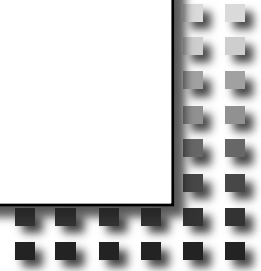




IETF Hackathon

IETF 109
ns-3 summary
November 9-13, 2020
Online



Motivation

- Congestion control algorithms continue to be worked on in several IETF/IRTF groups (tsvwg, tcpm, iccrg)
 - ECN-based congestion control is becoming more important, as well as newer algorithms such as BBR
- Testbeds are popular for performance evaluation and offer the most realism to test prototype implementation code
- Network simulation (ns-3) offers some complementary benefits, including accessibility and ability to introduce various wireless (Wi-Fi access, 4G/5G) network models, and reproducibility
 - Validating ns-3 models against testbed experiments is important

Hackathon Plan

- What problems were you working on?
 - ns-3 TCP-related simulation models for TCP Cubic and BBRv1
- What drafts/RFC's were involved?
 - RFC 8312 (TCP Cubic)
 - RFC 6937 (TCP Proportional Rate Reduction)
 - draft-cardwell-iccr-g-bbr-congestion-control-00 (BBRv1)
- Specific problems to solve
 - ECN support for ns-3 TCP Cubic, and general alignment with Linux
 - Alignment of ns-3 TCP BBRv1 model to Linux testbed results
 - Testing of a native 'flent' application for ns-3

What got done

- Key results
 - CWR state implemented in TcpSocketBase to handle the reduction of cwnd during the recovery phase of TCP Cubic. This patch aligns ns-3 Cubic with Linux to a large extent.
 - <https://gitlab.com/tomhenderson/ns-3-dev/tree/tcp-cubic-new>
 - BBRv1 results from ns-3 closely match those obtained from Linux. Minor variations in the congestion window are still being investigated.
 - <https://github.com/Sushma04/BBRv1-linux-vs-ns-3>
 - Ns-3 flent 'rrul' test results for large bandwidth-delay product links were brought into closer alignment with Linux
 - <https://github.com/hs256/ns-3-dev/tree/flent>

What we learned

- Lessons learned
 - Issues with existing drafts/RFCs: Cubic RFC is missing information about how to respond to ECN marks
 - New implementation guidance: None this week
 - New feedback to take to WG: New testing capabilities being developed
 - New work to take to WG: None

Wrap Up

Team members:

Tom Henderson (champion),
Sushama Meena, Sayali Patil,
Aditya Chaudhary, Mohit
Tahiliani.

First timers @ IETF/Hackathon:

Shuhma Meena, Sayali Patil, Aditya
Chaudhary

ns-3: <https://www.nsnam.org>