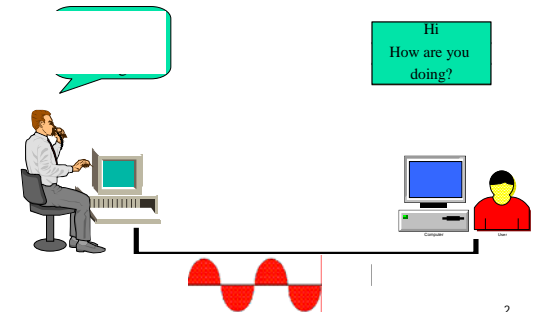


Network Model

ผศ. ดร. อนันต์ พลเพิ่ม
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Data Communication



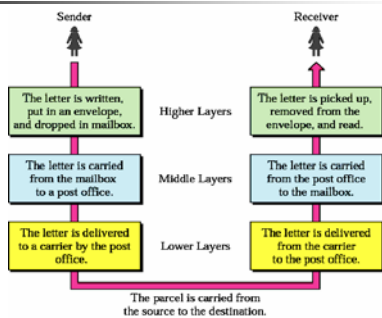
How can it happen?

- A lot of work since user inputs data until the data is transmitted.
- Should each application program take care all tasks?
 - NO

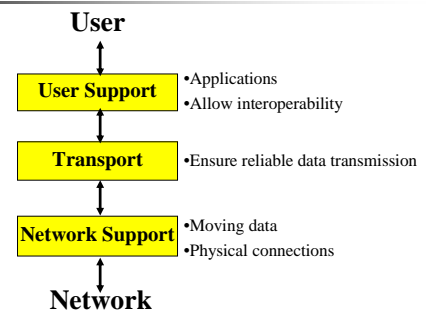
Computer Communication Model

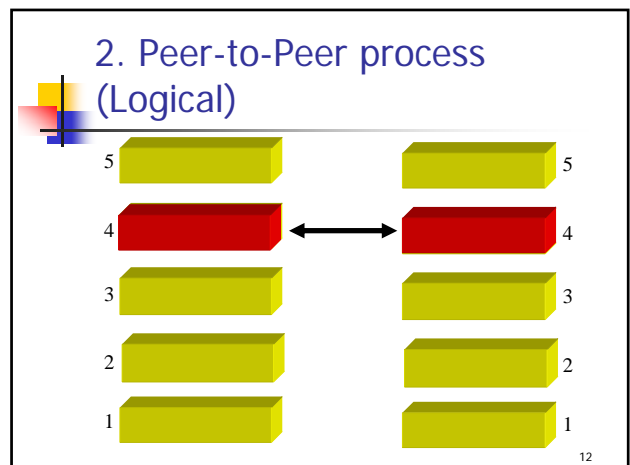
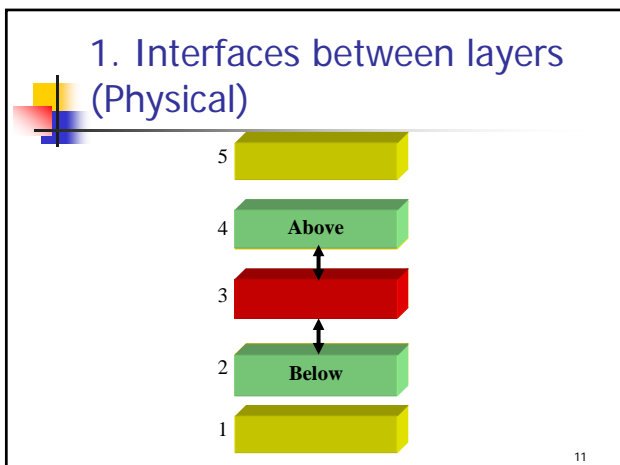
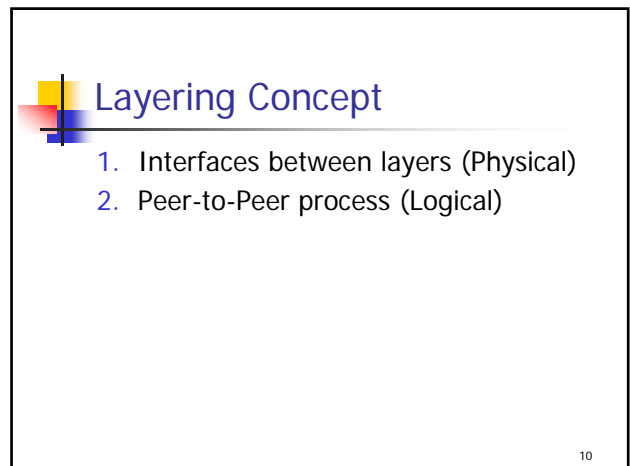
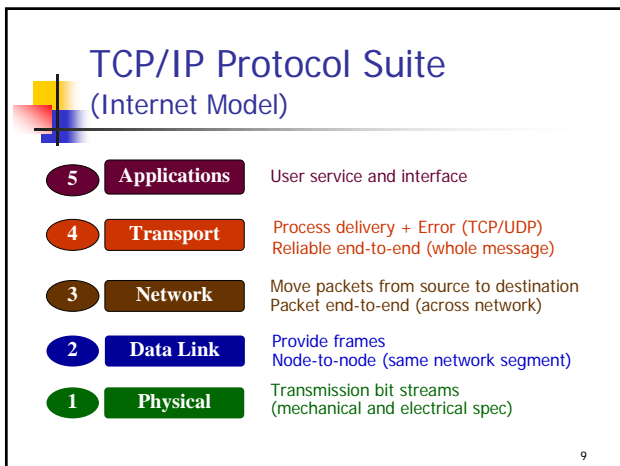
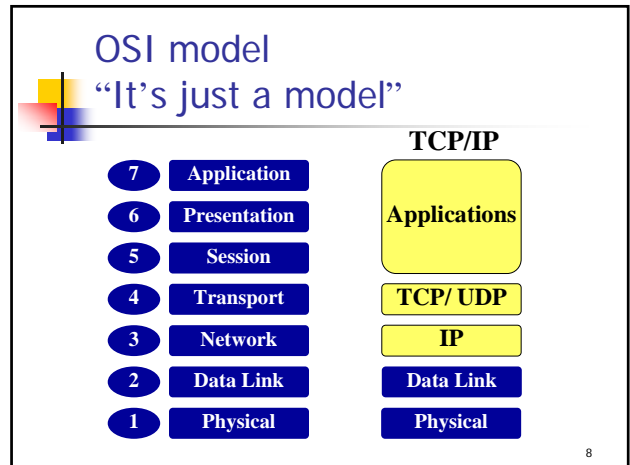
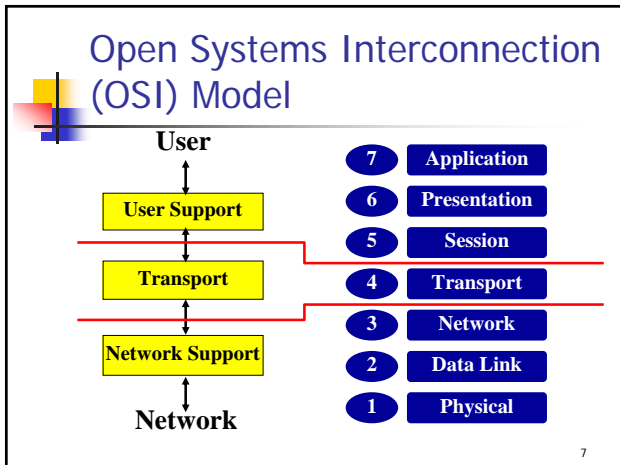
- Modularity
- Well-defined interfaces
- Well-defined functions and protocol

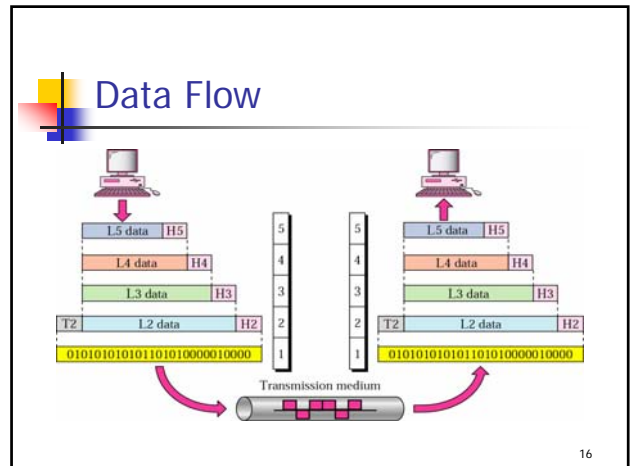
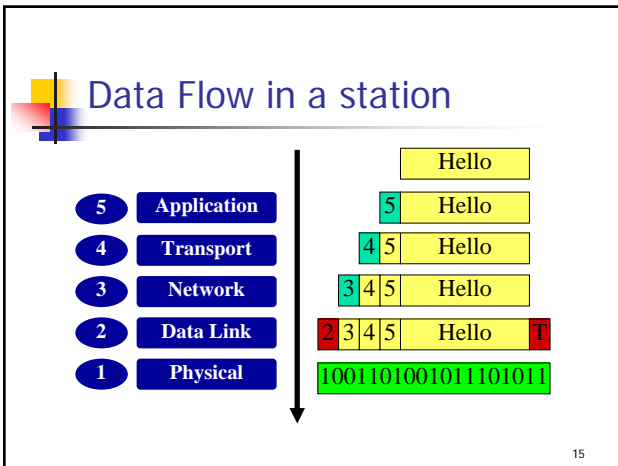
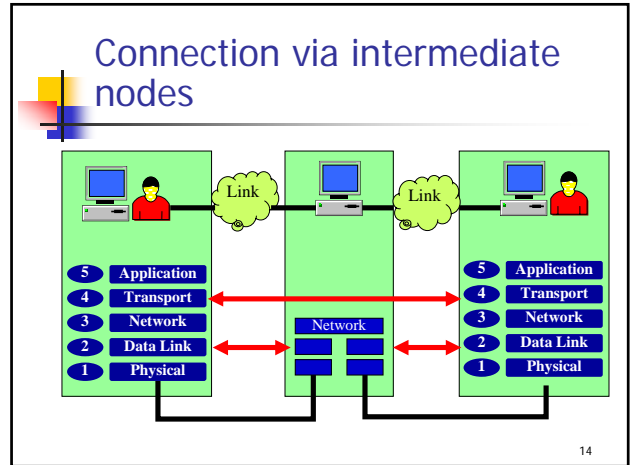
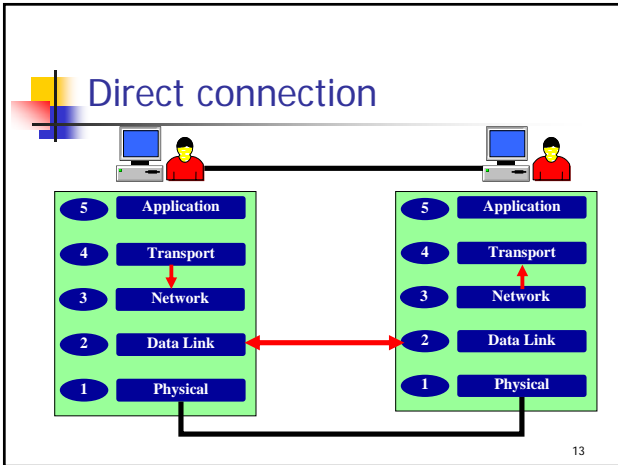
Transmit a letter



Layered Architecture

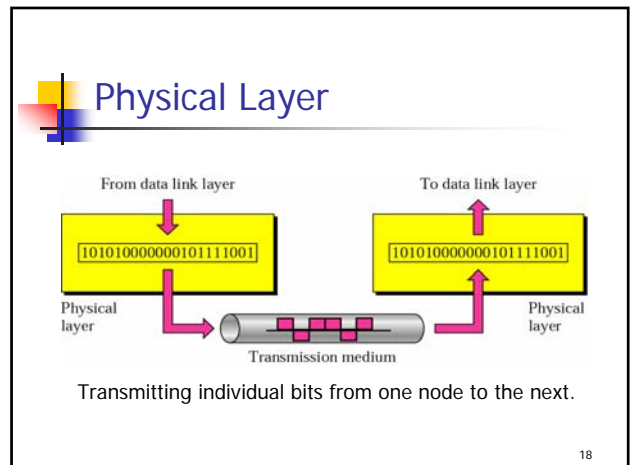






OSI Model and data flow

17

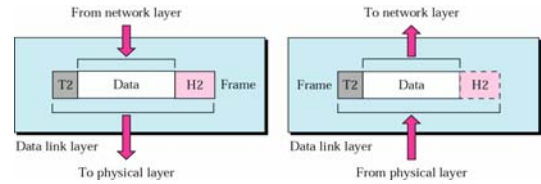


1. Physical Layer

- Physical characteristics of interface
- Stream of Bits (e.g., 001010100100)
- Line config. (e.g., point-to-point)
- Topology (e.g., bus, star)
- Transmission mode (e.g., half-duplex)

19

Data Link Layer



Transmitting frames from one node to the next.

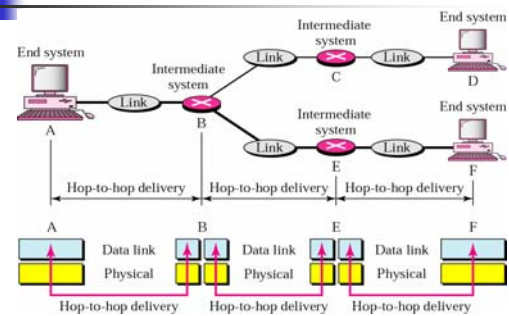
20

2. Data Link Layer

- Physical addressing
- Access control
- Error control
- Node-to-Node delivery** (same network)

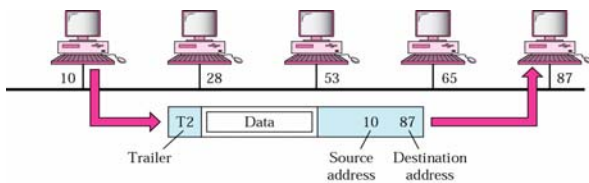
21

Node-to-node delivery



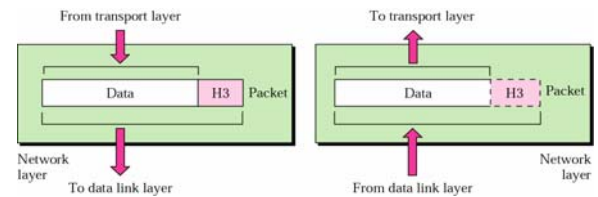
22

2. Data Link Layer Example



23

3. Network Layer



Delivery of packets from the source to the final destination

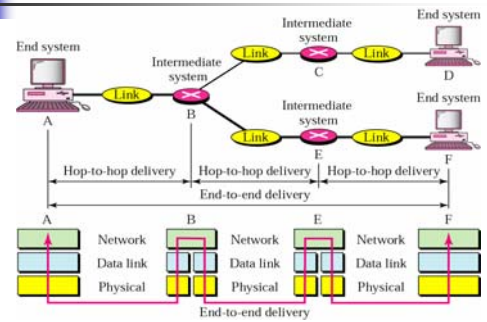
24

3. Network Layer

- Logical Address
(e.g., IP address: 158.108.33.66)
- Routing (router, gateway)

25

Source-to-destination delivery

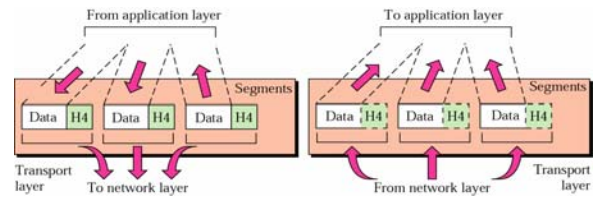


26

3. Network Layer Example

27

4. Transport Layer



Delivery of a message from one process to another

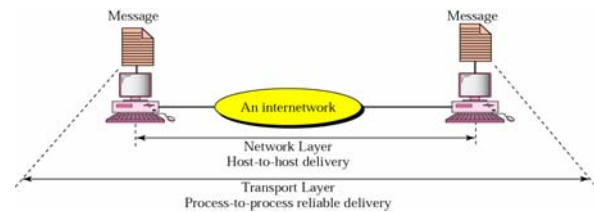
28

4. Transport Layer

- Service-point addressing (port number)
- Segmentation and assembly
- Flow and error control
- End-to-end delivery (across network)

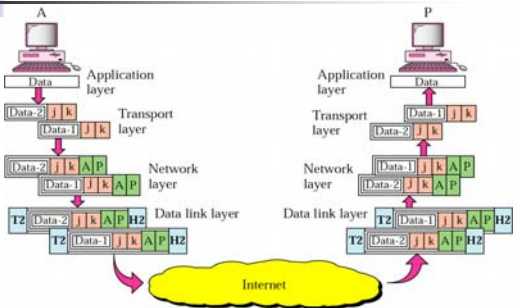
29

Process-to-process delivery



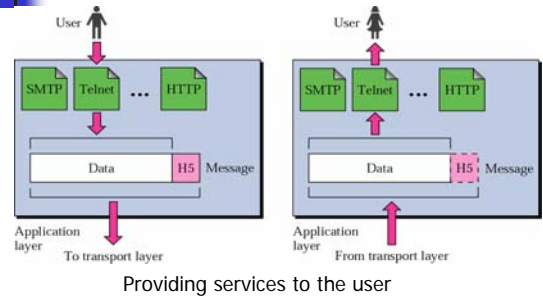
30

Process-to-process delivery



31

5. Application Layer



32

5. Application Layer

- User interfaces
- Service supports (e.g., mail, FTP)

33

TCP/IP Protocol Suite (Internet Model)

- 5 Applications** User service and interface
- 4 Transport** Process delivery + Error (TCP/UDP)
Reliable end-to-end (whole message)
- 3 Network** Move packets from source to destination
Packet end-to-end (across network)
- 2 Data Link** Provide frames
Node-to-node (same network segment)
- 1 Physical** Transmission bit streams
(mechanical and electrical spec)

34

OSI Model

- 7 Application** User service
- 6 Presentation** Translate format, encrypt
- 5 Session** Session manage, checkpoints
- 4 Transport** Reliable end-to-end (whole message)
- 3 Network** Packet end-to-end (across network)
- 2 Data Link** Node-to-node (same network segment)
- 1 Physical** Physical

35