Seneca | SCHOOL OF INFORMATION TECHNOLOGY
ADMINISTRATION & SECURITY

Lab3A VLANs routing GROUP 4

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Lab Theory

A **LAN** includes all devices in the same broadcast domain

A **broadcast domain** includes the set of all LAN-connected devices, so that when any of the devices sends a broadcast frame, all the other devices get a copy of the frame. So, from one perspective, you can think of a LAN and a broadcast domain as being basically the same thing.

With **VLANs**, a switch can configure some interfaces into one broadcast domain and some into another, creating multiple broadcast domains. These individual broadcast domains created by the switch are called virtual LANs (VLAN).

Lab Objectives

1. To understand how to create Virtual Local Area Networks VLANs on switches
2. To understand how to assign proper ports to different VLANs
3. To understand VLAN trunking with multiple switches
4. To create VLAN routing through one router and multiple VLANs

Lab Instructions

1. Type your name, student ID
2. Launch Packet Tracer and perform the lab
3. Follow the procedure of the lab and fulfill all requirements.
4. Answer all questions in the provided spaces (preferably in the red-bold font).
5. Add all required screenshots into corresponding spaces
6. Save the file again as a " .pdf " file
7. Submit the PDF file and the packet tracer file in Blackboard by the due date.
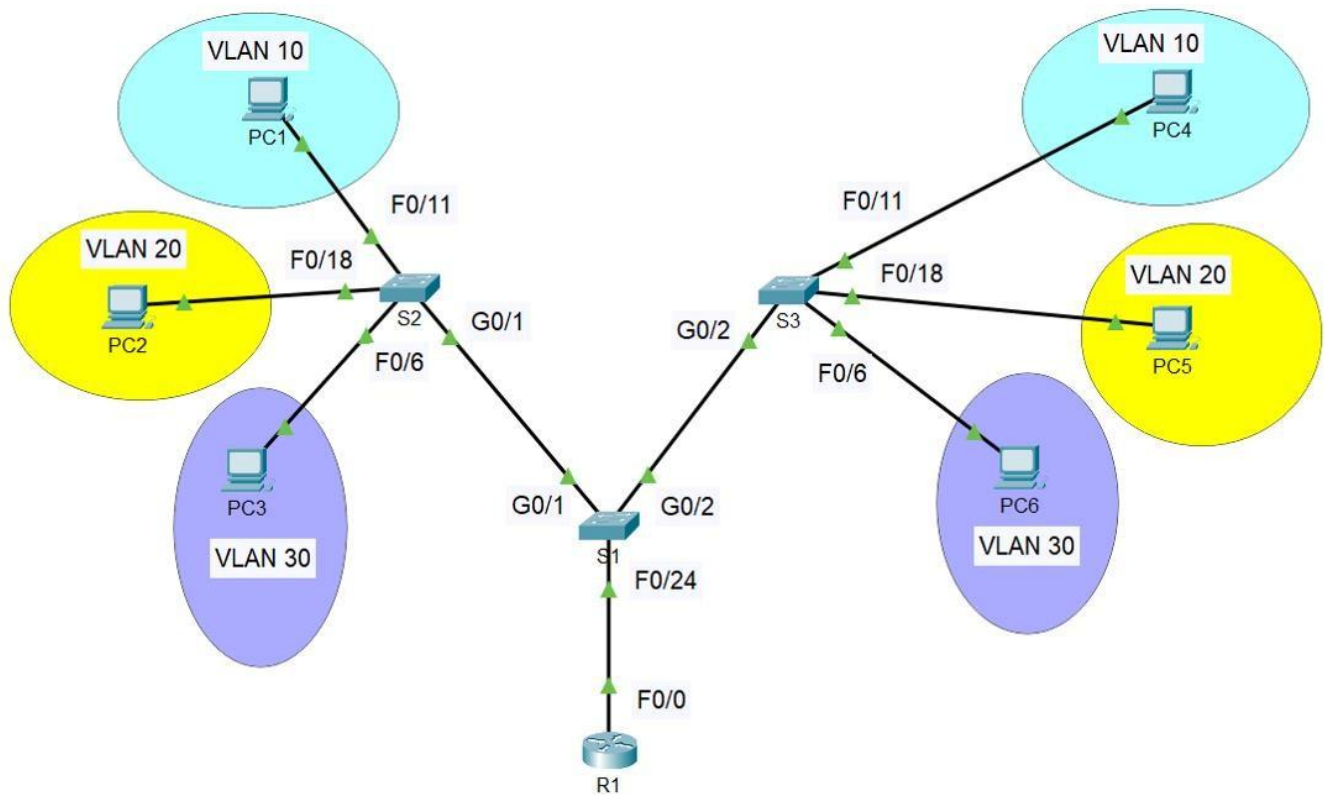
Network Topology

Fig1: VLANs routing

Procedure

1. Your major address from your BB account is 4.4.0.0/16
2. Create proper VLANs on each of the three switches
3. Assign proper ports to VLANs as follows

Network name	Name	Ports on S2 & S3
VLAN10	Ten	Fa0/7 – Fa0/12
VLAN20	Twenty	Fa0/13 – Fa0/18
VLAN30	Thirty	Fa0/1 – Fa0/6
VLAN99	Management	Fa0/19 – Fa0/20

4. On S2; use the command **show vlan brief** to display your details
5. Take a screen capture of the result and insert the image below *[4 marks]*

Fig2: VLANs and ports of S2

6. Repeat step 4 and 5 for S3 *[4 marks]*

Fig3: VLANs and ports of S3

7. Use the following table to set your IP addresses

Network name	Address
VLAN10	X.X.10.0/24
VLAN20	4.4.20.0/24
VLAN30	4.4.30.0/24

8. PCs and router connected to switched should have the following addresses

Device	Network	Address
PC1, PC4	VLAN10	PC1:1st address, PC4: 2nd address
PC2, PC4	VLAN20	PC2:1st address, PC5: 2nd address
PC3, PC1	VLAN30	PC3:1st address, PC6: 2nd address
Gateways	All networks	.100 address

9. Configure proper links to be trunks
10. On S1 display the ports that are configured as trunk
11. Take a screen capture of the result and insert it below *[2 marks]*

```
% Type show ? for a list of subcommands
SW1#show int trunk

Port            Mode            Encapsulation   Status          Native vlan
Fa0/24          on              802.1q          trunking        1
Gi0/1           on              802.1q          trunking        1
Gi0/2           on              802.1q          trunking        1

Port            Vlans allowed on trunk
Fa0/24          1-4094
Gi0/1           1-4094
Gi0/2           1-4094

Port            Vlans allowed and active in management domain
Fa0/24          1,20,30,99
Gi0/1           1,20,30,99
Gi0/2           1,20,30,99

Port            Vlans in spanning tree forwarding state and not pruned
Fa0/24          1,20,30,99
Gi0/1           1,20,30,99
Gi0/2           1,20,30,99
```

Fig4: Trunk ports of S1

12. Check connectivity between PCs in the same VLAN

    a. PC2 must be able to ping PC4

    b. PC3 must be able to ping PC1

13. Take a screen capture of one of the above three pings *[2 marks]*

```
Administrator: Command Prompt                                              —    □    ×
Microsoft Windows [Version 10.0.22621.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\bde-paula-carvalho-a>::pc4 to pc1
C:\Users\bde-paula-carvalho-a>ping 4.4.30.2

Pinging 4.4.30.2 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 4.4.30.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\bde-paula-carvalho-a>::pc4 to pc1
C:\Users\bde-paula-carvalho-a>ping 4.4.30.2

Pinging 4.4.30.2 with 32 bytes of data:
Reply from 4.4.30.2: bytes=32 time=1ms TTL=127
Reply from 4.4.30.2: bytes=32 time=1ms TTL=127
Reply from 4.4.30.2: bytes=32 time=1ms TTL=127
Reply from 4.4.30.2: bytes=32 time=1ms TTL=127

Ping statistics for 4.4.30.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\bde-paula-carvalho-a>
```
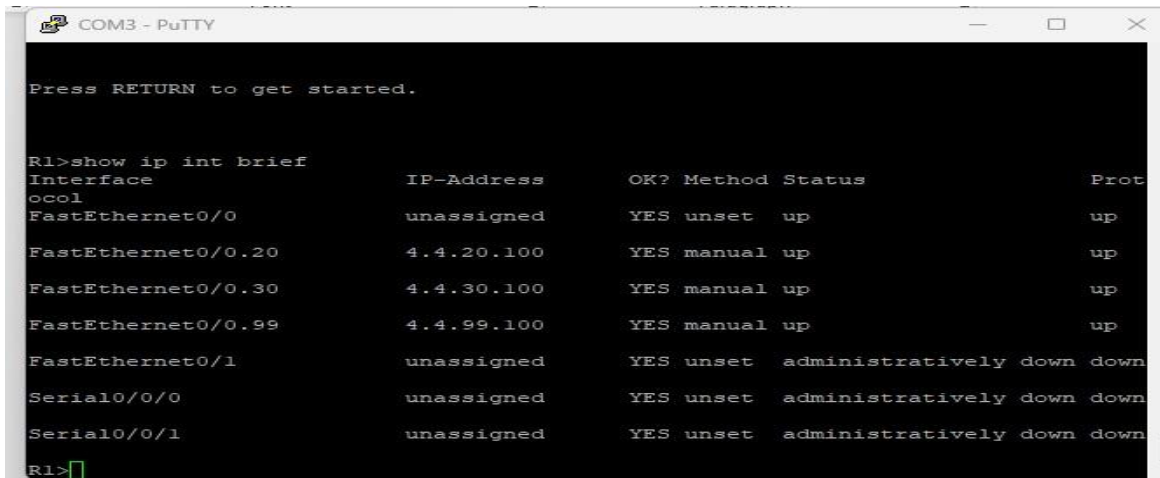
Fig5: PC 4 pinging PC 1

14. Configure R1 to allow all PCs to ping each other

15. Use the command **Show ip int brief** to display the IP addresses of your router

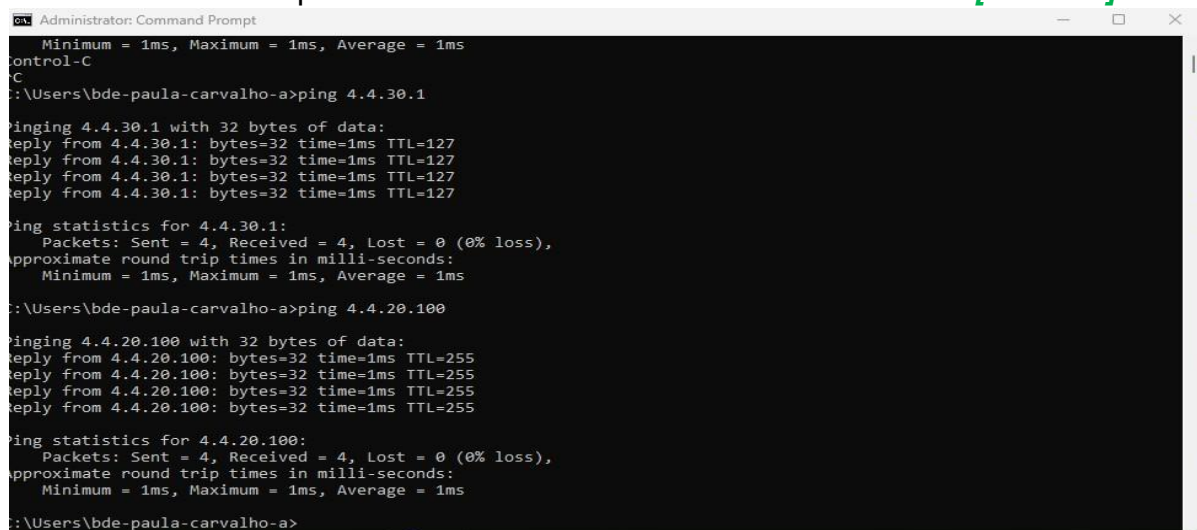16. Take a screen capture of the above and insert the image below *[6 marks]*

Fig6: IP addresses of gateways

17. At this point, all your PCs must be able to ping each other.

18. Toggle your PDU List window to be able to perform multiple pings

19. Allow at least four pair of PCs from different VLANs to ping each other and record the result

20. Take a screen capture of the PDU list window and insert it below *[6 marks]*

PC3 Pinging PC1, PC2, Default Gateway

```
C:\Users\fmnoor>ping 4.4.30.1

Pinging 4.4.30.1 with 32 bytes of data:
Reply from 4.4.30.1: bytes=32 time=1ms TTL=128
Reply from 4.4.30.1: bytes=32 time=1ms TTL=128
Reply from 4.4.30.1: bytes=32 time=1ms TTL=128
Reply from 4.4.30.1: bytes=32 time=1ms TTL=128

Ping statistics for 4.4.30.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\fmnoor>ping 4.4.20.2

Pinging 4.4.20.2 with 32 bytes of data:
Reply from 4.4.20.2: bytes=32 time=45ms TTL=49
Reply from 4.4.20.2: bytes=32 time=46ms TTL=49
Reply from 4.4.20.2: bytes=32 time=46ms TTL=49
Reply from 4.4.20.2: bytes=32 time=46ms TTL=49

Ping statistics for 4.4.20.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 45ms, Maximum = 46ms, Average = 45ms

C:\Users\fmnoor>ping 4.4.20.1

Pinging 4.4.20.1 with 32 bytes of data:
Reply from 4.4.20.1: bytes=32 time=47ms TTL=241
Reply from 4.4.20.1: bytes=32 time=48ms TTL=241
Reply from 4.4.20.1: bytes=32 time=47ms TTL=241
Reply from 4.4.20.1: bytes=32 time=47ms TTL=241

Ping statistics for 4.4.20.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 47ms, Maximum = 48ms, Average = 47ms

C:\Users\fmnoor>
```

PC1 pinging all other pcs

PC2(vlan20) pinging vlan 30

Fig7: PDU List Window

21. **Discussion** *[3 marks]*

The command **switchport mode** has three options: access, trunk and dynamic

Explain the **switchport mode dynamic** mode

The switchport mode dynamic allow for the switch port automatically to choose automatically to become either an access port or a trunk port based on what it's connected to. If the connected device is a trunk, it becomes trunk; if it's access, it becomes access.

22. Save this document as word document for your own modifications and save another copy as ".PDF"

23. Submit the PDF file with the packet tracer file to your Lab3 submission tab.