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Improving TCP performance and reducing self-induced congestion with receive window modulation (Conference Paper)

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Abstract

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We present a control module for software edge routers called Receive Window Modulation - RWM. Its main objective is to mitigate what we define as self-induced congestion : the result of traffic emission patterns at the source that cause buffering and packet losses in any of the intermediate routers along the path between the connection's endpoints. The controller modifies the receiver's TCP advertised window to match the computed bandwidth-delay product, based on the connection round-trip time estimation and the bandwidth locally available at

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the edge router. The implemented controller does not need any endpoint modification, allowing it to be deployed in corporate edge routers, increasing visibility and control capabilities. This scheme, when used in real-world experiments with loss-based congestion control algorithms such as CUBIC, is shown to optimize access link utilization and per-connection goodput, and to reduce latency variability and packet losses. © 2019 IEEE.

SciVal Topic Prominence ⓘ

Topic: Transmission control protocol | Congestion control (communication) | Congestion window

Prominence percentile: 86.958 ⓘ

Author keywords

Edge router Rate limiting Self-induced congestion TCP flow control ⓘ

Indexed keywords

Engineering controlled terms:

Bandwidth Computer networks Controllers Flow control Modulation Packet loss ⓘ

Engineering uncontrolled terms

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Rate limiting Real world experiment Self-induced congestion TCP flow control ⓘ

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Transmission control protocol ⓘ

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SDN-based Wireless Access Networks Utilising BBR TCP Congestion Control

Do, H. , Gregory, M.A. , Li, S. (2019) 2019 29th International Telecommunication Networks and Applications Conference, ITNAC 2019

Improvement of inter-protocol fairness for BBR congestion control using machine learning

Kim, G.-H. , Song, Y.-J. , Cho, Y.-Z. (2020) 2020 International Conference on Artificial Intelligence in Information and Communication, ICAIIC 2020

Enhanced Loss-Recovery Mechanism for BBR to Improve Inter-protocol Fairness

Song, Y.-J. , Kim, G.-H. , Cho, Y.-Z. (2019) ICTC 2019 - 10th International Conference on ICT Convergence: ICT Convergence Leading the Autonomous Future

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BCC: BPF Compiler Collection

<https://github.com/iovisor/bcc>

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