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-iccrg-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

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First timers @ IETF/Hackathon: 
Shuhma Meena, Sayali Patil, Aditya Chaudhary

ns-3: [https://www.nsnam.org](https://www.nsnam.org)