Streaming Media and TFRC

draft-ietf-dccp-tfrc-media-00.txt

http://www.phelan-4.com/dccp/draft-ietf-dccp-tfrc-media-00.txt

http://www.phelan-4.com/dccp/paris-streaming-media-and-tfrc.ppt

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Some History

- Most of this material originally appeared in draft-phelan-dccp-media-00.txt in November 2003
- Material incorporated in DCCP User Guide (currently draft-ietf-dccp-user-guide-03.txt)
  - User Guide adds gaming applications and advice on other DCCP features
- At IETF62 in Minneapolis, decided User Guide needs to await implementation experience, but media portion can proceed on own, hence this draft

Overview

- Starts with "TFRC for Dummies" ☺
  - Basics of TFRC pertinent to media apps
- Divides media apps into three categories:
  - One-way prerecorded
  - One-way live
  - Two-way interactive
- Describes three strategies for media apps using TFRC
  - Depend on stream switching – dynamically varying the encoding rate
  - Strategies for one-way apps not bad
  - Strategy for two-way apps has significant issues
- Explores fairness issues when TFRC/media apps compete with TCP apps in best-effort environment

One-way Apps – Issues

- One-way apps use playout buffer at receiver and transmit buffer (strategy 2) at transmitter to compensate for TFRC rate variations
- Describe when apps must shift to lower encoding rates, and when they may shift back to higher rates
  - But most users perceive quality variations as worse than continuous low quality, so many apps will choose not to switch back up
- Strategies pretty effective, but can be applied to TCP also
  - No lost packets with TCP
  - Is DCCP/TFRC or RTP/TFRC better?

Two-way Apps – Issues

- Might be viewed as requiring unnatural acts
  - Wouldn't pass RFC 4041 – "Requirements for Morality Sections" ☺
- Requires "training" period at start up to deal with slow start
- If app wants to switch back to higher encoding, must "pad" low-rate transmission
- Can't support silence suppression or variable rate video codecs

Fairness

- Draft describes "thought experiment"
  - Multiple strategy 3 media apps compete with TCP file transfer apps across chokepoint link
- Quite fair from TCP apps' point of view
  - Get same (or more) throughput as when competing with just TCP apps
  - TCP apps gradually "brown out" as load increases
- Not so fair from media apps' point of view
  - Strategy 3 training period prevents media apps from overloading links
  - But nothing prevents TCP apps from overloading
    - Media apps "black out" with enough TCP load