Technical Guide - Using Dell Networking S6000 Switches in the Dell Red Hat OpenStack Cloud Solution - Version 4.0

Contents

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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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Executive Summary

The *Dell Red Hat OpenStack Cloud Solution Reference Architecture* is prescriptive in its hardware, software, networking, and installation definitions. This ensures a consistent experience when you create your OpenStack environment.

The Reference Architecture uses Dell Networking™ S4048 switches. However, when the solution is expanded, or initially built beyond ten (10) systems, it can benefit from using Dell's newest aggregation and Top-of-Rack (TOR) switches - the Dell Networking S6000 switches. The S6000 provides the following benefits:

- Leverages a non-blocking switching architecture
- Delivers line-rate L2 and L3 forwarding capacity
- Provides up to 96 ports of 10Gbe, and eight (8) additional ports of 40Gbe

This technical guide presents configurations required to utilize S6000s as TOR switches in the Dell Red Hat OpenStack Cloud Solution.

Intended Audience

This technical guide is written for OpenStack administrators or deployment engineers who are responsible for installation and ongoing operation of OpenStack clusters.

Adding the S6000 to the Solution

When there is a desire to expand beyond ten (10) systems in multiple racks, adding a pair of Dell Networking™ S6000s becomes an effective alternative to S4048s. Doing so allows:

- Up to forty (40) servers with four (4) 10 Gb NICs each
- Multiple 40Gb uplinks between the switches, and up to the core

The S6000 provides the Dell Red Hat OpenStack Cloud Solution with simpler management capabilities, and better utilization of the network infrastructure, for multiple-rack solutions.

To add to the solution:

1. Replace up to four S4048s with two S6000s.
2. Mount the two switches in separate racks, so that they draw power from different Power Distribution Units (PDUs).
3. Using the 40G to 10G splitter cables, wire the servers so that each of the two 10Gb ports is connected to a port on a separate switch (e.g., no single NIC has both ports connected to the same switch).

Figure 1: S6000 Switches with Controllers in Two Racks on page 7 represents S6000 switches added to two racks, with Controller nodes split across the racks.

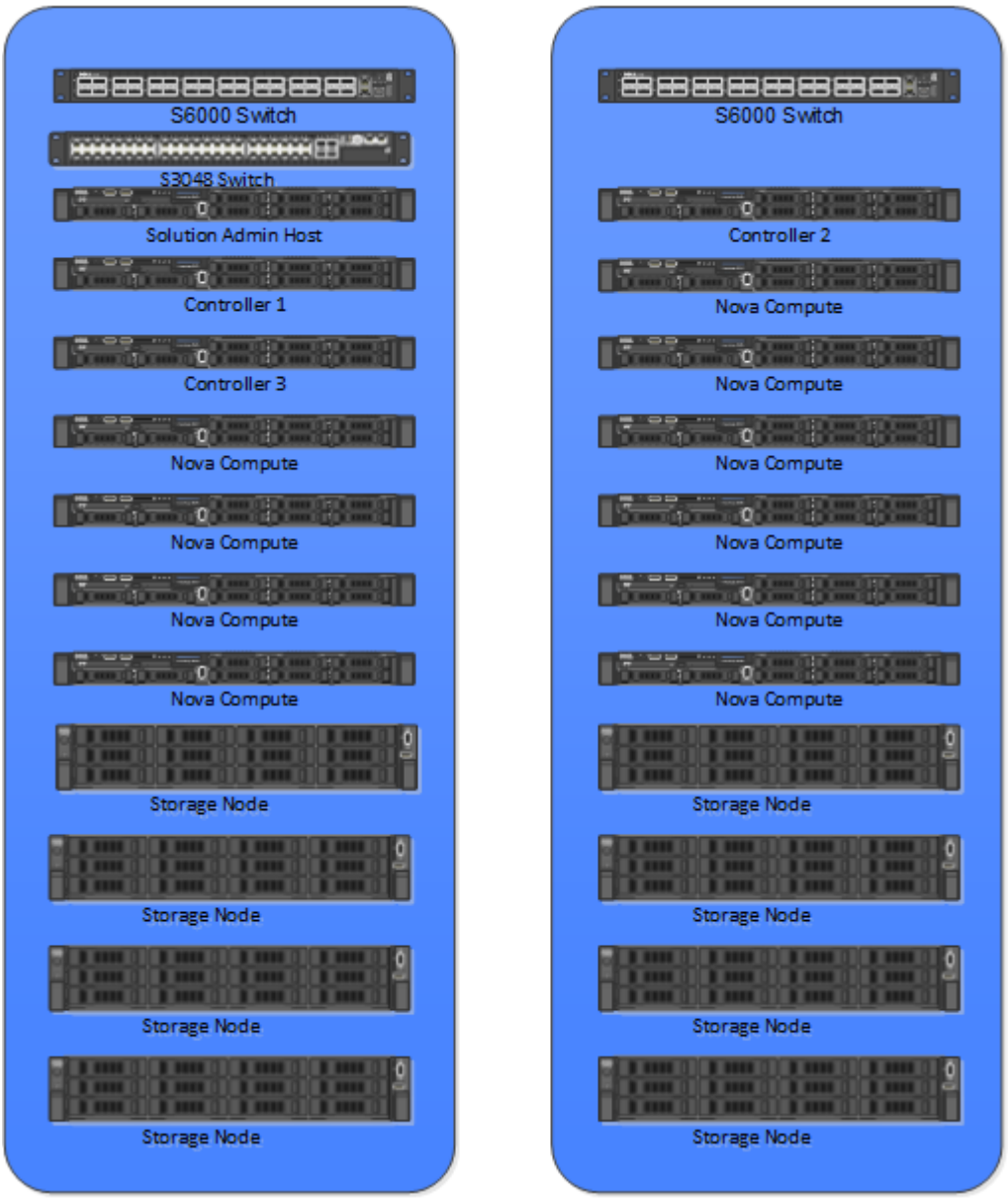

Figure 1: S6000 Switches with Controllers in Two Racks

Splitting Ports

There are several considerations you must take into account when splitting ports on Dell Networking S6000 switches:

- Splitting a single 40G port into four 10G ports is supported only on a standalone unit.
- Split ports cannot be used as stack-link to stack an S6000.
- Split ports cannot be a part of any stacked system.
- Some of the ports on an S6000 are fixed 40G ports. Therefore, splitting those ports is not allowed.
  - Fixed ports include ports 4, 12, 20, 28, 100, 108, 116, and 124.
- Reload is mandatory when:
  - QSFP ports are converted into 4x 10G SFP+ ports using the `portmode quad` CLI command

- Converting quad ports back to a QSFP port

To split a port:

1. Log onto the switch.
2. Execute the following command:

```
stack-unit 0 port 48 portmode quad
```

Example S6000 Configurations

The following example configurations enable Dell Networking S6000 switches to act as TOR switches for the Dell Red Hat OpenStack Cloud Solution:

Switch 1 Configuration

```
! Version 9.0(2.0P1)
! Last configuration change at Tue May 12 00:25:50 2015
! Startup-config last updated at Sat May 30 04:21:50 2015
!
boot system stack-unit 0 primary system: A:
boot system stack-unit 0 secondary system: B:
boot system stack-unit 0 default system: A:
!
redundancy auto-synchronize full
!
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 MHT1R1L_SW01
!

!
protocol spanning-tree rstp
 no disable
!
vlt domain 11
 peer-link port-channel 11
 back-up destination 192.168.253.131
 primary-priority 1
 unit-id 0
!
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 36 portmode quad
!
stack-unit 0 port 44 portmode quad
!
stack-unit 0 port 52 portmode quad
!
stack-unit 0 port 60 portmode quad
```

```
!
stack-unit 0 port 76 portmode quad
!
interface TenGigabitEthernet 0/0
 no ip address
!
 port-channel-protocol LACP
  port-channel 20 mode active
 no shutdown
!
interface TenGigabitEthernet 0/1
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/2
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/3
 no ip address
 no shutdown
!
interface fortyGigE 0/4
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/8
 no ip address
!
 port-channel-protocol LACP
  port-channel 24 mode active
 no shutdown
!
interface TenGigabitEthernet 0/9
 no ip address
!
 port-channel-protocol LACP
  port-channel 25 mode active
 no shutdown
!
interface TenGigabitEthernet 0/10
 no ip address
!
 port-channel-protocol LACP
  port-channel 26 mode active
 no shutdown
!
interface TenGigabitEthernet 0/11
 no ip address
!
 port-channel-protocol LACP
  port-channel 27 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 28 mode active
 no shutdown
```

```
!
interface TenGigabitEthernet 0/17
 no ip address
!
 port-channel-protocol LACP
  port-channel 29 mode active
 no shutdown
!
interface TenGigabitEthernet 0/18
 no ip address
!
 port-channel-protocol LACP
  port-channel 30 mode active
 no shutdown
!
interface TenGigabitEthernet 0/19
 no ip address
!
 port-channel-protocol LACP
  port-channel 31 mode active
 no shutdown
!
interface fortyGigE 0/20
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/24
 no ip address
!
 port-channel-protocol LACP
  port-channel 32 mode active
 no shutdown
!
interface TenGigabitEthernet 0/25
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 no shutdown
!
interface TenGigabitEthernet 0/26
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 no shutdown
!
interface TenGigabitEthernet 0/27
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 no shutdown
!
interface fortyGigE 0/28
 no ip address
 no shutdown
!
interface fortyGigE 0/32
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/36
 no ip address
```

```
!
 port-channel-protocol LACP
  port-channel 40 mode active
 no shutdown
!
interface TenGigabitEthernet 0/37
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/38
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/39
 no ip address
 no shutdown
!
interface fortyGigE 0/40
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/44
 no ip address
!
 port-channel-protocol LACP
  port-channel 44 mode active
 no shutdown
!
interface TenGigabitEthernet 0/45
 no ip address
!
 port-channel-protocol LACP
  port-channel 45 mode active
 no shutdown
!
interface TenGigabitEthernet 0/46
 no ip address
!
 port-channel-protocol LACP
  port-channel 46 mode active
 no shutdown
!
interface TenGigabitEthernet 0/47
 no ip address
!
 port-channel-protocol LACP
  port-channel 47 mode active
 no shutdown
!
interface fortyGigE 0/48
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/52
 no ip address
!
 port-channel-protocol LACP
  port-channel 48 mode active
 no shutdown
!
interface TenGigabitEthernet 0/53
 no ip address
!
 port-channel-protocol LACP
```

```
  port-channel 49 mode active
 no shutdown
!
interface TenGigabitEthernet 0/54
 no ip address
!
 port-channel-protocol LACP
  port-channel 50 mode active
 no shutdown
!
interface TenGigabitEthernet 0/55
 no ip address
!
 port-channel-protocol LACP
  port-channel 51 mode active
 no shutdown
!
interface fortyGigE 0/56
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/60
 no ip address
!
 port-channel-protocol LACP
  port-channel 52 mode active
 no shutdown
!
interface TenGigabitEthernet 0/61
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 no shutdown
!
interface TenGigabitEthernet 0/62
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 no shutdown
!
interface TenGigabitEthernet 0/63
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 no shutdown
!
interface fortyGigE 0/64
 no ip address
 no shutdown
!
interface fortyGigE 0/68
 no ip address
 no shutdown
!
interface fortyGigE 0/72
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/76
 description "Uplink from s55 Switch P0/50"
 no ip address
```

```
!
 port-channel-protocol LACP
  port-channel 1 mode active
 no shutdown
!
interface TenGigabitEthernet 0/77
 no ip address
 shutdown
!
interface TenGigabitEthernet 0/78
 no ip address
 shutdown
!
interface TenGigabitEthernet 0/79
 no ip address
 shutdown
!
interface fortyGigE 0/80
 no ip address
 no shutdown
!
interface fortyGigE 0/84
 no ip address
 no shutdown
!
interface fortyGigE 0/88
 no ip address
 no shutdown
!
interface fortyGigE 0/92
 no ip address
 no shutdown
!
interface fortyGigE 0/96
 no ip address
 no shutdown
!
interface fortyGigE 0/100
 no ip address
 no shutdown
!
interface fortyGigE 0/104
 no ip address
 no shutdown
!
interface fortyGigE 0/108
 no ip address
 no shutdown
!
interface fortyGigE 0/112
 no ip address
 no shutdown
!
interface fortyGigE 0/116
 description "Member of VLTi Link 11"
 no ip address
 no shutdown
!
interface fortyGigE 0/120
 no ip address
 no shutdown
!
interface fortyGigE 0/124
 description "Member of VLTi Link 11"
```

```
 no ip address
 no shutdown
!
interface ManagementEthernet 0/0
 ip address 192.168.253.130/24
 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 "Uplink from s55 Switch"
 no ip address
 switchport
 vlt-peer-lag port-channel 1
 no shutdown
!
interface Port-channel 11
 description "VLT_to_Switch 2"
 no ip address
 channel-member fortyGigE 0/116,124
 no shutdown
!
interface Port-channel 20
 no ip address
 portmode hybrid
 switchport
 no spanning-tree
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 20
 no shutdown
!
interface Port-channel 21
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 channel-member TenGigabitEthernet 0/1
 vlt-peer-lag port-channel 21
 no shutdown
!
interface Port-channel 22
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 channel-member TenGigabitEthernet 0/2
 vlt-peer-lag port-channel 22
 no shutdown
!
interface Port-channel 23
 no ip address
```

```
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 channel-member TenGigabitEthernet 0/3
 vlt-peer-lag port-channel 23
 no shutdown
!
interface Port-channel 24
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 24
 no shutdown
!
interface Port-channel 25
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 25
 no shutdown
!
interface Port-channel 26
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 26
 no shutdown
!
interface Port-channel 27
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 27
 no shutdown
!
interface Port-channel 28
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 28
 no shutdown
!
interface Port-channel 29
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 29
 no shutdown
!
interface Port-channel 30
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 30
 no shutdown
!
interface Port-channel 31
```

```
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 31
 no shutdown
!
interface Port-channel 32
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 32
 no shutdown
!
interface Port-channel 40
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 40
 no shutdown
!
interface Port-channel 41
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 channel-member TenGigabitEthernet 0/37
 vlt-peer-lag port-channel 41
 no shutdown
!
interface Port-channel 42
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 channel-member TenGigabitEthernet 0/38
 vlt-peer-lag port-channel 42
 no shutdown
!
interface Port-channel 43
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 channel-member TenGigabitEthernet 0/39
 vlt-peer-lag port-channel 43
 no shutdown
!
interface Port-channel 44
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 44
 no shutdown
!
interface Port-channel 45
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 45
```

```
 no shutdown
!
interface Port-channel 46
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 46
 no shutdown
!
interface Port-channel 47
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 47
 no shutdown
!
interface Port-channel 48
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 48
 no shutdown
!
interface Port-channel 49
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 49
 no shutdown
!
interface Port-channel 50
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 50
 no shutdown
!
interface Port-channel 51
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 51
 no shutdown
!
interface Port-channel 52
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 52
 no shutdown
!
interface Vlan 1
!untagged TenGigabitEthernet 0/25-27,61-63
!untagged Port-channel 11,20-28
!
interface Vlan 110
 description "iDrac Network"
```

```
 no ip address
 shutdown
!
interface Vlan 120
 description "Provisioner Network"
 no ip address
 tagged Port-channel 1,20
 shutdown
!
interface Vlan 140
 description "Private API Network"
 no ip address
 tagged Port-channel 1,20-28
 shutdown
!
interface Vlan 170
 description "Storage Network"
 no ip address
 tagged Port-channel 1,20-23
 untagged Port-channel 29-32,44-48
 shutdown
!
interface Vlan 180
 description "Storage (Ceph) Network"
 no ip address
 tagged Port-channel 21-23
 untagged Port-channel 49-52
 shutdown
!
interface Vlan 190
 description "Nova-Network Public"
 no ip address
 tagged Port-channel 1,20
 untagged Port-channel 41-43
 no shutdown
!
interface Vlan 201
 description "Nova-Network Private"
 no ip address
 tagged Port-channel 21-28
 shutdown
!
interface Vlan 202
 description "Nova-Network Private"
 no ip address
 tagged Port-channel 21-28
 shutdown
!
interface Vlan 203
 description "Nova-Network Private"
 no ip address
 tagged Port-channel 21-28
 shutdown
!
interface Vlan 204
 description "Nova-Network Private"
 no ip address
 tagged Port-channel 21-28
 shutdown
!
interface Vlan 205
 description "Nova-Network Private"
 no ip address
 tagged Port-channel 21-28
```

```
 shutdown
!
interface Vlan 206
 description "Nova-Network Private"
 no ip address
 tagged Port-channel 21-28
 shutdown
!
interface Vlan 207
 description "Nova-Network Private"
 no ip address
 tagged Port-channel 21-28
 shutdown
!
interface Vlan 208
 description "Nova-Network Private"
 no ip address
 tagged Port-channel 21-28
 shutdown
!
interface Vlan 209
 description "Nova-Network Private"
 no ip address
 tagged Port-channel 21-28
 shutdown
!
interface Vlan 210
 description "Nova-Network Private"
 no ip address
 tagged Port-channel 21-28
 shutdown
!
interface Vlan 2251
 description "Public Network"
 no ip address
 tagged Port-channel 1
 untagged Port-channel 40
 shutdown
!
snmp-server community password ro
no ip telnet server enable
!
arp learn-enable
!
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
!
```

```
end
```

Switch 2 Configuration

```
! Version 9.0(2.0P1)
! Last configuration change at Tue May 12 00:22:43 2015
! Startup-config last updated at Sat May 30 04:19:18 2015
!
boot system stack-unit 0 primary system: A:
boot system stack-unit 0 secondary system: B:
boot system stack-unit 0 default system: A:
!
redundancy auto-synchronize full
!
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 MHT1R1L_SW02
!

!
protocol spanning-tree rstp
 no disable
!
vlt domain 11
 peer-link port-channel 11
 back-up destination 192.168.253.130
 primary-priority 8192
 unit-id 1
!
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 36 portmode quad
!
stack-unit 0 port 44 portmode quad
!
stack-unit 0 port 52 portmode quad
!
stack-unit 0 port 60 portmode quad
!
stack-unit 0 port 76 portmode quad
!
interface TenGigabitEthernet 0/0
 no ip address
!
 port-channel-protocol LACP
  port-channel 20 mode active
 no shutdown
```

```
!
interface TenGigabitEthernet 0/1
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/2
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/3
 no ip address
 no shutdown
!
interface fortyGigE 0/4
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/8
 no ip address
!
 port-channel-protocol LACP
  port-channel 24 mode active
 no shutdown
!
interface TenGigabitEthernet 0/9
 no ip address
!
 port-channel-protocol LACP
  port-channel 25 mode active
 no shutdown
!
interface TenGigabitEthernet 0/10
 no ip address
!
 port-channel-protocol LACP
  port-channel 26 mode active
 no shutdown
!
interface TenGigabitEthernet 0/11
 no ip address
!
 port-channel-protocol LACP
  port-channel 27 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 28 mode active
 no shutdown
!
interface TenGigabitEthernet 0/17
 no ip address
!
 port-channel-protocol LACP
  port-channel 29 mode active
 no shutdown
!
interface TenGigabitEthernet 0/18
```

```
 no ip address
!
 port-channel-protocol LACP
  port-channel 30 mode active
 no shutdown
!
interface TenGigabitEthernet 0/19
 no ip address
!
 port-channel-protocol LACP
  port-channel 31 mode active
 no shutdown
!
interface fortyGigE 0/20
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/24
 no ip address
!
 port-channel-protocol LACP
  port-channel 32 mode active
 no shutdown
!
interface TenGigabitEthernet 0/25
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 no shutdown
!
interface TenGigabitEthernet 0/26
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 no shutdown
!
interface TenGigabitEthernet 0/27
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 no shutdown
!
interface fortyGigE 0/28
 no ip address
 no shutdown
!
interface fortyGigE 0/32
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/36
 no ip address
!
 port-channel-protocol LACP
  port-channel 40 mode active
 no shutdown
!
interface TenGigabitEthernet 0/37
 no ip address
 no shutdown
!
```

```
interface TenGigabitEthernet 0/38
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/39
 no ip address
 no shutdown
!
interface fortyGigE 0/40
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/44
 no ip address
!
 port-channel-protocol LACP
  port-channel 44 mode active
 no shutdown
!
interface TenGigabitEthernet 0/45
 no ip address
!
 port-channel-protocol LACP
  port-channel 45 mode active
 no shutdown
!
interface TenGigabitEthernet 0/46
 no ip address
!
 port-channel-protocol LACP
  port-channel 46 mode active
 no shutdown
!
interface TenGigabitEthernet 0/47
 no ip address
!
 port-channel-protocol LACP
  port-channel 47 mode active
 no shutdown
!
interface fortyGigE 0/48
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/52
 no ip address
!
 port-channel-protocol LACP
  port-channel 48 mode active
 no shutdown
!
interface TenGigabitEthernet 0/53
 no ip address
!
 port-channel-protocol LACP
  port-channel 49 mode active
 no shutdown
!
interface TenGigabitEthernet 0/54
 no ip address
!
 port-channel-protocol LACP
  port-channel 50 mode active
 no shutdown
```

```
!
interface TenGigabitEthernet 0/55
 no ip address
!
 port-channel-protocol LACP
  port-channel 51 mode active
 no shutdown
!
interface fortyGigE 0/56
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/60
 no ip address
!
 port-channel-protocol LACP
  port-channel 52 mode active
 no shutdown
!
interface TenGigabitEthernet 0/61
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 no shutdown
!
interface TenGigabitEthernet 0/62
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 no shutdown
!
interface TenGigabitEthernet 0/63
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 no shutdown
!
interface fortyGigE 0/64
 no ip address
 no shutdown
!
interface fortyGigE 0/68
 no ip address
 no shutdown
!
interface fortyGigE 0/72
 no ip address
 no shutdown
!
interface TenGigabitEthernet 0/76
 description "Uplink from s55 Switch P0/50"
 no ip address
!
 port-channel-protocol LACP
  port-channel 1 mode active
 no shutdown
!
interface TenGigabitEthernet 0/77
 no ip address
 shutdown
!
```

```
interface TenGigabitEthernet 0/78
 no ip address
 shutdown
!
interface TenGigabitEthernet 0/79
 no ip address
 shutdown
!
interface fortyGigE 0/80
 no ip address
 no shutdown
!
interface fortyGigE 0/84
 no ip address
 no shutdown
!
interface fortyGigE 0/88
 no ip address
 no shutdown
!
interface fortyGigE 0/92
 no ip address
 no shutdown
!
interface fortyGigE 0/96
 no ip address
 no shutdown
!
interface fortyGigE 0/100
 no ip address
 no shutdown
!
interface fortyGigE 0/104
 no ip address
 no shutdown
!
interface fortyGigE 0/108
 no ip address
 no shutdown
!
interface fortyGigE 0/112
 no ip address
 no shutdown
!
interface fortyGigE 0/116
 no ip address
 no shutdown
!
interface fortyGigE 0/120
 no ip address
 shutdown
!
interface fortyGigE 0/124
 no ip address
 shutdown
!
interface ManagementEthernet 0/0
 ip address 192.168.253.131/24
 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 "Uplink from s55 Switch"
 no ip address
 switchport
 vlt-peer-lag port-channel 1
 no shutdown
!
interface Port-channel 11
 description "VLT_to_Switch 1"
 no ip address
 channel-member fortyGigE 0/116,124
 no shutdown
!
interface Port-channel 20
 no ip address
 portmode hybrid
 switchport
 no spanning-tree
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 20
 no shutdown
!
interface Port-channel 21
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 channel-member TenGigabitEthernet 0/1
 vlt-peer-lag port-channel 21
 no shutdown
!
interface Port-channel 22
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 channel-member TenGigabitEthernet 0/2
 vlt-peer-lag port-channel 22
 no shutdown
!
interface Port-channel 23
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 channel-member TenGigabitEthernet 0/3
 vlt-peer-lag port-channel 23
 no shutdown
!
interface Port-channel 24
 no ip address
 portmode hybrid
 switchport
```

```
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 24
 no shutdown
!
interface Port-channel 25
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 25
 no shutdown
!
interface Port-channel 26
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 26
 no shutdown
!
interface Port-channel 27
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 27
 no shutdown
!
interface Port-channel 28
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 28
 no shutdown
!
interface Port-channel 29
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 29
 no shutdown
!
interface Port-channel 30
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 30
 no shutdown
!
interface Port-channel 31
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 31
 no shutdown
!
interface Port-channel 32
 no ip address
 portmode hybrid
 switchport
```

```
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 32
 no shutdown
!
interface Port-channel 40
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 40
 no shutdown
!
interface Port-channel 41
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 channel-member TenGigabitEthernet 0/37
 vlt-peer-lag port-channel 41
 no shutdown
!
interface Port-channel 42
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 channel-member TenGigabitEthernet 0/38
 vlt-peer-lag port-channel 42
 no shutdown
!
interface Port-channel 43
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 channel-member TenGigabitEthernet 0/39
 vlt-peer-lag port-channel 43
 no shutdown
!
interface Port-channel 44
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 44
 no shutdown
!
interface Port-channel 45
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 45
 no shutdown
!
interface Port-channel 46
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 46
 no shutdown
!
interface Port-channel 47
```

```
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 47
 no shutdown
!
interface Port-channel 48
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 48
 no shutdown
!
interface Port-channel 49
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 49
 no shutdown
!
interface Port-channel 50
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 50
 no shutdown
!
interface Port-channel 51
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 51
 no shutdown
!
interface Port-channel 52
 no ip address
 portmode hybrid
 switchport
 spanning-tree rstp edge-port
 vlt-peer-lag port-channel 52
 no shutdown
!
interface Vlan 1
!untagged TenGigabitEthernet 0/25-27,61-63
!untagged Port-channel 11,20-28
!
interface Vlan 110
 description "iDrac Network"
 no ip address
 shutdown
!
interface Vlan 120
 description "Provisioner Network"
 no ip address
 tagged Port-channel 1,20
 shutdown
!
interface Vlan 140
 description "Private API Network"
```

```
 no ip address
 tagged Port-channel 1,20-28
 shutdown
!
interface Vlan 170
 description "Storage Network"
 no ip address
 tagged Port-channel 1,20-23
 untagged Port-channel 29-32,44-48
 no shutdown
!
interface Vlan 180
 description "Storage (Ceph) Network"
 no ip address
 tagged Port-channel 21-23
 untagged Port-channel 49-52
 shutdown
!
interface Vlan 190
 description "Nova-Network Public"
 no ip address
 tagged Port-channel 1,20
 untagged Port-channel 41-43
 no shutdown
!
interface Vlan 201
 description "Nova-Network Private"
 no ip address
 tagged Port-channel 21-28
 shutdown
!
interface Vlan 202
 description "Nova-Network Private"
 no ip address
 tagged Port-channel 21-28
 shutdown
!
interface Vlan 203
 description "Nova-Network Private"
 no ip address
 tagged Port-channel 21-28
 shutdown
!
interface Vlan 204
 description "Nova-Network Private"
 no ip address
 tagged Port-channel 21-28
 shutdown
!
interface Vlan 205
 description "Nova-Network Private"
 no ip address
 tagged Port-channel 21-28
 shutdown
!
interface Vlan 206
 description "Nova-Network Private"
 no ip address
 tagged Port-channel 21-28
 shutdown
!
interface Vlan 207
 description "Nova-Network Private"
 no ip address
```

```
 tagged Port-channel 21-28
 shutdown
!
interface Vlan 208
 description "Nova-Network Private"
 no ip address
 tagged Port-channel 21-28
 shutdown
!
interface Vlan 209
 description "Nova-Network Private"
 no ip address
 tagged Port-channel 21-28
 shutdown
!
interface Vlan 210
 description "Nova-Network Private"
 no ip address
 tagged Port-channel 21-28
 shutdown
!
interface Vlan 2251
 description "Public Network"
 no ip address
 tagged Port-channel 1
 untagged Port-channel 40
 shutdown
!
snmp-server community password ro
no ip telnet server enable
!
arp learn-enable
!
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
!
end
```

Getting Help

This appendix details contact and reference information for the Dell™ Red Hat® Cloud Solutions with Red Hat Enterprise Linux® OpenStack Platform.

Contacting Dell

For customers in the United States, call 800-WWW-DELL (800-999-3355).

Note: If you do not have an active Internet connection, you can find contact information on your purchase invoice, packing slip, bill, or Dell product catalog.

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

1. Visit *dell.com/support*.
2. Click your country/region at the bottom of the page. For a full listing of country/region, click **All**.
3. Click **All Support** from the **Support** menu.
4. Select the appropriate service or support link based on your need.
5. Choose the method of contacting Dell that is convenient for you.

References

Additional information can be obtained at *http://www.dell.com/openstack* or by e-mailing *openstack@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 OpenStack Cloud Solution with Red Hat Enterprise Linux™ OpenStack Platform visit *http://www.dell.com/openstack*.