Department of Computer Science and Engineering
Institute of Technical Education & Research, SOA, Deemed to be University

WEEK-END ASSIGNMENT-09

Computer Networking Workshop (CSE 4541)

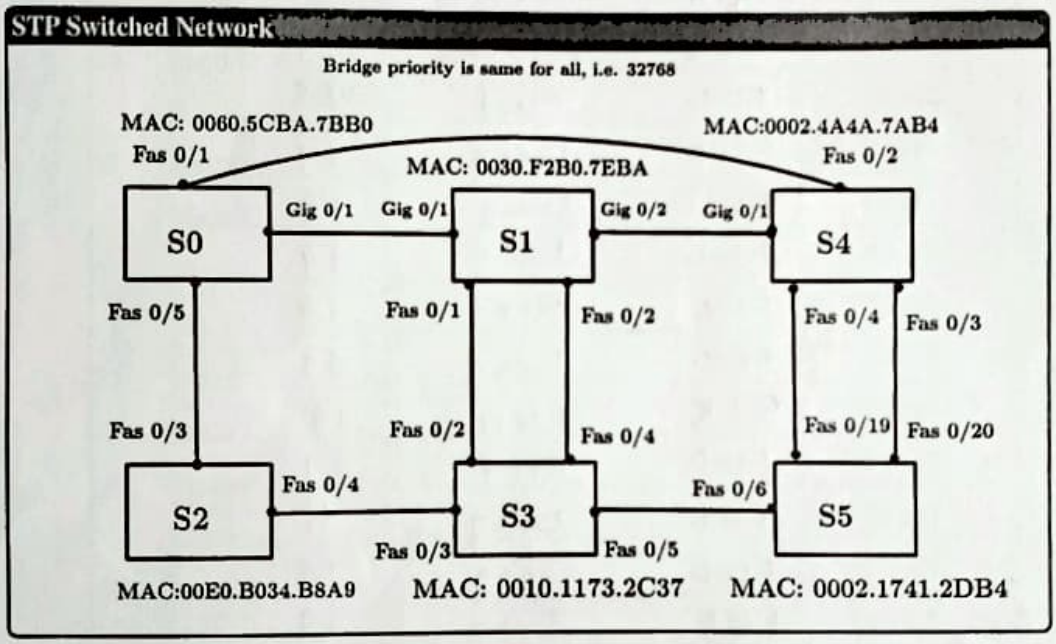
Publish on: 06-05-2024 **Submission on:** 11-05-2024
Course Outcome: CO_3 **Program Outcome:** PO_4 **Learning Level:** L_3

Experiment with Spanning Tree Protocol (STP) for Layer-2 Loop Avoidance

STP creates a spanning tree that characterizes the relationship of nodes within a network of connected layer-2 bridges, and disables those links that are not part of the spanning tree, leaving a single active path between any two network nodes.

So, in this assignment, you will determine the root bridge, non-root bridge, root port, designated port and block ports to avoid loop in the given switched network.

STP Switched Network



Determine Root Bridge and Non-Root Bridge Switches	Remarks
1. Root Bridge Switch 5 with MAC: 0002.1741.2DB4	
2. Non-root bridge Switch 0, Switch 1, Switch 4, Switch 2, Switch 3.	

Bridge Port(s) Determination **Remarks**

Switch	Port	States	Role	Cost
S0	Fas 0/1	BLK	Altn	19
	Fas 0/5	FWD	Desg	19
	Gig 0/1	FWD	Root	4
S1	Gig 0/1	Desg	FWD	4
	Gig 0/2	Root	FWD	4
	Fas 0/1	Altn	BLK	19
	Fas 0/2	Altn	BLK	19
S2	Fas 0/3	BLK	Altn	19
	Fas 0/4	FWD	Root	19
S3	Fas 0/2	FWD	Desg	19
	Fas 0/3	FWD	Desg	19
	Fas 0/4	FWD	Desg	19
	Fas 0/5	FWD	Root	19
S4	Fas 0/2	FWD	Desg	19
	Fas 0/3	BLK	Altn	19
	Fas 0/4	FWD	Root	19
	Gig 0/1	FWD	Desg	4
~~S0~~ S5	Fas 0/19	FWD	Desg	19
	Fas 0/20	FWD	Desg	19
	Fas 0/6	FWD	Desg	19

Now, the bridge priority for **Switch- S0** is set to 4096. So, **Switch- S0** is the root bridge. Determine the following considering **Switch- S0** as the root-bridge;

Determine Root Bridge and Non-Root Bridge Switches **Remarks**

1. Root Bridge

   Switch 0

2. Non-root bridge

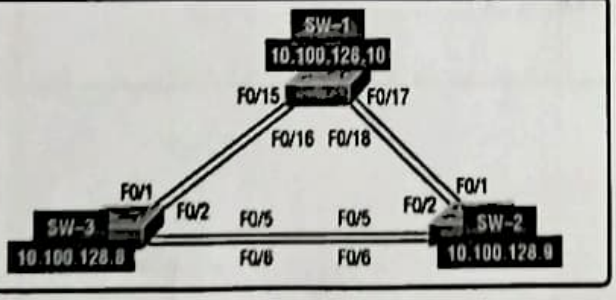
   Switch 1, Switch 2, Switch 3, Switch 4, Switch 5

Re-evaluate Bridge Port(s) , where Switch-So is the root bridge **Remarks**

Switch	Port	States	Role	Cost
S0	Fas 0/1	FWD	Desg	19
	Fas 0/5	FWD	Desg	19
	Gig 0/1	FWD	Desg	4
S1	Gig 0/1	FWD	Root	4
	Gig 0/2	FWD	Desg	4
	Fas 0/1	FWD	Desg	19
	Fas 0/2	FWD	Desg	19
S2	Fas 0/3	FWD	Root	19
	Fas 0/4	FWD	Desg	19
S3	Fas 0/2	FWD	Root	19
	Fas 0/3	BLK	Altn	19
	Fas 0/4	BLK	Altn	19
	Fas 0/5	FWD	Desg	19
S4	Fas 0/2	BLK	Altn	19
	Fas 0/3	FWD	Desg	19
	Fas 0/4	FWD	Desg	19
	Gig 0/1	FWD	Root	4
~~S0~~ S5	Fas 0/19	BLK	Altn	19
	Fas 0/20	FWD	Root	19
	Fas 0/6	BLK	Altn	19

Determine the number of block, **BLK**, ports for the given network.

Mark the Bridge Ports **# of BLK**



Mark the Bridge Ports

MAC Address of switches:

SW-1: 0010.1173.2C37

SW-2: 0060.5CBA.7BB0

SW-3: 0002.4A4A.7AB4

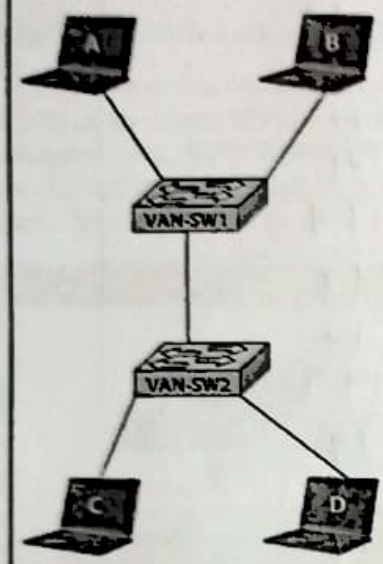
SW-3 is a Root Bridge

There are 4 BLK ports

Monitoring STP

In this exercise, you are instructed to use the following network configuration to verify that a port was placed in a blocking state with STP.

Switched Network



Task to be performed

- First connect the two switches with the proper cable and wait for some times (.e. around 50 sec) to observe both ends of the link turn green.
- Now, create another link between VAN-SW1 and VAN-SW2 using port 24 on each switch with a crossover cable. Wait a minute around, and notice that one of the links will stay amber as it is placed in a blocking state to prevent the loop.
- Run `show spanning-tree vlan 1` command to view the spanning tree setup.
- Record the following information about VAN-SW1:
  - Root ID Priority: 32769
  - Root ID Address: 0030.A369.6106
  - Bridge ID Priority: 32769
  - Bridge ID Address: 0030.A369.6106
- Is VAN-SW1 the root bridge (the previous values recorded are the same if it is)? Yes
- Look at the status of the interfaces of the command `show spanning tree` and record the role of each:
  - VAN-SW1 Port 1: FWD
  - VAN-SW1 Port 24: FWD

Task to be performed

- Record the following information about VAN-SW2:
  - Root ID Priority: 32769
  - Root ID Address: 0030.A369.6106
  - Bridge ID Priority: 32769
  - Bridge ID Address: 00D0.BCA2.3880
- Is VAN-SW2 the root bridge (the previous values recorded are the same if it is)? NO
- Look at the status of the interfaces of the command `show spanning tree` and record the role of each:
  - VAN-SW2 Port 1: FWD
  - VAN-SW2 Port 24: BLK
- Look at the LEDs on each of the connected interfaces on both switches and write the interface in a blocking state. Fa 0/24 of VAN-SW2
- Now, You are going to make switch with BLK port to be the root bridge by changing the priority (this will cause all ports on this switch to be in a forwarding state while the blocking state port will move to the other switch). Use the command **spanning-tree vlan 1 root primary**

Task to be performed

- After changing the root bridge, record the following information about VAN-SW1:
  - Interface: Fa0/1 port role: Root port state: FWD
  - Interface: Fa0/24 port role: Altn port state: BLK
- Also, record the following information about VAN-SW2:
  - Interface: Fa0/1 port role: Desg port state: FWD
  - Interface: Fa0/24 port role: Desg port state: FWD

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WEEK-END ASSIGNMENT-10

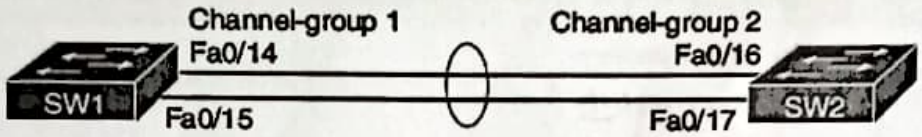
Computer Networking Workshop (CSE 4541)

Publish on: 10-05-2024 **Submission on:** 12-05-2024
Course Outcome: CO_3 **Program Outcome:** PO_4 **Learning Level:** L_4

Experiment with Layer 2 EtherChannel

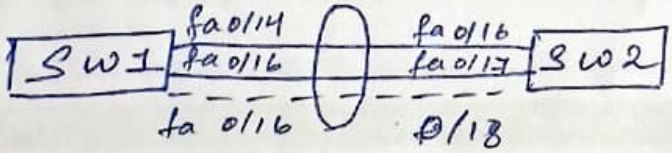
An EtherChannel bundles together multiple Ethernet ports between devices that appears to be a single logical interface. From STPs perspective, it sees the EtherChannel as a single logical connection between the connected devices, which means that you can actually use all of the individual connections, simultaneously, in the channel you have created. In this assignment, we will configure and verify layer 2 etherChannel to achieve higher bandwidth for certain kinds of connections in a network.

Swithed network for EtherChannel



EtherChannel Network reconfigure **Remarks**

- Consider the above network topology. Now, use two more crossover cables to connect ports between the two switches. Draw/paste the updated diagram with interface number.



Configure the interfaces at SW1 for EtherChannel **Remarks**

```
SW1>enable
SW1#configure terminal
```

int range fa0/14-16
channel group 1 mode desirable
exit

Configure the interfaces at SW2 for EtherChannel — **Remarks**

```
SW2>enable
SW2#configure terminal
```

int range fa 0/16 - 18
channel group 2 mode desirable
exit

View the EtherChannel Summary information at SW1 — **Remarks**

```
SW1>enable
SW1#show etherchannel summary
```

- Group: Port channel 1
- Protocol PAgP
- Ports Po1(SU) - Fa0/14(P) Fa0/15(P) Fa0/16(P)

View & Write the status of the port-channel 1 interface at SW1 — **Remarks**

```
SW1>enable
SW1#show interfaces port-channel 1
```

Port-channel is up, line protocol is up (connected)

```
Note:The above command could also be abbreviated as
   show interfaces po1
```

```
SW1>enable
SW1#show interfaces po1
```

Port-channel is up, line protocol is up (connected)

View the EtherChannel Summary information at SW2 | **Remarks**

```
SW2>enable
SW2#show etherchannel summary
```

- Group: Port channel 2
- Protocol PAgP
- Ports Po2(SU) fa0/16(P) fa 0/17(P) fa 0/18(P)

View & Write the status of the port-channel 2 interface at SW2 | **Remarks**

```
SW2>enable
SW2#show interfaces port-channel 2
```

Port channel2 is up . Protocol is up (connected)

```
Note:The above command could also be abbreviated as
   show interfaces po2
```

```
SW2>enable
SW2#show interfaces po2
```

port channel 2 is up. Protocol is up (connected)

- Write the reported bandwidth at SW1 for interface po1: 400000 Kbit
- Write the reported bandwidth at SW2 for interface po2: 400000 Kbit
- Write the reported bandwidth at SW1 for interface Fa0/14: 100000 Kbit
- Write the reported bandwidth at SW2 for interface Fa0/16: 100000 Kbit
- **Observations-** Bandwidth at physical interface vs port-channel interface: Bandwidth of port channel >= all connected ports in that channel.

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WEEK-END ASSIGNMENT-11A

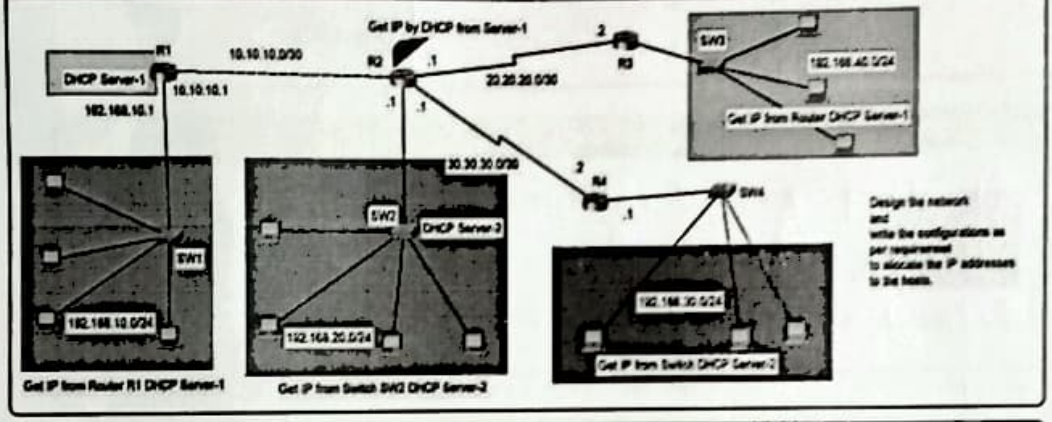
Computer Networking Workshop (CSE 4541)

Publish on: 13-05-2024 **Submission on:** 15-05-2024
Course Outcome: CO_4 **Program Outcome:** PO_4 **Learning Level:** L_4

Configuring DHCP Services to assign automatic IPs to Hosts

In this exercise you will configure R1 and switch SW2 as a DHCP server(s) on CISCO devices to provide IP addresses to the specified networks as shown in the below topology. Additionally, configure the router as DHCP client.

Network Topology for DHCP configuration



Configure the router, R1, interfaces manually **Remarks**

```
R1>en
R1#config t
R1(config)## int gig 0/0 10
R1(config-if)## ip address 192.168.10.1 255.255.255.0
R1(config-if)## exit
R1(config)## int gig 0/0/1
R1(config-if)# ip address 10.10.10.0 255.255.255.252
R1(config-if)#exit
R1(config)## do wr
```

Configure the router, R3 and R4, interfaces manually with the specified IPs **Remarks**

Router3

```
en
config t
int gig 0/0/0
ip address 20.20.20.2 255.255.255.252
exit
int gig 0/1/1
ip address 192.168.40.1 255.255.255.0
exit
```

Router4

```
en
config t
int gig 0/0/0
ip address 192.168.30.1 255.255.255.0
no shutdown
exit
int se 0/0/0
ip address 30.30.30.0
255.255.255.252
no shutdown
exit.
```

Configure the router, R2, interfaces manually with the specified IPs except One

```
en
configt
int se 0/0/1
ip address 30.30.30.2 255.255.255.252
noshutdown
exit
int se 0/0/0
ip address 20.20.20.2 255.255.255.252
noshutdown
exit
```

```
int gig 0/0/0
ip address 10.10.10.2 255.255.255.252
no shutdown
exit
int gig 0/0/1
ip address 192.168.20.1
                255.255.255.0
noshutdown
exit
dowr
```

Configure R1 as DHCP server to provide IP for 192.168.10.0/24

```
ip dhcp pool Routerline
network 192.168.10.0 255.255.255.0
default-router 192.168.10.1
exit
dowr
ip dhcp exclude-address 192.168.10.1
```

Configure R1 as DHCP server to provide IP for 10.10.10.0/30

```
ip dhcp pool RouterOneTwo
network 10.10.10.0 255.255.255.252
default-router 10.10.10.1
exit
dowr
ip dhcp excluded-address 10.10.10.1
```

sw2

Configure Switch, SW1 , as DHCP server to provide IP for 192.168.30.0/24

```
ip dhcp pool two
network 192.168.30.0  255.255.255.0
default-router 192.168.30.1
exit
do wr

ip dhcp exclude-address 192.168.30.1
```

Add the require routing over the Netwrok

Router1

```
en
config t
router rip
Network 192.168.20.0/24
Network 30.30.30.0/30
Network 20.20.20.0/30
Network 192.168.40.0/24
Network 192.168.30.0/24
exit
do wr
```

Router3

```
en
config t
Router Rip
Network 30.30.30.0/30
Network 192.168.30.0/24
Network 192.168.20.0/24
Network 10.10.10.0/30
Network 192.168.10.0/24
exit
do wr
```

Router 2

```
en
config t
router rip
Network 192.168.30.0/24
Network 192.168.40.0/24
Network 192.168.10.0/24
exit
do wr
```

Router 4

```
en
config t
Router rip
Network 20.20.20.0/30
Network 192.168.40.0/24
Network 192.168.20.20/24
Network 10.10.10.0/30
Network 192.168.10.0/24
exit
do wr
```

910-2

Configure Switch, SW1 , as DHCP server to provide IP for 192.168.20.0/24

```
ip dhcp pool one
network 192.168.20.0 255.255.255.0
default-router 192.168.20.1
exit
do wr
ip dhcp excluded-address 192.168.20.1
```

Configure Route, R1 , as DHCP server to provide IP for 192.168.40.0/24

```
ip dhcp pool RouterShare
network 192.168.40.0 255.255.255.0
default-router 192.168.40.1
exit
do wr
ip dhcp excluded-address 192.168.40.1
```

Command to make R2 as DHCP client to get IP from 10.10.10.0/30

```
en
config t
 int gig 0/0/0
 ip address dhcp
 No shutdown
```

For verification
show ip interface brief

- Same commands for restoring the interface of Router 2

Verify the DHCP configurations, POOLS and Bindings

show ip dhcp pool :- verification

Bindings
show ip dhcp binding.

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