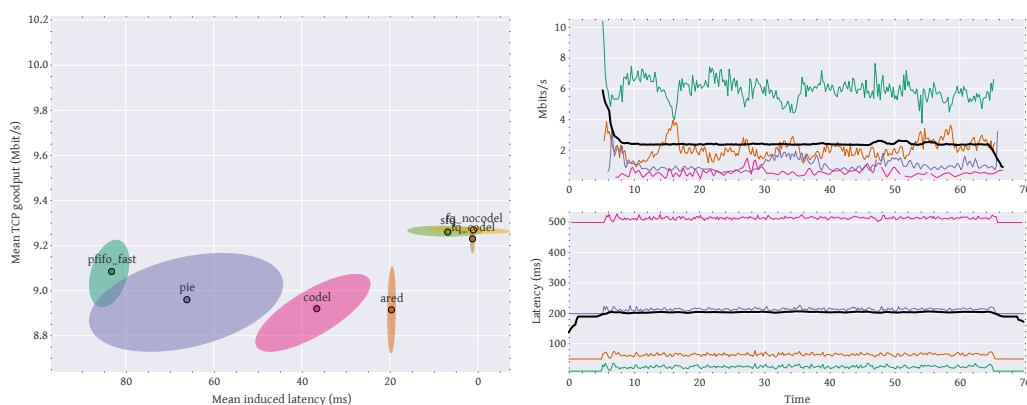


How to reliably measure the performance of modern AQMs – and what comes of doing so?

PIE, CoDel and the older Adaptive RED are all examples of AQM algorithms that seek to provide low delay and high goodput without requiring extensive parameter tuning. These, along with various fairness queueing algorithms, are readily available in the mainline Linux kernel; yet experimental evaluations of them are few and far between. Perhaps because running networking experiments on real systems can be error-prone and tedious: While several network performance measurement tools exist, coordinating tests that compose several tools is often necessary, and is most commonly done in an ad-hoc fashion, making tests harder to reproduce and less reliable.

This talk presents the results of one such experimental evaluation; results which reveal interesting features and noteworthy shortcomings of steady state, fairness and transient behaviour of the tested algorithms. The talk also tells the story of how the results were acquired, discussing various issues related to performing reliable networking measurements, and presenting a the netperf-wrapper testing tool as an example of how to alleviate these issues, showing off some of the tool's capabilities in the process.

The tool presented, netperf-wrapper, wraps several common benchmarking tools, making it possible to declaratively specify composite tests and aggregate their results. In addition to this, the tool has extensive automation and metadata gathering facilities, and contains a plotter with several plot types for easy data exploration. Netperf-wrapper is open source and written in Python; and it is easily extended to add additional tests as needed. It is widely used in the bufferbloat community to analyse new AQM and packet scheduling technologies and congestion control behaviour in complex scenarios of mixed RTT, different TCPs, VOIP traffic, web traffic, and latency under load.



Some example plots from netperf-wrapper.

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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