STP – Points to Remember

1. STP is a layer 2 protocol that runs on switches and bridges, the purpose of STP is to remove switching loops. By default, STP is enabled on cisco switches.
2. All switches participating in STP exchange info with other switches in the network Through messages known as **BPDUs (**Sent out at a frequency of 2 sec on every port)
3. STP port states are **Blocked, Listen, Learn, Forward, Disabled**
4. The command "show spanning-tree" includes the following info
   i. VLAN number
   ii. Root bridge priority, MAC address
   iii. Bridge timers (Max Age, Hello Time, Forward Delay)

STP Port Roles

1. **Root** : A bridge can have only one root port. The root port is the port that leads to the root bridge. All bridges except the root bridge will have a root port. the root port is in the STP forwarding state.
2. **Designated** : One designated port is elected per link (segment). The designated port is the port closest to the root bridge. Each designated port is in the STP forwarding state
3. **Alternate** : Alternate ports lead to the root bridge, but are not root ports. The alternate ports maintain the STP blocking state.
4. **Backup**: This is a special case when two or more ports of the same bridge (switch) are connected together, directly or through shared media. In this case, one port is designated, and the remaining ports block. The role for this port is backup.

Selection Criteria

Root Bridge Selection

The switch with the lowest Bridge ID is chosen as root.
Bridge ID is a combination of switch priority (32768 by default and the range is 0 to 65535 with increments of 4096) and switch's MAC address

Designated Bridge Selection

i. In a LAN segment, the bridge with the lowest path cost to the Root Bridge will be the DB **OR**

ii. If there are two bridges in the LAN segment with equal path cost to the Root Bridge, then the Bridge with the lowest Bridge ID becomes the DB.

Root Port Selection

i . If there are 2 or more paths to reach the Root Bridge, select the bridge port associated with the lowest accumulated path cost. **OR**

ii. If the path cost to reach the root bridge over 2 or more bridge ports is same, then: select the neighboring switch with the lowest Switch ID value to reach the Root Bridge **OR**

iii. If there are two or more ports on the same bridge with the lowest path cost, then:
   * Select the port with the lowest Port Priority value, if you have multiple paths to reach the Root Bridge via same neighbor switch. **OR**
   * If all the ports are configured with same priority number (32 by default), select the lowest port number on the switch.

Designated Port Selection

i. The switch port (associated with the DB) on the LAN segment with the lowest accumulated path cost to the Root Bridge will be selected as DP for the given segment. **OR**

ii. If a switch has redundant connections to the network segment, the switch port with the lowest port priority (32 by default) is selected. **OR**

iii. If there is again a tie (it can happen if the priorities of the ports on this switch are the same), then the lowest numbered port on the switch is selected.

Default Timers

Hello----------------> 2s
Forward Delay-----> 15s
Max Age------------> 20s

Link Costs

Bandwidth	Cost
10 Mbps	100
100 Mbps	19
1 Gbps	4
10 Gbps	2

Version 3.0

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