



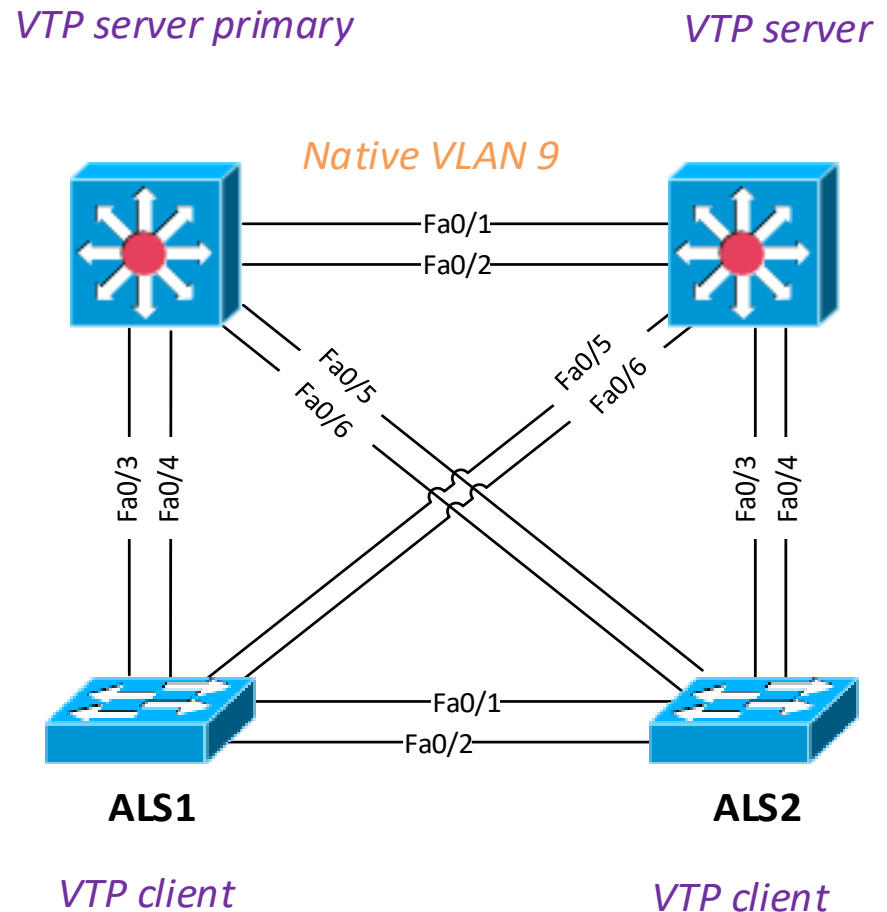
Spanning Tree Protocols



SWITCH Module 3

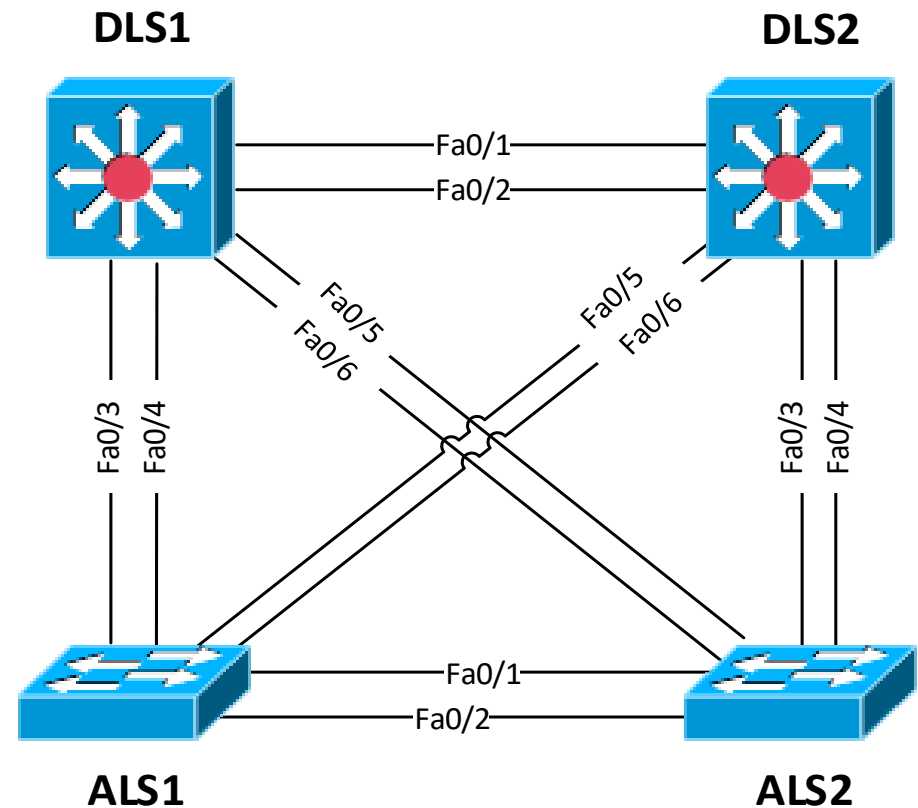
Lab 3.0: Prepare Topology

- *Establish trunks*
 - *Dot1Q*
 - *Disable DTP*
- *VTPv3*
- *Create VLANs*
 - 9 – Native
 - 10 – UIFS
 - 20 – UPSY
 - 30 – UPGM
 - 40 – UITS
 - 50 – CVT
 - 99 – Management
 - 999 – Parking Lot
- # show interfaces trunks



Lab 3.1: Draw Spanning-Tree for VLAN1

- *Who is the root bridge?*
- *What are port roles?*
- # show spanning-tree

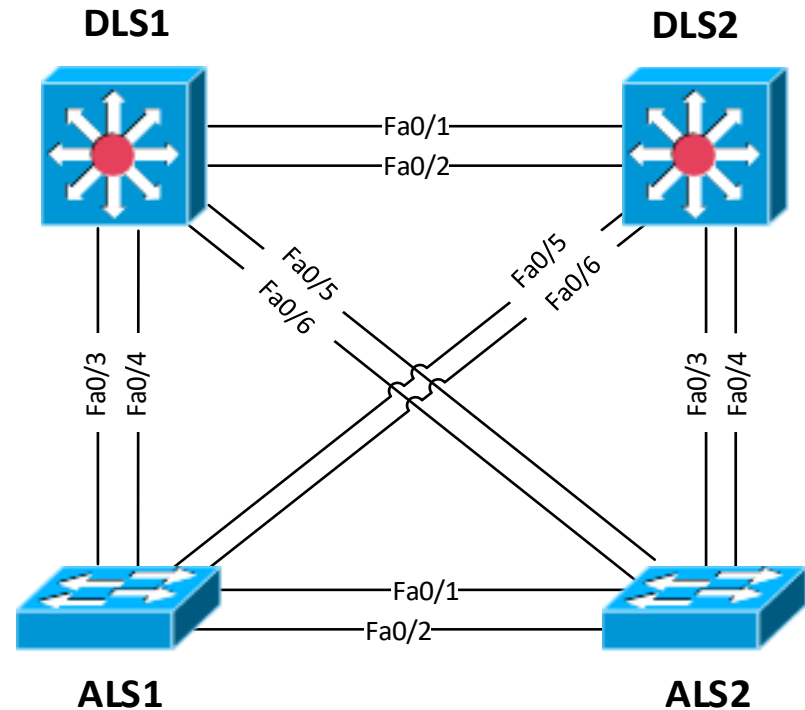


Lab 3.2: DLS* as STP Root Bridge

- *Who is the root bridge?*
- *What are port roles?*
- # show spanning-tree
- # show span root

*root pri VLAN10,20,30
root sec VLAN40,50,99*

*root sec VLAN10,20,30
root pri VLAN40,50,99*



- **DLS1:**

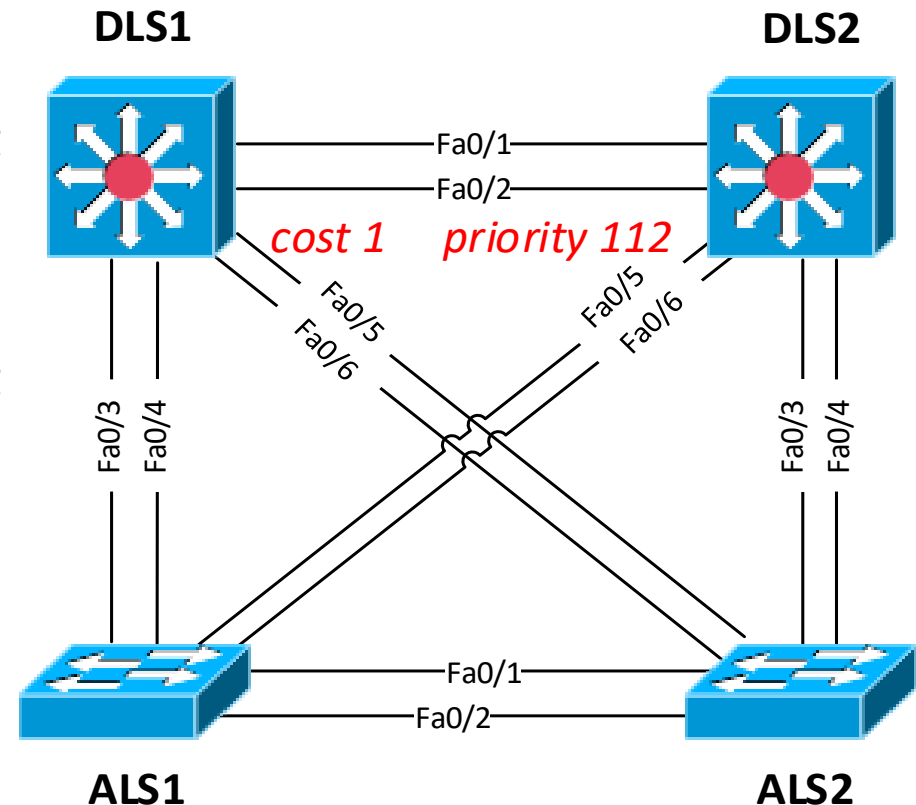
- (conf-t)# spanning-tree vlan 10,20,30 root primary
- (conf-t)# spanning-tree vlan 40,50,99 root secondary

- **DLS2:**

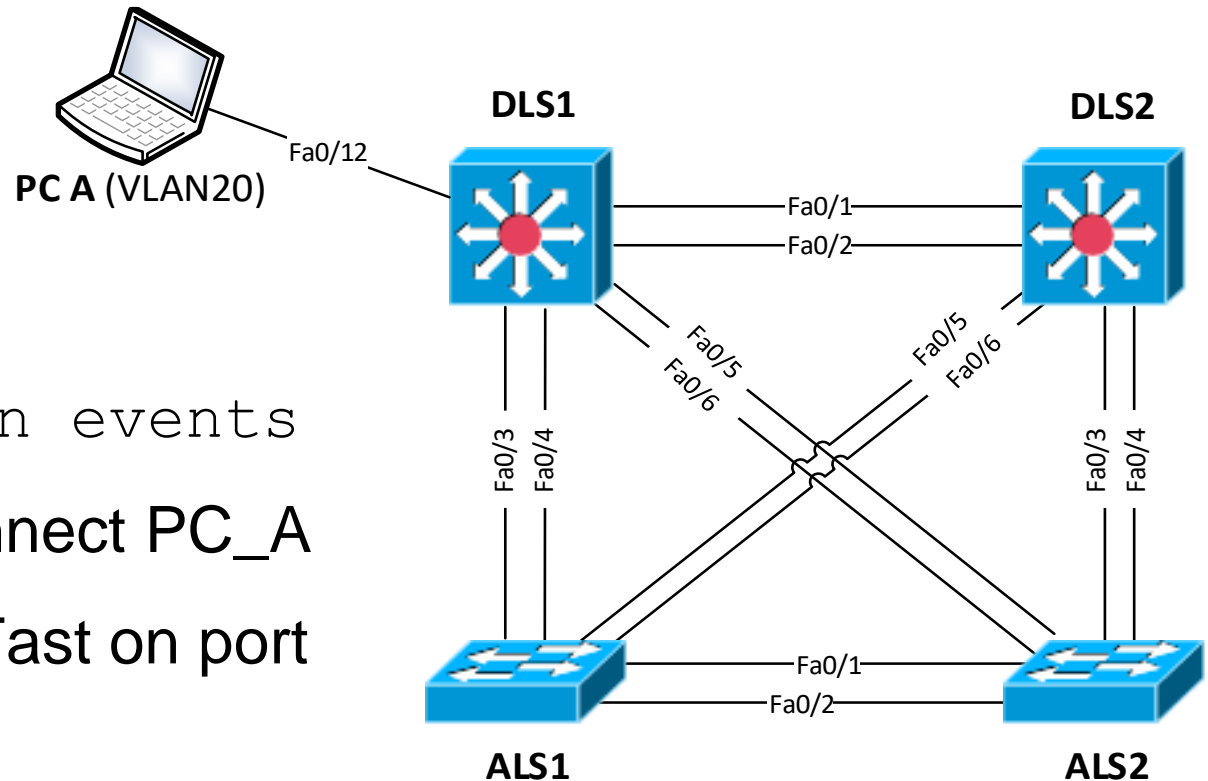
- (conf-t)# spanning-tree vlan 40,50,99 root primary
- (conf-t)# spanning-tree vlan 10,20,30 root secondary

Lab 3.3: Changing Cost and Priority

- On DLS2 secure via changing cost that Fa0/2 would be root port for VLAN10
 - `(conf-if)#
spanning-tree vlan 10 cost 1`
- On DLS1 secure via changing cost that Fa0/2 would be root port for VLAN40
 - `(conf-if)#
spann vlan 40 port-priority 64`
- `# show spanning-tree`



Lab 3.4: Understanding PortFast

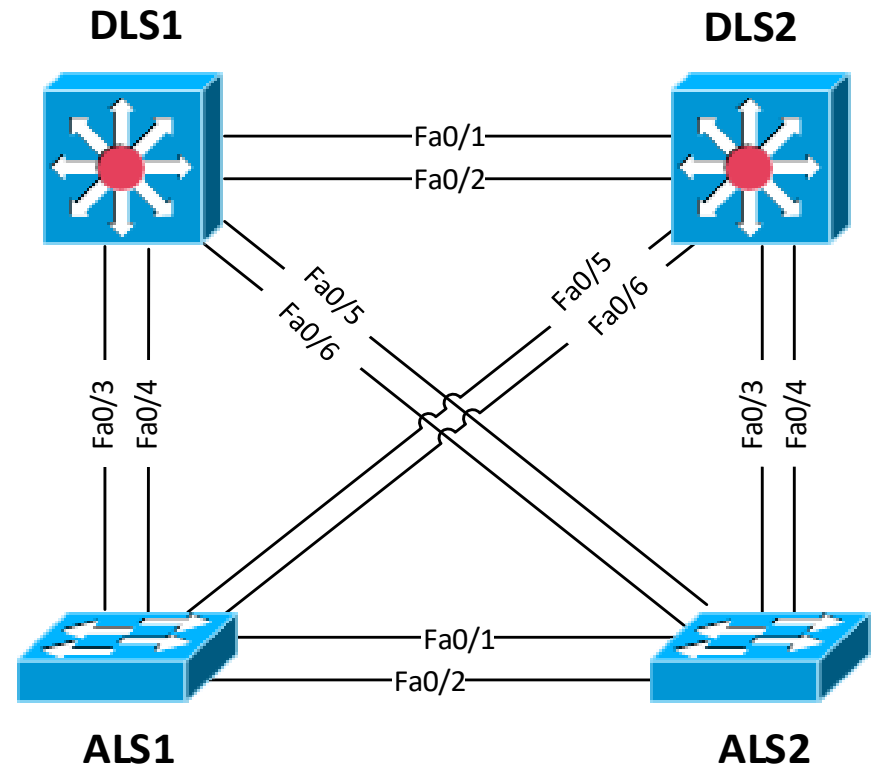


- 1) # debug span events
- 2) Connect/Disconnect PC_A
- 3) Configure PortFast on port towards client
 - (conf-if)# span portfast
- 4) Connect/Disconnect PC_A

Lab 3.5: Migrate to RSTP and Reestablish Roots

root pri VLAN10,20,30
root sec VLAN40,50,99

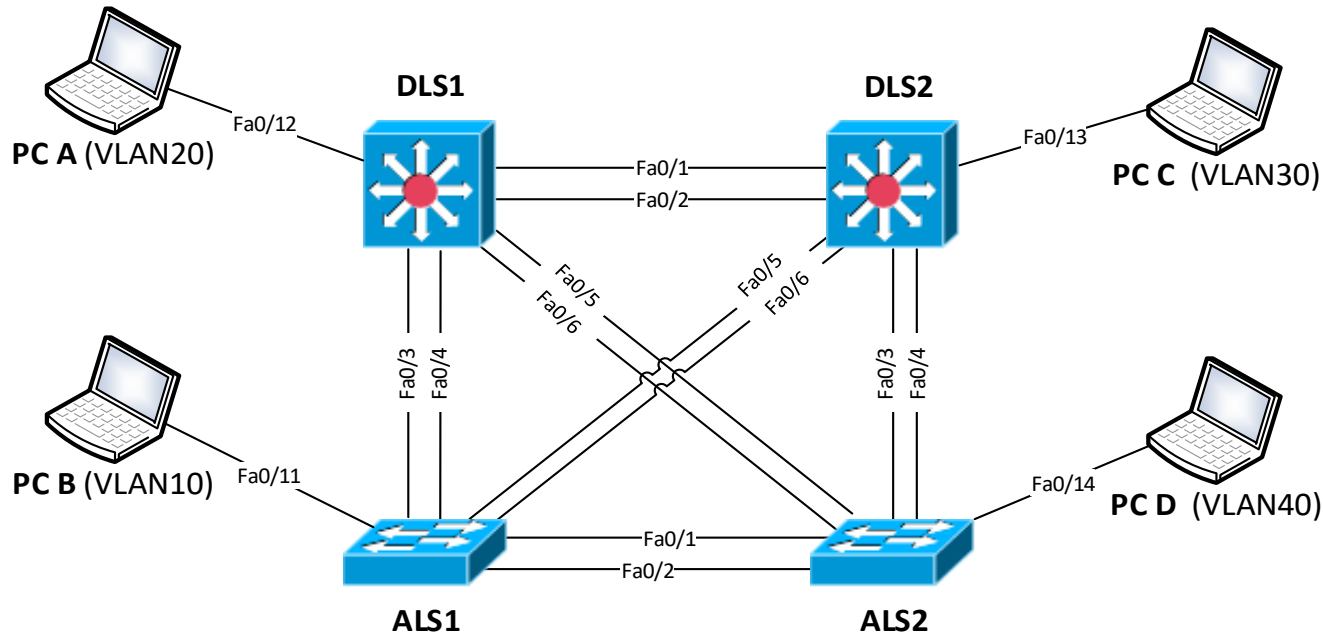
root sec VLAN10,20,30
root pri VLAN40,50,99



■ *LS*:

- (conf)# spanning-tree mode rapid-pvst
- # show spanning-tree [detail]

Lab 3.6: Add Access Ports



- On each switch add port:

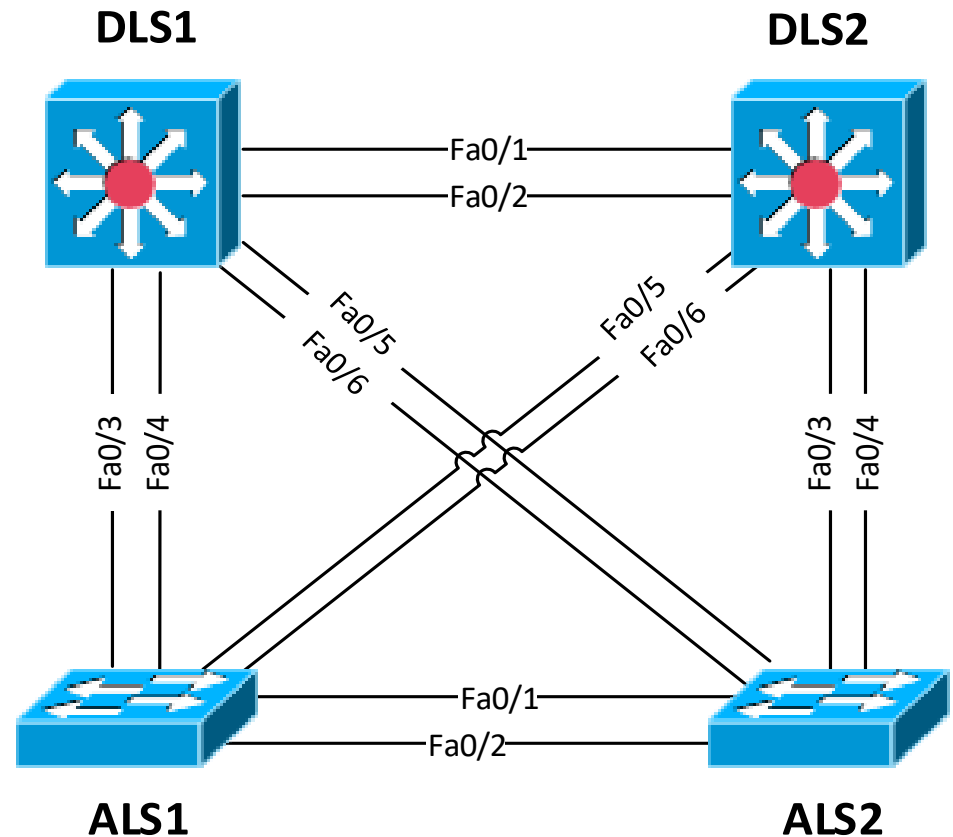
- Fa0/11 to access VLAN10
- Fa0/12 to access VLAN20
- Fa0/13 to access VLAN30
- Fa0/14 to access VLAN40

- *LS*:

- (conf-if) switchport host
- (conf-if) sw access vlan X

Lab 3.7: Migrate to MSTP

- *Who is the root bridge?*
- *What are port roles?*



- ***LS*:**
 - `(conf)# spanning-tree mode mst`
 - `# show spanning-tree [mst] [detail]`

Lab 3.8: Divide VLANs into Instances

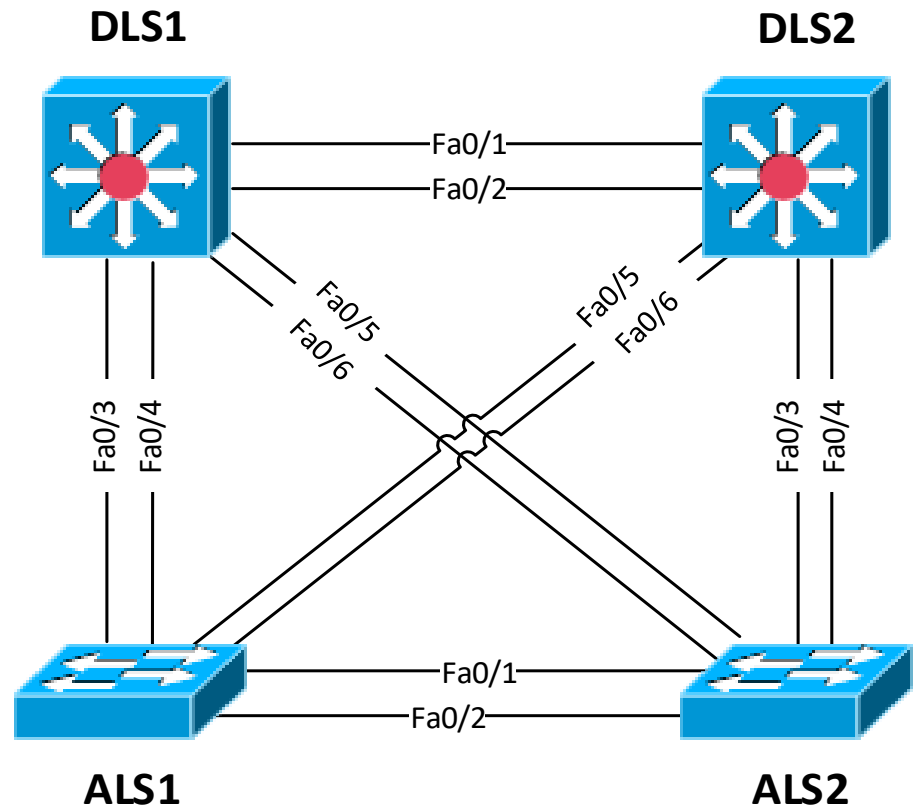
- Create MST configuration:

- Region name = FIT
- Revision number = 123
- Instance id 1
 - VLANs 10, 20, 30
- Instance id 2
 - VLANs 40, 50, 99

- *LS*

- (conf) #
spanning mst config
name FIT
revision 123
instance 1 vlan 10,20,30
instance 2 vlan 40,50,99
- # show span mst config

- *Who is the root bridge?*
- *What are port roles?*
- # show spanning-tree [mst]

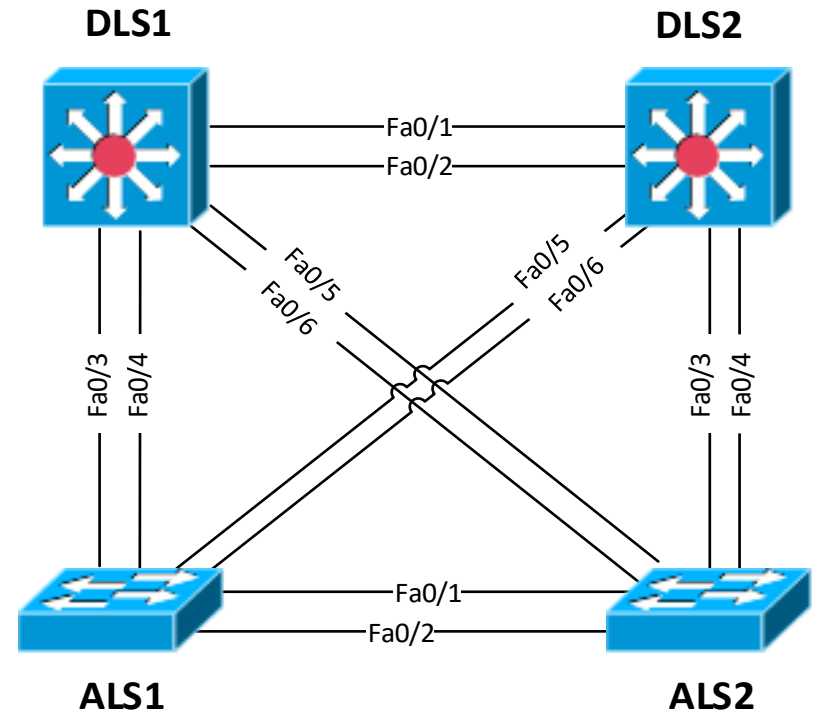


Lab 3.9: Reestablish Roots

- *Who is the root bridge?*
- *What are port roles?*
- # show spanning-tree [mst]

root pri instance 1
root sec Instance 2

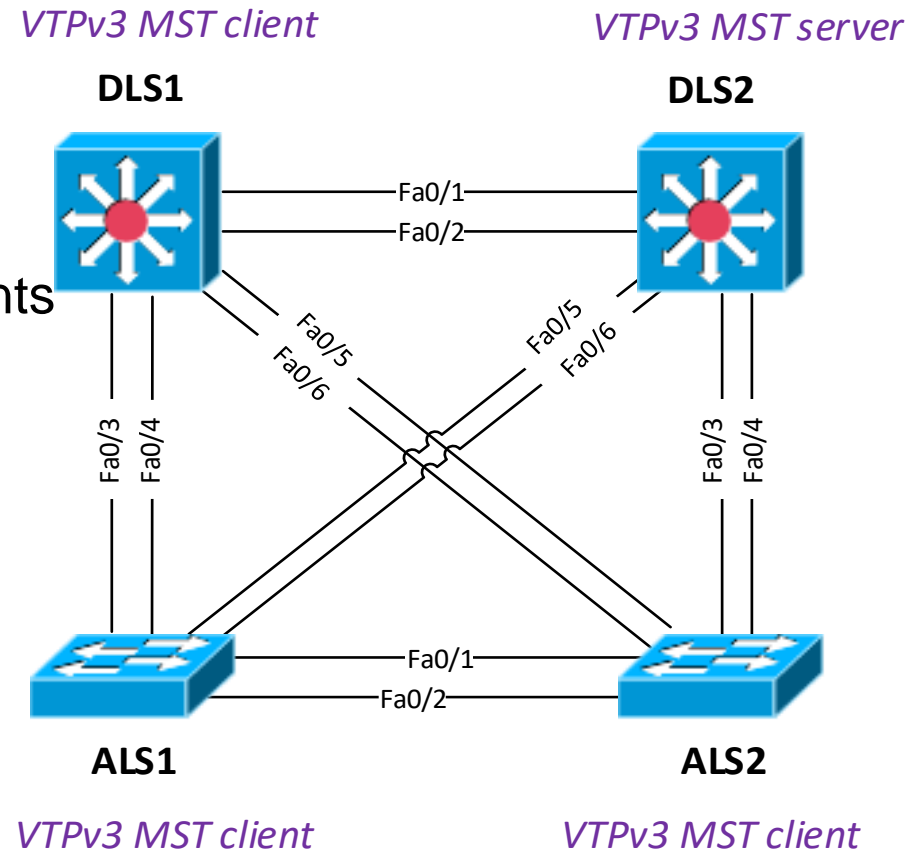
root sec instance 1
root pri instance 2



- DLS1:
 - (conf-t)# spanning-tree mst 1 root primary
 - (conf-t)# spanning-tree mst 2 root secondary
- DLS2:
 - (conf-t)# spanning-tree mst 2 root primary
 - (conf-t)# spanning-tree mst 1 root secondary

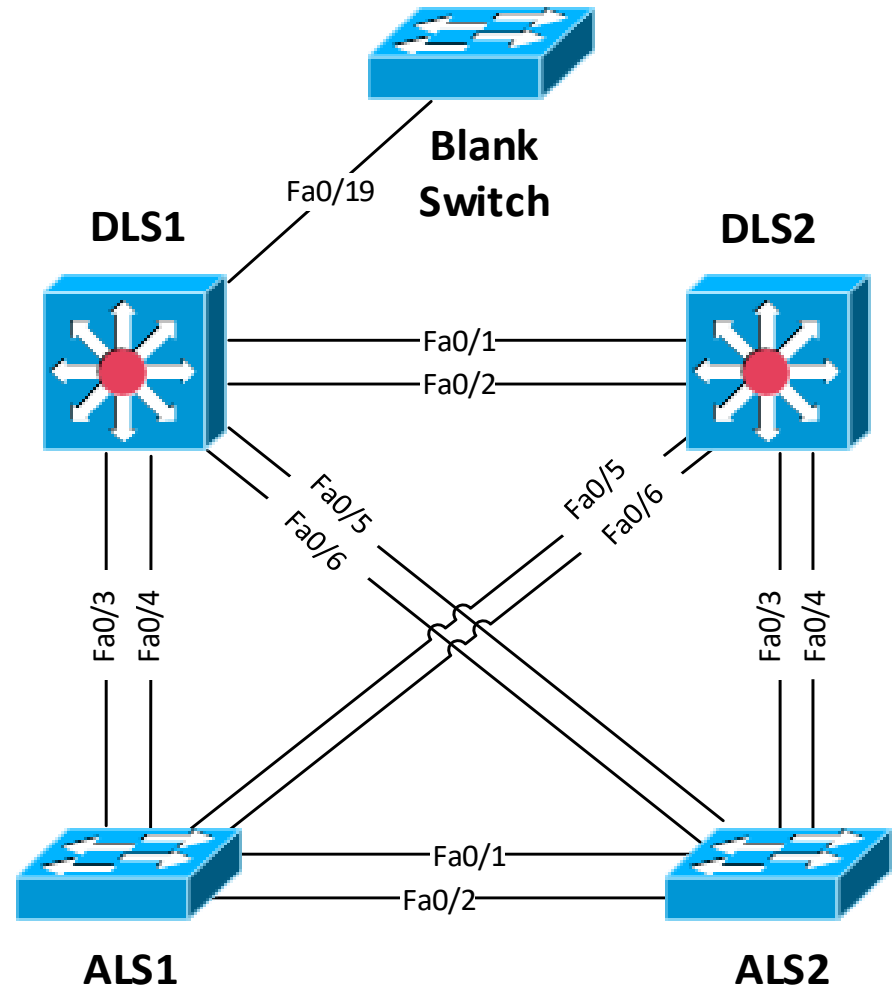
Lab 3.10: MSTP Configuration via VTPv3

- 1) Use DLS2 as primary MST server
 - (conf)# vtp mode server mst
 - # vtp primary mst
- 2) Configure DLS1, ALS* as MST clients
 - (conf)# vtp mode client mst
- 3) Add new MST instance 3 on DLS2 and associate with it VLAN 99
 - (conf)# spanning mst config
 - instance 3 vlan 99
- 4) Verify configuration
 - # show span mst config

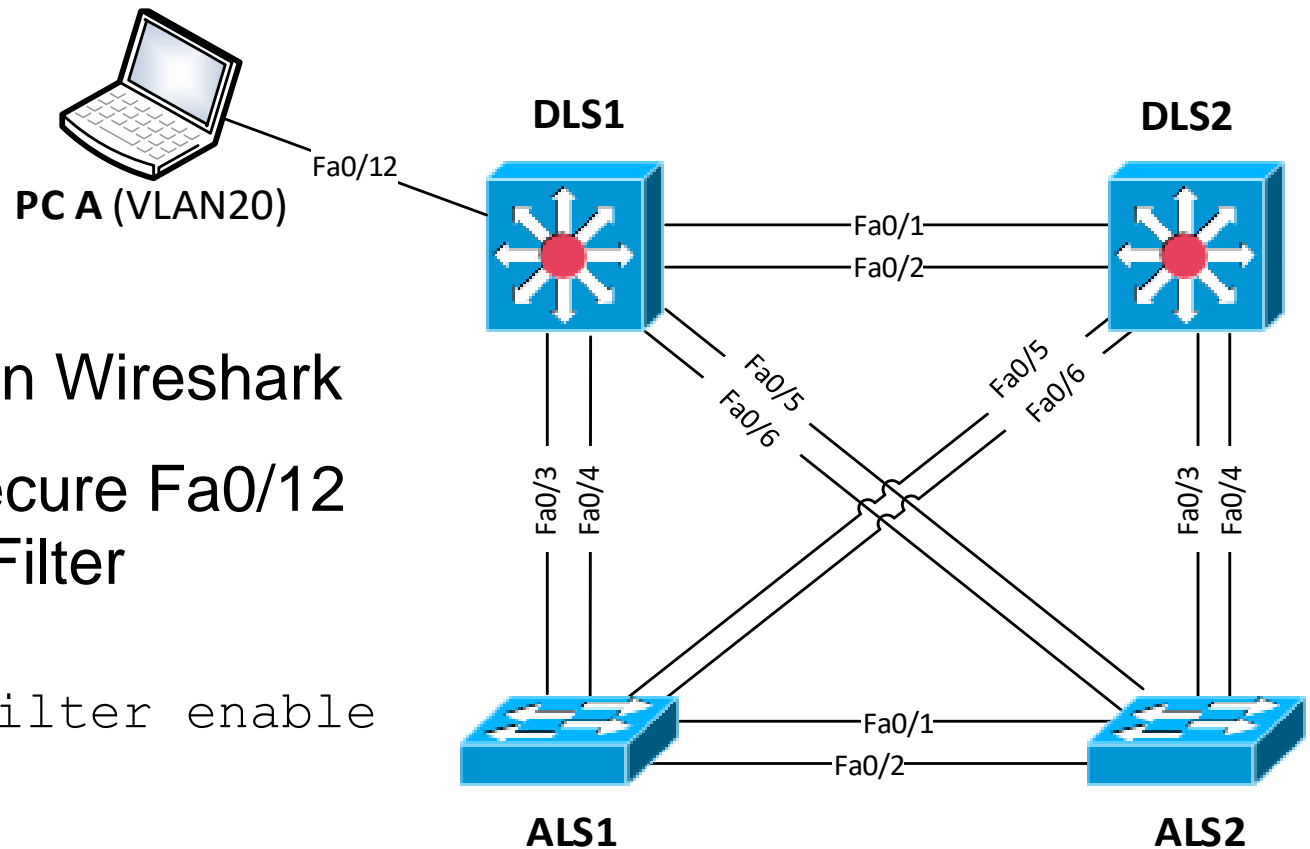


Lab 3.11: Understanding BPDU Guard

- 1) On DLS1 configure Fa0/19 to be access port with portfast capability
- 2) Connect Blank Switch
- 3) Verify port role
 - `#show spanning-tree`
- 4) Disconnect Blank Switch
- 5) On DLS1 secure Fa0/19 with BPDU Guard
 - `(conf-if) # span bpduguard enable`
- 6) Connect Blank Switch
- 7) Verify
 - `show interface switchport`
 - `show ip interface brief`
- 8) Configure it globally on access ports
 - `(conf) # span portfast bpdupfilter default`



Lab 3.12: Understanding BPDU Filter



- 1) On PC_A run Wireshark
- 2) On DLS1 secure Fa0/12 with BPDU Filter
 - `(conf-if) # span bpdupfilter enable`

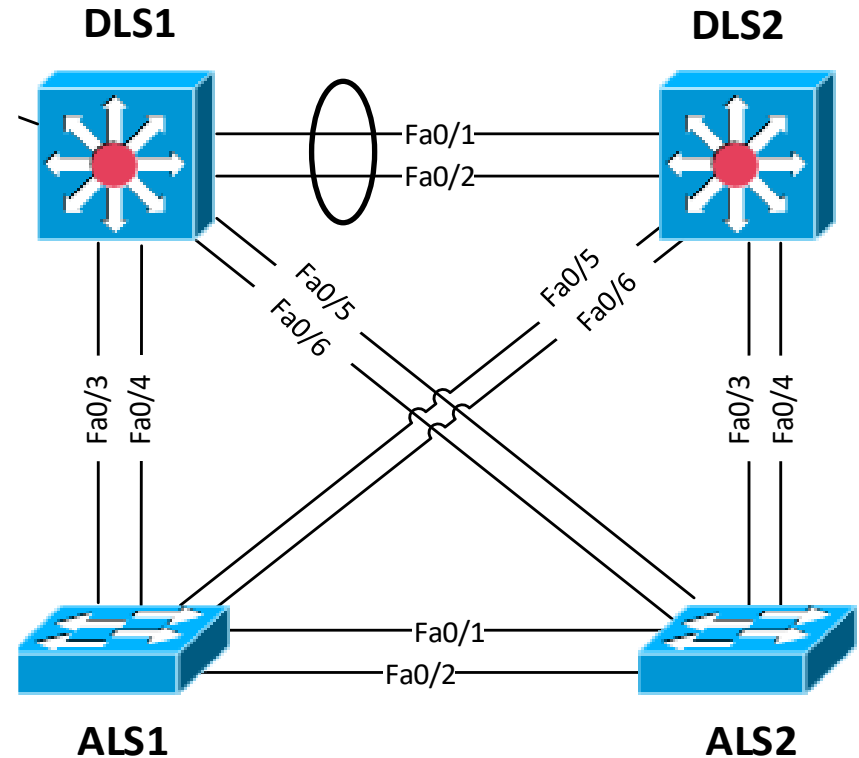
Lab 3.13: Etherchannel in STP

1) Observer STP topology before Etherchannel

- # sh int trunk
- # sh spanning-tree

2) Bind links between DLS1 and DLS2 into Etherchannel

3) Observer STP topology after Etherchannel



Lab 3.14: Understanding Root Guard

- 1) Protect trunks leading towards ALS2 on DLS*, ALS1 with Root Guard

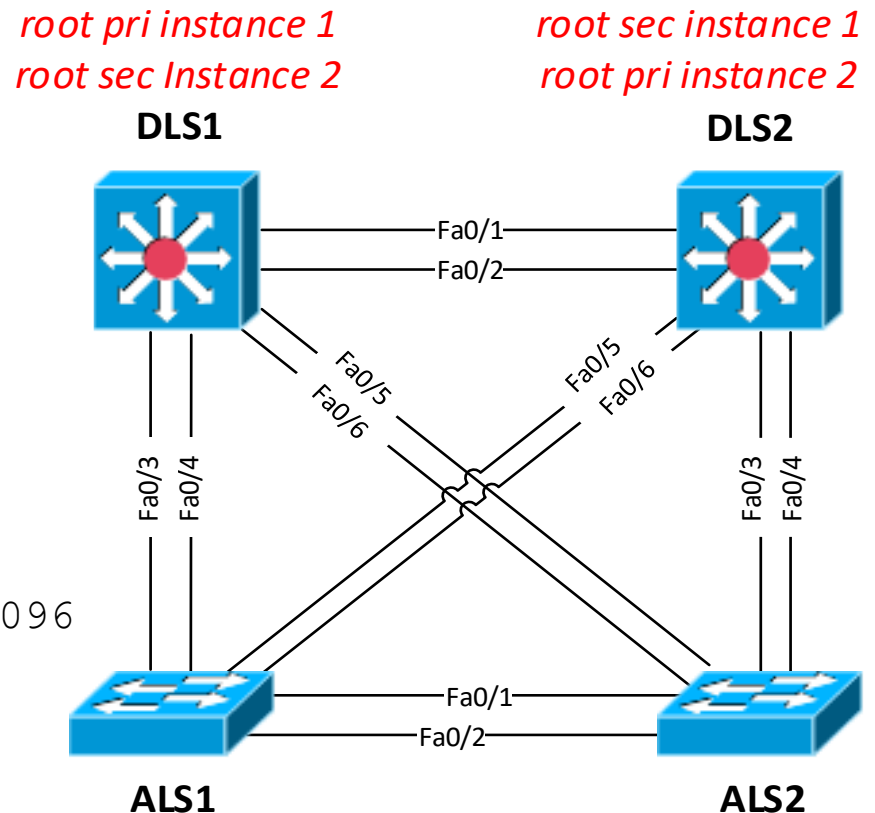
- `(conf-if)# spanning-tree guard root`

- 2) Configure ALS2 as a fake root bridge for all instances

- `(conf)# spanning-tree mst X priority 4096`

- 3) Verify

- `# show int stat err-disabled`





Labs created by [Vladimír Veselý](#) for C2P practice.

The last update: 2016-10-20