* **LAN & WAN**:

A local area network (**LAN**) is a collection of devices connected together in one physical location, such as a building, office, or home. A LAN can be small or large, ranging from a home network with one user to an enterprise network with thousands of users and devices in an office or school.

In its simplest form, a wide-area network (**WAN**) is a collection of local-area networks (LANs) or other networks that communicate with one another. A WAN is essentially a network of networks, with the Internet the world's largest WAN.

* **Subnet**:

A subnet, or subnetwork, is a segmented piece of a larger network. More specifically, subnets are a logical partition of an IP network into multiple, smaller network segments. Each computer, or host, on the internet has at least one IP address as a unique identifier.

* **ICMP Packets**:

ICMP (Internet Control Message Protocol) is an error-reporting protocol that network devices such as routers use to generate error messages to the source IP address when network problems prevent delivery of IP packets. ICMP creates and sends messages to the source IP address indicating that a gateway to the internet, such as a router, service or host, cannot be reached for packet delivery. Any IP network device has the capability to send, receive or process ICMP messages.

**ICMP** is **not** a **transport** **protocol** that sends data between systems.

While **ICMP** is **not** used **regularly** in **end**-**user** **applications**, it is used by **network** **administrators** to troubleshoot internet connections in diagnostic utilities including ping and traceroute.

* **Ping**:

Ping is a network utility that refers to the signal sent out across the network to another computer, which then sends its own signal back. This signal, which is measured in milliseconds (ms), lets you know how long it takes for a packet of data to travel from your computer to a server on the internet and back.

* **Traceroute**:

A traceroute works by sending Internet Control Message Protocol (ICMP) packets, and every router involved in transferring the data gets these packets. The ICMP packets provide information about whether the routers used in the transmission are able to effectively transfer the data.

* **IP addressing**:

IP address stands for internet protocol address; it is an identifying number that is associated with a specific computer or computer network. When connected to the internet, the IP address allows the computers to send and receive information.

* **IPV4 vs IPV6**:

The **IPv4** address is a 32-bit number that uniquely identifies a network interface on a machine. An IPv4 address is typically written in decimal digits, formatted as four 8-bit fields that are separated by periods. Each 8-bit field represents a byte of the IPv4 address.

An IPv6 address is a 128-bit alphanumeric value that identifies an endpoint device in an Internet Protocol Version 6 (IPv6) network. IPv6 is the successor to a previous addressing infrastructure, IPv4, which had limitations IPv6 was designed to overcome. Notably, IPv6 has drastically increased address space compared to IPv4.

Key benefits to IPv6 include:

* No more NAT (Network Address Translation)
* Auto-configuration
* No more private address collisionsv
* Better multicast routing
* Simpler header format
* Simplified, more efficient routing
* True quality of service (QoS), also called "flow labeling"
* Built-in authentication and privacy support
* Flexible options and extensions
* Easier administration (no more DHCP)