

NADA Interactions with AQMs

`draft-zhu-rmcat-nada-05`

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Outline

Test Setup

Network Settings

Queuing Schemes

Default Algorithm Parameters

NS2 Simulation Results

Test Case K: Single Flow

Test Case L: Two Flows

Test Case M: NADA vs. TCP

Network Settings

- ▶ Bottleneck BW: 4Mbps
- ▶ Bottleneck queue depth: 200 packets, 400ms
- ▶ One-way propagation delay: 50ms
- ▶ Background traffic: UDP/TCP flow
- ▶ Additional delay jitter: $\sim \mathcal{U}(0, 30)$ ms.

Queuing Schemes

- ▶ DropTail: queue depth = 400ms.
- ▶ RED: $(min_{th}, max_{th}, p) = (20, 180, 1.0)$.
- ▶ PIE: target delay = 20ms
- ▶ CoDel: target delay = 20ms

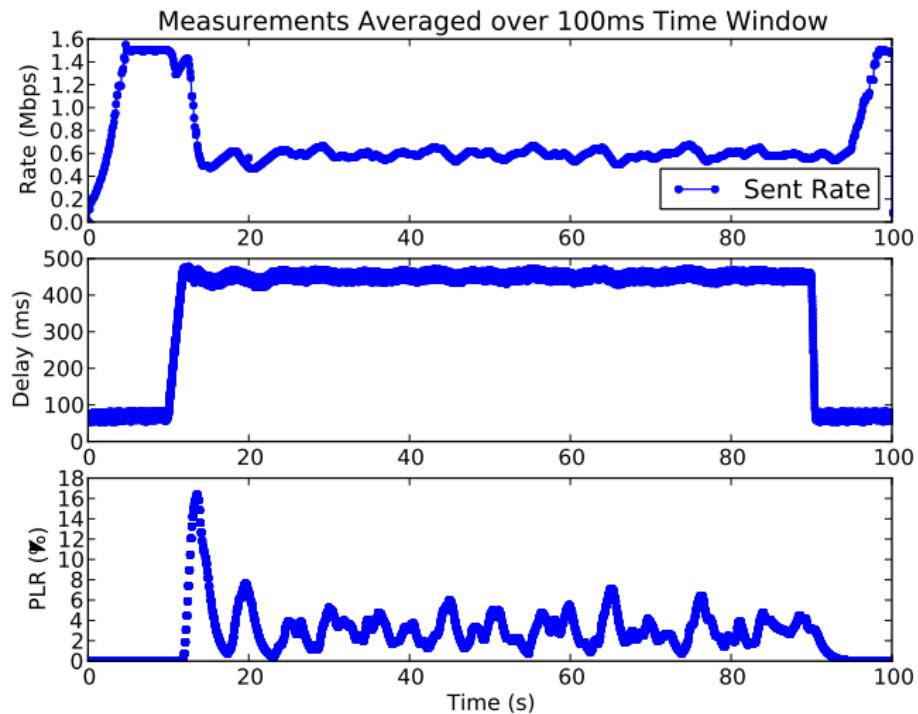
Default Algorithm Parameters

- ▶ Receiver report interval: $\delta_0 = 100$ ms.
- ▶ MTU size: 1000 Bytes
- ▶ Rate range: 150 Kbps \sim 1.5 Mbps
- ▶ Scaling parameters: $\kappa = 1.0, \eta = 2.0$.
- ▶ Upper bound on RTT: $\tau_o = 500$ ms.
- ▶ Reference delay: $x_{ref} = 10$ ms.
- ▶ Non-linear delay warping: $d_{th} = 50$ ms, $d_{max} = 400$ ms.
- ▶ Delay penalty for loss: $d_L = 1.0$ s.
- ▶ Delay penalty for marking: $d_M = 200$ ms.
- ▶ Accelerated ramp up: $T_{th} = 50$ ms, $\gamma_0 = 0.5$.

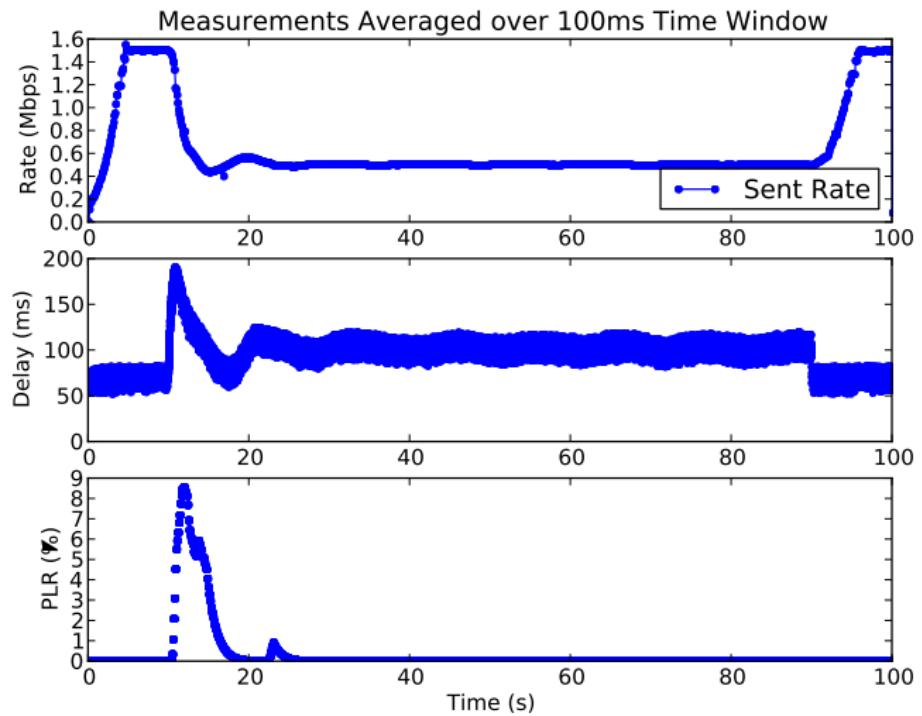
Test Case K: Single Flow

- ▶ Background UDP flow at 3.5Mbps; active at $t = 20 - 80$ s.
- ▶ NADA flow active at $t = 0 - 100$ s.

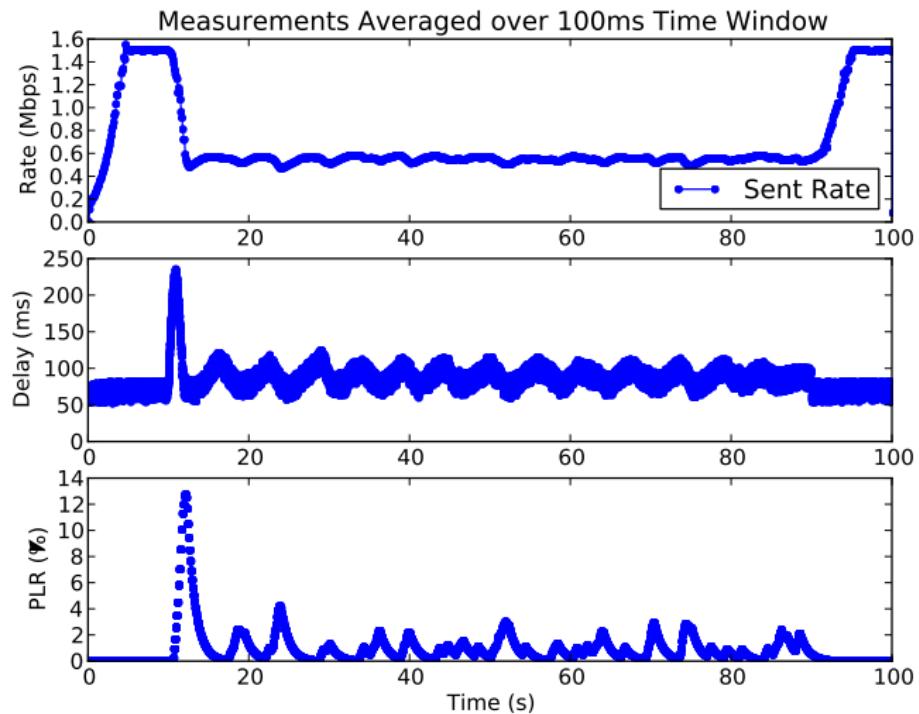
Single Flow — DropTail



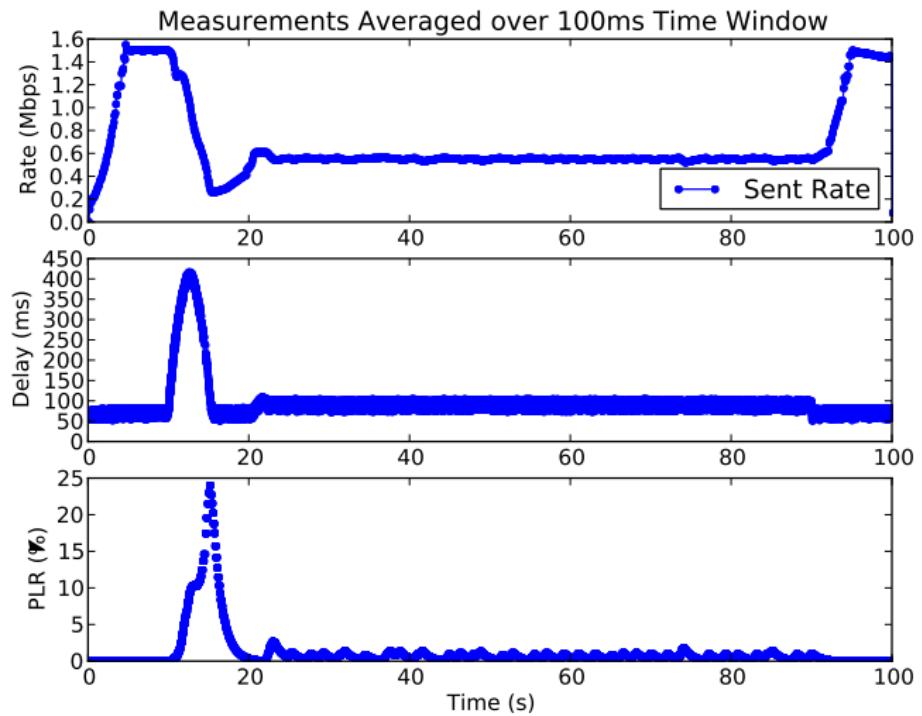
Single Flow — RED



Single Flow — PIE



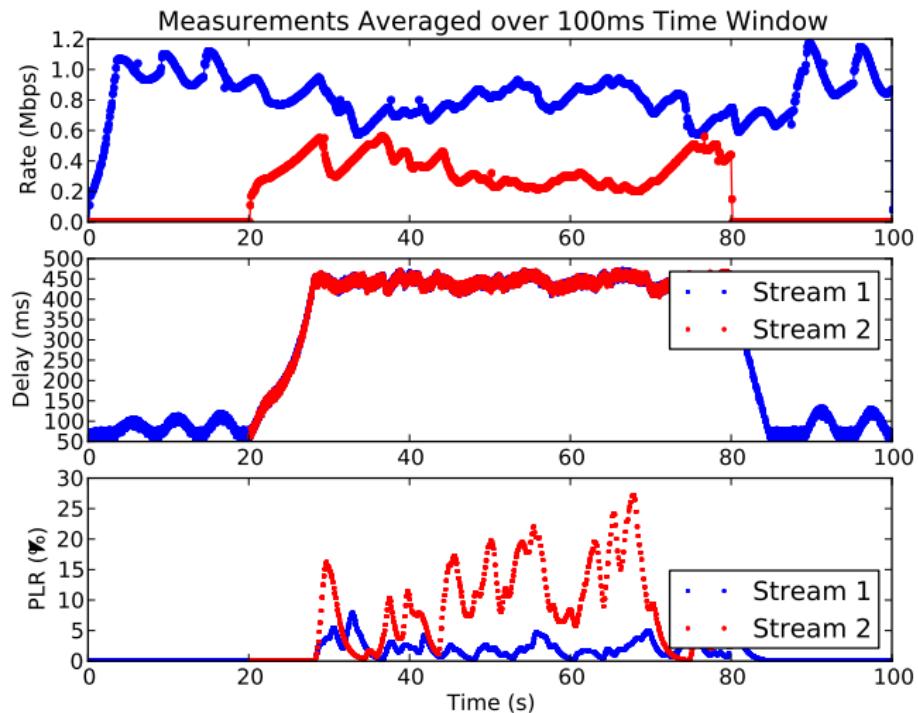
Single Flow — CoDel



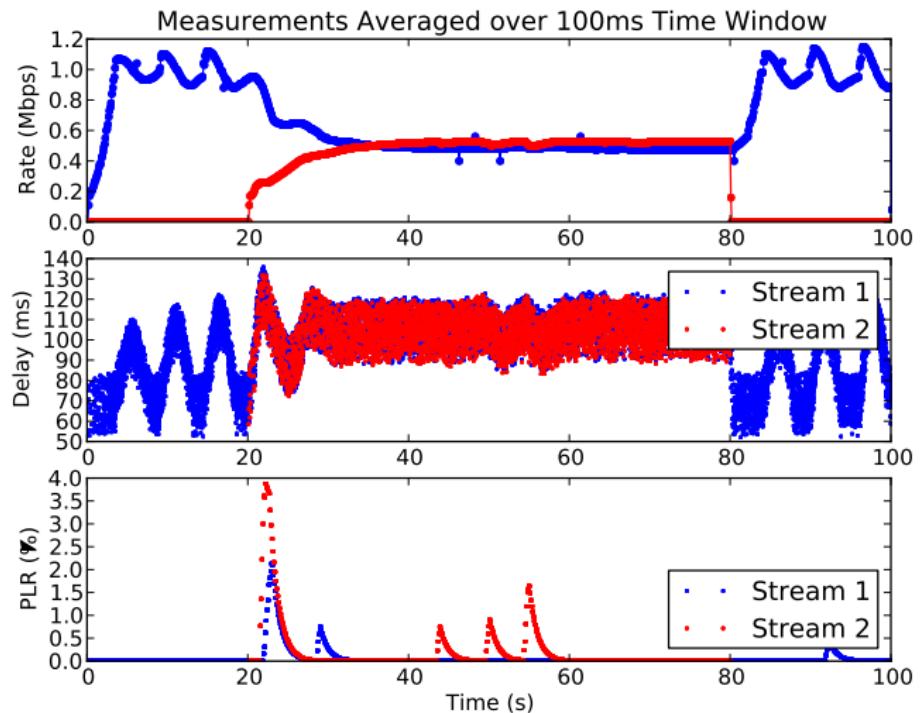
Test Case L: Two Flows

- ▶ Background UDP flow at 3Mbps; active at $t = 0 - 100$ s.
- ▶ First NADA flow active at $t = 0 - 100$ s.
- ▶ Second NADA flow active at $t = 20 - 80$ s.

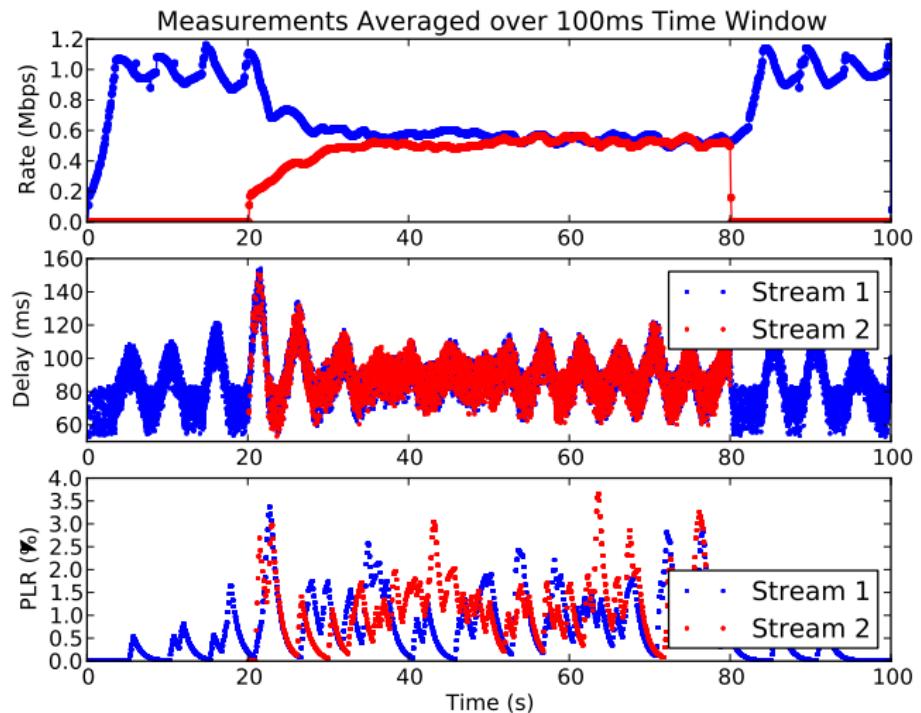
Two Flows — DropTail



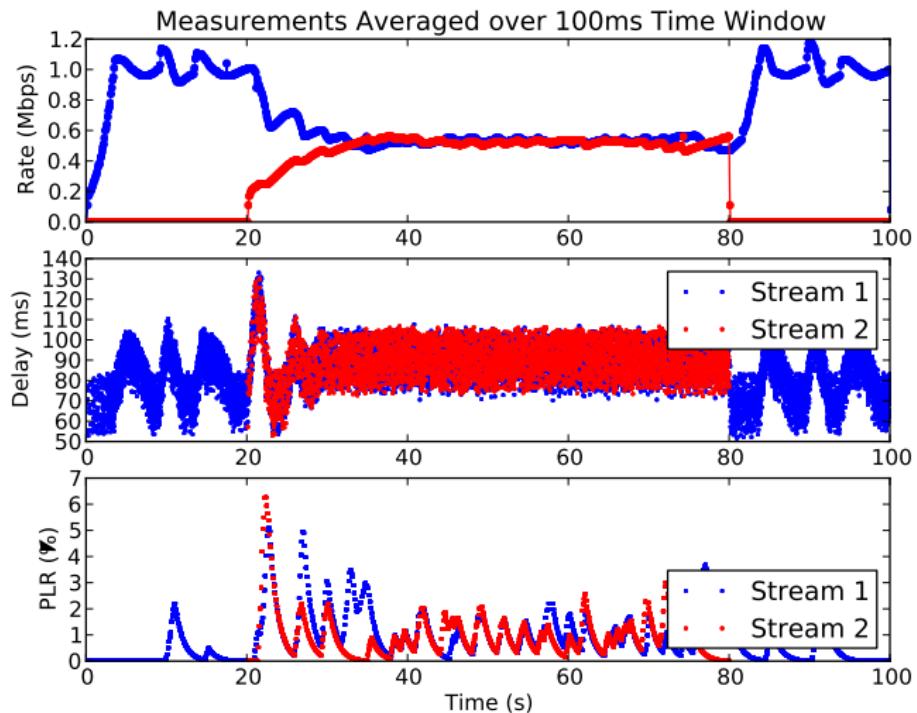
Two Flows — RED



Two Flows — PIE



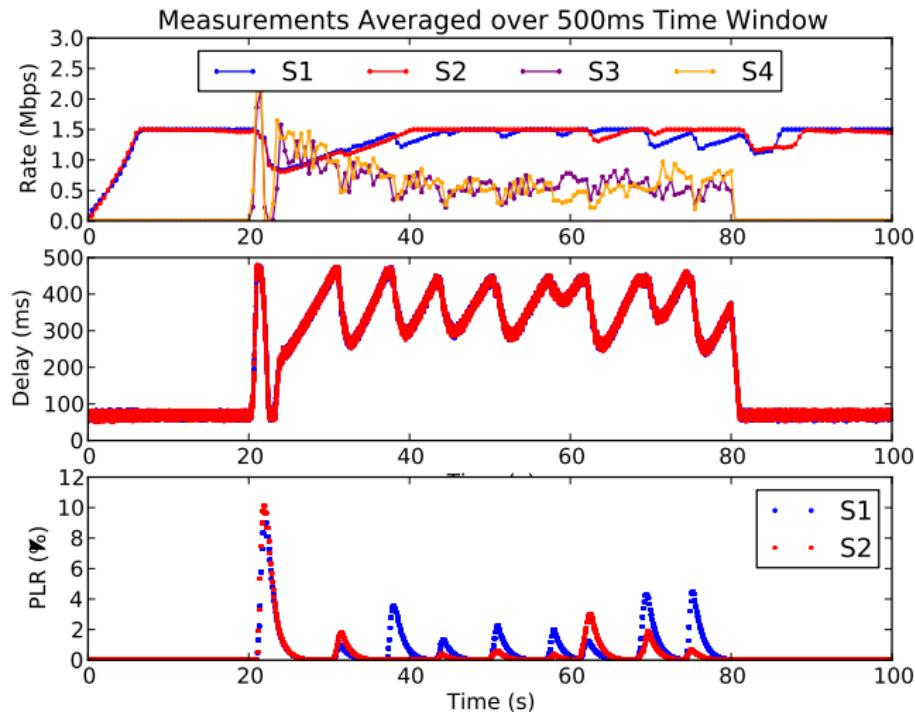
Two Flows — CoDel



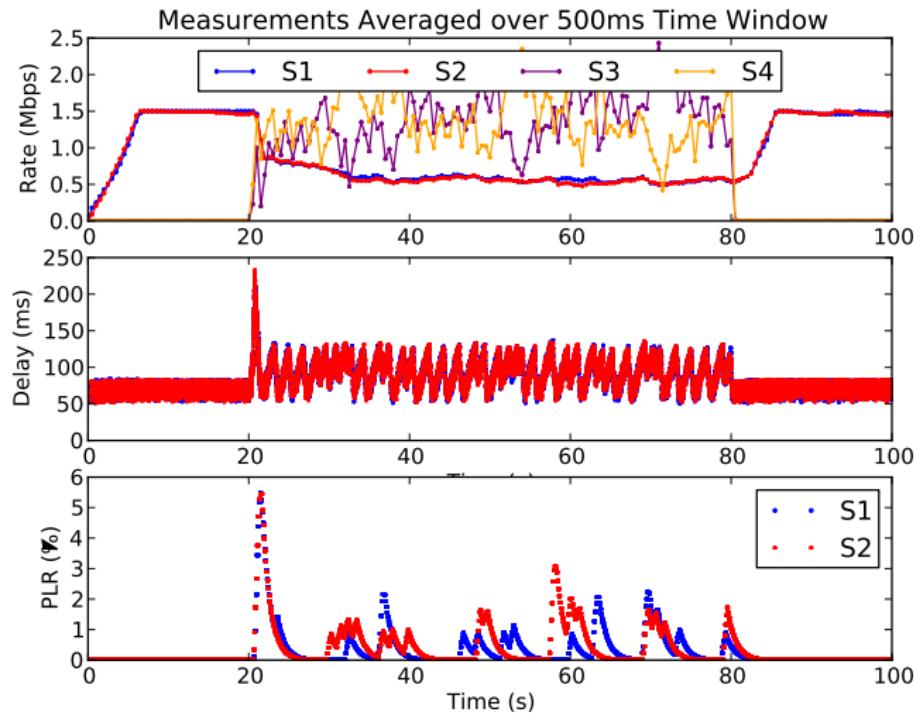
Test Case M: NADA vs. TCP

- ▶ Two NADA flows active at $t = 0 - 100$ s.
- ▶ Two TCP flows active at $t = 20 - 80$ s.

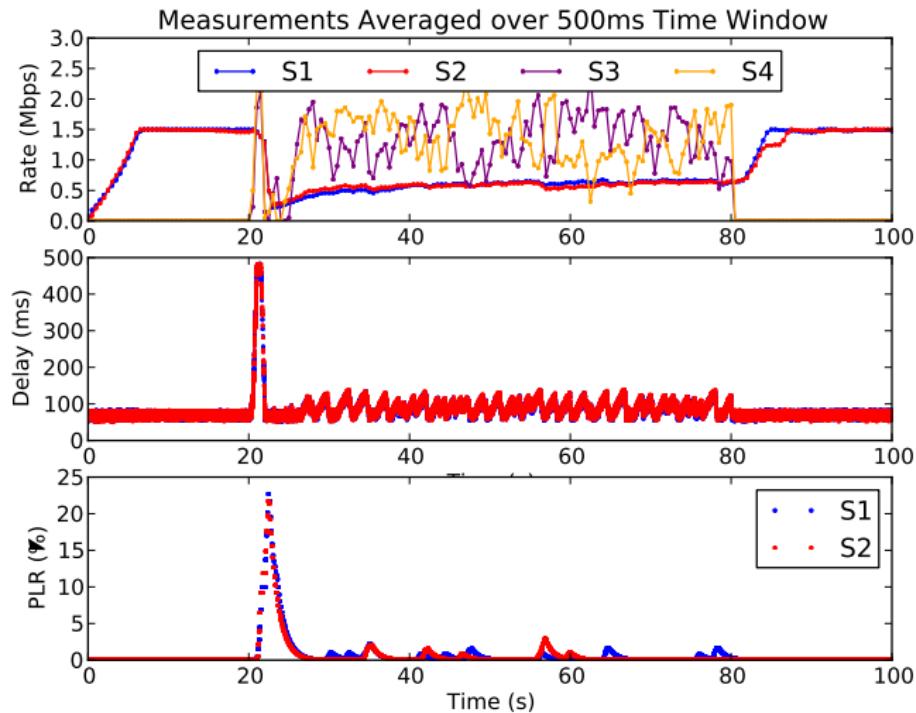
NADA vs. TCP — DropTail



NADA vs. TCP — RED



NADA vs. TCP — PIE



NADA vs. TCP — CoDel

