Internetworking: Concepts, Architecture, and Protocols

Chapter 17

Internetworking
• The Problem
  – How do you interconnect PCs to UNIX servers to IBM mainframes to MACs?
  – How to achieve universal service?
• The Solution
  – Connect LAN’s to LAN’s with a device that can do hardware matching and protocol conversion.
  – TCP/IP protocol suite

The Router, the Basic Building Block
• A router
  – Is like a bridge in that it has network interface, hardware, memory, and software.
  – Is not like a bridge in that it can do hardware format and protocol conversion.

Internet Architecture
• An internet is formed by connecting multiple LAN or WAN networks with routers.
• Multiple routers are often used to handle the traffic and for redundancy.

Virtual Network
• TCP/IP software provides the illusion of a single network to users and applications.
• Actually there is an underlying physical structure in which a computer attaches to one physical network, and routers interconnect the networks.

TCP/IP Internet Protocols
• TCP/IP is the first and most important set of protocols for the Internet.
• TCP/IP uses a 5 layer model.
  – The ISO Session layer (5) is omitted entirely.
  – The ISO Network layer (3) is replaced by the Internet layer.
### Layers of the TCP/IP Suite

- **Physical Layer**: T1, V.35, HSSI, OC-3, or RS-232 etc.
- **Link Layer (Network Interface Layer)**: Ethernet, ATM, Frame Relay, Token Ring, ppp
- **Network Layer (Internet Layer)**: Internet Protocol - IP
- **Transport Layer**: Transmission Control Protocol, TCP & User Datagram Protocol UDP
- **Application Layer**: Ping, Traceroute, FTP, NFS, Telnet, etc.