Pantheon Report

Generated at 2022-04-13 15:16:57 (UTC).
Tested in mahimahi: `mm-delay 5 mm-link random.trace random.trace`
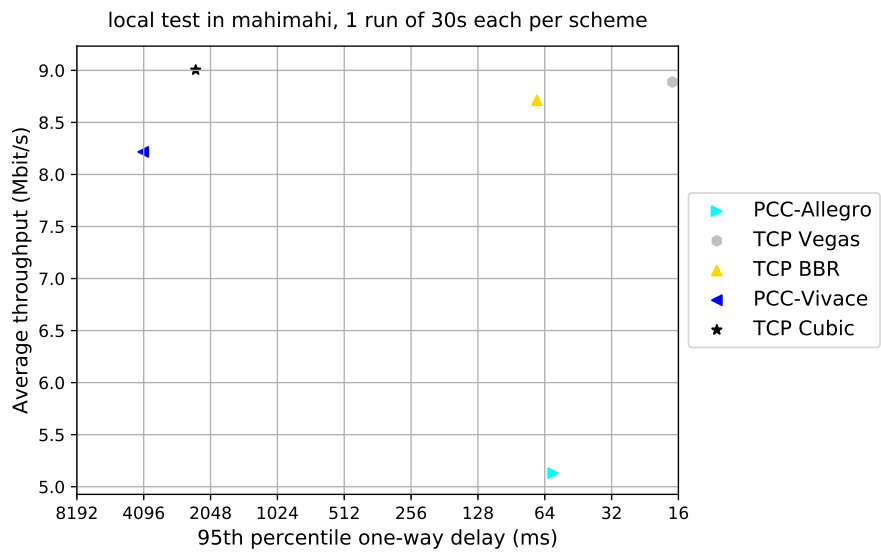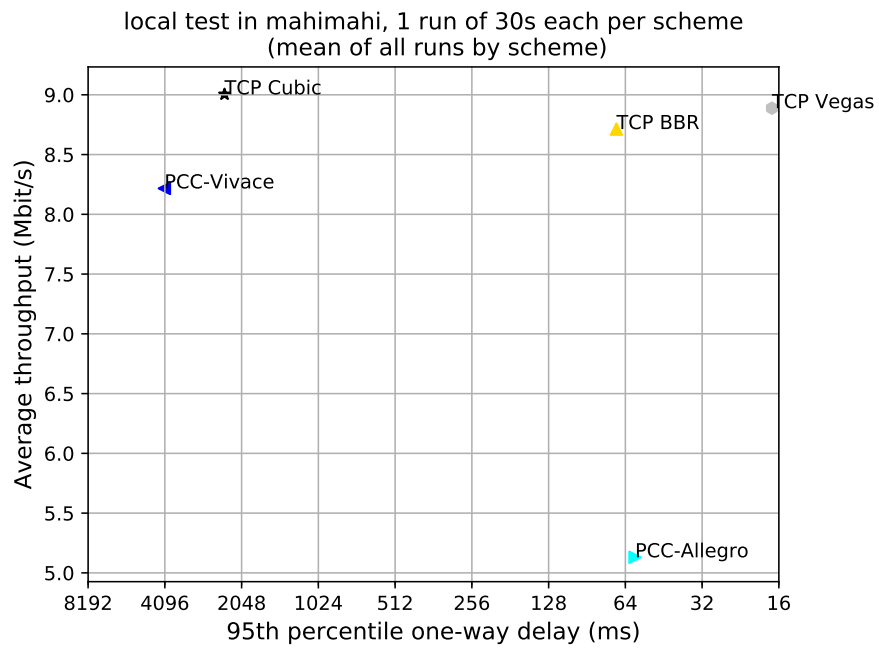Repeated the test of 5 congestion control schemes once.
Each test lasted for 30 seconds running 1 flow.

```
System info:
Linux 4.15.0-175-generic
net.core.default_qdisc = fq
net.core.rmem_default = 212992
net.core.rmem_max = 212992
net.core.wmem_default = 212992
net.core.wmem_max = 212992
net.ipv4.tcp_rmem = 4096 131072 6291456
net.ipv4.tcp_wmem = 4096 16384 4194304

Git summary:
branch: master @ 99ce503a4b7f0c69e0a7c7e25dfa3753c361252a
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdfe58e562f4
third_party/indigo @ 463d89b09699a57bfdfbae351646df6a60040b90
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ f866d3f58d27afd942717625ee3a354cc2e802bd
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
 M receiver/src/buffer.h
 M receiver/src/core.cpp
 M sender/src/buffer.h
 M sender/src/core.cpp
third_party/pcc-experimental @ cd43e34e3f5f5613e8acd08fab92c4eb24f974ab
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream-reproduce @ f099118d1421aa3131bf11ff1964974e1da3bdb2
 M src/ScreamClient
 M src/ScreamServer
third_party/sprout @ 366e35c6178b01e31d4a46ad18c74f9415f19a26
 M src/examples/cellsim.cc
 M src/examples/sproutbt2.cc
 M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
 M src/verus.hpp
 M tools/plot.py
third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851
```

local test in mahimahi, 1 run of 30s each per scheme
(mean of all runs by scheme)

Scatter plot of Average throughput (Mbit/s) vs 95th percentile one-way delay (ms). Points: TCP Cubic, TCP Vegas, TCP BBR, PCC-Vivace, PCC-Allegro.

local test in mahimahi, 1 run of 30s each per scheme

Scatter plot of Average throughput (Mbit/s) vs 95th percentile one-way delay (ms). Legend: PCC-Allegro, TCP Vegas, TCP BBR, PCC-Vivace, TCP Cubic.

scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	1	8.71	69.37	0.03
TCP Cubic	1	9.00	2389.66	7.32
PCC-Allegro	1	5.13	58.64	0.59
TCP Vegas	1	8.89	17.03	0.03
PCC-Vivace	1	8.22	4114.59	17.93

```
Run 1: Statistics of TCP BBR

Start at: 2022-04-13 15:09:17
End at: 2022-04-13 15:09:47

# Below is generated by plot.py at 2022-04-13 15:16:55
# Datalink statistics
-- Total of 1 flow:
Average capacity: 8.93 Mbit/s
Average throughput: 8.71 Mbit/s (97.6% utilization)
95th percentile per-packet one-way delay: 69.370 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 8.71 Mbit/s
95th percentile per-packet one-way delay: 69.370 ms
Loss rate: 0.03%
```
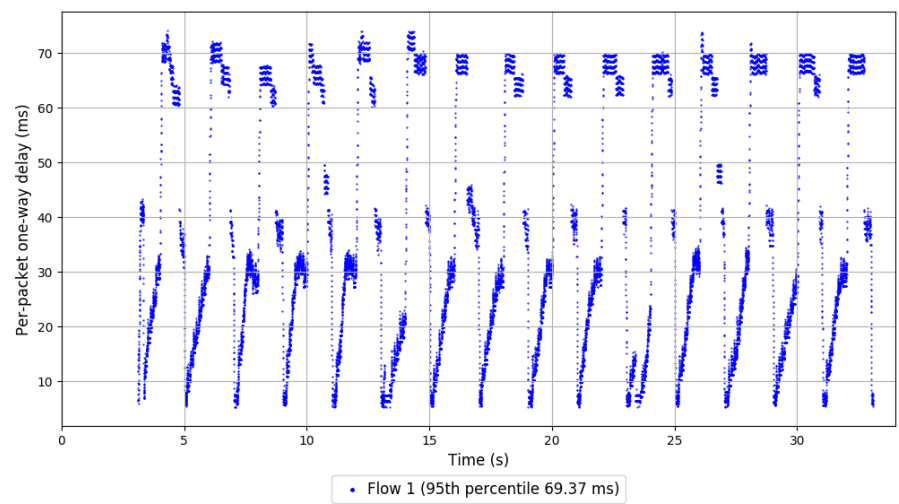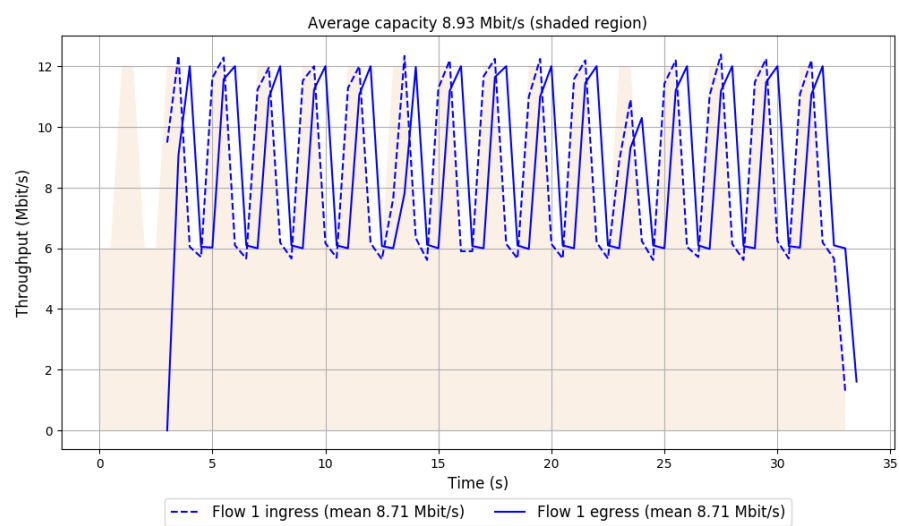
Run 1: Report of TCP BBR — Data Link

Average capacity 8.93 Mbit/s (shaded region)

--- Flow 1 ingress (mean 8.71 Mbit/s)   —— Flow 1 egress (mean 8.71 Mbit/s)

• Flow 1 (95th percentile 69.37 ms)

5

```
Run 1: Statistics of TCP Cubic

Start at: 2022-04-13 15:10:26
End at: 2022-04-13 15:10:56

# Below is generated by plot.py at 2022-04-13 15:16:56
# Datalink statistics
-- Total of 1 flow:
Average capacity: 8.93 Mbit/s
Average throughput: 9.00 Mbit/s (100.8% utilization)
95th percentile per-packet one-way delay: 2389.664 ms
Loss rate: 7.32%
-- Flow 1:
Average throughput: 9.00 Mbit/s
95th percentile per-packet one-way delay: 2389.664 ms
Loss rate: 7.32%
```
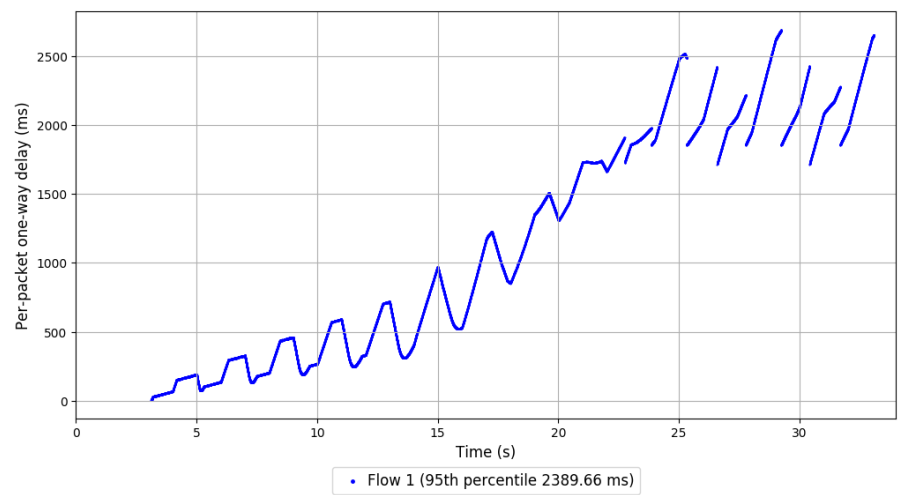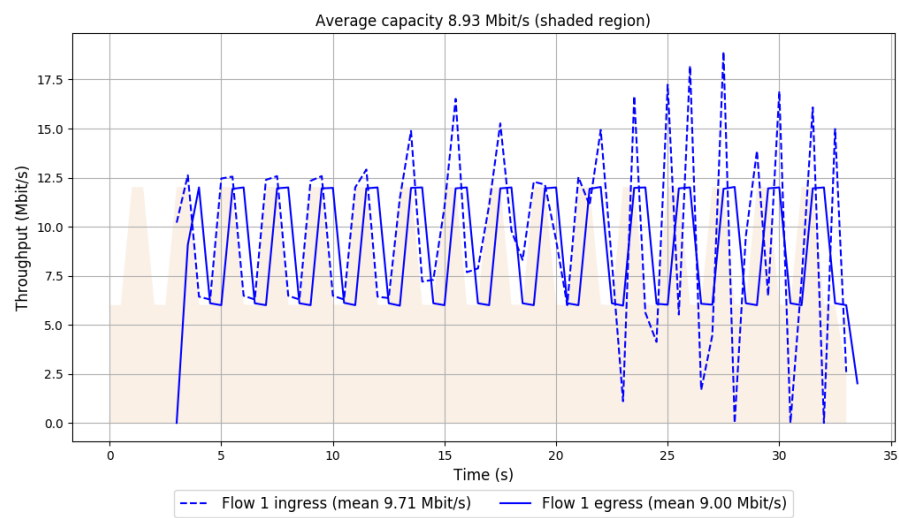
Run 1: Report of TCP Cubic — Data Link

Average capacity 8.93 Mbit/s (shaded region)

Flow 1 ingress (mean 9.71 Mbit/s)   Flow 1 egress (mean 9.00 Mbit/s)

Flow 1 (95th percentile 2389.66 ms)

7

```
Run 1: Statistics of PCC-Allegro

Start at: 2022-04-13 15:08:09
End at: 2022-04-13 15:08:39

# Below is generated by plot.py at 2022-04-13 15:16:56
# Datalink statistics
-- Total of 1 flow:
Average capacity: 8.93 Mbit/s
Average throughput: 5.13 Mbit/s (57.4% utilization)
95th percentile per-packet one-way delay: 58.642 ms
Loss rate: 0.59%
-- Flow 1:
Average throughput: 5.13 Mbit/s
95th percentile per-packet one-way delay: 58.642 ms
Loss rate: 0.59%
```
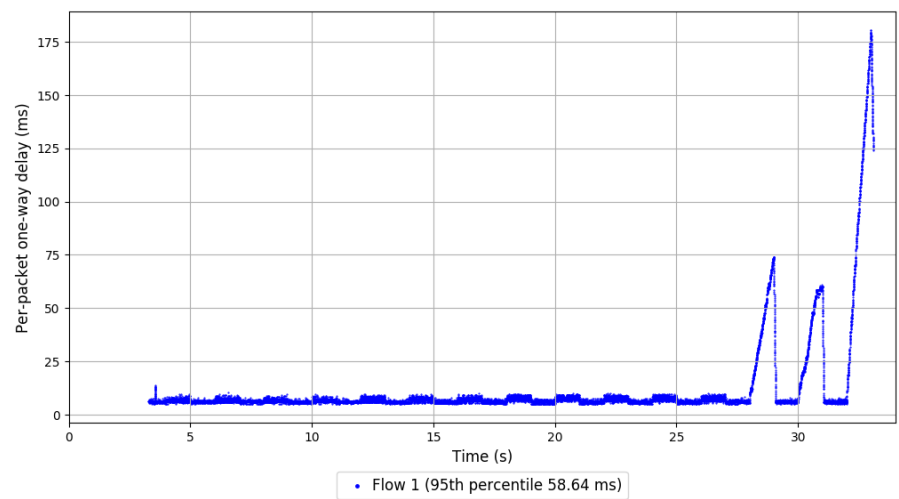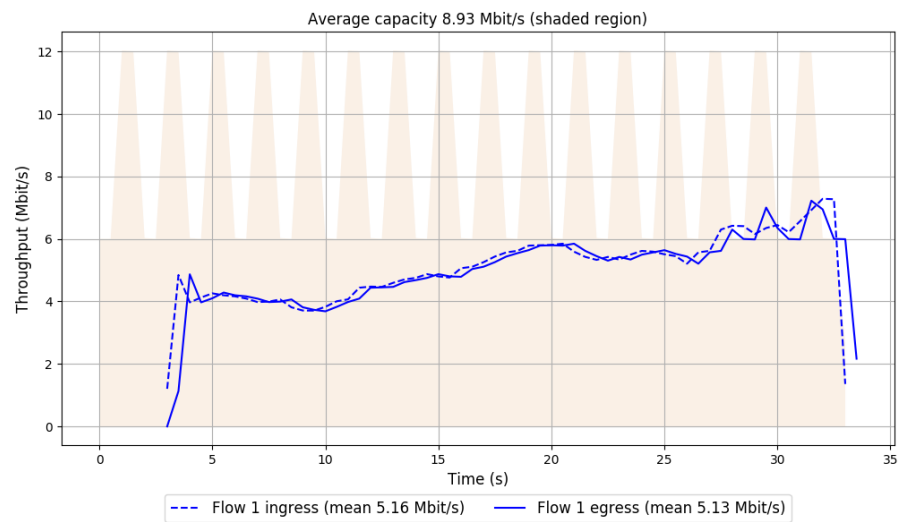
Run 1: Report of PCC-Allegro — Data Link

Average capacity 8.93 Mbit/s (shaded region)

--- Flow 1 ingress (mean 5.16 Mbit/s) — Flow 1 egress (mean 5.13 Mbit/s)

• Flow 1 (95th percentile 58.64 ms)

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```
Run 1: Statistics of TCP Vegas

Start at: 2022-04-13 15:08:43
End at: 2022-04-13 15:09:13

# Below is generated by plot.py at 2022-04-13 15:16:56
# Datalink statistics
-- Total of 1 flow:
Average capacity: 8.93 Mbit/s
Average throughput: 8.89 Mbit/s (99.5% utilization)
95th percentile per-packet one-way delay: 17.034 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 8.89 Mbit/s
95th percentile per-packet one-way delay: 17.034 ms
Loss rate: 0.03%
```
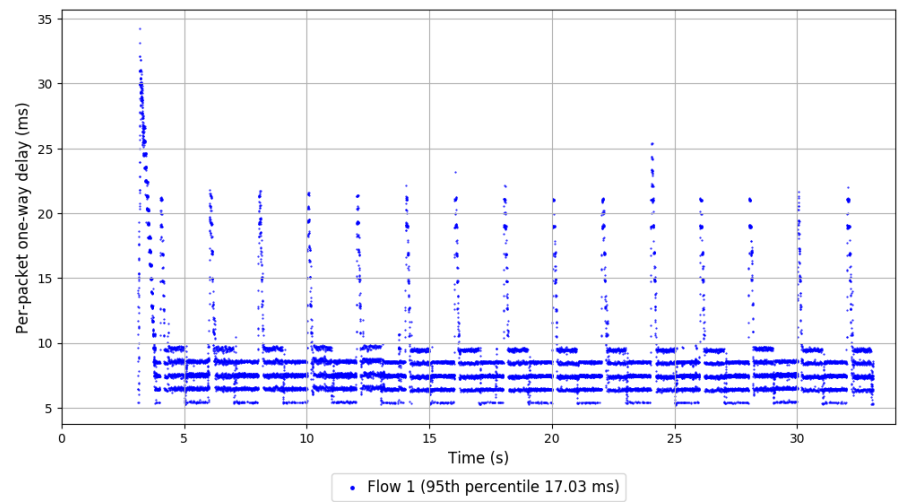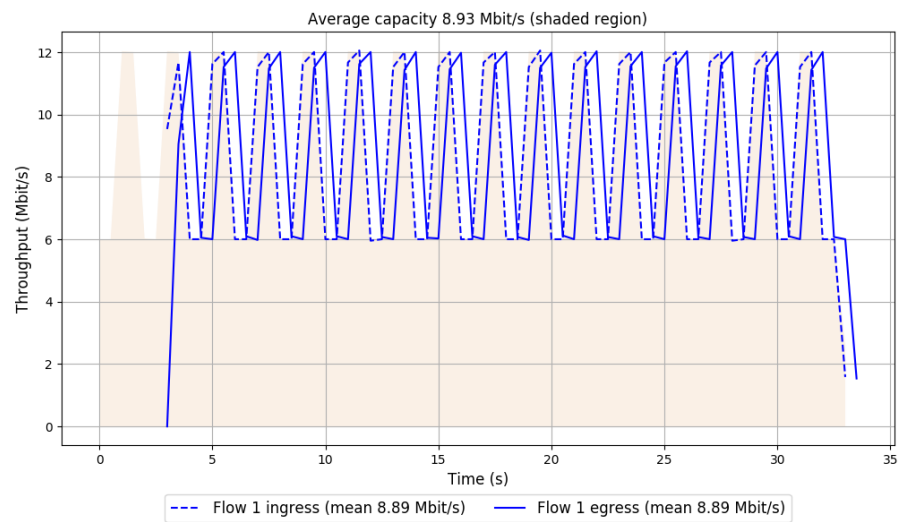
Run 1: Report of TCP Vegas — Data Link

Average capacity 8.93 Mbit/s (shaded region)

- - - Flow 1 ingress (mean 8.89 Mbit/s) —— Flow 1 egress (mean 8.89 Mbit/s)

• Flow 1 (95th percentile 17.03 ms)

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```
Run 1: Statistics of PCC-Vivace

Start at: 2022-04-13 15:09:51
End at: 2022-04-13 15:10:21

# Below is generated by plot.py at 2022-04-13 15:16:56
# Datalink statistics
-- Total of 1 flow:
Average capacity: 8.93 Mbit/s
Average throughput: 8.22 Mbit/s (92.0% utilization)
95th percentile per-packet one-way delay: 4114.594 ms
Loss rate: 17.93%
-- Flow 1:
Average throughput: 8.22 Mbit/s
95th percentile per-packet one-way delay: 4114.594 ms
Loss rate: 17.93%
```

Run 1: Report of PCC-Vivace — Data Link

Average capacity 8.93 Mbit/s (shaded region)

Flow 1 ingress (mean 10.01 Mbit/s)   Flow 1 egress (mean 8.22 Mbit/s)

Flow 1 (95th percentile 4114.59 ms)