EXP-8: Demonstrate Static and Dynamic Addressing Mechanisms

I. Aim:

To configure static IP Addresses.

To configure Automatic IP Addressing using DHCP.

Test Connectivity using ICMP.

II. Components and Tools:

System: Desktop Computer/Laptop

Operating system: Windows/Linux

Tool: Packet Tracer

Components: PCs (4), Switches (2), Routers (2)

III. Description:

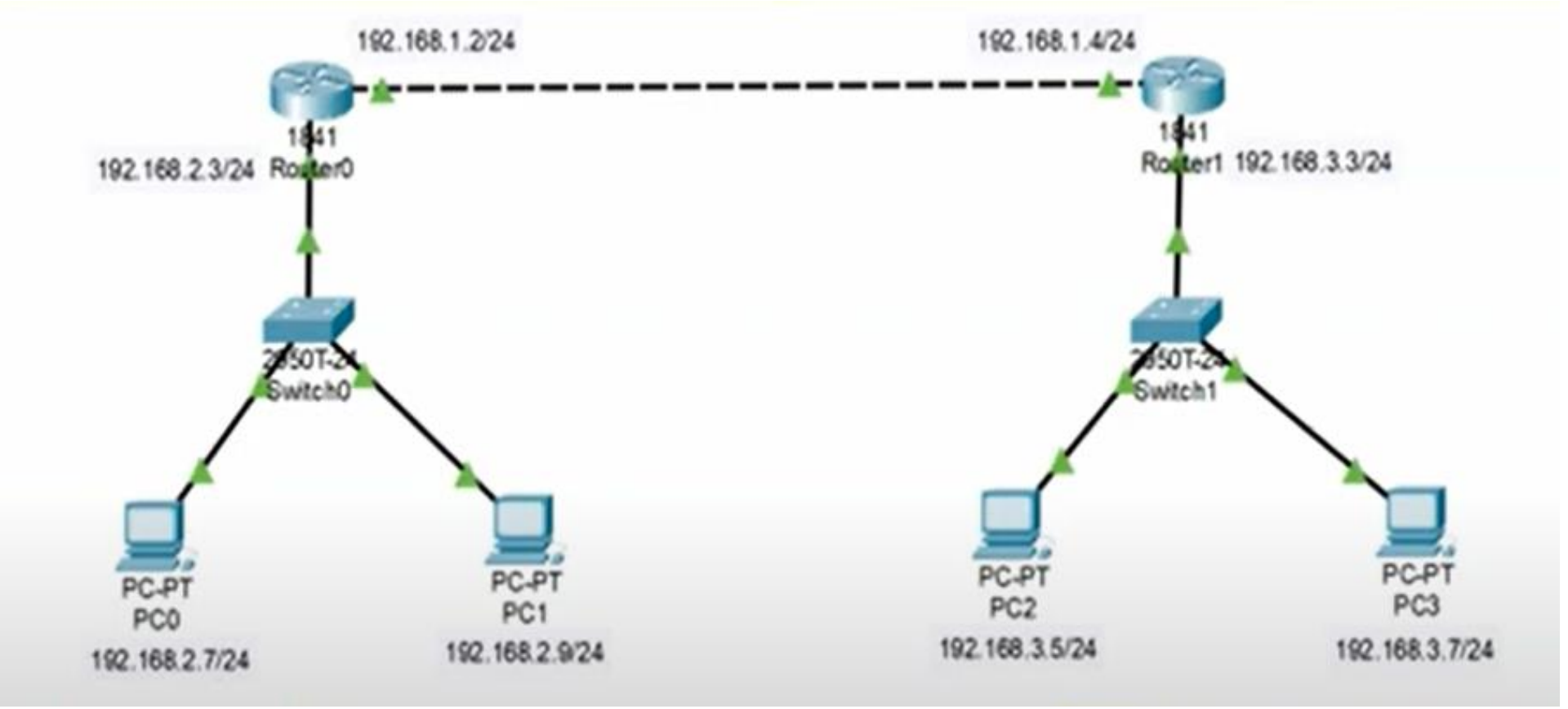
IV. Diagrams / Experimental set-up:

V. Procedure:

VI. Output Description/Analysis:

VII. Viva-Voce Questions:

Task 8.1: Experimental set-up - Configuration of static IP Addresses



Procedure

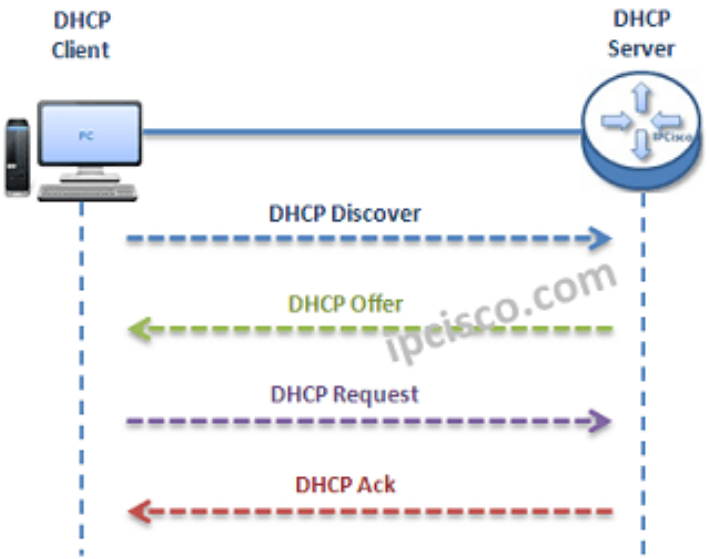
1. Deploy the components
2. Create the network
3. Assign the static IP address to each PC
4. Configure both Routers
5. Configure Routing-Configure routing on Router 0 and Router 1.
   Configure static routing in router-0
   a) Click on router 0
   b) Click on config
   c) Select static
   d) Enter network IP 192.168.3.0 (other network-destination network address)
   e) Enter mask 255.255.255.0
   f) Enter Next Hop 192.168.1.4
   g) Click on Add
   h) Go to settings and click on save
6. Configure static routing in router-1 –Repeat above steps for this also.
7. Test the connectivity between PC1 and PC3 using ping command.

Dynamic Host Configuration Protocol (DHCP)

Description

DHCP uses **UDP 67** and **UDP 68** ports. It has a messaging system for the communication between **DHCP Server** and **DHCP Client**. These messaging system's **messages** and their **types** are mentined below:

- **DHCP Discover (broadcast)**
- **DHCP Offer(broadcast)**
- **DHCP Request (broadcast)**
- **DHCP Ack (broadcast)**
- **DHCP Nak (unicast)**
- **DHCP Release (unicast)**
- **DHCP Decline (unicast)**
- **DHCP Inform (unicast)**

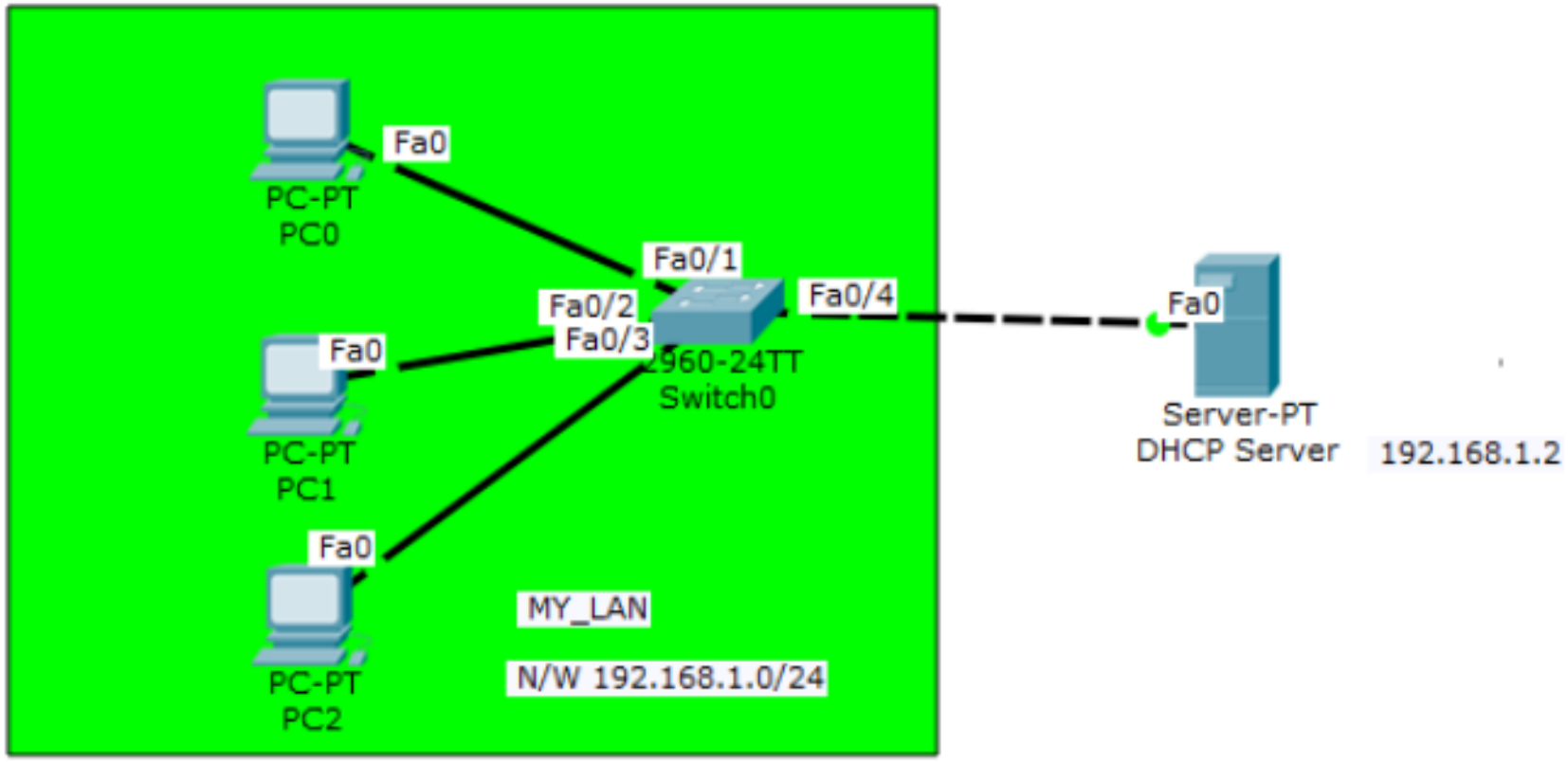


DHCP Messages

- Firstly, a client sends a broadcast **“DHCP Discovery”** message that mentions that it need an ip address.
- Then, the **DHCP servers** reply with configuration offers to the client by **“DHCP Offer”** unicast message.
- After that **DHCP client** sends a broadcast **“DHCP Request”** message to the network with the **“Transaction ID”** of the first **DHCP Server** that send **Offer**.
- The other **servers** understand that **client** wants to use the **server** that has the related **“Transaction ID”**.
- Lastly, the **Server** sends a unicast **“Acknowledgement”** message to the **client** that mentions the ip assignment is successfully done or it send a refuse messaged named “**DHCP-NACK**”.

Task 8.2: Experimental set-up- Configuring DHCP service on a generic server

1. Build the network topology in packet tracer

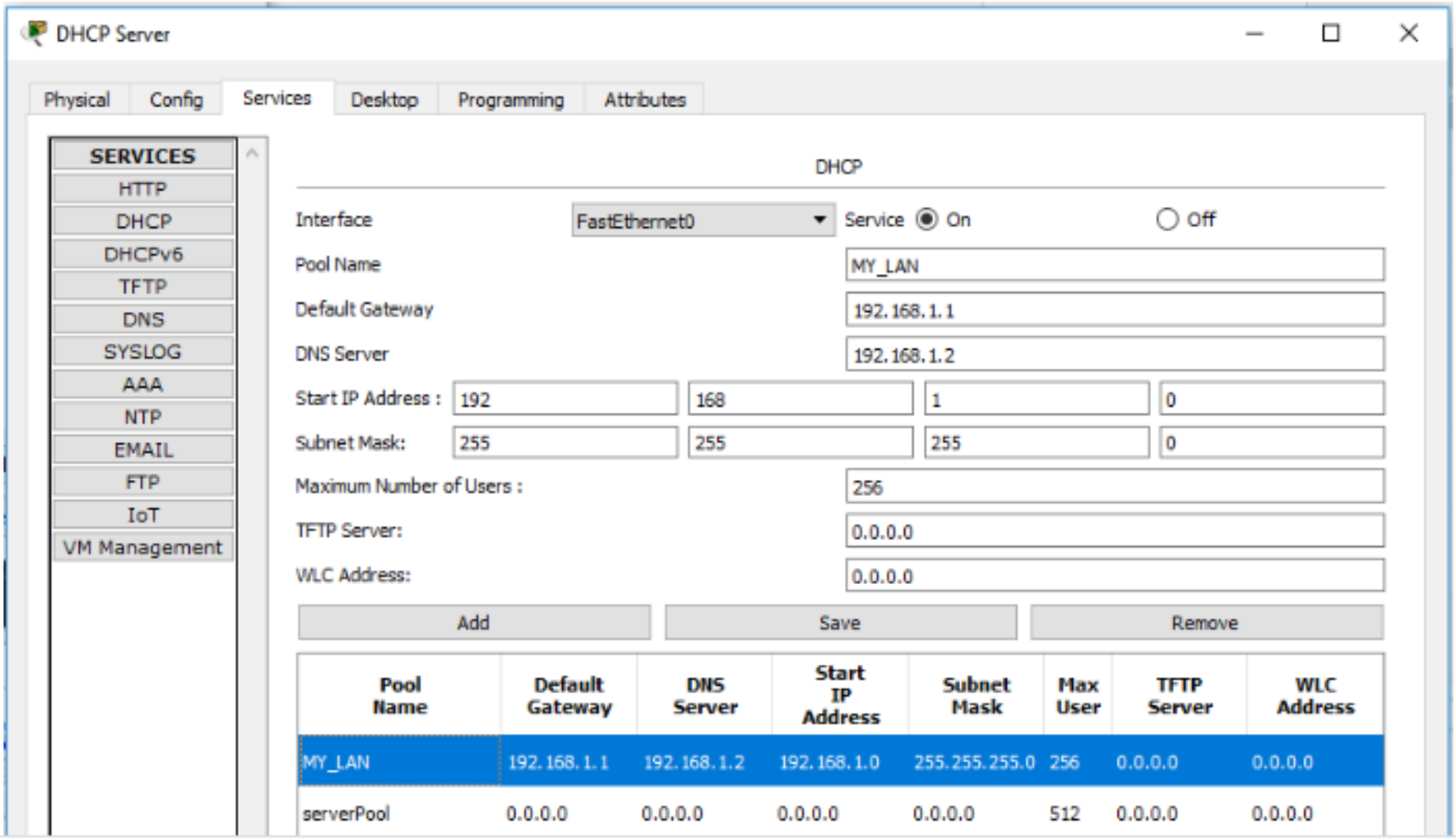


2. Configure static IP address on the server (192.168.1.2/24).
3. Now configure DHCP service on the generic server.

   To do this, click on the server, then click on **Services tab**.

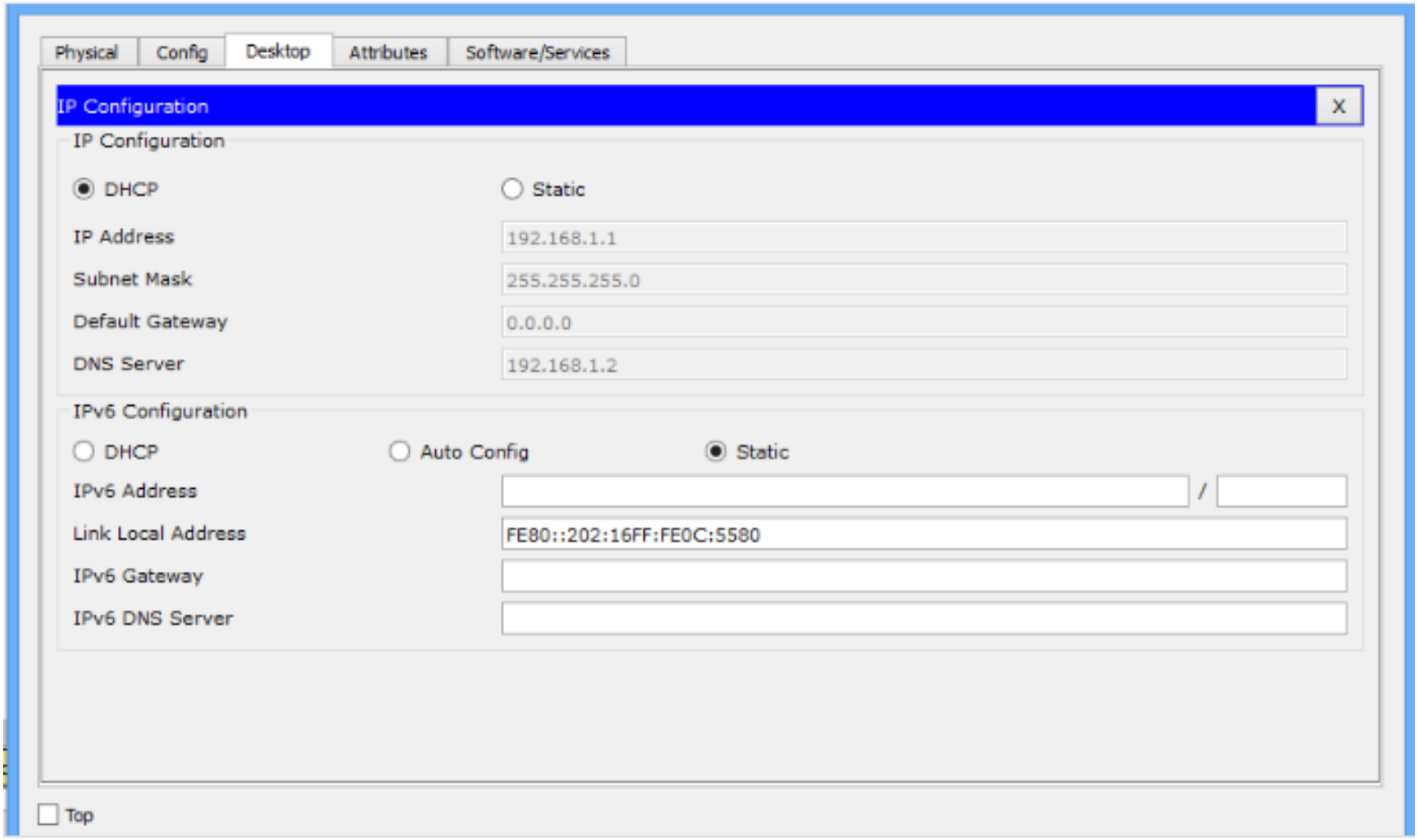
   – Pick **DHCP** on the menu.
   – Then proceed to define the DHCP network parameters as follows:
     - **Pool name**: MY_LAN
     - **Default Gateway:** 192.168.1.1
     - **DNS Server:** 192.168.1.2
     - **Start IP Address:** 192.168.1.0
     - **Subnet Mask:** 255.255.255.0
     - **Maximum Number of users:** 256
   – Click on **add** then **Save.**
   – The DHCP entry is included in the list.

Here are the configurations on the server:

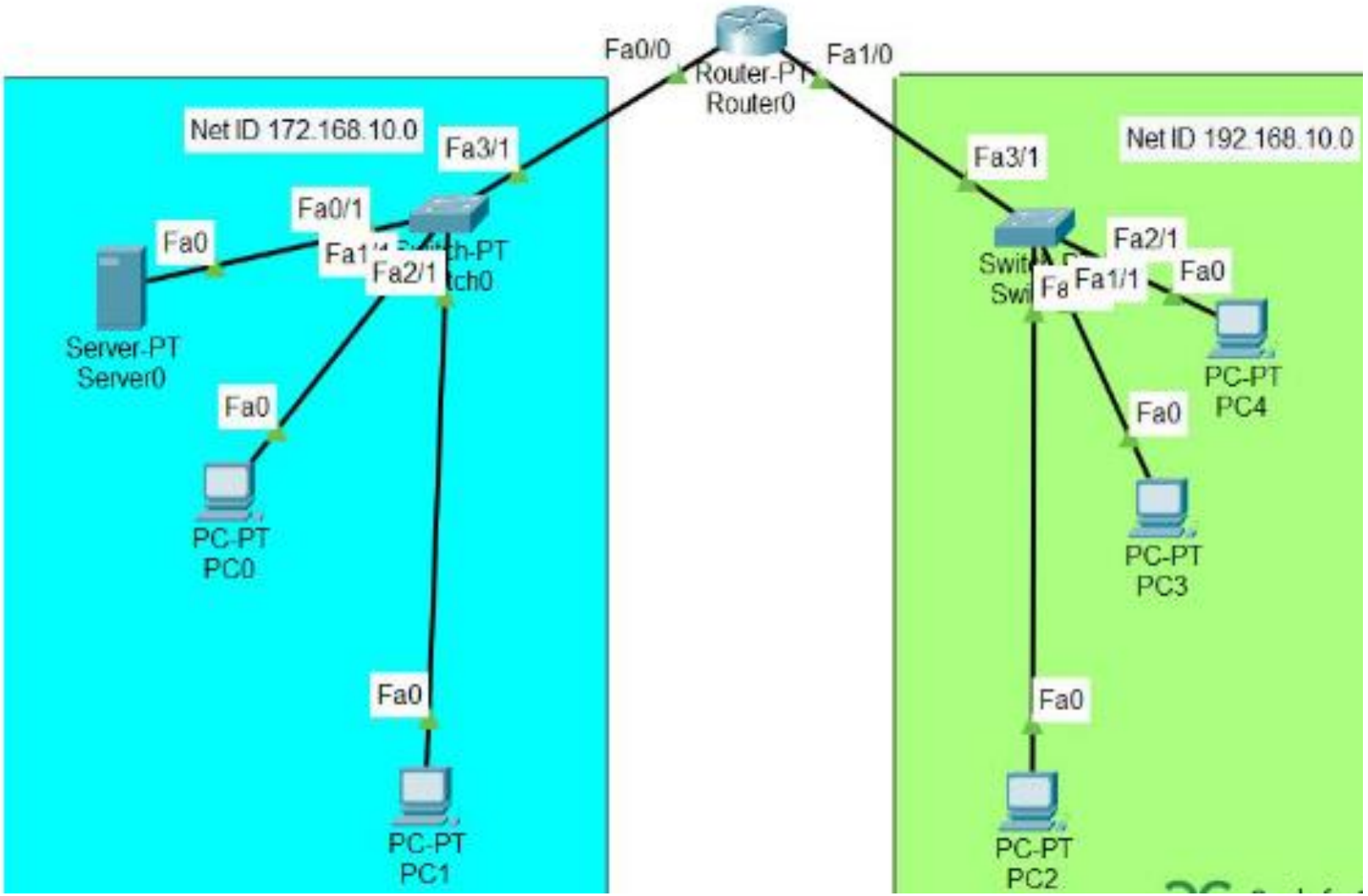


Once you've configured everything, turn ON the DHCP service.

4. Finally, enable DHCP configuration on each PC. The three PCs should get automatically configured.



Task 8.3- Configuring DHCP service for following network (try your self)

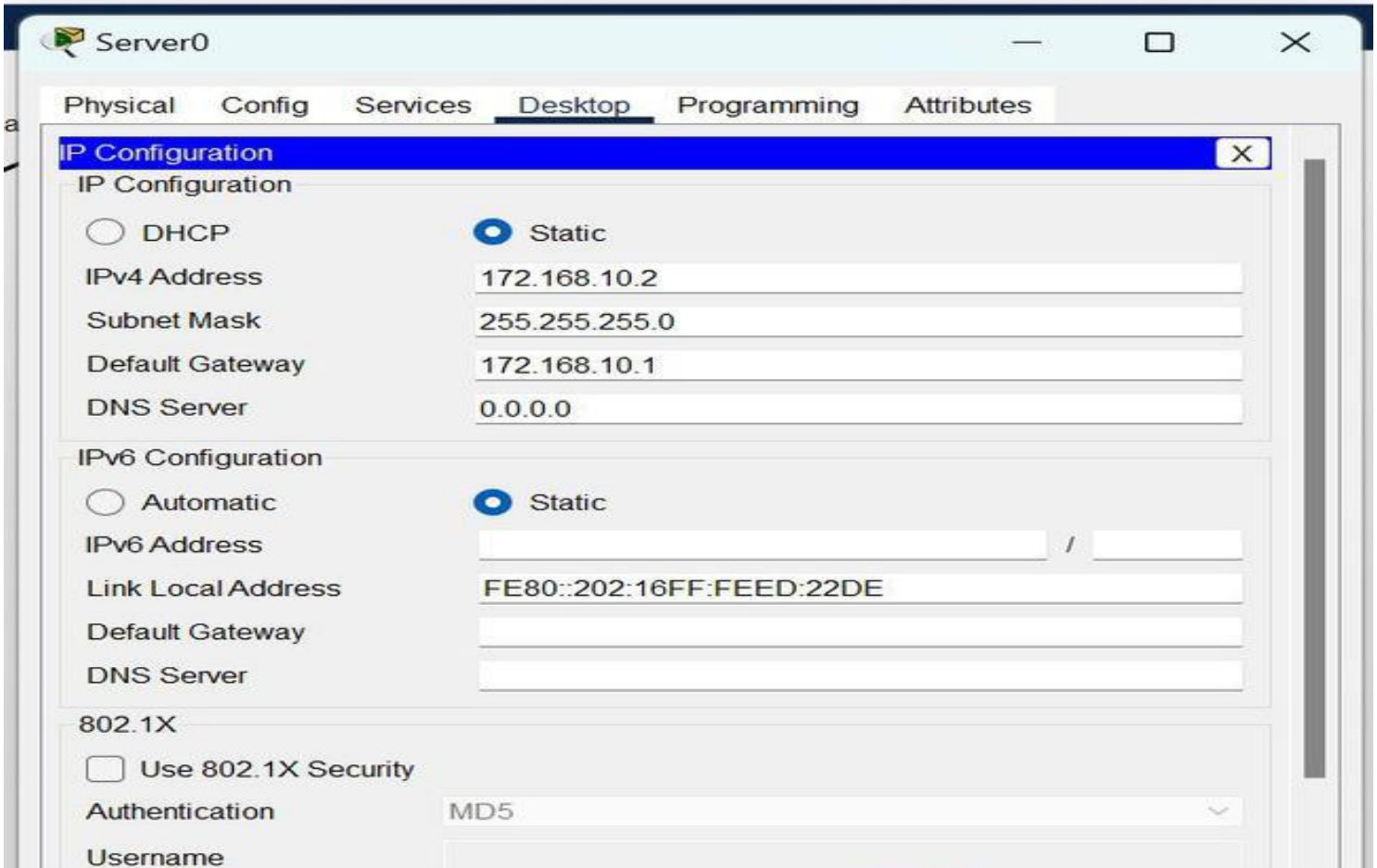


Step 1: First, open the cisco packet tracer desktop and select the devices given below:

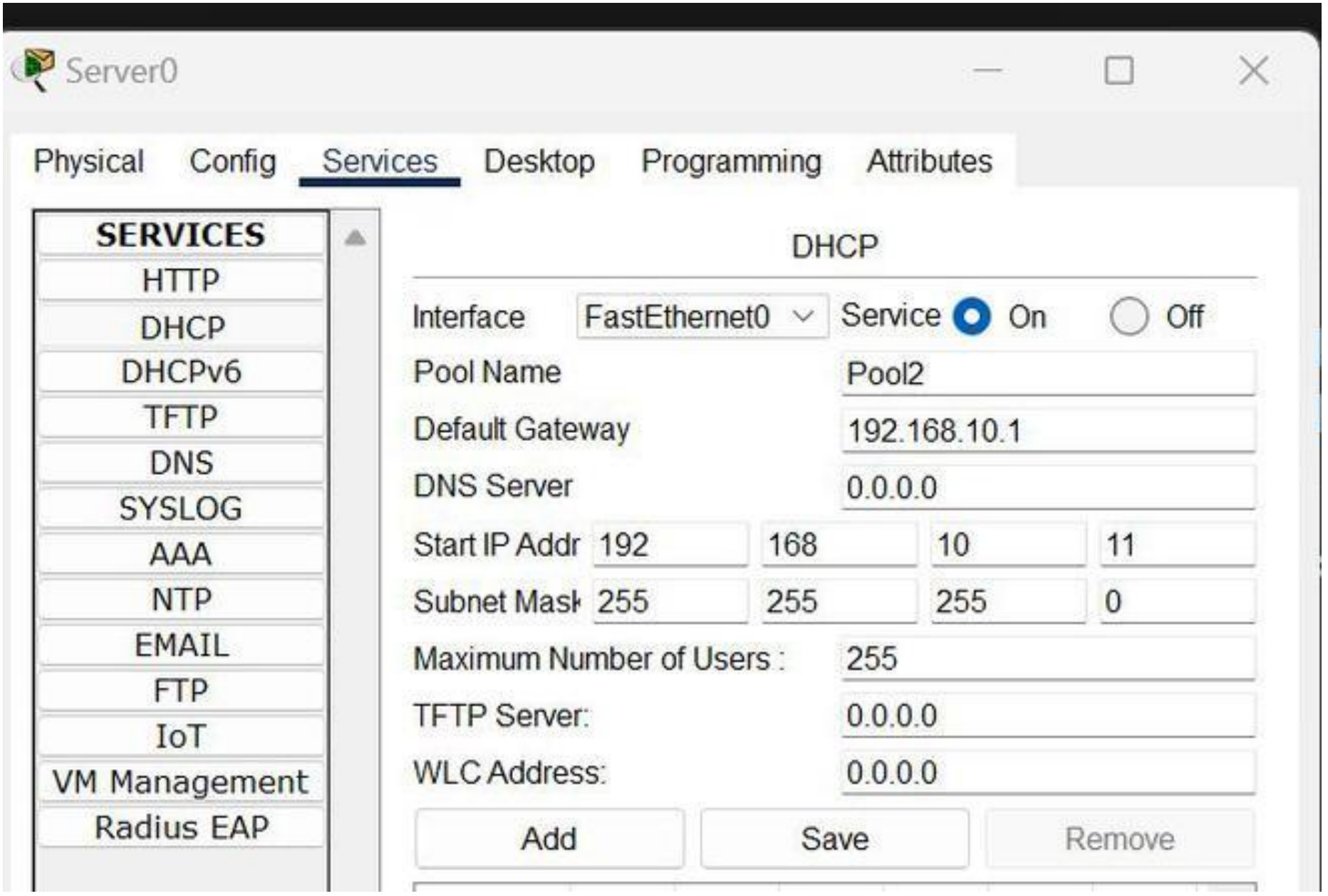
S.NO	Device	Model-Name	Unit
1.	PC	PC	5
2.	Switch	PT-Switch	2
3.	Router	PT-Router	1
4.	Server	Server-PT	1

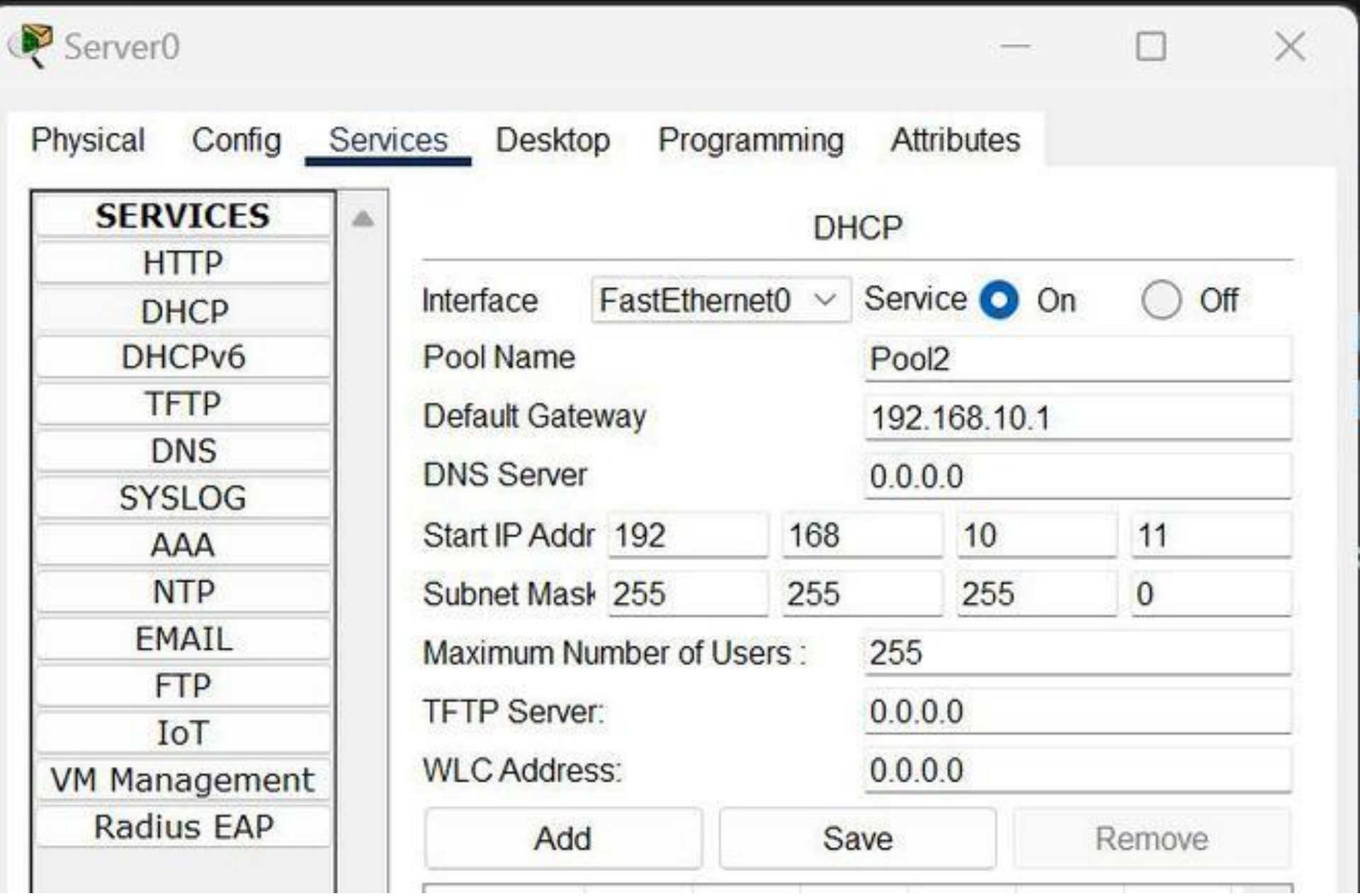
- Now create a network topology as shown in the image.
- Use an Automatic connecting cable to connect the devices with others.

- **Step 2:** Configure the Server with IPv4 address and Subnet Mask according to the Data given above.
  - To assign an IP address in Server, click on Server-PT.
  - Then, go to desktop and IP configuration and there you will find IPv4 configuration.
  - Add IPv4 address, subnet mask, and Default Gateway.



- **Step 3:** Configuring the DHCP server.
  - To configure the DHCP server first,
  - Click on Server then, Go to services.
  - Click on DHCP and turn on the services and, configure the DHCP server with the help of the data given below.
    - Delete the default values of Start IP Address and subnet Mask then save the info.
    - Create two new pools.
      - POOL1 and POOL2 and fill the data as shown in the images below.


Server0
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
Pool2
Default Gateway
192.168.10.1
DNS Server
0.0.0.0
Start IP Addr
192
168
10
11
Subnet Mask
255
255
255
0
Maximum Number of Users :
255
TFTP Server:
0.0.0.0
WLC Address:
0.0.0.0
Add
Save
Remove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SYSLOG
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NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
DHCP
Interface
FastEthernet0
Service
On
Off
Pool Name
Pool2
Default Gateway
192.168.10.1
DNS Server
0.0.0.0
Start IP Addr
192
168
10
11
Subnet Mask
255
255
255
0
Maximum Number of Users :
255
TFTP Server:
0.0.0.0
WLC Address:
0.0.0.0
Add
Save
Remove

- **Step 4:** Configuring Router with IPv4 Address and Subnet Mask.
  - To assign an IP address in router0, click on router0.
  - Then, go to config and then Interfaces, and make sure to turn on the ports.
  - Then, configure the IP address in FastEthernet according to IP addressing Table.
  - Fill IPv4 address and subnet mask.

Device	Interface	IPv4 Address	Subnet Mask
router0	FastEthernet0/0	172.168.10.1	255.255.255.0
	FastEthernet0/1	192.168.10.1	255.255.255.

- **Step 5:** Configuring the PCs and changing the IP configuration.
  - To assign an IP address in PC0, click on PC0.
  - Then, go to desktop and IP configuration and there you will find IPv4 configuration.
  - Change its state from static to DHCP.
  - It will automatically fetch the data and configure itself.
- Repeat the same procedure with other PCs to configure them thoroughly.

- **Step 6:** . Test the connectivity between PC1 and PC2 using ping command.

Task 8.4- Configuring DHCP service for following network (Try yourself)