NetCom LAB DA -1

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Course Code : CSE1004

Course Title : Network and Communication

Hub :-

A hub is a physical layer networking device which is used to connect multiple devices in a network. They are generally used to connect computers in a LAN. A computer which intends to be connected to the network is plugged in to one of these ports.

Advantages of Hub

1. The primary function of hub is to allow clients to connect to a network so that they can share and have conversations.
2. Hub is known for having very less number of performance impacts on the network. This is because it operates using broadcast model which rarely affects the network.
3. Comparing to switches, hubs are really inexpensive. Basically due to its form of simplicity.
4. Hubs can connect different types of medias all together with a central hub. Even if the media used to operate at different speeds they can be used to support them.
5. Area coverage of a network is limited to certain distance. Hub extends the distance of the network such that communication is made easy.
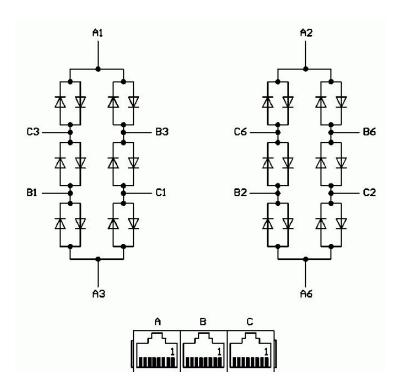
Disadvantages of Hub

1. Hub lacks the function of collision domain and retransmission of packets.
2. Hubs cannot communicate in full duplex mode, it can only operate in half duplex mode.
3. Hubs cannot support networks that are large in size such as token rings. This is because hubs needs to share data among all the devices in the network.
4. Since all attachments are received in post, hubs cannot reduce network traffic.

Working principle of a hub in a LAN

Step 1: PC-A sends a data to PC-D via hub

Step 2: Hub receives the data in the form of an electrical signal, makes multiple copies of it and sends to every other connected PC, except PC-A. In other words, it broadcasts the same data to everyone except PC-A.

Step 3: PC-B, PC-C and PC-D receives the data from Hub and compare their self IP address with the destination IP address in the IP packet.

Step 4: PC-B and PC-C rejects the data as their self IP address do not match with the destination IP address in the packet.

Step 5: PC-D finds it's self IP address as same as the destination IP address in the packet and response to the sender (PC-A) with the acknowledgement packet via hub.

Step 6: Hub receives the acknowledgement packet from PC-D in the form an electrical signal and by it's nature, broadcasts the same data to every other PC/node in the network.

Step 7: PC-A, PC-B and PC-C receives the data from Hub and compare their self IP address with the destination IP address in the IP packet.

Step 8: PC-B and PC-C rejects the data as their's self IP addresses do not match with the destination IP address in the packet.

Step 9: PC-A finds it's self IP address as same as the destination IP address in the acknowledgement packet and receive it.

A hub works at the physical layer (layer 1) of the OSI model.

Switch :-

Switch connect devices in a network and use packet switching to send, receive or forward data packets or data frames over the network. A switch has many ports, to which computers are plugged in.

Advantages of Switches:

1. They increase the available bandwidth of the network.
2. They help in reducing workload on individual host PCs.
3. They increase the performance of the network.
4. Networks which use switches will have less frame collisions. This is due to the fact that switches create collision domains for each connection.
5. Switches can be connected directly to workstations.

Dis-advantages of Switches:

1. They are more expensive compare to network bridges.
2. Network connectivity issues are difficult to be traced through the network switch.
3. Proper design and configuration is needed in order to handle multicast packets.
4. While limiting broadcasts, they are not as good as routers.

A network switch is a device that operates at the Data Link layer of the OSI model—Layer 2
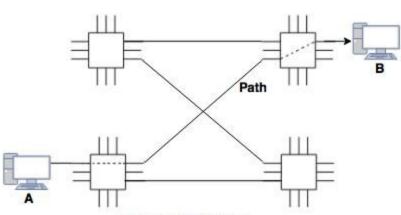

Fig: Circuit Switching

Bridge :-

A bridge operates at data link layer. A bridge is a repeater, with add on the functionality of filtering content by reading the MAC addresses of source and destination.

Advantages of Bridges

1. Sometimes bridges act as repeaters to extend a network. Networks with different architectures can be connected together using bridges.

2. Few of the nodes present on a network share a separate collision domain. For these individual nodes, bridges increases bandwidth.
3. Overall the network reliability is basically high in a bridge which makes it easier to maintain the network.
4. Different segments uses different MAC protocols. As a result it creates frame buffers. Therefore, bridges works to interconnect different segments.
5. Bridges generally functions at the MAC layer. This makes higher levels of protocol transparent.

Disadvantages of Bridges

1. On average a bridge costs more than the hub and repeaters
2. A bridge does more buffering of frames and introduce more relays. This makes them slower compare to a repeater.
3. Since bridges make extra processing by viewing all of the MAC addresses, they can potentially downgrade network performance.
4. Bridges cannot individually filter the broadcast traffic. They simply forward broadcast packets.
5. Another downfall of simply forwarding broadcast traffic is that they can situation known as broadcast storms.

Working Principle

The working principle of a bridge is, it blocks or forwards the data depending on the destination MAC address and this address is written into every data frame.
In a computer network, a bridge separates a LAN into different segments like segment1 & segment2, etc and the MAC address of all the PCs can be stored into the table. For instance, PC1 transmits the data to PC2, where the data will transmit to the bridge first. So the bridge reads the MAC address & decides whether to transmit the data to segment1 or segment2. Therefore, the PC2 is accessible in segment1, which means the bridge transmits the data in segment1 only & eliminates all the connected PCs in segment2. In this way, the bridge reduces traffic in a computer network.

In the OSI model, bridging is performed in the data link layer (layer 2).

Router:-

A router is a networking device that forwards data packets between computer networks. Routers perform the traffic directing functions on the Internet.

Advantages of Routers:

1. It provides connection between different network architectures such as ethernet & token ring etc.
2. It can choose best path across the internetwork using dynamic routing algorithms.
3. It can reduce network traffic by creating collision domains and also by creating broadcast domains.
4. It provides sophisticated routing, flow control and traffic isolation.
5. They are configurable which allows network manager to make policy based on routing decisions.

Disadvantages of Routers:

1. They operate based on routable network protocols.
2. They are expensive compare to other network devices.
3. Dynamic router communications can cause additional network overhead. This results into less bandwidth for user data.
4. They are slower as they need to analyze data from layer-1 through layer-3.

Working Principle

A router examines a packet header's destination <u>IP address</u> and compares it against a <u>routing table</u> to determine the packet's best next <u>hop</u>. Routing tables list directions for forwarding data to particular network destinations, sometimes in the context of other variables, like cost. They amount to an algorithmic set of rules that calculate the best way to transmit traffic toward any given IP address.

A router works at Layer 3 of the OSI model – the Network Layer. This is the layer that the IP protocol works at.

Gateway:-

A gateway is a network node that forms a passage between two networks operating with different transmission protocols.

Advantages of Gateway

1. As mentioned earlier, the main benefit of gateway is the connectivity it provides. A gateway can expand the network by connecting computers with different systems together.
2. Gateways are known to posses improved security since they allow user authentication.
3. Filtering process is another important capability of a gateway. Without them, whatever the services that arrives at the gateway carries the risk of theft.
4. When the number of Collision and Broadcast domain increases, the network provider can assure that they will be able to provide better bandwidth.
5. Besides filtering, a gateway can also convert data packets according to the destination needs.

Disadvantages of Gateway

1. Generally gateways on default are installed on the routers itself. This makes it more difficult for the network administrators to install or configure them.
2. Configuration of devices through a gateway is made even more difficult or impossible. There must be special system administration for this purpose.

3. Gateway networks always causes time delay since information must be translated. There is no way can a instant transfer take place.
4. If there are possibilities of failure occurring at the gateway, it can lead to communication loss.
5. Computers on a network are with different protocols. Therefore, if there is any problem, each of these computers needed to be troubleshooted individually.

Working Principle:

All networks have a boundary that limits communication to devices that are directly connected to it. Due to this, if a network wants to communicate with devices, nodes or networks outside of that boundary, they require the functionality of a gateway. A gateway is often characterized as being the combination of a router and a modem.

The gateway operates at the network layer (Layer 3) of the OSI Model.

Repeater:-

Repeaters are network devices operating at physical layer of the OSI model that amplify or regenerate an incoming signal before retransmitting it.

Advantages of Repeaters

1. Comparing to other networking devices, repeaters are relatively inexpensive. They can be purchased at minimal expense.
2. Whenever a computer and a router is placed far apart, it will result in weak signals.

3. Other than enhancing signals, repeaters has the ability to extend the length of the transmission.

4. Physical obstructions may overall weaken the signals of wireless connectivity.

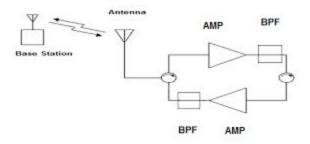5. In repeaters, networks can be connected for reception and transmission using various physical medias.

Disadvantages of Routers

1. Repeaters are unable to segment network traffic. Hence, they lack the capability to reduce congestion as well as network traffic.

2. Repeaters are also unable to connect networks of different architectures. For this purpose either a gateway or a router is needed.

3. There is a restriction in the number of repeaters which can be implemented on a particular network.

4. Repeaters does not have the capability to segment the network. Suppose if there are 2 different cables each with segments.

Working Principle:-

Repeater stations usually have their antennas mounted high up on top of a tall building or hill which ideally is central to your area that you are looking to cover, so their range is much greater. The boosted signal from a repeater can also improve the clarity of the transmission.

Repeaters are network devices operating at physical layer of the OSI model

Access Points:-

An access point is a device that creates a wireless local area network, or WLAN, usually in an office or large building. An access point connects to a wired router, switch, or hub via an Ethernet cable, and projects a Wi-Fi signal to a designated area.

Advantages:

1. An ordinary wireless router can only support 10-20 users access, while AP is able to allow over 50 or even hundreds of users access, and what's more, it has stronger ability to send and receive signals.
2. Generally, the range of signal transmission that a wireless router can cover is just dozens of meters, and if beyond this range, signal will be lost.
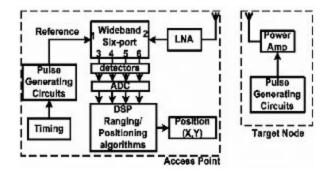
Disadvantages:

1. Some people think that wireless AP is a little bit expensive, because for enterprises, when the scale of enterprise wireless network is larger, the more wireless APs are needed

2. Now, many people would firstly think of wireless routers instead of wireless AP at the mention of building wireless networks, unless it's a large hotel, or public places.

Working Principle

Access points work by connecting direct to your broadband router or network switch with a Ethernet or data cable. This provides the AP with the internet connection and bandwidth required. It then transmits and receives a wireless signal in either the 2.4Ghz or 5Ghz frequency range (WIFI).This allows you to connect wireless to your Local Area Network (LAN) and the internet.

Access points normally operate in Layer 2

Network interface card

A network interface card (NIC) is a hardware component without which a computer cannot be connected over a network. It is a circuit board installed in a computer that provides a dedicated network connection to the computer. It is also called network interface controller, network adapter or LAN adapter.
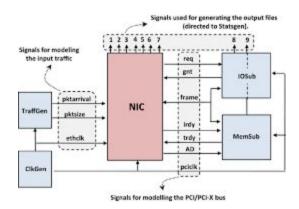
Advantages

- The communication speed using the Internet is high usually in Gigabytes
- Highly reliable connection
- Many peripheral devices can be connected using many ports of NIC cards.
- Bulk data can be shared among many users.

Disadvantages

- Inconvenient in case of wired cable NIC, as it is not portable like a wireless router
- The configuration should be proper for better communication.
- Data is unsecured.

The network interface card operates on layer two of the OSI model- the Data Link Layer.

Modem:-

Modem is a device that enables a computer to send or receive data over telephone or cable lines. The data stored on the computer is digital whereas a telephone line or cable wire can transmit only analog data.
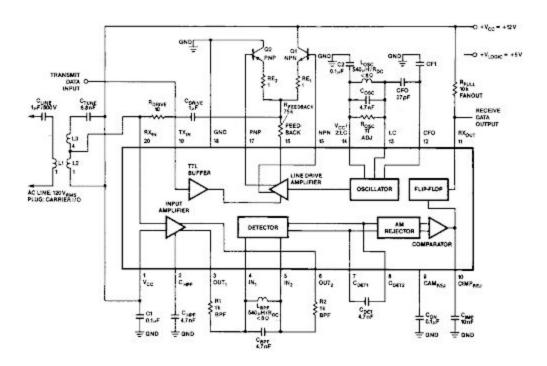
Advantages of Modem

1. When a computer sends digital signals, it is converted into analog signals by a modem.
2. Modems posses high transmission rates since telephone lines are used here. Usually these rates are measured in a unit called baud.
3. Modems are considerably expensive.
4. Modem modems out there perform a function known as Automatic Dialing.

Disadvantages of Modem

1. One major drawback of connecting a modem is that it can make your computer vulnerable to hackers and malwares.
2. While external modems lacks mobility, all the internal modems does support them.
3. Modems especially of DSL type has a problem in availability. Services are not available in rural and remote locations.

The modem is works at the Physical Layer of the OSI model

Brouters:-

A bridge router or brouter is a network device that works as a bridge and as a router. The brouter routes packets for known protocols and simply forwards all other packets as a bridge would.

Advantages of Brouter

➡It offers best route for the data packets and hence reduces network traffic. This

increases efficiency of internet connection as it only transmits or receives traffic

intended for it instead of all the traffic on the network.

➡It supports packet filtering and packet switching.

➡It can be used with both LAN and WAN.

➡It offers NAT to be configured and hence hides real IP address of internal network which makes network more secure.

Drawbacks or disadvantages of Brouter

➡It is expensive compare to hub and router.

➡It is complex to manage and requires considerable amount of initial configuration.

Brouters operate at both the network layer for routable protocols and at the data link layer for non-routable protocols.

LAN (Local Area Network)

A Local Area Network (LAN) is a group of computer and peripheral devices which are connected in a limited area such as school, laboratory, home, and office building. It is a widely useful network for sharing resources like files, printers, games, and other application.

Advantages of LAN
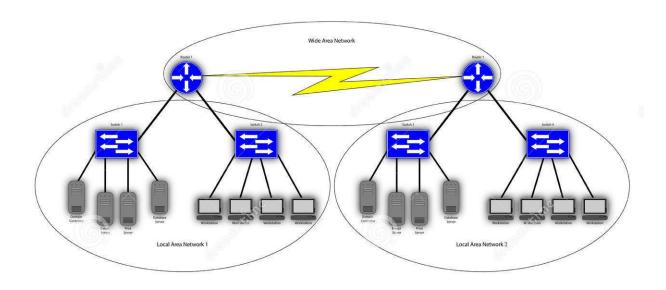
➡The basic LAN implementation does not cost too much.

➡It is easy to control and manage the entire LAN as it is available in one small region.
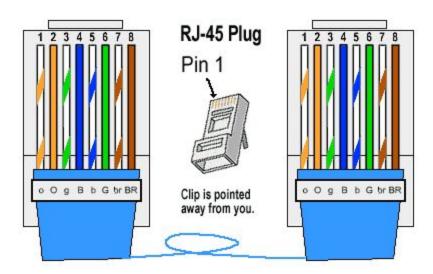
➡The LAN configuration is very easy due to availability of required protocols in the Operating System (OS) itself.

➡With the help of file servers connected on the LAN, sharing of files and folders among peers will become very easy and efficient.

➡It is easy to setup security protocols to protect the LAN users from intruders or hackers.

➡It is easy to share common resources such as printers and internet line among multiple LAN users.

Disadvantages of LAN
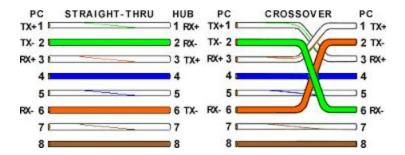
➡LAN covers small geographical area.

➡It is difficult to setup and maintain LAN and requires skilled technicians and network administrators.

➡In the server based LAN architecture, if server develops some fault, all the users are affected.

➡Appearance of virus in one system can spread very fast to all the LAN users very easily.

Circuit Diagram
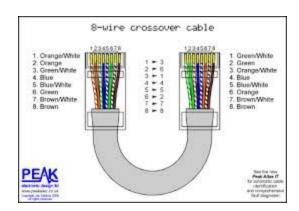
Cross over

Patch Cable

Ping and commands

Description:

```
C:\Users\Nagamani>ping

Usage: ping [-t] [-a] [-n count] [-l size] [-f] [-i TTL] [-v TOS]
            [-r count] [-s count] [[-j host-list] | [-k host-list]]
            [-w timeout] [-R] [-S srcaddr] [-c compartment] [-p]
            [-4] [-6] target_name

Options:
    -t              Ping the specified host until stopped.
                    To see statistics and continue - type Control-Break;
                    To stop - type Control-C.
    -a              Resolve addresses to hostnames.
    -n count        Number of echo requests to send.
    -l size         Send buffer size.
    -f              Set Don't Fragment flag in packet (IPv4-only).
    -i TTL          Time To Live.
    -v TOS          Type Of Service (IPv4-only. This setting has been deprecated
                    and has no effect on the type of service field in the IP
                    Header).
    -r count        Record route for count hops (IPv4-only).
    -s count        Timestamp for count hops (IPv4-only).
    -j host-list    Loose source route along host-list (IPv4-only).
    -k host-list    Strict source route along host-list (IPv4-only).
    -w timeout      Timeout in milliseconds to wait for each reply.
    -R              Use routing header to test reverse route also (IPv6-only).
                    Per RFC 5095 the use of this routing header has been
                    deprecated. Some systems may drop echo requests if
                    this header is used.
    -S srcaddr      Source address to use.
    -c compartment  Routing compartment identifier.
    -p              Ping a Hyper-V Network Virtualization provider address.
    -4              Force using IPv4.
    -6              Force using IPv6.
```

Command Prompt

```
Microsoft Windows [Version 10.0.18363.1316]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\Nagamani>ping www.google.com

Pinging www.google.com [2404:6800:4007:805::2004] with 32 bytes of data:
Reply from 2404:6800:4007:805::2004: time=18ms
Reply from 2404:6800:4007:805::2004: time=18ms
Reply from 2404:6800:4007:805::2004: time=17ms
Reply from 2404:6800:4007:805::2004: time=17ms

Ping statistics for 2404:6800:4007:805::2004:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 17ms, Maximum = 18ms, Average = 17ms

C:\Users\Nagamani>_
```

```
C:\Users\Nagamani>ping www.google.com -t

Pinging www.google.com [2404:6800:4007:811::2004] with 32 bytes of data:
Reply from 2404:6800:4007:811::2004: time=19ms
Reply from 2404:6800:4007:811::2004: time=18ms
Reply from 2404:6800:4007:811::2004: time=18ms
Reply from 2404:6800:4007:811::2004: time=18ms
Reply from 2404:6800:4007:811::2004: time=17ms
Reply from 2404:6800:4007:811::2004: time=18ms
Reply from 2404:6800:4007:811::2004: time=17ms
Reply from 2404:6800:4007:811::2004: time=17ms
Reply from 2404:6800:4007:811::2004: time=19ms
Reply from 2404:6800:4007:811::2004: time=18ms
Reply from 2404:6800:4007:811::2004: time=19ms
Reply from 2404:6800:4007:811::2004: time=17ms
Reply from 2404:6800:4007:811::2004: time=19ms
Reply from 2404:6800:4007:811::2004: time=16ms
Reply from 2404:6800:4007:811::2004: time=18ms
Reply from 2404:6800:4007:811::2004: time=18ms
Reply from 2404:6800:4007:811::2004: time=17ms
Reply from 2404:6800:4007:811::2004: time=16ms
Reply from 2404:6800:4007:811::2004: time=19ms

Ping statistics for 2404:6800:4007:811::2004:
    Packets: Sent = 19, Received = 19, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 16ms, Maximum = 19ms, Average = 17ms
Reply from 2404:6800:4007:811::2004: Control-C
^C
C:\Users\Nagamani>S_
```

```
C:\Users\Nagamani>ping www.google.com -a

Pinging www.google.com [2404:6800:4007:811::2004] with 32 bytes of data:
Reply from 2404:6800:4007:811::2004: time=18ms
Reply from 2404:6800:4007:811::2004: time=18ms
Reply from 2404:6800:4007:811::2004: time=18ms
Reply from 2404:6800:4007:811::2004: time=18ms

Ping statistics for 2404:6800:4007:811::2004:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 18ms, Maximum = 18ms, Average = 18ms
```

```
C:\Users\Nagamani>ping www.google.com -n 4

Pinging www.google.com [2404:6800:4007:812::2004] with 32 bytes of data:
Reply from 2404:6800:4007:812::2004: time=19ms
Reply from 2404:6800:4007:812::2004: time=18ms
Reply from 2404:6800:4007:812::2004: time=24ms
Reply from 2404:6800:4007:812::2004: time=22ms

Ping statistics for 2404:6800:4007:812::2004:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 18ms, Maximum = 24ms, Average = 20ms

C:\Users\Nagamani>ping www.google.com -l 10

Pinging www.google.com [2404:6800:4007:812::2004] with 10 bytes of data:
Reply from 2404:6800:4007:812::2004: time=19ms
Reply from 2404:6800:4007:812::2004: time=20ms
Reply from 2404:6800:4007:812::2004: time=23ms
Reply from 2404:6800:4007:812::2004: time=19ms

Ping statistics for 2404:6800:4007:812::2004:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 19ms, Maximum = 23ms, Average = 20ms

C:\Users\Nagamani>ping www.google.com -f

Pinging www.google.com [142.250.71.36] with 32 bytes of data:
Reply from 142.250.71.36: bytes=32 time=21ms TTL=112
Reply from 142.250.71.36: bytes=32 time=23ms TTL=112
Reply from 142.250.71.36: bytes=32 time=21ms TTL=112
Reply from 142.250.71.36: bytes=32 time=22ms TTL=112

Ping statistics for 142.250.71.36:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 21ms, Maximum = 23ms, Average = 21ms
```

```
C:\Users\Nagamani>ping www.google.com -i 3

Pinging www.google.com [2404:6800:4007:812::2004] with 32 bytes of data:
Reply from 2404:6800:4007:812::2004: TTL expired in transit.
Reply from 2404:6800:4007:812::2004: TTL expired in transit.
Reply from 2404:6800:4007:812::2004: TTL expired in transit.
Reply from 2404:6800:4007:812::2004: TTL expired in transit.

Ping statistics for 2404:6800:4007:812::2004:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

C:\Users\Nagamani>ping www.google.com -v TOS

Pinging www.google.com [142.250.71.36] with 32 bytes of data:
Reply from 142.250.71.36: bytes=32 time=21ms TTL=112
Reply from 142.250.71.36: bytes=32 time=40ms TTL=112
Reply from 142.250.71.36: bytes=32 time=22ms TTL=112
Reply from 142.250.71.36: bytes=32 time=23ms TTL=112

Ping statistics for 142.250.71.36:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 21ms, Maximum = 40ms, Average = 26ms
```

```
C:\Users\Nagamani>ping www.google.com -r 5

Pinging www.google.com [142.250.71.36] with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 142.250.71.36:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\Nagamani>ping www.google.com -s 5
Bad value for option -s, valid range is from 1 to 4.

C:\Users\Nagamani>ping www.google.com -s 3

Pinging www.google.com [142.250.71.36] with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 142.250.71.36:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
C:\Users\Nagamani>ping www.google.com -w timeout

Pinging www.google.com [2404:6800:4007:811::2004] with 32 bytes of data:
PING: transmit failed. General failure.
PING: transmit failed. General failure.
PING: transmit failed. General failure.
PING: transmit failed. General failure.

Ping statistics for 2404:6800:4007:811::2004:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\Nagamani>ping www.google.com -R

Pinging www.google.com [2404:6800:4007:811::2004] with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 2404:6800:4007:811::2004:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\Nagamani>ping www.google.com -S srcaddr
srcaddr is not a valid address.

C:\Users\Nagamani>ping www.google.com -c compartment
Access denied. Option -c requires administrative privileges.
```

Netstat

```
C:\Users\Nagamani>netstat www.google.com

Displays protocol statistics and current TCP/IP network connections.

NETSTAT [-a] [-b] [-e] [-f] [-n] [-o] [-p proto] [-r] [-s] [-x] [-t] [interval]

  -a            Displays all connections and listening ports.
  -b            Displays the executable involved in creating each connection or
                listening port. In some cases well-known executables host
                multiple independent components, and in these cases the
                sequence of components involved in creating the connection
                or listening port is displayed. In this case the executable
                name is in [] at the bottom, on top is the component it called,
                and so forth until TCP/IP was reached. Note that this option
                can be time-consuming and will fail unless you have sufficient
                permissions.
  -e            Displays Ethernet statistics. This may be combined with the -s
                option.
  -f            Displays Fully Qualified Domain Names (FQDN) for foreign
                addresses.
  -n            Displays addresses and port numbers in numerical form.
  -o            Displays the owning process ID associated with each connection.
  -p proto      Shows connections for the protocol specified by proto; proto
                may be any of: TCP, UDP, TCPv6, or UDPv6.  If used with the -s
                option to display per-protocol statistics, proto may be any of:
                IP, IPv6, ICMP, ICMPv6, TCP, TCPv6, UDP, or UDPv6.
  -q            Displays all connections, listening ports, and bound
                nonlistening TCP ports. Bound nonlistening ports may or may not
                be associated with an active connection.
  -r            Displays the routing table.
  -s            Displays per-protocol statistics.  By default, statistics are
                shown for IP, IPv6, ICMP, ICMPv6, TCP, TCPv6, UDP, and UDPv6;
                the -p option may be used to specify a subset of the default.
  -t            Displays the current connection offload state.
  -x            Displays NetworkDirect connections, listeners, and shared
                endpoints.
  -y            Displays the TCP connection template for all connections.
                Cannot be combined with the other options.
  interval      Redisplays selected statistics, pausing interval seconds
                between each display.  Press CTRL+C to stop redisplaying
                statistics.  If omitted, netstat will print the current
                configuration information once.
```

```
C:\Users\Nagamani>netstat -a

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:135            SampreethSpin:0        LISTENING
  TCP    0.0.0.0:445            SampreethSpin:0        LISTENING
  TCP    0.0.0.0:2343           SampreethSpin:0        LISTENING
  TCP    0.0.0.0:3580           SampreethSpin:0        LISTENING
  TCP    0.0.0.0:3582           SampreethSpin:0        LISTENING
  TCP    0.0.0.0:5040           SampreethSpin:0        LISTENING
  TCP    0.0.0.0:6646           SampreethSpin:0        LISTENING
  TCP    0.0.0.0:7680           SampreethSpin:0        LISTENING
  TCP    0.0.0.0:8080           SampreethSpin:0        LISTENING
  TCP    0.0.0.0:49664          SampreethSpin:0        LISTENING
  TCP    0.0.0.0:49665          SampreethSpin:0        LISTENING
  TCP    0.0.0.0:49666          SampreethSpin:0        LISTENING
  TCP    0.0.0.0:49667          SampreethSpin:0        LISTENING
  TCP    0.0.0.0:49668          SampreethSpin:0        LISTENING
  TCP    0.0.0.0:49689          SampreethSpin:0        LISTENING
  TCP    0.0.0.0:59110          SampreethSpin:0        LISTENING
  TCP    0.0.0.0:59111          SampreethSpin:0        LISTENING
  TCP    0.0.0.0:59112          SampreethSpin:0        LISTENING
  TCP    127.0.0.1:5354         SampreethSpin:0        LISTENING
  TCP    127.0.0.1:5354         SampreethSpin:49778    ESTABLISHED
  TCP    127.0.0.1:5354         SampreethSpin:49779    ESTABLISHED
  TCP    127.0.0.1:27015        SampreethSpin:0        LISTENING
  TCP    127.0.0.1:49669        SampreethSpin:0        LISTENING
  TCP    127.0.0.1:49669        SampreethSpin:49684    ESTABLISHED
  TCP    127.0.0.1:49684        SampreethSpin:49669    ESTABLISHED
  TCP    127.0.0.1:49778        SampreethSpin:5354     ESTABLISHED
  TCP    127.0.0.1:49779        SampreethSpin:5354     ESTABLISHED
  TCP    192.168.29.105:139     SampreethSpin:0        LISTENING
  TCP    192.168.29.105:57636   117.18.237.29:http     CLOSE_WAIT
  TCP    192.168.29.105:61508   52.114.148.148:https   ESTABLISHED
  TCP    192.168.29.105:61517   52.111.246.13:https    ESTABLISHED
  TCP    192.168.29.105:61520   52.114.15.140:https    ESTABLISHED
  TCP    192.168.29.105:61695   52.139.250.253:https   ESTABLISHED
  TCP    192.168.29.105:61864   ec2-13-57-124-132:https  ESTABLISHED
  TCP    192.168.29.105:61865   ec2-13-57-124-132:https  TIME_WAIT
  TCP    192.168.29.105:61866   52.114.142.219:https   ESTABLISHED
  TCP    192.168.29.105:61867   52.114.142.219:https   ESTABLISHED
  TCP    192.168.29.105:61868   server-99-86-17-102:https  ESTABLISHED
  TCP    192.168.56.1:139       SampreethSpin:0        LISTENING
```

HostName

```
C:\Users\Nagamani>hostname
SampreethSpin
```

Nslookup

```
>
C:\Users\Nagamani>nslookup google.com
Server:   reliance.reliance
Address:   2405:201:c010:d0f9::c0a8:1d01

Non-authoritative answer:
Name:     google.com
Addresses:  2404:6800:4007:80e::200e
          216.58.196.174
```

Trace Route

```
C:\Users\Nagamani>tracert google.com

Tracing route to google.com [2404:6800:4007:80e::200e]
over a maximum of 30 hops:

  1     4 ms     4 ms     3 ms   2405:201:c010:d0f9:7add:12ff:fedb:4f8a
  2     *        *        *      Request timed out.
  3     8 ms     8 ms     7 ms   2405:203:400:100:172:31:0:136
  4    30 ms    21 ms    20 ms   2001:4860:1:1::170
  5    18 ms    18 ms   123 ms   2404:6800:8045::1
  6    19 ms    20 ms    20 ms   2001:4860:0:1::714
^C
C:\Users\Nagamani>
```

Net and commands

```
C:\Users\Nagamani>net
The syntax of this command is:

NET
    [ ACCOUNTS | COMPUTER | CONFIG | CONTINUE | FILE | GROUP | HELP |
      HELPMSG | LOCALGROUP | PAUSE | SESSION | SHARE | START |
      STATISTICS | STOP | TIME | USE | USER | VIEW ]

C:\Users\Nagamani>net user

User accounts for \\SAMPREETHSPIN

-------------------------------------------------------------------------------
Administrator           cnaga                   DefaultAccount
Guest                   Nagamani                WDAGUtilityAccount
The command completed successfully.


C:\Users\Nagamani>net localgroup

Aliases for \\SAMPREETHSPIN

-------------------------------------------------------------------------------
*Administrators
*Distributed COM Users
*Event Log Readers
*Guests
*Hyper-V Administrators
*IIS_IUSRS
*Performance Log Users
*Performance Monitor Users
*Remote Management Users
*System Managed Accounts Group
*Users
The command completed successfully.
```

```
C:\Users\Nagamani>net config
The following running services can be controlled:

   Server
   Workstation

The command completed successfully.


C:\Users\Nagamani>net statistics
Statistics are available for the following running services:

   Workstation

The command completed successfully.


C:\Users\Nagamani>
```

Host,Nmap,ip route show (not working since using windows)

```
C:\Users\Nagamani>host
'host' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\Nagamani>nmap
'nmap' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\Nagamani>io route show
'io' is not recognized as an internal or external command,
operable program or batch file.
```