


Spanning Tree Protocol

Dr.Mohammed Abdalla Mahmoud
Youssif



COMPUTER NETWORKS

A Bottom up approach 

IEEE 802.1D Spanning Tree Protocol (STP)

OUTCOMES

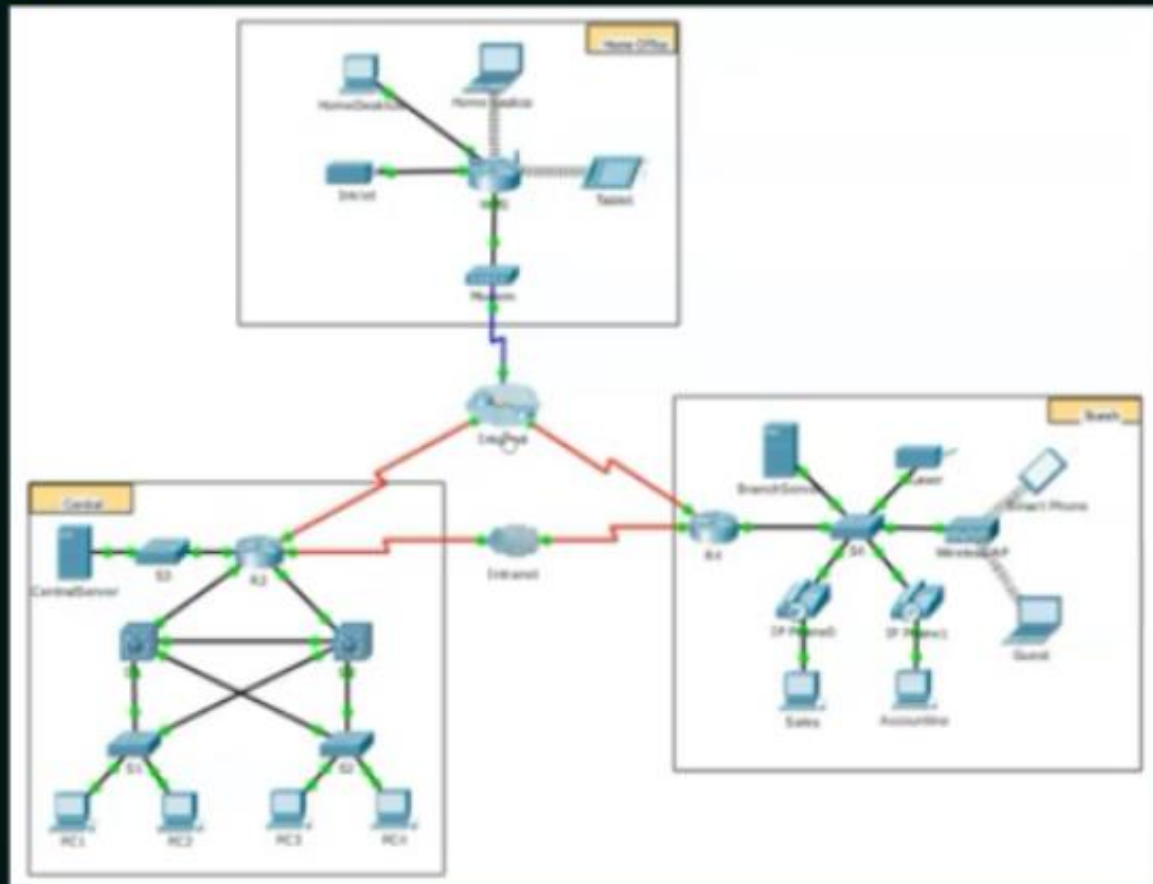
Upon the completion of this session, the learner will be able to

- ★ Understand the need for redundancy and how failure is handled.
- ★ Know about broadcast storm.
- ★ Understand Spanning Tree Protocol.
- ★ Understand various key concepts and terms in STP.

REDUNDANCY IS GOOD!

- ★ Enables users to access network resources, despite path disruption.
 - Improves reliability.
 - Improves availability.
- ★ In Technology, 2 is 1 and 1 is none. Single connection mean single point of failure.
 - Creating redundant links is very simple and is advisable.

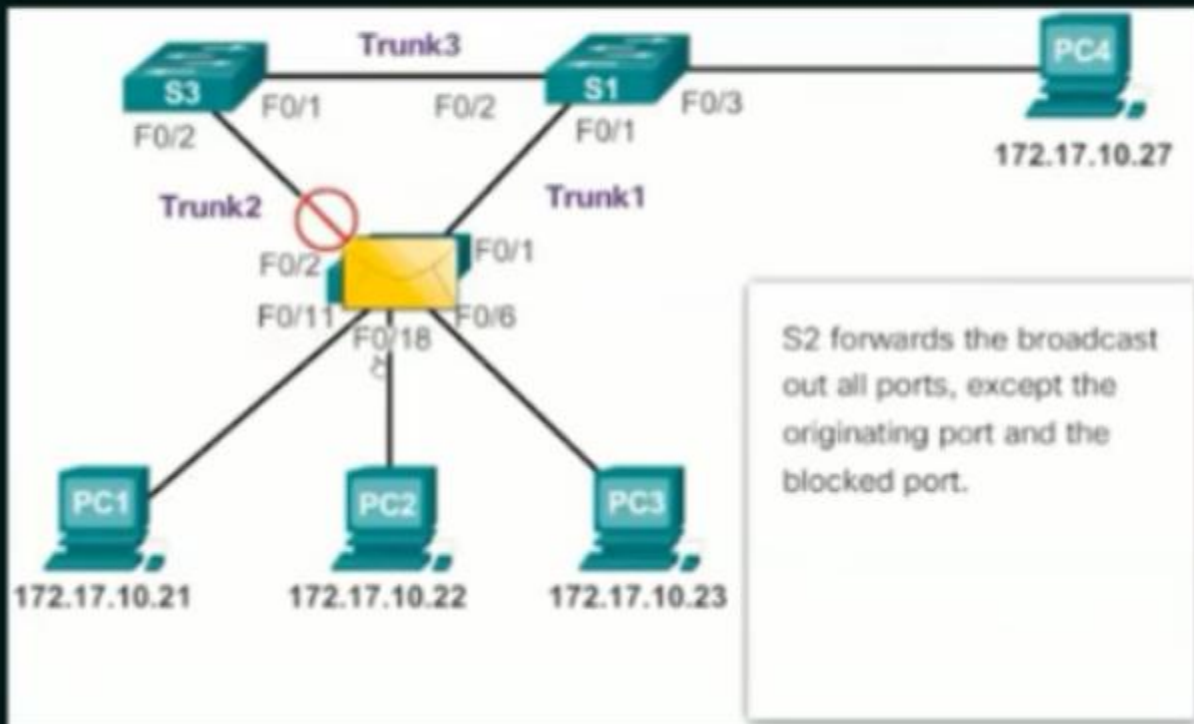
REDUNDANCY



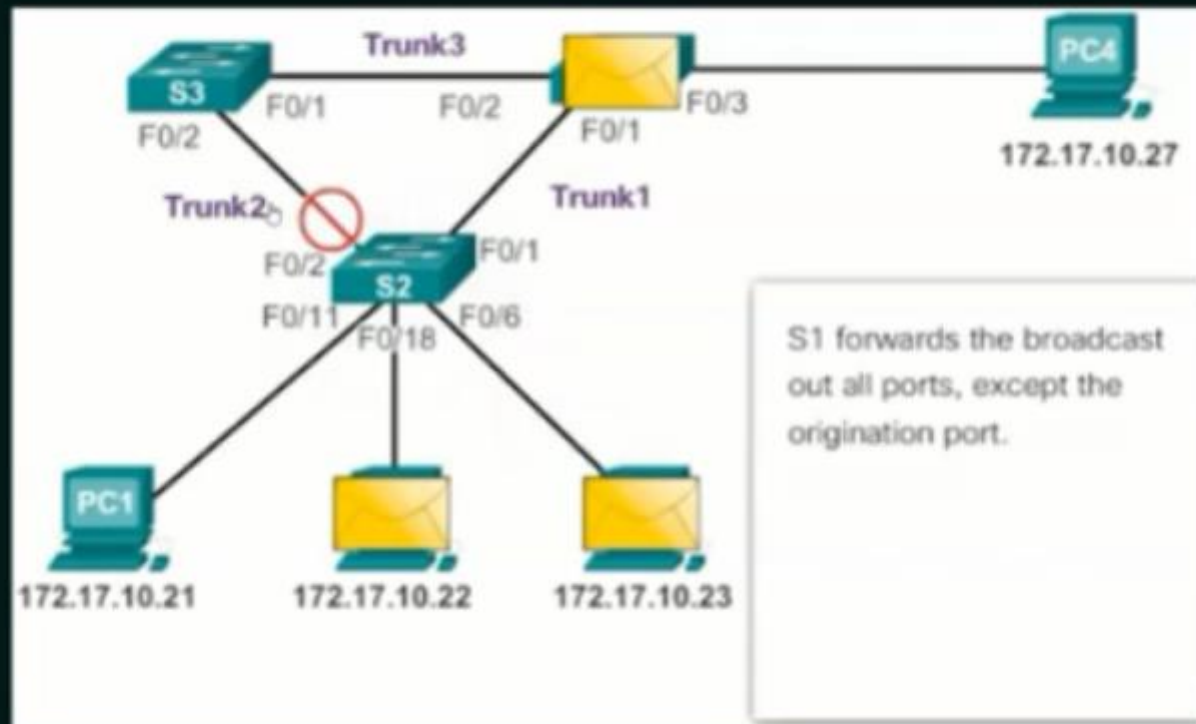
BROADCAST STORM



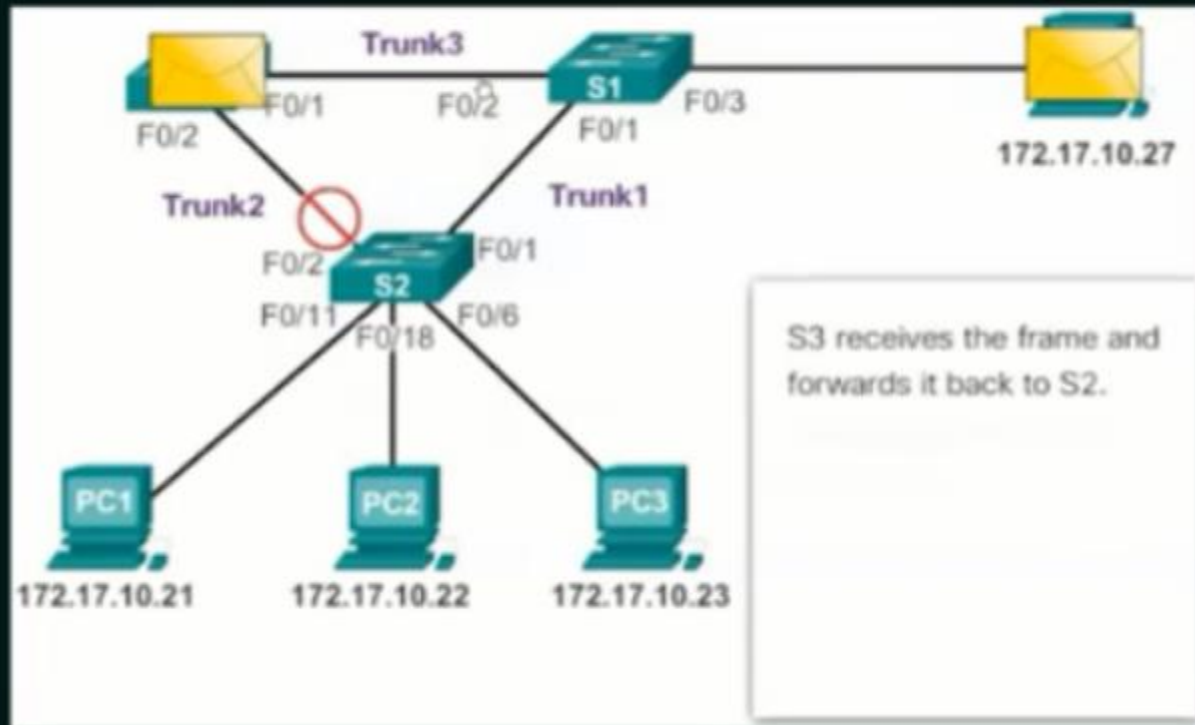
STP PREVENTS LOOPS



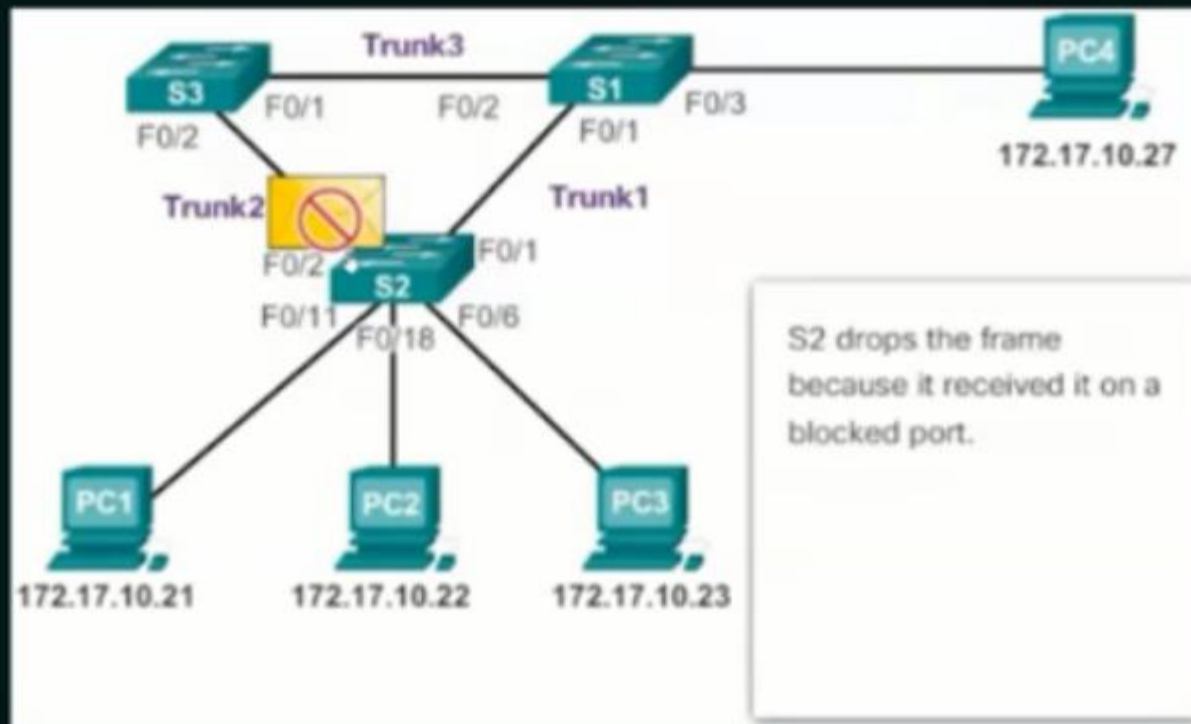
STP PREVENTS LOOPS



STP PREVENTS LOOPS



STP PREVENTS LOOPS



KEY FACTS – STP

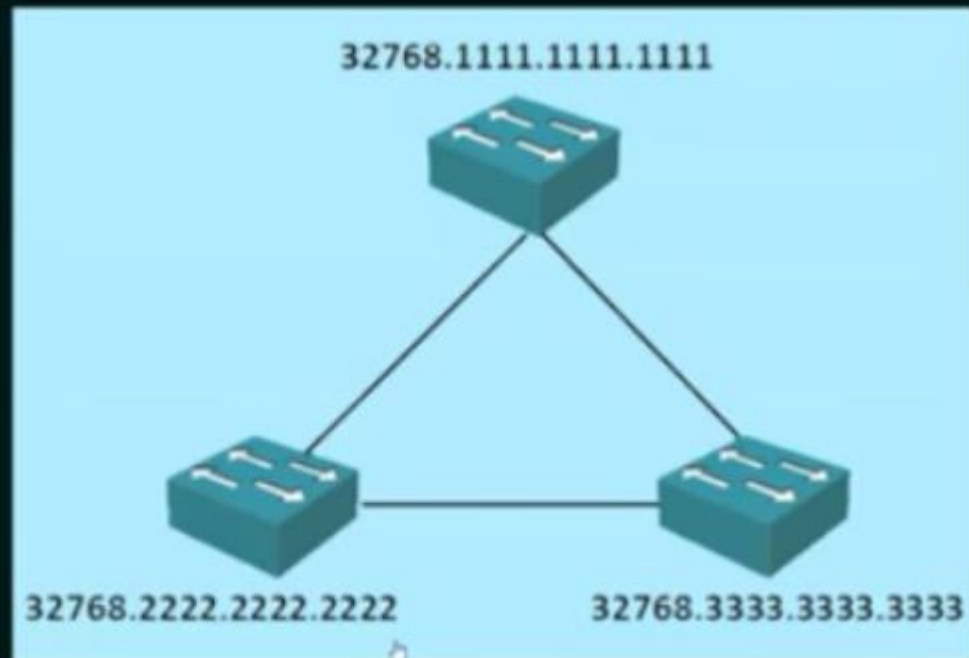
- ★ Original STP (802.1D) was created to prevent loops.
- ★ Switches send probes into the network to discover loops.
- ★ These probes are called as BPDU.
- ★ BPDU = Bridge Protocol Data Unit.
- ★ BPDU will have specific information about the switch.
- ★ Switch multicasts BPDU probes (every 2 seconds) and if it receives its own BPDU back, it means there is a loop in the network.



KEY FACTS – STP

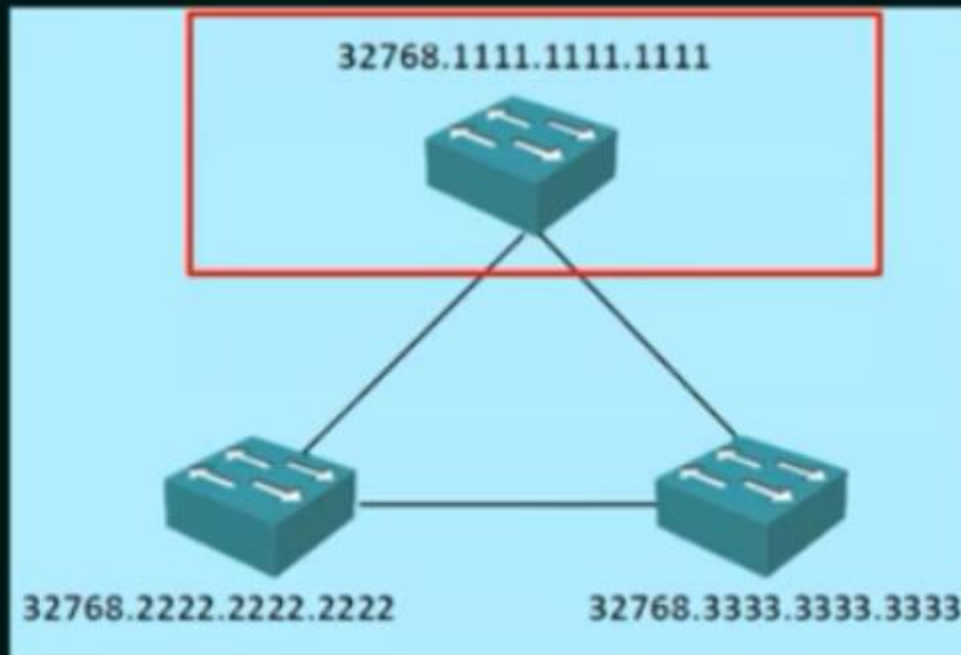
- ★ Original STP (802.1D) was created to prevent loops.
- ★ Switches send probes into the network to discover loops.
- ★ These probes are called as BPDU.
- ★ BPDU = Bridge Protocol Data Unit.
- ★ BPDU will have specific information about the switch.
- ★ Switch multicasts BPDU probes (every 2 seconds) and if it receives its own BPDU back, it means there is a loop in the network.
- ★ Also the BPDU probes helps to elect the root bridge.
- ★ All switches will find the best way to reach the root bridge and the redundant links will be blocked. (Port cost)
- ★ This redundant links will be active only if the existing links or ports goes down.

ELECTION – ROOT BRIDGE



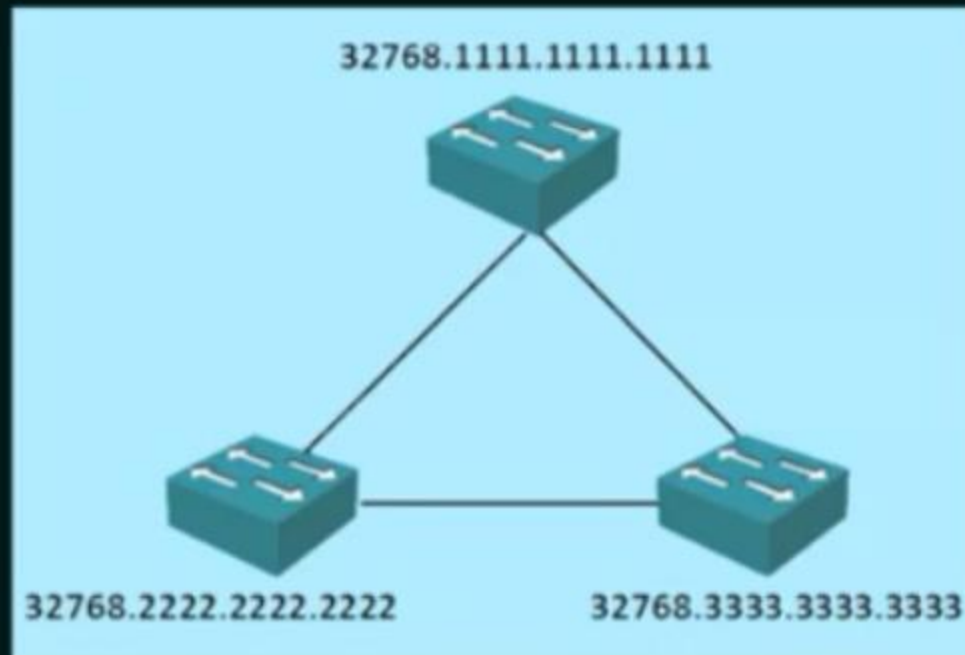
ELECTION – ROOT BRIDGE

BPDU (Bridge ID)	
Bridge Priority	MAC Address of the switch



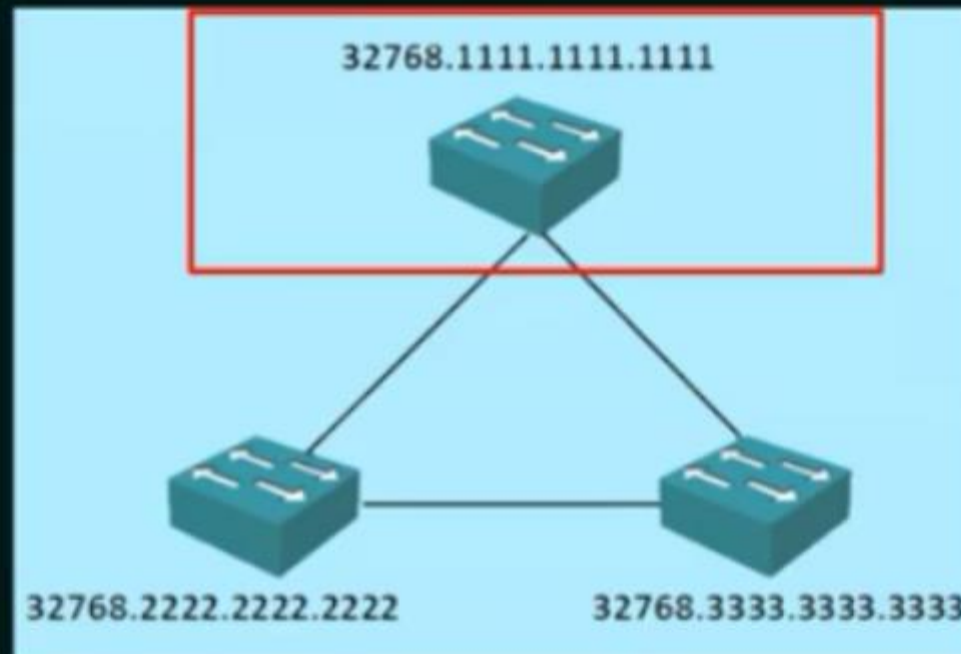
ROOT BRIDGE

- ★ The Root Bridge will have the lowest bridge id.
- ★ If Tie, The bridge with the lowest MAC address will be the Root bridge.



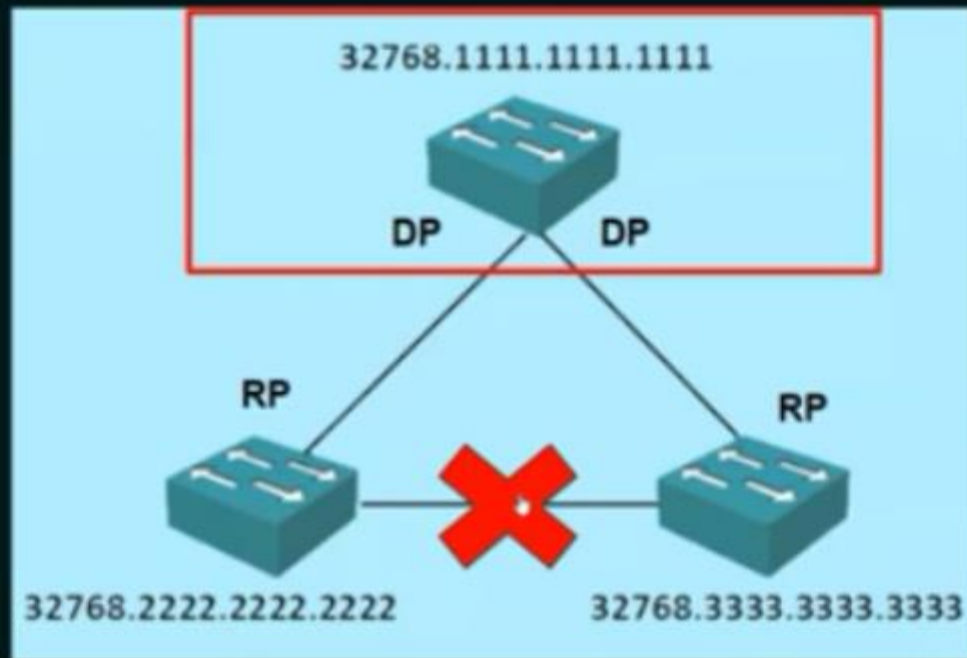
PORT ROLES

- ★ Root Port (Used to reach the root bridge)
- ★ Designated Port (Forwarding port; One per link)
- ★ Blocking/Non Designated Port. (Loops)



PORT ROLES

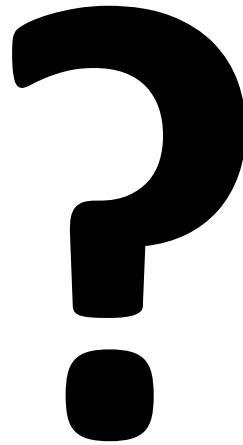
- ★ Root Port (Used to reach the root bridge)
- ★ Designated Port (Forwarding port; One per link)
- ★ Blocking/Non Designated Port. (Loops)



SPANNING TREE PROTOCOL

- ★ STP ensures that there is only one logical path between all destinations on the network by intentionally blocking redundant paths that could cause a loop.
- ★ A port is considered blocked when user data is prevented from entering or leaving that port. This does not include bridge protocol data unit (BPDU) frames that are used by STP to prevent loops.
- ★ The physical paths still exist to provide redundancy, but these paths are disabled to prevent the loops from occurring.
- ★ If the path is ever needed to compensate for a network cable or switch failure, STP recalculates the paths and unblocks the necessary ports to allow the redundant path to become active.

Questions



THANK YOU!