Update on NADA Draft

draft-ietf-rmcat-nada-05

Xiaoqing Zhu, Rong Pan, Michael A. Ramalho, Sergio Mena, Paul E. Jones, Jiantao Fu, and Stefano D'Aronco

Nov 2017 | IETF 100 | Singapore
Outline

• Algorithm update for loss-based behavior
• Status update of open source codes: syncodecs and ns3-rmcat
• Highlights of updated evaluation results
• Summary of draft changes
Algorithm Update on Loss-based Behavior

• *Goal: more robust performance when competing with loss-based flows*

• Changes in algorithm:
  • Self-adaptive thresholding for loss/delay mode switching:
  • More smooth transition of warped congestion signal
  • Revised form of loss penalty function: linear => quadratic

* Motivated by issues reported by Julius Flohr from his OMNeT++ implementation
Self-Adapting Threshold for Expected Loss Intervals

• Draft -04: fixed threshold $T_{EXP}$ as expiration time for previously observed losses

• Draft -05: self-scaling the threshold as multiples of measured average loss interval

$$t_{loss\_exp} = \text{MULTILOSS} \times t_{loss\_int}$$

- Constant multiplier
- Average loss event interval as calculated by TFRC (RFC5348)
Benefit of Self-Scaling Expected Loss Interval

Bottleneck Capacity: 1Mbps
One-way Propagation delay: 40ms

Bottleneck Capacity: 10Mbps
One-way Propagation delay: 40ms
Varying Bottleneck Capacity and Propagation Delay

Low-capacity regime:
- roughly fair share of BW
- robust w.r.t. propagation delay

High-capacity regime:
- penalized by presence of losses
- penalized by high propagation delay
**syncodecs: Added New Traffic Source Models**

- Added support for new type of codecs:
  - CBR-like (SYNCODEC_TYPE_PERFECT)
  - Fixed-FPS (SYNCODEC_TYPE_FIXFPS)
  - Based on statistical model (SYNCODEC_TYPE_STATS)
  - Trace-driven (SYNCODEC_TYPE_TRACE) => Hybrid (SYNCODEC_TYPE_HYBRID)
  - Content sharing (SYNCODEC_TYPE_SHARING)

- Code now in sync with descriptions in draft-ietf-rmcat-video-traffic-model-03

- Available online at: [https://github.com/cisco/syncodecs](https://github.com/cisco/syncodecs)
ns3-rmcat: Ready for Public Release

- Online available (soon!) at: https://github.com/cisco/ns3-rmcat
- Adopts syncodecs as the traffic source via submodule import
- Reference congestion controller implementations:
  - dummy-controller: fixed configurable sending rate
  - nada-controller: as specified by draft-ietf-rmcat-nada-05
  - diy-controller: should be easy to add and try out your own
- Reference test case implementations:
  - RMCAT wired test cases as specified by draft-ietf-rmcat-eval-test-05
  - RMCAT wifi test cases as specified by draft-ietf-rmcat-wireless-tests-04 (Sec. 4)
  - Pending: LTE/Celluar test cases (Sec. 3 in draft-ietf-rmcat-wireless-tests-04) — need further input/help on this
5.1: Variable Available Capacity with a Single Flow

Traffic Source: CBR-like

Traffic Source: Fixed FPS (Default)
5.1: Variable Available Capacity with a Single Flow

Traffic Source: Hybrid

Traffic Source: Content Sharing
5.2: Variable Available Capacity with Multiple Flows

**draft-ietf-rmcat-nada-04**

Locked in loss-based mode

**draft-ietf-rmcat-nada-05**
5.5: Round Trip Time Fairness

draft-ietf-rmcat-nada-04

draft-ietf-rmcat-nada-05
Summary of Draft Changes

• Changes from -04 to -05: algorithm changes (Sec. 4.2) on loss-based behavior

• Planned changes from -05 to -06:
  • Address review comments from Roland Bless
  • Fix Normative vs. Informative References as pointed out by MichaelW
  • Update Section 7 on Implementation Status

• Draft status: do we need to go through WGLC again or not?

• Next step: experiment with embedding NADA in Mozilla browsers
Backup: Additional Results
5.3: Congested Feedback Link with Bi-directional Flows

draft-ietf-rmcat-nada-04

draft-ietf-rmcat-nada-05
5.4: Multiple Competing RMCAT Flows

draft-ietf-rmcat-nada-04

draft-ietf-rmcat-nada-05
5.6: RMCAT Flow Competing with a Long TCP Flow

draft-ietf-rmcat-nada-04

draft-ietf-rmcat-nada-05
5.7: RMCAT Flow Competing with Short TCP Flows

**draft-ietf-rmcat-nada-04**

**draft-ietf-rmcat-nada-05**
5.8: Media Pause and Resume

draft-ietf-rmcat-nada-04

draft-ietf-rmcat-nada-05