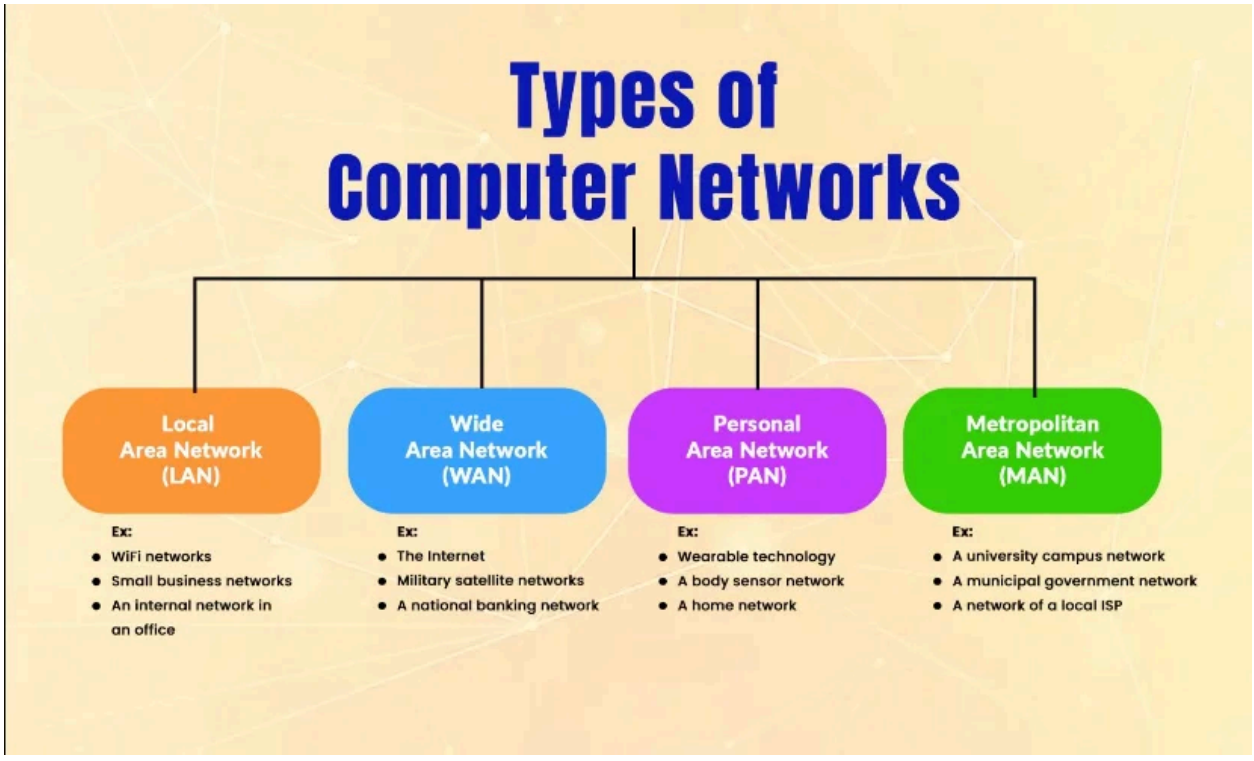
GANPAT UNIVERSITY
U.V. PATEL COLLEGE OF ENGINEERING B. TECH 1ST SEMESTER CE/IT/CE-AI 2ES1109: BASICS OF WEB TECHNOLOGY

Practical-1

AIM: To acquire a fundamental understanding of web technology concepts and their practical applications

1. Network
- **a. Types of Computer network**
- **b. Topology**

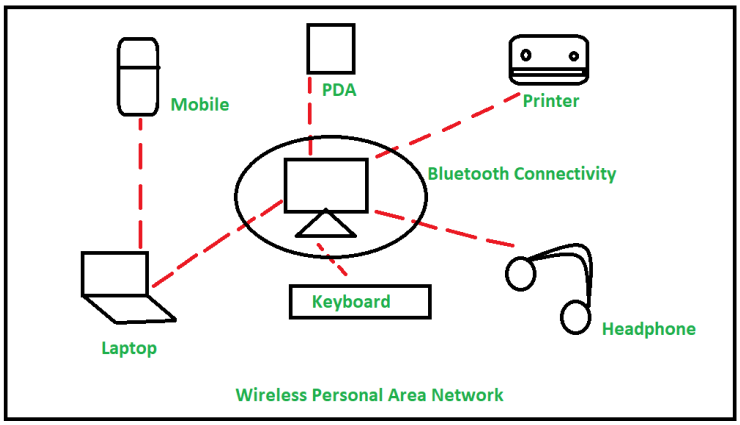
Computer networks are broadly classified into four main types based on their geographic scope:



Personal Area Network (PAN):

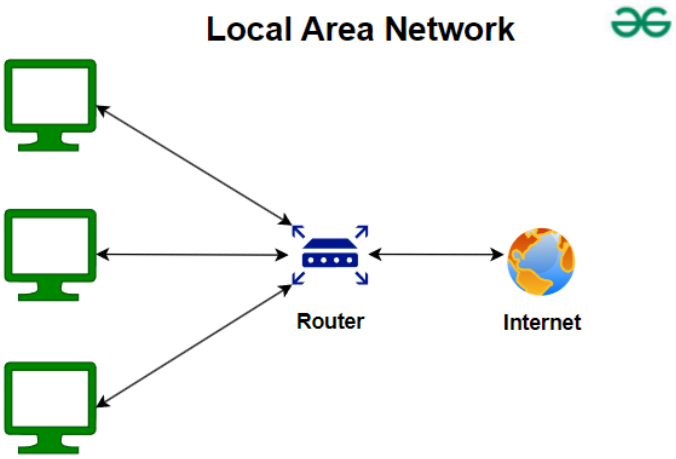
A PAN is a network for interconnecting devices centered around an individual person,

typically within a range of a few meters. Examples include connecting a smartphone to a headset or a computer to a printer.



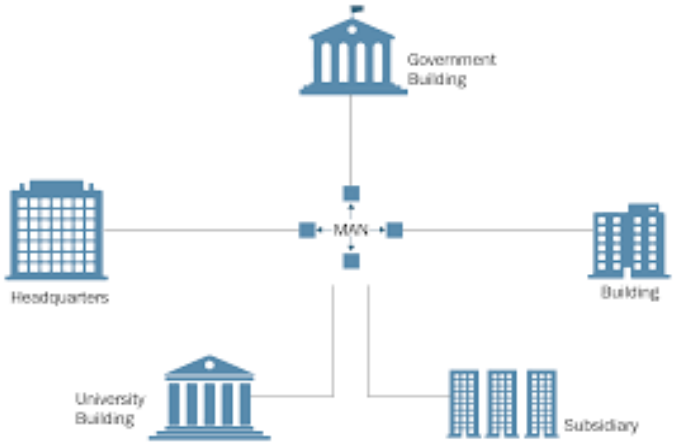
Local Area Network (LAN):

LANs connect devices within a limited area, such as a home, office, or school. They offer faster speeds and are generally more secure than larger networks.



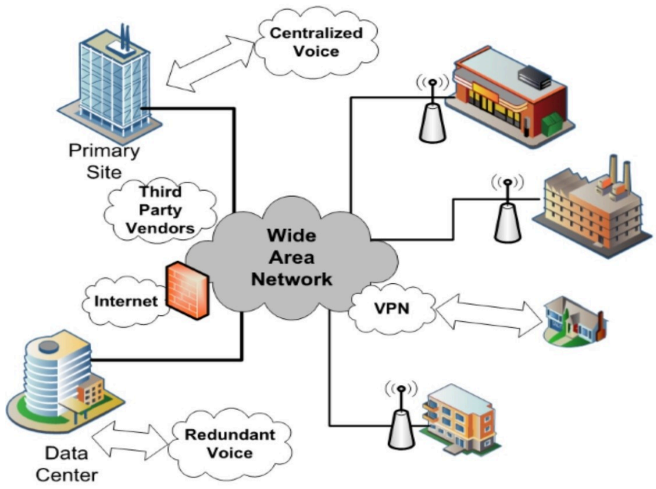
Metropolitan Area Network (MAN):

A MAN spans a larger area than a LAN, typically covering a city or a large campus. It can be a collection of interconnected LANs.



Wide Area Network (WAN):

WANs cover a large geographical area, potentially spanning countries or even the globe. The internet is the most prominent example of a WAN.



Other specialized networks:

Campus Area Network (CAN):

Connects devices across multiple buildings within a campus or university.

Wireless Local Area Network (WLAN):

Similar to a LAN, but uses wireless technology (like Wi-Fi) to connect devices.

Storage Area Network (SAN):

A specialized network designed for data storage, often used to connect storage devices to servers.

Virtual Private Network (VPN):

Extends a private network across a public network, allowing users to access resources as if they were on the same private network

2.TOPOLOGY IN COMPUTERS:

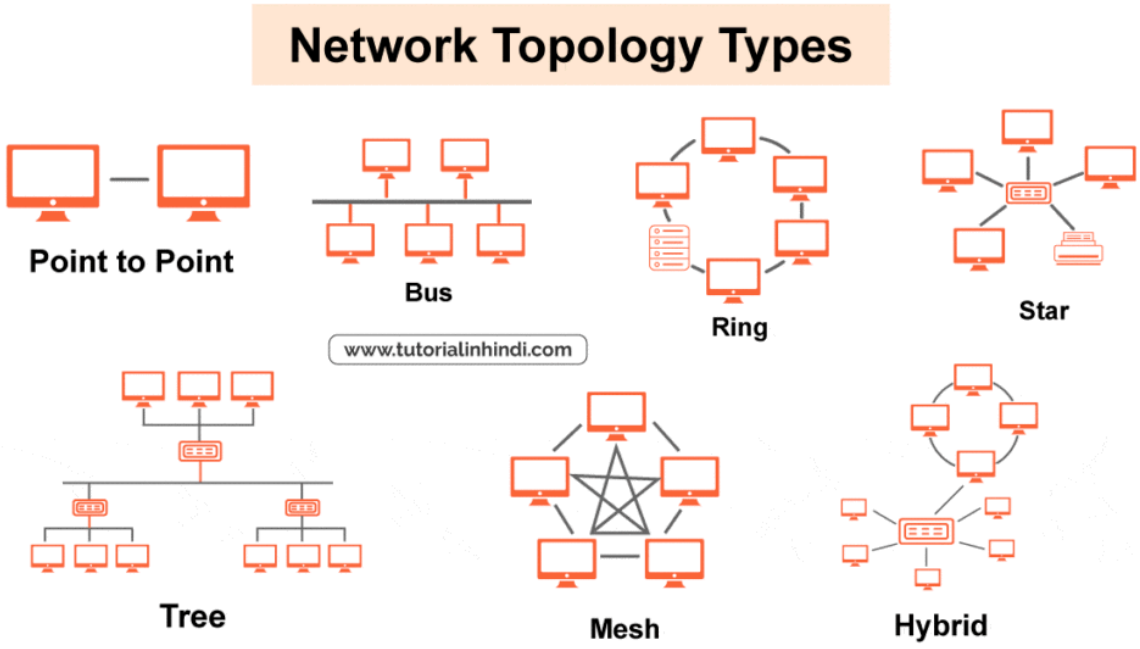
In the context of computers and networking, topology refers to the arrangement of devices and the connections between them in a network. It describes how devices are interconnected and how data flows within the network. Network topology is crucial for understanding how a network is organized, optimizing its performance, and troubleshooting issues.

Here's a more detailed explanation:

Key Concepts:

- **Nodes:**
  These are the devices in a network, such as computers, servers, printers, and routers.
- **Connections:**
  These are the physical or logical links that connect the nodes.
- **Physical Topology:**
  This describes the actual layout of the network, including the physical arrangement of cables and devices.
- **Logical Topology:**
  This describes how data flows between devices, regardless of the physical layout.

Types of Network Topologies:



- **Bus Topology:** All devices are connected to a single cable, the "bus".
- **Star Topology:** All devices are connected to a central hub or switch.
- **Ring Topology:** Devices are connected in a circular fashion, with each device connected to two others.
- **Mesh Topology:** Each device is connected to multiple other devices, providing redundancy.
- **Tree Topology:** A hierarchical structure, combining elements of bus and star topologies.
- **Hybrid Topology:** A combination of two or more different topologies.

Importance of Network Topology:

- **Optimizes Network Performance:**
  Choosing the right topology can improve data transmission speed and reduce congestion.
- **Ensures Reliability:**
  Redundant topologies (like mesh) can help maintain network connectivity even if some devices fail.
- **Simplifies Troubleshooting:**
  A clear understanding of the topology helps administrators quickly identify and resolve network issues.

- **Facilitates Scalability:**
  Topology design can make it easier to add new devices to the network without disrupting existing connections.

3. WWW:

WWW, or the World Wide Web, is a system of interconnected web pages accessed via the internet. It allows users to navigate and view content like text, images, and videos through web browsers using protocols like HTTP and languages like HTML. While the web uses the internet, the two are distinct: the internet is the infrastructure, and the web is a service built on top of it.

4. Domain Name:

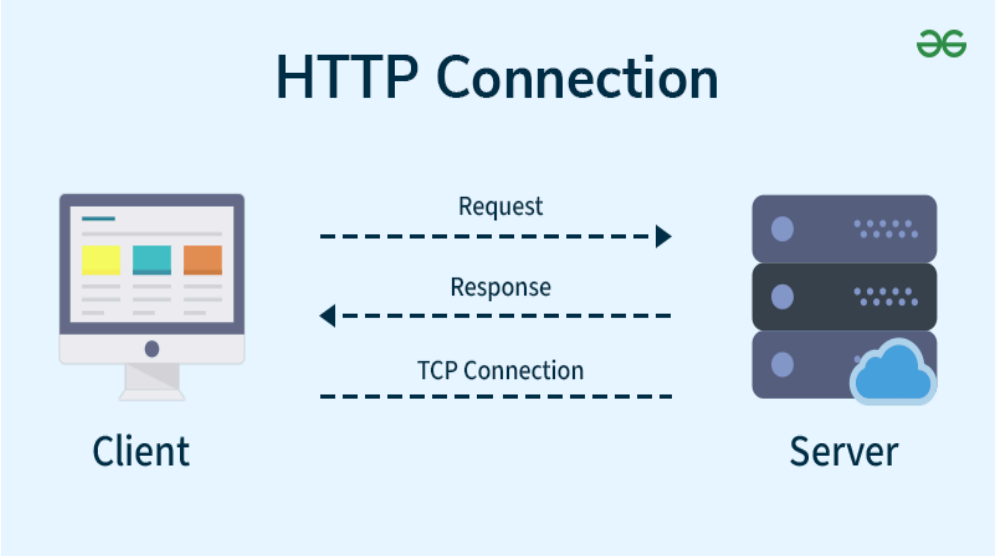
A domain name is a human-readable address for a website, like www.example.com, that identifies a specific IP address on the internet. It serves as a unique and memorable way for people to access websites, rather than having to remember complex numerical IP addresses. When you type a domain name into a browser, the Domain Name System (DNS) translates it into the correct IP address for the web server.

5. HTTP :

HTTP, or Hypertext Transfer Protocol, is the foundation for data communication on the World Wide Web, acting as a set of rules for transferring information between a client (like your web browser) and a server (where a website is hosted). It enables your browser to send a request for a webpage and the server to send back the data to display it.

How it works

Client-server model: HTTP uses a client-server model. When you type a URL into your browser, the browser acts as the client and sends an HTTP request to the web server.
Request and response: The server receives the request and sends back an HTTP response, which contains the requested data, such as HTML files, images, and videos.
Common methods: Various HTTP methods define the action to be performed. The most common are:
GET: To retrieve data from a server.
POST: To send data to the server, like submitting a form.
PUT: To update a resource on the server.
DELETE: To remove a resource.
Data transfer: HTTP transmits data over the Transmission Control Protocol/Internet Protocol (TCP/IP) suite, ensuring reliable communication.



6. HTTPS :

HTTPS, or Hypertext Transfer Protocol Secure, is the secure version of HTTP that encrypts data transmitted between a user's browser and a website, protecting sensitive information like passwords and credit card numbers from attackers. It uses SSL/TLS protocols to establish a secure, authenticated connection, which is indicated by a padlock icon in the browser's address bar.

7. Webpage:

A webpage is a single document on the internet, made up of content like text, images, and videos, and identified by a unique URL. It is displayed on a user's screen through a web browser, like Chrome or Firefox, and can be part of a larger website.

8. Website :

A website is a collection of related web pages, images, and other content that is accessible on the internet and identified by a common domain name. These pages are linked together, often starting with a home page, and are hosted on one or more web servers. People use web browsers to access websites by entering a specific URL (Uniform Resource Locator), such as `google.com`.

9. Web server :

A web server is a system that stores, processes, and delivers web content, such as web pages, images, and videos, to users over the internet. It can refer to both the hardware (a physical computer) and the software that handles requests from clients (like web browsers) using the HTTP/HTTPS protocol. When you visit a website, your browser sends a request to the web server, which then retrieves the files and sends them back for display.

10. URL :

A URL, or Uniform Resource Locator, is the unique web address used to locate a specific resource on the internet, such as a web page, image, or file. It acts like a digital street address, telling a web browser where to find the information you are looking for. You access a URL by typing it into the address bar or by clicking a link.

11. Protocol :

In a computer network, a protocol is a set of rules that defines how data is formatted, transmitted, and received between devices. These rules ensure that different devices, regardless of their hardware or software, can communicate effectively with each other. Protocols govern the syntax, semantics, synchronization, and error recovery of communication.

12. IP Address :

An IP address is a unique numerical label assigned to every device connected to a computer network that uses the Internet Protocol for communication. It functions as a unique identifier and locator for devices on the internet, allowing information to be sent to and from the correct destination, much like a street address for mail.

13. Browser :

A browser is a software application used to access and display websites on the internet. It works by retrieving files from web servers, interpreting them using languages like HTML, CSS, and JavaScript, and then displaying the content, such as text, images, and videos, on your screen. Examples include Google Chrome, Safari, and Firefox.

14. ISP :

An ISP, or Internet Service Provider, is a company that provides individuals and organizations with access to the internet. ISPs connect users to the online world through various technologies like fiber-optic, DSL, cable, or wireless connections, and typically charge a monthly fee for their services.