Internet Architecture Part 2

MCIT 595

Physical Layer (1)

- **Service**: move information between two systems connected by a physical link
- **Interface**: specifies how to send a bit
- **Protocol**: coding scheme used to represent a bit, voltage levels, duration of a bit
- **Examples**: coaxial cable, optical fiber links.

Datalink Layer (2)

- **Service**:
  - Aggregate stream of bits into **frames** (attach frame separators)
  - Send data frames between peers
  - Others:
    - Per-hop reliable transmission
    - Per-hop flow control (transmitting does not overflow receiving)
- **Interface**: send a data unit (frame) to a machine (MAC address) connected to the **same** physical media
- **Protocol**: Medium Access Control (MAC) (e.g., CSMA/CD, Token ring)…
- **Example**: Ethernet (LAN), 802.11 (wireless)

Network Layer (3)

- **Service**:
  - Deliver a packet to a specified network destination
  - Perform segmentation/reassembling (different networks have different package sizes)
  - Others:
    - Packet scheduling
    - Buffer management
- **Interface**: send a packet to a specified destination (network address)
- **Protocol**: define global unique addresses; construct routing tables
- **Example**: IP

Transport Layer (4)

- **Service**:
  - Process-to-process channels
  - Demultiplexing (via ports) to different processes
  - Optional: error-free and flow-controlled delivery
- **Interface**: send messages to a specific destination (address + port)
- **Protocol**: implements reliable transmission and flow control
- **Examples**: TCP (reliable) and UDP (unreliable)

Session (5) and Presentation (6) Layers

- **Session service**:
  - Combining different transport streams for each application
  - E.g. audio and video stream in a teleconferencing application
- **Presentation service**:
  - Convert data format between various representations to provide a standard interface for the application layer

Application Layer (7)

- **Service**: any service provided to the end user
- **Interface**: depends on the application
- **Protocol**: depends on the application
- **Examples**: FTP, Telnet, WWW browser

Layer Summary