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Network architectures refer to the structural design and organization of a computer network. There are several commonly used network architectures, each with its own characteristics and advantages.

Here are some of the main network architectures:

1. Peer-to-Peer (P2P) Architecture:

In a peer-to-peer network, devices are connected directly to each other without the need for a central server. Each device can act as both a client and a server, allowing users to share resources, files, and services directly with each other. P2P architectures are often used for file sharing, decentralized applications, and collaboration among a small group of devices.

2. Client-Server Architecture:

In a client-server architecture, the network consists of clients and servers. Clients are end-user devices, such as computers or smartphones, that request services or resources from servers. Servers are powerful computers or systems that provide services or resources to clients. This architecture allows for centralized management, scalability, and efficient resource sharing. Client-server architectures are commonly used in enterprise networks, web hosting, email systems, and centralized database systems.

3. Tiered Architecture:

Tiered architecture, also known as a three-tier architecture, divides the network into three layers: presentation layer, application layer, and data layer. The presentation layer handles the user interface, the application layer handles business logic and processing, and the data layer manages data storage and retrieval. This architecture provides modularity, scalability, and separation of concerns. It is often used in web applications, where the web browser acts as the presentation layer, application servers handle application logic, and databases serve as the data layer.

4. Hierarchical Architecture:

Hierarchical architecture organizes the network into multiple hierarchical layers, typically including core, distribution, and access layers. The core layer handles high-speed backbone connectivity, the distribution layer provides routing and policy enforcement, and the access layer connects end devices to the network. This architecture offers scalability, centralized management, and efficient traffic flow. Hierarchical architectures are commonly used in large enterprise networks and internet service providers (ISPs).

5. Mesh Architecture:

Mesh architecture connects devices in a network with multiple interconnected paths. Each device in the network can communicate directly with other devices, forming a mesh of connections. Mesh architectures provide redundancy, fault tolerance, and flexibility in routing. They are used in wireless mesh networks, sensor networks, and critical infrastructure networks where reliability and self-healing capabilities are crucial.

6. Virtual Private Network (VPN):

VPN is not a specific network architecture but a technology that enables secure communication over a public network, such as the internet. VPNs create an encrypted tunnel between the client and server, ensuring confidentiality and privacy of data transmission. VPNs are widely used to establish secure remote access connections, connect geographically dispersed networks, and protect sensitive data.

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