Dell Networking Switch CLI Examples

A deployment guide for Dell Networking switches

A Dell EMC Deployment and Configuration Guide

Revisions

Date	Description	Authors
2014	Initial release	John Wroblewski Enterprise Technologist - Networking

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Introduction

The Dell Networking Switches provide the feature sets required to construct redundant, reliable, Active / Active Fabrics for today's Data Center and Campus Networks. While the Dell Networking N-Series Campus Switches can be configured (after initially setting a management IP) using a Web-Based GUI, Customers may prefer to configure the switches using a console connection and the Command Line Interface. The Dell Networking Data Center Switches are always configured using a Command Line Interface. The dominate command line interface in Networking was originally developed and marketed by Cisco. Customers familiar with the Cisco CLI typically inquire about the Dell Networking Command Line Interface and the similarity to the Cisco CLI. Dell Networking Switches support a Command Line Interface that is very similar to the Cisco CLI. We use the term, Industry Standard Command Line Interface. This makes the transition from Customer familiar with Cisco to Dell Networking potentially seamless without the requirement for additional training. The 'look and feel' of the Dell Networking CLI is very familiar to most Network Engineers but it is not exactly the same and there are some feature set and protocol differences due to the proprietary nature of some of the Cisco Feature set. Dell Networking provides standards based features and protocols, therefore in our examples we will use interoperable standards.

This document will not attempt to cover all feature sets and protocols but will function as a way to begin a Dell Networking configuration to produce an operating switch. The document will also not cover the protocol differences between a Cisco deployed switch that might make use of proprietary protocols versus a Dell Networking Standards based switch. We will briefly cover some of the protocols that maybe deployed in a Cisco Network and the Dell equivalent Standards based protocols.

Protocols

These are some of the protocols that can be deployed in Networks. Since this is a starter document, we will not cover more extensive and complex protocols. There are capabilities, terms, and protocols that are standard and should not be confusing to experienced networking professionals. Let's explore some of the common terms and protocols.

Layer 2 Switching – A capability that forwards packets based on the destination MAC address where both end-stations communicating are in the same broadcast domain.

Layer 3 Switching – A capability that forwards packets based on the higher layer protocol destination address (Layer 3 in the OSI Model). This is across different Broadcast Domains or Subnets.

Virtual LANs (VLAN) - A Broadcast Domain created at Layer 2. A virtualization of a Switch or switching infrastructure. Inter-VLAN communication is through Layer 3 Switching or Routing.

Link Aggregation - Binding one or more separate Ethernet links together to form a larger bandwidth path that can be istributed for redundancy. Etherchannel, port-channel and LAG are synonymous terms.

LACP - Link Aggregation Control Protocol, a protocol that dynamically configures Link Aggregation.

Interface - A mode that specifies a port on a switch for applying configuration statements.

Switchport - An interface configuration term that places the port (configured interface) into Layer 2 mode so that VLAN information can be configured.

Spanning-Tree - A protocol that provides protection to the switch and switching infrastructure from network Loops while allowing redundant connections.

OSPF / EIGRP - Dynamic Routing Protocols that build information tables for switches to make Layer 3 Switching or Routing decisions. OSPF is Standards based. EIGRP is Cisco proprietary.

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1   N-Series Default Configuration

This is an N-series Switch defaulted configuration. The defaulted configuration doesn't show a lot of detail and defaulted configuration parameters are not displayed. As the configuration changes (protocols are changed from defaults or statements added), the CLI configuration will show more information.

In this initial configuration two additional configuration statements. An IP address was added to VLAN 1 to allow the Web interface to be displayed and a new User was added with a Password and a Privilege of 15, the highest.

```
!Current Configuration:
!System Description "Dell Networking N3024, 6.1.2.4, Linux 3.6.5-601418a5"
!System Software Version 6.1.2.4
!
configure
slot 1/0 1    ! Dell Networking N3024
stack
member 1 1    ! N3024
exit
interface vlan 1
ip address 10.5.5.1 255.255.255.0
exit
username "john" password 1c065ad7087eb8ce058b02e38654a2c4 privilege 15 encrypted
snmp-server engineid local 800002a203f8b1562b9ab2
exit
```

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It is not recommended to use VLAN 1 for Data or Voice configurations. VLAN 1 can represent a security risk. In the N-Series, VLAN is the default (by default the 'native' VLAN). Ports that are unassigned to other VLANs are configured to VLAN1.

Tech Note: Voice over IP (VoIP) applications usually uses either LLDP or Cisco Discovery Protocol (CDP) for the discovery of VoIP Devices. In the Dell Networking N-Series, LLDP and a CDP-like Protocol, ISDP are enabled by default. ISDP is interoperable with Cisco CDP.

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2 N-Series Configuration with a Port Channel to connect to another Switch supporting a VoIP Solution.

This is a configuration that can be used for connecting to an aggregation switch and be used for supporting a VoIP Solution. We use the term 'Switchport general' on the configured interfaces to support more than one VLAN for VoIP and data traffic. In this configuration example, the Layer Two Class of Service was modified to provide strict queuing for VoIP. The N-Series Voice VLAN feature is used to setup the switch for Voice and QOS for Voice. This feature is globally enabled. The N-Series 2000 Switches are stacked in this example and have a Port Channel (port channel 1) to an Aggregation Switch.

N-Series 2000P Configuration Example

```
!Current Configuration:
!System Description "Dell Networking N2048P, 6.0.1.3, Linux 3.6.5-320b2282"
!System Software Version 6.0.1.3
!
configure
vlan 152,160,194,401,421
exit
slot 1/0 9    ! Dell Networking N2048P
slot 2/0 8    ! Dell Networking N2024P
sntp unicast client enable
sntp server 10.100.200.1
clock timezone -5 minutes 0
stack
member 1 9    ! N2048P
member 2 7    ! N2024P
exit
no logging console
ip http secure-server
ip route 0.0.0.0 0.0.0.0 10.100.200.1
interface vlan 1
ip address 10.100.200.201 255.255.254.0
exit
username "admin" password dec68e4501ce09a74284cb1bd03164a2 privilege 15
encrypted
voice vlan
ip ssh server
classofservice dot1p-mapping 5 5
cos-queue min-bandwidth 0 0 5 5 10 30 40
cos-queue strict 5
!
interface Gi1/0/1
switchport mode general
switchport general pvid 160
switchport general allowed vlan add 160
```

```
switchport general allowed vlan add 152 tagged
voice vlan 152
voice vlan auth disable
exit
!
interface Gi1/0/2
switchport mode general
switchport general pvid 160
switchport general allowed vlan add 160
switchport general allowed vlan add 152 tagged
voice vlan 152
voice vlan auth disable
exit
!
interface Te1/0/1
channel-group 1 mode active
switchport mode trunk
switchport trunk allowed vlan 1,152,160,194,401,421
exit
!
interface Gi2/0/1
switchport mode general
switchport general pvid 160
switchport general allowed vlan add 160
switchport general allowed vlan add 152 tagged
voice vlan 152
voice vlan auth disable
exit
!
interface Te2/0/1
channel-group 1 mode active
exit
!
interface port-channel 1
switchport mode trunk
switchport trunk allowed vlan 1,152,160,194,401,421
exit
snmp-server engineid local 800002a203001ec9ded907
enable password dec68e4501ce09a74284cb1bd03164a2 encrypted
exit
```

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3 N-Series Configuration with MLAG (Virtual Port Channel)

The Dell Networking N-Series can provide a Layer Two Active/ Active construct that provides redundancy, resiliency and performance to attached switches and devices without Spanning-Tree blocking ports. This capability is becoming a required feature for Campus Networks as the importance of the Campus infrastructure grows. In the VPC Configuration for MLAG, Spanning-Tree is disabled. The S-Series 60 switch configuration that follows was attached to the MLAG configuration represented here via S-60 ports 0/46-47 in Port Channel 1. This S-60 Port Channel was connected to Port Channel 100 in this N-3000 Series Configuration.

This is an example of a MLAG N-Series 3000 Switch. This is the proposed topology.
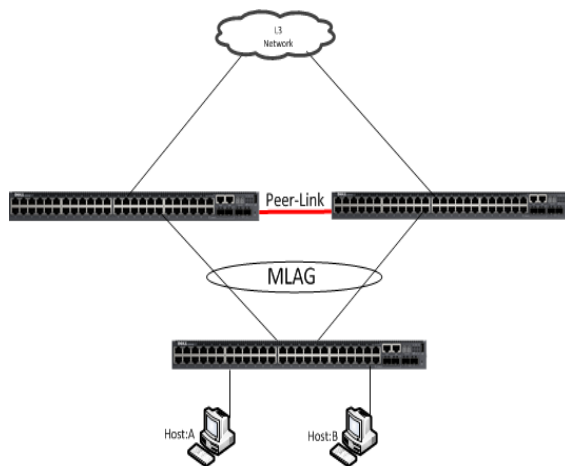
Figure 1   MLAG –N3000 series swtich

```
!Current Configuration:
!System Description "Dell Networking N3024P, 6.1.2.4, Linux 3.6.5-601418a5"
!System Software Version 6.1.2.4
!
configure
vlan 5,7,100
exit
hostname "John3024P_Dot1"
slot 1/0 6    ! Dell Networking N3024P
stack
member 1 3    ! N3024P
exit
interface out-of-band
ip address 10.168.1.1 255.255.255.0 0.0.0.0
exit
interface vlan 1
ip address dhcp
```

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```
exit
interface vlan 5
ip address 10.5.5.2 255.255.255.0
exit
interface vlan 7
ip address 10.7.7.2 255.255.255.0
exit
interface vlan 100
ip address 10.100.100.1 255.255.255.0
exit
username "john" password 9c91519328647000f9be49ebe9f7c939 privilege 15 encrypted
exit
udld enable
!
interface Gi1/0/1
switchport access vlan 5
exit
!
interface Gi1/0/2
switchport access vlan 5
exit
!
interface Gi1/0/3
switchport access vlan 5
exit
!
interface Gi1/0/4
switchport access vlan 5
exit
!
interface Gi1/0/5
switchport access vlan 100
exit
!
interface Gi1/0/9
switchport access vlan 100
exit
!
interface Gi1/0/10
switchport mode trunk
switchport trunk allowed vlan 5,7,100
exit
!
interface Gi1/0/22
channel-group 1 mode active
spanning-tree disable
exit
```

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```
!
interface Gi1/0/23
channel-group 100 mode active
spanning-tree disable
exit
!
interface Gi1/0/24
channel-group 100 mode active
spanning-tree disable
exit
!
interface port-channel 1
spanning-tree disable
switchport mode trunk
switchport trunk native vlan 5
switchport trunk allowed vlan 5,7
vpc 1
exit
!
interface port-channel 100
spanning-tree disable
switchport mode trunk
switchport trunk allowed vlan 5,7
vpc peer-link
exit
interface vlan 5
exit
interface vlan 7
exit
snmp-server engineid local 800002a203f8b15633f60a
feature vpc
vpc domain 1
role priority 1
peer-keepalive enable
peer-keepalive destination 10.100.100.254 source 10.100.100.1
peer detection enable
exit
```

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4 S-Series Configuration for Access with Port Channel

The S-Series 1Gb switches are excellent platforms for the access layer in the data center capable of supporting 1Gb attached servers at line rate with 10Gb uplink capability for attached to Dell Networking Active Fabric Cores or Top-of-Rack Solutions. S-Series switches based on Dell Networking FTOS are configured slightly differently than the N-Series DNOS 6 Switches. The major difference is that in Dell Networking FTOS, the interfaces are assigned into the VLANs (a configuration section 'interface vlan') versus VLANs being assigned to 'interface port' sections of the configuration. One other difference, Dell Networking FTOS uses the configuration term 'Hybrid' to place a port into a mode where multiple VLANs can be attached for VoIP applications. We will not cover that in this configuration example. This configuration was used to attach to a N-Series 3000 MLAG Aggregation using Port Channel 1.

> **Tech Note**: In Dell Networking FTOS, Spanning–Tree is not enabled by default. When configuring a Dell Networking FTOS Switch, select a Spanning-Tree Protocol (RSTP, PVST+, MST) and enable it on the Switch.

Current Configuration ...

```
! Version 8.3.3.7
! Last configuration change at Wed Jan 14 20:04:24 2015 by default
! Startup-config last updated at Wed Jan 14 20:04:01 2015 by default
!
boot system stack-unit 0 primary tftp://192.168.128.1/FTOS-SC-8.3.3.4.bin
boot system stack-unit 0 secondary system: A:
boot system stack-unit 0 default system: A:
boot system gateway 192.168.128.1
!
redundancy auto-synchronize full
hardware watchdog
hostname Force10
protocol spanning-tree pvst
 no disable
stack-unit 0 provision S60
interface GigabitEthernet 0/0
 no ip address
 switchport
 no shutdown
interface GigabitEthernet 0/1
 no ip address
 switchport
 no shutdown
interface GigabitEthernet 0/2
 no ip address
 switchport
 no shutdown
interface GigabitEthernet 0/3
 no ip address
```

```
 switchport
 no shutdown
interface GigabitEthernet 0/4
 no ip address
 shutdown
interface GigabitEthernet 0/5
 no ip address
 shutdown
interface GigabitEthernet 0/6
 no ip address
 shutdown
interface GigabitEthernet 0/7
 no ip address
 shutdown
interface GigabitEthernet 0/8
 no ip address
 shutdown
interface GigabitEthernet 0/9
 no ip address
 shutdown
interface GigabitEthernet 0/10
 no ip address
 shutdown
interface GigabitEthernet 0/11
 no ip address
 shutdown
interface GigabitEthernet 0/12
 no ip address
 shutdown
interface GigabitEthernet 0/13
 no ip address
 shutdown
interface GigabitEthernet 0/14
 no ip address
 shutdown
interface GigabitEthernet 0/15
 no ip address
 shutdown
interface GigabitEthernet 0/16
 no ip address
 shutdown
interface GigabitEthernet 0/17
 no ip address
 shutdown
interface GigabitEthernet 0/18
 no ip address
 shutdown
```

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```
interface GigabitEthernet 0/19
 no ip address
 shutdown
interface GigabitEthernet 0/20
 no ip address
 shutdown
interface GigabitEthernet 0/21
 no ip address
 shutdown
interface GigabitEthernet 0/22
 no ip address
 shutdown
interface GigabitEthernet 0/23
 no ip address
 shutdown
interface GigabitEthernet 0/24
 no ip address
 shutdown
interface GigabitEthernet 0/25
 no ip address
 shutdown
interface GigabitEthernet 0/26
 no ip address
 shutdown
interface GigabitEthernet 0/27
 no ip address
 shutdown
interface GigabitEthernet 0/28
 no ip address
 shutdown
interface GigabitEthernet 0/29
 no ip address
 shutdown
interface GigabitEthernet 0/30
 no ip address
 shutdown
interface GigabitEthernet 0/31
 no ip address
 shutdown
interface GigabitEthernet 0/32
 no ip address
 shutdown
interface GigabitEthernet 0/33
 no ip address
 shutdown
interface GigabitEthernet 0/34
 no ip address
```

```
 shutdown
interface GigabitEthernet 0/35
 no ip address
 shutdown
interface GigabitEthernet 0/36
 no ip address
 shutdown
interface GigabitEthernet 0/37
 no ip address
 shutdown
interface GigabitEthernet 0/38
 no ip address
 shutdown
interface GigabitEthernet 0/39
 no ip address
 shutdown
interface GigabitEthernet 0/40
 no ip address
 shutdown
interface GigabitEthernet 0/41
 no ip address
 shutdown
interface GigabitEthernet 0/42
 no ip address
 shutdown
interface GigabitEthernet 0/43
 no ip address
 shutdown
interface GigabitEthernet 0/44
 no ip address
 shutdown
interface GigabitEthernet 0/45
 no ip address
 shutdown
interface GigabitEthernet 0/46
 no ip address
 port-channel-protocol LACP
  port-channel 1 mode active
 no shutdown
interface GigabitEthernet 0/47
 no ip address
 port-channel-protocol LACP
  port-channel 1 mode active
 no shutdown
interface ManagementEthernet 0/0
 ip address 10.168.1.10/24
 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 1
 no ip address
 portmode hybrid
 switchport
 no shutdown
!
interface Vlan 1
!
interface Vlan 5
 ip address 10.5.5.10/24
 untagged GigabitEthernet 0/0-3
 untagged Port-channel 1
 no shutdown
!
interface Vlan 7
 ip address 10.7.7.10/24
 tagged Port-channel 1
 no shutdown
!
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
```

5 S-Series Configuration for TOR or Core – Virtual Link Trunk

The Dell Networking S-Series of 10Gb / 40Gb switches using Dell Networking Operating System 9 (DNOS 9) offer the ability to provide a redundant, resilient, Active Fabric construct to connected switches, appliances, systems. An Active Fabric based on VLT allows a pair of S-Series 10Gb / 40gb Switches to be viewed from the connected devices as a single switch for Link Aggregation. This allows the connected links to operate in an Active / Active manner without a Spanning-Tree block. In VLT, Spanning-Tree is still configured to prevent downstream devices from impacting the Fabric due to a misconfiguration that results in a loop. VLT is a flexible topology offering Layer 2 VLT Domains and Layer 3 constructs.

Tech Notes :
In Dell Networking FTOS, Spanning–Tree is not enabled by default. When configuring a Dell Networking FTOS Switch, select a Spanning-Tree Protocol (RSTP, PVST+, MST) and enable it on the Switch.

In the VLT Domain Configuration a System-MAC address is configured to improve fail-over speed. This is a Virtual MAC shared by both switches in the VLT Domain and is made up.

The VLT interconnect (VLTi) is a special port channel connecting the switches in a VLT Domain. Dell Networking recommends a static port channel (without LACP) for the VLTi. This will reduces the time-to-converge and allow the VLTi to become operational prior to the VLT Peer LAGs (LACP) connecting the devices attached to the VLT Domain.
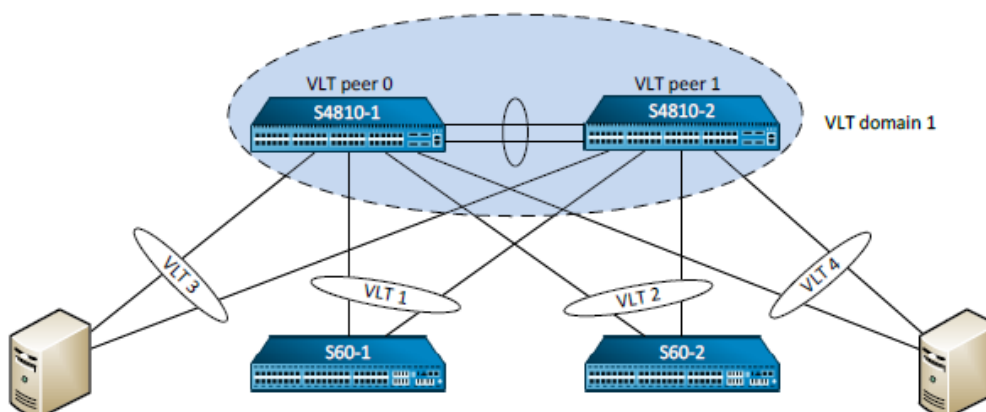
This is an example VLT Topology.

Figure 2   VLT topology

This is an example VLT Domain configuration.

```
Last configuration change at Sun Sep 29 21:04:22 2013 by admin
!
 Startup-config last updated at Wed Nov 13 14:13:38 2013 by admin
!
boot system stack-unit 0
 primary system: A:
boot system stack-unit 0
 secondary system: B:
boot system stack-unit 0
 default system: A:
boot
system gateway 0.0.0.0
redundancy auto-synchronize full
hardware watchdog
hostname S4810-2
!
username admin
 password 7 89afe0892189bd96 privilege 15
enable restricted 7 387a7f2df5969da4
!
protocol spanning-tree 0
protocol spanning-tree rstp
 no disable
 max-age 6
 forward-delay 6
 bridge-priority 36864
!
ip multicast-routing
vlan-stack protocol-type 8100
mac-address-table aging-time 0
!
vlt domain 1
 peer-link port-channel 100
 back-up destination 192.168.109.103
 primary-priority 8192
 system-mac mac-address 00:22:22:22:22:22
   unit-id 1
!
stack-unit 0 provision S4810
!
interface TenGigabitEthernet 0/0
 no ip address
```

```
 flowcontrol rx on tx off
 port-channel-protocol LACP
  port-channel 1 mode active
 no shutdown
!
Interface  TenGigabitEthernet 0/1
 no ip address
 flowcontrol rx on tx off
 port-channel-protocol LACP
  port-channel 2 mode active
  no shutdown
interface TenGigabitEthernet 0/2
 no ip address
 flowcontrol rx on tx off
 no shutdown
interface TenGigabitEthernet 0/3
 no ip address
 flowcontrol rx on tx off
 no shutdown
interface TenGigabitEthernet 0/4
 no ip address
flowcontrol rx on tx off
  shutdown
interface TenGigabitEthernet 0/5
 no ip address
flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/6
 no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/7
no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/8
 no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/9
no ip address
 flowcontrol rx on tx off
  shutdown
interface TenGigabitEthernet 0/10
 no ip address
 flowcontrol rx on tx off
  shutdown
```

```
interface TenGigabitEthernet 0/11
 no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/12
 no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/13
 no ip address
 flowcontrol rx on tx off
  shutdown
interface TenGigabitEthernet 0/14
 no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/15
 no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/16
 no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/17
 no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/18
 no ip address
 flowcontrol rx on tx off
  shutdown
interface TenGigabitEthernet 0/19
no ip address
 flowcontrol rx on tx off
  shutdown
interface TenGigabitEthernet 0/20
 no ip address
 switchport
 flowcontrol rx on tx off
  vlan-stack trunk
 no shutdown
interface TenGigabitEthernet 0/21
no ip address
switchport
 flowcontrol rx on tx off
 vlan-stack trunk
```

```
 no shutdown
interface TenGigabitEthernet 0/22
 no ip address
 flowcontrol rx on tx off
  shutdown
interface TenGigabitEthernet 0/23
 no ip address
 flowcontrol rx on tx off
  shutdown
interface TenGigabitEthernet 0/24
 no ip address
 flowcontrol rx on tx off
  shutdown
interface TenGigabitEthernet 0/25
 no ip address
 flowcontrol rx on tx off
  shutdown
interface TenGigabitEthernet 0/26
no ip address
flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/27
 no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/28
 no ip address
flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/29
 no ip address
 flowcontrol rx on tx off
  shutdown
interface TenGigabitEthernet 0/30
no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/31
 no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/32
 no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/33
 no ip address
```

```
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/34
 no ip address
 flowcontrol rx on tx off
  shutdown
interface TenGigabitEthernet 0/35
 no ip address
 flowcontrol rx on tx off
  shutdown
interface TenGigabitEthernet 0/36
 no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/37
no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/38
 no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/39
 no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/40
 no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/41
 no ip address
 flowcontrol rx on tx off
 shutdown
 interface TenGigabitEthernet 0/42
 no ip address
 flowcontrol rx on tx off
  shutdown
interface TenGigabitEthernet 0/43
 no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/44
 no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/45
```

```
 no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/46
 no ip address
 flowcontrol rx on tx off
 shutdown
interface TenGigabitEthernet 0/47
 no ip address
 flowcontrol rx on tx off
 shutdown
interface fortyGigE 0/48
 no ip address
 flowcontrol rx on tx off
  no shutdown
interface fortyGigE 0/52
 no ip address
 flowcontrol rx on tx off
  no shutdown
interface fortyGigE 0/56
 ip address 192.168.0.3/31
 flowcontrol rx on tx off
 no shutdown
interface fortyGigE 0/60
 ip address 192.168.0.7/31
 flowcontrol rx on tx off
 no shutdown
interface ManagementEthernet 0/0
 ip address 192.168.109.104/24
 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 Loopback 0
 ip address 10.0.0.4/32
 no shutdown
interface Port-channel 1
 no ip address
 switchport
 spanning-tree rstp edge-port
 rate-interval 10
 vlt-peer-lag port-channel 1
 no shutdown
interface Port-channel 2
 no ip address
 switchport
 spanning-tree rstp edge-port
 rate-interval 10
 vlt-peer-lag port-channel 2
 no shutdown
interface Port-channel 100
 no ip address
 channel-member fortyGigE 0/48,52
 no shutdown

interface Vlan 1
!untagged Port-channel 100
interface Vlan 100
 ip address 100.0.0.253/24
 tagged Port-channel 1-2
 ip igmp immediate-leave
ip igmp query-interval 2
 ip igmp snooping fast-leave
ip igmp snooping querier
!
 vrrp-group 1
  no preempt
  priority 110
 virtual-address 100.0.0.254
 no shutdown
interface Vlan 101
 ip address 101.0.0.253/24
 tagged Port-channel 1-2
 ip igmp immediate-leave
```

```
 ip igmp query-interval 2
 ip igmp snooping fast-leave
 ip igmp snooping querier
 vrrp-group 1
  no preempt
  priority 110
  virtual-address 101.0.0.254
 ip helper-address 100.0.0.101
 no shutdown
!
interface Vlan 192
 ip address 192.168.1.252/24
 tagged Port-channel 1-2
 ip igmp query-interval 2
ip igmp snooping querier
 no shutdown
!
interface Vlan 300
 no ip address
 tagged
 TenGigabitEthernet 0/20-21
shutdown
!
interface Vlan 400
 description IPTV-source
ip address 104.0.0.253/24
 tagged Port-channel 1-2
ip igmp immediate-leave
 ip igmp query-interval 2
 ip igmp snooping fast-leave
 ip igmp snooping querier
!
 vrrp-group 1
  no preempt
  priority 110
  virtual-address 104.0.0.254
 no shutdown
!
interface Vlan 901
 ip address 192.168.10.12/24
 tagged Port-channel 1
 no shutdown
!
logging 192.168.109.46
!
snmp-server community private rw
 snmp-server community public ro
```

```
snmp-server enable traps
 snmp authentication coldstart linkdown linkup
 snmp-server enable traps
lacp
snmp-server enable traps
 stp
snmp-server enable traps
 vlt
snmp-server enable traps
 xstp
snmp-server enable traps
envmon cam-utilization
 fan supply temperature
snmp-server host 192.168.109.41
 traps version 2c public udp-port 162

ntp server 192.168.109.46
ntp update-calendar 1440
clock timezone Singapore 8
ip ssh server enable
ip igmp snooping enable
!protocol lldp
 advertise management-tlv system-capabilities
 system-description system-name
 advertise interface-port-desc
line console 0
exec-timeout 35751 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
```

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6   Conclusion

Dell Networking N-Series and S-Series Switches use an Industry Standard Command Line (CLI) interface for configuration. The Dell Networking CLI features standard terms for configuration (interface gigabitethernet, switchport) and the Dell Networking Operating System (DNOS) contains the required features to successfully provide LAN services for Campus deployments and Data Center Services for successful Data Center Networks.

We have provided some examples of basic switch configurations and more complex Active Fabric Topologies for both the Campus N-Series Switches and the more Data Center Centric S-Series Switches. By the examples, Network Engineers and Administrators should be able to successfully configure Dell Networking Switches for most deployments.

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