Assignment # 2

- Text book, chapter Four:
  - » 4.2, 4.4, 4.6,4.10
  - » Due on Tuesday 21/12/1422H

Key Differences From OSI

- Connectionless Service: TCP/IP is pro-connectionless
- Simple Management
- Hierarchy vs layering
- Internetworking: Not in original OSI

Layering

- Each layer has to perform a set of functions
- All alternatives for a row have the same interfaces
- Choice at each layer is independent of other layers.
- Need one component of each layer
- Null components
- Nth layer control info is passed as N-1th layer data.

Hierarchy

- **Can directly use the services of a lower entity even if it is not in an adjacent layer**
- **Control and data can be separate connections.**
- **Control connections may have different reliability requirements than data.**
- **Lower layer control information can be used for higher layer control, e.g., lower layer close may close all higher layers**

Internetworking Terms

- **End-system: Host**
- **Network: Provides data transfer between end-systems**
- **Internet: A collection of networks**
- **Subnetwork: Each component of an internet**
- **Intermediate System: Connects two subnetworks**
- **Port: Application processes in the host**

Operation of TCP/IP

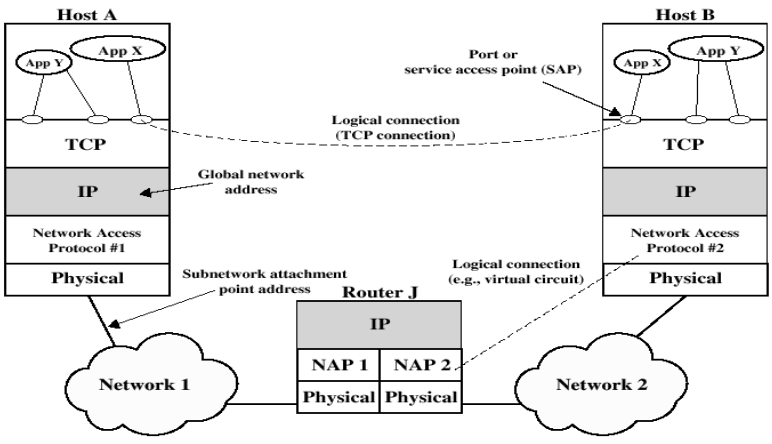

Figure 3.1 TCP/IP Concepts

Operation of TCP/IP

- Two levels of addressing are needed:
  - Each host on a subnet must have a unique global internet address
  - Each process with a host must have a unique address within the host (port)
- Host address on a network
- IP deals only with host addresses = Subnet + Host #
- Application messages are broken into TCP segments

Operation of TCP/IP (Cont.)

- **TCP Header**
  - Source port (16 bits)
  - Destination port (16 bits)
  - Uses segment sequence number (32 bits) for ordering and lost segment detection
  - Uses checksum for error detection
- Passes the segment to IP with instructions to deliver it to the destination host
- Delivers the data to appropriate port in the destination host

IP Operation

- **IP Protocol**
  - **Deals only with host addresses**
- **Services:**
  - **Send: user to IP**
  - **Deliver: IP to user**
  - **Error (optional): IP to user**

IP Operation

- **IP Header**
  - Source host address (32 bits)
  - Destination host address (32 bits)
  - Type of service (reliability, precedence, priority)
  - Time-to-live (TTL)
  - Uses checksum for error detection

IP Address

- Class A: 16,774,214
- Class B: 65,534
- Class C: 254
- Class D:
- Local : Subnet + Host