

5.3.3: LANs, WANs, and the Internet

Overview of Network Components

The link between the sender and the receiver can be as simple as a single cable connection between these two devices or more sophisticated as a set of switches and routers between them.



Figure 5.3.3.1 Lan-wan Networks. Image by Stuart Gray is

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The network framework contains three classes of network segments:

- Devices
- Media
- Services

Devices and media are the network's physical components or equipment. Equipment includes, a PC, switch, remote passageway, or the cabling used to associate the devices.

The administration of a network involves managing various essential network applications that people use in their daily lives, such as email and web management functions. These applications use procedures to facilitate the movement of messages through the network. Although procedures may seem inconspicuous, they are critical to the operation of networks.

End Devices

An end device is the source or destination of a message transmitted over the network. Each end device is identified by an IP address and a physical address. Both addresses are needed to communicate over a network. IP addresses are unique logical IP addresses that are assigned to every device within a network. If a device moves from one network to another, then the IP address has to be modified.

Physical addresses, also known as MAC (Media Access Control) addresses, are unique addresses assigned by the device manufacturers. These addresses are permanently burned into the hardware.

Intermediary Network Devices

Some devices act as intermediaries between devices. They are called delegated devices. These delegate devices give availability and guarantee that information streams over the network.

Routers utilize the destination end device address, related to data about the network interconnections, to decide how messages should take through the network.

Network Media

A medium called network media carries the act of transport data. The medium gives the channel over which the message makes a trip from source to destination.

Present-day organizations basically utilize three sorts of media to interconnect devices and give the pathway over which information can be transmitted.

These media are:

- Metallic wires within cables (Copper) - information is encoded into electrical driving forces.
- Glass or plastic fibers (fiber optic cable) - information is encoded as beats of light.
- Wireless transmission - information is encoded utilizing frequencies from the electromagnetic range.

Various sorts of network media have various highlights and advantages. Not all network media have similar qualities, nor are they all appropriate for the same purpose.



Figure 5.3.3.2 Network Cables. Image by [blickpixel](#) from [Pixabay](#) is licensed [CC BY](#)



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Figure 5.3.3.3 Fiber Optic Cable. Image by [blickpixel](#) from [Pixabay](#) is licensed

Bluetooth

Bluetooth wireless technology enables devices to communicate over short distances without cables. It creates personal area networks (PANs) to link devices like smartphones, headsets, speakers, PCs, and cars. For example, Bluetooth allows you to stream music from your phone to wireless headphones, connect a printer to a personal computer, or connect a wireless keyboard and mouse to a computer.



Figure 5.3.3.4 Bluetooth combo wordmark 2011. Image by [House](#) is

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First created in 1994, Bluetooth has become the standard for wirelessly connecting peripheral devices. Key features like low power usage, wireless range up to 30 feet, and a widely adopted protocol make Bluetooth well-suited for these device pairing scenarios.

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