

CCIE Enterprise Infrastructure LAB

Module2-DOO V1.2

Ver: 1.2

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Device Login Info:

Device	OOB IP address	Username	Password	No
DNAC	https://203.0.113.11	admin	CCIE!nfr4	Accessible from any HostXY.
ISE	https://203.0.113.12	admin	CCIE!nfr4	Accessible from any HostXY.
vManage	https://203.0.113.21	admin	CCIE!nfr4	Accessible from any HosyXY.
cEdges		admin	CCIE!nfr4	Accessible via clickable map
HostXY		cisco	cisco	Accessible via clickable map
R30		netadmin	CCIE!nfr4	Not accessible via clickable map. Accessible via NETCONF/RESTCONF
SW400		netadmin	CCIE!nfr4	Accessible via clickable map.
SW501		netadmin	CCIE!nfr4	Accessible via clickable map.
SW502		netadmin	CCIE!nfr4	Accessible via clickable map.
SW510		netadmin	CCIE!nfr4	Accessible via clickable map.
TerminalServer		admin	Cisco	Accessible via clickable map.
vBond		admin	CCIE!nfr4	Accessible via clickable map.
vSmart		admin	admin	Accessible via clickable map.

Module Specific Instructions

Read before starting.

Module-specific guidelines

- The lab topology has several end hosts, named hostXY (for example, host11). They are all identical and they can all be used at your full discretion, including accessing the GUI of Cisco DNA Center, vmanage, and Cisco ISE through Firefox, performing IP connectivity tests, generating or capturing traffic, and performing coding Python or C.
- All hostXY devices are configured as DHCP Clients. If it is necessary to force the host to release and renew its DHCP lease, double-click the desktop icon "Reset Port".
- The web-based GUI of Cisco DNA Center, Cisco ISE, and vManage can be accessed only from the hostXY end hosts, using Firefox installed on these end hosts. These servers cannot be accessed directly from the desktop/workstation that you are working from. You must always connect to one of the hostXY and use them as a jump host to access Cisco DNA Center, ISE, and/or vManage. Always ignore any SSL/TLS certificate warnings in Firefox that may be displayed. Refer to the "Device Login into," table under Resources > Tables. for detailed access to these devices.
- R30 (10.3.11.1) can be accessed via RESTCONF and NETCONF from host31.
- Devices in the topology may have more interface, addresses and routes configured than what is shown in the diagrams and comparing tables: Ignore such interfaces, addresses, and routes entirely. Unless a task exactly requires you to use or modify them.
- Changing or removing parts of initial running configuration on devices, as opposed to adding new configuration, is allowed only if the task allows or requires it explicitly, or if there is no other way to accomplish the task.

SECTION1.Exiting Network Review and Tuning

1.1: Introduction

**Welcome to the Deploy, Operate, Optimize (DOO) module for
XANDER Pharmaceuticals.**

The topology you will be working on this module will be similar, but not necessarily identical, to
the network that you helped design in the previous module.

It may also include technologies and feature sets not touched upon previously.

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1.2: Configure VLANs

Ensure that the VLANs and forwarding are configured on all switches and switchports according to the following table.

Site	VLAN	Switch	Port(s)	802.1Q
HQ	2000	SW101	PO1, PO3	Yes
HQ	2000	SW102	PO2 PO3	Yes
HQ	2000	SW110	P01, P02	Yes
HQ	2000	SW110	GE0/0	NO
HQ	2001	SW101	P01, P03	Yes
HQ	2001	SW102	P02 P03	Yes
HQ	2001	SW110	P01, P02	Yes
HQ	2001	SW110	GE0/1	NO
Branch #3	2000	SW601	GE2/0	Yes
Branch #3	2000	SW602	GE2/0	Yes
Branch #3	2000	SW610	GE2/0-1	Yes
Branch #3	2000	SW610	GE2/0	NO
Branch #3	2001	SW601	GE2/0	Yes
Branch #3	2001	SW602	GE2/0	Yes
Branch #3	2001	SW610	GE2/0-1	Yes
Branch #3	2001	SW610	GE0/1	NO

Solution

SW101 & SW102:

This part of the content will be configured in Q1.3

SW110:

```
SW110(config)#interface g0/0
SW110(config-if)#switchport mode access
SW110(config-if)#switchport access vlan 2000
SW110(config-if)#no shutdown
SW110(config-if)#exit
SW110(config)#interface g0/1
SW110(config-if)#switchport mode access
SW110(config-if)#switchport access vlan 2001
SW110(config-if)#no shutdown
SW110(config-if)#exit
SW110(config)
```

SW601 & SW602:

```
SW60x(config)#interface g2/0
SW60x(config-if)#switchport trunk encapsulation dot1q
SW60x(config-if)#switchport mode trunk
SW60x(config-if)#no shutdown
SW60x(config-if)# exit
SW60x(config)#
```

SW610:

```
SW610(config)#interface range g2/0-1
SW610(config-if-range)#switchport trunk encapsulation dot1q
SW610(config-if-range)#switchport mode trunk
SW610(config-if-range)#switchport trunk allowed vlan 1,2000,2001
SW610(config-if-range)#no shutdown
SW610(config-if-range)#exit
SW610(config)#interface g0/1
```

SW610(config-if)#switchport mode access

SW610(config-if)#switchport access vlan 2001

SW610(config-if)#shutdown

SW610(config-if)#exit

SW610(config)#

Verify:

SW601:

SW601#show vlan brief

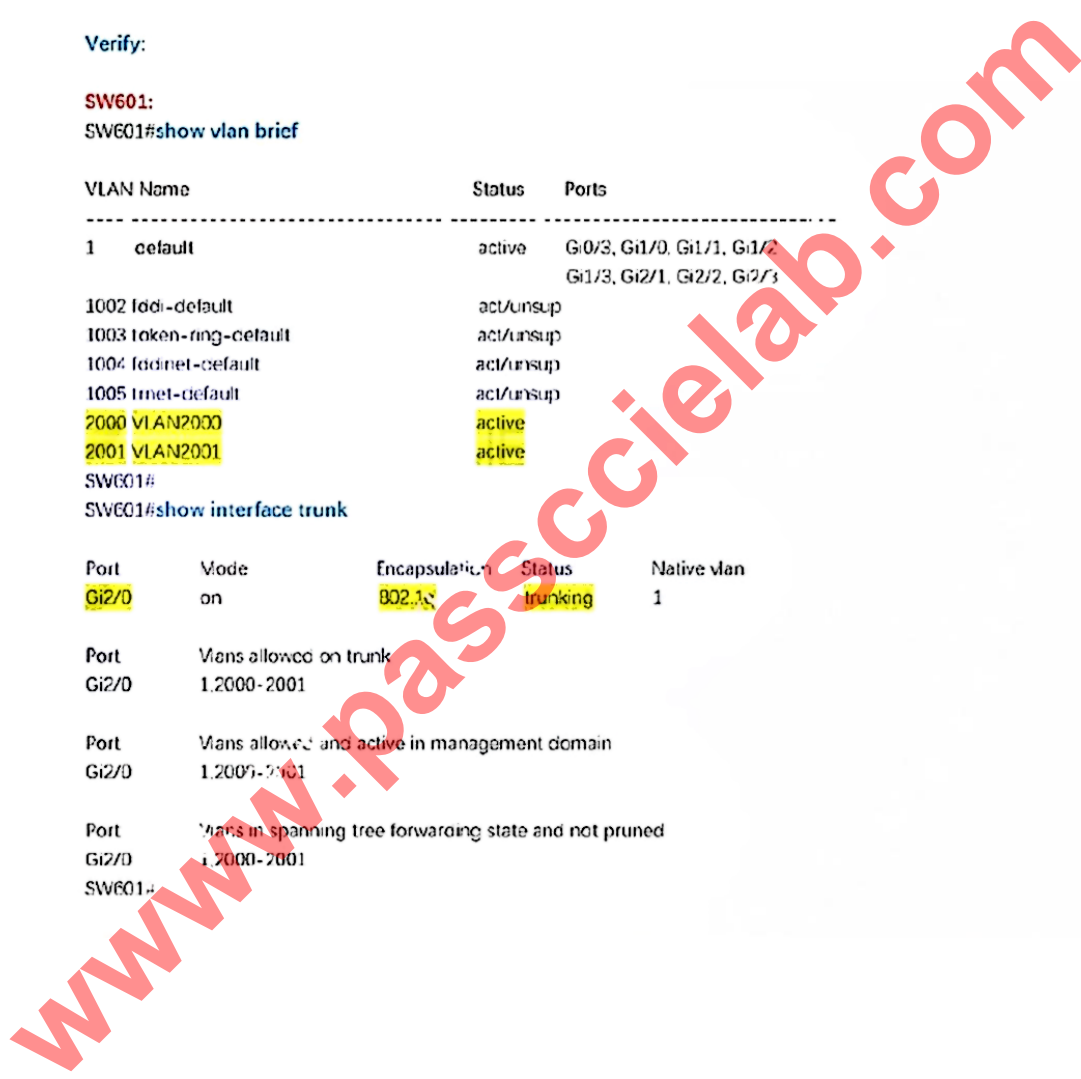
VLAN Name	Status	Ports
1 default	active	Gi0/3, Gi1/0, Gi1/1, Gi1/2, Gi1/3, Gi2/1, Gi2/2, Gi2/3
1002 fddi-default	act/unsup	
1003 token-ring-default	act/unsup	
1004 fddinet-default	act/unsup	
1005 trnet-default	act/unsup	
2000 VLAN2000	active	
2001 VLAN2001	active	

SW601#

SW601#show interface trunk

Port	Mode	Encapsulation	Status	Native vlan
Gi2/0	on	802.1Q	trunking	1
Port	Vlans allowed on trunk			
Gi2/0	1,2000-2001			
Port	Vlans allowed and active in management domain			
Gi2/0	1,2000-2001			
Port	Vlans in spanning tree forwarding state and not pruned			
Gi2/0	1,2000-2001			

SW601#



Port Vlans allowed on trunk
Gi2/0 1,2000-2001

Port Vlans allowed and active in management domain
Gi2/0 1,2000-2001

Port Vlans in spanning tree forwarding state and not pruned
Gi2/0 1,2000-2001
SW601#

SW602:

SW602#show vlan brief

VLAN Name	Status	Ports
1 default	active	Gi0/3, Gi1/0, Gi1/1, Gi1/2 Gi1/3, Gi2/1, Gi2/2, Gi2/3
1002 fddi-default	act/unsup	
1003 token-ring-default	act/unsup	
1004 fddinet-default	act/unsup	
1005 trnet-default	act/unsup	
2000 VLAN2000	active	

Port Vlans in spanning tree forwarding state and not pruned
Gi2/0 1,2000-2001
SW602#

SW610:

SW610#show vlan brief

VLAN Name	Status	Ports
1 default	active	Gi0/2, Gi0/3, Gi1/0, Gi1/1 Gi1/2, Gi1/3, Gi2/2, Gi2/3
1002 fddi-default	act/unsup	
1003 token-ring-default	act/unsup	
1004 fddinet-default	act/unsup	
1005 trnet-default	act/unsup	
2000 VLAN2000	active	Gi0/0
2001 VLAN2001	active	Gi0/1

SW610#

SW610#show interface trunk

Port	Mode	Encapsulation	Status	Native vlan
Gi2/0	on	802.1q	trunking	1
Gi2/1	on	802.1q	trunking	1

Port Vlans allowed on trunk

Gi2/0 1,2000-2001
Gi2/1 1,2000-2001

Port Vlans allowed and active in management domain

Gi2/0 1,2000-2001

Gi2/1	1.2000-2001
Port	Vlans in spanning tree forwarding state and not pruned
Gi2/0	1.2000-2001
Gi2/1	1.2000-2001
SW610#	

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1.3: Configure EtherChannel

Ensure that the EtherChannel links are configured on the switches at Headquarters according to the following table.

EtherChannel ID	Switch A	Switchports	Switch B	Switchports	Type
1	SW101	GE1/2-3	SW110	GE1/0-1	802.3ad
2	SW102	GE1/2-3	SW110	GE1/2-3	802.3ad
3	SW101	GE2/0-1	SW102	GE2/0-1	802.3ad

Ensure the STP features are configured on the switches at Headquarters according to the following

requirements:

- The protocol must support a separate instance for each VLAN.
- The protocol must support only three states.
- All endpoint-facing ports must bypass the STP forwarding delay, without configuring individual witchports.
- SW101 must be the root bridge for VLANs 2000-2001, and default vlan ,with SW102 as the secondary Use the owest possible priority values to achieve this.
 - Ignore any other VLANS already present on the switches and do not change their configuration.
- SW101 and SW102 must ignore superior BPDUs for the other switches at Headquarters. While uperior BPDUs are received, traffic must not be forwarded on the receiving port.

Solution

SW101:

```
SW101(config)#spanning-tree mode rapid-pvst
```

```
SW101(config)#spanning-tree vlan 1,2000,2001 priority 0
```

```
SW101(config)#spanning-tree portfast edge default
```

```
SW101(config)#no interface po1
```

```
SW101(config)#no interface po3
```

```
SW101(config)#interface range gi/2-3
```

```
SW101(config-if-range)#switchport trunk encapsulation dot1q
```

```
SW101(config-if-range)#switchport mod trunk
```

```
SW101(config-if-range)#no shutdown
```

```
SW101(config-if-range)#channel-group 1 mode active
```

```
SW101(config-if-range)#exit
```

```
SW101(config)#interface range g2/0-1
```

```
SW101(config-if-range)# switchport trunk encapsulation cJoriq
```

```
SW101(config-if-range)# switchhport mod trunk
```

```
SW101(config-if-range)# no shutdown
```

```
SW101(config-if-range)# channel-group 3 mode active
```

```
SW101(config-if-range)# #exit
```

```
SW101(config)#ininterface range po1,po3
```

```
SW101(config-if-range)#spanningq -tre. guard root
```

```
SW101(config-if-range)#exit
```

```
SW101(config)#interface range gi0/3, gi1/0-3,gi2/0-1
```

```
SW101(config-if-range)# spanning-tree guard root
```

```
SW101(config-if-range)# exit
```

```
SW101l(config)#
```

```
SW102;

SW102(config)#spanning-tree mode rapid-pvst

SW102(config)#spanning-tree vlan 2,2000,2001 priority 4096

SW102(config)#spanning-tree portfast edge default

SW102(config)#no interface po2

SW102(config)#no interface po3

SW102(config)#interface range g1/2-3

SW102(config-if-range)#switchport trunk encapsulation dot1q

SW102(config-if-range)#switchport mod trunk

SW102(config-if-range)#no shutdown

SW102(config-if-range)#channel-group 2 mode active

SW102(config-if-range)#exit

SW102(config)#interface range g2/0-1

SW102(config-if-range)#switchport trunk encapsulation dot1q

SW102(config-if-range)#switchport mod trunk

SW102(config-if-range)#no shutdown

SW102(config-if-range)#channel-group 3 mode active

SW102(config-if-range)#exit

SW102(config)#interface po2

SW102(config-if-range)#spanning-tree guard root

SW102(config-if-range)#exit

SW102(config)#interface range gi0/3, gi1/0-3

SW102(config-if-range)#spanning-tree guard root

SW102(config-if-range)#exit

SW102(config)#
```

SW110

```
SW110(config)#spanning-tree mode rapid-pvst
SW110(config)#spanning-tree portfast edge default
SW110(config)#no interface port-channel 1
SW110(config)#no interface port-channel 2
SW110(config)#interface range g1/0-1-
SW110(config-if- range)#switchport trunk encapsulation dot1q
SW110(config-if- range)#switchport mod trunk
SW110(config-if- range)#no shutdown
SW110(config-if- range)#channel-group 1 mode active
SW110(config-if- range)#exit
SW110(config)#interface range g1/2-3
SW110(config-if- range)#switchpart trunk encapsulation dot1q
SW110(config-if- range)#switchport mod trunk
SW110(config-if- range)#no shutdown
SW110(config-if- range)# channel -group 2 mode active
SW110(config-if- range)#exit
SW110(config)#
```

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Verification

Verify:

SW101:

SW101#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
 f - failed to allocate aggregator

M - not in use, minimum links not met
 m - not in use, port not aggregated due to minimum links not met
 u - unsuitable for bundling
 w - waiting to be aggregated
 d - default port

A - formed by Auto LAG

Number of channel-groups in use: 2
 Number of aggregators: 2

Group	Port-channel	Protocol	Ports
1	Po1(SU)	LACP	Gi1/2(P) Gi1/3(P)
3	Po3(SU)	LACP	Gi2/0(P) Gi2/1(P)

SW101#

SW101#show vlan brief

VLAN Name	Status	Ports
1 Po1(SU)	LACP	Gi1/2(P) Gi1/3(P)
3 Po3(SU)	LACP	Gi2/0(P) Gi2/1(P)

SW101#

SW101#show vlan brief

VLAN Name	Status	Ports
1 default	active	Gi0/3, Gi1/0, Gi1/1, Gi2/2, Gi2/3
1002 fddi-default	act/unsup	
1003 token-ring-default	act/unsup	
1004 fddinet-default	act/unsup	
1005 trnet-default	act/unsup	
2000 VLAN2000	active	
2001 VLAN2001	active	

SW101#

SW101#show interface trunk

```

Port      Mode      Encapsulation  Status      Native vlan
Po1       on        802.1q         trunking    1
Po3       on        802.1q         trunking    1
    
```

```

Port      Vans allowed on trunk
Po1       1-4094
Po3       1-4094
    
```

```

Port      Vans allowed and active in management domain
Po1       1,2000-2001
Po3       1,2000-2001
    
```

```

Port      Vans in spanning tree forwarding state and not pruned
Po1       1,2000-2001
Po3       1,2000-2001
    
```

```

SW101#
SW101#show spanning-tree vlan 2000
    
```

VLAN2000

```

Spanning tree enabled protocol rstp
Root ID    Priority    2000
Address    5000.0011.0000
This bridge is the root
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
    
```

```

Bridge ID  Priority    2000 (priority 0 sys-id-ext 2000)
Address    5000.0011.0000
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300 sec
    
```

Interface	Role	Sts	Cost	Prio.	Nbr	Type
Po1	Desg	FWD	3	128	65	P2p
Po3	Desg	FWD	3	128	66	P2p

```

SW101#
SW101#show spanning-tree vlan 2001
    
```

VLAN2001

```

Spanning tree enabled protocol rstp
Root ID    Priority    2001
Address    5000.0011.0000
This bridge is the root
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
    
```

```

Bridge ID  Priority    2001 (priority 0 sys-id-ext 2001)
Address    5000.0011.0000
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300 sec
    
```

Interface	Role	Sts	Cost	Prio.	Nbr	Type
Po1	Desg	FWD	3	128	65	P2p
Po3	Desg	FWD	3	128	66	P2p

```

SW101#
SW101#show spanning-tree interface po1 active detail
    
```

Port path cost 3, Port priority 128, Port Identifier 128.65
 Designated root has priority 32769, address 5000.0011.0000
 Designated bridge has priority 32769, address 5000.0011.0000
 Designated port id is 128.65, designated path cost 0
 Timers: message age 0, forward delay 0, hold 0
 Number of transitions to forwarding state: 1
 Link type is point-to-point by default
Root guard is enabled on the port
 BPDU: sent 618, received 1

Port 65 (Port-channel1) of VLAN2000 is designated forwarding
 Port path cost 3, Port priority 128, Port Identifier 128.65.
 Designated root has priority 2000, address 5000.0011.0000
 Designated bridge has priority 2000, address 5000.0011.0000
 Designated port id is 128.65, designated path cost 0
 Timers: message age 0, forward delay 0, hold 0
 Number of transitions to forwarding state: 1
 Link type is point-to-point by default
Root guard is enabled on the port
 BPDU: sent 618, received 4

Port 65 (Port-channel1) of VLAN2001 is designated forwarding
 Port path cost 3, Port priority 128, Port Identifier 128.65.
 Designated root has priority 2001, address 5000.0011.0000
 Designated bridge has priority 2001, address 5000.0011.0000
 Designated port id is 128.65, designated path cost 0
 Timers: message age 0, forward delay 0, hold 0

Number of transitions to forwarding state: 1
 Link type is point-to-point by default
Root guard is enabled on the port
 BPDU: sent 618, received 4

SW101#

SW101#show spanning-tree interface po3 active detail

Port 66 (Port-channel3) of VLAN0001 is designated forwarding
 Port path cost 3, Port priority 128, Port Identifier 128.66.
 Designated root has priority 32769, address 5000.0011.0000
 Designated bridge has priority 32769, address 5000.0011.0000
 Designated port id is 128.66, designated path cost 0
 Timers: message age 0, forward delay 0, hold 0
 Number of transitions to forwarding state: 1
 Link type is point-to-point by default
Root guard is enabled on the port
 BPDU: sent 705, received 12

Port 66 (Port-channel3) of VLAN2000 is designated forwarding
 Port path cost 3, Port priority 128, Port Identifier 128.66.
 Designated root has priority 2000, address 5000.0011.0000
 Designated bridge has priority 2000, address 5000.0011.0000
 Designated port id is 128.66, designated path cost 0
 Timers: message age 0, forward delay 0, hold 0
 Number of transitions to forwarding state: 1
 Link type is point-to-point by default
Root guard is enabled on the port
 BPDU: sent 705, received 12

SW102:

SW102#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
 f - failed to allocate aggregator

M - not in use, minimum links not met
 m - not in use, port not aggregated due to minimum links not met
 u - unsuitable for bundling
 w - waiting to be aggregated
 d - default port

A - formed by Auto LAG

Number of channel-groups in use: 2
 Number of aggregators: 2

Group	Port-channel	Protocol	Ports
2	Po2(SU)	LACP	Gi1/2(P) Gi1/3(P)
3	Po3(SU)	LACP	Gi2/0(P) Gi2/1(P)

SW102#

SW102#show vlan brief

VLAN Name	Status	Ports
1 default	active	Gi0/3, Gi1/0, Gi1/1, Gi2/2, Gi2/3
1002 fddi-default	act/unsup	
1003 token-ring-default	act/unsup	
1004 fddinet-default	act/unsup	
1005 trnet-default	act/unsup	
2000 VLAN2000	active	
2001 VLAN2001	active	

SW102#
 SW102#show vlan brief

VLAN Name	Status	Ports
1 default	active	Gi0/3, Gi1/0, Gi1/1, Gi2/2, Gi2/3
1002 fddi-default	act/unsup	
1003 token-ring-default	act/unsup	
1004 fddinet-default	act/unsup	
1005 trnet-default	act/unsup	
2000 VLAN2000	active	
2001 VLAN2001	active	

SW102#

SW102#show interface trunk

```

Po2      on          802.1c      trunking    1
Po3      on          802.1c      trunking    1
    
```

```

Port      Vlans allowed on trunk
Po2       1,2000-2001
Po3       1,2000-2001
    
```

```

Port      Vlans allowed and active in management domain
Po2       1,2000-2001
Po3       1,2000-2001
    
```

```

Port      Vlans in spanning tree forwarding state and not pruned
Po2       1,2000-2001
Po3       1,2000-2001
    
```

SW102#

SW102#show spanning-tree vlan 2000

VLAN2000

Spanning tree enabled protocol **rstp**

```

Root ID    Priority    2000
Address    5000.0011.0000
Cost       3
Port       66 (Port-channel3)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
    
```

```

Bridge ID  Priority    6096 (priority 4096 sys-id-ext 2000)
Address    5000.0012.0000
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300 sec
    
```

Interface	Role	Sts	Cost	Prio.	Nbr	Type
Po2	Desg	FWD	3	128.65		P2p
Po3	Root	FWD	3	128.66		P2p

SW102#

SW102#show spanning-tree vlan 2001

VLAN2001

Spanning tree enabled protocol **rstp**

```

Root ID    Priority    2001
Address    5000.0011.0000
Cost       3
    
```

```

Port                00 (Port-Channels)
Hello Time          2 sec  Max Age 20 sec  Forward Delay 15 sec
    
```

```

Bridge ID Priority 6097 (priority 4096 sys-id-ext 2001)
Address          5000.0012.0000
Hello Time       2 sec  Max Age 20 sec  Forward Delay 15 sec
Aging Time       300 sec
    
```

Interface	Role	Sts	Cost	Prio.	Nbr	Type
Po2	Desg	FWD	3	128.65		P2p
Po3	Root	FWD	3	128.66		P2p

SW102#

SW102#show spanning-tree interface po2 active detail

```

Port 65 (Port-channel2) of VLAN0001 is designated forwarding
Port path cost 3, Port priority 128, Port Identifier 128.65.
Designated root has priority 32769, address 5000.0011.0000
Designated bridge has priority 32769, address 5000.0012.0000
Designated port id is 128.65, designated path cost 3
Timers: message age 0, forward delay 0, hold 0
Number of transitions to forwarding state: 1
Link type is point-to-point by default
Root guard is enabled on the port
BPDU: sent 711, received 1
    
```

```

Port 65 (Port-channel2) of VLAN2000 is designated forwarding
Port path cost 3, Port priority 128, Port Identifier 128.65.
Designated root has priority 2000, address 5000.0011.0000
Designated bridge has priority 6096, address 5000.0012.0000
Designated port id is 128.65, designated path cost 3
    
```

```

Port 65 (Port-channel2) of VLAN0001 is designated forwarding
Port path cost 3, Port priority 128, Port Identifier 128.65.
Designated root has priority 32769, address 5000.0011.0000
Designated bridge has priority 32769, address 5000.0012.0000
Designated port id is 128.65, designated path cost 3
Timers: message age 0, forward delay 0, hold 0
Number of transitions to forwarding state: 1
Link type is point-to-point by default
Root guard is enabled on the port
BPDU: sent 711, received 1
    
```

```

Port 65 (Port-channel2) of VLAN2000 is designated forwarding
Port path cost 3, Port priority 128, Port Identifier 128.65.
Designated root has priority 2000, address 5000.0011.0000
Designated bridge has priority 6096, address 5000.0012.0000
Designated port id is 128.65, designated path cost 3
Timers: message age 0, forward delay 0, hold 0
Number of transitions to forwarding state: 1
Link type is point-to-point by default
Root guard is enabled on the port
BPDU: sent 711, received 4
    
```

```

Port 65 (Port-channel2) of VLAN2001 is designated forwarding
Port path cost 3, Port priority 128, Port Identifier 128.65.
Designated root has priority 2001, address 5000.0011.0000
Designated bridge has priority 6097, address 5000.0012.0000
Designated port id is 128.65, designated path cost 3
Timers: message age 0, forward delay 0, hold 0
    
```

```

number of transitions to forwarding state: 1
Link type is point-to-point by default
Root guard is enabled on the port
BPDU: sent 711, received 4
SW102#
    
```

SW110:

```
SW110#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
       f - failed to allocate aggregator

       M - not in use, minimum links not met
       m - not in use, port not aggregated due to minimum links not met
       u - unsuitable for bundling
       w - waiting to be aggregated
       d - default port

       A - formed by Auto LAG
    
```

```

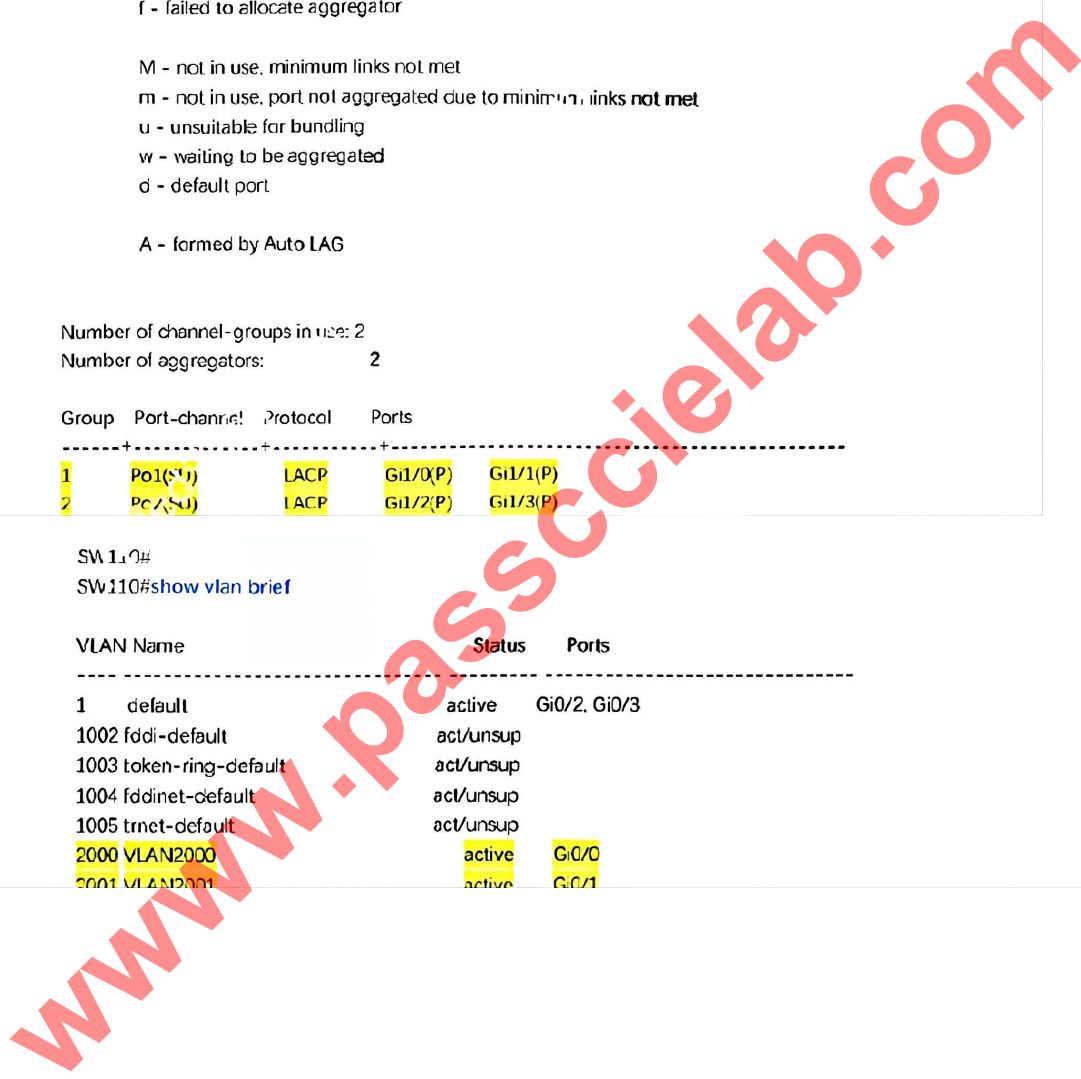
Number of channel-groups in use: 2
Number of aggregators:          2
    
```

Group	Port-channel	Protocol	Ports	
1	Po1(SU)	LACP	Gi1/0(P)	Gi1/1(P)
2	Po2(SU)	LACP	Gi1/2(P)	Gi1/3(P)

```

SW110#
SW110#show vlan brief
    
```

VLAN Name	Status	Ports
1 default	active	Gi0/2, Gi0/3
1002 fddi-default	act/unsup	
1003 token-ring-default	act/unsup	
1004 fddinet-default	act/unsup	
1005 trnet-default	act/unsup	
2000 VLAN2000	active	Gi0/0
2001 VLAN2001	active	Gi0/1



SW110#

SW110#show interface trunk

Port	Mode	Encapsulation	Status	Native vlan
Po1	on	802.1q	trunking	1
Po2	on	802.1q	trunking	1

Port Vlans allowed on trunk

Po1 1,2000-2001

Po2 1,2000-2001

Port Vlans allowed and active in management domain

Po1 1,2000-2001

Po2 1,2000-2001

Port Vlans in spanning tree forwarding state and not pruned

Po1 1,2000-2001

Po2 none

SW110#

SW110#show spanning-tree summary

Switch is in rapid-pvst mode

Root bridge for: none

Extended system ID is enabled

Portfast Default is edge

Portfast Edge BPDU Guard Default is disabled

Portfast Edge BPDU Filter Default is disabled

Loopguard Default is disabled

SW110#show spanning-tree vlan 2000

Name	Blocking	Listening	Learning	Forwarding	STP Active
VLAN0001	1	0	0	3	4
VLAN2000	1	0	0	2	3
VLAN2001	1	0	0	2	3
3 vlans	3	0	0	7	10

SW110#

SW110#show spanning-tree vlan 2000

www.passccielab.com

VLAN2000

Spanning tree enabled protocol rstp

Root ID **Priority** **2000**
 Address 5000.0011.0000
Cost **3**
 Port 65 (Port-channel1)
 Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID **Priority** **34768** (priority 32768 sys-id-ext 2000)
 Address 5000.0013.0000
 Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
 Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Gi0/0	Desg	FWD	4	128.1	P2p Edge
Po1	Root	FWD	3	128.65	P2p
Po2	Altn	BLK	3	128.66	P2p

SW110#

SW110#show spanning-tree vlan 2001

VLAN2001

Spanning tree enabled protocol rstp

Root ID **Priority** **2001**
 Address 5000.0011.0000
Cost **3**
 Port 65 (Port-channel1)
 Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID **Priority** **34769** (priority 32768 sys-id-ext 2001)

SW110#

SW110#show spanning-tree vlan 2001

VLAN2001

Spanning tree enabled protocol rstp

Root ID **Priority** **2001**
 Address 5000.0011.0000
Cost **3**
 Port 65 (Port-channel1)
 Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID **Priority** **34769** (priority 32768 sys-id-ext 2001)
 Address 5000.0013.0000
 Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
 Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Gi0/1	Desg	FWD	4	128.2	P2p Edge
Po1	Root	FWD	3	128.65	P2p
Po2	Altn	BLK	3	128.66	P2p

1.4: Configure Network Services

Ensure that network services are configured at Headquarters accordingly to the following table.

VLAN	Subnet		
2000	10.1.100.0/24	10.1.100.1	10.2.255.211
2001	10.1.101.0/24	10.1.101.1	10.2.255.211

Ensure that first-hop gateways for these VLANs are configured according to the following requirements:

- Gateway virtual MAC address for VLAN 2000 must be 0000.0c9f.f0d2
- Gateway virtual MAC address for VLAN 2001 must be 0000.0c9f.f0dc
- The active gateway must send periodic packets three times faster than default
- Failure of the peer must be detected two times faster than default
- Configure authentication using the most secure method and a simple key-string of CC!Enfr4
- SW101 must be active and have a priority of 10 above the default.
- SW102 must be standby and use the default priority
- Both first-hop gateway switches must transition to active if their priority becomes superior, Ensure a minimal delay before transition to active state of 15 seconds
- The first-hop gateway must monitor the DHCP server reachability with ICMP echoes and failover if it is not available to do so, decrement priority by 20 automatically
- DHCP requests must be received by both first-hop gateway switches

Solution

SW101:

```
SW101(config)#ip dhcp relay information trust-all
```

```
SW101(config)#ip dhcp relay information option
```

```
SW101(config)#ip sla 1
```

```
SW101(config-ip-sla)#icmp-echo 10.2.255.211
SW101(config-ip-sla)#exit
SW101(config)#ip sla schedule 1 start-time now life forever
SW101(config)#track 1 ip sla 1 reachability
SW101(config - track)#exit
SW101(config)#interface vlan 2000
SW101(config-if)#standby version 2
SW101(config-if)#standby 210 ip 10.1.100.1
SW101(config-if)#standby 210 timers 1 5
SW101(config - if)#standby 210 priority 110

SW101(config - if)#standby 210 preempt delay minimum 15
SW101(config - if)#standby 210 authentication md5 key-string CCIE!nfr4
SW101(config - if)#standby 210 track 1 decrement 20
SW101(config - if)#ip helper-address 10.2255.211
SW101(config - if)#ip ospf 1 area 0
SW101(config - if)#no shutdown
SW101(config - if)#exit
SW101(config)#interface vlan 2001
SW101(config - if)#standby version 2
SW101(config - if)#standby 220 ip 10.1.101.1
SW101(config - if)#standby 220 timers 1 5
SW101(config - if)#standby 220 priority 110
SW101(config - if)#standby 220 preempt delay minimum 15

SW101(config - if)#standby 220 authentication md5 key-string CCIE!nfr4
SW101(config - if)#standby 220 track 1 decrement 20
SW101(config - if)#ip helper-address 10.2255.211
SW101(config - if)#ip ospf 1 area 0
SW101(config - if)#no shutdown
```