Spanning Tree Protocol

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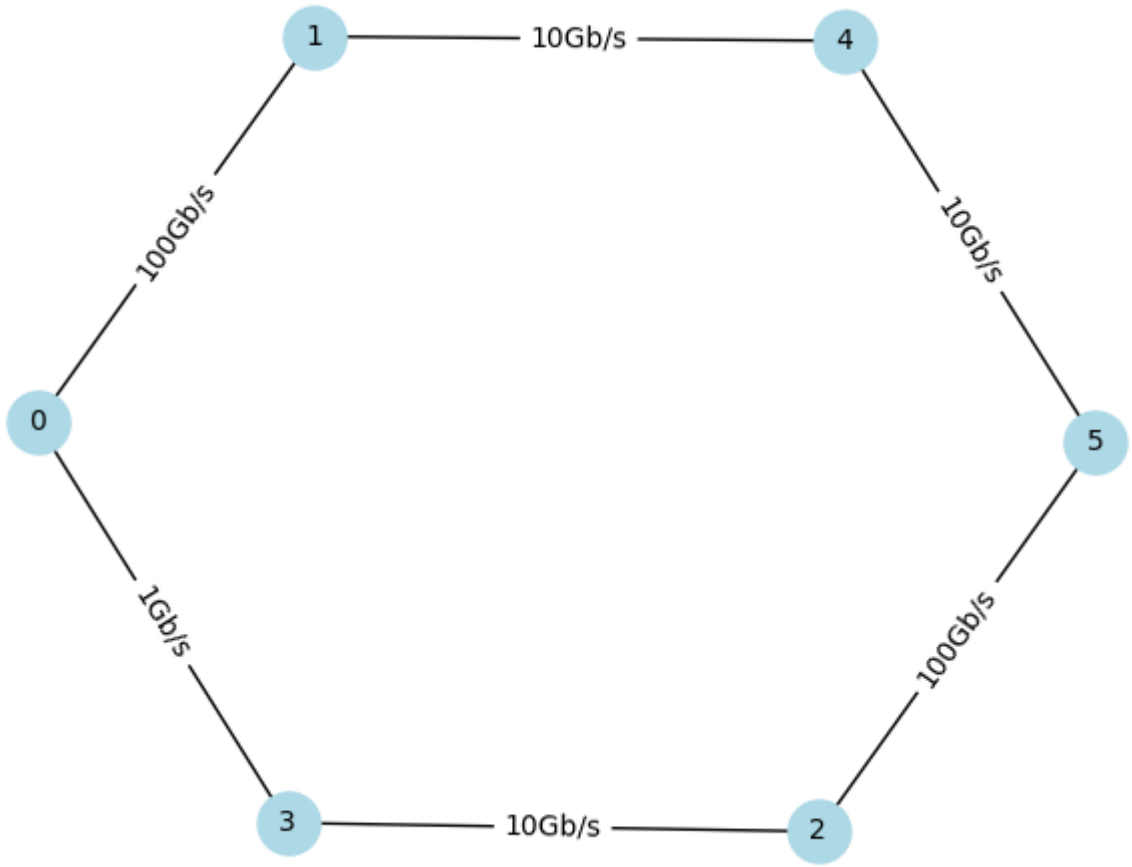

Consider the network in the figure and assume that:

- The adopted algorithm is the **Spanning Tree Protocol (STP)**.
- BPDUs are formatted as a tuple: (Root ID, Path Cost, Sender ID).
- Tie-breaking preference is: **Lowest Root ID**, **Lowest Cost**, **Lowest Sender ID**.

Instructions:

Write down the sequence of message exchanges. For every BPDU that causes a state change in the receiver, write:

1. The Sender -> Receiver and the [BPDU] content.
2. The receiver's **Updated Best BPDU**.
3. The receiver's **Updated Port List** using the format [Neighbor:ROLE].

Use the following abbreviations for roles: ROOT, DESI (Designated), and BLOC (Blocked).

Message Sequence

0 -> 1: [BPDU] (0, 0, 0)

  Updated BPDU of 1: (0, 200, 1)
  Updated Ports of 1: [0:ROOT, 4:BLOC]

0 -> 3: [BPDU] (0, 0, 0)

  Updated BPDU of 3: (0, 20000, 3)
  Updated Ports of 3: [0:ROOT, 2:BLOC]

1 -> 4: [BPDU] (0, 200, 1)

  Updated BPDU of 4: (0, 2200, 4)
  Updated Ports of 4: [1:ROOT, 5:BLOC]

2 -> 5: [BPDU] (2, 0, 2)

  Updated BPDU of 5: (2, 200, 5)
  Updated Ports of 5: [2:ROOT, 4:BLOC]

3 -> 2: [BPDU] (0, 20000, 3)

  Updated BPDU of 2: (0, 22000, 2)
  Updated Ports of 2: [3:ROOT, 5:BLOC]

4 -> 5: [BPDU] (0, 2200, 4)

  Updated BPDU of 5: (0, 4200, 5)
  Updated Ports of 5: [2:BLOC, 4:ROOT]

5 -> 2: [BPDU] (0, 4200, 5)

  Updated BPDU of 2: (0, 4400, 2)
  Updated Ports of 2: [3:BLOC, 5:ROOT]

1 -> 4: [BPDU] (0, 200, 1)

  Updated BPDU of 4: (0, 2200, 4)
  Updated Ports of 4: [1:ROOT, 5:DESI]

4 -> 5: [BPDU] (0, 2200, 4)

  Updated BPDU of 5: (0, 4200, 5)
  Updated Ports of 5: [2:BLOC, 4:ROOT]

2 -> 3: [BPDU] (0, 4400, 2)

  Updated BPDU of 3: (0, 6400, 3)
  Updated Ports of 3: [0:BLOC, 2:ROOT]

2 -> 3: [BPDU] (0, 4400, 2)

  Updated BPDU of 3: (0, 6400, 3)
  Updated Ports of 3: [0:BLOC, 2:ROOT]

4 -> 5: [BPDU] (0, 2200, 4)

  Updated BPDU of 5: (0, 4200, 5)
  Updated Ports of 5: [2:DESI, 4:ROOT]

Final Network State

Node 0

  Cost: 0
  Via: Node 0
  Port State: [1:DESI, 3:DESI]

Node 1

  Cost: 200
  Via: Node 1
  Port State: [0:ROOT, 4:DESI]

Node 2

  Cost: 4400
  Via: Node 2
  Port State: [3:DESI, 5:ROOT]

Node 3

  Cost: 6400
  Via: Node 3
  Port State: [0:BLOC, 2:ROOT]

Node 4

  Cost: 2200
  Via: Node 4
  Port State: [1:ROOT, 5:DESI]

Node 5

  Cost: 4200

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Via: Node 5
Port State: [ 2:DESI, 4:ROOT ]
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