

INF3190 Group lecture

Lecture #6

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Feel free to send questions, suggestions and feedback.

- Terminology
- Technologies
- Typical things which are good to know for the final exam
- Several of these questions have been covered by previous group lecture slides

- Line switching
 - A connection is established between two nodes
 - Guaranteed bandwidth
 - No packet loss (except for losses caused by external sources)
 - Wasted bandwidth
 - The packets follow the same route
 - Uses a constant stream
- Packet switching
 - Uses packets
 - No guaranteed bandwidth, but less bandwidth waste
 - Packets may get lost
 - Each packet is routed through the network based on local decisions - may vary
- Packet switching is used a lot more than line switching (especially when considering amounts of data)

- Asynchronous transmission - random delays due to packet switching
- Synchronous transmission - constant delay due to line switching

Connection-orientation

- Connction-oriented (for instance: TCP)
 - Handles packet loss
 - Gets things always in order
 - Great delays if a packet is lost
 - Used for reliable communication (file transfers, web browsing etc.)
- Connection-less (for instance: UDP)
 - No guarantees (packet loss, order)
 - No delay if a packet is lost
 - Used for voice/video-chat and other services which need performance, not reliability

Multiplexing

- Frequency - same medium used with different frequencies
- Time - same medium but time-slots assigned to different end-points
- (Optical and radio only) Polarization-division - polarization used to differentiate the different signals
- Space-division - different channels

- Hierarchical routing
- Discovery of connections which go down - finding routes around the problem
- Must be able to handle a range of mediums and implementations of the different layers
- A network of many independent networks

LAN-topologies - network types

- Former normal topologies: ring and bus topology
- Currently: one cable per client - a bit more costly but performs a lot better and is much more reliable
- Broadcast networks - everyone receives the packets (unsafe!)
- Point-to-point networks - only the clients in the destination field receive the packet (safer, but can still be unsafe)

- Many factors count: maximum possible frequency (determined by noise-to-signal ratio and the material - these are also correlated), measurement-levels and signal strength
- Measured in bps or baud
- Throughput - actual bandwidth over a certain link
- Delay sources:
 - Propagation
 - Processing
 - Re-transmission

Quality of Service (QoS)

- Old definition (today: Quality of Traffic):
 - Quality measurement of a line, things like: delay, jitter (randomization in delay), errors, throughput, packet misordering
- New definition:
 - Guaranteed bandwidth - reserves a portion of the line
 - Used for VoIP in some cases - but has to be configured
 - Was a buzz-word at some point

- Protocol - ruleset for executing communication
- Interface - Method of communicating with layers above/beneath you