

Steady state, fairness and transient behaviour of modern AQMs

Several new AQM and hybrid AQM/fairness queueing algorithms have appeared recently, that all seek to provide low delay and high goodput without requiring extensive parameter tuning. Many of these algorithms are included in the mainline Linux kernel; more specifically, the PIE and CoDel algorithms and the older Adaptive RED are available, along with several fairness queueing schemes. However, experimental evaluations of these algorithms are few and far between. This talk presents the results of one such experimental evaluation, testing the Linux queue management schemes under a variety of realistic traffic scenarios and bandwidths, performed in a test-bed representative of residential internet connections of both symmetrical and asymmetrical bandwidths.

The evaluation measures latency under load, and performance of VoIP and web traffic patterns under steady state conditions. Furthermore, the impact of the algorithms on fairness between TCP flows with different RTTs is examined, as is the transient behaviour of the algorithms at flow startup. The results show that while the AQM algorithms can significantly improve steady state performance, they also exacerbate TCP flow unfairness; and the algorithms often struggle to quickly contain latency at flow startup. The fairness queueing algorithms alleviate these problems, supporting their important role in simultaneously providing low latency and high throughput.

A large data set is available for analysis outside the scope of this talk.

About the speaker

Toke Høiland-Jørgensen is a PhD student at Karlstad University in Värmland, Sweden. His research interests include computer networking, with a special focus on reducing latency by controlling queues in the network. He has been involved in the bufferbloat community for two years and is the author of the netperf-wrapper testing tool widely used in the community, as well as a contributor to the CeroWrt router firmware.

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