Introduction to Transmission Media

HUAWEI TECHNOLOGIES CO., LTD.

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Foreword

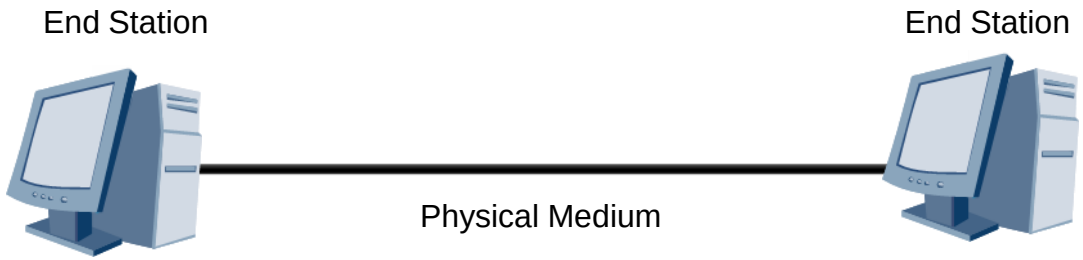
Establishment of an enterprise network requires a fundamental understanding of general networking concepts. These concepts include knowledge of what defines a network, as well as the general standards of technology and physical components that are used to establish enterprise networks. An understanding of the underlying network communications and the impact that such behavior has on the network is also paramount to ensuring performance effective implementation.

Objectives

Upon completion of this section, trainees will be able to:

- Explain what constitutes a network.
- Identify the basic components of a network.
- Describe the primary mechanisms for communication over a network.

Simple Point-to-Point Ethernet Networks



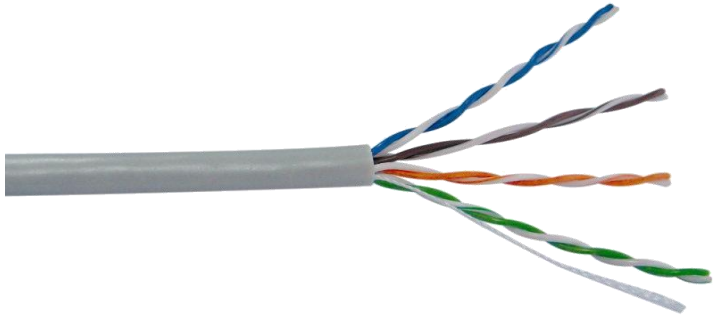
- Networks are comprised of at least two end stations, and a medium over which data can be carried.

Coaxial

Standard	Cables	Maximum Transmission Distance
10Base2	Thin coaxial	185m
10Base5	Thick coaxial	500m

- Copper coaxial cabling commonly used to support users as part of a shared network.

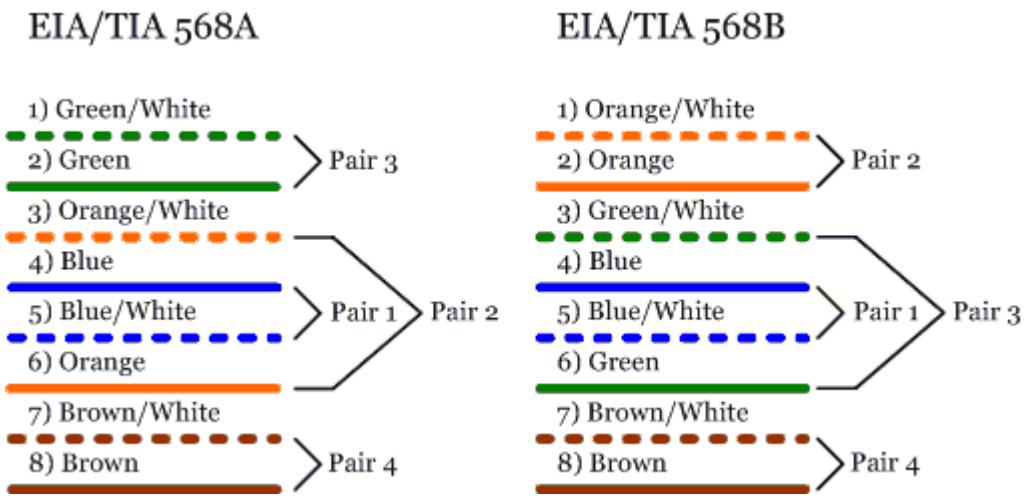
Ethernet



Standard	Physical Medium	Distance
10Base-T	Two pairs of Category 3/4/5 twisted pair cables	100m
100Base-TX	Two pairs of Category 5 twisted pair cables	100m
1000Base-T	Four pairs of Category 5e twisted pair cables	100m

- The primary physical medium used in enterprise networks.

Ethernet



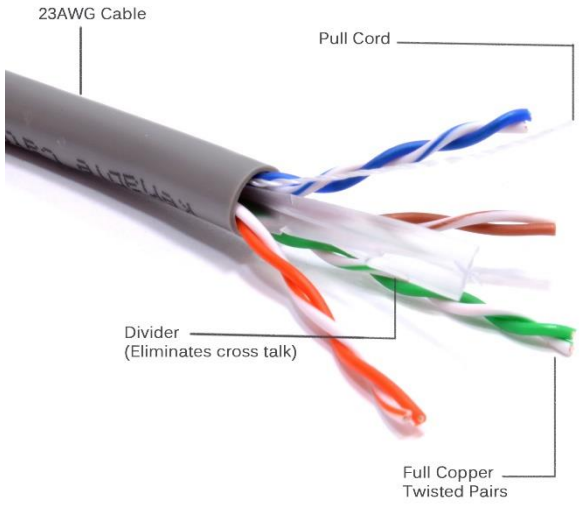
Tipologie di cavi:

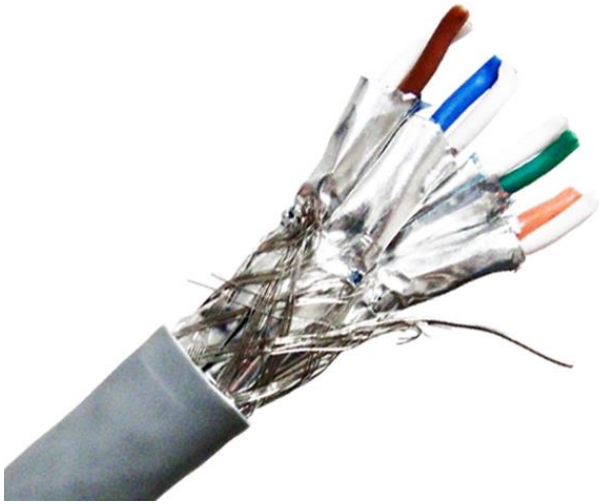
- straight – entrambi gli estremi con lo stesso schema;
- cross – estremi con schema diverso;

Ethernet

Altre categorie di cavi

- Cat 6 e 6A con schermatura;
- Cat 7 e 7A per applicazioni fino a 10Gbps;
- Cat 8, 8.1 ed 8.2 per applicazioni fino a 40Gbps.

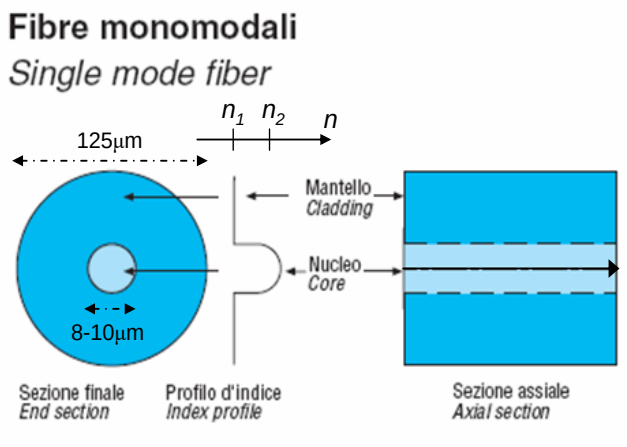


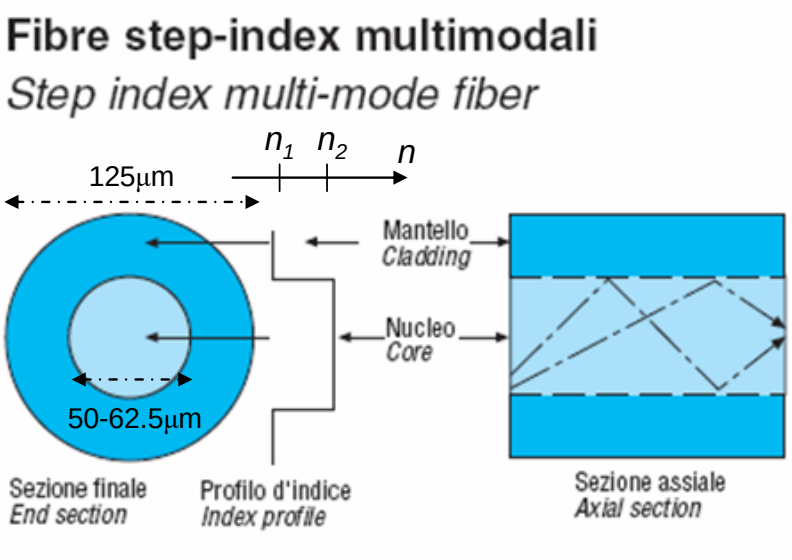


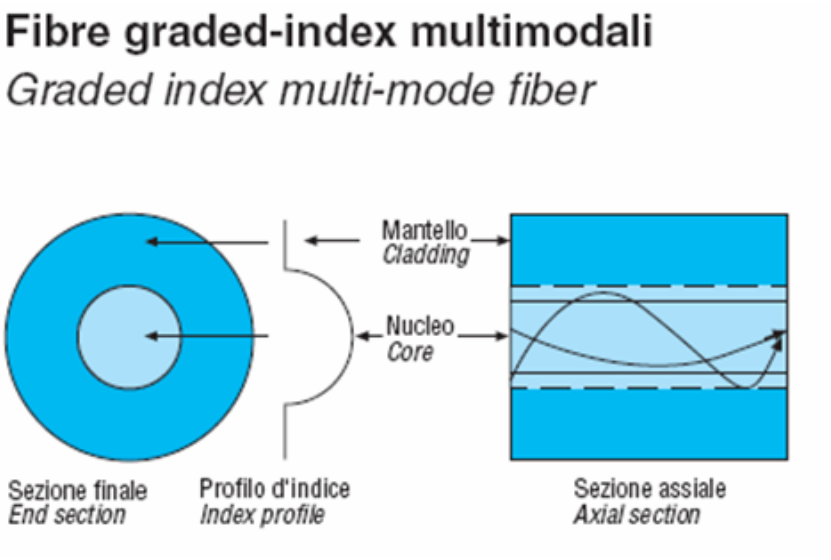
Fiber Optic

Standard	Physical Medium	Distance
10Base-F	Two strand fiber	2000m
100Base-FX	Two strand multi-mode fiber	2000m
1000Base-LX	Single-mode fiber or multi-mode fiber	316 - 5000m
1000Base-SX	Multi-mode fiber	275 - 550m

Fiber Optic







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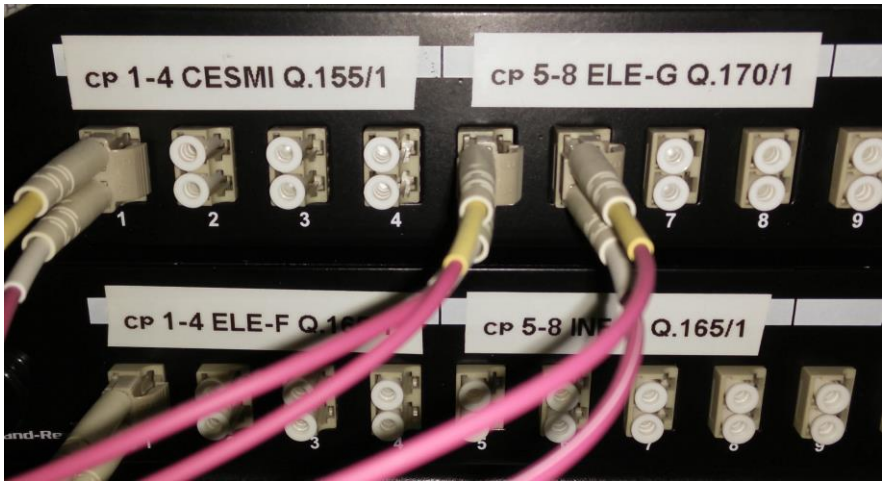
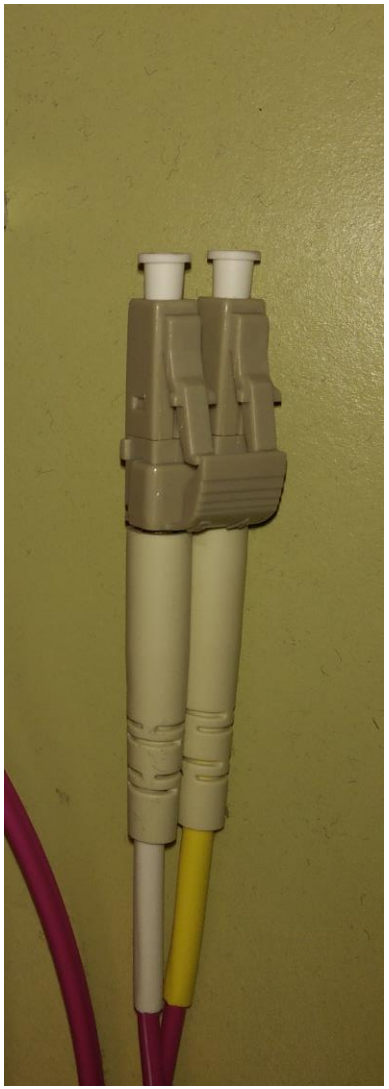
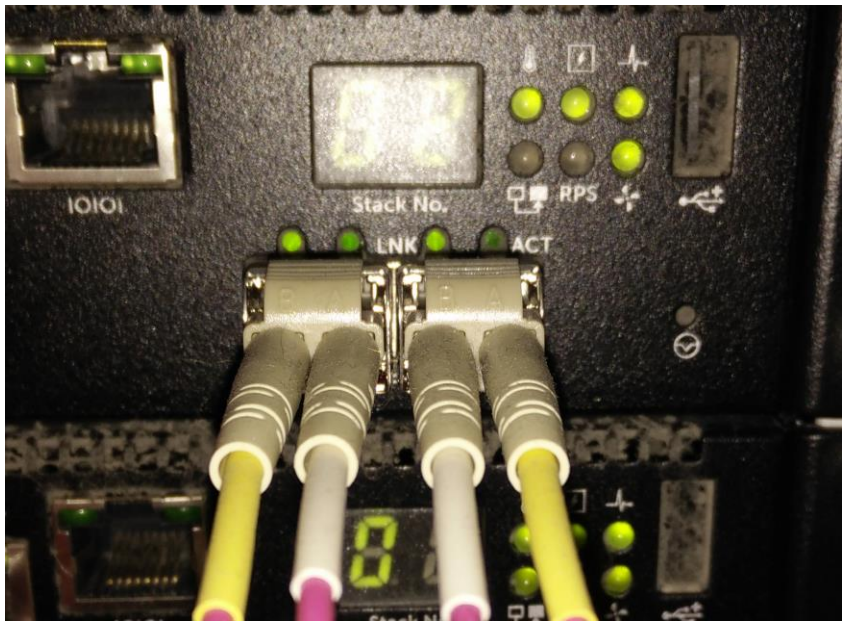
Fiber Optic







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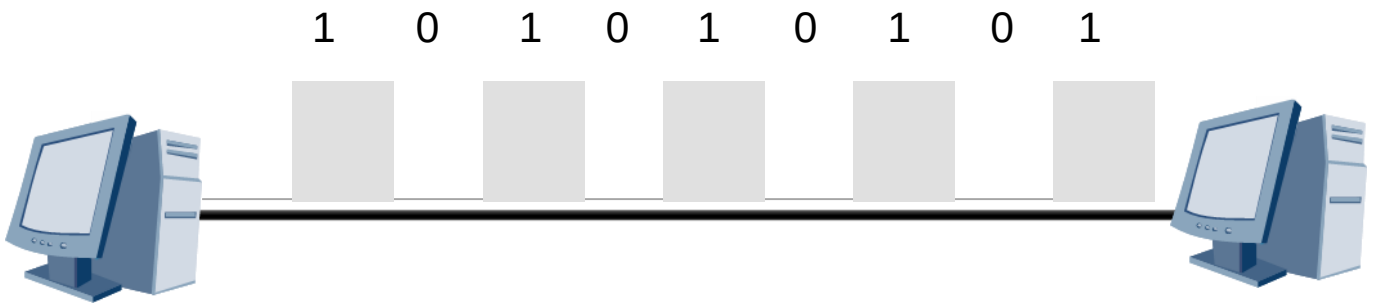
Serial

Standard	Speed
RS-232	Standards define up to 20000bps, but can reach 1Mbit/s
RS-422	100Kbit/s ~ 10Mbit/s+

- Serial represents a legacy form of data transmission.
- Standards continue to evolve as in forms such as USB.

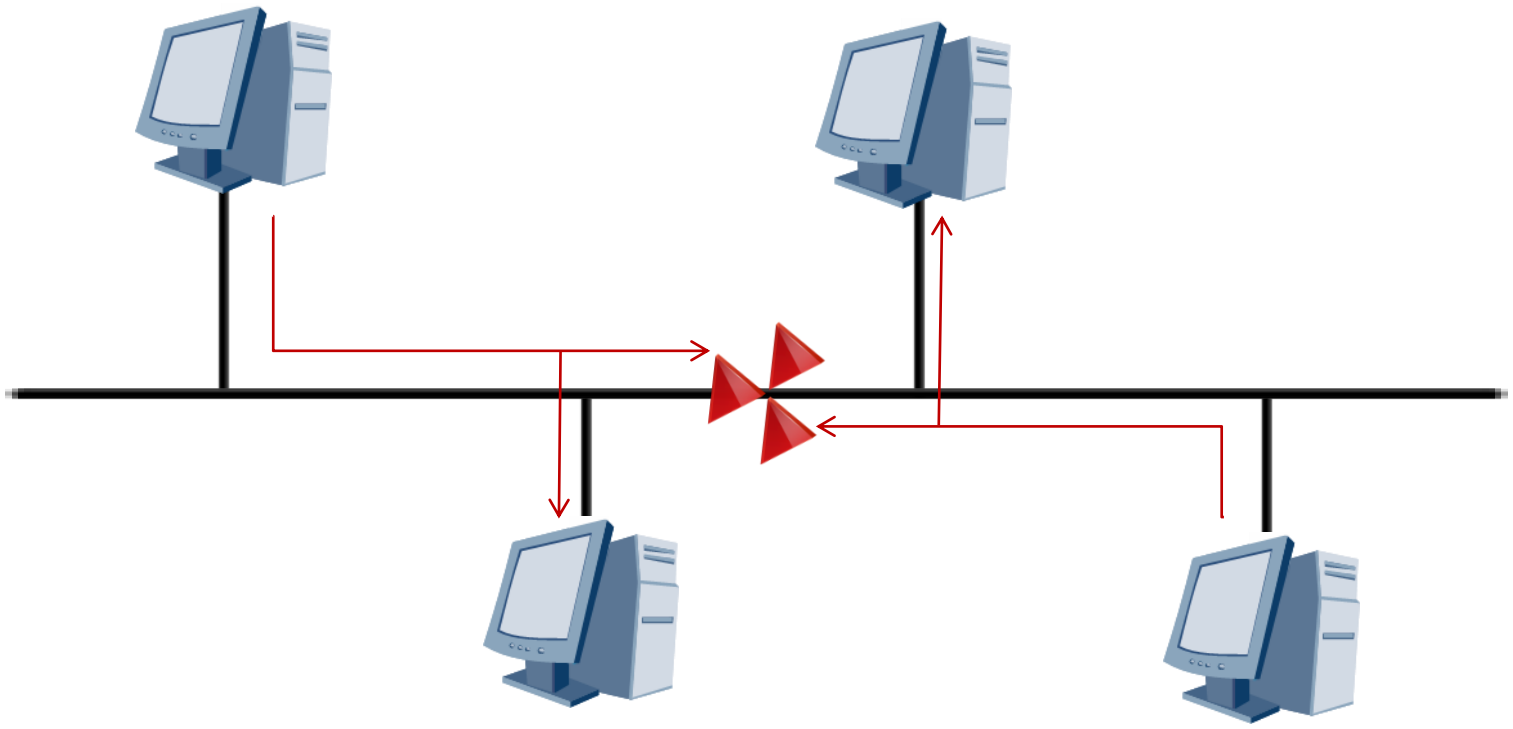
Signal Data Encoding



0000	0001	0010	0011	0100
0	1	2	3	4

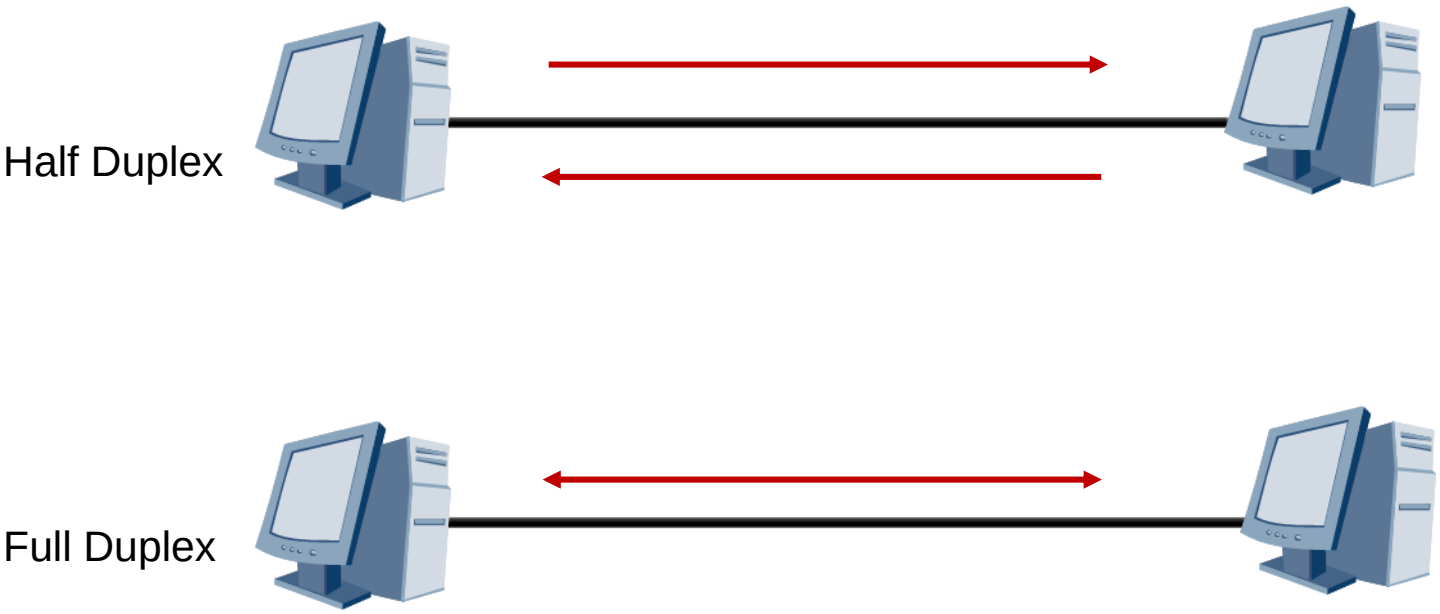
- Signal patterns used for interpretation of communication.
- Encoding is used to synchronize transmission.

Collision Domains



- Signals in a shared network are susceptible to collisions.
- A collision detection mechanism is used to identify collisions.

Duplex Modes



- Duplex modes support simultaneous and non-simultaneous bidirectional communication.

Summary

- Which forms of cabling can be used to support Gigabit Ethernet transmissions within an enterprise network?
- What is a collision domain?
- What is the purpose of CSMA/CD?

Thank you

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