Institute of Computer Technology
B. Tech Computer Science and Engineering
Sub: CN

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SEM: CSE 5-B (BATCH53)
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PRACTICAL 3

Aim: To Design and configure a network using Dynamic Host Configuration Protocol (DHCP).

Scenario:

Mr. Jason has hired a new network admin and asked him to create a network for his company. He has given him the liberty to erase all the previous network setup and create a new one as per his understanding and expertise. Below are the details provided by Mr. Jason to the network admin.

1) The company has 3 departments – Admin, HR, Sales. 2) Each department have 10 users (add at least 3 devices in each network)
3) The networking device available in the organization is 3 DNS servers, 2 DHCP servers, 3 routers and 3 switches.
4) All the users should get the IP address dynamically.
5) The organization has their own inbuilt Domain Name Server (DNS) which will have the details of the website that the user can access. 6) The users of the company are allowed to access only mentioned websites in the office premises. The list of the website is mentioned below:

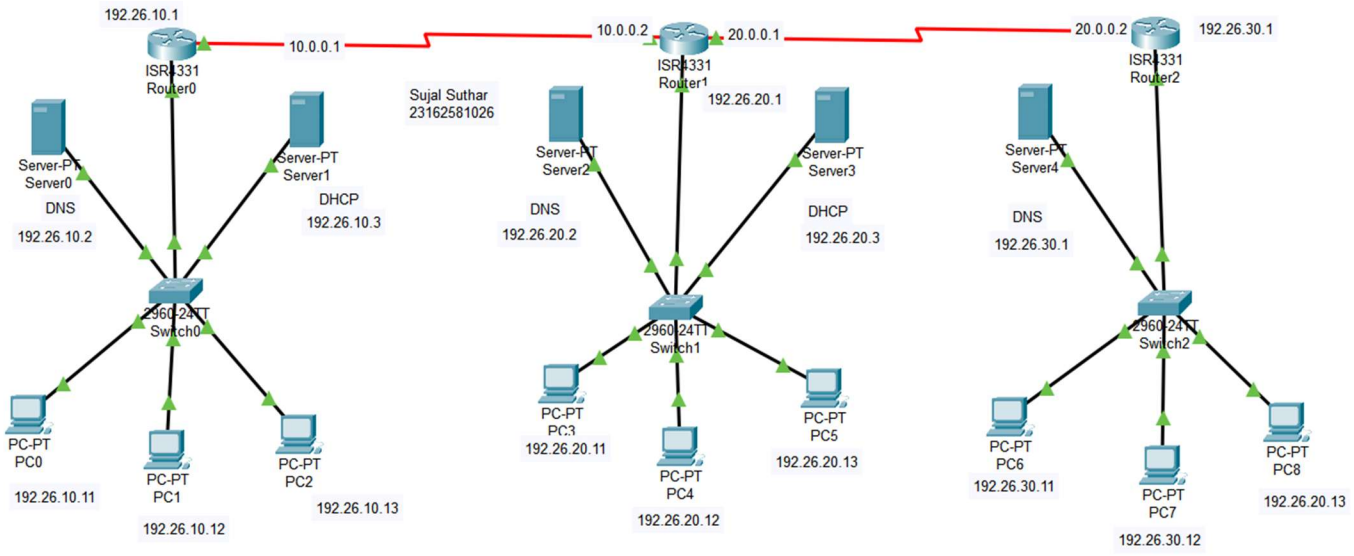
Admin – google, yahoo, cisco
HR – google, cisco
Sales – google

Help the admin to create the network and establish the connection between the devices.
Procedure:

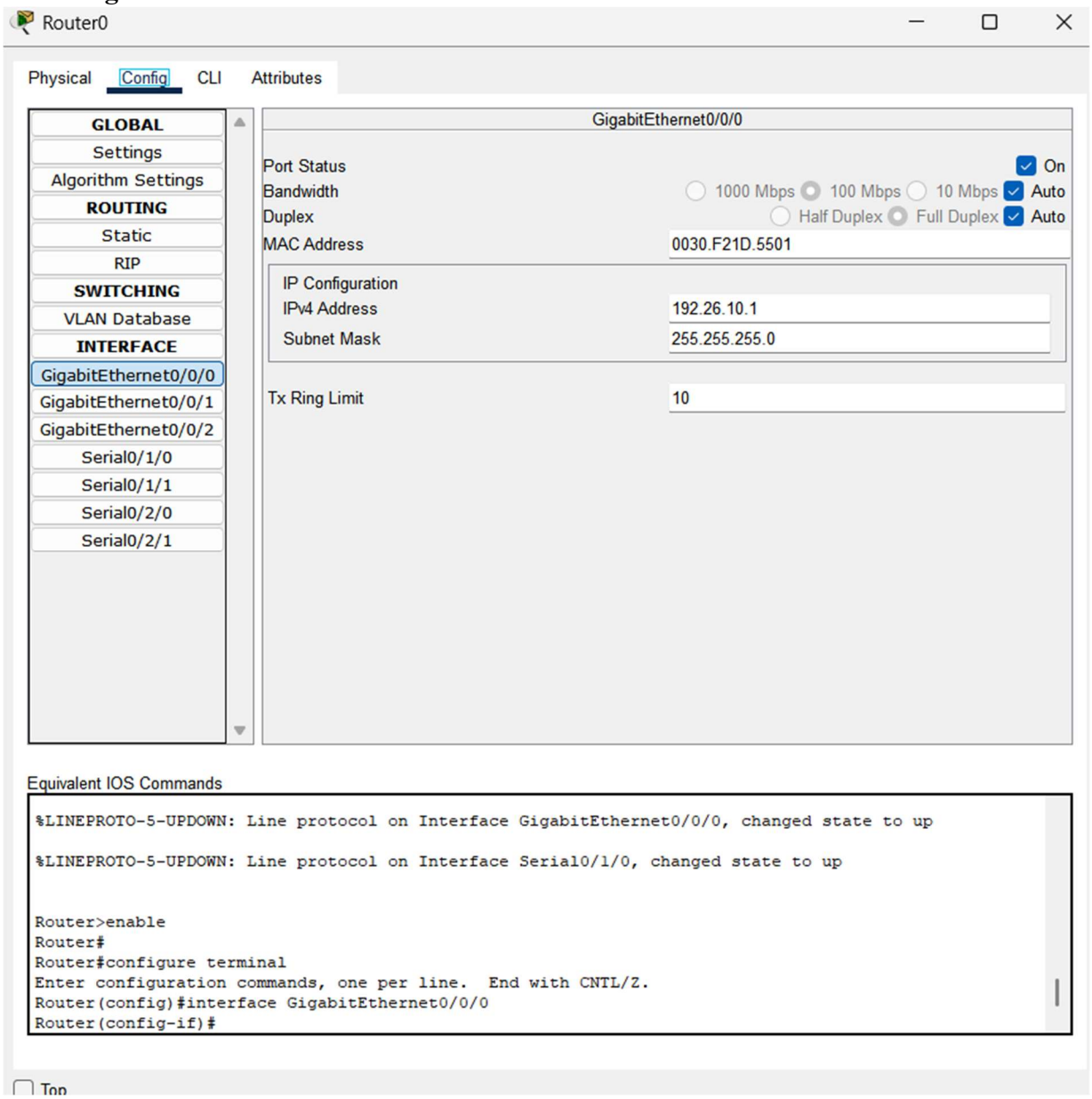
1) Create network as given below
2) Configure IP address (Routers, DNS servers, DHCP servers)
3) Configure dynamic routing table (RIP in routers)
4) Configure DNS service
5) Configure WEB service by hosting websites
6) Configure DHCP server
7) Configure IP-Helper command to appropriate interface of a router
8) Set PC to get IP address based on DHCP

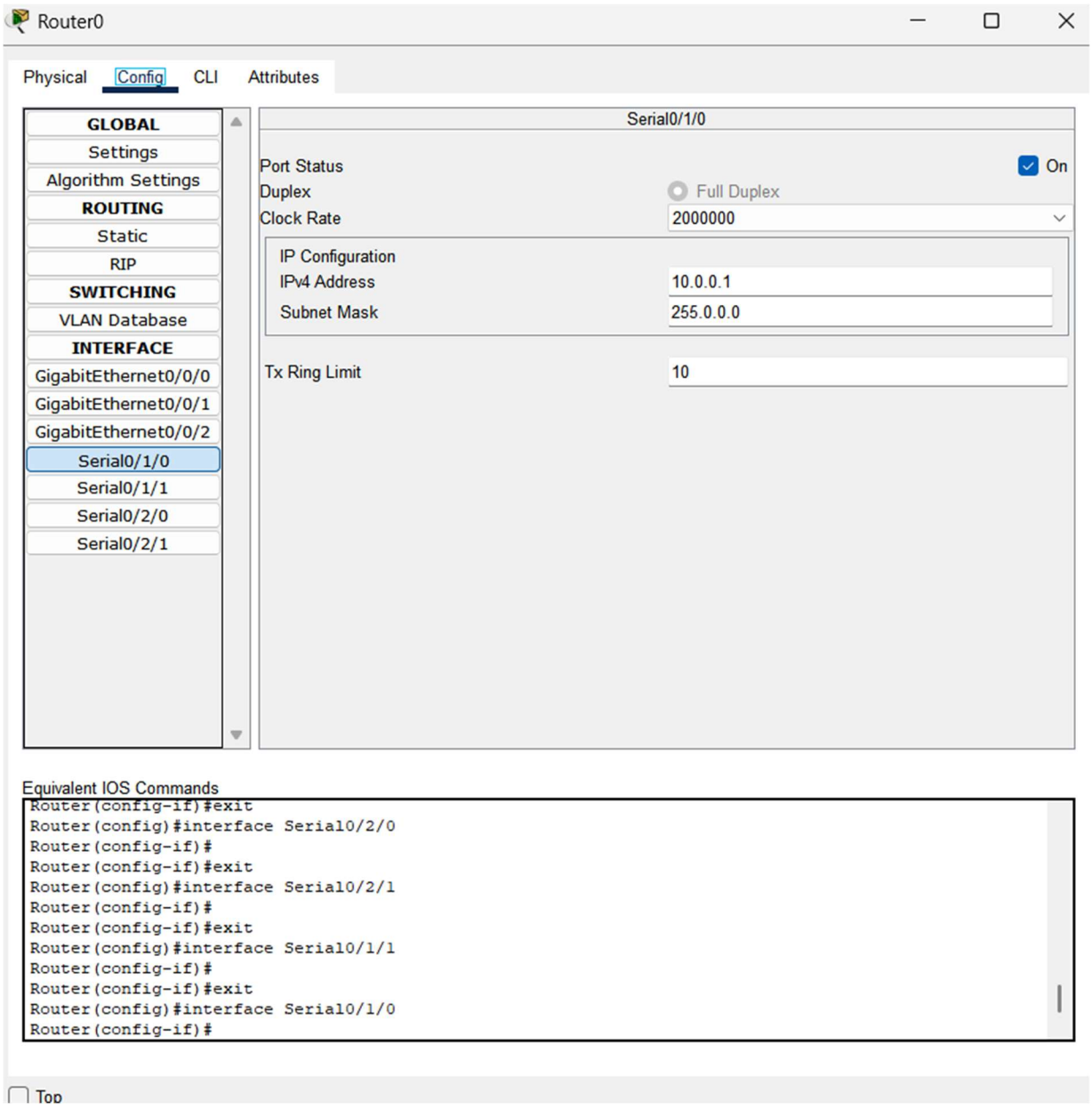
Note:
Make sure last two digits of your enrollment numbers appears in network IP address that must be visible in snapshot of the cisco packet tracer. i.e. 192. XX .10.1 (XX indicates last two digits of your enrollment no.)

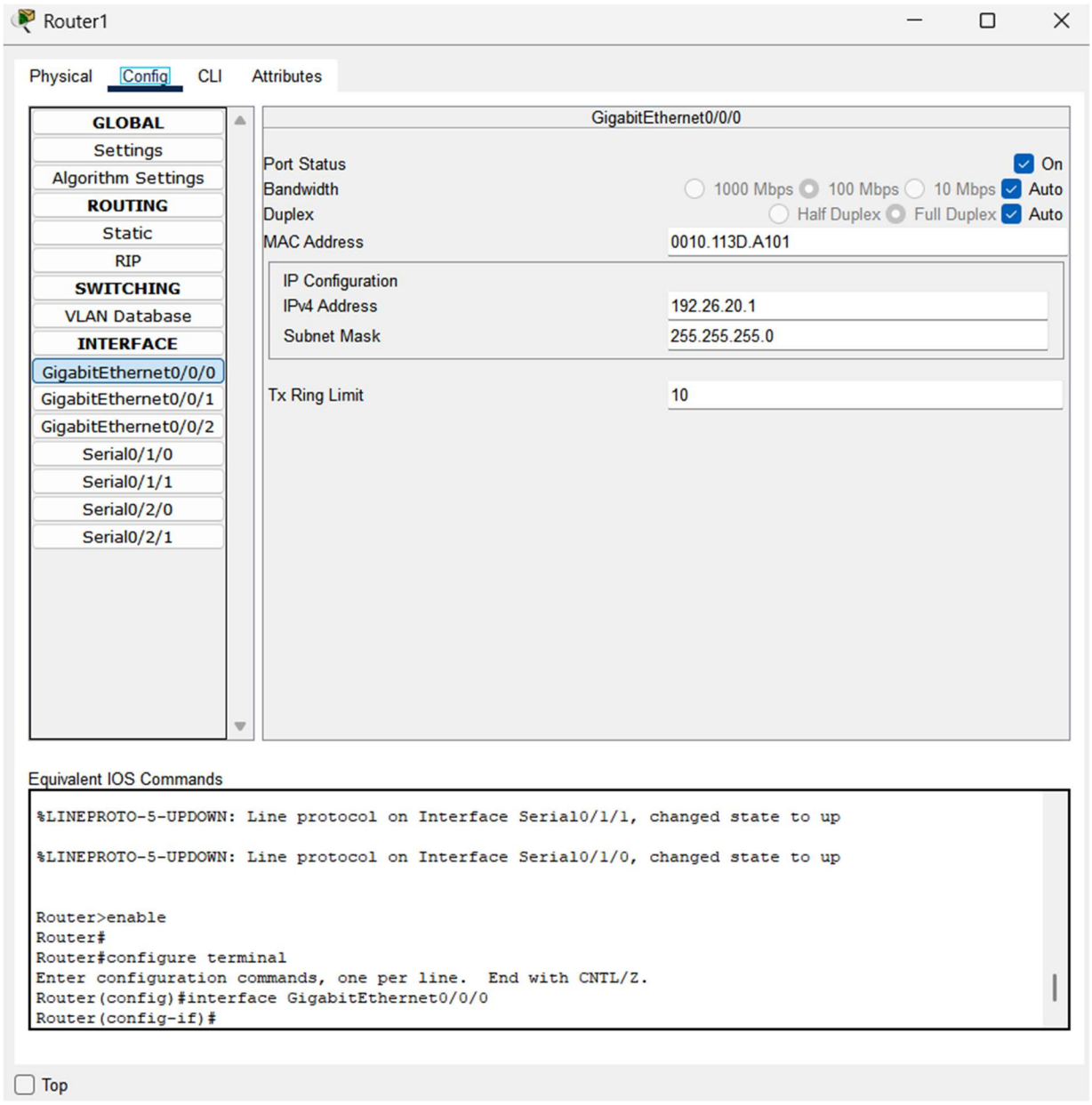
- **Main configuration**

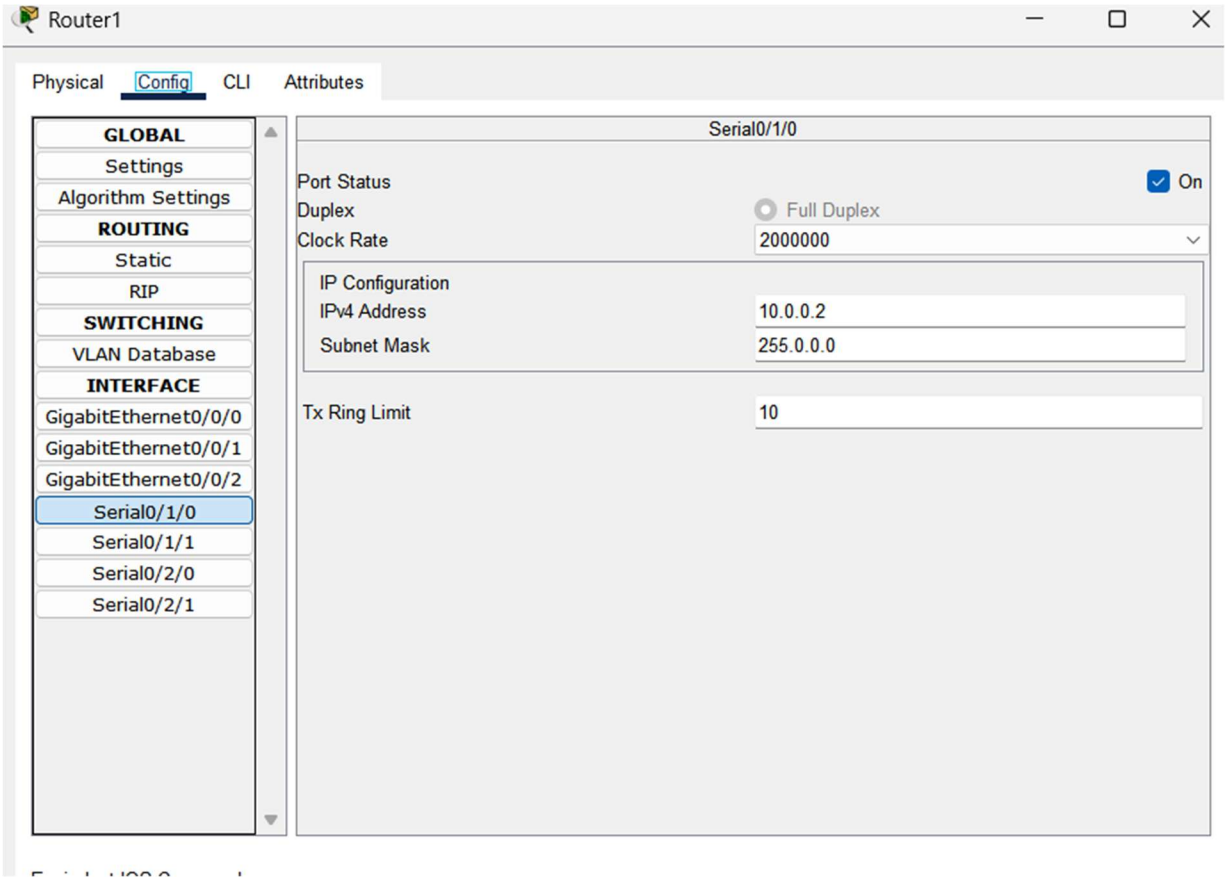


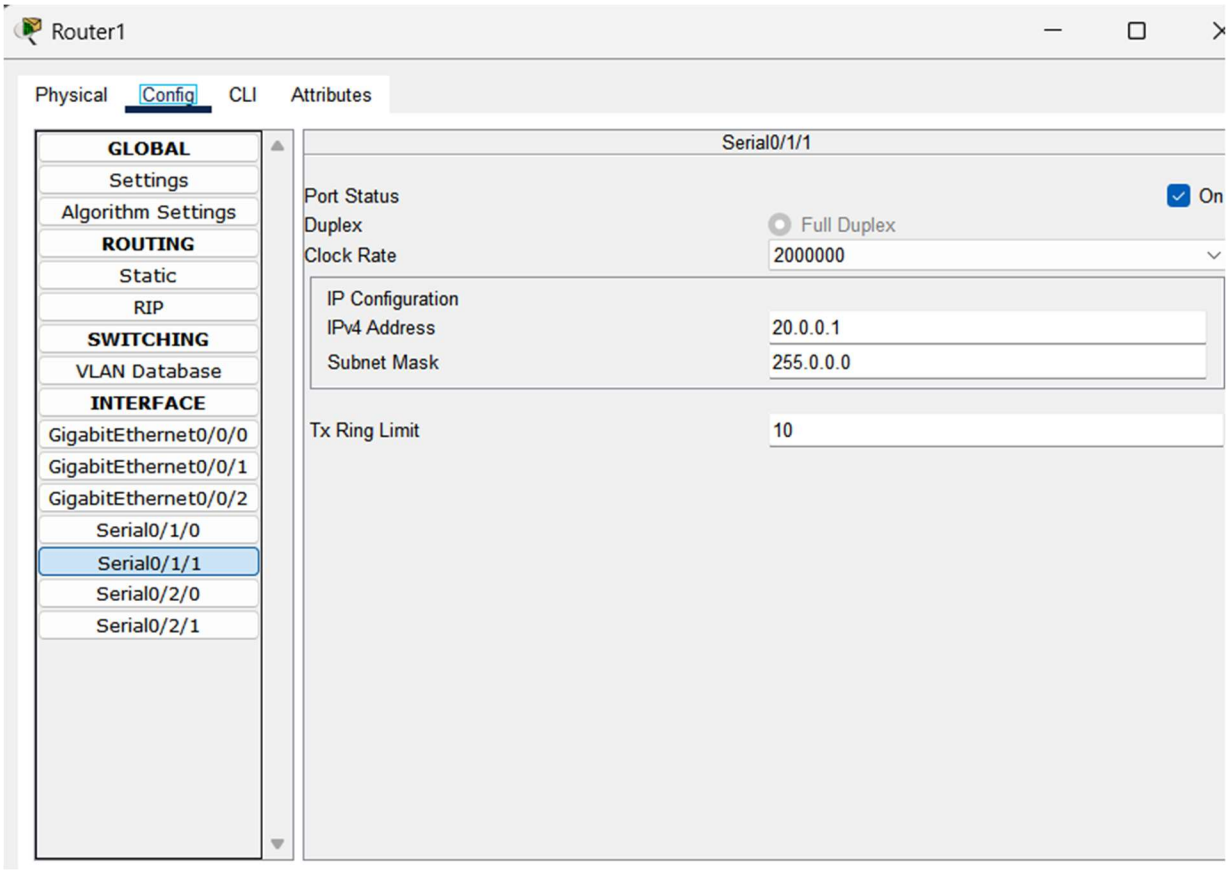
IP configuration of routers:

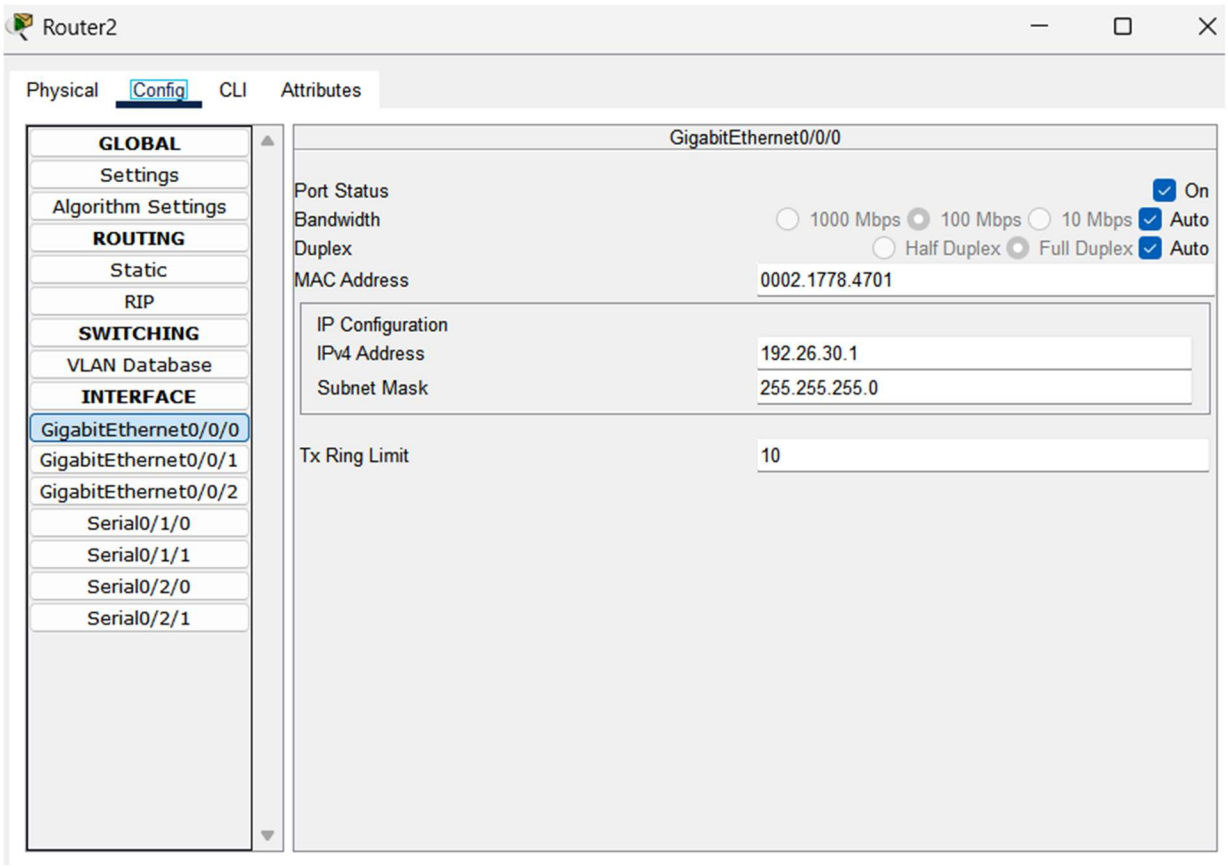


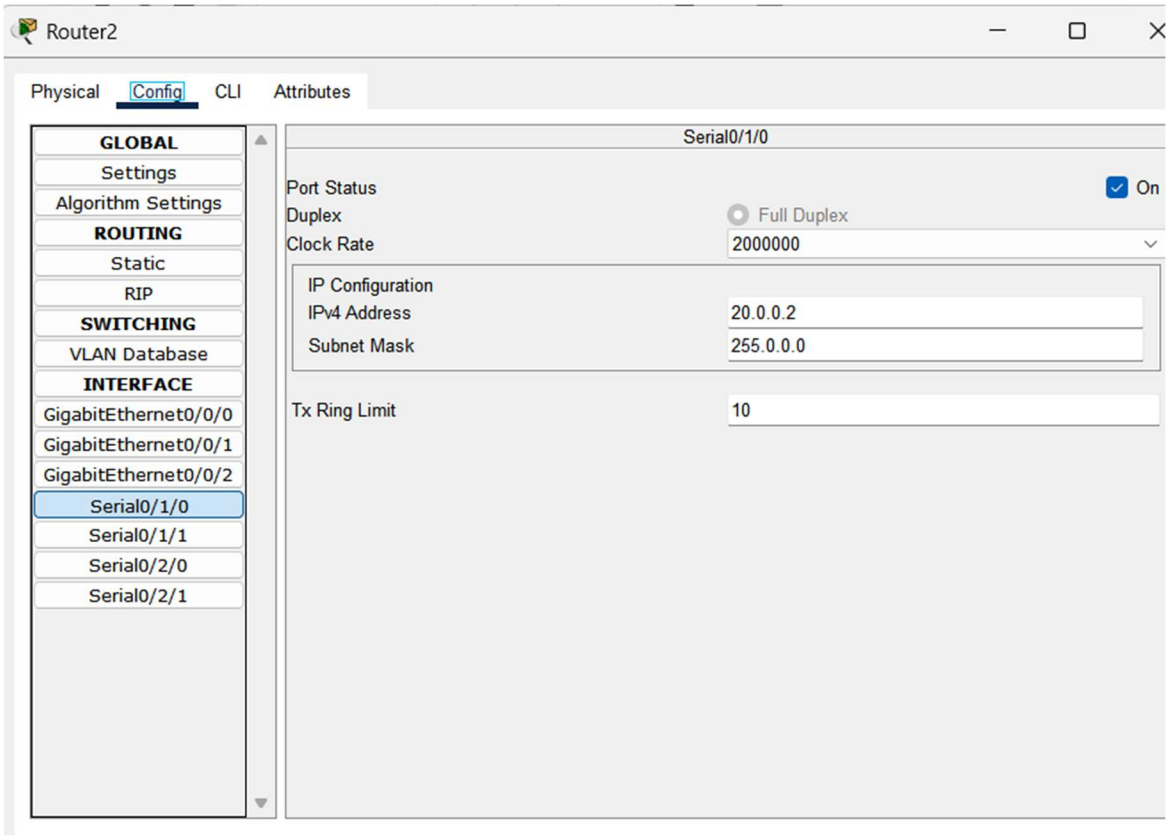

Router0
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/1/0
Serial0/1/1
Serial0/2/0
Serial0/2/1
Serial0/1/0
Port Status
On
Duplex
Full Duplex
Clock Rate
2000000
IP Configuration
IPv4 Address
10.0.0.1
Subnet Mask
255.0.0.0
Tx Ring Limit
10
Equivalent IOS Commands
Router(config-if)#exit
Router(config)#interface Serial0/2/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/2/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Top


Router1
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/1/0
Serial0/1/1
Serial0/2/0
Serial0/2/1
GigabitEthernet0/0/0
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0010.113D.A101
IP Configuration
IPv4 Address
192.26.20.1
Subnet Mask
255.255.255.0
Tx Ring Limit
10
Equivalent IOS Commands
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Top

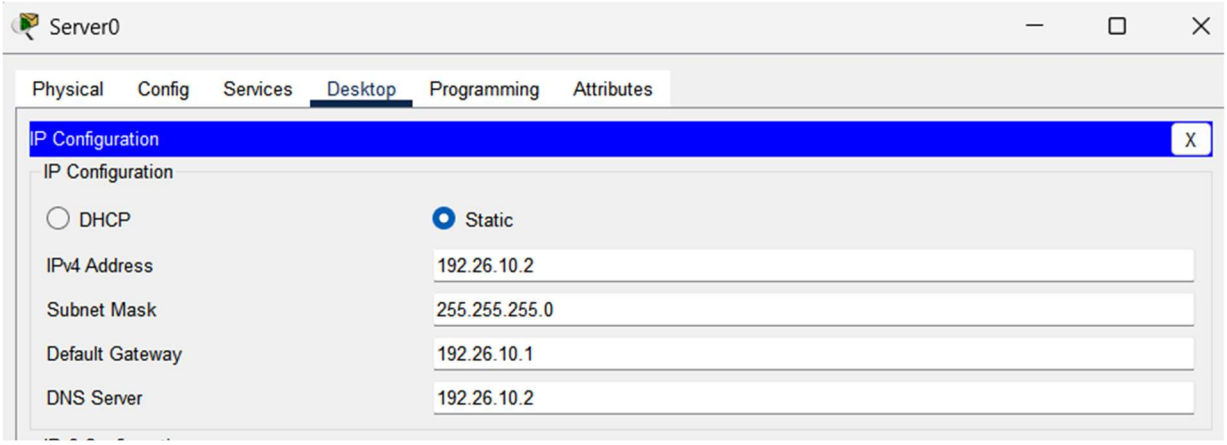

Router1
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/1/0
Serial0/1/1
Serial0/2/0
Serial0/2/1
Serial0/1/0
Port Status
On
Duplex
Full Duplex
Clock Rate
2000000
IP Configuration
IPv4 Address
10.0.0.2
Subnet Mask
255.0.0.0
Tx Ring Limit
10

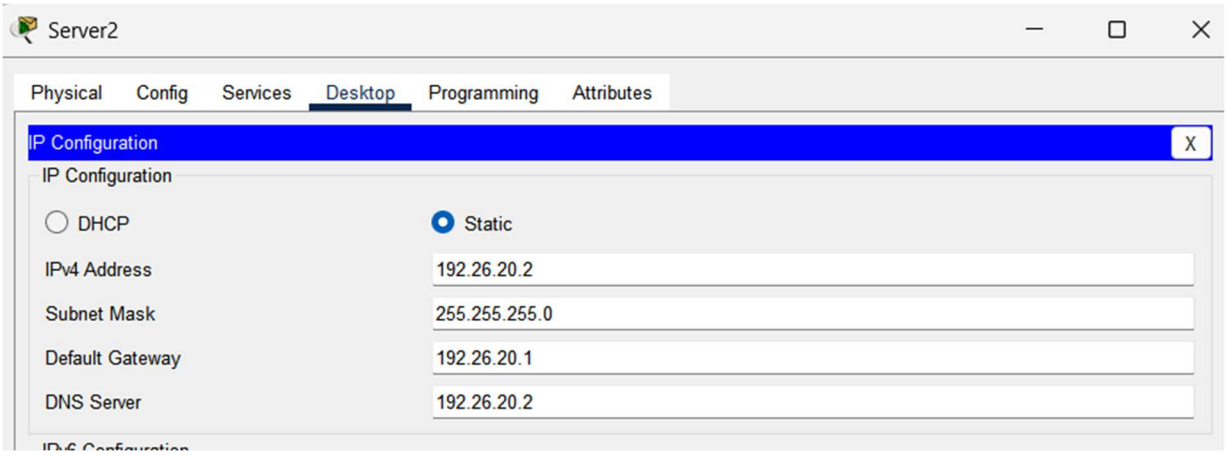

Router1
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/1/0
Serial0/1/1
Serial0/2/0
Serial0/2/1
Serial0/1/1
Port Status
On
Duplex
Full Duplex
Clock Rate
2000000
IP Configuration
IPv4 Address
20.0.0.1
Subnet Mask
255.0.0.0
Tx Ring Limit
10

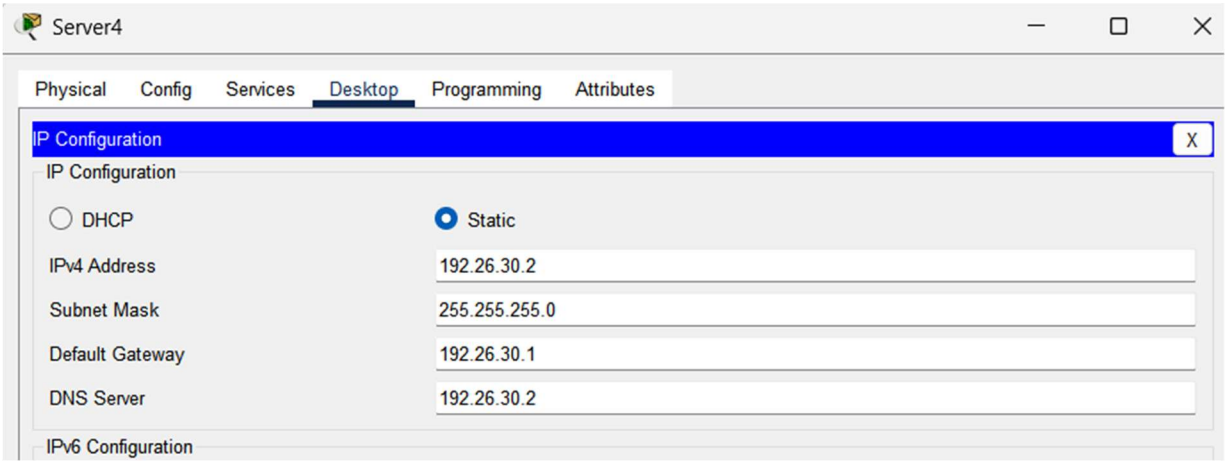

Router2
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/1/0
Serial0/1/1
Serial0/2/0
Serial0/2/1
GigabitEthernet0/0/0
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0002.1778.4701
IP Configuration
IPv4 Address
192.26.30.1
Subnet Mask
255.255.255.0
Tx Ring Limit
10


Router2
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/1/0
Serial0/1/1
Serial0/2/0
Serial0/2/1
Serial0/1/0
Port Status
On
Duplex
Full Duplex
Clock Rate
2000000
IP Configuration
IPv4 Address
20.0.0.2
Subnet Mask
255.0.0.0
Tx Ring Limit
10

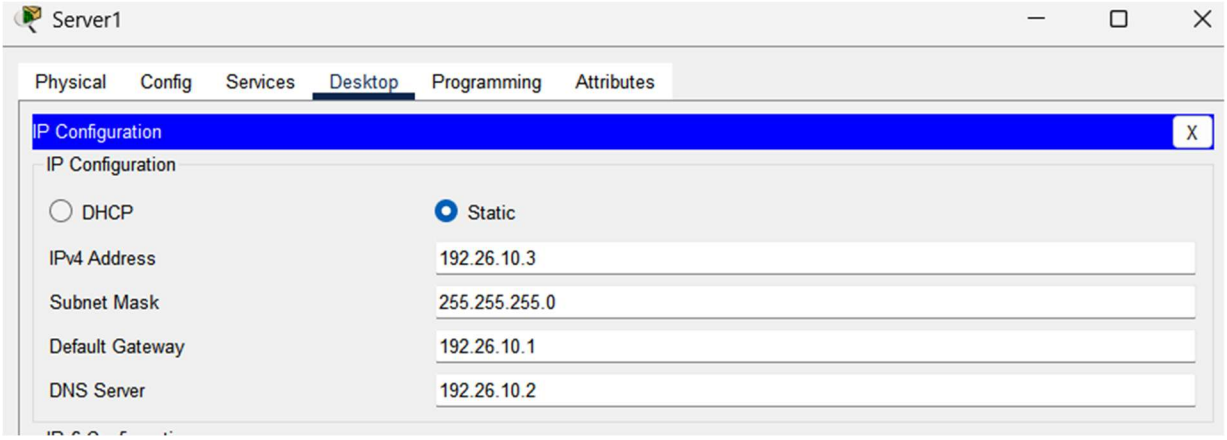
- **IP Config of DNS Servers:**

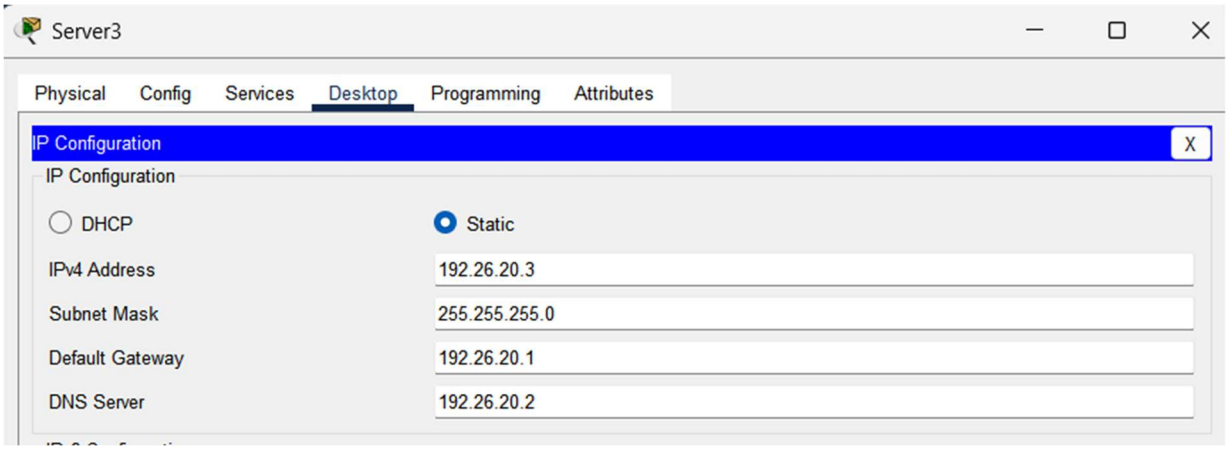




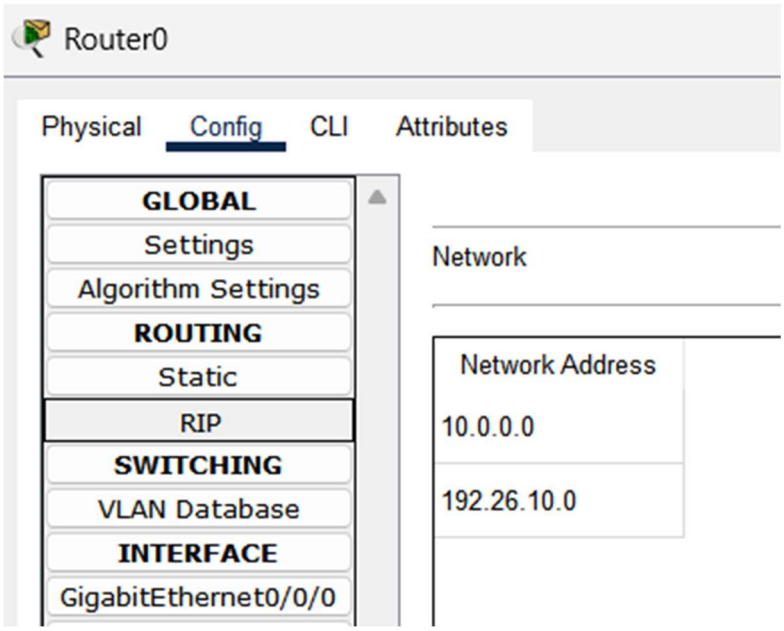


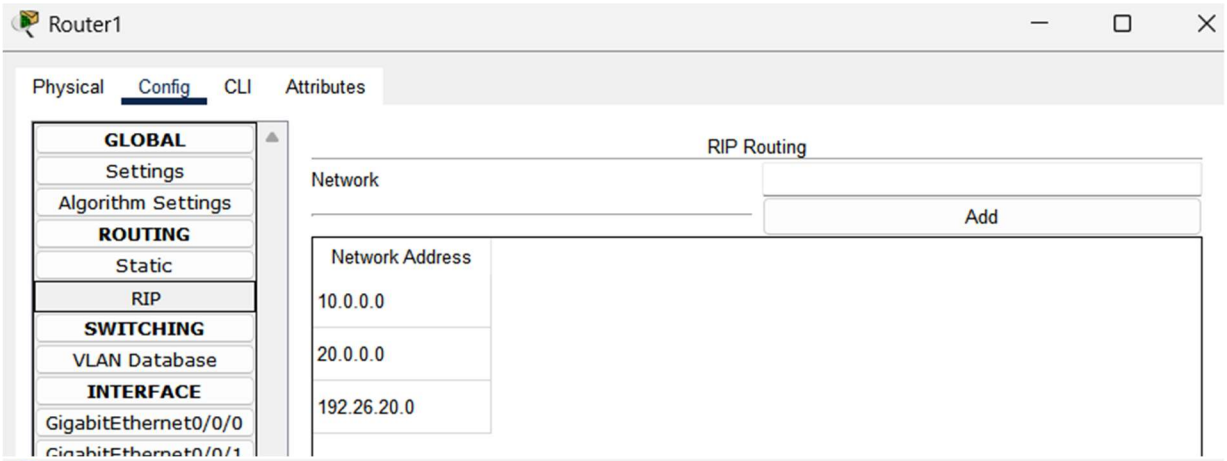
- **IP Config of DHCP Servers:**

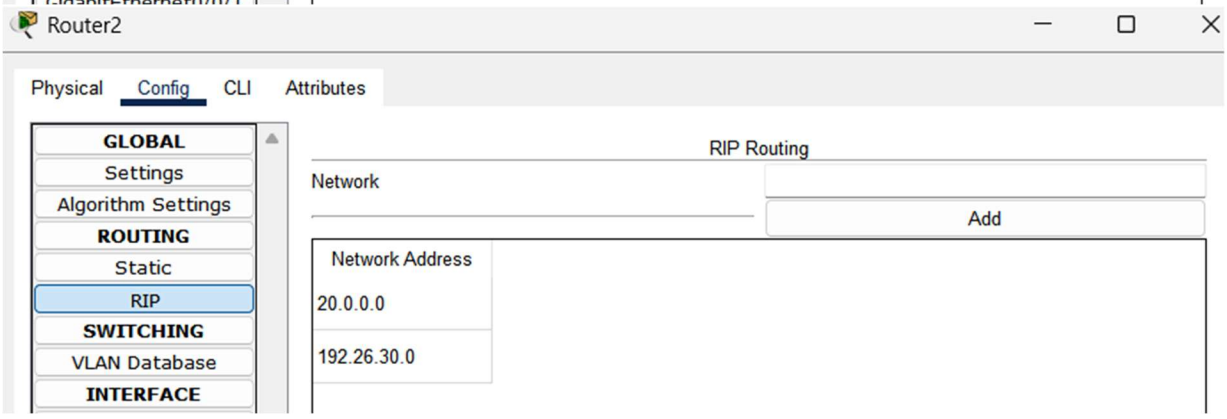




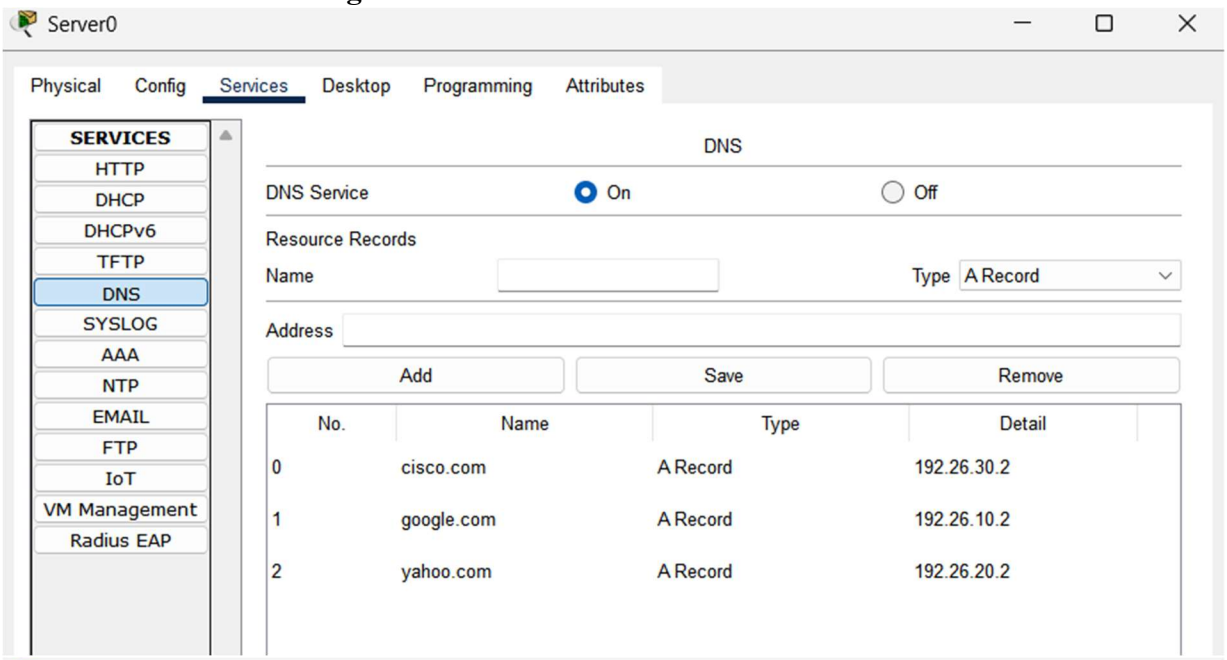
- **RIP Config of Routers:**

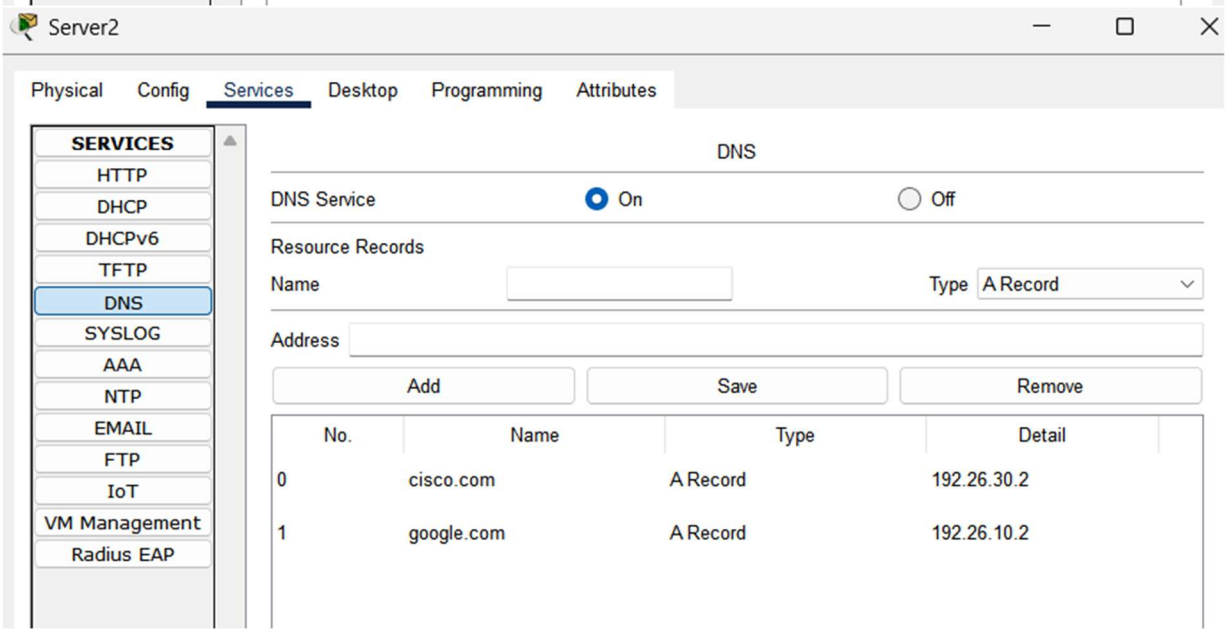


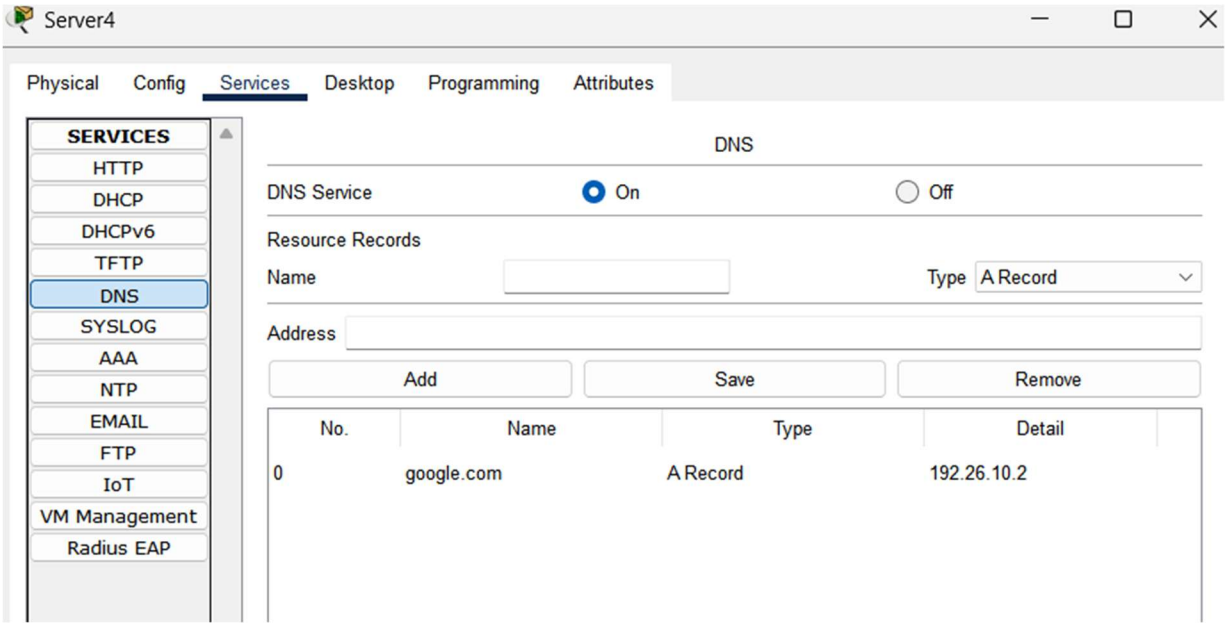




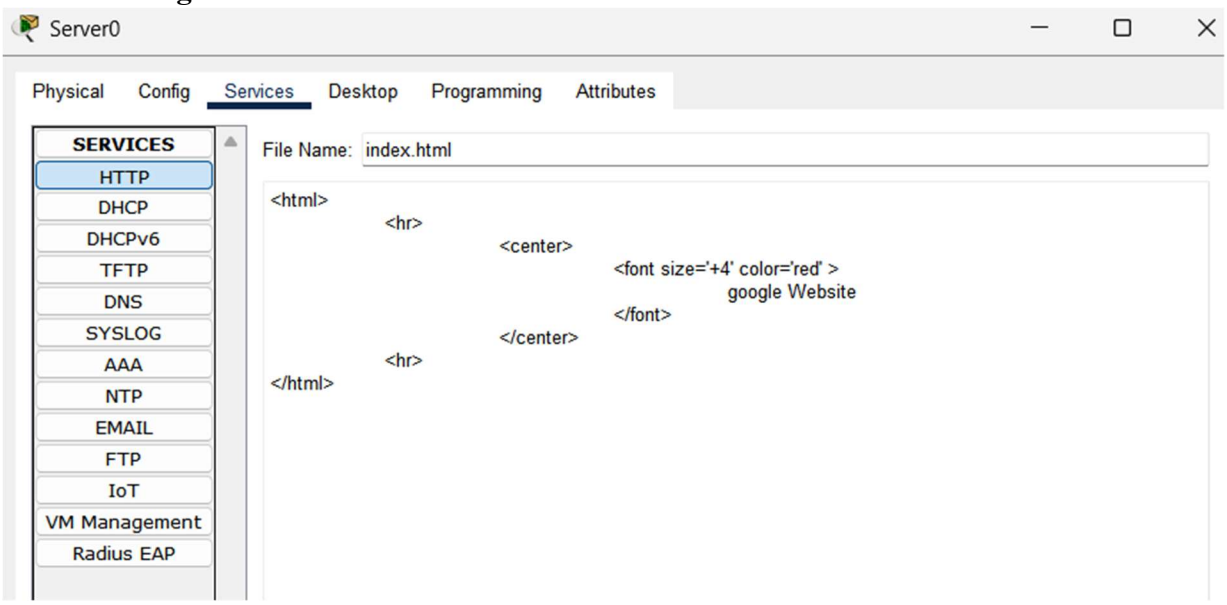
- **DNS Service config:**

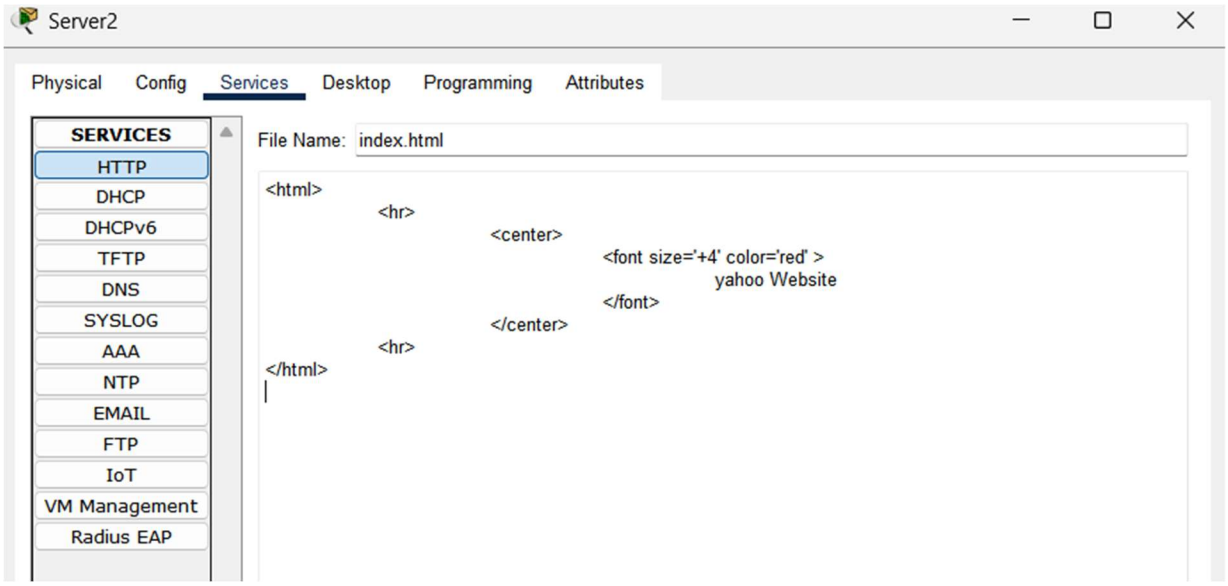






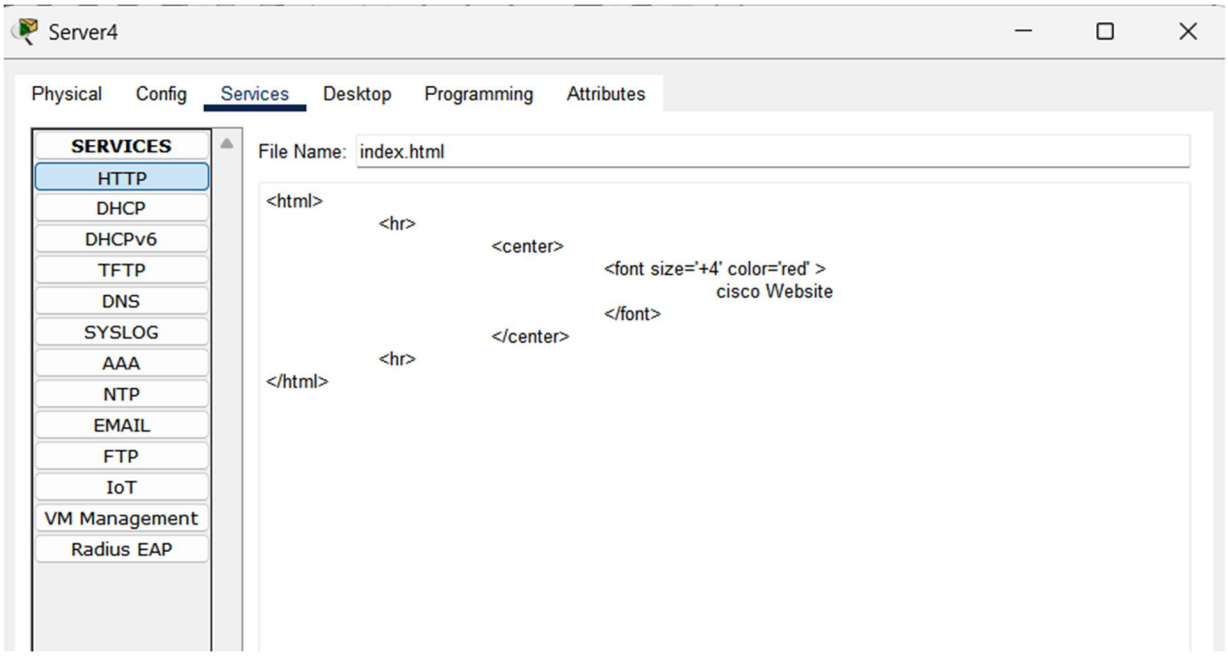
- **Config of web service:**




Server2
Physical
Config
Services
Desktop
Programming
Attributes
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
File Name: index.html
<html>
<hr>

yahoo Website

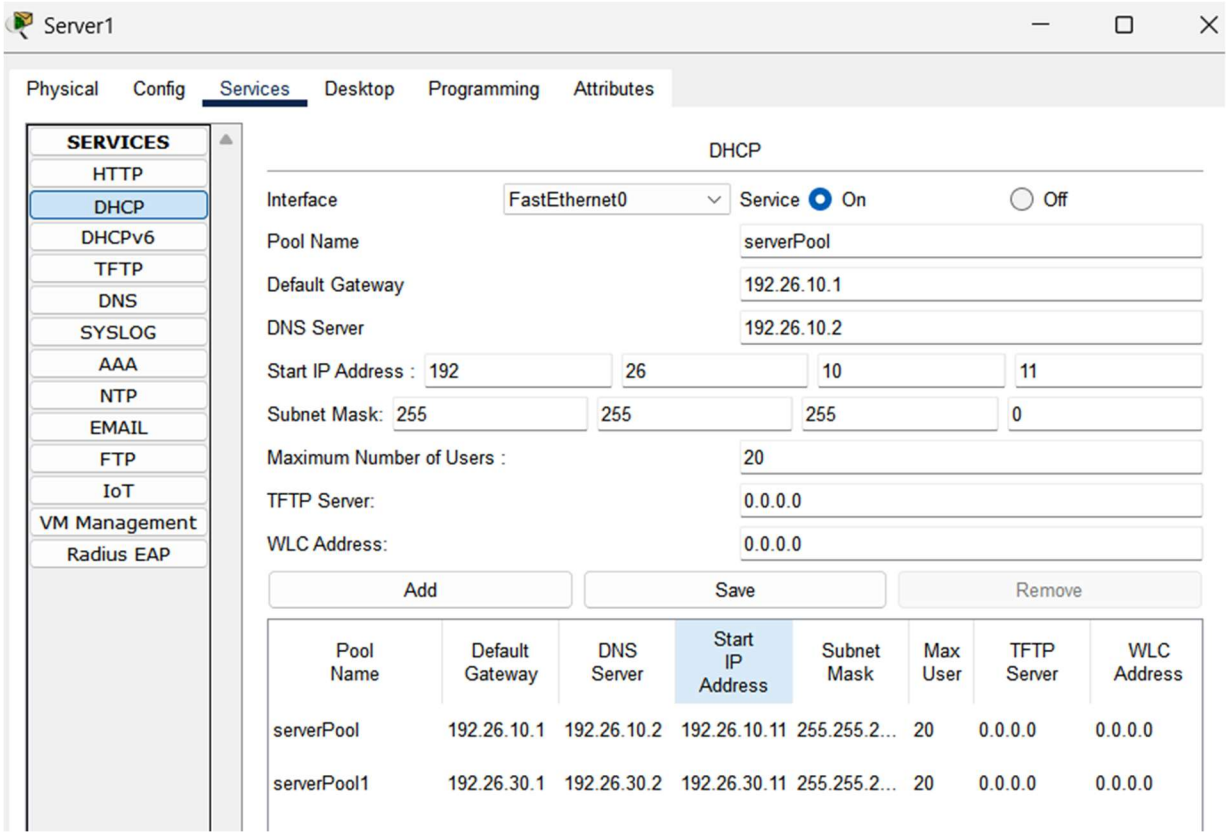
<hr>
</html>

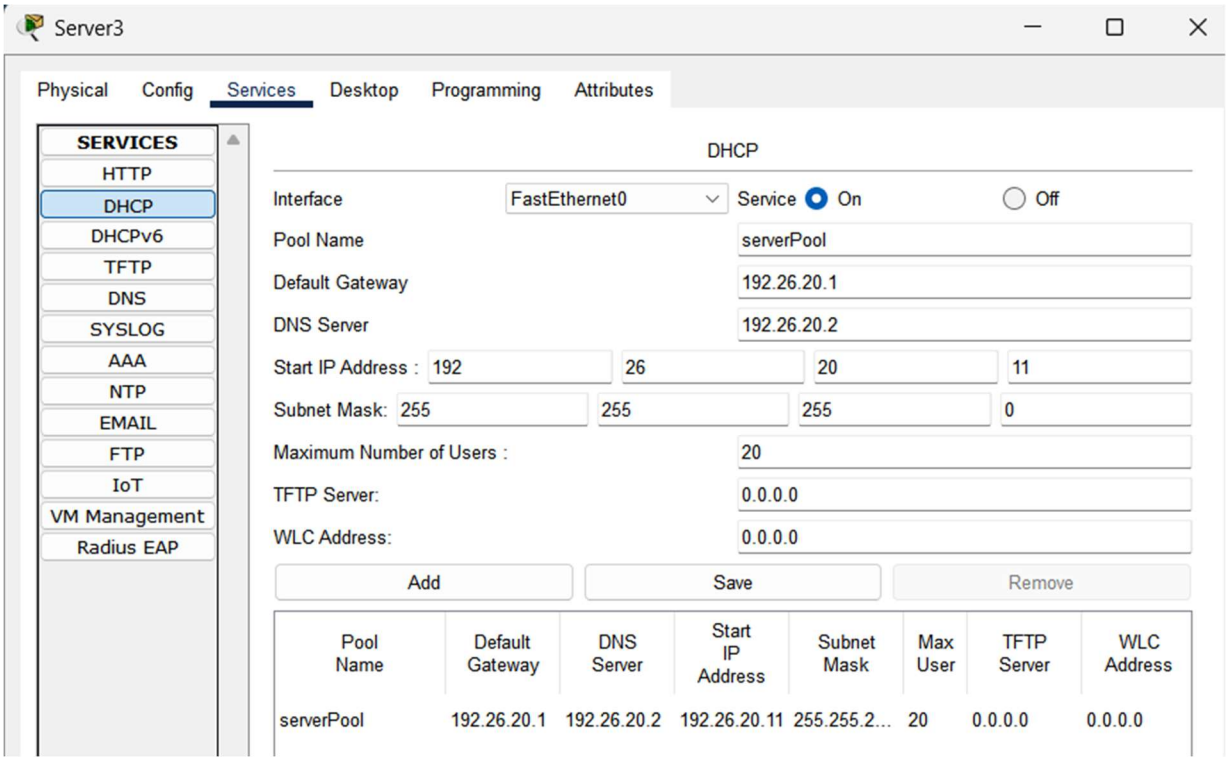

Server4
Physical
Config
Services
Desktop
Programming
Attributes
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
File Name: index.html
<html>
<hr>

cisco Website

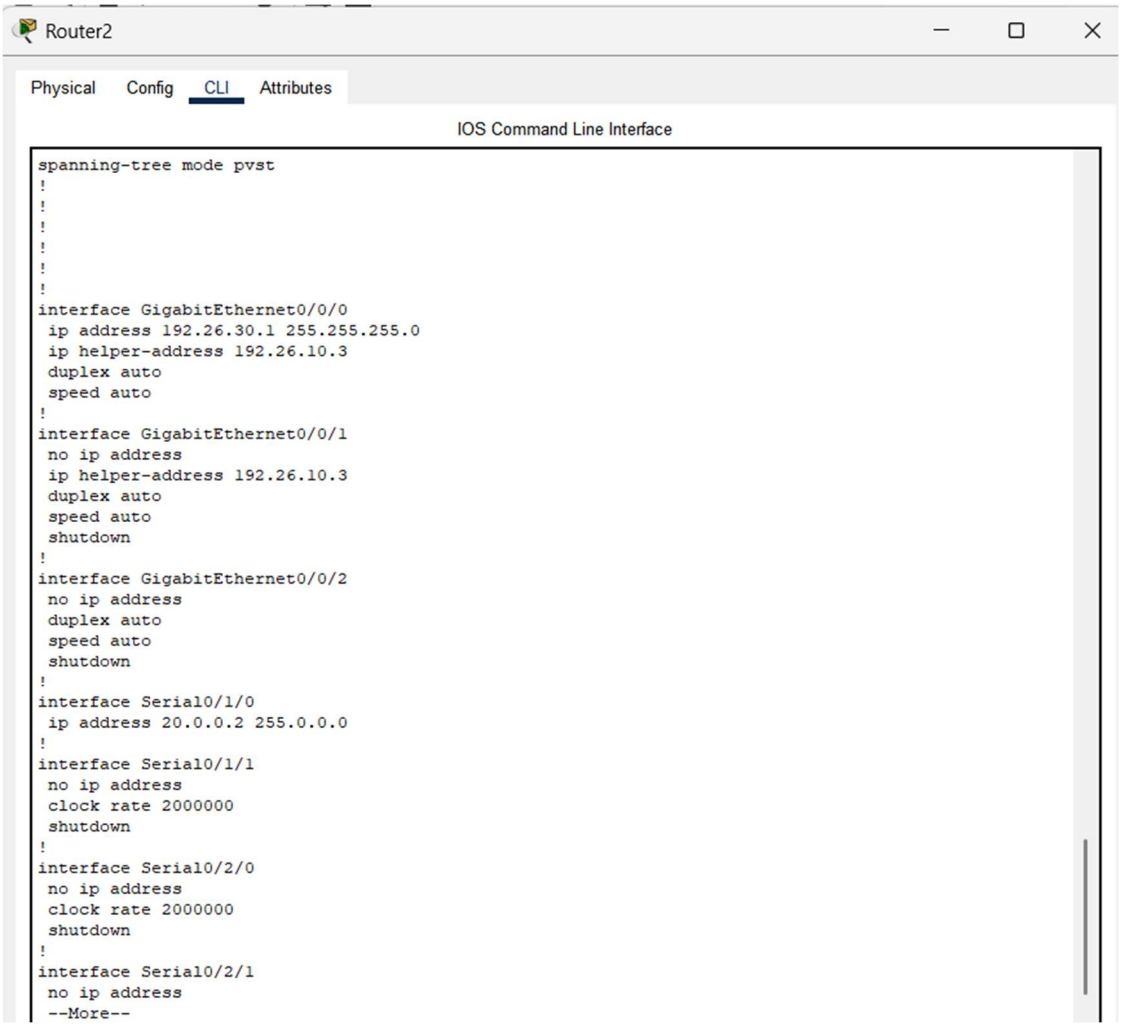
<hr>
</html>

- **Config of DHCP Server:**



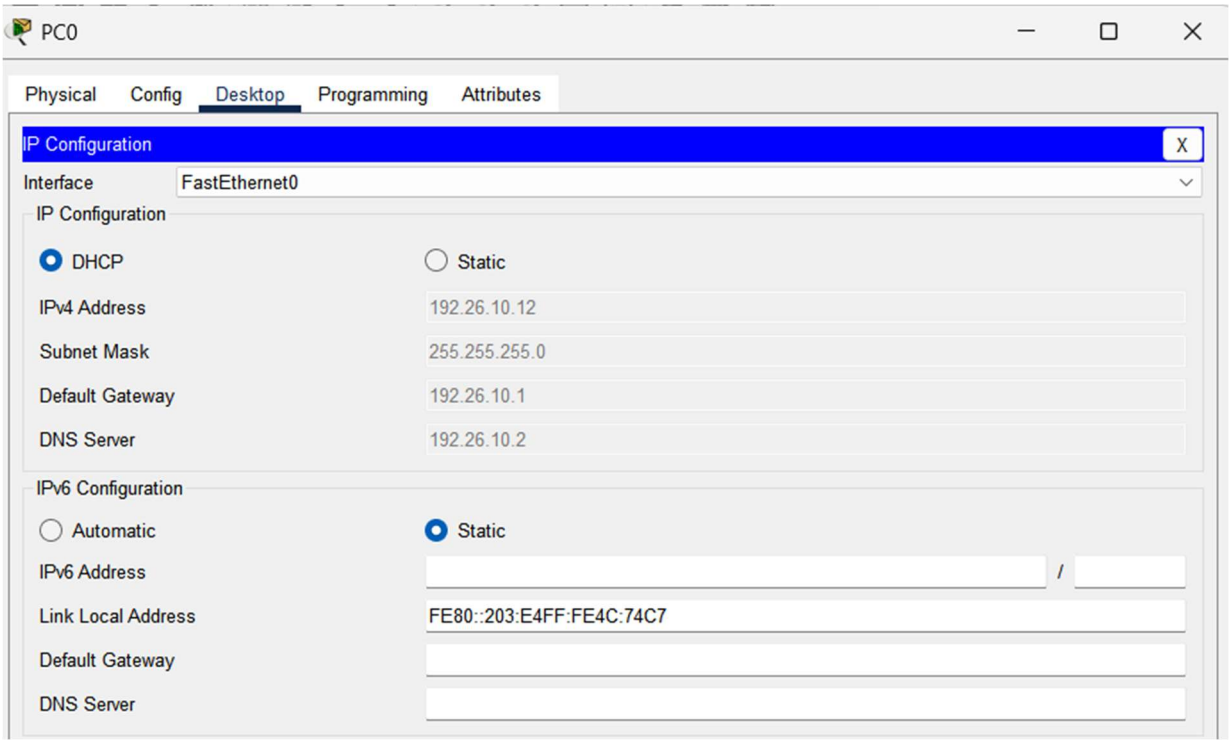


- **Configuring ip helper:**

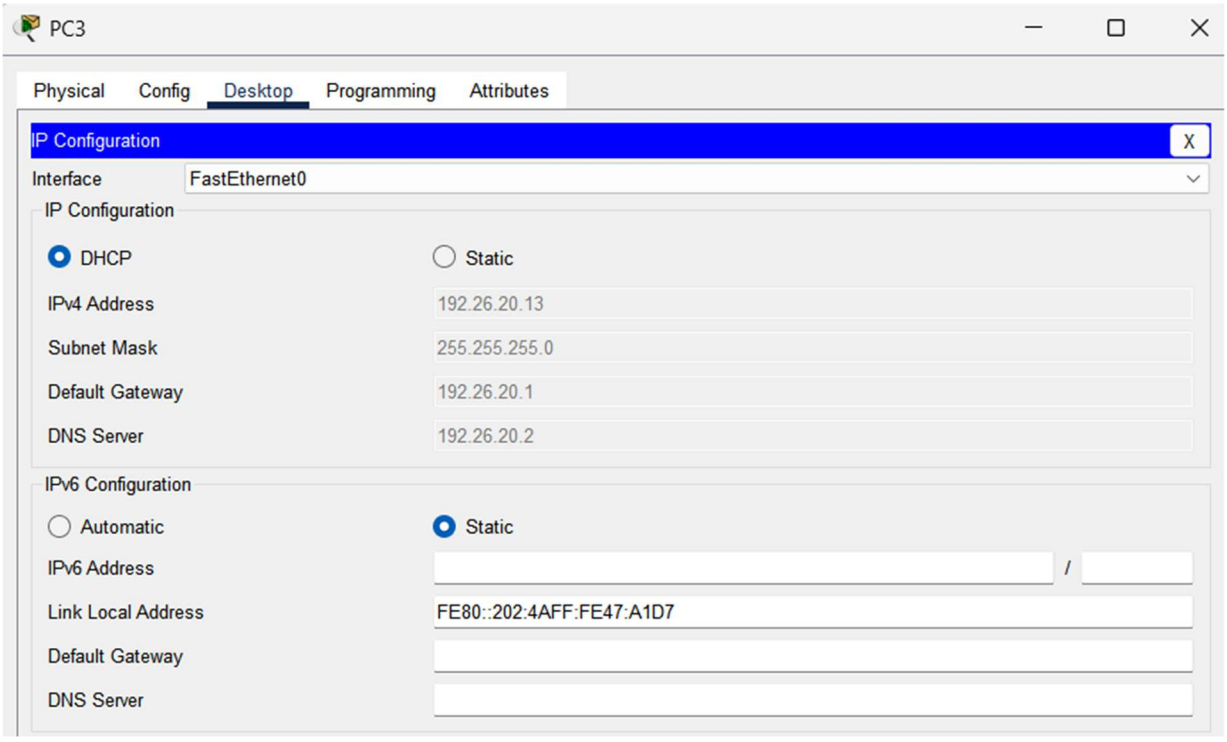


Setting all PC to configure themselves on DHCP type IP

- **PC0**

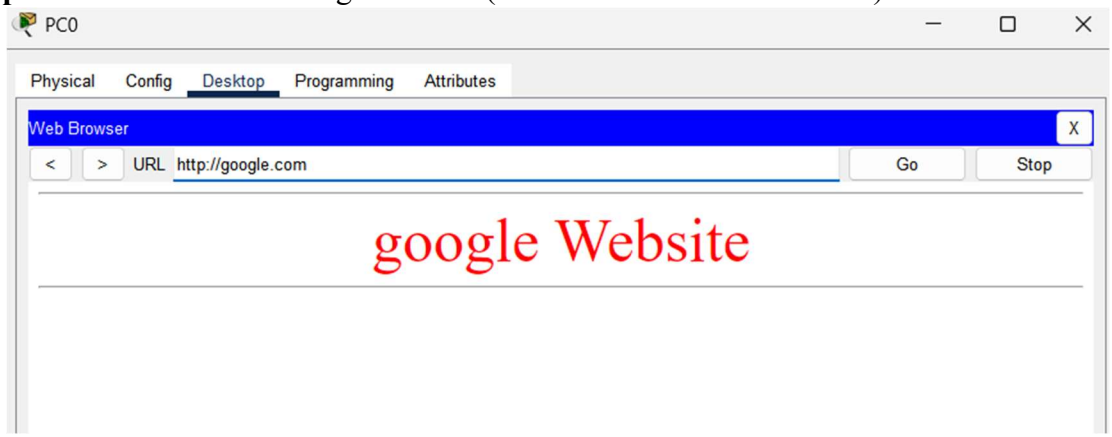


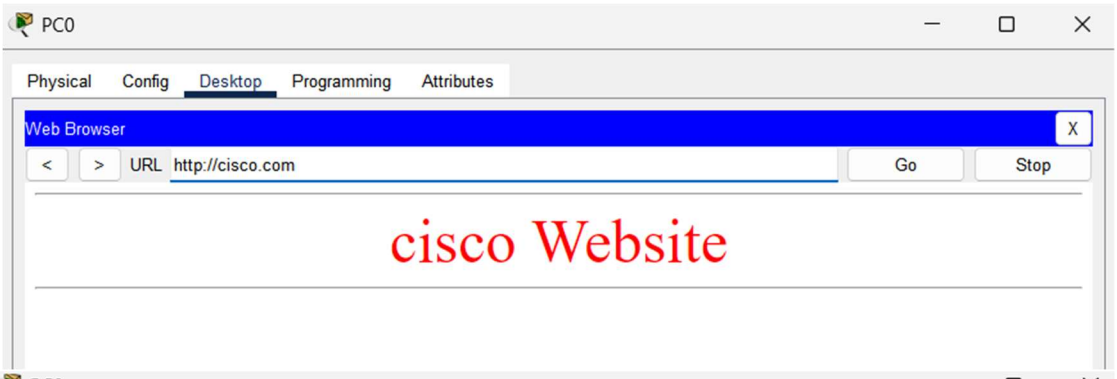
- **PC3**

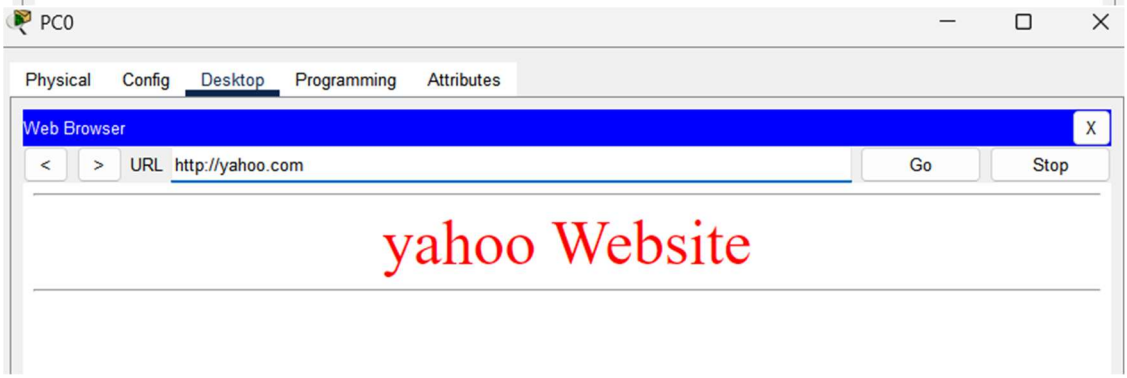


- **Now we search for a domain website from a pc in a different domain, and see if we can access the web page**

Output: Here we are accessing from PC0(which can access all websites):







Conclusion:

In the previous practicals, IP addresses were manually assigned to each PC, which is a time-consuming and inefficient process. To overcome this, the DHCP (Dynamic Host Configuration Protocol) is used. A DHCP server automatically provides IP addresses to devices from a predefined range whenever they join the network. This automation ensures that devices receive valid IP configurations without the need for manual setup, making network management much simpler and more efficient.