NETWORK MEDIA

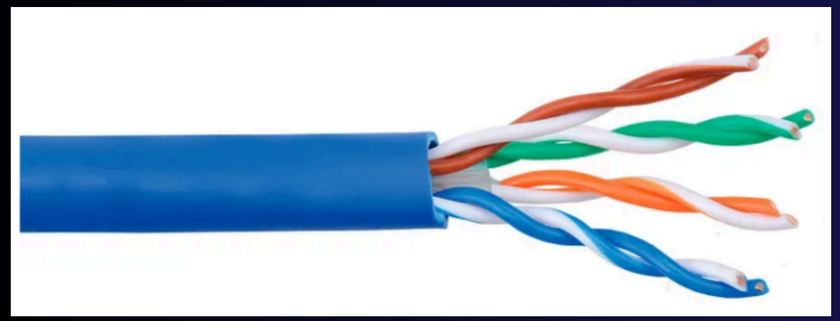
Network Media

A medium is used to carry out communication over a network. The channel that the message uses to get from its source to its destination is provided by the medium.

Types of Network Media

- Twisted-pair wires
- Coaxial cables
- Optical fiber cables

Twisted-Pair Wires

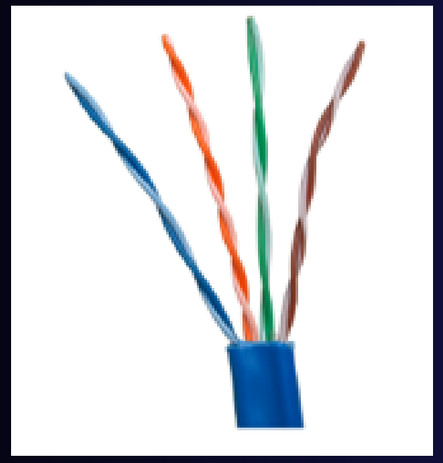


The wires are spiral-shaped after being twisted together. Twisting the wires reduces electrical interference from noise from outside sources or from similar pairings.

Two types of twisted-pair:

- Unshielded Twisted Pair (UTP)
- Shielded Twisted Pair (STP)

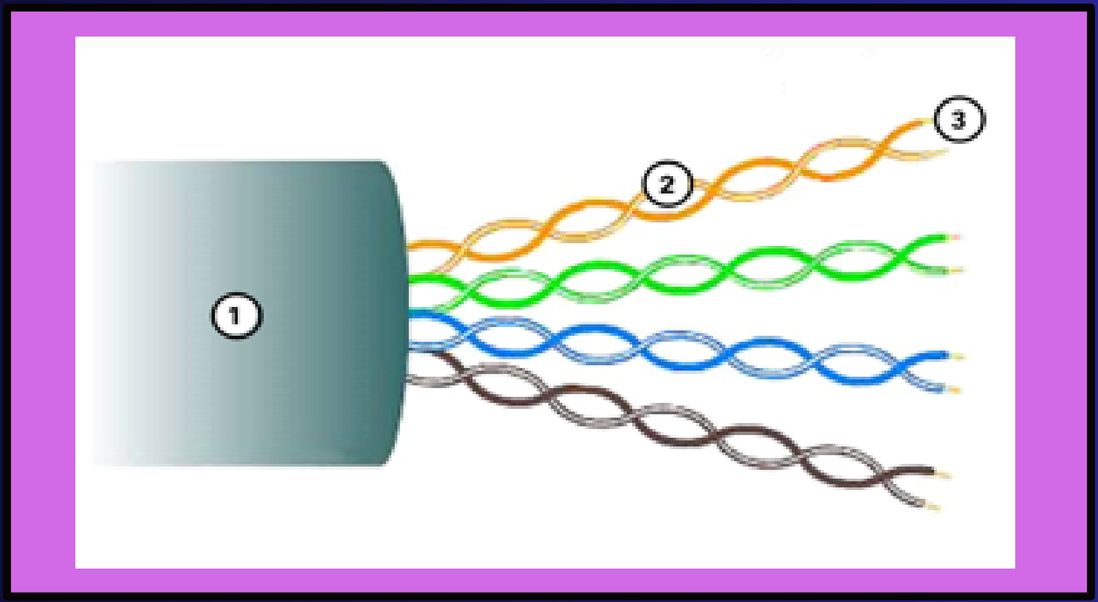
Unshielded Twisted-Pair (UTP)



The wires are spiral-shaped after being twisted together. Twisting the wires reduces electrical interference from noise from outside sources or from similar pairings.

- UTP is the most common networking media.
- Terminated with RJ-45 connectors.
- Interconnect hosts with intermediary network devices.

Key Characteristics of UTP

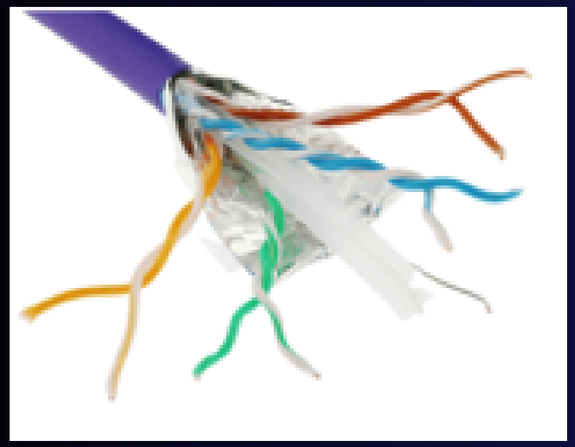


1 The outer jacket protects the copper wires from physical damage.

2 Twisted pairs protect the signal from interference.

3 Color-coded plastic insulation electrically isolates the wires from each other and identifies each pair.

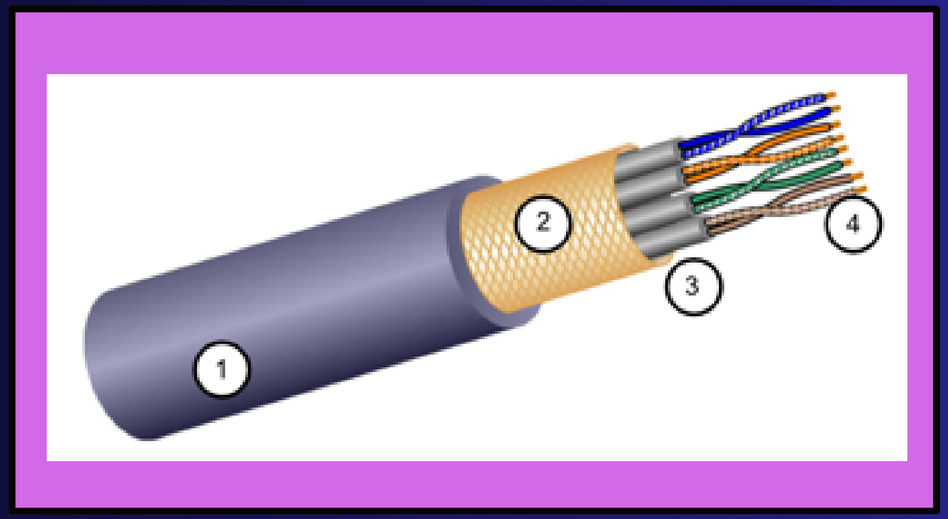
Shielded Twisted-Pair (STP)



Consists of insulated solid wire pairs encircled by a corrugated or braided shielding. STP lessens the disruption of data communication signals brought on by electromagnetic or radiofrequency interference.

- Better noise protection than UTP.
- More expensive than UTP.
- Harder to install than UTP.
- Terminated with RJ-45 connectors.
- Interconnect hosts with intermediary network devices.

Key Characteristics of STP



1 The outer jacket protects the copper wires from physical damage.

2 Braided or foil shield provides EMI/RFI protection.

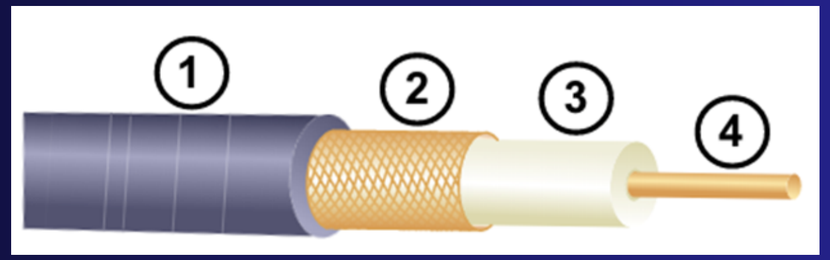
3 Foil shield for each pair of wires provides EMI/RFI protection.

4 Color-coded plastic insulation electrically isolates the wires from each other and identifies each pair.

Coaxial Cables

- Coaxial cables have an insulating layer encircling a strong copper wire that serves as the core.
- The conductor is cylindrical and usually consists of a tightly woven braided mesh surrounding the insulator.
- Protective plastic wrap surrounds the outside conductor.
- More data can be carried by a coaxial cable than by twisted pair wires, and it is far less prone to electromagnetic interference.
- This makes it suitable for carrying both television signals and high-speed data traffic.

Key Characteristics of Coaxial Cables



1 The outer jacket prevent minor physical damage.

2 A woven copper braid, or metallic foil, acts as the second wire in the circuit and as a shield for the inner conductor.

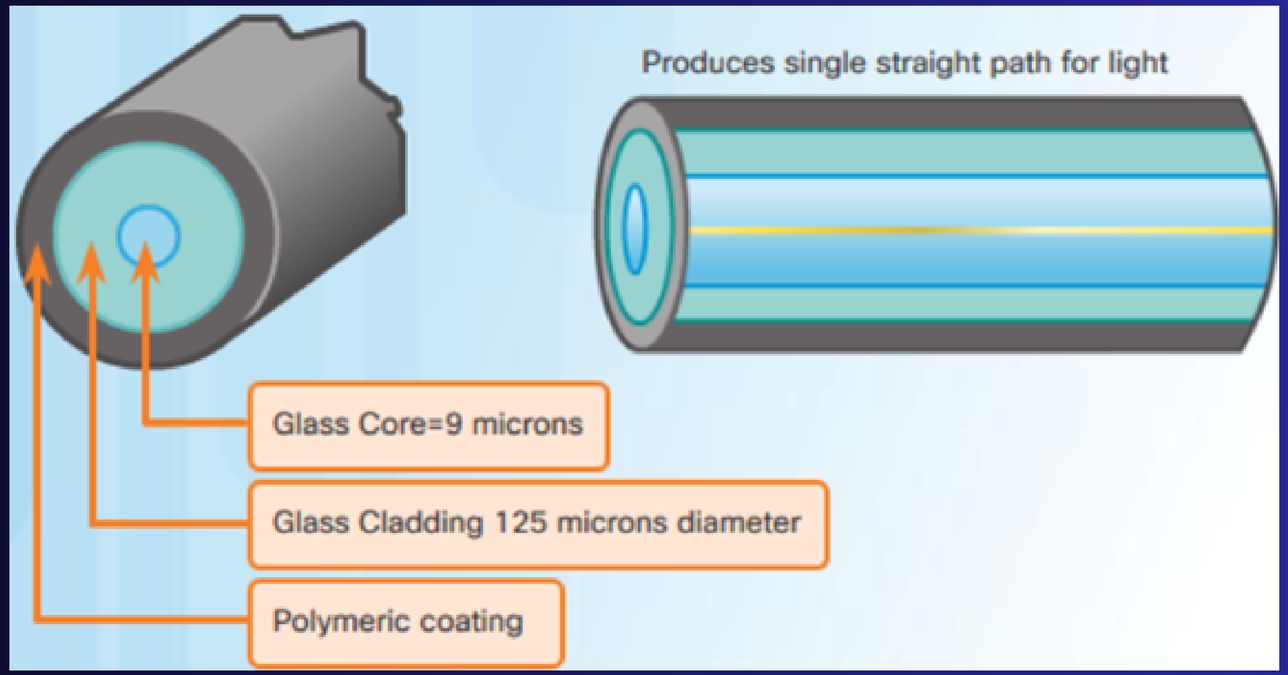
3 A layer of flexible plastic insulation.

4 A copper conductor is used to transmit the electronic signals.

Fiber Optic Cabling

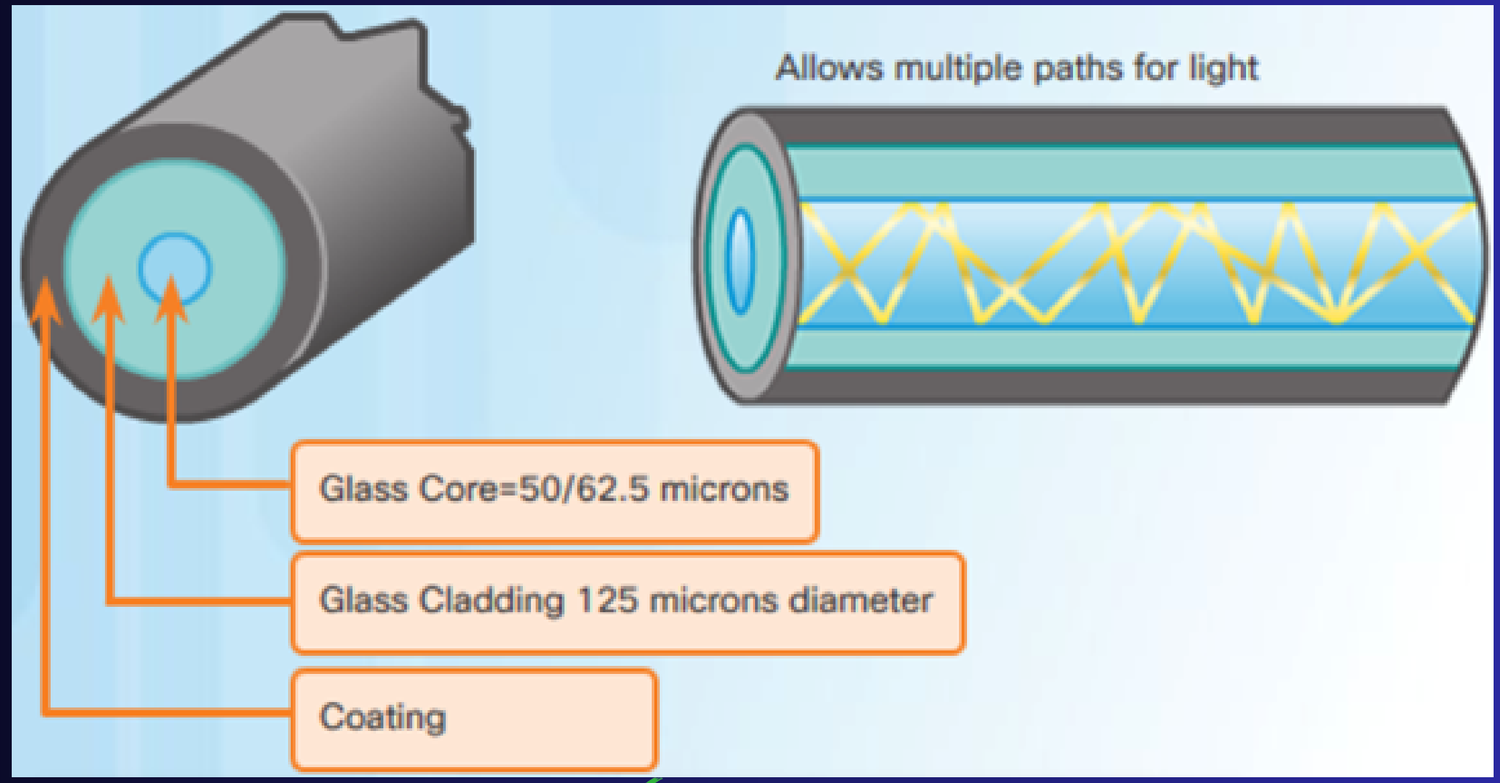
- Not as common as UTP because of the expense involved
- Ideal for some networking scenarios
- Transmits data over longer distances at higher bandwidth than any other networking media
- Less susceptible to attenuation, and completely immune to EMI/RFI
- Made of flexible, extremely thin strands of very pure glass
- Uses a laser or LED to encode bits as pulses of light
- The fiber-optic cable acts as a wave guide to transmit light between the two ends with minimal signal loss

Single Mode Fiber



✓ Very small core
✓ Uses expensive lasers
✓ Long-distance applications

Multi Mode Fiber



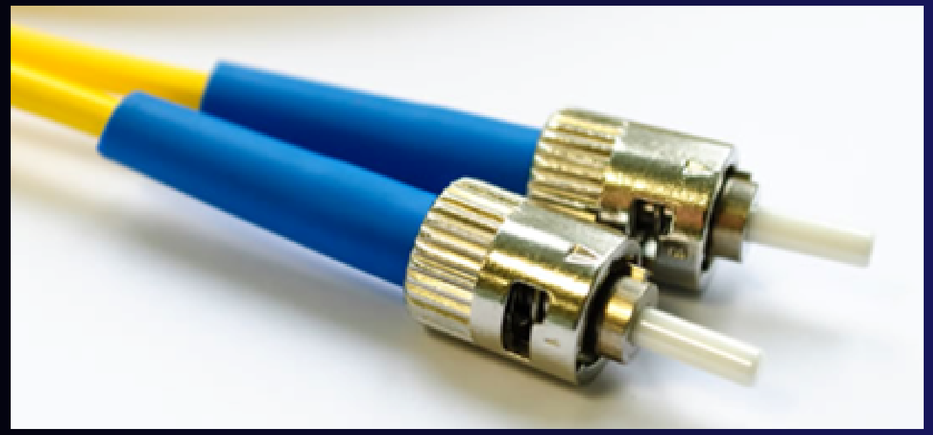
✓Larger core

✓Uses less expensive LEDs

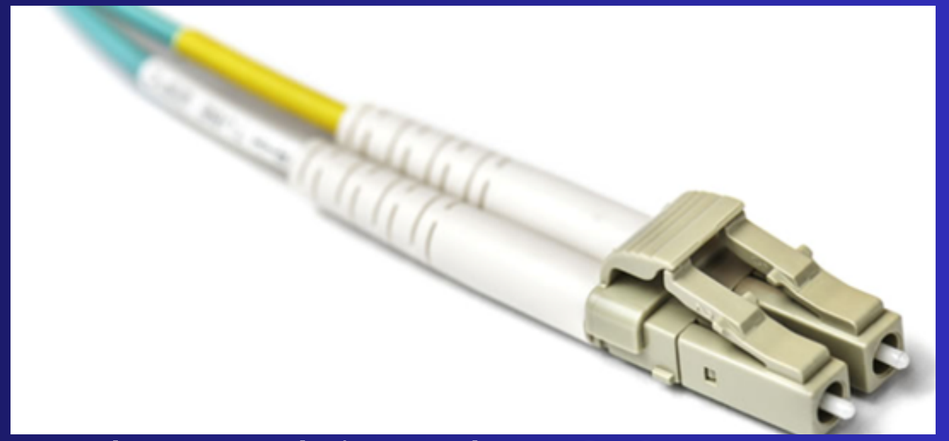
✓LEDs transmit at different angles

✓ Up to 10 Gbps over 550 meters

Fiber Optic Connectors



Straight-Tip (ST) Connectors



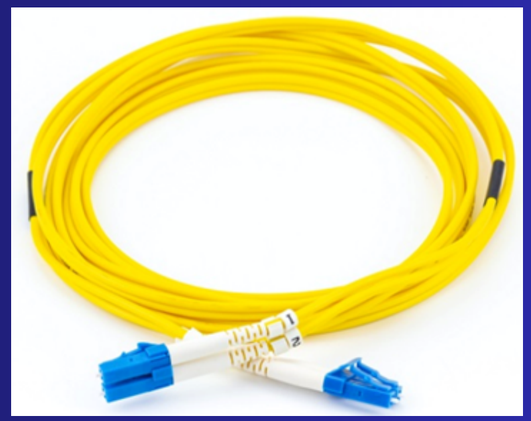
Duplex Multimode LC Connectors

Lucent Connector (LC) Simplex Connectors

Subscriber Connector (SC) Connectors

Fiber Patch Cords

SC-SC MM Patch Cord



LC-LC SM Patch Cord

ST-LC MM Patch Cord

ST-SC SM Patch Cord

Fiber versus Copper

Implementation Issues	UTP Cabling	Fiber-Optic Cabling
Bandwidth supported	10 Mb/s - 10 Gb/s	10 Mb/s - 100 Gb/s
Distance	Relatively short (1 - 100 meters)	Relatively long (1 - 100,000 meters)
Immunity to EMI and RFI	Low	High (Completely immune)
Immunity to electrical hazards	Low	High (Completely immune)
Media and connector costs	Lowest	Highest
Installation skills required	Lowest	Highest
Safety precautions	Lowest	Highest