

VLAN

Group Number: 6

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Group Number: 18

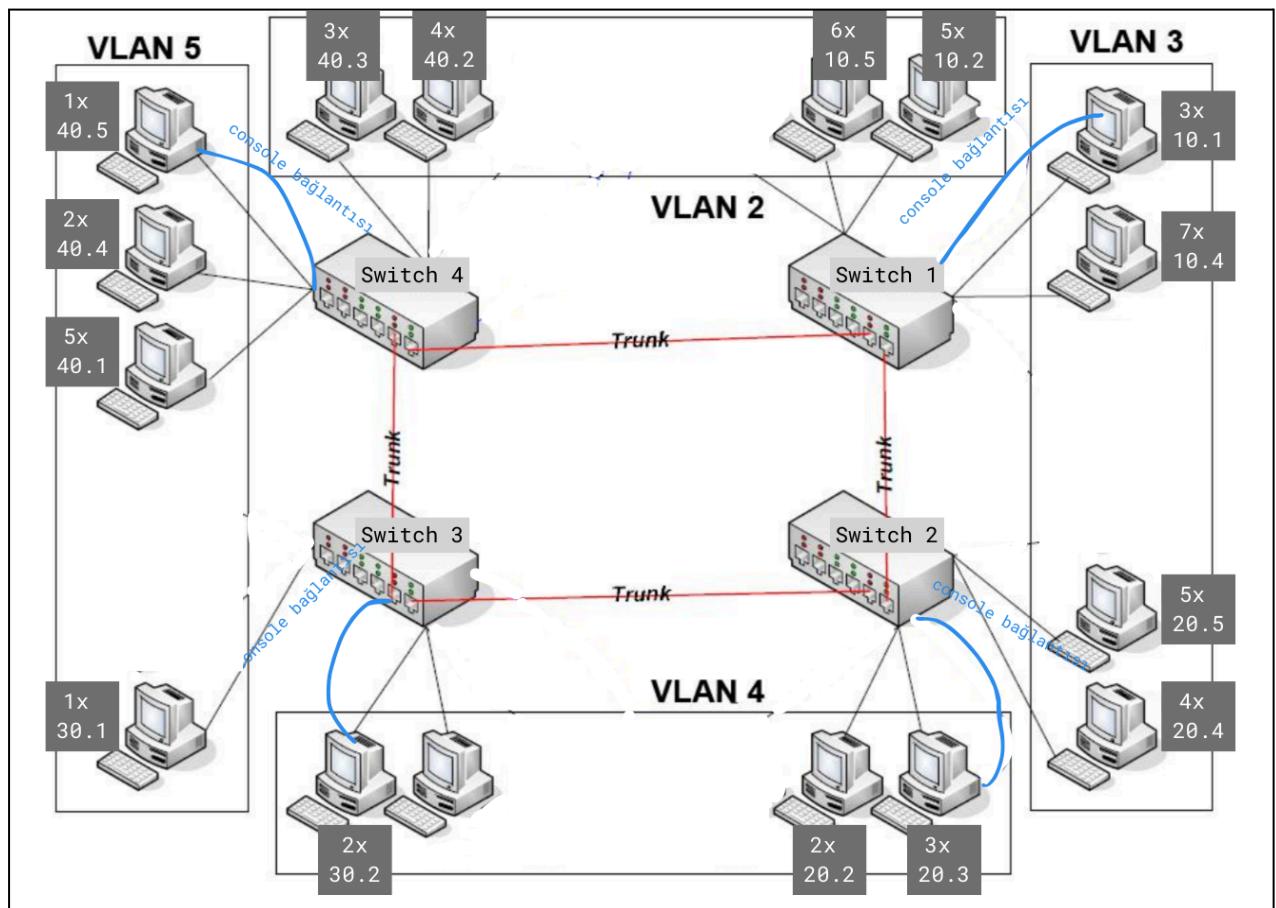
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***Note: We couldn't match with our original groups because there was confusion in the lab but we worked on the same switch so our results match.

VLAN Configuration

As you can see from the topology, we have created a network that consists of 4 virtual LANs with 4 switches. In each VLAN, one computer is chosen as a console and all operations related to VLANs are done by this computer.



The topology image

IP Adress Assignment

We worked on Group 4 with computers 10.200.40.1 and 10.200.40.4

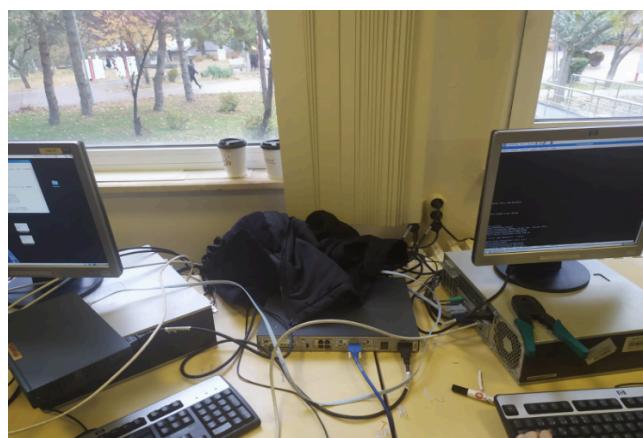
Group Name	IP Address	Subnet mask
Group1	10.200.10.1 - 10.200.10.5	255.255.0.0
Group2	10.200.20.1 - 10.200.20.5	255.255.0.0
Group3	10.200.30.1 - 10.200.30.2	255.255.0.0
Group4	10.200.40.1 - 10.200.40.5	255.255.0.0

```
[root@localhost ~]# ifconfig eth0 10.200.40.1
[root@localhost ~]# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:1C:C4:66:BC:C4
          inet  addr:10.200.40.1  Bcast:10.255.255.255  Mask:255.0.0.0
                  inet6 addr: fe80::21c:c4ff:fe66:bcc4/64  Scope:Link
                      UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
                      RX packets:63  errors:0  dropped:0  overruns:0  frame:0
                      TX packets:51  errors:0  dropped:0  overruns:0  carrier:0
                      collisions:0  txqueuelen:1000
                      RX bytes:15103 (14.7 KiB)  TX bytes:10363 (10.1 KiB)
                      Interrupt:20

lo       Link encap:Local Loopback
          inet  addr:127.0.0.1  Mask:255.0.0.0
                  inet6 addr: ::1/128  Scope:Host
                      UP LOOPBACK RUNNING  MTU:16436  Metric:1
                      RX packets:3113  errors:0  dropped:0  overruns:0  frame:0
                      TX packets:3113  errors:0  dropped:0  overruns:0  carrier:0
                      collisions:0  txqueuelen:0
                      RX bytes:3152640 (3.0 MiB)  TX bytes:3152640 (3.0 MiB)
```

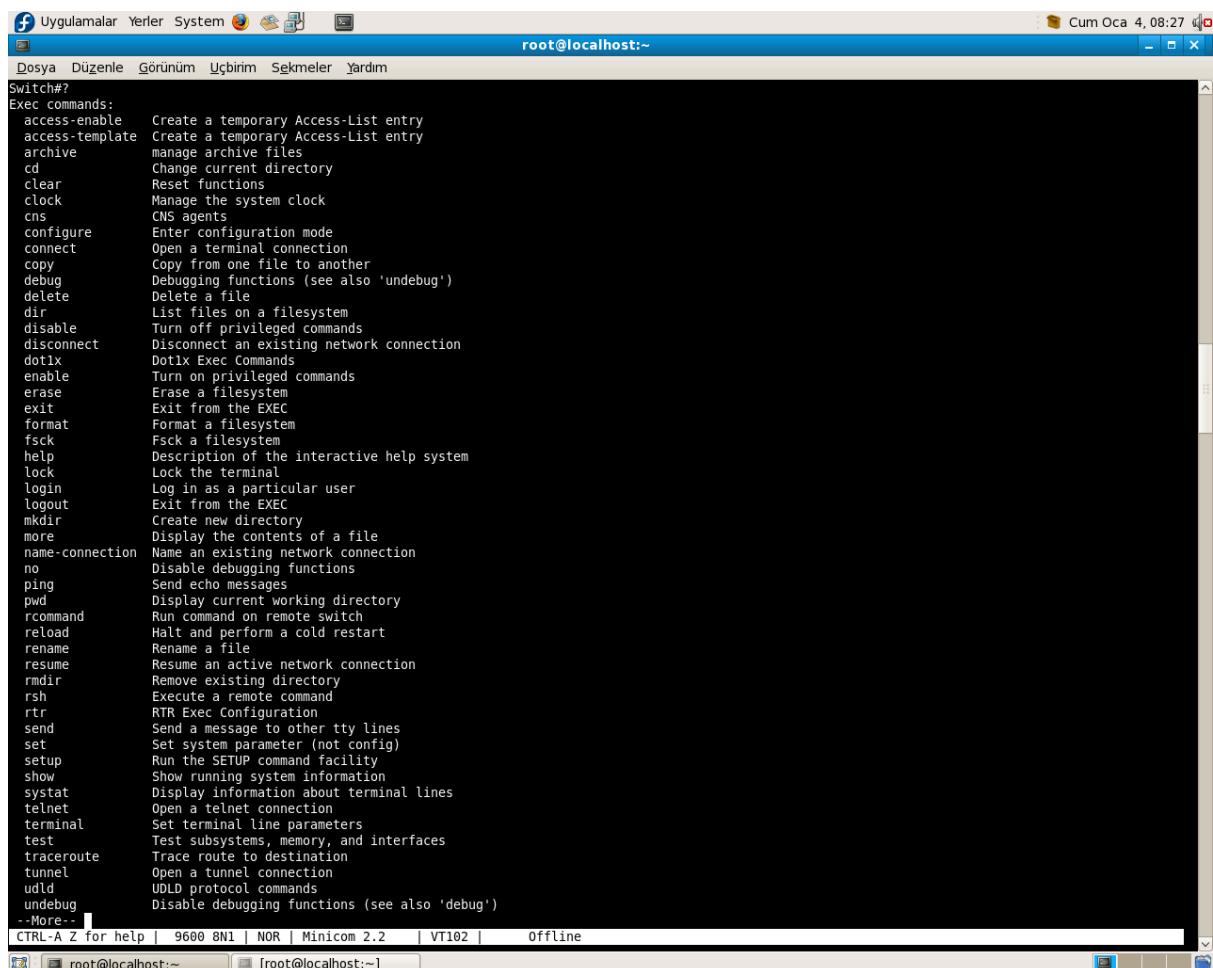
Switch Configuration

In our group computer with IP address 10.200.40.4. We connected our computer with a blue cable to the console input port as you can see from the image.



Minicom Use

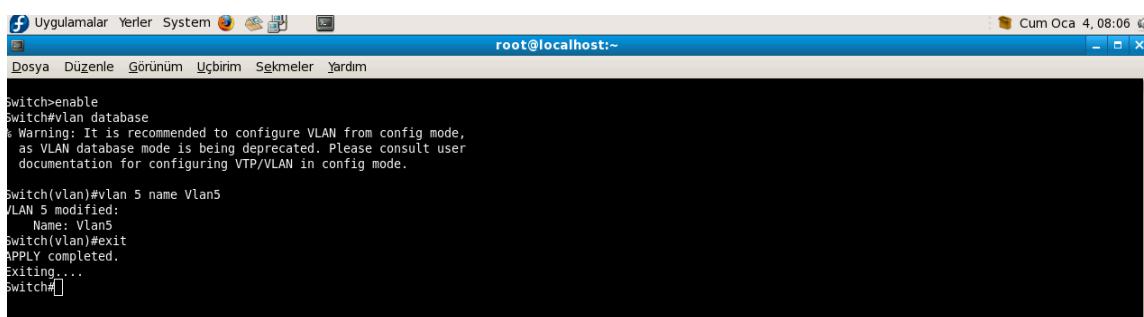
We have configured the Cisco switch with the **minicom** command. After entering the Cisco operating system, we can see what kind of commands we can use by **?** command.



The screenshot shows a Linux desktop environment with a terminal window open. The terminal title is "root@localhost:~". The screen displays the command help menu for the Cisco switch, which lists various EXEC mode commands with their descriptions. The menu includes commands like access-enable, archive, cd, clear, clock, cms, configure, connect, copy, debug, delete, dir, disable, disconnect, dot1x, enable, erase, exit, format, fsck, help, lock, login, logout, mkdir, more, name-connection, no, ping, pwd, rcommand, reload, rename, resume, rmdir, rsh, rtr, send, set, setup, show, sysstat, telnet, terminal, test, traceroute, tunnel, udld, undebug, and --More--. At the bottom of the terminal window, there is status information: CTRL-A Z for help | 9600 8N1 | NOR | Minicom 2.2 | VT102 | Offline.

VLAN Configuration Commands

And now we will configure our VLAN settings. First of all, we will create a new VLAN. To do this, we enter the VLAN database and create a new one with the ID we want.



The screenshot shows a Linux desktop environment with a terminal window open. The terminal title is "root@localhost:~". The screen shows the configuration of a VLAN. It starts with "Switch>enable" and "Switch#vlan database". A warning message states: "Warning: It is recommended to configure VLAN from config mode, as VLAN database mode is being deprecated. Please consult user documentation for configuring VTP/VLAN in config mode." Then, "Switch(vlan)#vlan 5 name VLAN5" is entered, followed by "VLAN 5 modified:", "Name: VLAN5", "Switch(vlan)#exit", "APPLY completed.", "Exiting...", and finally "Switch#".

After this, we assign different computers to our VLAN. For this experiment, our group consisted of 5 computers. Respectively, their IP addresses and switch ports were assigned as this:

10.200.40.1 → 5x
10.200.40.2 → 4x
10.200.40.3 → 3x
10.200.40.4 → 2x
10.200.40.5 → 1x

And we did this assignment on minicom with these commands you can see in the screenshots:

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface fastEthernet0/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 5
Switch(config-if)#exit
Switch(config)#^Z
Switch#
04:55:04: %SYS-5-CONFIG_I: Configured from console by console
```

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface fastEthernet0/2
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan <5>
^
s Invalid input detected at '^' marker.

Switch(config-if)#switchport access vlan 5
Switch(config-if)#exit
Switch(config)#interface fastEthernet0/3
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 2
Switch(config-if)#exit
Switch(config)#interface fastEthernet0/4
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 2
Switch(config-if)#exit
Switch(config)#interface fastEthernet0/5
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 5
Switch(config-if)#exit
Switch(config)#^Z
Switch#
05:02:16: %SYS-5-CONFIG_I: Configured from console by console
CTRL-A Z for help | 9600 8N1 | NOR | Minicom 2.2 | VT102 | Offline
```

After this, we assigned switch ports to trunk mode. It can be done using these commands:

```
switch>
switch>enable
switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)#interface fastEthernet0/7
switch(config-if)#switchport mode trunk
switch(config-if)#exit
switch(config)#interface fastEthernet0/8
switch(config-if)#switchport mode trunk
switch(config-if)#exit
switch(config)#
CTRL-A Z for help | 9600 8N1 | NOR | Minicom 2.2 | VT102 |
```

And finally, we can see the network just like in the topology:

```
switch>
switch>enable
switch#show vlan

V/LAN Name          Status    Ports
----- -----
1   default          active    Fa0/6, Gi0/1
2   VLAN2            active    Fa0/3, Fa0/4
3   VLAN3            active
5   Vlan5             active    Fa0/1, Fa0/2, Fa0/5
20  VLAN0020         active
50  VLAN0050         active
1002 fddi-default    act/unsup
1003 token-ring-default act/unsup
1004 fddinet-default act/unsup
1005 trnet-default   act/unsup
```

From the screenshot, you can see that Vlan5 has 3 different ports 1 and Vlan2 has 2 different ports. As you saw from the topology, all these ports are on Switch 4 but ports 1, 2 and 5 are in VLAN 5 and ports 3 and 4 are connected to VLAN 2.

Testing

After all these configurations when we tested we can ping:

1. A computer which is in another VLAN and connected to the same switch

```
[root@localhost ~]# ping 10.200.40.2
PING 10.200.40.2 (10.200.40.2) 56(84) bytes of data.
From 10.200.40.4 icmp_seq=2 Destination Host Unreachable
From 10.200.40.4 icmp_seq=3 Destination Host Unreachable
From 10.200.40.4 icmp_seq=4 Destination Host Unreachable

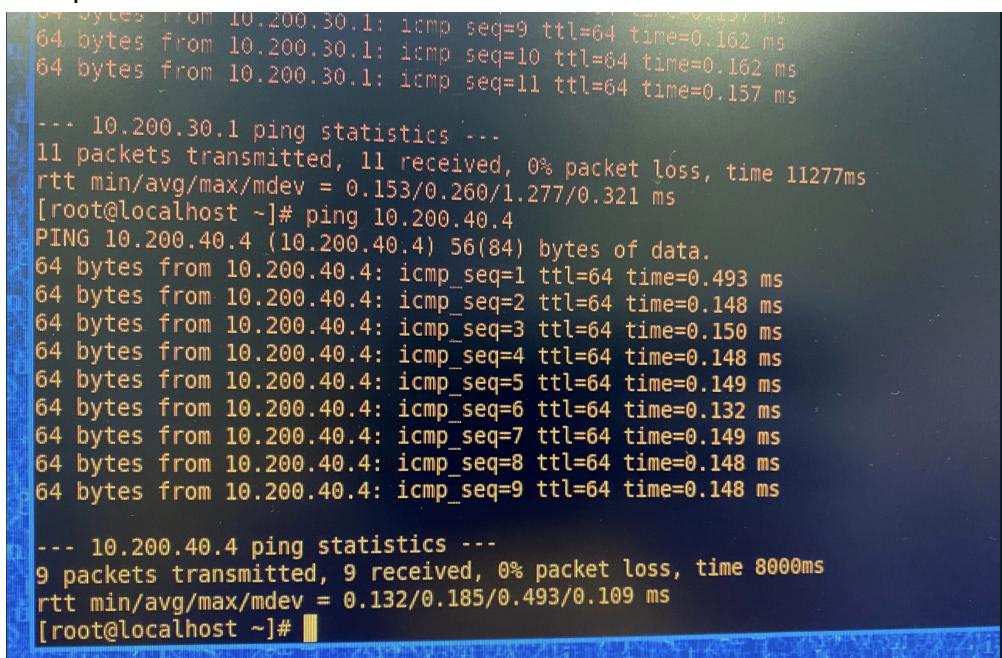
--- 10.200.40.2 ping statistics ---
4 packets transmitted, 0 received, +3 errors, 100% packet loss, time 2999ms
, pipe 3
[root@localhost ~]
```

2. A computer that is in the same VLAN but connected to another switch

```
[root@localhost ~]# ping 10.200.30.1
PING 10.200.30.1 (10.200.30.1) 56(84) bytes of data.
64 bytes from 10.200.30.1: icmp_seq=1 ttl=64 time=0.178 ms
64 bytes from 10.200.30.1: icmp_seq=2 ttl=64 time=0.171 ms
64 bytes from 10.200.30.1: icmp_seq=3 ttl=64 time=0.174 ms

--- 10.200.30.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 1999ms
rtt min/avg/max/mdev = 0.171/0.174/0.178/0.011 ms
```

3. A computer that has the same VLAN and the same switch



```
64 bytes from 10.200.30.1: icmp_seq=9 ttl=64 time=0.157 ms
64 bytes from 10.200.30.1: icmp_seq=10 ttl=64 time=0.162 ms
64 bytes from 10.200.30.1: icmp_seq=11 ttl=64 time=0.157 ms

--- 10.200.30.1 ping statistics ---
11 packets transmitted, 11 received, 0% packet loss, time 11277ms
rtt min/avg/max/mdev = 0.153/0.260/1.277/0.321 ms
[root@localhost ~]# ping 10.200.40.4
PING 10.200.40.4 (10.200.40.4) 56(84) bytes of data.
64 bytes from 10.200.40.4: icmp_seq=1 ttl=64 time=0.493 ms
64 bytes from 10.200.40.4: icmp_seq=2 ttl=64 time=0.148 ms
64 bytes from 10.200.40.4: icmp_seq=3 ttl=64 time=0.150 ms
64 bytes from 10.200.40.4: icmp_seq=4 ttl=64 time=0.148 ms
64 bytes from 10.200.40.4: icmp_seq=5 ttl=64 time=0.149 ms
64 bytes from 10.200.40.4: icmp_seq=6 ttl=64 time=0.132 ms
64 bytes from 10.200.40.4: icmp_seq=7 ttl=64 time=0.149 ms
64 bytes from 10.200.40.4: icmp_seq=8 ttl=64 time=0.148 ms
64 bytes from 10.200.40.4: icmp_seq=9 ttl=64 time=0.148 ms

--- 10.200.40.4 ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 8000ms
rtt min/avg/max/mdev = 0.132/0.185/0.493/0.109 ms
[root@localhost ~]#
```

Conclusion

In this experiment, we created a VLAN configuration for creating a segmented and organized network environment. We followed each step one by one. Lastly decided to test it with two different scenarios.

1- A computer that is in another VLAN and connected to the same switch

When we tried to ping that computer the host was unreachable. This was caused because, between these two computers, there was not a successful inter-VLAN communication capability. We can see that if we want to segment and organize our network environment VLAN can be used. In this way, we can limit the scope of broadcast domains and facilitate more efficient network management. This result is proof that a switch that supports VLANs allows multiple virtual local area networks to be defined over a single physical local area network infrastructure.

2- A computer that is in the same VLAN but connected to another switch

When we tried to ping that computer the process was successful. This was successful because ports within the same VLAN communicate directly with each other, regardless of the physical switch to which they are connected. That shows us the scalability and organizational capabilities of modern network architectures.

3- A computer that is in the same VLAN and connected to the same switch

The successful ping between two computers in the same VLAN and connected to the same switch emphasizes the efficiency and simplicity of VLANs in local communication.