Evaluation of NADA in \textit{ns3-rmc}\textit{at}

draft-ietf-rmc\textit{at}-nada-04

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Outline

• NADA implementation in ns3-rmcat
• Performance in rmcat-wired test cases with different traffic sources
• Performance in rmcat-wifi test cases with CBR-like traffic source
• Summary of known issues
NADA Implementation in *ns3-rmcat*

- Congestion control algorithm closely follow descriptions in draft (-04)
- This time also includes the rate shaping buffer module
- All logics moved to sender side: acting on per-packet feedback
- Works with four variants of traffic sources provided by *Syncodec*:
  - CBR-like (SYNCODEC_TYPE_PERFECT)
  - Based on statistical model (SYNCODEC_TYPE_STATS)
  - Trace-driven (SYNCODEC_TYPE_TRACE)
  - Content sharing (SYNCODEC_TYPE_SHARING)
Basic Test Cases

draft-ietf-rmcat-eval-test-04
5.1: Variable Available Capacity with a Single Flow

**Traffic Source: CBR-like**

- Rate (Mbps)
- QDelay (ms)
- PLR (%)

**Traffic Source: Statistical Model**

- Rate (Mbps)
- QDelay (ms)
- PLR (%)
5.1: Variable Available Capacity with a Single Flow

Traffic Source: Trace-driven

Traffic Source: Content Sharing

potential under-utilization
5.2: Variable Available Capacity with Multiple Flows

Locked in loss-based mode
5.3: Congested Feedback Link with Bi-directional Flows
5.4: Multiple Competing RMCAT Flows

![Graph showing multiple RMCAT flow rates, round trip delays, and packet loss rates over time.](image-url)
5.5: Round Trip Time Fairness

![Diagram showing rate, QDelay, and PLR over time with a note on long convergence time.]
5.6: RMCAT Flow Competing with a Long TCP Flow

![Graph showing the comparison of RMCAT and TCP flows over time, with rate, QDelay, and PLR metrics.]
5.7: RMCAT Flow Competing with Short TCP Flows
5.8: Media Pause and Resume
Wifi Test Cases
draft-ietf-rmcat-wireless-tests-03
4.1: Bottleneck in Wired Network
— Bidirectional RMCAT Flows
4.1: Bottleneck in Wired Network
— Bidirectional RMCAT Flows w. Background CBR Flow

Background Downlink CBR Flow

Background Uplink CBR Flow
4.1: Bottleneck in Wired Network — Bidirectional RMCAT Flows w. Background TCP Flow
4.2: Bottleneck in Wi-Fi Network
— Multiple Downlink/Uplink RMCAT Flows

N_D=24 Downlink RMCAT Flows

N_U=24 Uplink RMCAT Flows
4.2: Bottleneck in Wi-Fi Network — Multiple Bidirectional RMCAT Flows

N_D=12, N_U=12

[Diagram showing rate, QDelay, and PLR over time for multiple streams]
4.2: Bottleneck in Wi-Fi Network

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Multiple Bidirectional RMCAT Flows w. Background Flows

- 12 Pairs of RMCAT Flows w. 4 CBR Flows
  - Rate of each CBR flow: 600Kbps

- 8 Pairs of RMCAT Flows w. 4 TCP Flows
  - Presence of background flows

Rate of each CBR flow: 600Kbps
Summary of Known Issues

- Occasionally the algorithm may get stuck in loss-based mode
- When working with trace-based traffic source, may under-utilize the available bandwidth
- In the presence of a fully utilized bottleneck, incoming new flows may take a long time (~60 seconds) to converge to equilibrium rate