Network Software

- Network Layers
- Message
- Design Issues
- Service Primitives

1

Sample Communications

- Philosopher
  - Protocol
- Translator
  - Services
  - Interfaces
  - Protocols
- Secretary
  - Services
  - Interfaces
  - Protocols

2

1
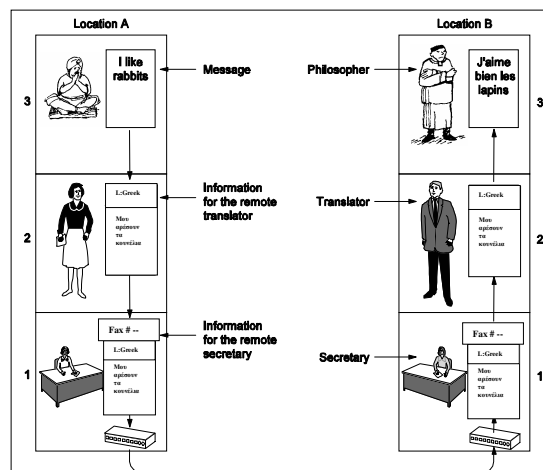
Network Layers

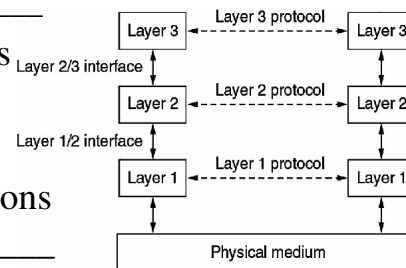- Network Software is organized into layers to…
  - Reduce _____
  - Allow layers to be _____

- Each layer
  - Provides _____
  - Uses _____

- Interfaces for the services _____

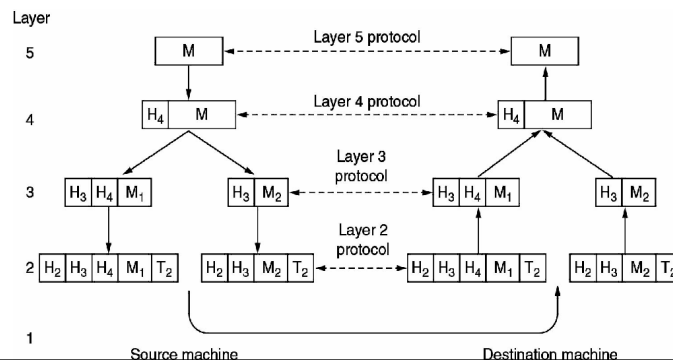- From an end-to-end perspective communications are _____

```
                              Layer 3 protocol
              Layer 3  <------------------------>  Layer 3
Layer 2/3 interface
              Layer 2  <------------------------>  Layer 2
                              Layer 2 protocol
Layer 1/2 interface
              Layer 1  <------------------------>  Layer 1
                              Layer 1 protocol

                          Physical medium
```

Messages

- Control info
  - Each layers adds _____
  - Used by _____ and then _____
- Protocol Data Unit (PDU): _____

```
Layer
 5            [M]  <----- Layer 5 protocol ----->  [M]

 4         [H4][M]  <--- Layer 4 protocol --->  [H4][M]

                              Layer 3
 3   [H3][H4][M1]  [H3][M2] <-protocol->  [H3][H4][M1]  [H3][M2]

                              Layer 2
 2 [H2][H3][H4][M1][T2] [H2][H3][M2][T2] <-protocol-> [H2][H3][H4][M1][T2] [H2][H3][M2][T2]

 1
     Source machine                    Destination machine
```

2

Some Design Issues (1)

Layers
Messages
Design
Primitives

■ Overall
  – Type of comms: _____
  – Connection: _____
  – Confirmation: _____
  – Quality of service: _____

■ Error control: _____

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Some Design Issues (2)

Layers
Messages
Design
Primitives

■ Messages
  – Addressing: _____
  – Routing: _____
  – Max Length: _____

■ Flow control
  – Overloading: _____
  – Ordering: _____
  – Multiplexing: _____

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Sample Service Primitives

■ Connection-oriented or connectionless comms?

■ Primitives:

– Listen: _____

– Connect: _____

– Receive: _____

– Send: _____

– Disconnect: _____

Client machine   Server machine

(1) Connect request

Client
process   (2) ACK

Server
process

(3) Request for data

(4) Reply

System
calls

Operating   (5) Disconnect
system   Kernel Protocol Drivers
stack   (6) Disconnect   Kernel Protocol Drivers
stack

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