Communication Networks Protocol

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1 Mission 1,2 and 3

1.1 Snapshot of our topology

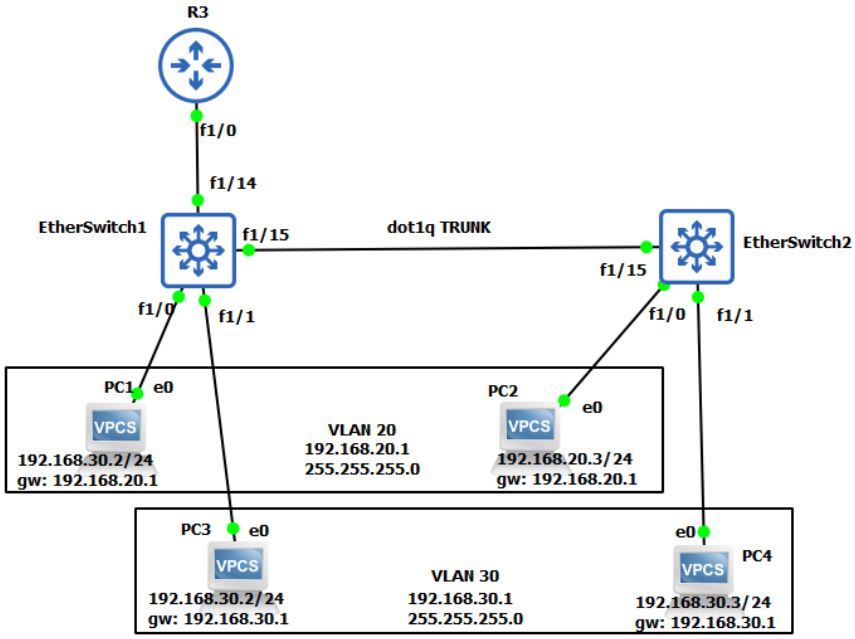

Figure 1: Inter-Vlan Topology

1.2 Configuration for Mission 1

Mission 1 , here we validate that we can ping back and forth between PC1 and PC3, before vlan exits. This Require first to adjust the subnet to 16 instead of 24 so they have same subnets. Below is how we did that.

1.3 PC3 show IP as follows

```
PC3> show ip

NAME        : PC3[1]
IP/MASK     : 192.168.30.2/24
GATEWAY     : 192.168.30.1
DNS         :
MAC         : 00:50:79:66:68:02
LPORT       : 20032
RHOST:PORT  : 127.0.0.1:20033
MTU         : 1500

PC3> ip 192.168.30.2 255.255.0.0 192.168.30.1
Checking for duplicate address...
PC3 : 192.168.30.2 255.255.0.0 gateway 192.168.30.1

PC3> show ip

NAME        : PC3[1]
IP/MASK     : 192.168.30.2/16
GATEWAY     : 192.168.30.1
DNS         :
MAC         : 00:50:79:66:68:02
LPORT       : 20032
RHOST:PORT  : 127.0.0.1:20033
MTU         : 1500

PC3> ping 192.168.20.2

84 bytes from 192.168.20.2 icmp_seq=1 ttl=64 time=1.103 ms
84 bytes from 192.168.20.2 icmp_seq=2 ttl=64 time=1.257 ms
84 bytes from 192.168.20.2 icmp_seq=3 ttl=64 time=1.349 ms

PC1> show ip

NAME        : PC1[1]
IP/MASK     : 192.168.20.2/24
GATEWAY     : 192.168.20.1
DNS         :
MAC         : 00:50:79:66:68:00
LPORT       : 20028
RHOST:PORT  : 127.0.0.1:20029
MTU         : 1500

PC1> ip 192.168.20.2 255.255.0.0 192.168.20.1
Checking for duplicate address...
PC1 : 192.168.20.2 255.255.0.0 gateway 192.168.20.1

PC1> show ip
```

```
NAME         : PC1[1]
IP/MASK      : 192.168.20.2/16
GATEWAY      : 192.168.20.1
DNS          :
MAC          : 00:50:79:66:68:00
LPORT        : 20028
RHOST:PORT   : 127.0.0.1:20029
MTU          : 1500

PC1> ping 192.168.30.2

84 bytes from 192.168.30.2 icmp_seq=1 ttl=64 time=0.627 ms
84 bytes from 192.168.30.2 icmp_seq=2 ttl=64 time=0.693 ms
84 bytes from 192.168.30.2 icmp_seq=3 ttl=64 time=0.649 ms
```

1.3.1 Mission 2: Trunking

This requires the configuration Etherswitch1 and Etherswitch2 to enable the ping between PC1 and PC2.

```
EtherSwitch1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
EtherSwitch1(config)#no ip routing
EtherSwitch1(config)#end
EtherSwitch1#
*Mar  1 00:01:44.215: %SYS-5-CONFIG_I: Configured from console by console
EtherSwitch1#vlan database
EtherSwitch1(vlan)#vlan 20
VLAN 20 added:
    Name: VLAN0020
EtherSwitch1(vlan)#vlan 30
VLAN 30 added:
    Name: VLAN0030
EtherSwitch1(vlan)#exit
APPLY completed.
Exiting....
EtherSwitch1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
EtherSwitch1(config)#interface fastEthernet 1/0
EtherSwitch1(config-if)#switchport mode access
EtherSwitch1(config-if)#switchport access vlan 20
EtherSwitch1(config-if)#exit
EtherSwitch1(config)#interface fastEthernet 1/1
EtherSwitch1(config-if)#switchport mode access
EtherSwitch1(config-if)#switchport access vlan 30
EtherSwitch1(config-if)#exit
EtherSwitch1(config)#interface vlan 20
EtherSwitch1(config-if)#
*Mar  1 00:05:05.239: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan20, changed state to up
EtherSwitch1(config-if)#no shutdown
EtherSwitch1(config-if)#exit
EtherSwitch1(config)#interface vlan 30
EtherSwitch1(config-if)#n
*Mar  1 00:05:43.355: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan30, changed state to up
EtherSwitch1(config-if)#no shutdown
EtherSwitch1(config-if)#exit
EtherSwitch1(config)#exit
EtherSwitch1#
*Mar  1 00:06:02.083: %SYS-5-CONFIG_I: Configured from console by console
EtherSwitch1#show vlan-switch

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa1/2, Fa1/3, Fa1/4, Fa1/5
                                                Fa1/6, Fa1/7, Fa1/8, Fa1/9
                                                Fa1/10, Fa1/11, Fa1/12, Fa1/13
                                                Fa1/14, Fa1/15
20   VLAN0020                         active    Fa1/0
30   VLAN0030                         active    Fa1/1
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        1002   1003
20   enet  100020     1500  -      -      -        -    -        0      0
30   enet  100030     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        1      1003
1003 tr    101003     1500  1005   0      -        -    srb      1      1002
1004 fdnet 101004     1500  -      -      1        ibm  -        0      0
1005 trnet 101005     1500  -      -      1        ibm  -        0      0
```

Figure 2: Etherswicth1 configuration

1.4 Configuration for Etherswicth2

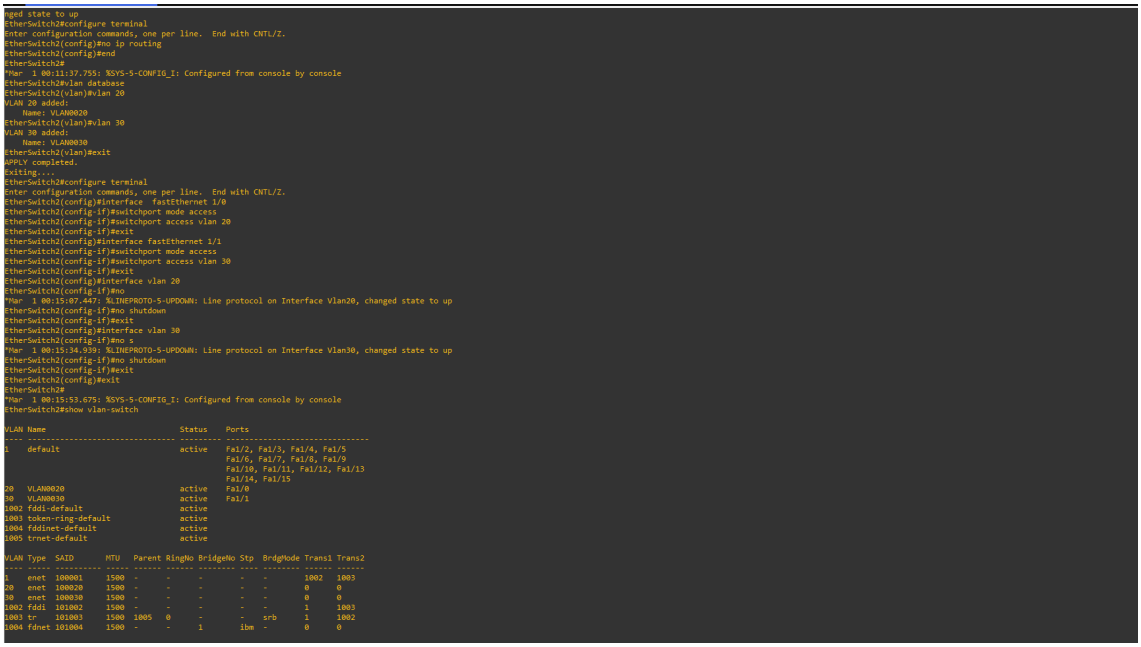

Figure 3: Etherswitch2 Configuration

1.5 Ping between PC1 and PC2 on the Vlan but different switches. We could pinged back and forth between PC1 and PC2.

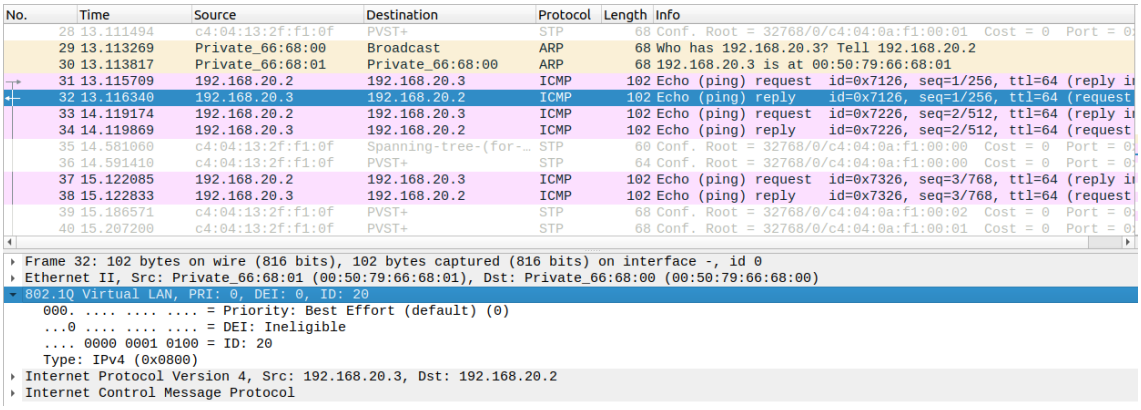

Figure 4: PC1 Pings PC2

1.6 Wiresshark capture on the trunk line while PC1 pings PC2

We managed to get the correct package passing through the wireshark capture as soon as ICMP echo ping packet was noticed,just as it can be seen above.

2 Mission 3: Inter-vlan Routing

2.1 Configuration for transforming router interface to a switch port

```
R3(config)#int fastEthernet 1/0
R3(config-if)#no shutdown
R3(config-if)#exit
R3(config)#exit
R3#write

R3#conf t
R3(config)#int fastEthernet 1/0.20
R3(config-subif)#encapsulation dot1Q 20
R3(config-subif)#ip address 192.168.20.1 255.255.255.0
R3(config-subif)#exit
R3(config)#exit
R3#write

R3#conf t
R3(config)#int fastEthernet 1/0.30
R3(config-subif)#encapsulation dot1Q 30
R3(config-subif)#ip address 192.168.30.1 255.255.255.0
R3(config-subif)#exit
R3(config)#exit
R3#write


It is worthy to note that,
Vlan 20 belongs to the subinterface 1/0.20
The default gateway IP of all PC's on vlan 20, hence all PC are configured with the default gateway s
```

2.2 Packets were made to flow through the traffic between vlan 20 and vlan 30 by configuring the router on a stick labelled R3.

3 Mission 3: Question 1. PC1 pings the Router Interface

Mission 3: Question 2

3.1 PC1 pings PC3

```
PC3> ping 192.168.20.2

84 bytes from 192.168.20.2 icmp_seq=1 ttl=63 time=30.741 ms
84 bytes from 192.168.20.2 icmp_seq=2 ttl=63 time=19.051 ms
84 bytes from 192.168.20.2 icmp_seq=3 ttl=63 time=18.155 ms

PC1> ping 192.168.30.2

84 bytes from 192.168.30.2 icmp_seq=1 ttl=63 time=24.356 ms
84 bytes from 192.168.30.2 icmp_seq=2 ttl=63 time=12.464 ms
84 bytes from 192.168.30.2 icmp_seq=3 ttl=63 time=19.504 ms
84 bytes from 192.168.30.2 icmp_seq=4 ttl=63 time=21.439 ms
```

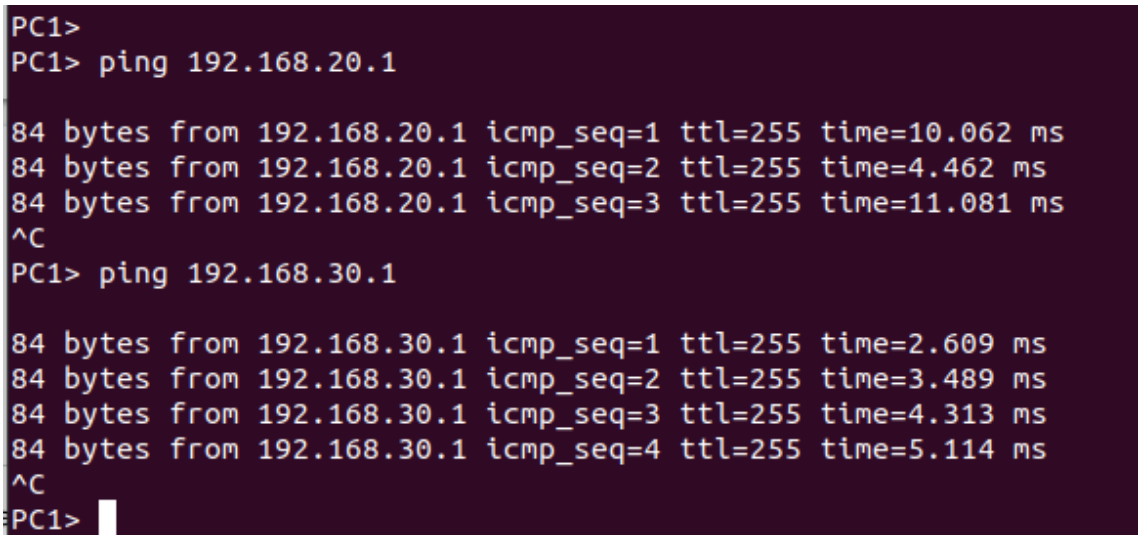

Figure 5: PC1 Pings Router Surface

```
84 bytes from 192.168.30.2 icmp_seq=5 ttl=63 time=13.157 ms
```

```
Though PC1 and PC3 are on different VLANs yet they were able to ping each other.
Why? The  ping between PC1 and  PC3 is made possible through inter-Vlan routing which is enabled by t
```

3.2 Impart on the bandwidth

The bandwidth becomes saturated with time due to the traffic from multiple Vlans. Whenever more devices are added to the broadcast domain, more broadcast start to saturate the network while keeping the VLAN identification and segment untouched.

3.3 Opportunities in terms of security offered by inter-Vlan

Inter-vlan allows a good security system configuration to be achieved in the sense that it allows filtering through different subnets by giving access to or block certain subnets while keeping the ID tag of the packet being sent until it arrived at the desired destination.

4 With Wireshark monitor the stick line i.e the connection between EtherSwicth1 and the router when pinging from PC1 to PC3 with the packet observed

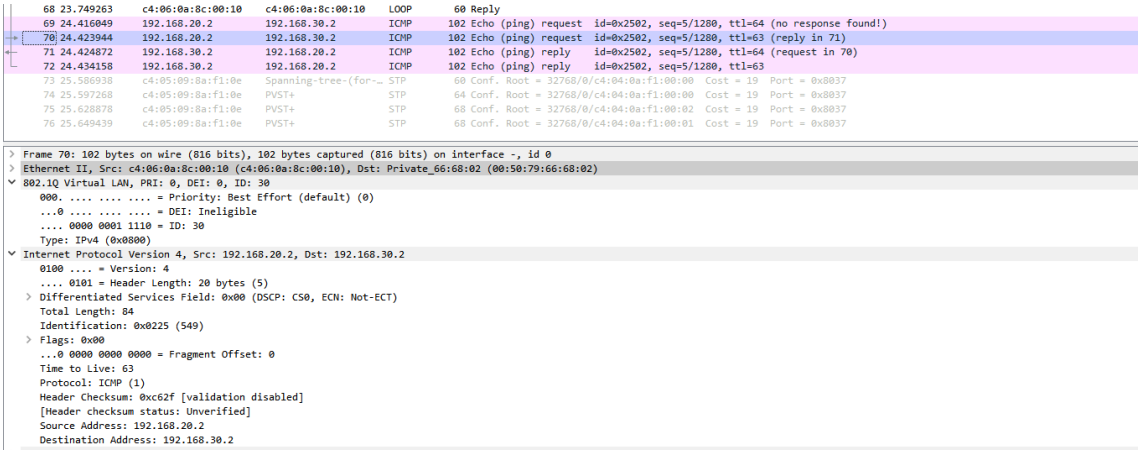

Figure 6: PC1 Pings Router Surface