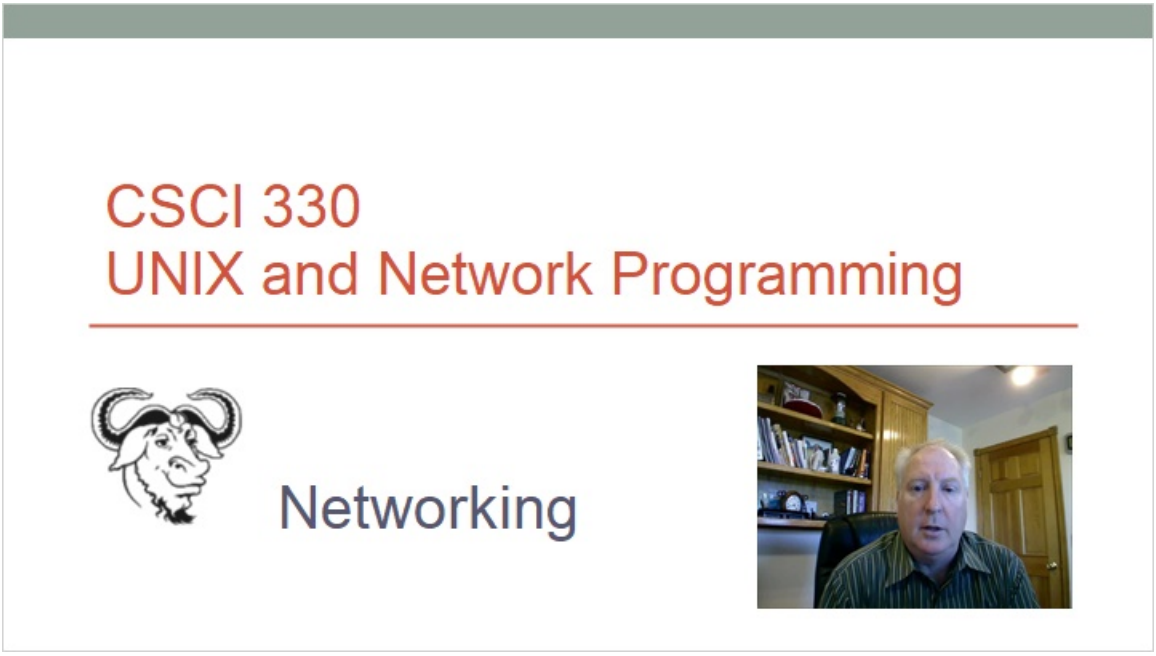
Networking

1. Networking

1.1 CSCI 330



1.2 Unit Overview

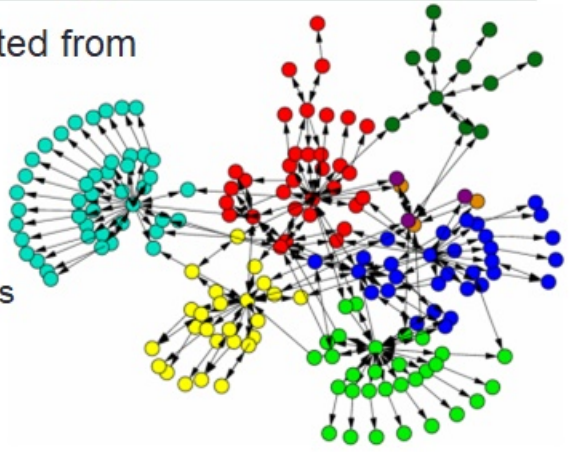
Unit Overview

- Network concepts & terminology
- OSI reference model for protocols
  - Physical layer
  - Data Link layer
  - Network layer
  - Transport layer

1.3 Network Terminology

Network Terminology

- connected graph constructed from
  - node
  - link
- nodes can reach others via path
  - sequence of nodes and links



1.4 Internet Terminology

Internet Terminology

- node
  - host or intermediary
- link
  - point-to-point or broadcast
- link medium
  - wired or wireless
- path
  - routed or switched

1.5 Networking Protocol

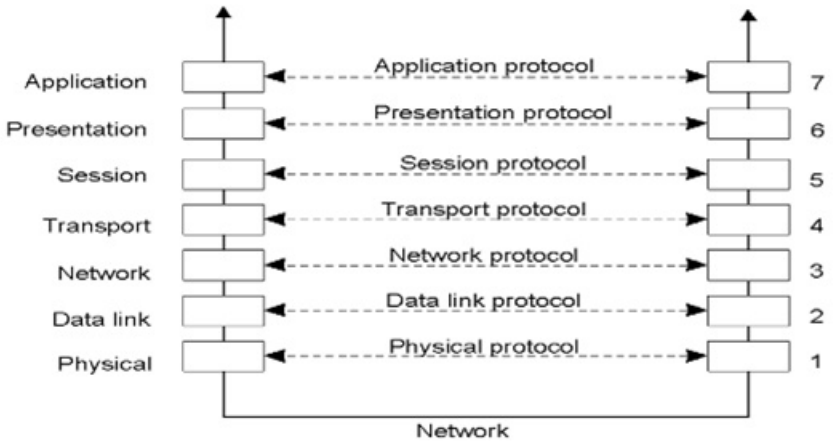
Networking Protocol

- communication in a network is governed by rules and conventions
- information is exchanged between nodes via messages
- messages use well-defined format
- each message has an exact meaning intended to provoke a defined response of the receiver

a protocol describes the syntax, semantics, and synchronization of communication

1.6 OSI reference model

OSI reference model



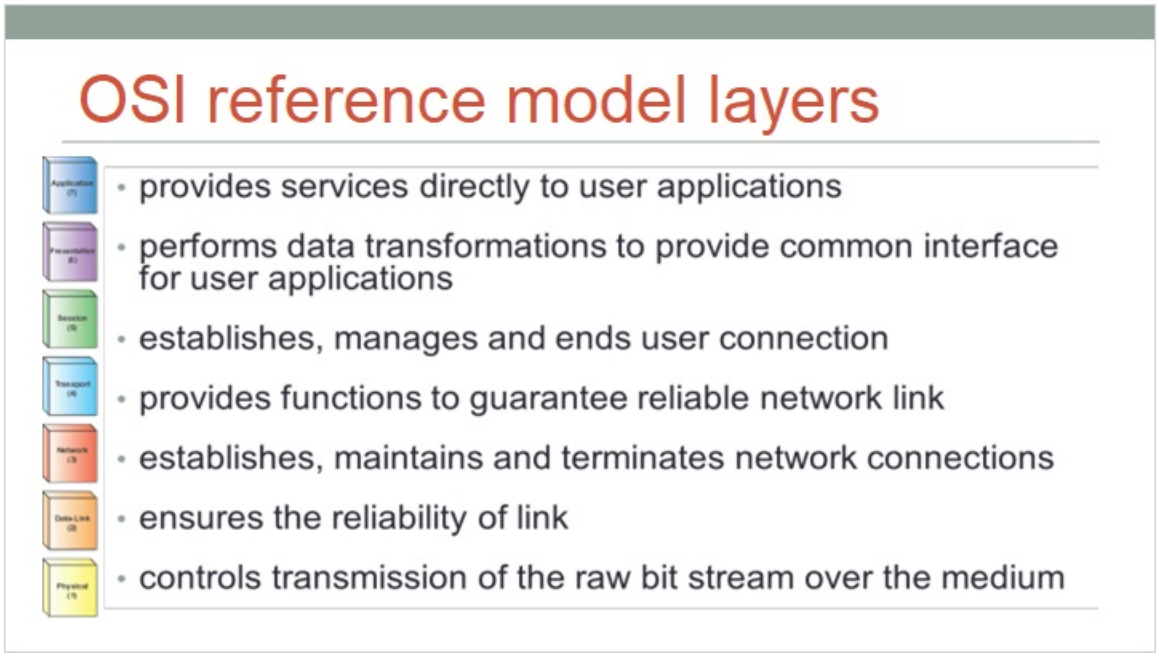
1.7 Layered protocols

Layered protocols

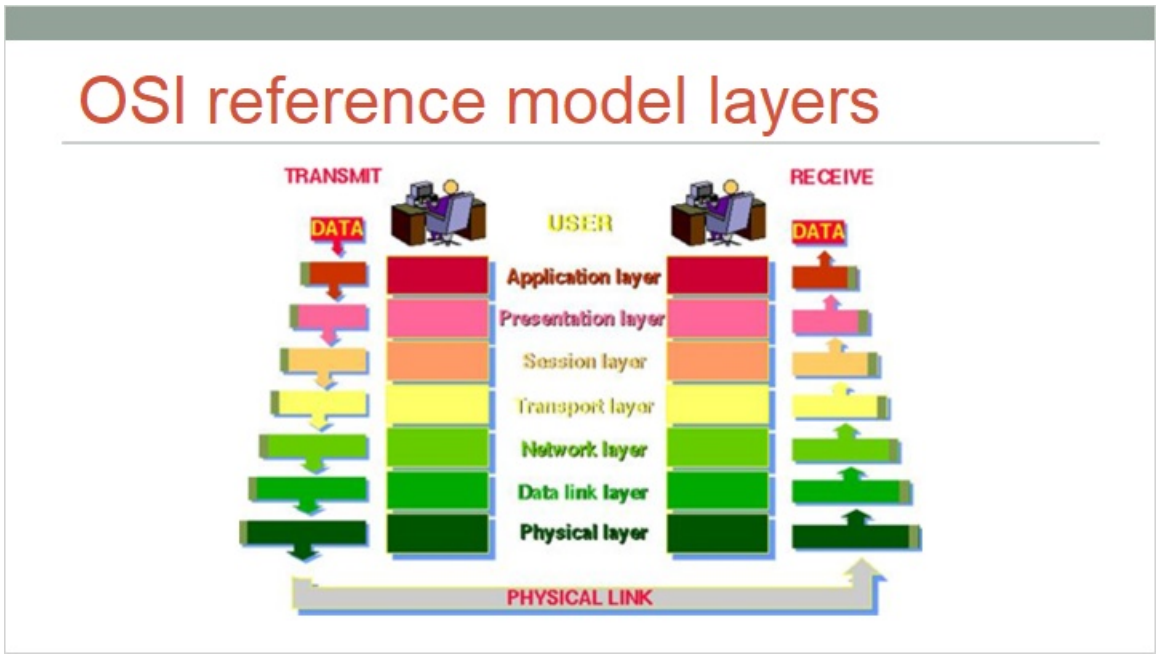
- complexities of communication organized into successive layers of protocols
  - lower-level layers: specific to medium
  - higher-level layers: specific to application
- standards achieve inter-operability

Open Systems Interconnection model:
OSI reference model

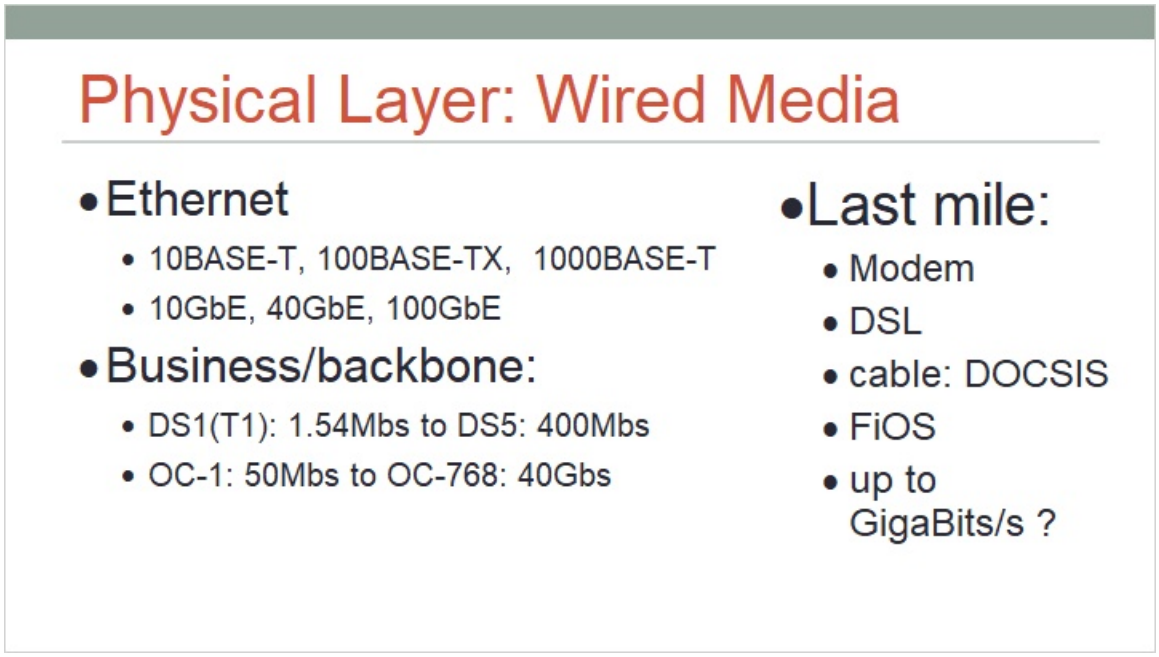
1.8 OSI reference model layers



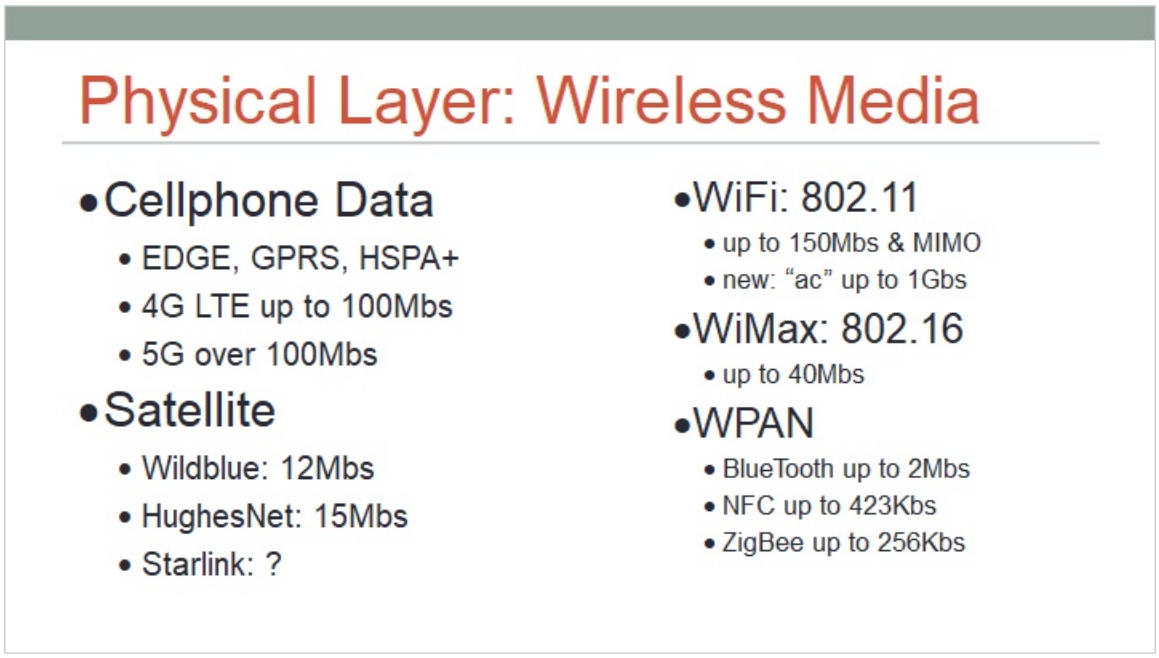
1.9 OSI reference model layers



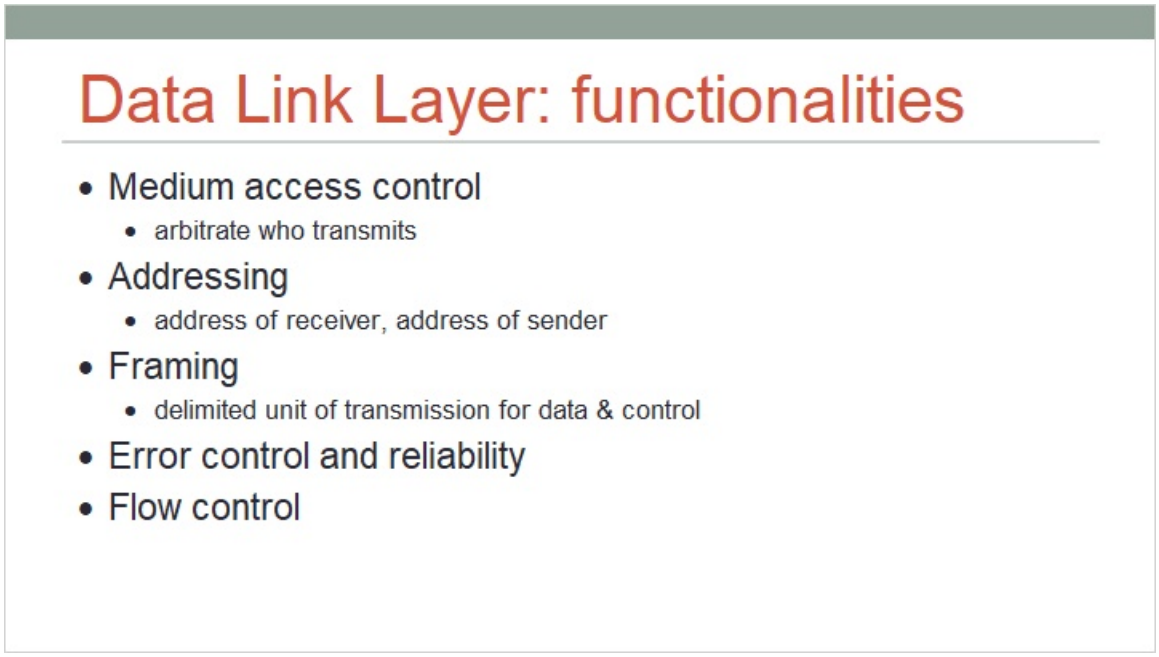
1.10 Physical Layer: Wired Media



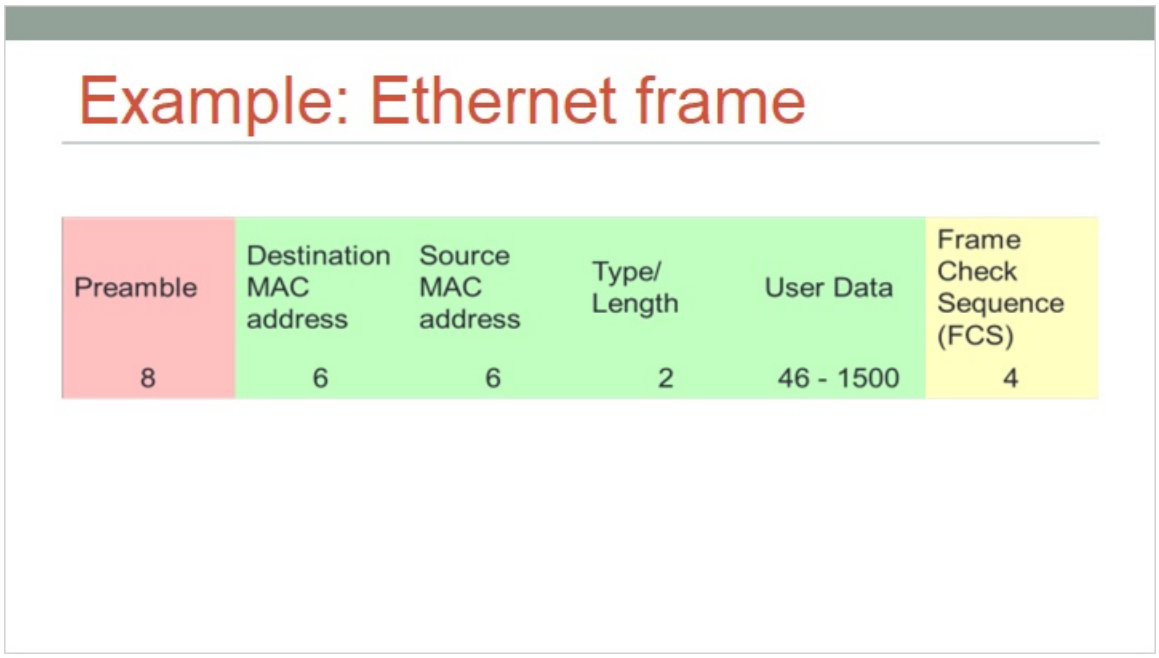
1.11 Physical Layer: Wireless Media



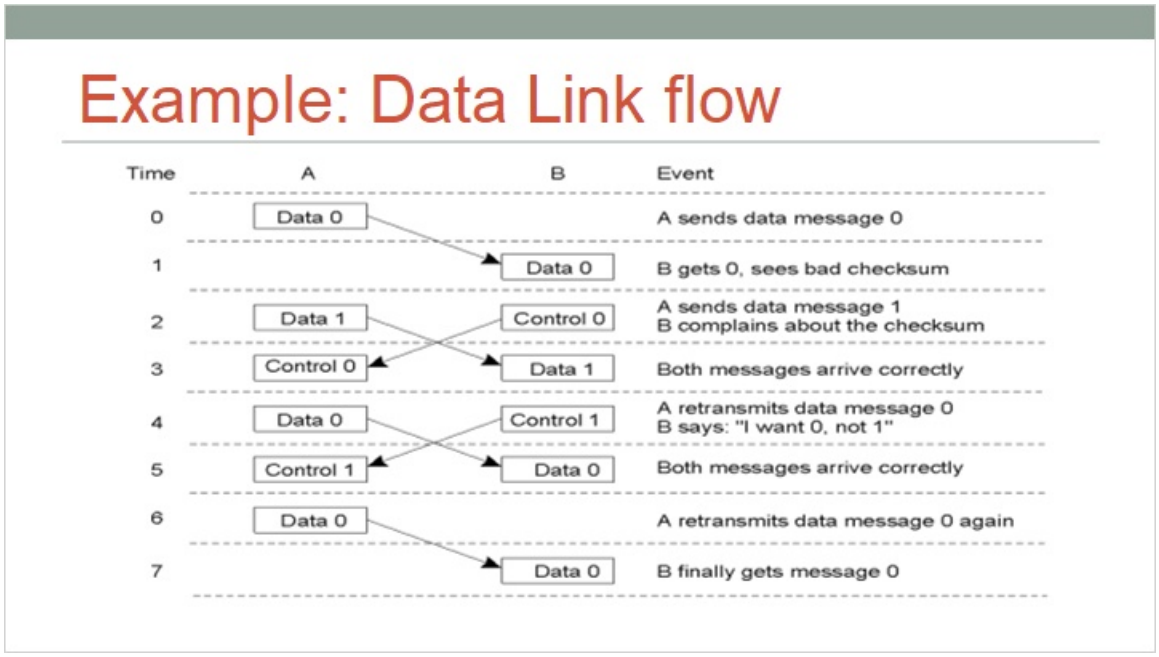
1.12 Data Link Layer: functionalities



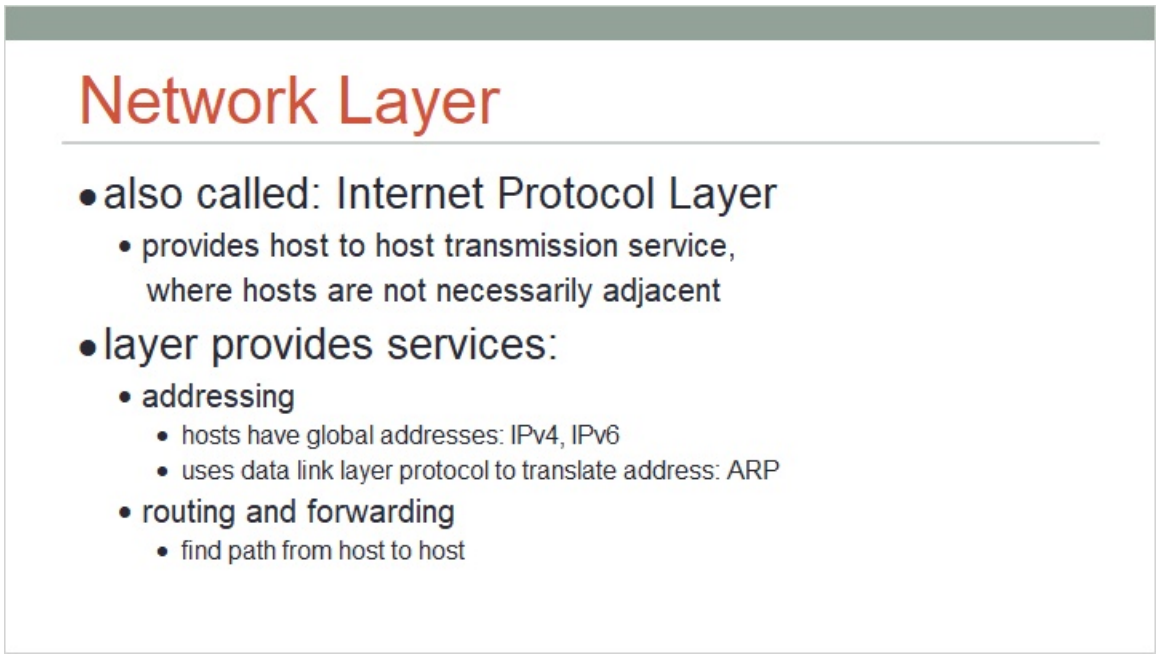
1.13 Example: Ethernet frame



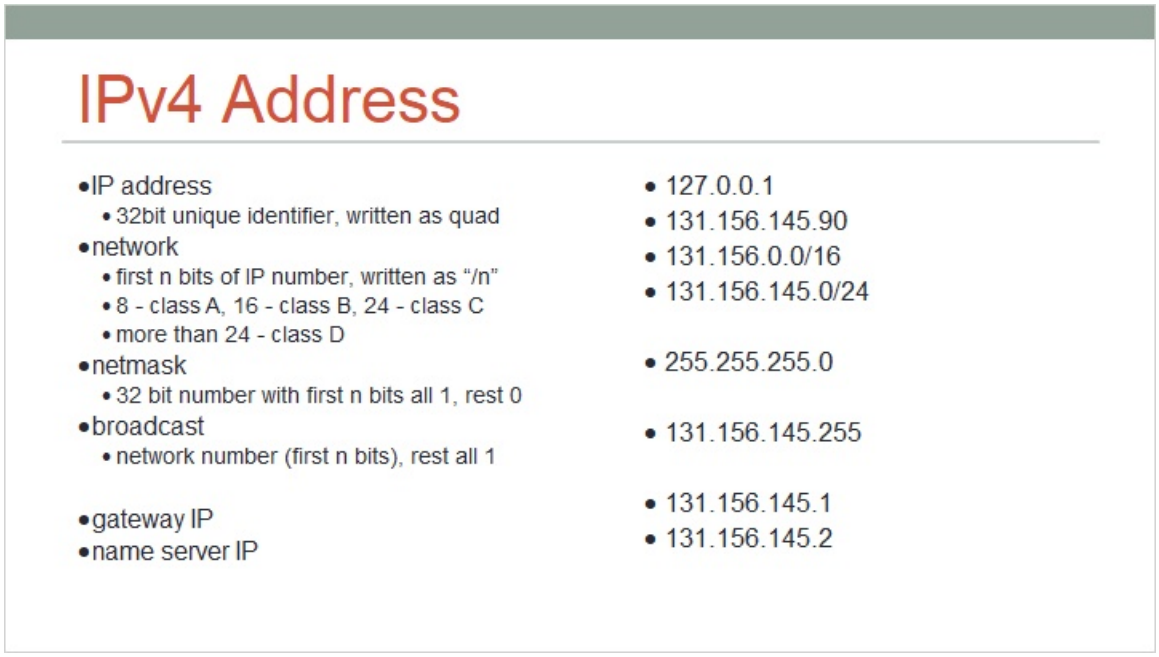
1.14 Example: Data Link flow



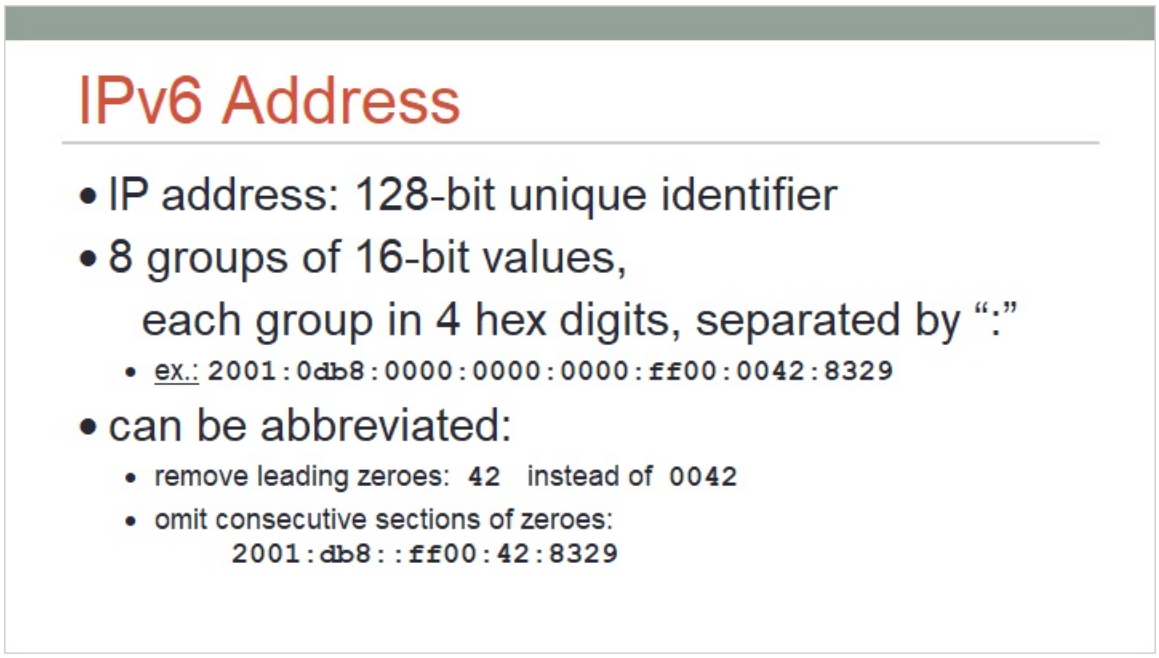
1.15 Network Layer



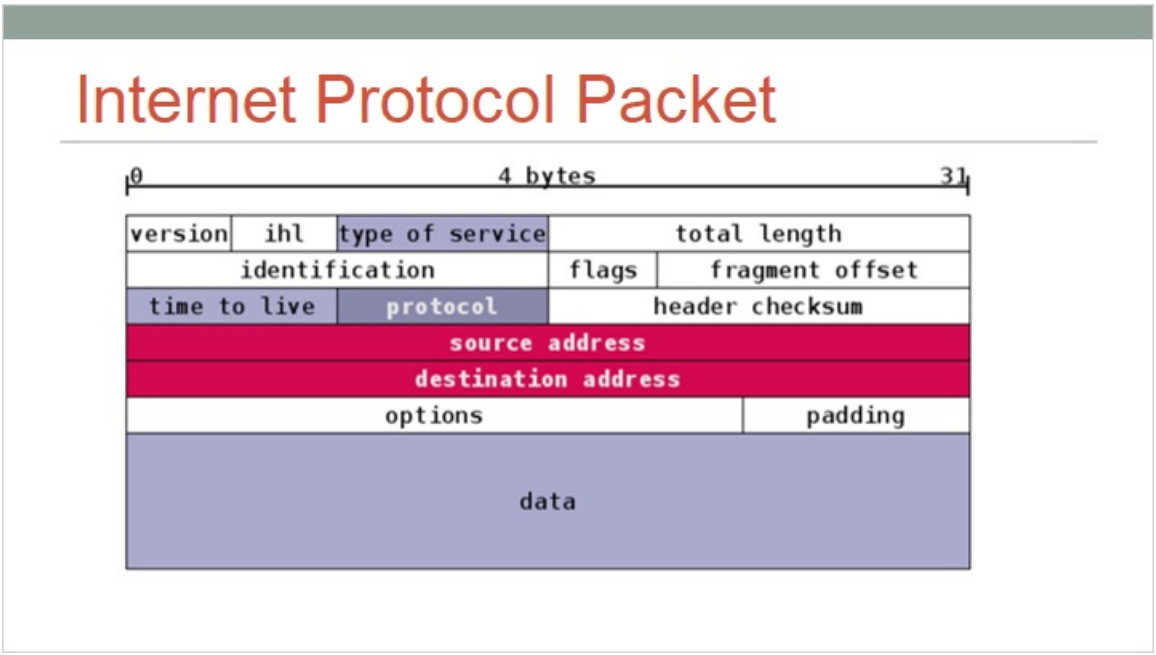
1.16 IPv4 Address



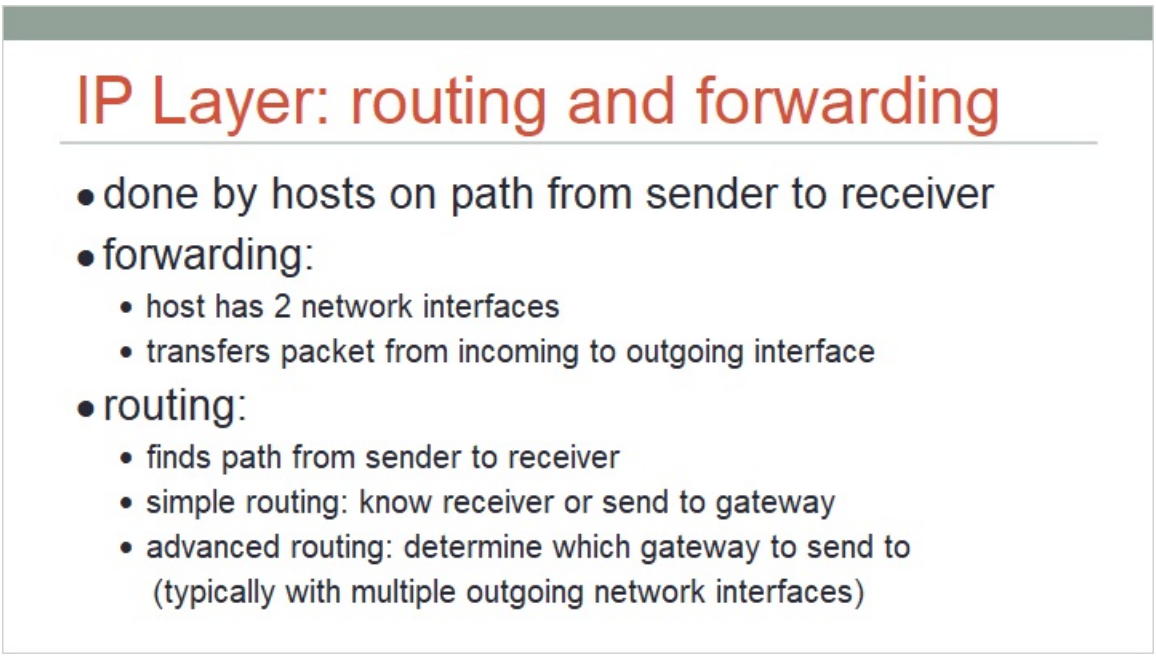
1.17 IPv6 Address



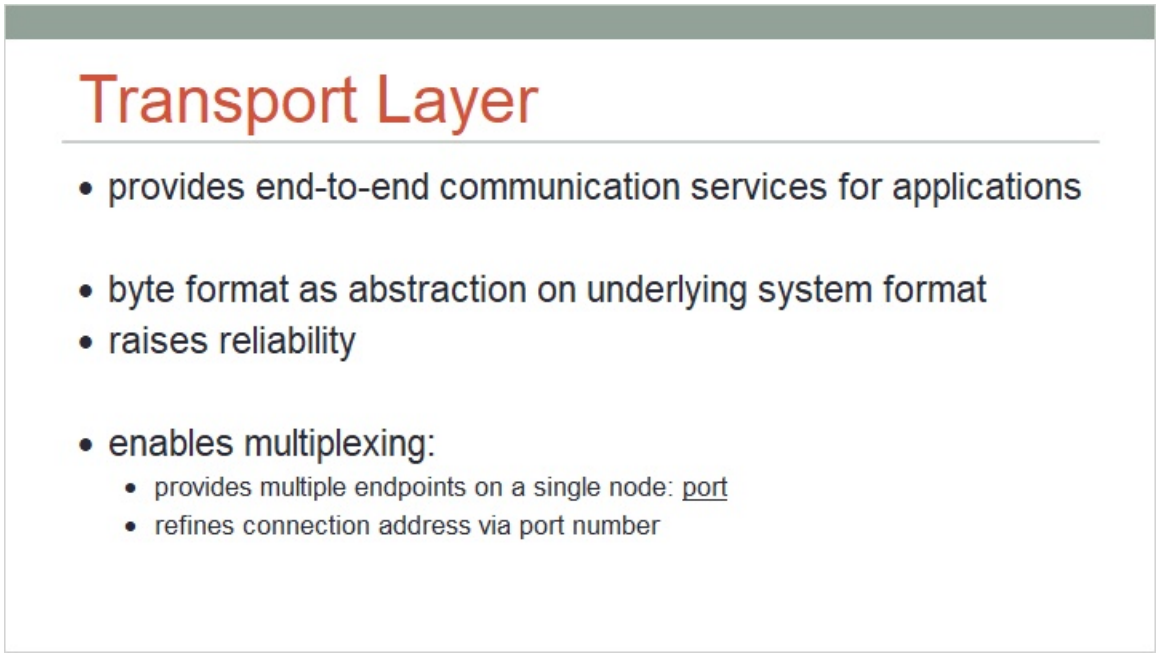
1.18 Internet Protocol Packet



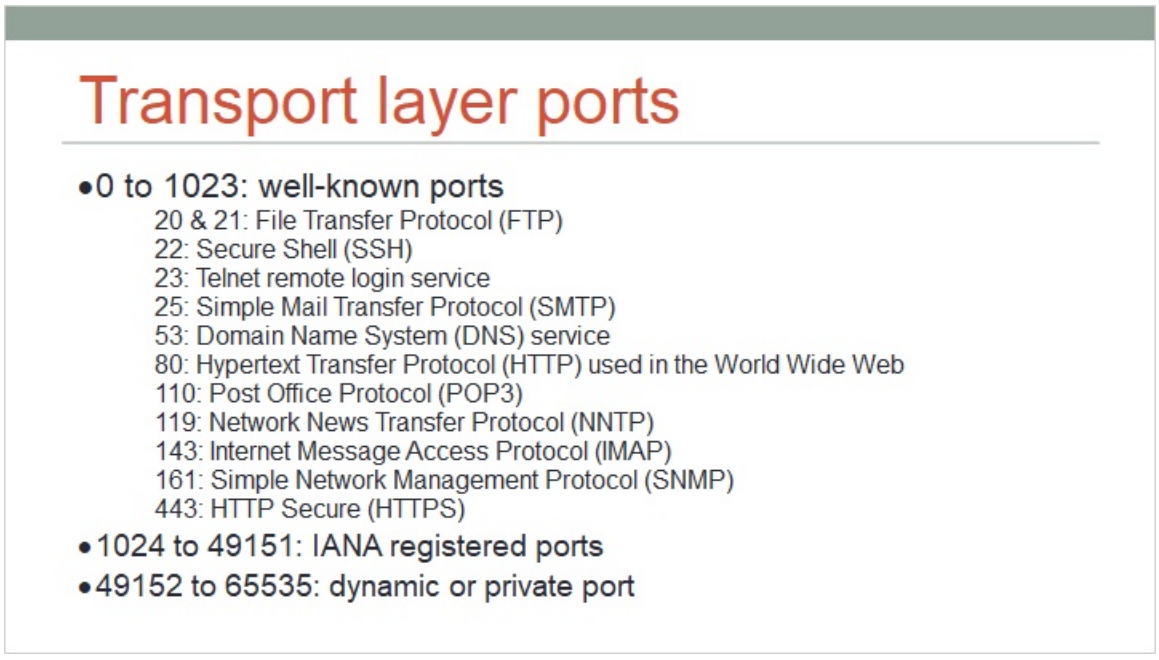
1.19 IP Layer: routing and forwarding



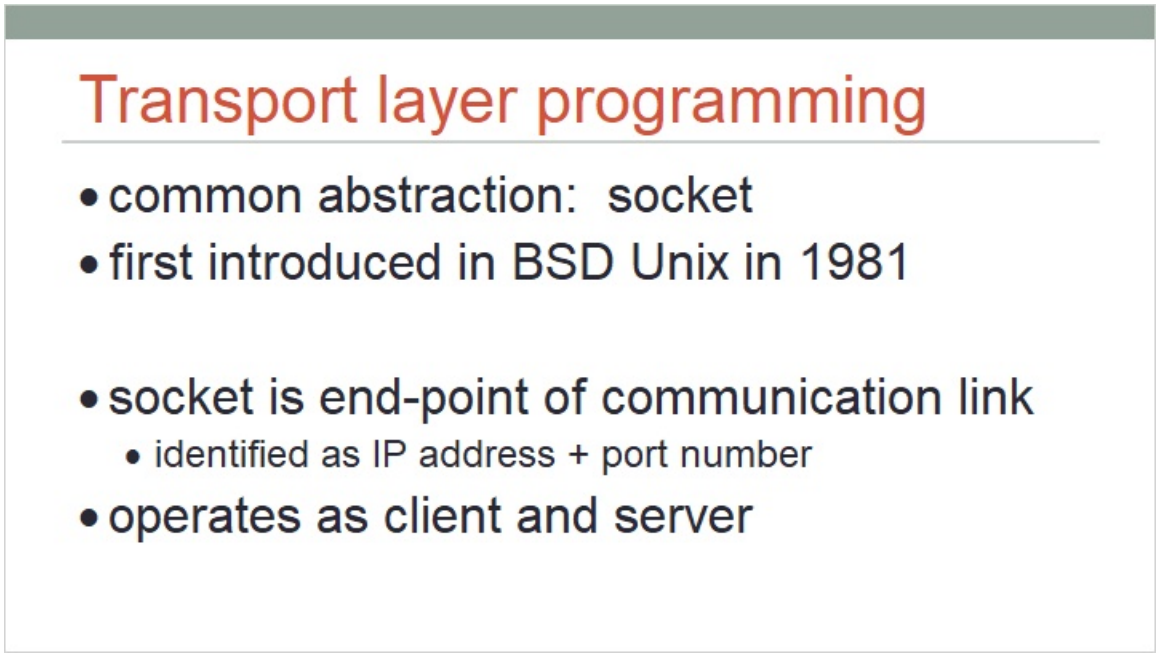
1.20 Transport Layer



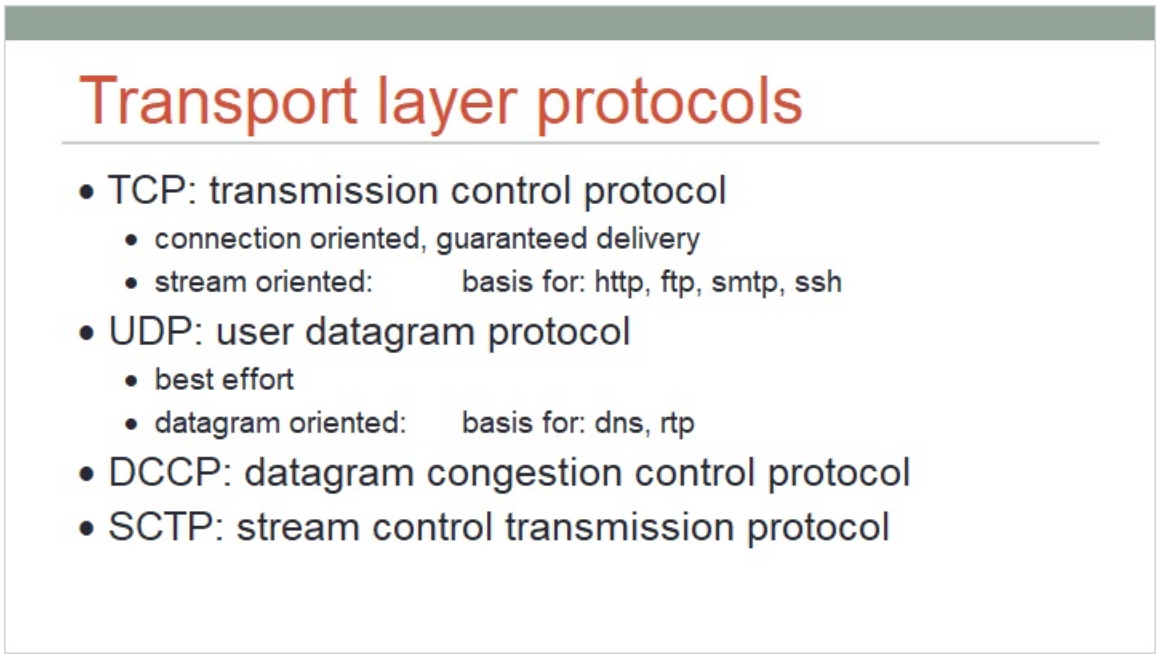
1.21 Transport layer ports



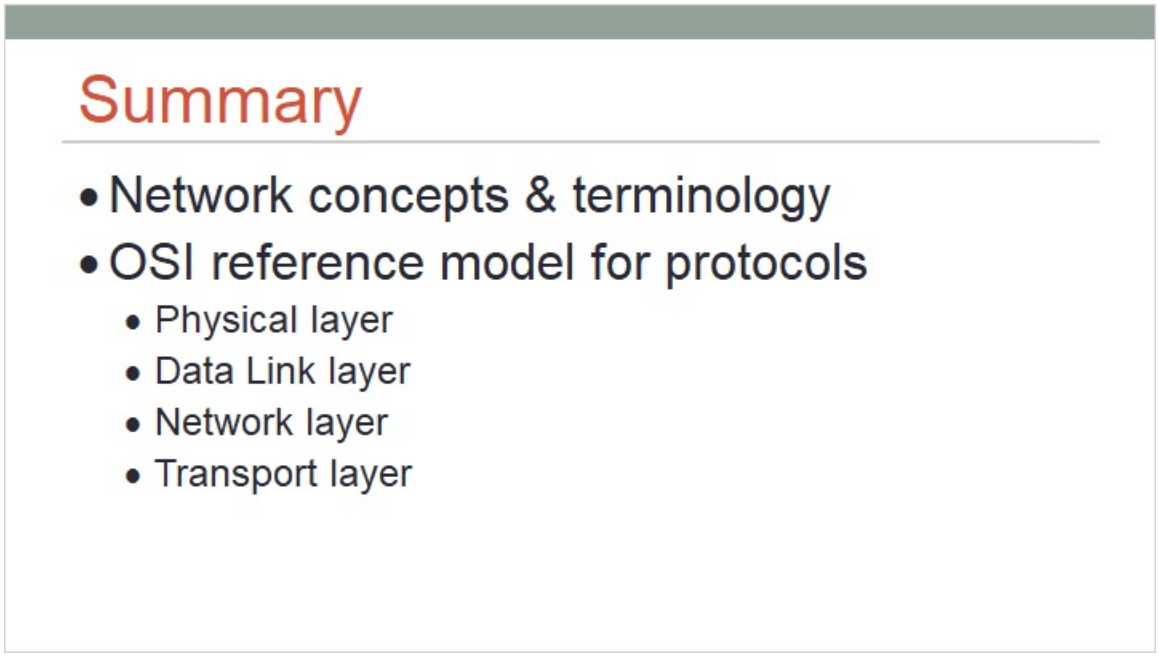
1.22 Transport layer programming



1.23 Transport layer protocols



1.24 Summary


Summary
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• Physical layer
• Data Link layer
• Network layer
• Transport layer