



IETF 63 – DCCP WG (Issues with) Interactive Applications Using DCCP

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`draft-burness-dccp-interactive-apps-00.txt`



Preamble

- A presentation of the draft
 - Why the interest from BT?
 - TFRC Issues for Interactive Applications
 - Contribution to re-chartering of the DCCP WG
 - Pushing the protocols as far as they will go

The Interest to the Network Operator

- BT and others migrating to all-IP networks
- ~50% voice bits initially
- QoS and admission control
- DCCP for end-system driven QoS as an alternative
 - low cost users
 - new applications
 - wireless and mobile

Overview

Issues for Interactive Applications

- TFRC Rate Equation
- TFRC Loss Calculation
- Slow Start
- Silence Suppression
- Variable Bit Rate
- User Experience

Other Issues

- Interaction between CCIDs
- Application self-interest

Summary and suggestions

TFRC Rate Equation

- Handle small packets
- Adjust packet size not rate
- As suggested by
 - Floyd and Kohler
 - <http://www.ietf.org/internet-drafts/draft-ietf-dccp-tfrc-voip-01.txt>

TFRC Loss Rate Calculation

- Incorrect for variable sized packets
 - Loss event = 1 or more pkt losses per RTT, flows with small packets therefore get too much bandwidth as multiple loss events are interpreted as one loss event
- RED in byte mode a problem = drop rate as $fn(\text{pkt size})$
 - Unfair to TCP
 - Uncertain what's out there – byte mode in the minority
- Use Virtual packet approach??
 - Widmer
 - Vasallo
- Needs investigation – don't know how big the problem is

Initial Slow Start

- Link DCCP to management flows via Congestion Manager?
 - Revisit?
 - Balakrishnan, RFC3124
- Slow start within call set-up (Phelan)
- Will users tolerate a longer call set-up?
 - Can happen on mobile to mobile calls

Silence Suppression

- No data, eg silence suppression → no ACKs > assume severe congestion → slow start
- Longer RTT (400ms), less probability that silence suppression period > RTO
 - More of a problem for sub-continental networks
- Fast Restart in TFRC for VoIP, too long a gap allowed (up to 10min and interpolated up to 30 min)
 - Difficult for mobile and video (we know it's not designed for that!) (but they are both important aspects for our future network!)
- Allow fast restart after $4 * 400\text{ms}$?

Variable Bit Rate

- Video rate can vary by a factor of 10
 - But unlikely for interactive (conferencing style apps)
- Treat similar to silence suppression
- Use fast restart
 - if video was at a higher rate in a recent, limited time period (cf silence suppression)
 - And rate reduction was application controlled not congestion response
 - And application has received no indication of increased congestion
- Alternatively – use a Congestion Manager

User Experience

- Users intolerant of quality fluctuations
- Is there any point in running at higher bandwidth for short periods? (as perceived by user)
- Could congestion management between multiple flows help here too?
- Transport can go up and down but not the application.
 - Need media guide for application developers

Interaction Between CCIDs

- How do various CCIDs and TCP all interact together?
- Would a single CCID be better than individual ones tailored to different application types?
 - Does having >1 CCID allow too much room for cheating?
 - Could applications choose the “wrong” CCID to improve throughput?
 - Are there conditions when they are not fair to each other?

Self Interest

- Applications such as Media Player and Real do congestion control in order to offer better quality experience
- Congestion control not necessarily network friendly
- How much worse is it than DCCP?
- Will self-interest drive a switch?

What we want to happen

- How to do congestion management for real-time interactive applications such as telephony and video-conferencing?
- Output
 - Media guide for application developers
 - Defined congestion behaviour within DCCP
- Study
 - DCCP with congestion manager
 - Facilitate rate smoothing for key flows
 - Ease slow start, VBR problems
 - TFRC loss rate calculation for variable packet sizes
 - Fast restart for all apps
- Hope to contribute - with help