Transmission Media

By

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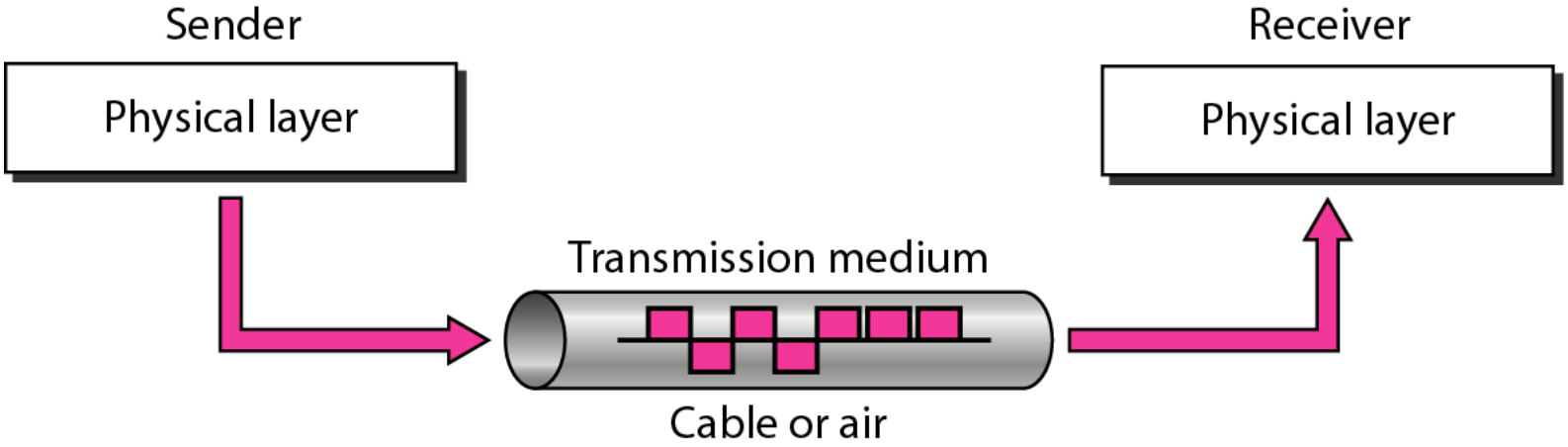
What is a Transmission Media ?



What is a Transmission Media ?

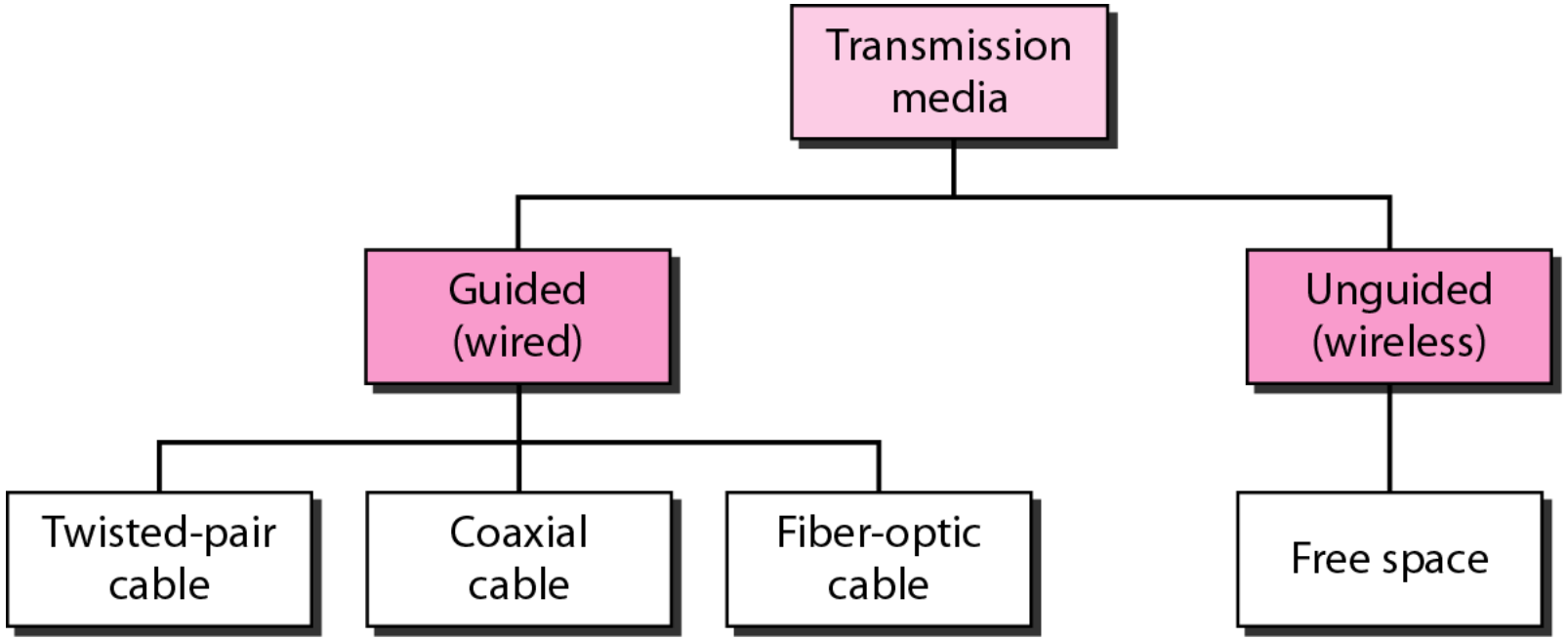
In data communication,

- ✓ **Transmission media is a pathway that carries the** Signals from sender to receiver
- ✓ It is located below the physical layer
- ✓ Computers produces Digital data
- ✓ Digital data is converted into Signals at Physical Layer

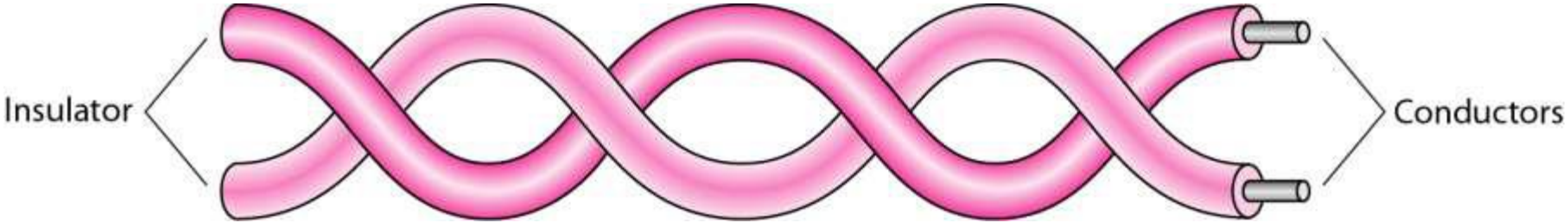
What is a Transmission Media ?

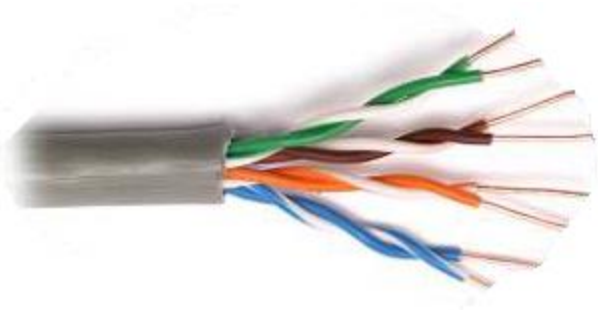
- ✓ Signals are transmitted in form of electromagnetic energy
- ✓ We use different types of cables or waves to transmit data

Classification of Transmission Media



Twisted-pair cable





Twisted-pair cable

- ✓ A twisted pair consists of two conductors
- ✓ Basically copper based
- ✓ With its own plastic insulation, twisted together
- ✓ Helical Structure

Twisted-pair cable

✓Plastic provides protection against cross talk or interference(noise)

✓One wire use to carry signals to the receiver

✓Second wire used as a ground reference

✓Twisting provides balanced transmission

✓Number of twists per inch, determines the quality

Twisted-pair cable

- ✓**Advantages**
  - ✓Cheap
  - ✓Easy to Install
- ✓**Disadvantages**
  - ✓Low data rate
  - ✓Short range

Twisted-pair cable

Applications

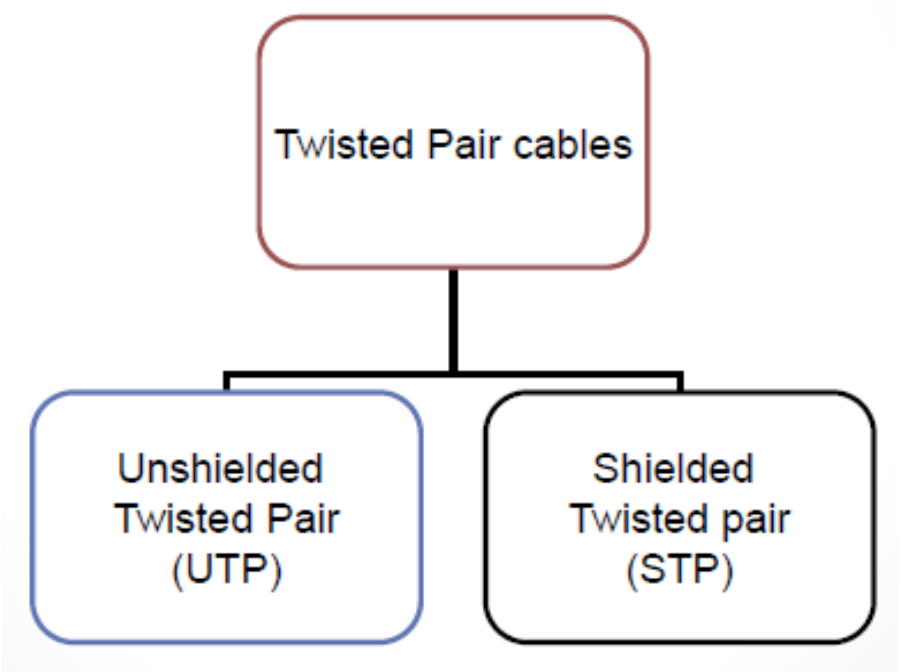
✓Very common medium

✓Can be use in telephone network

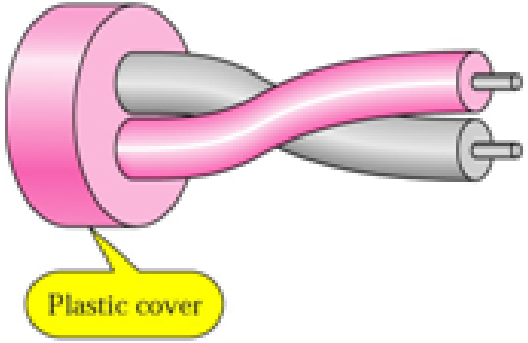
✓Connection within the buildings

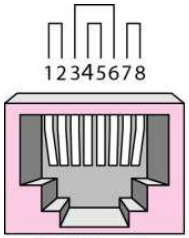
✓For Local Area Networks (LAN)

Categories of Twisted-pair cable

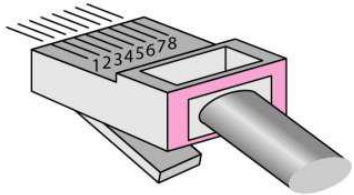


Unshielded Twisted Pair (UTP)

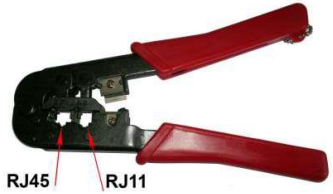




RJ-45 Female



RJ-45 Male



Crimper Tool

Unshielded Twisted Pair (UTP)

- ✓ Pair of unshielded wires wound around each other
- ✓ Easiest to install

Applications

- ✓ Telephone subscribers connect to the central telephone office
- ✓ DSL lines
- ✓ LAN – 10Mbps or 100Mbps

Unshielded Twisted Pair (UTP)

Category	*Specification*	*Data Rate (Mbps)*	*Use*
1	Unshielded twisted-pair used in telephone	< 0.1	Telephone
2	Unshielded twisted-pair originally used in T-lines	2	T-1 lines
3	Improved CAT 2 used in LANs	10	LANs
4	Improved CAT 3 used in Token Ring networks	20	LANs
5	Cable wire is normally 24 AWG with a jacket and outside sheath	100	LANs
5E	An extension to category 5 that includes extra features to minimize the crosstalk and electromagnetic interference	125	LANs
6	A new category with matched components coming from the same manufacturer. The cable must be tested at a 200-Mbps data rate.	200	LANs
7	Sometimes called SSTP (shielded screen twisted-pair). Each pair is individually wrapped in a helical metallic foil followed by a metallic foil shield in addition to the outside sheath. The shield decreases the effect of crosstalk and increases the data rate.	600	LANs

Unshielded Twisted Pair (UTP)

Advantages of UTP

✓Affordable

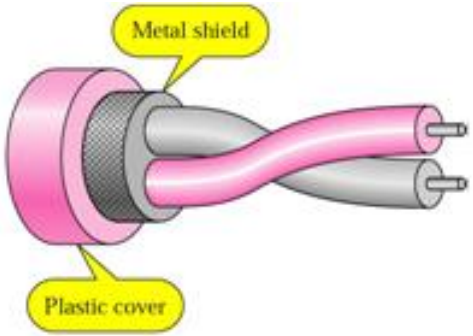
✓Most compatible cabling

✓Major networking system

Disadvantages of UTP

✓ Suffers from external Electromagnetic interference

Shielded Twisted Pair (STP)



Shielded Twisted Pair (UTP)

- ✓ Pair of wires wound around each other placed inside a protective foil wrap
- ✓ Metal braid or sheath foil that reduces Interference
- ✓Harder to handle (thick, heavy)

Shielded Twisted Pair (UTP)

Applications

- ✓ STP is used in IBM token ring networks
- ✓ Higher transmission rates over longer distances

Advantages of STP

- ✓ Shielded
- ✓ Faster than UTP

Disadvantages of STP

- ✓ More expensive than UTP
- ✓ High attenuation rate

References

- ✓ Book: Data communication and Networking
  Fourth edition
  By : BEHROUZ A FOROUZAN

- ✓ various relevant websites

Thank you