

Spanning Tree Protocol

Group n. _____ N° _____ Name: _____
Shift: _____ N° _____ Name: _____
Score: _____

Objective: To study the spanning tree protocol.

Equipment: Lab PC running Windows, 3 RB450 MikroTik RouterBoards, 4 RJ-45 Ethernet cables.

Connect the PC to interface **Eth1** of each RouterBoard and reset it to clear any previous configurations
(**New Terminal** → **system reset no-def=yes**).

In each RouterBoard:

- Configure a bridge/switch (**Bridge** → **Bridge** → **+**). Name the bridges as **Bridge10**, **Bridge20** and **Bridge30**.
- Associate interfaces **Eth2**, **Eth3** and **Eth4** to the bridge configured in each RouterBoard
(**Bridge** → **Ports** → **+**, and select the Interfaces).
- Associate an IP address to the bridge created in this RouterBoard
(**IP** → **Addresses** → **+**; then make **Interface** equal to the name of the bridge and enter an IP address).

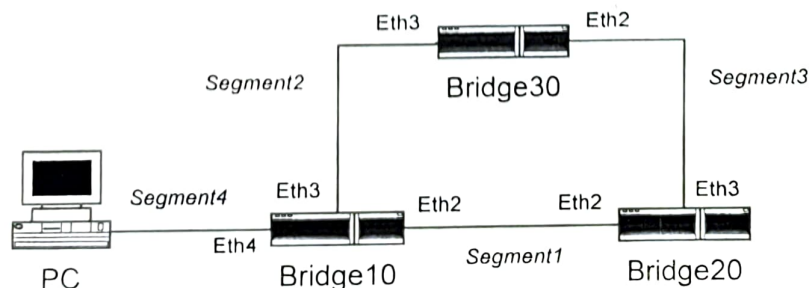
Notice that the IP addresses of the bridges are required only for maintenance purposes and all selected bridge IP addresses must belong to the same subnet. Choose IP addresses $X.Y.Z.10/24$ for Bridge10, $X.Y.Z.20/24$ for Bridge 20 and $X.Y.Z.30/24$ for Bridge 30. ($X, Y, Z \in [0,255]$).

- Activate the spanning tree protocol in each bridge
(**Bridge** → double click the bridge name → **STP** then select STP).

Register the bridge IP addresses: Bridge 10: _____
Bridge 20: _____ Bridge 30: _____

Connect the three RouterBoards as depicted in the figure and connect the PC to the Eth4 interface of Bridge10 after configuring an appropriate IP address in the PC. Remove any default gateway configuration.

PC IP address: _____



- 1.1 From the PC, connected to Eth4 of Bridge 10, use the **ping** command to the three bridges (10, 20, 30) and then use the **arp -a** command in the PC to register the MAC addresses associated with the IP addresses of each bridge (look for the *dynamic* type entries).
(You can check the MAC associated to a RouterBoard Eth interface on the lower part of the RouterBoard's case.)

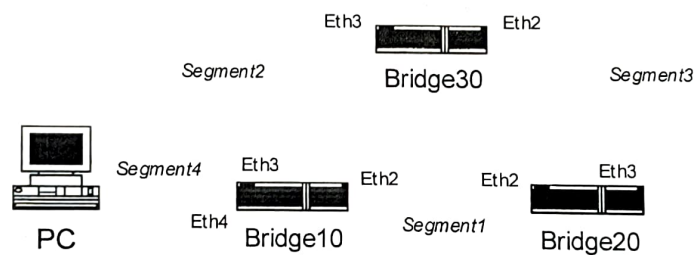
	IP address	MAC address	corresponding RouterBoard's Eth interface
Bridge10			
Bridge20			
Bridge30			

- 1.2 Determine the root bridge, the root port of each bridge, the root path cost of each bridge and the designated bridge in each Ethernet subnet, by looking at:
(i) **Bridge** → double click the bridge name → **Status** menu;
(ii) **Bridge** → **Ports** → **Role** information.

	Root bridge ID	Root port	Root path cost
Bridge10			
Bridge20			
Bridge30			

Designated bridges (B10, B20 or B30): *segment1*_____ *segment2*_____ *segment3*_____ *segment4*_____

Draw the resulting spanning tree and label each interface according to its role (R, D, B):
(note that unused Eth4 ports will appear as *disabled* ports, but these are not blocked/alternative ports)



	Root ports (R)	Designated ports (D)	Blocked ports (B)
Bridge10			
Bridge20			
Bridge30			

Compare the root bridge ID value with the MAC addresses of the interfaces that are part of the bridge network.
What can you conclude about the root bridge selection?

Register which is the inactive/blocked interface (**alternate port**). _____

Explain why this interface is inactive considering the operation of the spanning tree protocol.

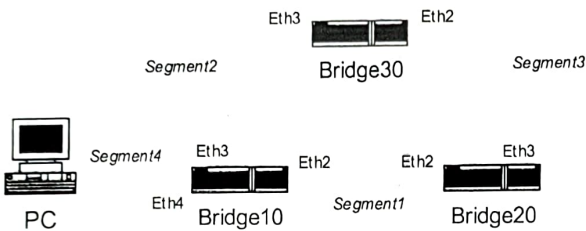
- 1.3 By changing only the ID in the **root bridge**, configure the network such that a different bridge becomes the root bridge. You can do that by changing the **Priority** value in the **STP** menu, accessed by clicking **Bridge** → **Bridge** and double clicking in the bridge's name. Register the bridge whose value you changed and the priority value you assigned. Determine the new root bridge, the root port of each bridge, the root path cost of each bridge and the designated bridge in each Ethernet network segment.

Bridge _____, Priority value: _____

	Root bridge ID	Root port	Root path cost
Bridge10			
Bridge20			
Bridge30			

Designated bridges: *segment1* _____ *segment2* _____ *segment3* _____ *segment4* _____

Draw the resulting spanning tree and label each interface according to its role (R, D, B):



	Root port	Designated ports	Blocked ports
Bridge10			
Bridge20			
Bridge30			

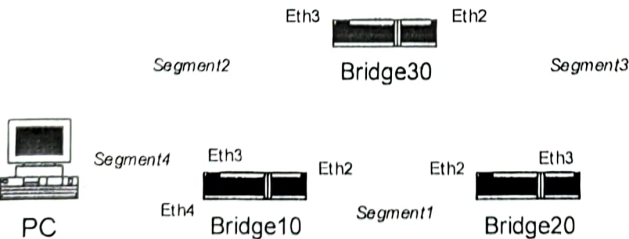
- 1.4 Now, configure the network such that the blocked (alternate) port remains in the same network segment, but changes from one bridge to the other. Do this by changing the path cost of only one interface. To change the path cost of an interface click **Bridge** → **Ports** and double click the interface name; then in the **General** menu you can set the **Path Cost** value. Register the changes made and determine again the root bridge, the root port of each bridge, the root path cost of each bridge and the designated bridge in each Ethernet network segment.

Bridge _____, Interface: _____, Path cost: _____

	Root bridge ID	Root port	Root path cost
Bridge10			
Bridge20			
Bridge30			

Designated bridges: *segment1* _____ *segment2* _____ *segment3* _____ *segment4* _____

Draw the resulting spanning tree and label each interface according to its role:



	Root ports	Designated ports	Blocked ports
Bridge10			
Bridge20			
Bridge30			

Explain your procedure to change the blocked (alternate) port from one bridge to another:
