Ch. 10 Protocol Layering
Outline

1. Introduction
2. The Need For Multiple Protocols
3. The Conceptual layers of Protocol Software
4. Functionality of the Layers
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6. Locus of Intelligence
7. The Protocol Layering Principle
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9. Two Important Boundaries in the TCP/IP Model
10. The Disadvantage of Layering
11. The Basic Idea Behind Multiplexing and Demultiplexing
12. Summary
Protocol Layering

• Separates protocol functionality
• Each layer solves one part of the communication problem
• Intended primarily for protocol designers
• Set of layers is called a protocol stack
Reference Models

ISO 7-Layer Reference Model

TCP/IP 5-Layer Reference Model
Illustration of Layering In an Internet

- IP is machine-to-machine: layering principle only applies across one hop
- TCP is end-to-end: layering principle from original source to ultimate destination

FTP, SMTP, HTTP
TCP, UDP
IP
ARP
TCP/IP Multiplexing and Demultiplexing

Application Layer

Transport Layer

Network Layer

Link Layer

Physical Layer
Summary

• Layering
  – Intended for designers
  – Helps control complexity in protocol design

• TCP/IP uses 5-layer reference model
  – IP is machine-to-machine protocol
  – TCP is end-to-end protocol

• Conceptually, a router only needs layers 2 and 3, and a host needs all layers

• Demultiplexing used to handle multiple protocols at each layer