LAB5 STP Configuration

Spanning Tree Protocol (STP) is a Layer 2 network protocol designed to **prevent looping** within a network topology.

In a LAN, redundant links are added to improve the network availability of LAN. But these redundant links may cause the frame to loop in the network for an infinite time until some action is taken, e.g. some links are taken down. To cope with the problem of frame looping, Spanning Tree Protocol (STP) comes to play.

Effects of Looping

- Broadcast Storm
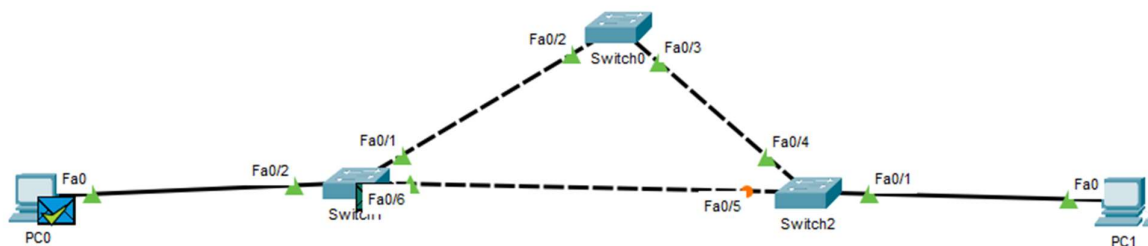- Unstable MAC address table
- Duplicate frames

Types of STP

STP / 802.1D Original STP

PVST+ Cisco improvement of STP adding a per VLAN feature

**RSTP / 802.1w** Improved STP with much faster convergence

Rapid PVST+ Cisco improvement of RSTP adding per VLAN feature

A sample topology below for configuring Spanning Tree Protocol in Cisco Packet Tracer.

What is Root Bridge?

- Root Bridge is a centralized switch which decide the best route to send the data in a network.
- All the switches available in a spanning tree protocol are going to forward the data to this root bridge and this route bridge forward the data to the destination by selecting the best path.
- There can be only one root bridge in a spanning tree protocol.
- In a root bridge switch, all the ports will always be in forwarding status and none of the port is in blocking status.
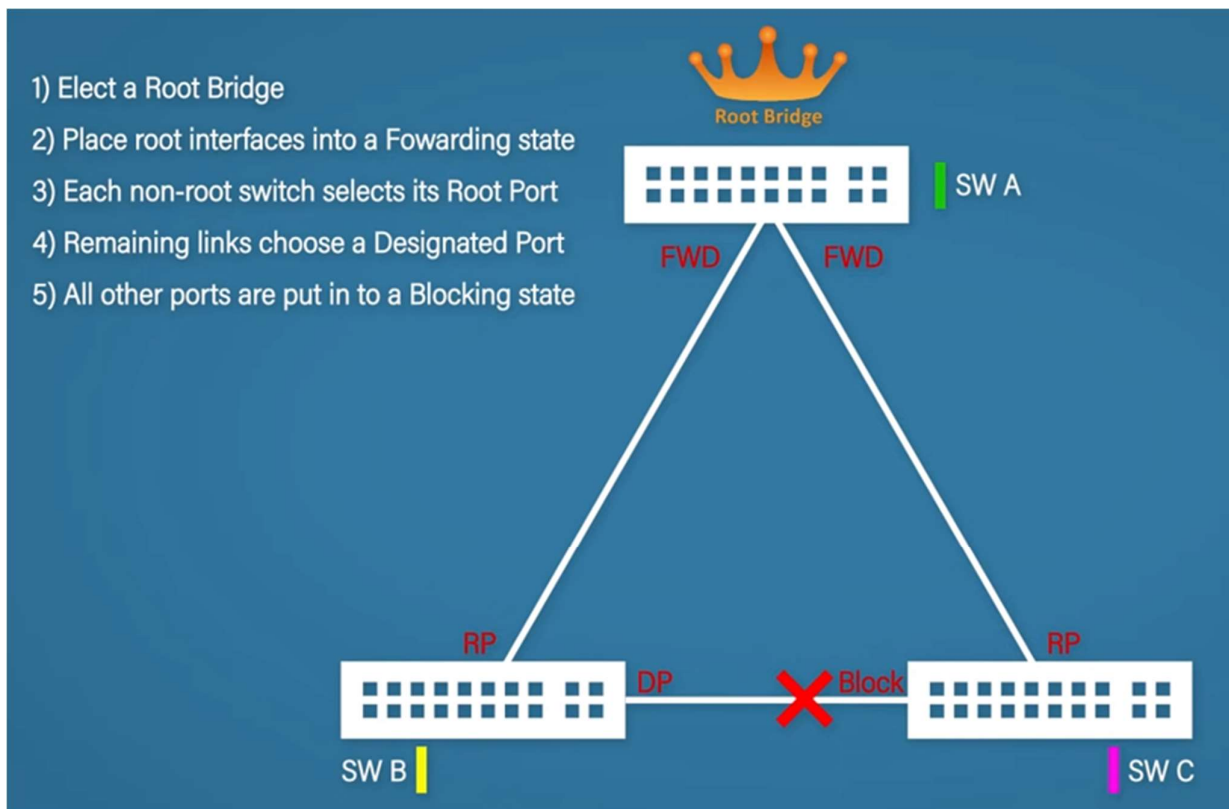
How to configure STP

1. Elect a **Root Bridge**
2. Place root interfaces into a **forwarding state**
3. Each non-root switch selects its **root port**
4. Remaining links choose a **designated port**
5. All other ports are put into a **blocking state**

Roles

Root Ports The best port to reach the Root Bridge

Designated Port Port with the best route to the Root Bridge on a link

Non-Designated Port All other ports that are in a blocking state

States

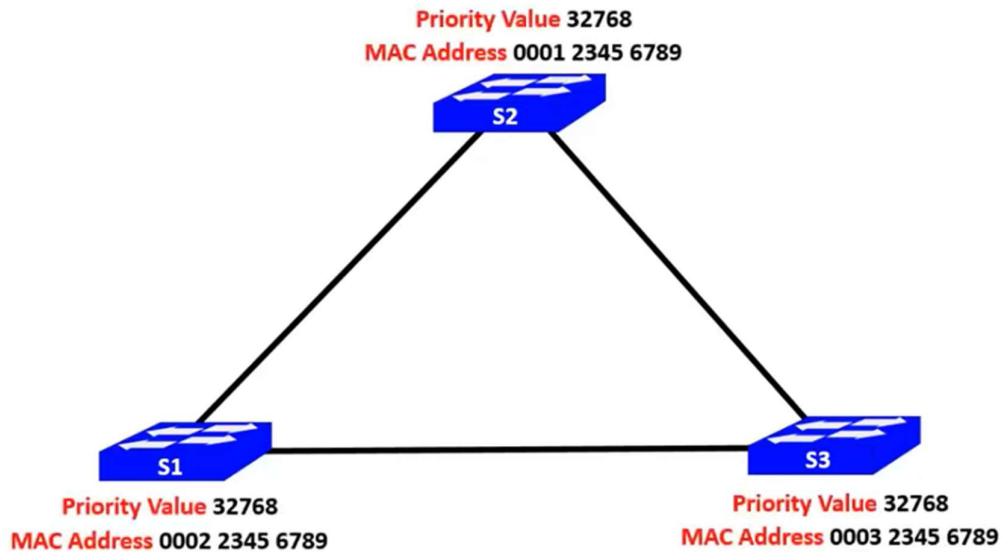**Disabled** A port that is shutdown

Blocking A port that is blocking traffic

Listening Not forwarding traffic and not learning MAC addresses

Learning Not forwarding traffic but learning MAC addresses
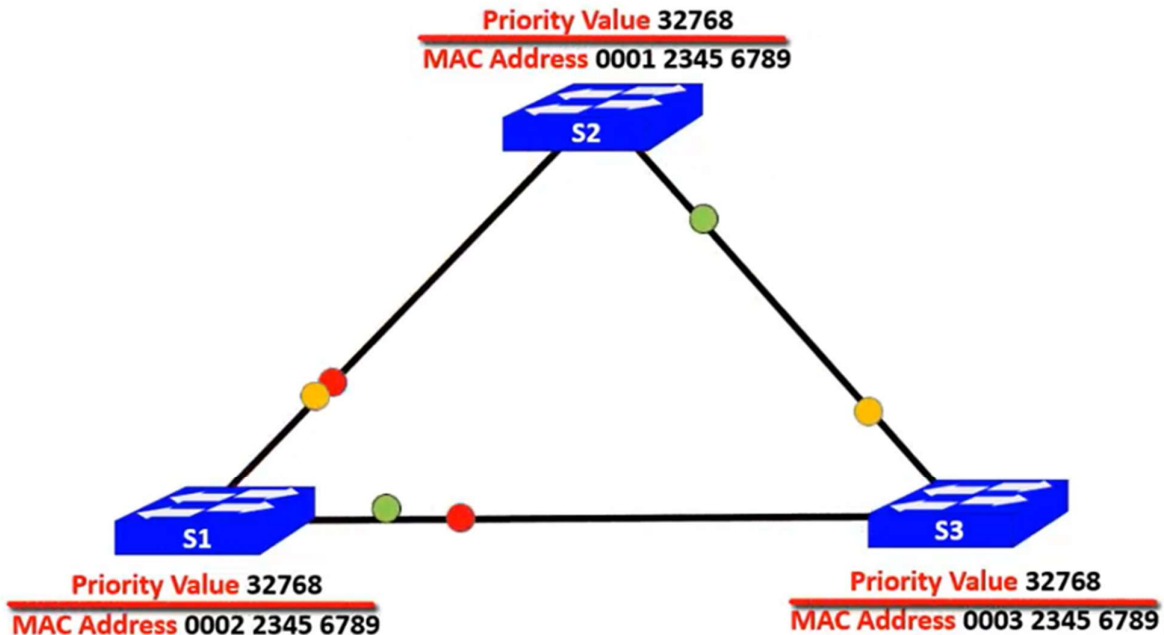
Forwarding Sending and receiving traffic like normal

How switch identify the Root Bridge?

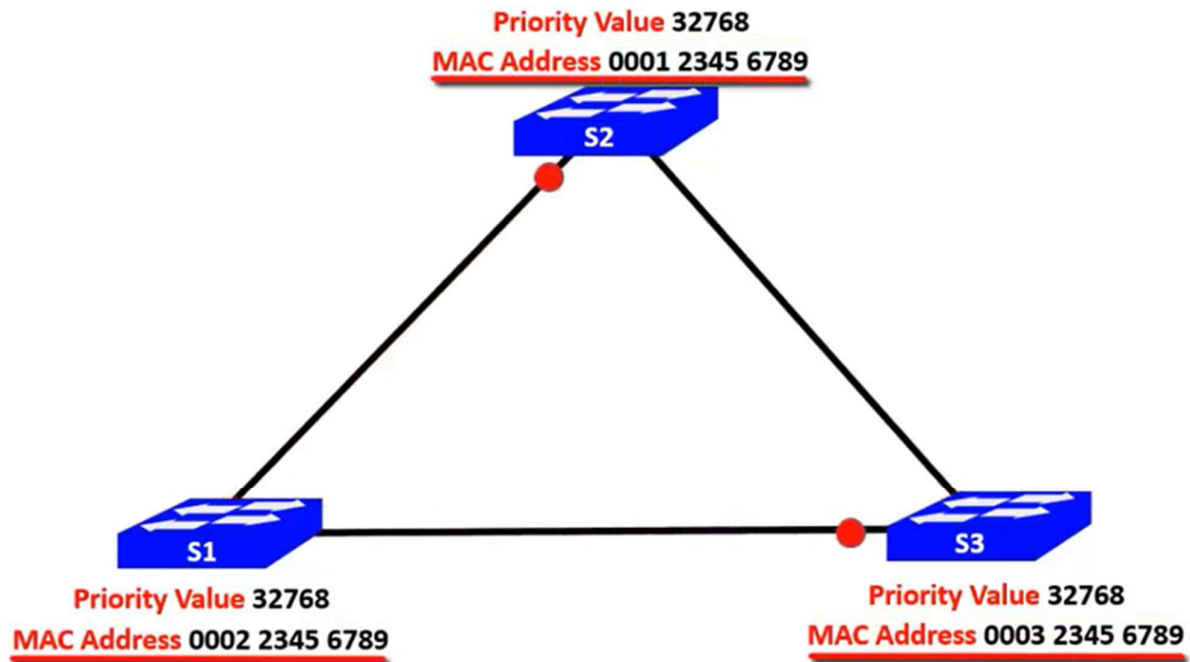**BPDU (Bridge Protocol Data Unit)**

You can check the STP properties using this command **show spanning-tree**

How switch identify the Root Bridge?

Step 1: Compare the priority value

How switch identify the Root Bridge?

Priority Value 32768
MAC Address 0001 2345 6789

S2

S1

Priority Value 32768
MAC Address 0002 2345 6789

S3

Priority Value 32768
MAC Address 0003 2345 6789

Step 2: Compare the MAC Address

The switch which has the lowest Bridge ID will be elected as root bridge.

What is Root Port?

- Root port is a physical port of a switch which is connected to shortest path to reach to the root bridge and it is also called a designated port.
- The port which is not connected to the shortest route to the root bridge. It will be considered as non-designated port.

How switch identify the **Root Port**?

1.Check the port cost

Bandwidth	Port Cost
10 mbps	100
100 mbps	19
1 gbps	4
10 gbps	2

2. Check the Bridge ID (Priority and MAC)
3. Lowest Forwarding physical port number.

The port which is connected to the lowest port of the forwarding switch will be elected as a root port.

Port Cost

Port Speed	Original	New
10 Mbps	100	2,000,000
100 Mbps	19	200,000
1 Gbps	4	20,000
10 Gbps	2	2,000
100 Gbps	N/A	200
1 Tbps	N/A	20

What if you want a specific switch to be the root Bridge?

Use this command **spanning-tree vlan 1 priority 4096**

BPDU – Bridge Protocol Data Unit (P &MAC)

Shutoff STP   **no spanning-tree vlan 1**

Turnon STP **spanning-tree vlan 1**