

Assignment 3

Aim: To setup a wired lan using a layer 2 Switch & then I.P. Switch of minimum 4 computers.

Problem Statement:

It includes preparation of cable, testing of cable using line tester, configuration machine using IP addresses, testing using PING utility & demonstrate the PING packets.

B. Extend the same assignment for wireless access point.

Prerequisites:

Knowledge of components such as Ethernet card, cable type, connection, topologies.

Theory:

Types of LAN

A local area network is a computer network that inter-connects computers within a limited area such as residence, school, library, etc.

- Ethernet LAN:

The most popular physical layer in LAN technology. A standard ethernet network can transmit data at rate upto 10mbps. Other LAN types include Token Ring,

fast Ethernet, Gigabyte Ethernet,
10 Gigabit Ethernet, FDDI.

- Fast Ethernet (standard IEEE 802.3u)
Ethernet speed is 100mbps with
minimal changes in existing cable
structure.

- Gigabit Ethernet:
It was developed to meet the
need for faster comm. networks
with applications such as multimedia
& Voice over IP (VoIP). It is
defined in the IEEE 802.3
standard & is used currently as
enterprise backbone.

- 10 Gigabyte Ethernet:
10 Gigabyte ethernet is the
fastest & the most recent of the
Ethernet standards. IEEE 802.3ae
defines a version of ethernet with
nominal rate of 10Gbits/s.

- IP Switching:
It is performed by implementing
layer-3 switches which employ
ASIC hardware & transferring
via ATM switches.

Cable Testing:

Cable test instruments are designed with a variety of focused features for particular field tasks. They vary in price performance & application. Depending on task the field test instrument performs it can be classified into certification, qualification or verification.

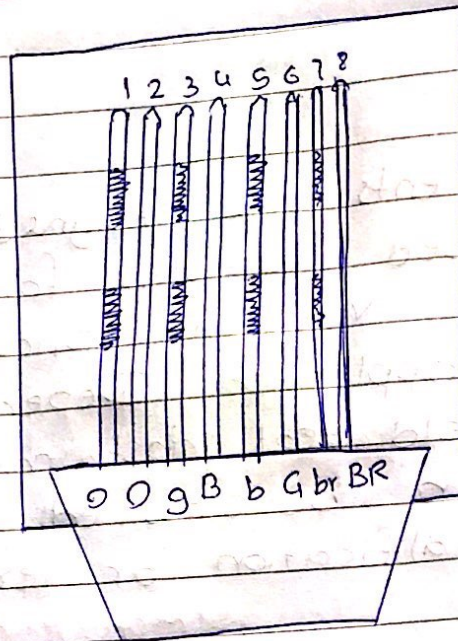
Wireshark Packet Analyzer Tool:

Wireshark (Ethereal) captures packets in real time & displays them in human readable format. It includes filters, colorcoding & other features that let you dig deeper into network traffic & inspect individual packets.

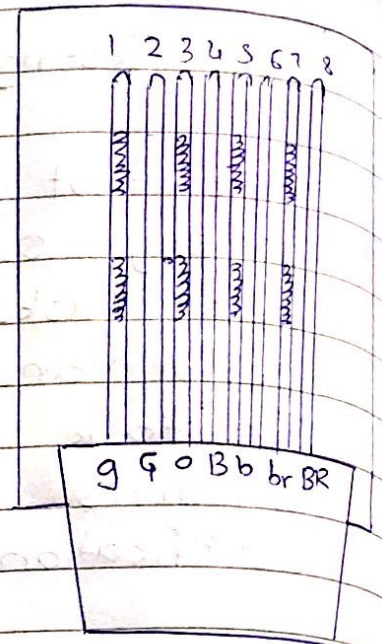
TCP traffic - green
DNS - dark blue
UDP traffic - light blue
TCP packets - black

Steps for setting up LAN:

- Installation of Ethernet card in machine
- Crimping of Ethernet cable
- PC to switch / PC to router.
- Connect cables to switch & switch to machines. Thus it forms Star topology

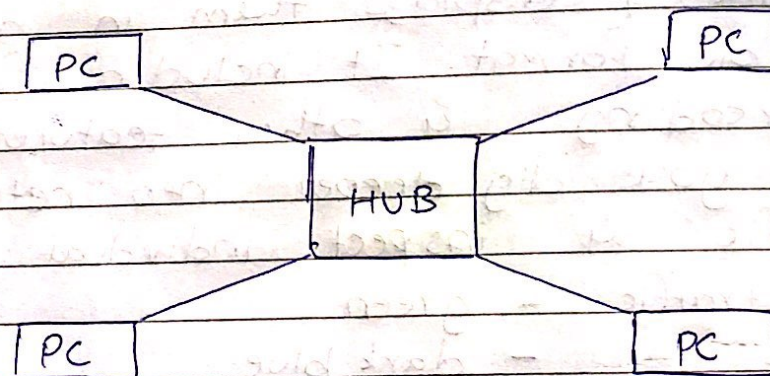


STRAIGHT THROUGH



CROSS - OVER

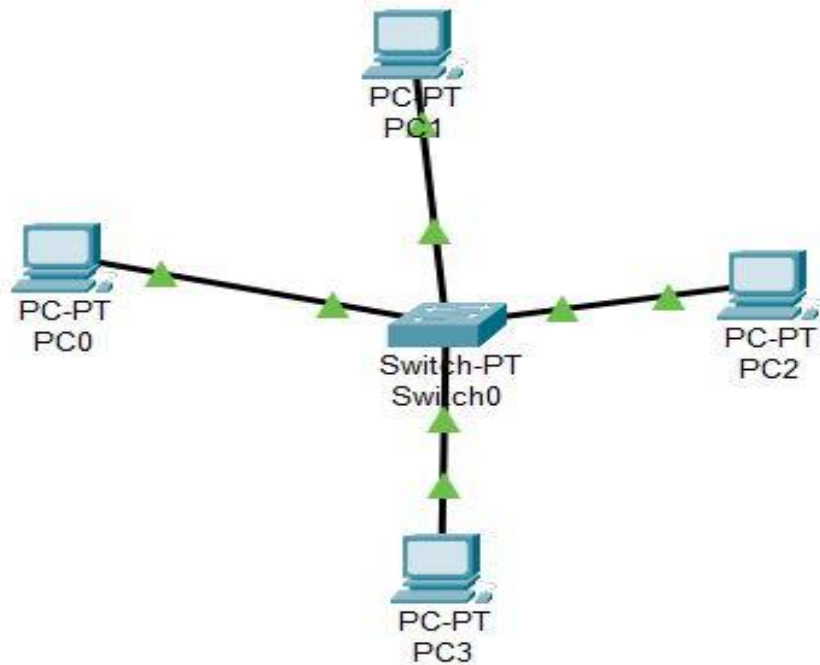
- STAR TOPOLOGY AND LAN CREATED



Conclusion:

Thus we implemented LAN using layer 2 switch. We also understood the structure & working of various networks including inter connecting devices. used.

Testing by Ping and output:-



PC1

Physical Config Desktop Programming Attributes

Command Prompt

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

☐ Top

Wireless ping output:-

```
Activities  Terminal  Fri Sep 18 10:37 AM
pratt3000@pratts-laptop: -

(base) pratt3000@pratts-laptop ~$ ip addr show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: wlp1s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether f8:34:41:b7:19:2f brd ff:ff:ff:ff:ff:ff
    inet 192.168.0.108/24 brd 192.168.0.255 scope global dynamic noprefixroute wlp1s0
        valid_lft 81816sec preferred_lft 81816sec
    inet6 fe80::4fab:7174:8a15:9029/64 scope link noprefixroute
        valid_lft forever preferred_lft forever

(base) pratt3000@pratts-laptop ~$ ping -b 192.168.0.108
PING 192.168.0.108 (192.168.0.108) 56(84) bytes of data.
64 bytes from 192.168.0.108: icmp_seq=1 ttl=64 time=0.025 ms
64 bytes from 192.168.0.108: icmp_seq=2 ttl=64 time=0.028 ms
64 bytes from 192.168.0.108: icmp_seq=3 ttl=64 time=0.029 ms
64 bytes from 192.168.0.108: icmp_seq=4 ttl=64 time=0.035 ms
64 bytes from 192.168.0.108: icmp_seq=5 ttl=64 time=0.027 ms
64 bytes from 192.168.0.108: icmp_seq=6 ttl=64 time=0.027 ms
64 bytes from 192.168.0.108: icmp_seq=7 ttl=64 time=0.047 ms
64 bytes from 192.168.0.108: icmp_seq=8 ttl=64 time=0.039 ms
64 bytes from 192.168.0.108: icmp_seq=9 ttl=64 time=0.029 ms
64 bytes from 192.168.0.108: icmp_seq=10 ttl=64 time=0.027 ms
64 bytes from 192.168.0.108: icmp_seq=11 ttl=64 time=0.042 ms
64 bytes from 192.168.0.108: icmp_seq=12 ttl=64 time=0.028 ms
64 bytes from 192.168.0.108: icmp_seq=13 ttl=64 time=0.024 ms
^C
--- 192.168.0.108 ping statistics ---
13 packets transmitted, 13 received, 0% packet loss, time 12278ms
rtt min/avg/max/mdev = 0.024/0.031/0.047/0.006 ms
(base) pratt3000@pratts-laptop ~$
```


WireShark output:-

No.	Time	Source	Destination	Protocol	Length	Info
11550	27.229032	52.85.117.64	192.168.43.163	TCP	1354	443 → 49782 [ACK] Seq=5428931 Ack=645 Win=31488 Len=1300 [TCP segment of a reassembled PDU]
11551	27.229121	192.168.43.163	52.85.117.64	TCP	54	49782 → 443 [ACK] Seq=645 Ack=5430231 Win=370432 Len=0
11552	27.230408	52.85.117.64	192.168.43.163	TCP	1354	443 → 49782 [ACK] Seq=5430231 Ack=645 Win=31488 Len=1300 [TCP segment of a reassembled PDU]
11553	27.230501	192.168.43.163	52.85.117.64	TCP	54	49782 → 443 [ACK] Seq=645 Ack=5431531 Win=369152 Len=0
11554	27.230771	52.85.117.64	192.168.43.163	TCP	1354	443 → 49782 [ACK] Seq=5431531 Ack=645 Win=31488 Len=1300 [TCP segment of a reassembled PDU]
11555	27.242096	52.85.117.64	192.168.43.163	TCP	1354	443 → 49782 [ACK] Seq=5432831 Ack=645 Win=31488 Len=1300 [TCP segment of a reassembled PDU]
11556	27.242192	192.168.43.163	52.85.117.64	TCP	54	49782 → 443 [ACK] Seq=645 Ack=5434131 Win=366592 Len=0
11557	27.242392	52.85.117.64	192.168.43.163	TCP	1354	443 → 49782 [ACK] Seq=5434131 Ack=645 Win=31488 Len=1300 [TCP segment of a reassembled PDU]
11558	27.247634	52.85.117.64	192.168.43.163	TCP	1354	443 → 49782 [ACK] Seq=5435431 Ack=645 Win=31488 Len=1300 [TCP segment of a reassembled PDU]
11559	27.247697	192.168.43.163	8.36.80.234	TCP	54	49772 → 80 [ACK] Seq=158 Ack=610513 Win=64768 Len=0
11560	27.247737	192.168.43.163	52.85.117.64	TCP	54	49782 → 443 [ACK] Seq=645 Ack=5436731 Win=363776 Len=0
11561	27.249632	52.85.117.64	192.168.43.163	TCP	1354	443 → 49782 [ACK] Seq=5436731 Ack=645 Win=31488 Len=1300 [TCP segment of a reassembled PDU]

> Frame 1: 54 bytes on wire (432 bits), 54 bytes captured (432 bits) on interface \Device\NPF_{929ECFC2-8E4A-45B0-9F1E-DF153F139052}, id 0
 > Ethernet II, Src: XiaomiCo_1f:6d:55 (0c:f3:46:1f:6d:55), Dst: IntelCor_ac:7b:d2 (f4:d1:08:ac:7b:d2)
 > Internet Protocol Version 4, Src: 40.122.160.14, Dst: 192.168.43.163
 > Transmission Control Protocol, Src Port: 443, Dst Port: 49725, Seq: 1, Ack: 1, Len: 0

0000	f4 d1 08 ac 7b d2 0c f3 46 1f 6d 55 08 00 45 00{...F-mU...E
0010	00 28 0d 5a 40 00 6b 06 4d a2 28 7a a0 0e c0 a8	..(Z@.k.M.(z....
0020	2b a3 01 bb c2 3d c5 cb fd 5b 9e 4d bf 03 50 10	+.....-[.M...P
0030	04 01 12 8e 00 00

Wi-Fi: <live capture in progress>

Packets: 11561 · Displayed: 11561 (100.0%)

