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Unit: Data, Networks And The Web

Unit Code: CMP1017

Assignment Number: 2

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LAN – Local Area Network

Classification:

A LAN, is a collection of terminals(computers), and devices which are connected together. The resources on the network can be shared around the connected terminals/ devices. LAN's can range from just 2 terminals and a printer, to 50, 100 etc.

Operation

A LAN passes information between devices, such as computers, printers, scanners etc. The data will then be accepted by the device it is intended for, and a response will be sent to the device/terminal that sent the initial data.

Topology

Physical, and Logical Topologies are not always the same! A physical Topology is how the wires are connected in the real world, however a logical Topology is how the data is passed around the network, depending on what protocols it uses etc.

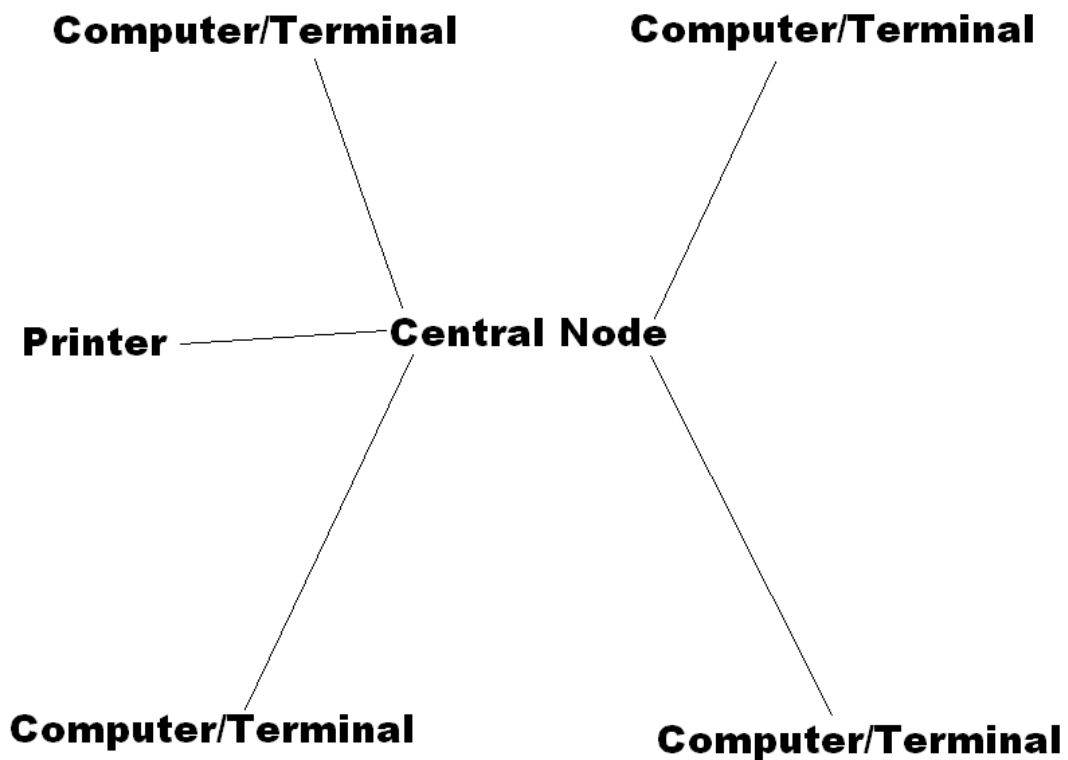
A common example of this, is that most physical star Topologies, are logically a ring Topology.

(Peter Hodson, 1997) “The physical layout of cabling in LANs has seen significant change in the last decade. Basic topologies still exist to support the individual approach that the various network standards offer. However these basic topologies frequently exist in a physical structure that looks somewhat different from the logical structure that the standard indicates. Those changes have largely occurred as LANs have grown larger and the need to find an efficient method of managing the installation has become a necessity.” (P52).

A LAN uses 3 main types of Topology:

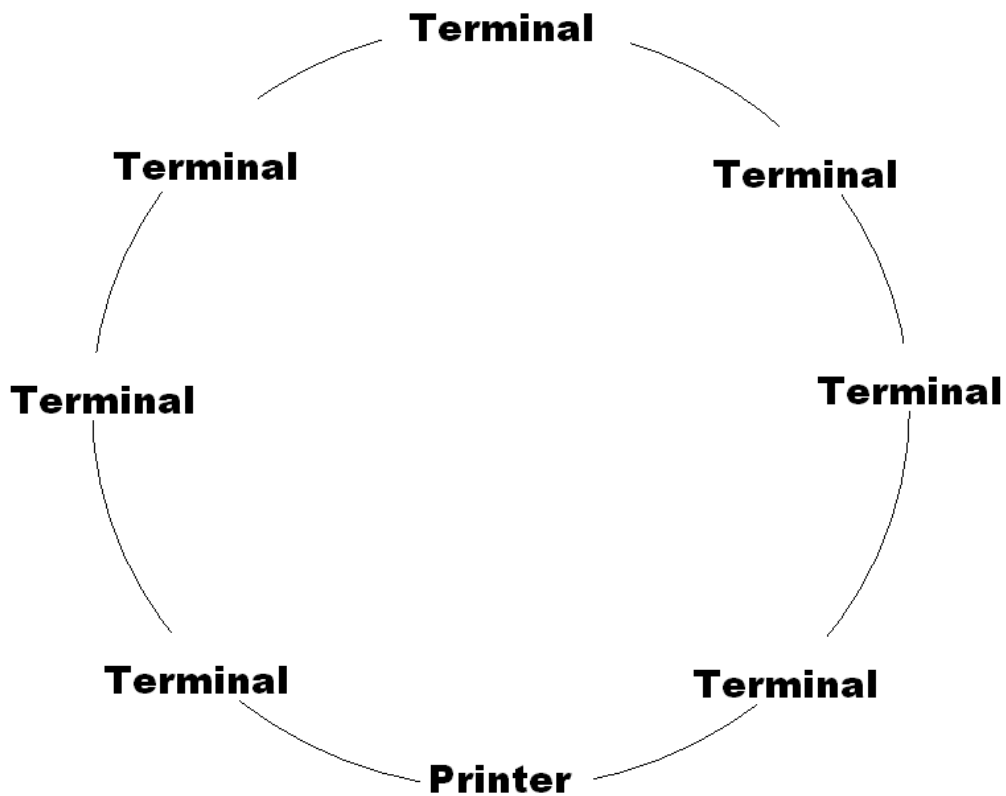
Star – A star Topology has one central node, which every other device is connected to, all communications are sent to each device/terminal on the network, and they can then respond to the central node. This is somewhat reliable, for example if one wire were to break then the connected device would be isolated from the network and the other terminals would continue to function, however if the central node were to fail so would the rest of the network.

See Diagram:



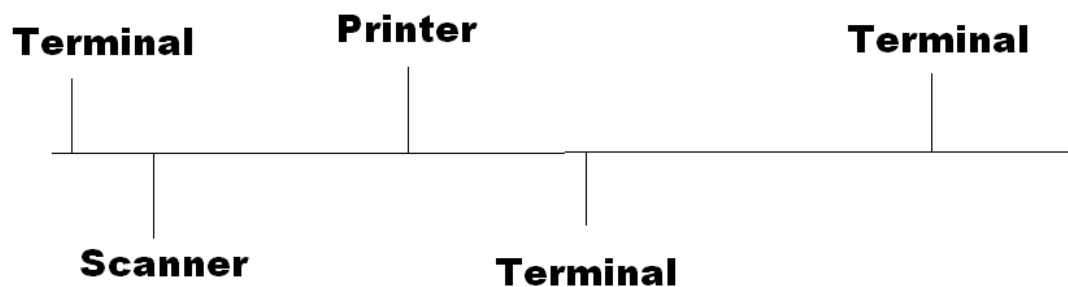
Ring – A ring Topology is a connection of devices which pass data from one, to the next in either a clockwise or anti-clockwise direction. This network is slower than some as data must be passed between each computer, it cannot simply travel to its destination. If one terminal/device breaks the entire network will go down.

See Diagram:



Bus – Bus Topology is constructed by a row (or two) of devices, data is passed from one end of the bus to the other, and is terminated once it reaches the end so that it does not echo back into the network. All devices on the network can see the data being transmitted, however do not accept it unless it is intended for them, e.g. a terminal may send a print request to a printer, all computers on the network will see this, but only the printer will accept it. If this type of network is broken, then the network can continue to function on its own.

See Diagram:



Uses

A LAN can be used for many things, some examples of which are:

- ❖ A Print Server – Each person with the correct permissions will be able to share one printer.
- ❖ A File Sharing Server
- ❖ Internal Email Server
- ❖ Media Streaming
- ❖ Central Server With Resource Sharing

A central server is useful for colleges, companies etc. It allows one server to contain all the software, licenses, data, etc and let other terminals access them, for example Adobe Photoshop could have 50 licenses, and at any one time only 50 people could use the application.

(Peter Hodson, 1997) “The central server approach clearly offers the organisation enormous benefits in creating genuine corporate data. Both data and application software can be accessed or down-loaded to local workstations by authorised users as appropriate. It offers the organisation the opportunity to keep control of software releases, and exercise control to act legally in terms of the number of product licenses purchased (and the number o users attempting to use the product simultaneously). ” (P45).

(June Miles, 1987b) “Resources can be shared to give all departments access to all facilities. This results in more efficient utilization of devices that are otherwise used at only a small percentage of their capability.” (P169)

Time sharing is also a useful asset, allowing computer resources to be shared between specific people, for example the load on a printer may be shared by looking at the different levels of access a user has, an admin could have the ability to print there documents, even if 20 other people have sent their jobs first.

LAN’s can be used in many different places, usually contained to a specific building, or site, e.g.:

- ❖ At Home
- ❖ A School
- ❖ A College
- ❖ A Business (Small to Medium, Maybe Large)

MAN – Metropolitan Area Network

Classification

A MAN is a larger version of a LAN, it connects groups of LAN's together. It can be used in a small area, such as with a large enterprise, or across a city. Its range can stretch up to 50km. Using special copper, and fiberoptic cables high transfer speeds can be obtained.

Operation

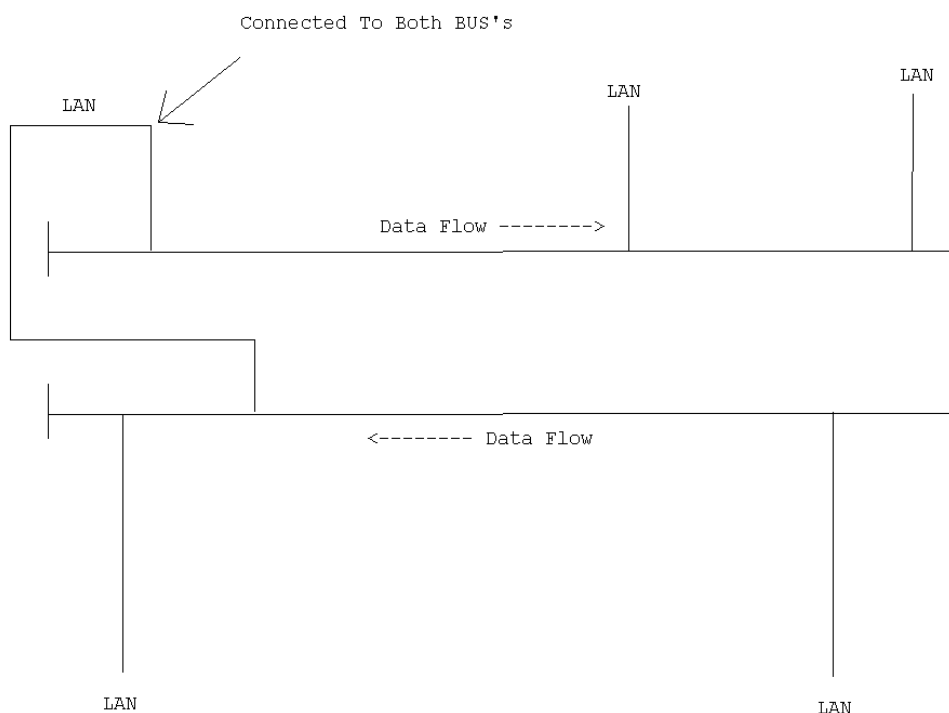
A MAN works similarly to a LAN however on a much larger scale, it allows the sharing of resources, internet access etc

Topology

The physical Topology of a MAN is dependant on the area it is in, for example a small area may represent a bus, while a large area may represent a ring, or star Topology.

Logically the Topology of a MAN, is in the form of a dual bus.

See Diagram:



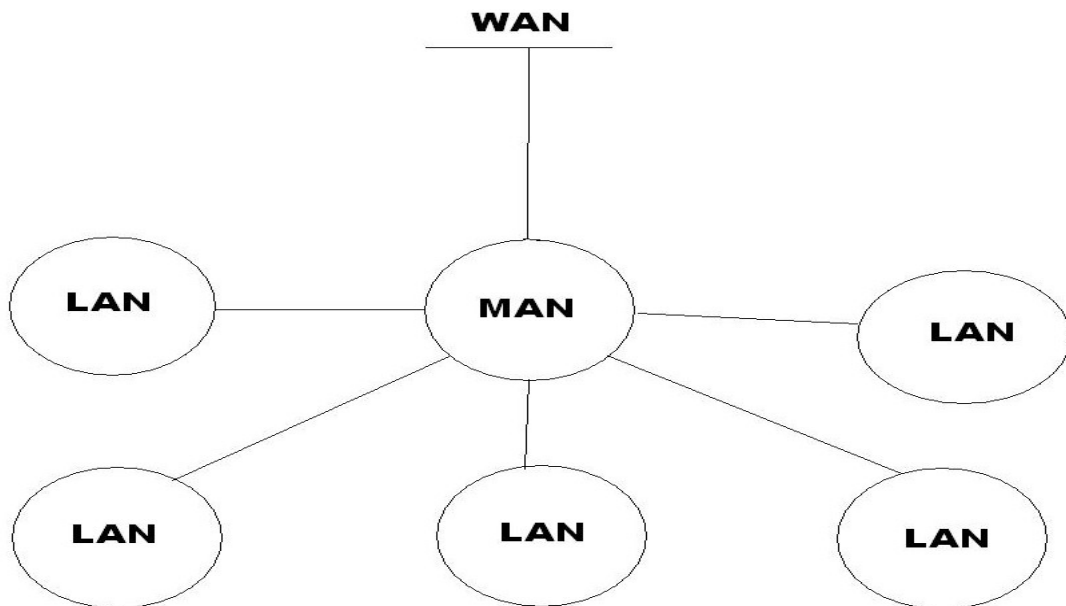
Dual Bus Topology, is comprised of two bus's, passing data in opposite directions, the reason two bus's exist is in case one fails, a Company, University etc can decide to connect to a single bus, or both, connecting to both is more costly, but provides more reliability.

Uses

MAN's can be connected to WAN's and supply fast internet to sites within the MAN, for example in a university, college, business.

Resources can be shared among an area, e.g media streaming, file sharing etc. It is also possible to provide wireless connectivity to an area.

See Diagram:



One example of MAN's in action is with "The JANET" which has 19 different MAN's over the UK connected (This can also be classed as a WAN however).

More Info At: <http://en.wikipedia.org/wiki/JANET>

WAN – Wide Area Network

Classification

A WAN is a network which contains several MAN's and LAN's, it will cover countries, and even continents. It allows all computers on the network to communicate directly with each other, sharing information, resources etc.

Operation

WAN is much slower than a LAN or MAN, and is more costly to implement, with larger amounts of cabling etc needed. It generally runs over public telephone, and data networks, however can be used on private rented lines.

It works in a similar way to LAN and MAN however on a much larger scale.

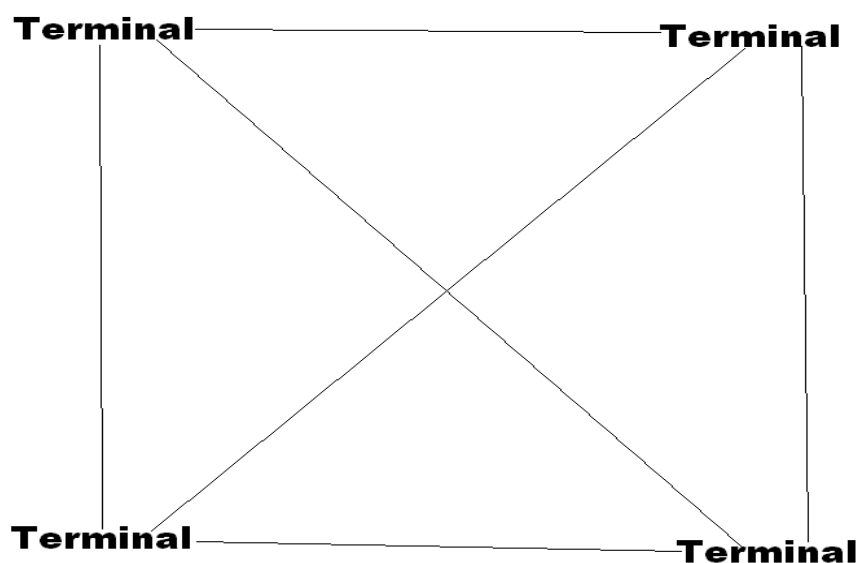
Topology

The type of Topology that a WAN uses is dependant on several issues, including the size of the WAN and the distance it is spread over. It however uses, Ring, Star and Mesh Topologies.

Mesh – A mesh allows every computer on a network to see, and talk to each other. This means that for example a computer in London can talk with a computer in Sydney. If part of the network is down, it is possible for data to flow up an alternative path.

(Mark Norris, Steve Pretty) “In this topology, every site is able to communicate with every other site.” (P113).

See Diagram:



Uses

A WAN has many uses, it can connect sites all around a country, or around the world, an example of this would be a world bank such as HSBC, with has sites in almost every country, all of which are connected.

A WAN can be connected into MAN's allowing fast internet access to be provided to Cities, Campuses etc.

The Internet is a type of WAN, in which all the servers, networks etc are connected together to provide information, services etc.

WWW – World Wide Web

The WWW is different to the Internet, however is commonly confused as the same thing! The internet is a WAN. The WWW is something which runs over the internet.

(Frances Blomeley, 1994) “In WANs such as JANET and the Internet, the two communicating hosts are separated by an intervening network path.” (P35).

Classification

The WWW, makes it possible for users to access and share information, such as WebPages over the internet. It uses HTTP (Hyper Text Transfer Protocol) which is one of many protocols available on the internet. The WWW works over the internet which is a WAN.

See Also:

http://www.webopedia.com/DidYouKnow/Internet/2002/Web_vs_Internet.asp

Operation

The WWW operates via the user inputting an address, it will then request the information from that address, and receive it, then display it in whatever format it is able to do so in.

See Also: http://en.wikipedia.org/wiki/World_Wide_Web#How_the_Web_works

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