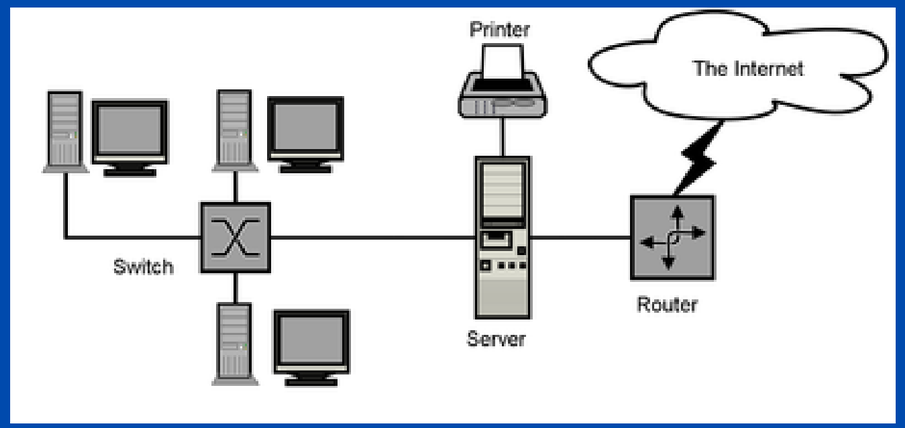
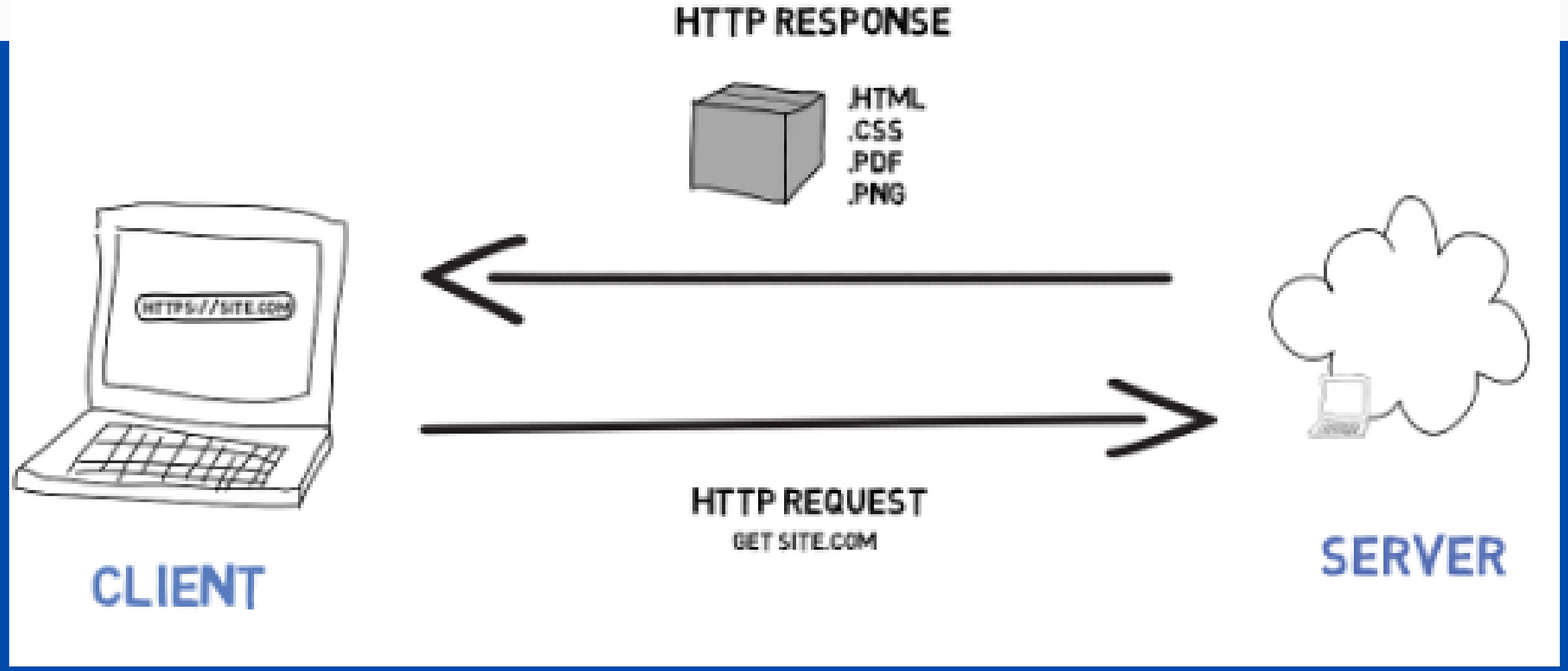
DAY 4

INTERNET AND WORLD WIDE WEB

HOW INTERNET WORKS





You Make a Request: Imagine you're using your web browser to visit a website, like "www.example.com." When you hit enter after typing the website's address, you're making a request.

Request Sent to Server: Your request is sent over the Internet to a special computer known as a "server." This server is like a storehouse of information for the website.

Your Request Message: Your request message tells the server what you want. It's like saying, "Hey, I'd like to see the home page of your website, please!"

THE INTERNET

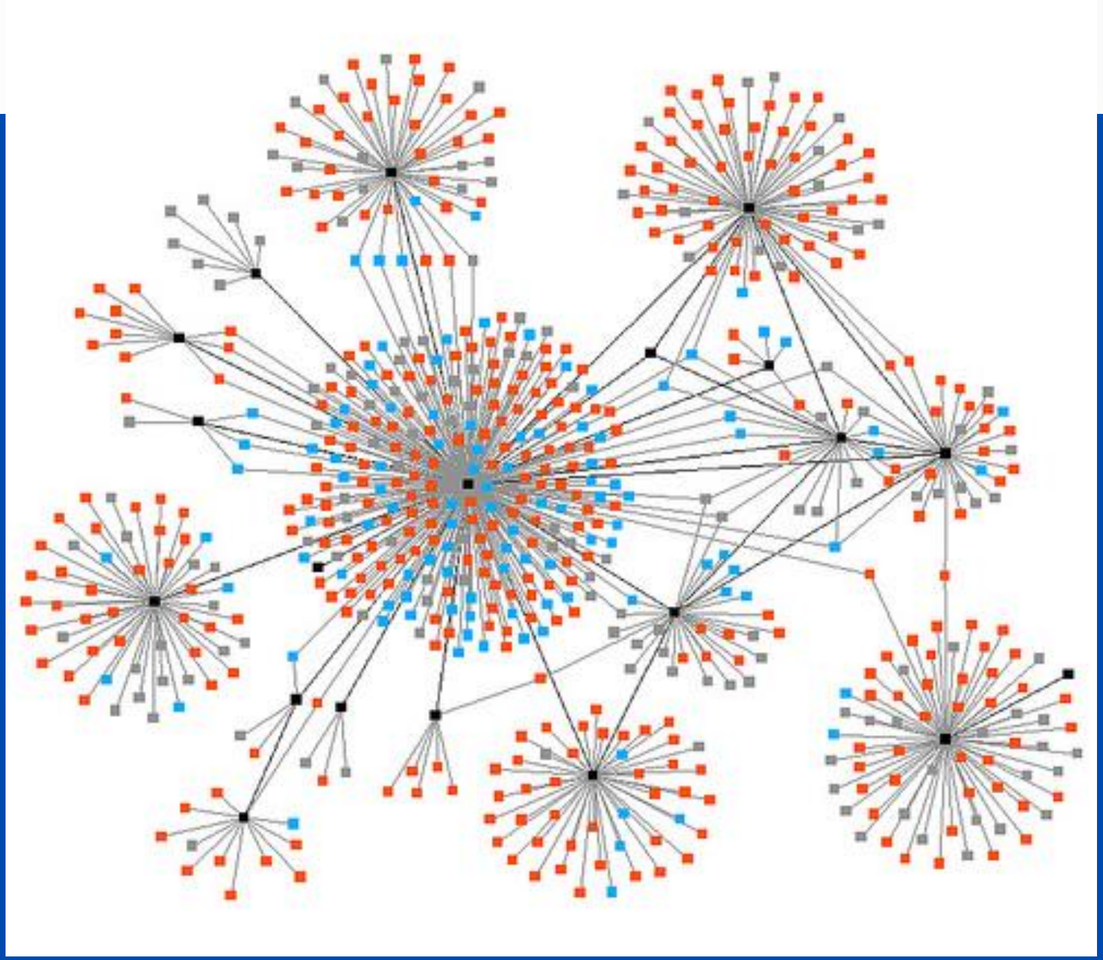
The Internet's architecture is a complex and decentralized system that enables global connectivity and the exchange of information. At its core, the Internet is a vast network of interconnected devices and networks that follow a set of standardized protocols and principles. Here are the basics of the Internet's architecture and its global connectivity

- Network of Networks
- Protocols and Standards
- IP Addresses
- Domain Name System (DNS)
- Packet Switching
- Internet Service Providers (ISPs)
- Internet Backbone
- Content Delivery Networks (CDNs)
- Global Connectivity
- Security and Encryption

1. Network of Networks

- The Internet is a network of networks, meaning it is composed of millions of interconnected smaller networks, each operated independently by organizations, businesses, and individuals.

- These networks can vary in size and scope, from local area networks (LANs) within homes or businesses to wide area networks (WANs) that span countries or continents.



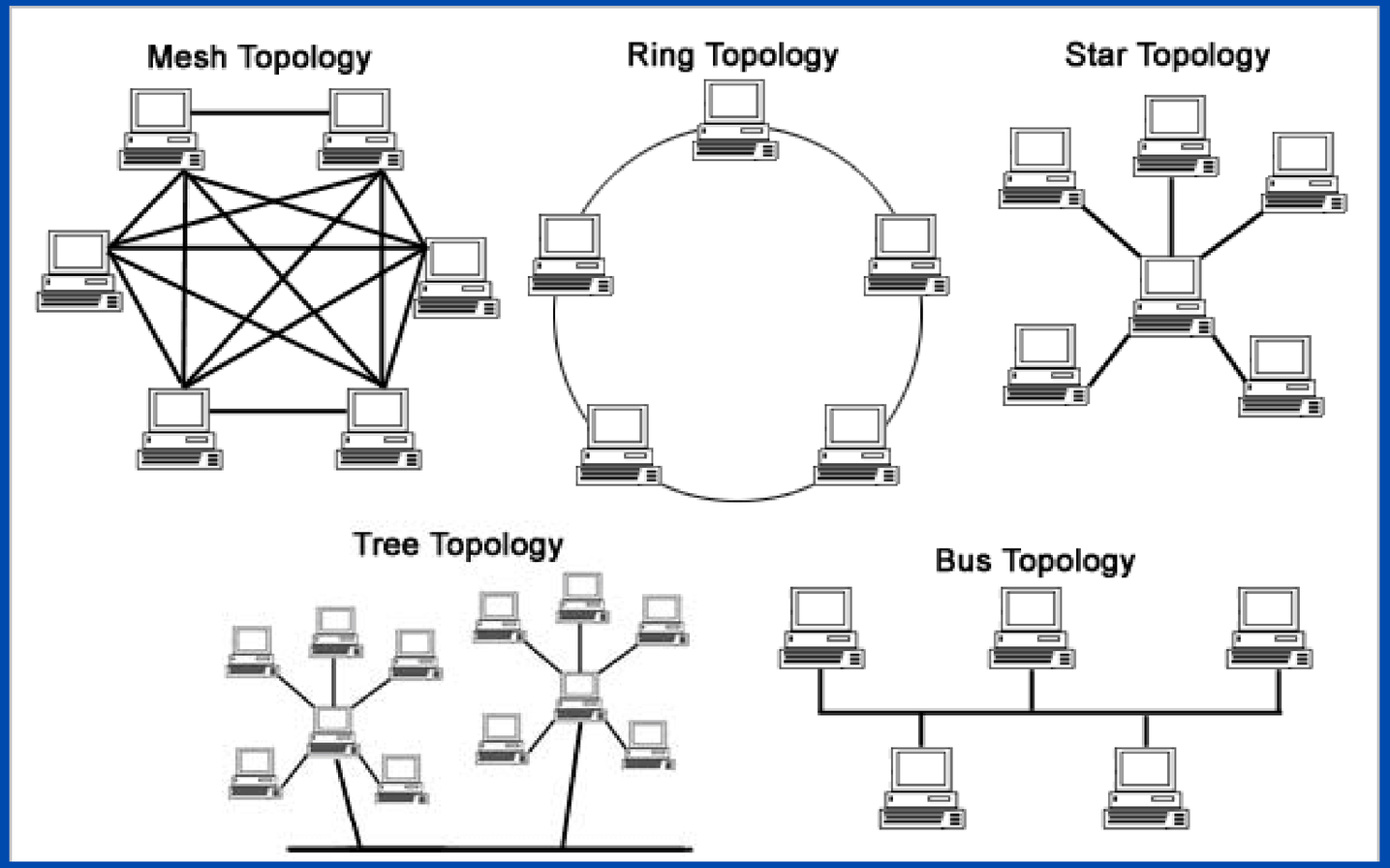
Network Topologies

Network topologies refer to the physical or logical layout or structure of a computer network. They define how devices and nodes in a network are connected to each other. There are several common network topologies, each with its own advantages and disadvantages.

- Bus Topology
- Star Topology
- Ring Topology
- Mesh Topology
- Tree (Hierarchical) Topology

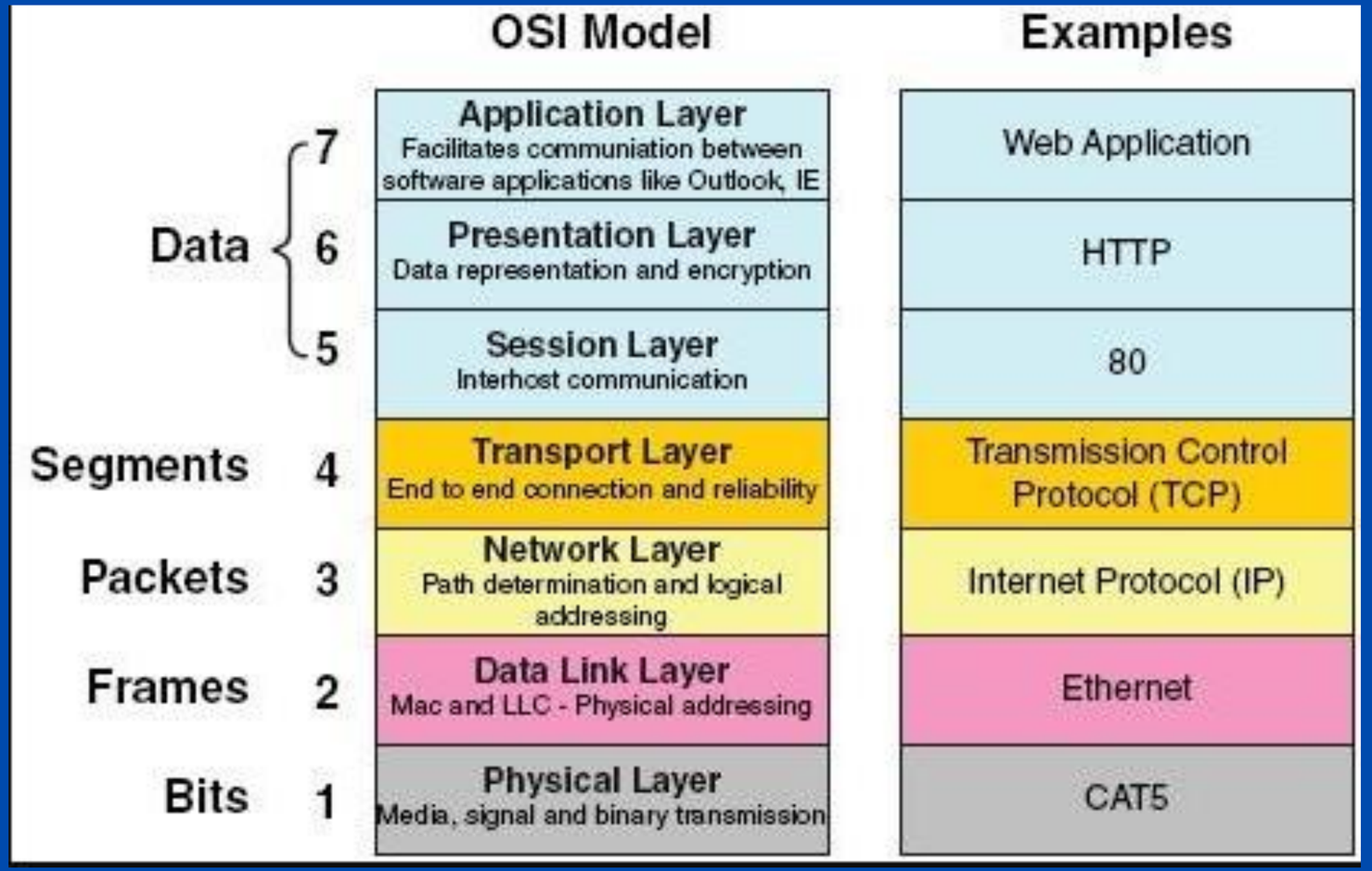
- Hybrid Topology
- Point-to-Point Topology
- Full-Mesh Topology

choice of network topology depends on factors such as the network's size, cost constraints, scalability requirements



Network Layer

The OSI (Open Systems Interconnection) model is a conceptual framework that standardizes the functions and processes of computer networking. It divides the complex task of network communication into seven distinct layers, each with its own specific functions and responsibilities. The OSI model serves as a reference model to understand and describe how different networking protocols and technologies interact within a network



2. Protocols and Standards

- The Internet relies on a set of standardized protocols and communication rules to ensure interoperability between different devices and networks.

- The Transmission Control Protocol (TCP) and Internet Protocol (IP) are fundamental protocols that govern data transmission and routing on the Internet, collectively referred to as TCP/IP.

3. IP Addresses

- Every device connected to the Internet is assigned a unique numerical address called an IP address. IP addresses are used to identify devices and route data packets to their destinations.

- There are two main versions of IP: IPv4 and IPv6, with IPv6 designed to address the limitations of IPv4, such as the exhaustion of available addresses.

4. Domain Name System (DNS)

- DNS is a system that translates human-readable domain names (e.g., www.example.com) into IP addresses. It simplifies the process of locating resources on the Internet.

- DNS servers maintain a distributed database of domain name-to-IP address mappings.

5. Packet Switching

- Data transmitted over the Internet is broken into small packets. These packets travel independently through the network and are reassembled at their destination.
- Packet switching allows for efficient use of network resources and robustness against network failures.

6. Internet Service Providers (ISPs)

- ISPs are organizations that provide Internet connectivity to end-users and businesses. They operate the infrastructure that connects users to the broader Internet.

- ISPs connect to each other through peering agreements to enable global connectivity.

7. Internet Backbone

- The Internet backbone consists of high-capacity, long-distance fiber optic cables and network nodes that serve as the primary infrastructure for transmitting data across continents.

- Tier 1 ISPs form the core of the Internet backbone.

8. Content Delivery Networks (CDNs)

- CDNs are distributed networks of servers strategically placed around the world to deliver web content, such as web pages and multimedia, faster and more efficiently to users.

- Popular CDNs include Akamai, Cloudflare, and Amazon CloudFront.

9. Global Connectivity

- The Internet's global connectivity is achieved through a combination of undersea cables, satellite links, and terrestrial networks.
- It allows users to access resources and communicate with others worldwide, transcending geographical boundaries.

10. Security and Encryption

- Security is a critical aspect of Internet architecture. Encryption protocols like HTTPS and VPNs are used to protect data in transit.
- Firewalls, intrusion detection systems, and other security measures help safeguard against cyber threats.

The Internet's decentralized and scalable architecture has enabled it to become a transformative force in modern society, supporting a wide range of applications and services, from email and web browsing to e-commerce, social networking, and cloud computing. Its global connectivity has connected people, businesses, and information across the globe, making it an integral part of our daily lives.

Internet Vs WWW (World Wide Web)

The terms "Internet" and "World Wide Web" (WWW) are often used interchangeably, but they refer to different concepts within the realm of computer networking and information sharing.

Definition: The Internet, short for "interconnected networks," is a global network of networks. It is a vast and decentralized infrastructure that connects millions of devices, including computers, servers, routers, and more.

Purpose: The primary purpose of the Internet is to provide a means for devices and networks to communicate and exchange data. It serves as the foundation for various services, applications, and protocols.

Key Characteristics: Decentralization, Protocols, Global Reach, Infrastructure

THE WWW

The World Wide Web, often abbreviated as the WWW or simply the web, is a system of interlinked documents and resources that are accessed via the Internet. It is a subset of the Internet.

Purpose: The primary purpose of the WWW is to provide a user-friendly and visually appealing way to access and share information on the Internet. It's a collection of multimedia content, documents, web pages, and web applications.

Key Characteristics: Hyperlinks, Web Browsers, Uniform Resource Locators, HTML and HTTP

In summary, the Internet is the vast global network infrastructure that connects devices and networks worldwide, while the World Wide Web is a subset of the Internet that consists of interlinked web pages and resources designed for information sharing and interactive browsing. The WWW is just one of many services and applications that rely on the Internet for connectivity and data exchange.

LET’S CREATE THE WEB