Multimedia Data

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Overview I

Requirements of Applications

- **Speech:** Needs to be sent in real-time for conversations but relatively low in terms of bit rate. Speech can also tolerate errors and to some extent the speech coding algorithm can hide them.
- **Audio streaming:** Needs to be fast, but not necessarily real-time - can employ buffering on the termincal to allow for variability in transmission times.. Can also tolerate errors and to some extend can hide them.
- **images:** Have no real-time requirement but can often be quite large in size. Can tolerate a small number of errors in transmission.
- **Video phone:** Needs to be real-time while video streaming does not. High bit rate requirements and error tolerant.
- **SMS:** Does not need to be real time or require large bit rates, however the messages are not error tolerant.

Application Service Requirements - Transport Layer

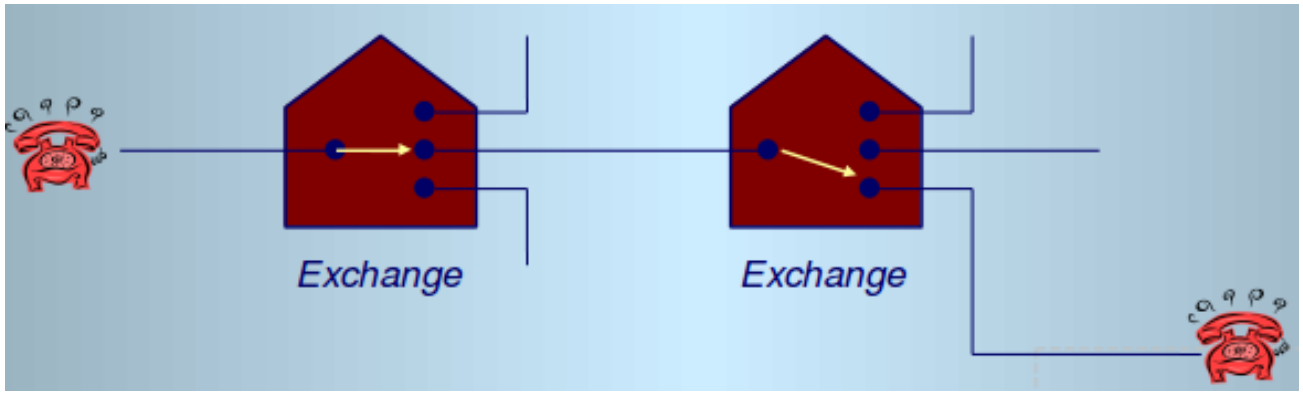
- **Throughput:** Required data transfer rate - bits per second - to support the application.
- **Latency:** Maximum propogation delay/maximum variation to make application usable.
- **Error Sensitivity:** How sensitive the application is to errors in the data.

Circuit switched vs Packet switched I

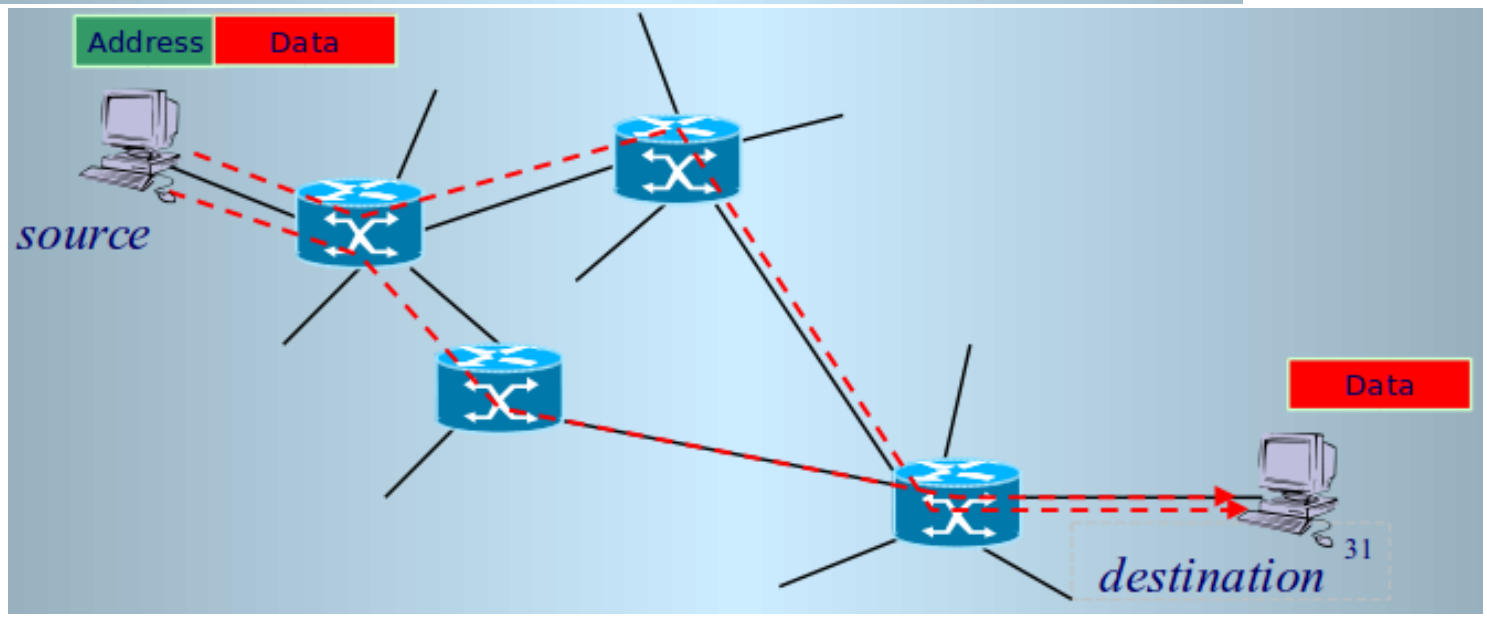
- Circuit Switched:
  - Require dedicated point-to-point connections during call.
  - Continuous stream of data
  - E.G. Phone network.
  - Physical circuit allocated for each connection.
  - If insufficient resources are available then the connection is refused (e.g. engaged signal)
  - If an invalid number is called then you hear the unobtainable tone
- Packet Switched:
  - Move data in seperate, small blocks.
  - Each packet contains destination address.
  - Packets reassembled in sequence make up the message.
  - Example is IP network.
  - Address field of header is used to decide path through the network.
  - Packets may take different routes though
  - Network will always attempt to deliver the packets even in times of congestion.

Circuit switched vs Packet switched II

Circuit



Switched



Connection-oriented and connectionless

- Connection-oriented:
  - Requires connection set-up and close-down.
  - Packets are acknowledged by the receiver.
  - If no acknowledgement by the receiver then the packet is re-sent.
  - Guaranteed in-order delivery of packets.
  - In the IP suite this service is provided by the Transmission Control Protocol (TCP).
- Connectionless:
  - No connection set-up or close-down.
  - No guarantee of delivery.
  - No acknowledgement of receipt.
  - No in-order delivery
  - Packets transmitted in isolation, delivered on a best effort basis.
  - In the IP suite this service is provided by the User Datagram Protocol (UDP).

The End