LABORATORY PROGRAM – 11

To construct a VLAN and make the PC's communicate among a VLAN

18/12/24

Lab No 9

VLAN

Aim: To Conduct a VLAN and make the PC's communicate among a VLAN

Topology:

192.168.1.1   192.168.2.1

fa0/0   Router 1841

Eth 6/1

Switch

Fa0/1.   Fa0/1   Fa3/1

Fa1/1   Fa2/1

PC   PC   PC   PC
192.168.1.2   198.168.1.3   192.168.2.2   192.168.2.3

Procedure:

1. Place a 1841 Router, a switch and 4 PCs
2. Connect the four PCs to the switch via fast ethernet
3. Since only 4 fastethernet ports are available in the switch, we have to add an ethernet port
4. - Switch off the Power button of switch
   - Add the ethernet port to the switch
   - Switch On the Power button
   - Connect the router to the switch via Ethernet 6/1

5. In the switch, go to Config Tab and
   - Select VLAN Database.
   - Give VLAN number say 2
   - Give VLAN name say 'cse ise'
   - Add it to the Database

6. Select the Switch
   - Go to Config
   - Go to Ethernet 6/1 ie Connected to Router
   - Make it the trunk

7. Configure the PCs as shown in the topology

8. Select Switch
   - Go to Config
   - Go to fastethernet 2/1
   - Set VLAN number as 2 ie 'cse ise'
   - Similarly set VLAN 2 for fastethernet 3/1 interface

9. Configure the Router:
   Router (Config) # interface fastethernet 9/0
   Router (Config - if) # ipaddress 192.168.1.1 255.255.255.0
   Router (Config - if) # no shut
   Router (Config - if) # exit
   Now, to Configure the router's VLAN interface:
   Router (Config) # interface fast ethernet 9/0.1
   Router (Config - subif) # encapsulation dot1q 2
   Router (Config - subif) # ip address 192.168.2.1 255.255.255.0
   Router (Config - subif) # no Shut
   Router (Config - subif) # exit

10. Ping devices within the same VLAN and to devices of different VLAN

Observations:
1. When devices are pinged within Same VLAN.
   - Pinging 192.168.1.3 from 192.168.1.2
   - The data packet doesn't go to the router
   - The Switch forwards the packet without the need of the router

2. When a device pings a device of another VLAN
   - Pinging 192.168.2.3 from 192.168.1.2
   - The data packet is journey is as follows:

   192.168.1.2 → Switch → Router

   192.168.2.3 ← Switch

3. VLAN's divide a single switch into multiple logical switches
   - Devices in one VLAN cannot directly communicate with devices in another VLAN without a router.

4. Traffic Isolation:
   - Each VLAN maintains its own broadcast domain.
   - Broadcasts sent by devices in one VLAN do not reach devices in another VLAN.

5. VLAN trunking allows switches to forward frames from different VLAN's over a single link called trunk

   - This is done by adding an additional header information called tag to the ethernet frame - VLAN tagging.
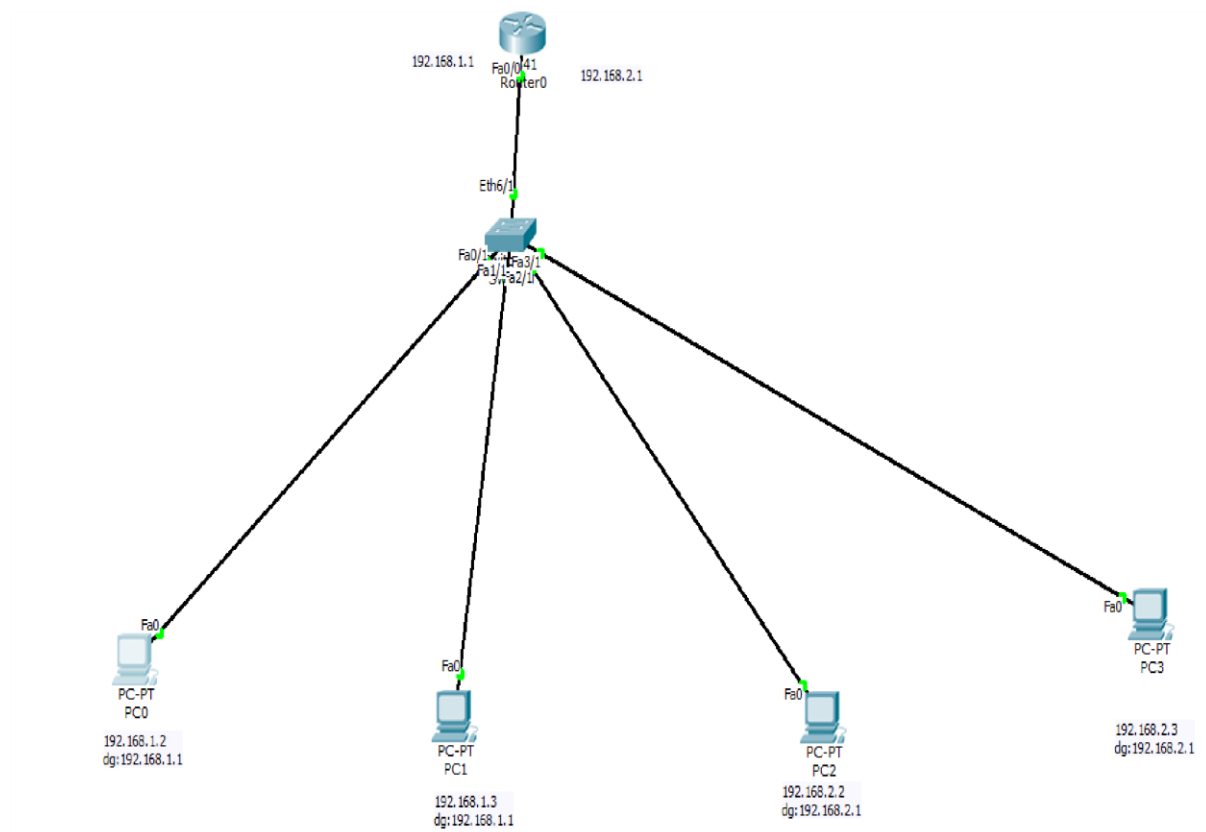
Command Prompt

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Packet Tracer PC Command Line 1.0
PC>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Request timed out.
Reply from 192.168.2.2: bytes=32 time=0ms TTL=127
Reply from 192.168.2.2: bytes=32 time=0ms TTL=127
Reply from 192.168.2.2: bytes=32 time=4ms TTL=127

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 4ms, Average = 1ms

PC>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Reply from 192.168.2.2: bytes=32 time=0ms TTL=127
Reply from 192.168.2.2: bytes=32 time=0ms TTL=127
Reply from 192.168.2.2: bytes=32 time=2ms TTL=127
Reply from 192.168.2.2: bytes=32 time=0ms TTL=127

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 0ms

PC>ping 192.168.2.3

Pinging 192.168.2.3 with 32 bytes of data:

Request timed out.
Reply from 192.168.2.3: bytes=32 time=3ms TTL=127
Reply from 192.168.2.3: bytes=32 time=2ms TTL=127
Reply from 192.168.2.3: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.2.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 3ms, Average = 2ms

PC>ping 192.168.2.3

Pinging 192.168.2.3 with 32 bytes of data:

Reply from 192.168.2.3: bytes=32 time=0ms TTL=127
Reply from 192.168.2.3: bytes=32 time=0ms TTL=127
Reply from 192.168.2.3: bytes=32 time=2ms TTL=127
Reply from 192.168.2.3: bytes=32 time=0ms TTL=127

Ping statistics for 192.168.2.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 0ms

PC>
```