DATA COMMUNICATION

Submitted to:

Dr. Ajay Kakkar

Submitted by:

Yoshita Pant

102106040

3EC-2

AIM

Configure the given topology in Figure 1 with classless addressing with minimum or no IP wastage using GNS 3. Show the connectivity using the PING command from:

c) R1 to R6, and d) R3 to R9 e) R3 to R5---------- In testing the PING command, kindly write the issues, which results in the unsuccessful connection if occurred in GNS3. Also, write the possible solution(s) for it under observations section.

INTRODUCTION

Classless Inter-Domain Routing (CIDR) is another name for classless addressing. This addressing type aids in the more efficient allocation of IP addresses. This technique assigns a block of IP addresses based on specified conditions when the user demands a specific amount of IP addresses. This block is known as a "CIDR block", and it contains the necessary number of IP addresses.

There are two forms of IP addressing: *classful* and *classless*. The primary distinction between classful and classless addressing is that classless addressing provides for a more efficient allocation of IP addresses than classful addressing. In a nutshell, classless addressing avoids the problem of IP address exhaustion that can arise with classful addressing.

SNAPSHOTS OF GNS3 WINDOW

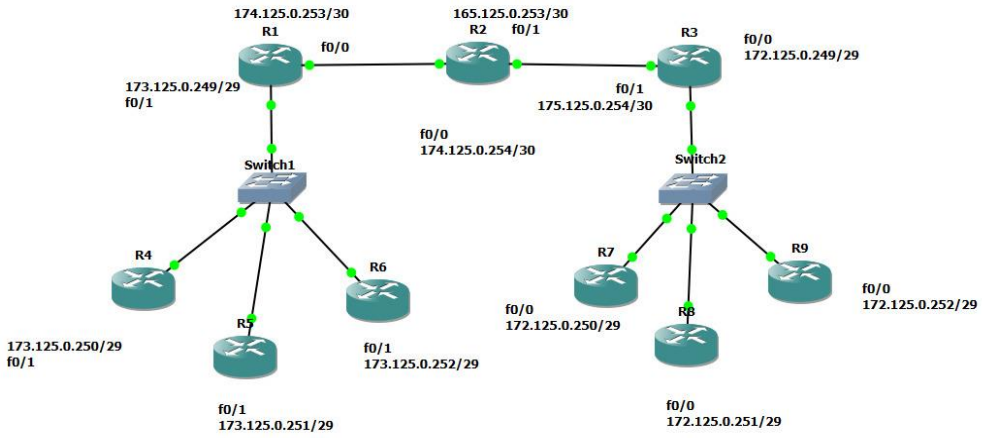

Fig 1.1

SNAPSHOTS OF PING COMMANDS

a) PING command used to R1 to R6:

```
R1#
R1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#hostname 102106040R1
102106040R1(config)#int fa0/0
102106040R1(config-if)#ip address 174.125.0.253 255.255.255.252
102106040R1(config-if)#int fa0/1
102106040R1(config-if)#ip address 173.125.0.249 255.255.255.248
102106040R1(config-if)#no shut
102106040R1(config-if)#
102106040R1#
*Nov  3 23:38:44.007: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
102106040R1#
*Nov  3 23:38:44.275: %SYS-5-CONFIG_I: Configured from console by console
*Nov  3 23:38:45.007: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
102106040R1#ping 173.125.0.252
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 173.125.0.252, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 8/24/32 ms
102106040R1#ping 173.125.0.252
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 173.125.0.252, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 32/77/96 ms
102106040R1#
```

Fig1.2

b) PING Commands used R3 to R9:

```
102106040R9(config)#
102106040R9#
*Nov  4 00:03:13.715: %SYS-5-CONFIG_I: Configured from console by console
102106040R9#ping 172.125.0.252
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.125.0.252, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/6/8 ms
102106040R9#ping 172.125.0.252
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.125.0.252, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 8/8/8 ms
```

Fig1.3

c) PING Commands R3 to R5:

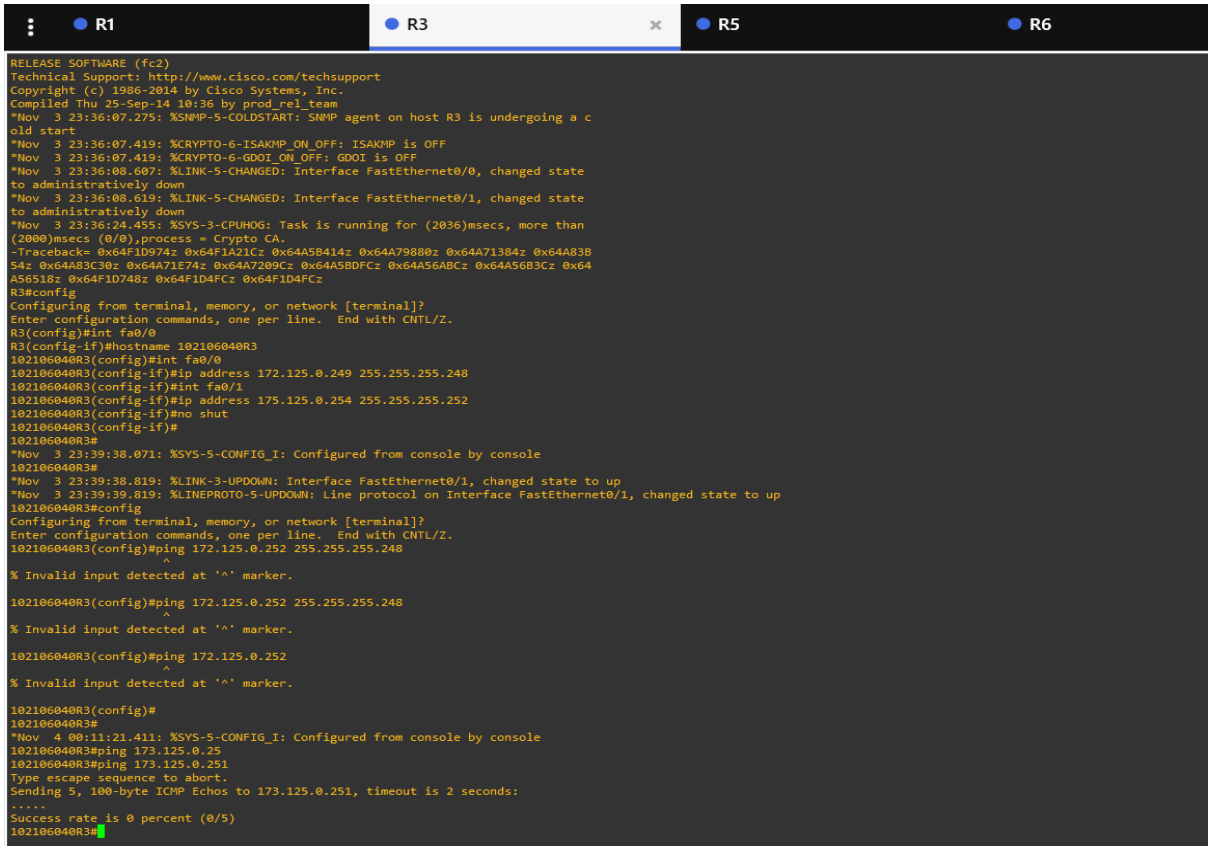

Fig1.4

Observation

Figures 1.2 and 1.3, could ping successfully because they were within the same local network. However, there was an issue of IP wastage when using a subnet mask of 29, as two IP addresses are reserved for network and broadcast (248 and 255), leaving only six usable IPs, of which four were used (249-252). In contrast, when using a subnet mask of 30, there was no IP wastage as all IPs were assigned. We have shown the image above (Fig 1.1 & 1.2) of the IPs that we used and why we used them.

In Figure 1.4, it was not successfully ping because the two entities were not part of the same local network. To illustrate this, imagine two separate labs where one needs to move from one lab to another. In this scenario, routing commands, such as the RIP command, are required to facilitate communication between these distinct networks.