

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 5 departments – admin, HR, support, construction, sales.
- 2) Each department have 20 users (add at least 5 devices in each network)
- 3) The networking device available in the organization is 5 servers, 3 routers and 5 switches.
- 4) All the devices should get the IP address dynamically.
- 5) The organization has their own inbuilt name server which will have the details of the website that the user can access.
- 6) The users of the company are allowed to access only five mentioned websites in the office premises. The list of the website is mentioned below:

Admin – google, yahoo, amazon, cisco and Microsoft

HR – naukri.com, linkedin, twitter, google and Microsoft

Support – Cisco, amazon, google, icann, internet society

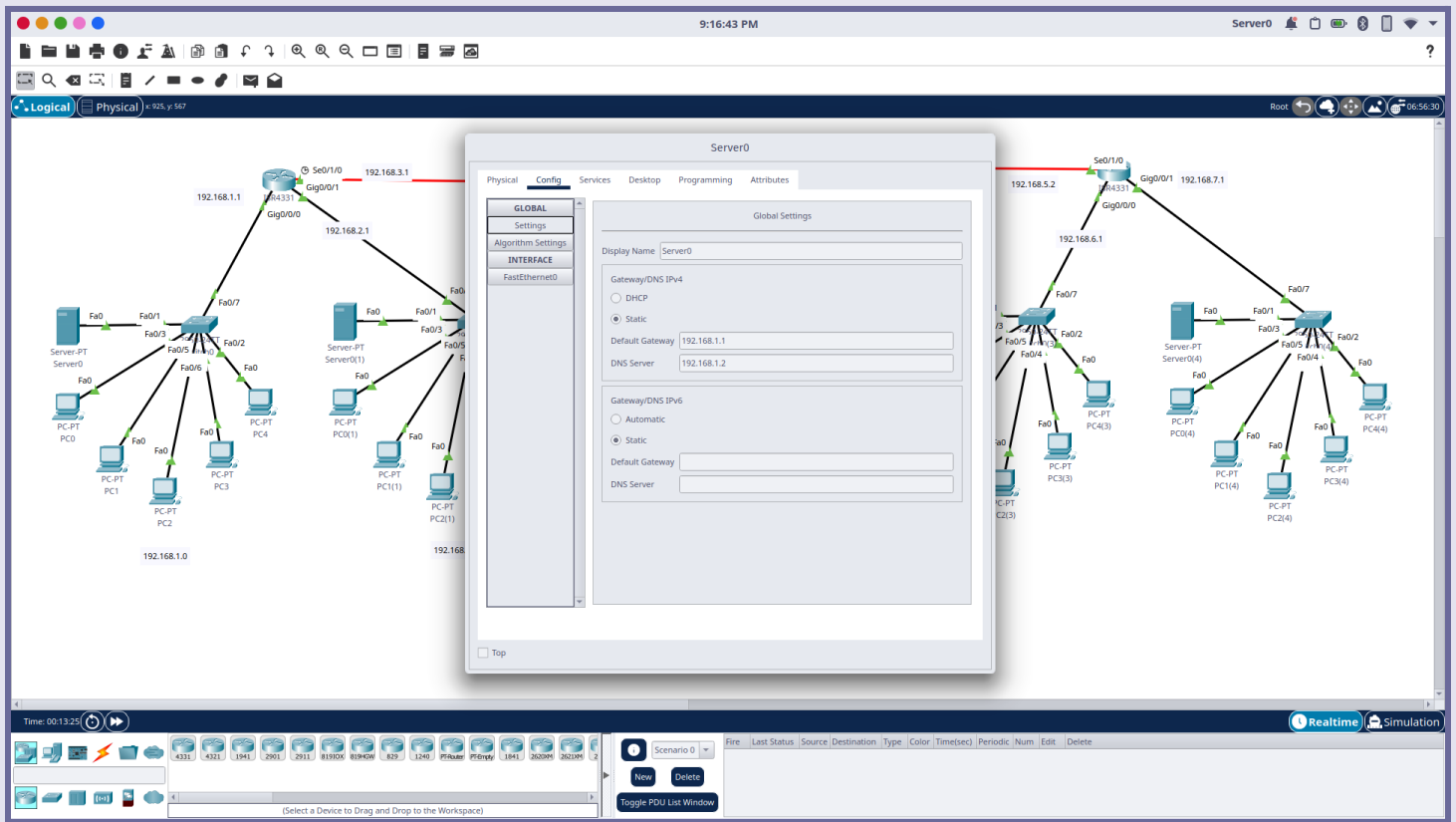
Construction – ubuntu, google, linux, amazon and sophos

Sales – any five websites related to sales that are not mentioned in the above department.

2. Assign an IP address 192.168.1.2 to the Server0 of the Admin department of the network 192.168.1.0

The screenshot displays a network simulation environment. In the center, a configuration window for 'Server0' is open, showing the 'FastEthernet0' interface settings. The IP configuration is set to 'Static' with an IP address of 192.168.1.2 and a subnet mask of 255.255.255.0. The IPv6 configuration is set to 'Automatic' with a link local address of FE80::250:FFF:FE52:2DDC. The background shows a network topology with two main switches connected to a central router. The left switch is connected to a server (Server-PT Server0) and several PCs (PC-PT PC0, PC1, PC2, PC3, PC4). The right switch is connected to another server (Server-PT Server0(4)) and several PCs (PC-PT PC0(4), PC1(4), PC2(4), PC3(4), PC4(4)). The interface 'Fa0/0/0' of the central router is connected to the left switch, and 'Fa0/0/1' is connected to the right switch. The IP addresses 192.168.1.1 and 192.168.1.2 are visible on the left switch's interfaces. The bottom of the window shows a timeline and a list of devices.

3. Assign gateway IP of the router connected to it and its own IP as DNS server



4. Assign IP to Router0's gigabit ethernet port connected to the router, which was given as gateway in Server0

The screenshot displays a network simulation environment. In the center, a configuration window for 'Router0' is open, showing the 'Config' tab for the 'GigabitEthernet0/0/0' interface. The configuration includes:

- Port Status:** On
- Bandwidth:** 1000 Mbps
- Duplex:** Full Duplex
- MAC Address:** 0030.F25C.E801
- IP Configuration:**
 - IPv4 Address: 192.168.1.1
 - Subnet Mask: 255.255.255.0
- Tx Ring Limit:** 10

Below the configuration fields, the 'Equivalent IOS Commands' are listed:

```
Router(config) terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/2
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/8
Router(config-if)#
Router(config-if)#exit
```

The background shows a network topology with two main clusters of devices. The left cluster includes 'Server-PT Server0' and several 'PC-PT' devices connected to a central switch. The right cluster includes 'Server-PT Server(0/4)' and more 'PC-PT' devices connected to another switch. A red line indicates a connection between the two clusters via 'GigabitEthernet0/0/0' and 'GigabitEthernet0/0/1'.

At the bottom, there is a 'Realtime Simulation' status bar with a timer at 00:30:40 and a 'Toggle PDU List Window' button.

5. Assign IP to other ports of Router0 accordingly.

The screenshot shows the Packet Tracer interface with Router0 selected. The configuration window for GigabitEthernet0/0/1 is open, displaying the following settings:

- Port Status:** On
- Bandwidth:** 1000 Mbps
- Duplex:** Full Duplex
- MAC Address:** 0030.F25C.E802
- IP Configuration:**
 - IPv4 Address: 192.168.2.1
 - Subnet Mask: 255.255.255.0
- Interface:** GigabitEthernet0/0/0, GigabitEthernet0/0/1, GigabitEthernet0/0/2, Serial0/1/0, Serial0/1/1

The Equivalent IOS Commands section shows the following configuration:

```
Router(config-if)#  
Router(config-if)#exit  
Router(config)#interface GigabitEthernet0/0/0  
Router(config-if)#  
Router(config)#interface GigabitEthernet0/0/1  
Router(config-if)#  
Router(config)#interface GigabitEthernet0/0/2  
Router(config-if)#  
Router(config)#interface GigabitEthernet0/0/1  
Router(config-if)#  
Router(config)#interface GigabitEthernet0/0/1  
Router(config-if)#
```

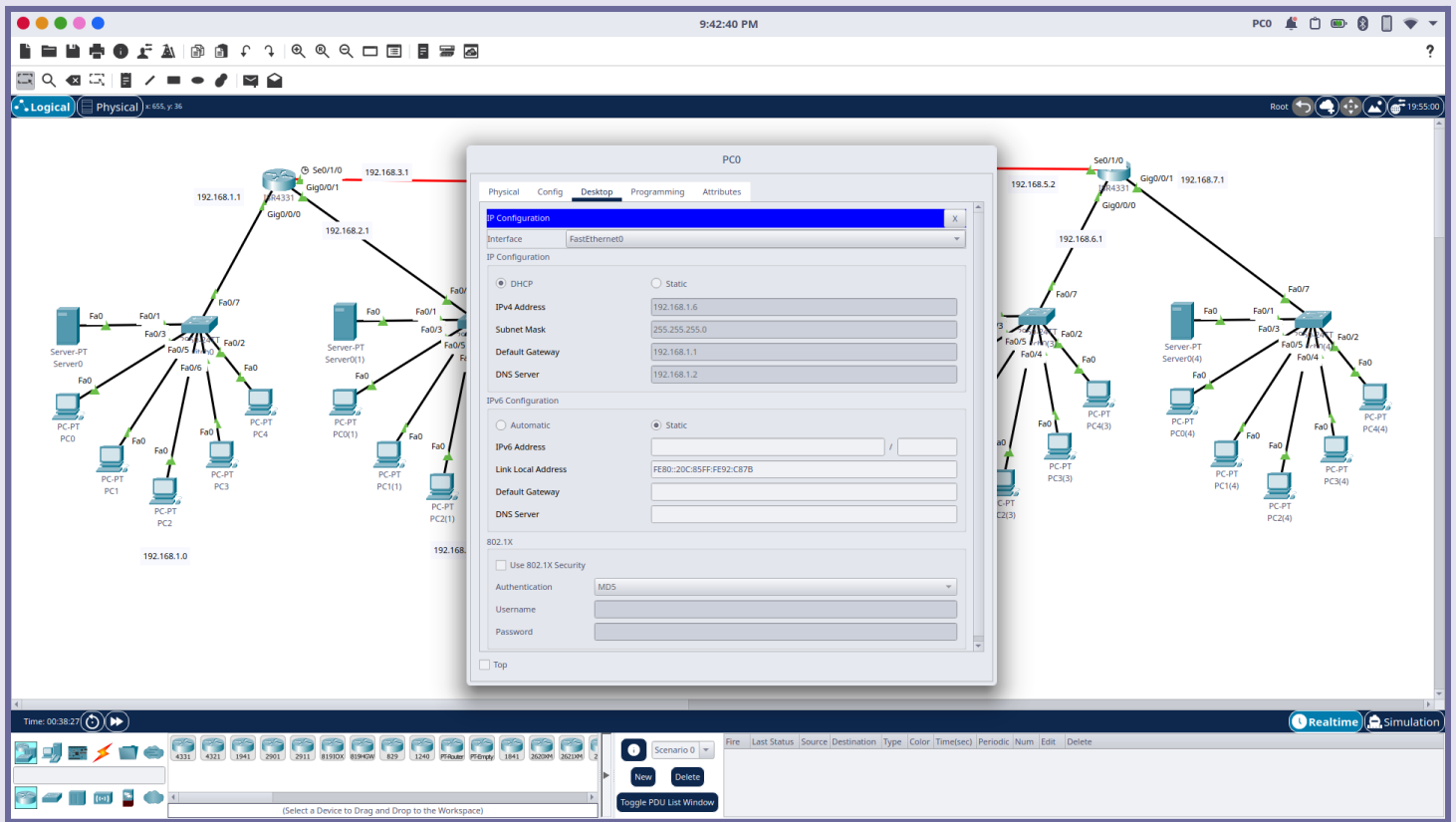
The screenshot shows the Packet Tracer interface with Router0 selected. The configuration window for Serial0/1/0 is open, displaying the following settings:

- Port Status:** On
- Duplex:** Full Duplex
- Clock Rate:** 2000000
- IP Configuration:**
 - IPv4 Address: 192.168.3.1
 - Subnet Mask: 255.255.255.0
- Interface:** GigabitEthernet0/0/0, GigabitEthernet0/0/1, GigabitEthernet0/0/2, Serial0/1/0, Serial0/1/1

The Equivalent IOS Commands section shows the following configuration:

```
Router(config-if)#  
Router(config-if)#exit  
Router(config)#interface GigabitEthernet0/0/0  
Router(config-if)#  
Router(config)#interface GigabitEthernet0/0/1  
Router(config-if)#  
Router(config)#interface GigabitEthernet0/0/2  
Router(config-if)#  
Router(config)#interface GigabitEthernet0/0/1  
Router(config-if)#  
Router(config)#interface Serial0/1/0  
Router(config-if)#
```

6. Configure all end devices connected to Server0 to use DHCP for IP addresses.



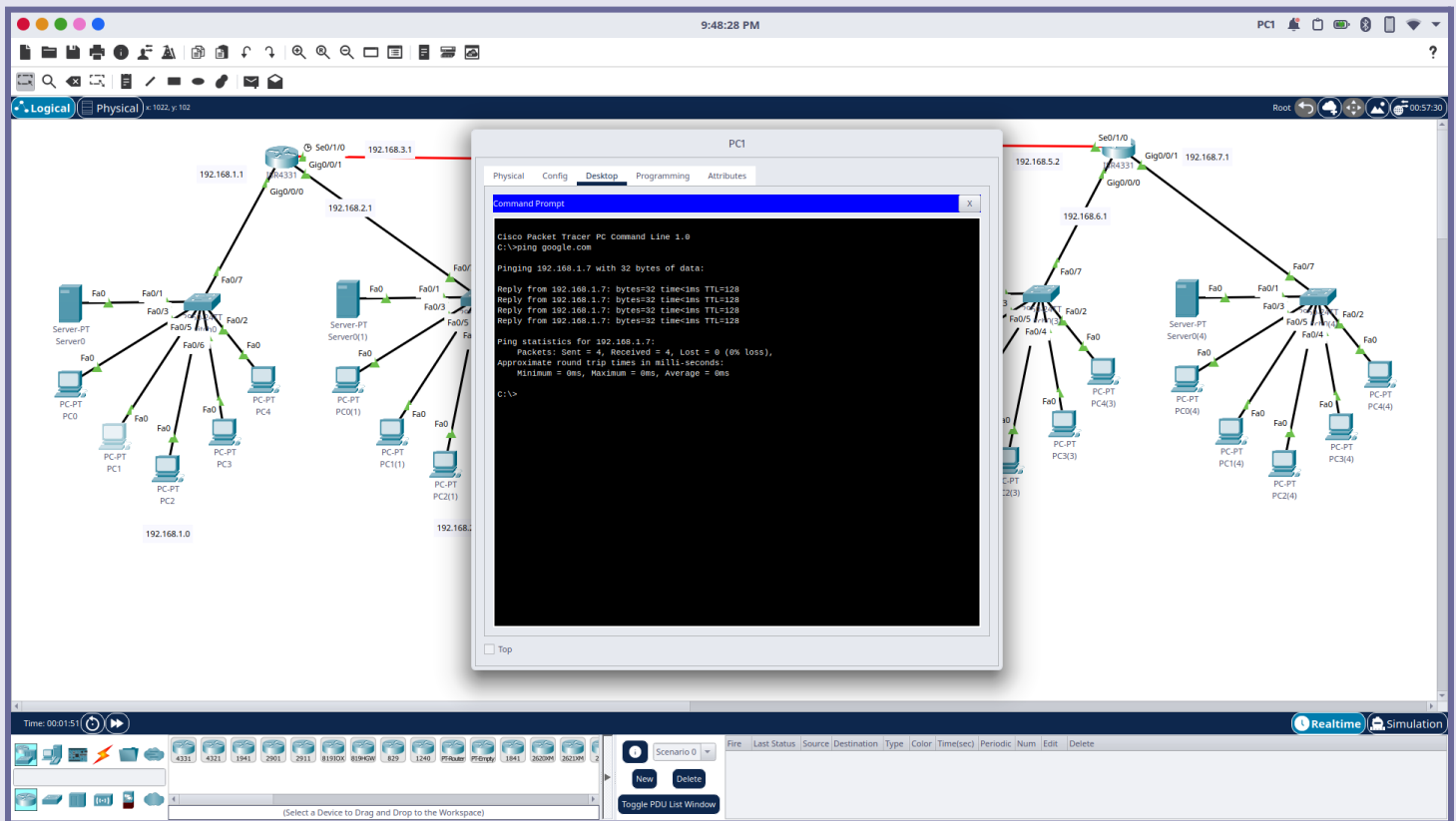
7. Add DNS domains and respective addresses in DNS service of Server0.

The screenshot displays a network simulation environment. A central configuration window for 'Server0' is open, showing the 'DNS' service settings. The 'DNS Service' is set to 'On'. Below this, there is a 'Resource Records' section with a table of records:

No.	Name	Type	Detail
0	amazon.com	A Record	192.168.1.2
1	google.com	A Record	192.168.1.7
2	yahoo.com	A Record	192.168.1.6

The background shows a network topology with various servers and PCs connected to a central switch. The interface includes a top bar with the time '9:44:50 PM' and a bottom bar with a 'Realtime' simulation status.

8. Similarly, follow the same steps for all other networks with IP and network range given in the figure 1 of first step. And then ping and test the URL or domain set in the DNS server of the network.



Conclusion : By the analysis of this experiment, it was observed how DHCP protocol works and dynamically assigns the IP addresses to the end devices whenever powered ON, and also DNS servers can be used locally for accessing the domains within a department of an organization.