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LAB # 04: HUB, BRIDGE, DHCP AND DNS CONFIGURATION

1. HUB

HUB is a device that is used to interconnect multiple machines to create a network. HUB is considered as **"Multi-port repeater"** that accepts data on one port and broadcast it on rest of the ports it is not an intelligent device and doesn't care where the data is coming and what its destination is.

Figure 1.Hub

In order to make a network using hub, carry out the following steps:

1) Open Packet Tracer
2) Select "HUB" from the list of devices visible at the bottom of packet tracer interface.
3) Below is a screen shot with HUB marked with red.

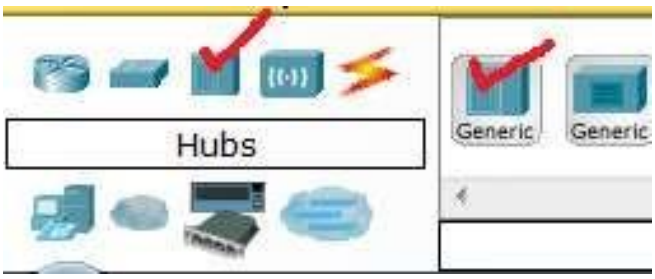

Figure 2. Select Device

4) Drag and Drop the HUB on main working area.
5) Now click on the HUB, you will see following image.

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Figure 3. Ports in Hub

6) Here the hub has 6 ports installed with provision of 4 extra ports.
7) You can select and add the ports visible on left of the screen under the title "modules"

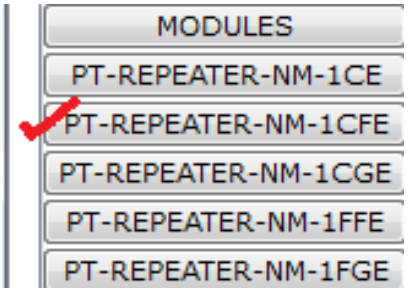

Figure 4. Modules in Hub

E is for Ethernet
FE is for Fast Ethernet
GE is for Gigabit Ethernet
FFE is for Fiber Fast Ethernet
FGE is for Fiber Gigabit Ethernet

8) Now select 3 PCs and a server from "End Devices" your work area will look like this.

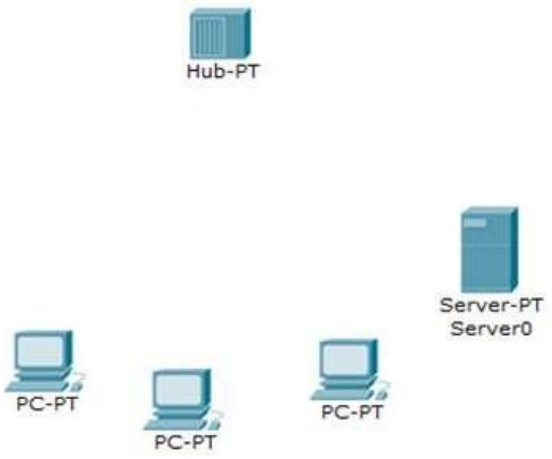

Figure 5. Place Devices

9) Choose "Connection Type" to connect these devices with HUB.

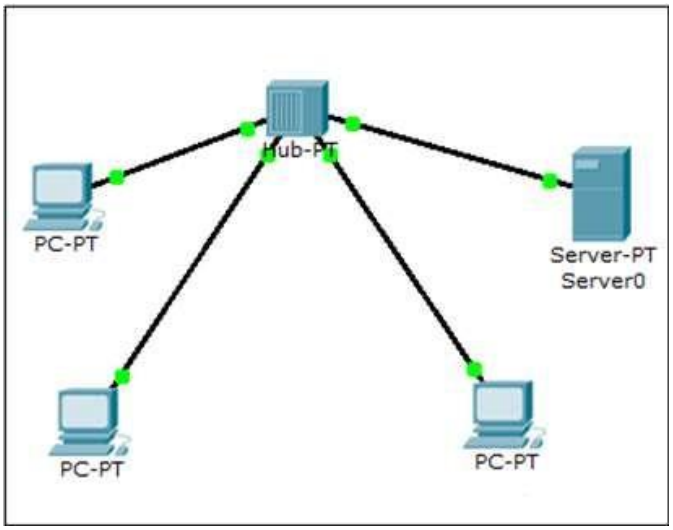

Figure 6. Connect Devices

10) Now click on all three PCs
11) Go to "DESKTOP"
12) Then "IP CONFIGURATION"
13) Here select option "DHCP" instead of assigning IP Address Statically
14) Now click the Server
15) The screen you will see will look some thing like this:

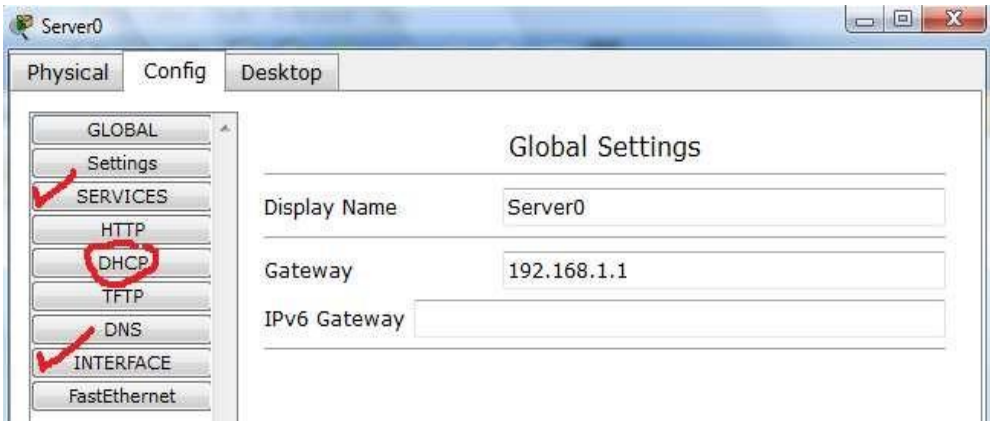

Figure 7. Server Settings

16) Above diagram shows the screen which you will see on clicking "SERVER" Machine.
17) Here go to Fast Ethernet placed just under Interface marked with red.
18) After clicking "Fast Ethernet" you will see following window. Here assign IP ADDRESS to this SERVER.

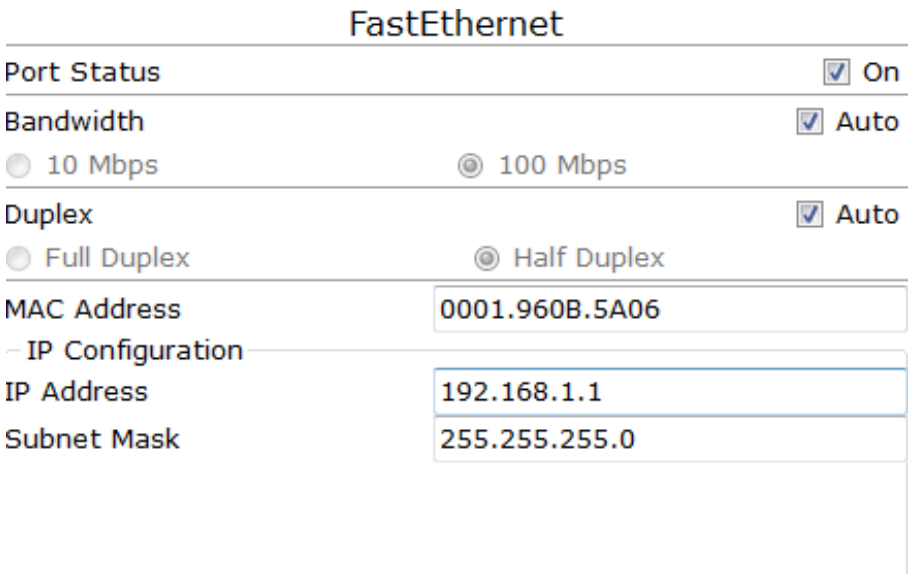

Figure 8. Set IP

19) Now click "DHCP" to make this server a DHCP server.

Figure 9. DHCP Server

20) DHCP is "Dynamic Host Control Protocol" a DHCP server is responsible for Assigning IP Addresses to the devices present in the Network from its pool. This Concept can be seen in the image shown below.

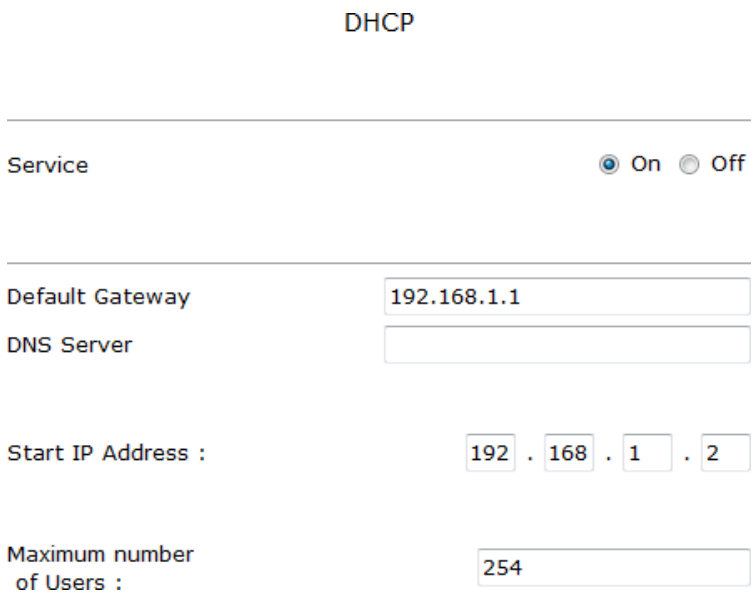

Figure 10. Turn on Service

21) now each device will take IP from DHCP

22) Send packet from source to destination.

23) Send DNS packet

24) If not successful create a DNS server Just like you have created DHCP server

25) Assign it IP Address.

26) Mention this IP Address of DNS at DHCP server as well. Look at the above screen shot there the slot of DNS server is empty, because we have no DNS server in our network but once you will introduce a DNS server you will have to give its Address at DHCP server shown in above diagram

27) Now after creating DNS server the DNS Packets should also travel successfully

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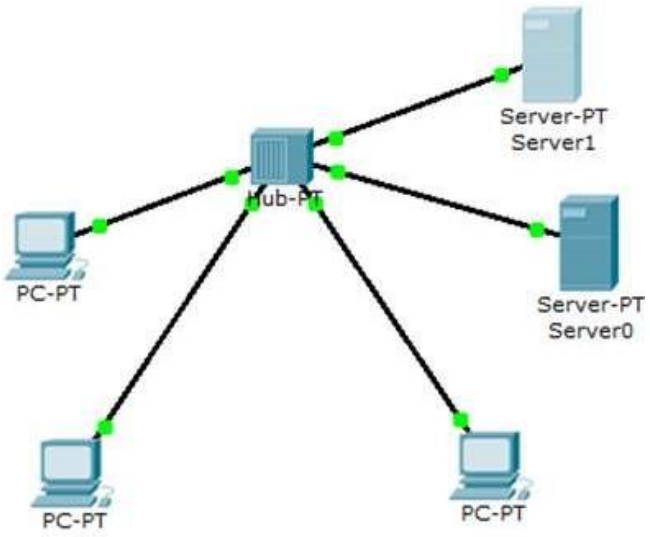

Figure 11. DNS and DHCP Server

Above SERVER 1 is DNS server and SERVER 0 is DHCP

2. CONFIGURATION OF DNS

DNS is" Domain Name Services" server the main purpose of this server is to resolve domain name against its allocated IP address. Humans can recognize a name that's why we give names to web sites or locations in networks but actual destination is located through IP address which is a sequence of numbers and is very difficult for an individual to remember.

Example: It is easy to remember **www.yahoo.com** then 87.248.113.14

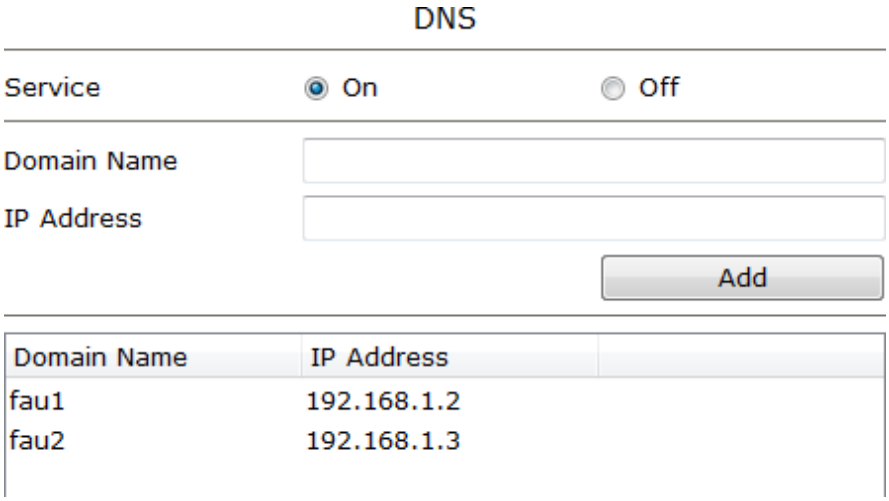

Figure 12. DNS Service

GO TO "FAST ETHERNET" of DNS and assign this server IP address **192.168.1.8**

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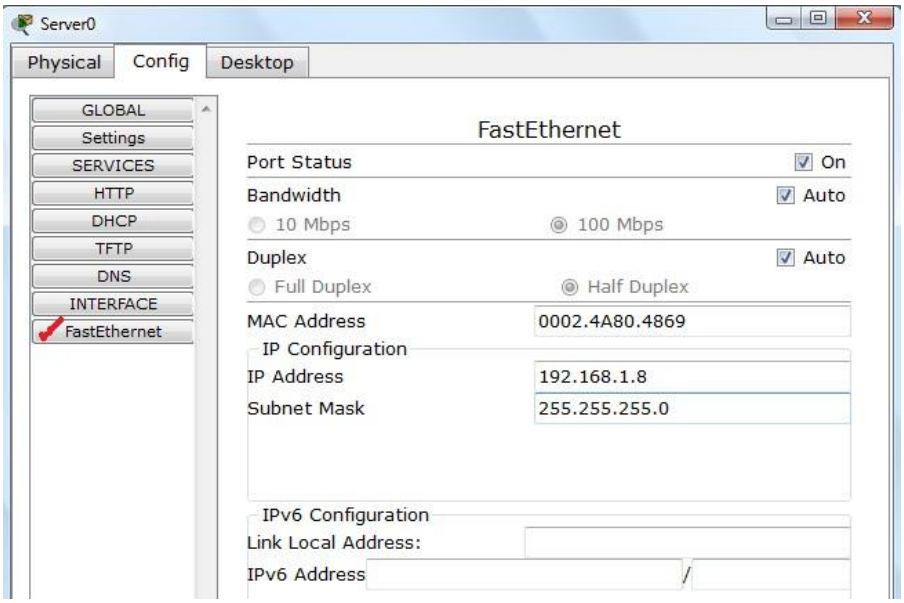

Figure 13. Set IP

3. BRIDGE

A **network bridge** helps to join two otherwise separate computer networks together to enable communication between them. Bridge devices are used with local area networks (LANs) for extending their reach to cover larger physical areas.

Bridge devices inspect incoming network traffic and determine whether to forward or discard it according to its intended destination. An Ethernet bridge, for example, inspects each incoming Ethernet frame - including the source and destination MAC addresses, and sometimes the frame size - in making individual forwarding decisions. Bridge devices operate at the data link layer (Layer 2) of the OSI model.

Types of Network Bridges

Several different kinds of bridge devices exist, each designed for specific kinds of networks including

- Wireless bridges - support Wi-Fi wireless access points
- Wi-Fi Ethernet bridges - allows connecting Ethernet clients and interfacing them to a local Wi-Fi network, useful for older network devices that lack Wi-Fi capability

Bridges vs. Switches and Routers

In wired computer networks, bridges serve a similar function as network switches. Traditional wired bridges support one incoming and one outgoing network

connection (accessible through a hardware port), whereas switches usually offer four or more hardware ports. Switches are sometimes called *multi-port bridges* for this reason.

Likewise, bridges lack the intelligence of network routers: Bridges do not understand the concept of remote networks and cannot redirect messages to different locations dynamically but instead support only one outside interface.

4. REPEATER

Network **repeaters** regenerate incoming electrical, wireless or optical signals. With physical media like Ethernet or Wi-Fi, data transmissions can only span a limited distance before the quality of the signal degrades. Repeaters attempt to preserve signal integrity and extend the distance over which data can safely travel.

Actual network devices that serve as repeaters usually have some other name.

Active hubs, for example, are repeaters. Active hubs are sometimes also called "multiport repeaters," but more commonly they are just "hubs." Other types of "passive hubs" are not repeaters. In Wi-Fi, access points function as repeaters only when operating in so-called "repeater mode."

Higher-level devices in the OSI model like switches and routers generally do not incorporate the functions of a repeater. All repeaters are technically OSI physical layer devices.

Bridges vs. Repeaters

Bridge and network repeater devices share a similar physical appearance; sometimes, a single unit performs both functions. Unlike bridges, however, repeaters do not perform any traffic filtering and do not join two networks together but instead pass along all traffic they receive. Repeaters serve primarily to regenerate traffic signals so that a single network can reach longer physical distances.

Lab 5

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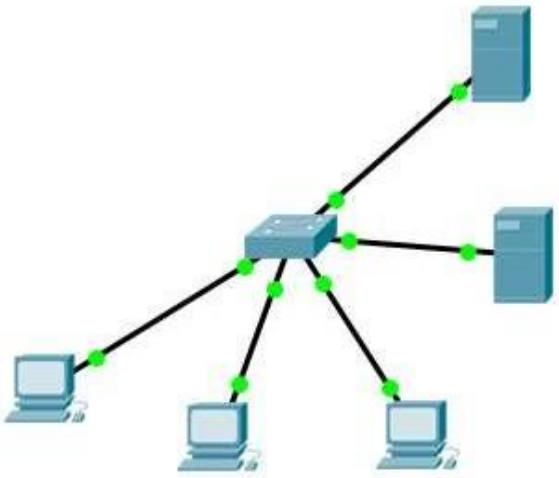
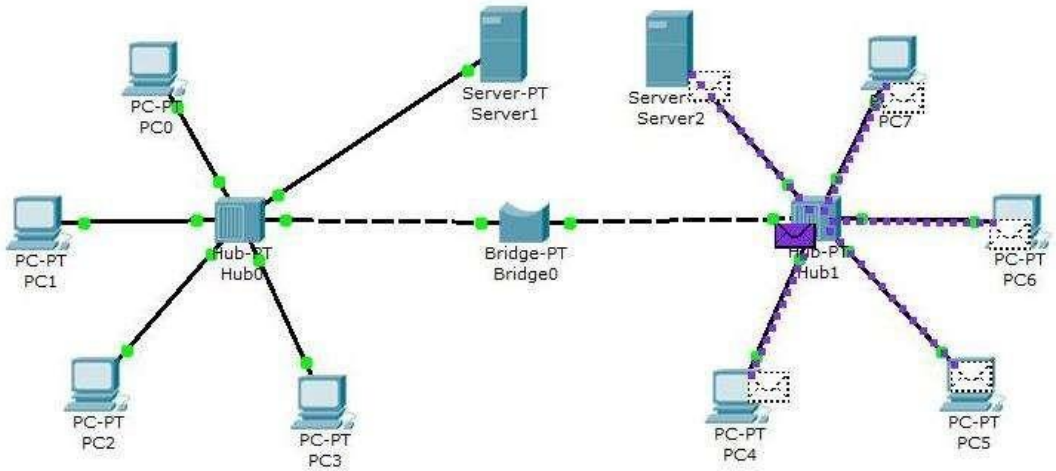
Lab Tasks

1. Create the following network with DHCP server. Send DNS packets in your network.



2. Create a network using Packet Tracer having eight PC with 4 of them in one broadcast domain and remaining 4 in other broadcast domain achieve this by using HUB and Bridge.
[HINT: HUB has single Broadcast and collision domain; broadcast domain mean all devices connected will receive data of every transaction, USE 2 HUB and 1 Bridge having 8 PCs in Network]
show steps in form of screen shots also explain the working of bridge.



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3. Solve the following IP Address exercises:

Change the following IP address from binary notation to dotted-decimal notation.

10000001 00001011 00001011 11101111

Change the following IP address from dotted-decimal notation to binary notation:

111.56.45.78