

LECTURE #4

Standards

“A standard provides a model for development that makes it possible for a product to work regardless of the individual manufacturer|”

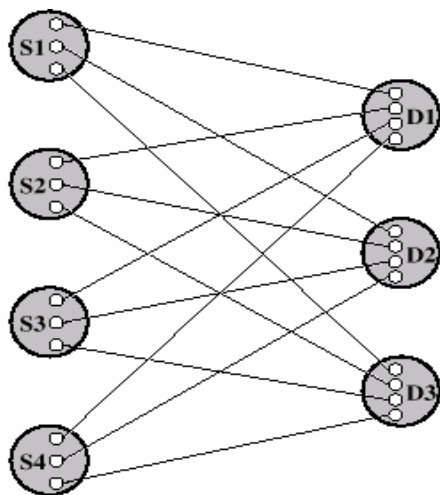
- A great deal of coordination and cooperation is required by the devices to communicate
 - A device prepared by a specific manufacturer may not be compatible with the devices prepared by other manufacturers
 - Unavailability of standards creates problems and puts a halt to product growth
- ✓ An example of non-standardized products is AUTOMOBILES

Why Standards are Essential?

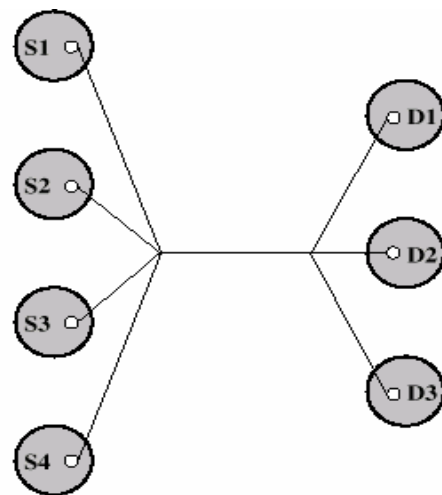
Standards are therefore essential in:

- Creating and Maintaining an Open and competitive Market for Equipment Manufacturers
- Guaranteeing National and International Interoperability of Data and Telecommunications Technology and Equipment

Let us understand this using an EXAMPLE



(a) Without standards: 12 different protocols;
24 protocol implementations



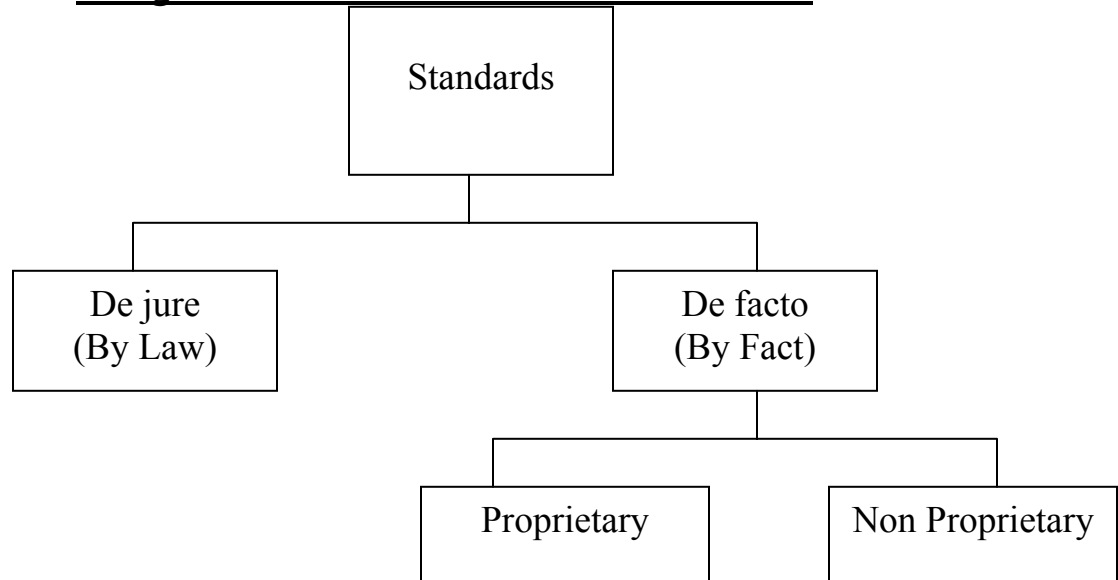
(a) With standards: 1 protocol;
7 implementations

NOTE

- K sources and L receivers leads to K*L protocols and 2*K*L implementations

- If common protocol used, K + L implementations needed

Categories of Data Communication Standards



❖ **De facto (By fact or By Convention)**

Standards not approved by an organized body but have been adopted as standards through their widespread use

❖ **De jure (By Law or By Regulation)**

Standards that have been legislated by an officially recognized regulation body

Subdivision of De Facto Standards

➤ **PROPRIETARY** (Closed Standards)

Standards that are originally invented by a Commercial Organization as a basis for the operation of its products they are wholly owned by that company. They are also called Closed Standards because they close off Communication between systems

➤ **NON- PROPRIETARY** (Open Standards)

They are Originally developed by groups or committees that have passed them into public domains. They are also called Open Standards because they open Communication between different systems

Standard Organizations

Standards are developed mainly by 3 entities:

- Standard Creation Committees
- Forums
- Regulatory Agencies

❖ **Standard Creation Committees**

They are Procedural Bodies and they are so slow moving and cannot co-op with the fast growing communication industry.

➤ **ISO**

- ✓ International Standard's Organization
- ✓ Voluntary Organization
- ✓ Created in 1947
- ✓ Members are from Standard Creation Committees of different countries
- ✓ Includes representatives from 82 countries
- ✓ Open System Interconnection (OSI) Model

➤ **ITU-T**

- ✓ By 1970s a lot of countries were defining standards but there was no International compatibility
- ✓ United Nations made as a part of their ITU
- ✓ Consultative Committee for International Telegraphy and Telephony (CCITT)
- ✓ IN 1993 , ITU-Telecomm Standards Sector
- ✓ Important ITU-T Standards
- ✓ V Series (V32, V33, V42, Define Data Transmission over phone lines
- ✓ X Series(X.25, 400, 500): Define Transmission over Public Digital Network
- ✓ ISDN: Integrated Services Digital Network

➤ **The American National Standard Institute (ANSI)**

- ✓ Private-Non Profit Cooperation not affiliated with US Government
- ✓ Members include professional societies, industrial associations, govt. and regulatory bodies
- ✓ Submits proposal to ITU-T and is a voting member for USA in ISO

➤ **The Institute of Electrical and Electronics Engineers (IEEE)**

- ✓ Largest professional engineering society in the world
- ✓ Also oversees the development of Telecommunication and Wireless International Standards

- ✓ Special committee for LANS out of which emerged Project 802 (802.3, 802.4, 802.5)

❖ **Forums**

Special Interest Groups with representatives from interested corporations they facilitate and fasten standardization process by working with universities, and users to test, evaluate and standardize new technologies
Each Forum Concentrate on a specific technology and present their conclusions to the standard bodies

- Frame Relay Forum
- ATM Forum
- Internet Society & IETF

❖ **Regulatory Agencies**

All communication technology is subject to regulation and laws by government agencies. The purpose is to protect Public Interest by regulating Radio ,Television and Cable Communications.

- FCC
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Before we go into the details of how data are transmitted from one device to the other, it is important to understand:

- The relationship between communication devices.
- How the devices connect with each other in a System?
- How do they do the exchange of information?

Five Concepts provide the basis

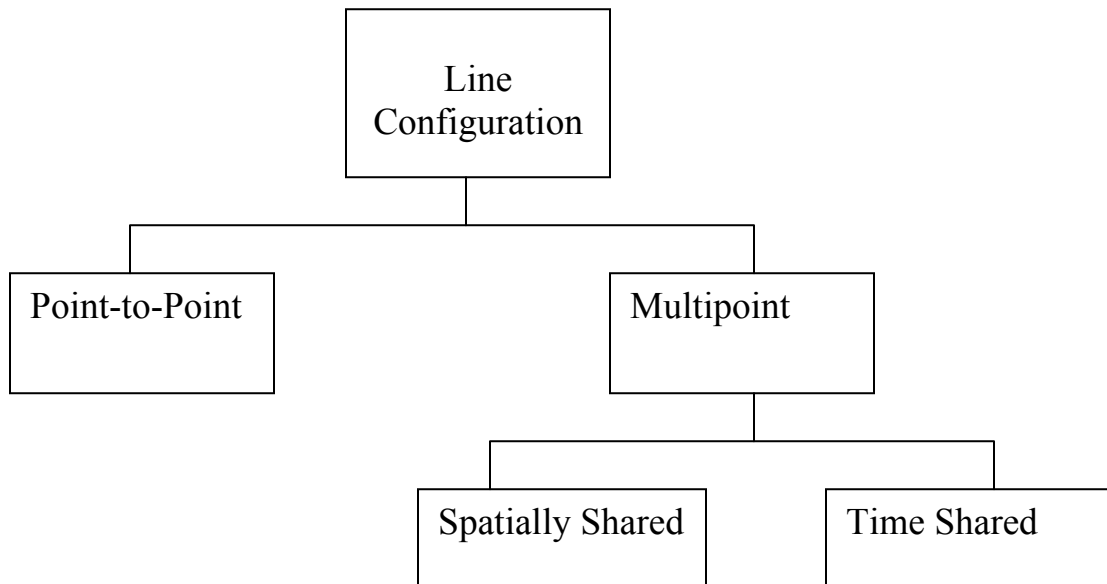
- Line Configuration
- Topology
- Transmission Mode
- Categories of networks
- Internetworks

LINE CONFIGURATION

“Line Configuration refers to the way two or more devices attach to a **Link**”

A link is the physical communication path that transfers data from one device to the other. Link can be thought of as a Line drawn between two points. For communication to occur, two devices must be connected to each other using a link.

Line Configurations

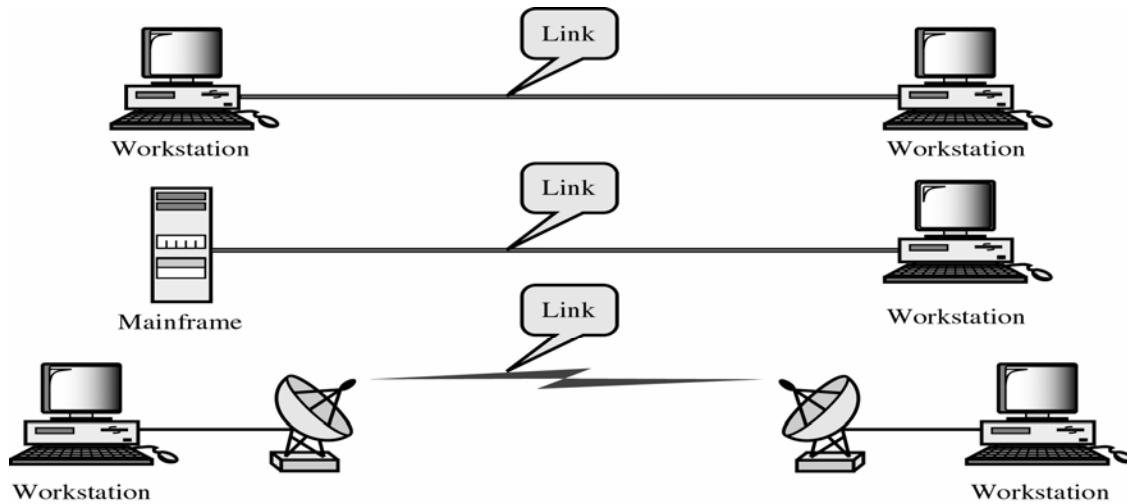


❖ Point-to-Point Line Configuration

Dedicated Link between two devices. Entire Capacity of the channel is reserved for TX. B/w these two devices. Mostly point-to-point connection use wire/cable to connect with each other. But Microwave, Satellite Links can also be used
Data and Control information pas directly between entities with no intervening agent

➤ Examples:

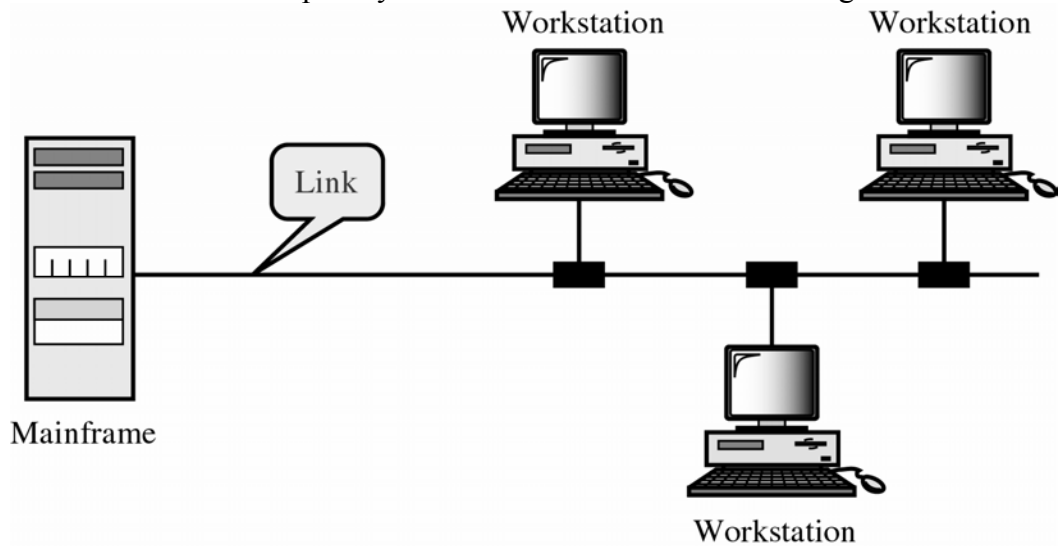
- ✓ TV Remote Control and TV Control Systems
- ✓ Mobile Phone (when talking) and Base Station (Antenna)



❖ Multipoint Line Configuration

More than two devices share the Link that is the capacity of the channel is SHARED now. With shared capacity, there can be two possibilities in a Multipoint Line Config:

- **Spatial Sharing**: If several devices can share the link simultaneously, its called Spatially shared line configuration
- **Temporal (Time) Sharing**: If users must take turns using the link , then its called Temporally shared or Time Shared Line Configuration



Summary

- ♦ Standards
- ♦ Standard Organizations
- ♦ Line Configuration
- ♦ Categories of Line Configuration

Reading Sections

- ♦ Section 1.5,2.1 “Data Communications and Networking” 2nd Edition by Behrouz A. Forouzan