

## Example Networks

Internet  
ATM  
Ethernet  
Wireless

- Internet
- Connection Oriented Networks
  - ATM
- Ethernet
- Wireless LANs

## Internet – Applications

**Internet**  
ATM  
Ethernet  
Wireless

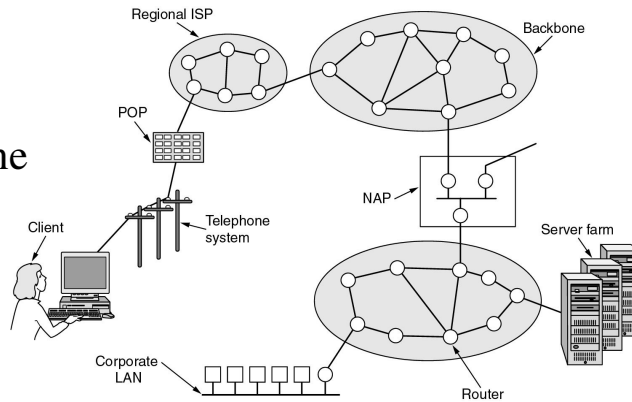
- Internetworks: A collection of \_\_\_\_\_
  - Uses gateways to \_\_\_\_\_
- The Internet is a \_\_\_\_\_
- Applications based on protocols:
  - HTTP: \_\_\_\_\_
  - SMTP: \_\_\_\_\_
  - FTP: \_\_\_\_\_
  - TELNET: \_\_\_\_\_
  - DNS: \_\_\_\_\_
  - NNTP: \_\_\_\_\_

APPLICATION LAYER

## Internet – Physical Layout

Internet  
ATM  
Ethernet  
Wireless

- User
- PC
- Modem
- Telephone
- POP
- ISP
- Internet
- NAP
- Local network
- Server



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## Internet – Messages

Internet  
ATM  
Ethernet  
Wireless

- Packaging: \_\_\_\_\_
- Sending
  - Broadcast to \_\_\_\_\_
  - May want to ensure \_\_\_\_\_ or  
may not mind if they \_\_\_\_\_
- Receiving
  - Validity: \_\_\_\_\_
  - Order: \_\_\_\_\_
- Network independence: Need to ensure that our  
communications are independent of \_\_\_\_\_  
\_\_\_\_\_

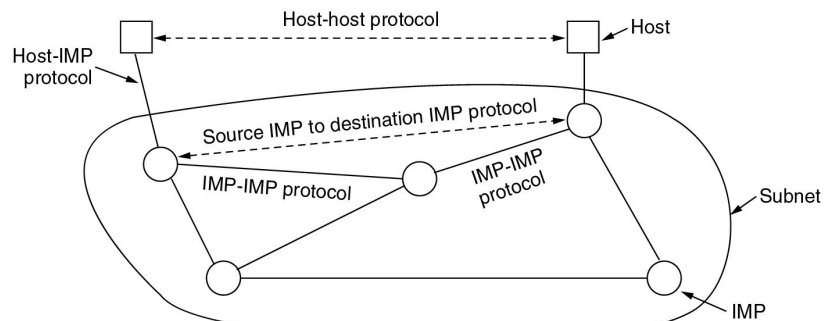
TRANSPORT LAYER

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## Internet – ARPANET

Internet  
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Wireless

- End to end communication for \_\_\_\_\_
- We go through a Subnet: \_\_\_\_\_



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## Internet – Getting there?

Internet  
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Wireless

- Routing
  - Learn where to \_\_\_\_\_
  - Can be based on \_\_\_\_\_ although can lead to \_\_\_\_\_ and \_\_\_\_\_
  - Instead use \_\_\_\_\_ based on \_\_\_\_\_
- Different Networks
  - We must often \_\_\_\_\_ due to \_\_\_\_\_
  - We also need to \_\_\_\_\_ which is even more problematic.

NETWORK LAYER

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## Internet – Transmission ?

Internet  
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Wireless

*HOST-TO-NETWORK LAYER*

- To send a message across a network we must consider:
  - Media: \_\_\_\_\_
  - Encoding: \_\_\_\_\_
  - Errors: \_\_\_\_\_
  - Flow Control:
    - Multiple senders on the same network
    - Slow receivers: Stop them being \_\_\_\_\_

## Connection Oriented Networks

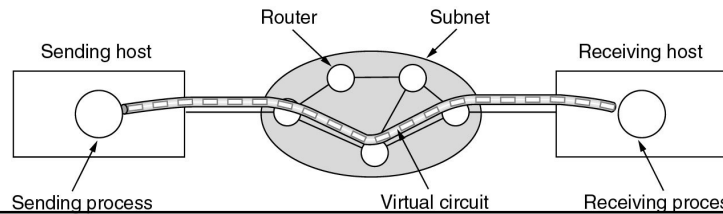
Internet  
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Wireless

- The Internet is a connectionless network designed for fault tolerance in the case of \_\_\_\_\_
  - Routes all packets \_\_\_\_\_
- Problems for network operators
  - Quality of service: \_\_\_\_\_
  - Billing: \_\_\_\_\_
- A Connection oriented approach simplifies these issues. We have to
  - Establish connections \_\_\_\_\_
  - Reserve \_\_\_\_\_

# ATM

Internet  
**ATM**  
 Ethernet  
 Wireless

- Asynchronous \_\_\_\_\_
- Intended as a solution to all problems
- Uses: \_\_\_\_\_
- Cell based
- Routers establish connections: \_\_\_\_\_
  - Can be permanent with \_\_\_\_\_
  - No Ordering issues as \_\_\_\_\_

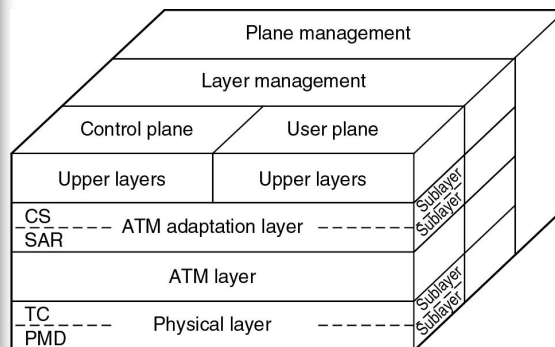


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## ATM Reference Model (1)

Internet  
**ATM**  
 Ethernet  
 Wireless

- Different reference model to \_\_\_\_\_
  - Physical layer: \_\_\_\_\_
  - ATM layer: \_\_\_\_\_
  - AAL layer: \_\_\_\_\_



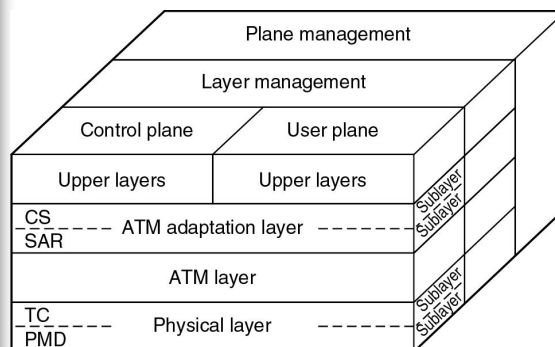
CS: Convergence sublayer  
 SAR: Segmentation and reassembly sublayer  
 TC: Transmission convergence sublayer  
 PMD: Physical medium dependent sublayer

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## ATM Reference Model (2)

Internet  
**ATM**  
 Ethernet  
 Wireless

- User plane: \_\_\_\_\_
- Control plane: \_\_\_\_\_
- Layer & Plane Management: \_\_\_\_\_

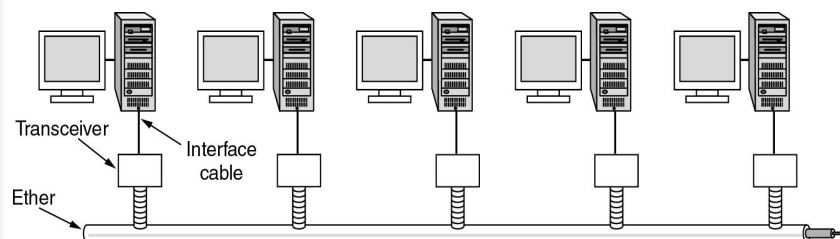


CS: Convergence sublayer  
 SAR: Segmentation and reassembly sublayer  
 TC: Transmission convergence sublayer  
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## Ethernet

Internet  
 ATM  
**Ethernet**  
 Wireless

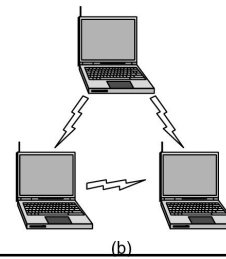
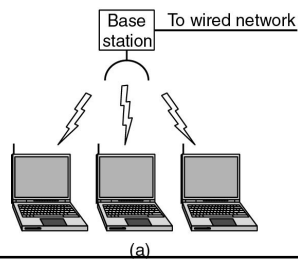
- Most popular LAN (\_\_\_\_\_)
- Coaxial Cable up to \_\_\_\_\_
  - Repeaters every \_\_\_\_\_
  - 256 machines could be connected via \_\_\_\_\_
- Sharing the medium: \_\_\_\_\_
- Simultaneous transmission: \_\_\_\_\_



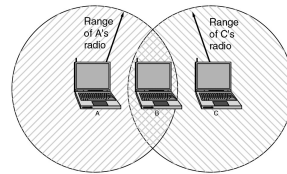
## Wireless LANs (1)

Internet  
ATM  
Ethernet  
**Wireless**

- 802.11: IEEE standard for \_\_\_\_\_
- Two Modes provided
  - a) With a Base station
    - All comms go through \_\_\_\_\_
  - b) Without a base station
    - All comms go directly \_\_\_\_\_



## Wireless LANs (2)



- Challenges
  - Frequency band: \_\_\_\_\_
  - Range: \_\_\_\_\_
  - Privacy: \_\_\_\_\_
  - Safety: \_\_\_\_\_
  - Bandwidth: \_\_\_\_\_
  - Listen doesn't work: \_\_\_\_\_
  - Multipath fading: \_\_\_\_\_
  - Mobile software: \_\_\_\_\_
  - Handoff: \_\_\_\_\_

- New standards

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