

PRR and NewCWV for FreeBSD

RFC 6937 & draft-ietf-tcpm-newcwv

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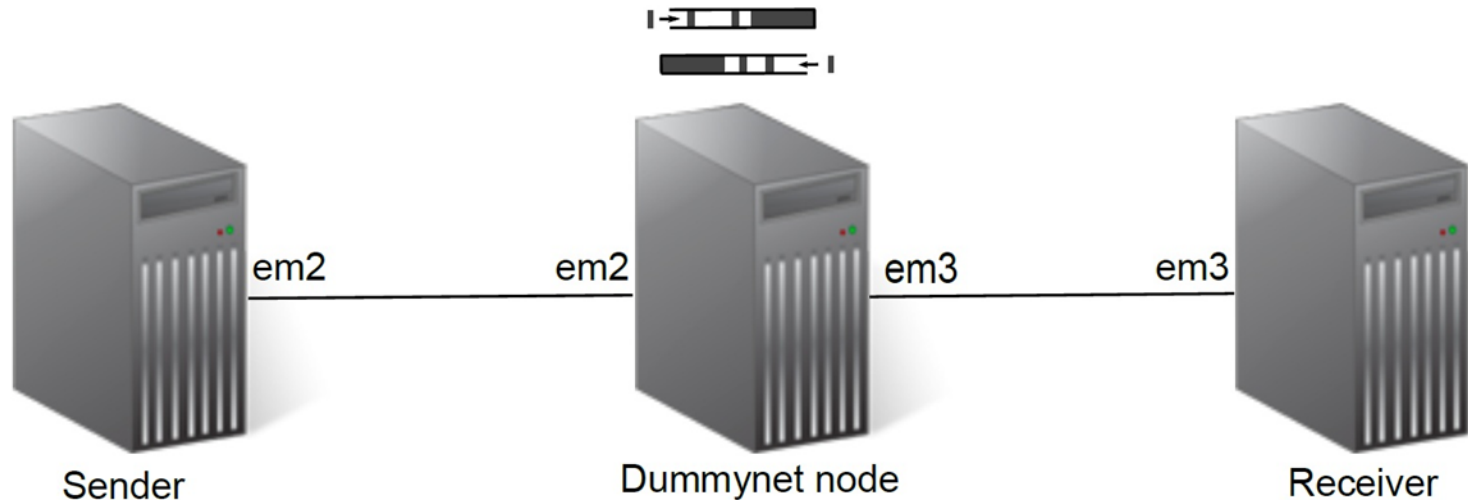
TCPM, IETF-89, London, UK

March 3, 2014

Status

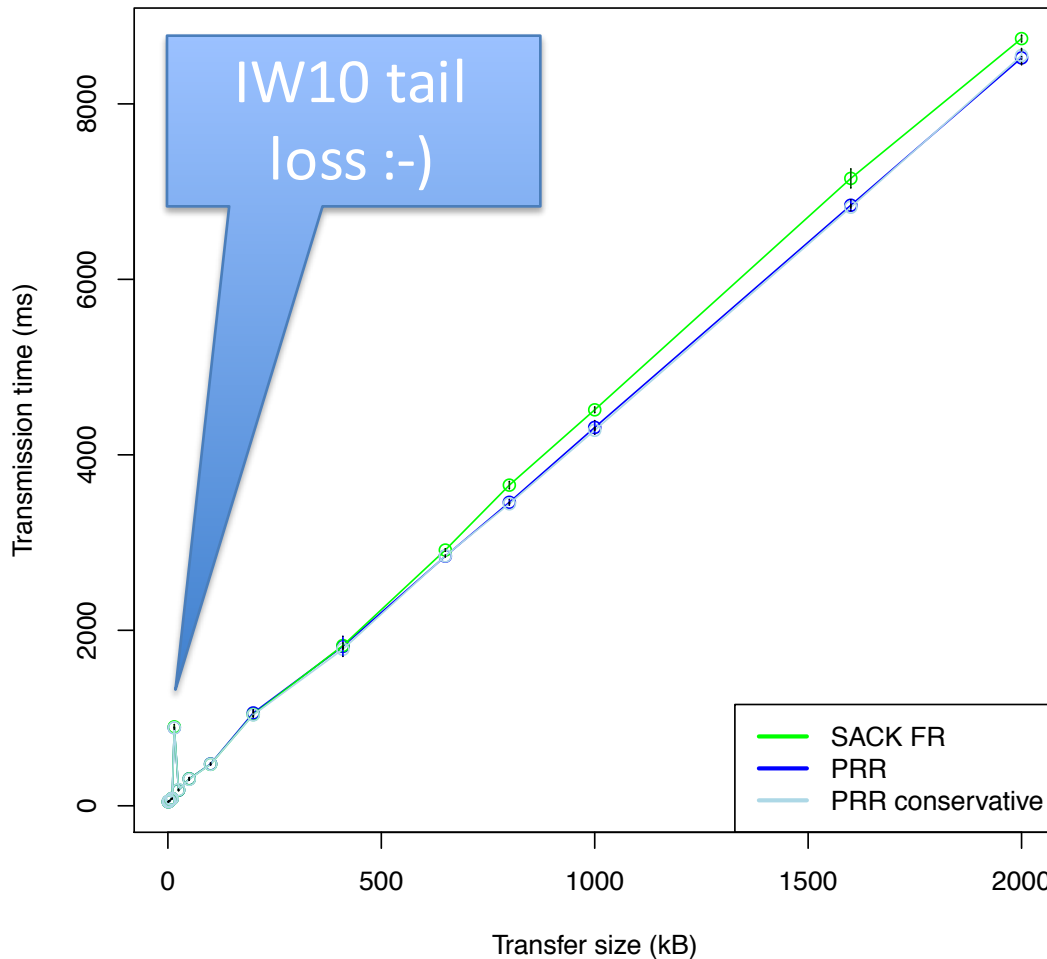
- Implemented by Aris Angelogiannopoulos as part of his MS thesis
- Patches to FreeBSD-CURRENT (submitted)
- PRR (believed to be) implemented per the RFC
- NewCWV as of draft-ietf-tcpm-newcwv-00
 - Modulo the “pipeACK” bit

Experimental topology



RTT delay	10 – 120 ms
Queue size	bandwidth*delay product
Loss	0 – 10% (random)
Bandwidth	1 – 35 Mbit/s
TCP IW	10

PRR performance



BW 2 Mbit/s

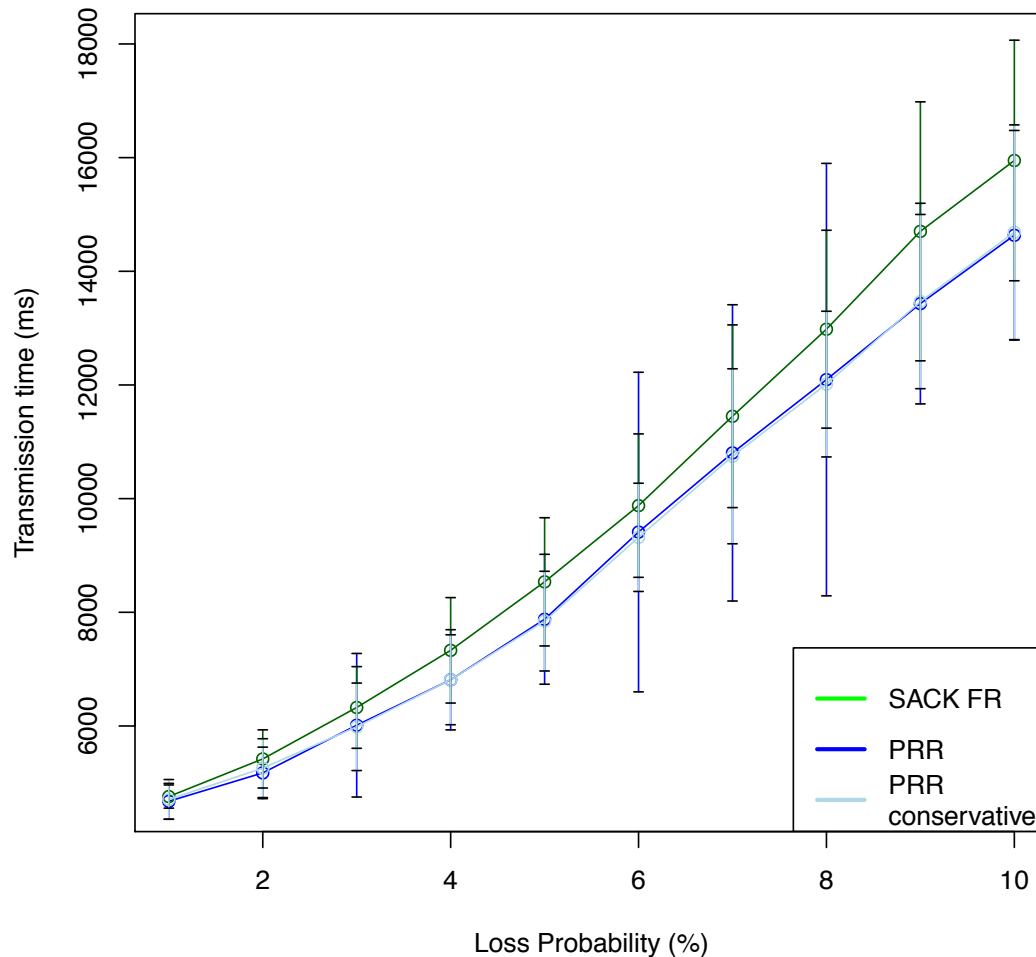
RTT 40 ms

Loss 0%

T. Size 1KB – 2MB

Benefit 0 – 2.95%

PRR performance under loss



BW 2 Mbit/s

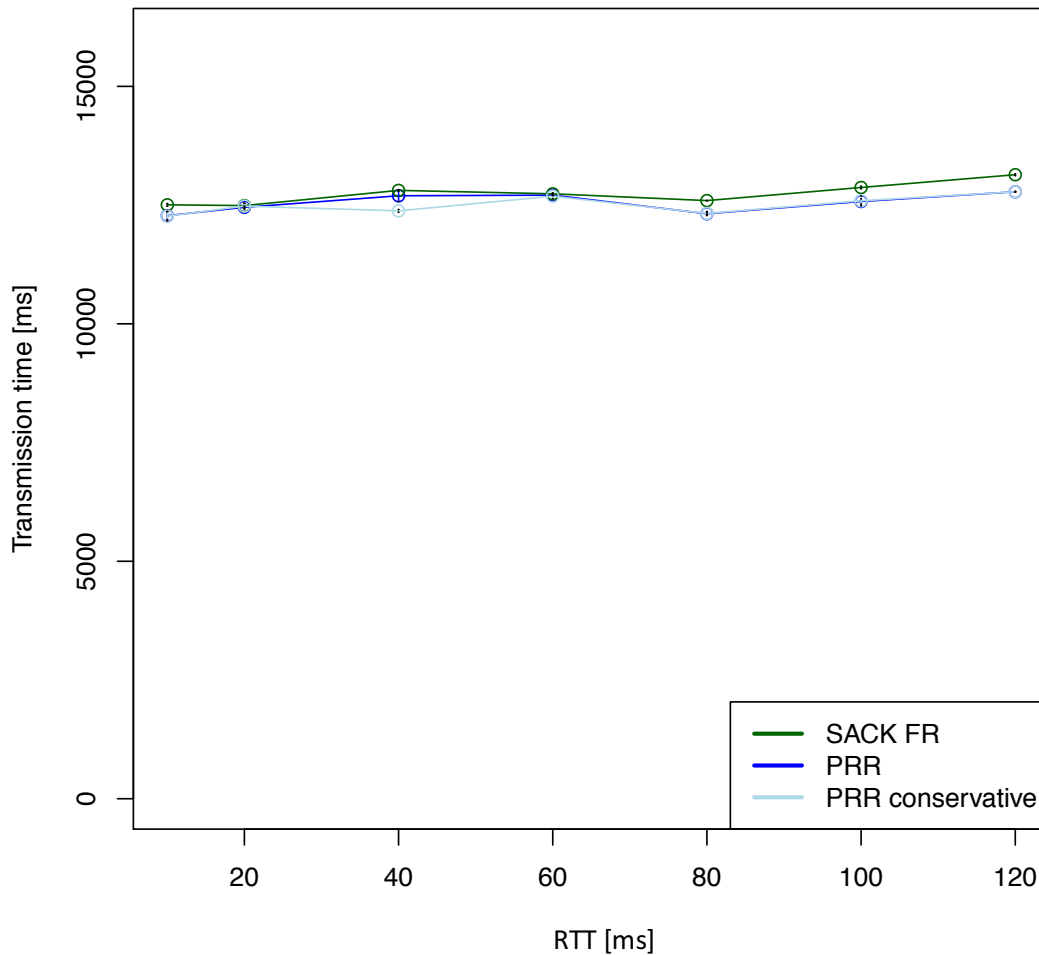
RTT 40 ms

Loss 1 – 10%

T. Size 1MB

Benefit 3 – 9%

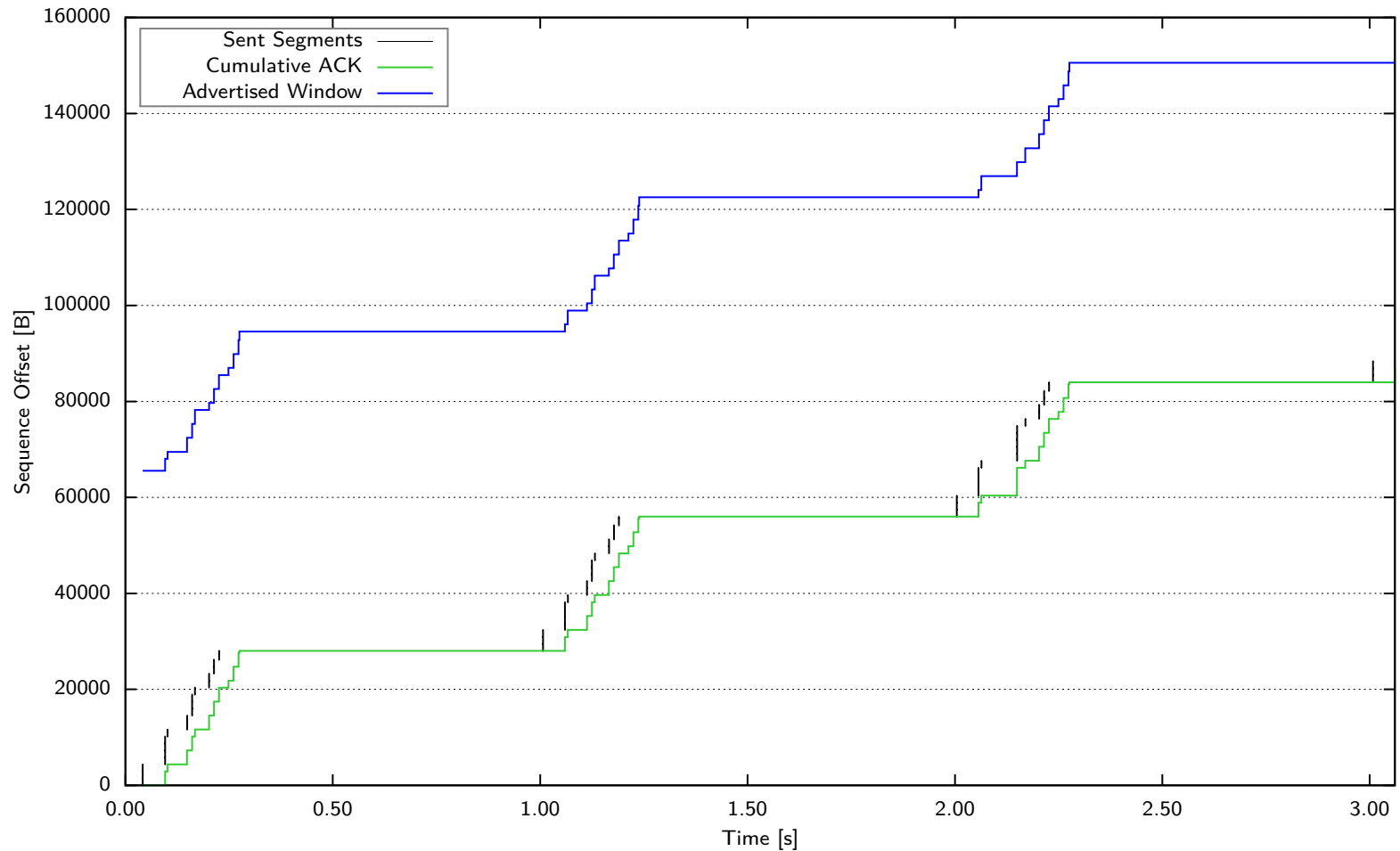
PRR performance with varying RTT



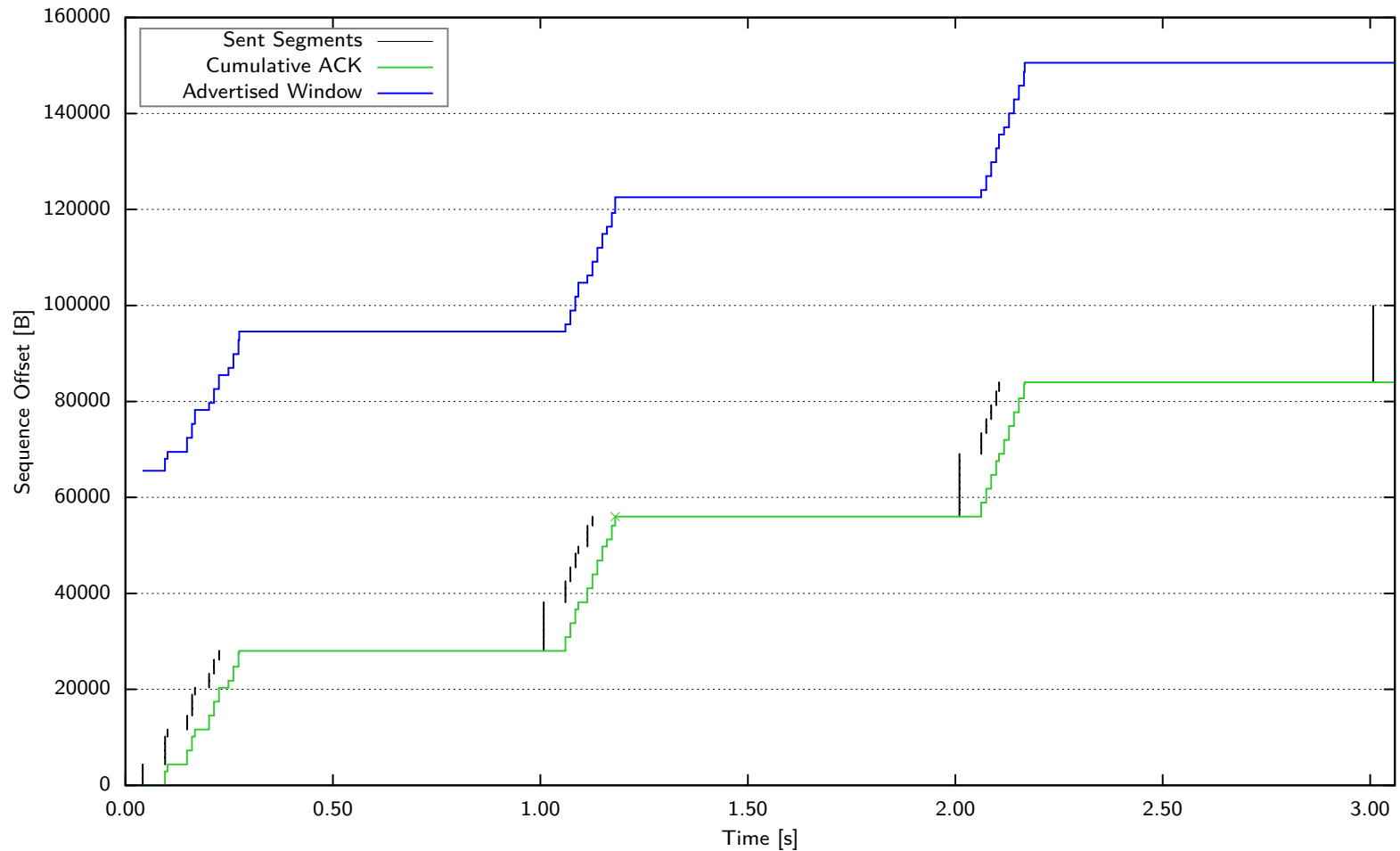
BW 2 Mbit/s
RTT 10 – 120 ms
Loss 0%
T. Size 3 MB

Benefit 0.1 – 1.9%

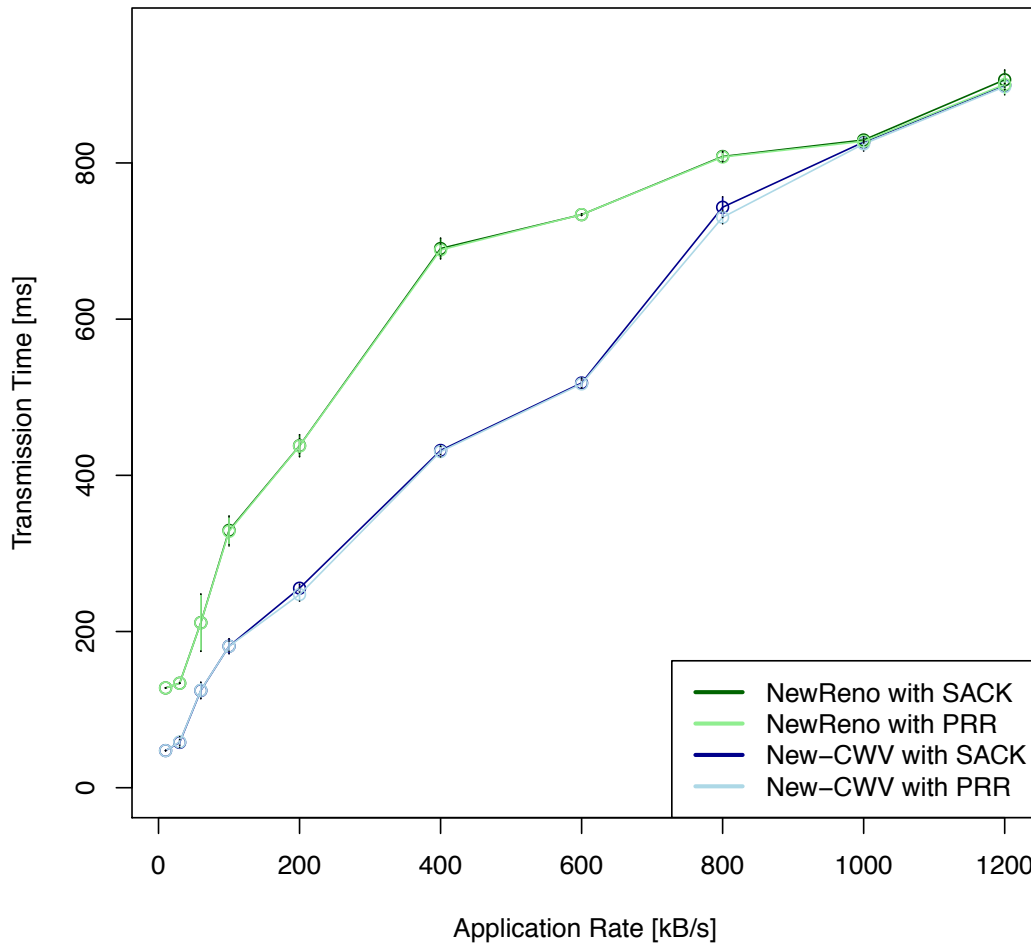
NewCWV illustration (disabled)



NewCWV illustration (enabled)



NewCWV with varying burst sizes



BW 20 Mbit/s

RTT 40 ms

Loss 0%

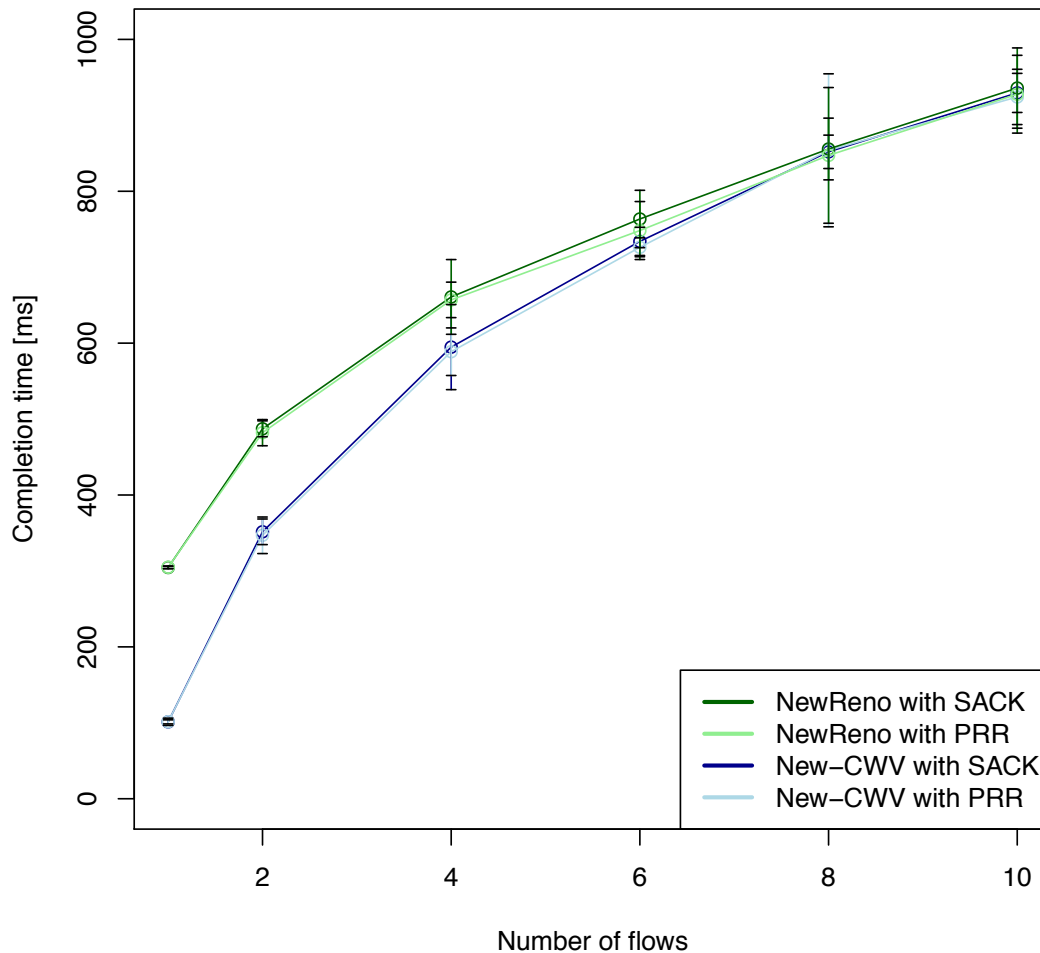
B. Size 10–1200KB

Flows 1

Benefit 0.3 – 59.9%

+PRR 0.3 – 60%

NewCWV with multiple flows



BW 15 Mbit/s

RTT 40 ms

Loss 0%

B. Size 64KB/s

Flows 1 – 10

Benefit 0.4 – 38.6%

+PRR 0.4 – 39%

More info

- **Thesis**

<https://eggert.org/students/angelogiannopoulos-thesis.pdf>

- **Code**

<http://lists.freebsd.org/pipermail/freebsd-net/2014-February/037771.html>

- Waiting for FreeBSD stack committers to review & commit