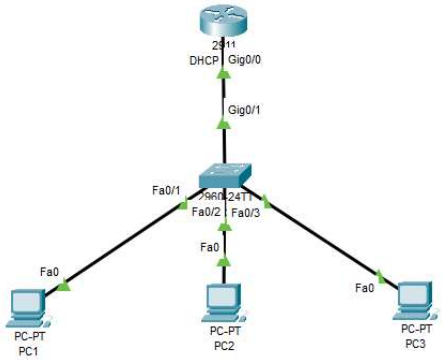
INDIAN INSTITUTE OF INFORMATION TECHNOLOGY, NAGPUR,
Department of Computer Science & Engineering

Lab Exercise No. 4

Objectives: To demonstrate and configure a DHCP server using Router



Theory

DHCP Server is a network server that automatically provides and assigns IP addresses, default gateways and other network parameters to client devices. It relies on the standard protocol known as Dynamic Host Configuration Protocol or DHCP to respond to broadcast queries by clients. A DHCP server automatically sends the required network parameters for clients to properly communicate on the network. Without it, the network administrator has to manually set up every client that joins the network, which can be cumbersome, especially in large networks. DHCP servers usually assign each client with a unique dynamic IP address, which changes when the client's lease for that IP address has expired.

Steps to be followed on Cisco Packet Tracer

Step-1:

A network topology is created in the Cisco Packet Tracer, which includes a router, a switch, and three host systems connected to a network.

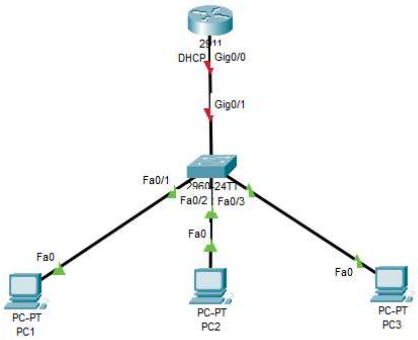


Fig: Network Topology

Step-2:

Command Line Interface of the router is accessed and high-lighted commands are executed to successfully configure the DHCP. At first, the 'IP DHCP pool pool_name' command is executed. After this, the network address is defined along with its subnet mask. And further, the 'default-router IP-address' command is used to define the default route address.

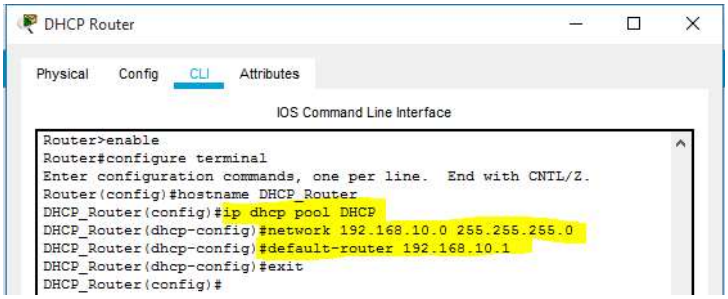


Fig: Creation of DHCP pool

Step-3:

In this step, a range of IP addresses is excluded from the addresses defined in the subnet mask of the DHCP pool. Excluded IP addresses will be not assigned to any host system in the network.

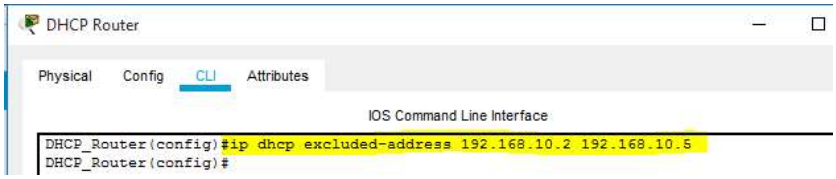


Fig: Command used to exclude IP range

Step-4:

The interface of the router connected with the switch is assigned with the IP address defined as the default router during the DHCP configuration. This route will be taken by the data packets to reach their destination system. Also, the 'no shutdown command is used to change the state of the connected interface to up.

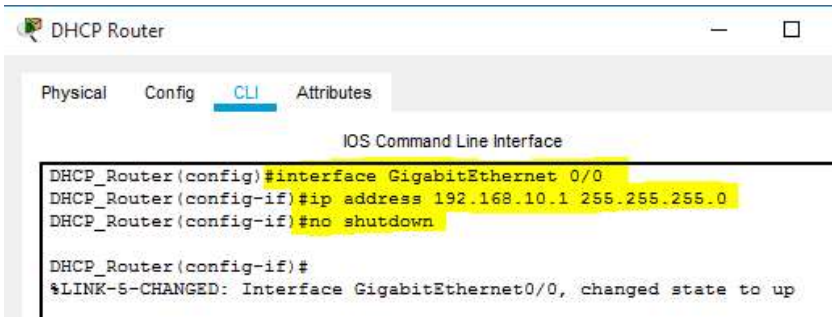


Fig: Assigning of IP address to router's interface

Step-5:

A successful connection is established between all the devices connected in a network. In further steps, host systems in the network are assigned with dynamic IP and default gateway address by the DHCP service configured on the router.

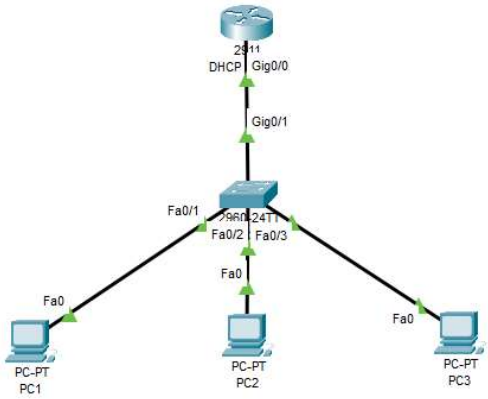


Fig: All the devices are successfully connected

Step-6:

Desktop settings of a host system are accessed and the DHCP option is selected. DHCP request forwarded by the system is acknowledged and IP address, associated subnet mask, and default gateway address are assigned to it.

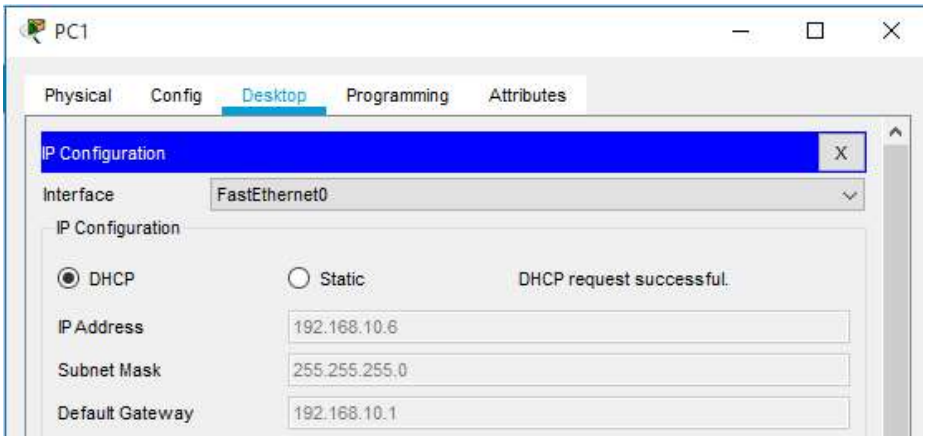


Fig: The dynamic IP address assigned to the Host System

Another host system deployed in the network is assigned with required logical addresses through the DHCP server configured on Cisco Router. In addition, IP addresses defined in the excluded range are not assigned to the computer systems.