

Unit 2 : Transmission Media Multiplexing & Switching Concepts Network devices

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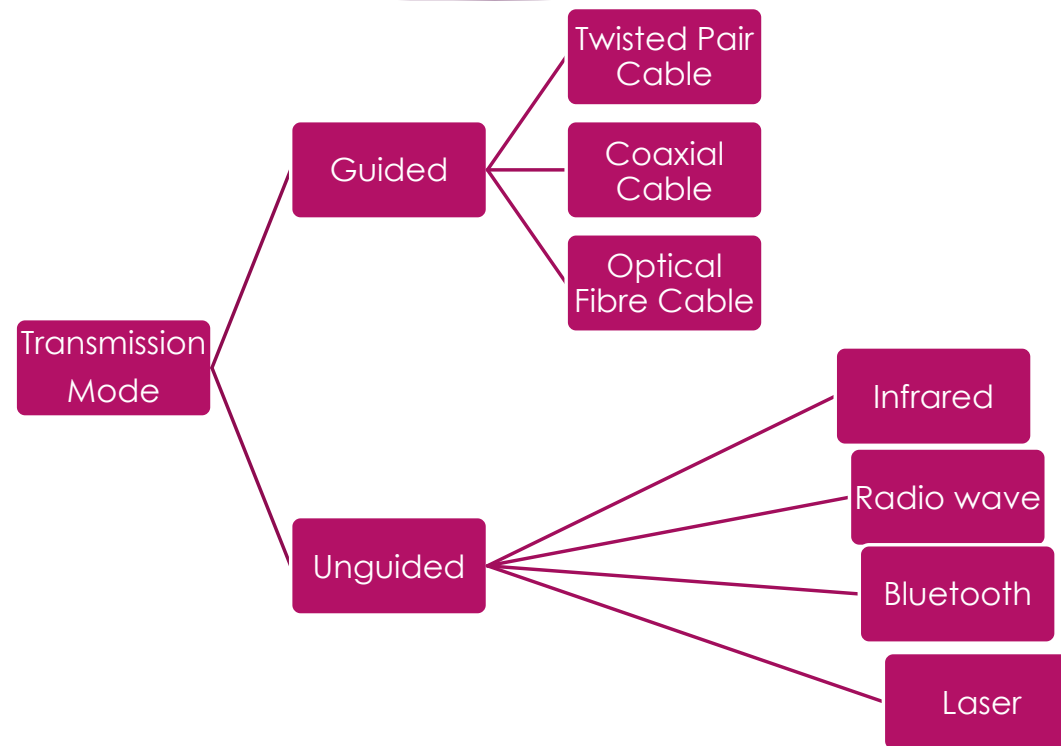
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Topics

- ▶ Transmission Media
 - Types of Transmission media - Guided media
 - Co – Axial Cable,
 - Twisted Pair Cable,
 - Crimping of Twisted pair cable - Fiber Optic Cable
 - Unguided media
 - Infrared, Laser, Radio, Microwave, Bluetooth tech.
- ▶ Different Frequency Ranges
- ▶ Multiplexing & Demultiplexing
- ▶ Multiplexing Types - FDM, - TDM, - CDM, - WDM
- ▶ Circuit Switching,- Message Switching, - Packet Switching
- ▶ LAN CARD, MODEM , DSL & ADSL HUB, REPEATER ,SWITCH,BRIDGE, ROUTER GATEWAY, Network Printer
- ▶ WIRELESS NETWORK DEVICES Wireless switch ,Wireless router, ACCESSPOINT

Transmission Mode



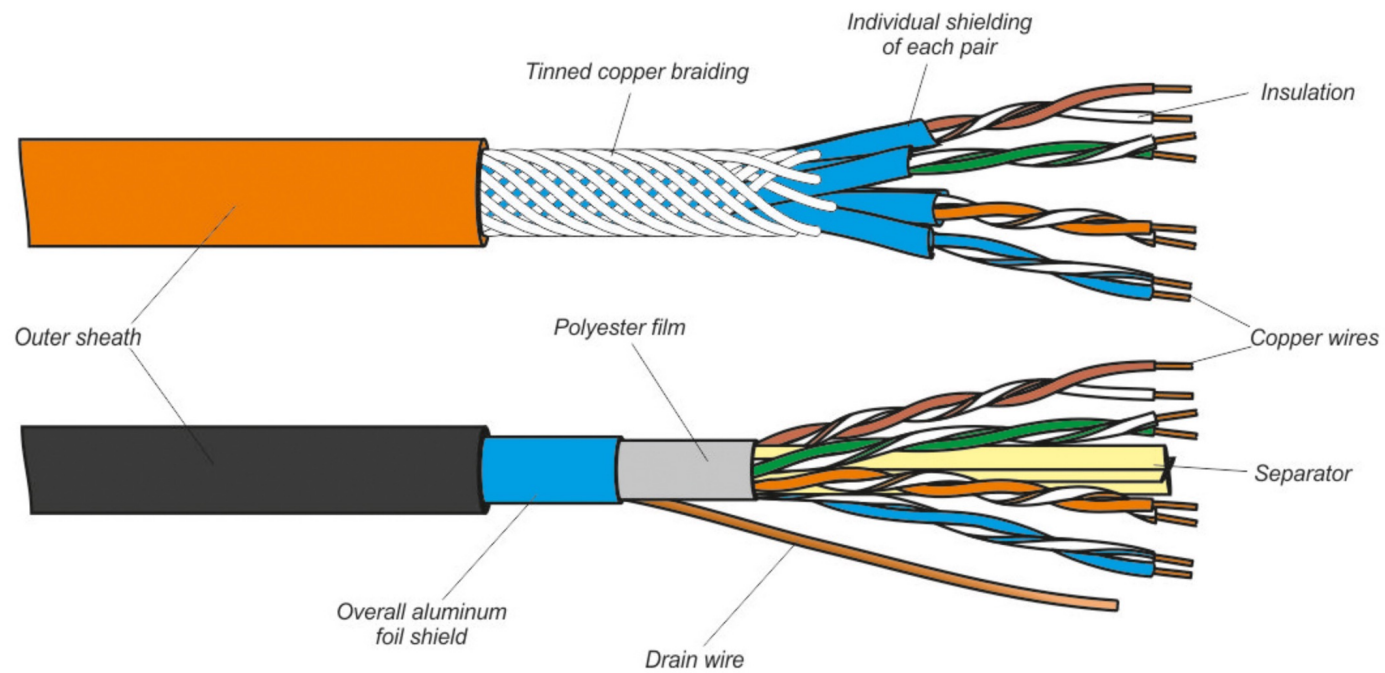
Guided Media

- ▶ It is also referred to as Wired or Bounded transmission media. Signals being transmitted are directed and confined in a narrow pathway by using physical links.
- ▶ Features:
 - ▶ High Speed
 - ▶ Secure
 - ▶ Used for comparatively shorter distances

Twisted Pair Cable

- ▶ It consists of 2 separately insulated conductor wires wound about each other. Generally, several such pairs are bundled together in a protective sheath. They are the most widely used Transmission Media.
 - ▶ **Unshielded Twisted Pair (UTP):** This type of cable has the ability to block interference and does not depend on a physical shield for this purpose. It is used for telephonic applications.
 - ▶ **Features:** Least expensive, Easy to install, High-speed capacity, Susceptible to external interference, Lower capacity and performance in comparison to STP, Short distance transmission due to attenuation
 - ▶ **Shielded Twisted Pair (STP):** This type of cable consists of a special jacket to block external interference. It is used in fast-data-rate Ethernet and in voice and data channels of telephone lines.
 - ▶ **Features:** Better performance at a higher data rate in comparison to UTP, Eliminates crosstalk, Comparatively faster, Comparatively difficult to install and manufacture, More expensive, Bulky

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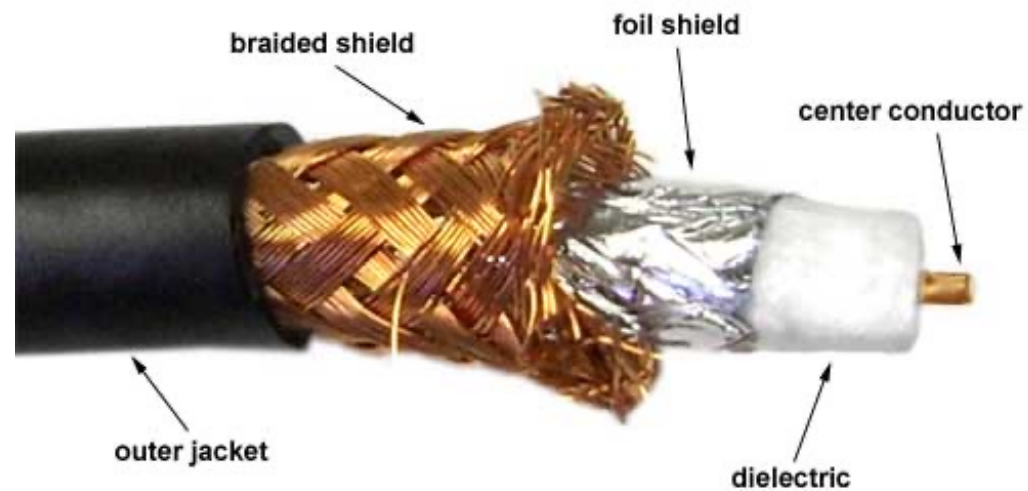


Coaxial Cable

- ▶ It has an outer plastic covering containing 2 parallel conductors each having a separate insulated protection cover. The coaxial cable transmits information in two modes: Baseband mode(dedicated cable bandwidth) and Broadband mode(cable bandwidth is split into separate ranges). Cable TVs and analog television networks widely use Coaxial cables.
- ▶ **Advantages:**
 - ▶ High Bandwidth
 - ▶ Better noise Immunity
 - ▶ Easy to install and expand
 - ▶ Inexpensive
- ▶ **Disadvantages:**
 - ▶ Single cable failure can disrupt the entire network

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COAXIAL CABLE



Unguided Media

- ▶ It is also referred to as Wireless or Unbounded transmission media. No physical medium is required for the transmission of electromagnetic signals.
- ▶ **Features:**
- ▶ The signal is broadcasted through air
- ▶ Less Secure
- ▶ Used for larger distances

Radio waves

- ▶ These are easy to generate and can penetrate through buildings. The sending and receiving antennas need not be aligned. Frequency Range: 3KHz – 1GHz. AM and FM radios and cordless phones use Radio waves for transmission.
- ▶ Further Categorized as Terrestrial and Satellite.

Microwaves

- ▶ It is a line of sight transmission i.e. the sending and receiving antennas need to be properly aligned with each other. The distance covered by the signal is directly proportional to the height of the antenna. Frequency Range: 1GHz – 300GHz. These are majorly used for mobile phone communication and television distribution.

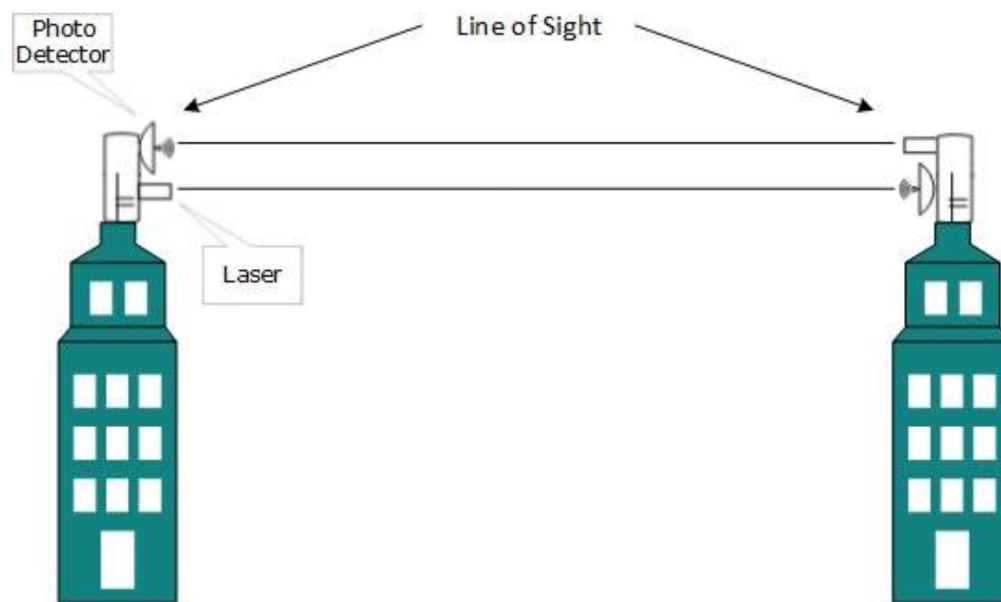
Infrared

- ▶ Infrared waves are used for very short distance communication. They cannot penetrate through obstacles. This prevents interference between systems. Frequency Range: 300GHz – 400THz. It is used in TV remotes, wireless mouse, keyboard, printer, etc.

Laser/Light Transmission

- ▶ Highest most electromagnetic spectrum which can be used for data transmission is light or optical signaling. This is achieved by means of LASER.
- ▶ Because of frequency light uses, it tends to travel strictly in straight line. Hence the sender and receiver must be in the line-of-sight. Because laser transmission is unidirectional, at both ends of communication the laser and the photo-detector needs to be installed. Laser beam is generally 1mm wide hence it is a work of precision to align two far receptors each pointing to lasers source.
- ▶ Laser works as Tx (transmitter) and photo-detectors works as Rx (receiver).
- ▶ Lasers cannot penetrate obstacles such as walls, rain, and thick fog. Additionally, laser beam is distorted by wind, atmosphere temperature, or variation in temperature in the path.
- ▶ Laser is safe for data transmission as it is very difficult to tap 1mm wide laser without interrupting the communication channel.

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Bluetooth

- ▶ The main function of the Bluetooth technology is that permits you to connect a various electronic devices wirelessly to a system for the
- ▶ transferring of data. Cell phones are connected to hands free earphones, mouse, wireless keyboard. By using Bluetooth device the
- ▶ information from one device to another device. This technology has various functions and it is used commonly in the wireless communication market.