

Technical Guide - Using Dell Networking S6000-ON Switches in the Dell Red Hat OpenStack Cloud Solution - Version 5.0



Contents

- Trademarks..... 3
- Notes, Cautions, and Warnings..... 4
- Executive Summary..... 5
 - Intended Audience..... 5
- Adding the S6000-ON to the Solution..... 6
 - Splitting Ports..... 7
- Example S6000-ON Configurations..... 9
 - Switch 1 Configuration..... 9
 - Switch 2 Configuration..... 21
- Getting Help..... 34
 - Contacting Dell..... 34
 - References..... 34
 - To Learn More..... 34

Trademarks

© 2014-2016 Dell Inc. All rights reserved. Reproduction of this material in any manner whatsoever without the express written permission of Dell Inc. is prohibited. For more information, contact Dell.

Trademarks used in this text: Dell™, the DELL logo, PowerEdge™, and Dell Networking™ are trademarks of Dell Inc. Intel® and Xeon® are registered trademarks of Intel Corporation in the U.S. and other countries. Microsoft® and Windows® are registered trademarks of Microsoft Corporation in the United States and/or other countries.

Red Hat®, Red Hat Enterprise Linux®, and Ceph are trademarks or registered trademarks of Red Hat, Inc., registered in the U.S. and other countries. Linux® is the registered trademark of Linus Torvalds in the U.S. and other countries. Oracle® and Java® are registered trademarks of Oracle Corporation and/or its affiliates.




DISCLAIMER: The OpenStack® Word Mark and OpenStack Logo are either registered trademarks/service marks or trademarks/service marks of the OpenStack Foundation, in the United States and other countries, and are used with the OpenStack Foundation's permission. We are not affiliated with, endorsed or sponsored by the OpenStack Foundation or the OpenStack community.

Firefox® and the Firefox logo are registered trademarks of the Mozilla Foundation.

The Midokura® name and logo, as well as the MidoNet® name and logo, are registered trademarks of Midokura SARL.

Other trademarks and trade names may be used in this publication to refer to either the entities claiming the marks and names or their products. Dell Inc. disclaims any proprietary interest in trademarks and trade names other than its own.

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.

This document is for informational purposes only and may contain typographical errors and technical inaccuracies. The content is provided as is, without express or implied warranties of any kind.

Executive Summary

This technical guide presents configurations required to utilize S6000-ONs as TOR switches in the Dell Red Hat OpenStack Cloud Solution.

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-ON 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-ON switches. The S6000-ON 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

Intended Audience

This guide is written for OpenStack administrators or deployment engineers who are responsible for installation and ongoing operation of OpenStack clusters. It assumes that the reader is familiar with:

- OpenStack
- Red Hat Enterprise Linux (RHEL)
- Red Hat OpenStack Platform (RHOSP) documentation
- Networking and system administration

Adding the S6000-ON to the Solution

When there is a desire to expand beyond ten (10) systems in multiple racks, adding a pair of Dell Networking™ S6000-ONs becomes an effective alternative to S4048-ONs. 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-ON 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 S4048-ONs with two S6000-ONs.
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-ON Switches with Controllers in Two Racks on page 7 represents S6000-ON switches added to two racks, with Controller nodes split across the racks.

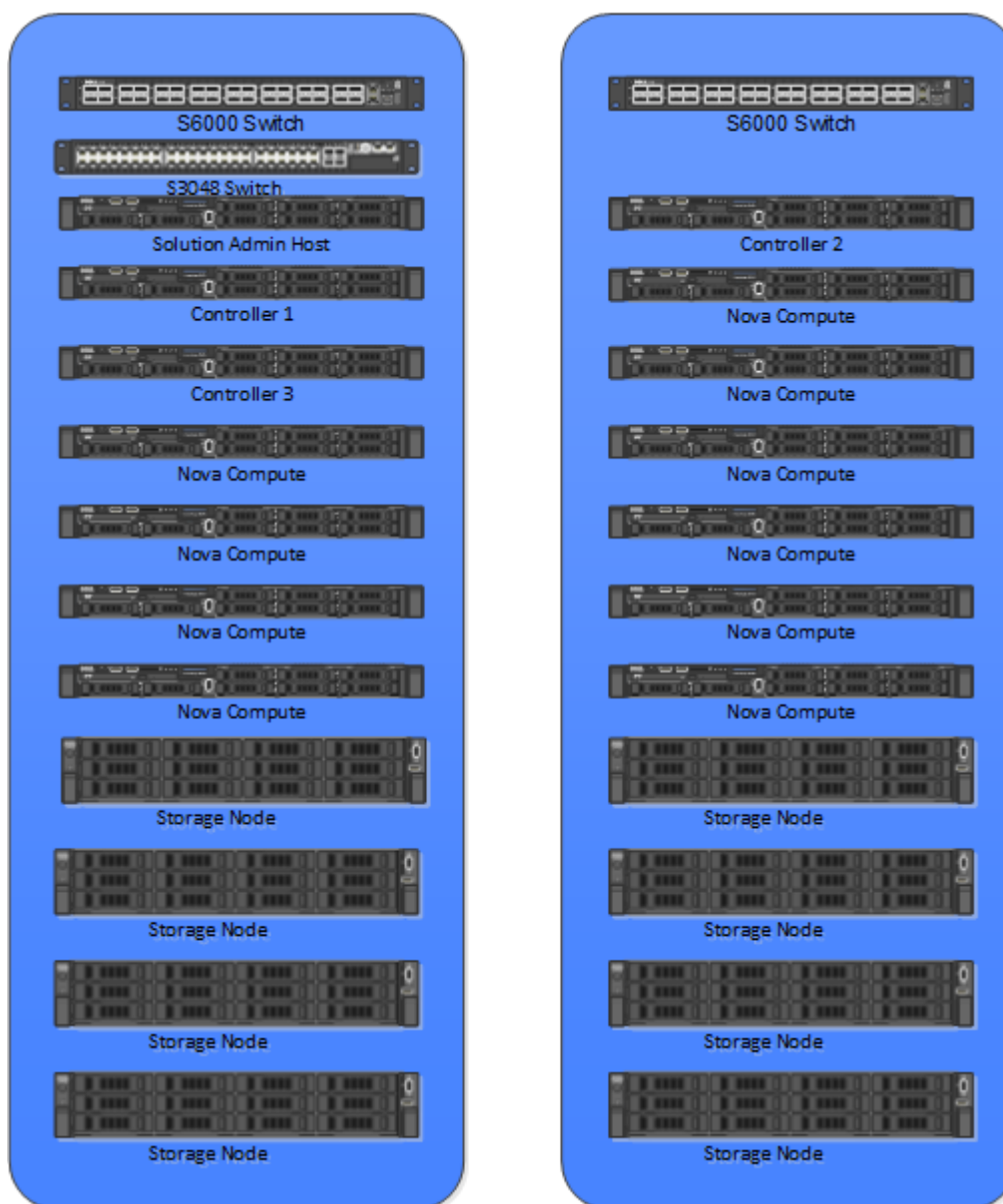


Figure 1: S6000-ON Switches with Controllers in Two Racks

Splitting Ports

There are several considerations you must take into account when splitting ports on Dell Networking S6000-ON 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-ON.
- Split ports cannot be a part of any stacked system.
- Some of the ports on an S6000-ON 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-ON Configurations

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

- [Switch 1 Configuration](#) on page 9
- [Switch 2 Configuration](#) on page 21

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 generic_name1
!

!
protocol spanning-tree rstp
no disable
hello-time 1
max-age 6
forward-delay 4
bridge-priority 8192
!
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 Clustering Network"
no ip address
tagged Port-channel 21-23
untagged Port-channel 49-52
shutdown
!
interface Vlan 190
description "Public API Network"
ip address 192.168.190.2/24
tagged Port-channel 1,20,41-43
no shutdown
vrrp-group 190
virtual-address 192.168.190.1
!
interface Vlan 191
description "External Tenant Network"
ip address 192.168.191.2/24
tagged Port-channel 41-43
vrrp-group 191
virtual-address 192.168.190.1
no shutdown
!
interface Vlan 201
description "Tenant Private"
no ip address
tagged Port-channel 21-28
shutdown
!
interface Vlan 202
description "Tenant Private"
no ip address
tagged Port-channel 21-28
shutdown
!
interface Vlan 203
description "Tenant Private"
no ip address

```

```

tagged Port-channel 21-28
shutdown
!
interface Vlan 204
description "Tenant Private"
no ip address
tagged Port-channel 21-28
shutdown
!
interface Vlan 205
description "Tenant Private"
no ip address
tagged Port-channel 21-28
shutdown
!
interface Vlan 206
description "Tenant Private"
no ip address
tagged Port-channel 21-28
shutdown
!
interface Vlan 207
description "Tenant Private"
no ip address
tagged Port-channel 21-28
shutdown
!
interface Vlan 208
description "Tenant Private"
no ip address
tagged Port-channel 21-28
shutdown
!
interface Vlan 209
description "Tenant Private"
no ip address
tagged Port-channel 21-28
shutdown
!
interface Vlan 210
description "Tenant Private"
no ip address
tagged Port-channel 21-28
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 genericname2
!

!
protocol spanning-tree rstp
no disable
hello-time 1
max-age 6
forward-delay 4
bridge-priority 16384
!
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 "Public API Network"
ip address 192.168.190.3/24
tagged Port-channel 1,20,41-43
no shutdown
vrrp-group 190
virtual-address 192.168.190.1
!
interface Vlan 191
description "External_VM_Network"
ip address 192.168.191.3/24
tagged Port-channel 41-43
vrrp-group 191
virtual-addreess 192.168.191.1
no shutdown
!
interface Vlan 201
description "Tenant Private"
no ip address
tagged Port-channel 21-28
shutdown
!
interface Vlan 202
description "Tenant Private"
no ip address
tagged Port-channel 21-28
shutdown
!
interface Vlan 203
description "Tenant Private"
no ip address
tagged Port-channel 21-28
shutdown
!
interface Vlan 204
description "Tenant Private"

```

```

no ip address
tagged Port-channel 21-28
shutdown
!
interface Vlan 205
description "Tenant Private"
no ip address
tagged Port-channel 21-28
shutdown
!
interface Vlan 206
description "Tenant Private"
no ip address
tagged Port-channel 21-28
shutdown
!
interface Vlan 207
description "Tenant Private"
no ip address
tagged Port-channel 21-28
shutdown
!
interface Vlan 208
description "Tenant Private"
no ip address
tagged Port-channel 21-28
shutdown
!
interface Vlan 209
description "Tenant Private"
no ip address
tagged Port-channel 21-28
shutdown
!
interface Vlan 210
description "Tenant Private"
no ip address
tagged Port-channel 21-28
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® OpenStack Cloud Solution with Red Hat 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/en-us/work/learn/openstack-cloud> 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 visit <http://www.dell.com/learn/us/en/04/solutions/red-hat-openstack>.

© 2014-2016 Dell Inc. All rights reserved. Trademarks and trade names may be used in this document to refer to either the entities claiming the marks and names or their products. Specifications are correct at date of publication but are subject to availability or change without notice at any time. Dell and its affiliates cannot be responsible for errors or omissions in typography or photography. Dell's Terms and Conditions of Sales and Service apply and are available on request. Dell service offerings do not affect consumer's statutory rights.

Dell, the DELL logo, the DELL badge, and PowerEdge are trademarks of Dell Inc.