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Assignment No	Eight

Assignment Number - 08

Title : Installation and configuration of DHCP server for Linux/Windows.

Problem Statement : Configure a server with Dynamic Host Configuration Protocol (DHCP). Connect different nodes with DHCP server and show that all nodes autoconfigure with DHCP.

Theory :

DHCP stands for Dynamic Host Configuration Protocol. It is the critical feature on which the users of an enterprise network communicate. DHCP helps enterprises to smoothly manage the allocation of IP addresses to the end-user clients' devices such as desktops, laptops, cellphones, etc. is an application layer protocol.

DHCP helps in managing the entire process automatically and centrally. DHCP helps in maintaining a unique IP Address for a host using the server. DHCP servers maintain information on TCP/IP configuration and provide configuration of address to DHCP-enabled clients in the form of a lease.

How DHCP works

DHCP runs at the application layer of the TCP/IP stack. It dynamically assigns IP addresses to DHCP clients and allocates TCP/IP configuration information to DHCP clients. This information includes subnet mask information, default gateway IP addresses and domain name system (DNS) addresses.

DHCP is a client-server protocol in which servers manage a pool of unique IP addresses, as well as information about client configuration parameters. The servers then assign addresses out of those address pools. DHCP-enabled clients send a request to the DHCP server whenever they connect to a network.

Clients configured with DHCP broadcast a request to the DHCP server and request network configuration information for the local network to which they're attached. A client typically broadcasts a query for this information immediately after booting up. The DHCP server responds to the client request by providing IP configuration information previously specified by a network administrator. This includes a specific IP address, as well as a time period -- also called a lease -- for which the allocation is valid.

When refreshing an address assignment, a DHCP client requests the same parameters, but the DHCP server may assign a new IP address based on policies set by administrators. DHCP clients can also be configured on an Ethernet interface.
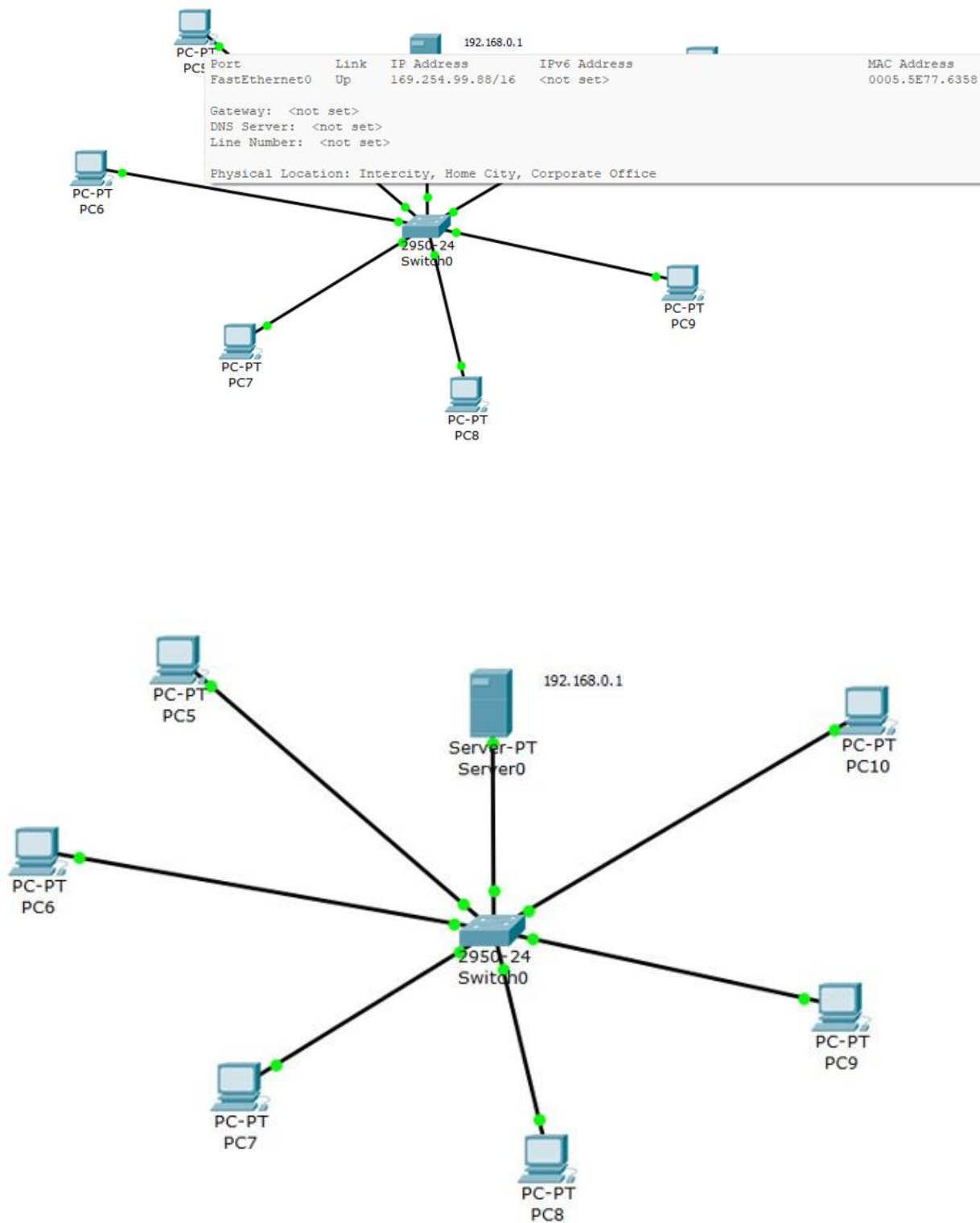
DHCP SERVER with two ethernet Port
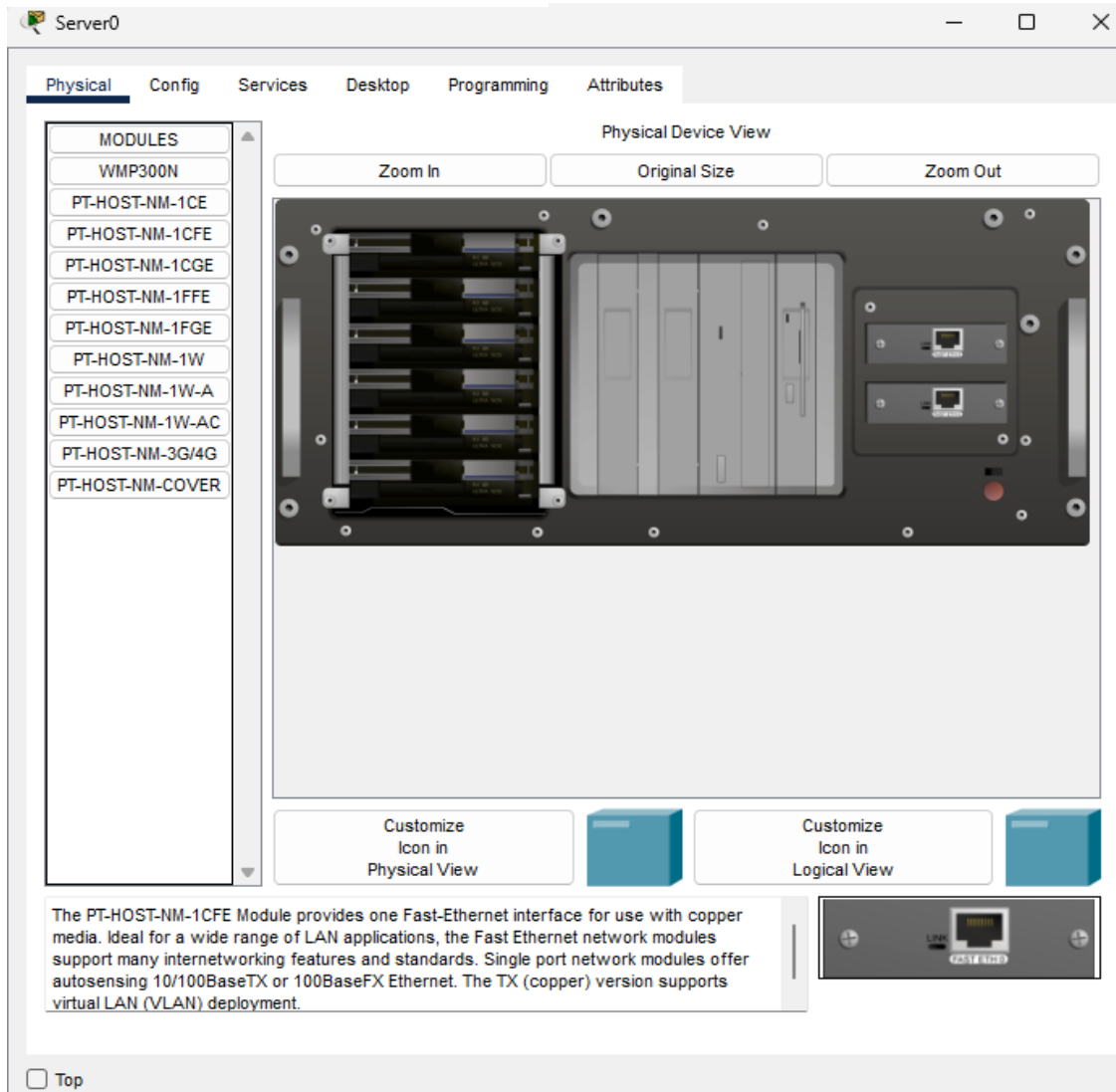
DHCP SERVER with two ethernet port where one port for LAN service and other for WAN connectivity.

Figure :DHCP service configuration

Port	Link	IP Address	IPv6 Address	MAC Address
FastEthernet0	Up	169.254.99.88/16	<not set>	0005.5E77.6358

Gateway: <not set>
DNS Server: <not set>
Line Number: <not set>

Physical Location: Intercity, Home City, Corporate Office

Conclusion : Through this DHCP server configuration assignment, I gained crucial insights into how IP address management works in modern networks. By setting up a DHCP server with multiple ethernet ports, I learned how the protocol automatically assigns IP addresses and network configuration parameters to client devices, eliminating the need for manual configuration. The practical implementation helped me understand the client-server interaction in DHCP, including the lease concept and how clients request and receive network configurations. This hands-on experience with DHCP server configuration has shown me how essential this protocol is for managing large networks efficiently, as it significantly reduces administrative overhead and prevents IP address conflicts. The knowledge gained will be particularly valuable in enterprise environments where dynamic IP management is crucial for network operations.