YILDIZ TECHNICAL UNIVERSITY

FACULTY OF ELECTRICAL AND ELECTRONICS

Computer Networking Technologies

(BLM 3022)

LAB #3 REPORT

19011619 – Rıdvan Ülker
18011072 – Mustafa Kemal Ekim

ridvan.ulker@std.yildiz.edu.tr

kemal.ekim@std.yildiz.edu.tr

DEPARTMENT OF COMPUTER ENGINEERING

1. INTRODUCTION

The subject expected to be realized in the laboratory is the spanning tree protocol (STP). In our example, 3 different buildings and 6 computers in total, 2 floors in each, are required to communicate between their floors. However, since this communication can take place in different ways, STP is used to prevent possible loops that may occur. In short, if we talk about the spanning tree protocol;

A network communication protocol called Spanning Tree Protocol (STP) is used to avoid loops and guarantee the uninterrupted flow of network traffic. The OSI model's Data Link Layer (Layer 2) is where it operates. STP's main objective is to establish a network with potentially redundant links that is loop-free logically. Redundant links are extra connections between network devices that offer extra bandwidth or backup paths. Although redundancy is advantageous, it can also result in loops, which can clog networks and trigger broadcast storms. STP prevents loops by designating one specific switch as the root bridge. The root bridge serves as the common denominator for all network components and determines the shortest path to all other switches in the system. Based on the cost of each link, each switch chooses a route to the root bridge. The active path is determined to be the one with the lowest cost because it is deemed to be the shortest.

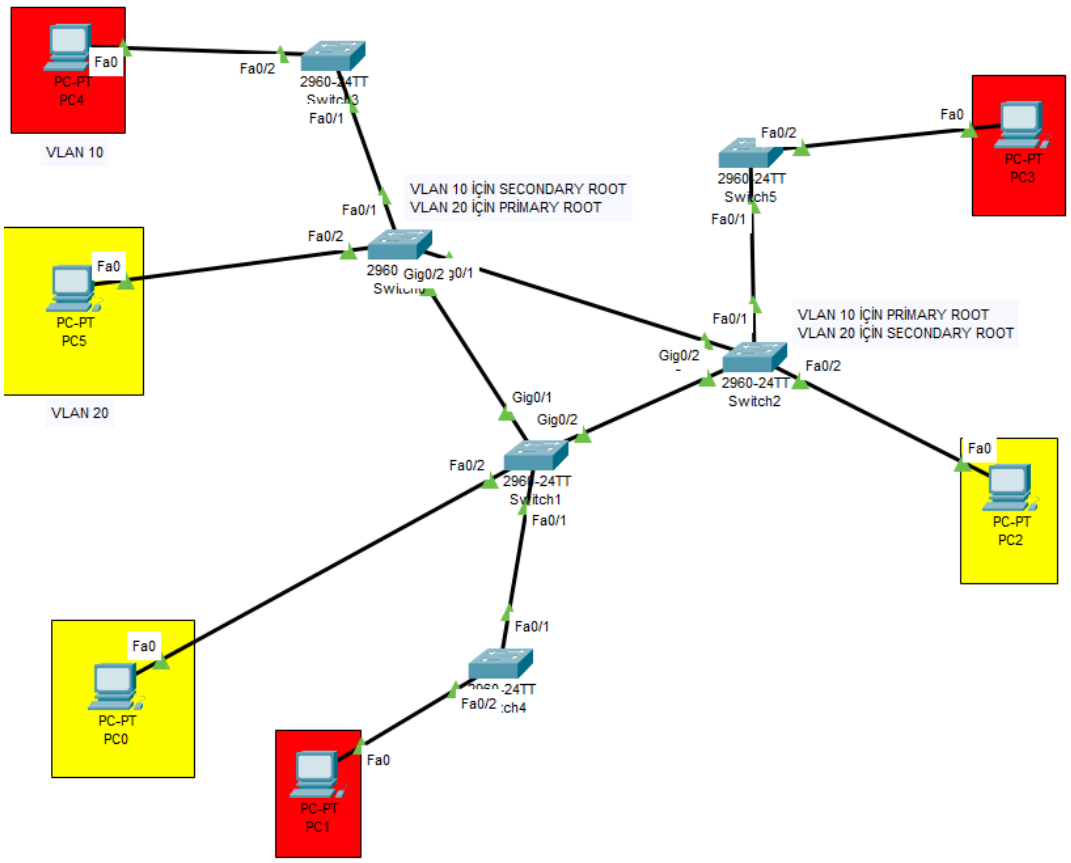


Fig1. Constructed Structure

In the image above, red computers are set to VLAN10 (1st floor), yellow computers are set to VLAN20 (2nd floor).

2. METHOD

The operations performed are as follows:

1- 3 switches for 3 building communication, 1 switch for floor 1s, a total of 6 switch connections were made.
2- 6 computers are placed on endpoints.
3- IP and default gateway configurations of computers and VLAN database configurations of switches were made.
4- Port connections between switches are set as trunk, switch and port connections between PCs.

After the above settings are made, the switches use the spanning tree algorithm to block some ports so that only one active connection remains. At the same time, it prevents loops that can occur with multiple active routes between stops.

Bridge Protocol Data Unit - BPDU: All switchers and bridges included in the spanning-tree protocol in the same local area network (LAN) communicate with each other via BPDU messages. BPDUs; It contains information such as switcher's priority, port priority, port value, MAC address. STP includes 5 different states:

1- Blocking: The packet cannot be sent, only BPDU listens.
2- Listening: BPDU listens and prepares for data transmission.
3- Learning: BPDU listens and learns the ways.
4- Forwarding: Receives and sends packets.
5- Disable: It does not participate in packet forwarding and STP.

VLAN port properties can be seen with the show spanning-tree command entered in the Switch CLIs. Ports can be in alternate (alternate route if no transit) - root (hard pass) - designated(passing data) modes.

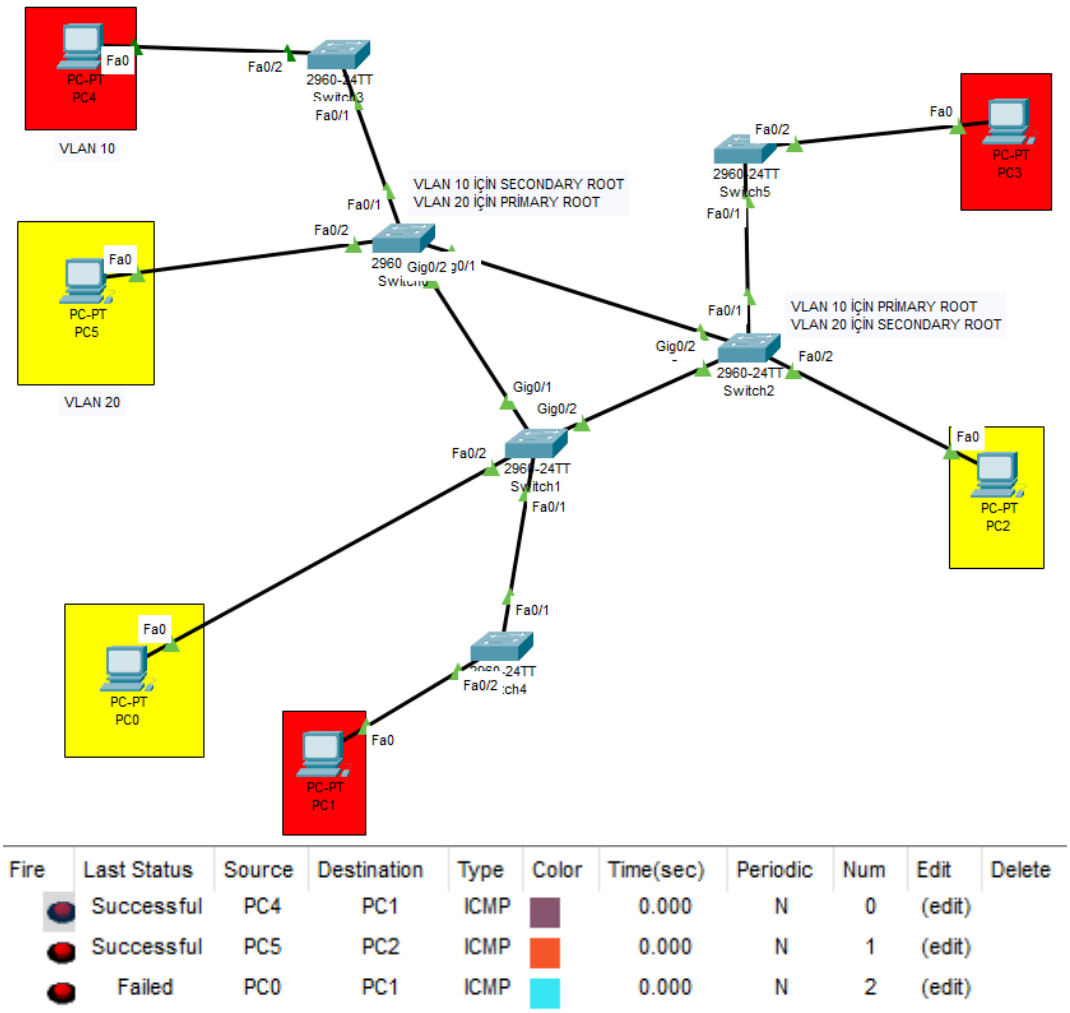
```
VLAN0010
  Spanning tree enabled protocol ieee
  Root ID     Priority    24586
              Address     0002.167A.6576
              This bridge is the root
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    24586  (priority 24576 sys-id-ext 10)
              Address     0002.167A.6576
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time  20

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------
Fa0/1            Desg FWD 19        128.1    P2p
Gi0/2            Desg FWD 4         128.26   P2p
Gi0/1            Desg FWD 4         128.25   P2p
```

Fig2. Switch 2 VLAN 10 Ports

3. RESULTS



Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC4	PC1	ICMP		0.000	N	0	(edit)	
	Successful	PC5	PC2	ICMP		0.000	N	1	(edit)	
	Failed	PC0	PC1	ICMP		0.000	N	2	(edit)	

Fig3. Packet Delivery

It has been observed that the communication between floors is successful and packet transmission between different floors is not provided. In addition, since Switch 0 primary root is set for communication for VLAN10 and Switch 2 primary root is set for communication for VLAN20, packet flow is in question over the specified switches in these transmissions. In addition, it is seen that the communication between floors is blocked.