

Network Types

Client-Server & Peer-to-Peer

Client-Server

An example of this is a typical mail client that accesses the mail server.

Peer-to-Peer model where clients and servers can play both roles is more used currently but this model can still be applied to applications where clients access the resources for information.

There is a strict client-server relationship with this example, where the client cannot serve mail because it was designed with one purpose, to act as a client.

Same as such with the mail server, it was designed with one purpose, to act as server.

If a firewall is involved, then you may have to open ports on the firewall for client connectivity. If there is a client-based firewall, then ports may need to be opened on the client side to egress the network.

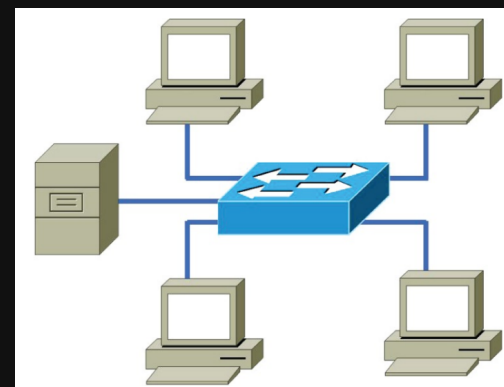
A peer is nothing more than a network node that can act as both a client and server at the same time.

This model breaks the strict client-server model because it allows a network host to access files and printers as well as serve them simultaneously.

Clients used the resources from the servers, such as printers or files, and servers only existed to serve the clients.

Servers were only servers and could only serve up printers or files and clients could only be clients and could not serve files or printers.

Local Area Network (LAN)



Wireless Local Area Network (WLAN)

A local area network (LAN) defines the company's internal network.

There should be little or no consideration for the placement of resources within the LAN.

LAN speeds "should" always be the fastest within your network design and can be internally upgraded as needed.

A wireless local area network (WLAN) is a company's internal wireless network.

The WLAN is a wireless extension of our wired local area network.

Wide Area Network (WAN)

A wide area network (WAN) is a network that interconnects your network location together via a provider over a "wide area."

These locations could be within the region or different regions of the world.

As is pertains to your infrastructure implementation, a consideration is the placement of your resource within your various networks that are interconnected.

This is mainly due to the fact that WAN connections usually operate at lower speeds than your internal networks.

So resources should be placed closest to the users.

They also could use different protocols than your internal networks do, so certain broadcast-based technologies might not work.

Metropolitan Area Network (MAN)

Type of WAN that's connected over a defined geographical area and has a higher connection speed between network locations via a provider.

The area could be a city or a few-block radius or region of a state.

The infrastructure implementation is similar to a WAN; the difference is the speed of the connection, because a MAN is built out by the provider as the backbone for your network locations.

As it pertains to your infrastructure implementation, the placement of resources is less of a concern because of the higher speeds between the locations.

Campus Area Network (CAN)

A campus area network (CAN) defines multiple buildings (LANs) that are connected together, all of which are locally managed by your company.

As long as you locally manage the connections between the buildings, it is considered to be a campus area network.

The CAN connects multiple LANs with a private communications infrastructure.

You should always take the speed between LANs into consideration for the placement of resources.

Generic Routing Encapsulation (GRE)

A protocol used to create a virtual tunnel over the Internet or an internetwork.

The GRE protocol only creates a tunnel between two routed points; it does not provide encryption. This is why it's used in conjunction with IPSec.

In practice, it is used all the time to create point-to-point virtual tunnels on the Internet. The Internet Protocol Security (IPSec) protocol is then employed to encrypt the transmission over the tunnel.

The problem with GRE tunnels is that a tunnel must be built for each endpoint and between endpoints. This isn't much of a problem if you have a few locations, but once you get more than a few routers it becomes extremely difficult to manage.

Multipoint Generic Routing Encapsulation (mGRE)

Multipoint Generic Routing Encapsulation (mGRE) solves problems with scale and complication of configuration.

The mGRE protocol allows an administrator to configure multiple GRE paths throughout the enterprise; it also allows branch offices to create logical tunnels between each office.

Still needs encryption

Software Defined Wide Area Network (SDWAN)

Software-defined wide area network (SDWAN) is another emerging WAN technology.

A network device consists of 3 planes

Data Plane

Where data is moved

Control Plane

Where data flow is controlled

Management Plane

Where the administrator manages the control plane.

SDWAN decouples the control plane from branch routers and centralizes the control plane at the SDWAN controller.

The SDWAN control now decides based upon congestion or application response.

This control allows an administrator to centrally control policies for branch office routers to prioritize and route traffic over an existing Internet connection or leased line.

Because SDWAN is application aware, it can differentiate between application traffic and intelligently control the flow of information over an Internet connection.

SDWAN can also be combined with traditional technologies such as virtual private networks (VPNs) to maintain access to centralized resources back at a corporate office.

Multiprotocol Label Switching (MPLS)

An emerging WAN technology that uses packet switching technology

It operates by adding MPLS labels to each packet generated from the customer and switching them in the provider's network.

This MPLS label allows the MPLS provider to packet-switch the data based on the label and not the layer 3 network addressing.

This is why MPLS is considered to work at layer 2.5; it is not a true layer 2 protocol because it is augmented with an MPLS label. It is also not a true layer 3 protocol since the destination IP address is not used for routing decisions.

It is considered a packet-switched technology and can be used across many different types of connectivity technologies, such as SONET, Ethernet, and ATM

MPLS is a great connectivity method for branch offices to a centralized corporate office. Cost is increased with the addition of each branch office, so at some point these lease lines become uneconomical.

Personal Area Network (PAN)

A personal area network (PAN) defines an ultra-small network for personal use.

Examples: smart watches, smartphones, and personal fitness devices transmit data back and forth.

A protocol often used with PANs is Bluetooth. However, PANs can use any protocol and any media.

They can be wired or wireless, as long as they enable communications for devices near the person and are used for personal access.

Storage Area Network (SAN)

The network reserved for storage access.

SANs often use dedicated switching equipment to provide low latency and lossless connectivity.

SANs often use redundant connections in the form of a partial mesh for fault tolerance.