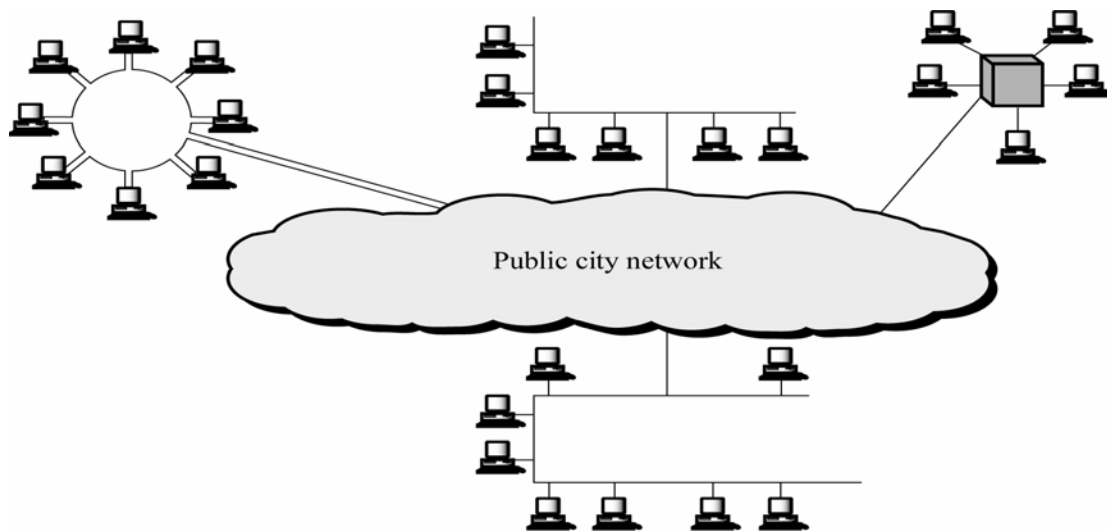


LECTURE # 7

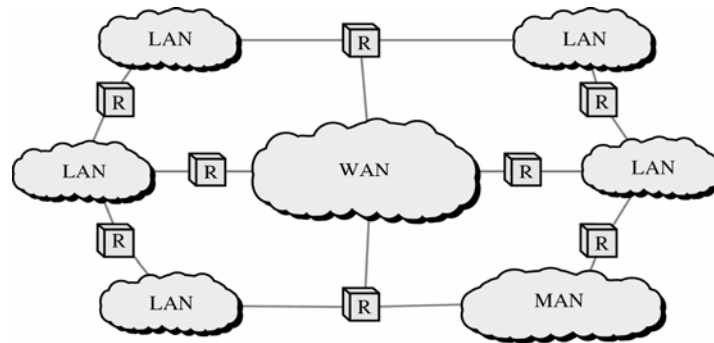
Metropolitan Area Networks

- Designed to extend over an entire city
- It may be a single network e.g Cable TV Network
- Or**
- Interconnection of a No. of LANs into a larger network
- ✓ Example: A company can use a MAN to connect the LANs in all of its offices throughout a city



Internetworks

- When two or more networks are connected they become an internetwork or internet
- Individual networks are joined together by the use of Internetworking Devices like Routers, Gateways etc.
- **internetwork**: Combination of Networks
- **Internet**: Specific World wide Network



The OSI MODEL

- International Standards Organization (ISO) 1947
- Multinational body dedicated to worldwide agreement on International Standards
- An ISO Standard that covers all aspects of Network Communication is **Open System Interconnection Model (OSI)**
- **Open System:** A model that allows two different systems to communicate regardless of their underlying network
- Vendor –Specific Models close off communication

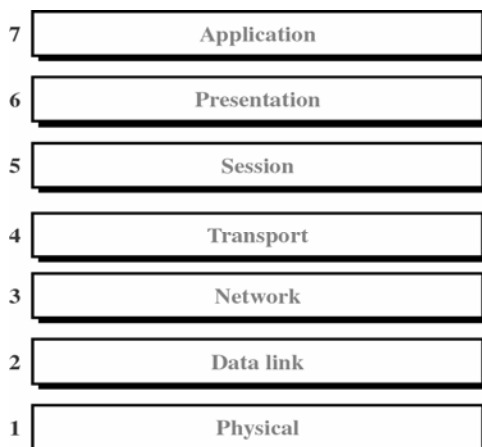
❖ Purpose of the OSI MODEL

- Open Communication between different systems without requiring changes to the underlying hardware and software.

OSI Model is not a Protocol. It is a model for understanding and designing a network architecture that is flexible, robust and interoperable

❖ Definition of the OSI MODEL

A layered framework for the design of network systems that allows communication across all types of computer systems regardless of their underlying architecture

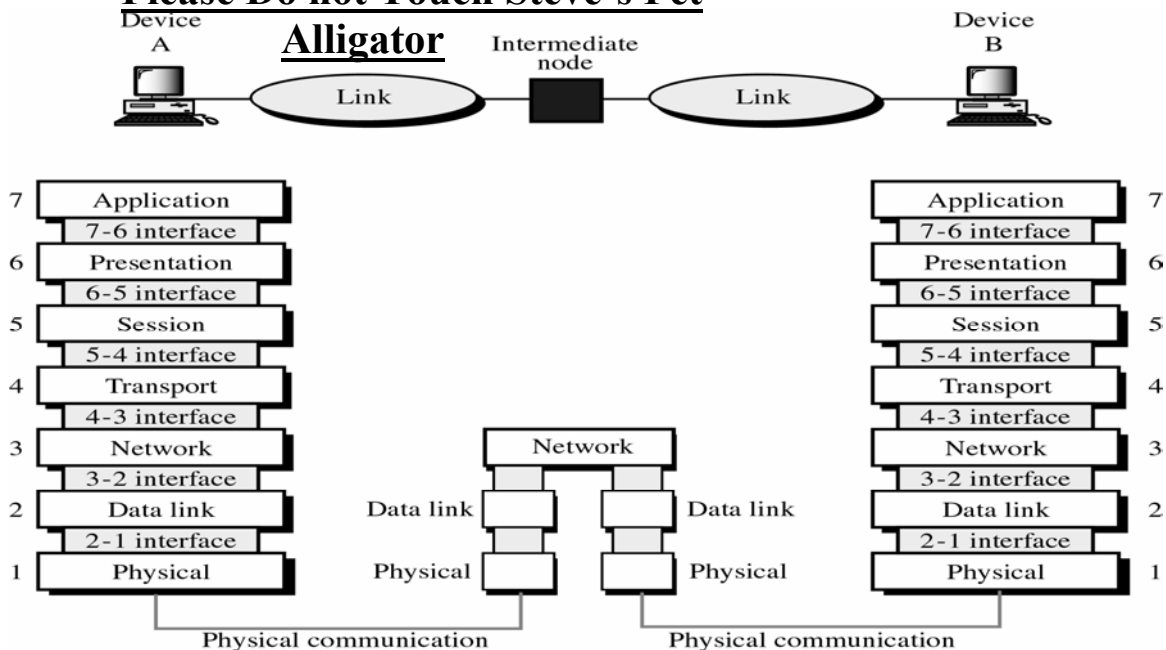


❖ Layers of the OSI Model

1. Physical (Bits)
2. Data Link (Frames)
3. Network (Packets)
4. Transport (Segment)
5. Session (Dialog units)
6. Presentation (Raw Data)
7. Application (Text, Numbers)

What happens when a message travels from device A to Device B?

Please Do not Touch Steve's Pet



- As the message travels from A to B, it may pass through many intermediate “Nodes”
- These nodes usually involve only the first three layers of the OSI Model
- In developing the OSI model, designers identified which networking functions had related uses and collected those functions into discrete groups that became the layers
- Each layer defines a family of functions distinct from other layers
- By defining and localizing functionality in this fashion, the designers created an architecture that is both comprehensive and flexible
- The OSI model allows complete transparency b/w otherwise incompatible systems

Peer-to-Peer Processes

- Within a single machine, each layer provides services to the layer above it and all upon the services from the layer below it.

- For example Layer 3
- Between machines, layer x on one machine communicates with layer x on the other machine.
- The communication is governed by Protocols
- The processes on each m/c that communicate at a given layer are called Peer –to peer processes

Headers and trailers

- Control data added to a data parcel
- Sender appends header and passes it to the lower layer
- Receiver removes header and passes it to upper layer
- Headers are added at layer 6,5,4,3,2. Trailer is added at layer 2

Passing of data and network information down through the layers of sending machine AND Back up through the layers of the receiving machine is made possible by an

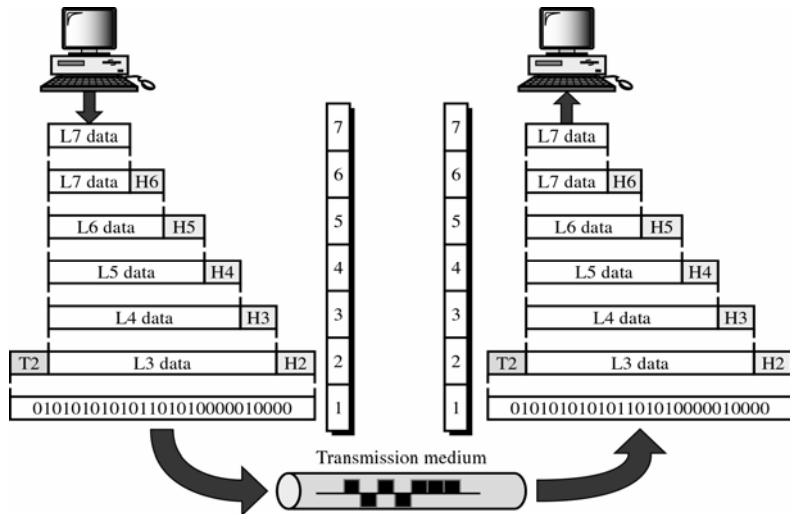
INTERFACE

- Each interface defines what information and services a layer must provide for the layer above it
 - Interface provides **MODULARITY**
 - Each layer works as a separate module
 - Any modification or replacements can be made without changes in surrounding layers
 - Organization of Layers
- Network Support Layers
- Deals with the Physical aspect of moving data from one device to another
 - Layers 1, 2, 3
- User Support Layers
- Allows interoperability among unrelated software systems
 - Layers 5, 6, 7

Organization of Layers

- Layer 4
 - Ensures end-to-end reliable transmission
- Upper OSI Layers always implemented in Software
- Lower Layers are a combination of software and hardware
- Physical layer is mostly Hardware

The OSI Model



Summary

- ♦ Categories of Networks (MANs)
- ♦ Internetworks
- ♦ The OSI Model

Reading Sections

- ♦ Section 2.5, 3.1, 3.2 “Data Communications and Networking” 2nd Edition by Behrouz A. Forouzan