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Introduction to Computer Network Architectures by Imran Zafar

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Network architecture means design of computers, devices and media in a network. The computer network can be designed using different ways. The most popular network architectures are described below.

File-Server Network:

In File-Server computer network, a powerful computer having disk with large storage capacity and processing power is installed as central computer. This central computer is known as File-Server, Network Server, Application Server or simply a Server. A File-Server stores and manages files. The data files and software are stored on the Server. The individual computers on a network, called nodes, access the data files and software on the Server. It means that, the File-Server is used to store files and to forward them to nodes that request for them.

Client/Server Network:

Client/Server model is the most popular network model. It is also known as dedicated server model. In client/server network (or arrangement), a powerful computer is used as server. The server controls the functions of network. In addition to control the network, the server also provides a centralized storage area. The software and databases are stored on the server. Different nodes or computers connected to the network can access these software and databases.

All computers (other than computer server) connected in the network are called clients. The clients send requests to the server. Server receives the requests from clients and takes proper actions on these requests. It means that processing is usually done by the server. The results of processing are sent to the clients. Client/Server network may be LAN or WAN.

For example, in a Client/Server network, a database is stored on the Server and the Client computers access the database. The Server portion of the DBMS (Database Management system) is stored on the Server that allows the Clients to add information in database or extract information from database. Similarly, the client portion of DBMS is stored on each Client computer through which request is sent to the Server to access the database. The Server processes the data and sends the result-to the Client computer.

Advantages:

The client/server network has the following advantages.

It reduces the volume of data traffic on the network.

It allows faster response at each node.

It allows using less expensive computers as clients because most of the work is done by server.

Disadvantages:

The main disadvantage of this network is that the entire network is affected if there is any problem in the server computer.

Peer-To-Peer Network:

In peer-to-peer (P2P) arrangement, all nodes (or computers) on the network have equal status. No one has control over others. It means that there is no central computer to control other computers on the network. Each computer stores files on its own storage devices and has its own peripheral devices. The users can share each other's data and devices (or resources) as and when needed. For example, a printer attached with any computer can be used by all computers connected in the network.

Peer-to-Peer network is used in small offices or schools, where primary purpose of the network is to share storage and printers. A Peer-to-Peer network can also include a Server. In this case, a Peer-to-Peer local area network is similar to a File-Server network.

Advantages:

The main advantages of peer-to-peer model are:

It is useful in small offices.

It is easy to design and to maintain.

Disadvantages:

The main disadvantages of peer-to-peer model are:

It becomes slow under heavy use.

It does not provide the security to protect the data stored on computers connected in the network.

Hybrid Network Model:

The hybrid network has combined features of both client/server and peer-to-peer network (or arrangements) models. It also has a server. The users can share the data and software. Similarly, each node can store its own files, programs, and has its own peripheral devices. The users can also share each other's data and devices. These are the main advantage of hybrid arrangement.

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Imran Zafar writes articles about computer basics and database management such as a elements of communication, a database development and a semantic objects.

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