

## Lab4 – Computer Network Design using SWITCH and ROUTERS in GNS3

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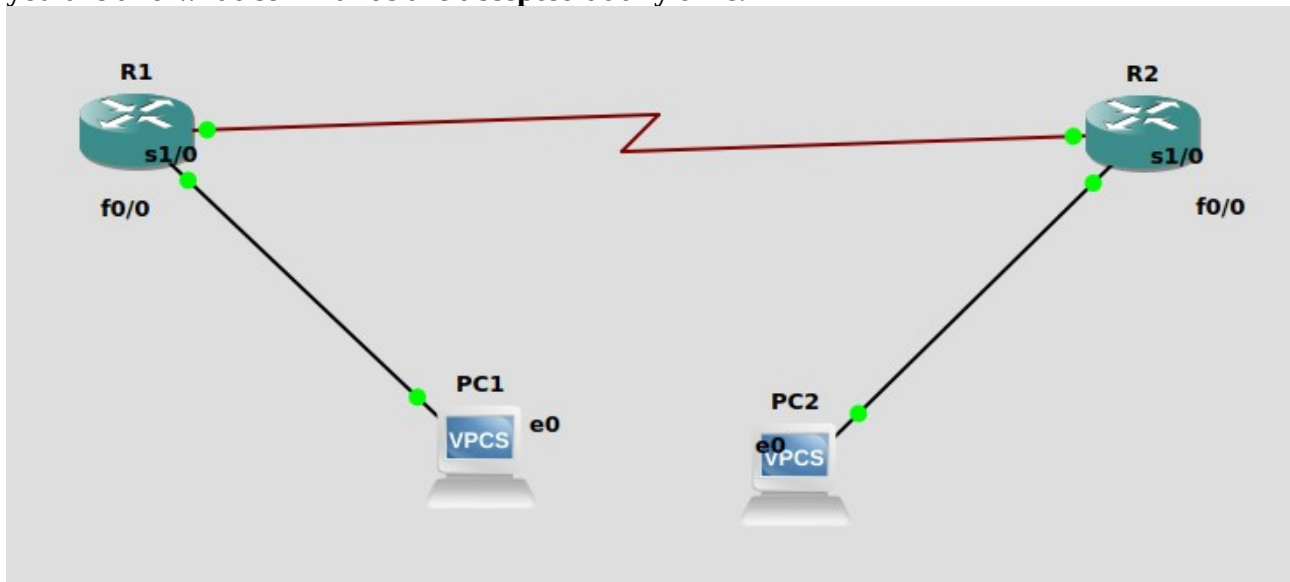
Roll No: 23

Section: CSE-D

Batch: D1

### 1. Switching Cisco IOS Command Modes

This exercise demonstrates how to log into a router and how to work with the different Cisco IOS command modes. It is important to understand the different modes so you know where you are and what commands are accepted at any time.



I made the network structure and assigned IP addresses to every interface.

R1:

s1/0: 10.0.0.1 255.0.0.0

f0/0: 20.0.0.1 255.0.0.0

R2:

s1/0: 10.0.0.2 255.0.0.0

f0/0: 30.0.0.1 255.0.0.0

PC1:

20.0.0.2 Gateway: 20.0.0.1

PC2:

30.0.0.2 Gateway: 30.0.0.1

I pinged PC2 from PC1, but there was a timeout.

This is because the packets are going through the gateway but not getting routed completely. For this, we need to configure the routers with the **destination network** and **next hop's IP address**.

## Pc2 to s1/0 of r2

```
R1(config)#ip route 30.0.0.0 255.0.0.0 10.0.0.2
R1(config)#
```

## pc1 to s1/0 of r1

```
R2(config)#ip route 20.0.0.0 255.0.0.0 10.0.0.1
R2(config)#
```

Now the routes have been established.

We ping PC1 from PC2 again, and this is the response:

```
PC2> ping 20.0.0.2

20.0.0.2 icmp_seq=1 timeout
 84 bytes from 20.0.0.2 icmp_seq=2 ttl=62 time=29.016 ms
 84 bytes from 20.0.0.2 icmp_seq=3 ttl=62 time=29.828 ms
 84 bytes from 20.0.0.2 icmp_seq=4 ttl=62 time=39.609 ms
 84 bytes from 20.0.0.2 icmp_seq=5 ttl=62 time=40.955 ms
```

We can see ICMP messages being passed from PC1 (20.0.0.2) to PC2(30.0.0.2).

The image shows a Wireshark packet capture window. The top menu bar includes File, Edit, View, Go, Capture, Analyze, Statistics, Telephony, Wireless, Tools, and Help. Below the menu is a toolbar with various icons. A filter bar shows 'Apply a display filter ... <Ctrl-/>' and an 'Expression...' field. The main packet list table is as follows:

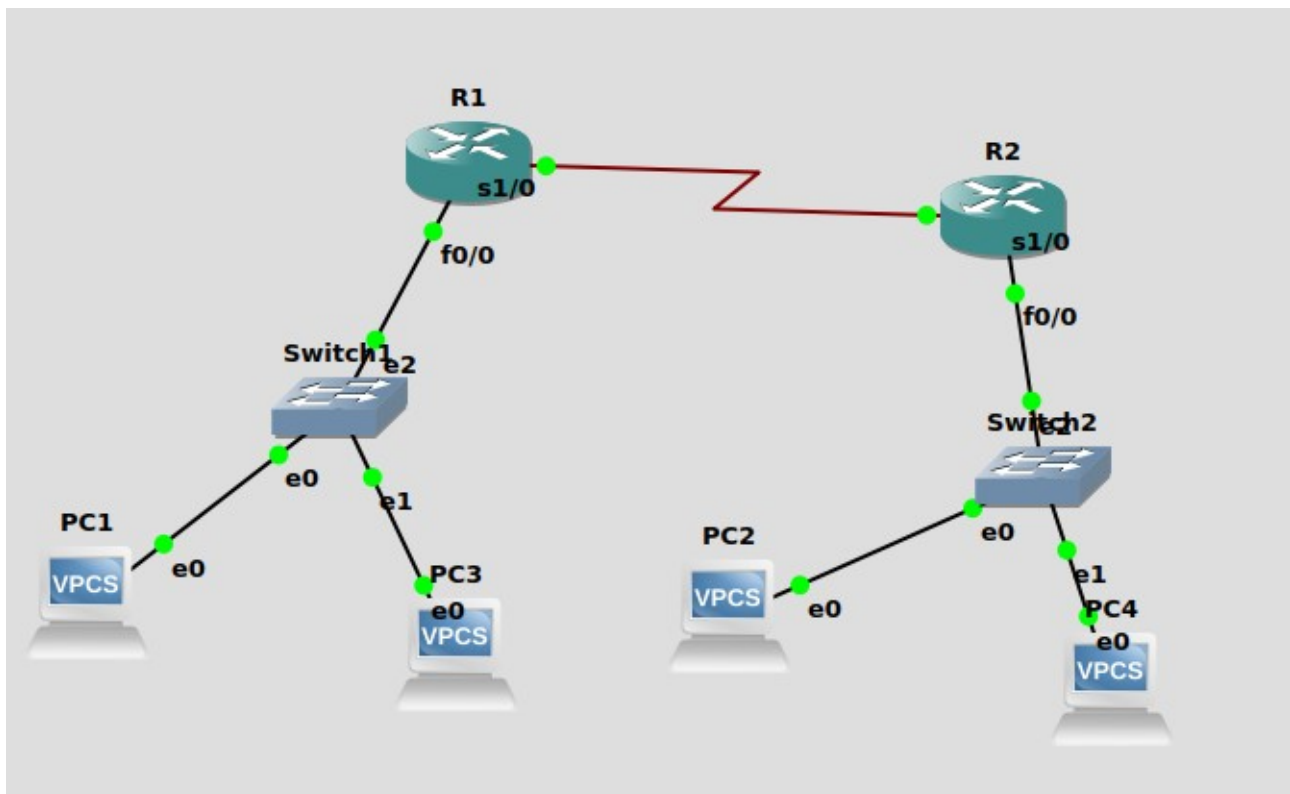
No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	30.0.0.2	20.0.0.2	ICMP	98	Echo (ping) request id=0xe
2	0.000465	20.0.0.2	30.0.0.2	ICMP	98	Echo (ping) reply id=0xe
3	1.030947	30.0.0.2	20.0.0.2	ICMP	98	Echo (ping) request id=0xe
4	1.031619	20.0.0.2	30.0.0.2	ICMP	98	Echo (ping) reply id=0xe
5	2.062013	30.0.0.2	20.0.0.2	ICMP	98	Echo (ping) request id=0xe
6	2.062608	20.0.0.2	30.0.0.2	ICMP	98	Echo (ping) reply id=0xe
7	3.093258	30.0.0.2	20.0.0.2	ICMP	98	Echo (ping) request id=0xe
8	3.093874	20.0.0.2	30.0.0.2	ICMP	98	Echo (ping) reply id=0xe

Below the packet list, the details pane shows the selected packet (Frame 1) with the following information:

- Frame 1: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface 0
- Ethernet II, Src: ca:01:15:90:00:00 (ca:01:15:90:00:00), Dst: Private\_66:68:00 (00:50:79:66:68:00)
- Internet Protocol Version 4, Src: 30.0.0.2, Dst: 20.0.0.2
- Internet Control Message Protocol

## 2) Next Page

Configure the below network topology as shown in Figure 7.8 and check the connectivity by pinging from PC0 to PC2.



Since there are multiple PCs on each network, we use a switch to help us forward the data to the destination device.

I first constructed the network topology and assigned IP addresses to every interface.

R1:

s1/0: 10.0.0.1 255.0.0.0

f0/0: 20.0.0.1 255.0.0.0

R2:

s1/0: 10.0.0.2 255.0.0.0

f0/0: 30.0.0.1 255.0.0.0

PC1:

20.0.0.2 Gateway: 20.0.0.1

PC2:

30.0.0.2 Gateway: 30.0.0.1

PC3:

20.0.0.3 Gateway: 20.0.0.1

PC4:

30.0.0.3 Gateway: 30.0.0.1

- I configured the routers with their respective routes (destination network ID and next hop IP address).

- First, to check whether the individual network with ID 30.0.0.0 is working, I

pinged PC4 (30.0.0.3) from PC32(30.0.0.2) and i could clearly see ICMP messages being exchanged between the two devices which confirmed the exchange of data.

- Next, to check whether my routers are working properly, I pinged PC1 (20.0.0.2) from PC2(30.0.0.2), and again, Wireshark showed me ICMP messages getting exchanged from address 30.0.0.2 to 20.0.0.2 and vice versa.

```
PC2> ping 30.0.0.3
```

```
84 bytes from 30.0.0.3 icmp_seq=1 ttl=64 time=0.454 ms
84 bytes from 30.0.0.3 icmp_seq=2 ttl=64 time=0.880 ms
84 bytes from 30.0.0.3 icmp_seq=3 ttl=64 time=0.787 ms
84 bytes from 30.0.0.3 icmp_seq=4 ttl=64 time=0.901 ms
84 bytes from 30.0.0.3 icmp_seq=5 ttl=64 time=0.835 ms
```

```
PC2> ping 20.0.0.2
```

```
84 bytes from 20.0.0.2 icmp_seq=1 ttl=62 time=29.530 ms
84 bytes from 20.0.0.2 icmp_seq=2 ttl=62 time=30.022 ms
84 bytes from 20.0.0.2 icmp_seq=3 ttl=62 time=29.341 ms
84 bytes from 20.0.0.2 icmp_seq=4 ttl=62 time=29.774 ms
84 bytes from 20.0.0.2 icmp_seq=5 ttl=62 time=29.597 ms
```