Introduction (3)

Web browser client/server

Access networks:
Dial-up connection for internet
DSL: telephone cable with splitter that connects network to landline and computer through modem
Wifi:

Residential
Organization (LAN)
Mobile

Client/server model:
- Internet
- Client can access a particular data/file that server provides

Peer-to-peer model:
- Utorrent, Skype
- Each host(node) acts as client or server

Network Core:

Multiplexing networks:
Method 1:
Frequency division multiplexing
3 users want to access a channel of 9kHz bandwidth, channel is divided into 3 subchannel of strength 3kHz using FDM.

Allot channels but all users do not have full capacity of the channel

Method 2:
Time division multiplexing
Each frame divided into time slots according to number of users
Full bandwidth available but limited time
- Synchronous TDM (circuit switching)
- Asynchronous TDM(statistical)(packet switching) (assume in frame 2, b does not have data to transmit. In FDM and STDM, if user does not transmit data, bandwidth is wasted. But in ATDM, next user can use the time slot.)
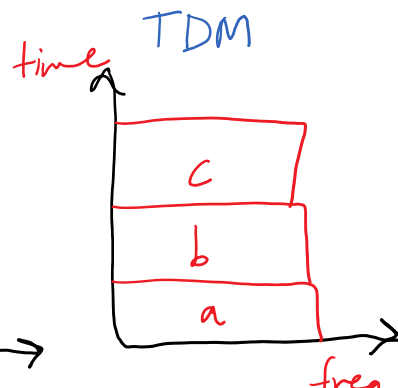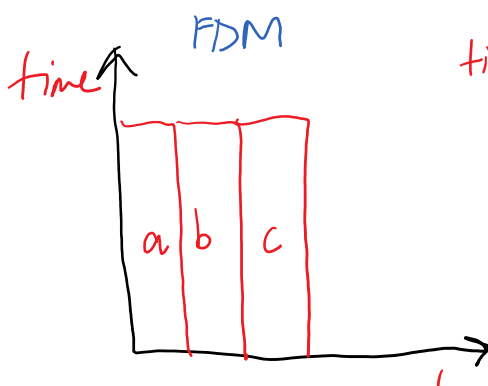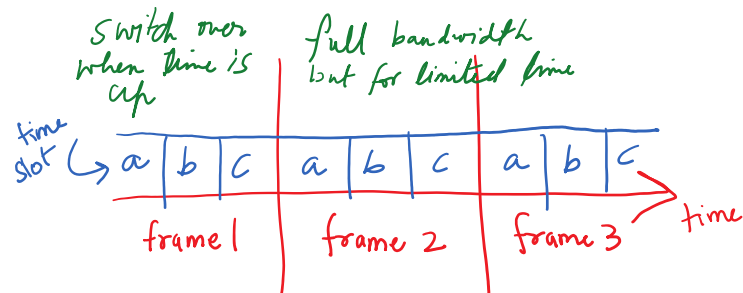
GSM uses TDMA/FDM

How is data transferred? Split the channel (logically)
1. Circuit switching
Connection request from sender to receiver. Acknowledgement from receiver to sender.
Reserving the resource for communication for a specific amount of time. No one can access the channel. (STDM, FDM)

Assume the communication is over before the time limit is over. Remaining time is wasted since channel is idle. Connection termination after time is over. Acknowledgement that data is received properly (TCP, connection oriented)

Suitable for transmitting data for a long amount of time.
Internet uses TCP.

1. Packet switching
No concept of connection setup. On demand basis through multiple intermediate nodes between sender and receiver.

Data divided into packets and independently transmitted over the channel. Each packet may take a different route.

Packets do not arrive in sequence. Time depends on availability of the channel through which packets travel.

No bandwidth is wasted. If link available, packet forwarded. Drawbacks: guarantee of delivery isn't possible. No acknowledgement of receiving the packet. (UDP, connectionless protocol)

ATDM, statistical multiplexing used because resources are not reserved, on demand transmission.

OSI Model (Open Systems Interconnection)

Need: invented in 1984, compatibility problem between devices on different platforms (Windows, Mac, Linux)
ISO proposes OSI model to transmit data without compatibility issues.
Defines functionality from application to network medium to receiving application
Each layer provides a service to layer above and below with a protocol specification (interaction or logical communication, headers)

Additional information added to data (protocol, header, routing information, IP address)
Data encapsulation and decapsulation