Update on NADA Performance Evaluation

draft-ietf-rmcat-nada-02

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Outline

- Summary of NADA evaluation scenarios
- Sample results on wired network test cases (draft-ietf-rmcat-eval-test)
- Summary and next steps

Summary of NADA Evaluation Scenarios

	Wired TCs	Wireless TCs	
		Wifi Networks	Cellular Networks
Perfect Codec	X	X	
Statistical Codec	X	X	
Trace-based Codec	X	X	
Content Sharing Codec	X	X	

in ns-2

X in ns-3

Comparison of Two Simulation Platforms

	ns-2	ns-3
NADA Algorithm Implementation		
Sender: mode switching logic	closely follows draft	simplified w.r.t . draft
Sender: Ramp-up mode behavior	closely follows draft	simplified w.r.t . draft
Sender: Presence of rate shaping buffer	Y	N
Test Case Implementation		
Time-varying physical link rate	Y	N
Presence of delay jitter	Y	N
Wireless test cases (Wifi network)	N	Y
Video traffic source model	Perfect Codec (CBR-like) only	4 variants via *Syncodes*

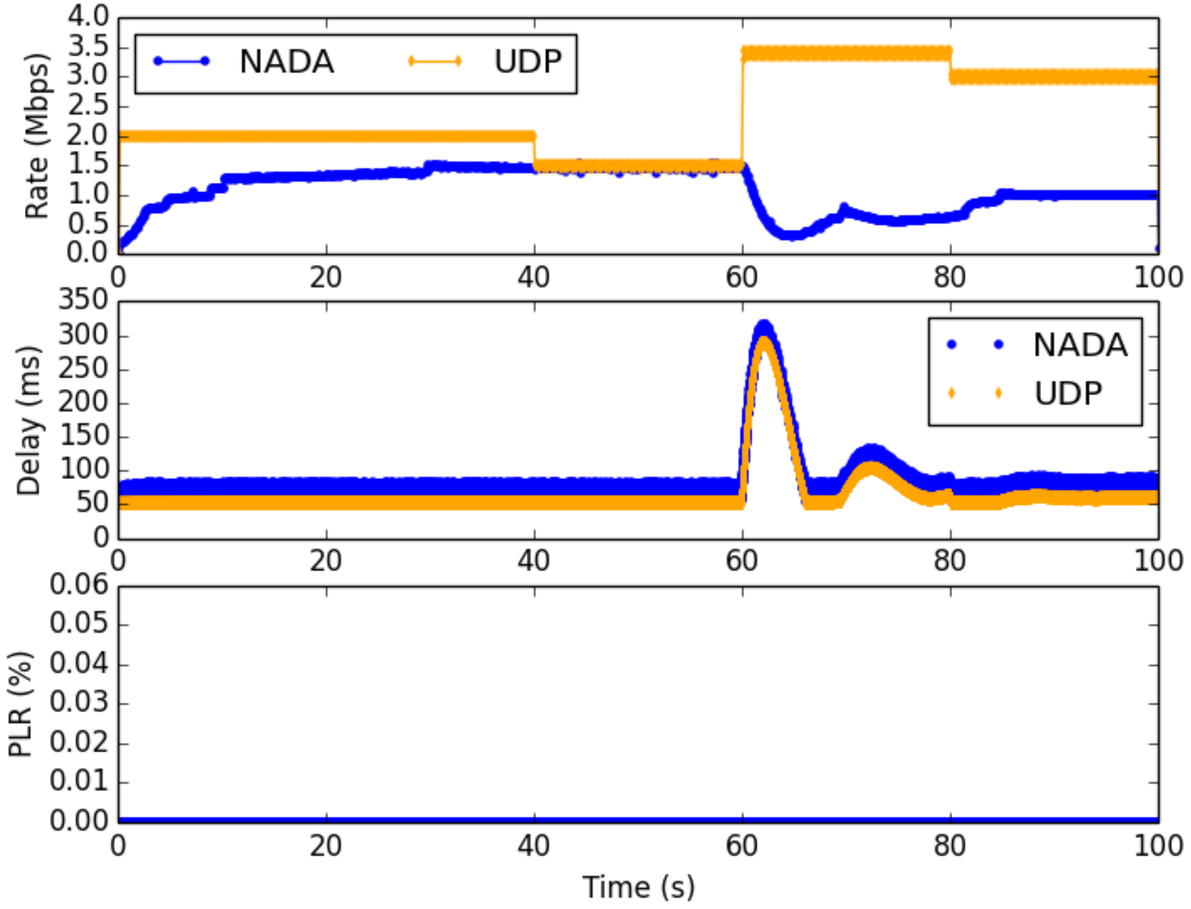
RMCAT Test Cases over Wired Network

- **5.1 Variable Available Capacity with Single RMCAT flow**
- 5.2. Variable Available Capacity with Multiple RMCAT flows
- 5.3. Congested Feedback Link with Bi-directional RMCAT flows
  - *5.3.a: Congested Feedback Link with TCP Flow along Backward Path*
- **5.4. Competing Flows with Same RMCAT Algorithm**
- 5.5. Round Trip Time Fairness
- **5.6. RMCAT Flow Competing with a Long TCP Flow**
- 5.7. RMCAT Flow Competing with Short TCP Flows
- 5.8. Media Pause and Resume

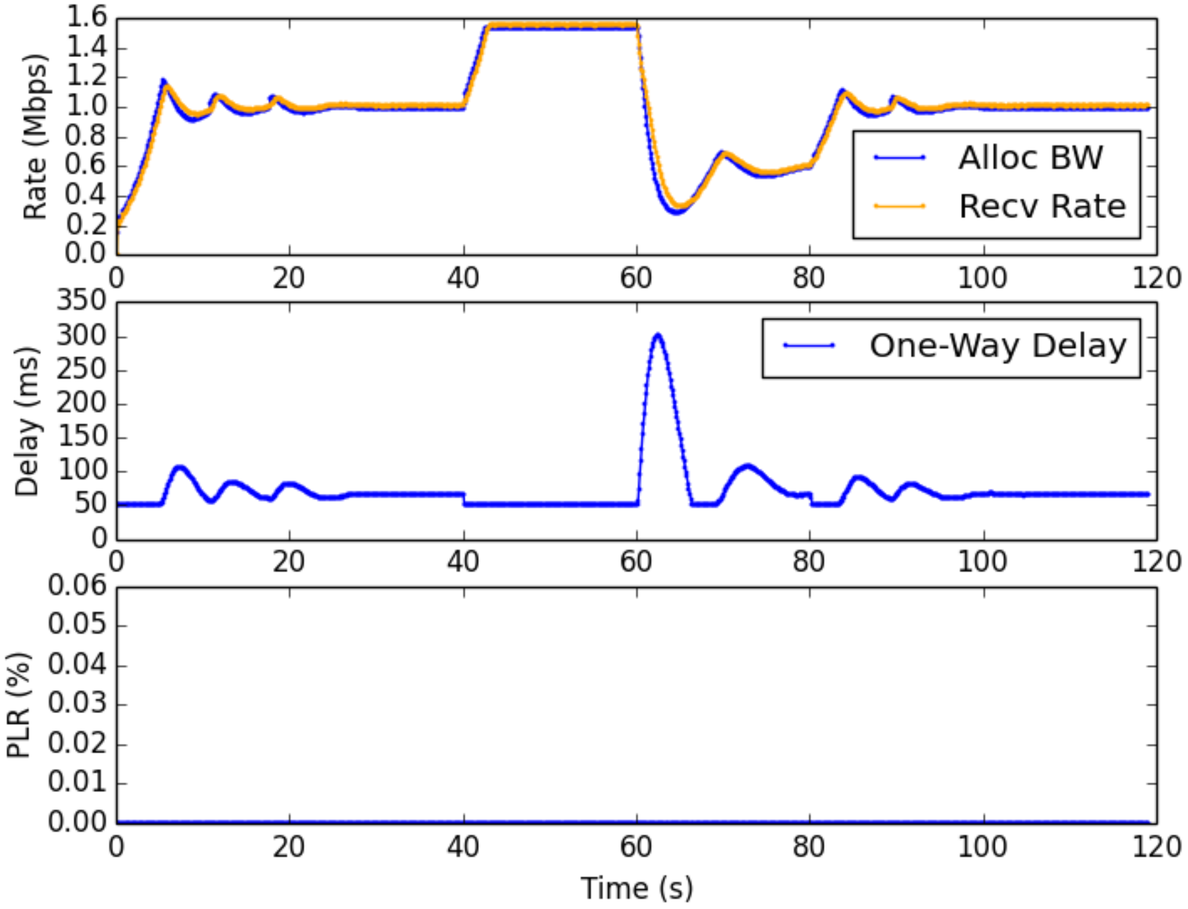
** Video trace in use: "Concat"*

Wired Network Test Case 5.1

Bottleneck BW @ 4Mbps, time-varying background UDP flow



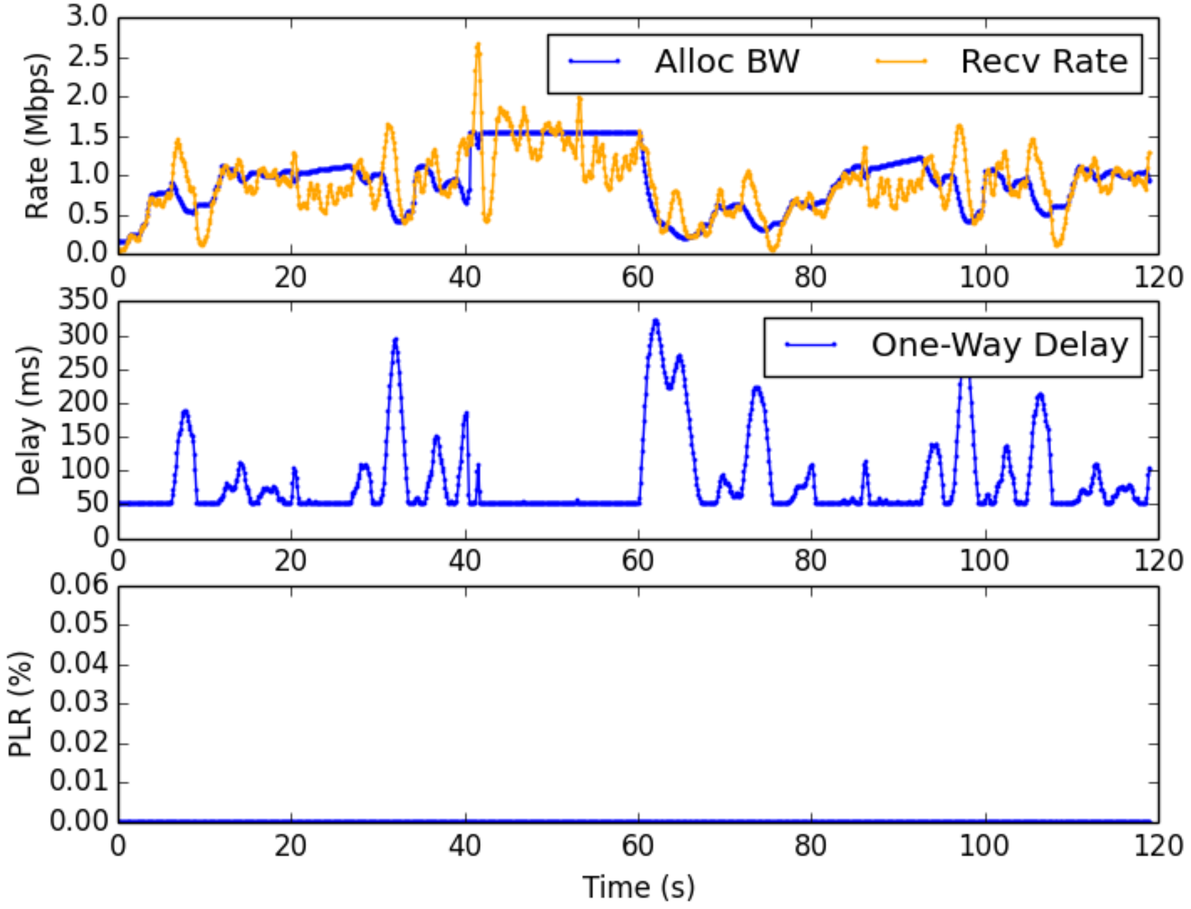
Simulation Platform: ns-2
Traffic Source: Perfect Codec

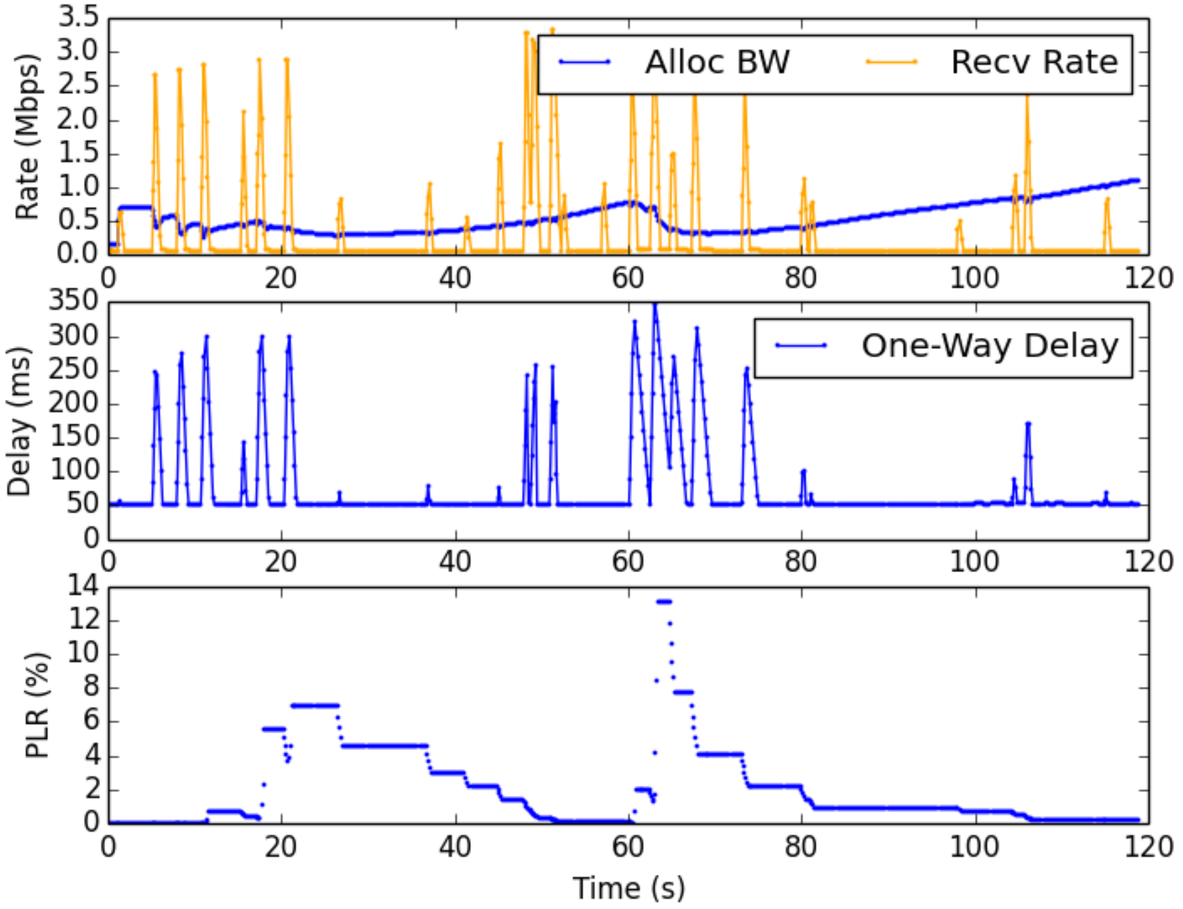


Simulation Platform: ns-3
Traffic Source: Perfect Codec

Wired Network Test Case 5.1

Bottleneck BW @ 4Mbps, time-varying background UDP flow



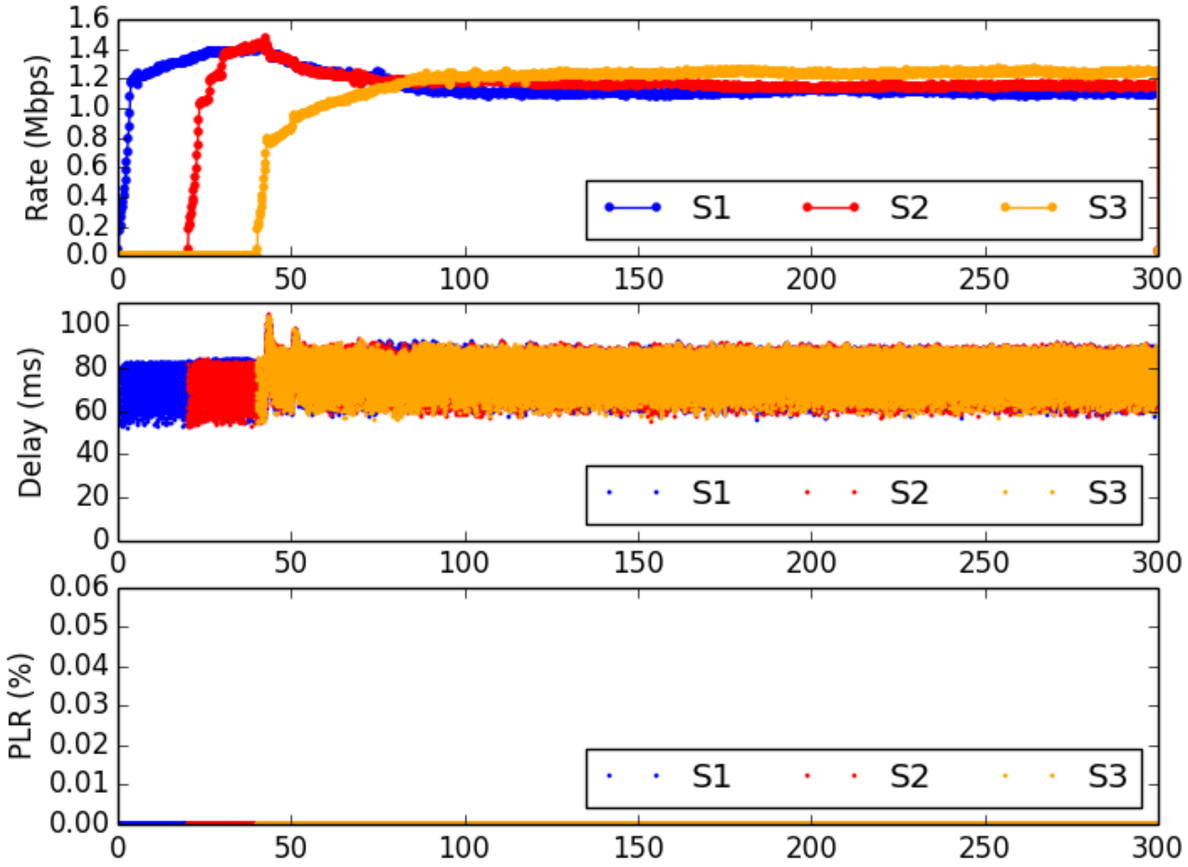


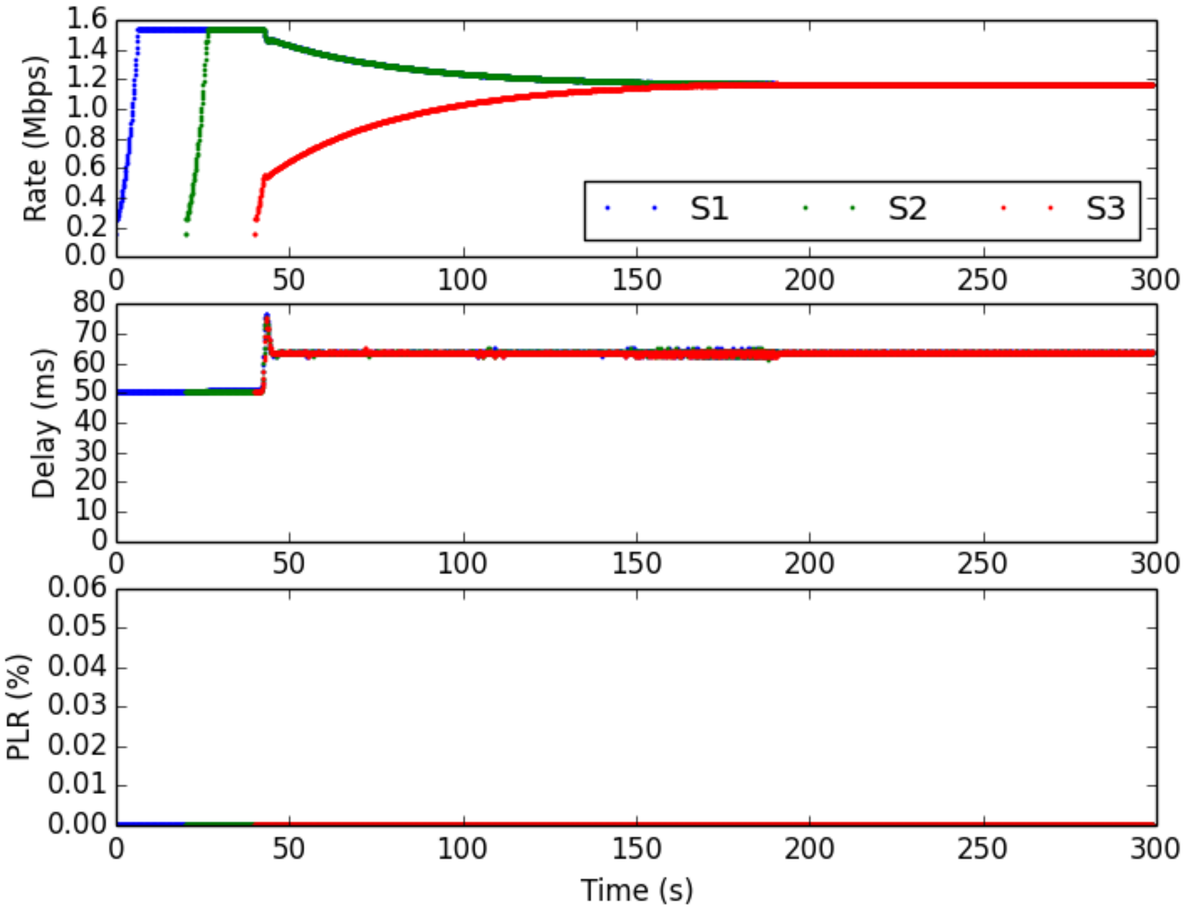
Simulation Platform: ns-3
Traffic Source: Trace-based Codec

Simulation Platform: ns-3
Traffic Source: Content Sharing Codec

Wired Network Test Case 5.4

Multiple RMCAT flows sharing a common bottleneck



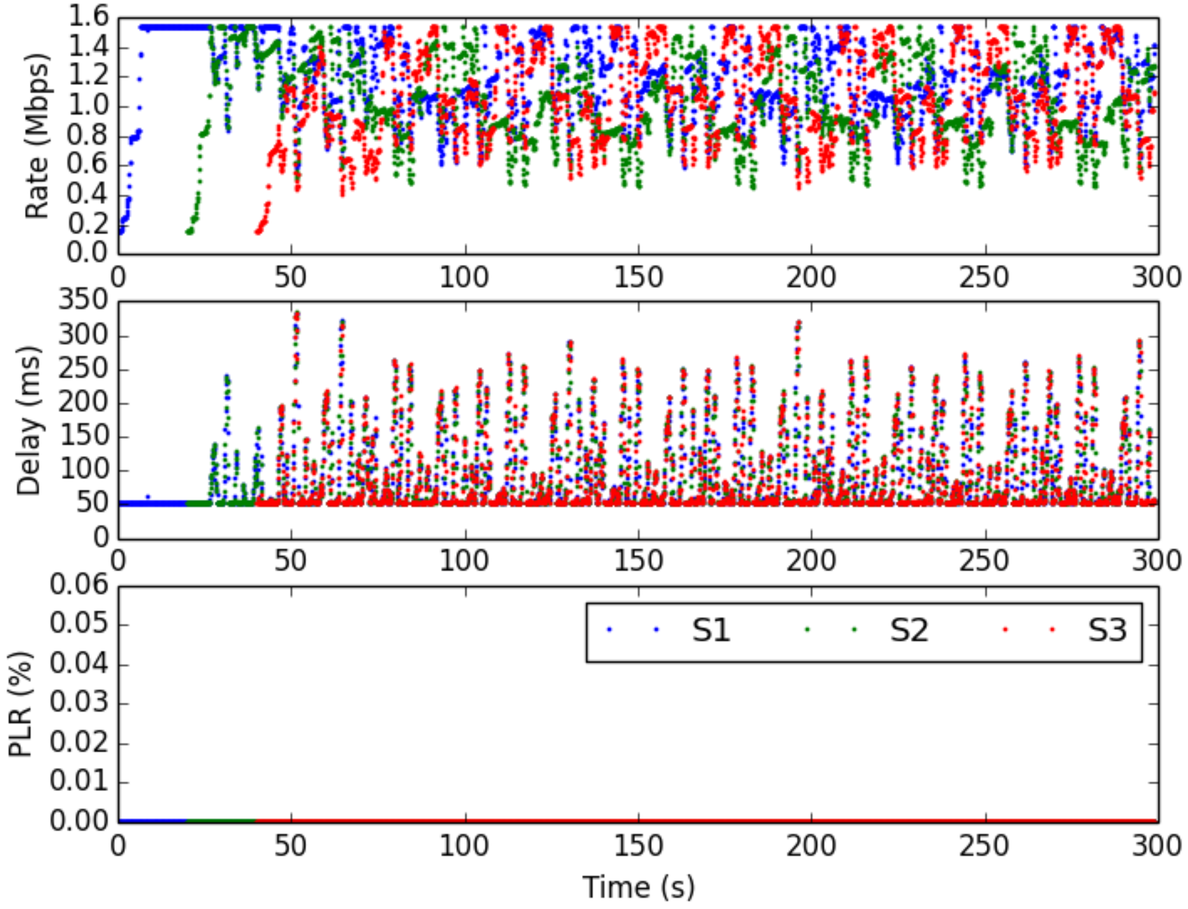


Simulation Platform: ns-2
Traffic Source: Perfect Codec

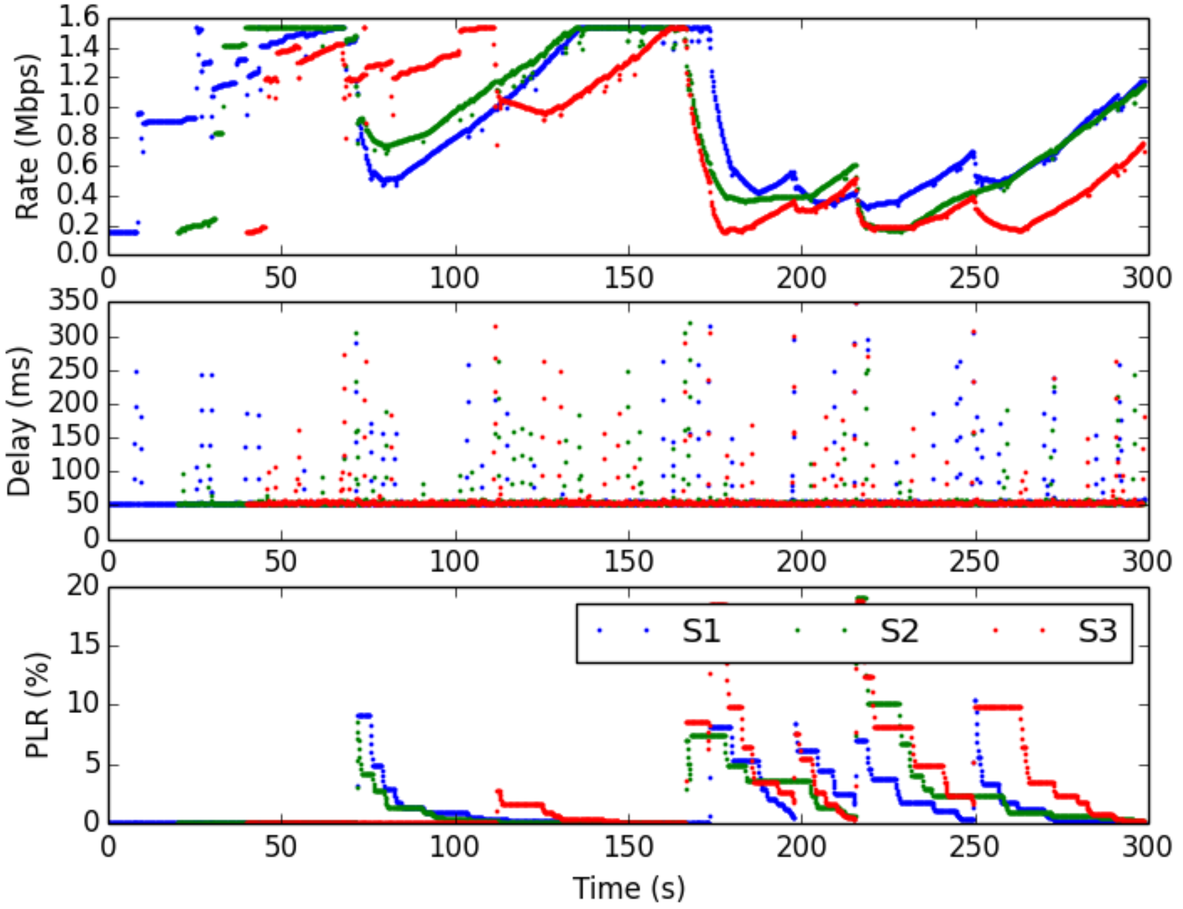
Simulation Platform: ns-3
Traffic Source: Perfect Codec

Wired Network Test Case 5.4

Multiple RMCAT flows sharing a common bottleneck



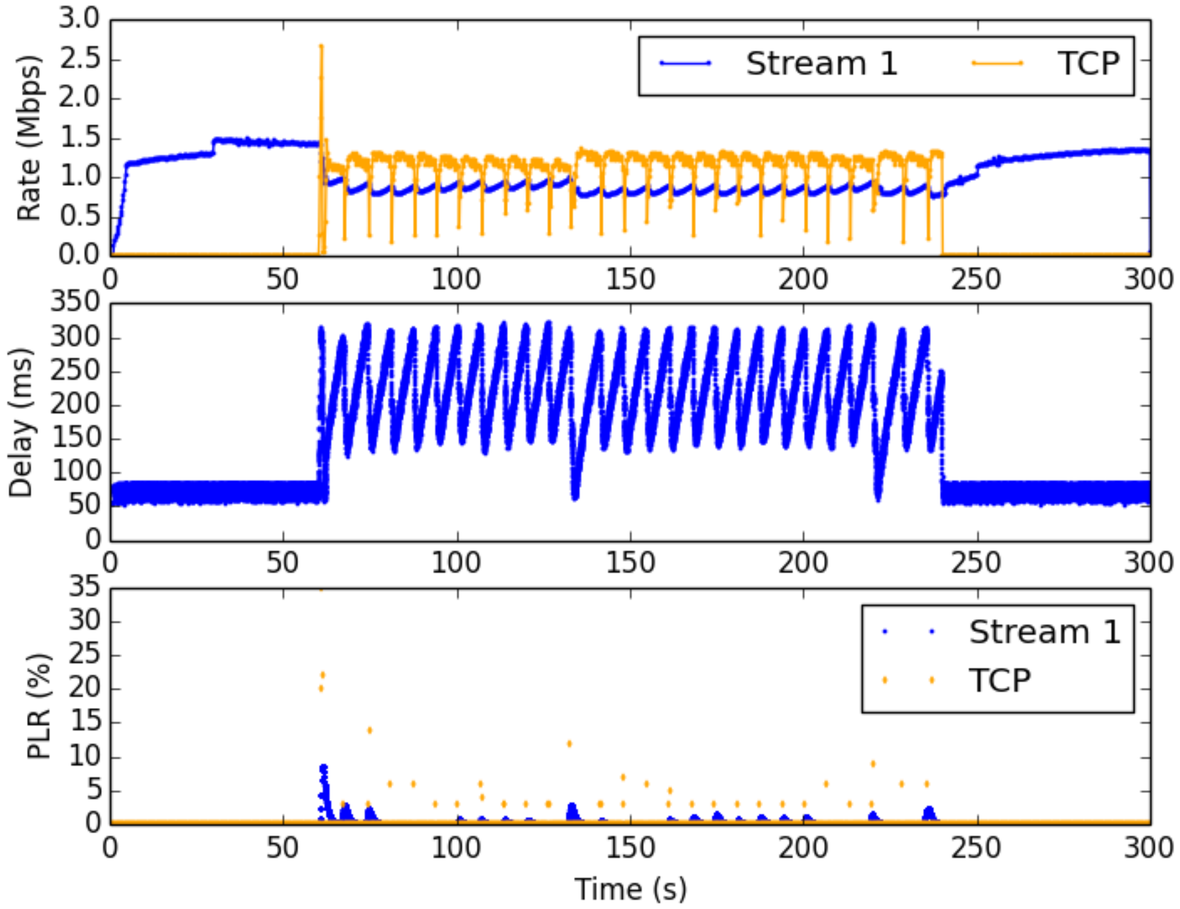
Simulation Platform: ns-3
Traffic Source: Trace-based Codec

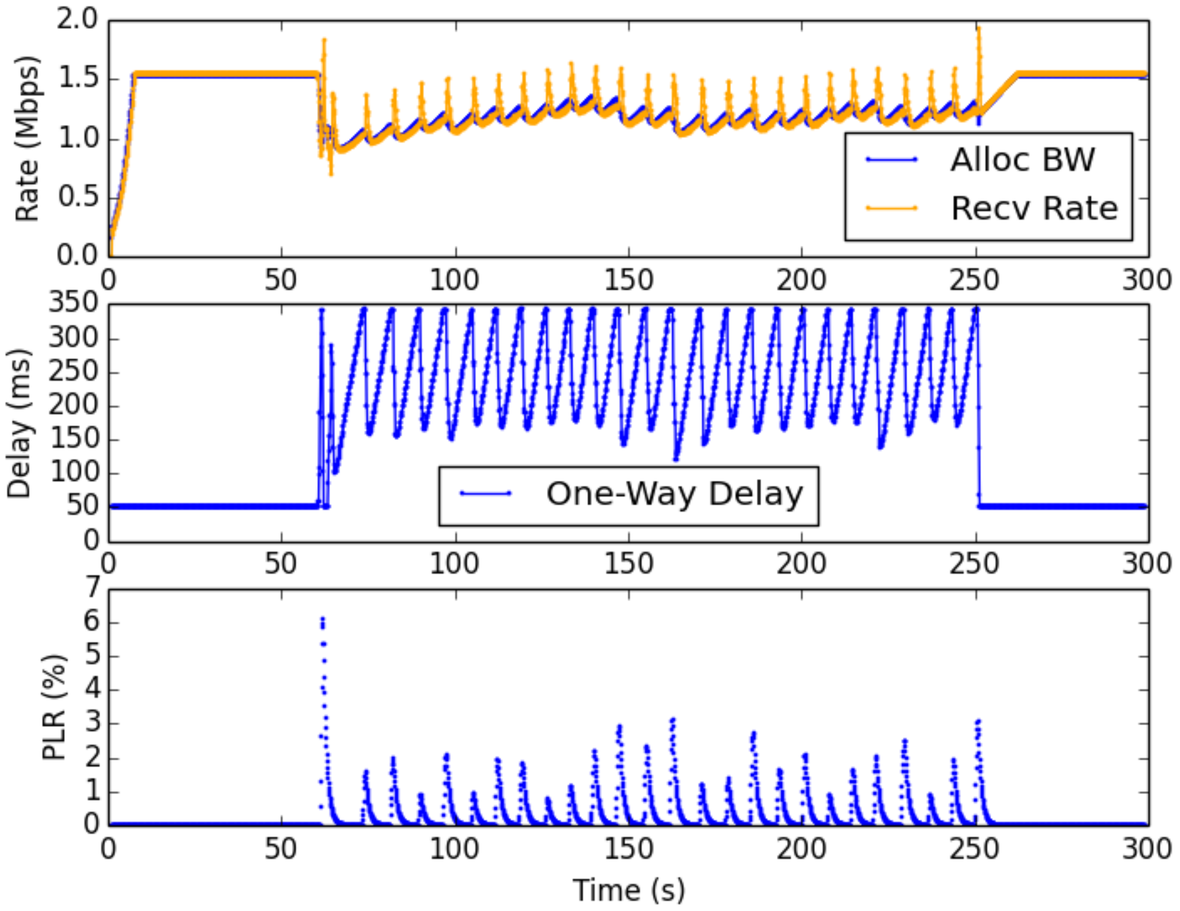


Simulation Platform: ns-3
Traffic Source: Content Sharing Codec

Wired Network Test Case 5.6

RMCAT flows vs. long-live TCP flow



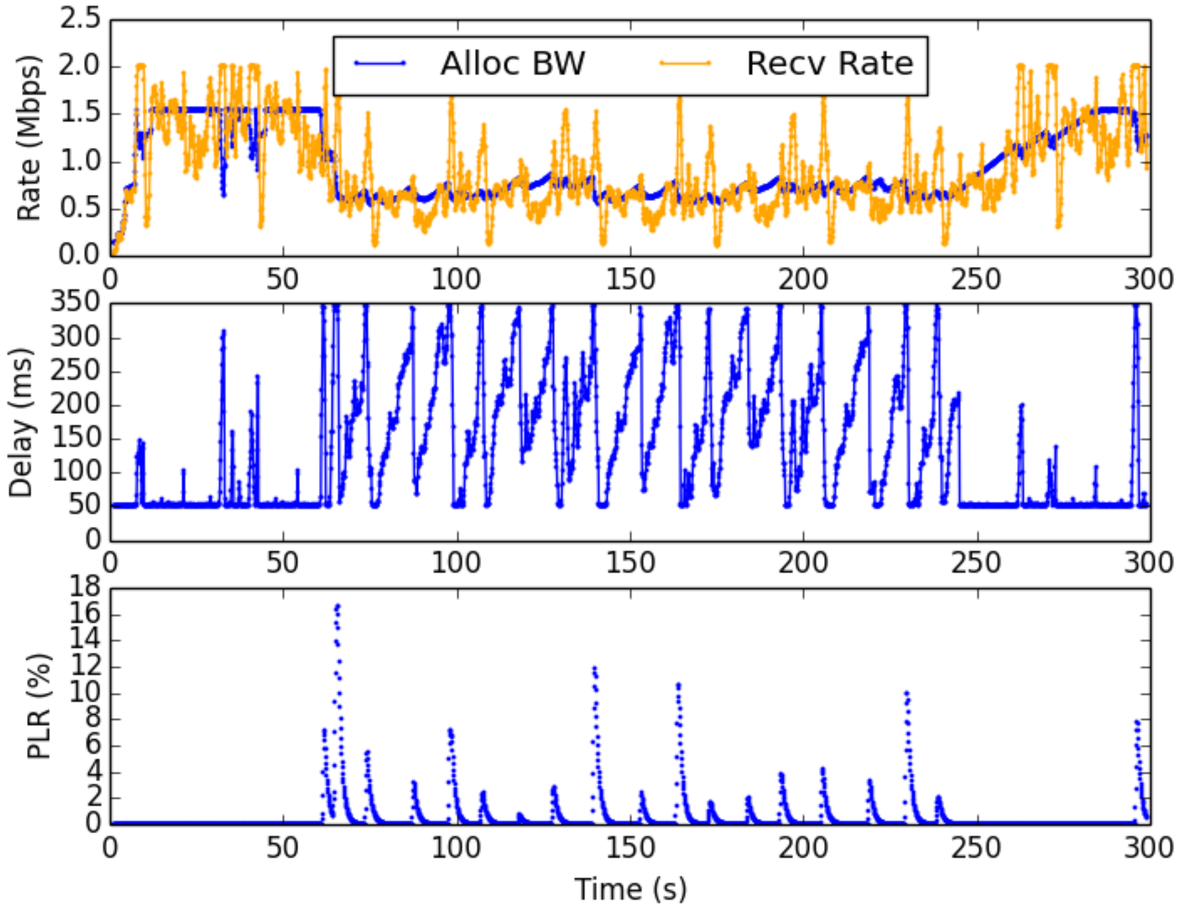


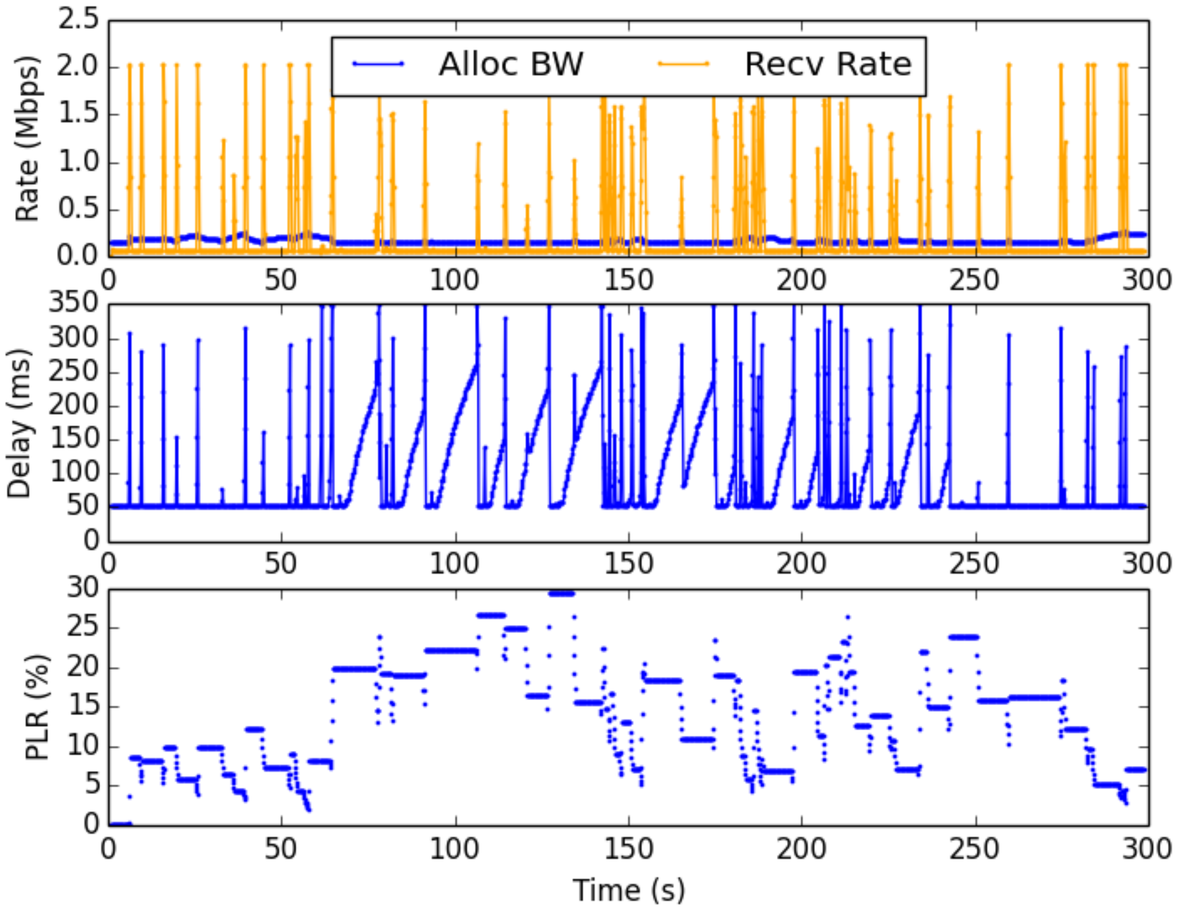
Simulation Platform: ns-2
Traffic Source: Perfect Codec

Simulation Platform: ns-3
Traffic Source: Perfect Codec

Wired Network Test Case 5.6

RMCAT flows vs. long-live TCP flow





Simulation Platform: ns-3
Traffic Source: Trace-based Codec

Simulation Platform: ns-3
Traffic Source: Content Sharing Codec

Summary: Test Cases over Wired Networks

- Mostly consistent results over ns-2 and ns-3 with Perfect Codec as traffic source
- Results with Statistical Codec as traffic source closely resembles those with Perfect Codec (hence not shown here)
- Performance degrades when using alternative traffic sources:
  - Trace-based Codec: greater rate oscillations and higher loss rates when multiple flows share a common bottleneck
  - Content Sharing traffic source: significant packet losses introduced by large transient frames (e.g., upon switching from previous to next shared slide).
  - Both due *to absence of rate shaping buffer in ns3 implementation*

Next Steps

- Update to draft:
  - Align terminology in solution description to the framework draft
  - Summarize implementation and evaluation status (what has been tested and what test case need further work)
- Implementation and evaluation efforts:
  - Implement rate shaping buffer in ns-3 version of NADA
  - Evaluate improved NADA implementation for wifi test cases