

Wiring and Transmission

ITL

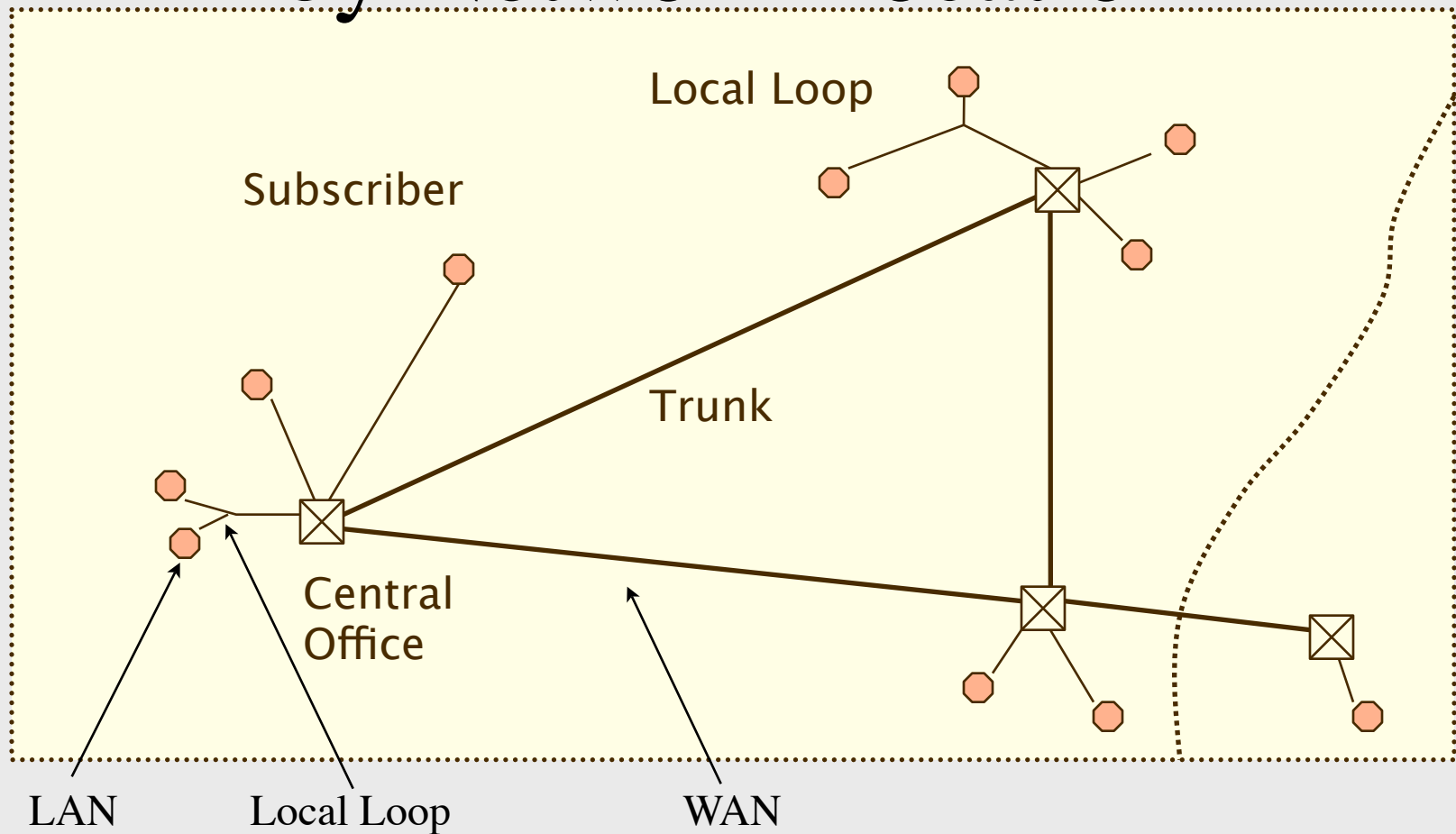
Transmission Media

- 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	