Dell Networking and Cisco Switch CLI Examples

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White Paper

Abstract

This white paper describes the Dell SmartFabric OS10 network operating system (NOS) supporting multiple architectures and environments.

Dell Technologies Solutions

Contents

Introduction

Overview

The Dell SmartFabric OS10 network operating system (NOS) is a purpose-built data center OS with a full set of Layer 2 and Layer 3 features providing a solid framework with a deep breadth of solutions and integrations. By leveraging industry-standard tools and utilities, the CLI provides a powerful set of commands to monitor and configure devices running OS10.

Dell SmartFabric OS10 key features include:

- Standard networking features, interfaces, and scripting functions for legacy network operations integration

- Standards-based switching hardware abstraction through the Switch Abstraction Interface (SAI)

- Pervasive, unrestricted developer environment through Control Plane Services (CPS)

- Layer 2 switching and Layer 3 routing protocols with integrated IP services, quality of service, manageability, and automation features

- Ability to increase VM Mobility region by extending L2 VLAN within or across multiple DCs with unique VLT capabilities

- Programmatic APIs and CLI automation using batch and aliases to simplify configuration management

- Converged network support for Data Center Bridging, with priority flow control (802.1Qbb), ETS (802.1Qaz), DCBx, and iSCSI TLV

- For complete details on all the features of OS10 Enterprise Edition Release 10.5.3

This document's intent is to provide basic CLI command examples for some of the key features of the Dell SmartFabric OS10 and Cisco IOS to demonstrate the similarities between both CLI syntax.

Key CLI features

The Dell SmartFabric OS10 CLI key features include:

- **Consistent command names**: Commands that provide the same type of function have the same name, regardless of the portion of the system on which they are operating. For example, all show commands display software information and statistics, and all clear commands erase several types of system information.

- **Available commands**: Information about available commands is provided at each level of the CLI command hierarchy. You can enter a question mark (?) at any level and view a list of the available commands, along with a brief description of each command.

- **Command completion:** Command completion for command names (keywords) and for command options available at each level of the hierarchy. In OS10, to complete a command or option that you have partially entered, click the Tab key or the Spacebar and in some just press the enter key. If the partially entered letters are a string that uniquely identifies a command, the complete command name

appears. A beep indicates that you have entered an ambiguous command, and the possible completions display. Completion also applies to other strings, such as interface names and configuration statements.

The Dell SmartFabric OS10 CLI uses two top-level command modes:

EXEC mode — Monitor, troubleshoot, check status, and network connectivity

CONFIGURATION mode — Configure network devices, also called the running configuration. By default, all configuration changes are automatically saved to the running configuration.

When you initially log in to Dell SmartFabric OS10, you are placed in EXEC mode. To access CONFIGURATION mode, enter the **configure terminal** command (you can use the command completion by typing either **con** and press enter or **cont t** and press the **tab** or Spacebar). Use CONFIGURATION mode to manage interfaces, protocols, and features. To manage and configure interfaces you use the interface mode (a Sub-mode of CONFIGURATION mode) which will be used to configure Layer 2 (L2) and Layer 3 (L3) protocols, and IPv4 services on an interface.

As with Cisco IOS, the **exit** command will take you up one level and the **end** command will take you back to EXEC mode.

1-Layer 2 Protocols CLI Functions

In this chapter we will configure Layer 2 protocols and IPv4 services through port-based VLAN configuration and verification, including the following task:

Port-Base VLAN configuration and verification

Create VLANS

Switches configurations: We will be using the following 3-switch topology as a reference for this demonstration.
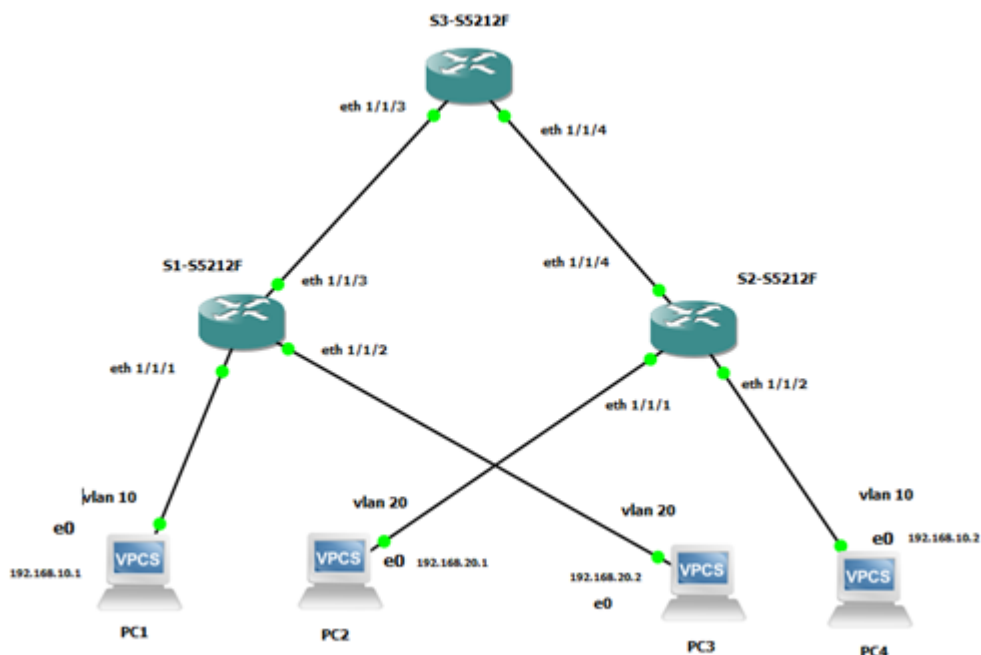
Figure 1.   3-switch topology

For our first exercise we will configure access ports for VLAN membership.

Use the configuration mode *"configure terminal"* command to create VLANs and add the VLAN name to S1 & S2, using Table 1 for reference.

Device	VLAN	VLAN Name
S1	10	Engineering
S1	20	Marketing
S2	10	Engineering
S2	20	Marketing
S3	10	Engineering
S3	20	Marketing

Table 1. VLAN information

Creating a VLAN and assigning a name on Cisco IOS is different from how it's done on OS10:

OS10 command type *interface VLAN #* then use *description* + desired name

Use the "no" addition to delete the new VLAN created.

Cisco command type   *VLAN #* then type *name* + the desired name

Sample Command:

Dell SmartFabric OS10 Command	Cisco IOS Command
configure terminal	*conf terminal*
interface vlan 10	*vlan 10*
description Engineering	*name Engineering*
exit	*exit*
interface vlan 20	*vlan 20*
description Marketing	*name Marketing*
end	*end*

Use the ***show vlan*** command to verify the creation of the VLANs and their descriptions. Notice there are no member ports/interfaces in these newly created VLANs.

Example output:

Dell SmartFabric OS10 Output	Cisco IOS Output
OS10-S1# **show vlan**	Cisco-S1#**show vlan**
Codes: * - Default VLAN, M - Management VLAN, R - Remote Port Mirroring VLANs,	VLAN Name Status Ports
@ - Attached to Virtual Network, P - Primary, C - Community, I – Isolated	---- ------------------------------- --------- -------------------------
Q: A - Access (Untagged), T – Tagged	1 default active Gi0/0, Gi0/1, Gi0/3, Gi1/0,
NUM Status Description Q Ports	Gi1/1, Gi1/2, Gi1/3, Gi2/0,
* 1 Active A Eth1/1/1-1/1/15	Gi2/1, Gi2/2, Gi2/3, Gi3/0,
10 Inactive Engineering	Gi3/1, Gi3/2, Gi3/3
20 Inactive Marketing	10 Engineering active
OS10-S1#	20 Marketing active
	. . . Output edited for brevity . . .
	Cisco-S1#

Trunking (Port Tagging):

Next, we will configure trunks on all 3 switches to carry traffic for multiple VLANs. Use the 3-switch topology shown in the following figure as a reference for Dell SmartFabric OS10 and Cisco IOS configuration:
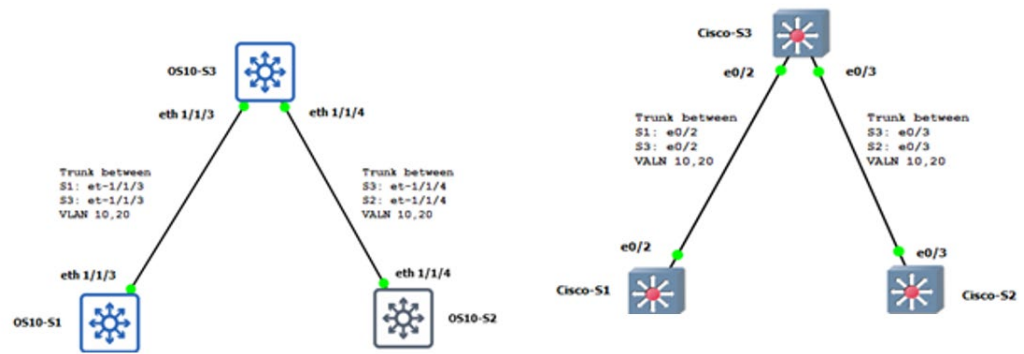
Figure 2.   3-switch topology

The commands to configure a port or interface as trunk or tagged are very similar on both Dell SmartFabric OS10 and Cisco IOS. The only difference is that on Cisco IOS after selecting the interface to be configured as trunk mode you need to add an 802.1Q tag protocol. The rest of the commands are the same. See the command sample below for both OS.

Dell SmartFabric OS10 Command	Cisco IOS Command
conf t	*conf t*
interface ethernet 1/1/3	*interface gigabitEthernet 0/2*
... In OS10 this extra line is not need ➔	*switchport trunk encapsulation dot1q*
switchport mode trunk	*switchport mode trunk*
switchport trunk allowed vlan 10,20	*switchport trunk allowed vlan 10,20*
no shutdown	*no shut*
exit	*end*
. . . Output edited for brevity . . .	*. . . Output edited for brevity . . .*

Use the ***show vlan*** command on an OS10 switch to verify port membership and confirm the ports are Tagged carrying traffic for VLANs 10 and 20.

On Cisco IOS use the ***show interface trunk*** command.

Dell SmartFabric OS10 Output	Cisco IOS Output

OS10-S1# **show vlan**
 	
 Codes: * - Default VLAN, M - Management VLAN, R - Remote Port Mirroring VLANs,
 	
     @ - Attached to Virtual Network, P - Primary, C - Community, I - Isolated
 	
 Q: A - Access (Untagged), T - Tagged
 	
   NUM   Status   Description   Q Ports
 * 1   Active   A Eth1/1/3-1/1/15
  10   Active   Engineering   T Eth1/1/3
                                        A Eth1/1/1
  20   Active   Marketing   T Eth1/1/3
 . . .   Output edited for brevity . . .
	Cisco-S1#**show interfaces trunk**
	
	 Port Mode Encapsulation Status Native vlan
	 Gi0/2 on 802.1q trunking 1
	 Port Vlans allowed on trunk
	 Gi0/2 10,20
	 Port Vlans allowed and active in management domain
	 Gi0/2 10,20
	
	 . . . Output edited for brevity . . .

On OS10-S2 configure Eth 1/1/4 as a trunk (Tagged) port allowing VLANs 10 and 20.

On Cisco-S2 configure Gi0/3 as Tagged port allowing VLANs 10 and 20.

Cisco IOS adds the encapsulation dot1q command to use the dot1q standard.

Dell SmartFabric OS10 Command	Cisco IOS Command
conf t interface ethernet 1/1/4 switchport mode trunk switchport trunk allowed vlan 10,20 no shutdown end . . . Output edited for brevity . . .	conf t interface gigabitEthernet 0/3 switchport trunk encapsulation dot1q switchport mode trunk switchport trunk allowed vlan 10,20 no shutdown end . . . Output edited for brevity . . .

Spanning Tree Protocol

The default Spanning Tree Protocol (STP) variant running on Dell SmartFabric OS10 is RPVST+ (Rapid per-VLAN spanning-tree). You can change the mode to RSTP or MSTP using the spanning tree mode {rstp | mst | rapid-pvst} command. For more details on variants of STP, see the Dell SmartFabric OS10 User Guide Release 10.5.3, page 622-663.

On this session we will use the previous switch topology configuration, add an additional switch (S4) as well as connectivity to the existing switches indicated by the **green color** in the following diagram of the new topology, and demonstrate basic spanning-tree commands using RPVST+ for both Dell SmartFabric OS10 and Cisco IOS.
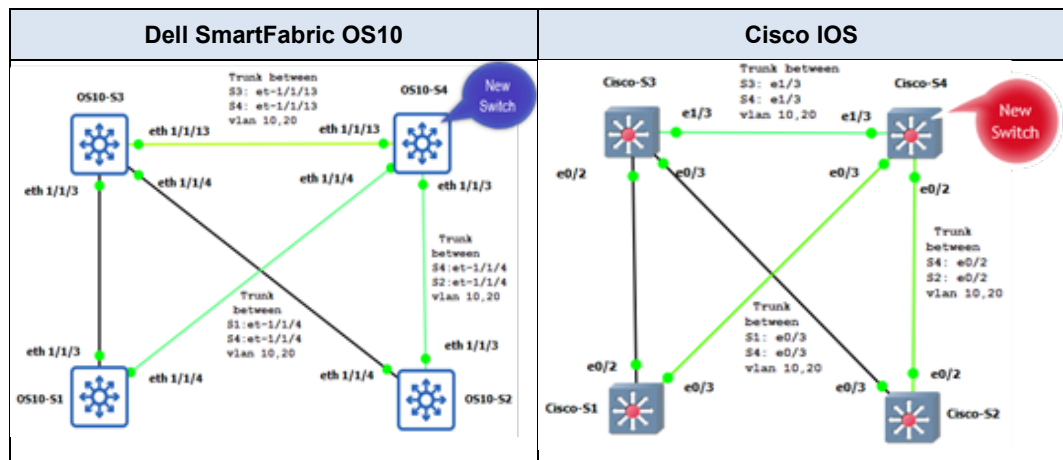
Figure 3.   New topology for STP

Type the ***show spanning-tree*** command on both OS10 and Cisco IOS (switch S4) to verify the default running version of STP.

Dell SmartFabric OS10 Output	Cisco IOS Output
*OS10-S4# **show spanning-tree*** *Spanning tree enabled protocol ==rapid-pvst with force-version rstp==* *VLAN 1* *Executing IEEE compatible Spanning Tree Protocol* *Root ID Priority 32769, Address 0c3b.ee6a.0000* *. . . Output edited for brevity . . .*	*Cisco-S4#**show spanning-tree*** *VLAN0001* *Spanning tree enabled protocol ==rstp==* *Root ID Priority 32769* * Address aabb.cc00.0300* * Cost 100* * Port 8 (Ethernet1/3)* * Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec* * Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)* *. . . Output edited for brevity . . .*

Multiple Spanning-Tree Protocol

Configuring MST is a four-step process:

1. Enable MST, if the current running spanning-tree protocol (STP) version is not MST.

2. Ensure the same region name is configured in all the bridges running MST.

3. (Optional) Map the VLAN to different instances in such a way that the traffic is load balanced well and the link utilization is efficient.

4. (Optional) Configure the revision number. The revision number is the same on all the bridges.

See the table below for the sample CLI command to change spanning tree mode from RPVST+ mode to MSTP mode.

Dell SmartFabric OS10 Command	Cisco IOS Command
conf t	conf t
spanning-tree mode mst	spanning -tree mode mst
spanning-tree mst configuration	spanning tree mst configuration
name Dell-NA <=== region name	name Cisco-NA
instance 1 vlan 1-50	instance 1 vlan 1-50
instance 2 vlan 51-100	instance 2 vlan 51-100
revision 1 <=== revision number 0 to 65535	revision 1
exit	exit
spanning-tree mst 0 priority 0	spanning -tree mode mst 1 root primary
spanning -tree mode mst 1 root primary	spanning -tree mode mst 2 root secondary
spanning -tree mode mst 2 root secondary	end
end	

Configuration on S4 was performed. The output has been omitted for the sake of brevity.

Note: With all the switches configured we can run the ***show spanning-tree active*** command to check the configurations on every switch and verify root switch and ports status.

Root switch

For example, to find out the root bridge for a specific VLAN (VLAN 10) use the ***show spanning-tree VLAN 10*** command on both OS10 and Cisco IOS switches.

Dell SmartFabric OS10 Output	Cisco IOS Output
OS10-S4# **show spanning-tree vlan 10**	Cisco-S3#**show spanning-tree vlan 10**
Spanning tree enabled protocol rapid-pvst with force-version rstp	VLAN0010
VLAN 10	Spanning tree enabled protocol rstp
Executing IEEE compatible Spanning Tree Protocol	Root ID Priority 32778
Root ID Priority 32778, Address 0c3b.ee6a.0000	Address 0c02.0b8f.0000
Root Bridge hello time 2, max age 20, forward delay 15	This bridge is the root
Bridge ID Priority 32778, Address 0c3b.ee6a.0000	Hello Time, 2 sec Max Age 20 sec Forward Delay 15 sec
We are the root of VLAN 10	. . . . Output abbreviated for brevity . . .
. . . . Output abbreviated for brevity . . .	

Root switch is determined by the lowest bridge ID that contains the bridge MAC address. See the following tables after running the **show spanning-tree active** command:

OS10 switch	Mac address	Priority	Role	Cisco switch	Mac address	Priority	Role
S1	0c4f.fde2.0000	32778		**S1**	0c43.2a61.0000	32778	
S2	0ce4.1e51.0000	32769		**S2**	0c33.7218.0000	32778	
S3	0c58.6edf.0000	32769		**S3**	0c02.0b8f.0000	32778	Root
S4	0c3b.ee6a.0000	32769	Root	**S4**	0c40.8ac1.0000	32778	

Table 4 Root switch information

Edge ports:

Ports that are connected to servers/ SAN / laptops are call edge ports. We set edge ports configuration "edge port / portfast" to tell the switch NOT to cause a topology change if that port goes up or down.

The Cisco IOS CLI command to set an interface as an edge port is **spanning-tree portfast** whereas in OS10 the command is **spanning-tree port type edge**. The following table shows an example of the command line to configure port (1/1/1 on OS10) and port (Gi0/0 on Cisco) as edge ports using Switch 1.

Dell SmartFabric OS10 commands	Cisco IOS commands
conf t	*conf t*
interface ethernet 1/1/1	*interface Gi 0/0*
spanning-tree port type edge	*spanning-tree portfast*
no shutdown	*no shutdown*
end	*end*

To verify the status of the ports we use the "show spanning-tree vlan <vlan id> command. The command is the same for both Cisco IOS and OS10.

Dell SmartFabric OS10 output	Cisco IOS output
OS10-S1# **show spanning-tree vlan 10**	Cisco-S1#**show spanning-tree vlan 10**
Spanning tree enabled protocol <mark>rapid-pvst with force-version rstp</mark>	VLAN0010
VLAN 10	Spanning tree enabled protocol <mark>rstp</mark>
Executing IEEE compatible Spanning Tree Protocol	Root ID Priority 32778
Root ID Priority 32778, Address 0c3b.ee6a.0000	Address 0c02.0b8f.0000
Root Bridge hello time 2, max age 20, forward delay 15	Cost 4
Bridge ID Priority 32778, Address 0c4f.fde2.0000	Port 3 (GigabitEthernet0/2)
. . . Output abbreviated for brevity . . .	Hello Time 2 sec Max Age 20 sec
Name Role PortID Prio Cost Sts Cost Link-type Edge	Forward Delay 15 sec
--	. . . Output abbreviated for brevity . . .
<mark>ethernet1/1/1 Disb 128.8 128 200000000 BLK 0 AUTO Yes</mark>	Interface Role Sts Cost Prio.Nbr Type
ethernet1/1/3 Altr 128.24 128 800 BLK 0 AUTO No	------------------- ---- --- --------- -------- ---------------------
ethernet1/1/4 Root 128.32 128 800 FWD 0 AUTO No	<mark>Gi0/0 Desg FWD 4 128.1 Shr Edge</mark>
ethernet1/1/3 Altr 128.24 128 800 BLK 0 AUTO No	Gi0/2 Root FWD 4 128.3 Shr
ethernet1/1/4 Root 128.32 128 800 FWD 0 AUTO No	Gi0/3 Altn BLK 4 128.4 Shr

Link Aggregation (LAG):

Also called Link Aggregation Group, LAG, Port-Channel, and Ether-channel, this is where you use a group of Ethernet interfaces to form a single link. Aggregating multiple links between physical interfaces creates a single logical LAG, which balances traffic across the member links within an aggregated Ethernet bundle and increases the uplink bandwidth.
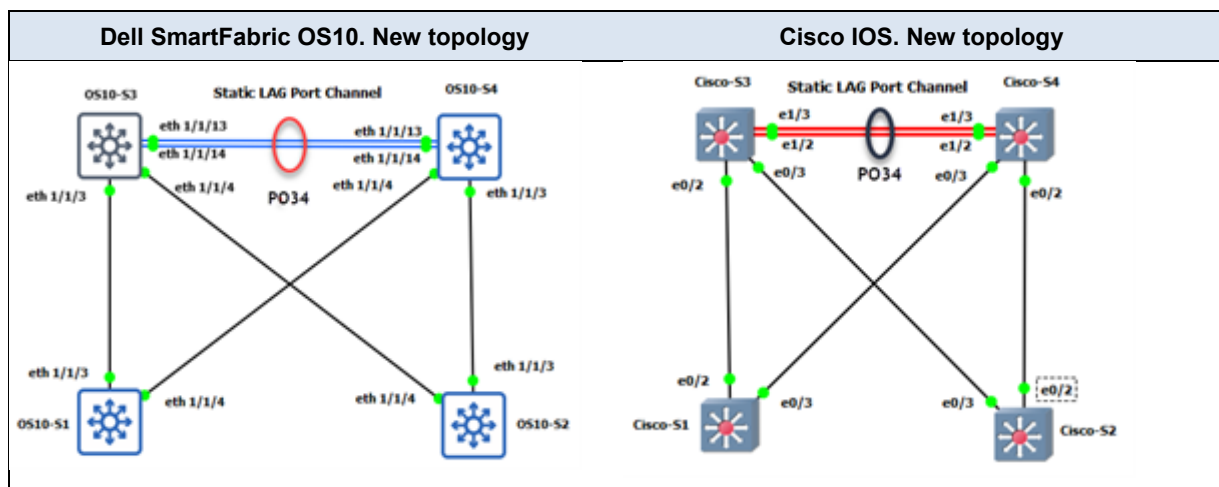

Figure 4.   **Link Aggregation Group Comparison**

Creating a static LAG port channel

We will create a static LAG between Switch-3 and Switch-4, first shut down the interfaces that will be part of the LAG on both S3 and S4, create a Port-Channel 34, add a description to the interface, assign port interfaces 1/1/13 and 1/1/14 to Port-Channel on the OS10 switches and assign port interfaces 1/2 and 1/3 to the Port-Channel on the Cisco switches S3 and S4. See the topology in the figure 5 above for reference.

Dell SmartFabric OS10 commands switches S3 & S4	Cisco IOS commands switches S3 & S4
Conf t interface range ethernet 1/1/13,1/1/14 ← *Using the range option* shutdown exit *command not needed* → interface port-channel 34 ← *Creating* *command* description "Port_ Channel_ to_switch S4" ← *description optional* exit channel-group 34 mode on ← *setting LAG to Static mode* no shutdown exit	conf t int range Gi1/2, Gi1/3 ← *Using the range option* shut switchport trunk encapsulation dot1q switchport mode trunk channel-group 34 mode ON description Port_ Channel_ to_S4 no shut end

Note that on OS10 we use "mode on" to enable static LAG as well as on Cisco IOS.

Verify LAG configuration

On the OS10 switch, use the command *show interface port-channel 34 summary* to verify that the port channel has been created and the appropriate interfaces are members of the port channel.

On the Cisco switch the command varies depending on the Switch model and the OS version. In the example below we use the command *show EtherChannel summary.*

Dell SmartFabric OS10 output	Cisco IOS output
OS10-S3# *show interface port-channel 34 summary* LAG Mode Status Uptime Ports 34 L2 up 00:16:19 Eth 1/1/13 (Up) Eth 1/1/14 (Up)	Cisco-S3#*show etherchannel summary* Number of channel-groups in use: 1 Number of aggregators: 1 Group Port-channel Protocol Ports 34 Po34(SU) - Gi1/2(P) Gi1/3(P)

Another useful command on OS10 is *show port-channel summary*, which includes the protocol type as well (static or dynamic), similar to the output of the Cisco *show etherchannel summary* command.

Dell SmartFabric OS10 output	Cisco IOS output

OS10-S3# **show port-channel summary**
 	
Flags: D - Down I - member up but inactive P - member up and active U - Up(port-channel) F - Fallback Activated IND - LACP Individual
 	
Group Port-Channel   Type Protocol Member Ports
 	
-- 	
 	
34 port-channel34 (U) Eth STATIC   1/1/13(P) 1/1/14(P)
	Cisco-S3#**show etherchannel summary**
	
	Flags: D - down P - bundled in port-channel
	       I - stand-alone s - suspended
	       H - Hot-standby (LACP only)
	       R - Layer3 S - Layer2
	       U - in use N - not in use, no aggregation
	Number of channel-groups in use: 1
	Number of aggregators: 1
	Group Port-channel Protocol Ports
	34 Po34(SU) - Et1/2(P) Et1/3(P)

The next step is to configure port channel 34 as a trunk port on both S3 and S4 and allow to pass traffic for VLANS 10 and 20. See the following commands for both OS10 and Cisco IOS.

Dell SmartFabric OS10 commands	Cisco IOS commands
Conf Ter interface port-channel 34 shutdown switchport mode trunk no switchport access vlan switchport trunk allowed vlan 10,20 no shutdown end	Conf t interface port-channel 34 switchport trunk allowed vlan add 10,20 end

Use the **Show vlan** command on the OS10 switch to verify that the port channel is a trunk port and the VLANs are assigned to it. The output shows more comprehensive information than the Cisco IOS **show EtherChannel summary** command, however, you can use the **show interface switchport | begin Po34** command to get similar information. See the following example:

Dell SmartFabric OS10 Switch output	Cisco IOS Switch output

OS10-S3# show vlan
Codes: * - Default VLAN, M - Management VLAN, R - Remote Port Mirroring VLANs,
 @ - Attached to Virtual Network, P - Primary, C - Community, I - Isolated
Q: A - Access (Untagged), T - Tagged
  NUM   Status   Description   Q Ports
* 1   Inactive   A Eth1/1/1-1/1/12,1/1/15
  10   Active   Engineering   T Eth1/1/3-1/1/4
                                T Po34
  20   Active   Marketing   T Eth1/1/3-1/1/4
                                T Po34
	Cisco-S3#**show interface switchport	begin Po34**
		Operational Mode: static access (member of bundle Po34)
		Administrative Trunking Encapsulation: negotiate
		Operational Trunking Encapsulation: native
		Negotiation of Trunking: On
		Access Mode VLAN: 1 (default)
		. . . . Output abbreviated for brevity . . .
		Operational private-vlan: none
		Trunking VLANs Enabled: 10,20

Creating a dynamic LAG port channel with LACP (Link Aggregation Control Protocol)

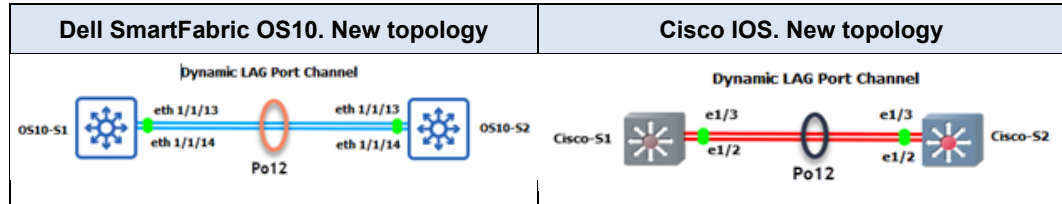| Dell SmartFabric OS10. New topology	Cisco IOS. New topology

Figure 5.   Dynamic LAG port channel

We will create a dynamic LAG between Switch-1 and Switch-2, starting by creating a Port-Channel 12, assigning port interfaces on the OS10 assign interfaces 1/1/13 and 1/1/14 and on the Cisco Switches S1 and S2 assign interfaces and1/3 to the port channel. See the topology shown in the figure above for reference.

Dell SmartFabric OS10 commands	Cisco IOS commands
Con	conf ter
interface port-channel 12	int range eth 1/2, eth 1/3
description "Port_ Channel_ to_switch S2"	shut
exit	switchport trunk encapsulation dot1q
interface range ethernet 1/1/13,1/1/14	switchport mode trunk
shut	channel-group 12 mode active ← LACP option
channel-group 12 mode Active ← setting LAG to LACP mode	description Po
no shutdown	no shut
exit	end

Note that on OS10 we use "mode active" to enable Dynamic LAG as well as on Cisco IOS.

The next step is to configure port channel 12 as a trunk port and add VLAN 10 and 20 on both S1 and S2. See the commands below for both OS10 and Cisco IOS and follow the example from the previous steps.

Verify dynamic LAG configuration

Use the ***show port-channel summary*** command and verify that ports Ethernet 1/1/13 and Ethernet 1/1/14 are active members of the dynamic LAG configured using LACP.

Switch S2

Dell SmartFabric OS10 output	Cisco IOS output
OS10-S2# ***show port-channel summary*** Flags: D - Down I - member up but inactive P - member up and active U - Up(port-channel) F - Fallback ActivatedIND - LACP Group Port-Channel Type Protocol Member Ports --- 12 port-channel12 (U)Eth DYNAMIC 1/1/13(P) 1/1/14(P)	Cisco-S2#***show etherchannel summary*** Number of channel-groups in use: 1 Number of aggregators: 1 Group Port-channel Protocol Ports 12 Po12(SU) LACP Et1/2(s) Et1/3(P)

2-Layer 3 Routing Protocol

Basic point connections

In this first session we will cover basic point connections and static route commands. We will start with setting up two switches and assign IP addresses using the switch topology shown below to demonstrate the CLI commands for OS10 and Cisco IOS:so what routing protocol is being configured?? Is it static?

Figure 6.   Basic Switch topology

First, we will assign the provided IP address shown on the topology above to the lookback 0 and to the interface 1/1/13,(On Cisco switches use interface Et0/3).

Dell SmartFabric OS10 Commands	Cisco IOS Command
Conf interface loopback 0 ip address 10.0.2.1/32 end	conf t interface loopback 0 ip address 10.0.2.1 255.255.255.255 end

Use the **show ip interface brief** command and verify the configuration.

Dell SmartFabric OS10 Output	Cisco IOS Output
OS10-S1)# **show ip interface brief** Interface Name IP-Address OK Method Status Protocol == Ethernet 1/1/1 unassigned NO unset admin down down Ethernet 1/1/2 unassigned NO unset admin down down . . . . Output abbreviated for brevity . . . Ethernet 1/1/15 unassigned NO unset up down Vlan 1 unassigned NO unset up down Loopback 0 10.0.2.1/32 YES manual up up	Cisco-S1# **show ip interface brief** Interface IP-Address OK? Method Status Protocol Ethernet0/0 unassigned YES unset administratively down down Ethernet0/1 unassigned YES unset administratively down down . . . Output abbreviated for brevity . . . Loopback0 10.0.2.1 YES manual up up Vlan1 unassigned YES unset administratively down down Cisco-S1#

On Cisco: Switches 1 and 2 assign IP address 144.254.1.1/30 & .2/30 to port Et0/3

On OS10: Switches 1 and 2 assign IP address 144.254.1.1/30 & .2/30 to port 1/1/13

Note: The commands are very similar.

Dell SmartFabric OS10 Commands	Cisco IOS Command
Conf interface ethernet 1/1/13 no switchport ip address 144.254.1.1/30 end	conf t interface ethernet 0/3 no switchport ip address 144.254.1.1 255.255.255.252 end

Configuration on S2 was performed. The output has been omitted for the sake of brevity.

Dell SmartFabric OS10 Output	Cisco IOS Output
OS10-S1)# **show ip interface brief** Interface Name IP-Address OK Method Status Protocol === Ethernet 1/1/1 unassigned NO unset admin down down Ethernet 1/1/2 unassigned NO unset admin down down . . . . Output abbreviated for brevity . . . Ethernet 1/1/13 144.254.1.1/30 YES manual up up Ethernet 1/1/14 unassigned NO unset up down Vlan 1 unassigned NO unset up down Loopback 0 10.0.2.1/32 YES manual up up OS10-S1#	Cisco-S1# **show ip interface brief** Interface IP-Address OK? Method Status Protocol Ethernet0/0 unassigned YES unset administratively down down Ethernet0/1 unassigned YES unset administratively down down . . . Output abbreviated for brevity . . . Ethernet0/3 144.254.1.1 YES manual up up Loopback0 10.0.2.1 YES manual up up Vlan1 unassigned YES unset administratively down down Cisco-S1#

Use the **show lp route** command to see the routing table and verify the two connected routes. One to interface Ethernet 1/1/13 and the other to interface Loopback 0. Verify this on both switch S1 & switch 2.

Dell SmartFabric OS10 Switch output	Cisco IOS Switch output
OS10-S1# **show ip route**	Cisco-S1# **show ip route**
Destination Gateway Dist/Metric Last Change	10.0.0.0/32 is subnetted, 1 subnets
C 10.0.2.1/32 via 10.0.2.1 loopback0 0/0 01:34:57	C 10.0.2.1 is directly connected, Loopback0
C 144.254.1.0/30 via 144.254.1.1 et1/1/13:1 0/0 00:59:11	144.254.0.0/16 is variably subnetted, 2 subnets, 2 masks
	C 144.254.1.0/30 is directly connected, Ethernet0/3
	L 144.254.1.1/32 is directly connected, Ethernet0/3

Border Gateway Protocol (BGP)

For this example of BGP protocol we will compare the Dell SmartFabric OS10 and Cisco CLI commands by implementing the following steps:

1.	Configure, verify, and troubleshoot iBGP within our autonomous system.

2.	Then we will connect the eBGP autonomous system to the iBGP autonomous system.

3.	Then create an all eBGP leaf spine configuration.

IBGP Configuration:

Routes must exist to each loopback address. This can be accomplished using OSPF or static routes. Using the following topology diagram as reference we will configure switch S1, S2, and S3 to exchange routes though OSPF and we will add iBGP. The ASN for the iBGP network will be 65511.
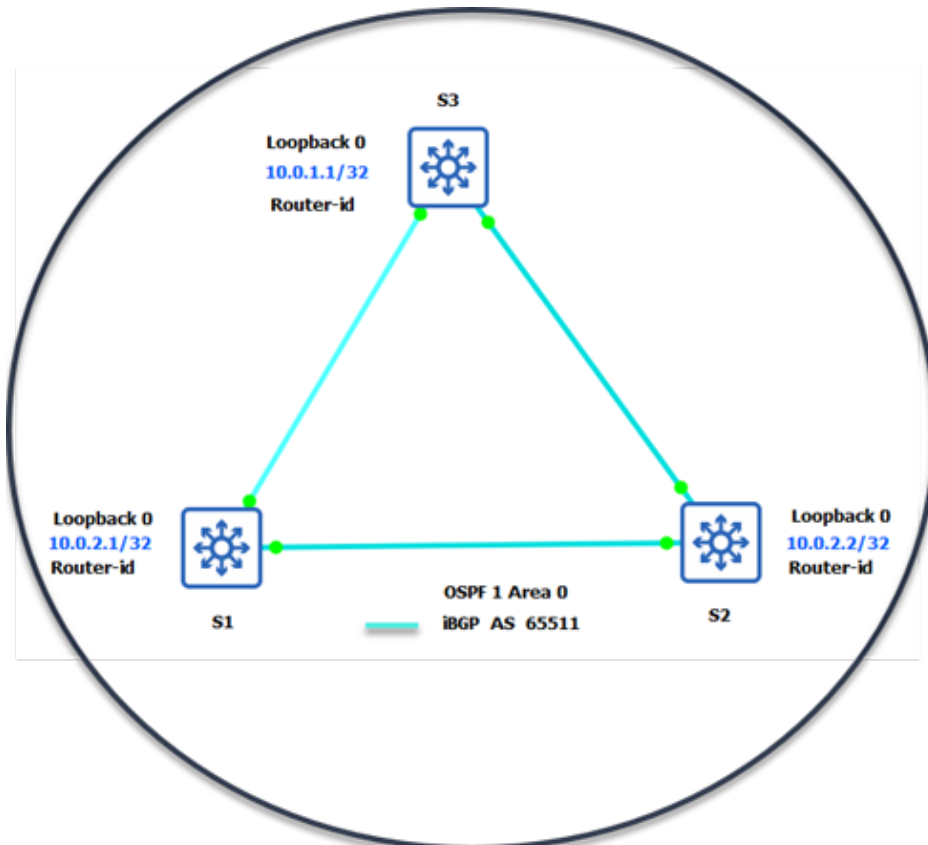
Figure 7.   iBGP Topology diagram

1.   First, we will configure all the switches to interconnect via iBGP using AS 65511.

S1 to connect via iBGP to the BGP interface on S3. Type the following command:

Dell SmartFabric OS10 Commands	Cisco IOS Commands
conf t router bgp 65511 neighbor 10.0.1.1 remote-as 65511 ← needs to be on separate line update-source loopback 0 no shut exit	Conf t router bgp 65511 neighbor 10.0.1.1 remote-as 65511 neighbor 10.0.1.1 update-source loopback 0 end

2.   Next configure S1 to connect using iBGP to the BGP interface on S2:

Dell SmartFabric OS10 Commands	Cisco IOS Commands
conf t router bgp 65511 neighbor 10.0.2.2 remote-as 65511 update-source loopback 0 no shut exit	Conf t router bgp 65511 neighbor 10.0.2.2 remote-as 65511 neighbor 10.0.2.2 update-source loopback 0 end

3.

Note: Make sure to configure S3 to connect via iBGP to the BGP interface on S1 and configure S3 to connect via iBGP to the BGP interface on S2.

In OS10 using the command ***show ip bgp neighbors*** will verify that BGP adjacencies are formed with neighboring routers, and it will show the BGP state as established. The same command is used in Cisco IOS. You can also use the command ***Show ip bgp Summary***.

On S1 type the command: show ip bgp neighbors

Dell SmartFabric OS10 Output	Cisco IOS Output
OS10-S1# **show ip bgp neighbors**	Cisco-S1#**show ip bgp neighbors**
BGP neighbor is 10.0.1.1, remote AS 65511, local AS 65511 internal link	BGP neighbor is 10.0.1.1, remote AS 65511, internal link
BGP version 4, remote router ID 10.0.1.1	BGP version 4, remote router ID 10.0.1.1
BGP state ==ESTABLISHED==, in this state for 00:08:42	BGP state = ==Established==, up for 00:53:11
Last read 01:12:23 seconds	Last read 00:00:30, last write 00:00:12, hold time is 180, keepalive interval is 60 seconds
Hold time is 180, keepalive interval is 60 seconds	
Configured hold time is 180, keepalive interval is 60 seconds	. . . Output abbreviated for brevity . . .
Fall-over disabled	
. . . Output abbreviated for brevity . . .	BGP neighbor is 10.0.2.2, remote AS 65511, internal link
BGP neighbor is 10.0.2.2, remote AS 65511, local AS 65511 internal link	BGP version 4, remote router ID 10.0.2.2
BGP version 4, remote router ID 10.0.2.2	BGP state = ==Established,== up for 01:00:31
BGP state ==ESTABLISHED==, in this state for 00:25:25	Last read 00:00:06, last write 00:00:10, hold time is 180, keepalive interval is 60 seconds
Last read 00:00:28 seconds	
Hold time is 180, keepalive interval is 60 seconds	
Configured hold time is 180, keepalive interval is 60 seconds	
Fall-over disabled	

Note: Verify that BGP adjacencies are formed with neighboring routers as established. If it is not, troubleshoot to establish adjacencies.

5.   Create a static link to a null interface on S3 that will be forwarded by IBGP. The same command is used in Cisco IOS. Type the following command:

Dell SmartFabric OS10 Commands	Cisco IOS Commands
conf t	Conf t
ip route 144.254.33.0==/24== interface null 0	ip route 144.254.33.0 ==255.255.255==.0 null 0 254
router bgp 65511	router bgp 65511
address-family ipv4 unicast	address-family ipv4 unicast
redistribute static	redistribute static
end	end

6.   From S1 show the route table to confirm the new route:

Dell SmartFabric OS10 Output	Cisco IOS Output

OS10-S1# *show ip route*
 	
. . . *Output abbreviated for brevity . . .*
 	
Destination   Gateway   Dist/Metric   Last Change
O 10.0.1.1/32 via 192.168.100.0 ethernet1/1/3 110/5 4:13:05
C 10.0.2.1/32   via 10.0.2.1 loopback0   0/0   04:14:17
O 10.0.2.2/32 via 192.168.100.4 ethernet1/1/13 110/3 00:30:33
B IN 144.254.33.0/24   via 10.0.1.1   200/0   00:58:02
C 192.168.10.0/24   via 192.168.10.254 vlan10 0/0   04:13:48
C 192.168.100.0/31 via 192.168.100.1 ethernet1/1/3   0/0 07:35:26
O 192.168.100.2/31   via 192.168.100.4 ethernet1/1/13 110/ 05:28:01
C 192.168.100.4/31   via 192.168.100.5 ethernet1/1/13 0/0   07:35:26
OS10-S1#
	isco-S1#*show ip route*
	
	. . . *Output abbreviated for brevity . . .*
	
	  10.0.0.0/32 is subnetted, 3 subnets
	O 10.0.1.1 [110/11] via 192.168.100.0, 04:37:12, Ethernet0/3
	C 10.0.2.1 is directly connected, Loopback0
	O 10.0.2.2 [110/11] via 192.168.100.4, 04:44:28, Ethernet3/1
	  144.254.0.0/24 is subnetted, 1 subnet
	B 144.254.33.0 [200/0] via 10.0.1.1, 00:00:07
	  192.168.100.0/24 is variably subnetted, 5 subnets, 2 masks
	C 192.168.100.0/31 is directly connected, Ethernet0/3
	L 192.168.100.1/32 is directly connected, Ethernet0/3
	O 192.168.100.2/31
	          [110/20] via 192.168.100.4, 04:43:05, Ethernet3/1
	          [110/20] via 192.168.100.0, 04:36:38, Ethernet0/3
	C 192.168.100.4/31 is directly connected, Ethernet3/1
	L 192.168.100.5/32 is directly connected, Ethernet3/1
	  192.168.200.0/24 is variably subnetted, 2 subnets, 2 masks
	. . . *Output abbreviated for brevity . . .*

Add EBGP configuration to existing IBGP

We will add S4 to the topology and connect S1, S2, and S4 with EBGP. The EBGP ASN is 64567 the iBGP ASN is 65511. Refer to the following topology diagram for reference as we compare the OS10 and Cisco CLI commands by implementing the following steps:
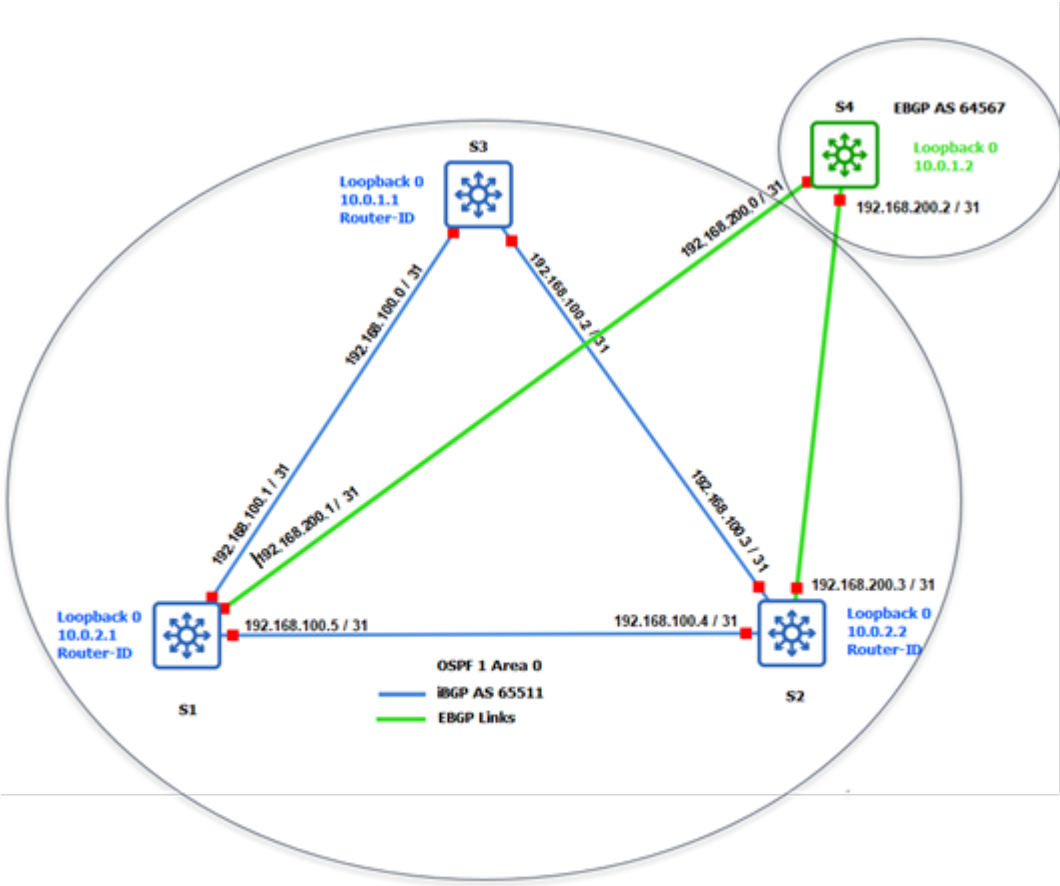
Figure 8.   **iBGP to EBGP Topology diagram**

1.   Configure the switch S1 to connect using EBGP to the S4 BGP interface. Type the following command:

Dell SmartFabric OS10 Commands	Cisco IOS Commands
Conf t *router bgp 65511* *neighbor 192.168.200.0* *remote-as 64567* *no shutdown* ← *additional command line on OS10* *end*	*Conf t* *router bgp 65511* *neighbor 192.168.200.0 remote-as 64567* *end*

2.   We will also need to configure switch S2 to connect using EBGP to the S4 BGP
interface. Type the following command:

Dell SmartFabric OS10 Commands	Cisco IOS Commands
Conf t router bgp 65511 neighbor 192.168.200.2 remote-as 64567 no shutdown end	Conf t router bgp 65511 neighbor 192.168.200.2 remote-as 64567 end

3.   Configure S4 to connect using EBGP to the S1 BGP interface. Type the following
commands:

Dell SmartFabric OS10 Commands	Cisco IOS Commands
Conf t router bgp 64567 neighbor 192.168.200.1 remote-as 65511 *this line is not required on OS10* ➔ no shutdown end	Conf t router bgp 64567 neighbor 192.168.200.1 remote-as 65511 neighbor 192.168.200.1 update-source loopback 0 end

4. Configure S4 to connect using EBGP to the S2 bgp interface. Type the following commands:

Dell SmartFabric OS10 Commands	Cisco IOS Commands
Conf t	*Conf t*
router bgp 64567	*router bgp 64567*
neighbor 192.168.200.3	*neighbor 192.168.200.3 remote-as 65511*
remote-as 65511	*neighbor 192.168.200.3 update-source loopback 0*
no shutdown	*end*
end	

5. Create a static link on S4 that will be forwarded by EBGP. Type the following commands:

Dell SmartFabric OS10 Commands	Cisco IOS Commands
conf t	*Conf t*
ip route 144.254.32.0/24 interface null 0	*ip route 144.254.32.0 255.255.255.0 null 0 254*
router bgp 64567	*router bgp 64567*
address-family ipv4 unicast	*address-family ipv4 unicast*
redistribute static	*redistribute static*
end	*end*

Use the show *ip bgp neighbors* command to confirm that S4 has established state with all peers. Type the following commands:

Dell SmartFabric OS10 Output	Cisco IOS Output
OS10-S4# show ip bgp neighbors	*Cisco-S4# show ip bgp neighbors*
BGP neighbor is 192.168.200.1, remote AS 65511, local AS 64567 external link	*BGP neighbor is 192.168.200.1, remote AS 65511, external link*
BGP version 4, remote router ID 10.0.2.1	*BGP version 4, remote router ID 10.0.2.1*
BGP state ESTABLISHED, in this state for 00:52:04	*BGP state = Established*
Last read 00:46:56 seconds	
	. . . Output abbreviated for brevity . . .
. . . Output abbreviated for brevity . . .	
	BGP neighbor is 192.168.200.3, remote AS 65511, external link
BGP neighbor is 10.0.1.1, remote AS 65511, local AS 65511 internal link	*BGP version 4, remote router ID 10.0.2.2*
BGP version 4, remote router ID 10.0.1.1	*BGP state = Established, up for 00:14:29*
BGP state ESTABLISHED, in this state for 03:11:38	

Verify configurations and routes. Go to S1 and use the **Show ip route** command to show the router table to see the internal and external BGP route.

Dell SmartFabric OS10 Output	Cisco IOS Output
OS10-S1# Show ip route	*Cisco-S1# Show ip route*
Destination Gateway Dist/Metric Last Change	
---	*Gateway of last resort is not set*
O 10.0.1.1/32 via 192.168.100.0 ethernet1/1/3 110/5 01:37:31	*10.0.0.0/32 is subnetted, 3 subnets*
C 10.0.2.1/32 via 10.0.2.1 loopback0 0/0 01:38:50	*O 10.0.1.1 [110/11] via 192.168.100.0, 00:06:46, Ethernet0/3*
O 10.0.2.2/32 via 192.168.100.4 ethernet1/1/13 110/3 01:37:31	*C 10.0.2.1 is directly connected, Loopback0*
B EX 144.254.32.0/24 via 192.168.200.0 20/0 00:08:13	*O 10.0.2.2 [110/11] via 192.168.100.4, 00:06:46, Ethernet3/1*
B IN 144.254.33.0/24 via 10.0.1.1 200/0 00:00:21	*144.254.0.0/24 is subnetted, 1 subnets*
C 192.168.10.0/24 via 192.168.10.254 vlan10 0/0 01:38:17	*B 144.254.33.0 [200/0] via 10.0.1.1, 00:05:33*
O E2 192.168.20.0/24 via 192.168.100.4 eth1/1/13 110/20 01:37:31	*192.168.100.0/24 is variably subnetted, 5 subnets, 2 masks*
. . . Output abbreviated for brevity . . .	*. . . Output abbreviated for brevity . . .*

EBGP Leaf Spine Configuration

For this example, we will first:

- Clear all the switches setting.
- Use the topology diagram below as a reference to configure EBGP peering with other switches in pods with physical address, not loopback.
- Notice the Interfaces for inter-AS connectivity, inter-AS networks, and associated interface addresses.
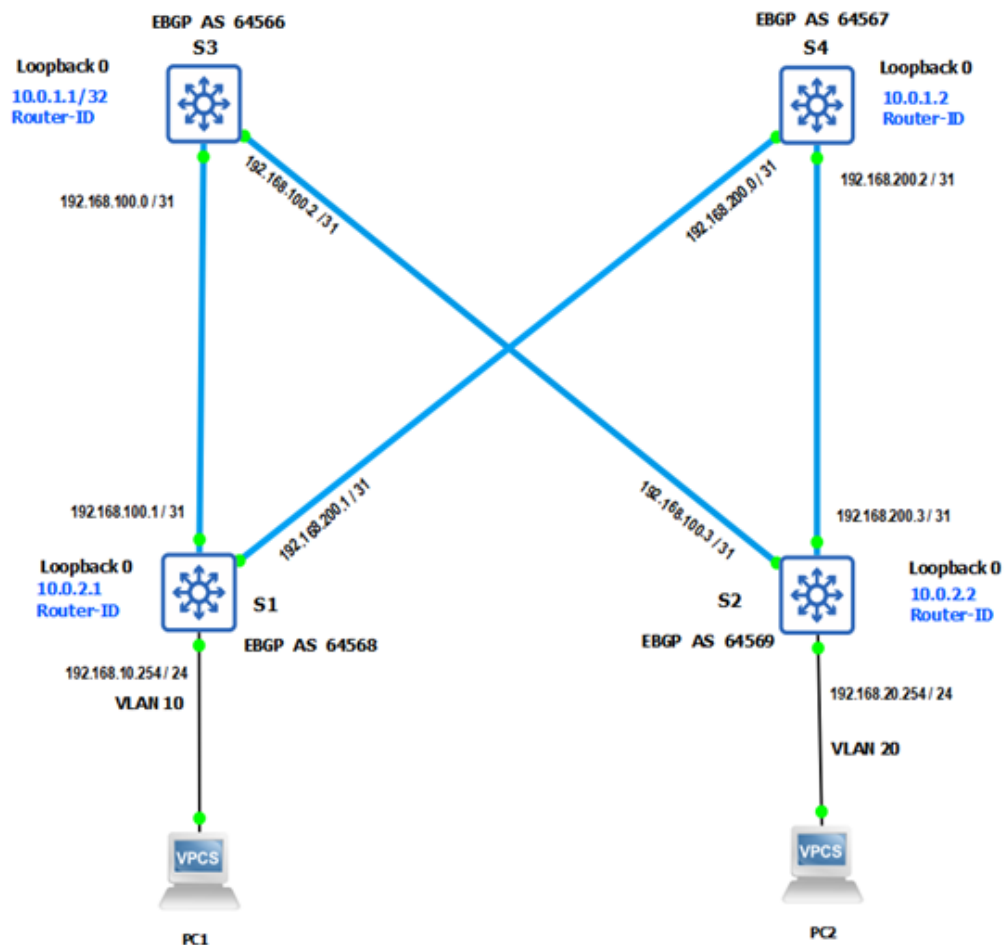
Figure 9.   EBGP Topology diagram

1. Clear all the switches. For Cisco switches the command may vary depending on the ISO version and switch model. For OS10 it remains the same command.

The commands are shown below:

Dell SmartFabric OS10 Commands	Cisco IOS Commands
conf t	**write erase or erase startup-config**
delete start ➔ *(delete startup-configuration)*	*Erasing the nvram filesystem will remove all configuration files! Continue? [confirm] [OK]*
Proceed to delete startup-configuration [confirm yes/no(default)]:y	*=Erase of nvram: complete*
reload	**reload**
*System configuration has been modified. Save? [yes/**no**]:n*	*System configuration has been modified. Save? [yes/**no**]:n*
➔ *Continuing without saving system configuration*	**** You may have to delete the vlan.dat file*
Proceed to reboot the system? [confirm yes/no]:yes	**delete flash:vlan.dat**
Session terminated for user admin on console	*filename [vlan.dat]?*
<don't save>	*Delete flash:vlan.dat ? [confirm]*
end	**reload**

2. On S1 create a VLAN 10, add IP address 192.168.10.254/24, assign it to interface 1/1/1 on the OS10 switch and interface 0/1 on the Cisco switch. The commands are very similar between two OS. The commands are shown below:

Dell SmartFabric OS10 Commands	Cisco IOS Commands
conf t	Conf t
interface vlan 10	vlan 10
ip address 192.168.10.254/24	Ip address 192.168.10.254 255.255.255.0
exit	exit
int eth 1/1/1	Int eth 0/1
switchport mode access ← Additional command	switchport access vlan 10
switchport access vlan 10	end
end	

3. On S2 create a VLAN 20, add IP address 192.168.20.254/24, assign it to interface 1/1/1 on the OS10 switch and interface 0/1 on the Cisco switch. The commands are shown below:

Dell SmartFabric OS10 Commands	Cisco IOS Commands
conf t	Conf t
interface vlan 20	vlan 20
ip address 192.168.20.254/24	Ip address 192.168.20.254 255.255.255.0
exit	Exit
interface ethernet 1/1/1	Int eth 0/1
switchport mode access ← Additional command	switchport access vlan 20
switchport access vlan 20	end
exit	

4. Configure S1 to connect to S4 and S3 interfaces using EBGP. From router BGP configuration mode create a ASN 64568. Use the provided diagram as a reference. The commands are shown below:

Dell SmartFabric OS10 Commands	Cisco IOS Commands
conf t	Conf t
router bgp 64568	router bgp 64568
neighbor 192.168.200.0	neighbor 192.168.200.0 remote-as 64567
remote-as 64567 ← needs to be on separate line	neighbor 192.168.100.0 remote-as 64566
no shutdown	end
Exit (To exit back to the config-router-bgp-64569 prompt)	
neighbor 192.168.100.0	
remote-as 64566	
no shutdown	
Exit	

5. Configure S2 to connect to the S4 and S3 interfaces using EBGP. Use the provided diagram as a reference. The commands are shown below:

Dell SmartFabric OS10 Commands	Cisco IOS Commands
conf t router bgp 64569 neighbor 192.168.200.2 remote-as 64567 ← needs to be on separate line no shutdown Exit (To exit back to the config-router-bgp-64569 prompt) neighbor 192.168.100.2 remote-as 64566 no shutdown exit	Conf t router bgp 64569 neighbor 192.168.200.2 remote-as 64567 neighbor 192.168.100.2 remote-as 64566 end

6. Configure S3 to connect to the S1 and S2 interfaces using EBGP. Use the provided diagram as a reference. The commands are shown below:

Dell SmartFabric OS10 Commands	Cisco IOS Commands
conf t router bgp 64566 neighbor 192.168.100.1 remote-as 64568 ← needs to be on separate line no shutdown Exit (To exit back to the config-router-bgp-64566 prompt) neighbor 192.168.100.3 remote-as 64569 no shutdown Exit	Conf t router bgp 64566 neighbor 192.168.100.1 remote-as 64568 neighbor 192.168.100.3 remote-as 64569 end

7. Configure S4 to connect to the S1 and S2 interfaces using EBGP. Use the provided diagram as a reference. The commands are shown below:

Dell SmartFabric OS10 Commands	Cisco IOS Commands
conf t router bgp 64567 neighbor 192.168.200.1 remote-as 64568 ← needs to be on separate line no shutdown Exit (To exit back to the config-router-bgp-64566 prompt) neighbor 192.168.200.3 remote-as 64569 no shutdown end	Conf t router bgp 64567 neighbor 192.168.200.1 remote-as 64568 neighbor 192.168.200.3 remote-as 64569 end

8. From each switch, enter the **"show ip bgp neighbors"** command to ensure that you have ==ESTABLISHED== state with all peers:

Dell SmartFabric OS10 Output	Cisco IOS Output
OS10-S4# show ip bgp neighbors	Cisco-S4# *Show ip bgp neighbors*
BGP neighbor is 192.168.200.1, remote AS 64568, local AS 64567 external link	*BGP neighbor is 192.168.200.1, remote AS 64568, external link*
BGP version 4, remote router ID 10.0.2.1	*BGP version 4, remote router ID 10.0.2.1*
BGP state ==ESTABLISHED==, in this state for 02:36:40	*BGP state = ==Established==, up for 01:39:11*
Last read 00:08:18 seconds	*Last read 00:00:12, last write 00:00:28, hold time is 180, keepalive interval is 60 seconds*
. . . Output abbreviated for brevity . . .	*. . . Output abbreviated for brevity . . .*
BGP neighbor is 192.168.200.3, remote AS 64569, local AS 64567 external link	*BGP neighbor is 192.168.200.3, remote AS 64569, external link*
BGP version 4, remote router ID 10.0.2.2	*BGP version 4, remote router ID 10.0.2.2*
BGP state ==ESTABLISHED==, in this state for 02:36:47	*BGP state = ==Established==, up for 01:38:55*
Last read 01:16:10 seconds	*Last read 00:00:34, last write 00:00:38, hold time is 180, keepalive interval is 60 seconds*
. . . Output abbreviated for brevity . . .	*. . . Output abbreviated for brevity . . .*

9. Add equal cost multipath commands to switch S1.

From Global configuration:

Enter equal cost multipath command: **bestpath as-path multipath-relax**

Enter the maximum paths command: **maximum-paths ebgp 2**

Type the following commands:

Dell SmartFabric OS10 Commands	Cisco IOS Commands
conf t	*Conf t*
router bgp 64568	*router bgp 64568*
==*bestpath*== *as-path multipath-relax*	==*bgp bestpath*== *as-path multipath-relax*
==*maximum-paths ebgp 2*==	==*maximum-paths 2*==
end	*end*

10. Make sure to add equal cost multipath commands to switches S2, S3 and S4.

. . . command session details skipped for brevity . . .

11. Set up a route-map called spine-leaf for S1, S2, S3 and S4.

The commands are the same for both OS10 and Cisco IOS.

Type the following commands:

Dell SmartFabric OS10 Commands	Cisco IOS Commands
Conf t	Conf t
route-map spine-leaf permit 10	route-map spine-leaf permit 10
match ip address prefix-list spine-leaf	match ip address prefix-list spine-leaf
exit	exit
ip prefix-list spine-leaf seq 10 permit 192.168.0.0/18 ge 24	ip prefix-list spine-leaf seq 10 permit 192.168.0.0/18 ge 24
end	end

12.   Make sure to also apply the commands above to switches S2, S3 and S4.

. . . command session details skipped for brevity . . .

13.   Add the redistribute connected route-map spine-leaf command to switch S1, S2, S3 and S4. The commands are the same for both OS10 and Cisco IOS.

Type the following commands:

Dell SmartFabric OS10 Commands	Cisco IOS Commands
conf t	Conf t
router bgp 64568	router bgp 64568
address-family ipv4 unicast	address-family ipv4 unicast
redistribute connected route-map spine-leaf	redistribute connected route-map spine-leaf
end	end

14.   Make sure to also apply the commands above to switches S2, S3 and S4.

. . . command session details skipped for brevity . . .

Note: For more details on BGP configuration and commands, see the Dell SmartFabric Services User Guide Release 10.5.3, page 815.

3- Virtual Link Trunking (VLT) vs Cisco Nexus vPC

We will show the Dell SmartFabric OS10 VLT feature configuration as well as the Cisco vPC feature using Cisco NX-OS 9K switches. Refer to the topology diagram below to configure the VLT and vPC domain. Verify that heartbeat messages are being sent between two switches in the VLT/vPC domain.

We will use an additional switch (Port-Channel-S3) to create the port channel that will connect to VLT/vPC Domain peer switches.
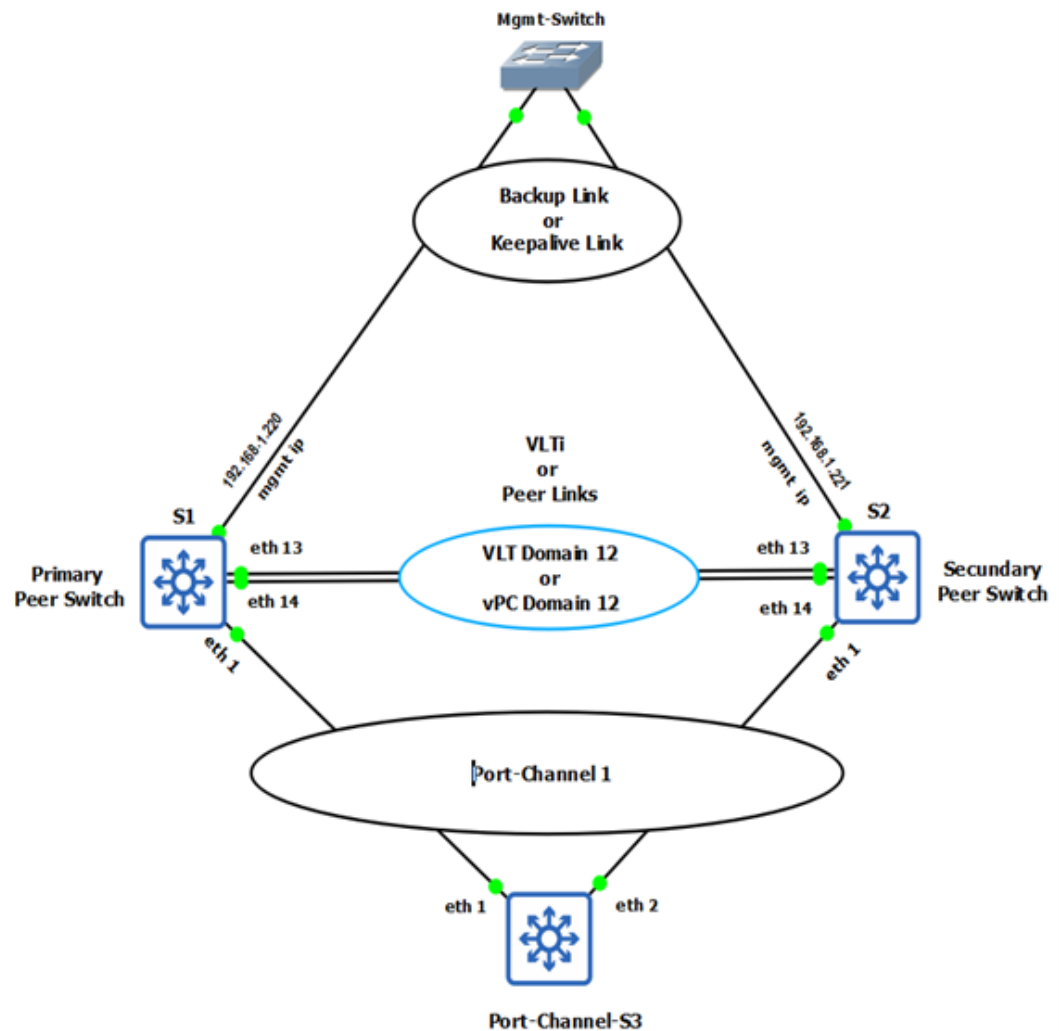
Verify the status of VLT/vPC.

Figure 10.   Simple Layer 2 VLT -vPC Topology diagram

Configure the backup destination link or Keepalive link:

Using the topology diagram above as a reference, configure the backup destination link or Keepalive link.

On the peer switches (S1 and S2), configure the management interface for the backup destination link or Keepalive link. Use ip 192.168.1.220/24 and 192.168.1.221/24. We recommend using a separate OOB Management Switch (See the topology diagram above for reference). On the N-OS switches first you have to enable the feature for vPC and lacp. On OS10 VLT features are enabled by default.

Type the following command to configure the management interface:

On S1 configure the management interface with ip 192.168.1.220/24

Dell SmartFabric OS10 Commands	Cisco-NX-OS Commands
conf t interface mgmt 1/1/1 no ip address dhcp ← additional line optional ip address 192.168.1.220/24 end	Conf t feature vpc feature lacp interface mgmt 0 ip address 192.168.1.220/24 no shut end

Configure S2 as well and use management interface ip 192.168.1.221/24

. . . command session details skipped for brevity . . .

Configure the discovery interfaces" - "Peer-Link" interfaces

Place the ports that will be used for "Discovery interfaces" or "Peer-Link" interfaces in non-switchport mode. Use interfaces 1/13 and 1/14.

The commands are shown below:

Dell SmartFabric OS10 Commands	Cisco-NX-OS Commands
conf t	Conf t
interface range ethernet 1/1/13-1/1/14	interface eth 1/13-14
no switchport	no switchport
description "VLTi link"	description "vC peer link"
end	end

Configure a VLT/vPC domain:

On both S1 and S2 create a VLT domain 12 and set priority in accordance. Configure the discovery interfaces or Peer-Link interfaces for the VLTi connections using interfaces 13 and 14. Assign a common virtual vlt-mac address (Recommended). Set up the Management ip as backup destination link (Keep alive).

On Cisco NX-OS configure the vPC-domain 12, set priority, and configure the peer-keepalive using the management t vrf ip. Create a channel-group 20 for the vPC Peer-Link and add interfaces eth 1/13 and 1/14. Verify that heartbeat messages are being sent between the two switches in the domain.

Note: For the most part the number of configuration commands on Cisco NX-OS are very close to OS10 with few exceptions, which makes it easier and faster to configure. See the following example when configuring the VLT vs vPC Domain.

Type the following commands:

Dell SmartFabric OS10 VLT config Commands	Cisco-NX-OS vPC config Commands
conf t vlt-domain 12 primary-priority 4096 backup destination 192.168.1.221　　　← peer-keepalive discovery-interface ethernet 1/1/13-1/1/14　← VLT Peer-Link vlt-mac 00:11:22:33:44:55　← Optional,　VLT would auto generate one end	Conf t vpc domain 12 role priority 10 peer-keepalive destination 192.168.1.221 source 192.168.1.220 vrf management exit interface ethernet 1/13-14 description **vPC Peer-Link** channel-group 12 mode active interface port-channel 20 no shut switchport switch mode trunk vpc peer-link end

Make sure to configure S2 and set a higher priority to make it a secondary peer.

. . . command session details skipped for brevity . . .

Note: Each VLT domain in the network must use a separate unique mac address. This mac address must be the same on both switches in the VLT Domain.

The "VLT time interval" optional is not covered in this document. Changing the VLT time interval is based on design requirements. In certain environments, the timer may need to be increased to ensure routing protocols come up before VLT converges to prevent possible outages.

Verify the status of VLT or vPC using the following commands:

Dell SmartFabric OS10 Output	Cisco-NX-OS Output
show vlt 12 Domain ID　　　　　　　　: 12 Unit ID　　　　　　: 1 Role　　　　　　　　: primary Version　　　　　　　: 3.1 Local System MAC address　　: 0c:5d:fd:52:00:00 Role priority　　　　　: 4096 　　　. . . Output abbreviated for brevity . . . VLT Peer ID System MAC Address Status IP Address　　　　Ver 　12　　　　0c:02:e4:cb:00:00　　up　　fda5:74c8:b79e:1::2　3.1	*show vpc brief* Legend:　　(*) - local vPC is down, forwarding via vPC peer-link vPC domain id　　　　　　: 12 Peer status　　　　　　: peer adjacency formed ok vPC keep-alive status　　　: peer is alive Configuration consistency status : success Per-vlan consistency status　　: success Type-2 consistency status　　: success vPC role　　　　　　: primary 　　　. . . Output abbreviated for brevity . . . vPC Peer-link status --- id　Port　Status Active vlans --　----　------ -- 1　Po20　up　　1,10,20

Configure a Port-Channel on both S1 and S2, with vlt-id 1 and assign member port interface 1/1/1 to the port-channel for the down string switch S3 where end devices will be connected.

On Cisco NX-OS configure a regular port channel on S1 and S2 "channel group 1", then assign the member port using interfaces 1/1 to connect to S3 and enter the vPC -domain 1. Type the following commands:

Dell SmartFabric OS10 Commands	Cisco-NX-OS Commands
conf t	Conf t
interface port-channel 1	interface ethernet 1/1
switchport mode trunk	description **vPC to S3 **
switchport trunk allowed vlan 10	no shut
vlt-port-channel 1	switchport
no shutdown	channel-group 1 mode active
exit	interface port-channel 1
interface ethernet 1/1/1	switchport mode trunk
channel-group 1 mode active	switchport trunk allowed vlan 10
description "VLT12 to S3"	vpc 1
no shutdown	end
end	

Configuration on S2 was performed. The output has been omitted for the sake of brevity.

On S3 configure a Port-Channel 1 and assign member ports 1/1/1-2 to the port-channel.

Dell SmartFabric OS10 Commands	Cisco-NX-OS Commands
conf t	Conf t
interface port-channel 1	interface ethernet 1/1-2
switchport mode trunk	description **Port-Channel 1 **
switchport trunk allowed vlan 10	no shut
vlt-port-channel 1	switchport
no shutdown	channel-group 1 mode active
exit	interface port-channel 1
	switchport mode trunk
	vpc 1
	end

We can verify the status of Port-Channel 1 using the following commands:

Dell SmartFabric OS10 Commands	Cisco-NX-OS Commands
show interface port-channel 1 summary LAG Mode Status Uptime Ports 1 L2-HYBRID up 21:48:24 Eth 1/1/1 (Up) Eth 1/1/2 (Up)	*show port-channel summary* Group Port- Channel Type Protocol Member Ports -- 1 Po1(SU) Eth LACP Eth1/1(P) Eth1/2(P)

Note: For more details on VLT configuration and commands, see the Dell SmartFabric OS10 - Virtual Link Trunking - Reference Architecture Guide as well as the Dell SmartFabric Services User Guide Release 10.5.3, page 1694.

4-Troubleshooting

Debug capability: In addition to the common list of commands to help troubleshoot, OS10 includes a debug capability that shows debug messages on the console keep in mind that enabling it will consume lots of CPU resources.

List of most common commands:

- Ping to check connectivity
- Show Arp Command
- Traceroute to check network route
- show inventory command to view the module IDs of the device
- Show inventory media to check whether the optical module is inserted properly