Overview

- Circuit-switched vs Packet-switched
- Difference between switch and router
    - Switch: within a Local Area Network (LAN), only in layer 2 protocols.
    - Router: between different LANs or even larger networks, only in layer 3 protocols.
- Forwarding and Routing
    - Packet: data chunk + header
    - Forwarding: transmit a packet towards the destination using forwarding table
    - Routing: the process of establishing forwarding table
- Multiplexing:
    - time division multiplexing (TDM): allocating time slices
    - frequency division multiplexing (FDM): allocating frequency
    - statistical multiplexing: queueing packets. Possible problem: congestion, packet loss.
- Protocol
    - Definition: specification for interface between modules on different machines
    - Characteristics: data format, rules for information exchange, service implemented
- Internet layered architecture

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L5: Application -> define interactions with users
L4: Transport   -> define logical channels between apps and the network
L3: Network     -> define how packets move (routing + forwarding)
L2: Link        -> define how hosts access physical layer
L1: Physical    -> cabal and bit representations

                Data unit    Protocols
+------------+
| Application|  message      HTTP, FTP, Email, ...
+------------+
| Transport  |  message          TCP, UDP
+------------+
| Network    |  packet               IP
+------------+
| Link       |  frame        Ethernet, ...
+------------+
| Physical   |  bit          Cabel
+------------+
```

    - Routers use up to network layer, while switches use only up to link layer.
    - Packet and frame are just different names for the same thing.
    - Encapsulation & Decapsulation

- Encapsulation: Adding headers when data moving down the stack
- Decapsulation: Removing headers when data moving up the stack