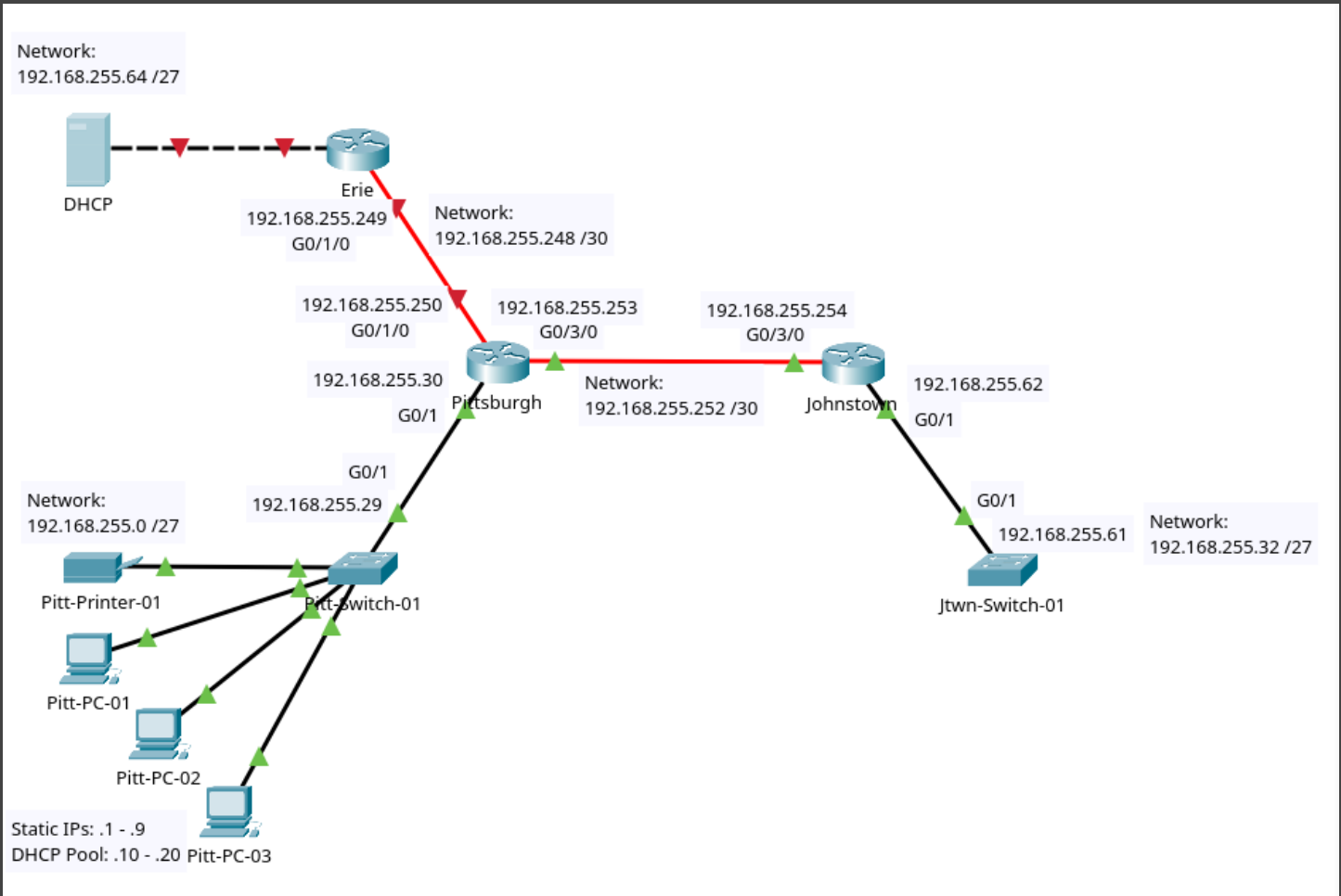


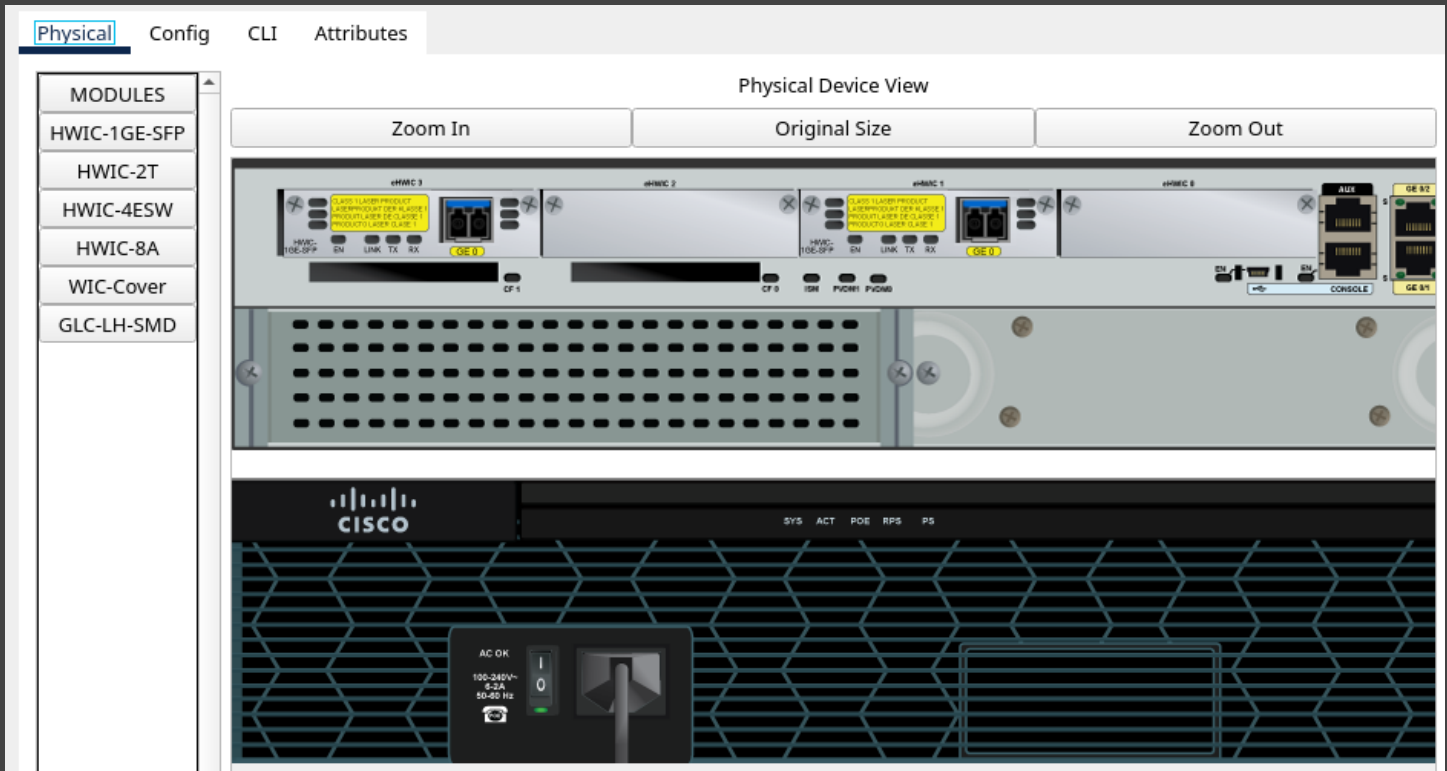
In this lab we will configure Dynamic Host Configuration Protocol:

- Add routers, servers, and PCs to the network.
- Router configuration.
- IP routing.
- Configure server to act as a DHCP server.
- Configure routers with DHCP commands.
- Verify DHCP
- Verify Telnet username/password login.

1. Select and delete the console cable from the admin laptop. Move the admin laptop to the side for a later date.
2. Select End Devices and drag and drop 3 PCs and one Printer to the canvas. Connect each device to Pitt-Switch-01 and rename them on the topology.
 - a. Connections:
 - i. Printer - Fa0/24
 - ii. PC-01 - Fa0/1
 - iii. PC-02 - Fa0/7
 - iv. PC-03 - Fa0/13
3. Notate the IPs you want to save for end devices that will need static IPs (e.g. printers, servers) and the pool of IPs for end devices that can learn their IP dynamically (e.g. PCs, laptops, smart phones).



4. Time to create a DHCP server. Configure a new router and configure it as we did in the first lab.
 - a. Power off. Insert HWIC-1GE-SFP, GLC-LH-SMD, and WIC-COVER. Power on.
 - b. Connect and notate hostname and IP addresses on the new router..
 - c. Note. You'll have to add a second HWIC module to the Pittsburgh router.
 - d. Drag and Drop a Server from the end devices to the canvas.
 - i. Rename it on the topology.
 - ii. Connect it to the new router with crossover cable.



Notice we have two modules now.

5. Configure the Pittsburgh's interface facing the new router.

User Access Verification

Username: Nathan
Password:

```
Pittsburgh>enable
Pittsburgh#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Pittsburgh(config)#interface g0/1/0
Pittsburgh(config-if)#ip address 192.168.255.250 255.255.255.252
Pittsburgh(config-if)#no shutdown
Pittsburgh(config-if)#exit
```

6. Configure hostname, interfaces, and username/password for the new router.

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Erie
Erie(config)#interface g0/1/0
Erie(config-if)#ip address 192.168.255.249 255.255.255.252
Erie(config-if)#no shutdown

Erie(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1/0, changed state to up
exit
Erie(config)#interface g0/0
Erie(config-if)#ip address 192.168.255.94 255.255.255.224
Erie(config-if)#no shutdown

Erie(config)#service password-encryption
Erie(config)#username Nathan secret Cisco
Erie(config)#
Erie(config)#line console 0
Erie(config-line)#login local
Erie(config-line)#exit
Erie(config)#line aux 0
Erie(config-line)#login local
Erie(config-line)#exit
Erie(config)#line vty 0 15
Erie(config-line)#login local
Erie(config-line)#exit
```

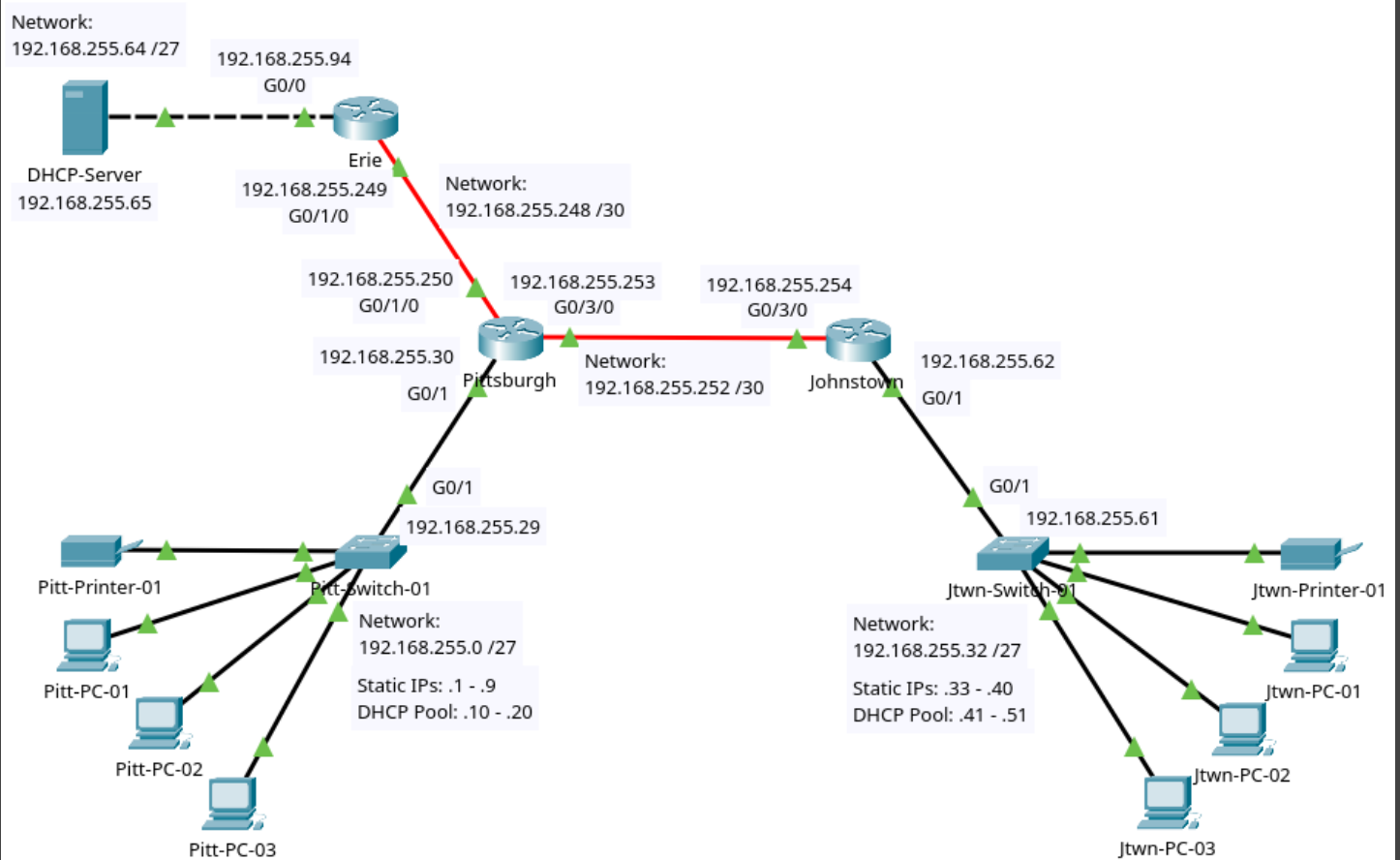
7. We need to configure multiple ip routes for the network to work with the new set up. Below are all the ip routes I have configured on all routers.

```
Pittsburgh#show run | include ip route
ip route 192.168.255.32 255.255.255.224 192.168.255.254
ip route 192.168.255.64 255.255.255.224 192.168.255.249
```

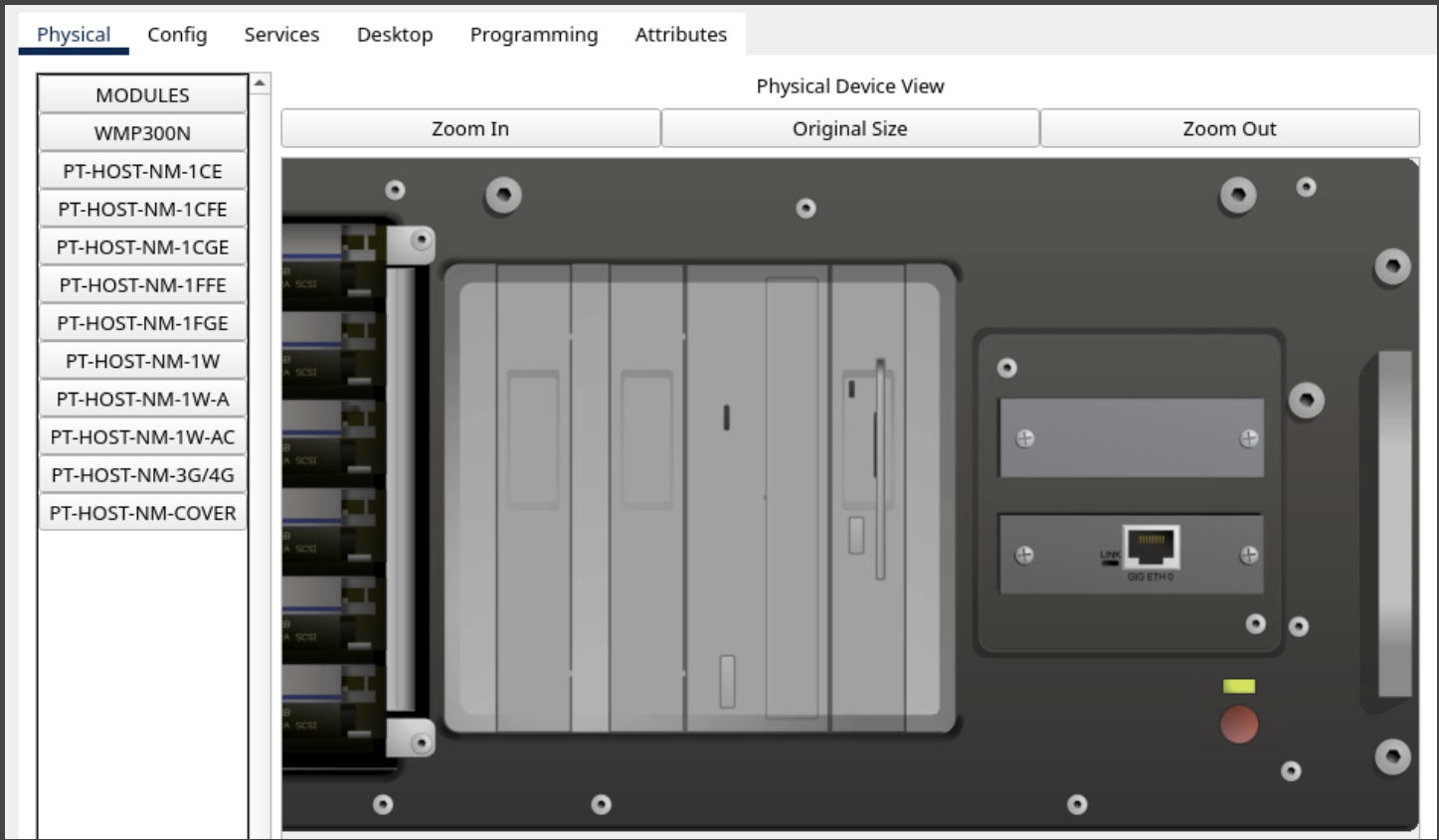
```
Johnstown#show run | include ip route
ip route 192.168.255.0 255.255.255.224 192.168.255.253
ip route 192.168.255.64 255.255.255.224 192.168.255.253
ip route 192.168.255.248 255.255.255.252 192.168.255.253
```

```
Erie#show run | include ip route
ip route 192.168.255.0 255.255.255.224 192.168.255.250
ip route 192.168.255.252 255.255.255.252 192.168.255.250
ip route 192.168.255.32 255.255.255.224 192.168.255.250
```

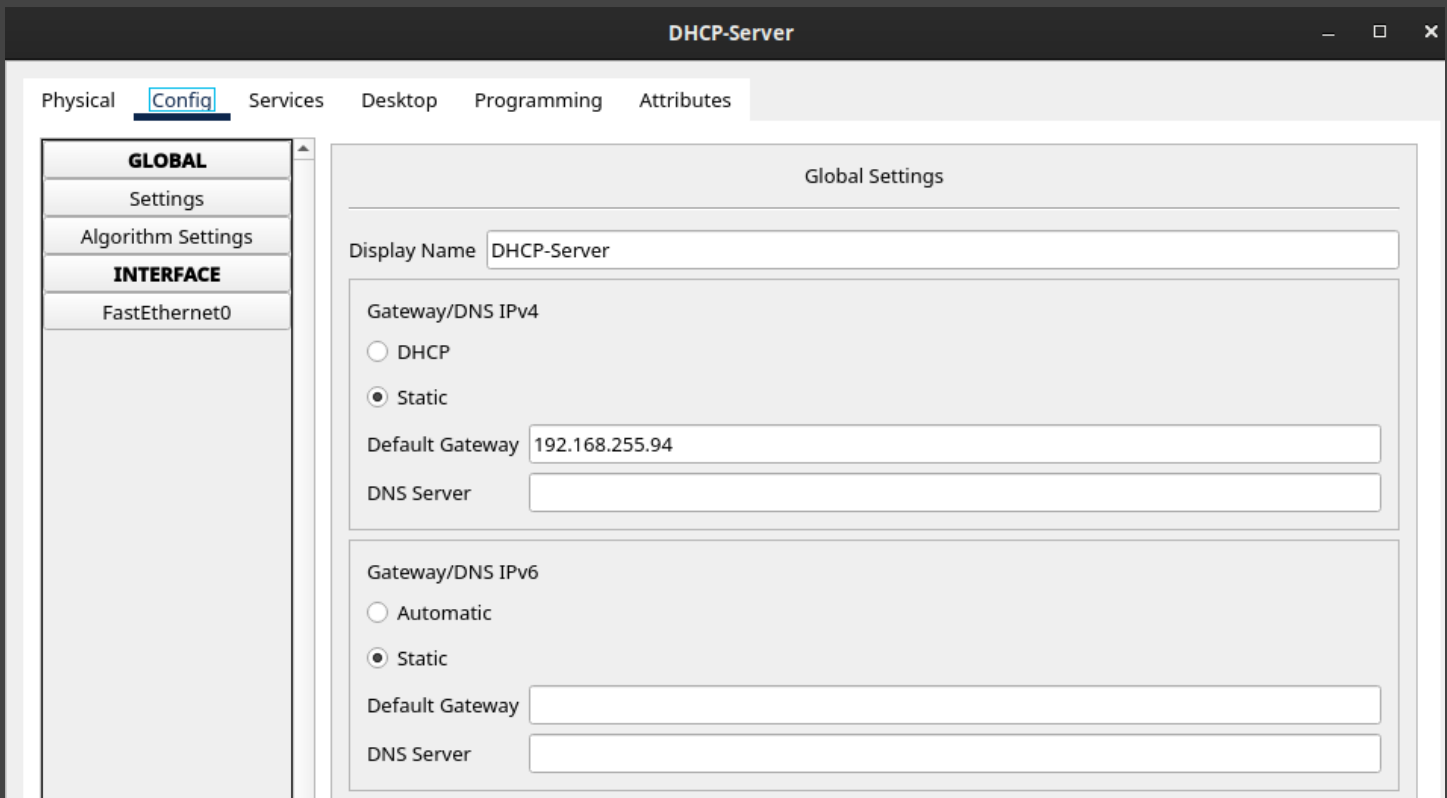
8. Set up and mirror PC's and Printers set up on the Jtwn Switch.



9. Left Click on the server icon. Remove the ethernet module currently installed and replace it with PT-HOST-NM-1CGE module. Cover the vacant slot.



10. Configure Default Gateway in the config GUI.



11. Configure the IP address and subnet mask in the Config GUI.

The screenshot shows the 'DHCP-Server' configuration window with the 'Config' tab selected. The left sidebar has a tree view with 'GLOBAL' and 'INTERFACE' sections. Under 'INTERFACE', 'FastEthernet0' is selected. The main area displays settings for 'FastEthernet0'. The 'Port Status' is 'On'. 'Bandwidth' is set to '100 Mbps'. 'Duplex' is set to 'Full Duplex'. The 'MAC Address' is '0010.1106.AA13'. Under 'IP Configuration', 'Static' is selected. The 'IPv4 Address' is '192.168.255.65' and the 'Subnet Mask' is '255.255.255.224'. Under 'IPv6 Configuration', 'Static' is selected. The 'IPv6 Address' is empty, and the 'Link Local Address' is 'FE80::210:11FF:FE06:AA13'.

Section	Parameter	Value
FastEthernet0	Port Status	<input checked="" type="checkbox"/> On
	Bandwidth	<input checked="" type="radio"/> 100 Mbps <input type="radio"/> 10 Mbps <input checked="" type="checkbox"/> Auto
	Duplex	<input type="radio"/> Half Duplex <input checked="" type="radio"/> Full Duplex <input checked="" type="checkbox"/> Auto
	MAC Address	0010.1106.AA13
IP Configuration	<input type="radio"/> DHCP	
	<input checked="" type="radio"/> Static	
IPv4 Configuration	IPv4 Address	192.168.255.65
	Subnet Mask	255.255.255.224
IPv6 Configuration	<input type="radio"/> Automatic	
	<input checked="" type="radio"/> Static	
	IPv6 Address	
Link Local Address	Link Local Address	FE80::210:11FF:FE06:AA13

12. In the services tab, disable all other services, including: HTTP, HTTPS, DHCPv6, TFTP, DNS, SYSLOG, AAA, NTP, EMAIL, FTP, IoT, VM Management, Radius EAP.

The screenshot shows the 'HTTP' and 'HTTPS' service configuration tabs. The 'HTTP' tab has 'On' and 'Off' radio buttons, with 'Off' selected. The 'HTTPS' tab has 'On' and 'Off' radio buttons, with 'Off' selected.

Service	On	Off
HTTP	<input type="radio"/>	<input checked="" type="radio"/>
HTTPS	<input type="radio"/>	<input checked="" type="radio"/>

13. Enable DHCP on the server.

14. Configure the DHCP in the GUI:

- Pool Name
- Start IP Address (Important to remember we designated DHCP pools on the topology)
- Maximum users (10 for our designated pools)

Physical Config **Services** Desktop Programming Attributes

SERVICES

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

DHCP

Interface: GigabitEthernet1 Service: ☒ On ☐ Off

Pool Name: serverPool

Default Gateway: 0.0.0.0

DNS Server: 0.0.0.0

Start IP Address: 192 168 255 64

Subnet Mask: 255 255 255 224

Maximum Number of Users: 0

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
serverPool	0.0.0.0	0.0.0.0	192.168.255.64	255.255.255.224	0	0.0.0.0	0.0.0.0
ERIE_POOL	192.168.255...	0.0.0.0	192.168.255.74	255.255.255.224	10	0.0.0.0	0.0.0.0
PITT_POOL	192.168.255...	0.0.0.0	192.168.255.10	255.255.255.224	10	0.0.0.0	0.0.0.0
JTWN-POOL	192.168.255...	0.0.0.0	192.168.255.44	255.255.255.224	10	0.0.0.0	0.0.0.0

15. Configure **ALL** active router interfaces with the dhcp command. This lets the router know where to send dhcp requests.

- Interface **[INTERFACE]**
- IP helper-address **[IP OF DHCP SERVER]**

```
Pittsburgh>enable
Pittsburgh#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Pittsburgh(config)#interface range g0/1, g0/1/0, g0/3/0
Pittsburgh(config-if-range)#ip helper-address 192.168.255.65
Pittsburgh(config-if-range)#do wr
Building configuration...
[OK]
```


16. Run the ipconfig command on Pitt-PC-01 to view it's IP Address and Default Gateway before the DHCP configuration.

```
C:\>ipconfig

FastEthernet0 Connection:(default port)

Connection-specific DNS Suffix...:
Link-local IPv6 Address.....: FE80::260:2FFF:FE5E:31E2
IPv6 Address.....: ::
IPv4 Address.....: 0.0.0.0
Subnet Mask.....: 0.0.0.0
Default Gateway.....: ::
                        0.0.0.0
```

17. Configure DHCP on Pitt-PC-01 through the Config GUI.
 - a. Click DHCP on Settings tab. This will automatically check DHCP on the FastEthernet0 tab as well. You can view to confirm.

The screenshot shows the 'Config' tab selected in the top navigation bar. On the left sidebar, the 'GLOBAL' section is expanded, showing 'Settings' as the active sub-tab. The main panel displays 'Global Settings' for 'Pitt-PC-01'. The 'Interfaces' dropdown is set to 'FastEthernet0'. Under the 'Gateway/DNS IPv4' section, the 'DHCP' radio button is selected, and the 'Static' radio button is unselected. The 'Default Gateway' field contains the value '192.168.255.30' and the 'DNS Server' field contains '0.0.0.0'.

Physical	Config	Desktop	Programming	Attributes
GLOBAL				
Settings				
Algorithm Settings				
INTERFACE				
FastEthernet0				
Bluetooth				

Global Settings

Display Name: Pitt-PC-01

Interfaces: FastEthernet0

Gateway/DNS IPv4

☒ DHCP

☐ Static

Default Gateway: 192.168.255.30

DNS Server: 0.0.0.0

18. Confirm DHCP has resulted in an IP address for the PC.
- Enter the ipconfig into the PC's command prompt.

```
C:\>ipconfig

FastEthernet0 Connection:(default port)

Connection-specific DNS Suffix...:
Link-local IPv6 Address.....: FE80::260:2FFF:FE5E:31E2
IPv6 Address.....: ::
IPv4 Address.....: 192.168.255.10
Subnet Mask.....: 255.255.255.224
Default Gateway.....: ::
                        192.168.255.30
```

19. Manually configure the printers with static IPs and default gateway in the config GUI.

The image displays two screenshots of a network configuration GUI, likely for a printer or network device.

Top Screenshot: Global Settings

- Physical | **Config** | Attributes
- GLOBAL Settings
- INTERFACE FastEthernet0
- Display Name: Pitt-Printer-01
- Gateway/DNS IPv4:
 - ☐ DHCP
 - ☒ Static
- Default Gateway: 192.168.255.29
- DNS Server: (empty field)

Bottom Screenshot: FastEthernet0 Interface Settings

- Physical | **Config** | Attributes
- FastEthernet0
- Port Status: ☒ On
- Bandwidth: ☒ 100 Mbps ☐ 10 Mbps ☒ Auto
- Duplex: ☐ Half Duplex ☒ Full Duplex ☒ Auto
- MAC Address: 00E0.A364.41D7
- IP Configuration:
 - ☐ DHCP
 - ☒ Static
- IPv4 Address: 192.168.255.1
- Subnet Mask: 255.255.255.224

20. Ping from a Pitt-PC to a Jtnw-PC to confirm connectivity still exists.

```
C:\>ping 192.168.255.12

Pinging 192.168.255.12 with 32 bytes of data:

Request timed out.
Reply from 192.168.255.12: bytes=32 time<1ms TTL=126
Reply from 192.168.255.12: bytes=32 time<1ms TTL=126
Reply from 192.168.255.12: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.255.12:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

21. Now that we have our IP addresses set up, let's call back to the last lab and attempt to connect with a VTY line. It should ask us for a log in if we configured it correctly.

- a. Telnet into Pitt-Switch-01 from a PC's terminal.
 - i. Terminal, Click OK.
 - ii. Telnet 192.168.255.30
 - iii. Log in.

```
C:\>
C:\>telnet 192.168.255.30
Trying 192.168.255.30 ...Open

User Access Verification

Username: Nathan
Password:
Pittsburgh>|
```

22. Go through all network devices and write the configurations to the startup-config.