

# Wiring and Transmission

ITL

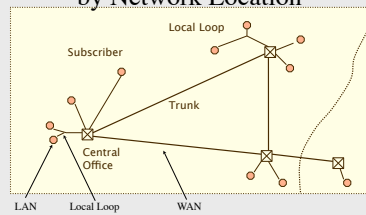
## Transmission Media

- Guided Media
  - Twisted Pair
  - Coaxial Cable
  - Optical Fiber
- Unguided Media
  - “Broadcast”-type radio transmission
    - Wireless LANs, Cell Phones, PCS
  - Satellite
  - Point-to-Point Microwave

## Transmission Systems by Function

- Basic multiplexing
  - DS-n (T1, DS3)
  - SONET (OC-3, OC-12, etc)
  - WDM
- Multiplexing and Other Functions
  - Ethernet
  - Frame Relay
  - ATM

## Transmission Systems by Network Location



## Logical Network

- LAN (Local Area Network)
  - to
- Switch, “Layer 3 Switch”, ...
  - to
- Campus Backbone LAN
  - to
- Router
  - to
- WAN

## Structured (Physical) Wiring

- Main Cross-Connect (Main Distribution Frame)
  - Riser Cable (“Backbone”)
- Intermediate Cross-Connect (Int. Dist. Frame)
  - Horizontal Wiring
- Jack Field
  - Drop Cable
- Workstation

## Ethernet

- Designed as a broadcast medium; each transmission is received by every station
- Based on a bus architecture
- Manchester Encoding
- Several Original Media Types
  - 10Base5
  - 10Base2
  - 10Base-T
  - 10Base-F

## 10Base-T

- Simulates the Ethernet bus using an active star topology.
- Uses unshielded twisted pair wiring.
- “4-pair” (8 conductor) wiring is normally used, but only 2 pairs are used – 1 transmit pair one receive pair
- Each station connects to a central hub.
  - Cables are wired “straight through”
  - Hub ports are “crossed” (transmit/receive are reversed)

## Fast Ethernet

- All use a star topology
- 100Base-TX
  - Two pair copper wire (Cat 5)
  - Same pin-out at 10Base-T, better wire
- 100Base-FX
  - Two fibers
- 100Base-T4
  - Rarely used; 4 pair lower quality (cat 3) wires
- 1000Base-X (4 pair Cat 5 or 5E)

## Wiring Standards

- Building Wiring Standards
  - Electronic Industries Association
  - Telecommunications Industry Association
  - EIA/TIA 568 Commercial Building Wiring Standard
- “Outside Plant”
  - Bell Labs technical publications
  - Now maintained by Telcordia (formerly Bellcore)

## RJ-What?

- As an aside for the eternally curious:

The RJxx nomenclature appears in the legal documents used by the FCC to identify permitted methods to connect telecom equipment to the network

- For the really, really curious:

Title 47 CFR, Part 68, Subpart F, Section 502

## Wiring Standards

Level/CAT 1	1Mbps	
Level/ CAT 2	4Mbps	
Level/ CAT 3	16Mbps	
Level/ CAT 4	20Mbps	
Level/ CAT 5	100Mbps 1000 Mbps (4 pair)	100m max distance
Level/ CAT 5E	100Mbps 1000 Mbps (4 pair)	
Level/ CAT 6	200-250MHz	