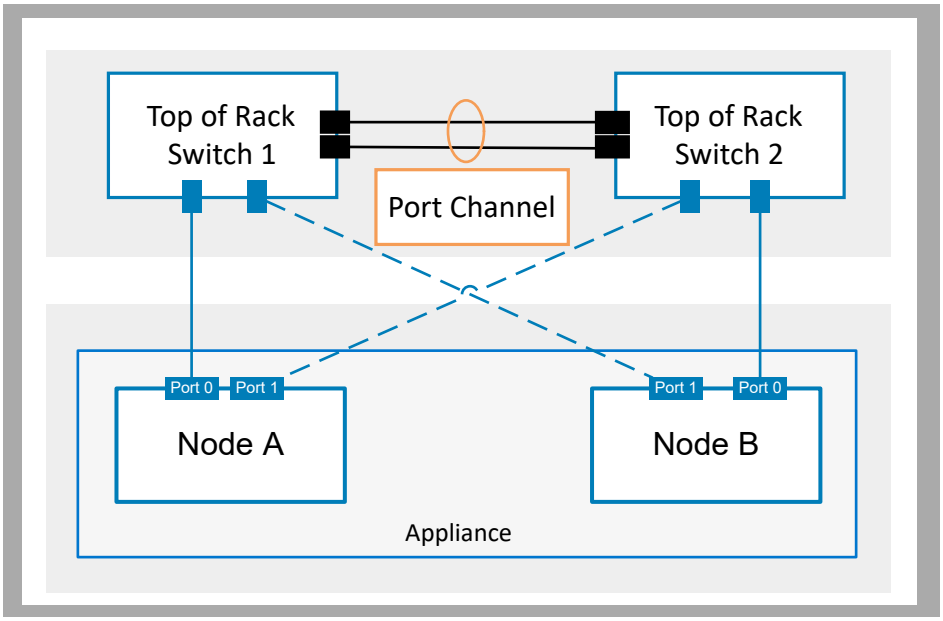

Figure 3. ToR switches direct interconnect not using MC-LAG

No direct interconnect between the switches

If the ToR switches cannot be interconnected directly, then use highly reliable Layer 2 (L2) upstream links.

ToR switch connectivity through the upstream links require redundant, high-speed connections.

Using L2 (Ethernet level) upstream links without an MC-LAG connection to connect the ToR switches is an acceptable alternative to a direct interconnect for PowerStore deployments.

When using highly reliable upstream links for ToR switch interconnectivity, the first 2-ports in the PowerStore appliance 4-port card (system bond) reverts into an active/passive state.

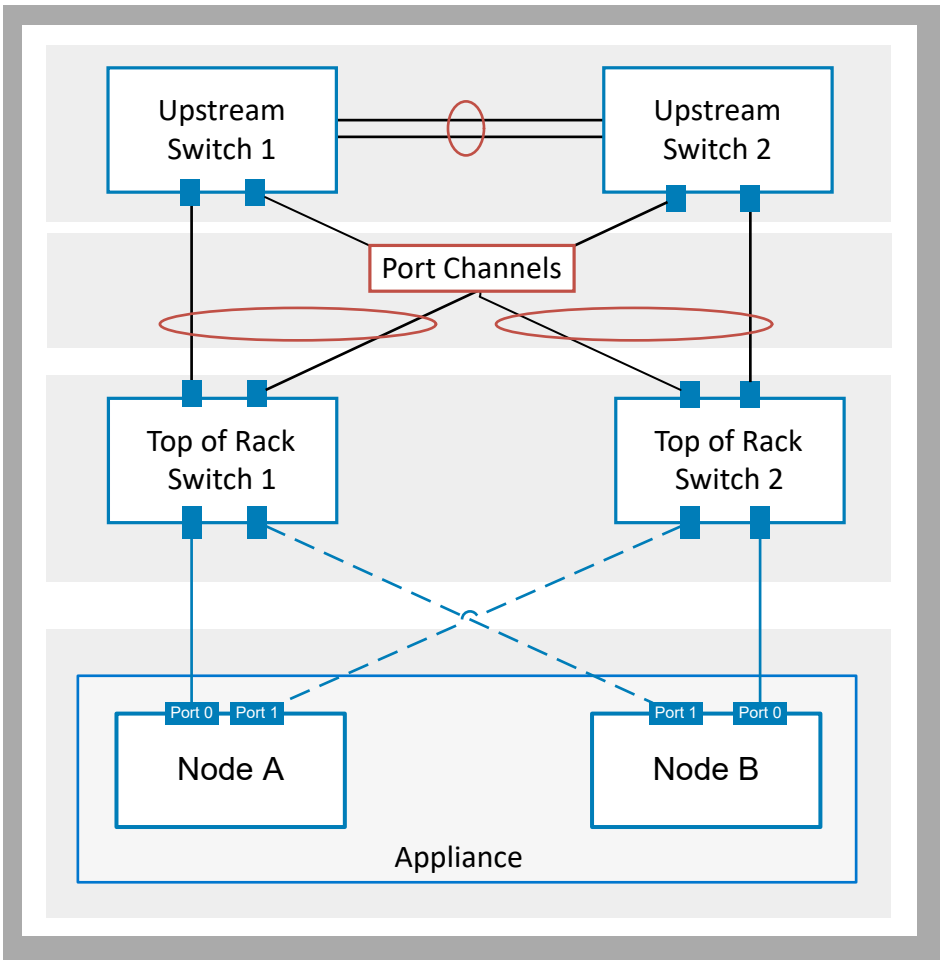

Figure 4. ToR switches with no direct interconnect

5

Network requirements for deployments with storage services

This chapter contains the following information.

Topics:

Storage services and network traffic

All the storage service traffic is routed from the PowerStore appliance node ports through the two Top-of-Rack (ToR) switches.

PowerStore appliances require that all storage service networks are unique. It is recommended that each storage network is configured on a dedicated port meeting the port requirements that are demonstrated in the following example.

NOTE: Ports 2 and 3 on a PowerStore 500T model appliance 4-port card are reserved for connectivity to the expansion enclosures.

Network connectivity for optional Block-optimized storage networks

The following networks can be configured for Block-optimized deployments when file storage is not enabled on the PowerStore cluster.

This example requires two Top-of-Rack (ToR) switches are deployed with PowerStore.

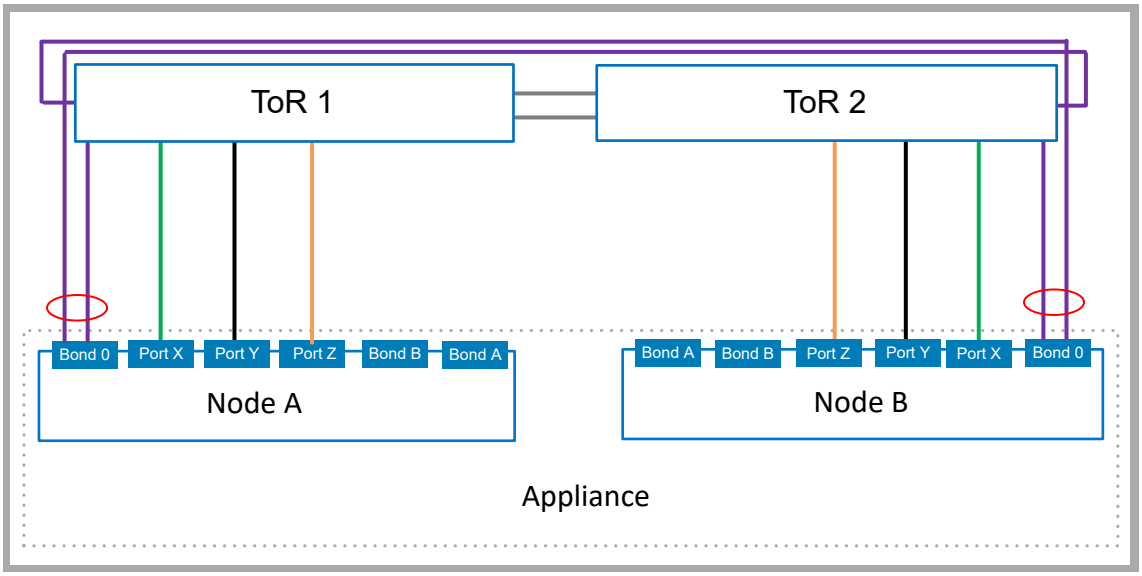

Figure 5. Network connectivity for Block-optimized storage networks

Identifier	Network	Requirements
	iSCSI	Can be cabled through any port on the 4-port card, I/O module, or an LACP bond.
	Replication and Import	Can be cabled through any port on the 4-port card or I/O module, or an LACP bond.
	NVMe/TCP	Can be cabled through any port on the 4-port card or I/O module, or an LACP bond.
	Cluster	Must be cabled through the first two ports of the 4-port card in an LACP Bond (0). Bond 0 is reserved only for the Cluster network.

Network connectivity with additional Unified (File) networks

Deploying PowerStore clusters in Unified mode allows you to configure Network Attached Storage (NAS) for file services.

Connectivity with a Network Attached Storage (NAS) network

Network attached storage (NAS) provides:

- Front-end access such as NFS, SMB, and FTP
- Active Directory (AD) for the NAS services
- External data mobility traffic for file storage

NAS can be configured with additional features, which require some network configuration.

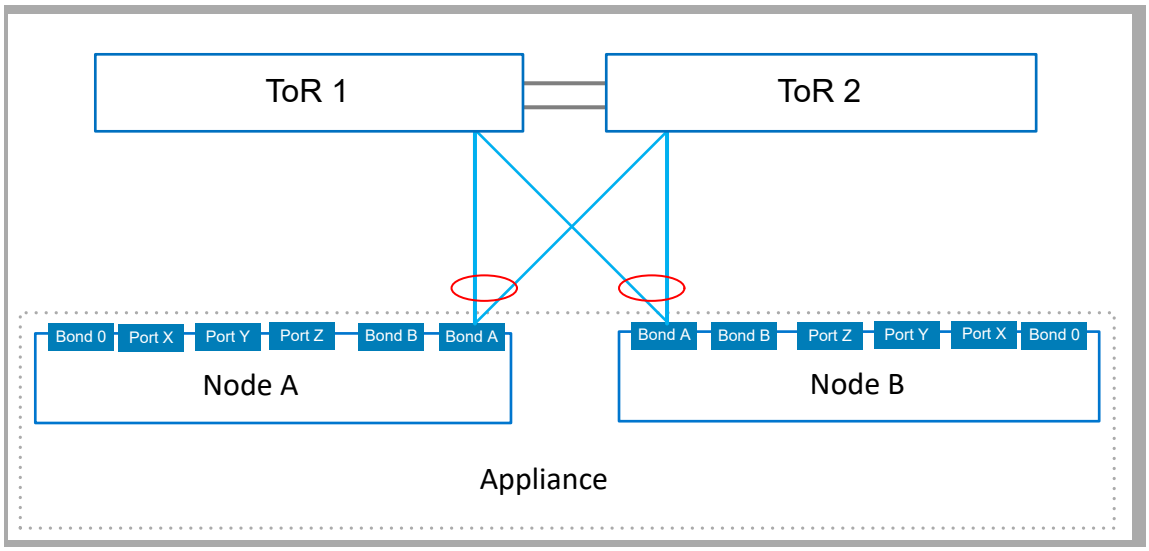

Figure 6. Connectivity for a NAS netwok

Identifier	Network	Requirements
	NAS	The NAS network must always be configured in an LACP bond. **NOTE:** The LACP bond can be configured with two or four ports on each node.

Connectivity when the NAS network is extended with a Fail-Safe Network (FSN)

PowerStore provides a Fail-Safe Network (FSN) feature for NAS configurations. The FSN feature provides a backup network for high availability when the Top-of-Rack switches have not been configured with MC-LAG.

An FSN enables the ability to configure an environment with:

- Explicit links that are designated as primary (active) and secondary (standby)
- Primary and secondary links which can have:
  - Different speeds and duplex settings
  - Ports from different I/O modules
  - More ports on the primary side than on the secondary side of the FSN

In this example, the primary and secondary networks are both configured in LACP bonds.

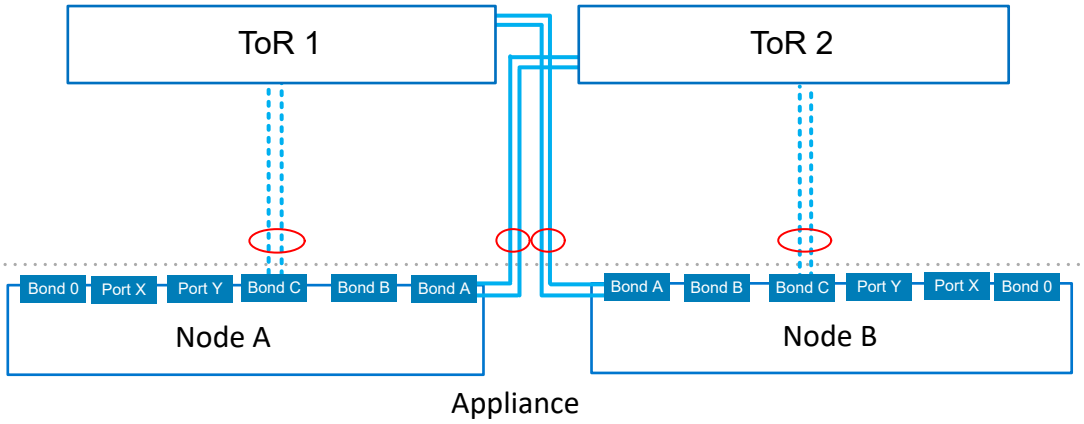

Figure 7. NAS network extended with a Fail Safe Network

Identifier	Network	Requirements
	Primary	The primary network is the active network and can be configured on a single port, an LACP bond, or a combination of both. **NOTE:** The LACP bond can be configured with two or four ports on each node.
	Secondary	The secondary network is the standby network and can be configured on a single port, an LACP bond, or a combination of both.

Connectivity with NAS and File Import networks

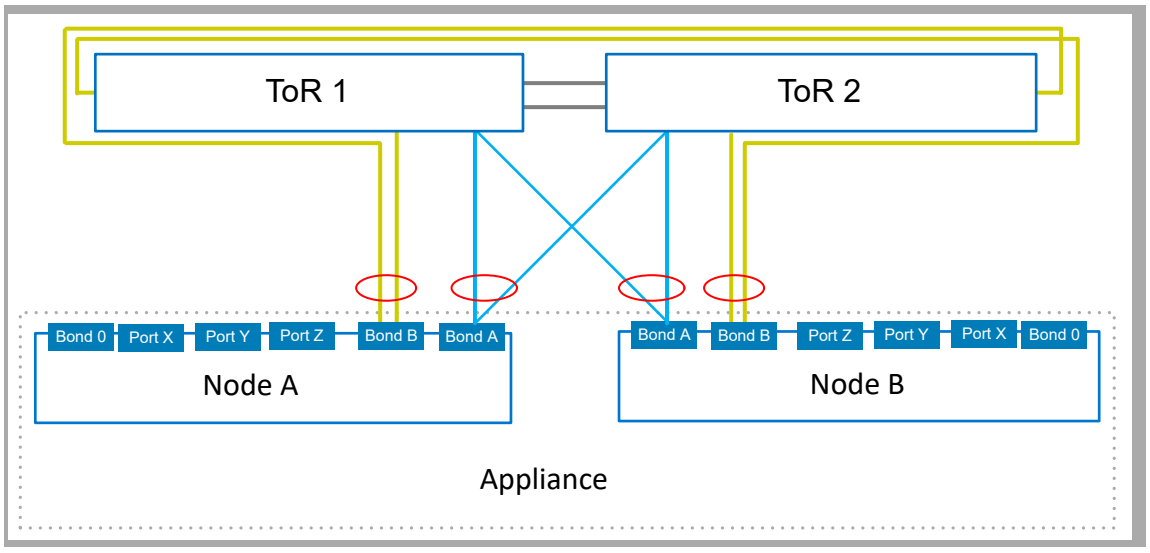

Figure 8. Network connectivity with NAS and File Import networks

Identifier	Network	Requirements
	NAS Services	Must be configured in an LACP bond. It is recommended that you configure the bond with one port from different I/O modules.
	File Import	Must be configured in an LACP bond. The LACP bond can be shared with the NAS Services bond, but cannot be shared with the Cluster bond (Bond 0).

Link Aggregation Control Protocol requirements

The NAS, File Import, and Cluster networks must be configured in an LACP bond. Optionally, iSCSI and Replication networks can also be run over LACP bonds.

Ports 0 and 1 on the PowerStore appliance nodes are reserved for the Cluster network. The LACP bond is automatically aggregated in PowerStore Manager which appears as **BaseEnclosure-NodeA-bond0**, and **BaseEnclosure-NodeB-bond0** on the PowerStore Manager, **Ports** page.

When configuring the LACP bonds on the switch:

- The PowerStore appliance node ports that are cabled for LACP must be the same speed.
- LACP can be configured using two or four ports on each node, however the same number of ports must be configured for LACP on both nodes.
- After you discover your PowerStore appliance you must aggregate the links in PowerStore Manager, on the **Hardware** > **appliance** > **Ports** page.

VLAN requirements for Storage networks

PowerStore appliance storage networks can be configured over different ports, VLANs, or subnets.

PowerStore appliances require all networks are unique. It is highly recommended to deploy PowerStore networks with multiple and unique VLANs to separate the traffic. However, if only one VLAN is available, you can deploy PowerStore appliances with a single VLAN and multiple unique subnets.

VLAN requirements

You can add up to 256 Storage networks with a maximum of 256 storage networks per interface.

For better security and performance, it is recommended that you specify a unique VLAN ID for each type of network.

If you are deploying into a single VLAN, ensure that you configure a unique subnet for each of the Storage networks.

When configuring the networks in PowerStore Manager, be sure to use the same VLAN IDs that were used to configure your networks on the switch.

Cluster network VLAN requirements

The Cluster network communication occurs on the Native VLAN.

For multi-appliance cluster configurations, ensure that the Cluster network has routing on the native VLAN such that the first 2 ports of the 4-port card can communicate to other appliances on the network.

Storage network IP address requirements for adding storage services

It is required that you reserve a minimum of two IP address per PowerStore appliance per Storage network. It is also recommended that you reserve another IP address per storage network for Global Storage Discovery.

Table 9. IP address assignments for Storage networks

IP Address per	Assigned to	Number of IP Addresses required
Appliance	Node A	1
	Node B	1
Cluster	Global Storage Discovery IP Address (Optional)	1

You can choose to assign either IPv4 or IPv6 addresses to the storage networks. You cannot assign different IP versions to the same network.

NOTE: It is recommended that you reserve extra IP addresses to accommodate adding more appliances in the future.

Cluster IP version requirements

IPv6 communication is required for internal communication between PowerStore appliances in a cluster. PowerStore also requires that IPv6 be enabled on the ToR switches through the native VLAN.

6

Configuring PowerStore storage networks with Dell PowerSwitch Series S4148 Top-of-Rack switches

This chapter includes the following information.

Topics:

Sample configuration

This document describes the steps to deploy a single PowerStore cluster consisting of one appliance with a single base enclosure.

Hardware

The sample deployment that is used in this document demonstrates configuring the PowerStore appliance with:

- A single Dell PowerSwitch Series S4148 Management switch

  NOTE: The following configuration sections assume that you have completed initial deployment of the PowerStore appliance and that the Management switch and networks are successfully configured.

- Two Dell PowerSwitch Series S4148 Top-of-Rack (ToR) switches with added I/O modules and a Virtual Link Trunk (VLT) connection between the switches.

  NOTE: If you are configuring a PowerStore appliance with different Dell switches or third-party switches, see the proprietary documentation for switch commands. See the *PowerStore Third-party Switch Simple Support Matrix* for the list of supported switches, which is available from dell.com/powerstoredocs.

- A PowerStore 500T model appliance with a 4-port card and two I/O modules

Networks

The sample that is used in this guide demonstrates the following network connectivity between the PowerStore appliance nodes and the ToR switches.

NOTE: The following sample configuration does not include deployment with a Fail-Safe Network. For a sample deployment with a Fail-Safe Network, see Sample deployment with a Fail Safe Network

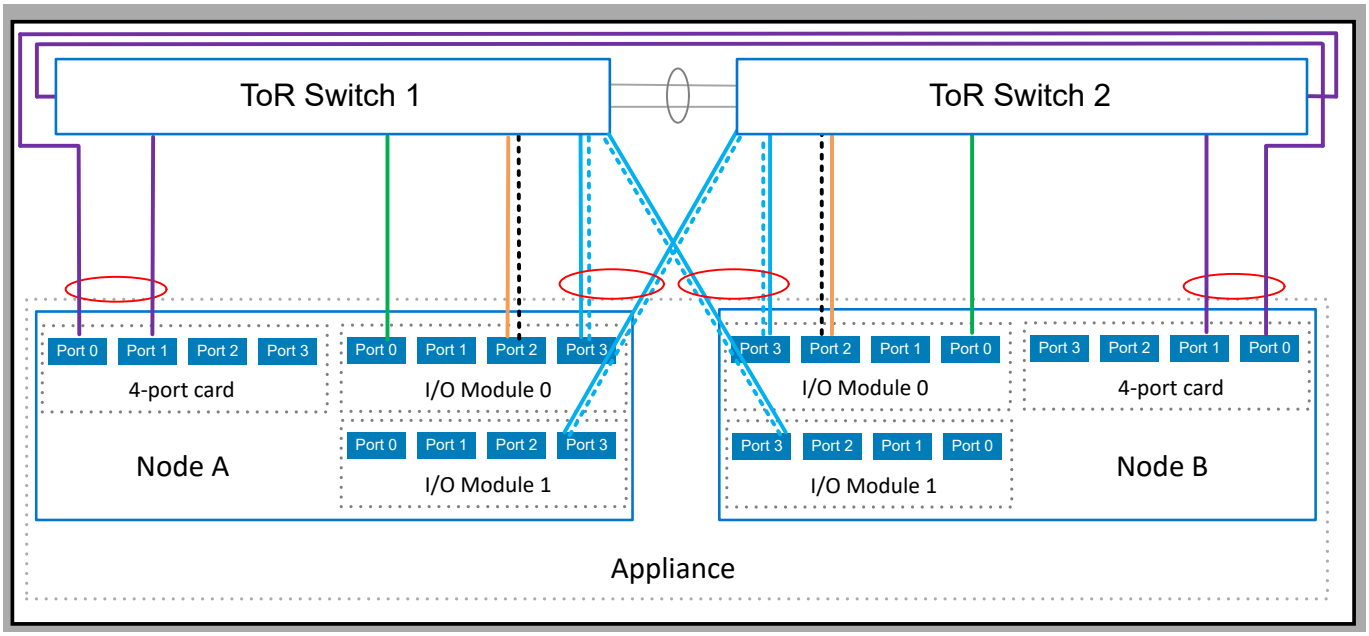

Figure 9. Sample network connectivity

Identifier	Network	Node Ports	Description
	iSCSI	Port 2 on I/O Module 0	Shared port with Replication and Block Import network. Separated by VLANs.
	NVMe/TCP	Port 0 on I/O Module 0	Dedicated port.
	Replication and Block Import	Port 2 on I/O Module 0	Shared port with iSCSI network. Separated by VLANs.
	NAS	Port 3 on I/O Module 0 and I/O Module 1	Configured into an LACP bond. **NOTE:** The LACP bond can be configured with two or four ports on each node. The LACP bond in this example is configured with two ports on each node.
	File Import	Port 3 on I/O Module 0 and I/O Module 1	Shares LACP bond with NAS network. **NOTE:** This sample shares the NAS network with the File Import network.
	Cluster	Ports 0 and 1 on the 4-port card	Configured into Bond 0.

Install the Top-of-Rack switches into the cabinet with the PowerStore appliance

See the following documents to install Dell PowerSwitch Series S4148, and S5200F model switches into the cabinet with the PowerStore system.

For instructions to install a Dell PowerSwitch S4148F-ON switch as the Top-of-Rack (ToR) switches, see the *Dell PowerSwitch S4100-On Series Installation Guide* at: Dell Support.

If you are deploying a PowerStore appliance with other Dell switches, or third-party switches, see the proprietary documentation for details to install the switches into the cabinet.

Configure Dell PowerSwitch Series for Storage services

At a minimum, one out-of-band (OOB) management switch, and two Top-of-Rack (ToR) switches are required for PowerStore to support iSCSI or NVMe/TCP host connectivity, replication, import, clustering or Network Attached Storage (NAS).

NOTE: This section assumes that you have completed initial deployment of the PowerStore T model appliance and the Management switch and networks are successfully configured.

As recommended, the following steps describe how to configure the two ToR switches with Virtual Link Trunking (VLT) as the Layer 2 (L2) interconnect. For steps to configure PowerStore T model deployments without a VLT interconnect, see: Configuring PowerStore T model without VLTi.

NOTE: Virtual Link Trunking (VLT) is specific to Dell PowerSwitch connectivity. The industry term is also referred to as Multi-chassis Link Aggregation Group (MC-LAG).

1. Get the completed Switch resources for storage services worksheet.
2. Establish a terminal session to the switch.
3. Validate the switch version and licensing.
4. Configure the general settings on the ToR switches.
5. Configure Virtual Link Trunking interconnect.
6. Configure the uplink ports on the ToR switches.
7. Configure the networks on the ToR switches:
   - iSCSI network
   - NVMe/TCP network
   - Replication and Block Import network
   - NAS network
   - Cluster network
8. If you have not already done so, cable the switches as described in Cable the Dell PowerSwitch Series for deployments with ToR switches.

Once you have configured and cabled the ToR switches to the base enclosure nodes, validate the configuration. For validation options see: Validate switch configuration.

Get the completed Switch resources for Storage services worksheet

Before configuring PowerStore T or Q models, you should have worked with your network administrator to reserve network resources, and complete the *Switch resources for Storage services worksheet*.

The following *Switch resources for Storage services worksheet* has been completed with the network resources that are used in the configuration steps that are provided in this document. You can use this worksheet exactly as it is when deploying your PowerStore T or Q model networks with Dell PowerSwitches Series S4148 switches.

If you are not configuring your switches and networks with the resources that are used in this guide, you can complete a new *Switch resources for Storage services worksheet* with the information relevant to your environment. To download a blank worksheet, see Switch resources for Storage services worksheet (blank).

Table 10. Switch resources for Storage services worksheet (completed)

Step	Details	Notes
1.	Print this table to record the reserved resources.	
2	Reserve and record the IP addresses necessary to configure the ToR switches below:	
	Management IP address for ToR Switch 1	**100.0.100.10/24**
	Management IP address for ToR Switch 2	**100.0.100.11/24**
	Default gateway	**100.0.100.1**
	NTP server	**100.0.100.200**

Table 10. Switch resources for Storage services worksheet (completed) (continued)

Step	Details	Notes
3.	As a best practice it is recommended to add a spanning tree protocol to the ToR switches. Record the spanning tree protocols to set on each switch.	
	Spanning tree protocol and priority for ToR Switch 1	**rstp** and **40960**
	Spanning tree protocol and priority for ToR Switch 2	**rstp** and **45056**
4.	Choose which Layer 2 interconnect to configure between the switches:	
	Highly Recommended: Direct interconnect using Multi-chassis Link Aggregation Group (MC-LAG) Continue to step 5.	**Yes**
	Direct Interconnect not using MC-LAG Continue to step 6.	N/A
	No direct interconnect between the switches Continue to step 6.	N/A
5.	If you are using MC-LAG, record the ports to use to connect the switches together. ToR Switch 1 to ToR Switch 2-port pair 1	**25 to 25**
	ToR Switch 1 to ToR Switch 2-port pair 2	**26 to 26**
	Enter the port channel ID used for connectivity between the ToR switches and the uplinks. Only a single port channel ID is required for MC-LAG (VLT).	**port channel 50**
	If using MC-LAG, enter the Domain ID.	**VLT domain ID 1**
	If using uplinks for Layer 2 connectivity between the switches, continue to step 6.	N/A
	If using VLT for the Layer 2 interconnect, record the:	
	VLT MAC address to use for both switch 1 and switch 2. Use the same VLT MAC address for switch 1 and switch 2. **NOTE:** You cannot use all zeros (00:00:00:00:00:00) for the VLT MAC address.	**00:00:00:00:00:01**
	VLT priority for ToR Switch 1	**1**
	VLT priority for ToR Switch 2	**8192**
	MTU setting for Jumbo Frames **NOTE:** It is recommended to configure jumbo frames with an MTU setting of 9216. The same MTU size must be set on both switches for both node ports.	**9216**
6.	If configuring the ToR switches with a direct Interconnect not using MC-LAG, or without a direct connection between the ToR switches, record the ports on the ToR switches to use to connect to the uplinks.	
	Uplink A to ToR Switch 1	**port 29**
	Uplink B to ToR Switch 1	**port 30**

Table 10. Switch resources for Storage services worksheet (completed) (continued)

Step	Details	Notes	
	Uplink A to ToR Switch 2	**port 29**	
	Uplink B to ToR Switch 2	**port 30**	
	Record the uplink port channel IDs required for L2 Uplinks without MC-LAG. L2 Uplinks without MC-LAG connectivity requires two port channel IDs.		
	1. Port channel ID for L2 Uplinks without MC-LAG	N/A	
	2. Port channel ID for L2 Uplinks without MC-LAG	N/A	
7.	Reserve the network resources required to configure the networks and the ports to connect from the PowerStore appliance nodes to the Top-of-Rack (ToR) switch ports for each Storage network to configure. You can put multiple storage networks on the same ports, or you can connect each storage network through different ports. When cabling from the node ports to the ToR switch ports, the corresponding ports on Node A and Node B should connect to opposite switches. **NOTE:** Ports 0 and 1 of the 4-port card are reserved for the cluster network with all PowerStore appliances. If deploying a PowerStore 500T appliance, ports 2 and 3 of the 4-port card are reserved for connectivity to the 24 Drive 2.5-Inch NVMe (ENS24) expansion enclosures.		
	iSCSI connectivity	Network Name	**iSCSI_Network**
		VLAN ID	**200**
		Record which appliance node port	To cable to the ToR switch number and port:
		Node A Port **2 on I/O Module 0**	ToR Switch **1** Switch port **7**
		Node B Port **2 on I/O Module 0**	ToR Switch **2** Switch port **48**
	NVMe/TCP host connectivity	Network Name	**NVMe_Network**
		VLAN ID	**300**
		Record which appliance node port	To cable to the ToR switch number and port:
		Node A Port **0 on I/O Module 0**	ToR Switch **1** Switch port **5**
		Node B Port **0 on I/O Module 0**	ToR Switch **2** Switch port **50**
	Replication and Import **NOTE:** Replication and Import networks cannot be separated and must run over the same ports.	Network Name	**RepBlockImport_Network**
		VLAN ID	**400**
		Record which appliance node port	To cable to the ToR switch number and port:
		Node A Port **2 on I/O Module 0**	ToR Switch **1** Switch port **7**
		Node B Port **2 on I/O Module 0**	ToR Switch **2** Switch port **48**

Table 10. Switch resources for Storage services worksheet (completed) (continued)

Step	Details	Notes	
	Network Attached Storage (NAS) must be configured in an LACP bond. It is recommended that you configure the bond with one port from different I/O modules. When configuring an LACP bond: • The PowerStore appliance node ports that are cabled for LACP must be the same speed. • LACP can be configured using two or four ports on each node, however the same number of ports must be configured for LACP on both nodes.	Network Name	**NAS_Network**
		VLAN ID	**500**
		Record the LACP (port channel) ID for the node connections:	
		Node A	**port channel 10**
		Node B	**port channel 20**
		Record which appliance node port	To cable to the ToR switch number and port:
		Node A Port **3 on I/O Module 0**	ToR Switch **1** Switch port **8**
		Node A Port **3 on I/O Module 1**	ToR Switch **2** Switch port **8**
		Node B Port **3 on I/O Module 0**	ToR Switch **2** Switch port **47**
		Node B Port **3 on I/O Module 1**	ToR Switch **1** Switch port **47**
		MTU setting for Jumbo Frames **NOTE:** It is recommended to configure jumbo frames with an MTU setting of 9216. The same MTU size must be set on both switches for both node ports.	**9216**
		If extending with a **Fail Safe Network**, record the following:	
		VLAN ID	N/A
		Record the LACP (port channel) ID, or the port number for the node connections:	
		Node A	N/A
		Node B	N/A
		Record which appliance node port	To cable to the ToR switch number and port:
		Node A Port N/A	ToR Switch N/A Switch port N/A
		Node A Port N/A	ToR Switch N/A Switch port N/A
		Node B N/A	ToR Switch N/A Switch port N/A
		Node B Port N/A	ToR Switch Switch port N/A

Table 10. Switch resources for Storage services worksheet (completed) (continued)

Step	Details	Notes	
		MTU setting for Jumbo Frames **NOTE:** It is recommended to configure jumbo frames with an MTU setting of 9216. The same MTU size must be set on both switches for both node ports.	N/A
	File Import must be configured in an LACP bond. File Import can use the same bond that is used for the NAS network, but it cannot use the bond that is dedicated to the Cluster network. When configuring an LACP bond: • The PowerStore T or Q model appliance node ports that are cabled for LACP must be the same speed. • LACP can be configured using two or four ports on each node, however the same number of ports must be configured for LACP on both nodes.	Network Name	N/A
		VLAN ID	N/A
		Record the LACP (port channel) ID for the node connections:	
		Node A	N/A
		Node B	N/A
		Record which appliance node port	To cable to the ToR switch number and port:
		Node A Port N/A	ToR Switch N/A Switch port N/A
		Node A Port N/A	ToR Switch N/A Switch port N/A
		Node B Port N/A	ToR Switch N/A Switch port N/A
		From Node B Port N/A	To ToR Switch N/A Switch port N/A
		MTU setting for Jumbo Frames **NOTE:** It is recommended to configure jumbo frames with an MTU setting of 9216. The same MTU size must be set on both switches for both node ports.	N/A
	Cluster When cabling the nodes for the cluster network: • Ports 0 and 1 of the 4-port card are reserved for clustering. • Ports 0 and 1 on the 4-port card on the same node must connect to opposite switches. • Port 0 on the 4-port card on Node A and Port 0 on the 4-port card on Node B must connect to opposite switches. • Port 1 on the 4-port card on Node A and Port 1 on the 4-port card on Node B must connect to opposite switches.	Network Name	**Cluster_Network**
		VLAN ID	**1**
		Record the LACP (port channel) ID for the node connections:	
		Node A	**port channel 30**
		Node B	**port channel 40**
		Record which appliance node port	To cable to the ToR switch number and port:
		Node A Port 0 of the 4-port card	ToR Switch **1** Switch port **1**
		Node A	ToR Switch **2**

Table 10. Switch resources for Storage services worksheet (completed) (continued)

Step	Details	Notes	
		Port 1 of the 4-port card	Switch port **1**
		Node B Port 0 of the 4-port card	ToR Switch **1** Switch port **54**
		Node B Port 1 of the 4-port card	ToR Switch **2** Switch port **54**
		MTU setting for Jumbo Frames **NOTE:** It is recommended to configure jumbo frames with an MTU setting of 9216. The same MTU size must be set on both switches for both node ports.	**9216**

Establish a terminal session to the switch

Perform the following steps to establish a terminal session to the serial console port on the Dell PowerSwitch Series S4148 switch.

These steps are specific to establishing connections to Dell PowerSwitch S4148-ON switches.

For console serial port cable requirements, and further details see the *Dell PowerSwitch S4100-ON Series Installation Guide* at the Dell PowerSwitch Support page.

You must establish a terminal session to each of the switches to configure the switches for deployment.

1. Power on the switch.
2. Use a serial cable to connect to the serial console port, which is the top port that is on the PSU-side of the PowerSwitch.

Identifier	Description
1	Serial Port
2	Management Port

3. Open a terminal emulator program, such as PuTTY, on the host.
4. Configure the serial connection in the terminal emulator program using the following settings.

Table 11. Serial connection settings

Setting	Value
Speed(baud)	115200 (9600 for micro-USB port)
Data bits	8
Stop bits	1

Table 11. Serial connection settings (continued)

Setting	Value
Parity	None
Flow control	None

5. Connect to the switch using the terminal emulator program.
6. Enter the switch login credentials. The default username and password are:
   - Username: **admin**
   - Password: **admin**
7. Enter global configuration mode.

```
configure terminal
```

8. It is recommended that you change the password after logging into the switch for the first time. Use the following command to change the switch password.

```
username admin password <NEW_PASSWORD> role sysadmin
```

Validate the switch version and licensing

Before you configure the switch and networks, check the switch operating system version and licensing.

If you are required to upgrade your switch operating system, or install the switch license see the *OS10 Enterprise Edition User Guide* for details.

1. Establish a terminal connection to the switch and press the **Enter** key after you have connected.
2. Run the command `show version` to display the operating system version. Dell Technologies recommends upgrading to the latest release available on Dell Digital Locker (dell.com/support/software/).

```
OS10# show version
Dell Networking OS10-Enterprise
Copyright (c) 1999-2018 by Dell Inc. All Rights Reserved.
OS Version: 10.5.x.x
Build Version: 10.5.x.x.x
Build Time: 2018-09-26T17:20:01-0700
System Type: S4148F-ON
Architecture: x86_64
Up Time: 2 weeks 04:34:35
```

3. Verify that the license was installed on the switches.

   Run the command `show license status` to display the license installation. The `License Type:` field should indicate `PERPETUAL`. If an evaluation license is installed, licenses purchased from Dell Technologies are available for download on Dell Digital Locker (dell.com/support/software/).

```
OS10# show license status

System Information
---------------------------------------------------------
Vendor Name : Dell
Product Name : S4148F-ON
Hardware Version: A00
Platform Name : x86_64-dellemc_s4100_c2538-r0
PPID : CN00Y2VTCES0082O0038
Service Tag : D8MSG02
License Details
----------------
Software : OS10-Enterprise
Version : 10.5.x.x
License Type : PERPETUAL
License Duration: Unlimited
License Status : Active
```

```
License location: /mnt/license/D8MSG02.lic
--------------------------------------------------------
```

NOTE: If OS10EE was preinstalled, a perpetual license is already installed on the switch.

4. Repeat the steps for each switch.

Configure general settings on the Top-of-Rack (ToR) switches

Perform the following steps to configure general settings on the two ToR switches.

In OS10EE, LLDP (Link Layer Discovery Protocol) is enabled globally on each interface by default. You can use LLDP for troubleshooting and validation. It is recommended that you enable all of the optional TLVs (type, length, value) in the LLDPU (Link Layer Discovery Protocol Data Units) on the switches.

1. Establish a terminal connection to the first ToR switch (Switch1).
2. Enter global configuration mode.

```
configure terminal
```

3. Configure a hostname for the switch.

```
hostname Switch1
```

4. If not already set, configure the management IP address for the switch.

   If the management IP address has already been configured for the switch, continue to step 6.

   NOTE: The following command sample assumes that automatic IP assignment through Dynamic Host Configuration Protocol (DHCP) is enabled on the switch. If automatic IP assignment through DHCP is not enabled, then you do not need to include `no ip address dhcp` in the commands below.

```
interface mgmt 1/1/1
no shutdown
no ip address dhcp
ip address 100.0.100.10/24
exit
```

   NOTE: Be sure to use a different IP address when configuring switch 2. This document uses `100.0.100.11/24` for switch 2 in the example below.

5. Optionally, configure the management route (default gateway) for the switch.

```
management route 0.0.0.0/0 100.0.100.1
```

6. Configure an NTP server for the switch.

```
ntp server 100.0.100.200
```

7. Enable the Rapid Spanning Tree Protocol (RSTP) on the switch.

```
spanning-tree mode rstp
```

8. Configure the spanning tree priority on the switch.

```
spanning-tree rstp priority 40960
```

   Note the following when selecting spanning-tree rstp priority values:

   - It is important that you work with your network administrator to determine which value to use to avoid conflicts with other switches in your network.
   - Different rstp priority values should be used when configuring switch 1 and switch 2.

- 0 priority is typically reserved for the root bridge.

9. Repeat the above steps for the second switch (Switch2).

Table 12. Code samples for configuring general settings on the ToR switches

Switch1	Switch2

`configure terminal`
 	
`hostname Switch1`
 	
`interface mgmt 1/1/1`
`no shutdown`
`no ip address dhcp`
`ip address 100.0.100.10/24`
`exit`
 	
`management route 0.0.0.0/0 100.0.100.1`
 	
`ntp server 100.0.100.200`
 	
`spanning-tree mode rstp`
`spanning-tree rstp priority 40960`
 	
`exit`
	`configure terminal`
	
	`hostname Switch2`
	
	`interface mgmt 1/1/1`
	`no shutdown`
	`no ip address dhcp`
	`ip address 100.0.100.11/24`
	`exit`
	
	`management route 0.0.0.0/0 100.0.100.1`
	
	`ntp server 100.0.100.200`
	
	`spanning-tree mode rstp`
	`spanning-tree rstp priority 45056`
	
	`exit`

Configure Virtual Link Trunking interconnect

Perform the following steps if you have chosen to implement VLT for your Layer 2 interconnectivity between the two Top of the Rack (ToR) PowerSwitch Series.

Work with a network administrator to implement VLTi. VLTi should not be configured without a networking specialist.

You can cable the switches together before configuring connectivity between the switches, or you can cable the switches after configuring the type of connectivity. See Cable the Top-of-Rack (ToR) Switches together for details.

VLTi is required to configure the Link Aggregation Control Protocol between the PowerStore nodes.

1. Establish a terminal connection to the first ToR switch (Switch1).
2. Enter global configuration mode.

```
configure terminal
```

3. Disable L2 mode on the 100 GbE ports that to use for VLTi on Switch1.

```
interface range ethernet 1/1/25-1/1/26
description VLTi
no switchport
mtu 9216
exit
```

4. Create a VLTi domain and select 100 GbE ports as discovery interfaces.

```
vlt-domain 1
discovery-interface ethernet 1/1/25-1/1/26
```

- `vlt-domain`, and port numbers should be the same on both switches.
- Ports 25 and 26 are both 100 GbE ports on the Dell S4148-ON PowerSwitch Series. Other switches may have different port numbers that are assigned to the 100 GbE ports.

5. Specify the management IP of the other ToR switch as VLT backup (required for heartbeat).
   - For Switch1, use the Switch2 IP address for the backup destination.

- For Switch2, use the Switch1 IP address for the backup destination.

```
backup destination 100.0.100.11
```

6. Enable peer-routing to prepare to configure your uplinks. Peer routing enables or disables L3 routing to peers.

   NOTE: Steps to configure uplinks to the customer networks are not described in this guide.

```
peer-routing
```

7. Set the priority of the switch.

```
primary-priority 1
```

   Valid priority values range from 1 to 65535. The switch with the lower priority setting takes precedence of the switch with the higher priority value. Do not set the same priority value to the two ToR switches.

8. Enter a VLT MAC address to avoid conflicts on the network.

   NOTE: You cannot use all zeros (`00:00:00:00:00:00`) for the VLT MAC address.

```
vlt-mac 00:00:00:00:00:01
```

   Use the same VLT MAC address when configuring switch 2.

9. Repeat the above steps for the second switch.

   While doing so, reverse the switch IP address in step 5 as demonstrated in the code sample below.

Table 13. Code sample of VLTi configuration steps

Switch 1	Switch 2

`configure terminal`
`interface range ethernet 1/1/25-1/1/26`
`description vlti`
`no switchport`
`mtu 9216`
`exit`
`vlt-domain 1`
`discovery-interface ethernet 1/1/25-1/1/26`
`backup destination 100.0.100.11`
`peer-routing`
`primary-priority 1`
`vlt-mac 00:00:00:00:00:01`
	`configure terminal`
	`interface range ethernet 1/1/25-1/1/26`
	`description vlti`
	`no switchport`
	`mtu 9216`
	`exit`
	`vlt-domain 1`
	`discovery-interface ethernet 1/1/25-1/1/26`
	`backup destination 100.0.100.10`
	`peer-routing`
	`primary-priority 8192`
	`vlt-mac 00:00:00:00:00:01`

Configure the uplink ports on the Top-of-Rack (ToR) switches

1. Establish a terminal connection to the first ToR switch (Switch1).
2. Enter global configuration mode.

```
configure terminal
```

3. Configure the port channel for the uplinks.

```
interface port-channel 50
description Uplink
no shutdown
switchport mode trunk
switchport access vlan 1
vlt-port-channel 50
mtu 9216
exit
```

4. Configure the uplink ports on the switch.

```
interface ethernet 1/1/29
description Uplink_Ports
no shutdown
channel-group 50 mode active
no switchport
flowcontrol receive on
flowcontrol transmit off
mtu 9216
exit

interface ethernet 1/1/30
description Uplink_Ports
no shutdown
channel-group 50 mode active
no switchport
flowcontrol receive on
flowcontrol transmit off
mtu 9216
exit
```

5. Commit the configuration to the NVRAM.

```
copy running-configuration startup-configuration
```

6. Repeat steps 1 - 5 on the second ToR switch (Switch2).

Table 14. Code sample for configuring ToR switch uplink ports

Switch1	Switch2

`configure terminal`
 	
`interface port-channel 50`
`description Uplink`
`no shutdown`
`switchport mode trunk`
`switchport access vlan 1`
`vlt-port-channel 50`
`mtu 9216`
`exit`
 	
`interface ethernet 1/1/29`
`description Uplink_Ports`
`no shutdown`
`channel-group 50 mode active`
`no switchport`
`flowcontrol receive on`
`flowcontrol transmit off`
`mtu 9216`
`exit`
 	
`interface ethernet 1/1/30`
`description Uplink_Ports`
`no shutdown`
`channel-group 50 mode active`
`no switchport`
`flowcontrol receive on`
`flowcontrol transmit off`
`mtu 9216`
`exit`
 	
`copy running-configuration startup-configuration`
	`configure terminal`
	
	`interface port-channel 50`
	`description Uplink`
	`no shutdown`
	`switchport mode trunk`
	`switchport access vlan 1`
	`vlt-port-channel 50`
	`mtu 9216`
	`exit`
	
	`interface ethernet 1/1/29`
	`description Uplink_Ports`
	`no shutdown`
	`channel-group 50 mode active`
	`no switchport`
	`flowcontrol receive on`
	`flowcontrol transmit off`
	`mtu 9216`
	`exit`
	
	`interface ethernet 1/1/30`
	`description Uplink_Ports`
	`no shutdown`
	`channel-group 50 mode active`
	`no switchport`
	`flowcontrol receive on`
	`flowcontrol transmit off`
	`mtu 9216`
	`exit`
	
	`copy running-configuration startup-configuration`

Configure the iSCSI network on the ToR switches

The following steps use the resources from the example that is used in this document. If you did not use the same resources, see your completed Network Preparation Worksheet for Storage services.

1. Establish a terminal connection to the first ToR switch (Switch1).
2. Enter global configuration mode.

```
configure terminal
```

3. Create the iSCSI VLAN.

```
interface vlan 200
description iSCSI_Network
no shutdown
exit
```

4. Configure iSCSI VLAN for Node A ports.

```
interface ethernet 1/1/7
description NodeA_IO_0_port_2
no shutdown
switchport mode trunk
switchport trunk allowed vlan 200
mtu 9216
exit
```

5. Configure the iSCSI VLAN on the uplinks.

```
interface port-channel 50
switchport trunk allowed vlan 200
exit
```

6. Repeat steps 3 - 5 for each iSCSI network that you are creating.
7. Repeat steps 1 - 6 on the second ToR switch (Switch2) as demonstrated below.

NOTE: Be sure to use the correct Ethernet ports when configuring the second ToR switch (Switch2).

Table 15. Code sample for configuring ToR switches for iSCSI network

Switch1	Switch2
configure terminal interface vlan 200 description iSCSI_Network no shutdown exit interface ethernet 1/1/7 description NodeA_IO_0_port_2 no shutdown switchport mode trunk switchport trunk allowed vlan 200 mtu 9216 exit interface port-channel 50 switchport trunk allowed vlan 200 exit	configure terminal interface vlan 200 description iSCSI_Network no shutdown exit interface ethernet 1/1/48 description NodeB_IO_0_port_2 no shutdown switchport mode trunk switchport trunk allowed vlan 200 mtu 9216 exit interface port-channel 50 switchport trunk allowed vlan 200 exit

Configure NVMe/TCP network on the ToR switches

The following steps use the resources from the example that is used in this document. If you did not use the same resources, see your completed Network Preparation Worksheet for Storage services.

1. Establish a terminal connection to the first ToR switch (Switch1).
2. Enter global configuration mode.

```
configure terminal
```

3. Create the NVMe/TCP VLAN.

```
interface vlan 300
description NVMe_Network
no shutdown
exit
```

4. Configure NVMe/TCP VLAN for Node A ports.

```
interface ethernet 1/1/5
description NodeA_IO_0_port_0
no shutdown
switchport mode trunk
switchport trunk allowed vlan 300
mtu 9216
exit
```

5. Configure the NVMe/TCP VLAN on the uplinks.

```
interface port-channel 50
switchport trunk allowed vlan 300
exit
```

6. Repeat steps 3 - 5 for each NVMe/TCP network that you are creating.
7. Repeat steps 1 - 6 on the second ToR switch (Switch2) as demonstrated below.

NOTE: Be sure to use the correct Ethernet ports when configuring the second ToR switch (Switch2).

Table 16. Code sample for configuring ToR switches for NVMe/TCP networks

Switch1	Switch2

`configure terminal`
`interface vlan 300`
`description NVMe_Network`
`no shutdown`
`exit`
 	
`interface ethernet 1/1/5`
`description NodeA_IO_0_port_0`
`no shutdown`
`switchport mode trunk`
`switchport trunk allowed vlan 300`
`mtu 9216`
`exit`
 	
`interface port-channel 50`
`switchport trunk allowed vlan 300`
`exit`
	`configure terminal`
	`interface vlan 300`
	`description NVMe_Network`
	`no shutdown`
	`exit`
	
	`interface ethernet 1/1/50`
	`description NodeB_IO_0_port_0`
	`no shutdown`
	`switchport mode trunk`
	`switchport trunk allowed vlan 300`
	`mtu 9216`
	`exit`
	
	`interface port-channel 50`
	`switchport trunk allowed vlan 300`
	`exit`

Configure the Replication and Block Import network on the ToR switches

The following steps use the resources from the example that is used in this document. If you did not use the same resources, see your completed Network Preparation Worksheet for Storage services.

1. Establish a terminal connection to the first ToR switch (Switch1).
2. Enter global configuration mode.

```
configure terminal
```

3. Create the Replication and Block Import VLAN.

```
interface vlan 400
description RepBlockImport_Network
no shutdown
exit
```

4. Configure Replication and Block Import VLAN for Node A ports.

```
interface ethernet 1/1/2
switchport trunk allowed vlan 400
exit
```

5. Configure the Replication and Block Import VLAN on the uplinks.

```
interface port-channel 50
switchport trunk allowed vlan 400
exit
```

6. Repeat steps 1 - 5 on the second ToR switch (Switch2) as demonstrated below.

NOTE: Be sure to use the correct Ethernet ports when configuring the second ToR switch (Switch2).

Table 17. Code sample for configuring ToR switches for the Replication and Block Import network

Switch1	Switch2
configure terminal interface vlan 400 description RepBlockImport_Network no shutdown exit interface ethernet 1/1/7 switchport trunk allowed vlan 400 exit interface port-channel 50 switchport trunk allowed vlan 400 exit	configure terminal interface vlan 400 description RepBlockImport_Network no shutdown exit interface ethernet 1/1/48 switchport trunk allowed vlan 400 exit interface port-channel 50 switchport trunk allowed vlan 400 exit

Configure NAS networks on the ToR switches

Configuring LACP is required for deployments with Network Attached Storage (NAS). Two ports are aggregated in an LACP bond. When LACP is configured, the ports run in an active/active mode. If LACP is not set, the ports run in active/passive mode.

Network Attached Storage is only supported with Unified deployments.

1. Establish a terminal connection to the first ToR switch (Switch1).

2. Enter global configuration mode.

```
configure terminal
```

3. Create the NAS VLAN.

```
interface vlan 500
description NAS_Network
no shutdown
exit
```

4. Create the LACP port channel for Node A ports.

```
interface port-channel 10
description NodeA_NAS_LACP_port_channel
vlt-port-channel 10
switchport trunk allowed vlan 500
switchport mode trunk
spanning-tree port type edge
mtu 9216
exit
```

5. Create LACP port channel for Node B ports.

```
interface port-channel 20
description NodeB_NAS_LACP_port_channel
vlt-port-channel 20
switchport trunk allowed vlan 500
switchport mode trunk
spanning-tree port type edge
mtu 9216
exit
```

6. Move Node A facing port to the first port channel group, and enable active LACP mode.

```
interface ethernet 1/1/8
description NodeA_IO_0_port_3
no shutdown
channel-group 10 mode active
flowcontrol receive on
flowcontrol transmit off
mtu 9216
exit
```

7. Move Node B facing port to the second port channel group, and enable active LACP mode.

```
interface ethernet 1/1/47
description NodeB_IO_1_port_3
no shutdown
channel-group 20 mode active
flowcontrol receive on
flowcontrol transmit off
mtu 9216
exit
```

8. Configure NAS VLAN for Uplink.

```
interface port-channel 50
switchport trunk allowed vlan 500
exit
```

9. Commit configuration changes to nvram.

```
copy running-configuration startup-configuration
```

10. Repeat steps 1 - 9 on the second ToR switch (Switch2) as demonstrated below.

NOTE: Be sure to use the correct Ethernet ports when configuring the second ToR switch (Switch2).

Table 18. Code sample for configuration NAS networks on the ToR switches

Switch1	Switch2

`configure terminal`
 	
`interface vlan 500`
`description NAS_Network`
`no shutdown`
`exit`
 	
`interface port-channel 10`
`description NodeA_NAS_LACP_port_channel`
`vlt-port-channel 10`
`switchport mode trunk`
`switchport trunk allowed vlan 500`
`spanning-tree port type edge`
`mtu 9216`
`exit`
 	
`interface port-channel 20`
`description NodeB_NAS_LACP_port_channel`
`vlt-port-channel 20`
`switchport mode trunk`
`switchport trunk allowed vlan 500`
`spanning-tree port type edge`
`mtu 9216`
`exit`
 	
`interface ethernet 1/1/8`
`no shutdown`
`description NodeA_IO_0_port_3`
`channel-group 10 mode active`
`flowcontrol receive on`
`flowcontrol transmit off`
`mtu 9216`
`exit`
 	
`interface ethernet 1/1/47`
`no shutdown`
`description NodeB_IO_1_port_3`
`channel-group 20 mode active`
`flowcontrol receive on`
`flowcontrol transmit off`
`mtu 9216`
`exit`
 	
`interface port-channel 50`
`switchport trunk allowed vlan 500`
`exit`
 	
`copy running-configuration startup-configuration`
	`configure terminal`
	
	`interface vlan 500`
	`description NAS_Network`
	`no shutdown`
	`exit`
	
	`interface port-channel 10`
	`description NodeA_NAS_LACP_port_channel`
	`vlt-port-channel 10`
	`switchport mode trunk`
	`switchport trunk allowed vlan 500`
	`spanning-tree port type edge`
	`mtu 9216`
	`exit`
	
	`interface port-channel 20`
	`description NodeB_NAS_LACP_port_channel`
	`vlt-port-channel 20`
	`switchport mode trunk`
	`switchport trunk allowed vlan 500`
	`spanning-tree port type edge`
	`mtu 9216`
	`exit`
	
	`interface ethernet 1/1/8`
	`description NodeA_IO_1_port_3`
	`no shutdown`
	`channel-group 10 mode active`
	`flowcontrol receive on`
	`flowcontrol transmit off`
	`mtu 9216`
	`exit`
	
	`interface ethernet 1/1/47`
	`description NodeB_IO_0_port_3`
	`no shutdown`
	`channel-group 20 mode active`
	`flowcontrol receive on`
	`flowcontrol transmit off`
	`mtu 9216`
	`exit`
	
	`interface port-channel 50`
	`switchport trunk allowed vlan 500`
	`exit`
	
	`copy running-configuration startup-configuration`

Configure Cluster network on the Top-of-Rack switches

Configuring LACP is not required, but highly recommended. The first two ports of the 4-Port Card are aggregated in an LACP bond. When LACP is configured the ports run in an active/active mode. When LACP is not set, the ports run in active/passive mode.

LACP requires that a Virtual Link Trunking interconnect (VLTi) has been configured on the switches. See Configure Virtual Link Trunking interconnect for details.

1. Establish a terminal connection to the first ToR switch (Switch1).

2. Enter global configuration mode.

```
configure terminal
```

3. Configure the Native VLAN 1 for the Cluster.

```
interface vlan 1
description Cluster_Network
no shutdown
exit
```

4. Create the LACP port channel for Node A ports.

```
interface port-channel 30
description NodeA_Cluster_LACP_port_channel
vlt-port-channel 30
switchport mode trunk
switchport access vlan 1
spanning-tree port type edge
mtu 9216
exit
```

5. Create LACP port channel for Node B ports.

```
interface port-channel 40
description NodeB_Cluster_LACP_port_channel
vlt-port-channel 40
switchport mode trunk
switchport access vlan 1
spanning-tree port type edge
mtu 9216
exit
```

6. Move Node A facing port to the first port channel group, and enable active LACP mode.

```
interface ethernet 1/1/1
description NodeA_4port_port_0
no shutdown
channel-group 30 mode active
flowcontrol receive off
flowcontrol transmit off
mtu 9216
exit
```

7. Move Node B facing port to the second port channel group, and enable active LACP mode.

```
interface ethernet 1/1/54
description NodeB_4port_port_1
no shutdown
channel-group 40 mode active
flowcontrol receive off
flowcontrol transmit off
mtu 9216
exit
```

8. Configure Cluster VLAN for Uplink.

```
interface port-channel 50
switchport trunk allowed vlan 1
exit
```

9. Commit configuration changes to nvram.

```
copy running-configuration startup-configuration
```

10. Repeat steps 1 - 9 on the second ToR switch (Switch2).

Table 19. Code sample for configuration Cluster network on the ToR switches

Switch1	Switch2
configure terminal interface vlan 1 description Cluster_Network no shutdown exit interface port-channel 30 description NodeA_Cluster_LACP_port_channel vlt-port-channel 30 switchport mode trunk switchport access vlan 1 spanning-tree port type edge mtu 9216 exit interface port-channel 40 description NodeB_Cluster_LACP_port_channel vlt-port-channel 40 switchport mode trunk switchport access vlan 1 spanning-tree port type edge mtu 9216 exit interface ethernet 1/1/1 description NodeA_4port_port_0 no shutdown channel-group 30 mode active flowcontrol receive off flowcontrol transmit off mtu 9216 exit interface ethernet 1/1/54 description NodeB_4port_port_1 no shutdown channel-group 40 mode active flowcontrol receive off flowcontrol transmit off mtu 9216 exit interface port-channel 50 switchport access vlan 1 exit copy running-configuration startup- configuration	configure terminal interface vlan 1 description Cluster_Network no shutdown exit interface port-channel 30 description NodeA_Cluster_LACP_port_channel vlt-port-channel 30 switchport mode trunk switchport access vlan 1 spanning-tree port type edge mtu 9216 exit interface port-channel 40 description NodeB_Cluster_LACP_port_channel vlt-port-channel 40 switchport mode trunk switchport access vlan 1 spanning-tree port type edge mtu 9216 exit interface ethernet 1/1/1 description NodeA_4port_port_1 no shutdown channel-group 30 mode active flowcontrol receive off flowcontrol transmit off mtu 9216 exit interface ethernet 1/1/54 description NodeB_4port_port_0 no shutdown channel-group 40 mode active flowcontrol receive off flowcontrol transmit off mtu 9216 exit interface port-channel 50 switchport access vlan 1 exit copy running-configuration startup- configuration

7

Cable Dell PowerSwitch Series ToR switches for Storage services

This chapter contains the following information.

Topics:

Cable the ToR switches together

The two Top of Rack (ToR) switches are cabled together when a PowerStore model is deployed with Virtual Link Trunking interconnect (VLTi).

Table 20. Available switch-to-switch ports

PowerSwitch	100 GbE Ports
S4148F-ON	25, 26, 29, and 30

Use two cables that support connectivity between the high-speed ports, for example 100Gbps Direct Attached Cables (DAC).

It is recommended that you use the same port numbers for the pair on the top and bottom switch.

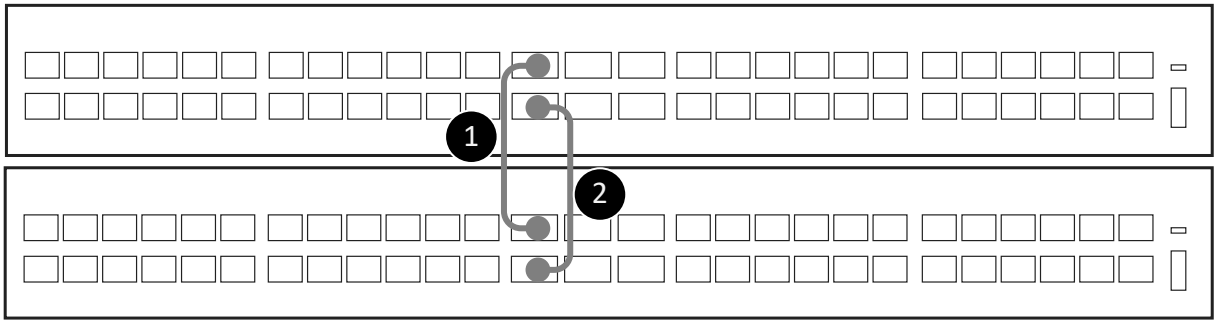

Figure 10. Switch-to-switch connectivity

1.	Connect 100 GbE port 25 of the bottom switch (1) to 100 GbE port 25 of the top switch (2).
2.	Connect 100 GbE port 26 of the bottom switch (1) to 100 GbE port 26 of the top switch (2).

Cable the Top-of-Rack switches to the core uplinks

Cable the Dell PowerSwitch Series S4148-ON Top-of-Rack (ToR) switches to the core uplinks.

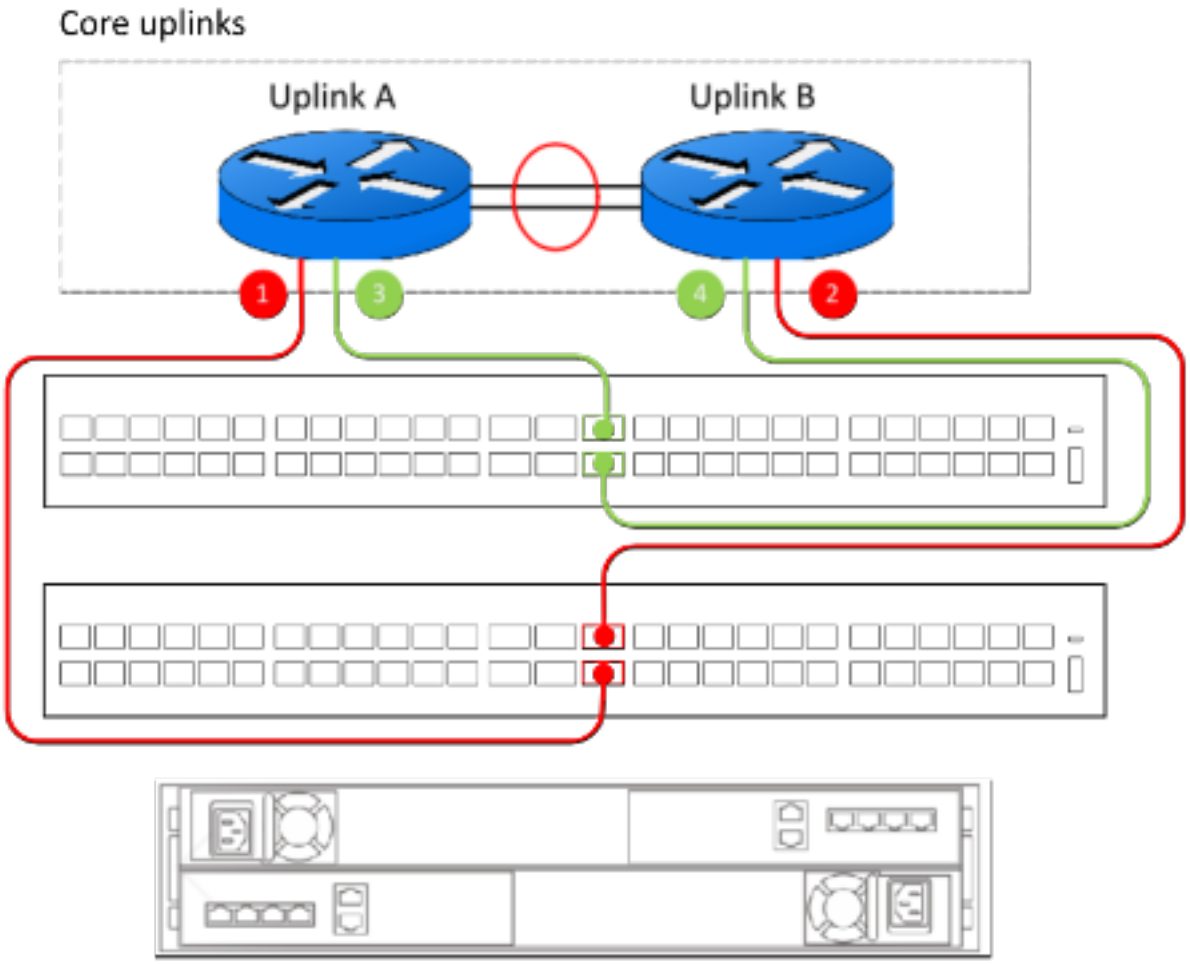

Figure 11. Dell PowerSwitch Series S4148-ON ToR switch connections to the core uplinks

1.	Connect port 30 of the bottom ToR switch to the core Uplink A.
2.	Connect port 29 of the bottom ToR switch to the core Uplink B.
3.	Connect port 29 of the top ToR switch to the core Uplink A.
4.	Connect port 30 of the top ToR switch to the core Uplink B.

NOTE: Work with your network administrator to determine the uplink ports to which the ToR switches connect.

Cable the base enclosure to the ToR switches

Cable the node ports to the Top of Rack (ToR) switch ports for each Storage network.

The sample configuration demonstrates configuring the following node to switch ports. If you have used different ports than demonstrated below, see the Switch resources for Storage services worksheet, which you completed with your network administrator for the correct port mappings.

NOTE: Ports 0 and 1 of the 4-port card are reserved for the cluster network with all PowerStore T model appliances. If deploying a PowerStore 500T model appliance ports 2 and 3 of the 4-port card are reserved for connectivity to the 24 Drive 2.5-Inch NVMe (ENS24) expansion enclosures.

Table 21. Cable the switches

Network	Node	Node Port	Switch	Switch Port
iSCSI/Replication and Block Import	A	Port 2 on I/O Module 0	1	7
	B	Port 2 on I/O Module 0	2	48
NVMe/TCP	A	Port 0 on I/O Module 0	1	5
	B	Port 0 on I/O Module 0	2	50
Network Attached Storage (NAS) /File Import	A	Port 3 on I/O Module 0	1	8
		Port 3 on I/O Module 1	2	8
	B	Port 3 on I/O Module 0	2	47
		Port 3 on I/O Module 1	1	47
Cluster	A	Port 0 on the 4-port card	1	1
		Port 1 on the 4-port card	2	1
	B	Port 0 on the 4-port card	2	54
		Port 1 on the 4-port card	1	54

Cable the iSCSI and Replication and Block Import networks

Cable the nodes to the Top of Rack (ToR) switches for the iSCSI and Replication and Import networks.

Cable the node ports for the iSCSI and Replication and Import networks.

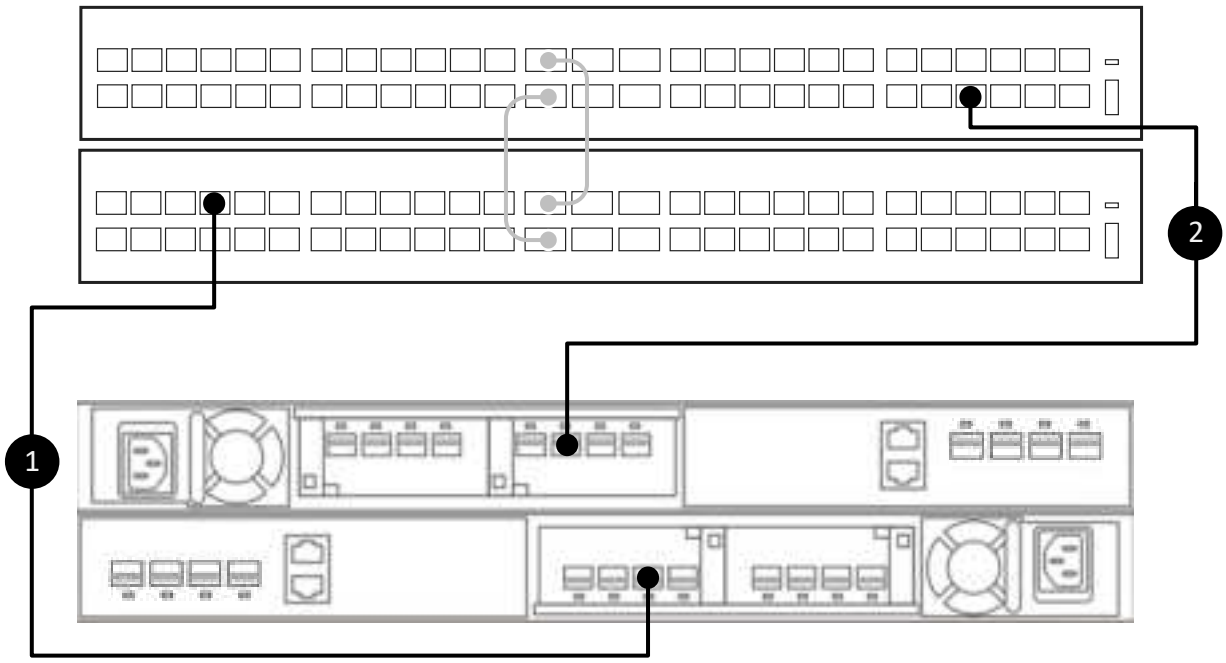

Figure 12. Connect node ports to the ToR switches for the iSCSI and Replication and Block Import networks

1.	Connect Port 2 on I/O Module 0 of the bottom Node A, to Port 7 of the bottom switch (Switch1).
2.	Connect Port 2 on I/O Module 0 of the top Node B, to Port 48 of the top switch (Switch2).

Cable the NVMe/TCP network

Cable the nodes to the Top of Rack (ToR) switches for the NVMe/TCP network.

Cable the node ports for the NVMe/TCP network.

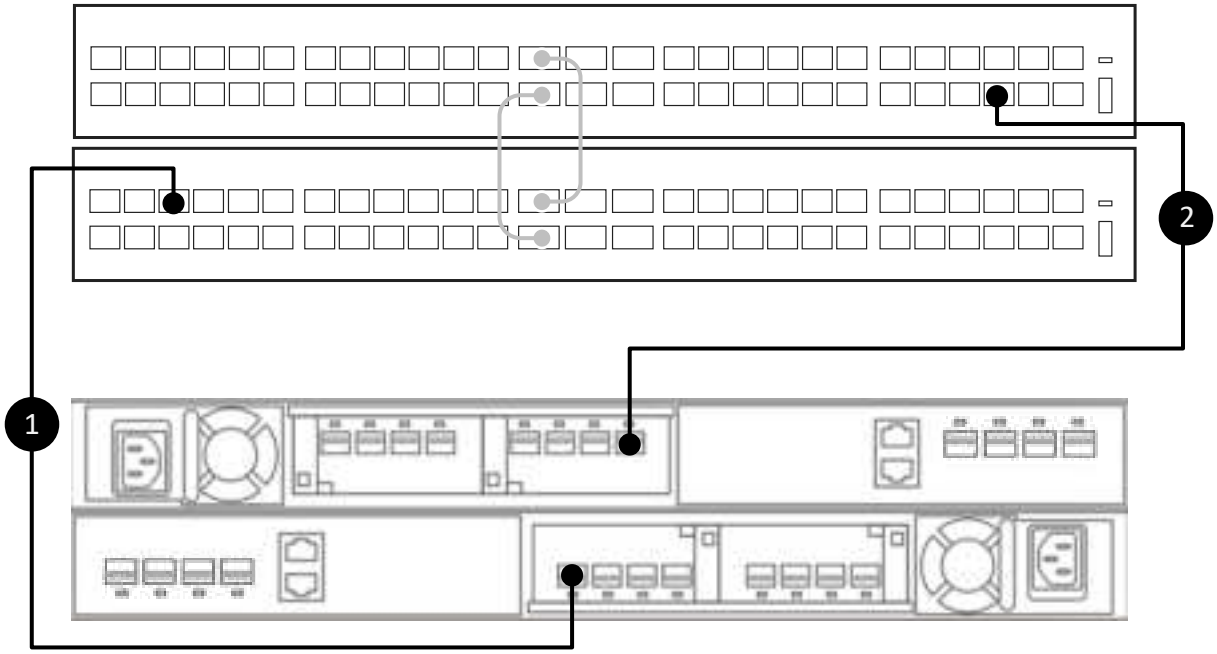

Figure 13. Connect node ports to the ToR switches for the NVMe/TCP network

1.	Connect Port 0 on I/O Module 0 of the bottom Node A, to Port 5 of the bottom switch (Switch1).
2.	Connect Port 0 on I/O Module 0 of the top Node B, to Port 50 of the top switch (Switch2).

Cable the NAS network

Cable the nodes to the Top of Rack (ToR) switches for the Network Attached Storage (NAS) network.

Cable the node ports for the NAS network.

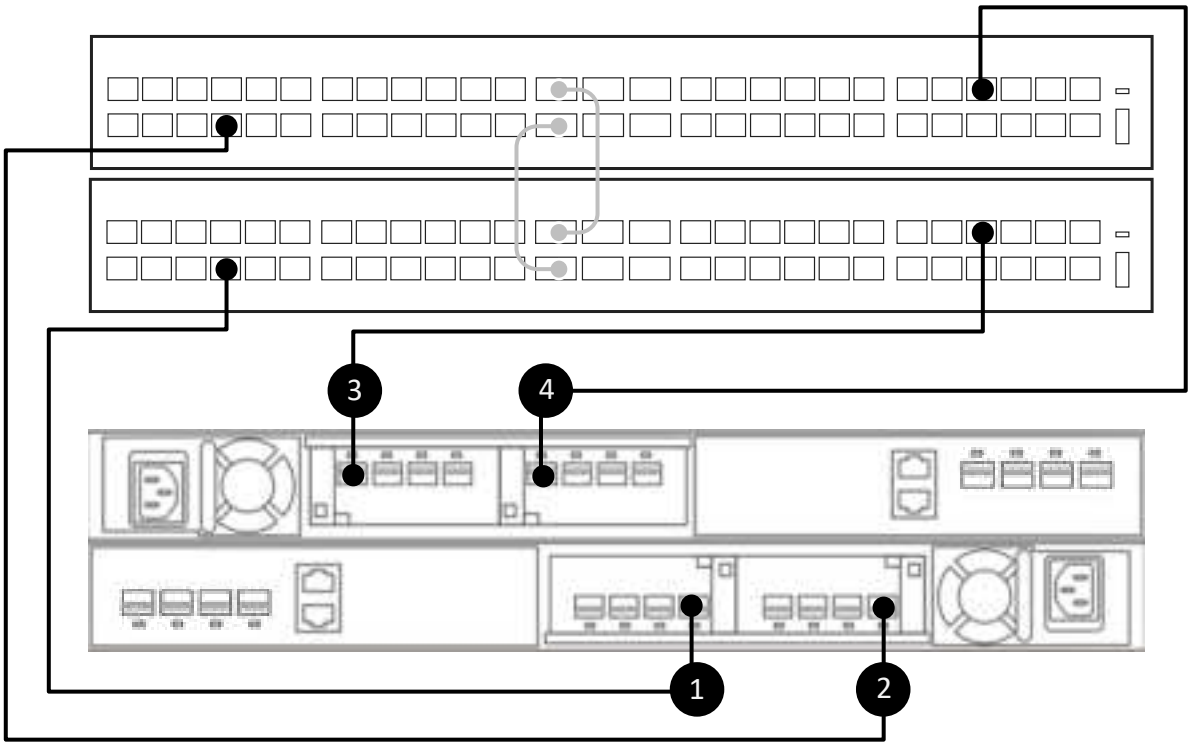

Figure 14. Connect node ports to the ToR switches for the NAS network

1.	Connect Port 3 on I/O Module 0 of the bottom Node A to Port 8 of the bottom switch (Switch1).
2.	Connect Port 3 on I/O Module 1 of the bottom Node A to Port 8 of the top switch (Switch2).
3.	Connect Port 3 on I/O Module 0 of the top Node B, to Port 47 of the bottom switch (Switch1).
4.	Connect Port 3 on I/O Module 1 of the top Node B, to Port 47 of the top switch (Switch2).

Cable the Cluster network

Cable the nodes to the Top of Rack (ToR) switches for the cluster network.

Cable the node ports for the Cluster network.

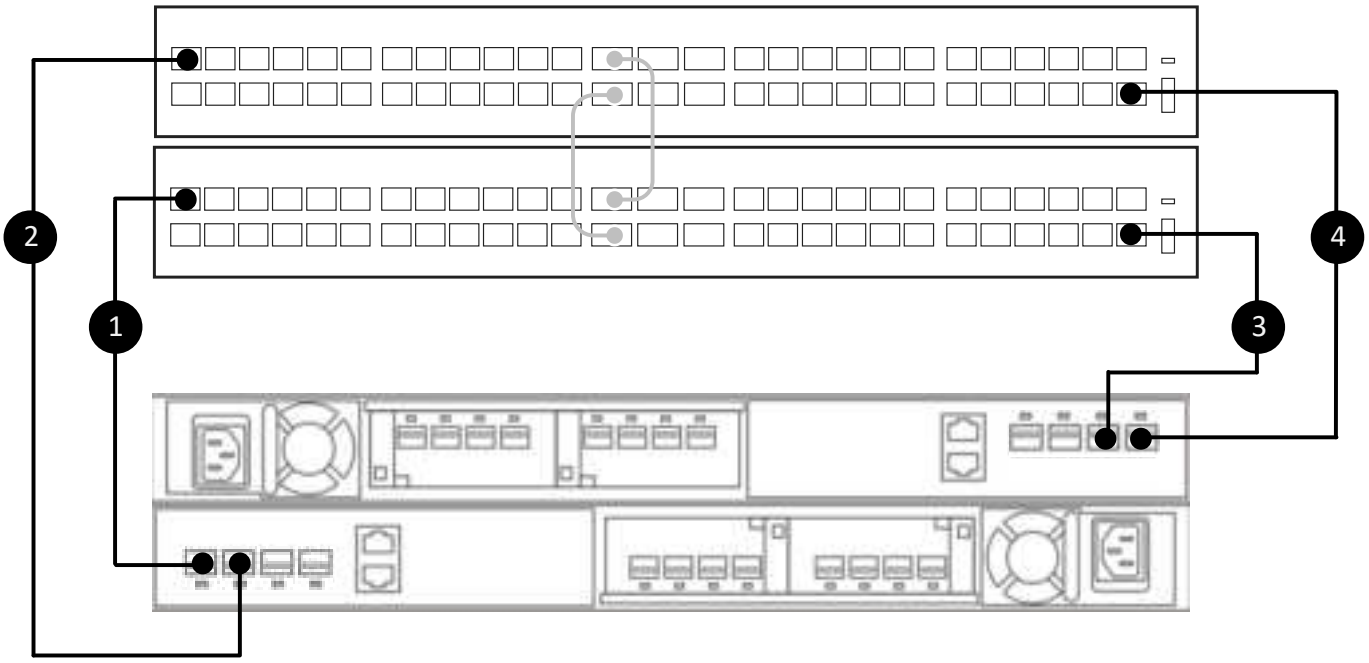

Figure 15. Connect node ports to the ToR switches for the Cluster network

1.	Connect Port 0 of the bottom node (A) to Port 1 of the bottom switch (Switch1).
2.	Connect Port 1 of the bottom node (A) to Port 1 of the top switch (Switch2).
3.	Connect Port 1 of the top node (B), to Port 54 of the bottom switch (Switch1).
4.	Connect Port 0 of the top node (B), to Port 54 of the top switch (Switch2).

8

Validate PowerSwitch Series configuration with ToR switches

This chapter includes the following information.

Topics:

- Validate configuration on the Top-of-Rack (ToR) switches

Validate configuration on the Top-of-Rack (ToR) switches

Once the ToR switches are configured and cabled, validate the configuration.

1. Establish a terminal session to the switch.
2. Validate the interface status.

```
show interface status | grep up
```

```
Port    Description     Status   Speed    Duplex   Mode Vlan Tagged-Vlans
Eth 1/1/1       NodeA_4port_p.. up       10G      full     -
Eth 1/1/5       NodeA_IO_0_po.. up       10G      full     T    1    300
Eth 1/1/7       NodeA_IO_0_po.. up       10G      full     T    1    200,400
Eth 1/1/8       NodeA_IO_0_po.. up       10G      full     -
Eth 1/1/25      VLTi            up       100G     full     -
Eth 1/1/26      VLTi            up       100G     full     -
Eth 1/1/29      Uplink_Ports    up       100G     full     -
Eth 1/1/30      Uplink_Ports    up       100G     full     A    1    -
Eth 1/1/47      NodeB_IO_1_po.. up       10G      full     -
Eth 1/1/54      NodeB_4port_p.. up       10G      full     -
```

3. Validate the port channel configuration.

```
show port-channel summary
```

```
Flags:  D - Down    I - member up but inactive    P - member up and active
        U - Up (port-channel)    F - Fallback Activated    IND - LACP Individual
--------------------------------------------------------------------------------
Group Port-Channel           Type     Protocol  Member Ports
--------------------------------------------------------------------------------
10   port-channel10   (U)     Eth      DYNAMIC   1/1/8(P)
20   port-channel20   (U)     Eth      DYNAMIC   1/1/47(P)
30   port-channel30   (U)     Eth      DYNAMIC   1/1/1(P)
40   port-channel40   (U)     Eth      DYNAMIC   1/1/54(P)
50   port-channel50   (U)     Eth      DYNAMIC   1/1/29(P) 1/1/30(P)
1000 port-channel1000 (U)     Eth      STATIC    1/1/25(P) 1/1/26(P)
```

4. Validate the VLAN configuration

```
show vlan
```

```
Codes: * - Default VLAN, M - Management VLAN, R - Remote Port Mirroring VLANs,
       @ - Attached to Virtual Network, P - Primary, C - Community, I - Isolated
Q: A - Access (Untagged), T - Tagged
```

```
    NUM    Status    Description                    Q Ports
*   1      Active    Cluster_Network                A Eth1/1/2-1/1/7,1/1/9-1/1/24,
                                                      1/1/31-1/1/46,1/1/48-1/1/53
                                                    A Po10,20,30,40,50,1000
    200    Active    iSCSI_Network                  T Eth1/1/7
                                                    T Po50,1000
    300    Active    NVMe_Network                   T Eth1/1/5
                                                    T Po50,1000
    400    Active    RepBlockImport_Network         T Eth1/1/7
                                                    T Po50,1000
    500    Active    NAS_Network                    T Po10,20,50,1000
    4094   Active                                   T Po1000
```

5. Validate the link layer discovery protocol (LLDP) configuration

```
show lldp neighbors
```

```
Loc PortID          Rem Host Name        Rem Port Id            Rem Chassis Id
-------------------------------------------------------------------------------
ethernet1/1/1       Not Advertised       00:e0:ec:da:5c:da      00:e0:ec:da:5c:da

ethernet1/1/1       Dell PowerStore      00:e0:ec:da:5c:ca      cyc-coreos

ethernet1/1/5       Not Advertised       00:60:16:a1:1a:4c      00:60:16:a1:1a:4c

ethernet1/1/5       Dell PowerStore      00:60:16:a1:1a:3c      cyc-coreos

ethernet1/1/7       Not Advertised       00:60:16:a1:1a:4e      00:60:16:a1:1a:4e

ethernet1/1/7       Dell PowerStore      00:60:16:a1:1a:3e      cyc-coreos

ethernet1/1/8       Not Advertised       00:60:16:a0:d6:7f      00:60:16:a0:d6:7f

ethernet1/1/8       Dell PowerStore      00:60:16:a0:d6:6f      cyc-coreos

ethernet1/1/25      Switch2              ethernet1/1/25         68:4f:64:0e:31:d9

ethernet1/1/26      Switch2              ethernet1/1/26         68:4f:64:0e:31:d9

ethernet1/1/29      UX-Spine-1           ethernet1/1/29         68:4f:64:68:c7:1d

ethernet1/1/30      UX-Spine-1           ethernet1/1/30         68:4f:64:68:c7:1d

ethernet1/1/47      Not Advertised       00:60:16:a1:83:b3      00:60:16:a1:83:b3

ethernet1/1/47      Dell PowerStore      00:60:16:a1:83:a3      cyc-coreos

ethernet1/1/54      Not Advertised       00:e0:ec:da:5b:23      00:e0:ec:da:5b:23

ethernet1/1/54      Dell PowerStore      00:e0:ec:da:5b:13      cyc-coreos

mgmt1/1/1           UX-Spine-1           ethernet1/1/41         68:4f:64:68:c7:1d
```

6. Validate the VLT domain_id

```
show vlt <domain_id>
```

```
Domain ID                             : 1
Unit ID                               : 1
Role                                  : primary
Version                               : 3.1
Local System MAC address              : 68:4f:64:0e:6d:d9
Role priority                         : 4096
VLT MAC address                       : 00:00:00:00:00:01
IP address                            : fda5:74c8:b79e:1::1
Delay-Restore timer                   : 90 seconds
Peer-Routing                          : Enabled
Peer-Routing-Timeout timer            : 0 seconds
Multicast peer-routing timer          : 300 seconds
```

```
VLTi Link Status
    port-channel1000                  : up

VLT Peer Unit ID    System MAC Address    Status    IP Address              Version
--------------------------------------------------------------------------------
  2                 68:4f:64:0e:31:d9      up       fda5:74c8:b79e:1::2     3.1
```

7. Validate VLT backup link

```
show vlt <domain_id> backup-link
```

```
VLT Backup Link
------------------------
Destination                    : 100.0.100.11
Peer Heartbeat status          : Up
Heartbeat interval             : 30
Heartbeat timeout              : 90
Destination VRF                : default
```

8. Validate that there is no mismatch with the VLT domain_id.

```
show vlt <domain_id> mismatch
```

```
VLT-MAC mismatch:
No mismatch

Peer-routing mismatch:
No mismatch

VLAN mismatch:
No mismatch

Private VLAN mode mismatch:
No mismatch

Private VLAN mapping mismatch:
No mismatch

Private VLAN port mode mismatch:
No mismatch

LACP Individual 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

Virtual Network VNI Mismatch:
No mismatch

Virtual Network Remote-VTEP Mismatch:
No mismatch
```

```
Virtual Network anycast ip Mismatch:
No mismatch

Virtual Network anycast mac Mismatch:
No mismatch

EVPN Mismatch:

EVPN Mode Mismatch:
No mismatch

EVPN EVI Mismatch:
No mismatch

EVPN VRF Mismatch:
No mismatch

EVPN ARP-ND SUPPRESSION Mismatch:
No mismatch

NVE Mismatch:
No mismatch

VLAN anycast ip Mismatch:
No mismatch

VLAN anycast mac Mismatch:
No mismatch

DHCP Snooping Mismatch:

Global Snooping Configuration Mismatch

-------------------------------------------------------------
    Codes: SE  - Static Entry Mismatch
           DT  - DAI Trust Mismatch
           ST  - Snooping Trust Mismatch
           SAV - Source-Address-Validation Mismatch
           ARP - ARP Inspection Mismatch
           VS  - VLAN Snooping Mismatch
          Interface              Interface Snooping Configuration Mismatch

-------------------------------------------------------------------------

DHCP Relay Mismatch:

Global Relay Configuration Mismatch

-------------------------------------------------------------------------

VRF Relay Configuration Mismatch

-------------------------------------------------------------------------

Interface Relay Configuration Mismatch

-------------------------------------------------------------------------

DHCP V6 Relay Mismatch:

Global Dhcpv6 Relay Configuration Mismatch

-------------------------------------------------------------------------

Interface Dhcpv6 Relay Configuration Mismatch

-------------------------------------------------------------------------


RA Guard Mismatch:

Global RA Guard Configuration Mismatch: No
```

```
Interface                  Vlan            Reason
-------------------------------------------------------------------
Multicast Snooping configuration mismatch:
Flood-restrict configuration:
Local     Peer
--------------------------
No mismatch
Global Snooping configuration:
Protocol      Local      Peer
-----------------------------------
No Mismatch
Vlan status          IPv4                   IPv6
VlanId         Local      Peer        Local       Peer
-----------------------------------------------------
No mismatch
Mismatch check for NLB configs in VLT
-------------------------------------------------
No mismatch
Multicast routing mismatches:
Global status:
Parameter        VRF                                Local     Peer
-------------------------------------------------------------------------
No mismatch
SSM-Range status:
Parameter        VRF                                Local     Peer
-------------------------------------------------------------------------
No mismatch
Register Filter status:
Parameter        VRF                                Local     Peer
-------------------------------------------------------------------------
No mismatch
Vlan status          IPv4                   IPv6
VlanId         Local      Peer        Local       Peer
-----------------------------------------------------
No mismatch
Neighbor Filter status:         IPv4                   IPv6
VlanId                     Local      Peer        Local       Peer
```

```
-----------------------------------------------------------------
No mismatch


Join Filter status:          IPv4                   IPv6

VlanId                 Local      Peer        Local       Peer

-----------------------------------------------------------------

No mismatch

PIM Anycast RP information mismatches:

Anycast RP:

Parameter    VRF                                 Local             Peer

-------------------------------------------------------------------------


Anycast RP-Set:

RP-address        VRF                                Local             Peer

-------------------------------------------------------------------------------------------

No mismatch

Mismatch check for Port Security configs in VLT

-------------------------------------------------------------------------

GLOBAL PORT-SECURITY CONFIGURATION

-------------------------------------------------------------------------

No mismatch
-------------------------------------------------------------------------

VLT-LAG PORT-SECURITY CONFIGURATION

-------------------------------------------------------------------------

No mismatch
```

9. Validate the VLT port configuration.

```
show vlt <domain_id> vlt-port-detail
```

```
vlt-port-channel ID : 10
VLT Unit ID    Port-Channel      Status    Configured ports    Active ports
-------------------------------------------------------------------------
* 1            port-channel10     up        1                   1
  2            port-channel10     up        1                   1

vlt-port-channel ID : 20
VLT Unit ID    Port-Channel      Status    Configured ports    Active ports
-------------------------------------------------------------------------
* 1            port-channel20     up        1                   1
  2            port-channel20     up        1                   1

vlt-port-channel ID : 30
VLT Unit ID    Port-Channel      Status    Configured ports    Active ports
-------------------------------------------------------------------------
* 1            port-channel30     up        1                   1
  2            port-channel30     up        1                   1

vlt-port-channel ID : 40
VLT Unit ID    Port-Channel      Status    Configured ports    Active ports
```

```
--------------------------------------------------------------------------------
* 1            port-channel40     up        1                    1
  2            port-channel40     up        1                    1

vlt-port-channel ID : 50
VLT Unit ID    Port-Channel      Status    Configured ports    Active ports
--------------------------------------------------------------------------------
  1            port-channel50     up        2                    2
  2            port-channel50     up        2                    2
```

10. Repeat the steps on ToR switch 2.
11. Review the running configuration for ToR switch 1, and repeat on ToR switch 2.

```
show running-configuration
```

For an example of the running configuration output see Running configuration of PowerSwitch Series used in PowerStore T model deployments.

9

Configure Storage networks in PowerStore Manager

This chapter includes the following information.

Topics:

Create Block-optimized Storage networks in PowerStore Manager

Once you have configured the Top-of-Rack (ToR) switches with iSCSI, NVMe/TCP, or Replication and Block import networks, the networks must also be created in PowerStore Manager.

This topic describes steps to configure the iSCSI, NVMe/TCP, and Replication and Block Import networks in PowerStore Manager. For steps to configure networks for Network Attached Storage (NAS) networks, see Create NAS networks in PowerStore Manager.

Get the completed *Network configuration worksheet for Storage services*.

The following *Network configuration worksheet for Storage services* has been completed with the network resources that are used in this guide. If the Top-of-Rack switches were not configured with the resources that are used in this guide, complete a new *Network configuration worksheet for Storage services* with the information relevant to your environment. To download a blank worksheet, see Network configuration worksheet for Block-optimized Storage services (blank).

Once you have configured the Cluster network on the switch, Cluster network configuration is automated in PowerStore Manager, and no further action is required.

By default PowerStore Manager assigns iSCSI, NVMe/TCP, and Replication to the Default Storage Network. You can change the Default Storage Network purposes in PowerStore Manager.

Table 22. Network configuration worksheet for additional Block-optimized storage services (completed)

Resource	iSCSI	NVMe/TCP	Replication and Block Import
Storage Network Name	`iSCSI_Network`	`NVMe_Network`	`RepBlockImport_Network`
Purpose A storage network can be purposed for iSCSI, NVMe/TCP, Replication (and Block Import), or all the protocols.	`Storage (iSCSI)`	`Storage (NVMe/TCP)`	`Replication`
(Optional) VLAN ID For better security and performance, it is recommended that you specify a unique VLAN ID for each type of network. If you are deploying into a single VLAN, ensure that you configure a unique subnet for the Management and each Storage network.	`200`	`300`	`400`

Table 22. Network configuration worksheet for additional Block-optimized storage services (completed) (continued)

Resource	iSCSI	NVMe/TCP	Replication and Block Import
Use the same VLAN IDs that were used to configure your Storage networks on the switch.			
Netmask/Prefix Length	`24`	`24`	`24`
Gateway	`192.168.2.1`	`192.168.3.1`	`192.168.4.1`
Storage Network IP addresses You must reserve a minimum of two IP addresses for each Storage network you are adding. (One IP address per node.)	`192.168.2.11-12`	`192.168.3.11-12`	`192.168.4.11-12`
(Optional) Global Storage Discovery IP It is recommended that you choose to create this IP address. It is used as the single highly available floating IP address for hosts to discover storage from your cluster.	`192.168.2.10`	`192.168.3.10`	`192.168.4.10`
Map Storage for Appliance/ Network Interface (Include the port or Link Aggregation (LACP bond) for each appliance to which the storage is mapped).	`Port 2 on I/O Module 0`	`Port 0 on I/O Module 0`	`Port 2 on I/O Module 0`
Network MTU Size You can provide an MTU size between 1280-9000 bytes. **NOTE:** It is recommended to set the MTU size to 9000.	`9000`	`9000`	`9000`

1. From PowerStore Manager go to the **Settings** > **Network IPs** > **Storage** tab.
2. Click **Create**.
3. Enter the network resources into the **Create Storage Network** wizard and select **Next**. When mapping the ports to the network, select the checkbox next to the name of the first port over which the storage traffic runs. PowerStore Manager automatically maps the network to both the port that you selected, and the corresponding port on the other node.
4. Repeat steps 1 - 3 for each network that you are adding.
5. To validate the Storage network was successfully configured:
   a. Go to **Hardware** > **Ports**.
   b. Locate the port on which you created the Storage network in the **Node-Module-Name** column.

      NOTE: If the cluster includes multiple appliances, check the **Appliance** column to confirm you are configuring ports on the correct appliance.

   c. The **Link State** should be green, and the network should appear in the **Mapped for Storage** column.
   d. Locate the corresponding port on the other appliance node, to validate that the **Link State** is green, and the Storage network appears in the **Networks Mapped** column.

Create NAS networks in PowerStore Manager

Once you have configured the ToR switches for Network Attached Storage (NAS) networks, you must create the NAS networks in PowerStore Manager.

This topic describes how to configure the NAS network in PowerStore Manager. For steps to configure networks for the iSCSI, NVMe/TCP, Replication and Import, or Cluster networks in PowerStore Manager, see Create Storage networks in PowerStore Manager.

NAS services are enabled when you select **Unified** mode in the PowerStore Manager**Initial Configuration Wizard** the first time you create a cluster in PowerStore Manager.

Get the completed *Network configuration worksheet for NAS storage services*.

The following *Network configuration worksheet for NAS storage services* has been completed with the resources that are used in this guide for NAS networks. If you did not configure the Top-of-Rack switches with the resources that are used in this guide, complete a new *Network configuration worksheet for NAS storage services* with the information relevant to your environment. To download a blank worksheet, see the Network configuration worksheet for NAS storage service (blank).

NAS networks are configured while creating a NAS server in PowerStore Manager. You need the following information to set up the NAS network while creating a NAS server. For additional requirements to set up a NAS server and detailed steps see the *PowerStore Configuring NFS Guide* or the *PowerStore Configuring SMB Guide*.

NAS networks require that you configure an LACP bond in PowerStore Manager.

Table 23. Network configuration worksheet for NAS storage service (completed)

Resource	NAS
Network Name	`NAS_Network`
(Optional) VLAN ID For better security and performance, it is recommended that you specify a unique VLAN ID for each type of network. If you are deploying into a single VLAN, ensure that you configure a unique subnet for the Management, Storage, and NAS networks. Use the same VLAN IDs that were used to configure your storage networks on the switch.	`500`
Netmask/Prefix Length	`24`
Gateway	`192.168.5.1`
Network IP addresses You must reserve a minimum of one IP address for NAS Server production. Optionally, you can reserve additional IP addresses for NAS Server backups.	Production: `192.168.5.11` Backup: `192.168.5.12`
Map Storage for Appliance/Network Interface Include the Node ports, or port channel on which the networks are configured.	Node A: • `Port 3 on I/O Module 0` • `Port 3 on I/O Module 1` Node B: • `Port 3 on I/O Module 0` • `Port 3 on I/O Module 1` The ports are configured into `BaseEnclosure-NodeA-Bond1`

1. Configure the Link Aggregation in PowerStore Manager for the LACP bond that you created for the NAS network on the switch.
   a. Go to **Hardware** > **Ports**.
   b. Select the two ports on Node A which were configured for the bond on Node A.

      NOTE: If the cluster includes multiple appliances, check the **Appliance** column to confirm you are configuring ports on the correct appliance.

c. Click **Link Aggregation** > **Aggregate Links**.

PowerStore Manager automatically creates a name for the bond using the following format: "BaseEnclosure-<Node>-<nextLACPbondcreated>" where:

- BaseEnclosure is constant.
- Node is the node that is displayed in the **Node-Module-Name** list.
- nextLACPbondcreated is the numbered by the order in which the bond was created in PowerStore Manager, starting with 0 for the first created.

For example, the second LACP bond that is created in PowerStore Manager on Node A would be named: **BaseEnclosure-NodeA-Bond1**.

d. Optionally, provide a **Description** of the bond.

It is recommended to put the name of the bond that is created on the switch that maps to this bond.

The same LACP bond is configured on the opposite node. For example if you configured the LACP bond on Node A, then the same LACP bond would be configured on Node B.

2. Create a NAS server.

NAS networks are created in PowerStore Manager when you create NAS servers. See the *PowerStore Configuring NFS Guide* or the *PowerStore Configuring SMB Guide* for detailed steps.

Optionally, add the File Import Interface in PowerStore Manager

The File Import interface (network) is added when you add the Remote system to PowerStore Manager.

Every active import requires its own File Import interface be created. However, a File Import interface can be reused for more File Imports when no other session is using it.

NAS Services must be enabled on your PowerStore T or Q model cluster.

The File Mobility network must be configured in PowerStore Manager.

The LACP bond that is used for File Import must have been configured on the switch and in PowerStore Manager.

You can create a Link Aggregation in PowerStore T or Q models or reuse the Link Aggregation that was configured for NAS services for the File Import interface.

The following network resources must be reserved before you can define the File Import interface in PowerStore Manager.

The network that is used for File Import is configured while creating the File Import Interface in PowerStore Manager. You need the following information to set up the File Import network in PowerStore Manager. For additional requirements to set up a File Import interface and detailed steps see the *PowerStore Importing External Storage to PowerStore Guide*.

Table 24. Network configuration worksheet for File Import (completed sample)

Resource	File Import
(Optional) VLAN ID	N/A
Netmask/Prefix Length	`24`
Gateway	`192.168.6.1`
Network IP addresses A minimum of one IP address is required for each active file import session. However, a File Import interface can be reused for File Import when no other session is using it.	`192.168.6.11`
(Optional) Global Storage Discovery IP It is recommended that you choose to create this IP address. It is used as the single highly available floating IP address for hosts to discover storage from your cluster.	N/A
Map Storage for Appliance/Network Interface Include the Node ports, or port channel on which the networks are configured.	Reuse `BaseEnclosure-NodeA-Bond1` configured for NAS services.

1. If you have not created a Link Aggregation in PowerStore Manager for the LACP bond you created on the switch for File Import perform the following steps, otherwise continue to step 2.
   a. Go to **Hardware** > **Ports**.
   b. Select the two ports on Node A which were configured for the bond on Node A.
      - You can create a Link Aggregation or reuse the Link Aggregation that was configured for NAS services for the File Import interface.
      - Bond 0 is reserved for the Cluster network. You cannot reuse the Link Aggregation that is created for the Cluster network for the File Import interface.
      - If you are creating a Link Aggregation and the cluster includes multiple appliances, check the **Appliance** column to confirm you are configuring ports on the correct appliance.
   c. Click **Link Aggregation** > **Aggregate Links**.

      PowerStore Manager automatically creates a name for the bond using the following format: "BaseEnclosure-<Node>-<nextLACPbondcreated>" where:
      - BaseEnclosure is constant.
      - Node is the node that is displayed in the **Node-Module-Name** list.
      - nextLACPbondcreated the order in which the bond was created in PowerStore Manager, starting with 0 for the first created bond.

      For example, the second LACP bond that is created in PowerStore Manager on Node A would be named: **BaseEnclosure-NodeA-Bond1**.

   d. Optionally, provide a **Description** of the bond.

      It is recommended to put the name of the bond that is created on the switch that maps to this bond.

      The same LACP bond is configured on the opposite node. For example if you configured the LACP bond on Node A, then the same LACP bond would be configured on Node B.
2. Add the Remote system from the PowerStore Manager**Migration** > **Import External Storage** > **Add Remote System** page.

   You define the File Import interface while adding the Remote system. See the PowerStore Manager online help, or the *PowerStore Importing External Storage to PowerStore Guide* for details.

10

Create an additional Storage network

This chapter includes the following information.

Topics:

- Create another Storage network

Create another Storage network

PowerStore supports configuring up to 256 storage networks.

The following information is required to create a Storage network.

NOTE: The sample network resources below can be used on the two Dell PowerSwitch Series S4148 Top-of-Rack (ToR) switches configured for the NVMe/TCP network that is described in Configuring PowerStore storage networks with Dell PowerSwitch Series S4148 Top-of-Rack switches. If the same network was not configured on the Dell PowerSwitch Series S4148 ToR switches described in this guide, replace the sample resources with values matching the configured network.

Table 25. New Storage network resources

Network resource	Sample
Storage network name	NVMe_Network2
Purpose	Storage (NVMe/TCP)
Port on the PowerStore appliance **NOTE:** The same port must be used on both nodes.	Port 1 on I/O Module 0
ToR Switch 1 port to cable to the bottom node (A)	6
ToR Switch 1 port to cable to the bottom node (B)	49
VLAN ID	210
Netmask or Prefix Length	24
Gateway	192.168.21.1
Optional, Global IP Address	192.168.21.70
IP addresses At least two IP addresses; one IP address for Node A iSCSI target and the other for Node B iSCSI target.	192.168.21.71-72

Perform the following steps to configure an additional port on which to create another Storage network on the PowerStore T model appliance.

1. Cable the nodes to the ToR switches.
2. Configure a Storage network on the ToR switches.
3. Create additional Storage network in PowerStore Manager.

Cable the nodes to the ToR switches

The following steps provide an example of cabling the PowerStore T model appliance nodes to two Dell PowerSwitch Series S4148 Top-of-Rack (ToR) switches.

The following instructions apply to the iSCSI storage network, and the ToR switches configured in Configuring PowerStore storage networks with Dell PowerSwitch Series S4148 Top-of-Rack switches .

The following example uses port 1 on I/O Module 0. However, use any available port on any I/O module if your nodes have been configured with I/O modules.

NOTE: Ports 0 and 1 of the 4-port card are reserved for the cluster network with all PowerStore T model appliances. Ports 2 and 3 of the 4-port card in PowerStore 500T model appliances are reserved for connectivity to the 24 Drive 2.5-Inch NVMe (ENS24) expansion enclosures.

As demonstrated below, when cabling the nodes to the ToR switches the bottom node (A), and the top node (B) must be cabled to opposite switches.

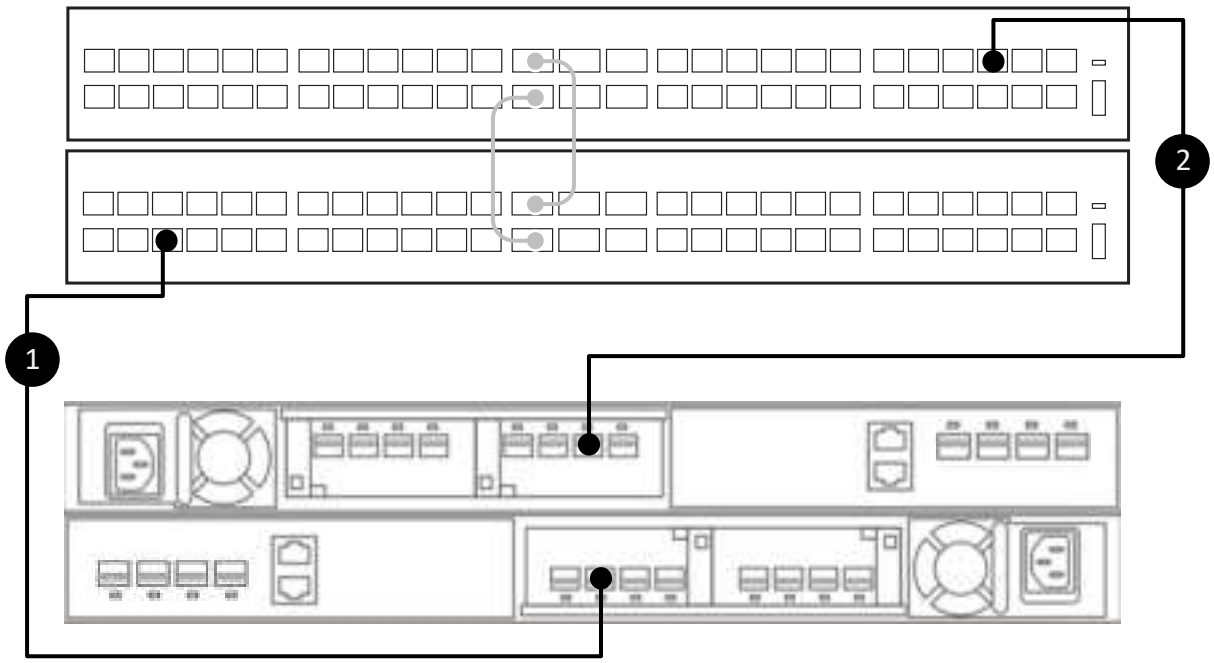

Figure 16. Cable the additional port

1. Connect Port 1 in I/O Module 0 of the bottom Node A to Port 6 of the bottom switch (Switch1).
2. Connect Port 1 in I/O Module 0 of the top Node B, to Port 49 of the top switch (Switch2).

Configure a Storage network on the ToR switches

The following steps provide an example of configuring an additional NVMe/TCP storage network on two Dell PowerSwitch Series S4148 Top-of-Rack (ToR) switches.

You can cable the PowerStore T model appliance nodes to the switches before or after you perform these steps. For steps, see Cable the nodes to the ToR switches.

See New storage network resources for a list of:

- Network resources required to add a storage network
- Sample values are used in the following steps.

1. Establish a terminal connection to the first ToR switch (Switch1).

2. Enter global configuration mode.

```
configure terminal
```

3. Configure the Storage network on ToR Switch1.

```
interface vlan 210
description NVMe_Network2
exit
```

4. Configure the Storage network to run over port 6 on ToR Switch1.

```
interface ethernet 1/1/6
description NodeA_IO_0_port_1
no shutdown
switchport mode trunk
switchport trunk allowed vlan 210
mtu 9216
no shutdown
```

5. Repeat steps 1 - 4 on the second ToR switch (Switch2) as demonstrated below.

NOTE: Be sure to use the correct Ethernet ports when configuring the second ToR switch (Switch2).

Table 26. Code sample for configuring ToR switches for a new iSCSI Storage network

Tor Switch1	ToR Switch2

`configure terminal`
`interface vlan 210`
`description NVMe_Network2`
`exit`
`interface ethernet 1/1/6`
`description NodeA_IO_0_port_1`
`no shutdown`
`switchport mode trunk`
`switchport trunk allowed vlan 210`
`mtu 9216`
`no shutdown`
	`configure terminal`
	`interface vlan 210`
	`description NVMe_Network2`
	`exit`
	`interface ethernet 1/1/49`
	`description NodeB_IO_0_port_1`
	`no shutdown`
	`switchport mode trunk`
	`switchport trunk allowed vlan 210`
	`mtu 9216`
	`no shutdown`

Create another Storage network in PowerStore Manager

Once you have configured and cabled the Top-of-Rack (ToR) switches to the nodes, you must create the Storage network in PowerStore Manager.

See the New Storage network resources for a list of:

- Network resources required to add a storage network.
- Sample values that are used in the following steps.

1. From PowerStore Manager go to **Settings** > **Networking** > **Network IPs** and select the **Storage** tab.
2. Select **Create**.
3. Enter the Storage network resources into the **Create Storage Network** wizard and select **Next**.
   See New Storage network resources for sample values.
4. Select the checkbox next to the name of the first port over which the storage traffic runs for the Storage network. PowerStore Manager automatically maps the Storage network to both the port that you selected, and the corresponding port on the other node.
5. To validate the Storage network was successfully configured:
   a. Go to **Hardware** > **Ports**.
   b. Locate the port on which you created the Storage network in the **Node-Module-Name** column.

NOTE: If the cluster includes multiple appliances, check the **Appliance** column to confirm you are configuring ports on the correct appliance.

c. The **Link State** should be green, and the Storage network should appear in the **Mapped for Storage** column.
d. Locate the corresponding port on the other appliance node, to validate that the **Link State** is green, and the Storage network appears in the **Mapped for Storage** column.

11

Expand a Storage network to run across multiple ports

This chapter includes the following information.

Topics:

- Expand a Storage network

Expand a Storage network

Expand a Storage network to run across multiple ports on a PowerStore T model appliance.

The following information is required to expand a Storage network.

NOTE: The sample network resources below can be used to expand the iSCSI storage network configured in Configuring PowerStore storage networks with Dell PowerSwitch Series S148 Top-of-Rack switches on the two Dell PowerSwitch Series S4148 Top-of-Rack (ToR) switches. If the iSCSI network was not configured as described in this guide, then replace the sample resources with values matching the configured network.

Table 27. iSCSI storage network resources

Network resource	Sample
Storage network name	iSCSI_Network
Purpose	Storage (iSCSi)
Node Port of the PowerStore T model appliance **NOTE:** The same port must be used on both nodes.	Port 1 of I/O Module 0
ToR Switch 1 port to cable to the bottom node (A)	6
ToR Switch 2 port to cable to the bottom node (B)	49
VLAN ID of the Storage network being expanded	200
IP addresses At least two IP addresses for each interface on which the storage network is being expanded. One IP address for Node A and the other for Node B	192.168.2.13-14

Perform the following steps to configure an additional port and expand a Storage network that is previously configured on the PowerStore T model appliance.

1. Cable the nodes to the switches for storage network expansion.
2. Configure the VLAN on the Top-of-Rack (ToR) switches.
3. Add IP addresses and map the Storage network to the ports.

Cable the nodes to the ToR switches

The following steps provide an example of cabling the PowerStore T model appliance nodes to two Dell PowerSwitch Series S4148 Top-of-Rack (ToR) switches.

The following instructions apply to the iSCSI storage network, and the ToR switches configured in Configuring PowerStore storage networks with Dell PowerSwitch Series S4148 Top-of-Rack switches .

The following example uses port 1 on I/O Module 0. However, use any available port on any I/O module if your nodes have been configured with I/O modules.

NOTE: Ports 0 and 1 of the 4-port card are reserved for the cluster network with all PowerStore T model appliances. Ports 2 and 3 of the 4-port card in PowerStore 500T model appliances are reserved for connectivity to the 24 Drive 2.5-Inch NVMe (ENS24) expansion enclosures.

As demonstrated below, when cabling the nodes to the ToR switches the bottom node (A), and the top node (B) must be cabled to opposite switches.

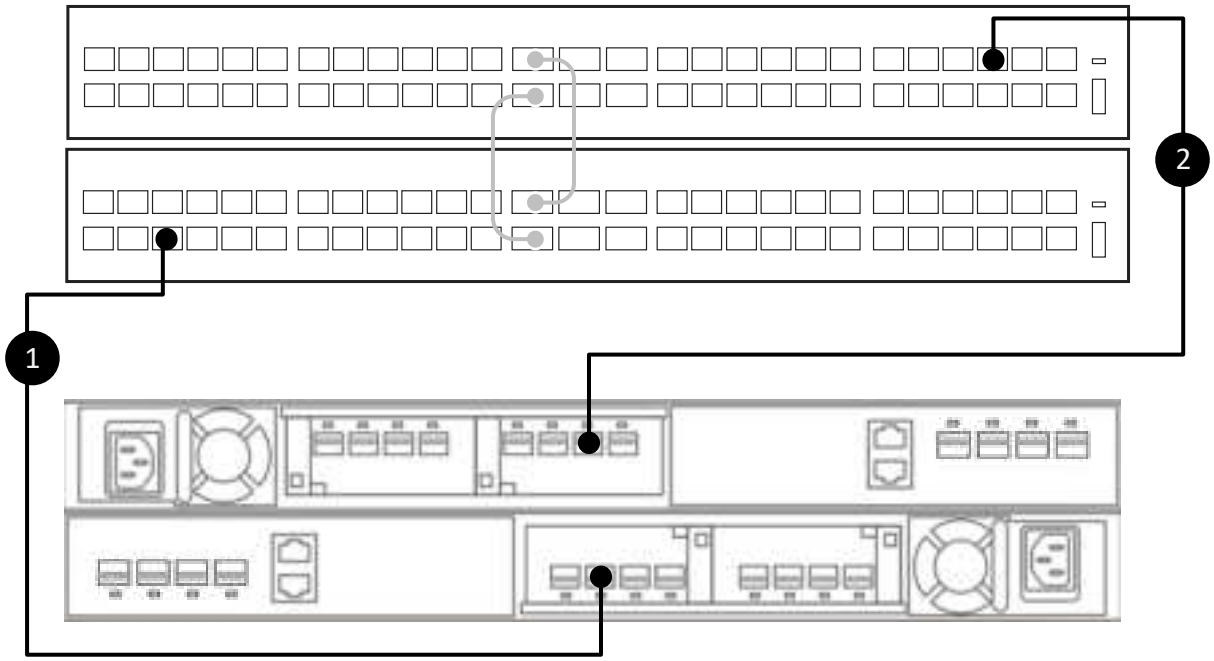

Figure 17. Cable the additional port

1. Connect Port 1 in I/O Module 0 of the bottom Node A to Port 6 of the bottom switch (Switch1).
2. Connect Port 1 in I/O Module 0 of the top Node B, to Port 49 of the top switch (Switch2).

Configure the VLAN on the ToR switches

The following steps provide an example of configuring VLANs on two Dell PowerSwitch Series S4148 Top-of-Rack (ToR) switches.

You can cable the PowerStore T model appliance nodes to the switches before or after you perform these steps. For steps, see Cable the nodes to the ToR switches.

You can skip this step if you have already configured the additional ToR switch ports with the VLAN on which the iSCSI storage network was created.

See iSCSI Storage network resources for a list of:

- Network resources required to expand a storage network
- Sample values are used in the following steps.

1. Establish a terminal connection to the first ToR switch (Switch1).
2. Enter global configuration mode.

```
configure terminal
```

3. Configure the storage network VLAN to run over ToR Switch 1 port 6.

```
interface ethernet 1/1/6
description NodeA_IO_0_port_1
no shutdown
```

```
switchport mode trunk
switchport trunk allowed vlan 200
no shutdown
exit
```

4. Repeat steps 1 - 3 on the second ToR switch (Switch2) as demonstrated below.

   NOTE: Be sure to use the correct Ethernet ports when configuring the second ToR switch (Switch 2).

Table 28. Code sample for configuring ToR switches to expand an iSCSI Storage network

Tor Switch1	ToR Switch2

`configure terminal`
`interface ethernet 1/1/6`
`description NodeA_IO_0_port_1`
`no shutdown`
`switchport mode trunk`
`switchport trunk allowed vlan 200`
`no shutdown`
`exit`
	`configure terminal`
	`interface ethernet 1/1/49`
	`description NodeB_IO_0_port_1`
	`no shutdown`
	`switchport mode trunk`
	`switchport trunk allowed vlan 200`
	`no shutdown`
	`exit`

Add IP addresses and map the Storage network to the ports

Once the Top-of-Rack (ToR) switches are configured and cabled to expand the storage network, you must add IP addresses, and map the ports for expansion in PowerStore Manager.

See iSCSI storage network resources for a list of:

- Network resources required to expand a storage network.
- Sample values are used in the following steps.

1. From PowerStore Manager go to **Settings** > **Networking** > **Network IPs** and select the **Storage** tab.
2. Select the checkbox next to the name of the Storage network that you are expanding.
3. Select **Add IPs**.
4. Select **Add** in the **IP Addresses for <storage network name> page**.
5. Enter the IP addresses or address range for the addresses that are reserved for expanding the storage network and Select **Add**.
6. Go to **Hardware** > **Ports**.
7. Select the checkbox next to the name of one of the ports on which you are expanding the Storage network.

   NOTE: If the cluster includes multiple appliances, check the **Appliance** column to confirm you are configuring ports on the correct appliance.

8. Select **Map Storage Network**.
9. Select the checkbox next to the Storage network that you are expanding on the **Map Storage Network** page, and Select **Map Network**.
   PowerStore Manager automatically maps the unused IP addresses that you added in Step 5.
10. Select **Map Network** again in the **Map Storage Network** confirmation dialog box.
    PowerStore Manager automatically maps the Storage network to both the port that you selected, and the corresponding port on the other node.
11. To validate the Storage network was successfully configured:
    a. Locate the port on which you expanded the Storage network in the **Node-Module-Name** column.
    b. The **Link State** should be green, and the Storage network should appear in the **Mapped for Storage** column.
    c. Locate the corresponding port on the other appliance node, to validate that the **Link State** is green, and the Storage network appears in the **Mapped for Storage** column.

12

Configuring a Fail-Safe Network with Dell PowerSwitch Series S4148 Top-of-Rack switches

This chapter includes the following information.

Topics:

Sample Configuration

This chapter provides an example configuration for configuring a Fail-Safe Network with Dell PowerSwitches.

Hardware

The sample deployment that is used in this document demonstrates configuring a PowerStore T model appliance with:

- A single cluster consisting of one appliance with a single base enclosure
- A single Dell PowerSwitch Series S4148 Management switch

  NOTE: The following configuration section assumes that you have completed initial deployment of the PowerStore T model appliance and the Management switch and networks are successfully configured.

- Two Dell PowerSwitch Series S4148 Top-of-Rack (ToR) switches with added I/O modules with no Multi-Chassis Link Aggregation (MC-LAG) connection between the switches.

  NOTE: If you are configuring a PowerStore T model appliance with different Dell switches or third-party switches, see the proprietary documentation for switch commands and specific details. See the *PowerStore Third-party Switch Simple Support Matrix* for the list of supported switches, which is available from dell.com/powerstoredocs.

- PowerStore 500T model appliance with a 4-port card and two I/O modules.

Networks

The sample that is used in this guide demonstrates the following network connectivity between the PowerStore T model nodes and ToR switches.

NOTE: Port channels are used for the connectivity between the Top-of-Rack switches. There is no MC-LAG connection between the switches.

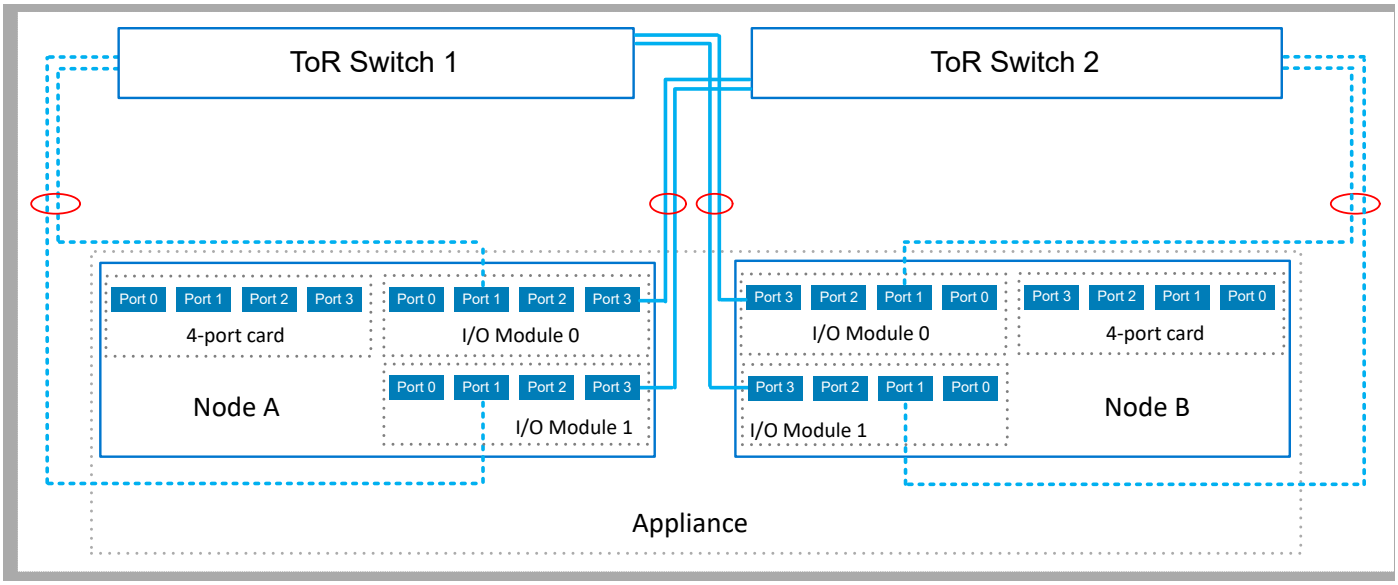

Figure 18. Sample configuration for a Fail Safe Network

Table 29. Sample Fail-Safe Network configuration

Identifier	Network	Appliance Node	Node Ports	Description
———	Primary	Node A	I/O Module 0, Port 3	The primary network is the active network. The primary network must always be configured in an LACP bond. **NOTE:** The LACP bond can be configured with two or four ports on each node. The LACP bond in this example is configured with two ports on each node.
			I/O Module 1, Port 3	
		Node B	I/O Module 0, Port 3	
			I/O Module 1, Port 3	
- - - - - -	Secondary	Node A	I/O Module 0, Port 1	The secondary network is the standby network and can be configured on a single port, an LACP bond, or a combination of both. In this example, the secondary networks are both configured in LACP bonds.
			I/O Module 1, Port 1	
		Node B	I/O Module 0, Port 1	
			I/O Module 1, Port 1	

Configure the Dell PowerSwitch Series to extend the NAS network with a Fail-Safe Network

At a minimum you must configure one out-of-band (OOB) management switch, and two Top-of-Rack (ToR) switches for PowerStore T model to support Network Attached Storage (NAS).

NOTE: This section assumes that you have:

- Completed initial deployment of the PowerStore T model appliance and the Management switch and networks are successfully configured.
- Configured the ToR switch connectivity to the uplinks.

The following steps describe how to configure the two ToR switches with a Fail-Safe Network.

1. Get the completed Switch resources to extend NAS network with FSN worksheet.

2. Cable the switches.
3. Establish a terminal session to the switch.
4. Configure the Fail Safe Network on the ToR switches.

   NOTE: Ensure that the NAS network is applied to the uplink ports and port channels.

5. Validate the ToR switch configuration.
6. Configure the Fail Safe Network in PowerStore Manager.

Get the completed worksheet for Switch resources to extend the NAS network with a Fail-Safe Network

The following table assumes that the resources have already been reserved and configured with the Top of Rack (ToR) switches with the storage networks, and uplinks before extending the NAS network with a Fail-Safe network.

The following *Switch Resources to extend the NAS network with FSN worksheet* has been completed with the network resources that are used in the configuration that is described in this Appendix. if you are extending the NAS network with a Fail-Safe Network with Dell PowerSwitch Series S4148 switches, you can use this worksheet exactly as it is. If you are not configuring your switches and networks with the resources that are used in this guide, you can complete a new *Switch resources for Storage services worksheet* with the information relevant to your environment. To download a blank worksheet, see Switch resources for Storage services worksheet (blank).

Table 30. Switch Resources to extend the NAS network with an FSN worksheet (completed)

Details	Notes	
Network Attached Storage (NAS) must be configured in an LACP bond. It is recommended that you configure the bond with one port from different I/O modules. When configuring an LACP bond: • The PowerStore T model appliance node ports that are cabled for LACP must be the same speed. • LACP can be configured using two or four ports on each node, however the same number of ports must be configured for LACP on both nodes.	Network Name	**NAS_active_network**
	VLAN ID	**500**
	Record the LACP (port channel) ID for the node connections:	
	Node A	**port channel 10**
	Node B	**port channel 20**
	Record which appliance node port	To cable to the ToR switch number and port:
	Node A Port **3 on I/O Module 0**	ToR Switch **2** Switch port **45**
	Node A Port **3 on I/O Module 1**	ToR Switch **2** Switch port **47**
	Node B Port **3 on I/O Module 0**	ToR Switch **1** Switch port **8**
	Node B Port **3 on I/O Module 1**	ToR Switch **1** Switch port **10**
	MTU setting for Jumbo Frames **NOTE:** It is recommended to configure jumbo frames with an MTU setting of 9216. The same MTU size must be set on both switches for both node ports.	**9216**
	If extending with a **Fail Safe Network**, record the following:	
	Network Name	**NAS_standby_network**

Table 30. Switch Resources to extend the NAS network with an FSN worksheet (completed) (continued)

Details	Notes	
	VLAN ID	**510**
	Record the LACP (port channel) ID, or the port number for the node connections:	
	Node A	**port channel 11**
	Node B	**port channel 12**
	Record which appliance node port	To cable to the ToR switch number and port:
	Node A Port **1 of I/O Module 0**	ToR Switch **1** Switch port **14**
	Node A Port **1 of I/O Module 1**	ToR Switch **1** Switch port **12**
	Node B **1 of I/O Module 0**	ToR Switch **2** Switch port **43**
	Node B Port **1 of I/O Module 1**	ToR Switch **2** Switch port **41**
	MTU setting for Jumbo Frames **NOTE:** It is recommended to configure jumbo frames with an MTU setting of 9216. The same MTU size must be set on both switches for both node ports.	**9216**

Cable the switches for the Fail-Safe Network

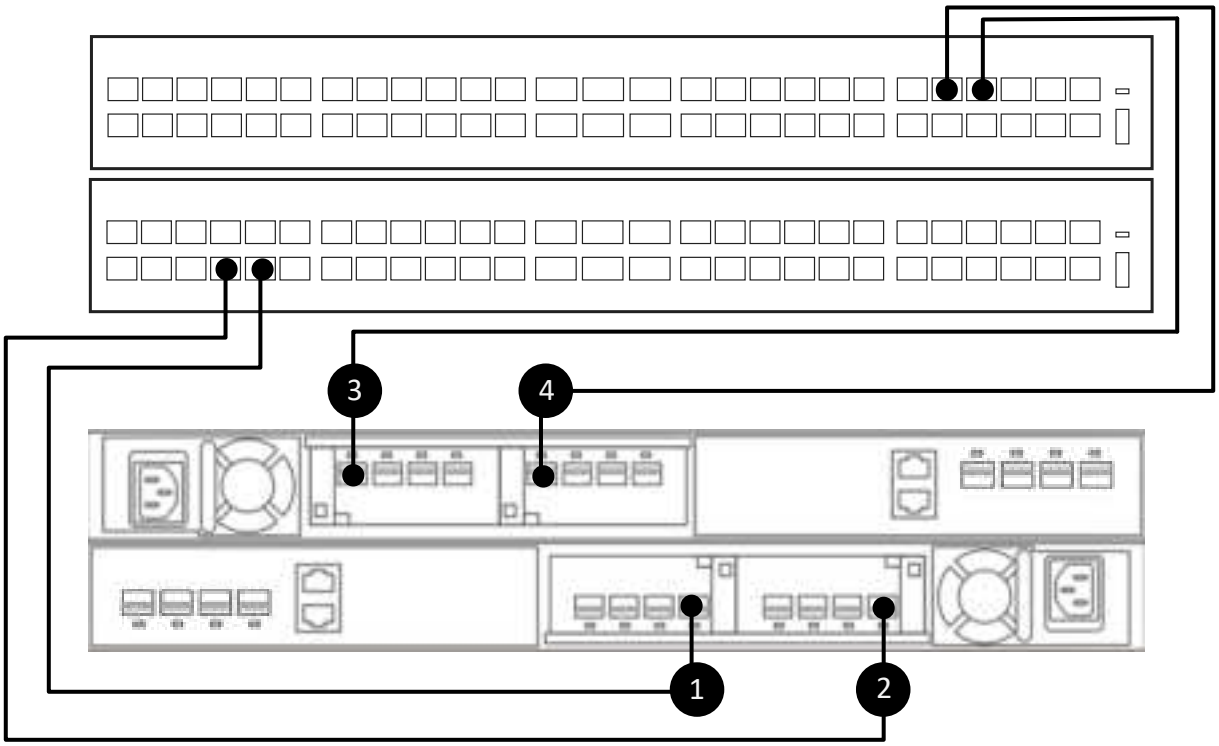

Figure 19. Connect node ports to the ToR switches for the NAS network

1.	Connect Port 3 on I/O Module 0 of the bottom Node A to Port 10 of the bottom switch (Switch1).
2.	Connect Port 3 on I/O Module 1 of the bottom Node A to Port 8 of the bottom switch (Switch1).
3.	Connect Port 3 on I/O Module 1 of the top Node B, to Port 47 of the bottom switch (Switch2).
4.	Connect Port 3 on I/O Module 0 of the top Node B, to Port 45 of the top switch (Switch2).

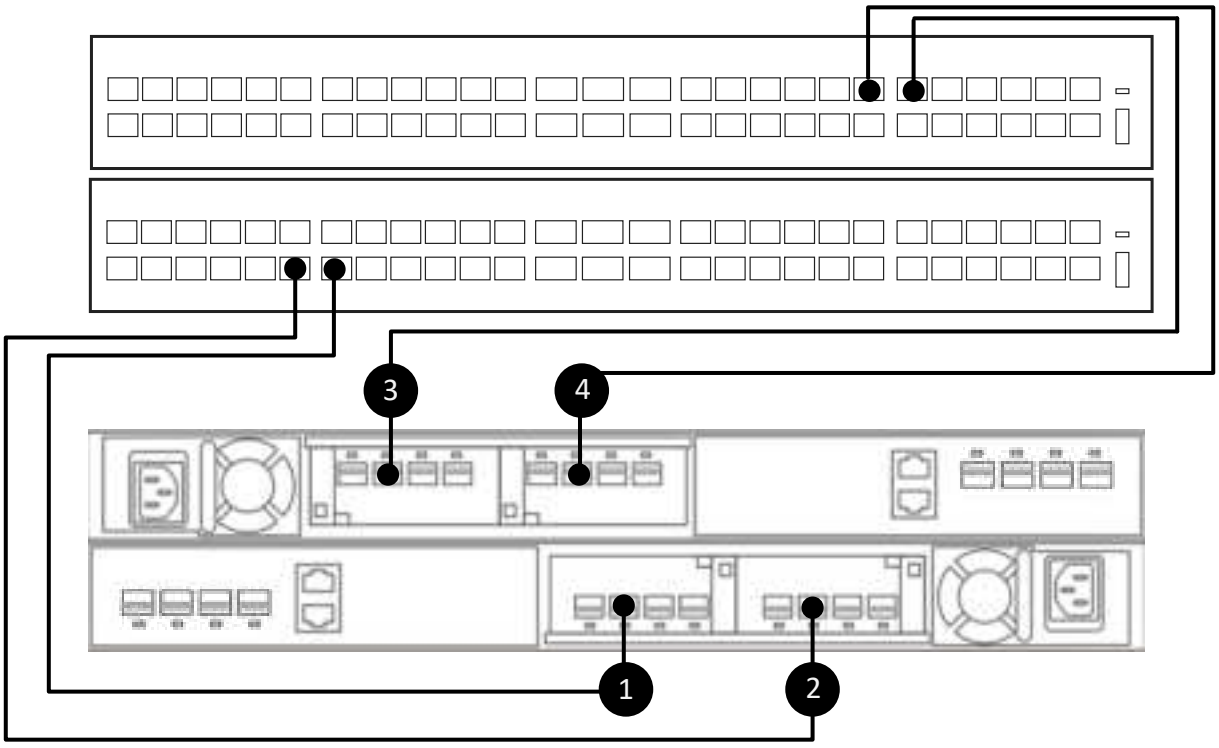

Figure 20. Connect node ports to the ToR switches to extend the NAS network with a Fail Safe Network

1.	Connect Port 1 on I/O Module 0 of the bottom Node A to Port 14 of the bottom switch (Switch1).
2.	Connect Port 1 on I/O Module 1 of the bottom Node A to Port 12 of the bottom switch (Switch1).
3.	Connect Port 1 on I/O Module 1 of the top Node B, to Port 43 of the bottom switch (Switch2).
4.	Connect Port 1 on I/O Module 0 of the top Node B, to Port 41 of the top switch (Switch2).

Establish a terminal session to the switch

Perform the following steps to establish a terminal session to the serial console port on the Dell PowerSwitch Series S4148 switch.

These steps are specific to establishing connections to Dell PowerSwitch S4148-ON switches.

For console serial port cable requirements, and further details see the *Dell PowerSwitch S4100-ON Series Installation Guide* at the Dell PowerSwitch Support page.

You must establish a terminal session to each of the switches to configure the switches for deployment.

1. Power on the switch.
2. Use a serial cable to connect to the serial console port, which is the top port that is on the PSU-side of the PowerSwitch.

Identifier	Description
1	Serial Port
2	Management Port

3. Open a terminal emulator program, such as PuTTY, on the host.
4. Configure the serial connection in the terminal emulator program using the following settings.

Table 31. Serial connection settings

Setting	Value
Speed(baud)	115200 (9600 for micro-USB port)
Data bits	8
Stop bits	1
Parity	None
Flow control	None

5. Connect to the switch using the terminal emulator program.
6. Enter the switch login credentials. The default username and password are:
   - Username: **admin**
   - Password: **admin**
7. Enter global configuration mode.

```
configure terminal
```

8. It is recommended that you change the password after logging into the switch for the first time. Use the following command to change the switch password.

```
username admin password <NEW_PASSWORD> role sysadmin
```

Configure the Fail-Safe Network on the switch

Network Attached Storage (NAS) is only supported with Unified deployments.

Ensure that the networks are applied to the uplink ports and port channels.

1. Establish a terminal connection to the first ToR switch (Switch1).
2. Enter global configuration mode.

```
configure terminal
```

3. Use the existing VLAN created for NAS traffic or create a NAS VLAN.
   If using an existing VLAN, continue to step 4.

```
interface vlan 500
description NAS_network
no shutdown
exit
```

4. Create the standby NAS LACP port channel for Node A ports.

```
interface port-channel 11
description NodeA_NAS_standby_port_channel
switchport mode trunk
switchport trunk allowed vlan 500
spanning-tree port type edge
```

```
mtu 9216
exit
```

5. Use the existing NAS port channel or create a NAS LACP port channel for Node B ports.
   If using an existing port channel, go to step 6.

```
interface port-channel 20
description NodeB_NAS_active_port_channel
switchport mode trunk
switchport trunk allowed vlan 500
spanning-tree port type edge
mtu 9216
exit
```

6. Assign Node A ports to the LACP group.

```
interface ethernet 1/1/14
description NodeA_NASs_IOM_0_port1
no shutdown
channel-group 11 mode active
flowcontrol receive on
flowcontrol transmit off
mtu 9216
exit

interface ethernet 1/1/12
description NodeA_NASs_IOM_1_port1
no shutdown
channel-group 11 mode active
flowcontrol receive on
flowcontrol transmit off
mtu 9216
exit
```

7. Assign Node B ports to the LACP group.

```
interface ethernet 1/1/8
description NodeB_NASa_IOM_0_port3
no shutdown
channel-group 20 mode active
flowcontrol receive on
flowcontrol transmit off
mtu 9216
exit

interface ethernet 1/1/10
description NodeB_NASa_IOM_1_port3
no shutdown
channel-group 20 mode active
flowcontrol receive on
flowcontrol transmit off
mtu 9216
exit
```

8. Use the existing NAS VLAN uplink configuration or configure the NAS VLAN for the uplink.
   If you have already configured the uplink, continue to step 9.

```
interface port-channel 50
switchport trunk allowed vlan 500
exit
```

9. Commit configuration changes to nvram.

```
copy running-configuration startup-configuration
```

10. Repeat steps 1 - 9 on the second ToR switch (Switch2) as demonstrated below.

NOTE: Be sure to use the correct port channels and Ethernet ports when configuring the second ToR switch (Switch2) as demonstrated below.

Table 32. Code sample for configuration for a Fail-Safe network for NAS on the ToR switches

Switch1

```
configure terminal

interface vlan 500
description NAS_network
no shutdown
exit

interface port-channel 11
description NodeA_NAS_standby_port_channel
switchport mode trunk
switchport trunk allowed vlan 500
spanning-tree port type edge
mtu 9216
exit

interface port-channel 20
description NodeB_NAS_active_port_channel
switchport mode trunk
switchport trunk allowed vlan 500
spanning-tree port type edge
mtu 9216
exit

interface ethernet 1/1/14
description NodeA_NASs_IOM_0_port1
no shutdown
channel-group 11 mode active
flowcontrol receive on
flowcontrol transmit off
mtu 9216
exit

interface ethernet 1/1/12
description NodeA_NASs_IOM_1_port1
no shutdown
channel-group 11 mode active
flowcontrol receive on
flowcontrol transmit off
mtu 9216
exit

interface ethernet 1/1/8
description NodeB_NASa_IOM_0_port3
no shutdown
channel-group 20 mode active
flowcontrol receive on
flowcontrol transmit off
mtu 9216
exit

interface ethernet 1/1/10
description NodeB_NASa_IOM_1_port3
no shutdown
channel-group 20 mode active
flowcontrol receive on
flowcontrol transmit off
mtu 9216
exit

interface port-channel 50
switchport trunk allowed vlan 500
```

Switch2

```
configure terminal

interface vlan 500
description NAS_active_network
no shutdown
exit

interface port-channel 10
description NodeA_NAS_active_port_channel
switchport mode trunk
switchport trunk allowed vlan 500
spanning-tree port type edge
mtu 9216
exit

interface port-channel 12
description NodeB_NAS_standby_port_channel
switchport mode trunk
switchport trunk allowed vlan 500
spanning-tree port type edge
mtu 9216
exit

interface ethernet 1/1/45
description NodeA_NASa_IOM_0_port3
no shutdown
channel-group 10 mode active
flowcontrol receive on
flowcontrol transmit off
mtu 9216
exit

interface ethernet 1/1/47
description NodeA_NASa_IOM_1_port3
no shutdown
channel-group 10 mode active
flowcontrol receive on
flowcontrol transmit off
mtu 9216
exit

interface ethernet 1/1/43
description Nodeb_NASs_IOM_1_port1
no shutdown
channel-group 12 mode active
flowcontrol receive on
flowcontrol transmit off
mtu 9216
exit

interface ethernet 1/1/41
description NodeB_NASs_IOM_0_port1
no shutdown
channel-group 12 mode active
flowcontrol receive on
flowcontrol transmit off
mtu 9216
exit

interface port-channel 50
switchport trunk allowed vlan 500
exit
```

Table 32. Code sample for configuration for a Fail-Safe network for NAS on the ToR switches

Switch1	Switch2
`copy running-configuration startup-configuration`	`copy running-configuration startup-configuration`

Validate NAS with FSN configuration on the Top-of-Rack (ToR) switches

Once you have configured and cabled your ToR switches, validate the configuration before discovering your PowerStore T model deployment.

1. Establish a terminal session to the switch.
2. Validate the interface status.

```
show interface status | grep up
```

```
ort            Description      Status    Speed     Duplex    Mode Vlan Tagged-Vlans
Eth 1/1/8       NodeB_NASa_IO.. up        10G       full      -
Eth 1/1/10      NodeB_NASa_IO.. up        10G       full      -
Eth 1/1/12      NodeA_NASs_IO.. up        10G       full      -
Eth 1/1/14      NodeA_NASs_IO.. up        10G       full      -
```

3. Validate the port channel configuration.

```
show port-channel summary
```

```
Flags:  D - Down    I - member up but inactive    P - member up and active
        U - Up (port-channel)    F - Fallback Activated    IND - LACP Individual
--------------------------------------------------------------------------------
Group Port-Channel           Type     Protocol  Member Ports
--------------------------------------------------------------------------------
11   port-channel11    (U)     Eth      DYNAMIC   1/1/12(P) 1/1/14(P)
20   port-channel20    (U)     Eth      DYNAMIC   1/1/8(I) 1/1/10(P)
```

4. Validate the VLAN configuration

```
show vlan
```

```
Codes: * - Default VLAN, M - Management VLAN, R - Remote Port Mirroring VLANs,
       @ - Attached to Virtual Network, P - Primary, C - Community, I - Isolated,
       S - VLAN-Stack VLAN
Q: A - Access (Untagged), T - Tagged
    NUM    Status    Description                    Q Ports
*   1      Active    Cluster_Network                A Eth1/1/29-1/1/30,1/1/47-1/1/54
                                                    A Po10-11,20-21,30,40,50,1000
    500    Active    NAS_active_network             T Po10,20
```

5. Repeat the steps on ToR Switch2.

Create the Fail-Safe Network in PowerStore Manager

Once you have configured the ToR switches with the networks that are required to create a Fail-Safe Network (FSN) for NAS, you must create the Fail-Safe Network in PowerStore Manager.

You must have the following information before creating the Fail-Safe Network (FSN) in PowerStore Manager:

- The node ports that are used to create the FSN
- If creating the FSN with Link Aggregation, you must know which ports to include in the Link Aggregation.

You need the following information to create the NAS Server with a Fail-Safe Network:

- Network Name
- Netmask/Prefix Length
- Gateway
- Network IP addresses - You must reserve a minimum of one IP address for NAS Server production. Optionally, you can reserve additional IP addresses for NAS Server backups.
- Fail-Safe Network name

1. Create the Link Aggregation in PowerStore Manager for the LACP bond you configured on the switch as the primary network in your Fail-Safe Network.
   a. From PowerStore Manager, go to the **Hardware** page and select the appliance for which you configured the bond.
   b. Open the **Ports** card.
   c. Select the two ports on Node A which were configured for the bond on Node A.
   d. Click **Link Aggregation** > **Aggregate Links**.

      PowerStore Manager automatically creates a name for the bond using the following format: "BaseEnclosure-<Node>-<nextLACPbondcreated>" where:
      - BaseEnclosure is constant
      - Node is the node that is displayed in the **Node-Module-Name** list.
      - nextLACPbondcreated the order in which the bond was created in PowerStore Manager, starting with 0 for the first created.

      For example, the second LACP bond that is created in PowerStore Manager on Node A would be named: **BaseEnclosure-NodeA-Bond1**.

   e. Optionally, provide a **Description** of the bond.

      It is recommended to put the name of the bond that is created on the switch that maps to this bond.

      The same LACP bond is configured on the opposite node. For example if you configured the LACP bond on Node A, then the same LACP bond would be configured on Node B.
2. Repeat step 1 for the LACP bond you configured on the switch for the secondary network in your Fail-Safe Network.

   NOTE: The sample uses an LACP bond for the secondary (standby) network. You can skip this step if you are using a single port for the secondary network.

   The same LACP bond is configured on the opposite node. For example if you configured the LACP bond on Node A, then the same LACP bond would be configured on Node B.
3. Select the Link Aggregations that you created in steps 1 and 2, and click **FSN** > **Create FSN**.
4. Select the Link Aggregation that is used as the primary network.

   NOTE: The primary port cannot be changed once is used to create a NAS Server.

5. Optionally, add a description of the Fail-Safe Network.
6. Click **Create**.

   PowerStore Manager automatically creates a name for the Fail-Safe Network using the following format: "BaseEnclosure-<Node>-fsn<nextLACPbondcreated>" where:
   - BaseEnclosure is constant
   - Node is the node that is displayed in the **Node-Module-Name** list.
   - nextLACPbondcreated is the numbered by the order in which the bond was created in PowerStore Manager, starting with 0 for the first created.

   For example, the first FSN created in PowerStore Manager on Node A would be named: **BaseEnclosure-NodeA-FSN0**.

   The same Fail-Safe Network (FSN) is configured on the opposite node. For example if you configured the FSN on Node A, then the same FSN would be configured on Node B.
7. Create a NAS server with the Fail-Safe Network.

   The Fail-Safe Network is applied to the NAS server while creating the NAS server in PowerStore Manager. See the *PowerStore Configuring NFS Guide* or the *PowerStore Configuring SMB Guide* for detailed steps.

A

File Mobility

This appendix contains the following information.

Topics:

- File Mobility overview

File Mobility overview

File Mobility is a prerequisite for replication and import traffic of File storage.

File Mobility runs over the Management network through the Management switch. PowerStore T model clusters use the File Mobility interface to establish SSH connections with external file resources. The local File Mobility addresses communicate through the management switch to the remote File Mobility addresses.

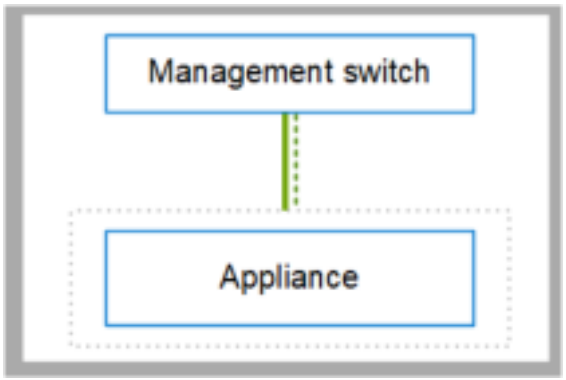

Figure 21. Management network

Identifier	Network
	Management
	File Mobility

For details about the Management network, and how to configure it see the *PowerStore T and Q Networking for Initial Deployment Guide*.

Create File Mobility in PowerStore Manager

File Mobility runs over the Management network. It is not necessary to configure File Mobility on the switch. File Mobility is required to be configured in PowerStore Manager.

The PowerStore T model appliance was deployed in **Unified** mode.

Three IP addresses are required for File Mobility.

Table 33. IP address assignments for Storage networks

IP Address per	Assigned to	Number of IP Addresses required
Appliance	Node A	1
	Node B	1

Table 33. IP address assignments for Storage networks (continued)

IP Address per	Assigned to	Number of IP Addresses required
Cluster	Cluster	1

1. From PowerStore Manager, go to the **Settings** > **Networking** > **File Mobility** tab and click **Create**.
2. Enter the resources that are reserved for the File Mobility network into the **Create File Mobility Network** page and click **Create**.
3. Map the File Mobility network to the first Management port on Node A (**BaseEnclosure-NodeA-EmbeddedModule-MgmtPort**).

   The File Mobility network is automatically mapped to Node B.

   NOTE: Reconfiguring the File Mobility interface can be disruptive. Before reconfiguring the File Mobility interface:
   - Verify with the network administrator that the configuration information is accurate.
   - Ensure that there are no active file migrations or file replication sessions.

File Mobility for file replication

To perform File replication configure File Mobility in PowerStore Manager, and at least one Storage network for replication on the switches. File Mobility runs over the Management network on the management switch. The Replication network runs over the two Top-of-Rack (ToR) switches to communicate with the remote system.

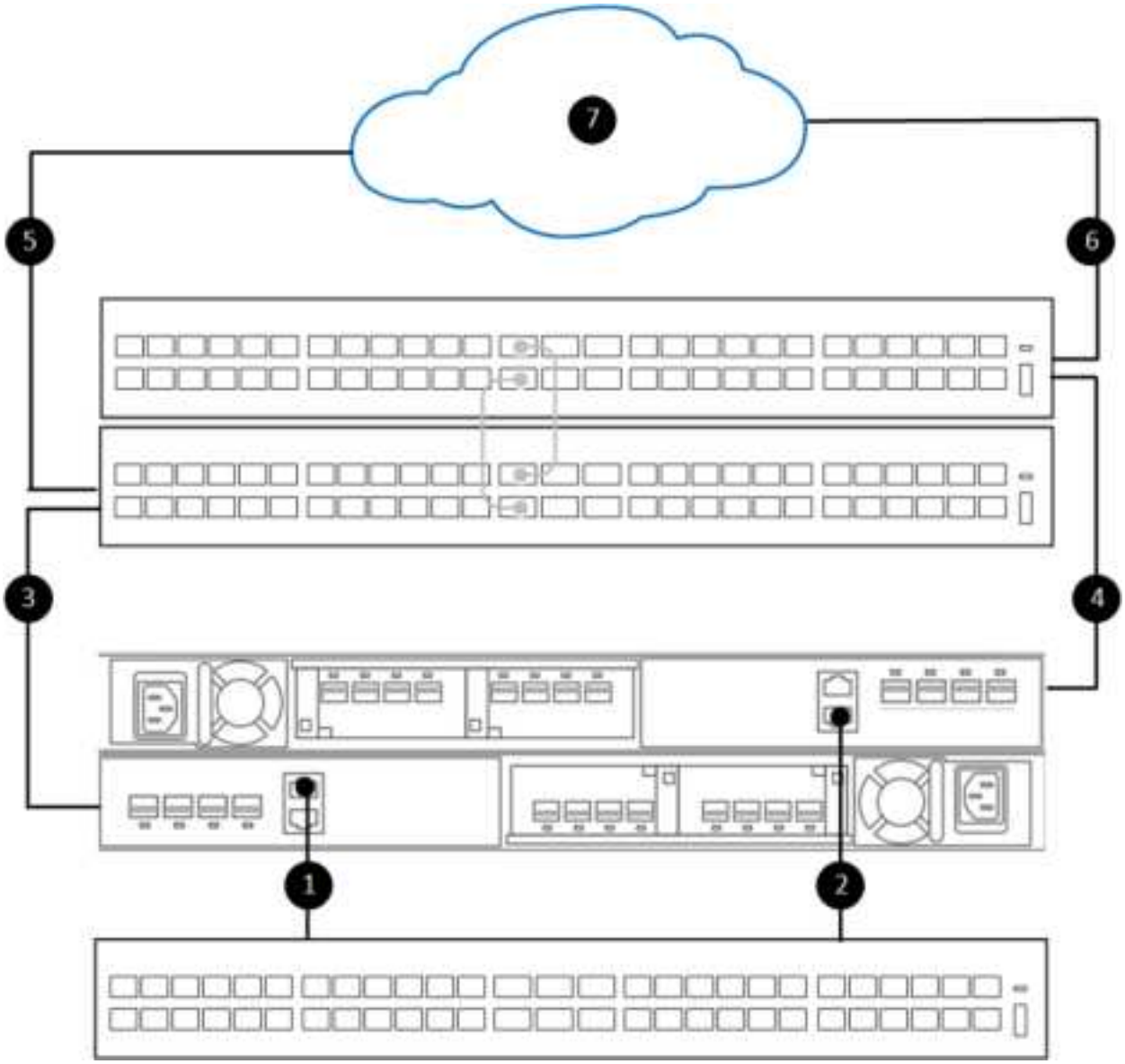

Figure 22. Networks required for replication of file storage

Identifier	Description
1	Node A Management port to Management switch
2	Node B Management port to Management switch
3	Node A connection to Bottom Top-of-Rack Switch 1
4	Node B connection to Bottom Top-of-Rack Switch 2
5	Bottom, Top-of-Rack Switch 1 connection to the remote system
6	Top, Top-of-Rack Switch 2 connection to the remote system
7	Connection to the remote system

The Replication network can be used for both Block and File storage replication. File replication can run over an existing Storage network that has been tagged for Replication. To configure a Replication network, see Configuring PowerStore storage networks with Dell PowerSwitch Series S4148 Top-of-Rack switches .

NOTE: If the Replication network is also being used for Block Import only the Replication portion of the network, with File Mobility, is used for replication of File storage.

File Mobility for File Import

To import File storage from external sources, configure File Mobility in PowerStore Manager and configure a network for File Import on the ToR switches and in PowerStore Manager. File Mobility is configured on the Management switch, while the File Import interface is configured on the Top-of-Rack (ToR) switches.

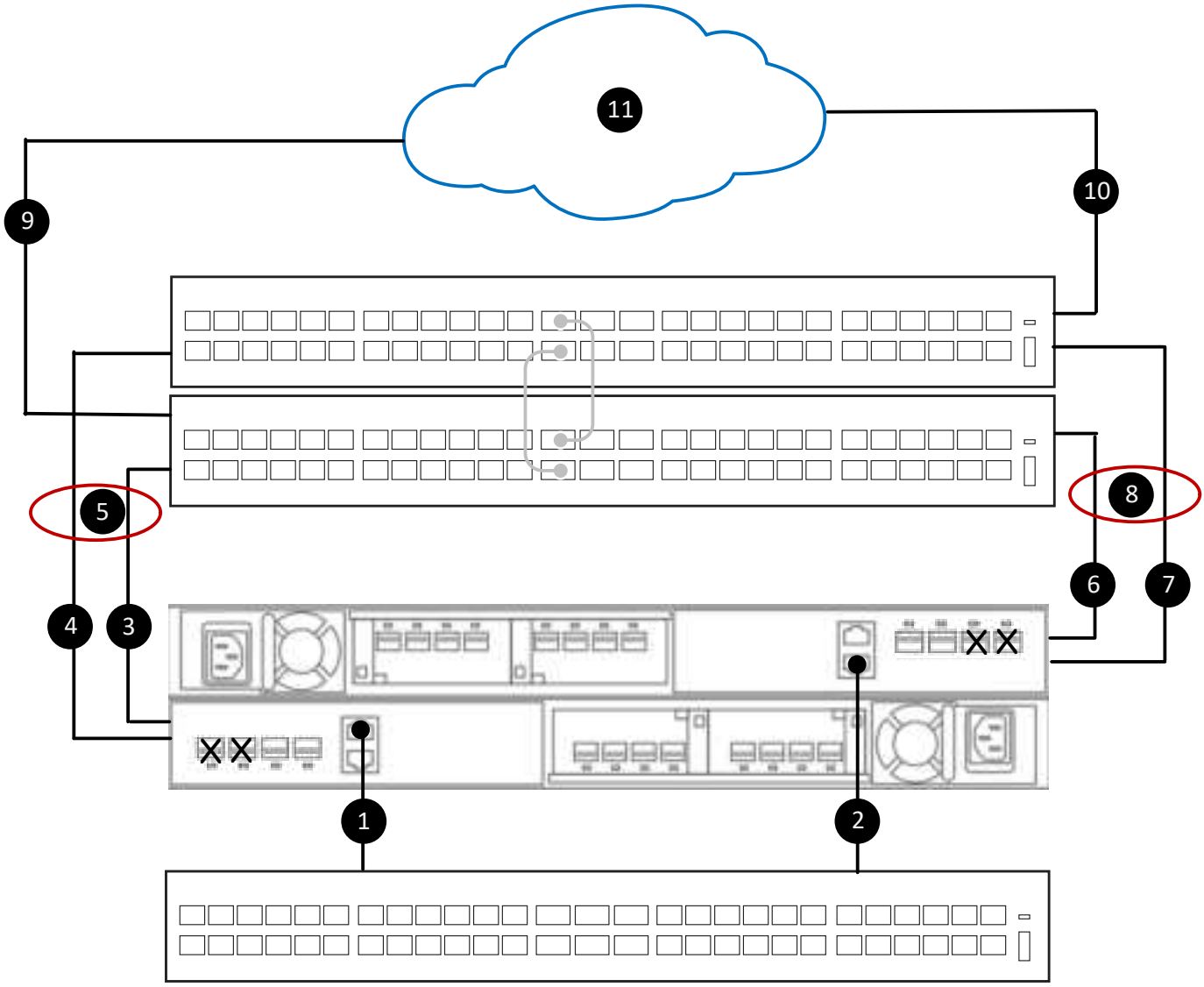

Figure 23. Networks required for importing file storage from a remote system

Identifier	Description
X	Unavailable ports on the nodes
1	Node A Management port to Management switch
2	Node B Management port to Management switch
3	Node A connection to Bottom, Top-of-Rack Switch1

Identifier	Description
4	Node A connection to Top, Top-of-Rack Switch1
5	LACP bond between Node A and the ToR switches.
6	Node B connection to Bottom, Top-of-Rack Switch1
7	Node B connection to Top, Top-of-Rack Switch 1
8	LACP bond between Node B and the ToR switches
9	Bottom, Top-of-Rack Switch1 connection to the remote system
10	Top, Top-of-Rack Switch2 connection to the remote system
11	Connection to the remote system.

To configure a network for File Import, see Configuring PowerStore storage networks with Dell PowerSwitch Series S4148 Top-of-Rack switches .

B

Configuring PowerStore T model appliances with ToR switches without a VLT interconnect

This appendix includes the following information.

Topics:

Steps to configure PowerStore T model with ToR switches without VLT

The following are the steps that are required to deploy PowerStore T model with two Top-or-Rack switches without a Virtual Link Trunking interconnect.

NOTE: This section assumes that initial deployment of the PowerStore T model appliance is complete and the Management switch and networks are successfully configured.

Specific code samples for the following steps for configuring PowerSwitches are available in Configuring Dell PowerSwitch Series for deployments with ToR switches.

1. Establish a terminal session to the switch.
2. Validate the switch version and licensing.
3. Repeat steps 1 and 2 for each switch.
4. Configure the general settings on the ToR switches.
5. Configure the uplink ports on the ToR switches.
6. If you have not done so already:
   a. Cable the base enclosure to the ToR switches
   b. Cable the ToR switches to the core uplinks
7. Validate PowerSwitch Series configuration with ToR switches.

C

Other Dell PowerSwitch Series configuration operations

This appendix contains the following information.

Topics:

Dell SmartFabric Services

Dell SmartFabric Services enable an end to end automated fabric with up to 98% of the tasks automated offering simplicity and agility towards day-two network operations for cluster and network expansion. The single pane of management with vCenter allows users to operate and perform life cycle management of one or more fabrics from within vCenter.

If you are interested in applying Dell SmartFabric services to your PowerStore networks deployment, see the following documents for more information:

- Dell SmartFabric Services with Dell PowerStore Reference Architecture Guide
- PowerStore: Configuring SmartFabric for a PowerStore environment

You can also see SolVe Online for steps to configure the Top-of-Rack switches using SmartFabric.

Dell SmartFabric Storage Software

Dell SmartFabric Storage Software (SFSS) automates storage connectivity for your NVMe IP Storage Area Network (SAN). It allows host and storage interfaces to register with a Centralized Discovery Controller, enables storage administrators to create and activate zoning configurations and then automatically notifies hosts of new storage resources. Hosts automatically connect to these storage resources. For more information, see the *Dell SmartFabric Storage Software Deployment Guide*.

Reset the switch to factory settings

If necessary, you can reset the Dell PowerSwitch Series S4148-ON switches to the default factory settings.

NOTE: If you reset the switch, all the existing configuration is lost, and if the switch is being used, there is a disruption in traffic.

When a Dell PowerSwitch Series S4148-ON switch is reset to the factory default settings:

- Telnet is disabled.
- SSH is enabled.
- DHCP is enabled.
- The default switch username and password are both `admin`.

NOTE: Dell Technologies recommends changing the admin password during the first login.

```
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
```

Running configuration of PowerSwitch Series used in PowerStore T and Q deployments

Use the following command to generate a running configuration file when Dell PowerSwitch Series S4148 switches are used for the Management and Top-of-Rack (ToR) switches:

```
show running-configuration
```

See the following sections for output examples:

- Example of running-configuration for the ToR switches

Example of running-configuration for the ToR switches

Table 34. Example of running-configuration for ToR Switch1 and Switch2

Switch1	Switch2
! Version 10.5.3.0 ! Last configuration change at May 04 16:13:40 2022 ! ip vrf default ! no multicast snooping flood-restrict spanning-tree mode rstp spanning-tree rstp priority 40960 hostname Switch1 system-user linuxadmin password **** interface breakout 1/1/25 map 100g-1x interface breakout 1/1/26 map 100g-1x interface breakout 1/1/29 map 100g-1x interface breakout 1/1/30 map 100g-1x iscsi enable iscsi target port 860 iscsi target port 3260 username admin password **** role sysadmin priv-lvl 15 aaa authentication login default local aaa authentication login console local ! class-map type application class-iscsi ! policy-map type application policy-iscsi ! interface vlan1 description Cluster_Network no shutdown ! interface vlan200 description iSCSI_Network no shutdown ! interface vlan300 description NVMe_Network no shutdown ! interface vlan400 description RepBlockImport_Network no shutdown !	! Version 10.5.x.x ! Last configuration change at May 04 16:22:40 2022 ! ip vrf default ! no multicast snooping flood-restrict spanning-tree mode rstp spanning-tree rstp priority 45056 hostname Switch2 system-user linuxadmin password **** interface breakout 1/1/25 map 100g-1x interface breakout 1/1/26 map 100g-1x interface breakout 1/1/29 map 100g-1x interface breakout 1/1/30 map 100g-1x iscsi enable iscsi target port 860 iscsi target port 3260 username admin password **** role sysadmin priv-lvl 15 aaa authentication login default local aaa authentication login console local ! class-map type application class-iscsi ! policy-map type application policy-iscsi ! interface vlan1 description Cluster_Network no shutdown ! interface vlan200 description iSCSI_Network no shutdown ! interface vlan300 description NVMe_Network no shutdown ! interface vlan400 description RepBlockImport_Network no shutdown !

Table 34. Example of running-configuration for ToR Switch1 and Switch2

Switch1	Switch2
interface vlan500 description NAS_Network no shutdown ! interface port-channel10 description NodeA_NAS_LACP_port_channel no shutdown switchport mode trunk switchport access vlan 1 switchport trunk allowed vlan 500 mtu 9216 spanning-tree port type edge vlt-port-channel 10 ! interface port-channel20 description NodeB_NAS_LACP_port_channel no shutdown switchport mode trunk switchport access vlan 1 switchport trunk allowed vlan 500 mtu 9216 spanning-tree port type edge vlt-port-channel 20 ! interface port-channel30 description NodeA_Cluster_LACP_port_channel no shutdown switchport mode trunk switchport access vlan 1 mtu 9216 spanning-tree port type edge vlt-port-channel 30 ! interface port-channel40 description NodeB_Cluster_LACP_port_channel no shutdown switchport mode trunk switchport access vlan 1 mtu 9216 spanning-tree port type edge vlt-port-channel 40 ! interface port-channel50 description Uplink no shutdown switchport mode trunk switchport access vlan 1 switchport trunk allowed vlan 200,300,400,500 mtu 9216 vlt-port-channel 50 ! interface mgmt1/1/1 no shutdown no ip address dhcp ip address 10.241.133.22/26 ipv6 address autoconfig ! interface ethernet1/1/1 description NodeA_4port_port_0 no shutdown channel-group 30 mode active no switchport mtu 9216 flowcontrol receive on flowcontrol transmit off	interface vlan500 description NAS_Network no shutdown ! interface port-channel10 description NodeA_NAS_LACP_port_channel no shutdown switchport mode trunk switchport access vlan 1 switchport trunk allowed vlan 500 mtu 9216 spanning-tree port type edge vlt-port-channel 10 ! interface port-channel20 description NodeB_NAS_LACP_port_channel no shutdown switchport mode trunk switchport access vlan 1 switchport trunk allowed vlan 500 mtu 9216 spanning-tree port type edge vlt-port-channel 20 ! interface port-channel30 description NodeA_Cluster_LACP_port_channel no shutdown switchport mode trunk switchport access vlan 1 mtu 9216 spanning-tree port type edge vlt-port-channel 30 ! interface port-channel40 description NodeB_Cluster_LACP_port_channel no shutdown switchport mode trunk switchport access vlan 1 mtu 9216 spanning-tree port type edge vlt-port-channel 40 ! interface port-channel50 description Uplink no shutdown switchport mode trunk switchport access vlan 1 switchport trunk allowed vlan 200,300,400,500 mtu 9216 vlt-port-channel 50 ! interface mgmt1/1/1 no shutdown no ip address dhcp ip address 10.241.133.23/26 ipv6 address autoconfig ! interface ethernet1/1/1 description NodeA_4port_port_1 no shutdown channel-group 30 mode active no switchport mtu 9216 flowcontrol receive on flowcontrol transmit off

Table 34. Example of running-configuration for ToR Switch1 and Switch2

Switch1	Switch2
!	!
interface ethernet1/1/2	interface ethernet1/1/2
shutdown	shutdown
switchport access vlan 1	switchport access vlan 1
flowcontrol receive on	flowcontrol receive on
flowcontrol transmit off	flowcontrol transmit off
!	!
interface ethernet1/1/3	interface ethernet1/1/3
shutdown	shutdown
switchport access vlan 1	switchport access vlan 1
flowcontrol receive on	flowcontrol receive on
flowcontrol transmit off	flowcontrol transmit off
!	!
interface ethernet1/1/4	interface ethernet1/1/4
shutdown	shutdown
switchport access vlan 1	switchport access vlan 1
flowcontrol receive on	flowcontrol receive on
flowcontrol transmit off	flowcontrol transmit off
!	!
interface ethernet1/1/5	interface ethernet1/1/5
description NodeA_IO_0_port_0	shutdown
no shutdown	switchport access vlan 1
switchport mode trunk	flowcontrol receive on
switchport access vlan 1	flowcontrol transmit off
switchport trunk allowed vlan 300	!
mtu 9216	interface ethernet1/1/6
flowcontrol receive on	shutdown
flowcontrol transmit off	switchport access vlan 1
!	flowcontrol receive on
interface ethernet1/1/6	flowcontrol transmit off
shutdown	!
switchport access vlan 1	interface ethernet1/1/7
flowcontrol receive on	shutdown
flowcontrol transmit off	switchport access vlan 1
!	flowcontrol receive on
interface ethernet1/1/7	flowcontrol transmit off
description NodeA_IO_0_port_2	!
no shutdown	interface ethernet1/1/8
switchport mode trunk	description NodeA_IO_1_port_3
switchport access vlan 1	no shutdown
switchport trunk allowed vlan 200,400	channel-group 10 mode active
mtu 9216	no switchport
flowcontrol receive on	mtu 9216
flowcontrol transmit off	flowcontrol receive on
!	flowcontrol transmit off
interface ethernet1/1/8	!
description NodeA_IO_0_port_3	interface ethernet1/1/9
no shutdown	shutdown
channel-group 10 mode active	switchport access vlan 1
no switchport	flowcontrol receive on
mtu 9216	flowcontrol transmit off
flowcontrol receive on	!
flowcontrol transmit off	interface ethernet1/1/10
!	shutdown
interface ethernet1/1/9	switchport access vlan 1
shutdown	flowcontrol receive on
switchport access vlan 1	flowcontrol transmit off
flowcontrol receive on	!
flowcontrol transmit off	interface ethernet1/1/11
!	shutdown
interface ethernet1/1/10	switchport access vlan 1
shutdown	flowcontrol receive on
switchport access vlan 1	flowcontrol transmit off
flowcontrol receive on	!
flowcontrol transmit off	interface ethernet1/1/12
!	shutdown
interface ethernet1/1/11	switchport access vlan 1
shutdown	flowcontrol receive on

Table 34. Example of running-configuration for ToR Switch1 and Switch2

Switch1	Switch2
switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/12 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/13 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/14 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/15 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/16 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/17 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/18 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/19 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/20 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/21 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/22 shutdown switchport access vlan 1 flowcontrol receive on	flowcontrol transmit off ! interface ethernet1/1/13 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/14 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/15 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/16 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/17 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/18 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/19 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/20 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/21 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/22 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/23 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off !

Table 34. Example of running-configuration for ToR Switch1 and Switch2

Switch1	Switch2
flowcontrol transmit off ! interface ethernet1/1/23 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/24 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/25 description VLTi no shutdown no switchport flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/26 description VLTi no shutdown no switchport flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/29 description Uplink_Ports no shutdown channel-group 50 mode active no switchport mtu 9216 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/30 description Uplink_Ports no shutdown switchport access vlan 1 mtu 9216 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/31 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/32 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/33 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/34 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off	interface ethernet1/1/24 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/25 description VLTi no shutdown no switchport flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/26 description VLTi no shutdown no switchport flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/29 description Uplink_ports no shutdown channel-group 50 mode active no switchport mtu 9216 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/30 description Uplink_ports no shutdown channel-group 50 mode active no switchport mtu 9216 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/31 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/32 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/33 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/34 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/35 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off !

Table 34. Example of running-configuration for ToR Switch1 and Switch2

Switch1	Switch2
!	interface ethernet1/1/36
interface ethernet1/1/35	shutdown
shutdown	switchport access vlan 1
switchport access vlan 1	flowcontrol receive on
flowcontrol receive on	flowcontrol transmit off
flowcontrol transmit off	!
!	interface ethernet1/1/37
interface ethernet1/1/36	shutdown
shutdown	switchport access vlan 1
switchport access vlan 1	flowcontrol receive on
flowcontrol receive on	flowcontrol transmit off
flowcontrol transmit off	!
!	interface ethernet1/1/38
interface ethernet1/1/37	shutdown
shutdown	switchport access vlan 1
switchport access vlan 1	flowcontrol receive on
flowcontrol receive on	flowcontrol transmit off
flowcontrol transmit off	!
!	interface ethernet1/1/39
interface ethernet1/1/38	shutdown
shutdown	switchport access vlan 1
switchport access vlan 1	flowcontrol receive on
flowcontrol receive on	flowcontrol transmit off
flowcontrol transmit off	!
!	interface ethernet1/1/40
interface ethernet1/1/39	shutdown
shutdown	switchport access vlan 1
switchport access vlan 1	flowcontrol receive on
flowcontrol receive on	flowcontrol transmit off
flowcontrol transmit off	!
!	interface ethernet1/1/41
interface ethernet1/1/40	shutdown
shutdown	switchport access vlan 1
switchport access vlan 1	flowcontrol receive on
flowcontrol receive on	flowcontrol transmit off
flowcontrol transmit off	!
!	interface ethernet1/1/42
interface ethernet1/1/41	shutdown
shutdown	switchport access vlan 1
switchport access vlan 1	flowcontrol receive on
flowcontrol receive on	flowcontrol transmit off
flowcontrol transmit off	!
!	interface ethernet1/1/43
interface ethernet1/1/42	shutdown
shutdown	switchport access vlan 1
switchport access vlan 1	flowcontrol receive on
flowcontrol receive on	flowcontrol transmit off
flowcontrol transmit off	!
!	interface ethernet1/1/44
interface ethernet1/1/43	shutdown
shutdown	switchport access vlan 1
switchport access vlan 1	flowcontrol receive on
flowcontrol receive on	flowcontrol transmit off
flowcontrol transmit off	!
!	interface ethernet1/1/45
interface ethernet1/1/44	shutdown
shutdown	switchport access vlan 1
switchport access vlan 1	flowcontrol receive on
flowcontrol receive on	flowcontrol transmit off
flowcontrol transmit off	!
!	interface ethernet1/1/46
interface ethernet1/1/45	shutdown
shutdown	switchport access vlan 1
switchport access vlan 1	flowcontrol receive on
flowcontrol receive on	flowcontrol transmit off
flowcontrol transmit off	!
!	interface ethernet1/1/47
interface ethernet1/1/46	description NodeB_IO_0_port_3

Table 34. Example of running-configuration for ToR Switch1 and Switch2

Switch1	Switch2
shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/47 description NodeB_IO_1_port_3 no shutdown channel-group 20 mode active no switchport mtu 9216 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/48 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/49 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/50 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/51 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/52 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/53 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/54 description NodeB_4port_port_1 no shutdown channel-group 40 mode active no switchport mtu 9216 flowcontrol receive on flowcontrol transmit off ! management route 0.0.0.0/0 100.0.100.10.1 ! vlt-domain 1 backup destination 100.0.100.11 discovery-interface ethernet1/1/25-1/1/26 peer-routing primary-priority 4096 vlt-mac 00:00:00:00:00:01 !	no shutdown channel-group 20 mode active no switchport mtu 9216 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/48 description NodeB_IO_0_port_2 no shutdown switchport mode trunk switchport access vlan 1 switchport trunk allowed vlan 200,400 mtu 9216 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/49 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/50 description NodeB_IO_0_port_0 no shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/51 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/52 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/53 shutdown switchport access vlan 1 flowcontrol receive on flowcontrol transmit off ! interface ethernet1/1/54 description NodeB_4port_port_0 no shutdown channel-group 40 mode active no switchport mtu 9216 flowcontrol receive on flowcontrol transmit off ! management route 0.0.0.0/0 100.0.100.10.1 ! vlt-domain 1 backup destination 100.0.100.10 discovery-interface ethernet1/1/25-1/1/26 peer-routing primary-priority 8192 vlt-mac 00:00:00:00:00:01 !