

Pantheon Report

Generated at 2019-10-21 22:00:39 (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

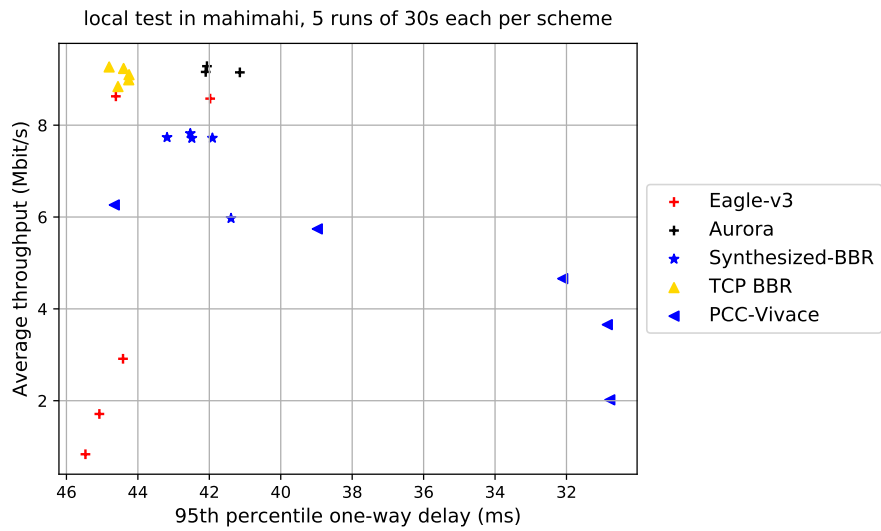
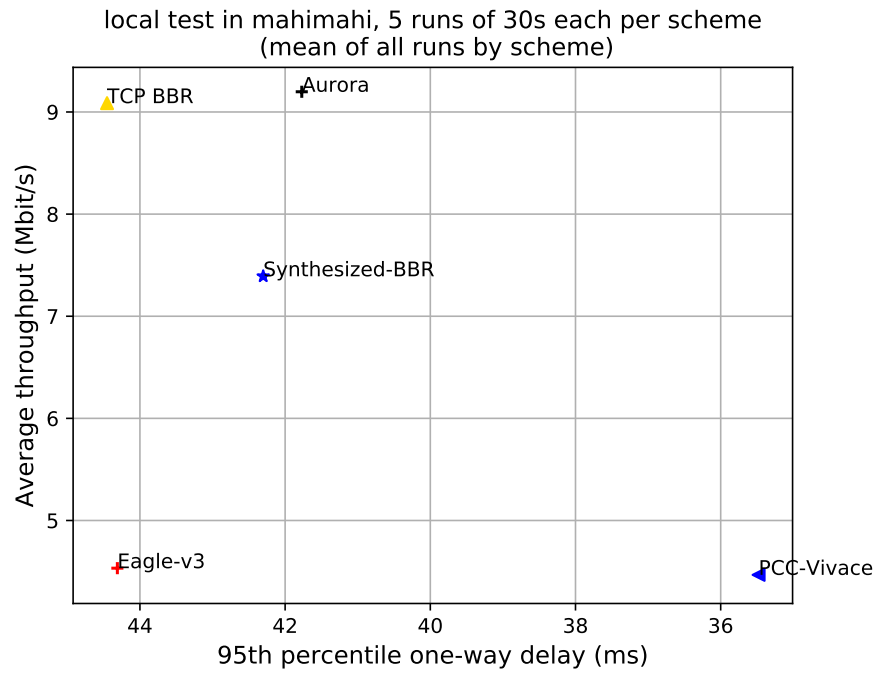
Git summary:

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 @ a63fea7809d9b57a6dbfc95c54181b54157c2b45
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/model-xentropy/model-xentropy.pt
M sender-receiver/sender-receiver/sender_receiver/logs.txt
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdfc58e562f4
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 @ a63fea7809d9b57a6dbfc95c54181b54157c2b45
M sender-receiver/sender-receiver/sender_receiver/__pycache__/__init__.cpython-36.pyc
M sender-receiver/sender-receiver/sender_receiver/envs/__pycache__/__init__.cpython-36.pyc
M sender-receiver/sender-receiver/sender_receiver/envs/__pycache__/datagram_pb2.cpython-36.pyc
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.pyc
M sender-receiver/sender-receiver/sender_receiver/envs/__pycache__/receiver.cpython-36.pyc
M sender-receiver/sender-receiver/sender_receiver/envs/__pycache__/sender_receiver_env.cpython-36.pyc
M sender-receiver/sender-receiver/sender_receiver/envs/model-xentropy/model-xentropy.py
M sender-receiver/sender-receiver/sender_receiver/envs/sender_receiver_env.py
M sender-receiver/sender-receiver/sender_receiver/logs.txt
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	3	9.20	41.77	97.93
TCP BBR	5	9.09	44.45	6.70
Eagle-v3	5	4.53	44.31	8.75
Synthesized-BBR	5	7.39	42.30	5.55
PCC-Vivace	5	4.47	35.48	5.24

Run 1: Statistics of Aurora

Start at: 2019-10-21 21:45:41

End at: 2019-10-21 21:46:11

Below is generated by plot.py at 2019-10-21 22:00:17

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: 41.145 ms

Loss rate: 98.00%

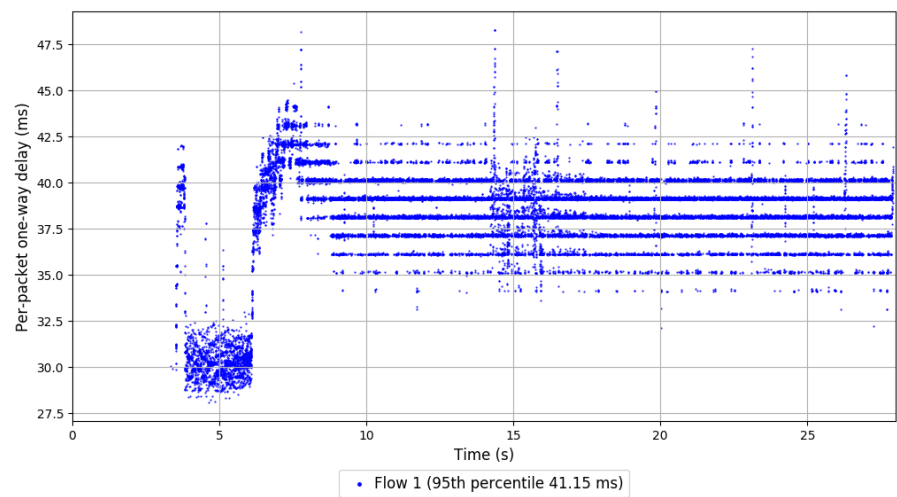
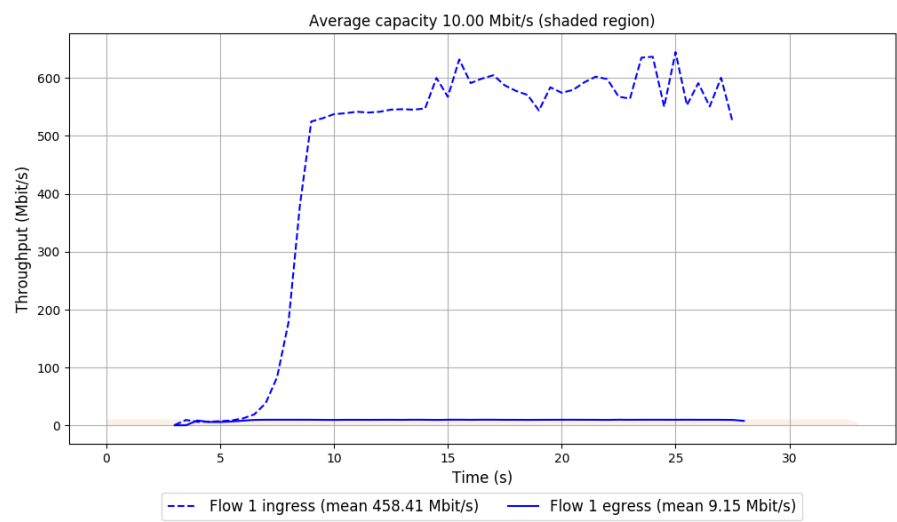
-- Flow 1:

Average throughput: 9.15 Mbit/s

95th percentile per-packet one-way delay: 41.145 ms

Loss rate: 98.00%

Run 1: Report of Aurora — Data Link

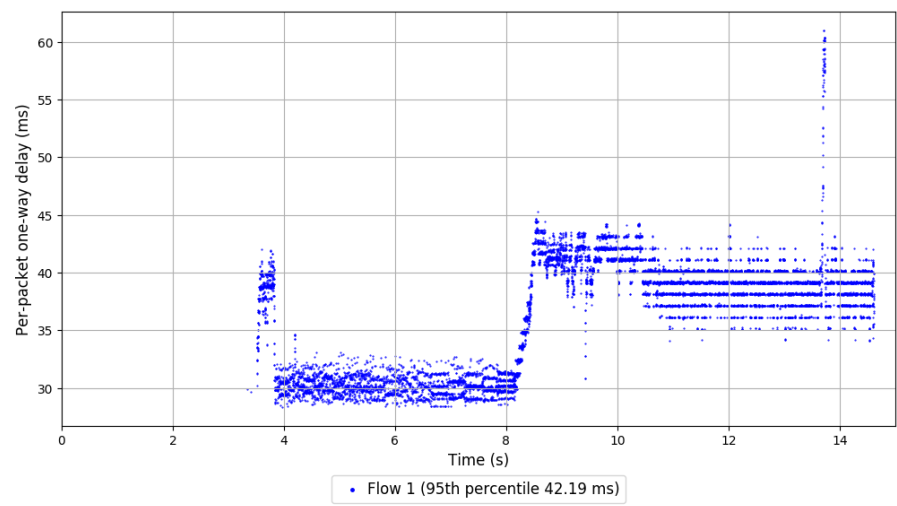
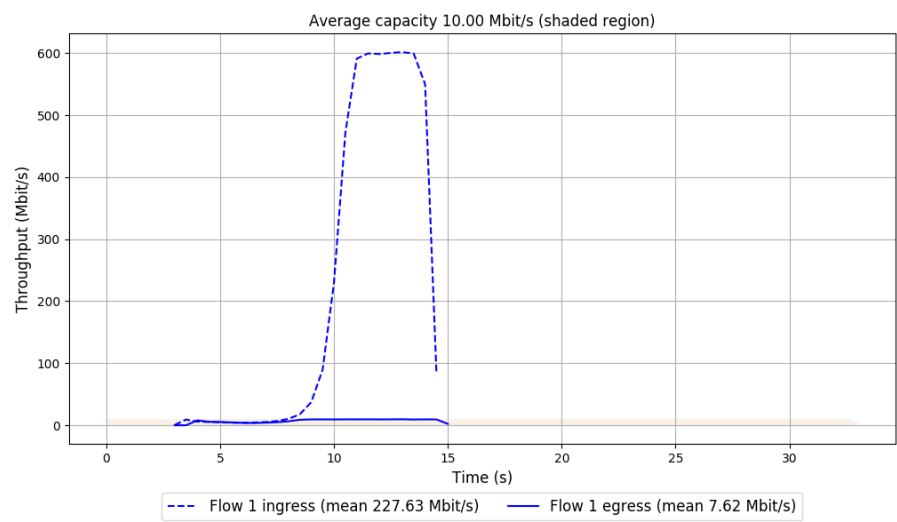


Run 2: Statistics of Aurora

Start at: 2019-10-21 21:48:43

End at: 2019-10-21 21:49:13

Run 2: Report of Aurora — Data Link



Run 3: Statistics of Aurora

Start at: 2019-10-21 21:51:37

End at: 2019-10-21 21:52:07

Below is generated by plot.py at 2019-10-21 22:00:17

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 9.28 Mbit/s (92.8% utilization)

95th percentile per-packet one-way delay: 42.066 ms

Loss rate: 97.96%

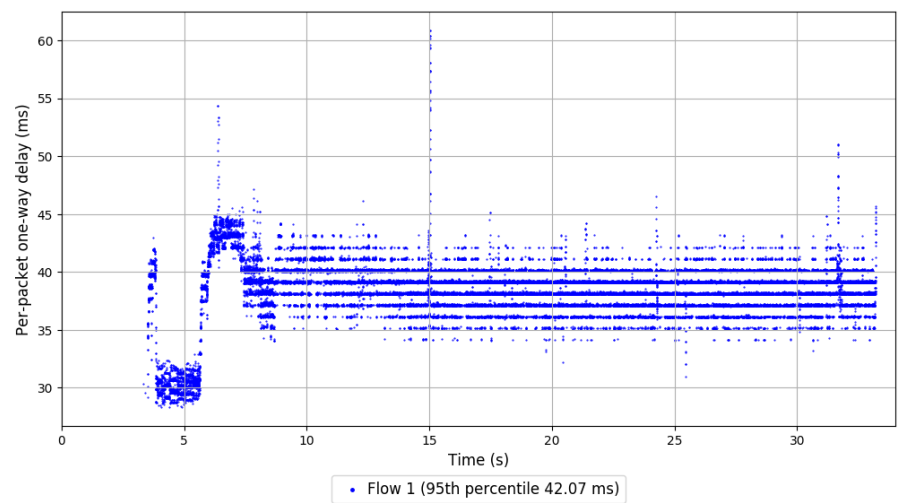
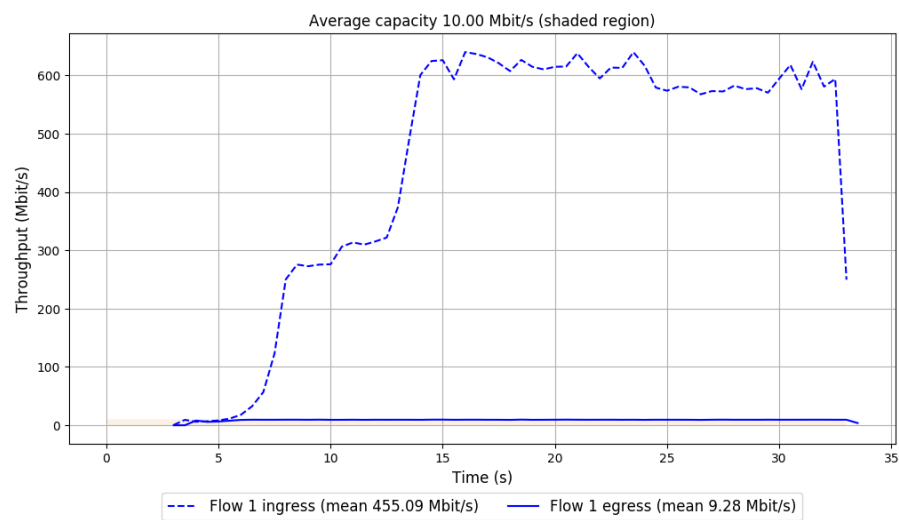
-- Flow 1:

Average throughput: 9.28 Mbit/s

95th percentile per-packet one-way delay: 42.066 ms

Loss rate: 97.96%

Run 3: Report of Aurora — Data Link

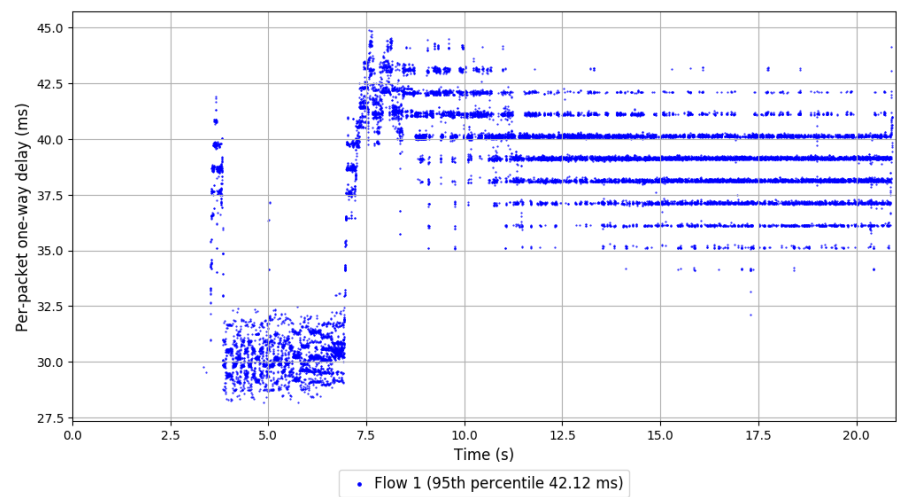
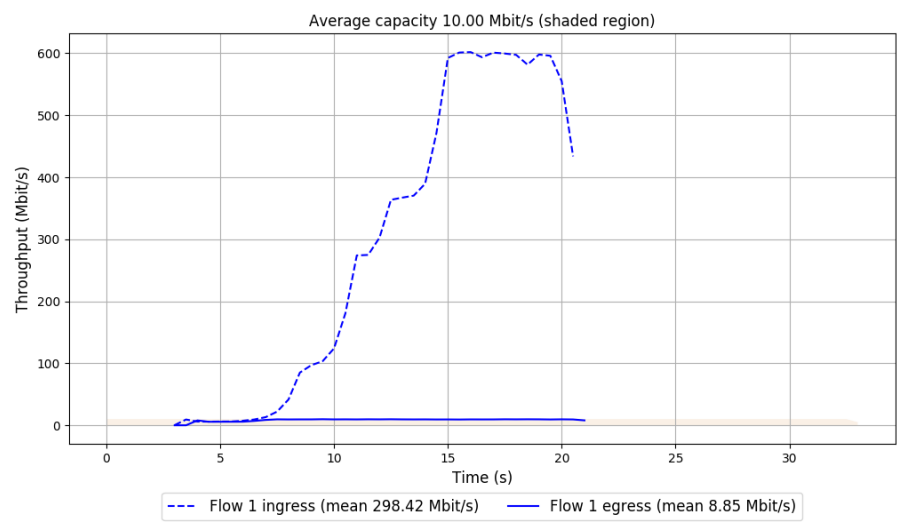


Run 4: Statistics of Aurora

Start at: 2019-10-21 21:54:41

End at: 2019-10-21 21:55:11

Run 4: Report of Aurora — Data Link



Run 5: Statistics of Aurora

Start at: 2019-10-21 21:57:37

End at: 2019-10-21 21:58:07

Below is generated by plot.py at 2019-10-21 22:00:38

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 9.16 Mbit/s (91.6% utilization)

95th percentile per-packet one-way delay: 42.101 ms

Loss rate: 97.83%

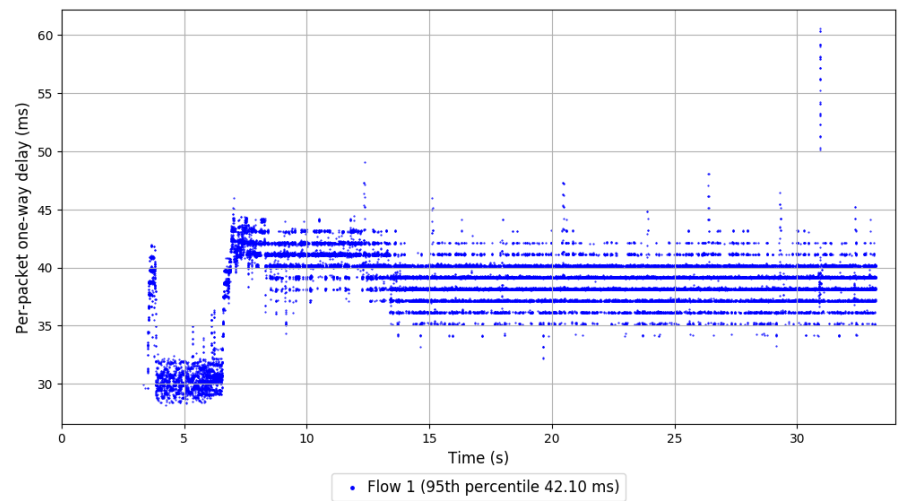
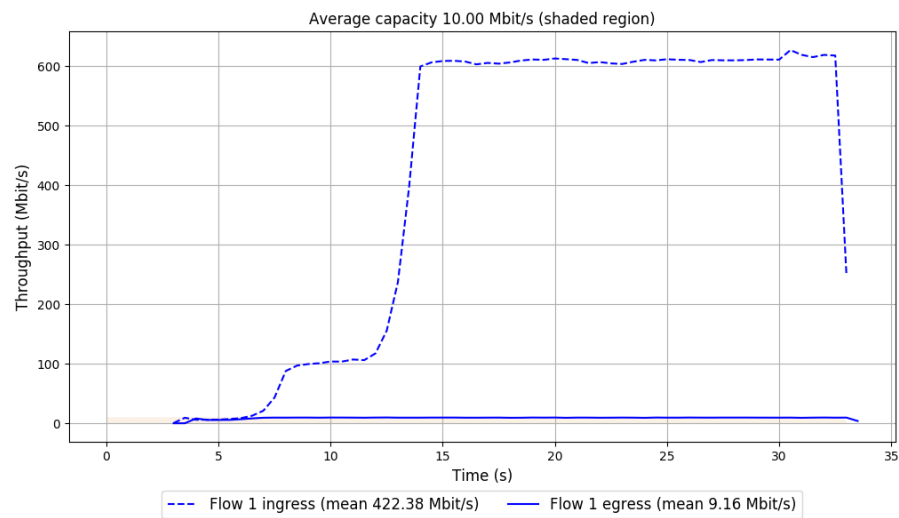
-- Flow 1:

Average throughput: 9.16 Mbit/s

95th percentile per-packet one-way delay: 42.101 ms

Loss rate: 97.83%

Run 5: Report of Aurora — Data Link

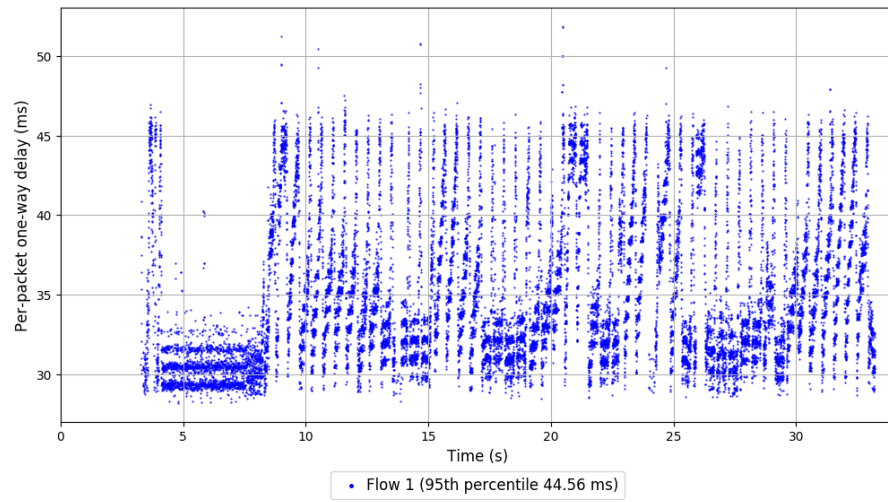
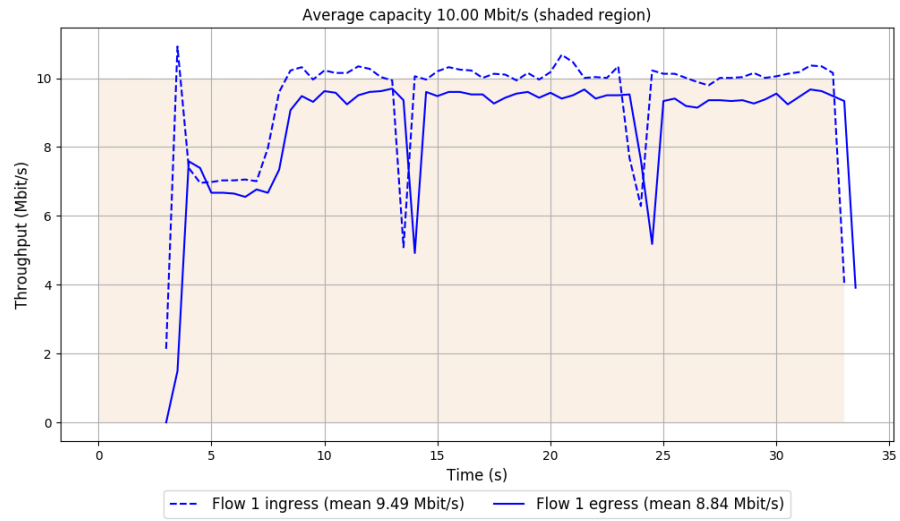


```
Run 1: Statistics of TCP BBR

Start at: 2019-10-21 21:43:57
End at: 2019-10-21 21:44:27

# Below is generated by plot.py at 2019-10-21 22:00:38
# Datalink statistics
-- Total of 1 flow:
Average capacity: 10.00 Mbit/s
Average throughput: 8.84 Mbit/s (88.4% utilization)
95th percentile per-packet one-way delay: 44.557 ms
Loss rate: 6.97%
-- Flow 1:
Average throughput: 8.84 Mbit/s
95th percentile per-packet one-way delay: 44.557 ms
Loss rate: 6.97%
```

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2019-10-21 21:46:59

End at: 2019-10-21 21:47:29

Below is generated by plot.py at 2019-10-21 22:00:38

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 9.24 Mbit/s (92.3% utilization)

95th percentile per-packet one-way delay: 44.400 ms

Loss rate: 6.56%

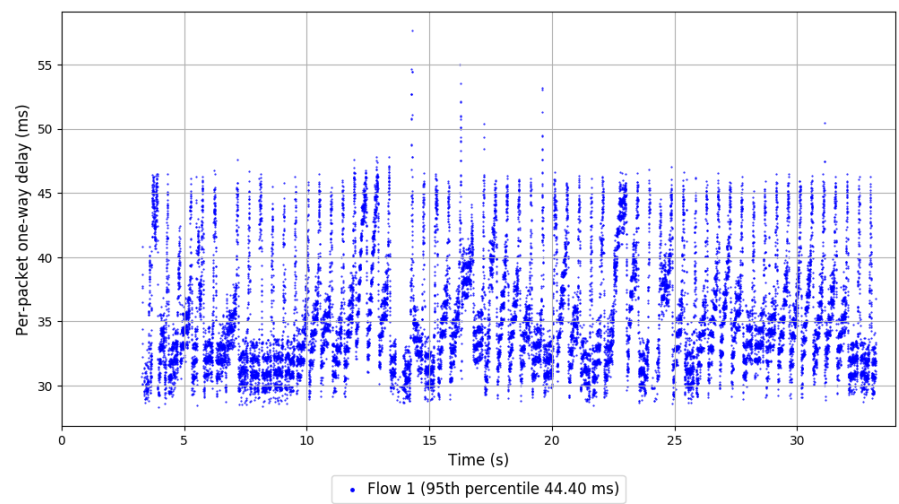
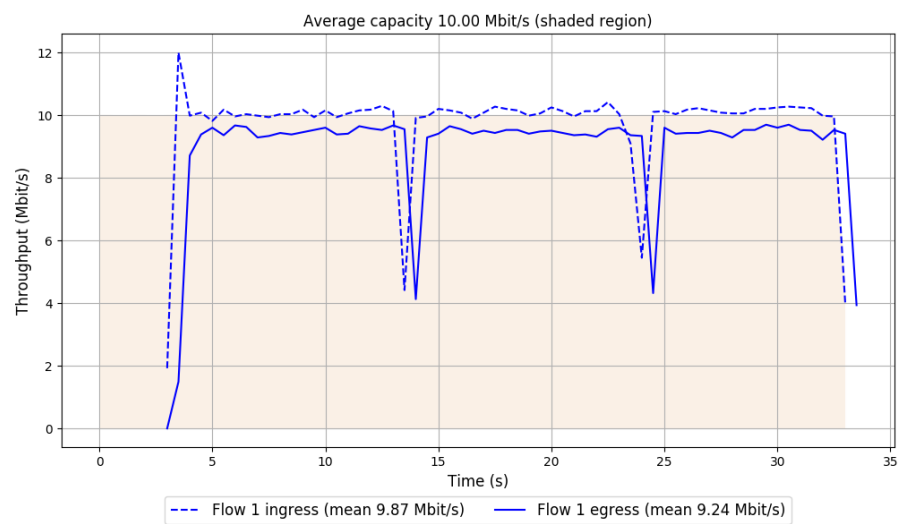
-- Flow 1:

Average throughput: 9.24 Mbit/s

95th percentile per-packet one-way delay: 44.400 ms

Loss rate: 6.56%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2019-10-21 21:49:54

End at: 2019-10-21 21:50:24

Below is generated by plot.py at 2019-10-21 22:00:38

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 9.27 Mbit/s (92.7% utilization)

95th percentile per-packet one-way delay: 44.804 ms

Loss rate: 6.62%

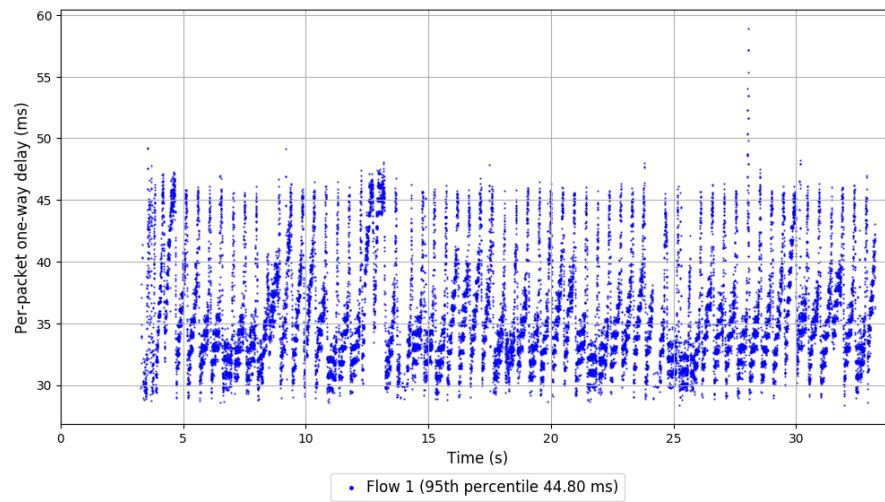
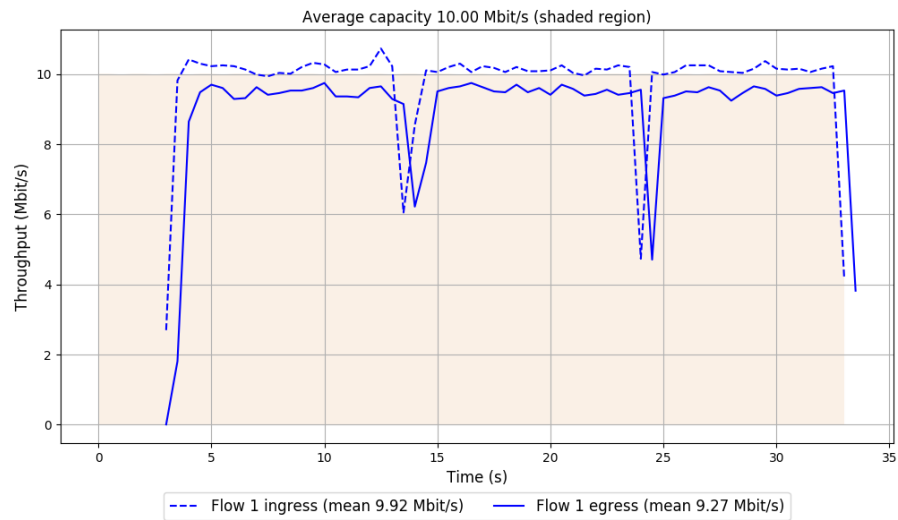
-- Flow 1:

Average throughput: 9.27 Mbit/s

95th percentile per-packet one-way delay: 44.804 ms

Loss rate: 6.62%

Run 3: Report of TCP BBR — Data Link



Run 4: Statistics of TCP BBR

Start at: 2019-10-21 21:52:57

End at: 2019-10-21 21:53:27

Below is generated by plot.py at 2019-10-21 22:00:38

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: 44.256 ms

Loss rate: 6.53%

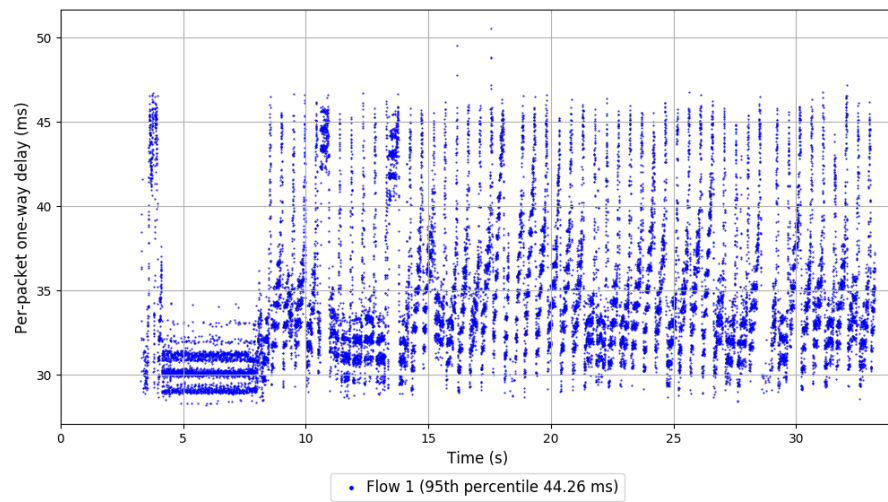
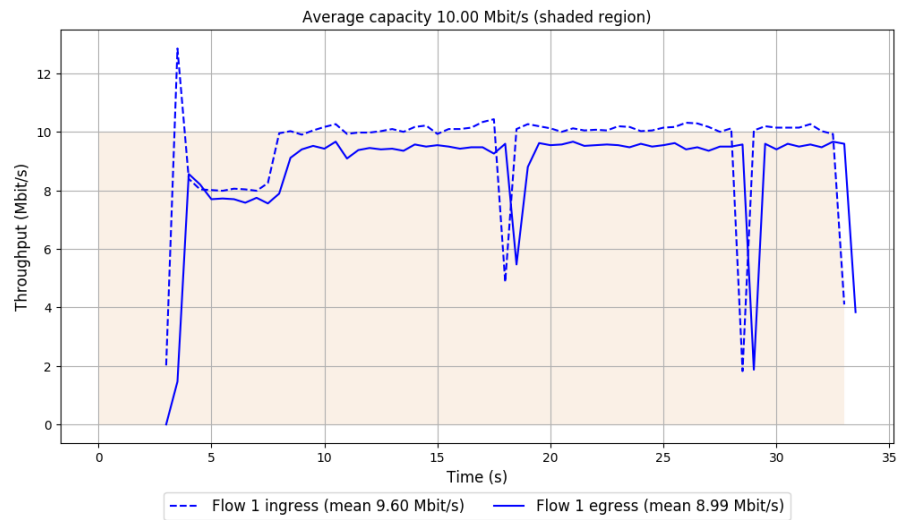
-- Flow 1:

Average throughput: 8.99 Mbit/s

95th percentile per-packet one-way delay: 44.256 ms

Loss rate: 6.53%

Run 4: Report of TCP BBR — Data Link



Run 5: Statistics of TCP BBR

Start at: 2019-10-21 21:55:54

End at: 2019-10-21 21:56:24

Below is generated by plot.py at 2019-10-21 22:00:38

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 9.10 Mbit/s (91.0% utilization)

95th percentile per-packet one-way delay: 44.248 ms

Loss rate: 6.84%

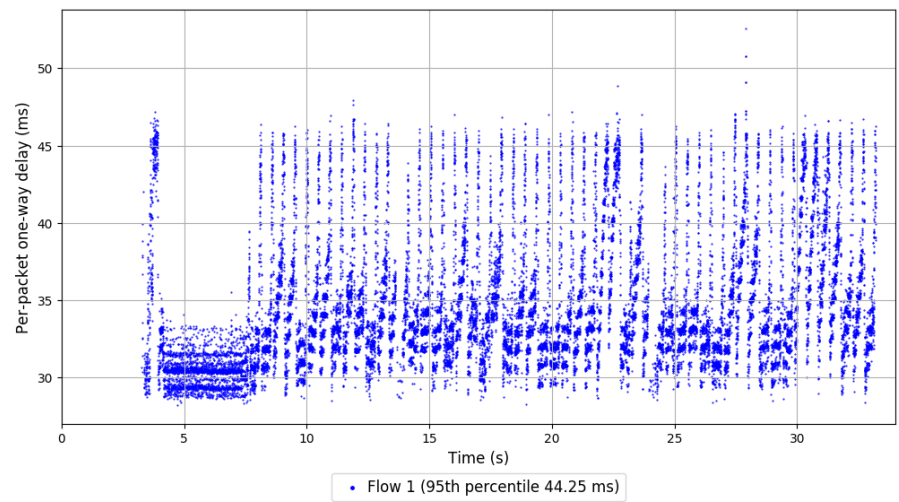
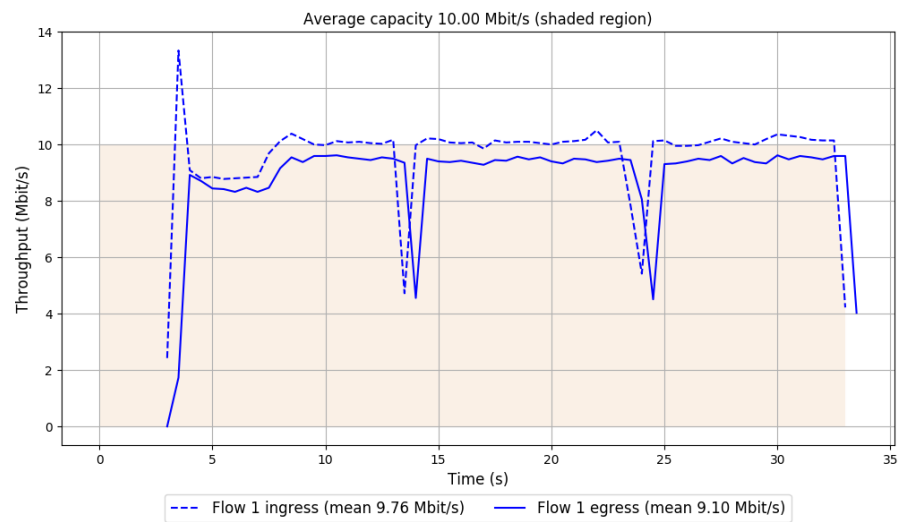
-- Flow 1:

Average throughput: 9.10 Mbit/s

95th percentile per-packet one-way delay: 44.248 ms

Loss rate: 6.84%

Run 5: Report of TCP BBR — Data Link

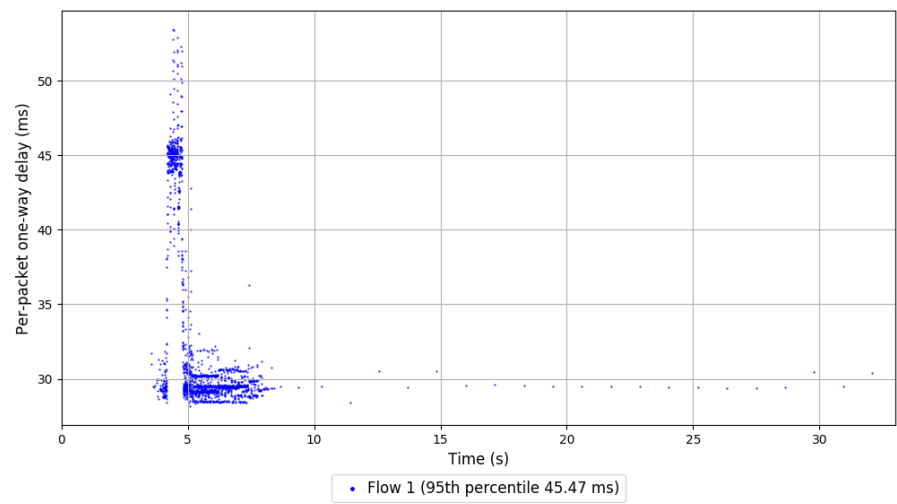
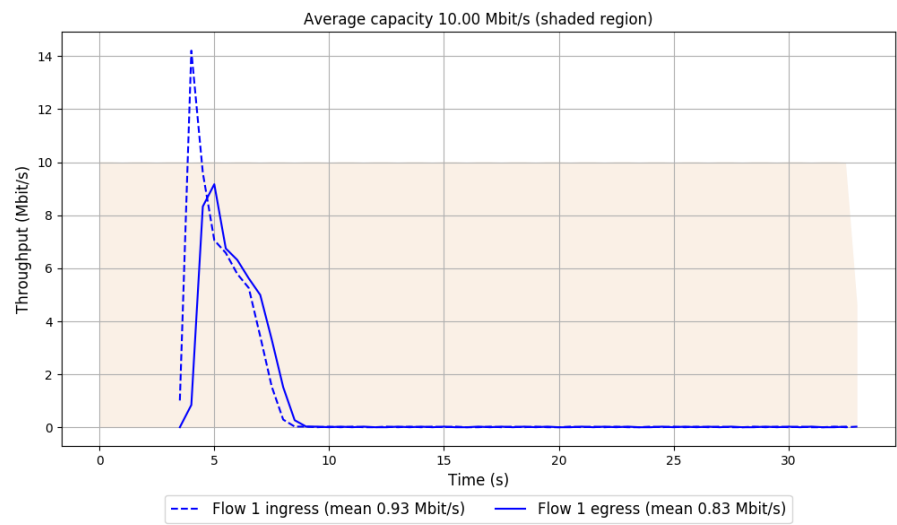



```
Run 1: Statistics of Eagle-v3

Start at: 2019-10-21 21:43:23
End at: 2019-10-21 21:43:53

# Below is generated by plot.py at 2019-10-21 22:00:38
# Datalink statistics
-- Total of 1 flow:
Average capacity: 10.00 Mbit/s
Average throughput: 0.83 Mbit/s (8.3% utilization)
95th percentile per-packet one-way delay: 45.468 ms
Loss rate: 13.89%
-- Flow 1:
Average throughput: 0.83 Mbit/s
95th percentile per-packet one-way delay: 45.468 ms
Loss rate: 13.89%
```

Run 1: Report of Eagle-v3 — Data Link



Run 2: Statistics of Eagle-v3

Start at: 2019-10-21 21:46:24

End at: 2019-10-21 21:46:54

Below is generated by plot.py at 2019-10-21 22:00:38

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 8.58 Mbit/s (85.8% utilization)

95th percentile per-packet one-way delay: 41.976 ms

Loss rate: 5.96%

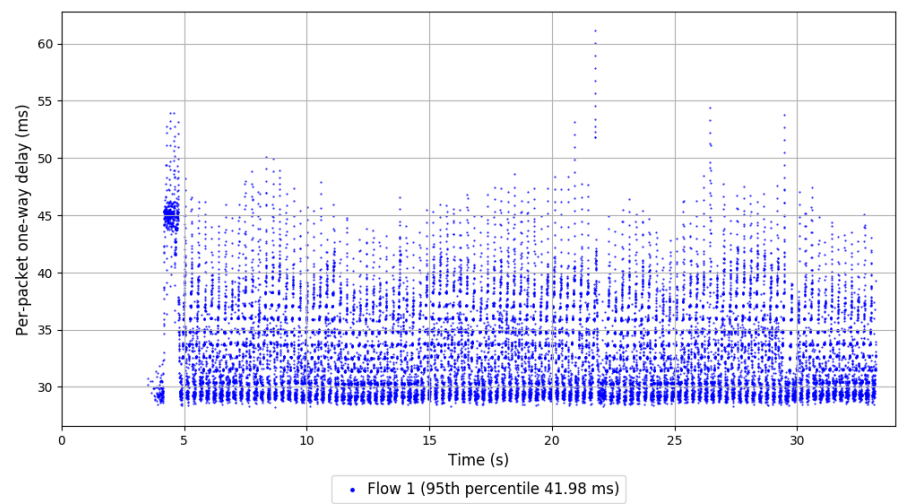
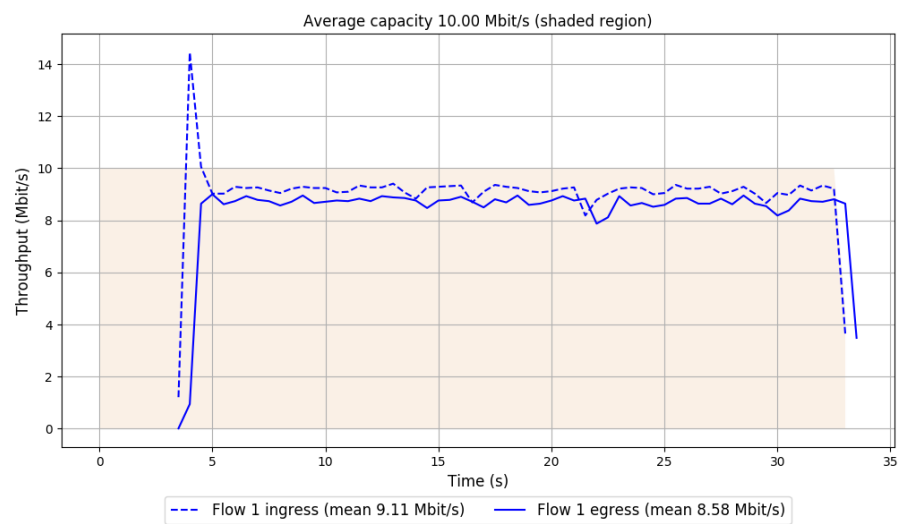
-- Flow 1:

Average throughput: 8.58 Mbit/s

95th percentile per-packet one-way delay: 41.976 ms

Loss rate: 5.96%

Run 2: Report of Eagle-v3 — Data Link



Run 3: Statistics of Eagle-v3

Start at: 2019-10-21 21:49:19

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

Below is generated by plot.py at 2019-10-21 22:00:38

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: 44.616 ms

Loss rate: 6.62%

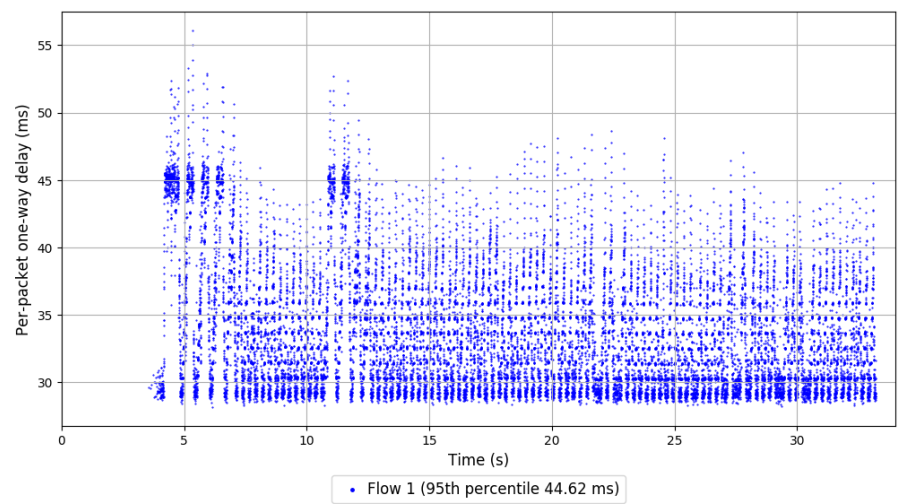
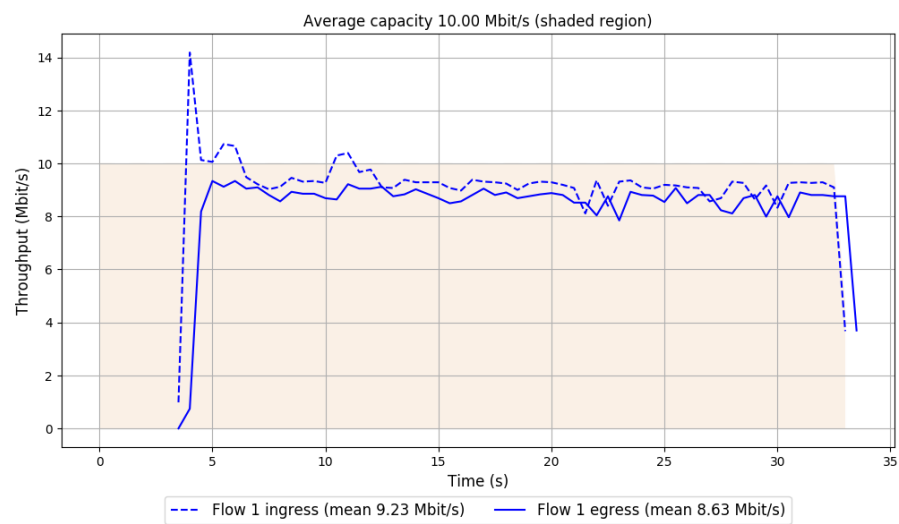
-- Flow 1:

Average throughput: 8.63 Mbit/s

95th percentile per-packet one-way delay: 44.616 ms

Loss rate: 6.62%

Run 3: Report of Eagle-v3 — Data Link



Run 4: Statistics of Eagle-v3

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

End at: 2019-10-21 21:52:53

Below is generated by plot.py at 2019-10-21 22:00:38

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 1.71 Mbit/s (17.1% utilization)

95th percentile per-packet one-way delay: 45.078 ms

Loss rate: 9.26%

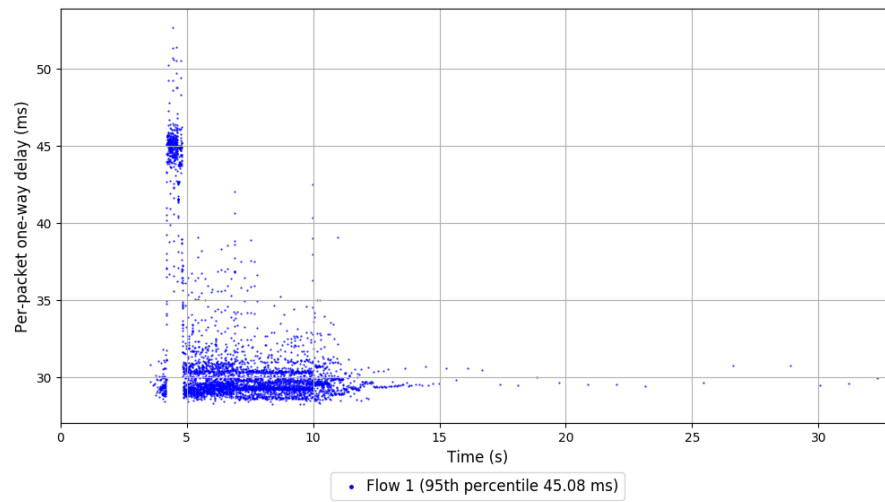
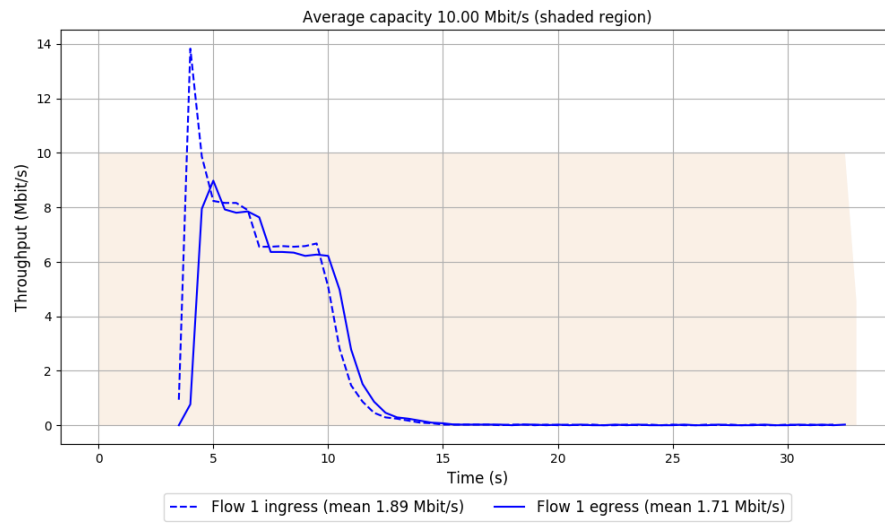
-- Flow 1:

Average throughput: 1.71 Mbit/s

95th percentile per-packet one-way delay: 45.078 ms

Loss rate: 9.26%

Run 4: Report of Eagle-v3 — Data Link



Run 5: Statistics of Eagle-v3

Start at: 2019-10-21 21:55:19

End at: 2019-10-21 21:55:50

Below is generated by plot.py at 2019-10-21 22:00:38

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 2.91 Mbit/s (29.1% utilization)

95th percentile per-packet one-way delay: 44.416 ms

Loss rate: 8.04%

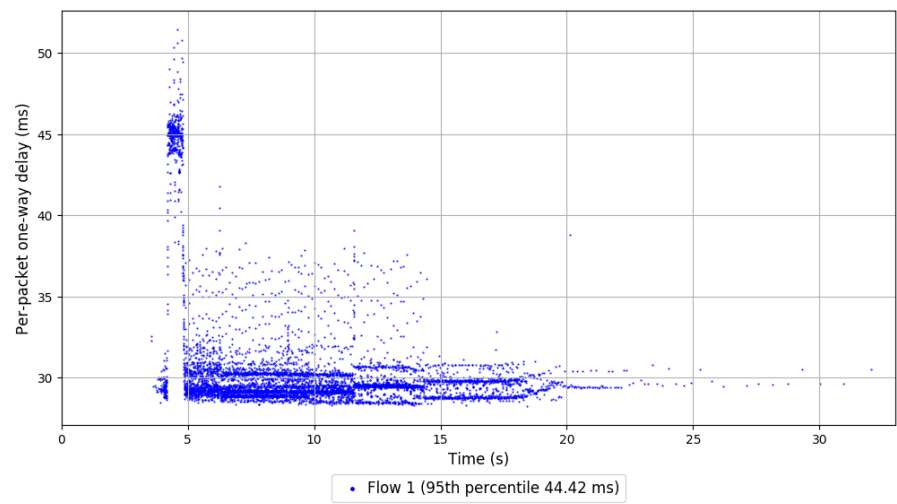
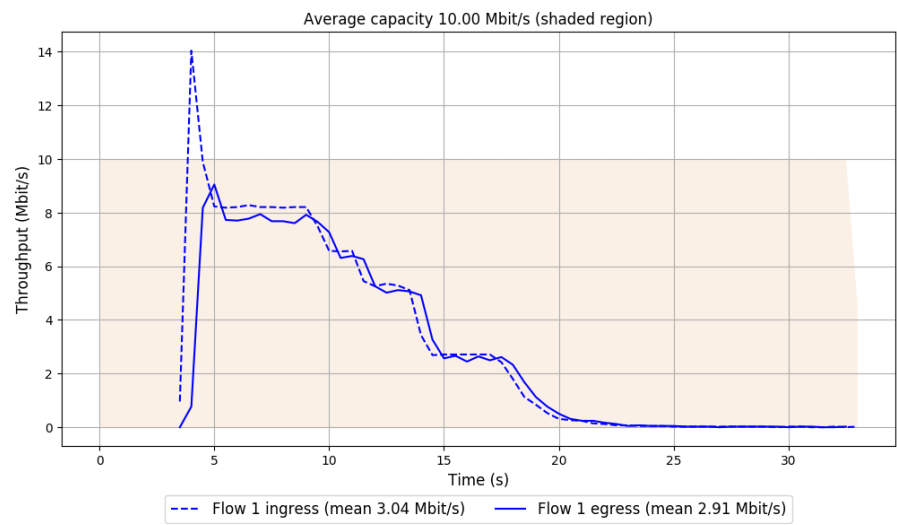
-- Flow 1:

Average throughput: 2.91 Mbit/s

95th percentile per-packet one-way delay: 44.416 ms

Loss rate: 8.04%

Run 5: Report of Eagle-v3 — Data Link

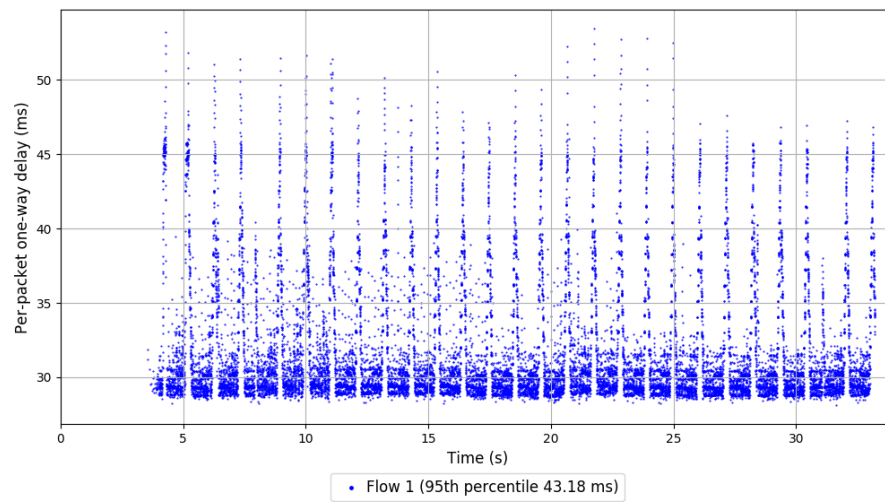
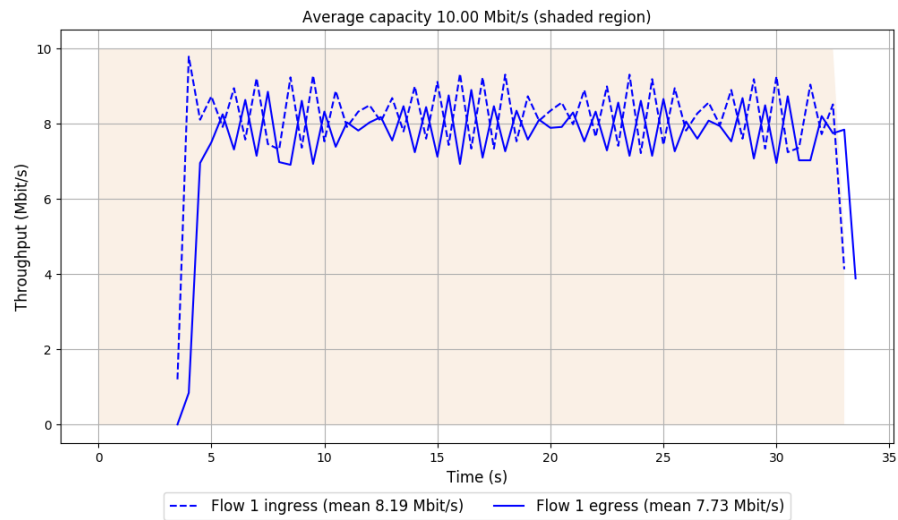


```
Run 1: Statistics of Synthesized-BBR

Start at: 2019-10-21 21:44:32
End at: 2019-10-21 21:45:02

# Below is generated by plot.py at 2019-10-21 22:00:38
# 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: 43.183 ms
Loss rate: 5.79%
-- Flow 1:
Average throughput: 7.73 Mbit/s
95th percentile per-packet one-way delay: 43.183 ms
Loss rate: 5.79%
```

Run 1: Report of Synthesized-BBR — Data Link



Run 2: Statistics of Synthesized-BBR

Start at: 2019-10-21 21:47:34

End at: 2019-10-21 21:48:04

Below is generated by plot.py at 2019-10-21 22:00:38

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 7.82 Mbit/s (78.2% utilization)

95th percentile per-packet one-way delay: 42.532 ms

Loss rate: 5.39%

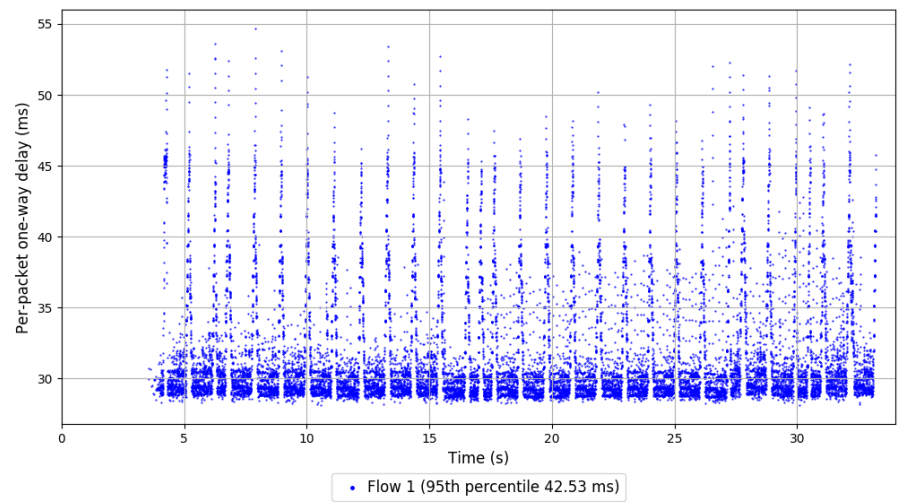
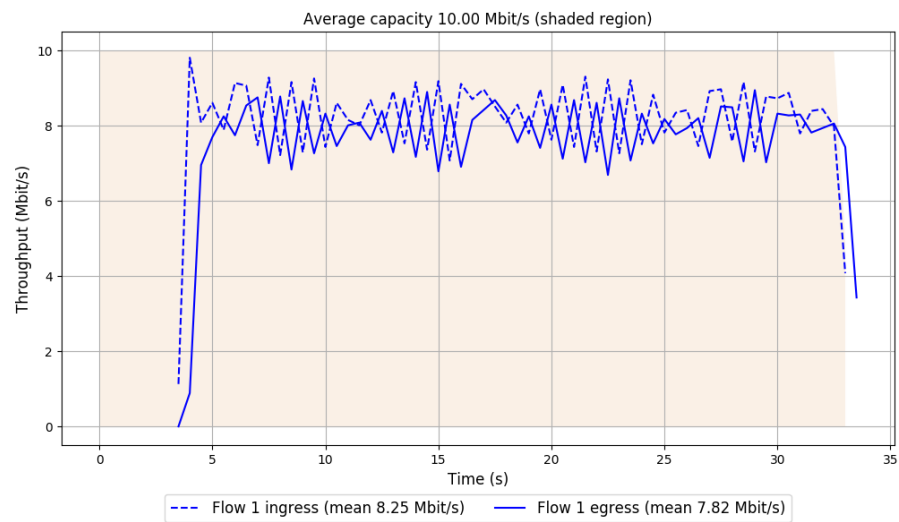
-- Flow 1:

Average throughput: 7.82 Mbit/s

95th percentile per-packet one-way delay: 42.532 ms

Loss rate: 5.39%

Run 2: Report of Synthesized-BBR — Data Link



Run 3: Statistics of Synthesized-BBR

Start at: 2019-10-21 21:50:28

End at: 2019-10-21 21:50:58

Below is generated by plot.py at 2019-10-21 22:00:38

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 5.97 Mbit/s (59.7% utilization)

95th percentile per-packet one-way delay: 41.392 ms

Loss rate: 5.35%

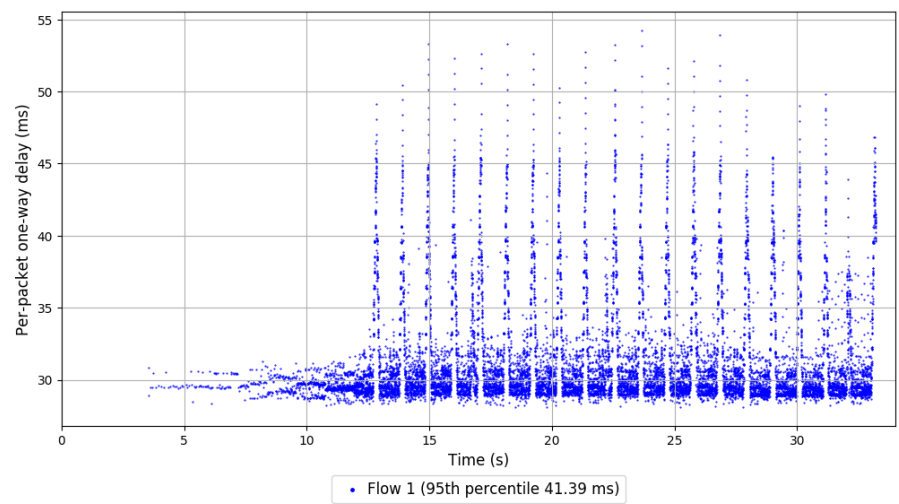
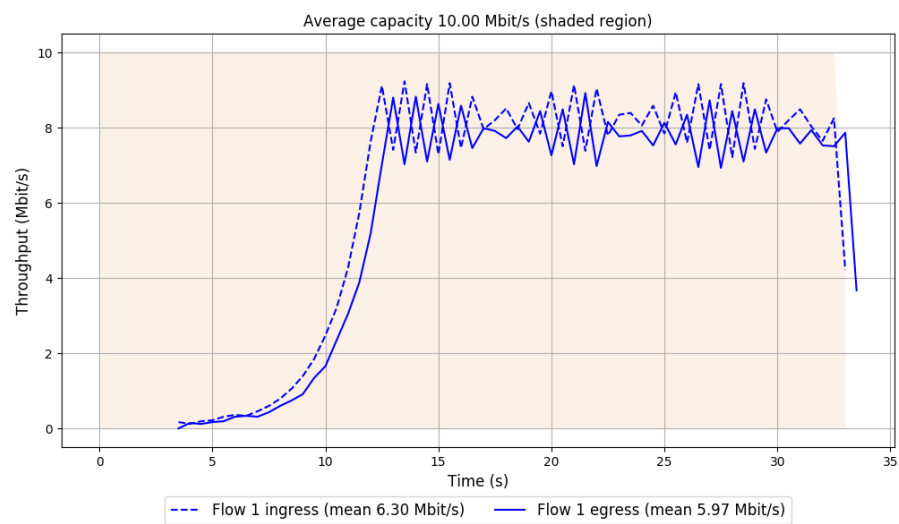
-- Flow 1:

Average throughput: 5.97 Mbit/s

95th percentile per-packet one-way delay: 41.392 ms

Loss rate: 5.35%

Run 3: Report of Synthesized-BBR — Data Link



Run 4: Statistics of Synthesized-BBR

Start at: 2019-10-21 21:53:32

End at: 2019-10-21 21:54:02

Below is generated by plot.py at 2019-10-21 22:00:38

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 7.72 Mbit/s (77.2% utilization)

95th percentile per-packet one-way delay: 41.913 ms

Loss rate: 5.59%

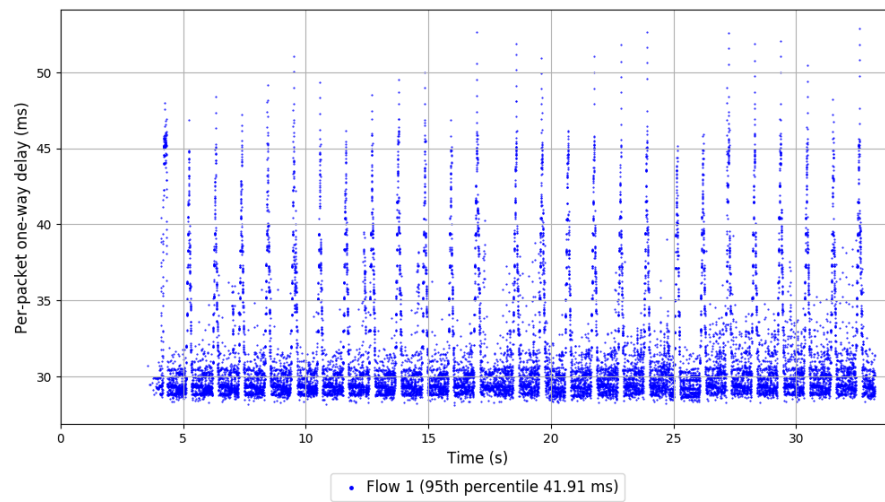
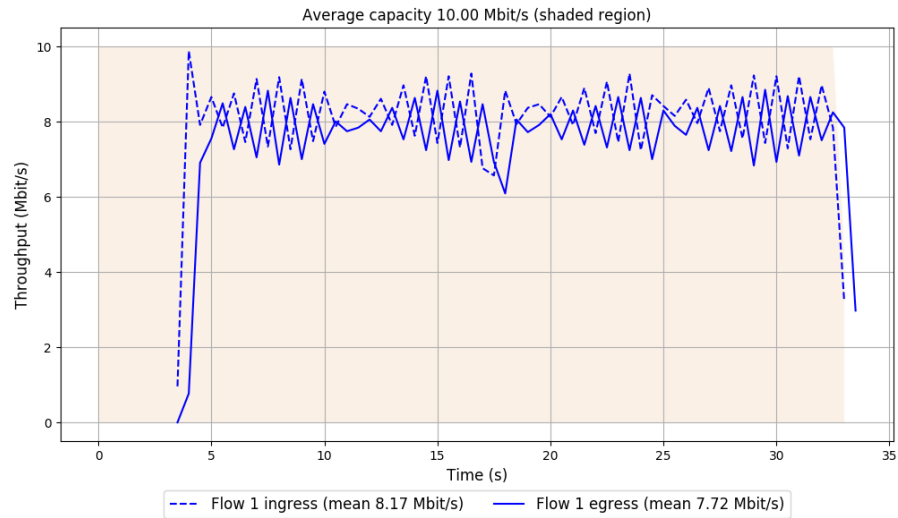
-- Flow 1:

Average throughput: 7.72 Mbit/s

95th percentile per-packet one-way delay: 41.913 ms

Loss rate: 5.59%

Run 4: Report of Synthesized-BBR — Data Link



Run 5: Statistics of Synthesized-BBR

Start at: 2019-10-21 21:56:28

End at: 2019-10-21 21:56:59

Below is generated by plot.py at 2019-10-21 22:00:38

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 7.72 Mbit/s (77.2% utilization)

95th percentile per-packet one-way delay: 42.489 ms

Loss rate: 5.63%

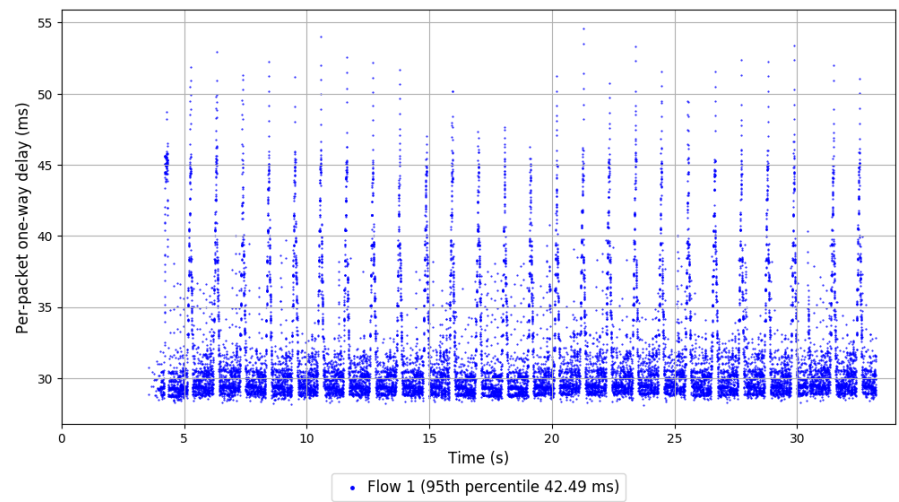
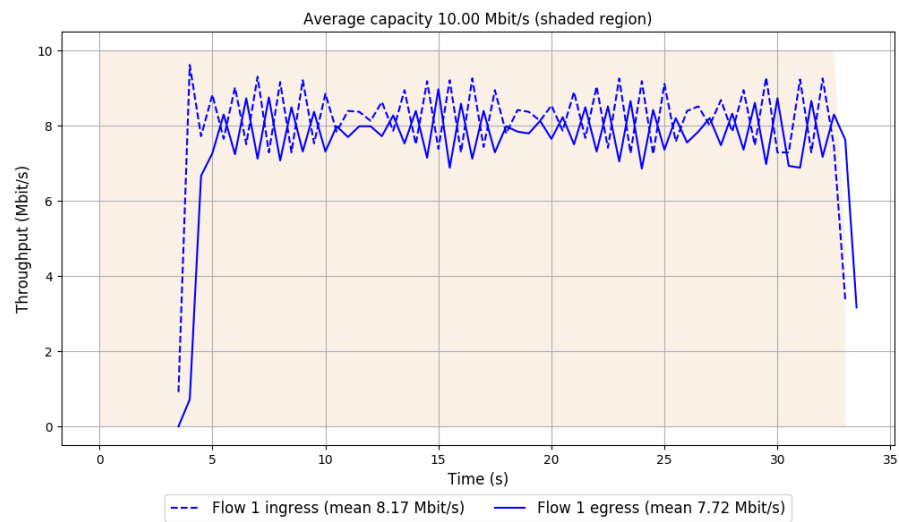
-- Flow 1:

Average throughput: 7.72 Mbit/s

95th percentile per-packet one-way delay: 42.489 ms

Loss rate: 5.63%

Run 5: Report of Synthesized-BBR — Data Link



Run 1: Statistics of PCC-Vivace

Start at: 2019-10-21 21:45:06

End at: 2019-10-21 21:45:36

Below is generated by plot.py at 2019-10-21 22:00:38

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 4.66 Mbit/s (46.6% utilization)

95th percentile per-packet one-way delay: 32.107 ms

Loss rate: 5.35%

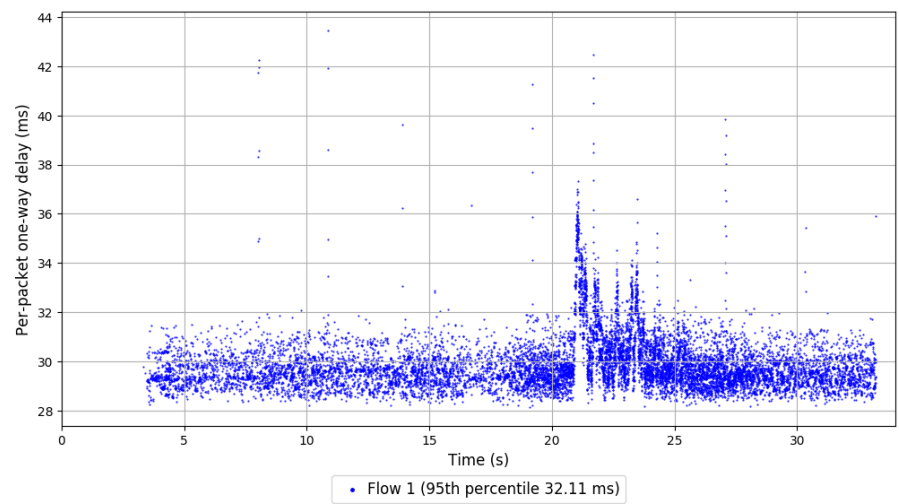
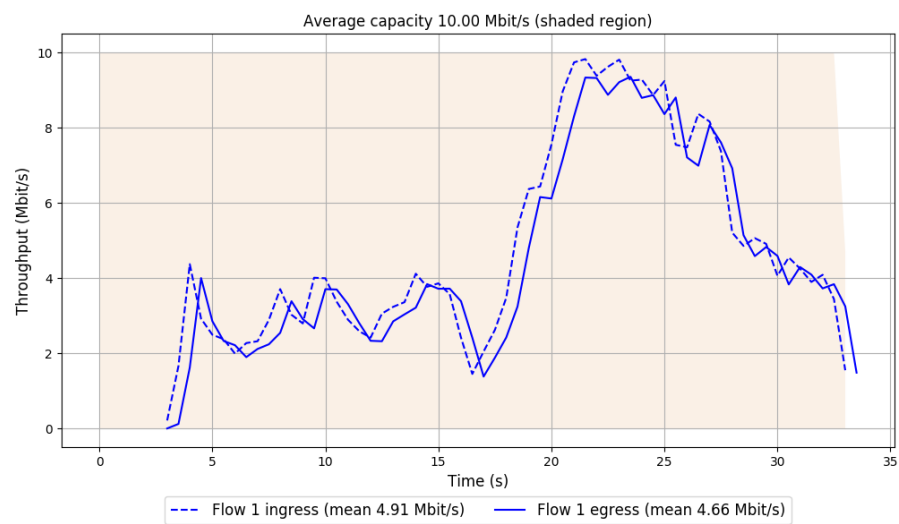
-- Flow 1:

Average throughput: 4.66 Mbit/s

95th percentile per-packet one-way delay: 32.107 ms

Loss rate: 5.35%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2019-10-21 21:48:08

End at: 2019-10-21 21:48:38

Below is generated by plot.py at 2019-10-21 22:00:38

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 3.66 Mbit/s (36.6% utilization)

95th percentile per-packet one-way delay: 30.858 ms

Loss rate: 4.59%

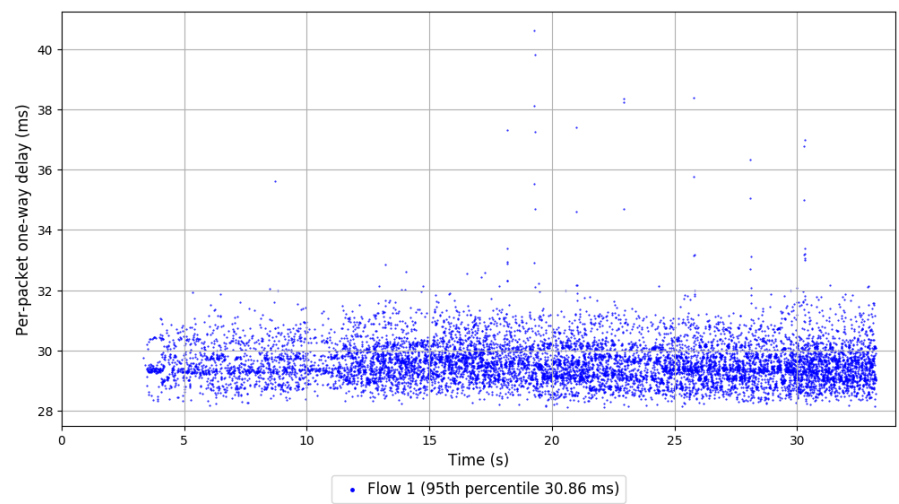
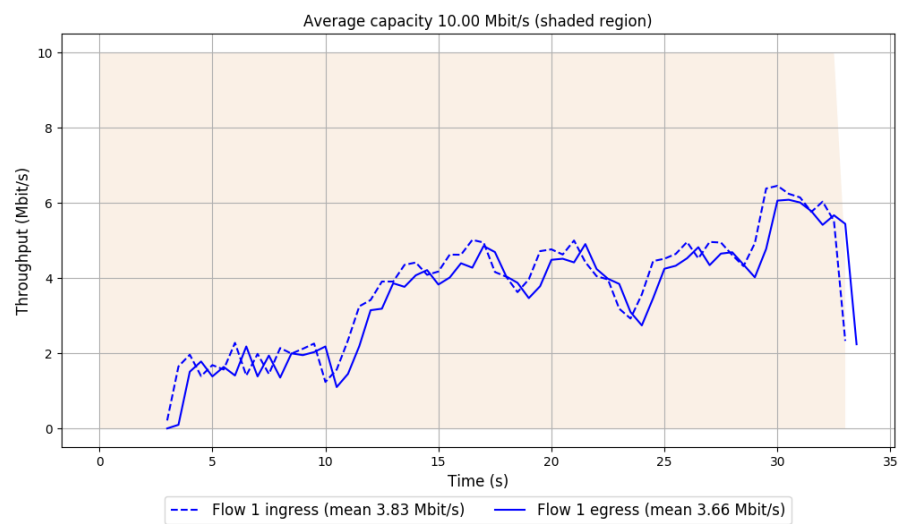
-- Flow 1:

Average throughput: 3.66 Mbit/s

95th percentile per-packet one-way delay: 30.858 ms

Loss rate: 4.59%

Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

Start at: 2019-10-21 21:51:03

End at: 2019-10-21 21:51:33

Below is generated by plot.py at 2019-10-21 22:00:38

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 5.74 Mbit/s (57.4% utilization)

95th percentile per-packet one-way delay: 38.977 ms

Loss rate: 5.30%

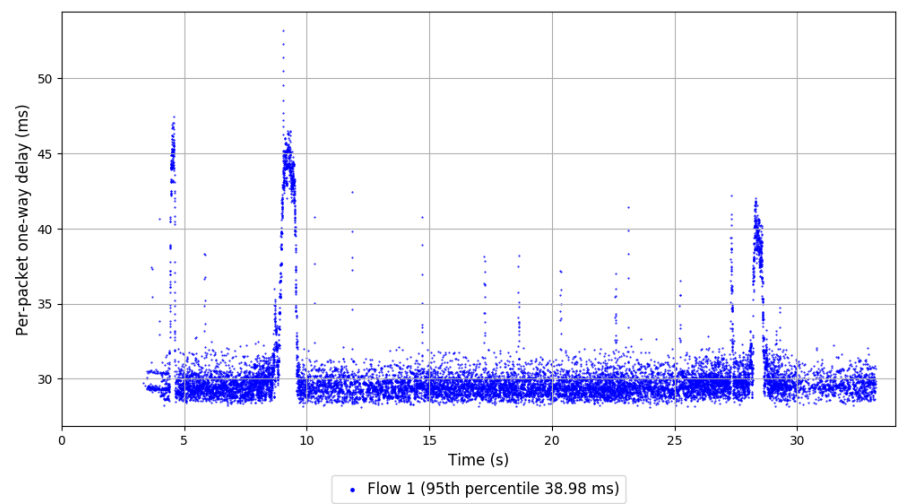
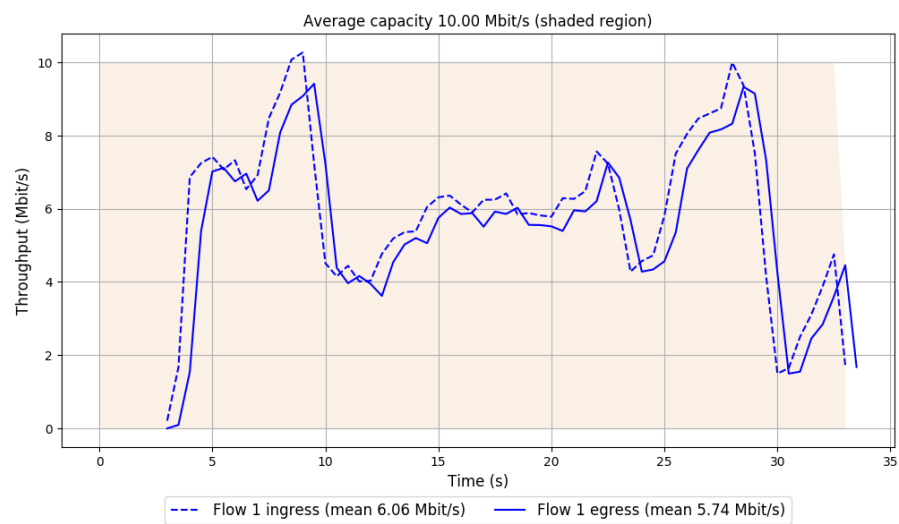
-- Flow 1:

Average throughput: 5.74 Mbit/s

95th percentile per-packet one-way delay: 38.977 ms

Loss rate: 5.30%

Run 3: Report of PCC-Vivace — Data Link



Run 4: Statistics of PCC-Vivace

Start at: 2019-10-21 21:54:06

End at: 2019-10-21 21:54:36

Below is generated by plot.py at 2019-10-21 22:00:38

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 6.26 Mbit/s (62.6% utilization)

95th percentile per-packet one-way delay: 44.661 ms

Loss rate: 5.98%

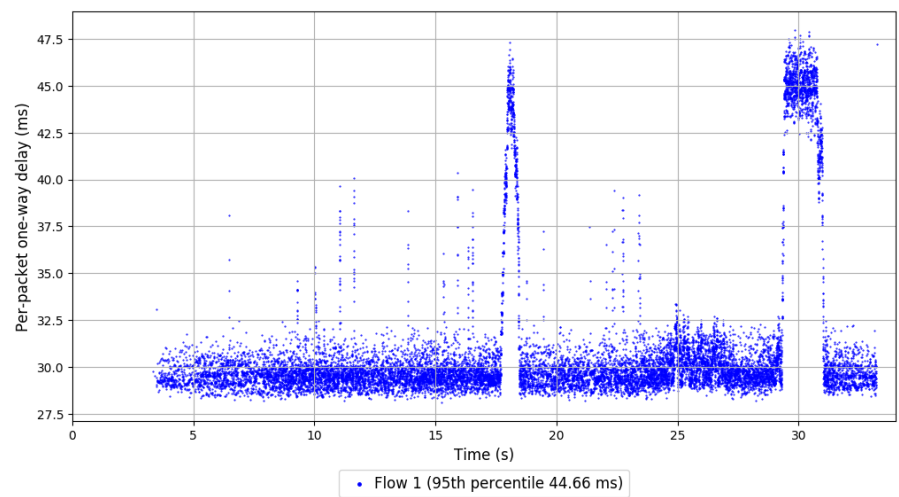
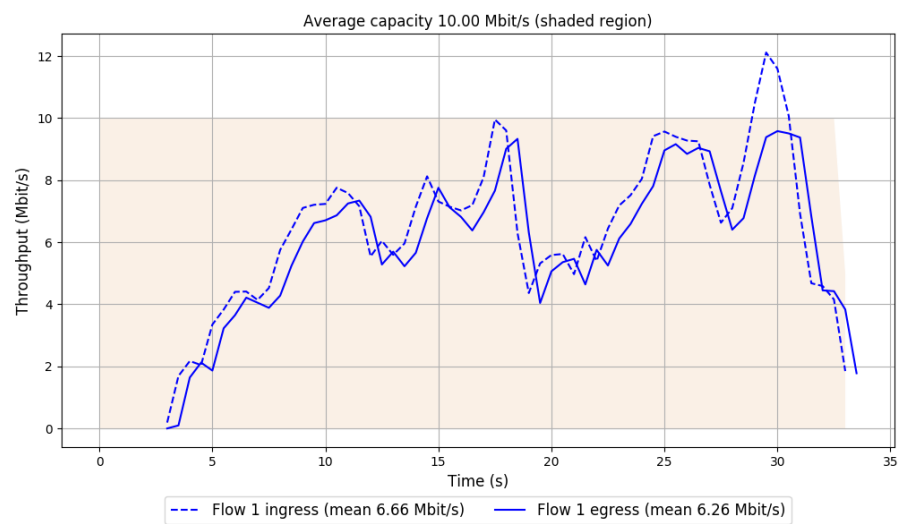
-- Flow 1:

Average throughput: 6.26 Mbit/s

95th percentile per-packet one-way delay: 44.661 ms

Loss rate: 5.98%

Run 4: Report of PCC-Vivace — Data Link



Run 5: Statistics of PCC-Vivace

Start at: 2019-10-21 21:57:03

End at: 2019-10-21 21:57:33

Below is generated by plot.py at 2019-10-21 22:00:38

Datalink statistics

-- Total of 1 flow:

Average capacity: 10.00 Mbit/s

Average throughput: 2.02 Mbit/s (20.2% utilization)

95th percentile per-packet one-way delay: 30.788 ms

Loss rate: 5.00%

-- Flow 1:

Average throughput: 2.02 Mbit/s

95th percentile per-packet one-way delay: 30.788 ms

Loss rate: 5.00%

Run 5: Report of PCC-Vivace — Data Link

