

Dell Red Hat NFV Solution Hardware Deployment Guide Version 4.0



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Notes, Cautions and Warnings



A **Note** indicates important information that helps you make better use of your system.



A **Caution** indicates potential damage to hardware or loss of data if instructions are not followed.



A **Warning** indicates a potential for property damage, personal injury, or death.

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Overview

This guide provides information necessary to deploy the Dell Red Hat NFV Solution with Red Hat Enterprise Linux™ OpenStack Platform 7, on Dell R630 and R730xd servers with Dell PowerEdge H730 disk controller; and the network with Dell Networking S4820T and S6000 switches.

Intended Audience

This guide assumes the reader is familiar with:

- OpenStack
- PowerEdge R630 and R730xd RAID and BIOS configuration
- Red Hat Enterprise Linux (RHEL)
- Network Configuration

Configuring R630 and R730xd Hardware

This section describes manually configuring R630 and R730xd server hardware for the Dell Red Hat NFV Solution with Red Hat Enterprise Linux™ OpenStack Platform:

- IPMI Configuration
- BIOS Configuration
- RAID Configuration

IPMI Configuration

You must perform configuration of the iDRAC on supported systems. Dell recommends that you configure these settings from the iDRAC web interface, or directly on the node console.

Configuring Server User Information

1. Set credentials for the root user, including changing the password based upon good password standards.
2. Set privileges for the user to the Admin level, including over LAN.
3. Enable the user, if disabled.

Configuring Server Network Settings

1. Set the iDRAC IP address, subnet mask, default gateway IP.
2. Set the iDRAC IP address source to *static* IP addressing.
3. Set the iDRAC NIC mode from *Shared* to *Dedicated*.

Validating Server IPMI Configuration

Validating that remote commands can be executed is an essential part of the IPMI setup.

1. Install the IPMI Utilities to your workstation from SourceForge:
 - a. For Linux - <http://sourceforge.net/projects/ipmitool/>
 - b. For Windows - <http://ipmiutil.sourceforge.net/>
 - c. Validate that you have all the requirements, and that it will run.
2. Plug your Ethernet port into a switch port that is on the same vLAN as your iDRACs.
3. Configure your network to use an IP address in the iDRAC network range.
4. Configure the IPMI over LAN Setting to Enabled.
5. Execute the following IPMI command:

```
for i in $(seq 74 82); do ipmitool -P "password" -U "username" -I lanplus -H 192.168.110.$i power status; done
```

This will perform a simple, non-destructive poll of the iDRAC from *192.168.110.74* to *192.168.110.82*, and return the power status of *on* or *off*.

 Note: Replace these IP addresses with your iDRAC IP addresses range

- a. You can replace the keyword status with *reset*, *off*, or *on*.
- b. Ensure that all machines return responses to the command.

Infrastructure and Virtualization Node Settings

This section describes the settings for nodes that will be used on the Solution Admin Host (SAH), OpenStack controller nodes, Compute nodes and Virtual Infrastructure Manager node (VIM). The following settings should be preset from the factory on the R630; be sure to double-check them:

- [OpenStack Infrastructure Specification](#)
- [OpenStack Compute Specification](#)

DTK Configurator

This topic contains Dell Toolkit (DTK) Configurator usage instructions. The DTK Configurator enables you to create a USB key from which you can boot a Dell PowerEdge R630 or R730xd, with BIOS and RAID settings created and applied.

Creating the Configurator ISO

To create the BIOS/RAID configuration ISO:

1. Make sure you are running in a Linux environment that has the following programs installed:
 - `cpio`
 - `rpm`
 - `rpm2cpio`
2. Make sure the user you are running this script as has passwordless `sudo` rights.
3. Make sure the loop module is loaded so that the script has access to loopback devices:

```
$ sudo modprobe loop
```

4. Run the following command:

```
$ ./build_bootimg.sh
```

Once the process is finished (which can take a while if you do not have a fast Internet connection), you will have a `bootimg.iso` file in the current directory.

5. Copy the ISO onto a USB key using the following command:

```
$ sudo dd if=bootimg.iso of=/dev/sdx bs=2048
```

Where: `/dev/sdx` is the device that was created when the USB key was inserted into the system. The USB key must be at least 512MB in size.

Customizing the ISO

This utility creates a CentOS 6.6 Live CD ISO that has the Dell DTK utilities installed. It uses `syscfg`, `raidcfg` and `racadm` to configure the system. The main customization point is `bootimg/nodeconfig.sh`, which automatically runs when the ISO finishes booting.

iDRAC Default Settings

[Table 1: OpenStack Infrastructure and Storage Node Specification](#) on page 8 lists and describes iDRAC default settings:

Table 1: OpenStack Infrastructure and Storage Node Specification:

Menu Choice	iDRAC Setting
iDRAC.IPMILan.Enable	Enabled
iDRAC.IPMILan.PrivLimit	4
iDRAC.IPv4.Enable	Enabled
iDRAC.Users.2.Enable	Enabled
iDRAC.Users.2.IpmiLanPrivilege	4
iDRAC.Users.2.Privilege	0x1ff
iDRAC.WebServer.Enable	Enabled

OpenStack Default BIOS Specification

[Table 2: OpenStack Default BIOS Specification](#) on page 8 lists and describes the default BIOS settings for the OpenStack servers.

Table 2: OpenStack Default BIOS Specification

Display Name	Attribute	Settings
Boot Mode	BootMode	UEFI
Boot Sequence Retry	BootSeqRetry	Enabled
DCU IP Prefetcher	DculpPrefetcher	Enabled
DCU Streamer Prefetcher	DcuStreamerPrefetcher	Enable
Logical Processor Idling	DynamicCoreAllocation	Disabled
Integrated RAID Controller	IntegratedRaid	Enabled
Internal SD Card	InternalSdCard	Off

I/OAT DMA Engine	IoatEngine	Enabled
Logical Processor	LogicalProc	Enabled
Memory Operating Mode	MemOpMode	OptimizerMode
System Memory Testing	MemTest	Disabled
Node Interleaving	NodeInterleave	Disabled
OS Watchdog Timer	OsWatchdogTimer	Disabled
Adjacent Cache Line Prefetch	ProcAdjCacheLine	Enabled
Number of Cores per Processor	ProcCores	all
Execute Disable	ProcExecuteDisable	Enabled
Hardware Prefetcher	ProcHwPrefetcher	Enabled
CPU Power Management	ProcPwrPerf	MaxPerf
Turbo Mode	ProcTurboMode	Enabled
Virtualization Technology	ProcVirtualization	Disabled
QPI Speed	QpiSpeed	MaxDataRate
Alternate RTID (Requestor Transaction ID) Setting	RtidSetting	Disabled
SR-IOV Global Enable	SriovGlobalEnable	Enabled
System Profile	SysProfile	PerfOptimized

OpenStack Controller and Storage Specification

The [Table 4: OpenStack Controller and Storage Node Specification](#) on page 10 lists and describes OpenStack Controller and Storage Node parameters that differ from [OpenStack Default BIOS Specification](#) on page 8. Controller nodes are sometimes referred to as Infrastructure nodes.

Setting RAID Profiles

[Table 3: RAID Setting Profiles](#) on page 9 lists and describes RAID setting profiles.

Table 3: RAID Setting Profiles

Profile	Settings
RAID10	1. Configure all the disks on the first controller as a single large RAID 10. 2. Mark it as the boot volume. All the disks must use the same media type (SSD or HDD), and the same interface type (SAS or SATA). If they do not, array creation will fail.

RAID1 and JBOD	1. Configure the last two disks on the first controller as a RAID 1. 2. Mark it as bootable. 3. Configure the rest of the disks as single-disk RAID 0 volumes. All the disks in the RAID 1 must use the same media type, and have the same interface type. On the R730xd, this should result in the boot volume being on the rear drives (assuming that the rear backplane is attached properly).
----------------	--

Table 4: OpenStack Controller and Storage Node Specification

Display Name	Attribute	Settings
Boot Mode	BootMode	Bios
SR-IOV Global Enable	SriovGlobalEnable	Enabled

OpenStack Compute and SAH Specification

The [Table 5: OpenStack Compute and SAH Specification](#) on page 10 lists and describes OpenStack Compute and SAH parameters that differ from [OpenStack Default BIOS Specification](#) on page 9.

Table 5: OpenStack Compute and SAH Specification

Display Name	Attributes	Settings
Boot Mode	BootMode	Bios
Virtualization Technology	ProcVirtualization	Enabled

VIM Node Specification

The [Table 6: VIM Node Specification](#) on page 10 lists and describes VIM Node parameters

Table 6: VIM Node Specification

Display Name	Attributes	Settings
Boot Mode	BootMode	Bios
Virtualization Technology	ProcVirtualization	Enabled

Configuring R630 and R730xd Hardware

Menu choices map to BIOS and RAID settings as follows:

1. OpenStack Controller: OpenStack Infrastructure, RAID10
2. OpenStack Compute: OpenStack Compute, RAID10
3. OpenStack Storage: OpenStack Storage, RAID1 and JBOD
4. OpenStack SAH: OpenStack SAH, RAID10

 **Note:** For the VIM Node select the menu choice OpenStack SAH (RAID10)

Mapping Menu Choices BIOS and RAID Settings

[Table 7: RAID and BIOS Menu Choices Mappings](#) on page 11 lists and describes the mappings of menu choices to RAID and BIOS settings.

Table 7: RAID and BIOS Menu Choices Mappings

Menu Choice	RAID/BIOS Setting
Openstack Infrastructure	Openstack Infrastructure, RAID10
Openstack Compute	Openstack Compute, RAID10
Openstack Storage	Openstack Storage, RAID1 and JBOD
OpenStack SAH	OpenStack SAH, RAID10

Running the BIOS/RAID Configuration ISO

To run the BIOS/RAID configuration ISO:

1. Boot the system to be configured from the USB key.
2. Once the system finishes booting, it displays the detected RAID controllers along with their current configuration; and offers you a choice of system configurations.
3. The system automatically configures the RAID and BIOS settings. Once finished, it will ask you to provide basic iDRAC connectivity information, including:
 - a. Whether the iDRAC should use DHCP
 - b. Or, basic IPv4 settings if it should not use DHCP
4. The system configures the iDRAC with some default settings plus the network settings from Step 3 above.
Once it finishes applying those settings, it prompts you to reboot the system.
5. Assuming there were no errors, reboot the system.

The changes are applied, and the system is configured for its role.

Dell Storage PS Series Storage Group

The PS Series Storage Group can consist of one or more storage arrays with one or more storage groups.

 Note: The configuration of the arrays is beyond the scope of this document. Please refer to PS Series Support Website (<https://eqsupport.dell.com/secure/login.aspx>) for the latest guides, whitepapers, and best practices on how to setup your Storage Group for your application.

Once the Storage Group(s) are setup, the information contained in [Table 8: PS Series Information Needed from Configuration](#) on page 12 must be collected to configure your storage backend.

 Note: The `san_thin_provision` variable should be left at the default if available; if not, then it must be set to `False`.

For the current driver list, refer to https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux_OpenStack_Platform/5/html/Configuration_Reference_Guide/section_volume_driver_s.html#dell-equallogic-driver.

Table 8: PS Series Information Needed from Configuration

[DEFAULT]	Description
<code>volume_driver = cinder.volume.drivers.eqlx.DellEQLSanISCSIDriver</code>	Dell PS Series volume driver
<code>san_ip = <IP_address_of_EQLX></code>	IP address used to reach the PS Series Group through SSH
<code>san_login = <user_name></code>	User name to login to the Group manager via SSH at the <code>san_ip</code>
<code>san_password = <password></code>	Password to login to the Group manager via SSH at the <code>san_ip</code> (not used when <code>san_private_key</code> is set)
<code>san_thin_provision = <true false></code>	Enable/disable creation of thin provisioned volumes
<code>san_ssh_port = 22</code>	Port used for SSH
<code>ssh_conn_timeout = 30</code>	Timeout value, in seconds, used by CLI commands over SSH
<code>san_private_key = <filename></code>	Filename of the private key used for SSH authentication
<code>ssh_min_pool_conn = 1</code>	Minimum number of SSH connections in the pool
<code>ssh_max_pool_conn = 5</code>	Maximum number of SSH connections in the pool
<code>eqlx_chap_login = admin</code>	Existing CHAP account name
<code>eqlx_chap_password = password</code>	Password for specified CHAP account name
<code>eqlx_cli_max_retries = 5</code>	Maximum retry count for reconnection

<code>eqlx_cli_timeout = 30</code>	Timeout for the Group Manager CLI command execution
<code>eqlx_group_name = group-0</code>	Group name to use for creating
<code>eqlx_pool = default</code>	Pool in which volumes will be created
<code>eqlx_use_chap = False</code>	Use CHAP authentication for targets?

Dell Storage PS Series Storage Arrays

The SC Series can consist of one or more Dell Storage Centers with Dell Storage Enterprise Manager platform.

 **Note:** The configuration of the cluster is beyond the scope of this document. Please refer to the Dell SC Series support website, <http://www.dell.com/support/contents/us/en/19/article/ProductSupport/Dell-Subsidiaries/compellent>, for the latest guides, white papers, and best practices on how to setup your storage cluster.

Once the Dell Storage SC Series with the Dell Storage Enterprise Manager platform is setup according to the Reference Architecture, the information contained in [Table 9: SC Series Information Needed from Configuration](#) on page 14 must be collected to configure your storage backend.

More information can be found at <http://docs.openstack.org/kilo/configreference/content/dellstoragecenter-driver.html>

Table 9: SC Series Information Needed from Configuration

[DEFAULT]	Description
Required Values	
<code>volume_backend_name = delliscsi</code>	Name given to the storage backend
<code>volume_driver = cinder.volume.drivers.dell.dell_storagecenter_iscsi.DellStorageCenterISCSIDriver</code>	Dell SC Series iSCSI volume driver
<code>san_ip = <IP_address></code>	IP address of Enterprise Manager
<code>san_login = <user_name></code>	User name to log into Enterprise Manager at the <code>san_ip</code>
<code>san_password = <password></code>	Password to log into the Enterprise Manager at the <code>san_ip</code>
<code>iscsi_ip_address = <IP_address></code>	The Storage Center iSCSI IP
<code>dell_sc_ssn = <serial_number></code>	The Storage Center serial number to use
Optional Values	
<code>dell_sc_api_port = <port_to_use></code>	Configured Enterprise Manager API port, default is 7077
<code>dell_sc_server_folder = <folder_name></code>	Server folder in which to place new server definitions
<code>dell_sc_volume_folder = <folder_name></code>	Volume folder in which to place created volumes
<code>iscsi_port = <port_number></code>	iSCSI port to use, if you do not wish to use the default port number 3260

Configuring your Network

Complete the following steps to set up your network:

1. Determine the vLANs to be used and how they are used.
2. Determine the IP ranges and associated to a vLAN.
3. Fill in the Solution Workbook [Using the Workbook](#) on page 15.
4. Ensure that the cabling matches your Workbook.
5. Configure your switches per the Workbook:
 - [Dell Networking Switches Default Solution Values](#) on page 20
 - [Configuring the Dell Networking S6000](#) on page 21
 - [Configuring the Dell Networking S4820T](#) on page 46

Third-Party Network Hardware

If you are not using Dell Networking S4820T and/or S6000 switches, you must program the switches to support your cloud instantiation. Your switches are expected to support the following:

- Support for IEEE 802.1Q vLAN traffic and port tagging
- Support for using one untagged and multiple tagged vLANs on the same port
- The ability to provide a minimum of 170 Gigabit Ethernet ports, in a non-blocking configuration, within the Provisioning vLAN
 - Configuration can be a single switch or a combination of stacked switches, to meet the additional requirements
- The ability to create link aggregation groups (LAGs) with a minimum of two physical links in each LAG
- If multiple switches are stacked:
 - The ability to create a LAG across stacked switches
 - Full-bisection bandwidth
 - Support for vLANs to be available across all switches in the stack
- 250,000 packets-per-second capabilities per switch
- A managed switch that supports both SSH and serial line configuration
- SNMP v3 support

Using the Workbook

The *Solution Workbook* is set up to enable the installers to use the same information to:

- Program the switches
- Build the configuration for each node

Using the worksheet, you must complete the following tasks for each connection from Server to Switch.

On Any Page:

- If the information is indicated as *required*, then it is needed in order to ensure a successful install.
- We provide a table for you to complete, similar to [Table 10: Example vLAN Assignments](#) on page 16.



Note: When configuring your networks, they must be aligned so that the tenant networks can be expanded by adding a vLAN for each internal network. This is accomplished by assigning all the other networks to lower vLAN numbers than that of the internal tenant network. The solution, as tested, uses a single external network for tenants. A service motion can be arranged to allow dedicated tenant networks.

Table 10: Example vLAN Assignments

vLAN Name	Recommended vLAN
iDRAC Network (can be used with OOB Management if needed)	110
Provisioning Network	120
Internal API Network	140
Storage Network	170
Storage Clustering Network	180
External Network (API, Tenants, GUI)	190
Internal Networks for Tenants	200+
Public Network	157

On the General Configuration Page:

- Fill in the information needed as required by the site.

On the Switch Configuration Pages:

- **Name** - The Port name on the switch.
- **Connector** - The type of connector used.
- **Device Name** - The name of the server/device connected to the switch. It is helpful to use a name that describes the server usage and associated bond.
- **Port** - The Network Interface Card (NIC) name and port number as the OS would generate.
- **Untagged** and **Tagged** - Used to indicate what vLAN(s) the port should be used, and how.
- **Port-channel number** - The unique number on the switch that represents the port-channel. Each pair in a server bond must have their own unique port-channel number, which is the same on both switches.
- **Mode** - The mode the port-channel will use: 802.3ad for all SAH, OpenStack Controller Nodes, OpenStack Compute Nodes, and Ceph Storage Nodes.

[Table 11: S6000 Configuration Excerpt](#) on page 17 is an example from an installation, and the resulting S6000 configuration.



Note: If you are using recommended vLANs, wire and configure the switches as per the example tables listed below

Table 11: S6000s and S4820T Configuration Excerpts

Host Port	Media Type	Host name	NIC	Untagged	Tagged	Port-channel #	Mode
Dell Networking S6000 - Switch 1							
Te 0/0	40GBASE-SR4	vim-bond0	em1	-	110,120,140,170,190,158	11	802.3ad
Te 0/1		sah-bond0	em1	-	120, 140, 170, 190	12	
Te 0/2		cntl1-bond0	em1	-	140, 170, 201-250	13	
Te 0/3		cntl2-bond0	em1	-	140, 170, 201-250	14	
Te 0/8	40GBASE-SR4	cntl3-bond0	em1	-	140, 170, 201-250	15	802.3ad
Te 0/9		nova1-bond0	em1	-	140, 201-250	16	
Te 0/10		nova2-bond0	em1	-	140, 201-250	17	
Te 0/11		nova3-bond0	em1	-	140, 201-250	18	
Te 0/16	40GBASE-SR4	ss1-bond0	em1	170	-	19	802.3ad
Te 0/17		ss2-bond0	em1	170	-	20	
Te 0/18		ss3-bond0	em1	170	-	21	
Te 0/32	40GBASE-SR4	vim-bond1	em2	157	-	31	802.3ad
Te 0/33		sah-bond1	em2	157	-	32	
Te 0/34		cntl1-bond1	em2	190	-	33	
Te 0/35		cntl2-bond1	em2	190	-	34	
Te 0/40	40GBASE-SR4	cntl3-bond1	em2	190	-	35	802.3ad
Te 0/41		nova1-bond1	em2	170	-	36	
Te 0/42		nova2-bond1	em2	170	-	37	
Te 0/43		nova3-bond1	em2	170	-	38	
Te 0/48	40GBASE-SR4	ss1-bond1	em2	180	-	39	802.3ad
Te 0/49		ss2-bond1	em2	180	-	40	
Te 0/50		ss3-bond1	em2	180	-	41	
Fo 0/112	QSFP	Lab-core	forty 0/56	-	110, 120, 170, 190, 157, 158	3	802.3ad

Fo 0/116	QSFP	S4820T	forty 0/56	-	110, 120, 157	2	802.3ad
Fo 0/120	QSFP	S6000-2	forty 0/120	-	-	1	VLT
Fo 0/124	QSFP	S6000-2	forty 0/124	-	-	1	VLT

Host Port	Media Type	Host name	NIC	Untagged	Tagged	Port-channel #	Mode
Dell Networking S6000 - Switch 2							
Te 0/0	40GBASE-SR4	vim-bond0	p1p1	-	110,120,140,170,190	11	802.3ad
Te 0/1		sah-bond0	p1p1	-	120, 140, 170, 190	12	
Te 0/2		cntl1-bond0	p1p1	-	140, 170, 201-250	13	
Te 0/3		cntl2-bond0	p1p1	-	140, 170, 201-250	14	
Te 0/8	40GBASE-SR4	cntl3-bond0	p1p1	-	140, 170, 201-250	15	802.3ad
Te 0/9		nova1-bond0	p1p1	-	140, 201-250	16	
Te 0/10		nova2-bond0	p1p1	-	140, 201-250	17	
Te 0/11		nova3-bond0	p1p1	-	140, 201-250	18	
Te 0/16	40GBASE-SR4	ss1-bond0	p2p1	170	-	19	802.3ad
Te 0/17		ss2-bond0	p2p1	170	-	20	
Te 0/18		ss3-bond0	p2p1	170	-	21	
Te 0/32	40GBASE-SR4	vim-bond1	p1p2	157	-	31	802.3ad
Te 0/33		sah-bond1	p1p2	157	-	32	
Te 0/34		cntl1-bond1	p1p2	190	-	33	
Te 0/35		cntl2-bond1	p1p2	190	-	34	
Te 0/40	40GBASE-SR4	cntl3-bond1	p1p2	190	-	35	802.3ad
Te 0/41		nova1-bond1	p1p2	170	-	36	
Te 0/42		nova2-bond1	p1p2	170	-	37	
Te 0/43		nova3-bond1	p1p2	170	-	38	

Te 0/48	40GBASE-SR4	ss1-bond1	p2p2	180	-	39	802.3ad
Te 0/49		ss2-bond1	p2p2	180	-	40	
Te 0/50		ss3-bond1	p2p2	180	-	41	
Fo 0/112	QSFP	Lab-core	forty 0/60	-	110, 120, 170, 190, 157, 158	3	802.3ad
Fo 0/116	QSFP	S4820T	forty 0/60	-	110, 120, 157	2	802.3ad
Fo 0/120	QSFP	S6000-1	forty 0/120	-	-	1	VLT
Fo 0/124	QSFP	S6000-1	forty 0/124	-	-	1	VLT

Host Port	Media Type	Host name	NIC	Untagged	Tagged	Port-channel #	Mode
Dell Networking S4820T							
Te 0/0	Cat5e	Vim	iDRAC	110	-	-	802.3ad
Te 0/1	Cat5e	Sah	iDRAC	110	-	-	802.3ad
Te 0/2	Cat5e	cntl1	iDRAC	110	-	-	802.3ad
Te 0/3	Cat5e	cntl2	iDRAC	110	-	-	802.3ad
Te 0/4	Cat5e	cntl3	iDRAC	110	-	-	802.3ad
Te 0/5	Cat5e	nova1	iDRAC	110	-	-	802.3ad
Te 0/6	Cat5e	ss1	iDRAC	110	-	-	802.3ad
Te 0/7	Cat5e	ss2	iDRAC	110	-	-	802.3ad
Te 0/8	Cat5e	ss3	iDRAC	110	-	-	802.3ad
Te 0/9	Cat5e	cntl1	EM4	110	-	-	802.3ad
Te 0/10	Cat5e	cntl2	EM4	110	-	-	802.3ad
Te 0/11	Cat5e	cntl3	EM4	110	-	-	802.3ad
Te 0/16	Cat5e	sah	EM3	120	-	-	802.3ad
Te 0/17	Cat5e	nova1	EM3	120	-	-	802.3ad
Te 0/18	Cat5e	nova2	EM3	120	-	-	802.3ad

Te 0/19	Cat5e	nova3	EM3	120	-	-	802.3ad
Te 0/20	Cat5e	cntl1	EM3	120	-	-	802.3ad
Te 0/21	Cat5e	cntl2	EM3	120	-	-	802.3ad
Te 0/22	Cat5e	cntl3	EM3	120	-	-	802.3ad
Te 0/23	Cat5e	ss1	EM3	120	-	-	802.3ad
Te 0/24	Cat5e	ss2	EM3	120	-	-	802.3ad
Te 0/25	Cat5e	ss3	EM3	120	-	-	802.3ad
Te 0/46	Cat5e	vim-Anaconda	EM4	157	-	-	802.3ad
Te 0/47	Cat5e	sah-Anaconda	EM4	157	-	-	802.3ad
Te 0/56	QSFP	S6000-1	0/16	-	110, 120, 157	2	802.3ad
Te 0/60	QSFP	S6000-2	0/16	-	110, 120, 157	2	802.3ad

Dell Networking Switches Default Solution Values

 Note: The VLT ports differ, and are defined in the example.

Table 12: Switch Port Defaults

CLI Command	Recommended Default	Example
ip address	No IP address assigned	no ip address
portmode	Hybrid mode	portmode hybrid
switchport	Enabled - after portmode hybrid executed	switchport
Mtu	9252 on S4820T; 12000 on S6000	mtu 9252 or mtu 12000
flowcontrol	Flow control receive on, transmit off	flowcontrol rx on tx off
spanning-tree	Rapid Spanning Tree set to Edge-Port going to servers.	spanning-tree rstp edgeport

Configuring the Dell Networking S6000

The *Solution Workbook* is designed to help configure the cluster. Configurations have been generated using the workbook, for [Switch 1](#) and [Switch 2](#).

 **Note:** You do not need to add the port-channel or the VLT to a vLAN. All vLANs will be passed on it.

Switch 1 Configuration

```
! Version 9.9(0.0)
! Last configuration change at Tue Nov  3 08:04:03 2015 by
crowbar
! Startup-config last updated at Tue Nov  3 08:04:22 2015 by
crowbar
!
boot system stack-unit 0 primary system://A
boot system stack-unit 0 secondary system://B
boot system stack-unit 0 default system://A
!
hardware watchdog stack-unit 0
hardware watchdog stack-unit 1
hardware watchdog stack-unit 2
hardware watchdog stack-unit 3
hardware watchdog stack-unit 4
hardware watchdog stack-unit 5
!
hostname S6000-1
!
protocol lldp
  advertise dot1-tlv port-protocol-vlan-id
  advertise dot3-tlv max-frame-size
  advertise management-tlv system-description system-name
  advertise med
!
redundancy auto-synchronize full
!
username crowbar password 7 b273ab54c2a8d82d privilege 15
!
protocol spanning-tree rstp
  no disable
  bridge-priority 16384
!
vlt domain 1
  peer-link port-channel 1
  back-up destination 192.168.110.92
```

```

primary-priority 1
unit-id 0
!
stack-unit 0 quad-port-profile
0,8,16,24,32,36,40,44,48,52,56,60,64,68,72,76,80,84,88,92,100,108
,116,124
!
stack-unit 0 provision S6000
!
stack-unit 0 port 0 portmode quad
!
stack-unit 0 port 8 portmode quad
!
stack-unit 0 port 16 portmode quad
!
stack-unit 0 port 24 portmode quad
!
stack-unit 0 port 32 portmode quad
!
stack-unit 0 port 40 portmode quad
!
stack-unit 0 port 48 portmode quad
!
stack-unit 0 port 100 portmode quad
!
interface TenGigabitEthernet 0/0
no ip address
!
port-channel-protocol LACP
port-channel 11 mode active
no shutdown
!
interface TenGigabitEthernet 0/1
no ip address
!
port-channel-protocol LACP
port-channel 12 mode active
no shutdown
!
interface TenGigabitEthernet 0/2
no ip address
!
port-channel-protocol LACP
port-channel 13 mode active
no shutdown
!

```

```

interface TenGigabitEthernet 0/3
  no ip address
  !
  port-channel-protocol LACP
  port-channel 14 mode active
  no shutdown
  !
interface fortyGigE 0/4
  no ip address
  no shutdown
  !
interface TenGigabitEthernet 0/8
  no ip address
  !
  port-channel-protocol LACP
  port-channel 15 mode active
  no shutdown
  !
interface TenGigabitEthernet 0/9
  no ip address
  !
  port-channel-protocol LACP
  port-channel 16 mode active
  no shutdown
  !
interface TenGigabitEthernet 0/10
  no ip address
  !
  port-channel-protocol LACP
  port-channel 17 mode active
  no shutdown
  !
interface TenGigabitEthernet 0/11
  no ip address
  !
  port-channel-protocol LACP
  port-channel 18 mode active
  no shutdown
  !
interface fortyGigE 0/12
  no ip address
  no shutdown
  !
interface TenGigabitEthernet 0/16
  no ip address
  !

```

```

    port-channel-protocol LACP
    port-channel 19 mode active
    no shutdown
!
interface TenGigabitEthernet 0/17
    no ip address
!
    port-channel-protocol LACP
    port-channel 20 mode active
    no shutdown
!
interface TenGigabitEthernet 0/18
    no ip address
!
    port-channel-protocol LACP
    port-channel 21 mode active
    no shutdown
!
interface TenGigabitEthernet 0/19
    no ip address
    no shutdown
!
interface fortyGigE 0/20
    no ip address
    no shutdown
!
interface TenGigabitEthernet 0/24
    no ip address
    no shutdown
!
interface TenGigabitEthernet 0/25
    no ip address
    no shutdown
!
interface TenGigabitEthernet 0/26
    no ip address
    no shutdown
!
interface TenGigabitEthernet 0/27
    no ip address
    no shutdown
!
interface fortyGigE 0/28
    no ip address
    no shutdown
!

```

```

interface TenGigabitEthernet 0/32
  no ip address
  !
  port-channel-protocol LACP
  port-channel 31 mode active
  no shutdown
  !
interface TenGigabitEthernet 0/33
  no ip address
  !
  port-channel-protocol LACP
  port-channel 32 mode active
  no shutdown
  !
interface TenGigabitEthernet 0/34
  no ip address
  !
  port-channel-protocol LACP
  port-channel 33 mode active
  no shutdown
  !
interface TenGigabitEthernet 0/35
  no ip address
  !
  port-channel-protocol LACP
  port-channel 34 mode active
  no shutdown
  !
interface fortyGigE 0/36
  no ip address
  no shutdown
  !
interface TenGigabitEthernet 0/40
  no ip address
  !
  port-channel-protocol LACP
  port-channel 35 mode active
  no shutdown
  !
interface TenGigabitEthernet 0/41
  no ip address
  !
  port-channel-protocol LACP
  port-channel 36 mode active
  no shutdown
  !

```

```

interface TenGigabitEthernet 0/42
  no ip address
!
  port-channel-protocol LACP
  port-channel 37 mode active
  no shutdown
!
interface TenGigabitEthernet 0/43
  no ip address
!
  port-channel-protocol LACP
  port-channel 38 mode active
  no shutdown
!
interface fortyGigE 0/44
  no ip address
  no shutdown
!
interface TenGigabitEthernet 0/48
  no ip address
!
  port-channel-protocol LACP
  port-channel 39 mode active
  no shutdown
!
interface TenGigabitEthernet 0/49
  no ip address
!
  port-channel-protocol LACP
  port-channel 40 mode active
  no shutdown
!
interface TenGigabitEthernet 0/50
  no ip address
!
  port-channel-protocol LACP
  port-channel 41 mode active
  no shutdown
!
interface TenGigabitEthernet 0/51
  no ip address
  shutdown
!
.
.
.

```

```

.
.
.
!
interface fortyGigE 0/112
  no ip address
!
  port-channel-protocol LACP
  port-channel 3 mode active
  no shutdown
!
interface fortyGigE 0/116
  no ip address
!
  port-channel-protocol LACP
  port-channel 2 mode active
  no shutdown
!
interface fortyGigE 0/120
  no ip address
  no shutdown
!
interface fortyGigE 0/124
  no ip address
  no shutdown
!
interface ManagementEthernet 0/0
  ip address 192.168.110.91/24
  no shutdown
!
interface ManagementEthernet 1/0
  no shutdown
!
interface ManagementEthernet 2/0
  no shutdown
!
interface ManagementEthernet 3/0
  no shutdown
!
interface ManagementEthernet 4/0
  no shutdown
!
interface ManagementEthernet 5/0
  no shutdown
!
interface Port-channel 1

```

```

description VLT_Domain1
no ip address
channel-member fortyGigE 0/120,124
no shutdown
!
interface Port-channel 2
description Uplink_S4820T
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 2
no shutdown
!
interface Port-channel 3
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 3
no shutdown
!
interface Port-channel 11
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 11
no shutdown
!
interface Port-channel 12
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 12
no shutdown
!
interface Port-channel 13
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 13
no shutdown
!
interface Port-channel 14
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 14

```

```

no shutdown
!
interface Port-channel 15
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 15
no shutdown
!
interface Port-channel 16
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 16
no shutdown
!
interface Port-channel 17
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 17
no shutdown
!
interface Port-channel 18
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 18
no shutdown
!
interface Port-channel 19
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 19
no shutdown
!
interface Port-channel 20
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 20
no shutdown
!
interface Port-channel 21
no ip address

```

```

portmode hybrid
switchport
vlt-peer-lag port-channel 21
no shutdown
!
interface Port-channel 31
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 31
no shutdown
!
interface Port-channel 32
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 32
no shutdown
!
interface Port-channel 33
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 33
no shutdown
!
interface Port-channel 34
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 34
no shutdown
!
interface Port-channel 35
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 35
no shutdown
!
interface Port-channel 36
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 36
no shutdown

```

```

!
interface Port-channel 37
  no ip address
  portmode hybrid
  switchport
  vlt-peer-lag port-channel 37
  no shutdown
!
interface Port-channel 38
  no ip address
  portmode hybrid
  switchport
  vlt-peer-lag port-channel 38
  no shutdown
!
interface Port-channel 39
  no ip address
  portmode hybrid
  switchport
  vlt-peer-lag port-channel 39
  no shutdown
!
interface Port-channel 40
  no ip address
  portmode hybrid
  switchport
  vlt-peer-lag port-channel 40
  no shutdown
!
interface Port-channel 41
  no ip address
  portmode hybrid
  switchport
  vlt-peer-lag port-channel 41
  no shutdown
!
interface Vlan 1
!untagged Port-channel 1-3,11-18
!
interface Vlan 110
  description iDRAC-OOB
  no ip address
  tagged Port-channel 2-3,11
  no shutdown
!
interface Vlan 120

```

```

description Provision
ip address 192.168.120.254/24
tagged Port-channel 2-3,11-12
no shutdown
!
interface Vlan 140
description Private_API
ip address 192.168.140.254/24
tagged Port-channel 3,11-18
no shutdown
!
interface Vlan 157
description NGN_Public
no ip address
tagged Port-channel 2-3
untagged Port-channel 31-32
no shutdown
!
interface Vlan 170
description Storage
ip address 192.168.170.254/24
tagged Port-channel 3,11-15
untagged Port-channel 19-21,36-38
no shutdown
!
interface Vlan 180
description Ceph_Cluster
ip address 192.168.180.254/24
untagged Port-channel 39-41
no shutdown
!
interface Vlan 190
description NOVA_NET_Public
ip address 192.168.190.254/24
tagged Port-channel 3,11-12
untagged Port-channel 33-35
no shutdown
!
interface Vlan 201
description NOVA_NET_Private
no ip address
tagged Port-channel 3,13-18
no shutdown
!
interface Vlan 202
description NOVA_NET_Private

```

```

no ip address
tagged Port-channel 3,13-18
no shutdown
!
interface Vlan 203
description NOVA_NET_Private
no ip address
tagged Port-channel 3,13-18
no shutdown
!
.
.
.
.
.
!
interface Vlan 250
description VM_Internal_Tenant
no ip address
tagged Port-channel 3,13-18
no shutdown
!
management route 0.0.0.0/0 10.148.45.254
!
ip ssh server enable
!
line console 0
line vty 0
line vty 1
line vty 2
line vty 3
line vty 4
line vty 5
line vty 6
line vty 7
line vty 8
line vty 9
!
reload-type
boot-type normal-reload
config-scr-download enable
!
end

```

Switch 2 Configuration:

```
! Version 9.9(0.0)
! Last configuration change at Tue Nov  3 08:03:46 2015 by
crowbar
! Startup-config last updated at Tue Nov  3 08:07:37 2015 by
crowbar
!
boot system stack-unit 0 primary system://A
boot system stack-unit 0 secondary system://B
boot system stack-unit 0 default system://A
!
hardware watchdog stack-unit 0
hardware watchdog stack-unit 1
hardware watchdog stack-unit 2
hardware watchdog stack-unit 3
hardware watchdog stack-unit 4
hardware watchdog stack-unit 5
!
hostname S6000-2
!
protocol lldp
  advertise dot1-tlv port-protocol-vlan-id
  advertise dot3-tlv max-frame-size
  advertise management-tlv system-description system-name
  advertise med
!
redundancy auto-synchronize full
!
username crowbar password 7 b273ab54c2a8d82d privilege 15
!
protocol spanning-tree rstp
  no disable
  bridge-priority 16384
!
vlt domain 1
  peer-link port-channel 1
  back-up destination 192.168.110.91
  primary-priority 2
  unit-id 1
!
stack-unit 0 quad-port-profile
0,8,16,24,32,36,40,44,48,52,56,60,64,68,72,76,80,84,88,92,100,108
,116,124
!
stack-unit 0 provision S6000
```

```

!
stack-unit 0 port 0 portmode quad
!
stack-unit 0 port 8 portmode quad
!
stack-unit 0 port 16 portmode quad
!
stack-unit 0 port 24 portmode quad
!
stack-unit 0 port 32 portmode quad
!
stack-unit 0 port 40 portmode quad
!
stack-unit 0 port 48 portmode quad
!
stack-unit 0 port 100 portmode quad
!
interface TenGigabitEthernet 0/0
  no ip address
!
  port-channel-protocol LACP
  port-channel 11 mode active
  no shutdown
!
interface TenGigabitEthernet 0/1
  no ip address
!
  port-channel-protocol LACP
  port-channel 12 mode active
  no shutdown
!
interface TenGigabitEthernet 0/2
  no ip address
!
  port-channel-protocol LACP
  port-channel 13 mode active
  no shutdown
!
interface TenGigabitEthernet 0/3
  no ip address
!
  port-channel-protocol LACP
  port-channel 14 mode active
  no shutdown
!
interface fortyGigE 0/4

```

```

no ip address
no shutdown
!
interface TenGigabitEthernet 0/8
no ip address
!
port-channel-protocol LACP
port-channel 15 mode active
no shutdown
!
interface TenGigabitEthernet 0/9
no ip address
!
port-channel-protocol LACP
port-channel 16 mode active
no shutdown
!
interface TenGigabitEthernet 0/10
no ip address
!
port-channel-protocol LACP
port-channel 17 mode active
no shutdown
!
interface TenGigabitEthernet 0/11
no ip address
!
port-channel-protocol LACP
port-channel 18 mode active
no shutdown
!
interface fortyGigE 0/12
no ip address
no shutdown
!
interface TenGigabitEthernet 0/16
no ip address
!
port-channel-protocol LACP
port-channel 19 mode active
no shutdown
!
interface TenGigabitEthernet 0/17
no ip address
!
port-channel-protocol LACP

```

```

    port-channel 20 mode active
    no shutdown
!
interface TenGigabitEthernet 0/18
    no ip address
!
    port-channel-protocol LACP
    port-channel 21 mode active
    no shutdown
!
interface TenGigabitEthernet 0/19
    no ip address
    no shutdown
!
interface fortyGigE 0/20
    no ip address
    no shutdown
!
interface TenGigabitEthernet 0/24
    no ip address
    no shutdown
!
interface TenGigabitEthernet 0/25
    no ip address
    no shutdown
!
interface TenGigabitEthernet 0/26
    no ip address
    no shutdown
!
interface TenGigabitEthernet 0/27
    no ip address
    no shutdown
!
interface fortyGigE 0/28
    no ip address
    no shutdown
!
interface TenGigabitEthernet 0/32
    no ip address
!
    port-channel-protocol LACP
    port-channel 31 mode active
    no shutdown
!
interface TenGigabitEthernet 0/33

```

```

no ip address
!
port-channel-protocol LACP
port-channel 32 mode active
no shutdown
!
interface TenGigabitEthernet 0/34
no ip address
!
port-channel-protocol LACP
port-channel 33 mode active
no shutdown
!
interface TenGigabitEthernet 0/35
no ip address
!
port-channel-protocol LACP
port-channel 34 mode active
no shutdown
!
interface fortyGigE 0/36
no ip address
no shutdown
!
interface TenGigabitEthernet 0/40
no ip address
!
port-channel-protocol LACP
port-channel 35 mode active
no shutdown
!
interface TenGigabitEthernet 0/41
no ip address
!
port-channel-protocol LACP
port-channel 36 mode active
no shutdown
!
interface TenGigabitEthernet 0/42
no ip address
!
port-channel-protocol LACP
port-channel 37 mode active
no shutdown
!
interface TenGigabitEthernet 0/43

```

```

no ip address
!
port-channel-protocol LACP
port-channel 38 mode active
no shutdown
!
interface fortyGigE 0/44
no ip address
no shutdown
!
interface TenGigabitEthernet 0/48
no ip address
!
port-channel-protocol LACP
port-channel 39 mode active
no shutdown
!
interface TenGigabitEthernet 0/49
no ip address
!
port-channel-protocol LACP
port-channel 40 mode active
no shutdown
!
interface TenGigabitEthernet 0/50
no ip address
!
port-channel-protocol LACP
port-channel 41 mode active
no shutdown
!
interface TenGigabitEthernet 0/51
no ip address
shutdown
!
.
.
.
.
.
!
interface fortyGigE 0/112
no ip address
!
port-channel-protocol LACP
port-channel 3 mode active

```

```

no shutdown
!
interface fortyGigE 0/116
no ip address
!
port-channel-protocol LACP
port-channel 2 mode active
no shutdown
!
interface fortyGigE 0/120
no ip address
no shutdown
!
interface fortyGigE 0/124
no ip address
no shutdown
!
interface ManagementEthernet 0/0
ip address 192.168.110.92/24
no shutdown
!
interface ManagementEthernet 1/0
no shutdown
!
interface ManagementEthernet 2/0
no shutdown
!
interface ManagementEthernet 3/0
no shutdown
!
interface ManagementEthernet 4/0
no shutdown
!
interface ManagementEthernet 5/0
no shutdown
!
interface Port-channel 1
description VLT_Domain1
no ip address
channel-member fortyGigE 0/120,124
no shutdown
!
interface Port-channel 2
description Uplink_S4820T
no ip address
portmode hybrid

```

```

switchport
vlt-peer-lag port-channel 2
no shutdown
!
interface Port-channel 3
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 3
no shutdown
!
interface Port-channel 11
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 11
no shutdown
!
interface Port-channel 12
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 12
no shutdown
!
interface Port-channel 13
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 13
no shutdown
!
interface Port-channel 14
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 14
no shutdown
!
interface Port-channel 15
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 15
no shutdown
!

```

```

interface Port-channel 16
  no ip address
  portmode hybrid
  switchport
  vlt-peer-lag port-channel 16
  no shutdown
!
interface Port-channel 17
  no ip address
  portmode hybrid
  switchport
  vlt-peer-lag port-channel 17
  no shutdown
!
interface Port-channel 18
  no ip address
  portmode hybrid
  switchport
  vlt-peer-lag port-channel 18
  no shutdown
!
interface Port-channel 19
  no ip address
  portmode hybrid
  switchport
  vlt-peer-lag port-channel 19
  no shutdown
!
interface Port-channel 20
  no ip address
  portmode hybrid
  switchport
  vlt-peer-lag port-channel 20
  no shutdown
!
interface Port-channel 21
  no ip address
  portmode hybrid
  switchport
  vlt-peer-lag port-channel 21
  no shutdown
!
interface Port-channel 31
  no ip address
  portmode hybrid
  switchport

```

```

vlt-peer-lag port-channel 31
no shutdown
!
interface Port-channel 32
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 32
no shutdown
!
interface Port-channel 33
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 33
no shutdown
!
interface Port-channel 34
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 34
no shutdown
!
interface Port-channel 35
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 35
no shutdown
!
interface Port-channel 36
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 36
no shutdown
!
interface Port-channel 37
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 37
no shutdown
!
interface Port-channel 38

```

```

no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 38
no shutdown
!
interface Port-channel 39
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 39
no shutdown
!
interface Port-channel 40
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 40
no shutdown
!
interface Port-channel 41
no ip address
portmode hybrid
switchport
vlt-peer-lag port-channel 41
no shutdown
!
interface Vlan 1
!untagged Port-channel 1-3,11-18
!
interface Vlan 110
description iDRAC-OOB
no ip address
tagged Port-channel 2-3,11
no shutdown
!
interface Vlan 120
description Provision
no ip address
tagged Port-channel 2-3,11-12
no shutdown
!
interface Vlan 140
description Private_API
no ip address
tagged Port-channel 3,11-18

```

```

no shutdown
!
interface Vlan 157
description NGN_Public
no ip address
tagged Port-channel 2-3
untagged Port-channel 31-32
no shutdown
!
interface Vlan 170
description Storage
no ip address
tagged Port-channel 3,11-15
untagged Port-channel 19-21,36-38
no shutdown
!
interface Vlan 180
description Ceph_Cluster
no ip address
untagged Port-channel 39-41
no shutdown
!
interface Vlan 190
description NOVA_NET_Public
no ip address
tagged Port-channel 3,11-12
untagged Port-channel 33-35
no shutdown
!
interface Vlan 201
description NOVA_NET_Private
no ip address
tagged Port-channel 3,13-18
no shutdown
!
interface Vlan 202
description NOVA_NET_Private
no ip address
tagged Port-channel 3,13-18
no shutdown
!
interface Vlan 203
description NOVA_NET_Private
no ip address
tagged Port-channel 3,13-18
no shutdown

```

```

!
.
.
.
.
.
.
!
interface Vlan 250
  description VM_Internal_Tenant
  no ip address
  tagged Port-channel 3,13-18
  no shutdown
!
management route 0.0.0.0/0 10.148.45.254
!
ip ssh server enable
!
line console 0
line vty 0
line vty 1
line vty 2
line vty 3
line vty 4
line vty 5
line vty 6
line vty 7
line vty 8
line vty 9
!
reload-type
  boot-type normal-reload
  config-scr-download enable
!
end

```

Configuring the Dell Networking S4820T

The [Switch 3](#) configuration below has been generated using the example given in [Table 11: S6000 Configuration Excerpt](#) on page 18. The configuration is set up with redundant network trunks between the two S6000s, to enable provisioning and access to the external network for the SAH installation.

Switch 3 Configuration:

```
! Version 9.5(0.1)
! Last configuration change at Tue Nov  3 15:42:56 2015 by
crowbar
! Startup-config last updated at Tue Nov  3 15:49:55 2015 by
crowbar
!
boot system stack-unit 0 primary system: A:
boot system stack-unit 0 secondary system: B:
!
redundancy auto-synchronize full
!
hardware watchdog
!
hostname S4820T
!
username crowbar password 7 b273ab54c2a8d82d privilege 15
!
protocol spanning-tree rstp
  no disable
!
stack-unit 0 provision S4820T
!
interface TenGigabitEthernet 0/0
  no ip address
  switchport
  no shutdown
!
interface TenGigabitEthernet 0/1
  no ip address
  switchport
  spanning-tree rstp edge-port
  no shutdown
!
interface TenGigabitEthernet 0/2
  no ip address
  switchport
  spanning-tree rstp edge-port
  no shutdown
!
interface TenGigabitEthernet 0/3
  no ip address
  switchport
  spanning-tree rstp edge-port
  no shutdown
```

```

!
interface TenGigabitEthernet 0/4
  no ip address
  switchport
  spanning-tree rstp edge-port
  no shutdown
!
interface TenGigabitEthernet 0/5
  no ip address
  switchport
  spanning-tree rstp edge-port
  no shutdown
!
interface TenGigabitEthernet 0/6
  no ip address
  switchport
  spanning-tree rstp edge-port
  no shutdown
!
interface TenGigabitEthernet 0/7
  no ip address
  switchport
  spanning-tree rstp edge-port
  no shutdown
!
interface TenGigabitEthernet 0/8
  no ip address
  switchport
  spanning-tree rstp edge-port
  no shutdown
!
interface TenGigabitEthernet 0/9
  no ip address
  switchport
  spanning-tree rstp edge-port
  no shutdown
!
interface TenGigabitEthernet 0/10
  no ip address
  switchport
  spanning-tree rstp edge-port
  no shutdown
!
interface TenGigabitEthernet 0/11
  no ip address
  switchport

```

```

    spanning-tree rstp edge-port
    no shutdown
!
interface TenGigabitEthernet 0/12
    no ip address
    switchport
    spanning-tree rstp edge-port
    no shutdown
!
interface TenGigabitEthernet 0/13
    no ip address
    switchport
    spanning-tree rstp edge-port
    no shutdown
!
interface TenGigabitEthernet 0/14
    no ip address
    switchport
    spanning-tree rstp edge-port
    no shutdown
!
interface TenGigabitEthernet 0/15
    no ip address
    switchport
    spanning-tree rstp edge-port
    no shutdown
!
interface TenGigabitEthernet 0/16
    no ip address
    switchport
    spanning-tree rstp edge-port
    no shutdown
!
interface TenGigabitEthernet 0/17
    no ip address
    switchport
    spanning-tree rstp edge-port
    no shutdown
!
interface TenGigabitEthernet 0/18
    no ip address
    switchport
    spanning-tree rstp edge-port
    no shutdown
!
interface TenGigabitEthernet 0/19

```

```

no ip address
switchport
spanning-tree rstp edge-port
no shutdown
!
interface TenGigabitEthernet 0/20
no ip address
switchport
spanning-tree rstp edge-port
no shutdown
!
interface TenGigabitEthernet 0/21
no ip address
switchport
spanning-tree rstp edge-port
no shutdown
!
interface TenGigabitEthernet 0/22
no ip address
switchport
spanning-tree rstp edge-port
no shutdown
!
interface TenGigabitEthernet 0/23
no ip address
switchport
spanning-tree rstp edge-port
no shutdown
!
interface TenGigabitEthernet 0/24
no ip address
switchport
spanning-tree rstp edge-port
no shutdown
!
interface TenGigabitEthernet 0/25
no ip address
switchport
spanning-tree rstp edge-port
no shutdown
!
interface TenGigabitEthernet 0/26
no ip address
switchport
speed 10000
spanning-tree rstp edge-port

```

```

no shutdown
!
interface TenGigabitEthernet 0/27
no ip address
switchport
speed 10000
spanning-tree rstp edge-port
no shutdown
!
interface TenGigabitEthernet 0/28
no ip address
switchport
speed 10000
spanning-tree rstp edge-port
no shutdown
!
interface TenGigabitEthernet 0/29
no ip address
switchport
speed 10000
spanning-tree rstp edge-port
no shutdown
!
interface TenGigabitEthernet 0/30
no ip address
switchport
speed 10000
spanning-tree rstp edge-port
no shutdown
!
interface TenGigabitEthernet 0/31
no ip address
switchport
speed 10000
spanning-tree rstp edge-port
no shutdown
!
interface TenGigabitEthernet 0/32
no ip address
switchport
spanning-tree rstp edge-port
no shutdown
!
interface TenGigabitEthernet 0/33
no ip address
switchport

```

```

    spanning-tree rstp edge-port
    no shutdown
!
interface TenGigabitEthernet 0/34
    no ip address
    switchport
    spanning-tree rstp edge-port
    no shutdown
!
interface TenGigabitEthernet 0/35
    no ip address
    switchport
    spanning-tree rstp edge-port
    no shutdown
!
interface TenGigabitEthernet 0/36
    no ip address
    switchport
    spanning-tree rstp edge-port
    no shutdown
!
interface TenGigabitEthernet 0/37
    no ip address
    switchport
    spanning-tree rstp edge-port
    no shutdown
!
interface TenGigabitEthernet 0/38
    no ip address
    switchport
    spanning-tree rstp edge-port
    no shutdown
!
interface TenGigabitEthernet 0/39
    no ip address
    switchport
    spanning-tree rstp edge-port
    no shutdown
!
interface TenGigabitEthernet 0/40
    no ip address
    switchport
    spanning-tree rstp edge-port
    no shutdown
!
interface TenGigabitEthernet 0/41

```

```

no ip address
switchport
spanning-tree rstp edge-port
no shutdown
!
interface TenGigabitEthernet 0/42
no ip address
switchport
spanning-tree rstp edge-port
no shutdown
!
interface TenGigabitEthernet 0/43
no ip address
switchport
spanning-tree rstp edge-port
no shutdown
!
interface TenGigabitEthernet 0/44
no ip address
switchport
spanning-tree rstp edge-port
no shutdown
!
interface TenGigabitEthernet 0/45
no ip address
switchport
spanning-tree rstp edge-port
no shutdown
!
interface TenGigabitEthernet 0/46
no ip address
switchport
spanning-tree rstp edge-port
no shutdown
!
interface TenGigabitEthernet 0/47
no ip address
switchport
speed 1000
spanning-tree rstp edge-port
no shutdown
!
interface fortyGigE 0/48
no ip address
shutdown
!

```

```

interface fortyGigE 0/52
  no ip address
  shutdown
!
interface fortyGigE 0/56
  no ip address
!
  port-channel-protocol LACP
  port-channel 2 mode active
  no shutdown
!
interface fortyGigE 0/60
  no ip address
!
  port-channel-protocol LACP
  port-channel 2 mode active
  no shutdown
!
interface ManagementEthernet 0/0
  ip address 192.168.110.93/24
  no shutdown
!
interface ManagementEthernet 1/0
  no shutdown
!
interface ManagementEthernet 2/0
  no shutdown
!
interface ManagementEthernet 3/0
  no shutdown
!
interface ManagementEthernet 4/0
  no shutdown
!
interface ManagementEthernet 5/0
  no shutdown
!
interface ManagementEthernet 6/0
  no shutdown
!
interface ManagementEthernet 7/0
  no shutdown
!
interface ManagementEthernet 8/0
  no shutdown
!

```

```

interface ManagementEthernet 9/0
  no shutdown
!
interface ManagementEthernet 10/0
  no shutdown
!
interface ManagementEthernet 11/0
  no shutdown
!
interface Port-channel 2
  no ip address
  portmode hybrid
  switchport
  no shutdown
!
interface Vlan 1
!untagged TenGigabitEthernet 0/35-39
!untagged Port-channel 2
!
interface Vlan 110
  description iDRAC_OOBmgmt
  no ip address
  tagged Port-channel 2
  untagged TenGigabitEthernet 0/0-15,32-34
  shutdown
!
interface Vlan 120
  description Provision
  ip address 192.168.120.252/24
  tagged Port-channel 2
  untagged TenGigabitEthernet 0/16-31
  ip helper-address 192.168.120.71
  no shutdown
!
interface Vlan 157
  no ip address
  tagged Port-channel 2
  untagged TenGigabitEthernet 0/44-47
  no shutdown
!
interface Vlan 190
  no ip address
  shutdown
!
management route 0.0.0.0/0 10.148.45.254
!

```

```
snmp-server community public rw
!
ip ssh server enable
!
protocol lldp
  advertise dot1-tlv port-protocol-vlan-id
  advertise dot3-tlv max-frame-size
  advertise management-tlv system-description system-name
  advertise med
!
line console 0
line vty 0
line vty 1
line vty 2
line vty 3
line vty 4
line vty 5
line vty 6
line vty 7
line vty 8
line vty 9
!
reload-type normal-reload
!
end
```

References

Additional information can be obtained at <http://www.dell.com/nfv> or by e-mailing nfv@dell.com.

If you need additional services or implementation help, please contact your Dell sales representative.

To Learn More

For more information on the Dell Red Hat NFV Solution with Red Hat Enterprise Linux™ OpenStack Platform visit <http://www.dell.com/nfv>.

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