

## Assignment-01

- \* Title: To setup a wired LAN using layer 2 switch & then IP switch of minimum four computers.
- \* Problem Statement:
  - A). Setup a wired LAN using layer 2 switch & then IP switch of minimum four computers. It includes preparation of cable, testing of cable using line tester, configuration machine using IP address, testing using PING utility & demonstration of PING packets captured traces using Wireshark packet Analyser.
  - B). Find the same assignment for wireless using access point.
- \* Software Requirements:
  - Windows 10 OS, Intel i5 processor, Cisco packet Tracer, Wireshark tool.
- \* Theory:-
  - Types of LAN:
    - A local area network (LAN) is a computer network that interconnects computers within a limited area such as a residence, school, laboratory, university campus or office building and has its network equipment & interconnects locally managed.

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Ethernet & wi-fi are the 2 most common transmission technologies in use.

• Ethernet LAN:

Ethernet is the most popular physical layer LAN technology in use today. It defines the number of conductors that are required for a connection.

A standard ethernet network can transmit data at a rate upto 10 megabits per second (10 Mbps). Other LAN types include Token Ring, Fast Ethernet, Gigabit Ethernet, 10 Gigabit Ethernet, Fiber Distributed Data Interface (FDDI).

• Fast Ethernet:

The fast Ethernet (standard IEEE 802.3u) has been established for Ethernet networks that need higher transmission speeds. This standard raises the ethernet speed limit from 10Mbps to 100 Mbps with only minimal changes to the existing cable structure.

• Gigabit Ethernet:

It was developed to meet the need for faster communication networks with applications such as multimedia & voice over IP (VoIP). It is defined in the IEEE 802.3 standard and is currently used as an enterprise backbone.

• 10 Gigabit Ethernet:

It is the fastest and most recent of the

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Ethernet standards IEEE 802.3ae defines a version of ethernet with a nominal rate of 10 Gbits/s, that with makes it 10 times faster than gigabit ethernet.

### IP Switching

Internet Protocol switching, for more commonly referred to as IP switching, is a routing technique which routes data packets faster than traditional routing by using layer-3 switches.

IP switching is performed by implementing layer-3 switches which employ Application Specific Integrated Circuit (ASIC) hardware & transferring via Asynchronous Transfer Mode (ATM) switches.

### Cable Testing

Cable test instruments are designed with a variety of focused features for particular field tasks. They vary in price, performance and applications. Depending on the task, the field test instrument performs. It can be classified with one of three hierarchical groups: certification, qualification, or verification.

### Wireshark Packet Analyser Tool

Wireshark, a network analyser tool formally known as Ethereal, captures packets in real time and displays them in human-readable format. It includes filters, color-coding and other features that



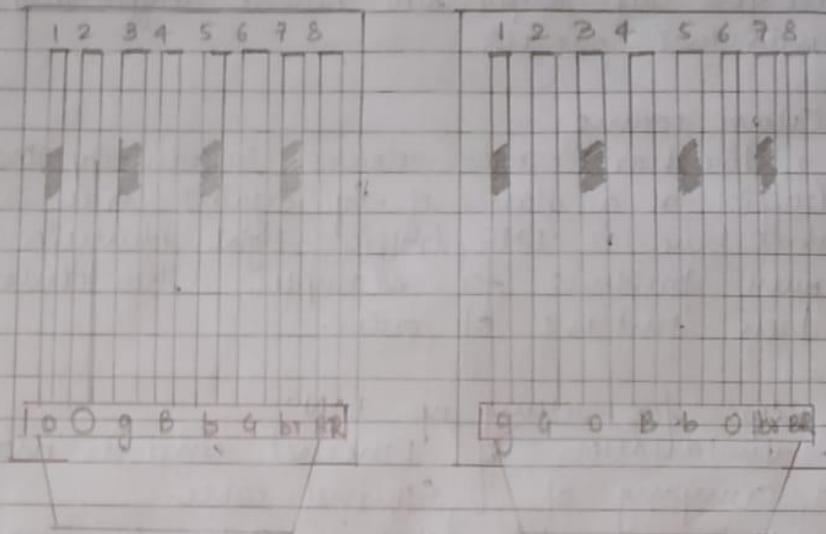
let you dig deeper into network traffic and inspect individual packets.

Colour coding:

Wireshark uses colours to identify the types of traffic at a glance of. By default, green is TCP traffic, dark blue is DNS traffic, light identifies TCP packets with problems for example, they could have been sent out of order.

#### • Steps for setting up LAN:

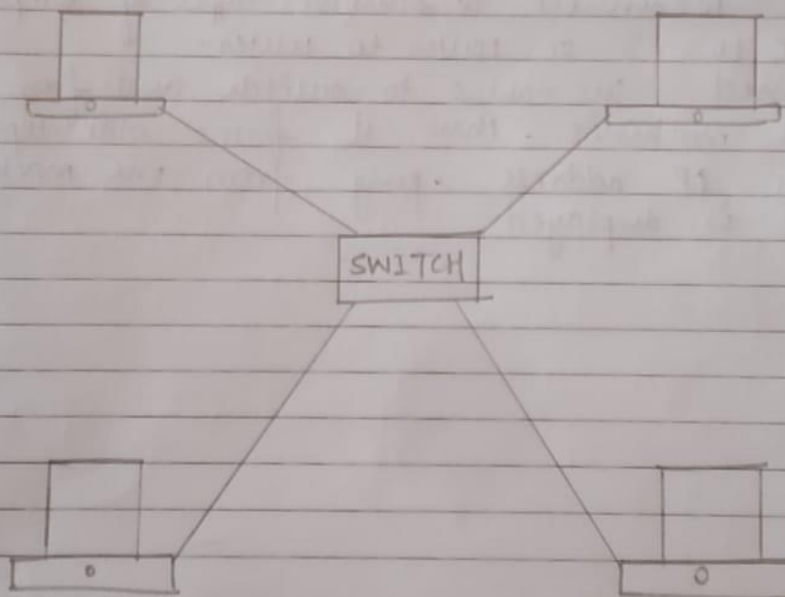
- Installation of Ethernet card in machine.
- Crimping of Ethernet cable.
- Make straight cable in order to form star topology network to connect 2 different types of components eg, PC to switch or PC to router.
- Make cross cable in order to form star topology network to connect 2 similar types of components eg PC to PC or router to router.
- Connect the cables to switch and from switch to the machines. Thus, it forms star topology.
- Assign IP address. ping from one machine message is displayed.



Straight-through

Cross-over

Star topology can be created

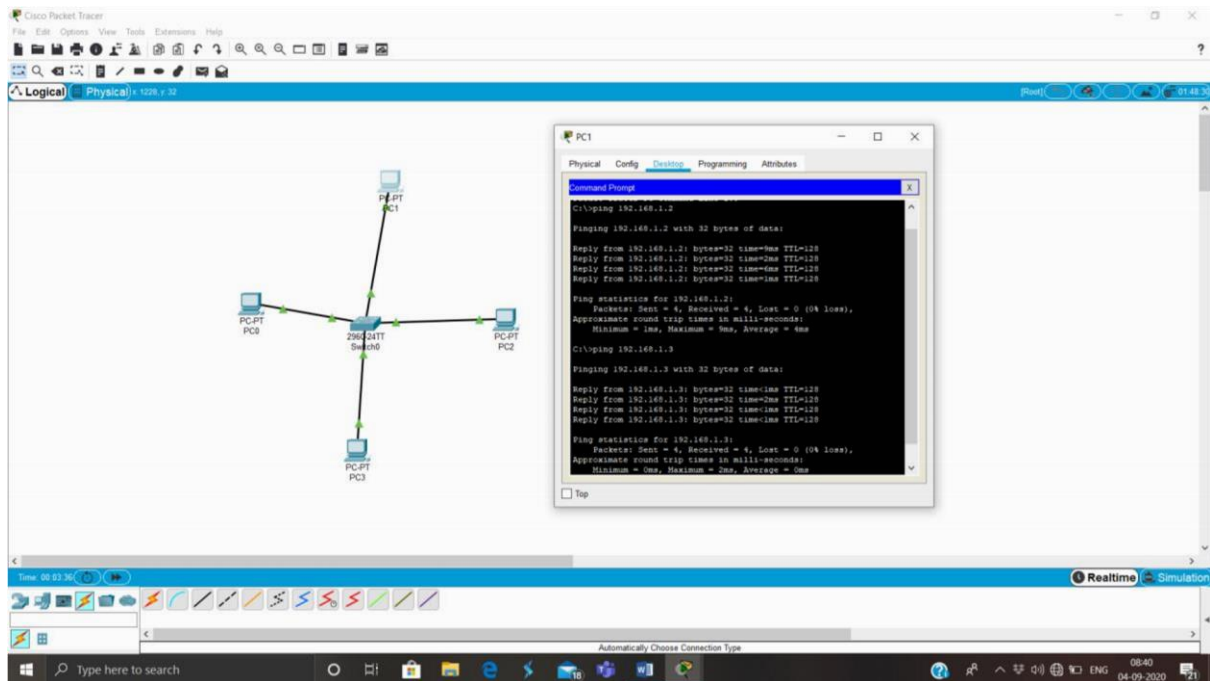


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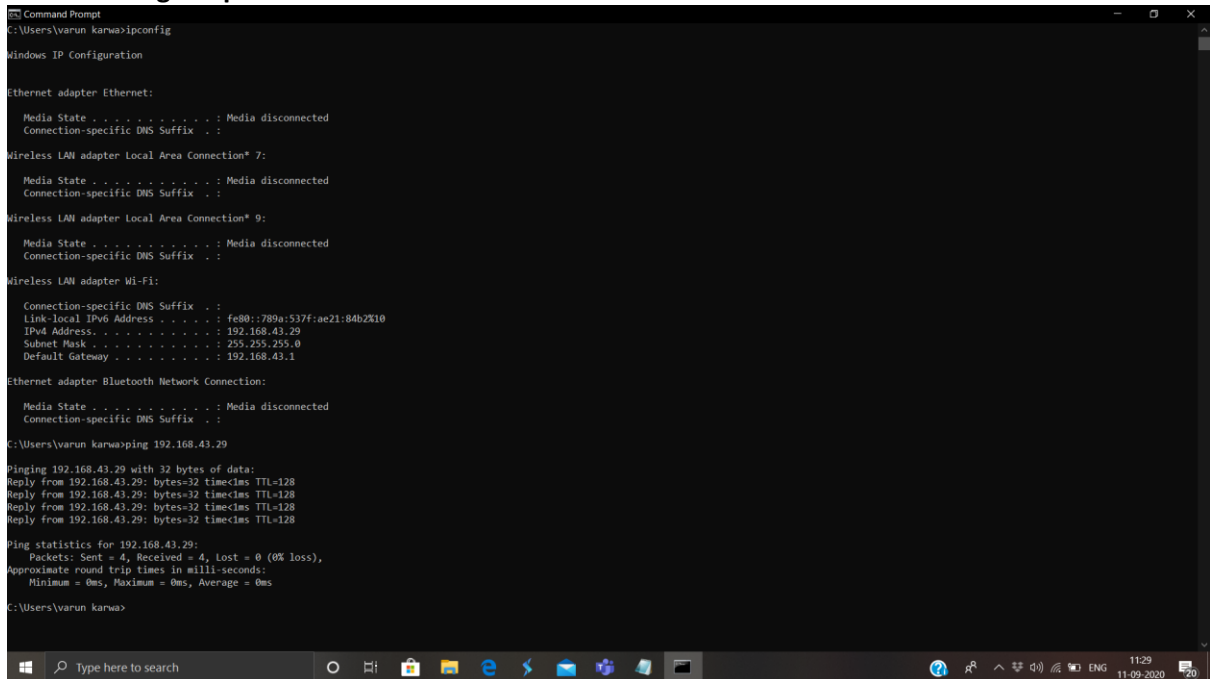
\* Conclusion:

Thus we implemented a wired LAN using layer 2 switch. We also implemented/understood the structure & working of various networks including interconnecting devices used.

## Testing by PING and Output:



## Wireless Ping Output:



## Wireshark Output:

The image shows a Wireshark capture of network traffic on a Wi-Fi interface. The packet list pane displays several packets, with packet 66 selected. The packet details pane shows the structure of the selected packet, and the packet bytes pane shows the raw data in hexadecimal and ASCII.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.43.29	111.111.111.111	TCP	66	54035 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM=1
2	1.000514	192.168.43.29	111.111.111.111	TCP	66	[TCP Retransmission] 54035 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM=1
3	2.204676	192.168.43.29	52.114.7.134	TLSv1.2	110	Application Data
4	2.376718	52.114.7.134	192.168.43.29	TLSv1.2	99	Application Data
5	2.417851	192.168.43.29	52.114.7.134	TCP	54	53937 → 443 [ACK] Seq=57 Ack=46 Win=258 Len=0
6	3.001319	192.168.43.29	111.111.111.111	TCP	66	[TCP Retransmission] 54035 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM=1
7	3.776328	192.168.43.29	52.114.14.131	TCP	54	54020 → 443 [FIN, ACK] Seq=1 Ack=1 Win=253 Len=0
8	3.906862	52.114.14.131	192.168.43.29	TCP	54	443 → 54020 [FIN, ACK] Seq=1 Ack=2 Win=2048 Len=0
9	3.906958	192.168.43.29	52.114.14.131	TCP	54	54020 → 443 [ACK] Seq=2 Ack=2 Win=253 Len=0
10	6.717508	IntelCor_18:bc:12	XiaomiCo_75:78:ab	ARP	42	Who has 192.168.43.1? Tell 192.168.43.29
11	6.721558	XiaomiCo_75:78:ab	IntelCor_18:bc:12	ARP	42	192.168.43.1 is at d8:32:e3:75:78:ab
12	6.982309	192.168.43.29	192.168.43.255	UDP	212	53155 → 6646 Len=170
13	7.027613	192.168.43.29	111.111.111.111	TCP	66	54036 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM=1

Frame 1: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface \Device\NPF\_{61601087-1161-4E27-8908-7949E7D58644}, Id 0  
> Ethernet II, Src: IntelCor\_18:bc:12 (3c:f0:11:18:bc:12), Dst: XiaomiCo\_75:78:ab (d8:32:e3:75:78:ab)  
> Internet Protocol Version 4, Src: 192.168.43.29, Dst: 111.111.111.111  
> Transmission Control Protocol, Src Port: 54035, Dst Port: 80, Seq: 0, Len: 0

0000 d8 32 e3 75 78 ab 3c f0 11 18 bc 12 08 00 45 00 -2 ux <: .....E-  
0010 00 34 52 03 40 00 00 06 00 00 c0 a8 2b 1d 6f 6f -4R @: ....+oo  
0020 6f 6f d3 13 00 50 b1 6d 1f a3 00 00 00 00 02 oo: P m .....  
0030 fa f0 ca ca 00 00 02 04 05 b4 01 03 03 08 01 01 .....  
0040 04 02 ..