Department of Computer Science and Engineering

Islamic University of Technology (IUT)

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Laboratory Report

CSE 4412: Data Communication and Networking Lab

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Section	**:1A**
Semester	**:Summer**
Academic Year	**:2021-2022**
Date of Submission	**:23.01.2023**
Lab No	**:03**

Title: Create a simple basic LAN (Local Area Network)

Objective:

1. Create a simple LAN by connecting multiple end devices.
2. Significance of IP address
3. Difference between Switch and Hub.
4. Configure the given topology (see .pkt file in the attachment) to create LAN.

Devices/ software Used: We used Cisco Packet Tracer for this experiment.

Working Procedure: At first I used a copper straight through cable for connection between PCs and Switch. Each PC had a FastEthernet0 port. And the Switch had 5 FastEthernet ports. I connected the PC with the Switch through these ports. Each PC was connected to different ports of the Switch.

Then I assigned an IP address to each PC. To do so I clicked on each PC and from the Desktop option selected the IP Configuration Option. And then assigned the IP address. I assigned the first PCs IP address as 10.220.20.65, second PCs IP address as 10.220.20.60 and third PCs IP address as 10.220.20.55. After providing the IP addresses I pressed “Enter” and the subnet masks were automatically provided with a default address of 255.255.255.0. The first three bytes of the IP address of each PC were identical.

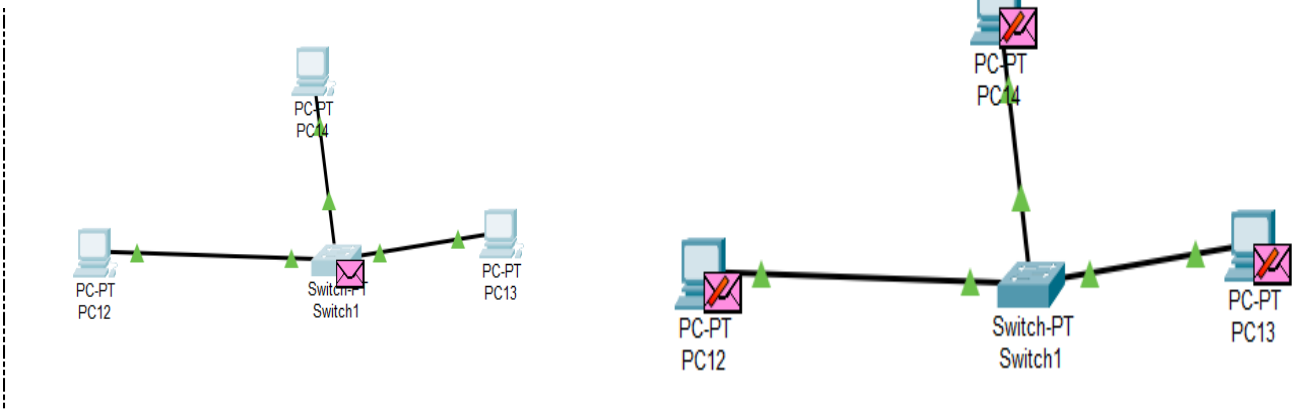
I repeated the same process to connect PCs with the hub.

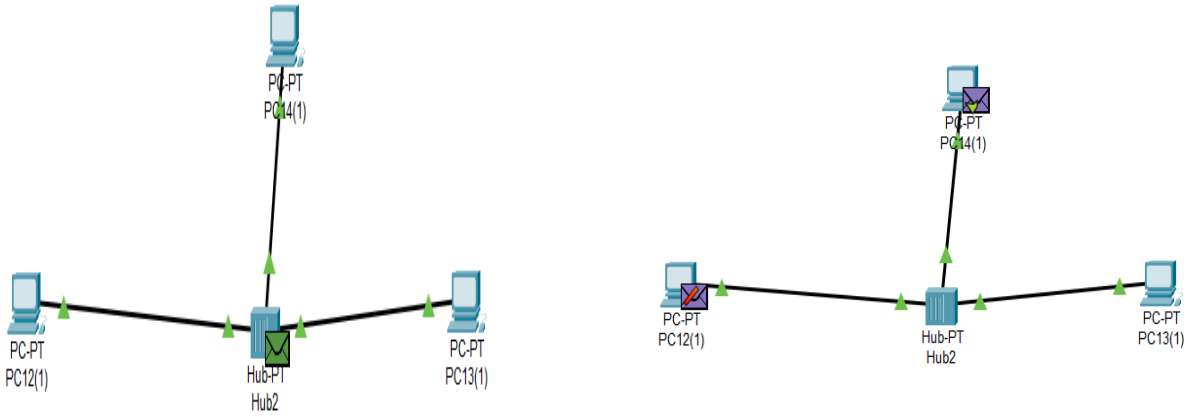
After setting up the structure, I clicked on the simulation button. From the ‘Edit Filter’ option I selected only the ICMP option under the IPv4 menu.

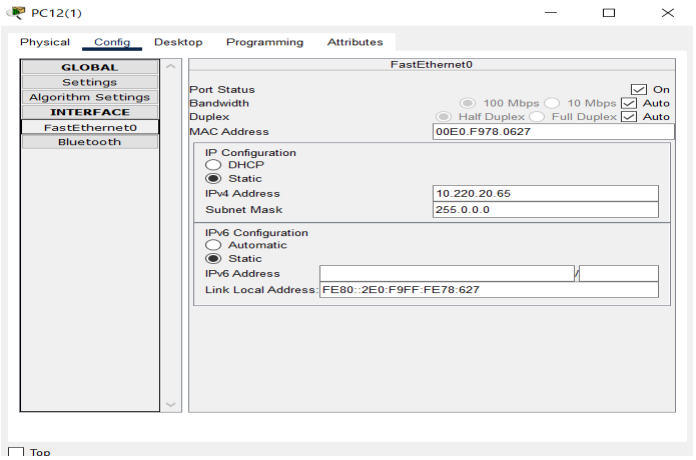
Then I selected a random PC. From the desktop of the PC. I clicked on the command prompt. Using the ping command I transferred packets from an end device to another end device.

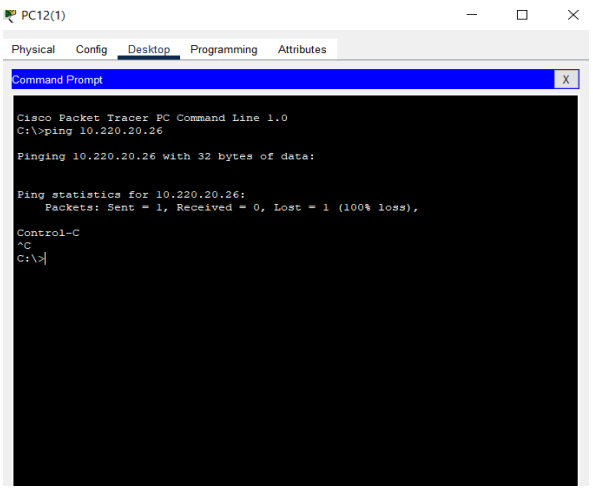
After that I repeated the whole process in the rooms which were already provided, named room- 101,102,103.In the rooms, I used straight-through cable to connect the PC with the hub. I connected the rooms using a switch through cross-over cable.

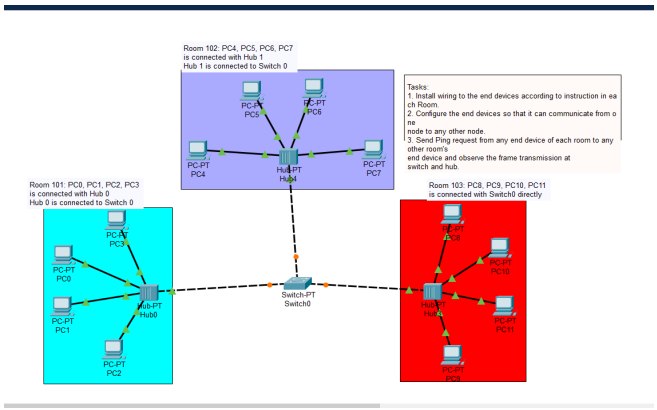
Diagram of the experiment:

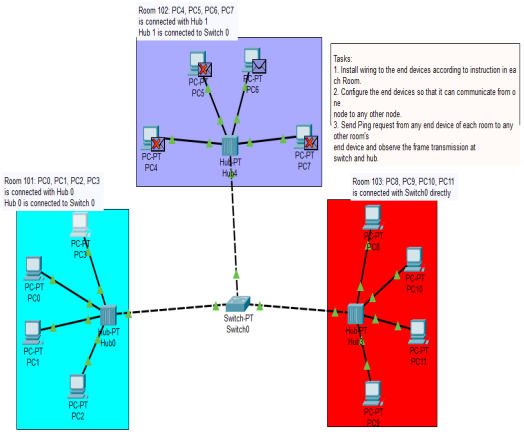





PC12(1)
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
00E0.F978.0627
IP Configuration
DHCP
Static
IPv4 Address
10.220.20.65
Subnet Mask
255.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address:
FE80::2E0:F9FF:FE78:627
Top


PC12(1)
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.220.20.26
Pinging 10.220.20.26 with 32 bytes of data:
Ping statistics for 10.220.20.26:
Packets: Sent = 1, Received = 0, Lost = 1 (100% loss),
Control-C
^C
C:\>


Room 102: PC4, PC5, PC6, PC7
is connected with Hub 1
Hub 1 is connected to Switch 0
Tasks:
1. Install wiring to the end devices according to instruction in ea
ch Room.
2. Configure the end devices so that it can communicate from o
ne
node to any other node.
3. Send Ping request from any end device of each room to any
other room's
end device and observe the frame transmission at
switch and hub.
Room 101: PC0, PC1, PC2, PC3
is connected with Hub 0
Hub 0 is connected to Switch 0
Room 103: PC8, PC9, PC10, PC11
is connected with Switch0 directly
PC-PT PC4
PC-PT PC5
PC-PT PC6
PC-PT PC7
Hub-PT Hub1
PC-PT PC3
PC-PT PC0
PC-PT PC1
PC-PT PC2
Hub-PT Hub0
Switch-PT Switch0
PC-PT PC8
PC-PT PC10
PC-PT PC11
PC-PT PC9
Hub-PT Hub2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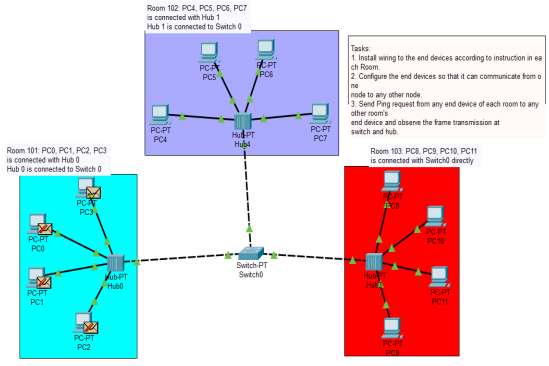
PC-PT PC6
PC-PT PC7
Hub-PT Hub1
PC-PT PC3
PC-PT PC0
PC-PT PC1
PC-PT PC2
Hub-PT Hub0
Switch-PT Switch0
PC-PT PC8
PC-PT PC10
PC-PT PC11
PC-PT PC9
Hub-PT Hub2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PC-PT PC2
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Switch-PT Switch0
PC-PT PC8
PC-PT PC10
PC-PT PC11
PC-PT PC9
Hub-PT Hub2

Observation:

Significance of IP address configuration to different end devices:

In this experiment we learned about IP addresses and subnet masks.

An IP address is a 32-bit number which uniquely identifies a host.
IP addresses are normally expressed in dotted-decimal format, with four numbers separated by periods, such as 10.220.20.65 .The IP address is the decimal representation of 32 bit binary notation. In the binary notation each part is replaced by an octet.

Each IP address is divided into two parts.One part is the network address and the other part is the host address. In the IP address 10.220.20.65, 10.220.65.0 is the network address and 0.0.0.65 is the host address.

A subnet mask is used to divide an IP address into these two parts. The subnet mask is 255.255.255.0 in this experiment. 255 can be represented in binary notation as 11111111. So, the subnet mask is 11111111.11111111.11111111.00000000.

By performing logical AND operation between the IP address and the subnet mask, the network and host part of the address are separated. The first 24 bits are identified as the network address. The last 8 bits are identified as the host address.

When we send packets through routers , the devices that pass packets of data between networks don't know the exact location of a host. They only know what network the host is a member of. So they send the packets to the appropriate destination network and from that network, the packet is delivered to the appropriate host.

This is why the network address of the devices in the same LAN must be the same.

Difference between Switch and Hub:

When using hub, hub receives packets from a PC and then transmits it to all others PCs in the LAN. This is called flooding. The other PCs except the destination PC reject the packets. But the destination PC receives the packet and sends an acknowledgment back to the hub.The hub again sends the acknowledgment back to all the PCs except the destination PC.

But the switch does not perform flooding. Switch is rather an intelligent device which sends packets only to the destination.

Challenges:

I learned about IP addresses, subnet mask and flooding for the first time. So it was a bit difficult for me to understand the concepts. I researched about them a bit to learn well. Moreover, I found some errors while doing the tasks. I faced some difficulties connecting wires properly. With practice I could overcome those. I look forward to learning more about these topics in a brief manner.