Problem Statement for DCP

draft-floyd-dcp-problem-00.txt

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Requirements:

- Unreliable data delivery, but with congestion control.

- ECN-capable.

- A choice of TCP-friendly congestion control mechanisms.

Constraints:

- Low overhead, for applications that send small packets.

- Traversing firewalls?

- Ability to negotiate congestion control parameters:
  - ECN.
  - type of congestion control.

Three possibilities, for flows that now use UDP:

- Congestion control above UDP.

- Congestion control below UDP.

- Congestion control in another transport protocol.

Congestion control above UDP:

- Burden on the application designer, or on RTP.

- The problems of firewall traversal and parameter negotiation remain.

- Application-level control over ECN?

- Evasion of end-to-end congestion control?

Congestion control below UDP:

- If congestion control feedback is at the application layer:
  - CM does this.
  - Issues: parameter negotiation; ECN; firewalls; evasion of congestion control.

- If congestion control feedback is at the layer below UDP:
  - An additional packet header is needed.
  - To be most effective, the semantics of the UDP socket API would have to be changed, for late binding, and for communication of sequence numbers. Thus, we are already changing UDP.

If a new transport protocol (other than UDP):

● Modify TCP?
  – We want a choice of congestion control mechanisms.
  – We want sequence numbers in packets rather than bytes.
  – Would we need a new protocol number anyway?

* Unreliable variants of SCTP?
  – Support for multiple streams is not needed for unreliable transfer, so we don't want to pay the price in extra packet overhead.
  – Separate control chunks for ECN feedback?
  – We want a choice of congestion control mechanisms.

* A new protocol?
  – Yep.

Other design considerations:

● Mobility?

● Defense against DoS attacks:
server should not hold state for unacknowledged connection attempts.

● Interoperation with RTP.

● Interactions with NATs and firewalls:
- Explicit connection setup and teardown helps.

Questions:

- Is this the right problem?

- Do we have the right set of constraints?

- Are there other requirements that we haven't considered?

- Feedback?