Internet Engineering Task Force **S. Floyd**
INTERNET-DRAFT **ICIR**
draft-floyd-dccp-ccid2slow-00b.ps **1 December 2006**
Expires: 1 June 2007

A Slowly-Responding Variant for Datagram Congestion Control Protocol (DCCP) Congestion Control ID 2.

Abstract

This document adds a Slowly-Responding variant to Congestion Control Identifier 2 (CCID 2) [RFC4341], TCP-like Congestion Control, in the Datagram Congestion Control Protocol (DCCP) [RFC4340]. Unlike standard CCID 2, the Slowly-Responding variant of CCID 2 uses an Additive Increase of 1/5 MSS for each round-trip time without a loss event, and a Multiplicative Decrease to 7/8-ths of the congestion window in response a loss or ECN-marking event [FMP00]. Specifically, this document adds an AIMD Category feature to CCID 2, where the AIMD Category can be either TCP-Like or Slowly-Responding. The Slowly-Responding variant of CCID 2 should be used by senders who don't need the fast response times of CCID 2, but would prefer the window-based, AIMD-based congestion control mechanisms of CCID 2 to the rate-based congestion control mechanisms of CCID 3 [RFC4342].

1. Introduction

2. The AIMD Category Feature

DCCP's feature numbers are given in Section 6.4 of RFC 4340. This document adds a new AIMD Category feature for CCID 2 as follows:

Number	Meaning	Rec'n Rule	Initial Value	Req'd	Section Reference
128	AIMD Category	SP	0	N	2

Table 1: The AIMD Category feature for CCID 2.

As Table 1 indicates, the AIMD Category feature has an initial value of 0, and is not required for CCID 2. The reconciliation rule is SP, server-priority, allowing this feature to be negotiable between the end-nodes.

Each AIMD Category specifies a specific value for the AIMD increase parameter I and decrease parameter D, where the congestion window is increased by I MSS for every congestion-free window, and decreased to D times the old value for every window with congestion.

AIMD Category	Name	Increase Parameter I	Decrease Parameter D
0	TCP-Like	1	0.5
1	Slowly-Responding	0.2	0.875

Table 2: AIMD Categories.

This document specifies two values for the AIMD Category. The default AIMD Category of 0 specifies TCP-Like AIMD parameters, with I=1 and D=0.5. The congestion window is increased by 1 MSS for every congestion-free window, and is halved for every window with congestion.

An AIMD Category of 1 specifies Slowly-Responding AIMD parameters, with I=0.2 and D=0.875. The congestion window is increased by 1/5-th MSS for every congestion-free window, and decreased to 7/8-ths of the old value for every window with congestion. These AIMD parameters are discussed in more depth in [FMP00].

3. Slowly-Responding AIMD

As discussed in [FMP00], TCP with slowly-responding AIMD parameters of I=0.2 and D=0.875 competes reasonably fairly with TCP with the default AIMD parameters. In addition, TCP with slowly-responding AIMD parameters of I=0.2 and D=0.875 has similar response times to TFRC, generally taking five round-trip times of persistent congestion to halve the sending rate. However, Section 5.2 of [FMP00] shows that TFRC has a somewhat smoother sending rate than TCP with slowly-responding AIMD parameters of I=0.2 and D=0.875.

(We note that the "decrease parameter" in [FMP00] is equivalent to one minus D, for D the decrease parameter in this document.)

4. IANA Considerataions

IANA has to add an AIMD Parameters feature to DCCP. We will also need a table of AIMD Categories.

Normative References

[RFC4340] Kohler, E., Handley, M., and S. Floyd, "Datagram Congestion Control Protocol (DCCP)", RFC 4340, March 2006.

[RFC4341] Floyd, S., and E. Kohler, Profile for Datagram Congestion Control Protocol (DCCP) Congestion Control ID 2: TCP-like Congestion Control, RFC 4341, March 2006.

[RFC4342] Floyd, S., E. Kohler, and J. Padhye, Profile for Datagram Congestion Control Protocol (DCCP) Congestion Control ID 3: TCP-Friendly Rate

Control (TFRC), RFC 4342, March 2006.

Informative References

[FMP00] Floyd, S., Handley, M., and Padhye, J., A Comparison of Equation-Based and AIMD Congestion Control, May 2000. URL "http://www.icir.org/floyd/papers.html".

Authors' Addresses

Sally Floyd
ICSI Center for Internet Research
1947 Center Street, Suite 600
Berkeley, CA 94704
USA

EMail: floyd@icir.org