- Lab 6 : Routing and switching
- Lecturer : Prof. Oumaima FADI
- T.A: Prof. Abdoulghaniyu HARAZEEM

Lab 6 – Routing and switching

Objective:

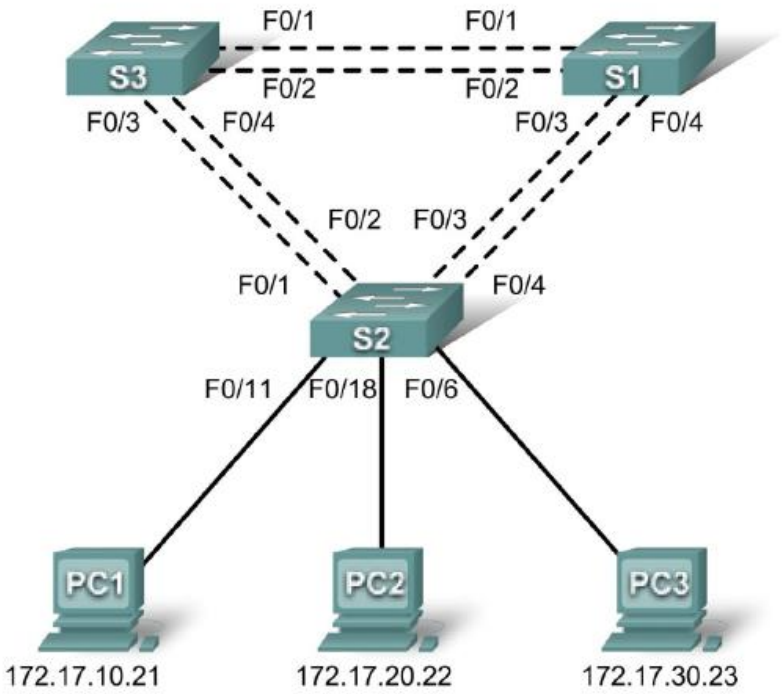
In this lab, you will perform basic switch configurations, configure addressing on PCs, configure VLANs, examine the Spanning Tree Protocol and learn how to optimize it. This lab will allow you to :

- Perform basic switch configurations.
- Configure the Ethernet interfaces on the host PCs.
- Configure VLANs.
- Configure spanning tree.
- Optimizing STP.

Instructions:

1. The lab report must be submitted one week after the session in electronic format to Moodle platform
2. The lab must be done in class in groups of maximum 2 students.
3. Groups should remain the same for both reports and upcoming labs.

Topology



Connecting the Devices

Note: Cross-Over Cables are used for Connection between the same devices, while Straight-through Cables are used for connections between different devices.

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Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
S1	VLAN 99	172.17.99.11	255.255.255.0	N/A
S2	VLAN 99	172.17.99.12	255.255.255.0	N/A
S3	VLAN 99	172.17.99.13	255.255.255.0	N/A
PC1	NIC	172.17.10.21	255.255.255.0	172.17.10.12
PC2	NIC	172.17.20.22	255.255.255.0	172.17.20.12
PC3	NIC	172.17.30.23	255.255.255.0	172.17.30.12

Port assignements:S2

Ports	Assignment	Network
Fa0/1 - 0/5	802.1q Trunks (Native VLAN 99)	172.17.99.0 /24
Fa0/6 - 0/10	VLAN 30 – Guest(Default)	172.17.30.0 /24
Fa0/11 - 0/17	VLAN 10 – Faculty/Staff	172.17.10.0 /24
Fa0/18 - 0/24	VLAN 20 - Students	172.17.20.0 /24

1- Enable the user ports on S2 in access mode

```
S2(config)#interface fa0/6
S2(config-if)#switchport mode access
S2(config-if)#no shutdown
S2(config-if)#interface fa0/11
S2(config-if)#switchport mode access
S2(config-if)#no shutdown
S2(config-if)#interface fa0/18
S2(config-if)#switchport mode access
S2(config-if)#no shutdown
```

2- Configure VTP

Configure VTP on the three switches using the following table.

Switch Name	VTP Operating Mode	VTP Domain	VTP Password
S1	Server	Lab5	cisco
S2	Client	Lab5	cisco
S3	Client	Lab5	cisco

```
S1(config)#vtp mode server
Device mode already VTP SERVER.
S1(config)#vtp domain Lab6
Changing VTP domain name from NULL to Lab6
S1(config)#end
S2(config)#vtp mode client
Setting device to VTP CLIENT mode
S2(config)#vtp domain Lab6
Changing VTP domain name from NULL to Lab6
S2(config)#end
S3(config)#vtp mode client
Setting device to VTP CLIENT mode
S3(config)#vtp domain Lab6
Changing VTP domain name from NULL to Lab6
S3(config)#end
```

3- Configure Trunk Links and Native VLAN

Configure trunking ports and native VLAN. For each switch, configure ports Fa0/1 through Fa0/5 as trunking ports. Designate VLAN 99 as the native VLAN for these trunks.

```
S1(config)#interface fa0/1
S1(config-if)#switchport mode trunk
S1(config-if)#switchport trunk native vlan 99
S1(config-if)#no shutdown
S1(config)#end
S2(config)#interface fa0/1
S2(config-if)#switchport mode trunk
S2(config-if)#switchport trunk native vlan 99
S2(config-if)#no shutdown
S2(config-if)#end
S3(config)#interface fa0/1
S3(config-if#switchport mode trunk
S3(config-if)#switchport trunk native vlan 99
S3(config-if)#no shutdown
S3(config-if-#end
```

4- Configure the VTP server with VLANs

VLAN	VLAN Name
VLAN 99	management
VLAN 10	faculty-staff
VLAN 20	students
VLAN 30	guest

```
S1(config)#vlan 99
S1(config-vlan)#name management
S1(config)#vlan 10
S1(config-vlan)#name faculty-staff
S1(config)#vlan 20
S1(config-vlan)#name students
S1(config)#vlan 30
```

```
S1(config-vlan)#name guest
S1(config-vlan)#end
```

5- Verify the VLANs

```
S2#show vlan brief
```

```
S3#show vlan brief
```

6- Configure the management interface address on all three switches.

```
S1(config)#interface vlan99
S1(config-if)#ip address 172.17.99.11 255.255.255.0
S2(config)#interface vlan99
S2(config-if)#ip address 172.17.99.12 255.255.255.0
S3(config)#interface vlan99
S3(config-if)#ip address 172.17.99.13 255.255.255.0
```

7- Assign switch ports to the VLANs

```
S2(config)#interface fa0/6
S2(config-if)#switchport access vlan 30
S2(config-if)#interface fa0/11
S2(config-if)#switchport access vlan 10
S2(config-if)#interface fa0/18
S2(config-if)#switchport access vlan 20
S2(config-if)#end
S2#copy running-config startup-config
```

8- Configure Spanning Tree

Examine the default configuration of 802.1D Spanning Tree Protocol (STP). Explain the output :

```
S1#show spanning-tree
```

Examine the VLAN 99 spanning tree for all three switches(S1,S2,S3) :

```
S1#show spanning-tree vlan 99
```

Questions :

1. What is the priority for switches S1, S2, and S3 on VLAN 99?
2. What is the priority for S1 on VLANs 10, 20, 30, and 99?
3. Which ports are blocking VLAN 99 on the root switch?
4. Which ports are blocking VLAN 99 on the non-root switches?
5. How does STP select the root?
6. Since the bridge priorities are all the same, what else does the switch use to determine the root?