


A Selective Retransmission Protocol for Multimedia on the Internet

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Applications: Text-Based vs. Multimedia

- Text
 - Strict loss constraints
 - Minimal timing constraints
- Multimedia
 - Forgiving to loss
 - Requires timing constraints




Protocols: TCP vs. UDP

- TCP
 - No loss
 - Retransmits all lost messages
 - Potentially large latency
- UDP
 - Potentially unbounded loss
 - Does no retransmission
 - Minimal latency
- Neither is what you want!




Our Solution: A Selective Retransmission Protocol

- Balances the extremes of TCP and UDP
- Tradeoff between loss and latency
- Retransmits a percentage of lost packets
 - If end-to-end delay is large, may accept loss
 - If end-to-end delay is small, may always request retransmission
 - If loss rate is very high, may request retransmission
- How to decide?

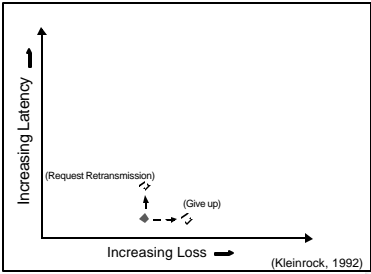



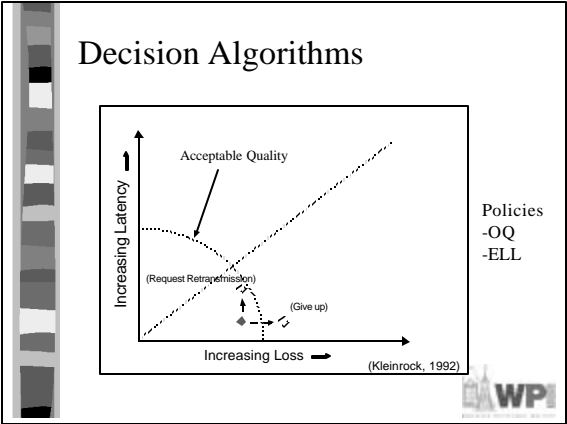
Groupwork

- Measure of loss
- Measure of latency
- Packet is lost
- ... Do you request retransmission?
- Consider:
 - Quiet WAN, interactive audio
 - LAN, broadcast video
 - Lossy MAN, interactive audio



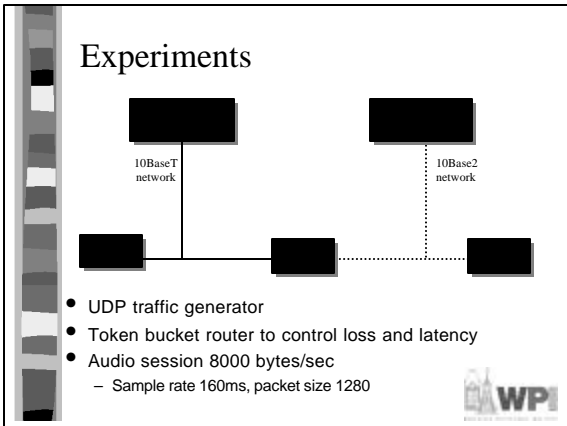
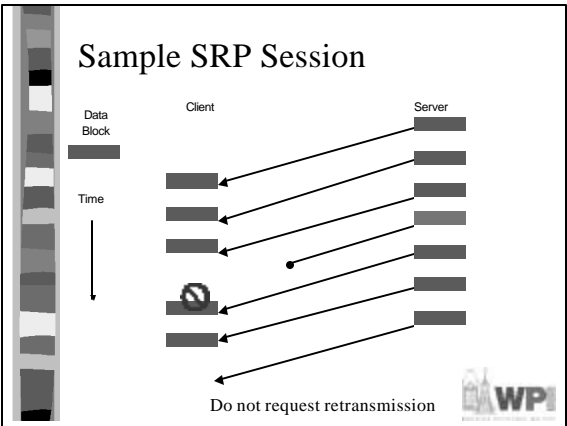
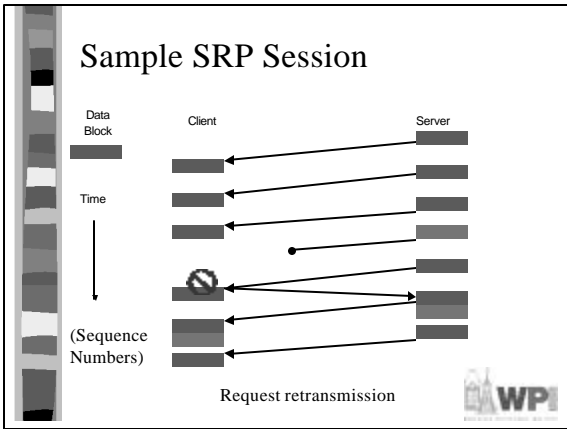
Decision Algorithms

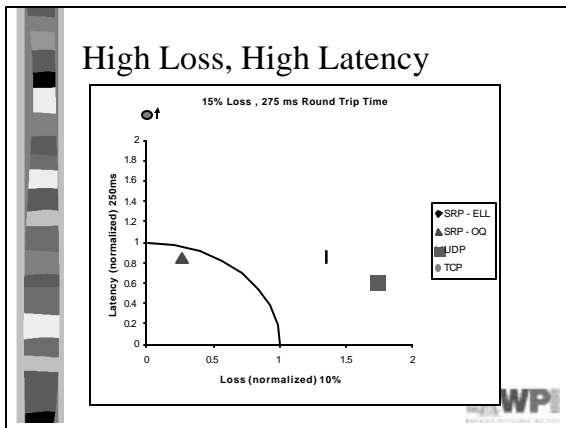
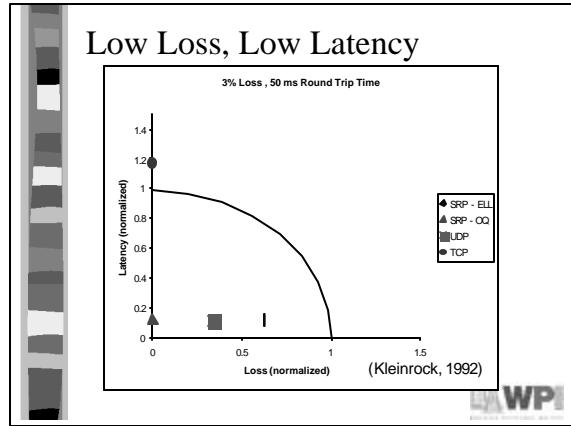
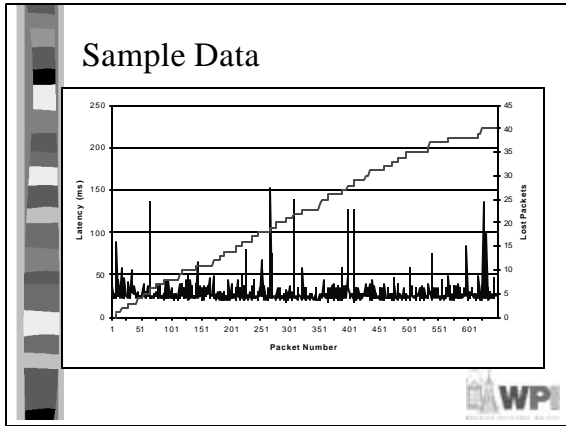





- ### Approach
- Implement SRP and “application”
 - Setup “WAN” test-bed
 - Run “application” over
 - TCP - No loss - Low latency
 - UDP - Medium loss - Medium latency
 - SRP - High loss - High latency
 - Measure “Quality”
 - Analyze Results

- ### Implementation of SRP
- Application layer client/server protocol
 - No “kernel hacking” (yet)
 - Built on top of UDP
 - Measure loss and latency
 - Use to decide when to request retransmission
 - Decision algorithm modular
 - Equal Loss Latency (ELL)
 - Optimum Quality (OQ)





- ### Conclusions
- TCP and UDP provide extremes
 - Not what Multimedia wants
 - SRP can provide a balance
 - Tuning of SRP depends upon
 - Application
 - Measure of "quality"
 - Measurement of network (loss, RTT)
- WPI

Future Work?

WPI

- ### Future Work
- Repair (FEC)
 - Congestion control
 - Loss detection (timeout)
 - Additional decision algorithms
 - Multicast
- WPI