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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
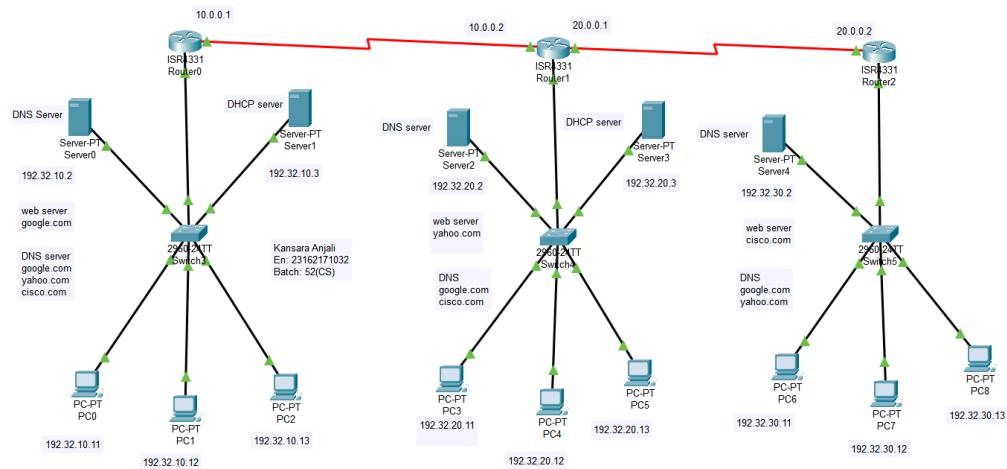
HR – google, cisco

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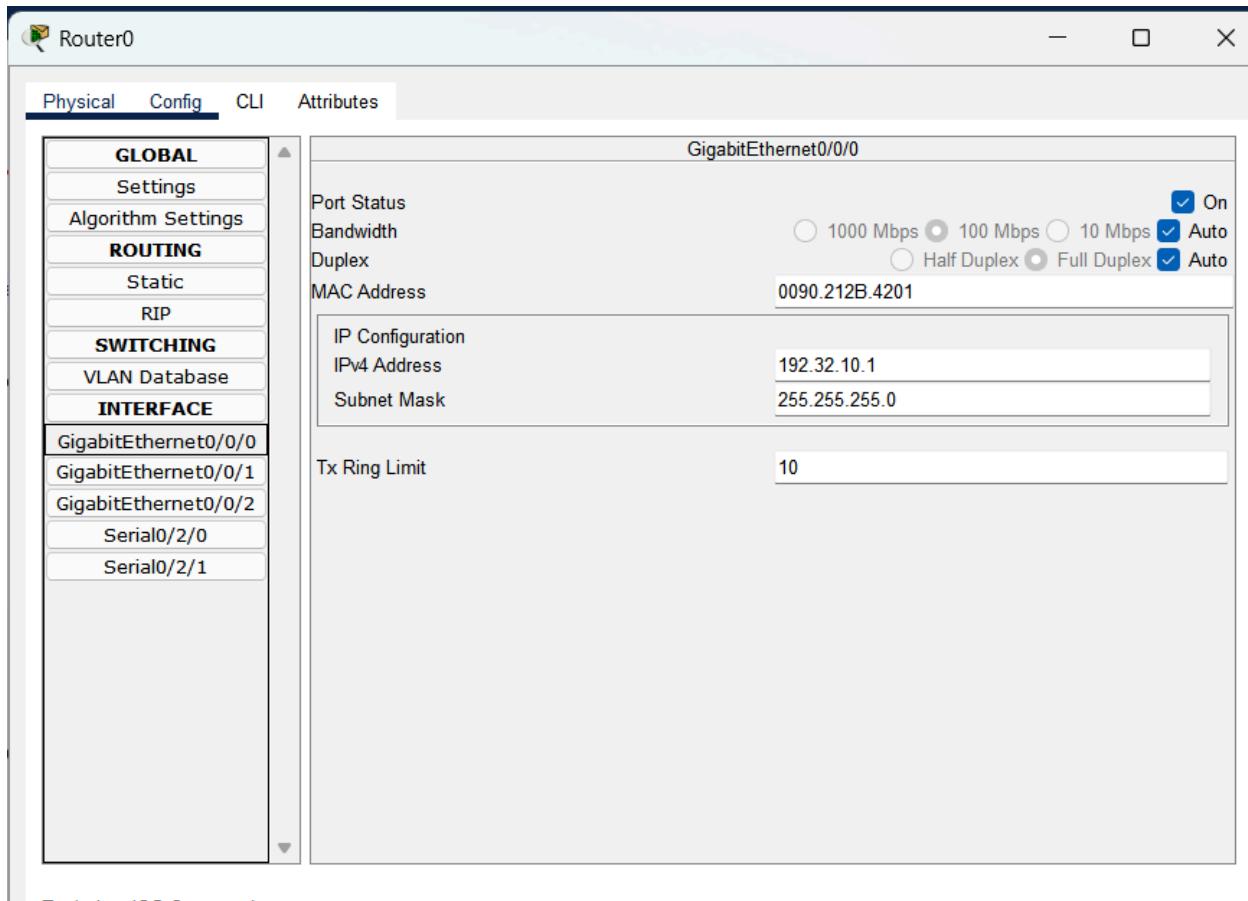
Help the admin to create the network and establish the connection between the devices.
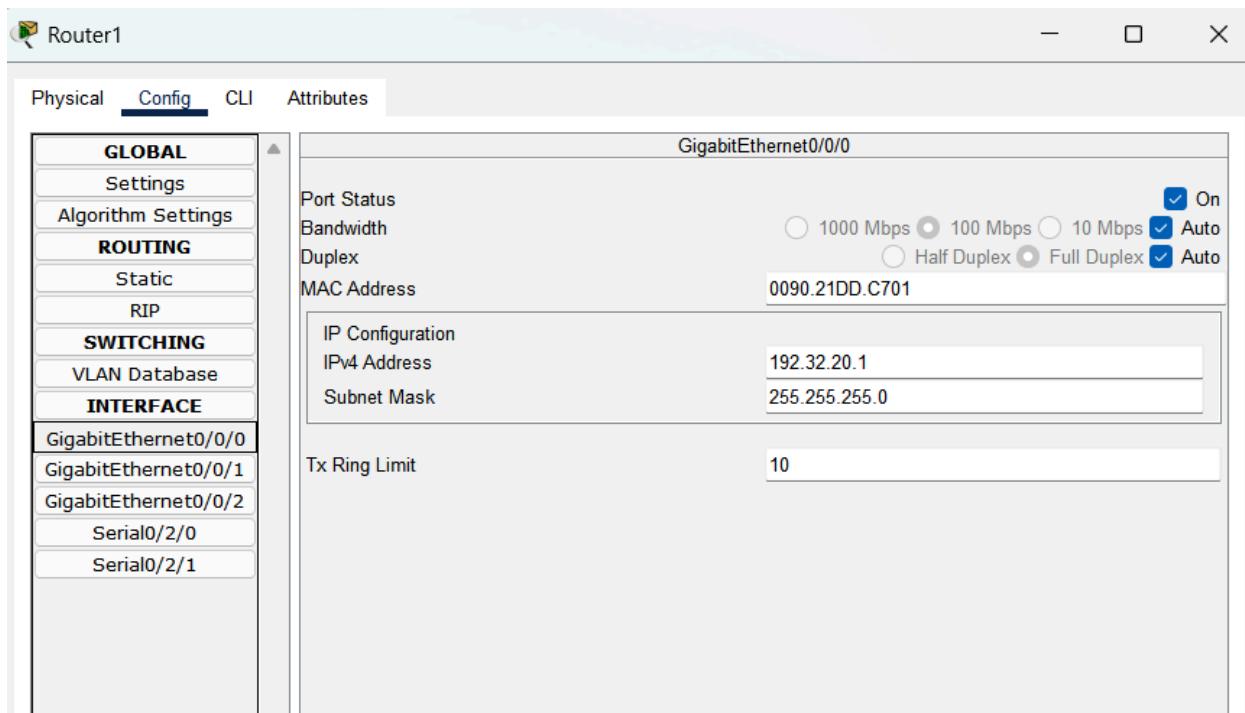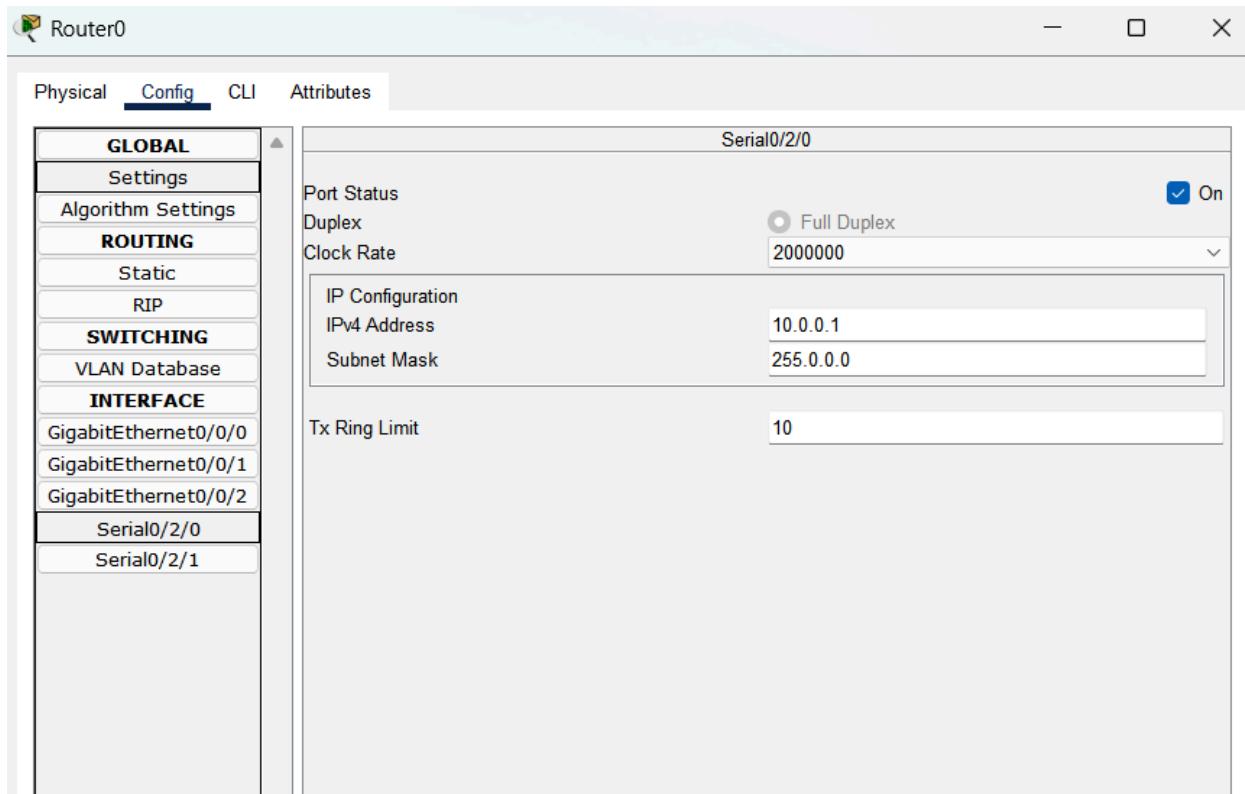
Procedure:

1) Create network as given below

2) Configure IP address (Routers, DNS servers, DHCP servers)

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
Serial0/2/0
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   0090.212B.4201

IP Configuration

IPv4 Address   192.32.10.1

Subnet Mask   255.255.255.0

Tx Ring Limit   10

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
- Serial0/2/0
- Serial0/2/1

Serial0/2/0

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

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
- Serial0/2/0
- 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	0090.21DD.C701

IP Configuration
- IPv4 Address: 192.32.20.1
- Subnet Mask: 255.255.255.0

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
- Serial0/2/0
- Serial0/2/1

Serial0/2/0

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

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
- Serial0/2/0
- Serial0/2/1

GigabitEthernet0/0/0
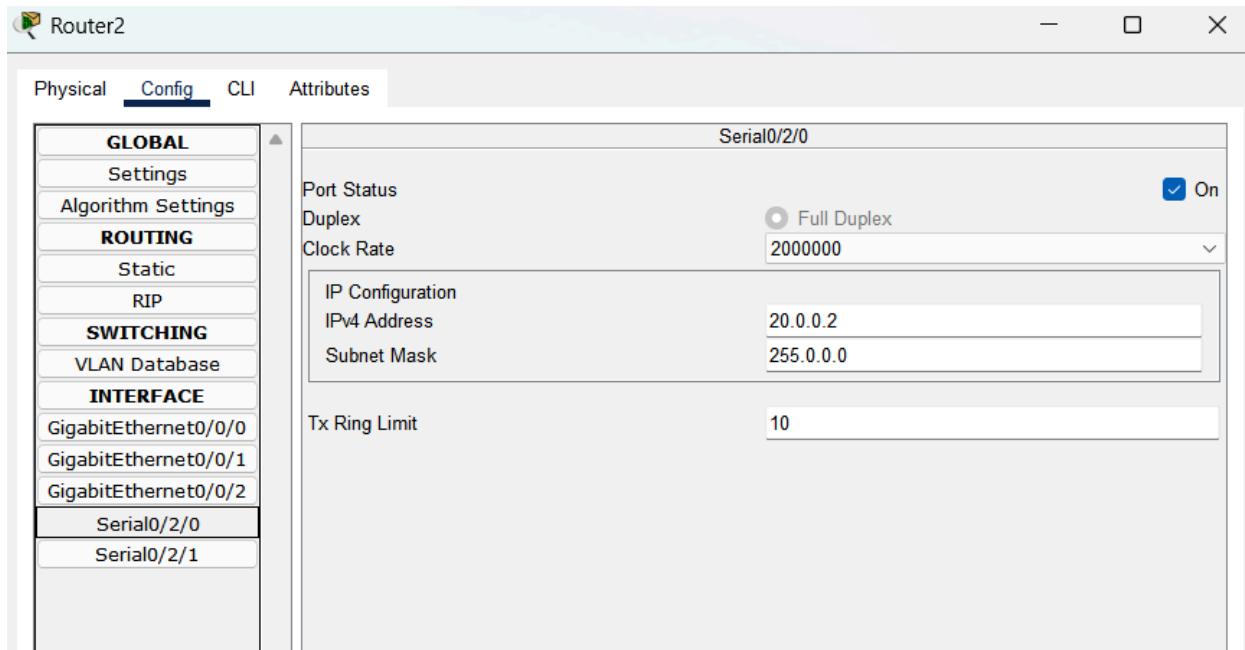
Port Status	☑ On
Bandwidth	◯ 1000 Mbps ◉ 100 Mbps ◯ 10 Mbps ☑ Auto
Duplex	◯ Half Duplex ◉ Full Duplex ☑ Auto
MAC Address	000A.F3B5.6801
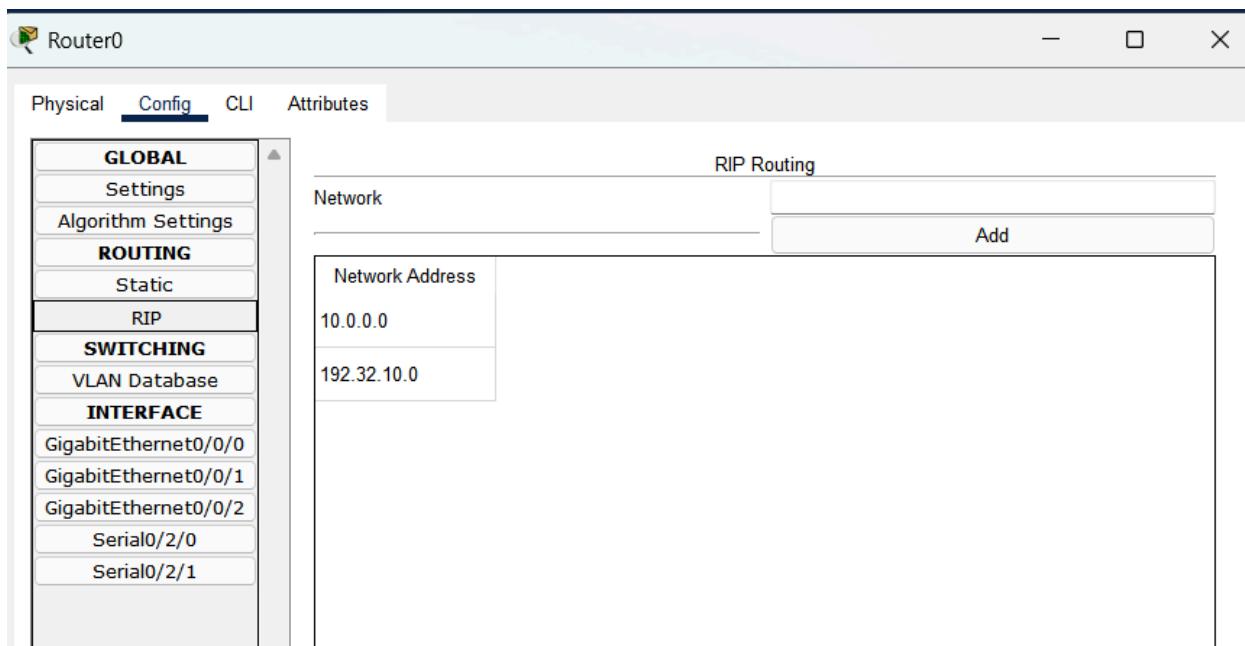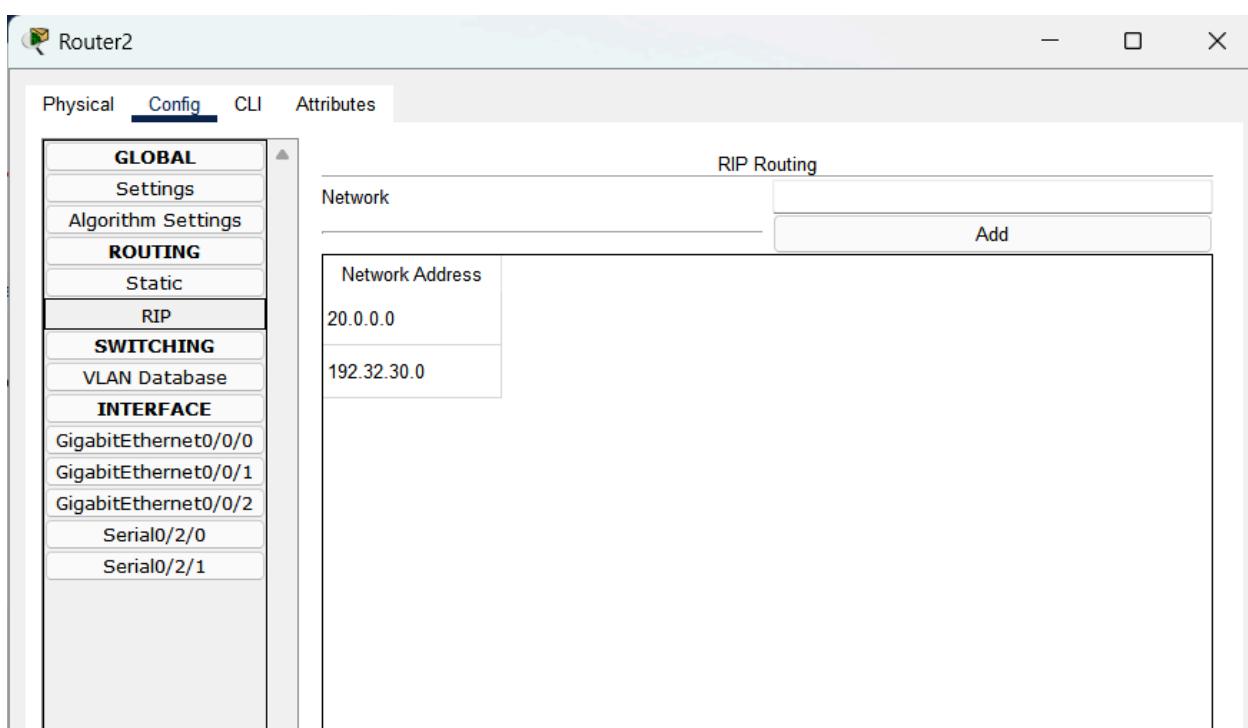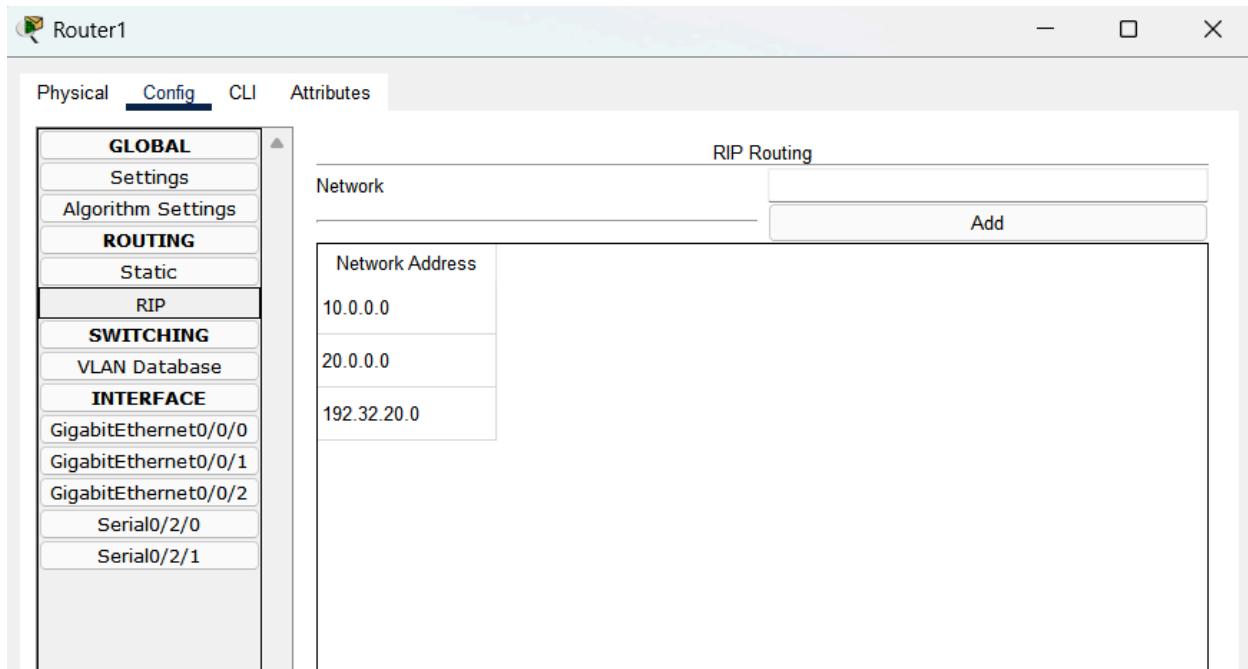
**IP Configuration**

IPv4 Address	192.32.30.1
Subnet Mask	255.255.255.0

Tx Ring Limit: 10

3) Configure dynamic routing table (RIP in routers)

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
- Serial0/2/0
- Serial0/2/1

RIP Routing

Network [   ]

[Add]

Network Address
10.0.0.0
20.0.0.0
192.32.20.0

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
- Serial0/2/0
- Serial0/2/1

RIP Routing

Network [   ]

[Add]

Network Address
20.0.0.0
192.32.30.0

4) Configure DNS service

Server0 — □ ✕

Physical   Config   Services   **Desktop**   Programming   Attributes

IP Configuration   X

IP Configuration

○ DHCP   ● Static

IPv4 Address   192.32.10.2

Subnet Mask   255.255.255.0

Default Gateway   192.32.10.1

DNS Server   192.32.10.2

IPv6 Configuration

○ Automatic   ● Static

IPv6 Address   /

Link Local Address   FE80::260:5CFF:FE72:ABC1

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication   MD5   ⌄

Username

Password

Server0

Physical   Config   Services   Desktop   Programming   Attributes

SERVICES
- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

DNS

DNS Service   ● On   ○ Off

Resource Records

Name [   ]   Type [A Record ▾]

Address [   ]

[Add]   [Save]   [Remove]

No.	Name	Type	Detail
0	cisco.com	A Record	192.32.30.2
1	google.com	A Record	192.32.10.2
2	yahoo.com	A Record	192.32.20.2

Server2

Physical | Config | Services | Desktop | Programming | Attributes

IP Configuration X

IP Configuration

○ DHCP   ● Static

IPv4 Address   192.32.20.2

Subnet Mask   255.255.255.0

Default Gateway   192.32.20.1

DNS Server   192.32.20.2

IPv6 Configuration

○ Automatic   ● Static

IPv6 Address   _____ / _____

Link Local Address   FE80::203:E4FF:FE7B:C9A

Default Gateway   _____

DNS Server   _____

802.1X

☐ Use 802.1X Security

Authentication   MD5

Username   _____

Password   _____

Server2

Physical | Config | Services | Desktop | Programming | Attributes

SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP

DNS

DNS Service   ● On   ○ Off

Resource Records

Name   [_____]   Type A Record

Address   [_____]

| Add | Save | Remove |

No.	Name	Type	Detail
0	cisco.com	A Record	192.32.30.2
1	google.com	A Record	192.32.10.2

Server4

Physical | Config | Services | **Desktop** | Programming | Attributes

IP Configuration X

IP Configuration

- ○ DHCP   ● Static

IPv4 Address	169.254.50.183
Subnet Mask	255.255.0.0
Default Gateway	0.0.0.0
DNS Server	0.0.0.0

IPv6 Configuration

- ○ Automatic   ● Static

IPv6 Address	/
Link Local Address	FE80::209:7CFF:FEE0:32B7
Default Gateway	
DNS Server	

802.1X

- ☐ Use 802.1X Security

Authentication	MD5
Username	
Password	

Server4

Physical | Config | **Services** | Desktop | Programming | Attributes

SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP

DNS

DNS Service   ● On   ○ Off

Resource Records

Name [　　　　　]　　　　Type [A Record ▾]

Address [　　　　　　　　　　　　　]
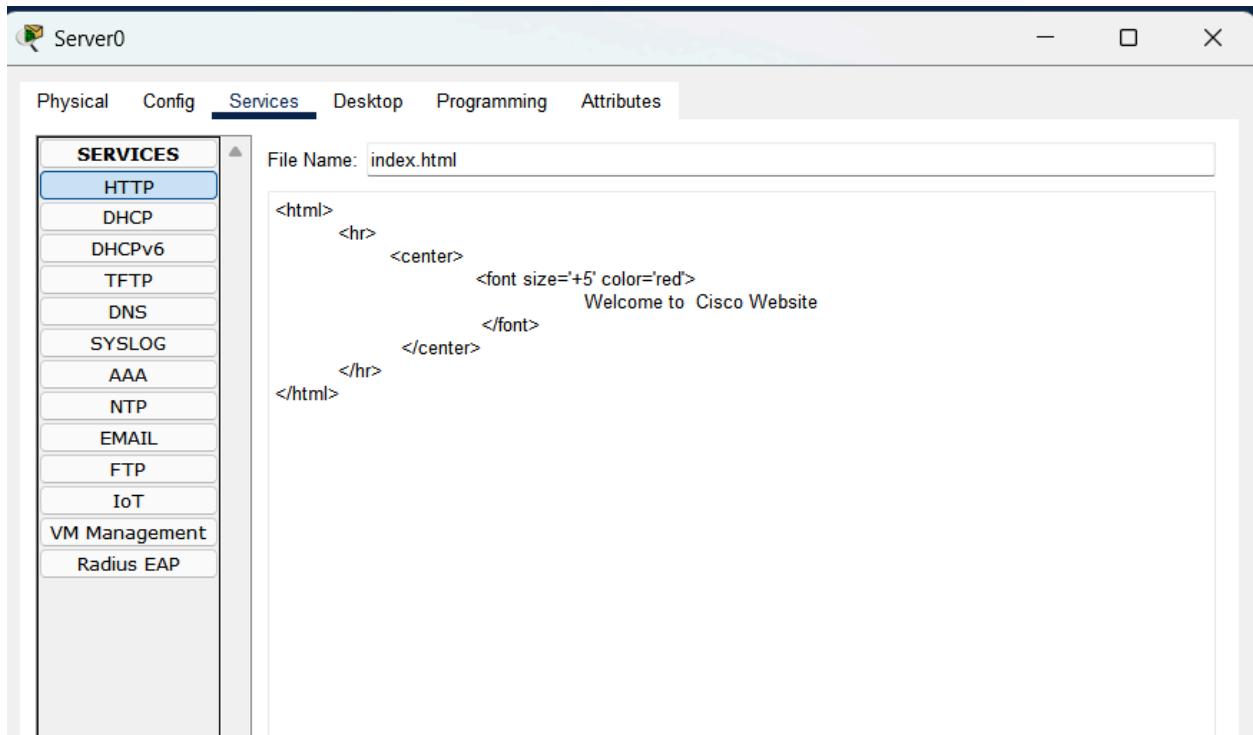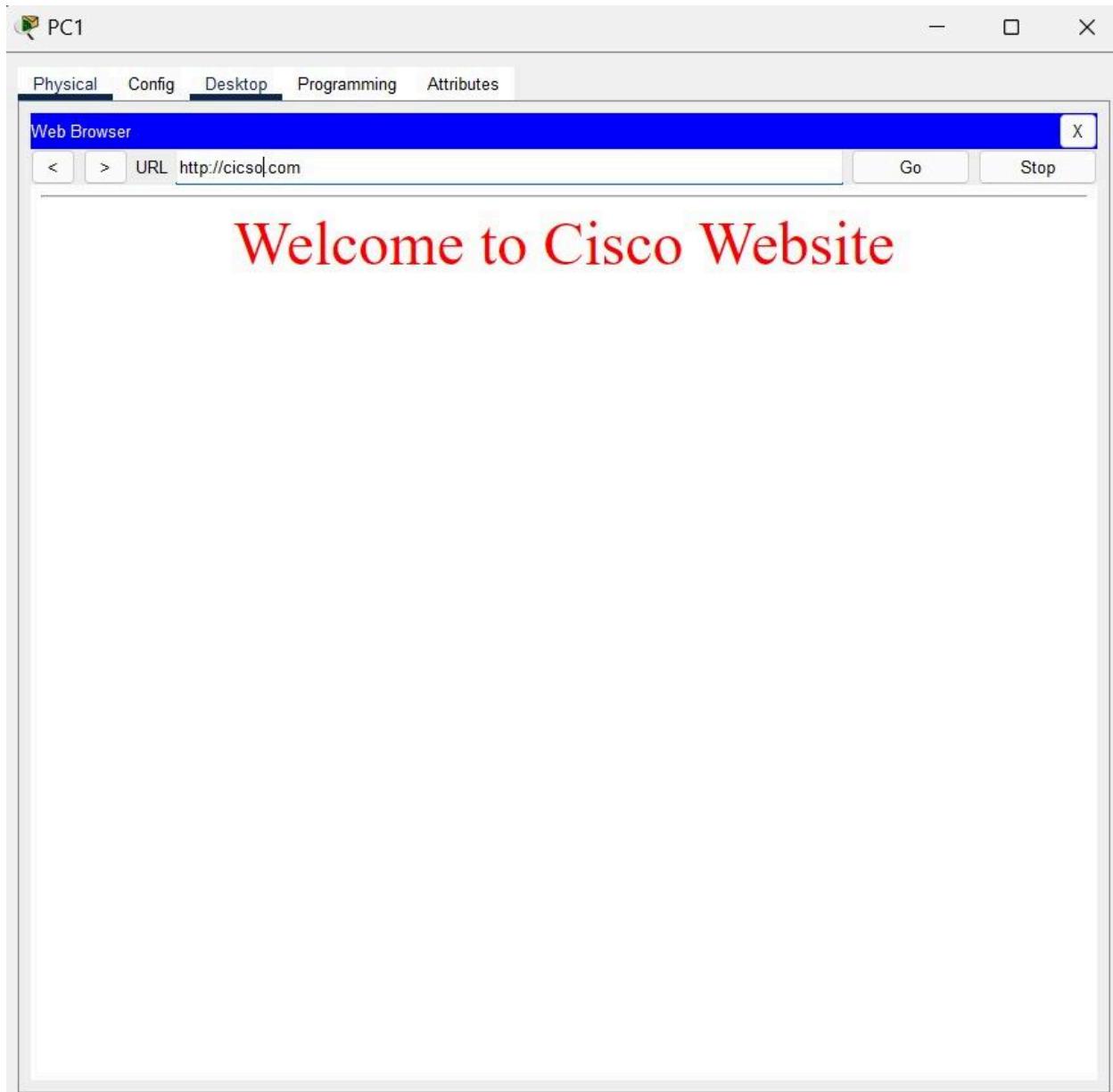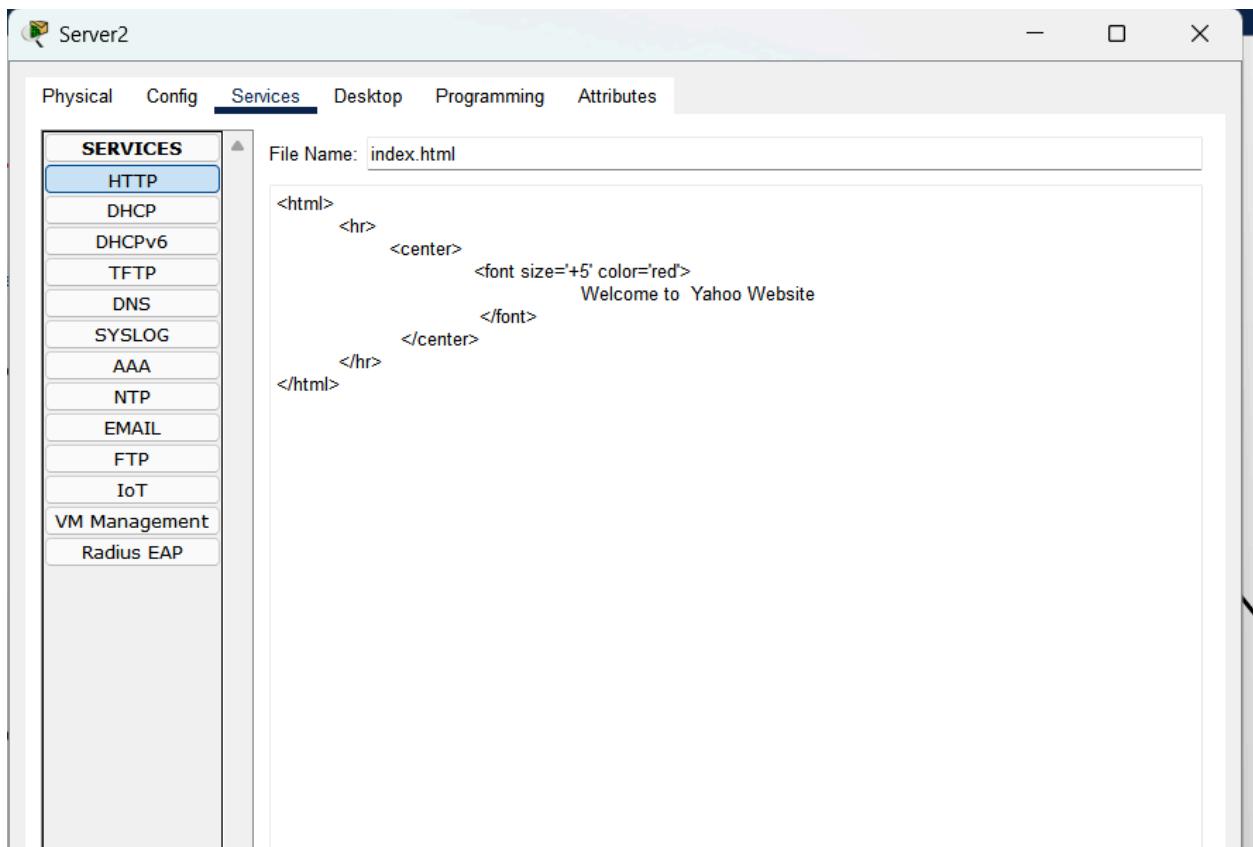
Add	Save	Remove
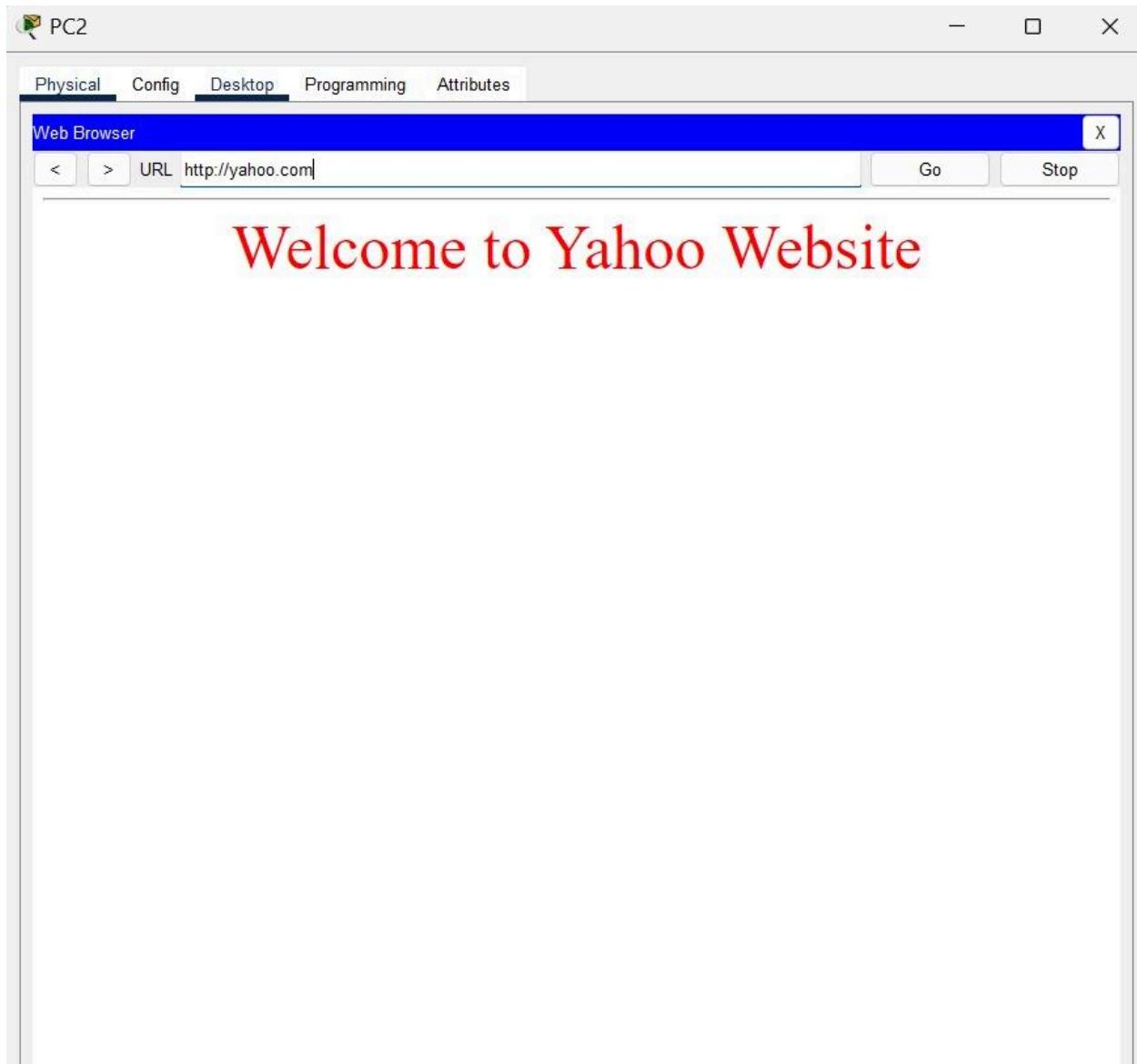
No.	Name	Type	Detail
0	google.com	A Record	192.32.10.2
1	yahoo.com	A Record	192.32.20.2

5) Configure WEB service by hosting websites

PC1 — □ X

Physical   Config   Desktop   Programming   Attributes

Web Browser   X

<   >   URL http://cicso.com   Go   Stop

Welcome to Cisco Website

Server2   — ☐ ✕

SERVICES

HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP

File Name: index.html

```
<html>
        <hr>
                <center>
                        <font size='+5' color='red'>
                                Welcome to  Yahoo Website
                        </font>
                </center>
        </hr>
</html>
```

6) Configure DHCP server

Server1 — □ ✕

Physical   Config   Services   Desktop   Programming   Attributes

SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP

DHCP

Interface	FastEthernet0 ▼	Service ● On	○ Off

Pool Name	serverPool
Default Gateway	192.32.10.1
DNS Server	192.32.10.2

Start IP Address :	129	32	0	0
Subnet Mask:	255	255	0	0
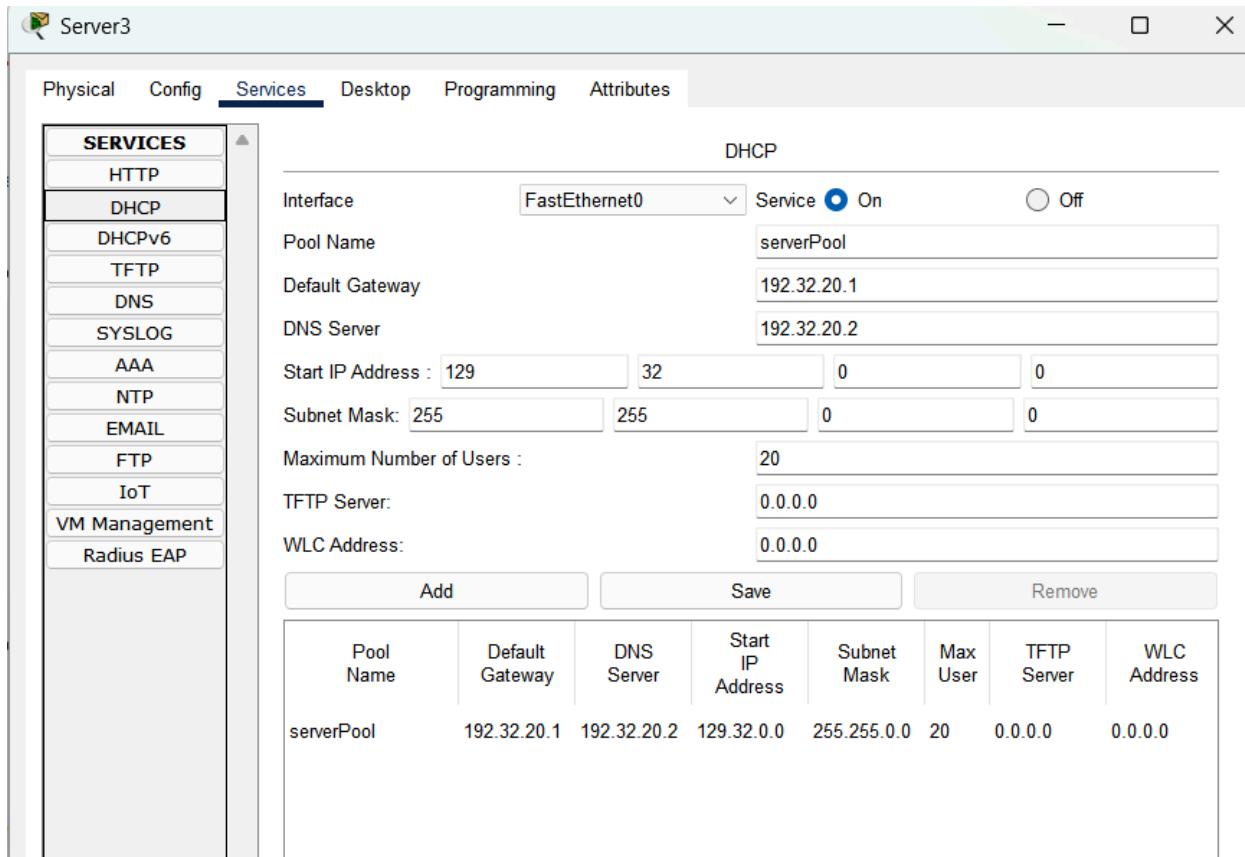
Maximum Number of Users :	20
TFTP Server:	0.0.0.0
WLC Address:	0.0.0.0

Add   Save   Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
serverPool1	192.32.30.1	192.32.30.2	192.32.30.11	255.255.2...	20	0.0.0.0	0.0.0.0
serverPool	192.32.10.1	192.32.10.2	129.32.0.0	255.255.0.0	20	0.0.0.0	0.0.0.0

7) Configure IP-Helper command to appropriate interface of a router

IP helper-address 192.32.10.3

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
interface GigabitEthernet0/0/0
 ip address 192.32.10.1 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface GigabitEthernet0/0/2
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/2/0
 ip address 10.0.0.1 255.0.0.0
 clock rate 2000000
!
interface Serial0/2/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router rip
 network 10.0.0.0
 network 192.32.10.0
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
```

Copy   Paste

☐ Top

8) Set PC to get IP address based on DHCP

PC0   —   □   X

Physical   Config   Desktop   Programming   Attributes

IP Configuration   X

Interface   FastEthernet0   ∨

IP Configuration

● DHCP   ○ Static   DHCP request successful.

IPv4 Address   192.32.10.11

Subnet Mask   255.255.255.0

Default Gateway   192.32.10.1

DNS Server   192.32.10.2

IPv6 Configuration

○ Automatic   ● Static

IPv6 Address   /

Link Local Address FE80::2D0:97FF:FE6E:AC54

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication   MD5   ∨

Username

Password

PC4 — □ ×

Physical   Config   **Desktop**   Programming   Attributes

IP Configuration   X

Interface   FastEthernet0   ⌄

IP Configuration

◉ DHCP   ◯ Static   DHCP request successful.

IPv4 Address   192.32.20.11

Subnet Mask   255.255.255.0

Default Gateway   192.32.20.1

DNS Server   192.32.20.2

IPv6 Configuration

◯ Automatic   ◉ Static

IPv6 Address   [   ] / [   ]

Link Local Address FE80::250:FFF:FEAB:6333

Default Gateway   [   ]

DNS Server   [   ]

802.1X

☐ Use 802.1X Security

Authentication   MD5   ⌄

Username   [   ]

Password   [   ]