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 Analyzer.

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 Gigbit 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, qpo qualifications or verfication.

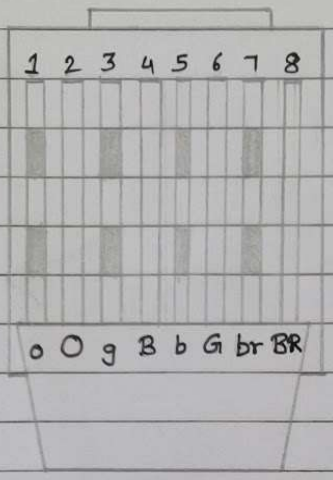
Wireshark Packet Analyzer Tool-

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.

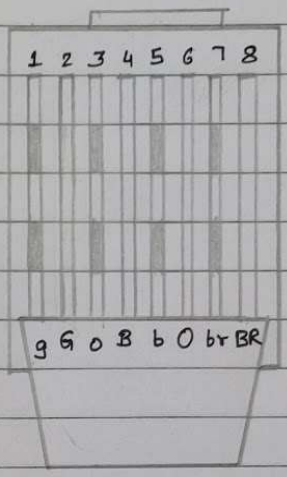
Colour coding: Wireshark uses colours to identify the types of traffic at a glance. By default, green is TCP traffic, dark blue is DNS traffic, light blue is UDP traffic, and black identifies TCP packets with problems, for example, they could have been sent out of order.

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 I.P. address, ping from one machine message is displayed.

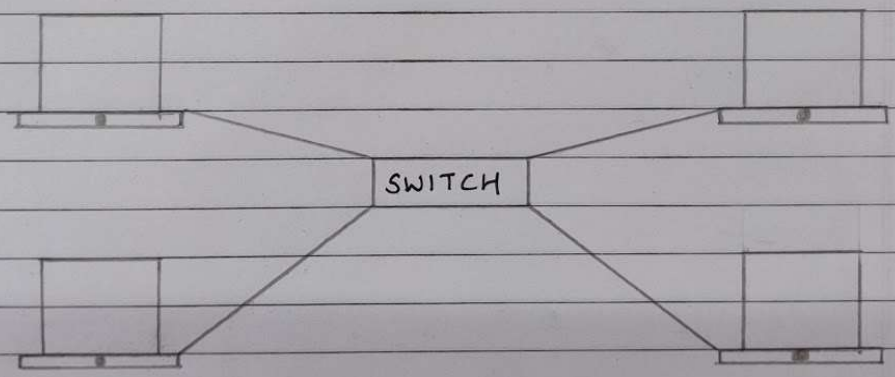


Straight - Through



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.