LAN CONFIGURATION WITH REDUNDANCY

18CSS202J- Computer Communication Project Report

Submitted by

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Submitted to

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in partial fulfilment for the award of the degree of

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In

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ABSTRACT :

Now more than ever, today's businesses require reliable network connectivity and access to corporate resources. Connections to and from business units, vendors and SOHOS are all equally important to keep the continuity when needed. Business runs all day, every day and even in off hours. Most companies run operations around the clock, seven days a week so it's important to realize that to keep a solid business continuity strategy, redundancy technologies should be considered and/or implemented.

So, we need to keep things up and available all the time. This is sometimes referred to five nines (99.999) uptime. The small percentage of downtime is accounted for unforeseen incidents, or 'scheduled maintenance' and usually set to take place during times of least impact, like in the middle of the night, or on holiday weekends if planned. If this is not a part of your systems and network architecture it should be considered if you want to keep a high level of availability. Because things break and unforeseen events do take place, we need to evaluate the need for creating an architecture that is 'highly available', or up as much as possible, with failures foreseen ahead of time and the only downtime, is to do planned maintenance.

INTRODUCTION :

- **What is LAN Network?**

A local area network (LAN) is a computer network which extends in a small coverage of geographical area (ex-home, school, computer laboratory, office building or group of buildings) A LAN is composed of internally connected functional workstations and pc', each capable of accessing and sharing data and devices inside the network (ex-printers, scanners and data storage devices, anywhere on the LAN). LANs are characterized by data transfer rates and various other characteristics such as leased lines.

- **What is Network Redundancy?**

The sole concept of network redundancy is to provide alternate and efficient paths for data to travel along in case a cable is broken or a connector accidentally un-plugged. Ethernet as standard does not have rings or loops in the network because it will cause broadcast storms and can ultimately cause the network to stop functioning**.** To withstand with redundancy, network building structure mainly the switches and routers used in the network must support redundancy protocols designed to avoid the usual problems of putting loops into a network.

Importance of Network Redundancy:

In our 21st century all networks are high-tech build and high speed. A simple example would be if you have a single network (ex T1) connection from your core site to each remote office you connect with. What will happen if the link went down?? In this section we will find the solution of this scenario to help designing and plan for a backup solution that you can count on and one that is cost effective and will not break the bank. Network redundancy is very simple concept. If there is a single point of failure and it fails the network, then there is nothing to rely on.

Solution:

The first and foremost step in building network redundancy is to follow a scheduled and perfect project plan to reconstruct the current architecture of the network

1. Plan for a way to make it redundant.
2. Plan for a way to deploy it and then set up a way to test it.

3 Final step will be applying all the policies and processes that allow to monitor it and be alerted when things do fail and actions can be taken. A company's various policy(security policy, disaster recovery plan, business continuity plan and/or incident response plan) will leave room for this type of solution. Always have a scheduled procedure regardless of automatic or manual. This means, when implementing the practical redundancy into systems or network, there will be need to take action immediately even if all the operations continue to take place to verify that everything went scheduled or not. Analysis is critical to building a good redundancy plan. Almost every network created is unique in some way of operations.

LITERATURE SURVEY:

The first and foremost step in building network redundancy is to follow a scheduled Plan for a way to make it redundant. Plan for a way to deploy it and then set up a way to test it. Final step will be applying all the policies and processes that allow to monitor it and be alerted when things do fail and actions can be taken. and perfect project plan to reconstruct the current architecture of the network

Always have a scheduled procedure regardless of automatic or manual. This means, when implementing the practical redundancy into systems or network, there will be need to take action immediately even if all the operations continue to take place to verify that everything went scheduled or not. Analysis is critical to building a good redundancy plan. Almost every network created is unique in some way of operations. This is why understanding the core concept is a must needed quality to acquire network redundancy

APPROACH TAKEN:

• A risk analysis assessment must take place.

• The core sites must be taken into consideration if that is where the bulk of network sources are located.

•. Routing and routing protocols need to be considered.

• Solutions exist only when specific routing and switching protocols are applied the designing of the network to achieve redundancy.

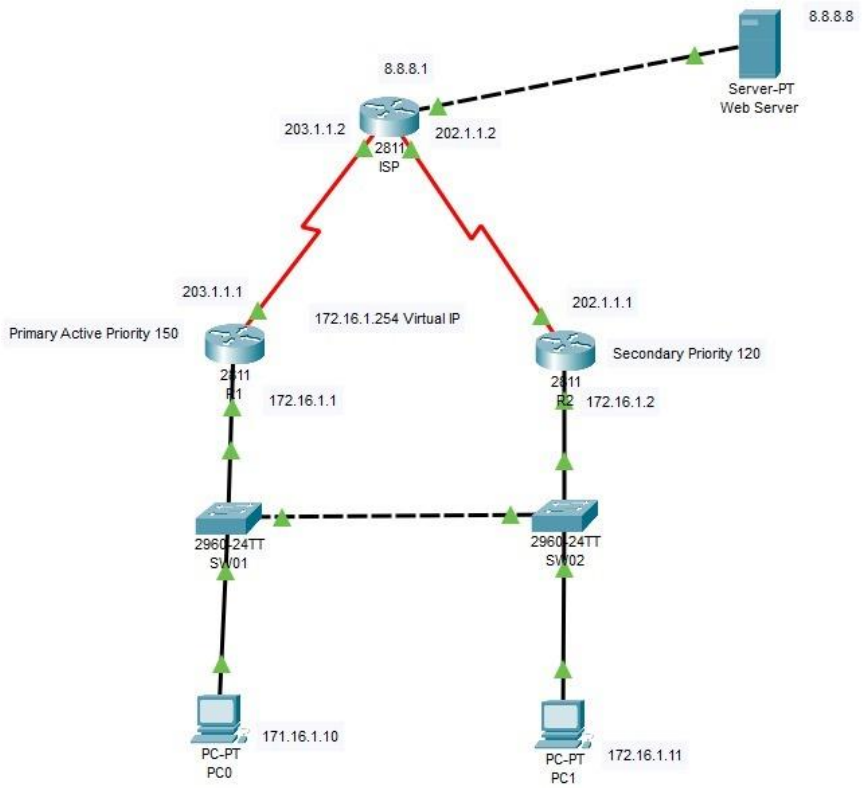
REQUIREMENTS :

- CISCO Packet Tracer for applying basic commands
- Server
- 2 or 3 Laptops.
- LAN Cable for connectivity.
- Routers

ARCHITECTURE DESIGN:

We will be using a HSRP routing protocol in our topology to establish connection.

This protocol establishes a framework between network router s in order to achieve default gateway failover if primary gateway gets in acces sible, in close as sociation with a rapid-converging routing protocol like EIGRP or OSPF. By multicas ting packet s, HSRP sends hello messages to the common multicast address i.e. to all routers.



IMPLEMENTATION:

•We take two PCs two switches and two router s.

•We setup a primary router and a secondary router.

•We keep the secondary router as stand by in case the primary router fails.

•This is done through cli tab we setup the terminal s IP's, we do this for both the pc' s and both the router' s.

•Then we use the pc's command prompt to check if the connection works

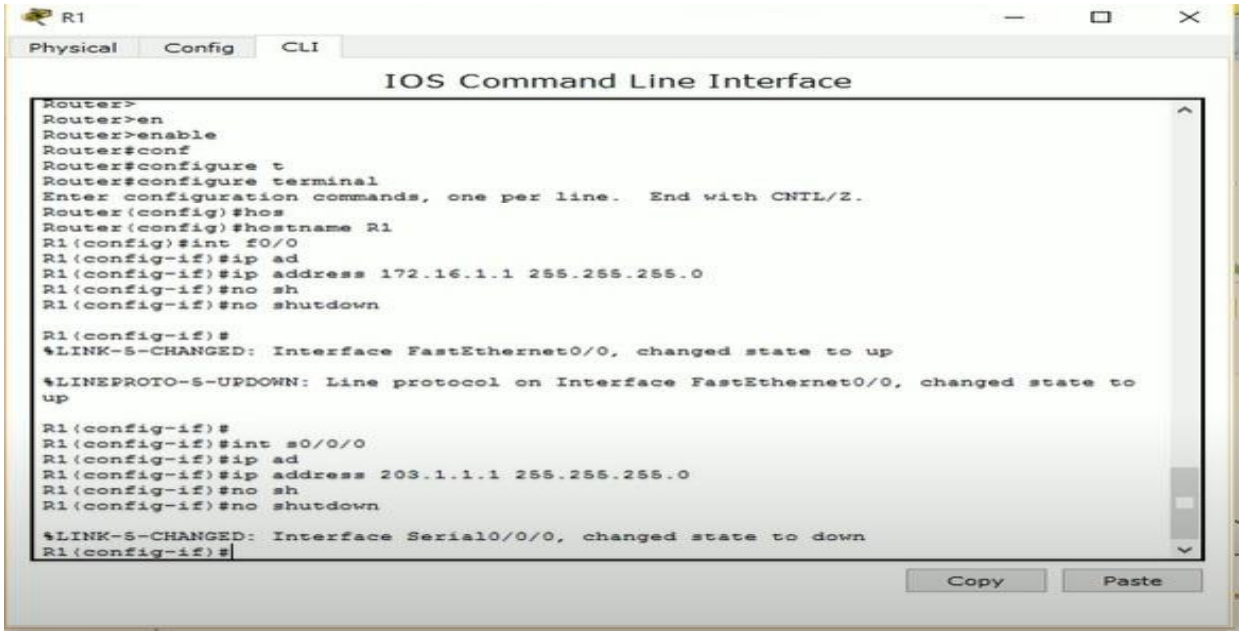
•Then we routers click to set stand by IP address and priority.

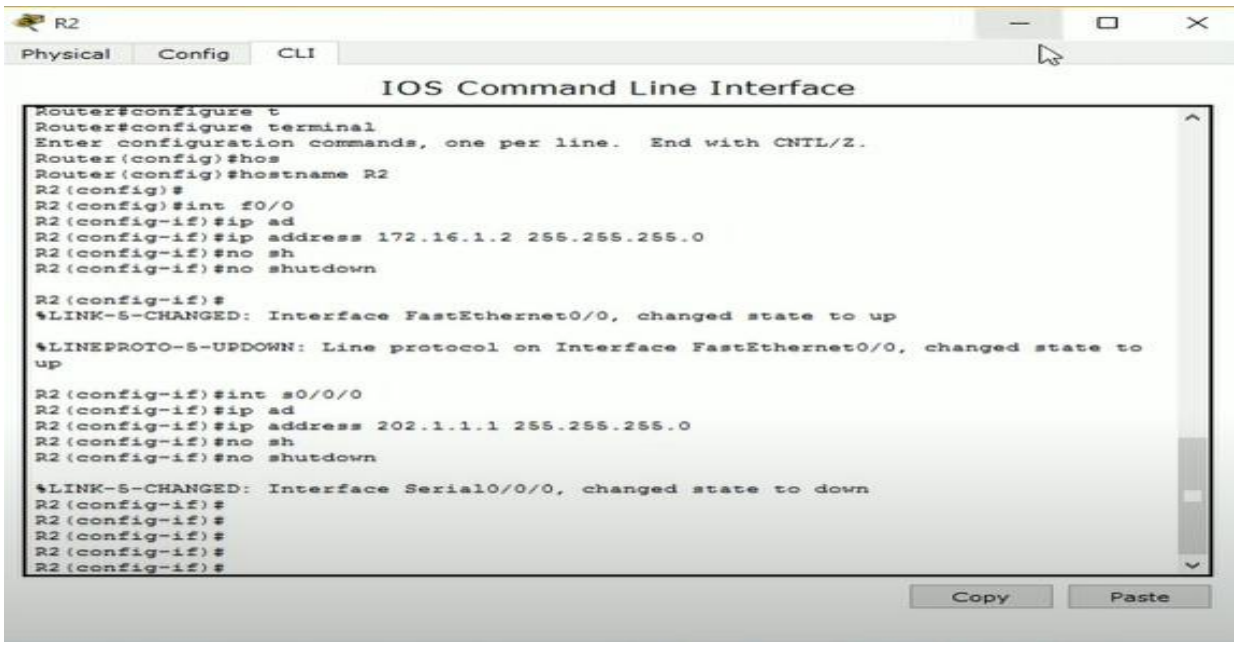
•Then we take a virtual IP this is so that all the pc have the same network gateway

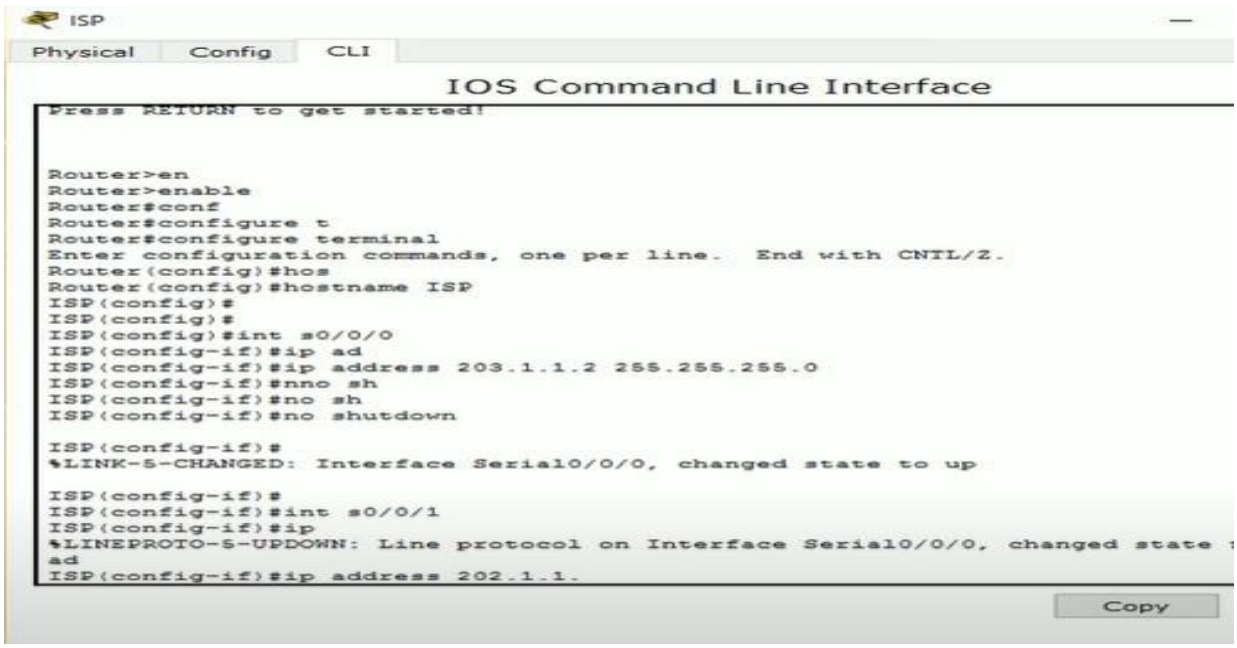
•Then we use the pc' s command prompt to check if the connection works

•Then we router s cli to set stand by IP address and priority.

•Then we take a virtual IP this is so that all the pc have the same network gateway


R1
Physical
Config
CLI
IOS Command Line Interface
Router>
Router>en
Router>enable
Router#conf
Router#configure t
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hos
Router(config)#hostname R1
R1(config)#int f0/0
R1(config-if)#ip ad
R1(config-if)#ip address 172.16.1.1 255.255.255.0
R1(config-if)#no sh
R1(config-if)#no shutdown
R1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R1(config-if)#
R1(config-if)#int s0/0/0
R1(config-if)#ip ad
R1(config-if)#ip address 203.1.1.1 255.255.255.0
R1(config-if)#no sh
R1(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R1(config-if)#
Copy
Paste


R2
Physical
Config
CLI
IOS Command Line Interface
Router#configure t
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hos
Router(config)#hostname R2
R2(config)#
R2(config)#int f0/0
R2(config-if)#ip ad
R2(config-if)#ip address 172.16.1.2 255.255.255.0
R2(config-if)#no sh
R2(config-if)#no shutdown
R2(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R2(config-if)#int s0/0/0
R2(config-if)#ip ad
R2(config-if)#ip address 202.1.1.1 255.255.255.0
R2(config-if)#no sh
R2(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R2(config-if)#
R2(config-if)#
R2(config-if)#
R2(config-if)#
R2(config-if)#
Copy
Paste


ISP
Physical
Config
CLI
IOS Command Line Interface
Press RETURN to get started!
Router>en
Router>enable
Router#conf
Router#configure t
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hos
Router(config)#hostname ISP
ISP(config)#
ISP(config)#
ISP(config)#int s0/0/0
ISP(config-if)#ip ad
ISP(config-if)#ip address 203.1.1.2 255.255.255.0
ISP(config-if)#nno sh
ISP(config-if)#no sh
ISP(config-if)#no shutdown
ISP(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
ISP(config-if)#
ISP(config-if)#int s0/0/1
ISP(config-if)#ip
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state
ad
ISP(config-if)#ip address 202.1.1.
Copy

ISP

Physical | Config | CLI

IOS Command Line Interface

```
ISP(config-if)#
ISP(config-if)#int s0/0/1
ISP(config-if)#ip
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
ad
ISP(config-if)#ip address 202.1.1.2 255.255.255.0
ISP(config-if)#no sh
ISP(config-if)#no shutdown

ISP(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

ISP(config-if)#
ISP(config-if)#
ISP(config-if)#int f0/
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
0
ISP(config-if)#ip ad
ISP(config-if)#ip address 8.8.8.1 255.255.255.0
ISP(config-if)#no sh
ISP(config-if)#no shutdown

ISP(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to
up

ISP(config-if)#
ISP(config-if)#
```

Copy | Paste

R1

Physical | Config | CLI

IOS Command Line Interface

```
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to
up

R1(config-if)#
R1(config-if)#int f0/0
R1(config-if)#st
R1(config-if)#standby 1 ip 172.16.1.254
R1(config-if)#st
R1(config-if)#standby 1 pri
R1(config-if)#standby 1 priority ?
  <0-255>  Priority value
R1(config-if)#standby 1 priority
%HSRP-6-STATECHANGE: FastEthernet0/0 Grp 1 state Speak -> Standby

%HSRP-6-STATECHANGE: FastEthernet0/0 Grp 1 state Standby -> Active

% Incomplete command.
R1(config-if)#
R1(config-if)#
R1(config-if)#standby 1 priority 150
R1(config-if)#st
R1(config-if)#standby 1 pr
R1(config-if)#standby 1 pre
R1(config-if)#standby 1 preempt
R1(config-if)#
R1(config-if)#
R1(config-if)#
R1(config-if)#
```

Copy | Paste

R2

Physical | Config | CLI

IOS Command Line Interface

```
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to
up

R2(config-if)#
R2(config-if)#
R2(config-if)#
R2(config-if)#
R2(config-if)#int f0/0
R2(config-if)#st
R2(config-if)#standby 1 ip 172.16.1.254
R2(config-if)#st
R2(config-if)#standby 1 pr
R2(config-if)#standby 1 pri
R2(config-if)#standby 1 priority 120
R2(config-if)#s
R2(config-if)#sta
R2(config-if)#standby 1 pre
R2(config-if)#standby 1 preempt
R2(config-if)#
R2(config-if)#
R2(config-if)#
R2(config-if)#
%HSRP-6-STATECHANGE: FastEthernet0/0 Grp 1 state Speak -> Standby
```

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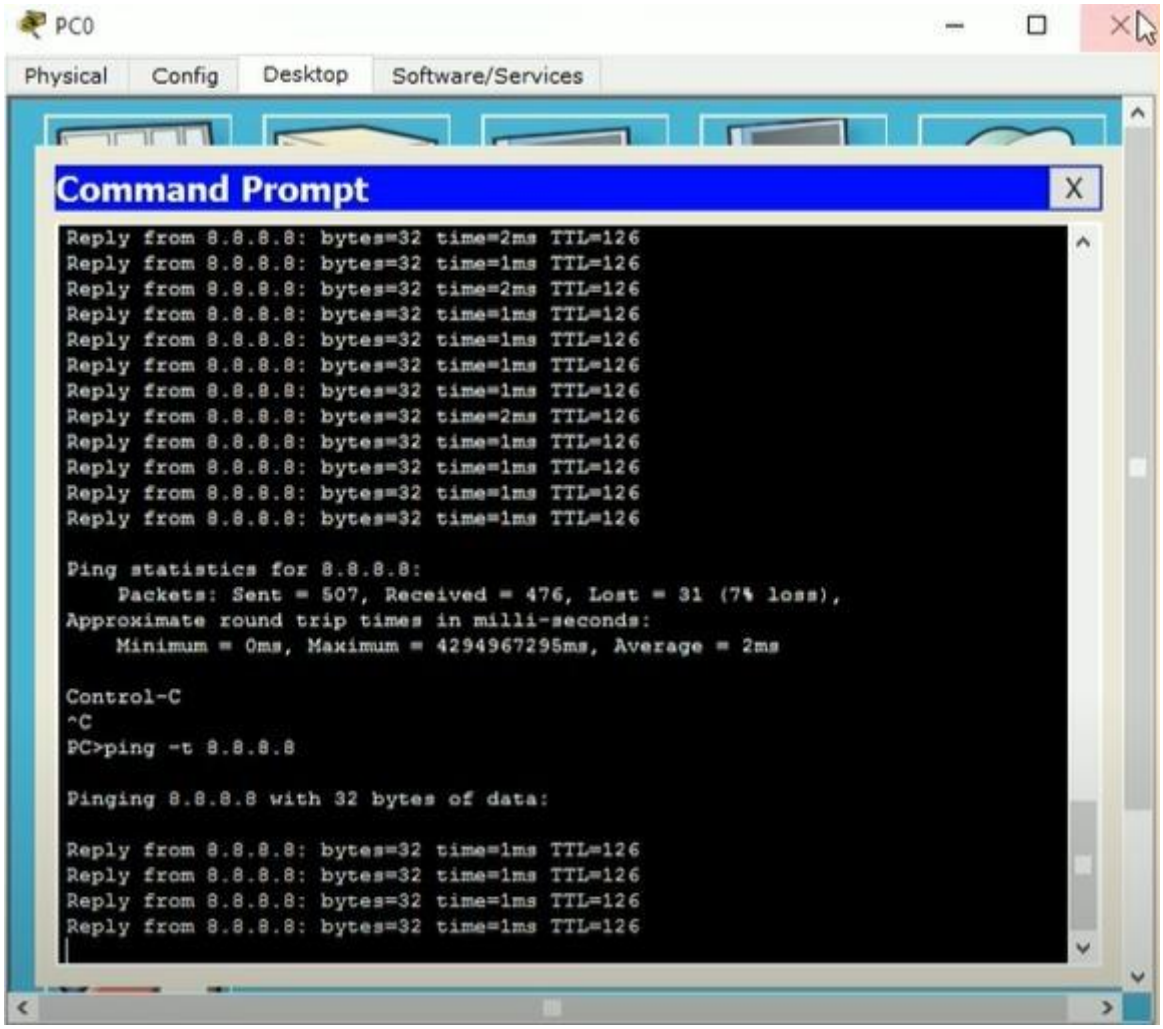
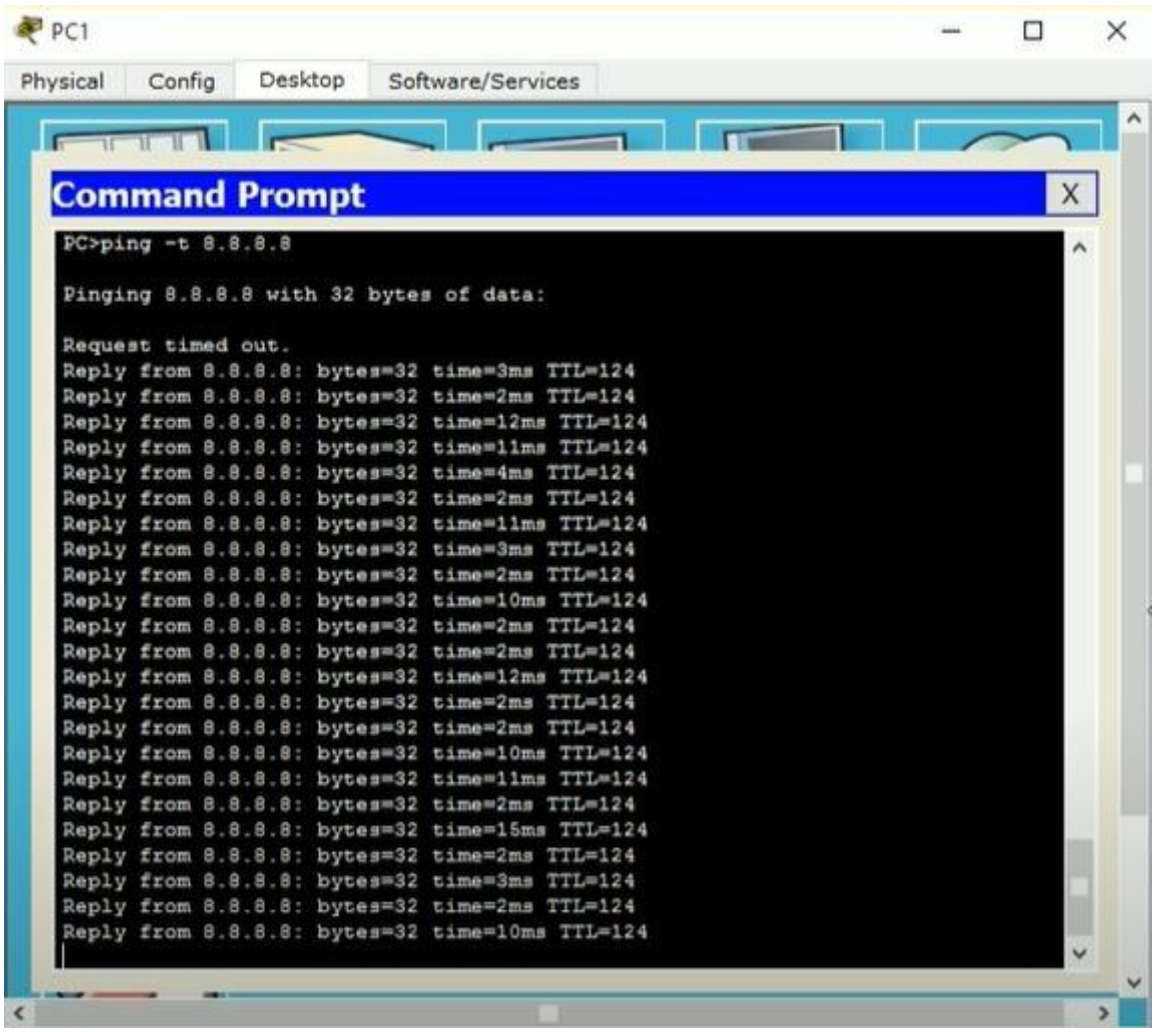

PC0
Physical
Config
Desktop
Software/Services
Command Prompt
Reply from 8.8.8.8: bytes=32 time=2ms TTL=126
Reply from 8.8.8.8: bytes=32 time=1ms TTL=126
Reply from 8.8.8.8: bytes=32 time=2ms TTL=126
Reply from 8.8.8.8: bytes=32 time=1ms TTL=126
Reply from 8.8.8.8: bytes=32 time=1ms TTL=126
Reply from 8.8.8.8: bytes=32 time=1ms TTL=126
Reply from 8.8.8.8: bytes=32 time=1ms TTL=126
Reply from 8.8.8.8: bytes=32 time=2ms TTL=126
Reply from 8.8.8.8: bytes=32 time=1ms TTL=126
Reply from 8.8.8.8: bytes=32 time=1ms TTL=126
Reply from 8.8.8.8: bytes=32 time=1ms TTL=126
Reply from 8.8.8.8: bytes=32 time=1ms TTL=126
Ping statistics for 8.8.8.8:
Packets: Sent = 507, Received = 476, Lost = 31 (7% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 4294967295ms, Average = 2ms
Control-C
^C
PC>ping -t 8.8.8.8
Pinging 8.8.8.8 with 32 bytes of data:
Reply from 8.8.8.8: bytes=32 time=1ms TTL=126
Reply from 8.8.8.8: bytes=32 time=1ms TTL=126
Reply from 8.8.8.8: bytes=32 time=1ms TTL=126
Reply from 8.8.8.8: bytes=32 time=1ms TTL=126


PC1
Physical
Config
Desktop
Software/Services
Command Prompt
PC>ping -t 8.8.8.8
Pinging 8.8.8.8 with 32 bytes of data:
Request timed out.
Reply from 8.8.8.8: bytes=32 time=3ms TTL=124
Reply from 8.8.8.8: bytes=32 time=2ms TTL=124
Reply from 8.8.8.8: bytes=32 time=12ms TTL=124
Reply from 8.8.8.8: bytes=32 time=11ms TTL=124
Reply from 8.8.8.8: bytes=32 time=4ms TTL=124
Reply from 8.8.8.8: bytes=32 time=2ms TTL=124
Reply from 8.8.8.8: bytes=32 time=11ms TTL=124
Reply from 8.8.8.8: bytes=32 time=3ms TTL=124
Reply from 8.8.8.8: bytes=32 time=2ms TTL=124
Reply from 8.8.8.8: bytes=32 time=10ms TTL=124
Reply from 8.8.8.8: bytes=32 time=2ms TTL=124
Reply from 8.8.8.8: bytes=32 time=2ms TTL=124
Reply from 8.8.8.8: bytes=32 time=12ms TTL=124
Reply from 8.8.8.8: bytes=32 time=2ms TTL=124
Reply from 8.8.8.8: bytes=32 time=2ms TTL=124
Reply from 8.8.8.8: bytes=32 time=10ms TTL=124
Reply from 8.8.8.8: bytes=32 time=11ms TTL=124
Reply from 8.8.8.8: bytes=32 time=2ms TTL=124
Reply from 8.8.8.8: bytes=32 time=15ms TTL=124
Reply from 8.8.8.8: bytes=32 time=2ms TTL=124
Reply from 8.8.8.8: bytes=32 time=3ms TTL=124
Reply from 8.8.8.8: bytes=32 time=2ms TTL=124
Reply from 8.8.8.8: bytes=32 time=10ms TTL=124

RESULT:

•THE PCS WERE CONNECTED TO EACH OTHER PHYSICALLY AND LOGICALLY WHICH WAS VERIFIED WITH THE PING COMMAND.

•THE ROUTERS IS CONNECTED TO THE PC PHYSICALLY AND LOGICALLY.

•THE SIMULATION CHECK RETURNS SUCCESSFUL WHEN PARSING A MESSAGE BETWEEN TWO DEVICES.