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Understanding Data Communications

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Types of Computer Network Architecture

A network is the interconnection of one or more computer devices associated with IT for the purpose of sharing information and resources. Within the world of networking there are four types of networks:-

Types of Computer Networking

Terminal to Host

- Mainframe & Mini Computer environment

Peer-to-Peer

- Distributed Mini & PC LAN environment

Client/Server

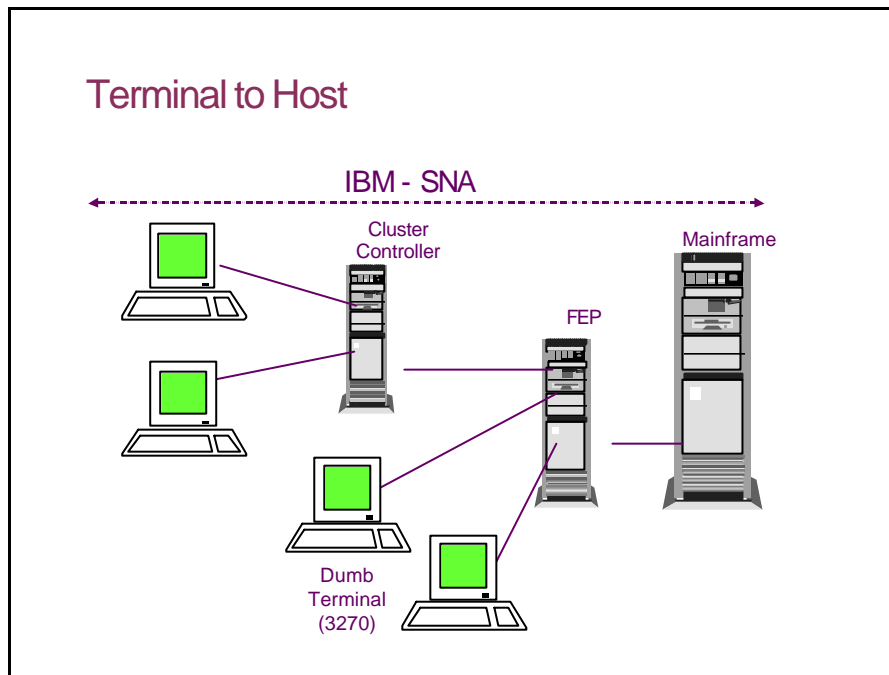
- LAN environment

Network Computing

- Client/Server & Mainframe

Terminal to Host

Terminal to host computing is a system where all computing is performed by a central mainframe called a host. The Mainframe is very capable at processing data, but for communications additional equipment is required. Situated in front of the Mainframe is the Front End Processor, this handles all communications either directly with terminals or via Cluster Controllers where more than one terminal may be situated at a remote site. The terminals are dumb devices with no capabilities beyond basic video display and keyboard input acceptance. When using a terminal/host system, the user inputs information via the keyboard. This information is sent to the host for processing. Then the host returns information, which is displayed on the screen. Many libraries and research facilities use this type of computing system to provide access to card catalogues, records databases, and other bulk information systems.



We see this type of transaction takes place where mainframes and mini are found at centralised locations. This allows for total control of resources both human & software i.e. applications, information storage, back-up & resilience.

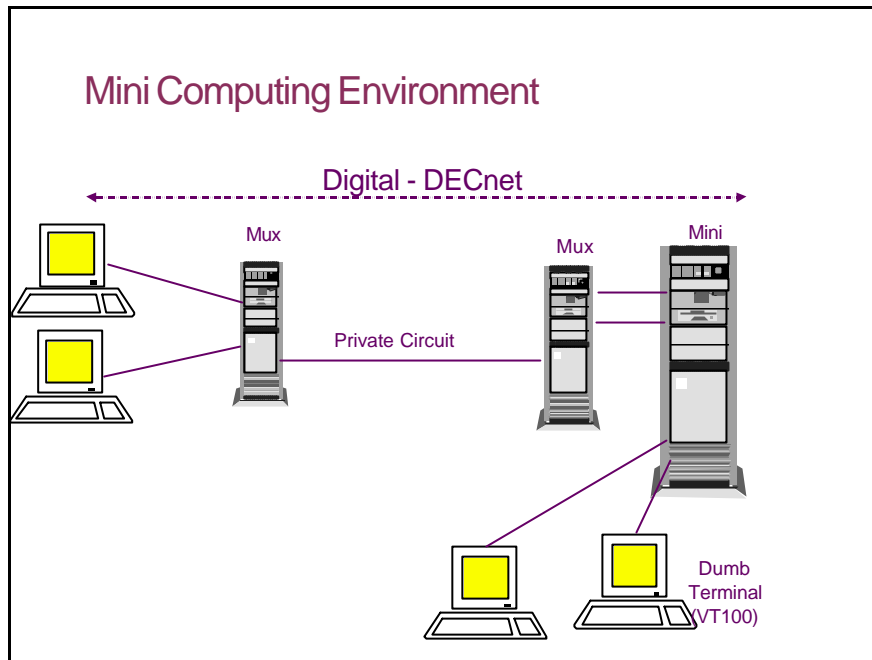
Terminal to Host in IT compares with Multiplexing for Datacomms utilising in many cases private circuits for networking. It is worth noting that SNA etc is VERY time critical and delay intolerant.

Many Mainframe applications are written in Common Business Oriented Language - **COBOL**

In today's Mainframe environment, the multi-functionality of the PC allows for the emulation of the dumb terminal, but with the intelligence to connect to a LAN for purposes of interconnection to the host system.

The Mini environment

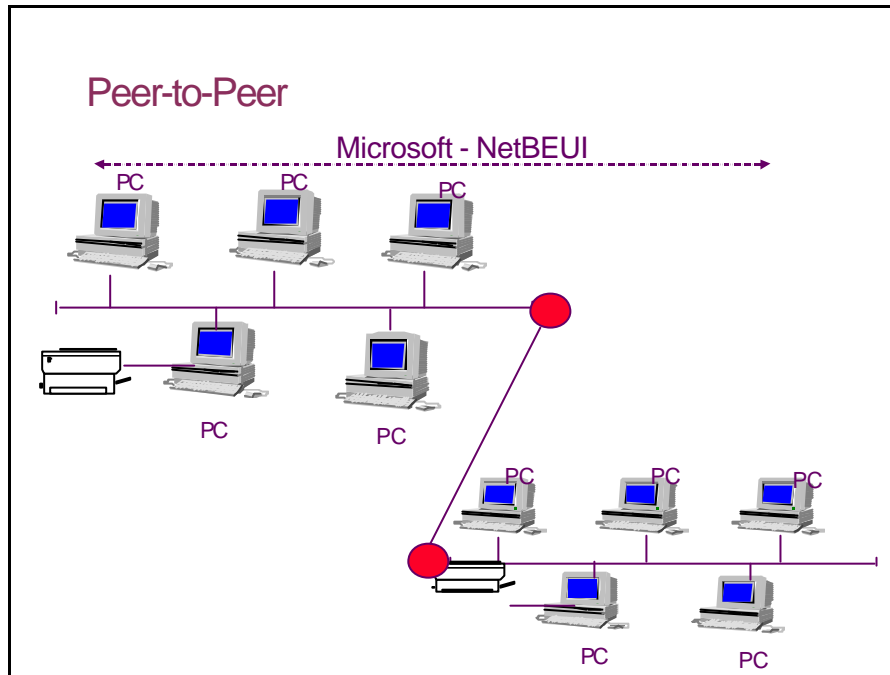
In the Mini computer environment, we see a similar topology to that of the Mainframe. To Link the remote devices back to the Mini is achieved through Multiplexed links for efficiency.



Peer to Peer

A peer to peer network is very much like it sounds: a network of peers. Every machine attached to a peer to peer network has the same access rights as every other machine on the network; no centralised location exists for applications. A peer to peer network can also be considered as a collection of computers that share information equally, where no one machine is the centre of the network.

Many operating systems support peer to peer networking. Some of these systems include Mac OS, OS/2 Warp, Windows for Workgroups, Windows 95, 98, 2000 and Windows NT Workstation.

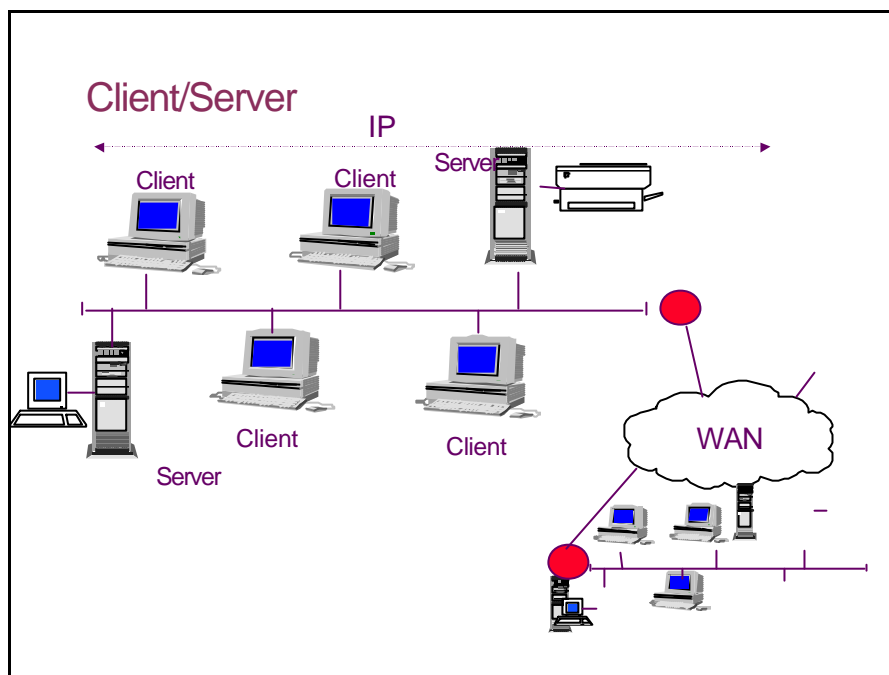


This type of network has its pros and cons:-

Pros	Cons
<ul style="list-style-type: none"> Can be beneficial to small collection of PCs It's inexpensive It's easy to set up and maintain It enables sharing of data and resources 	<ul style="list-style-type: none"> Limited capacity Can support no more than about 10 users No central control facility No overall security Difficult to connect variant platforms and operating systems Difficult to perform effective backups

Client/Server

The client/server network is a collection of computers (servers) that hold shareable resources and computers (clients) that access these resources from the servers which can then be manipulated. This type of network uses a rigid authority structure to manage and maintain resources. Some computers are designated to store, process and distribute data and resources - these machines are called servers. Other, and often more numerous, computers are designated to access and use the data and resources managed by the servers - these machines are called clients. This type of network is designed around the convention that applications and data are stored on one or more servers that users can access from any of the clients. Each client has a specific level of access that enables them to use, view, or manipulate data on the server. The relationship is similar to that of waiter and customer, you request items and the server brings them to you.



The client/server networking scheme has many advantages over peer to peer networking such as:

- Central control and storage of data, thus making security and backups possible
- Easier to connect different platforms and operating systems
- Unlimited capacity
- Unlimited users
- Consistent and manageable version control of both applications and data.

Client/server networking provides additional local processing power over a terminal to host solution which can be most cost effective if the source of data has to be accessed over a wide area (WAN).

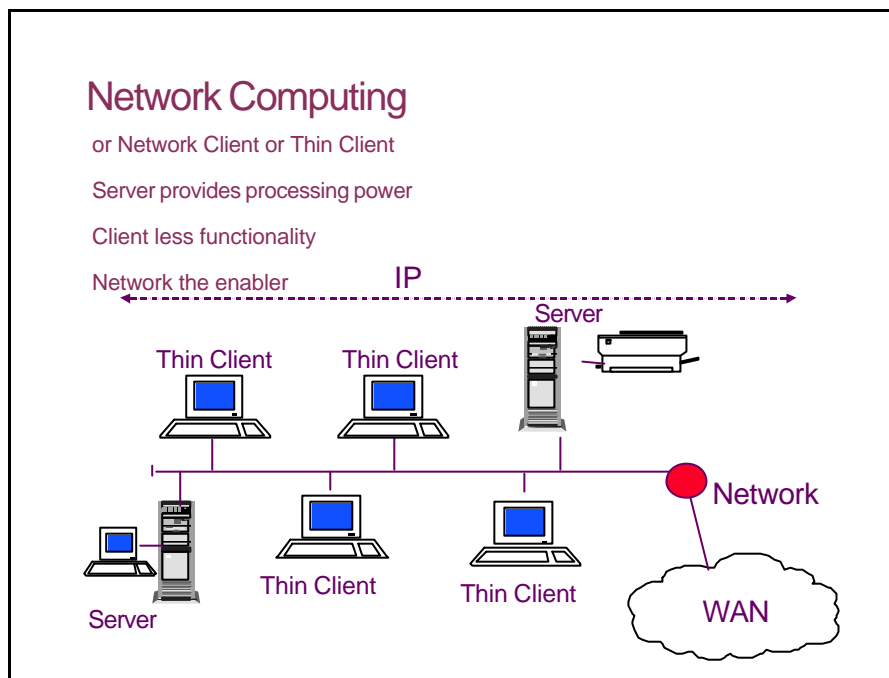
Client/server networking is a solid computing solution that has developed in various forms around the globe, from single -server, single-client units to set-ups made up of thousands of servers and millions of clients in global communities (The Internet).

Network Computing

It is interesting to note that a new trend is developing in Client/Server environments where the use of server side executables, Java, Web based applications and cheap network terminals, where the responsibility for computing power is returning to the server (host).

This type of working is sometimes known as Network Computing or Network Client or Thin Client.

The Client has reduced functionality making it less expensive, where the Server provides the processing and information holding. The Network therefore becomes the enabler for applications to be run.



NOTE:

1. Total reliance on the network connection to support working applications (as well as user files) makes Quality of Service mission critical.