

## Pantheon Report

Generated at 2020-05-29 23:23:53 (UTC).

Tested in mahimahi: mm-delay 40 mm-link 50Mbps.trace 50Mbps.trace  
--uplink-queue=droptail --uplink-queue-args=packets=300  
Repeated the test of 3 congestion control schemes 3 times.  
Each test lasted for 30 seconds running 1 flow.

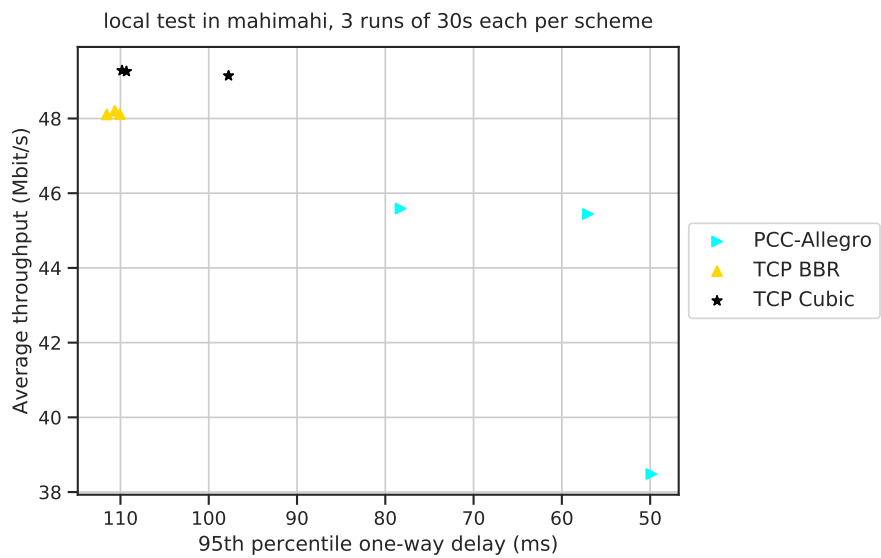
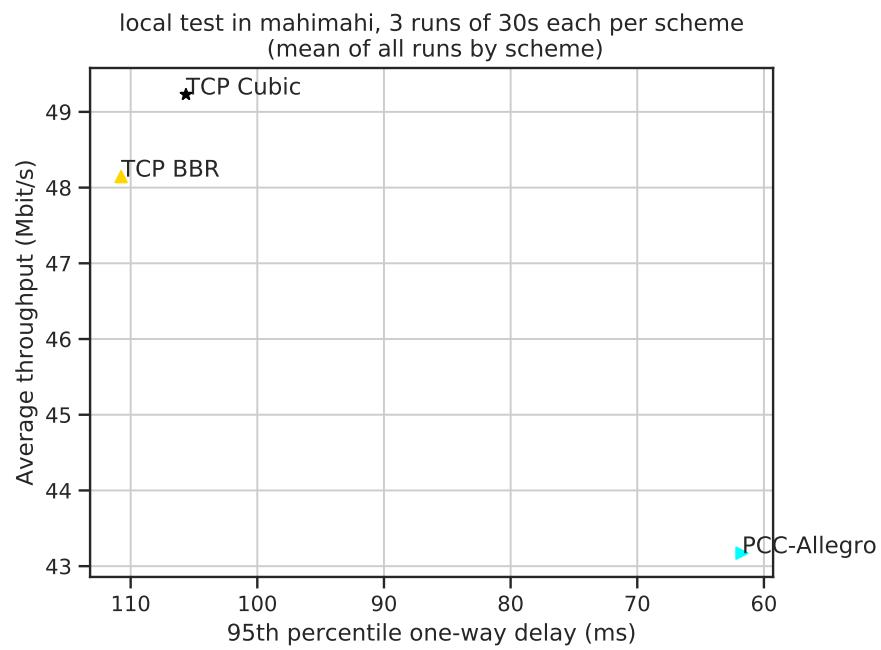
### System info:

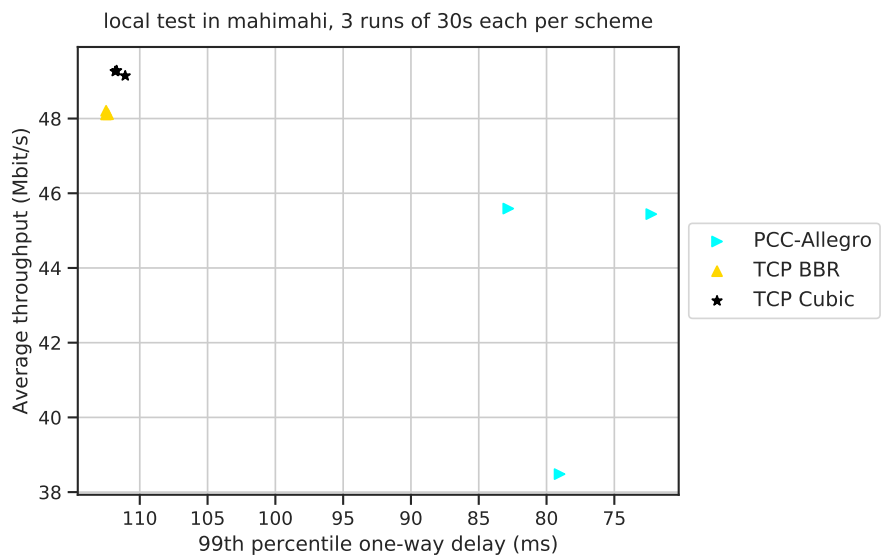
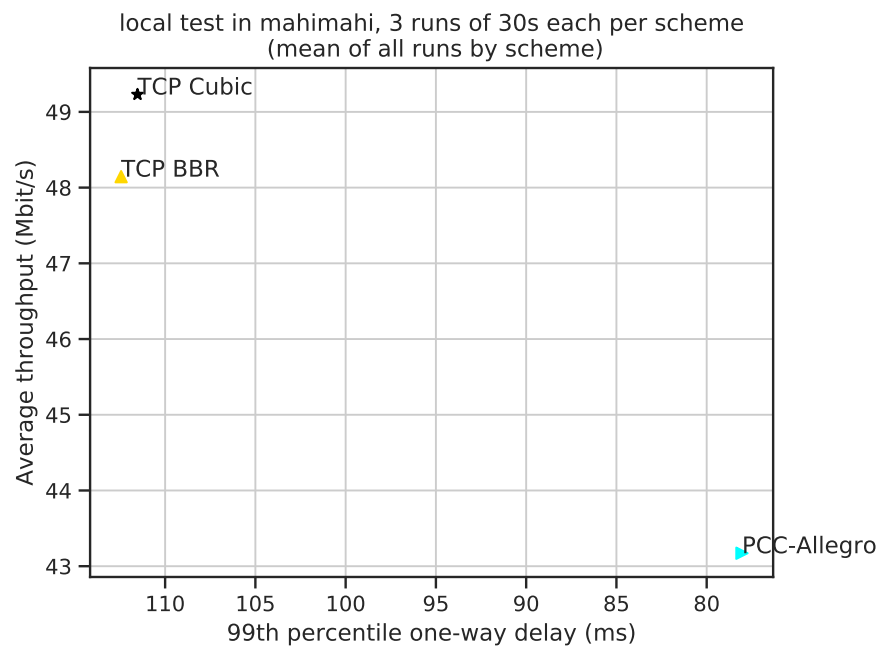
Linux 4.15.0-99-generic  
net.core.default\_qdisc = fq  
net.core.rmem\_default = 212992  
net.core.rmem\_max = 212992  
net.core.wmem\_default = 212992  
net.core.wmem\_max = 212992  
net.ipv4.tcp\_rmem = 4096 131072 6291456  
net.ipv4.tcp\_wmem = 4096 16384 4194304

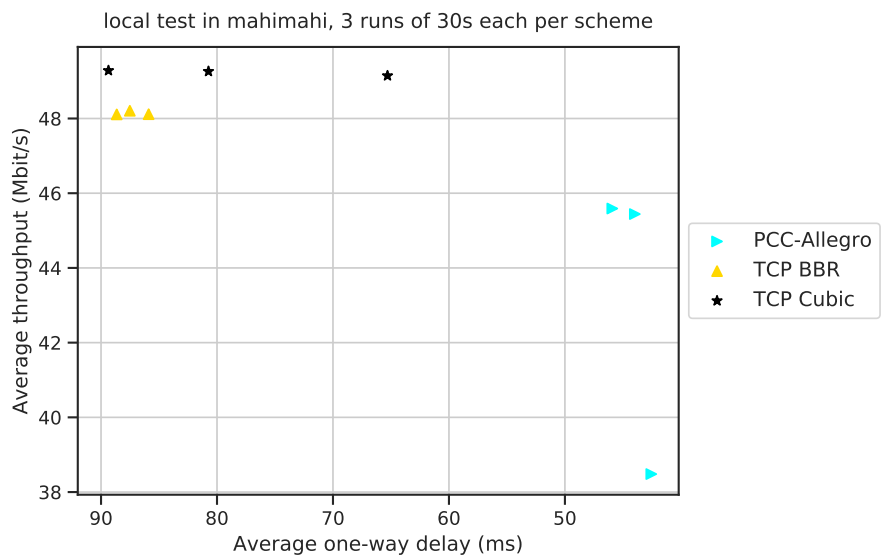
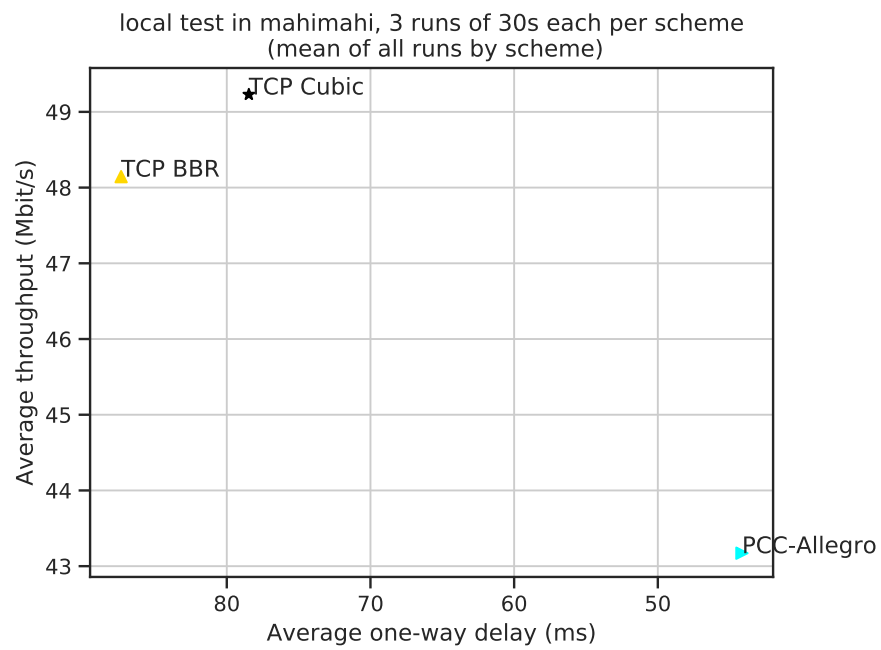
### Git summary:

branch: master @ de3f76227a60e77b1f167c30c7e2d92e4c1e3850  
third\_party/aurora @ f3e943d61015b39960854ba6391797e0c7984d74  
third\_party/aurora-model @ e292c316c23fb837255c4e142e40590d154bbe95  
third\_party/eagle-plus @ f84a9431dfbfa1640fc82bb6d18e33f0ffe0661a  
M net-em/net-em/net\_em/\_\_pycache\_\_/\_\_init\_\_.cpython-36.pyc  
M net-em/net-em/net\_em/envs/\_\_pycache\_\_/\_\_init\_\_.cpython-36.pyc  
M net-em/net-em/net\_em/envs/\_\_pycache\_\_/helpers.cpython-36.pyc  
M net-em/net-em/net\_em/envs/\_\_pycache\_\_/project\_root.cpython-36.pyc  
M net-em/net-em/net\_em/envs/\_\_pycache\_\_/receiver.cpython-36.pyc  
third\_party/eagle-v1 @ c68d985e042be5c30704c0aee48c363861951a95  
third\_party/eagle-v2 @ c8a1737b3c84d7d49eada5b8785045d272a70120  
third\_party/eagle-v3 @ 50d676bd6e47e3e29a3ce914a6e50b2c6f15136b  
third\_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519  
third\_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9  
third\_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4  
third\_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d  
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-quick @ 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
```







scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th- %ile delay (ms) flow 1	mean 99th- %ile delay (ms) flow 1	mean avg de- lay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	48.15	110.75	112.44	87.35	1.67
TCP Cubic	3	49.23	105.63	111.53	78.46	0.39
PCC-Allegro	3	43.17	61.73	78.04	44.14	0.86

Run 1: Statistics of TCP BBR

Start at: 2020-05-29 23:15:29

End at: 2020-05-29 23:15:59

# Below is generated by plot.py at 2020-05-29 23:23:42

# Datalink statistics

-- Total of 1 flow:

Average capacity: 50.00 Mbit/s

Average throughput: 48.21 Mbit/s (96.4% utilization)

95th percentile per-packet one-way delay: 110.637 ms

99th percentile per-packet one-way delay: 112.484 ms

mean per-packet one-way delay: 87.517 ms

Loss rate: 1.62%

-- Flow 1:

Average throughput: 48.21 Mbit/s

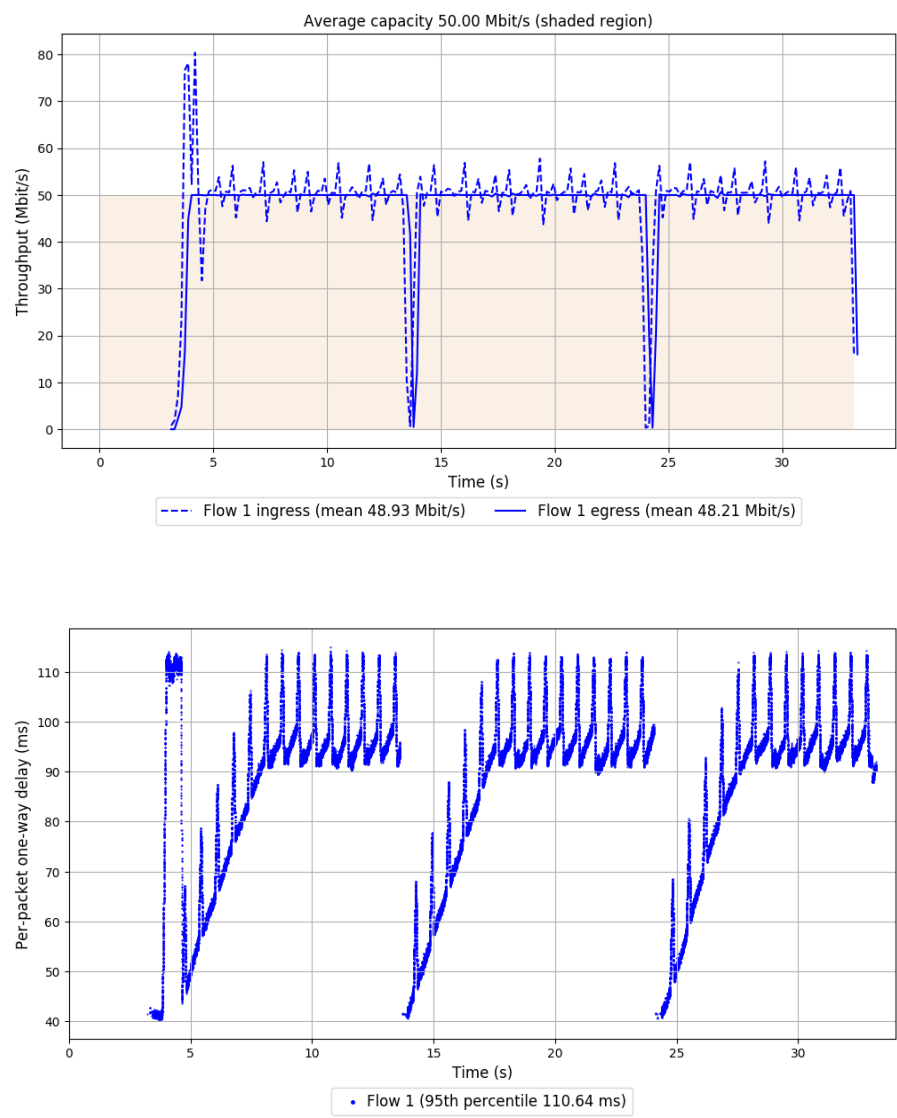
95th percentile per-packet one-way delay: 110.637 ms

99th percentile per-packet one-way delay: 112.484 ms

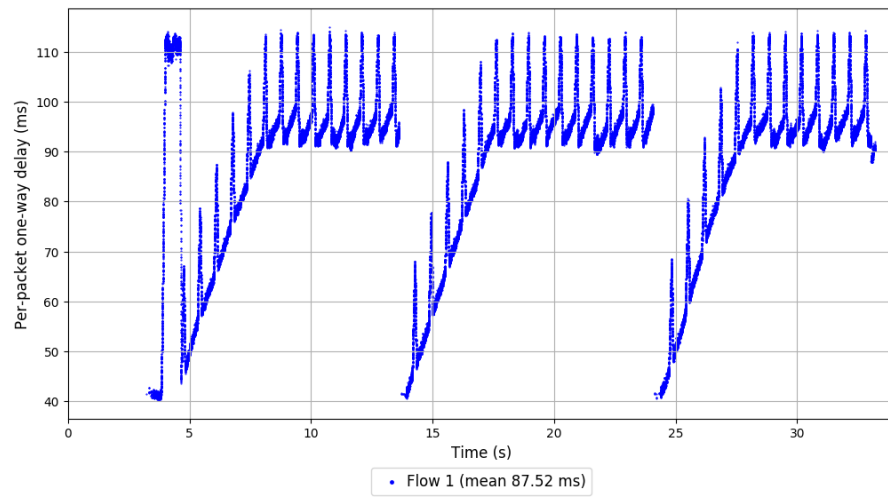
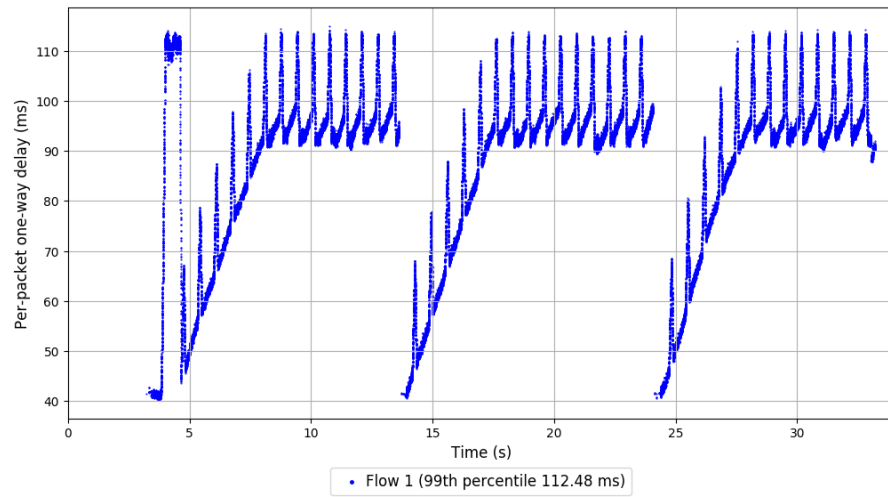
Average per-packet one-way delay: 87.517 ms

Loss rate: 1.62%

Run 1: Report of TCP BBR — Data Link







Run 2: Statistics of TCP BBR

Start at: 2020-05-29 23:17:17

End at: 2020-05-29 23:17:47

# Below is generated by plot.py at 2020-05-29 23:23:42

# Datalink statistics

-- Total of 1 flow:

Average capacity: 50.00 Mbit/s

Average throughput: 48.11 Mbit/s (96.2% utilization)

95th percentile per-packet one-way delay: 111.552 ms

99th percentile per-packet one-way delay: 112.488 ms

mean per-packet one-way delay: 88.648 ms

Loss rate: 1.89%

-- Flow 1:

Average throughput: 48.11 Mbit/s

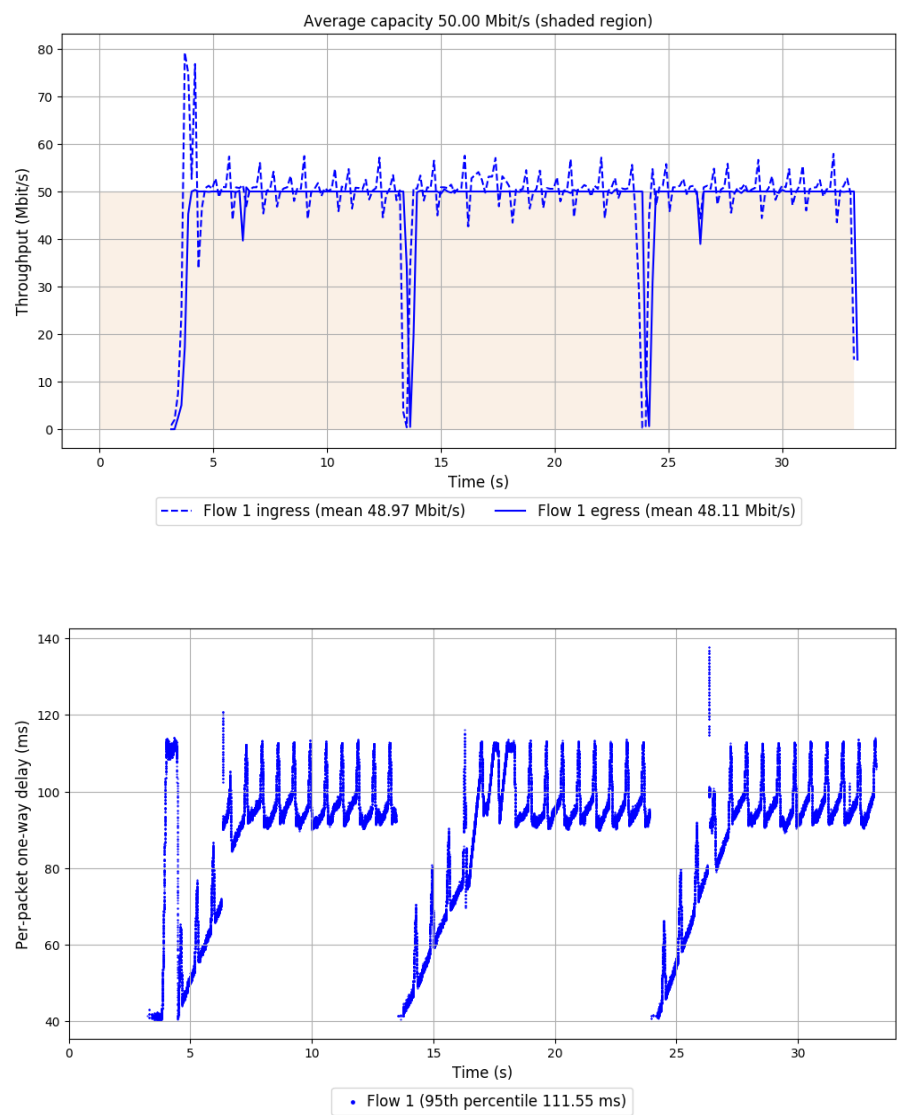
95th percentile per-packet one-way delay: 111.552 ms

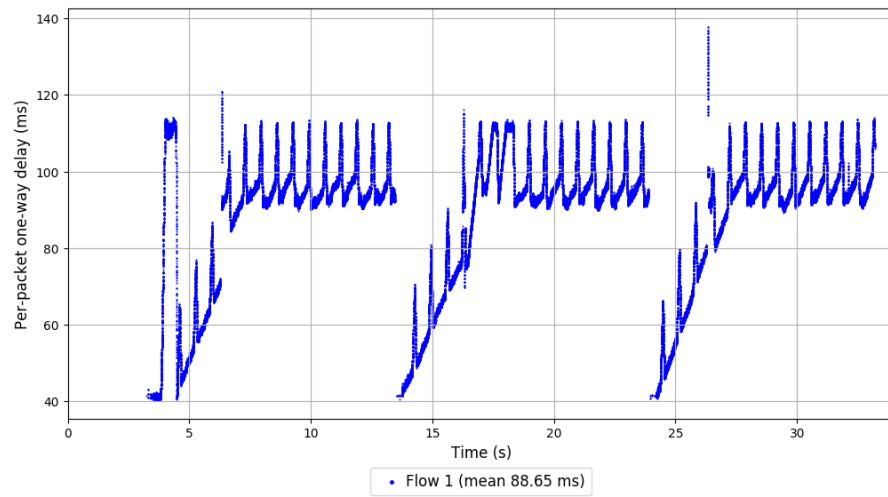
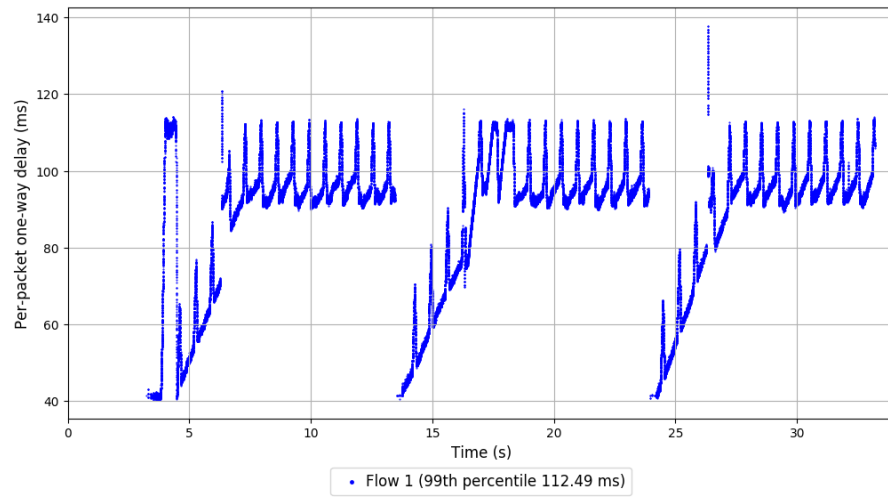
99th percentile per-packet one-way delay: 112.488 ms

Average per-packet one-way delay: 88.648 ms

Loss rate: 1.89%

Run 2: Report of TCP BBR — Data Link





Run 3: Statistics of TCP BBR

Start at: 2020-05-29 23:19:06

End at: 2020-05-29 23:19:36

# Below is generated by plot.py at 2020-05-29 23:23:42

# Datalink statistics

-- Total of 1 flow:

Average capacity: 50.00 Mbit/s

Average throughput: 48.12 Mbit/s (96.2% utilization)

95th percentile per-packet one-way delay: 110.069 ms

99th percentile per-packet one-way delay: 112.338 ms

mean per-packet one-way delay: 85.896 ms

Loss rate: 1.51%

-- Flow 1:

Average throughput: 48.12 Mbit/s

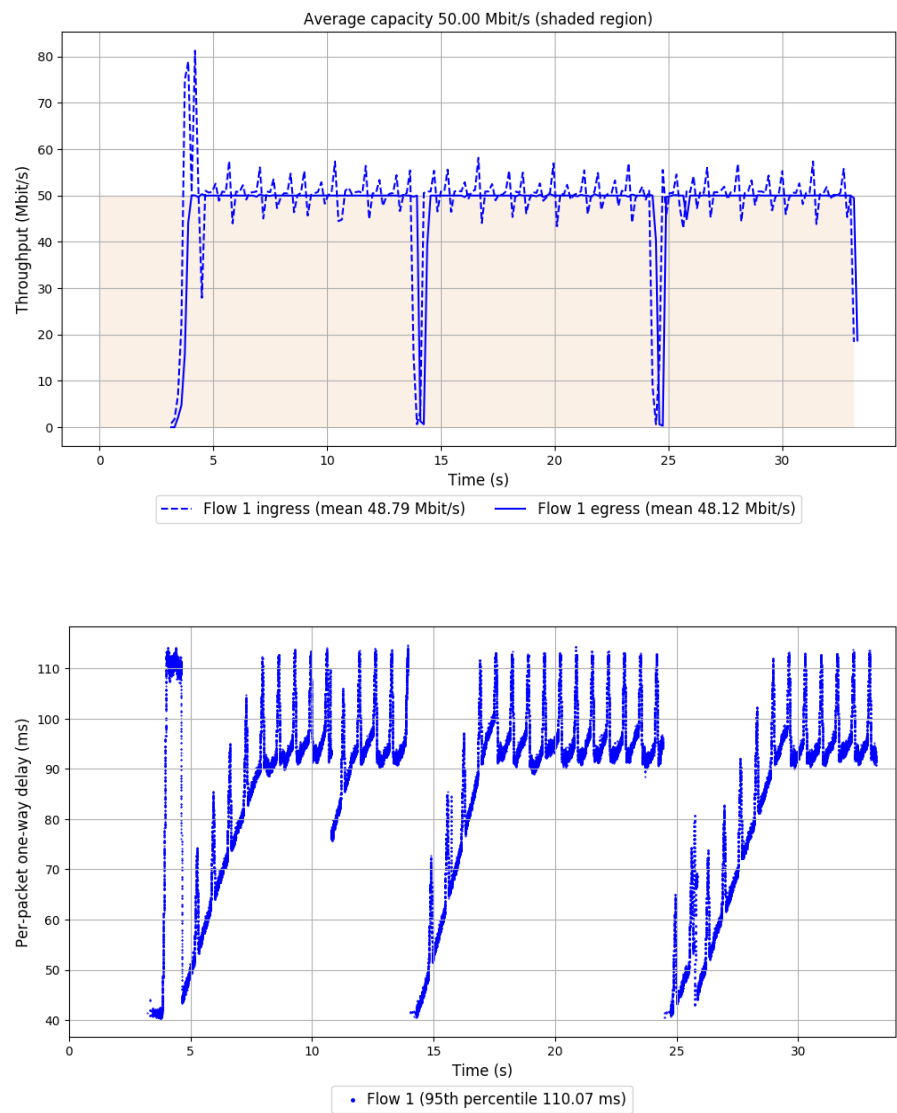
95th percentile per-packet one-way delay: 110.069 ms

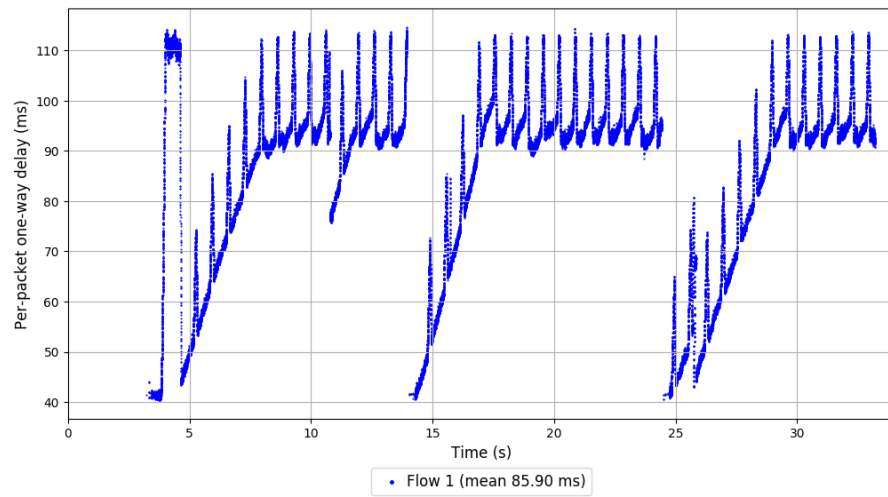
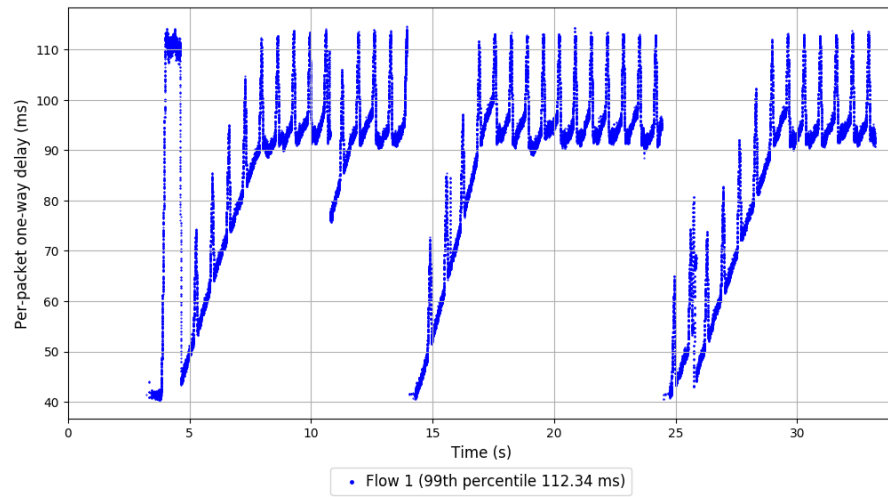
99th percentile per-packet one-way delay: 112.338 ms

Average per-packet one-way delay: 85.896 ms

Loss rate: 1.51%

Run 3: Report of TCP BBR — Data Link





Run 1: Statistics of TCP Cubic

Start at: 2020-05-29 23:16:05

End at: 2020-05-29 23:16:35

# Below is generated by plot.py at 2020-05-29 23:23:42

# Datalink statistics

-- Total of 1 flow:

Average capacity: 50.00 Mbit/s

Average throughput: 49.28 Mbit/s (98.6% utilization)

95th percentile per-packet one-way delay: 109.820 ms

99th percentile per-packet one-way delay: 111.707 ms

mean per-packet one-way delay: 89.358 ms

Loss rate: 0.33%

-- Flow 1:

Average throughput: 49.28 Mbit/s

95th percentile per-packet one-way delay: 109.820 ms

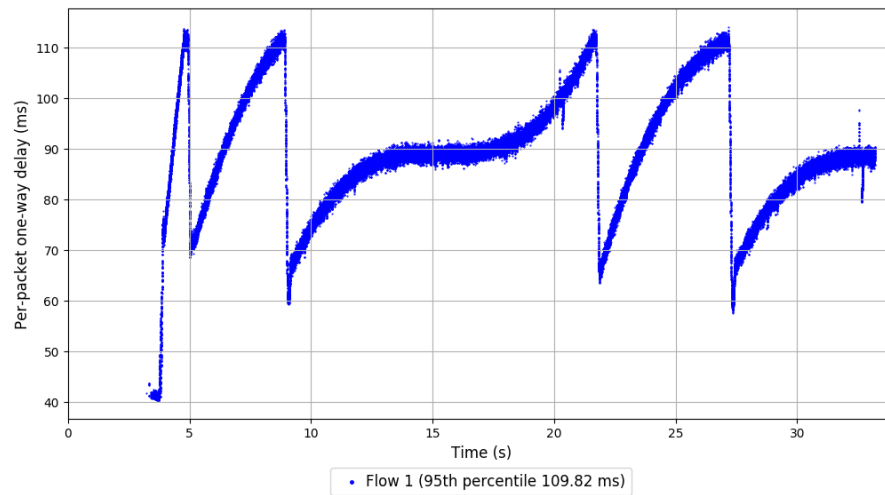
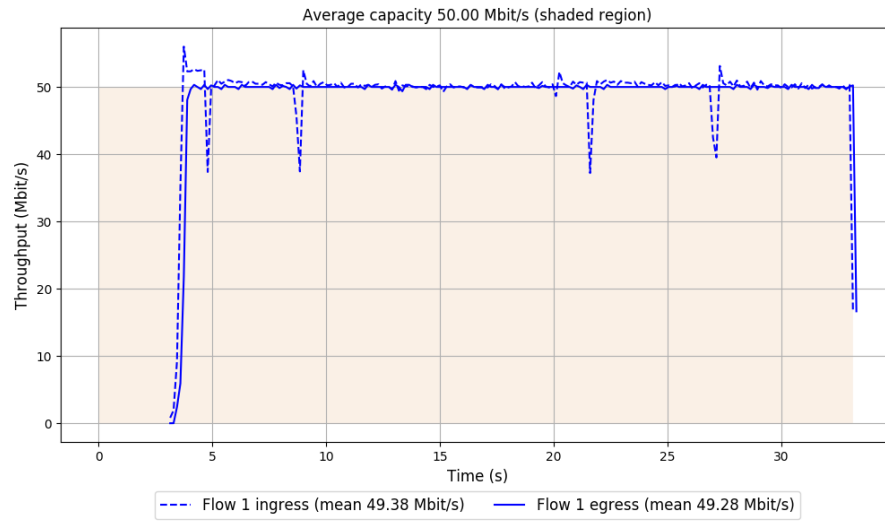
99th percentile per-packet one-way delay: 111.707 ms

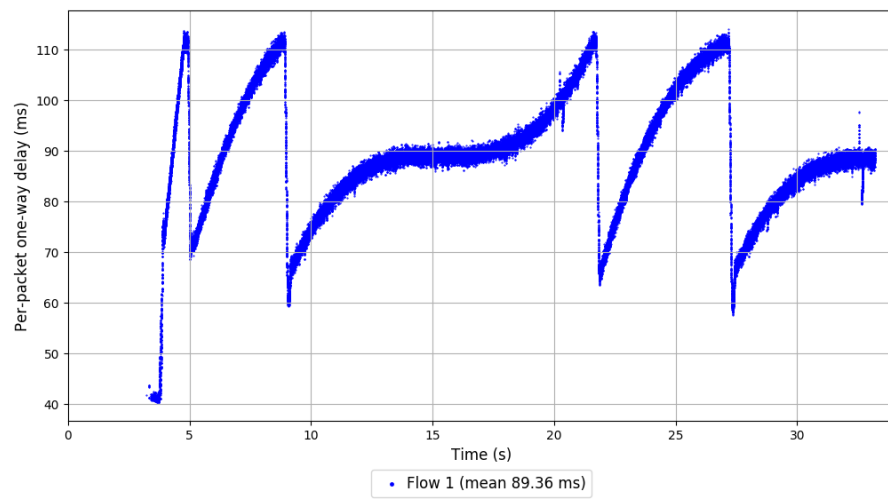
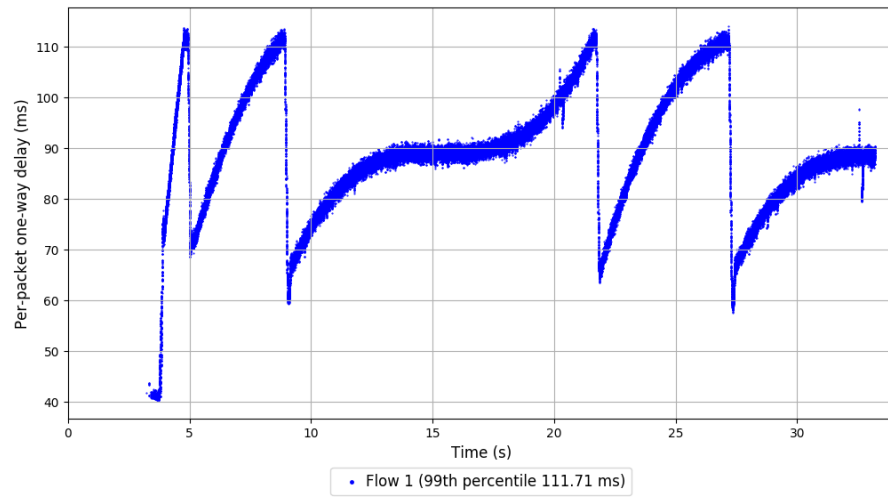
Average per-packet one-way delay: 89.358 ms

Loss rate: 0.33%



## Run 1: Report of TCP Cubic — Data Link





Run 2: Statistics of TCP Cubic

Start at: 2020-05-29 23:17:54

End at: 2020-05-29 23:18:24

# Below is generated by plot.py at 2020-05-29 23:23:45

# Datalink statistics

-- Total of 1 flow:

Average capacity: 50.00 Mbit/s

Average throughput: 49.26 Mbit/s (98.5% utilization)

95th percentile per-packet one-way delay: 109.322 ms

99th percentile per-packet one-way delay: 111.814 ms

mean per-packet one-way delay: 80.735 ms

Loss rate: 0.48%

-- Flow 1:

Average throughput: 49.26 Mbit/s

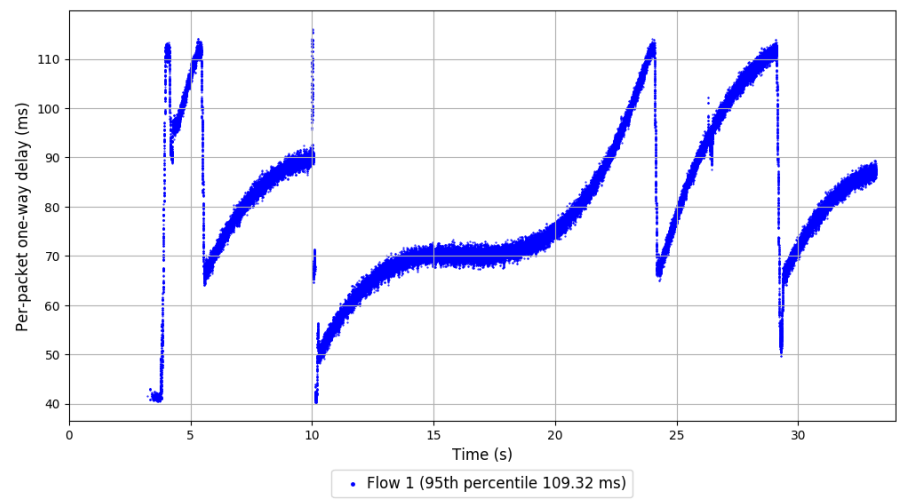
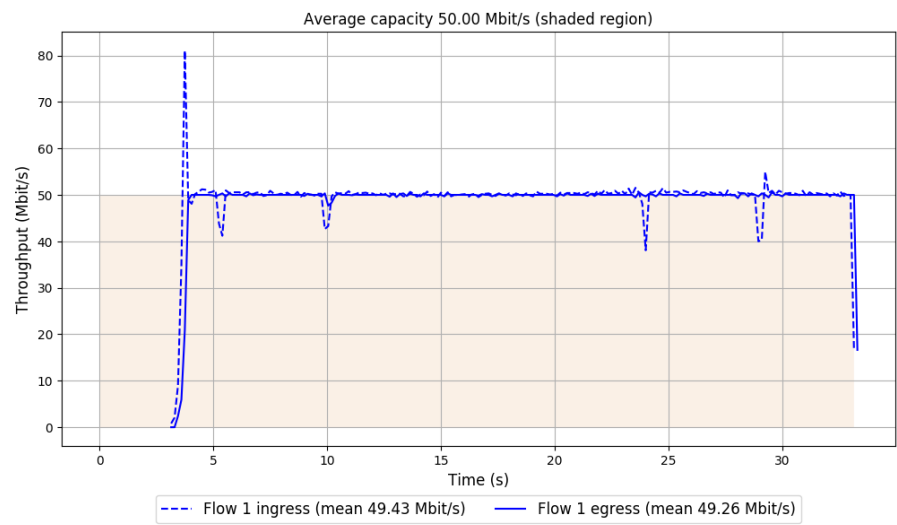
95th percentile per-packet one-way delay: 109.322 ms

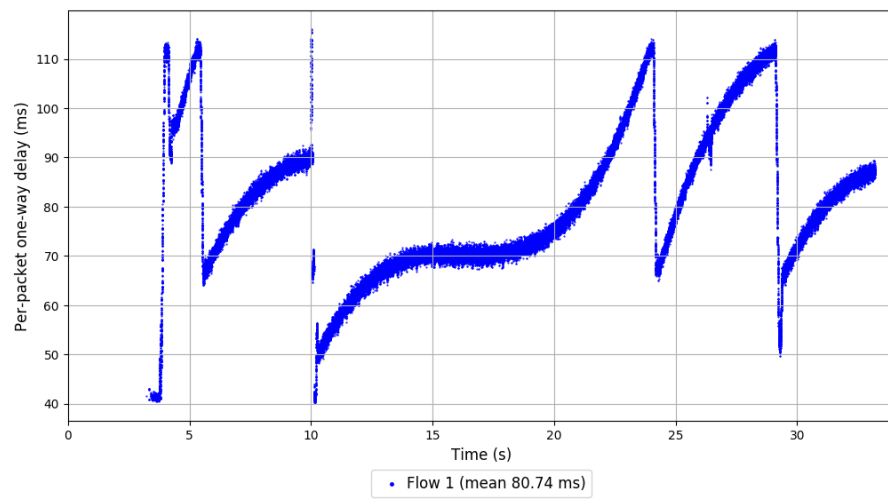
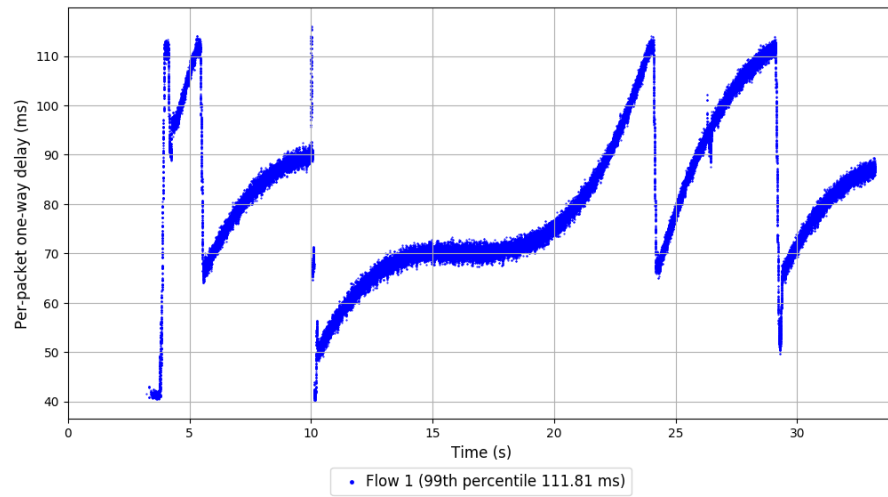
99th percentile per-packet one-way delay: 111.814 ms

Average per-packet one-way delay: 80.735 ms

Loss rate: 0.48%

Run 2: Report of TCP Cubic — Data Link





Run 3: Statistics of TCP Cubic

Start at: 2020-05-29 23:19:43

End at: 2020-05-29 23:20:13

# Below is generated by plot.py at 2020-05-29 23:23:45

# Datalink statistics

-- Total of 1 flow:

Average capacity: 50.00 Mbit/s

Average throughput: 49.14 Mbit/s (98.3% utilization)

95th percentile per-packet one-way delay: 97.756 ms

99th percentile per-packet one-way delay: 111.072 ms

mean per-packet one-way delay: 65.299 ms

Loss rate: 0.36%

-- Flow 1:

Average throughput: 49.14 Mbit/s

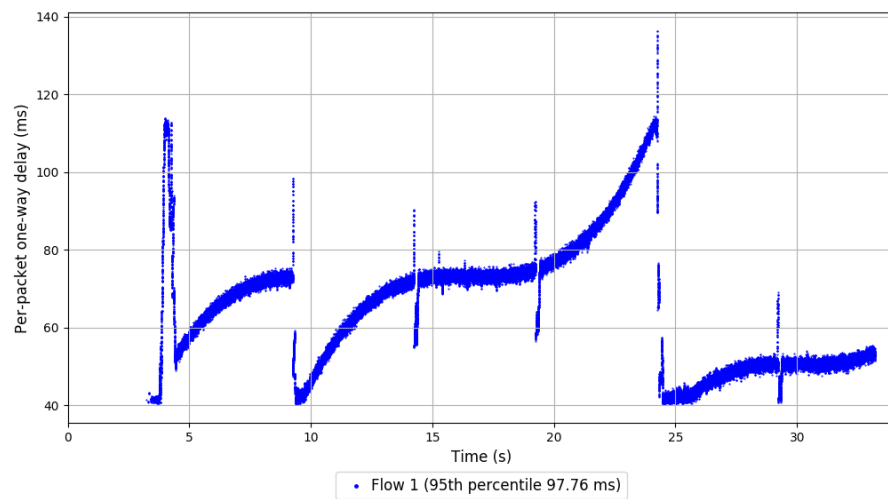
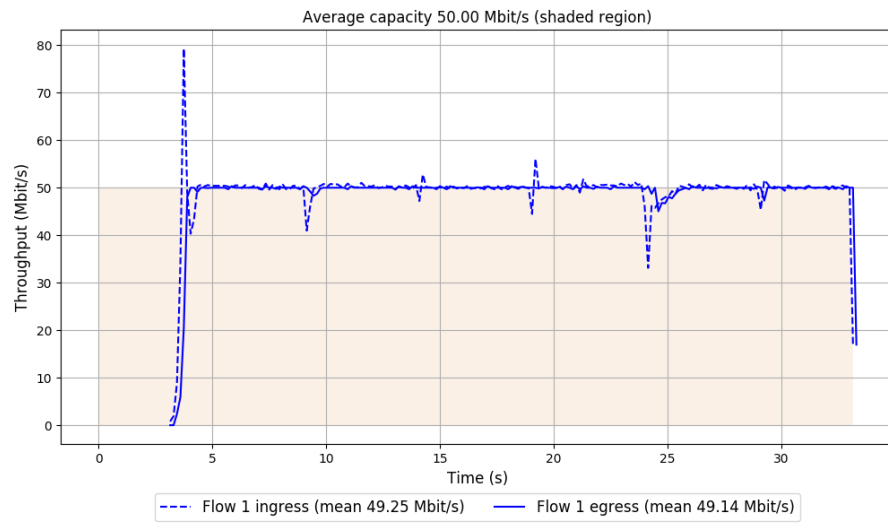
95th percentile per-packet one-way delay: 97.756 ms

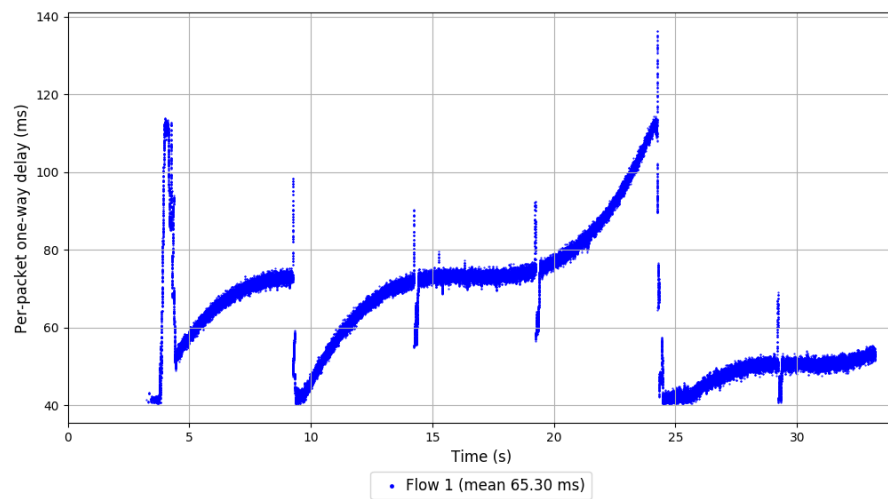
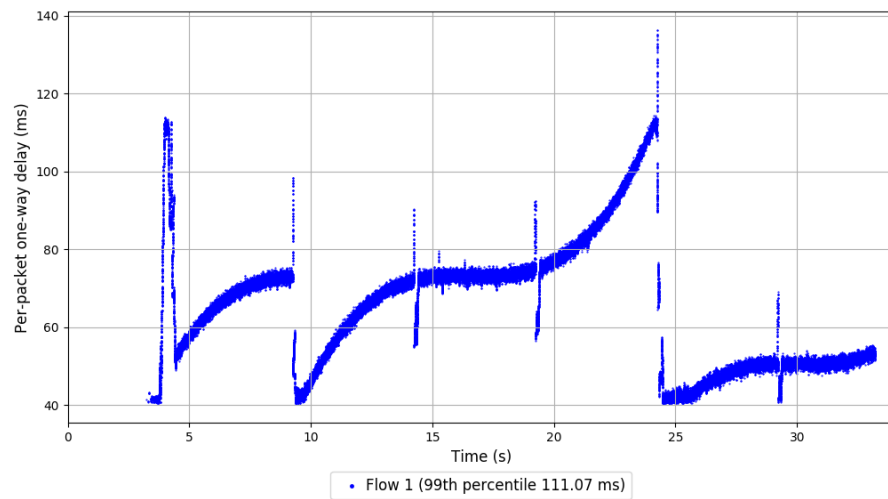
99th percentile per-packet one-way delay: 111.072 ms

Average per-packet one-way delay: 65.299 ms

Loss rate: 0.36%

### Run 3: Report of TCP Cubic — Data Link





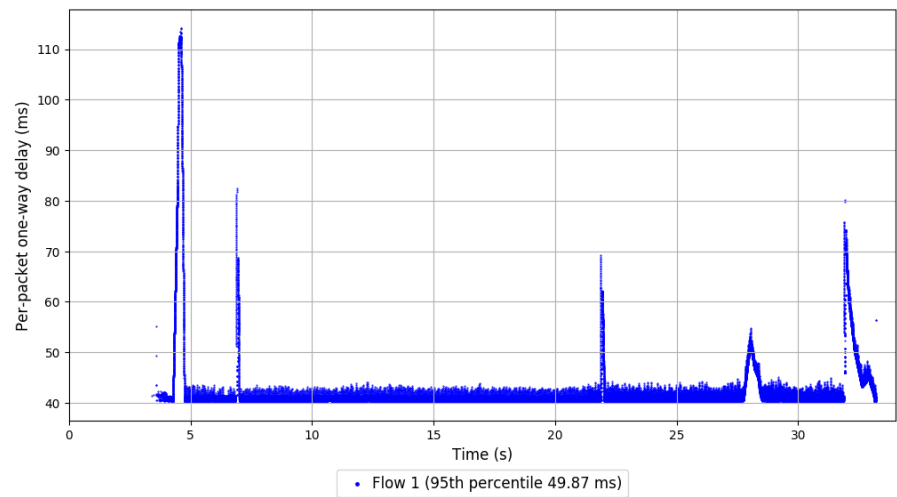
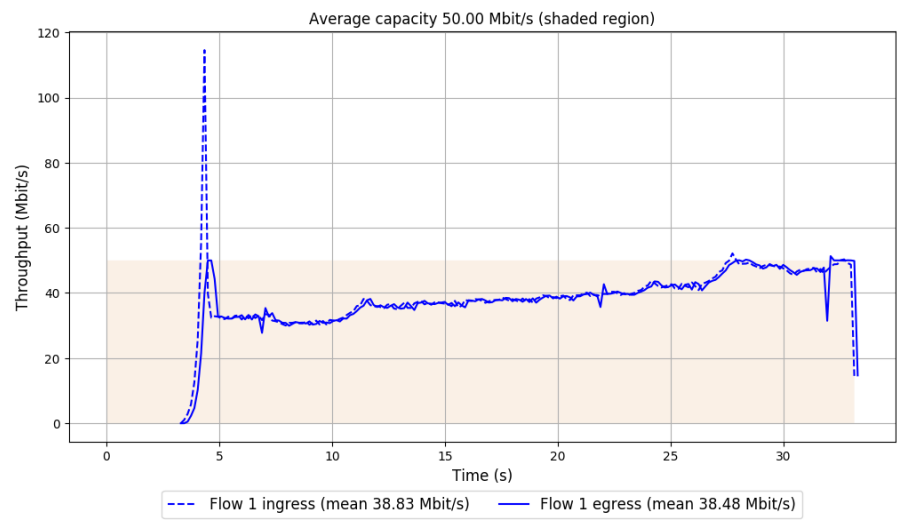


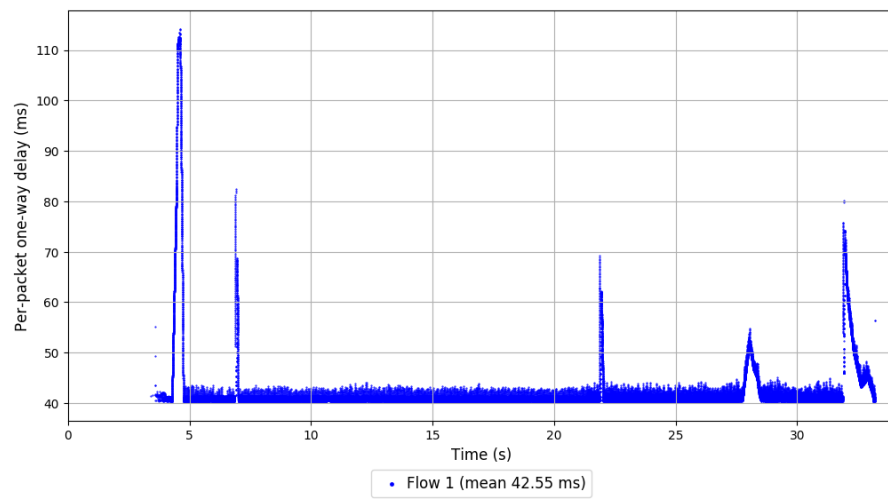
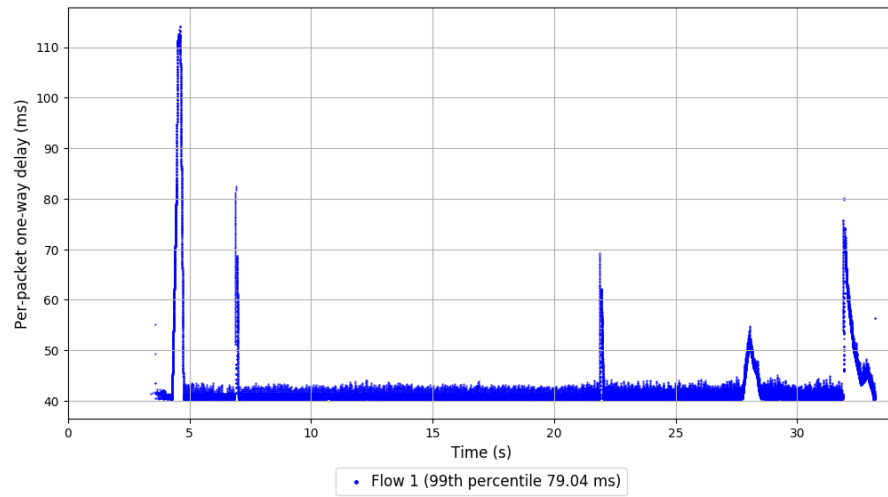
```
Run 1: Statistics of PCC-Allegro

Start at: 2020-05-29 23:16:42
End at: 2020-05-29 23:17:12

# Below is generated by plot.py at 2020-05-29 23:23:45
# Datalink statistics
-- Total of 1 flow:
Average capacity: 50.00 Mbit/s
Average throughput: 38.48 Mbit/s (77.0% utilization)
95th percentile per-packet one-way delay: 49.866 ms
99th percentile per-packet one-way delay: 79.038 ms
mean per-packet one-way delay: 42.551 ms
Loss rate: 0.99%
-- Flow 1:
Average throughput: 38.48 Mbit/s
95th percentile per-packet one-way delay: 49.866 ms
99th percentile per-packet one-way delay: 79.038 ms
Average per-packet one-way delay: 42.551 ms
Loss rate: 0.99%
```

Run 1: Report of PCC-Allegro — Data Link





Run 2: Statistics of PCC-Allegro

Start at: 2020-05-29 23:18:31

End at: 2020-05-29 23:19:01

# Below is generated by plot.py at 2020-05-29 23:23:45

# Datalink statistics

-- Total of 1 flow:

Average capacity: 50.00 Mbit/s

Average throughput: 45.59 Mbit/s (91.2% utilization)

95th percentile per-packet one-way delay: 78.275 ms

99th percentile per-packet one-way delay: 82.822 ms

mean per-packet one-way delay: 45.912 ms

Loss rate: 0.82%

-- Flow 1:

Average throughput: 45.59 Mbit/s

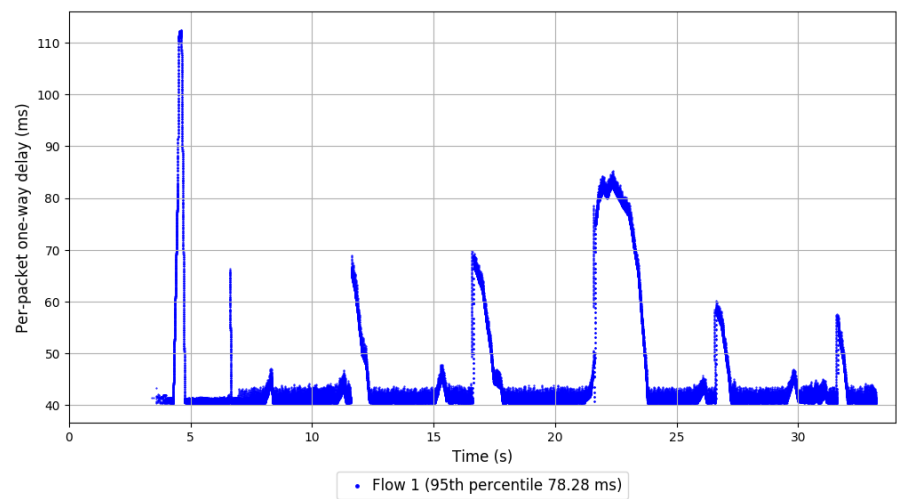
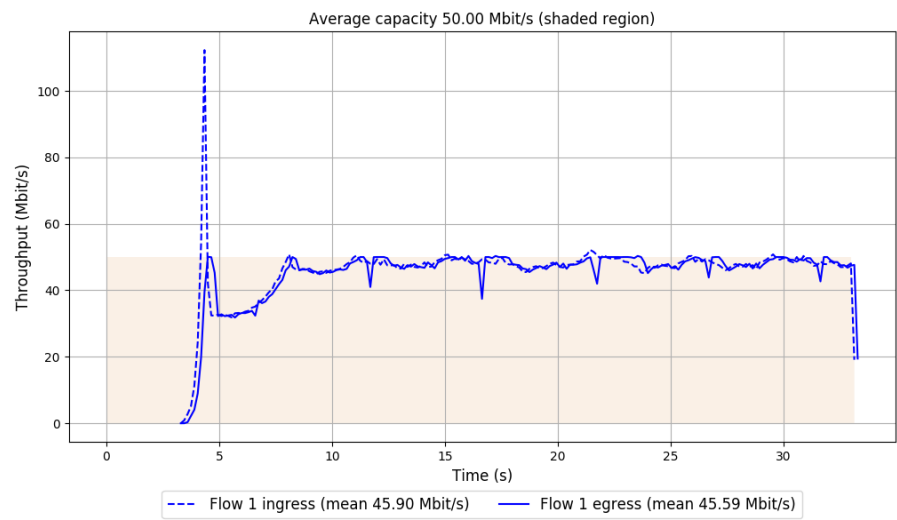
95th percentile per-packet one-way delay: 78.275 ms

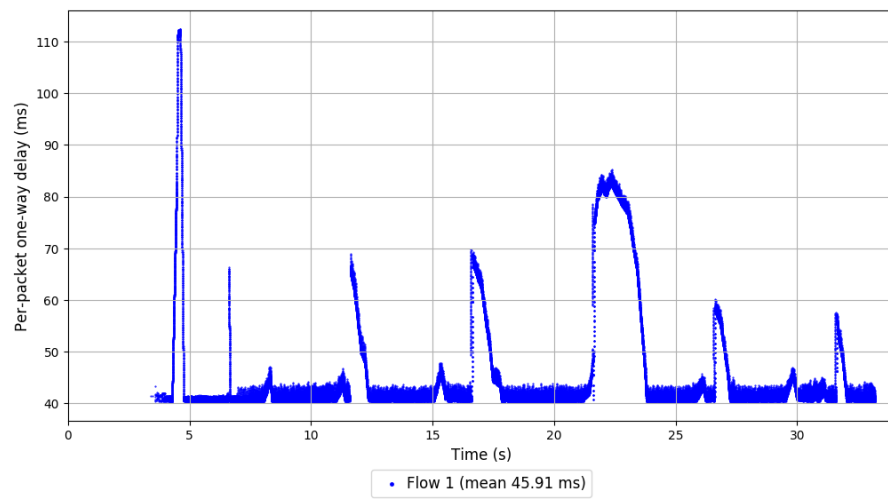
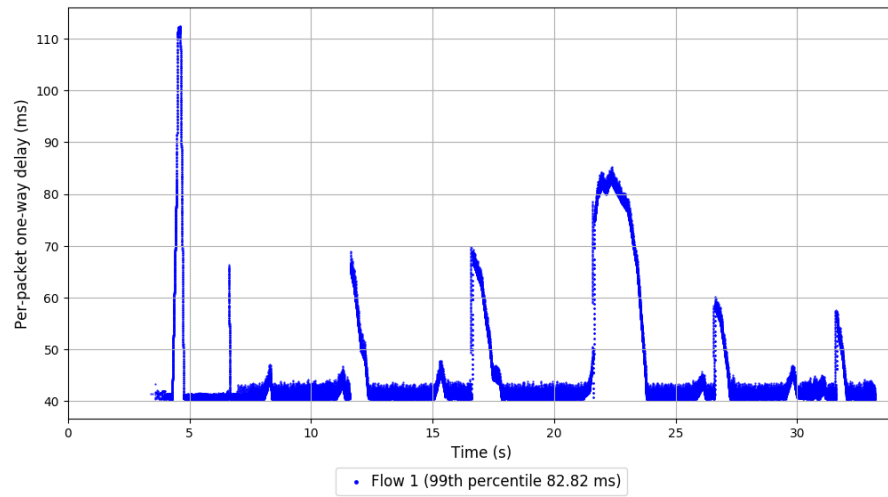
99th percentile per-packet one-way delay: 82.822 ms

Average per-packet one-way delay: 45.912 ms

Loss rate: 0.82%

Run 2: Report of PCC-Allegro — Data Link





Run 3: Statistics of PCC-Allegro

Start at: 2020-05-29 23:20:19

End at: 2020-05-29 23:20:49

# Below is generated by plot.py at 2020-05-29 23:23:45

# Datalink statistics

-- Total of 1 flow:

Average capacity: 50.00 Mbit/s

Average throughput: 45.44 Mbit/s (90.9% utilization)

95th percentile per-packet one-way delay: 57.058 ms

99th percentile per-packet one-way delay: 72.274 ms

mean per-packet one-way delay: 43.968 ms

Loss rate: 0.78%

-- Flow 1:

Average throughput: 45.44 Mbit/s

95th percentile per-packet one-way delay: 57.058 ms

99th percentile per-packet one-way delay: 72.274 ms

Average per-packet one-way delay: 43.968 ms

Loss rate: 0.78%

Run 3: Report of PCC-Allegro — Data Link

