

Assignment - 1

Title - To setup a wired LAN using layer 2 switch and then IP switch of minimum four computers.

Problem Statement -

A. Setup a wired LAN using layer 2 switch and then I.P switch of minimum four computers.

It includes preparation of cable, testing of cable using line tester, configuration machine using IP addresses, testing using PING utility and demonstrate the PING packets captured traces using Wireshark Packet Analyser.

B. Extend the same assignment for wireless using access point.

Software / Hardware Requirements -

Windows 10 OS, Intel i7 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 and interconnects locally managed.

Ethernet and Wi-Fi are the two most common transmission technologies in use for.

- 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 transfer data at a rate upto 10 megabits per second (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 10 Mbps to 100 Mbps with only minimal changes to the existing cable structure.

- Gigabit Ethernet -

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

- 10 Gigabit Ethernet -

10 Gigabit ethernet is the fastest and most recent of Ethernet standards. IEEE 802.3ae defines a version of ethernet with a nominal rate of 10 Gbits/s, that 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 and 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 application. Depending on the task, the field test instrument performs, it can be classified into one of three hierarchical groups: certification, qualifications or verification.

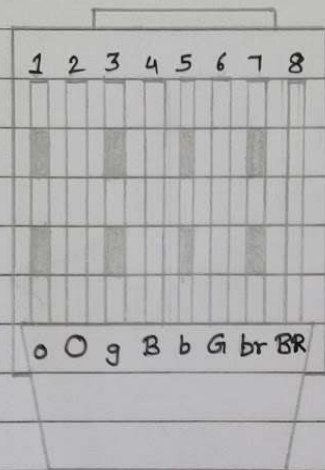
Wireshark Packet Analyzer Tool-

Wireshark, a network analysis tool formerly known as Ethereal, captures packets in real time and displays them in human-readable format. Wireshark includes filters, color-coding and other features that let you dig deeper into network traffic and inspect individual packets.

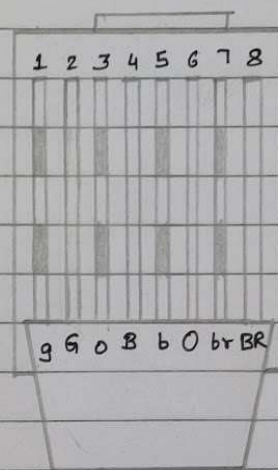
Colour Coding: Wireshark uses colours to identify the types of traffic at a glance. By default, green is TCP traffic, dark blue is DNS traffic, light blue is UDP traffic, and black identifies TCP packets with problems, for example, they could have been sent out of order.

Steps for setting up LAN:

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

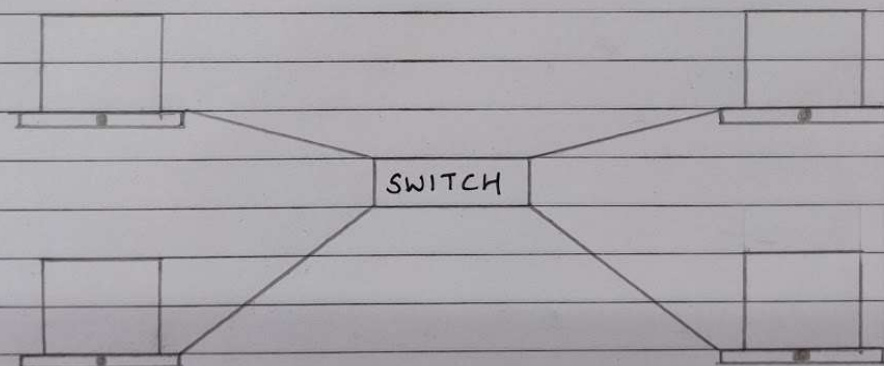


Straight - Through



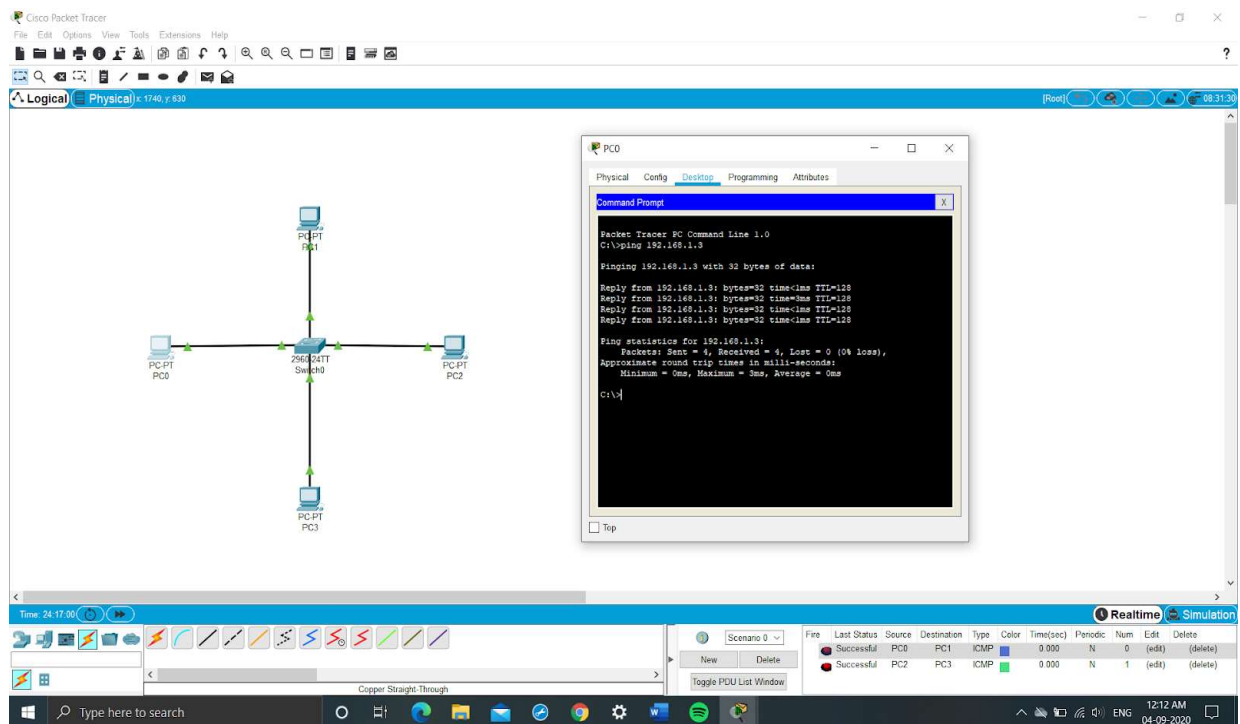
Cross - Over

Star Topology LAN created -

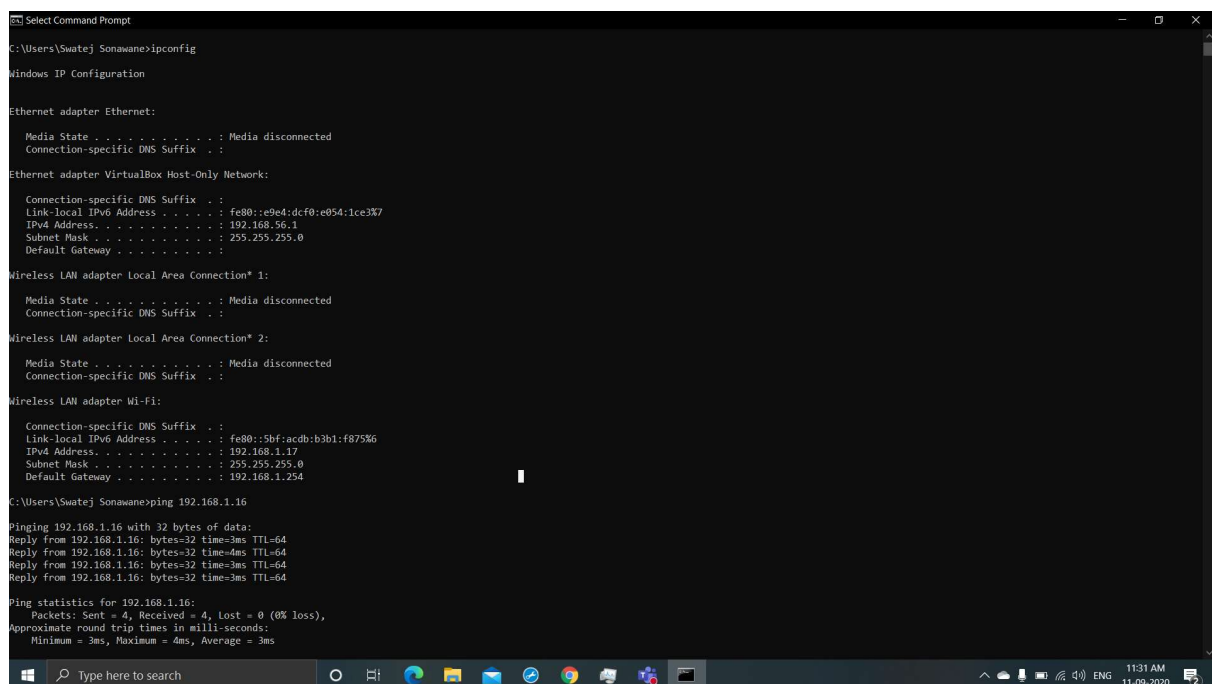


Conclusion -

Thus we implemented a wired LAN using Layer 2 switch. We also understood the structure and working of various networks.



WIRED LAN USING CISCO PACKET TRACER



WIRELESS LAN CONNECTION

Capturing from Wi-Fi

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter -- <Ctrl>F

No.	Time	Source	Destination	Protocol	Length	Info
4024	88.468409	52.114.2.30	192.168.43.138	UDP	183	3481 → 50041 Len=141
4025	88.468409	52.114.2.30	192.168.43.138	UDP	99	3481 → 50041 Len=57
4026	88.468569	52.114.2.30	192.168.43.138	UDP	87	3481 → 50041 Len=45
4027	88.469963	52.114.2.30	192.168.43.138	UDP	1198	3481 → 50041 Len=1156
4028	88.474150	52.114.2.30	192.168.43.138	UDP	1198	3481 → 50041 Len=1156
4029	88.474150	52.114.2.30	192.168.43.138	UDP	1198	3481 → 50041 Len=1156
4030	88.474150	52.114.2.30	192.168.43.138	UDP	1198	3481 → 50041 Len=1156
4031	88.474150	52.114.2.30	192.168.43.138	UDP	1198	3481 → 50041 Len=1156
4032	88.474439	52.114.2.30	192.168.43.138	UDP	1196	3481 → 50041 Len=1154
4033	88.479288	52.114.2.30	192.168.43.138	UDP	1103	3481 → 50041 Len=1061
4034	88.479519	52.114.2.30	192.168.43.138	UDP	1103	3481 → 50041 Len=1061
4035	88.480093	52.114.2.30	192.168.43.138	UDP	1103	3481 → 50041 Len=1061

> Frame 1: 145 bytes on wire (1160 bits), 145 bytes captured (1160 bits) on interface \Device\NPF_{48C3D0E3-A19B-4EFF-A980-3E8F9010C5B8}, id 0
> Ethernet II, Src: IntelCor_2e:d6:b4 (d8:3b:bf:2e:d6:b4), Dst: 6a:f2:b3:eb:42:85 (6a:f2:b3:eb:42:85)
> Internet Protocol Version 4, Src: 192.168.43.138, Dst: 52.114.2.30
> User Datagram Protocol, Src Port: 50021, Dst Port: 3480
> Data (103 bytes)

```
0000  6a f2 b3 eb 42 85 d8 3b bf 2e d6 b4 08 00 45 00  j---B---;.....E-
0010  00 83 1a a6 00 00 80 11 00 00 c9 a8 2b 8a 34 72  .....4r
0020  02 1e c3 65 0d 98 00 6f 23 43 ff 10 00 63 9c 5a  ...e--0#---c Z
0030  9a d2 f3 d3 29 b0 80 c9 00 06 00 00 a8 12 4c 48  ....})---LH
0040  53 1c 12 47 43 cc d2 d7 90 6d 82 31 cf fb b6 b6  S-GC---m-1--h-
0050  cc e8 1f 8b 0c d0 d0 a5 b8 91 ce d9 02 e9 d6 ab  .....
0060  7b 81 a7 83 57 f9 12 3d 00 84 d2 fb 0c 97 6a 50  {...W-=-...jP
0070  68 4b 82 bd c7 50 da 02 f3 35 7a 01 70 a3 1f c3  hK---P---52-p-
0080  dd d7 80 00 01 67 01 c4 e3 bb fd 5e 75 75 ad 3d  ....g---^uu=-
0090  89
```

Wi-Fi: <live capture in progress> | Packets: 4035 - Displayed: 4035 (100.0%) | Profile: Default

Type here to search

CAPTURING PACKETS USING WIRESHARK