LAB SESSION WEEK 9 – TUTORIAL NOTES

GENERAL INFO

1. Remember to complete VLSM Test 2 this week
2. Group Lab Activity 3 next week - MUST attend
3. Final Assessment Period dates posted.

   Final Oral Defence on 15th November

   Final Skills Demonstration on 17th November

   Student timetable for both have been posted
4. Final VLSM Defence in Week 12

REVIEW FROM LAST WEEK

1. STP used to break L2 loops in switched topologies with a physical loop

   STP achieves this by logically blocking alternative paths

   If active path becomes unavailable, STP will unblock an alternative path
2. 3-step STP algorithm to determine the active/blocked paths

   Root Bridge Selection

   Root port selection

   Designated and Non-Designated port selection
3. 2960s run PVST by default. 3650s in Rapid PVST by default.

   Change mode → **spanning tree mode** command

   Validate STP version → **running-config** or **show spanning-tree**
4. To manipulate the root bridge selection

   Change the bridge priority → **spanning-tree vlan <ID> priority**

   Use the explicit **spanning-tree vlan <ID> root primary** → changes priority to **24576**
5. Define a secondary root bridge

   Change the bridge priority → **spanning-tree vlan <ID> priority**

   Use the explicit **spanning-tree vlan <ID> root secondary** → changes the priority to **28672**
6. Per-VLAN STP Bridge ID

   2 bytes Bridge Priority broken into 4 bits priority and 12 bits VLAN ID

   Bridge Priority are the 4 higher order bits. It can only take certain values
7. PortFast used on switchports connected to end hosts to speed access to the network

   Per-interface command

   Or globally configure → **spanning-tree portfast default**

8. BPDU Guard should be enable on PortFast ports

   Per-interface command

   Or globally configure → **spanning-tree portfast bpduguard default**

   Native VLAN carries untagged traffic

   Must match at both ends of a link

   If EtherChannel → must match across all links

   Is not a requirement to change it when configuring EtherChannels → only do if instructed

   Good practice to configure something other than the default VLAN 1

9. Lets Lab SU-7a topology

   Not everyone one will have the same Root bridge.

   Per-VLAN STP Bridge ID

   2 bytes (16 bits) Bridge Priority → 4 bits priority and 12 bits VLAN ID

   Bridge Priority 4 higher order bits → can only take certain values

   15 14 13 12 (12 bits of VLAN ID)

   0 0 0 1

   0 0 1 0

   0 0 1 1

   0 1 0 0

   0 1 0 1

   0 1 1 0 → 24576

   0 1 1 1 → 28762

1 0 0 0 → 32768 (+1) = 32769

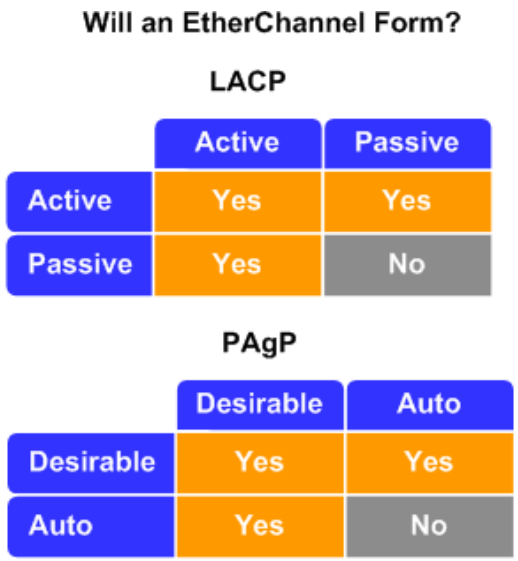
32768 (+10) = 32778

TUTORIAL

EtherChannel basics

10. EtherChannel → aggregate switchports to increase throughput
11. For Switches interconnecting with multiple physical ports, instead of STP blocking one, EtherChannel could be a better option.
12. For the aggregation to happen the two ends of the links need to exchange control messages → using LACP or PAgP
13. LACP (Link Aggregation Control Protocol)
    - IEEE standard → inter-vendor operability
    - Up to 16 ports per channel (max. 8 active and 8 standby)
    - Recommended by Cisco
14. PAgP (Port Aggregation Protocol)
    - Cisco proprietary → only between Cisco devices
    - Not recommended by Cisco

Mode	Protocol	Description
Auto	PAgP	Sets the interface to respond to PAgP negotiation packets, but the interface will start negotiations on its own.
Desirable	PAgP	Sets the interface to actively attempt to negotiate a PAgP connection.
On	EtherChannel	Forces the connection to bring all links up without using a protocol to negotiate connections. This mode can only connect to another device that is also set to on. When using this mode, the switch does not negotiate the link using either PAgP or LACP.
Active	LACP	Sets the interface to actively attempt to negotiate connections with other LACP devices.
Passive	LACP	Sets the interface to respond to LACP data if it receives negotiation requests from other systems.



EtherChannel Configuration considerations

1. Interfaces types cannot be mixed
2. Speeds and duplex must match among all member ports

   Note: you can mix FastEthernet, GigaEthernet and TenGigaEthernet ports, but all must operate at the lower speed among them
3. Switchport settings must match among all member ports

   Switchport mode (trunk or access)

   VLAN range if trunk ports (active VLANs in the trunk and native VLANs)

   Access VLAN if access ports

   The switchport settings of the port-channel interface also needs to be consistent (mode, VLAN range, native VLAN)
4. The channel ID needs to be the match **locally** for members in the same bundle, but does not need to match at the remote switch
5. Best practice:

   Configure the switchport settings of each member first

   Make sure the switchport settings are as desired and match for all members (for trunk links check they have trunked)

   Shutdown all the members of the channel (at least at one end)

   Make them part of the desired group channel → **channel-group <n> mode <mode>** command (with compatible modes)

   Re-enable the ports

   Check the channel status with the **show etcherchannel summary** command

   Note: this is not the order they follow in Lab 9a, but recommended for your skills assessments.

EtherChannel Troubleshooting

1. When checking the EtherChannel summary output status, **read the status codes carefully**

2. In our labs, we typically bundle trunk links and the code status should be:
   On the Por-Channel: **SU** (S for Layer 2 and U for in-use)
   On the member interfaces: **P** (in bundle)

3. Things to check for:
   Switchport mode
   Allowed VLAN range
   Native VLAN
   Channel group mode