

Pantheon Report

Generated at 2019-10-21 20:29:45 (UTC).

Tested in mahimahi: mm-delay 28 mm-loss uplink 0.0477 mm-link 10mbps.trace
10mbps.trace --uplink-queue=droptail --uplink-queue-args=packets=14

Repeated the test of 5 congestion control schemes 5 times.

Each test lasted for 30 seconds running 1 flow.

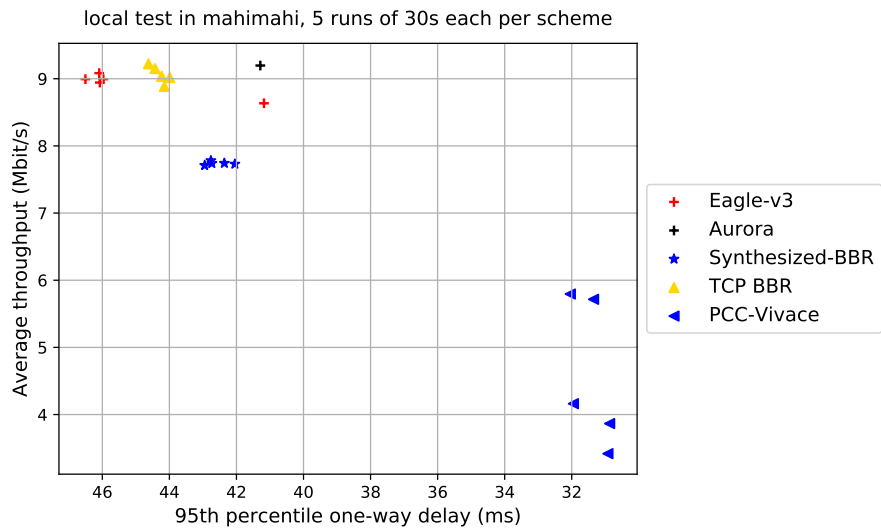
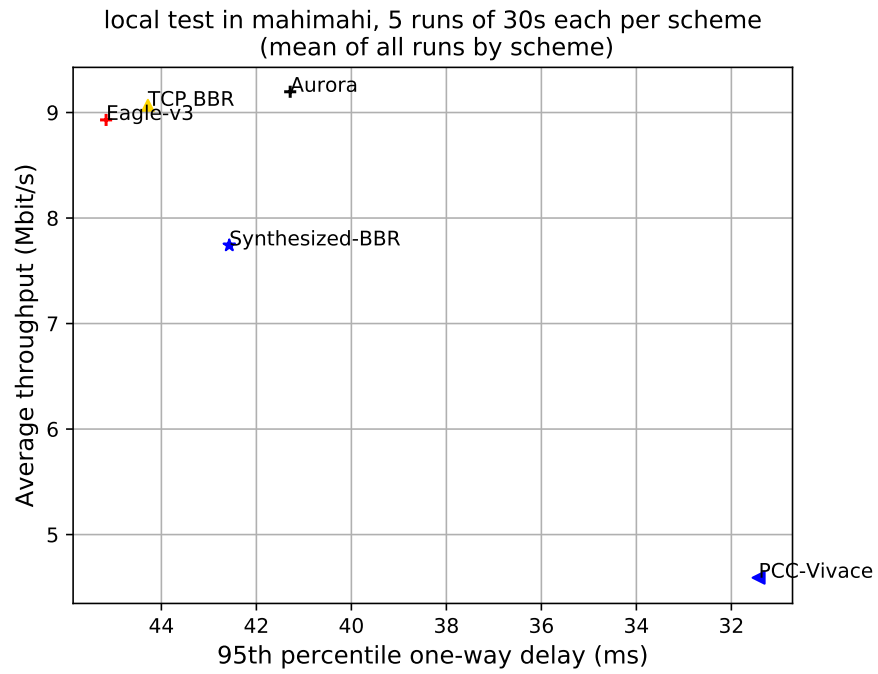
System info:

Linux 4.15.0-65-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 87380 6291456
net.ipv4.tcp_wmem = 4096 16384 4194304

Git summary:

branch: master @ b54fc866b3140559c1fa1782d26fa636f7a43a8d
third_party/aurora @ f3e943d61015b39960854ba6391797e0c7984d74
third_party/aurora-model @ e292c316c23fb837255c4e142e40590d154bbe95
third_party/eagle-v1 @ c68d985e042be5c30704c0aee48c363861951a95
third_party/eagle-v2 @ c8a1737b3c84d7d49eada5b8785045d272a70120
third_party/eagle-v3 @ c1ccd879d068023475fa120e962849b2bc171554
M sender-receiver/sender-receiver/sender_receiver/envs/__pycache__/datagram_pb2.cpython-36
M sender-receiver/sender-receiver/sender_receiver/envs/__pycache__/helpers.cpython-36.pyc
M sender-receiver/sender-receiver/sender_receiver/envs/__pycache__/mahimahi.cpython-36.pyc
M sender-receiver/sender-receiver/sender_receiver/envs/__pycache__/project_root.cpython-36
M sender-receiver/sender-receiver/sender_receiver/envs/__pycache__/receiver.cpython-36.pyc
M sender-receiver/sender-receiver/sender_receiver/envs/example-xentropy-random-switch.py
M sender-receiver/sender-receiver/sender_receiver/envs/model-xentropy/model-xentropy.pt
M sender-receiver/sender-receiver/sender_receiver/envs/sender_receiver_env.py
M sender-receiver/sender-receiver/sender_receiver/logs.txt
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/synthesizedBBR @ 0992b443bd3ec09a5df42ba0e0036cae4372eca1
  M sender-receiver/sender-receiver/sender_receiver/envs/example-xentropy.py
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
  M src/verus.hpp
  M tools/plot.py
third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851
```



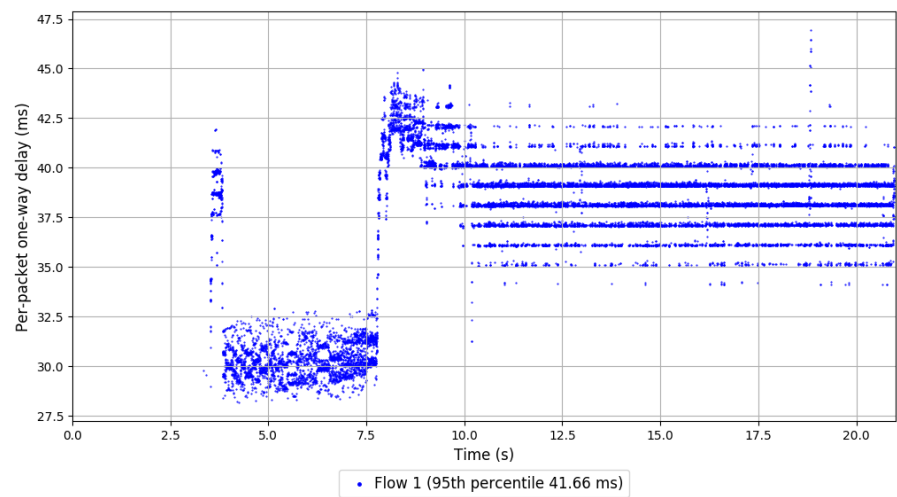
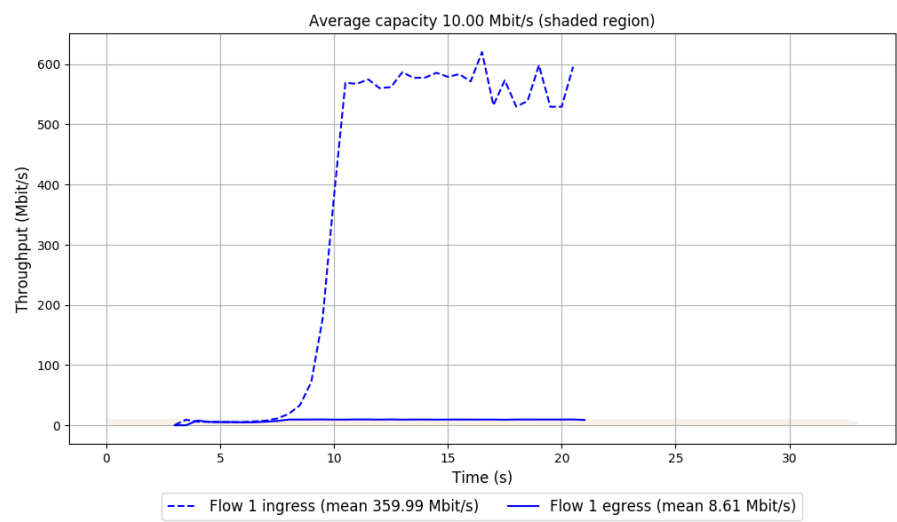
scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
Aurora	1	9.20	41.29	97.37
TCP BBR	5	9.06	44.28	6.65
Eagle-v3	5	8.93	45.16	9.93
Synthesized-BBR	5	7.74	42.57	5.60
PCC-Vivace	5	4.59	31.43	4.76

Run 1: Statistics of Aurora

Start at: 2019-10-21 20:12:01

End at: 2019-10-21 20:12:31

Run 1: Report of Aurora — Data Link

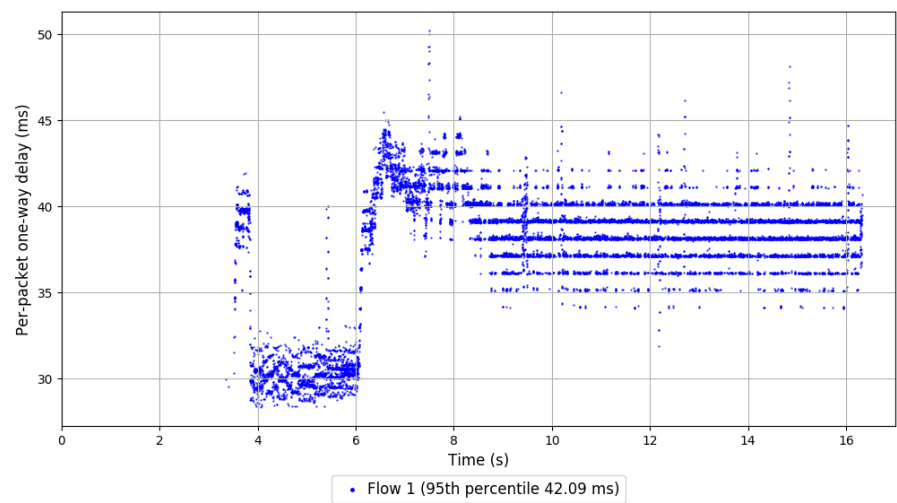
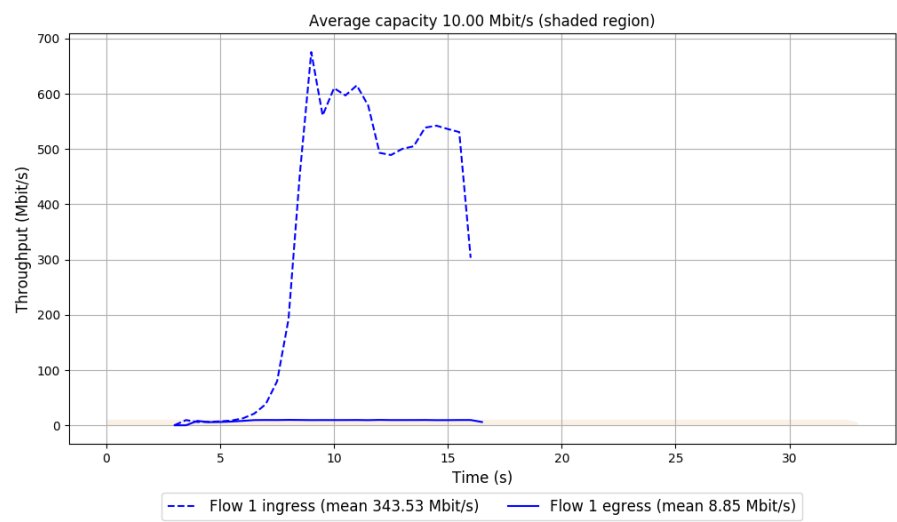


Run 2: Statistics of Aurora

Start at: 2019-10-21 20:15:00

End at: 2019-10-21 20:15:30

Run 2: Report of Aurora — Data Link

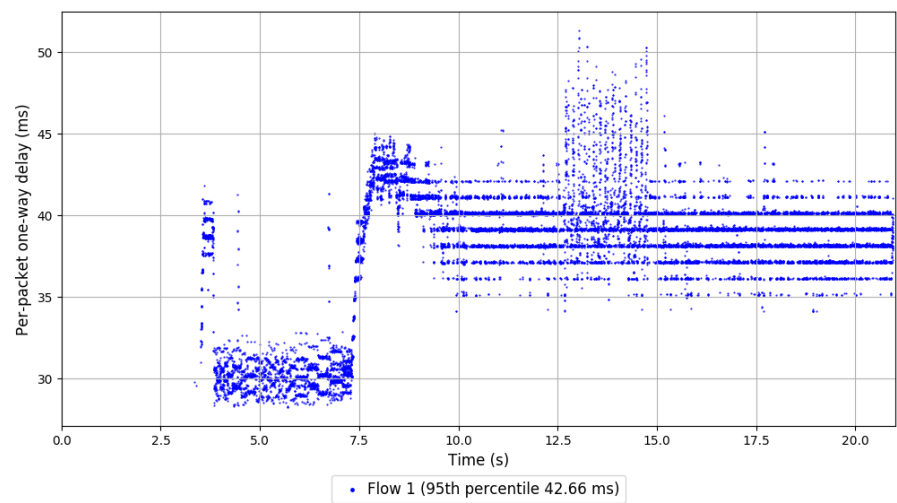
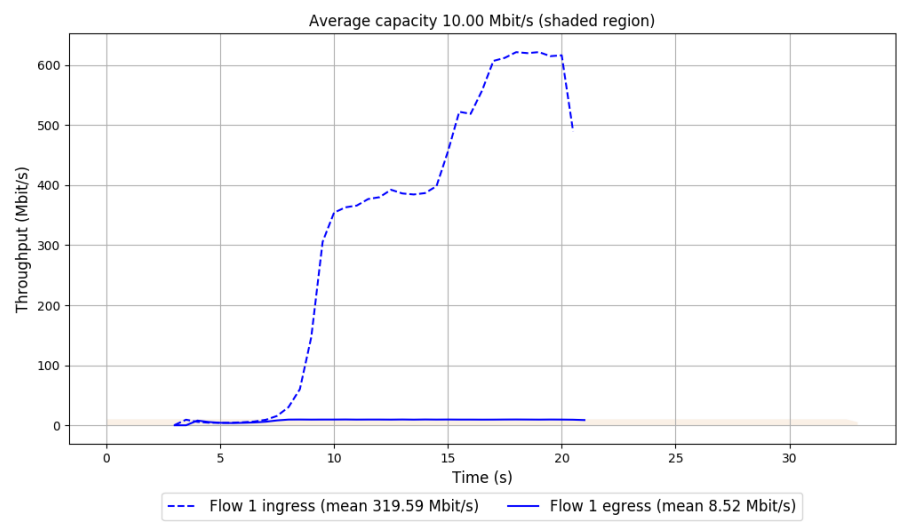


Run 3: Statistics of Aurora

Start at: 2019-10-21 20:17:56

End at: 2019-10-21 20:18:26

Run 3: Report of Aurora — Data Link

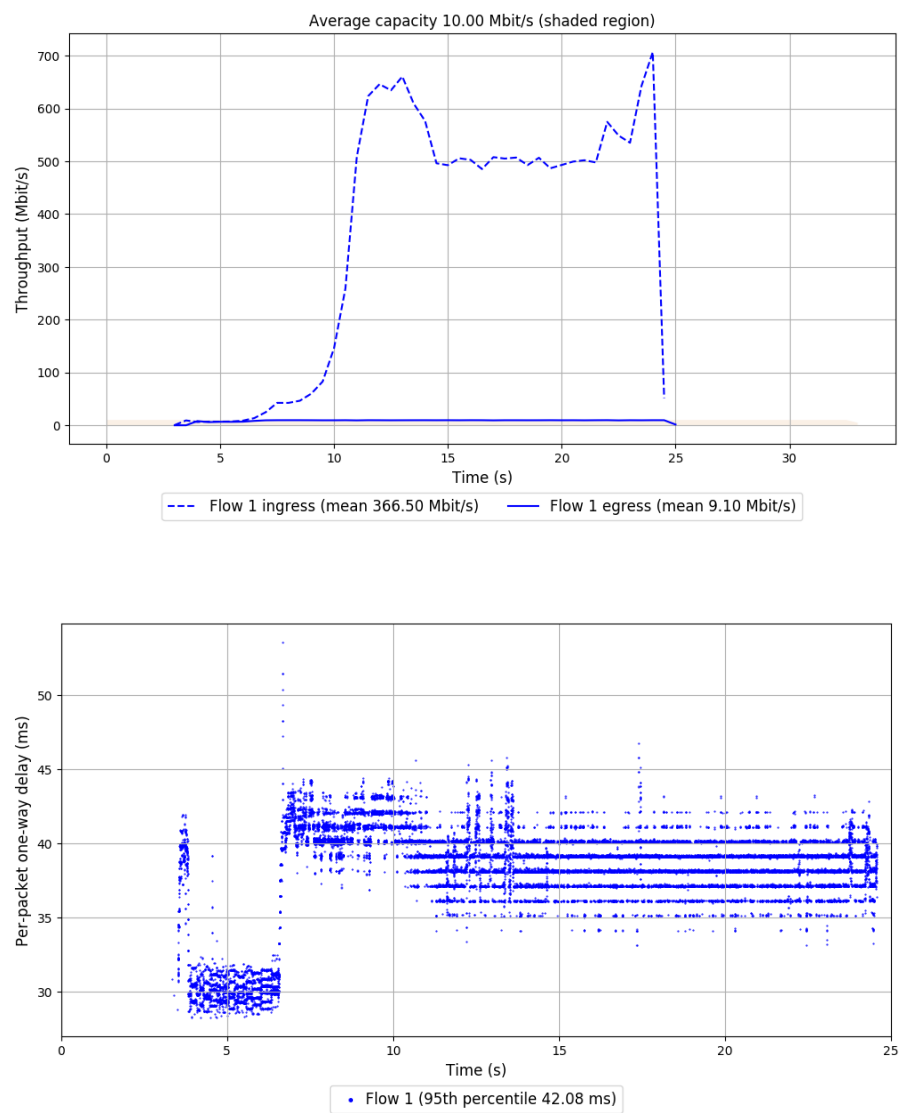


Run 4: Statistics of Aurora

Start at: 2019-10-21 20:20:53

End at: 2019-10-21 20:21:23

Run 4: Report of Aurora — Data Link



Run 5: Statistics of Aurora

Start at: 2019-10-21 20:23:52

End at: 2019-10-21 20:24:22

Below is generated by plot.py at 2019-10-21 20:29:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 9.20 Mbit/s (92.0% utilization)

95th percentile per-packet one-way delay: 41.288 ms

Loss rate: 97.37%

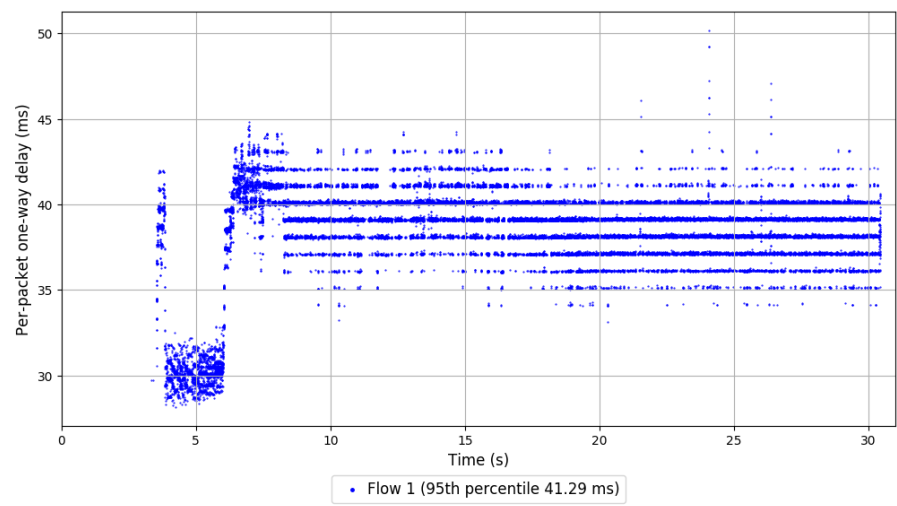
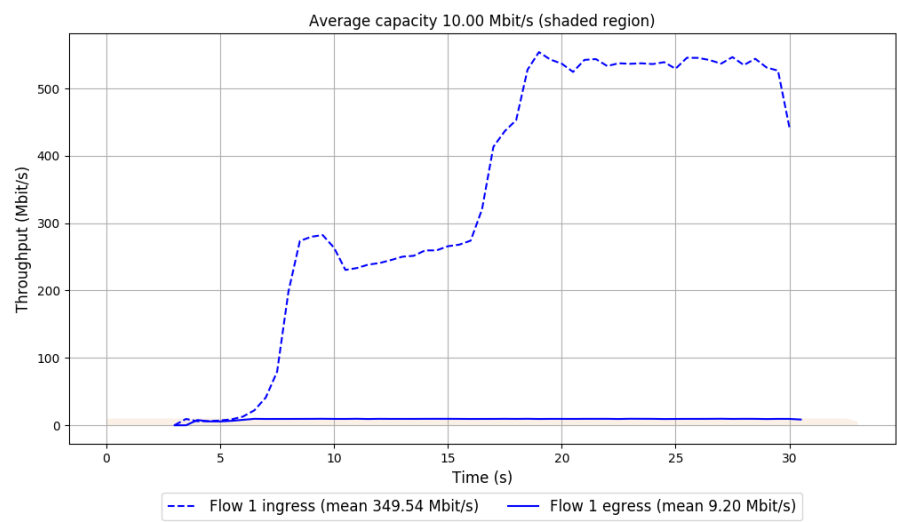
-- Flow 1:

Average throughput: 9.20 Mbit/s

95th percentile per-packet one-way delay: 41.288 ms

Loss rate: 97.37%

Run 5: Report of Aurora — Data Link

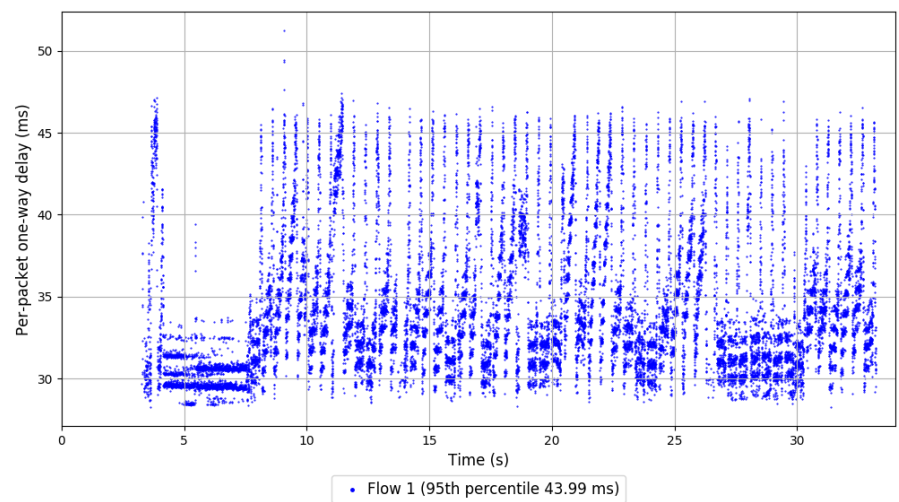
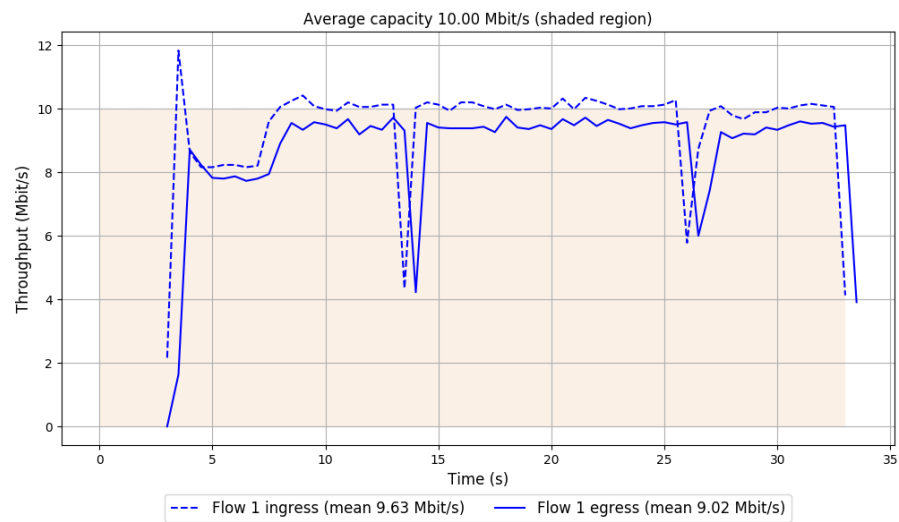


```
Run 1: Statistics of TCP BBR

Start at: 2019-10-21 20:10:17
End at: 2019-10-21 20:10:47

# Below is generated by plot.py at 2019-10-21 20:29:44
# Datalink statistics
-- Total of 1 flow:
Average capacity: 10.00 Mbit/s
Average throughput: 9.02 Mbit/s (90.2% utilization)
95th percentile per-packet one-way delay: 43.988 ms
Loss rate: 6.49%
-- Flow 1:
Average throughput: 9.02 Mbit/s
95th percentile per-packet one-way delay: 43.988 ms
Loss rate: 6.49%
```

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2019-10-21 20:13:16

End at: 2019-10-21 20:13:46

Below is generated by plot.py at 2019-10-21 20:29:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 9.04 Mbit/s (90.4% utilization)

95th percentile per-packet one-way delay: 44.230 ms

Loss rate: 6.61%

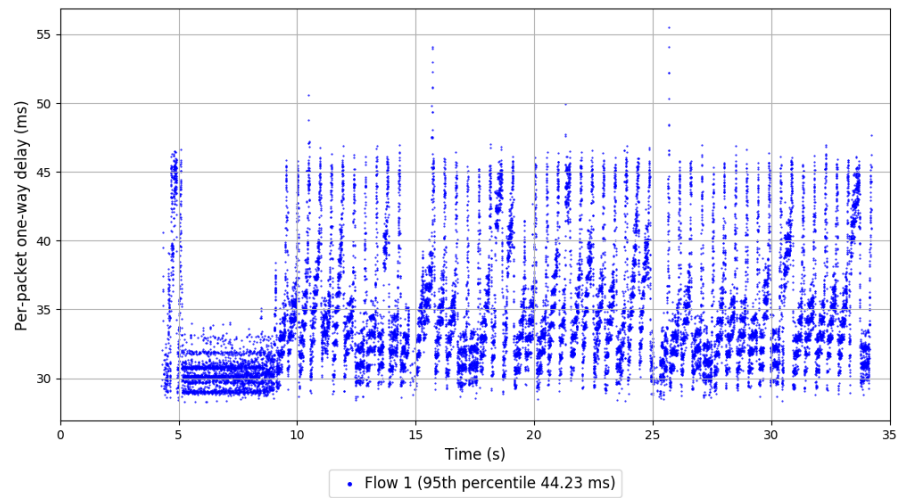
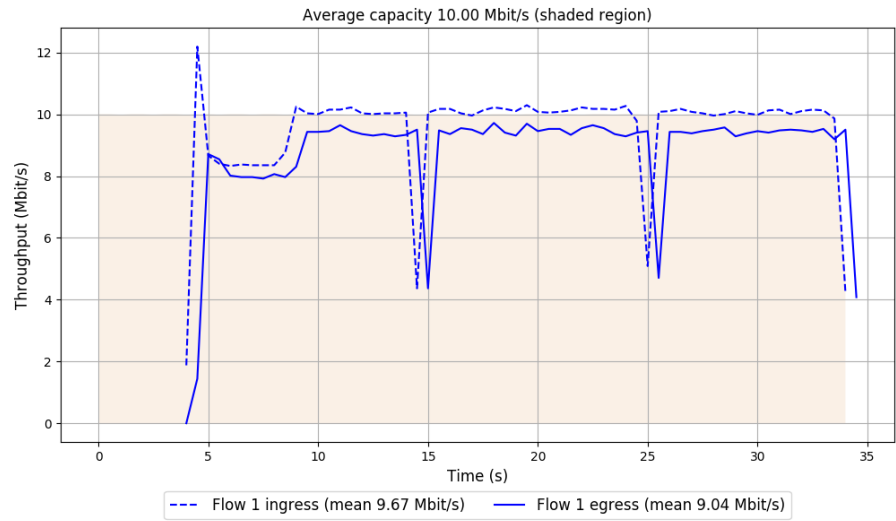
-- Flow 1:

Average throughput: 9.04 Mbit/s

95th percentile per-packet one-way delay: 44.230 ms

Loss rate: 6.61%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2019-10-21 20:16:12

End at: 2019-10-21 20:16:42

Below is generated by plot.py at 2019-10-21 20:29:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 9.15 Mbit/s (91.5% utilization)

95th percentile per-packet one-way delay: 44.428 ms

Loss rate: 6.69%

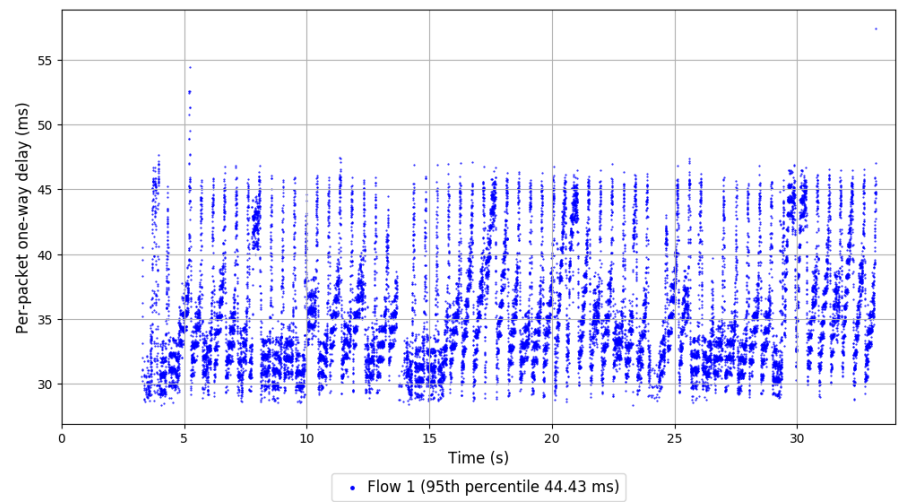
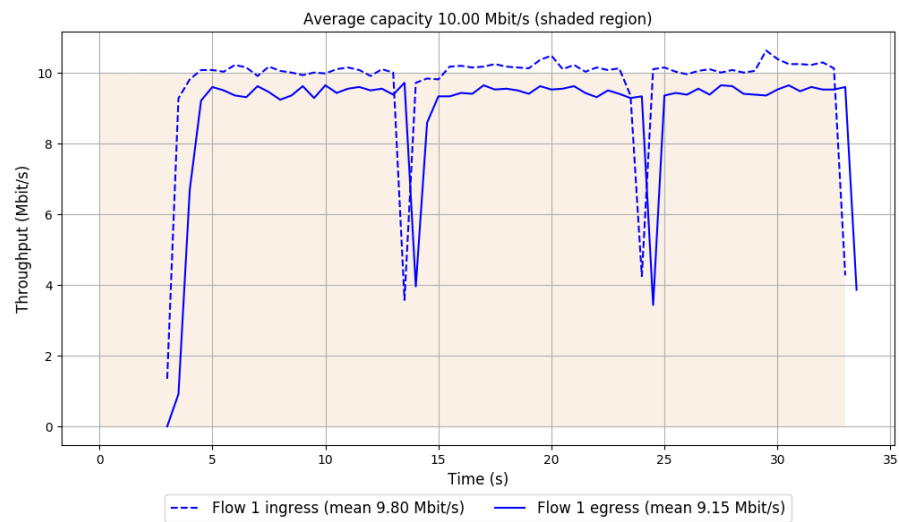
-- Flow 1:

Average throughput: 9.15 Mbit/s

95th percentile per-packet one-way delay: 44.428 ms

Loss rate: 6.69%

Run 3: Report of TCP BBR — Data Link



Run 4: Statistics of TCP BBR

Start at: 2019-10-21 20:19:10

End at: 2019-10-21 20:19:40

Below is generated by plot.py at 2019-10-21 20:29:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 8.89 Mbit/s (88.9% utilization)

95th percentile per-packet one-way delay: 44.151 ms

Loss rate: 6.32%

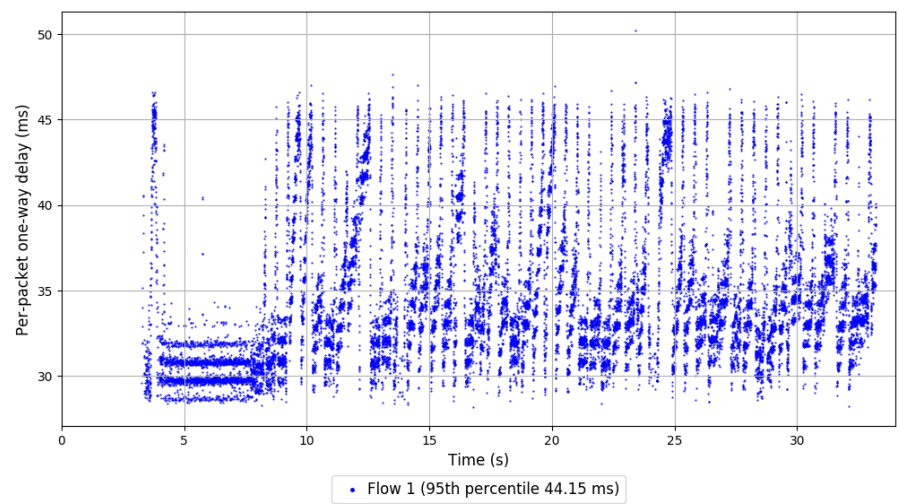
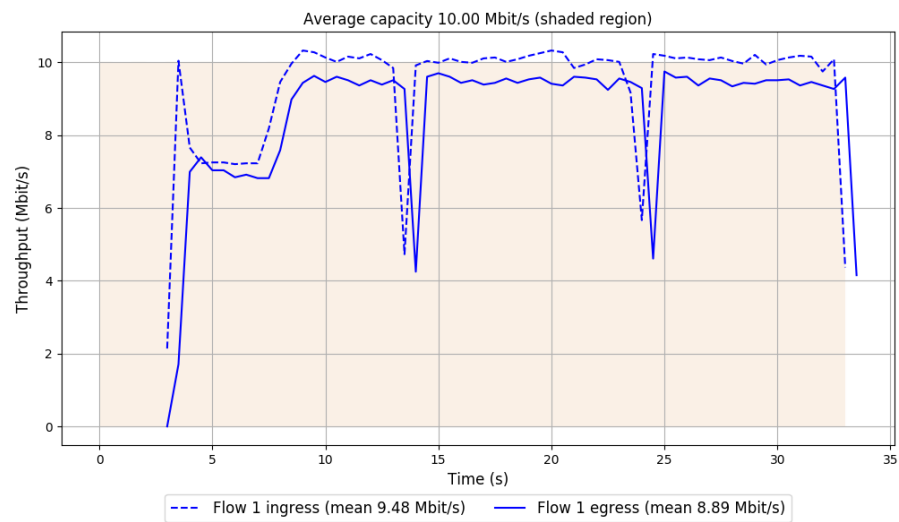
-- Flow 1:

Average throughput: 8.89 Mbit/s

95th percentile per-packet one-way delay: 44.151 ms

Loss rate: 6.32%

Run 4: Report of TCP BBR — Data Link



Run 5: Statistics of TCP BBR

Start at: 2019-10-21 20:22:09

End at: 2019-10-21 20:22:39

Below is generated by plot.py at 2019-10-21 20:29:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 9.22 Mbit/s (92.2% utilization)

95th percentile per-packet one-way delay: 44.623 ms

Loss rate: 7.13%

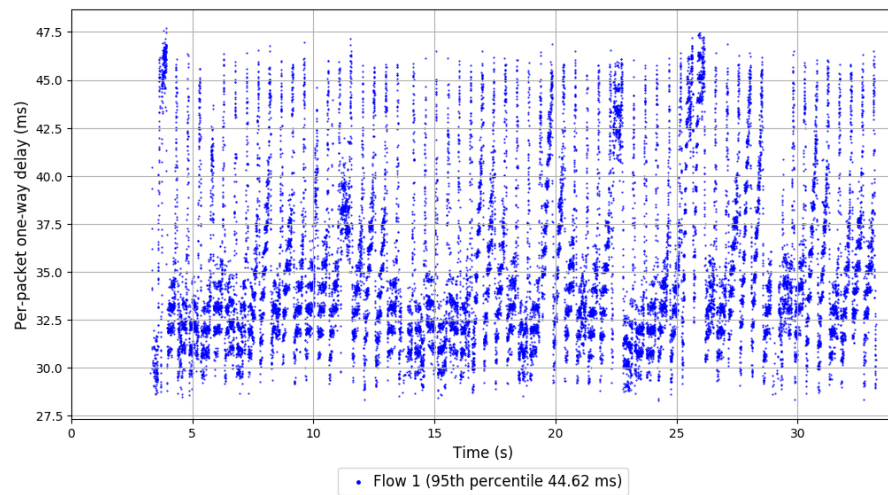
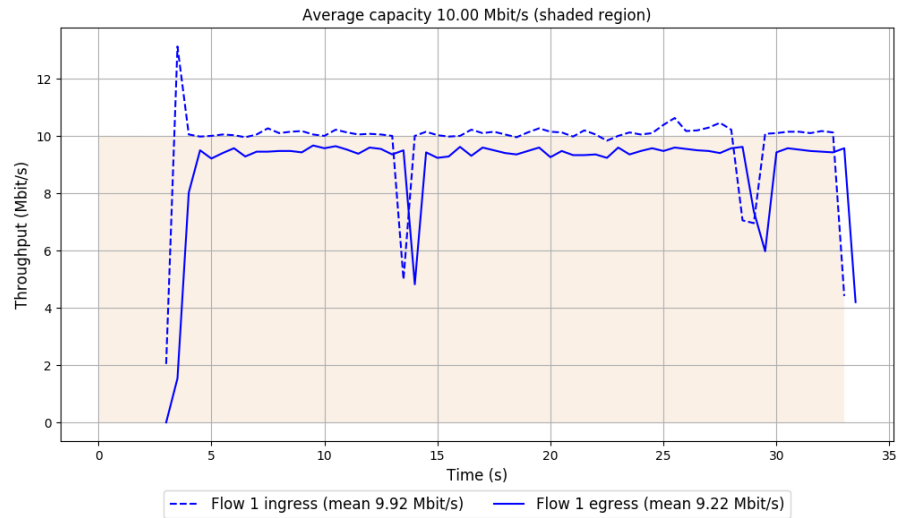
-- Flow 1:

Average throughput: 9.22 Mbit/s

95th percentile per-packet one-way delay: 44.623 ms

Loss rate: 7.13%

Run 5: Report of TCP BBR — Data Link

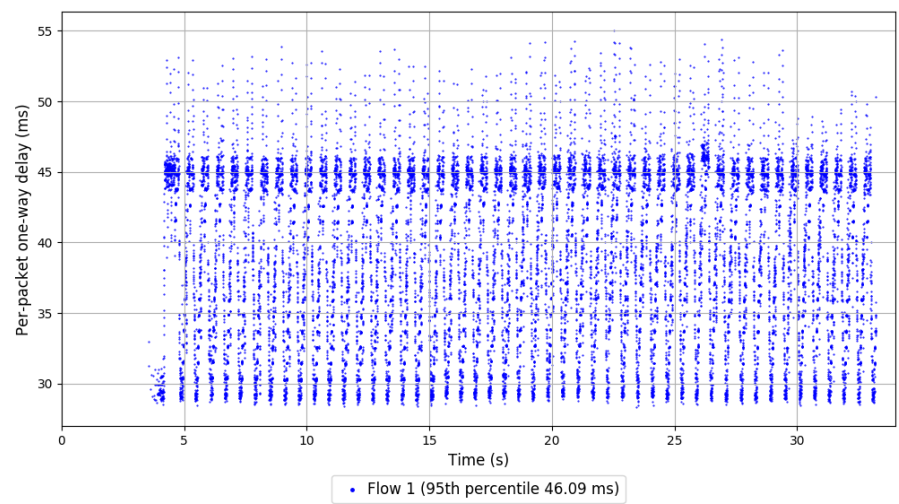
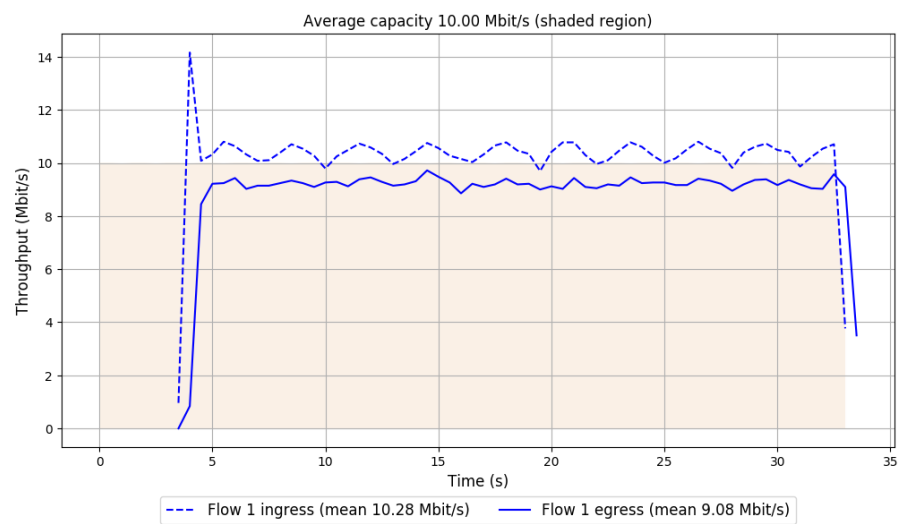



```
Run 1: Statistics of Eagle-v3

Start at: 2019-10-21 20:09:42
End at: 2019-10-21 20:10:12

# Below is generated by plot.py at 2019-10-21 20:29:44
# Datalink statistics
-- Total of 1 flow:
Average capacity: 10.00 Mbit/s
Average throughput: 9.08 Mbit/s (90.8% utilization)
95th percentile per-packet one-way delay: 46.092 ms
Loss rate: 11.73%
-- Flow 1:
Average throughput: 9.08 Mbit/s
95th percentile per-packet one-way delay: 46.092 ms
Loss rate: 11.73%
```

Run 1: Report of Eagle-v3 — Data Link



Run 2: Statistics of Eagle-v3

Start at: 2019-10-21 20:12:40

End at: 2019-10-21 20:13:10

Below is generated by plot.py at 2019-10-21 20:29:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 8.99 Mbit/s (89.9% utilization)

95th percentile per-packet one-way delay: 45.971 ms

Loss rate: 10.21%

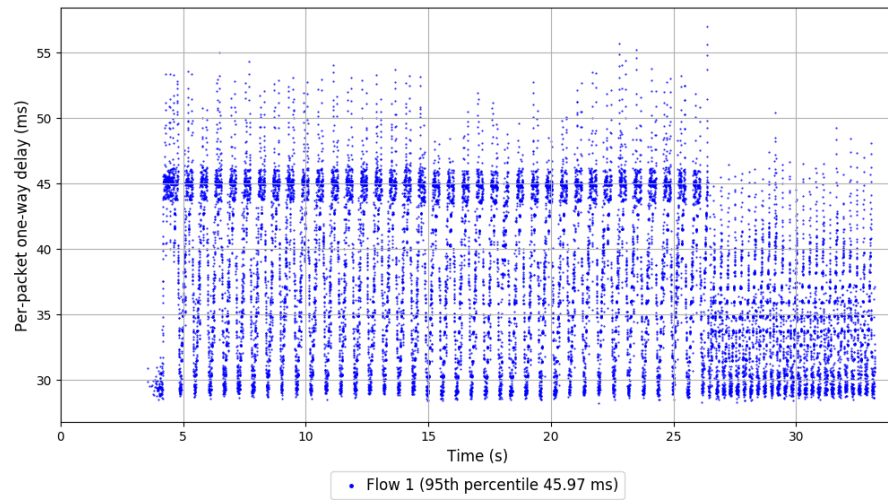
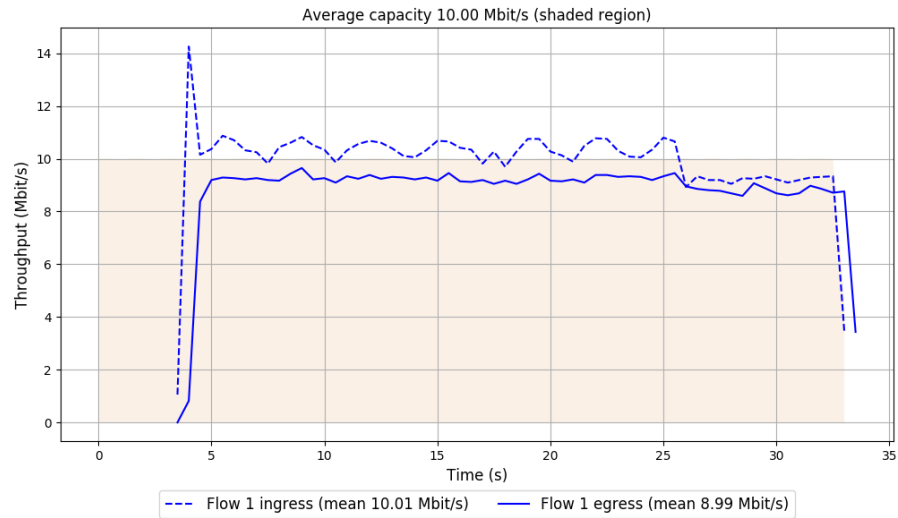
-- Flow 1:

Average throughput: 8.99 Mbit/s

95th percentile per-packet one-way delay: 45.971 ms

Loss rate: 10.21%

Run 2: Report of Eagle-v3 — Data Link



Run 3: Statistics of Eagle-v3

Start at: 2019-10-21 20:15:38

End at: 2019-10-21 20:16:08

Below is generated by plot.py at 2019-10-21 20:29:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 8.99 Mbit/s (89.9% utilization)

95th percentile per-packet one-way delay: 46.504 ms

Loss rate: 10.83%

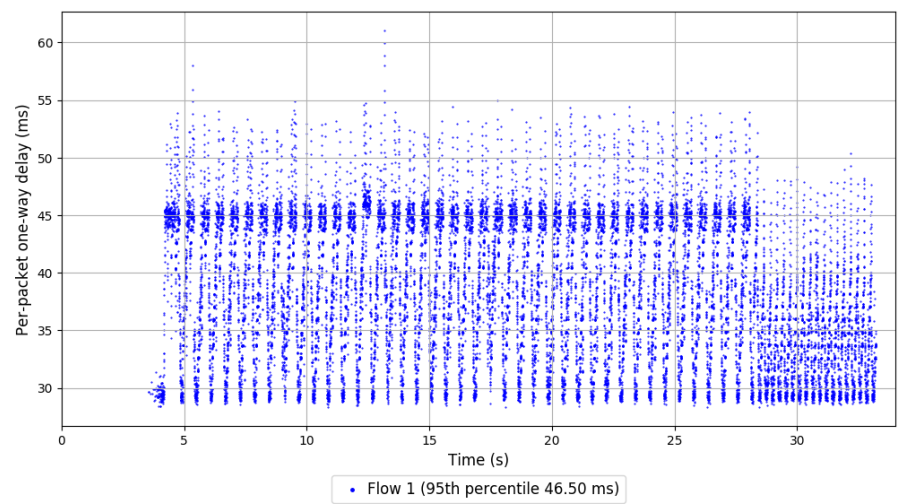
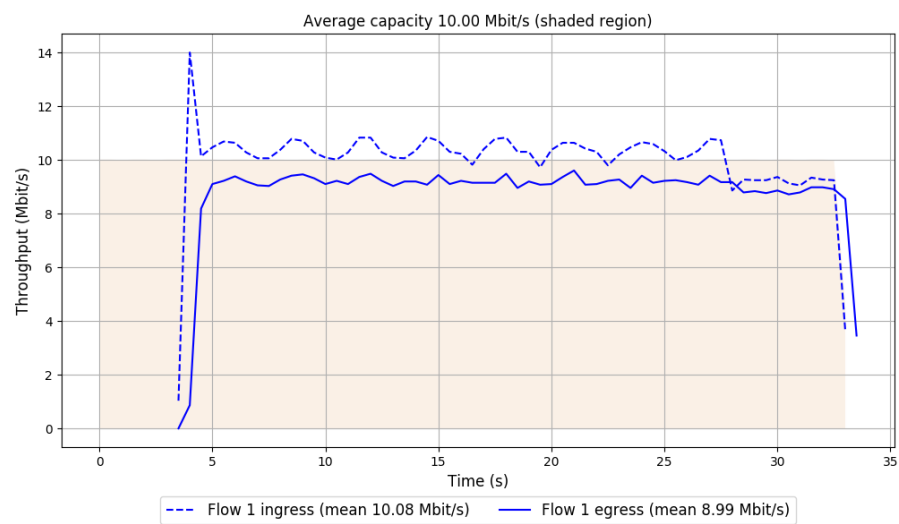
-- Flow 1:

Average throughput: 8.99 Mbit/s

95th percentile per-packet one-way delay: 46.504 ms

Loss rate: 10.83%

Run 3: Report of Eagle-v3 — Data Link



Run 4: Statistics of Eagle-v3

Start at: 2019-10-21 20:18:35

End at: 2019-10-21 20:19:05

Below is generated by plot.py at 2019-10-21 20:29:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 8.63 Mbit/s (86.3% utilization)

95th percentile per-packet one-way delay: 41.179 ms

Loss rate: 5.57%

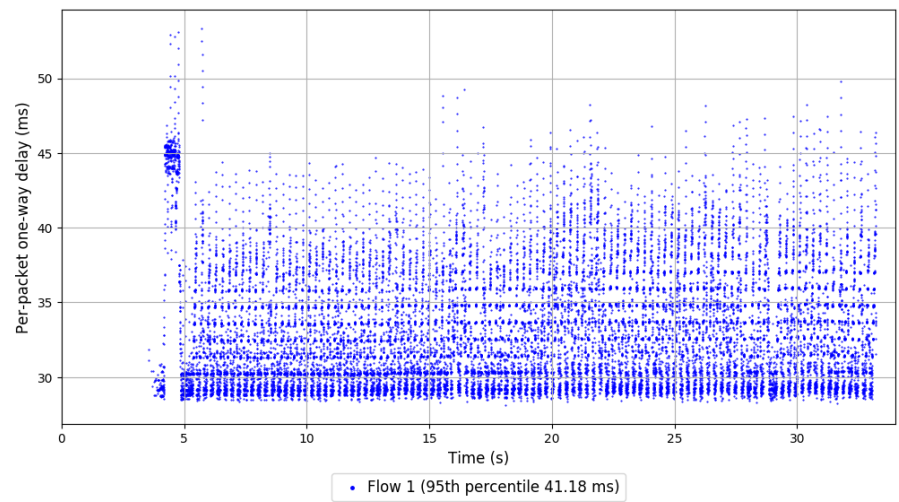
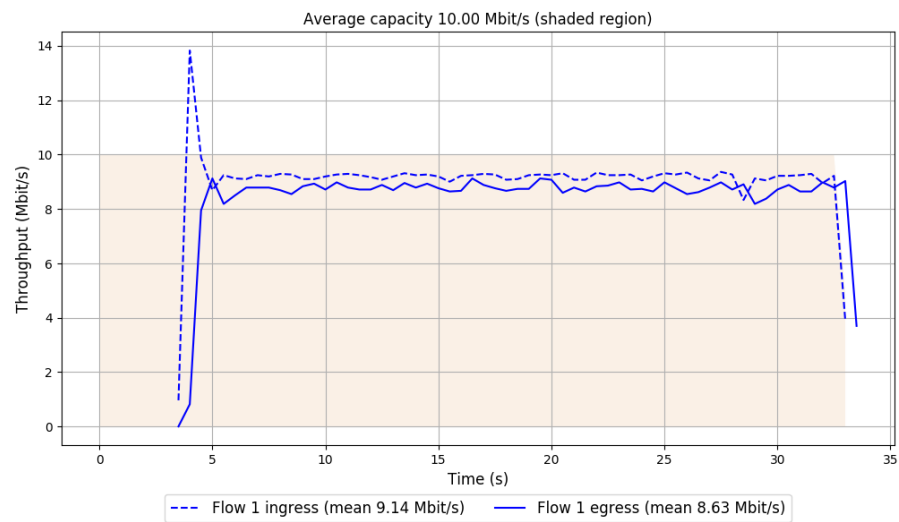
-- Flow 1:

Average throughput: 8.63 Mbit/s

95th percentile per-packet one-way delay: 41.179 ms

Loss rate: 5.57%

Run 4: Report of Eagle-v3 — Data Link



Run 5: Statistics of Eagle-v3

Start at: 2019-10-21 20:21:34

End at: 2019-10-21 20:22:04

Below is generated by plot.py at 2019-10-21 20:29:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 8.94 Mbit/s (89.4% utilization)

95th percentile per-packet one-way delay: 46.074 ms

Loss rate: 11.31%

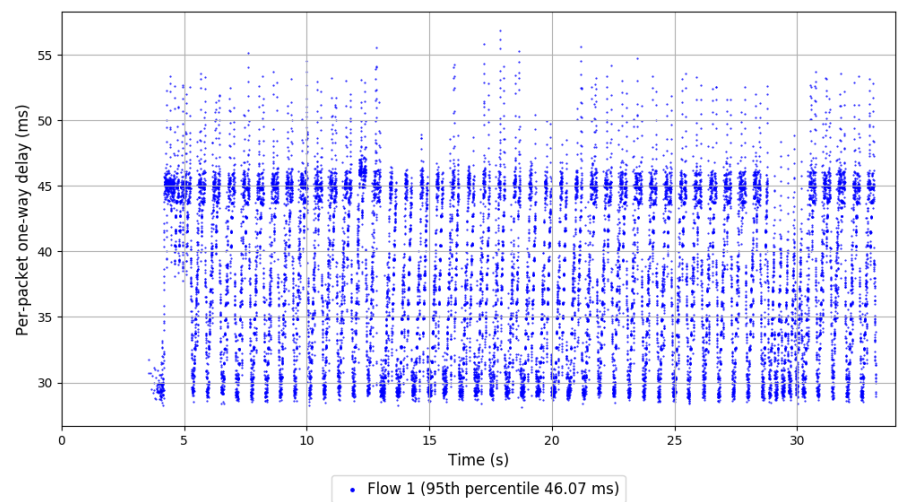
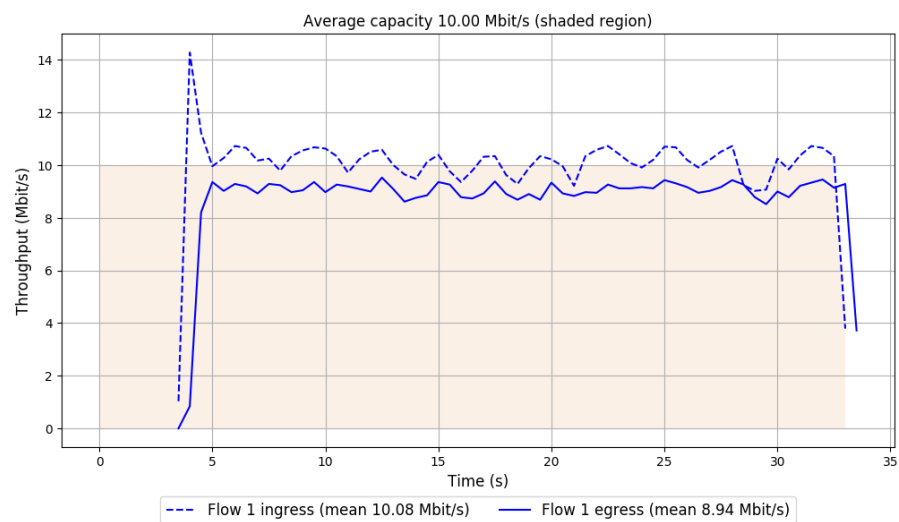
-- Flow 1:

Average throughput: 8.94 Mbit/s

95th percentile per-packet one-way delay: 46.074 ms

Loss rate: 11.31%

Run 5: Report of Eagle-v3 — Data Link

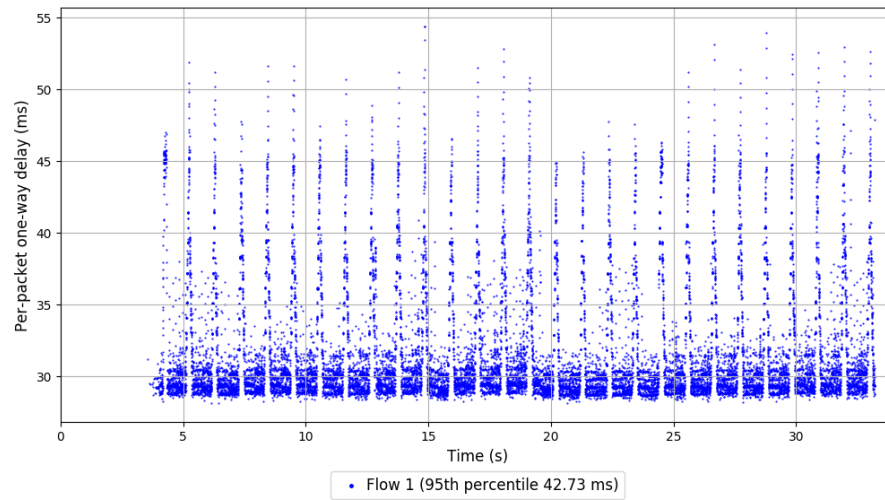
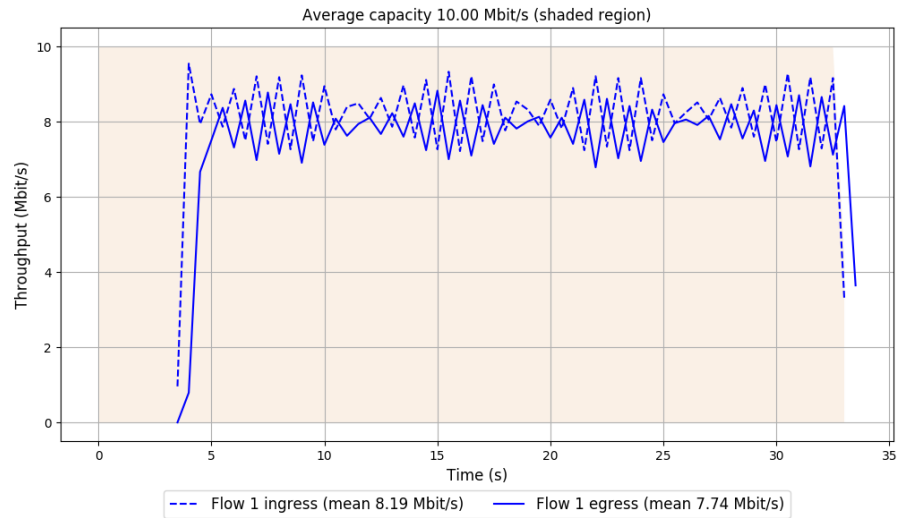


```
Run 1: Statistics of Synthesized-BBR

Start at: 2019-10-21 20:10:52
End at: 2019-10-21 20:11:22

# Below is generated by plot.py at 2019-10-21 20:29:44
# Datalink statistics
-- Total of 1 flow:
Average capacity: 10.00 Mbit/s
Average throughput: 7.74 Mbit/s (77.4% utilization)
95th percentile per-packet one-way delay: 42.735 ms
Loss rate: 5.54%
-- Flow 1:
Average throughput: 7.74 Mbit/s
95th percentile per-packet one-way delay: 42.735 ms
Loss rate: 5.54%
```

Run 1: Report of Synthesized-BBR — Data Link



Run 2: Statistics of Synthesized-BBR

Start at: 2019-10-21 20:13:50

End at: 2019-10-21 20:14:21

Below is generated by plot.py at 2019-10-21 20:29:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 7.71 Mbit/s (77.1% utilization)

95th percentile per-packet one-way delay: 42.948 ms

Loss rate: 5.88%

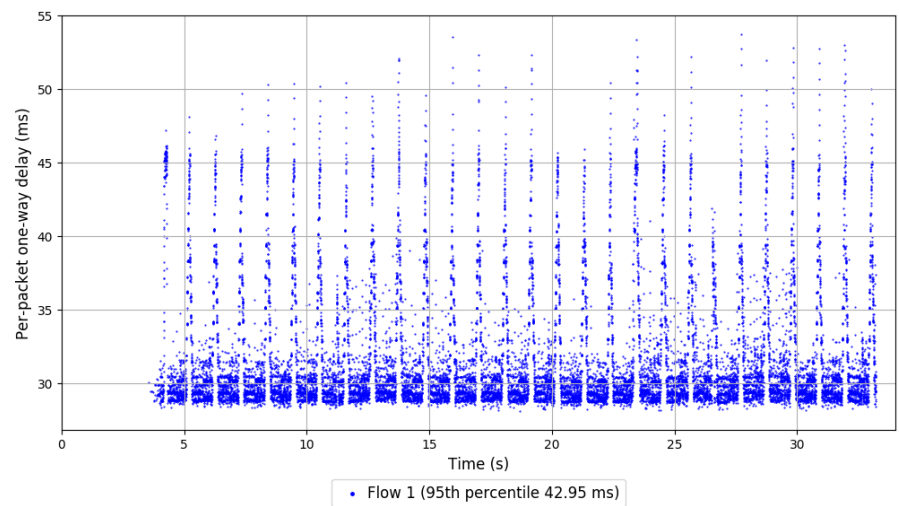
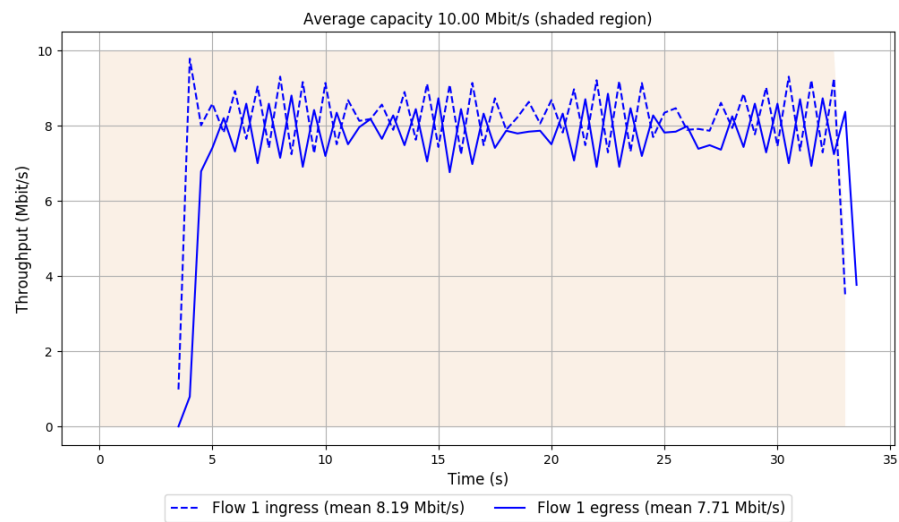
-- Flow 1:

Average throughput: 7.71 Mbit/s

95th percentile per-packet one-way delay: 42.948 ms

Loss rate: 5.88%

Run 2: Report of Synthesized-BBR — Data Link



Run 3: Statistics of Synthesized-BBR

Start at: 2019-10-21 20:16:47

End at: 2019-10-21 20:17:17

Below is generated by plot.py at 2019-10-21 20:29:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 7.73 Mbit/s (77.3% utilization)

95th percentile per-packet one-way delay: 42.047 ms

Loss rate: 5.41%

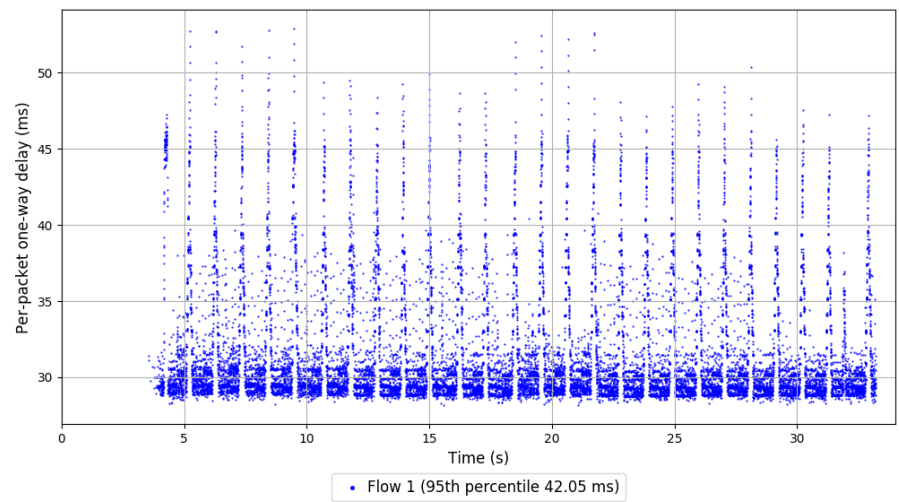
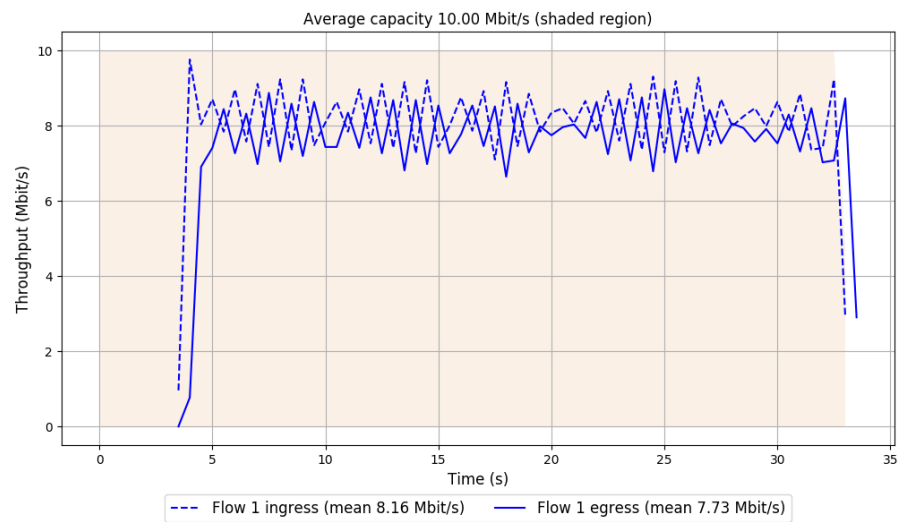
-- Flow 1:

Average throughput: 7.73 Mbit/s

95th percentile per-packet one-way delay: 42.047 ms

Loss rate: 5.41%

Run 3: Report of Synthesized-BBR — Data Link



Run 4: Statistics of Synthesized-BBR

Start at: 2019-10-21 20:19:44

End at: 2019-10-21 20:20:14

Below is generated by plot.py at 2019-10-21 20:29:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 7.78 Mbit/s (77.8% utilization)

95th percentile per-packet one-way delay: 42.762 ms

Loss rate: 5.61%

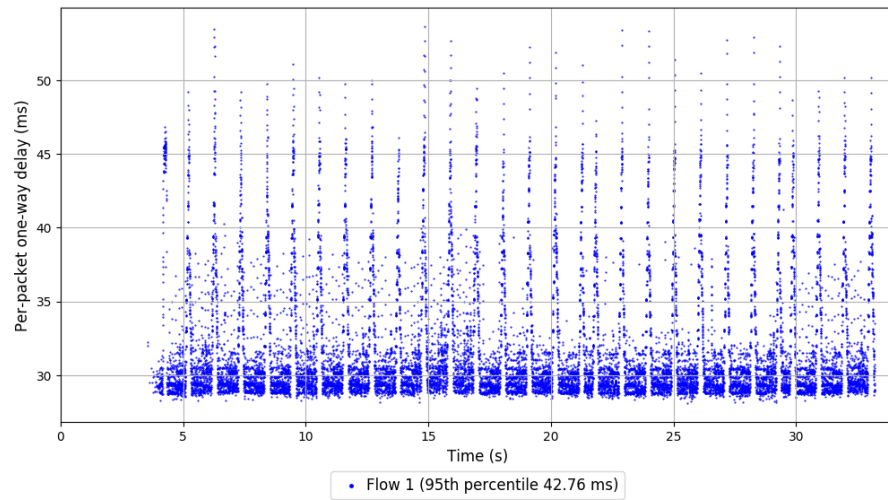
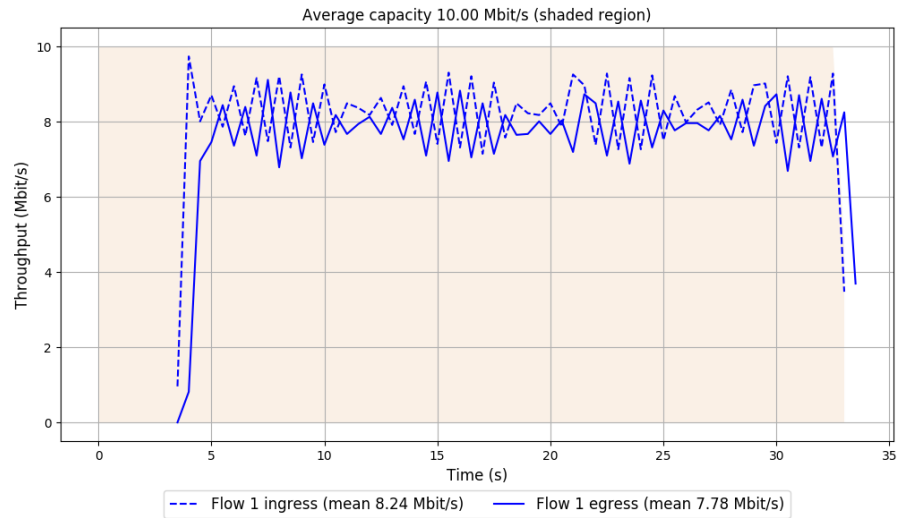
-- Flow 1:

Average throughput: 7.78 Mbit/s

95th percentile per-packet one-way delay: 42.762 ms

Loss rate: 5.61%

Run 4: Report of Synthesized-BBR — Data Link



Run 5: Statistics of Synthesized-BBR

Start at: 2019-10-21 20:22:43

End at: 2019-10-21 20:23:13

Below is generated by plot.py at 2019-10-21 20:29:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 7.74 Mbit/s (77.4% utilization)

95th percentile per-packet one-way delay: 42.360 ms

Loss rate: 5.54%

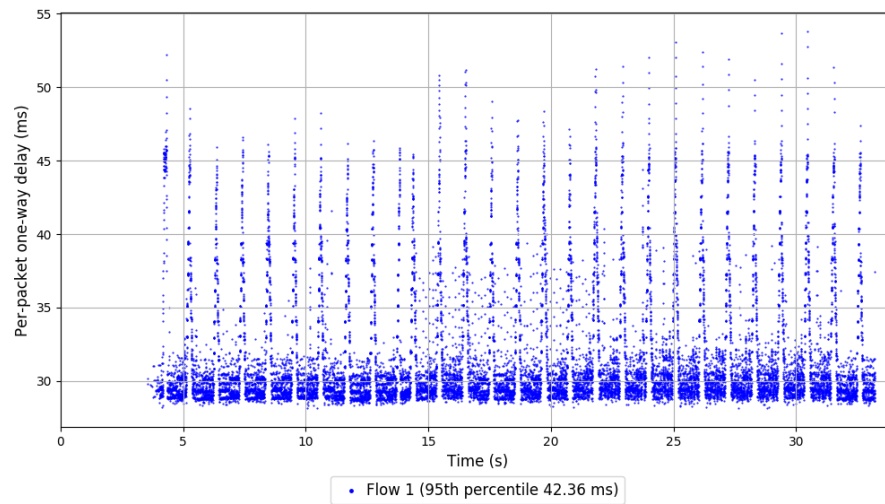
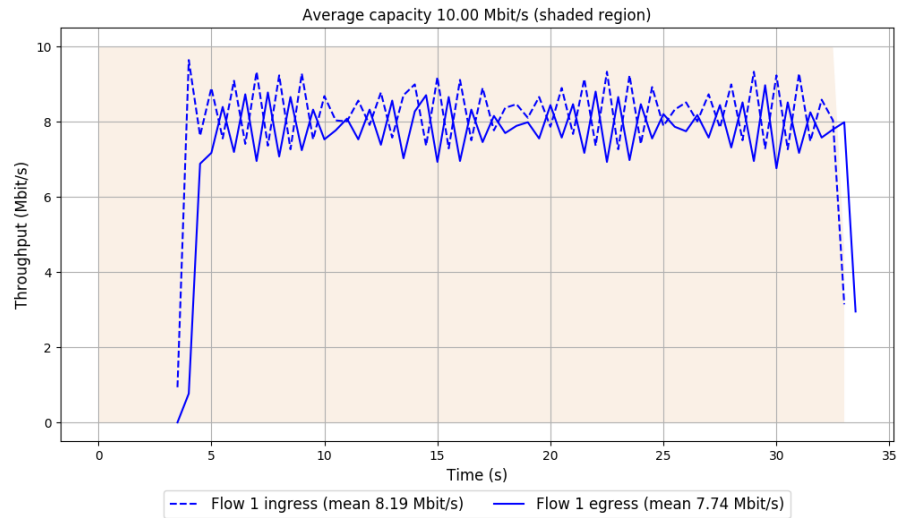
-- Flow 1:

Average throughput: 7.74 Mbit/s

95th percentile per-packet one-way delay: 42.360 ms

Loss rate: 5.54%

Run 5: Report of Synthesized-BBR — Data Link



Run 1: Statistics of PCC-Vivace

Start at: 2019-10-21 20:11:26

End at: 2019-10-21 20:11:56

Below is generated by plot.py at 2019-10-21 20:29:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 5.72 Mbit/s (57.2% utilization)

95th percentile per-packet one-way delay: 31.350 ms

Loss rate: 4.87%

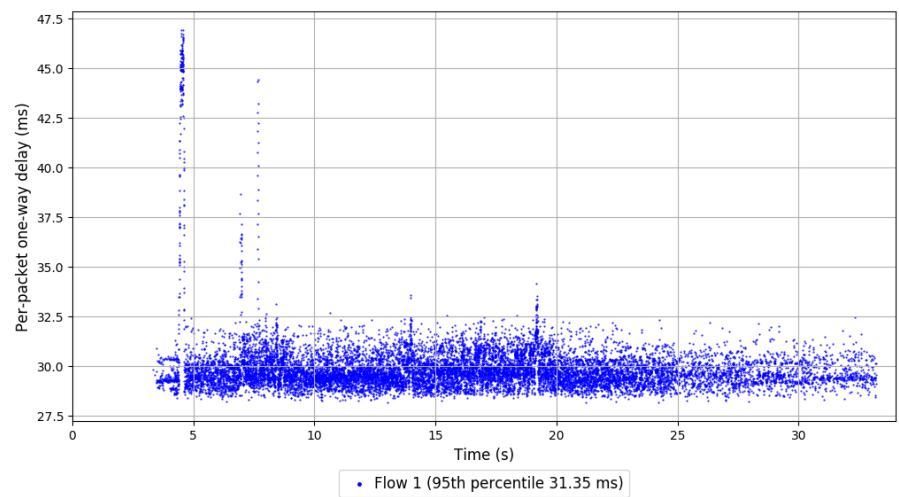
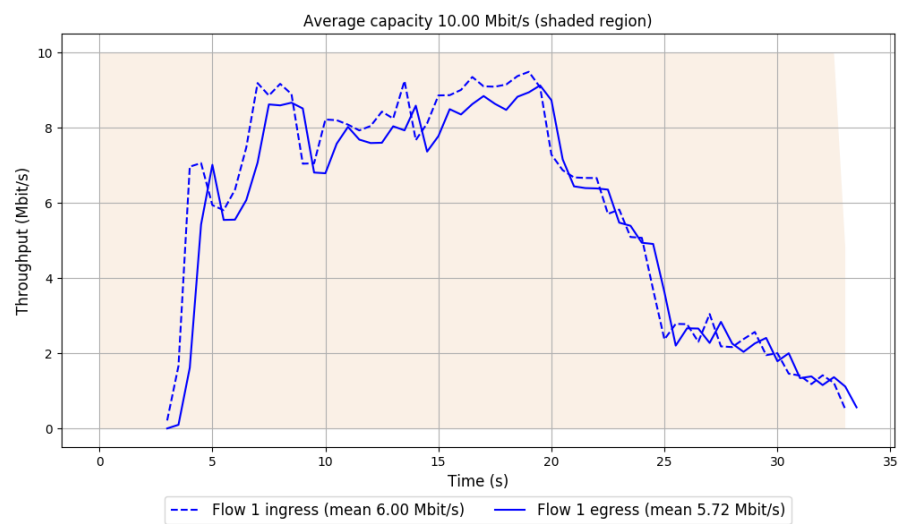
-- Flow 1:

Average throughput: 5.72 Mbit/s

95th percentile per-packet one-way delay: 31.350 ms

Loss rate: 4.87%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2019-10-21 20:14:25

End at: 2019-10-21 20:14:55

Below is generated by plot.py at 2019-10-21 20:29:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 4.16 Mbit/s (41.6% utilization)

95th percentile per-packet one-way delay: 31.951 ms

Loss rate: 4.91%

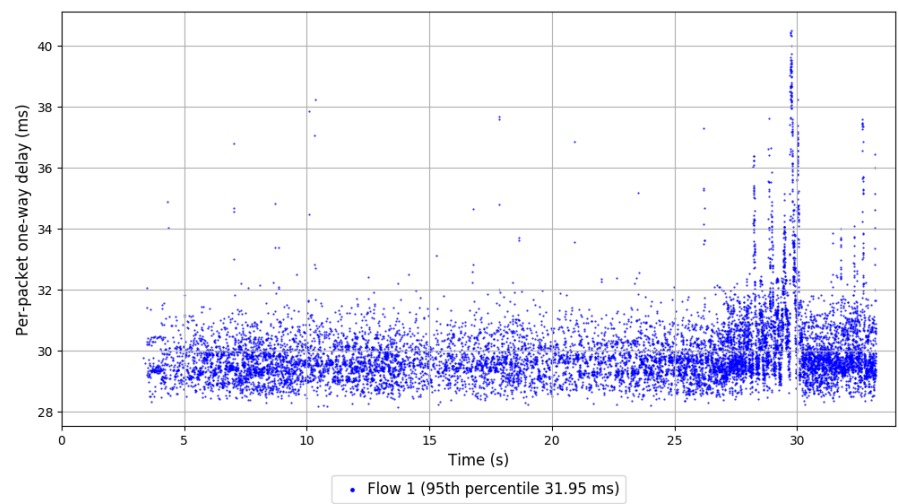
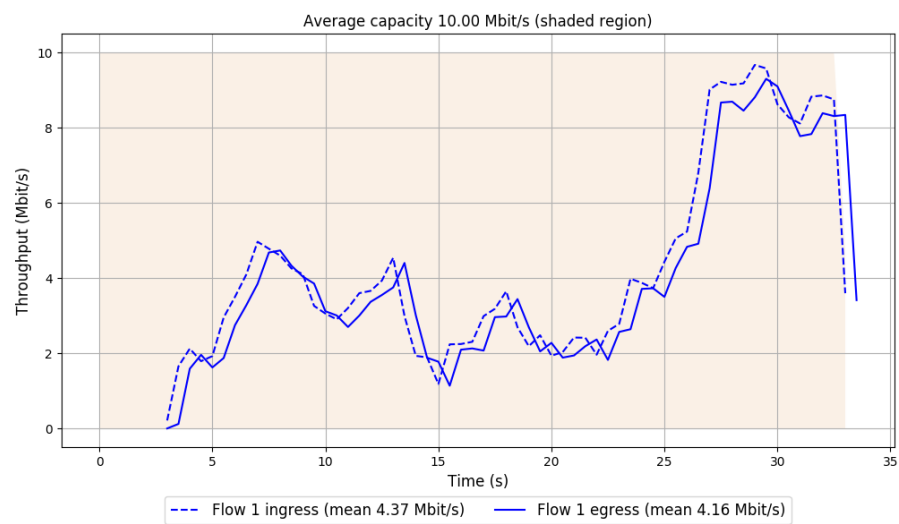
-- Flow 1:

Average throughput: 4.16 Mbit/s

95th percentile per-packet one-way delay: 31.951 ms

Loss rate: 4.91%

Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

Start at: 2019-10-21 20:17:21

End at: 2019-10-21 20:17:51

Below is generated by plot.py at 2019-10-21 20:29:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 5.79 Mbit/s (57.9% utilization)

95th percentile per-packet one-way delay: 32.043 ms

Loss rate: 4.69%

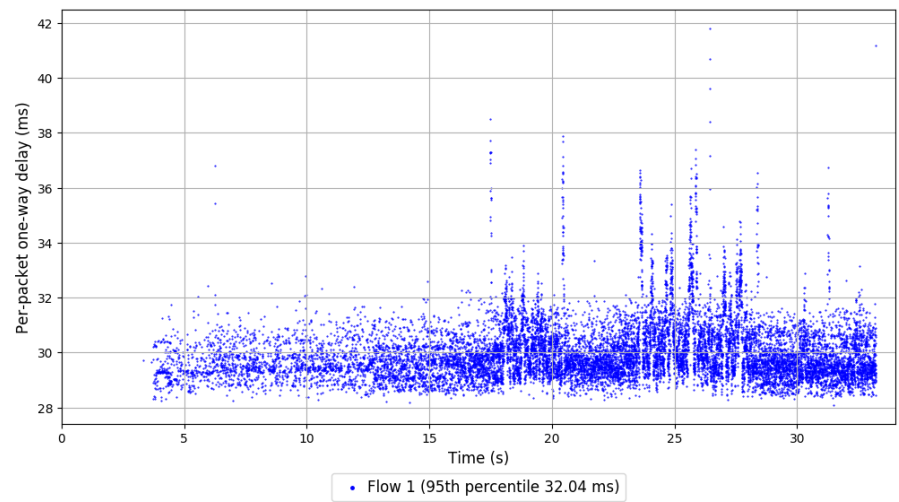
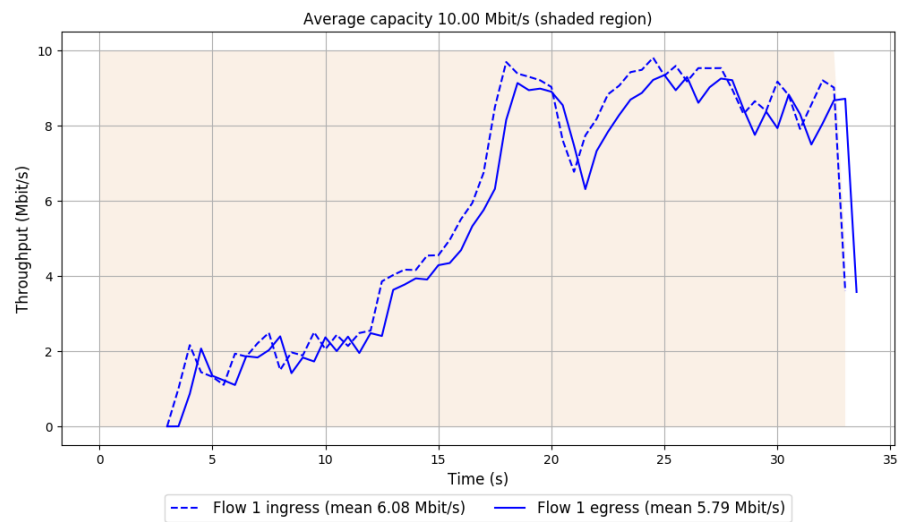
-- Flow 1:

Average throughput: 5.79 Mbit/s

95th percentile per-packet one-way delay: 32.043 ms

Loss rate: 4.69%

Run 3: Report of PCC-Vivace — Data Link



Run 4: Statistics of PCC-Vivace

Start at: 2019-10-21 20:20:19

End at: 2019-10-21 20:20:49

Below is generated by plot.py at 2019-10-21 20:29:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 3.87 Mbit/s (38.7% utilization)

95th percentile per-packet one-way delay: 30.870 ms

Loss rate: 4.68%

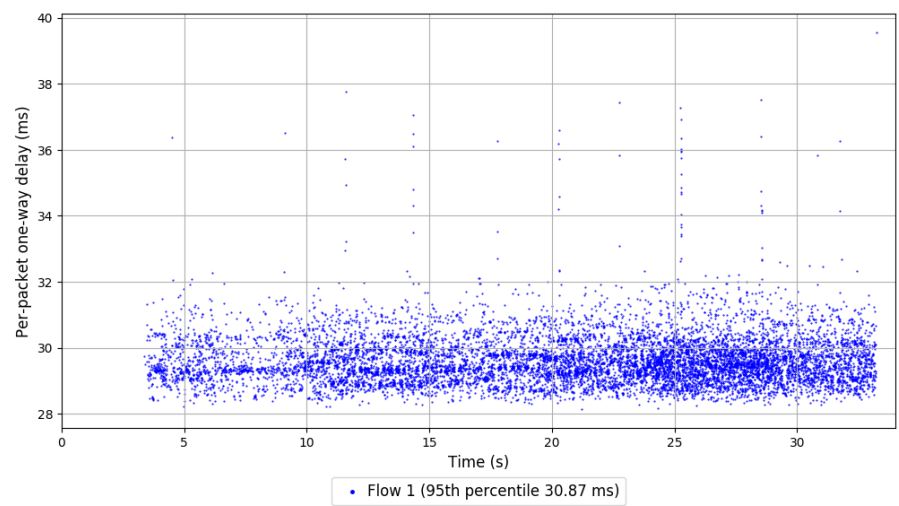
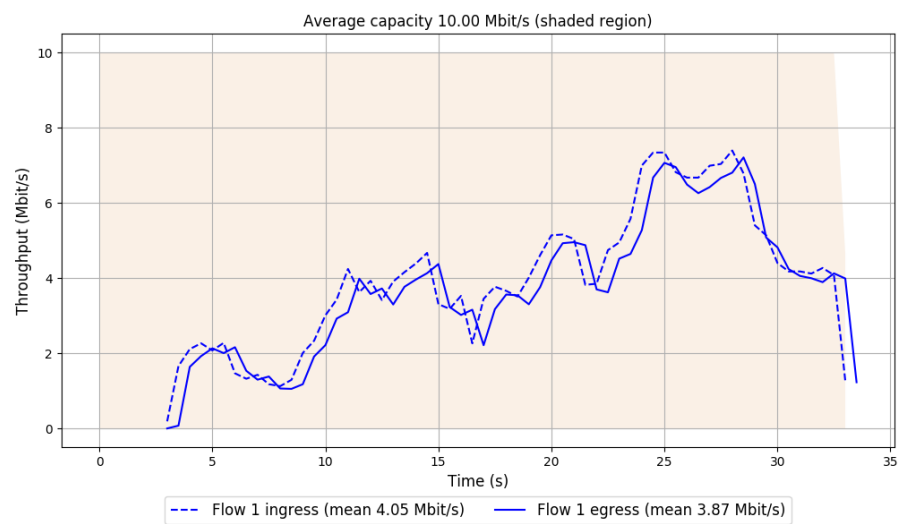
-- Flow 1:

Average throughput: 3.87 Mbit/s

95th percentile per-packet one-way delay: 30.870 ms

Loss rate: 4.68%

Run 4: Report of PCC-Vivace — Data Link



Run 5: Statistics of PCC-Vivace

Start at: 2019-10-21 20:23:18

End at: 2019-10-21 20:23:48

Below is generated by plot.py at 2019-10-21 20:29:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 3.42 Mbit/s (34.2% utilization)

95th percentile per-packet one-way delay: 30.921 ms

Loss rate: 4.65%

-- Flow 1:

Average throughput: 3.42 Mbit/s

95th percentile per-packet one-way delay: 30.921 ms

Loss rate: 4.65%

Run 5: Report of PCC-Vivace — Data Link

