NAME

cc_hd - HD Congestion Control Algorithm

DESCRIPTION

The HD congestion control algorithm is an implementation of the Hamilton Institute's delay-based congestion control which aims to keep network queuing delays below a particular threshold (queue_threshold).

HD probabilistically reduces the congestion window (cwnd) based on its estimate of the network queuing delay. The probability of reducing cwnd is zero at hd_qmin or less, rising to a maximum at queue_threshold, and then back to zero at the maximum queuing delay.

Loss-based congestion control algorithms such as NewReno probe for network capacity by filling queues until there is a packet loss. HD competes with loss-based congestion control algorithms by allowing its probability of reducing cwnd to drop from a maximum at queue_threshold to be zero at the maximum queuing delay. This has been shown to work well when the bottleneck link is highly multiplexed.

MIB Variables

The algorithm exposes the following tunable variables in the *net.inet.tcp.cc.hd* branch of the sysctl(3) MIB:

queue_threshold Queueing congestion threshold (qth) in ticks. Default is 20.

pmax Per packet maximum backoff probability as a percentage. Default is 5.

qmin Minimum queuing delay threshold (qmin) in ticks. Default is 5.

SEE ALSO

cc_cdg(4), cc_chd(4), cc_cubic(4), cc_dctcp(4), cc_htcp(4), cc_newreno(4), cc_vegas(4), h_ertt(4), mod_cc(4), tcp(4), khelp(9), mod_cc(9)

L. Budzisz, R. Stanojevic, R. Shorten, and F. Baker, "A strategy for fair coexistence of loss and delay-based congestion control algorithms", *IEEE Commun. Lett.*, 7, 13, 555-557, Jul 2009.

ACKNOWLEDGEMENTS

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FUTURE WORK

The Hamilton Institute have recently made some improvements to the algorithm implemented by this module and have called it Coexistent-TCP (C-TCP). The improvements should be evaluated and potentially incorporated into this module.

HISTORY

The **cc_hd** congestion control module first appeared in FreeBSD 9.0.

The module was first released in 2010 by David Hayes whilst working on the NewTCP research project at Swinburne University of Technology's Centre for Advanced Internet Architectures, Melbourne, Australia. More details are available at:

http://caia.swin.edu.au/urp/newtcp/

AUTHORS

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