

Pantheon Report

Generated at 2019-10-22 16:24:25 (UTC).

Tested in mahimahi: mm-delay 10 mm-link 5mbps.trace 5mbps.trace --uplink-queue=droptail
--uplink-queue-args=packets=300

Repeated the test of 4 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

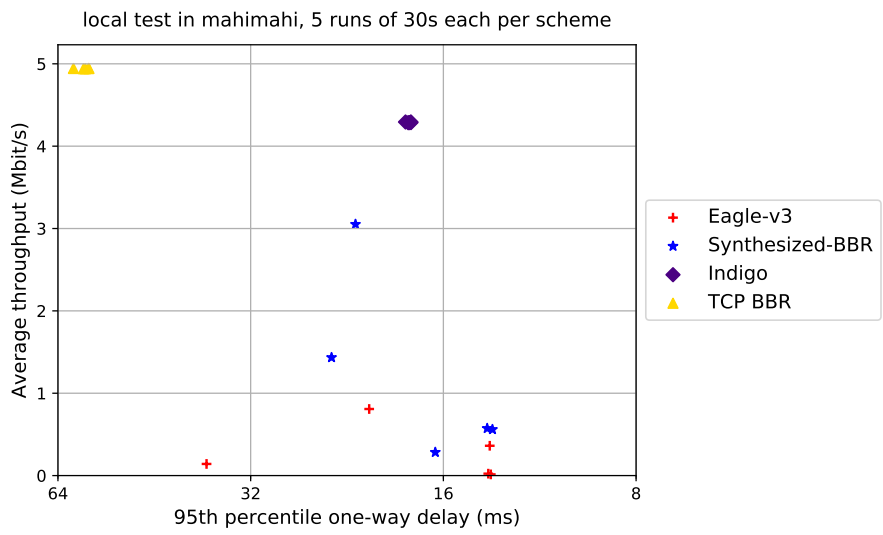
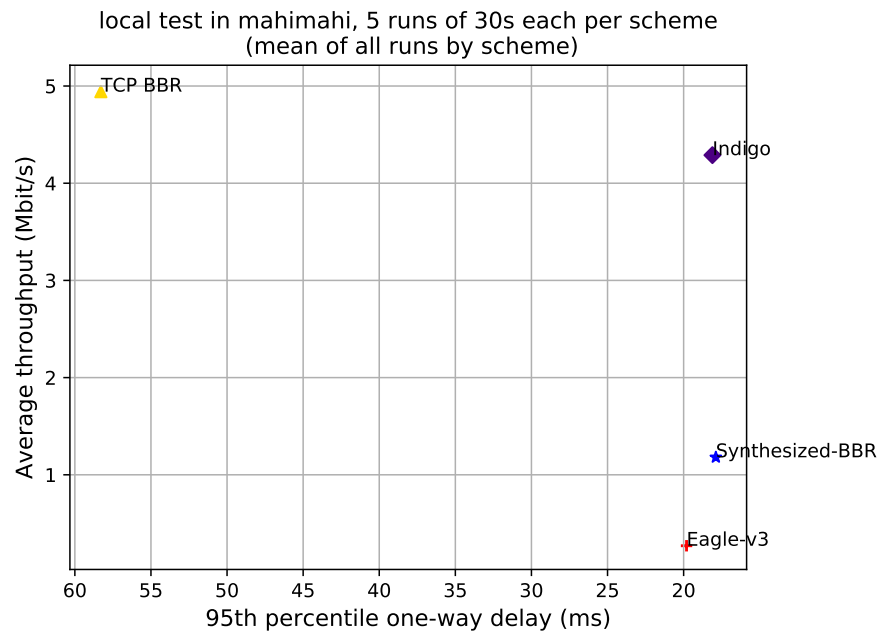
Git summary:

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-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/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
TCP BBR	5	4.94	58.29	0.18
Eagle-v3	5	0.27	19.81	0.00
Indigo	5	4.29	18.11	0.05
Synthesized-BBR	5	1.18	17.88	0.02

Run 1: Statistics of TCP BBR

Start at: 2019-10-22 16:13:29

End at: 2019-10-22 16:13:59

Below is generated by plot.py at 2019-10-22 16:24:04

Datalink statistics

-- Total of 1 flow:

Average capacity: 5.00 Mbit/s

Average throughput: 4.94 Mbit/s (98.9% utilization)

95th percentile per-packet one-way delay: 57.258 ms

Loss rate: 0.18%

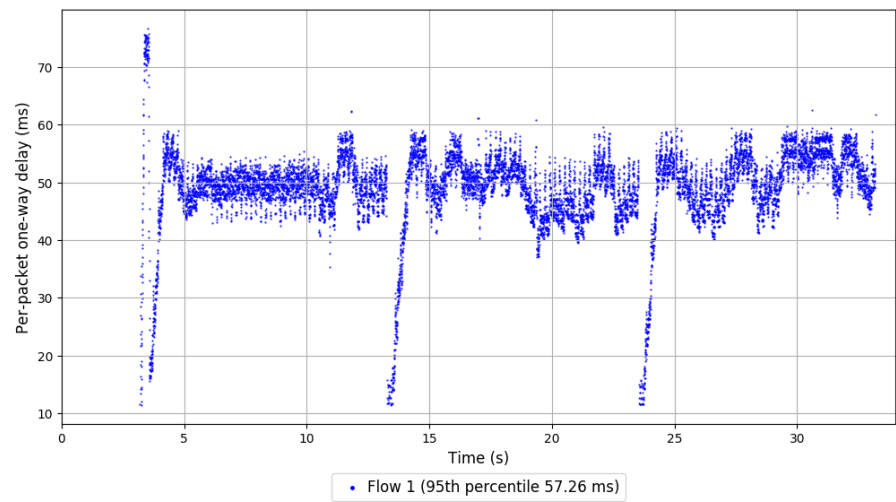
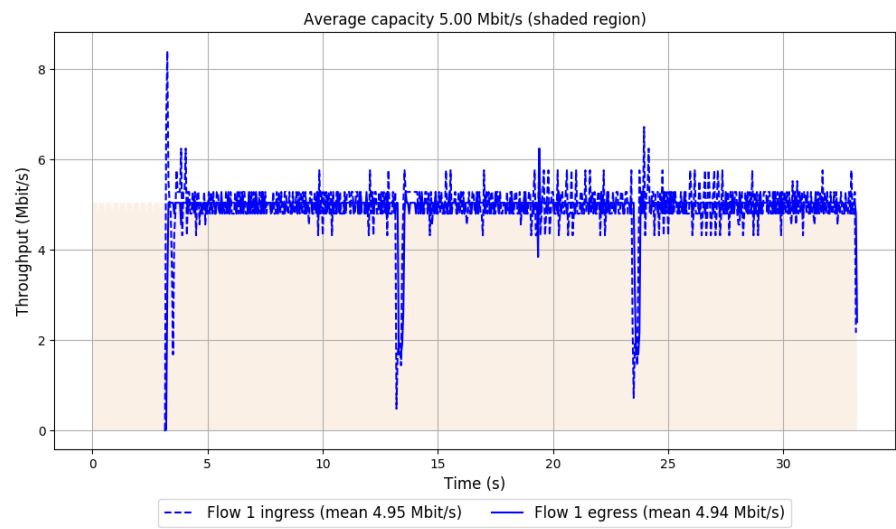
-- Flow 1:

Average throughput: 4.94 Mbit/s

95th percentile per-packet one-way delay: 57.258 ms

Loss rate: 0.18%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2019-10-22 16:15:44

End at: 2019-10-22 16:16:15

Below is generated by plot.py at 2019-10-22 16:24:06

Datalink statistics

-- Total of 1 flow:

Average capacity: 5.00 Mbit/s

Average throughput: 4.94 Mbit/s (98.9% utilization)

95th percentile per-packet one-way delay: 57.320 ms

Loss rate: 0.18%

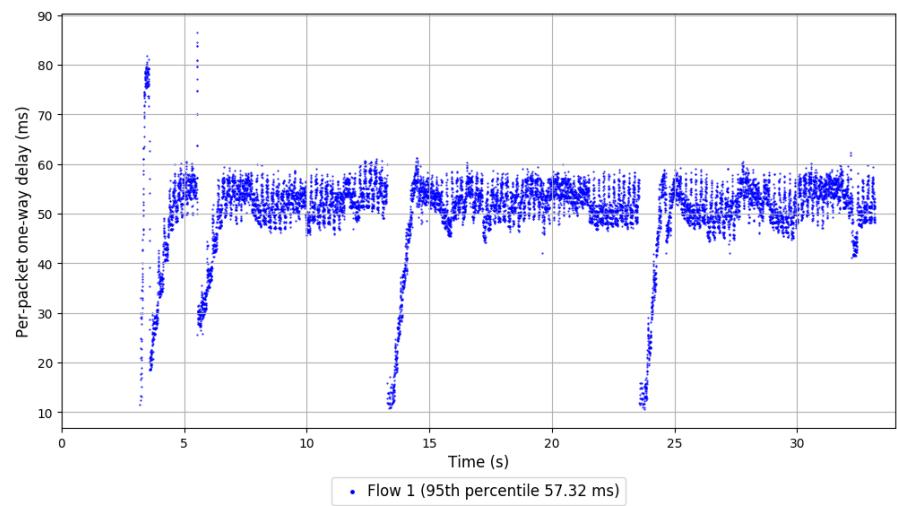
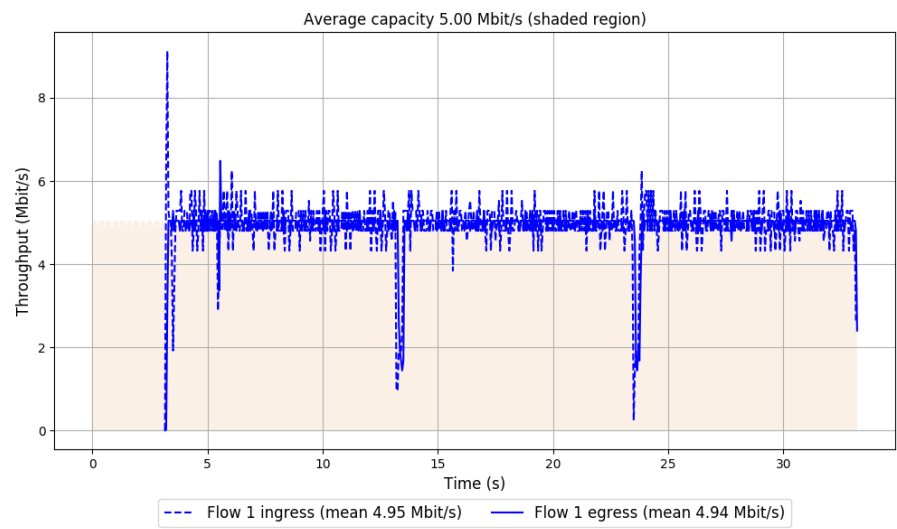
-- Flow 1:

Average throughput: 4.94 Mbit/s

95th percentile per-packet one-way delay: 57.320 ms

Loss rate: 0.18%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2019-10-22 16:18:00

End at: 2019-10-22 16:18:30

Below is generated by plot.py at 2019-10-22 16:24:06

Datalink statistics

-- Total of 1 flow:

Average capacity: 5.00 Mbit/s

Average throughput: 4.94 Mbit/s (98.8% utilization)

95th percentile per-packet one-way delay: 58.372 ms

Loss rate: 0.17%

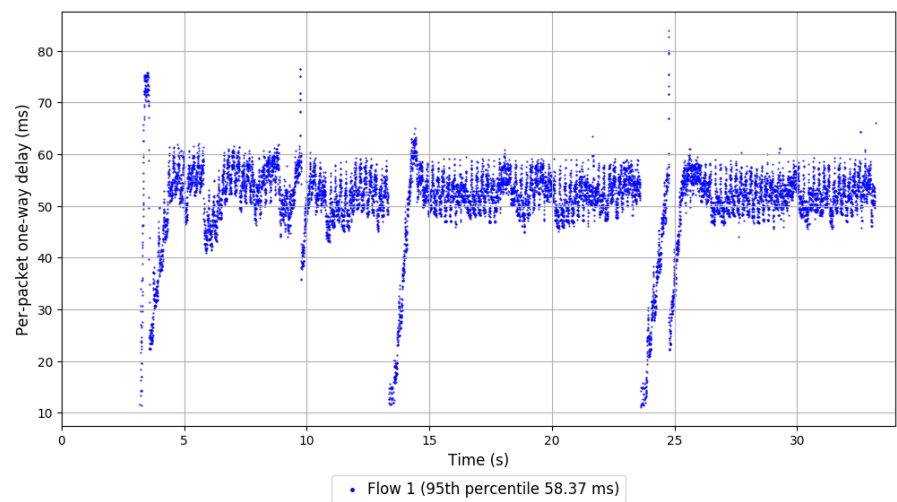
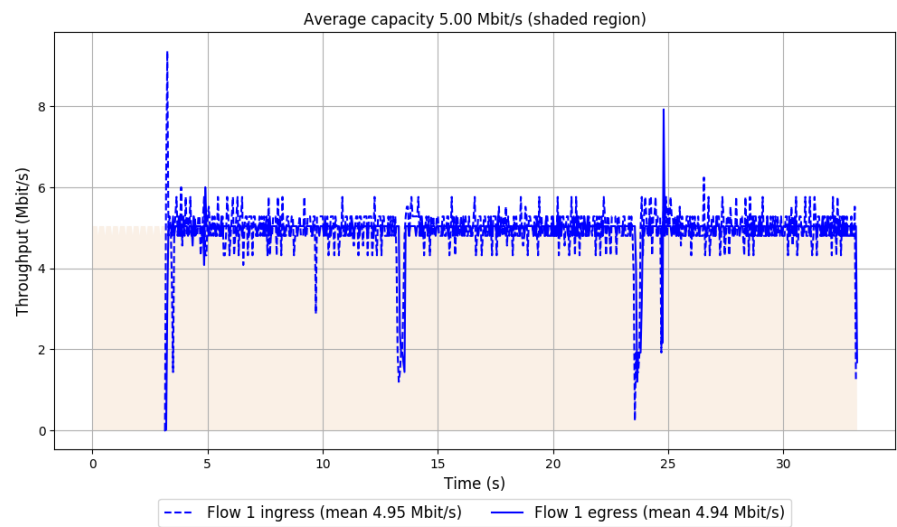
-- Flow 1:

Average throughput: 4.94 Mbit/s

95th percentile per-packet one-way delay: 58.372 ms

Loss rate: 0.17%

Run 3: Report of TCP BBR — Data Link



Run 4: Statistics of TCP BBR

Start at: 2019-10-22 16:20:16

End at: 2019-10-22 16:20:46

Below is generated by plot.py at 2019-10-22 16:24:06

Datalink statistics

-- Total of 1 flow:

Average capacity: 5.00 Mbit/s

Average throughput: 4.94 Mbit/s (98.9% utilization)

95th percentile per-packet one-way delay: 60.526 ms

Loss rate: 0.18%

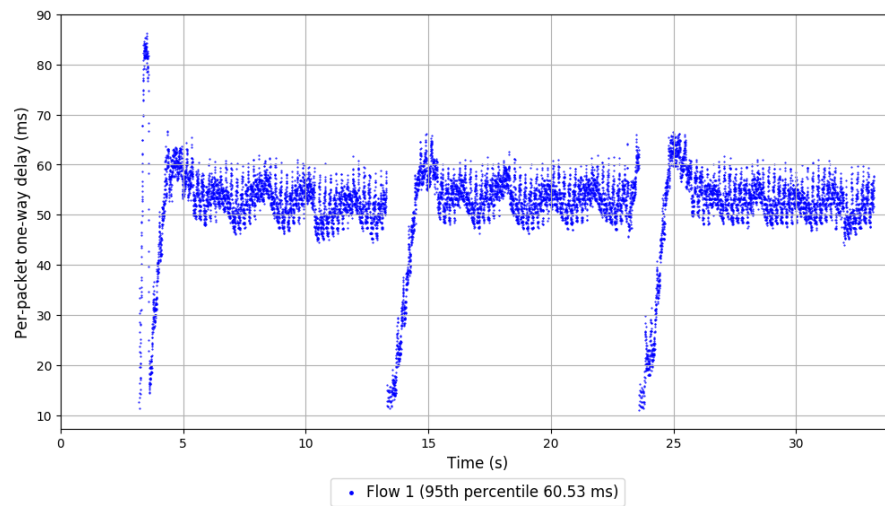
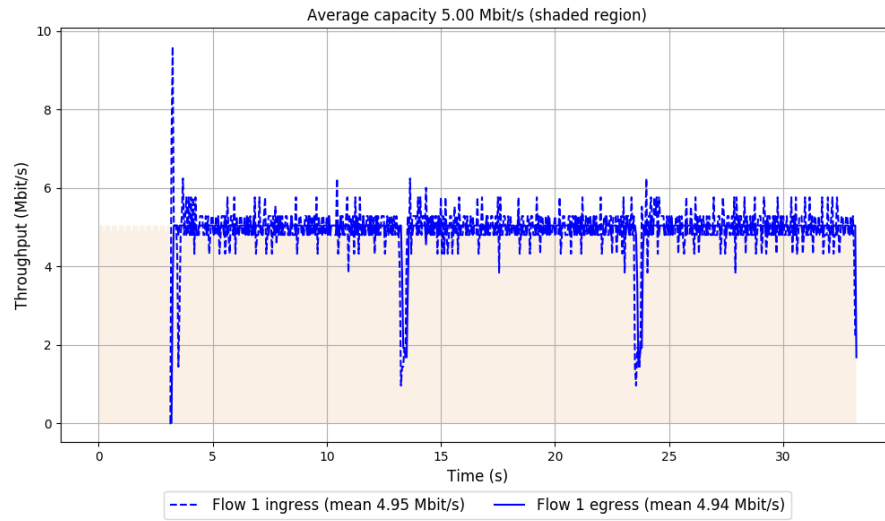
-- Flow 1:

Average throughput: 4.94 Mbit/s

95th percentile per-packet one-way delay: 60.526 ms

Loss rate: 0.18%

Run 4: Report of TCP BBR — Data Link



Run 5: Statistics of TCP BBR

Start at: 2019-10-22 16:22:32

End at: 2019-10-22 16:23:02

Below is generated by plot.py at 2019-10-22 16:24:10

Datalink statistics

-- Total of 1 flow:

Average capacity: 5.00 Mbit/s

Average throughput: 4.94 Mbit/s (98.8% utilization)

95th percentile per-packet one-way delay: 57.978 ms

Loss rate: 0.20%

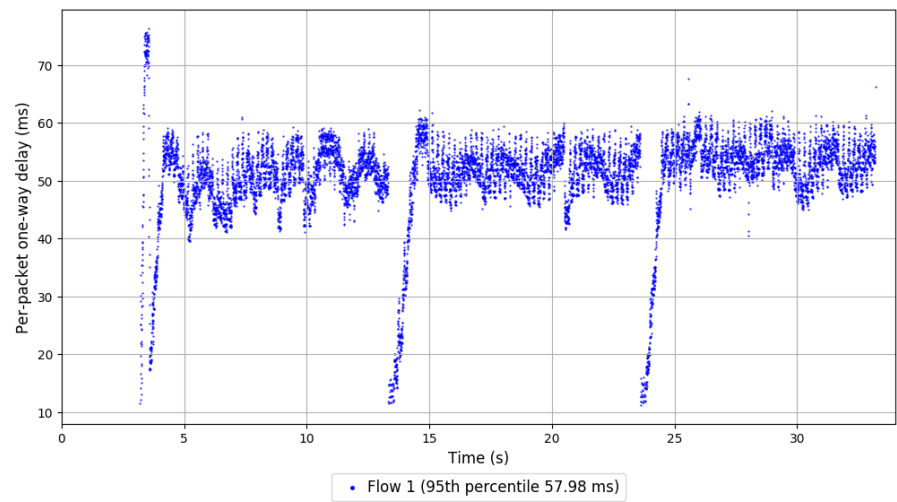
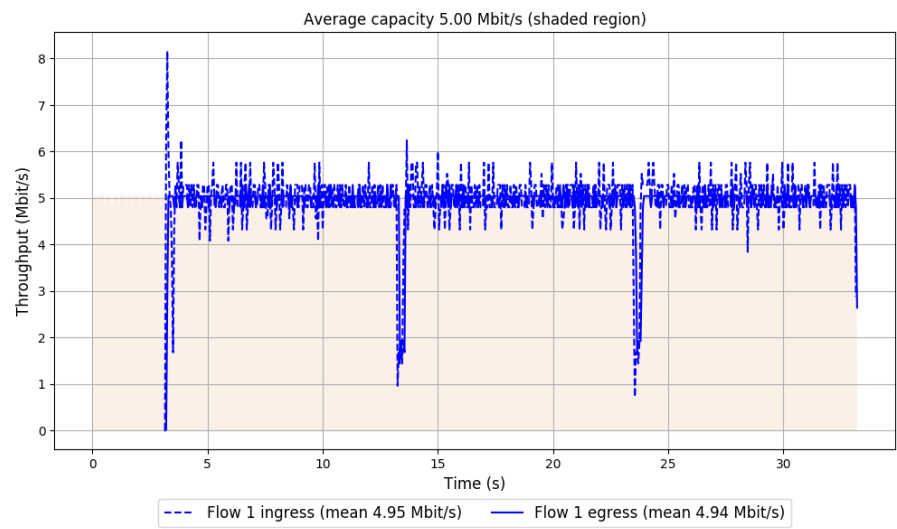
-- Flow 1:

Average throughput: 4.94 Mbit/s

95th percentile per-packet one-way delay: 57.978 ms

Loss rate: 0.20%

Run 5: Report of TCP BBR — Data Link

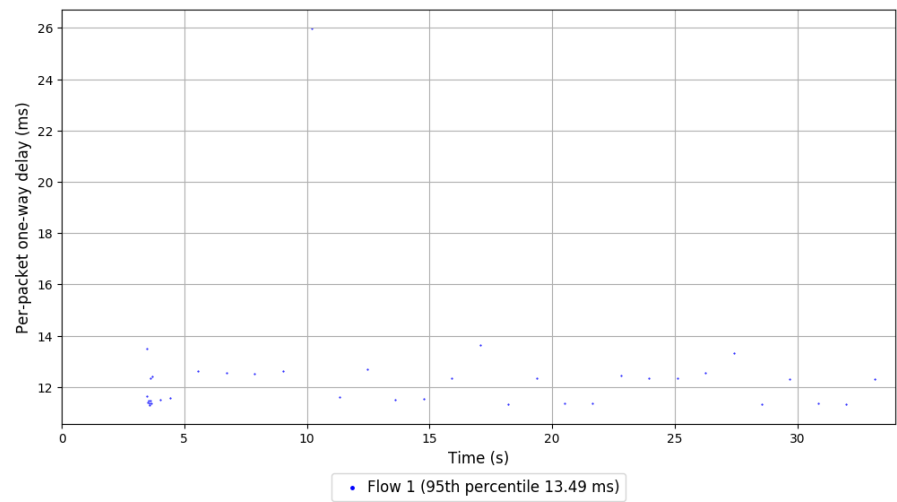
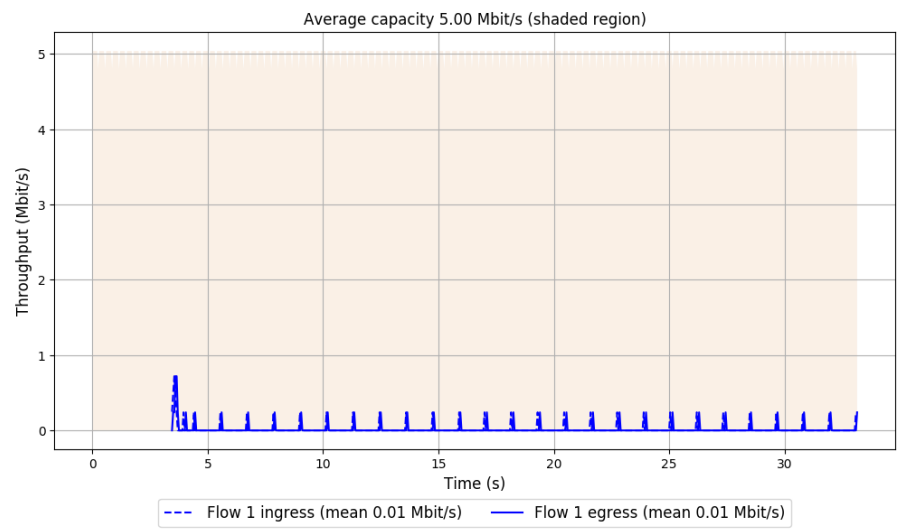


```
Run 1: Statistics of Eagle-v3

Start at: 2019-10-22 16:12:21
End at: 2019-10-22 16:12:51

# Below is generated by plot.py at 2019-10-22 16:24:10
# Datalink statistics
-- Total of 1 flow:
Average capacity: 5.00 Mbit/s
Average throughput: 0.01 Mbit/s (0.3% utilization)
95th percentile per-packet one-way delay: 13.491 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 13.491 ms
Loss rate: 0.00%
```

Run 1: Report of Eagle-v3 — Data Link



Run 2: Statistics of Eagle-v3

Start at: 2019-10-22 16:14:37

End at: 2019-10-22 16:15:07

Below is generated by plot.py at 2019-10-22 16:24:10

Datalink statistics

-- Total of 1 flow:

Average capacity: 5.00 Mbit/s

Average throughput: 0.81 Mbit/s (16.2% utilization)

95th percentile per-packet one-way delay: 20.893 ms

Loss rate: 0.00%

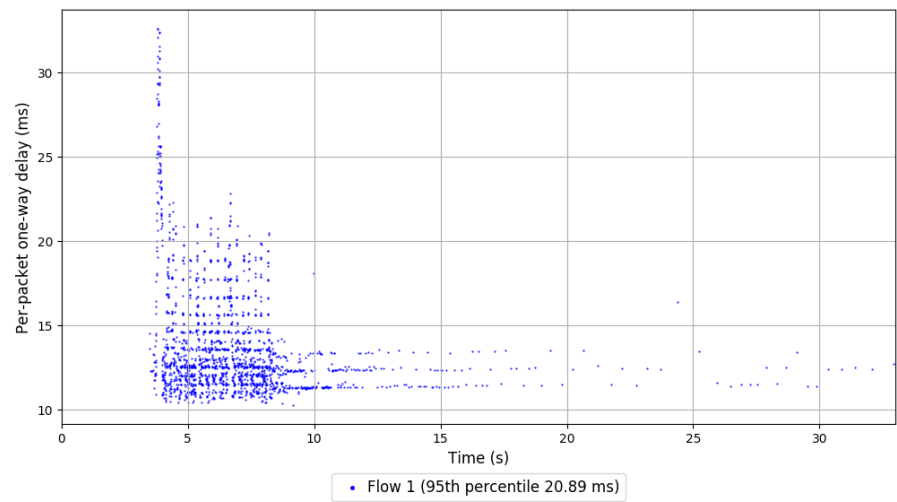
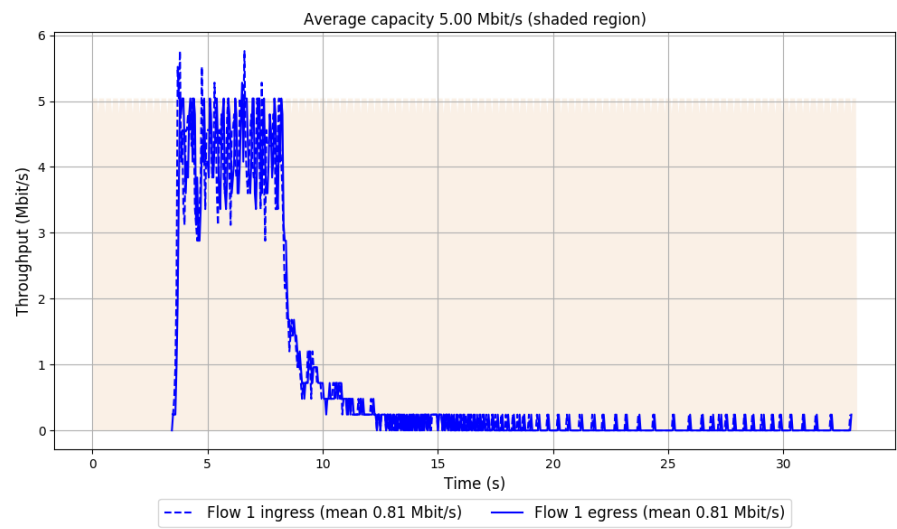
-- Flow 1:

Average throughput: 0.81 Mbit/s

95th percentile per-packet one-way delay: 20.893 ms

Loss rate: 0.00%

Run 2: Report of Eagle-v3 — Data Link



Run 3: Statistics of Eagle-v3

Start at: 2019-10-22 16:16:53

End at: 2019-10-22 16:17:23

Below is generated by plot.py at 2019-10-22 16:24:10

Datalink statistics

-- Total of 1 flow:

Average capacity: 5.00 Mbit/s

Average throughput: 0.14 Mbit/s (2.8% utilization)

95th percentile per-packet one-way delay: 37.503 ms

Loss rate: 0.00%

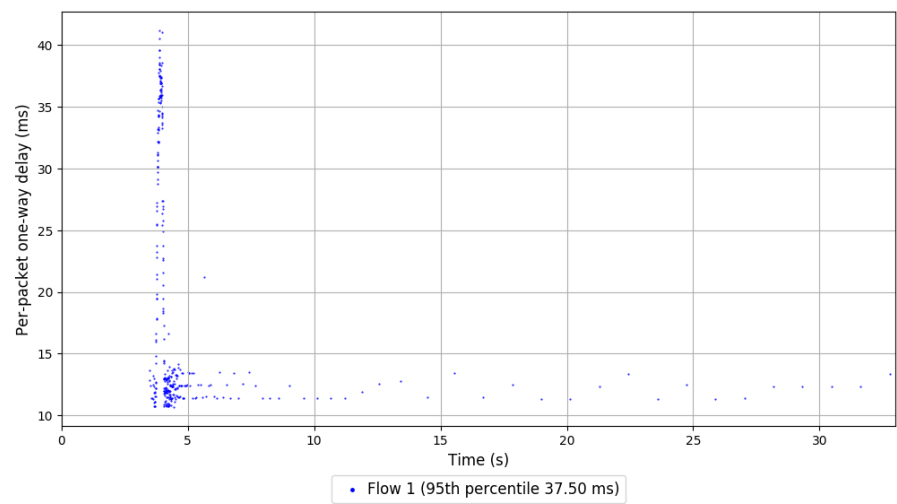
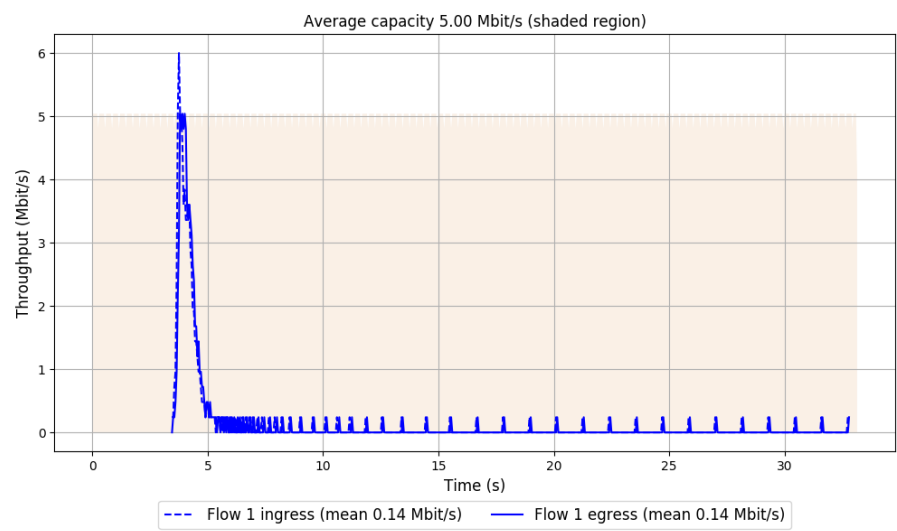
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 37.503 ms

Loss rate: 0.00%

Run 3: Report of Eagle-v3 — Data Link



Run 4: Statistics of Eagle-v3

Start at: 2019-10-22 16:19:08

End at: 2019-10-22 16:19:38

Below is generated by plot.py at 2019-10-22 16:24:11

Datalink statistics

-- Total of 1 flow:

Average capacity: 5.00 Mbit/s

Average throughput: 0.36 Mbit/s (7.2% utilization)

95th percentile per-packet one-way delay: 13.542 ms

Loss rate: 0.00%

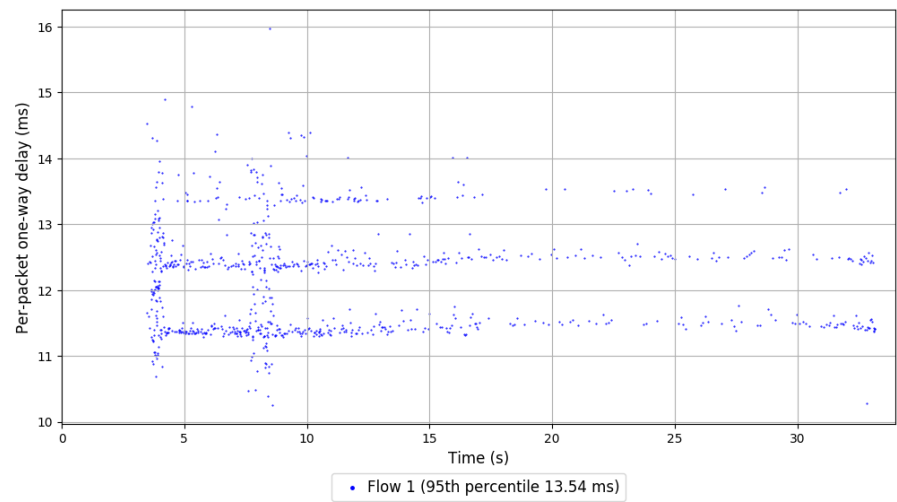
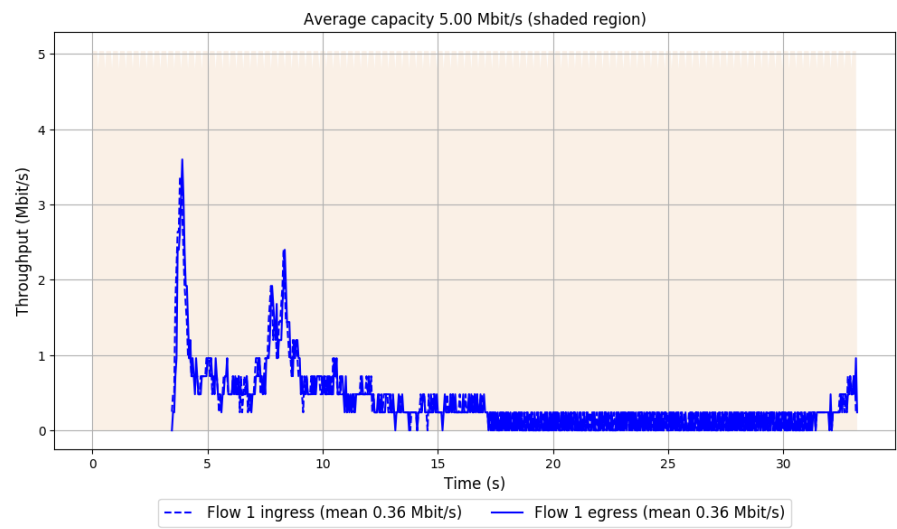
-- Flow 1:

Average throughput: 0.36 Mbit/s

95th percentile per-packet one-way delay: 13.542 ms

Loss rate: 0.00%

Run 4: Report of Eagle-v3 — Data Link



Run 5: Statistics of Eagle-v3

Start at: 2019-10-22 16:21:24

End at: 2019-10-22 16:21:54

Below is generated by plot.py at 2019-10-22 16:24:12

Datalink statistics

-- Total of 1 flow:

Average capacity: 5.00 Mbit/s

Average throughput: 0.02 Mbit/s (0.5% utilization)

95th percentile per-packet one-way delay: 13.614 ms

Loss rate: 0.00%

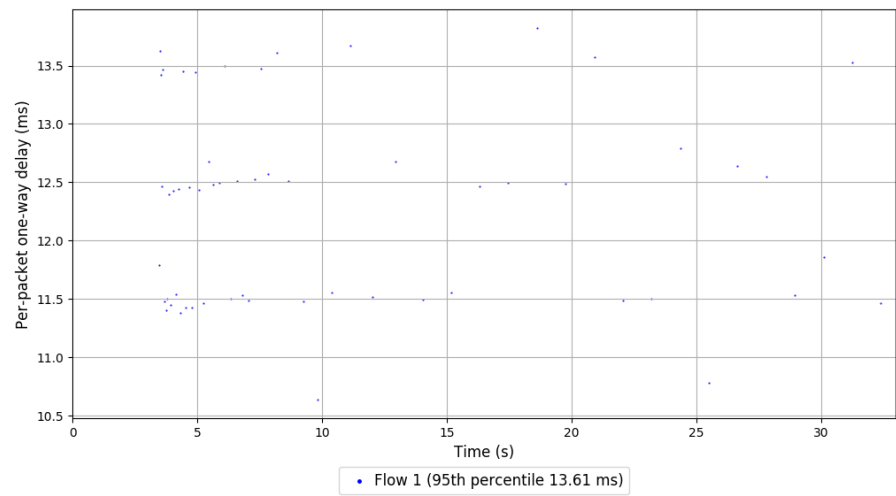
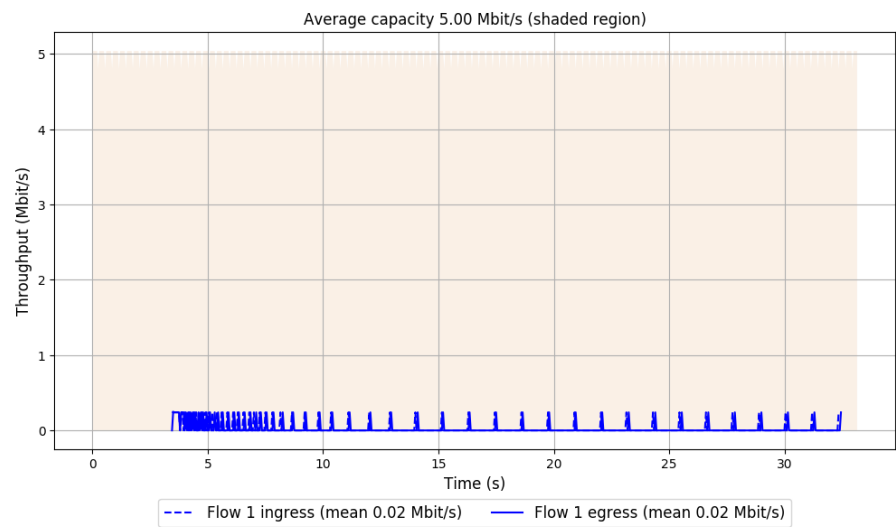
-- Flow 1:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 13.614 ms

Loss rate: 0.00%

Run 5: Report of Eagle-v3 — Data Link

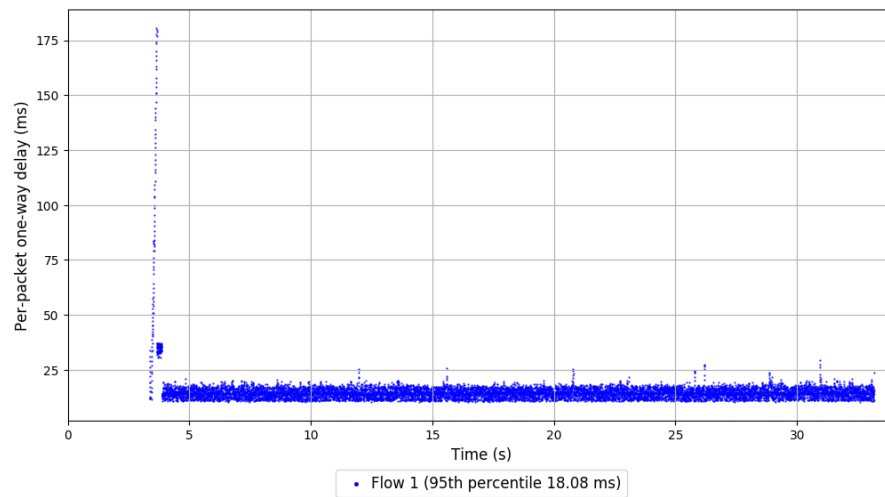
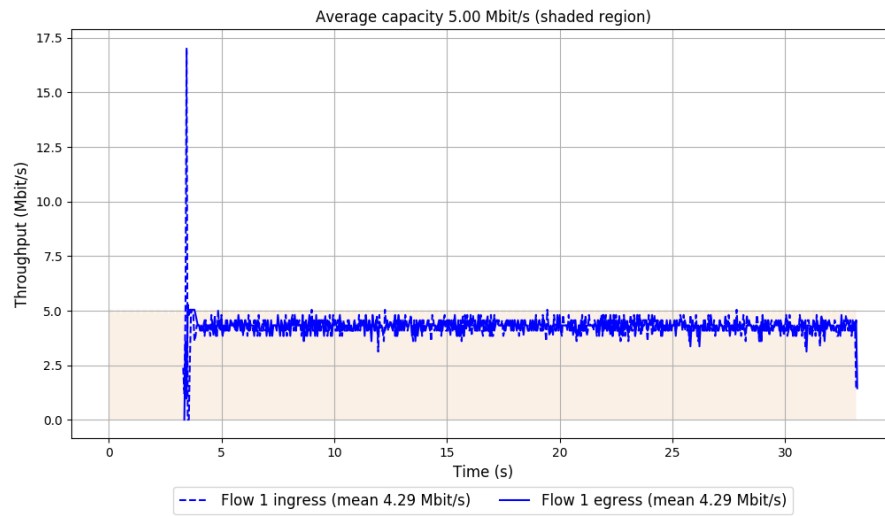



```
Run 1: Statistics of Indigo

Start at: 2019-10-22 16:14:03
End at: 2019-10-22 16:14:33

# Below is generated by plot.py at 2019-10-22 16:24:16
# Datalink statistics
-- Total of 1 flow:
Average capacity: 5.00 Mbit/s
Average throughput: 4.29 Mbit/s (85.7% utilization)
95th percentile per-packet one-way delay: 18.083 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 4.29 Mbit/s
95th percentile per-packet one-way delay: 18.083 ms
Loss rate: 0.06%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2019-10-22 16:16:19

End at: 2019-10-22 16:16:49

Below is generated by plot.py at 2019-10-22 16:24:16

Datalink statistics

-- Total of 1 flow:

Average capacity: 5.00 Mbit/s

Average throughput: 4.29 Mbit/s (85.7% utilization)

95th percentile per-packet one-way delay: 18.161 ms

Loss rate: 0.04%

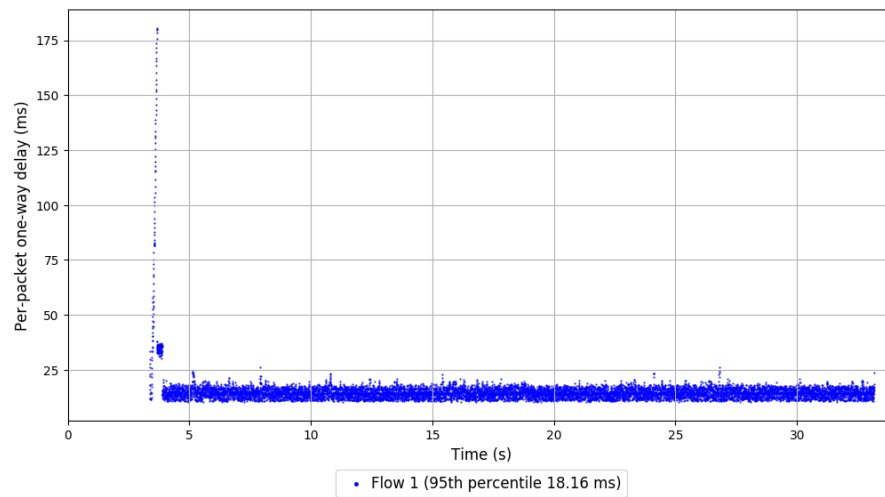
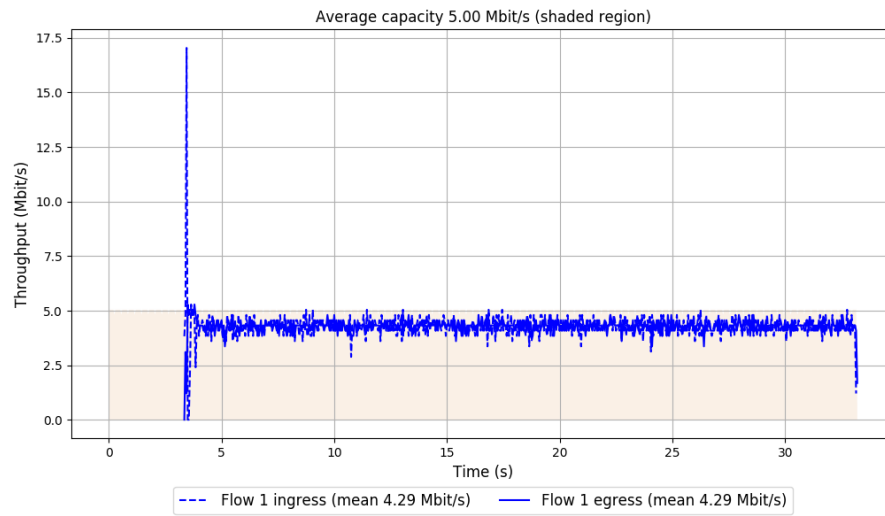
-- Flow 1:

Average throughput: 4.29 Mbit/s

95th percentile per-packet one-way delay: 18.161 ms

Loss rate: 0.04%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2019-10-22 16:18:34

End at: 2019-10-22 16:19:04

Below is generated by plot.py at 2019-10-22 16:24:17

Datalink statistics

-- Total of 1 flow:

Average capacity: 5.00 Mbit/s

Average throughput: 4.29 Mbit/s (85.9% utilization)

95th percentile per-packet one-way delay: 18.335 ms

Loss rate: 0.05%

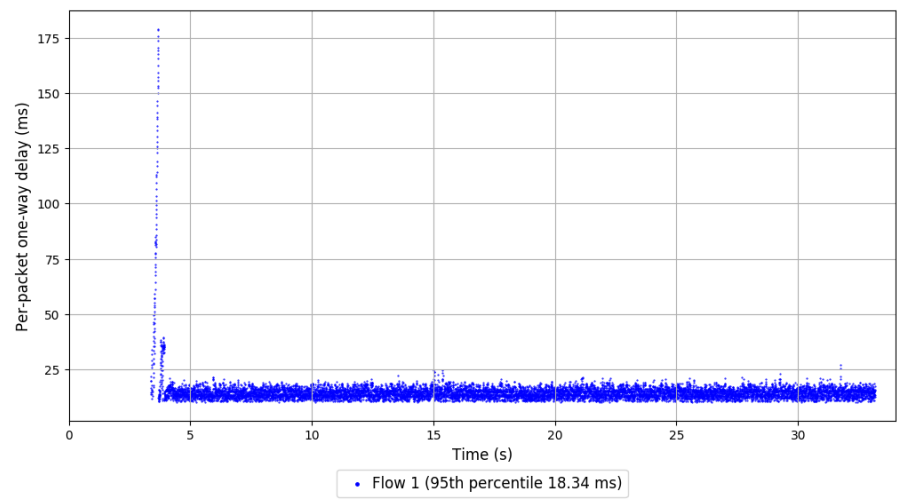
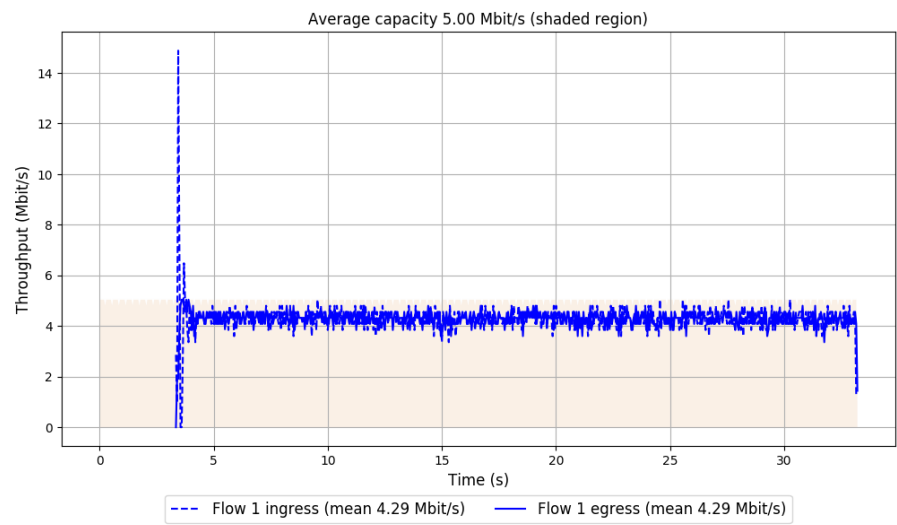
-- Flow 1:

Average throughput: 4.29 Mbit/s

95th percentile per-packet one-way delay: 18.335 ms

Loss rate: 0.05%

Run 3: Report of Indigo — Data Link



Run 4: Statistics of Indigo

Start at: 2019-10-22 16:20:50

End at: 2019-10-22 16:21:20

Below is generated by plot.py at 2019-10-22 16:24:18

Datalink statistics

-- Total of 1 flow:

Average capacity: 5.00 Mbit/s

Average throughput: 4.29 Mbit/s (85.9% utilization)

95th percentile per-packet one-way delay: 17.984 ms

Loss rate: 0.07%

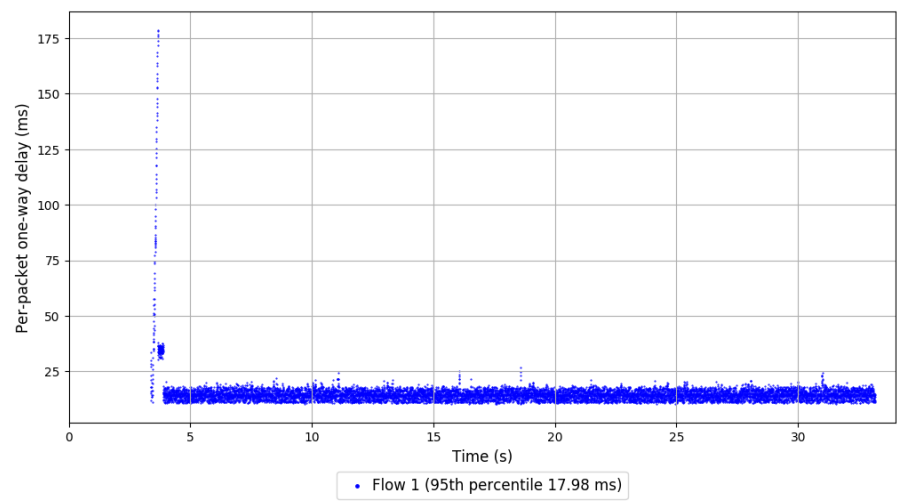
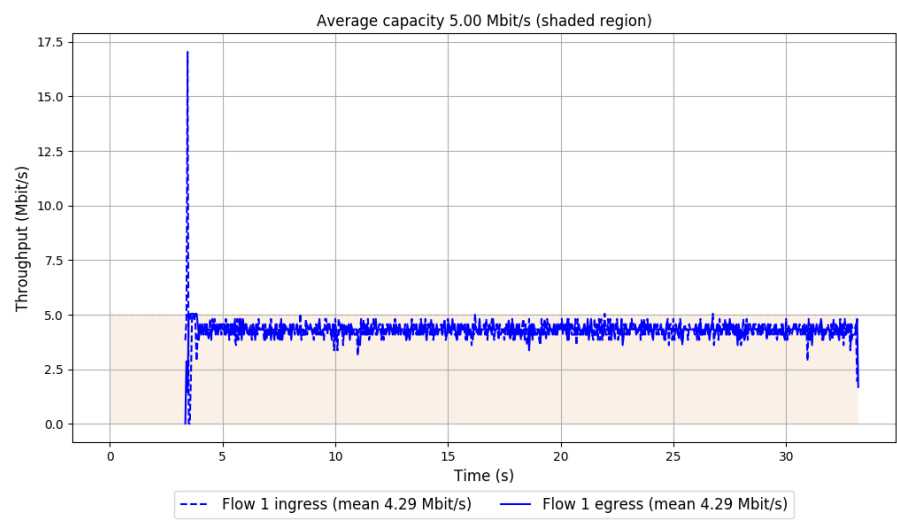
-- Flow 1:

Average throughput: 4.29 Mbit/s

95th percentile per-packet one-way delay: 17.984 ms

Loss rate: 0.07%

Run 4: Report of Indigo — Data Link



Run 5: Statistics of Indigo

Start at: 2019-10-22 16:23:06

End at: 2019-10-22 16:23:36

Below is generated by plot.py at 2019-10-22 16:24:22

Datalink statistics

-- Total of 1 flow:

Average capacity: 5.00 Mbit/s

Average throughput: 4.29 Mbit/s (85.7% utilization)

95th percentile per-packet one-way delay: 17.981 ms

Loss rate: 0.03%

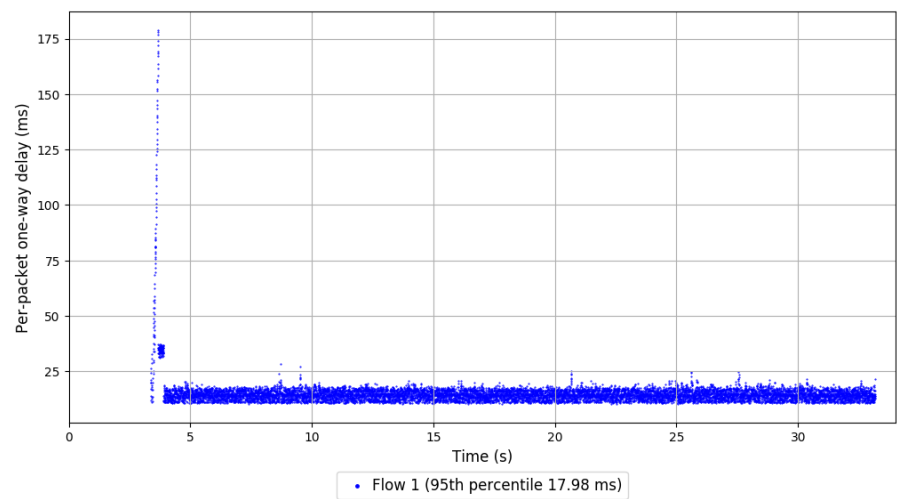
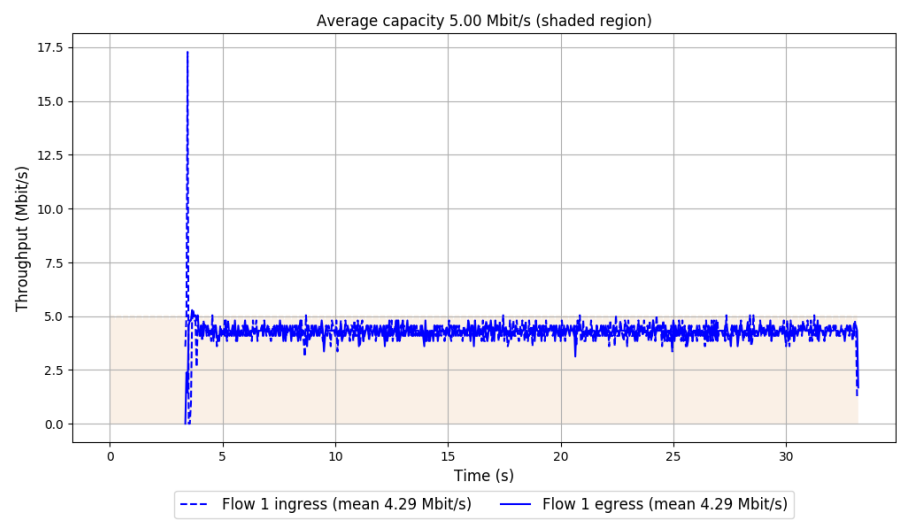
-- Flow 1:

Average throughput: 4.29 Mbit/s

95th percentile per-packet one-way delay: 17.981 ms

Loss rate: 0.03%

Run 5: Report of Indigo — Data Link

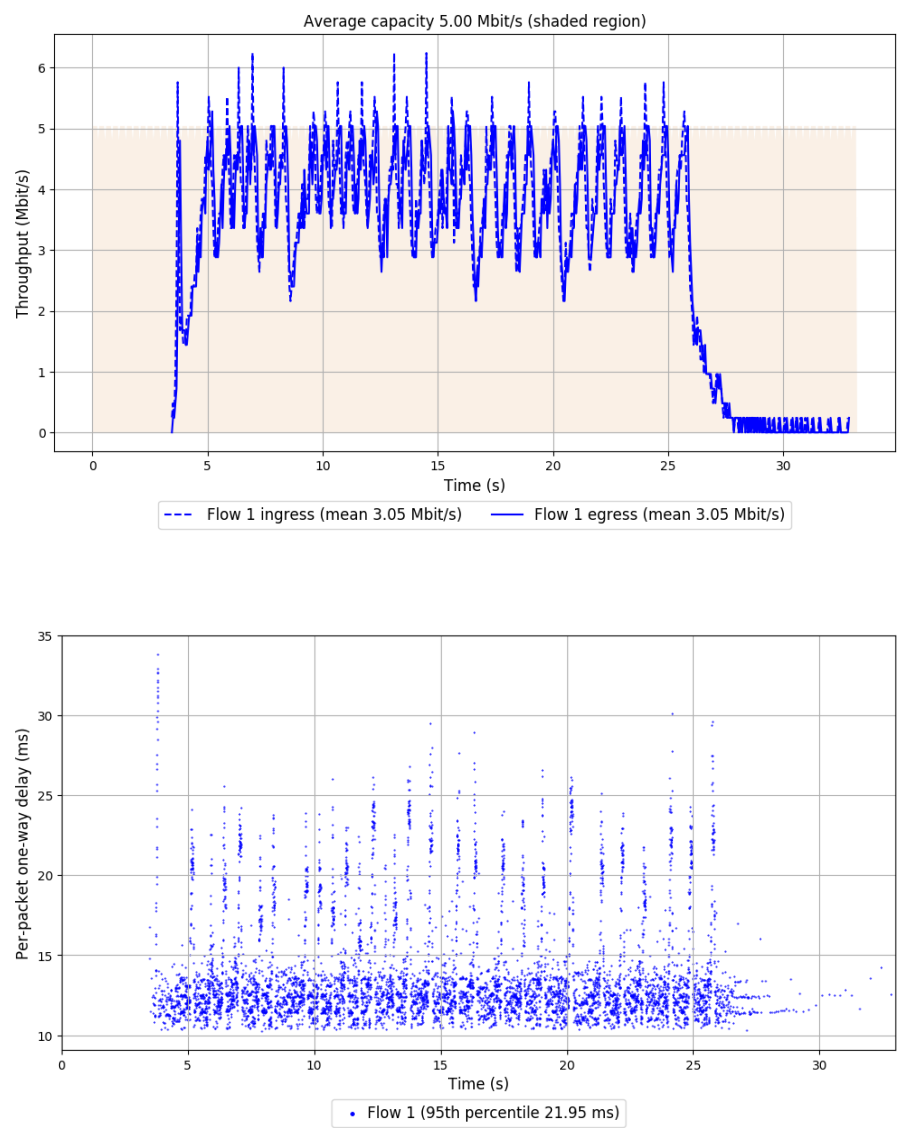


```
Run 1: Statistics of Synthesized-BBR

Start at: 2019-10-22 16:12:55
End at: 2019-10-22 16:13:25

# Below is generated by plot.py at 2019-10-22 16:24:22
# Datalink statistics
-- Total of 1 flow:
Average capacity: 5.00 Mbit/s
Average throughput: 3.05 Mbit/s (61.0% utilization)
95th percentile per-packet one-way delay: 21.948 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 3.05 Mbit/s
95th percentile per-packet one-way delay: 21.948 ms
Loss rate: 0.00%
```

Run 1: Report of Synthesized-BBR — Data Link



Run 2: Statistics of Synthesized-BBR

Start at: 2019-10-22 16:15:11

End at: 2019-10-22 16:15:41

Below is generated by plot.py at 2019-10-22 16:24:22

Datalink statistics

-- Total of 1 flow:

Average capacity: 5.00 Mbit/s

Average throughput: 0.28 Mbit/s (5.7% utilization)

95th percentile per-packet one-way delay: 16.471 ms

Loss rate: 0.00%

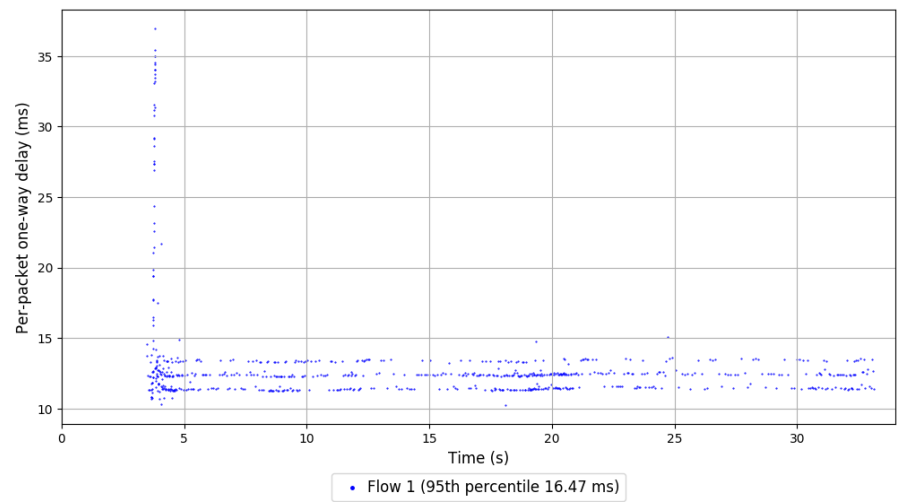
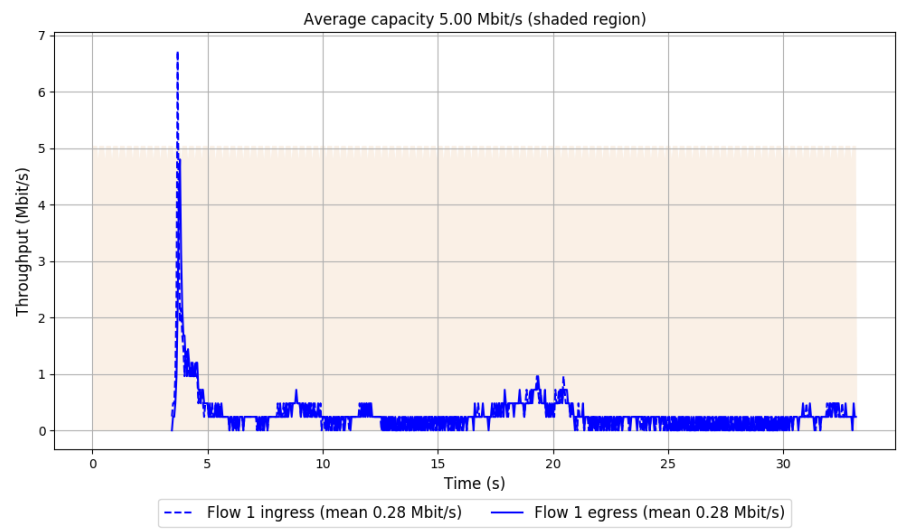
-- Flow 1:

Average throughput: 0.28 Mbit/s

95th percentile per-packet one-way delay: 16.471 ms

Loss rate: 0.00%

Run 2: Report of Synthesized-BBR — Data Link



Run 3: Statistics of Synthesized-BBR

Start at: 2019-10-22 16:17:26

End at: 2019-10-22 16:17:56

Below is generated by plot.py at 2019-10-22 16:24:22

Datalink statistics

-- Total of 1 flow:

Average capacity: 5.00 Mbit/s

Average throughput: 1.43 Mbit/s (28.7% utilization)

95th percentile per-packet one-way delay: 23.923 ms

Loss rate: 0.03%

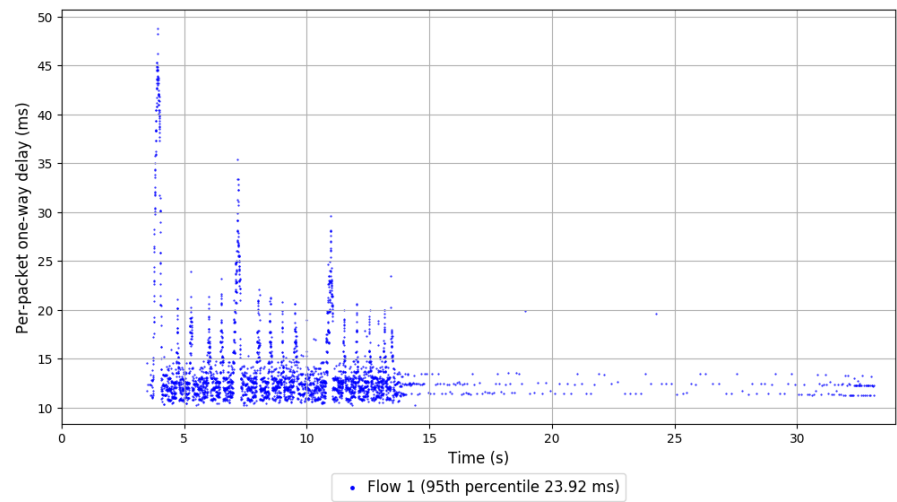
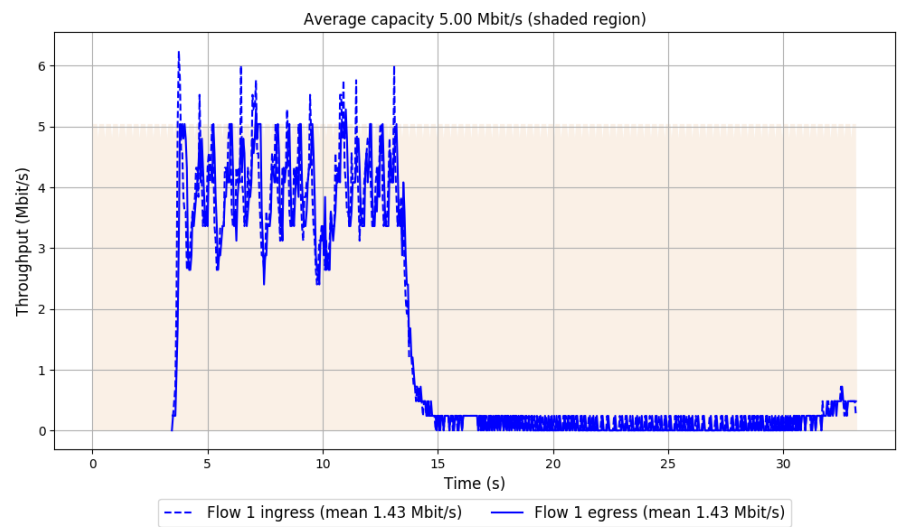
-- Flow 1:

Average throughput: 1.43 Mbit/s

95th percentile per-packet one-way delay: 23.923 ms

Loss rate: 0.03%

Run 3: Report of Synthesized-BBR — Data Link



Run 4: Statistics of Synthesized-BBR

Start at: 2019-10-22 16:19:42

End at: 2019-10-22 16:20:12

Below is generated by plot.py at 2019-10-22 16:24:23

Datalink statistics

-- Total of 1 flow:

Average capacity: 5.00 Mbit/s

Average throughput: 0.56 Mbit/s (11.2% utilization)

95th percentile per-packet one-way delay: 13.411 ms

Loss rate: 0.07%

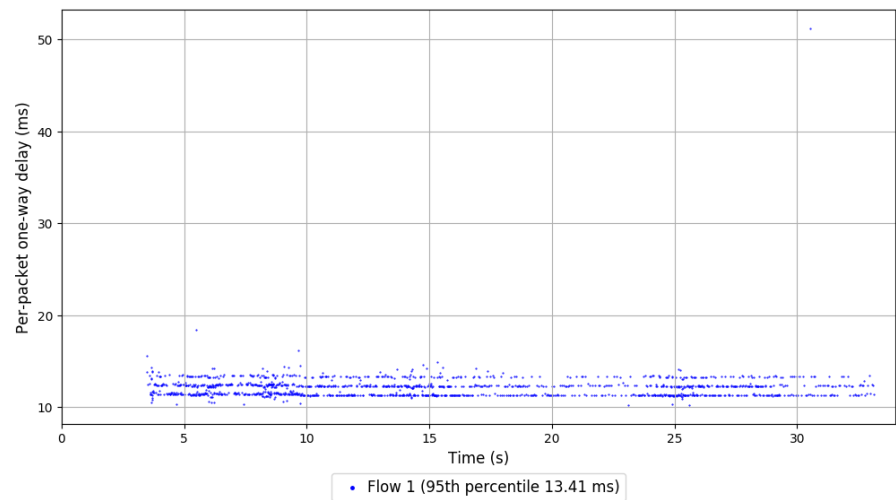
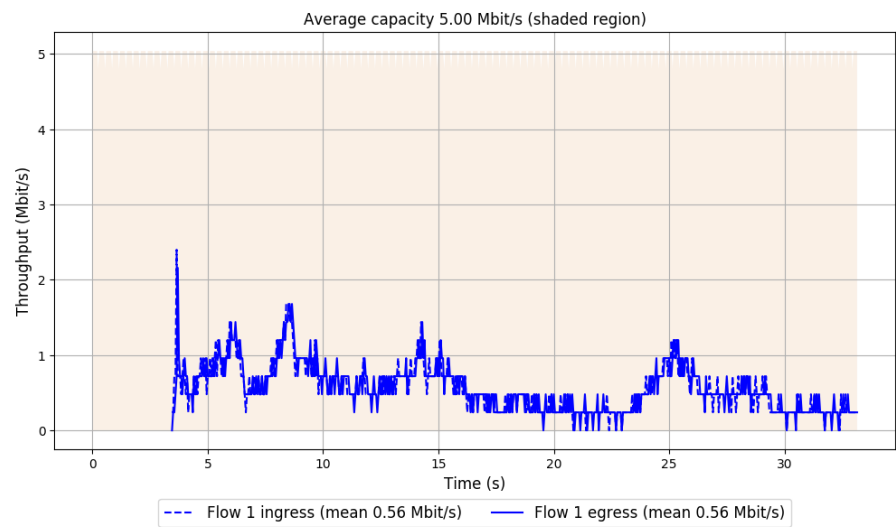
-- Flow 1:

Average throughput: 0.56 Mbit/s

95th percentile per-packet one-way delay: 13.411 ms

Loss rate: 0.07%

Run 4: Report of Synthesized-BBR — Data Link



Run 5: Statistics of Synthesized-BBR

Start at: 2019-10-22 16:21:58

End at: 2019-10-22 16:22:28

Below is generated by plot.py at 2019-10-22 16:24:24

Datalink statistics

-- Total of 1 flow:

Average capacity: 5.00 Mbit/s

Average throughput: 0.57 Mbit/s (11.5% utilization)

95th percentile per-packet one-way delay: 13.666 ms

Loss rate: 0.00%

-- Flow 1:

Average throughput: 0.57 Mbit/s

95th percentile per-packet one-way delay: 13.666 ms

Loss rate: 0.00%

Run 5: Report of Synthesized-BBR — Data Link

