Pantheon Report

Generated at 2019-07-31 05:53:40 (UTC).
Tested in mahimahi: `mm-delay 50 mm-link 10mbps.trace 10mbps.trace`
Repeated the test of 7 congestion control schemes twice.
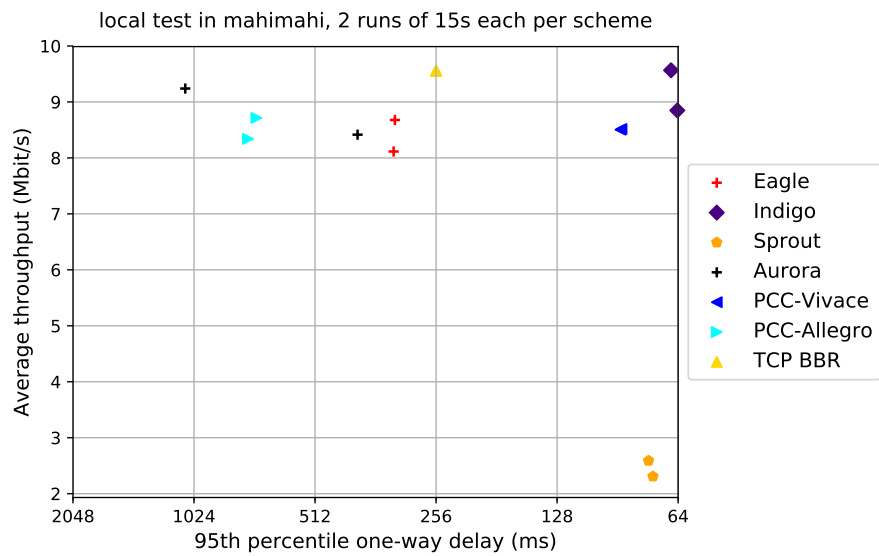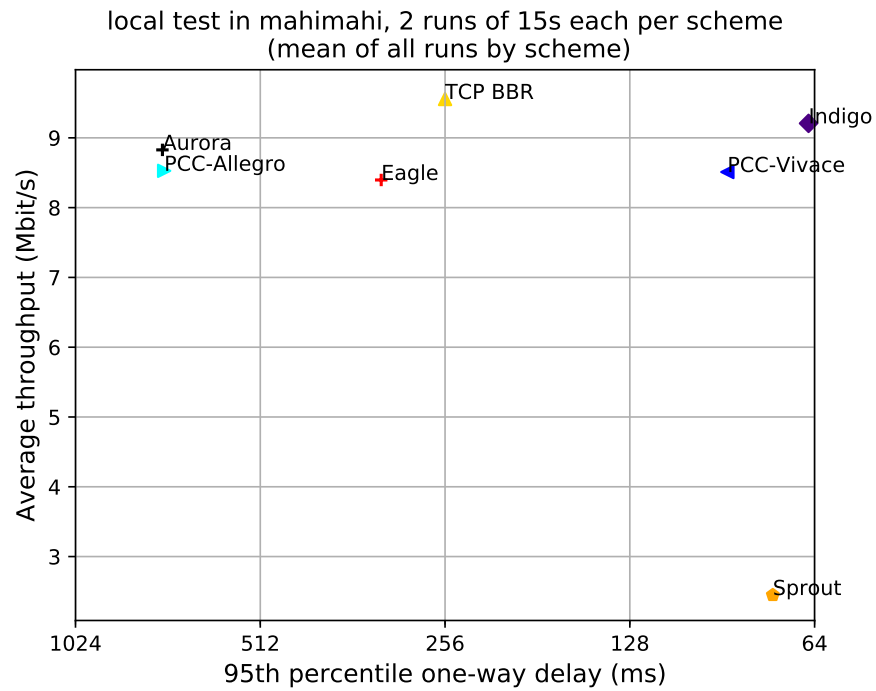Each test lasted for 15 seconds running 1 flow.

```
System info:
Linux 4.15.0-54-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 @ b22101545ea1262748c31480996539553d2922be
third_party/aurora @ f3e943d61015b39960854ba6391797e0c7984d74
third_party/aurora-model @ e292c316c23fb837255c4e142e40590d154bbe95
third_party/eagle @ f66d3a824f0abdd3b1d0afc0cc323607b2c38eca
 M sender-receiver/sender-receiver/sender_receiver/envs/example-xentropy.py
 D sender-receiver/sender-receiver/sender_receiver/envs/model-xentropy.pt
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdfe58e562f4
third_party/gold @ e47bed6d7495aa223eec8de2c7a43035967074ef
 M environment/__pycache__/datagram_pb2.cpython-36.opt-1.pyc
 M environment/__pycache__/datagram_pb2.cpython-36.pyc
 M environment/__pycache__/environment.cpython-36.opt-1.pyc
 M environment/__pycache__/helpers.cpython-36.opt-1.pyc
 M environment/__pycache__/helpers.cpython-36.pyc
 M environment/__pycache__/mahimahi.cpython-36.opt-1.pyc
 M environment/__pycache__/project_root.cpython-36.opt-1.pyc
 M environment/__pycache__/project_root.cpython-36.pyc
 M environment/__pycache__/receiver.cpython-36.opt-1.pyc
 M environment/__pycache__/receiver.cpython-36.pyc
 M environment/logs.txt
 M model
third_party/goldLSTM @ 6b512ee75b163fd680d7bf3cde4cf6d6aa7102c4
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/verus @ d4b447ea74c6c60a261149af2629562939f9a494
 M src/verus.hpp
 M tools/plot.py
third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851
```

local test in mahimahi, 2 runs of 15s each per scheme
(mean of all runs by scheme)

local test in mahimahi, 2 runs of 15s each per scheme

scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
Aurora	2	8.83	739.03	4.45
TCP BBR	2	9.56	255.99	0.90
Eagle	2	8.39	325.28	1.19
Indigo	2	9.21	65.47	0.42
PCC-Allegro	2	8.53	734.25	0.35
Sprout	2	2.45	74.86	0.29
PCC-Vivace	2	8.51	88.78	0.41

```
Run 1: Statistics of Aurora

Start at: 2019-07-31 05:46:37
End at: 2019-07-31 05:46:52

# Below is generated by plot.py at 2019-07-31 05:53:26
# Datalink statistics
-- Total of 1 flow:
Average capacity: 10.00 Mbit/s
Average throughput: 9.24 Mbit/s (92.4% utilization)
95th percentile per-packet one-way delay: 1076.717 ms
Loss rate: 7.59%
-- Flow 1:
Average throughput: 9.24 Mbit/s
95th percentile per-packet one-way delay: 1076.717 ms
Loss rate: 7.59%
```
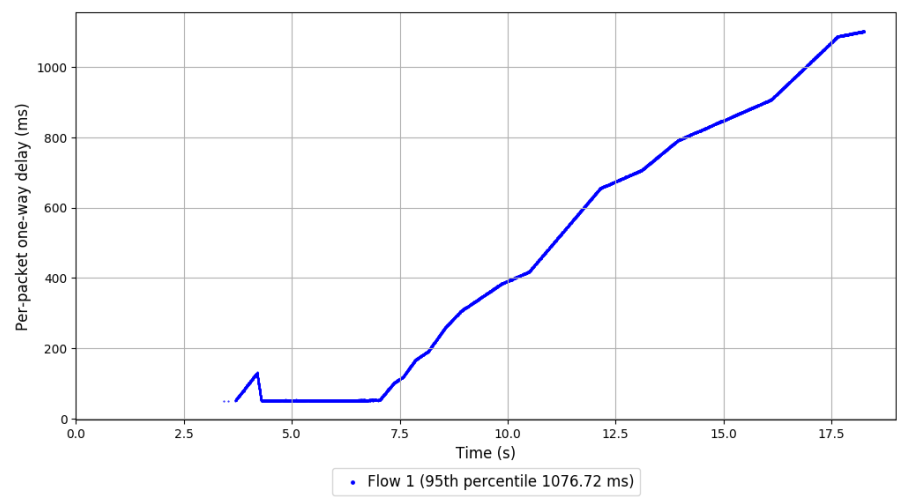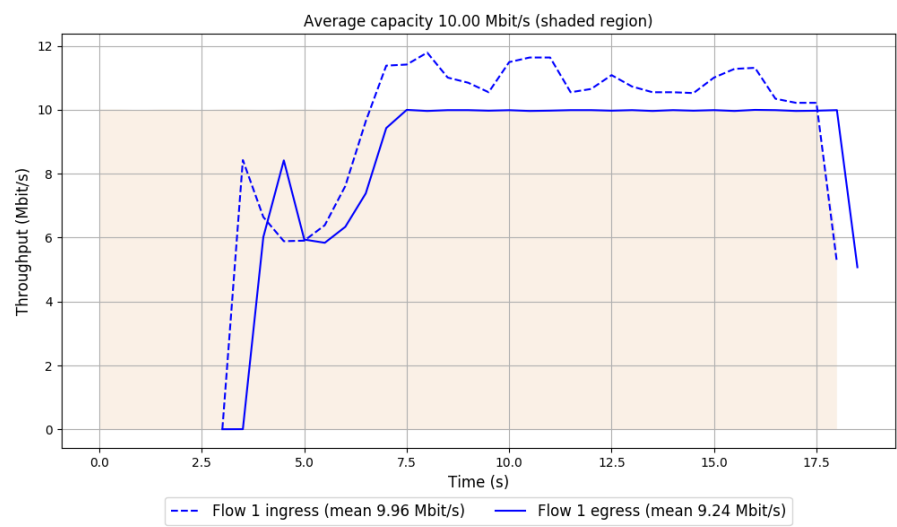
Run 1: Report of Aurora — Data Link

Average capacity 10.00 Mbit/s (shaded region)

Flow 1 ingress (mean 9.96 Mbit/s) ---- Flow 1 egress (mean 9.24 Mbit/s)

Flow 1 (95th percentile 1076.72 ms)

```
Run 2: Statistics of Aurora

Start at: 2019-07-31 05:48:52
End at: 2019-07-31 05:49:07

# Below is generated by plot.py at 2019-07-31 05:53:26
# Datalink statistics
-- Total of 1 flow:
Average capacity: 10.00 Mbit/s
Average throughput: 8.42 Mbit/s (84.1% utilization)
95th percentile per-packet one-way delay: 401.335 ms
Loss rate: 1.30%
-- Flow 1:
Average throughput: 8.42 Mbit/s
95th percentile per-packet one-way delay: 401.335 ms
Loss rate: 1.30%
```
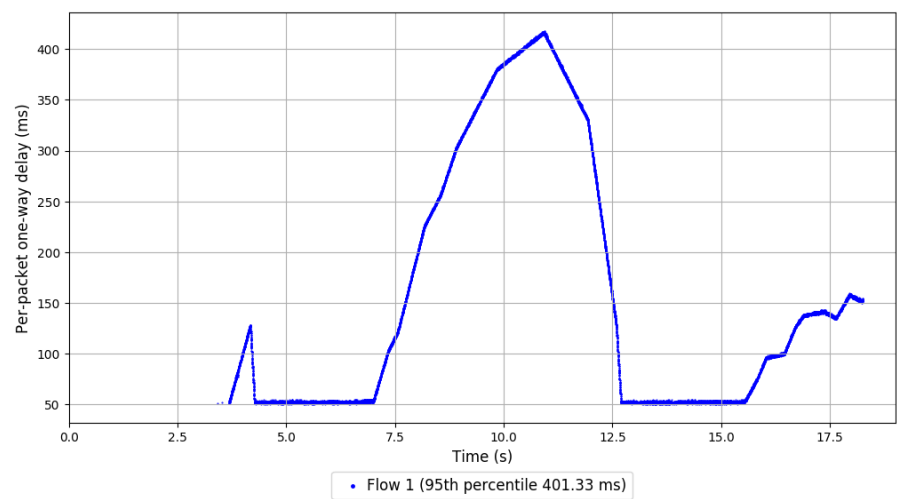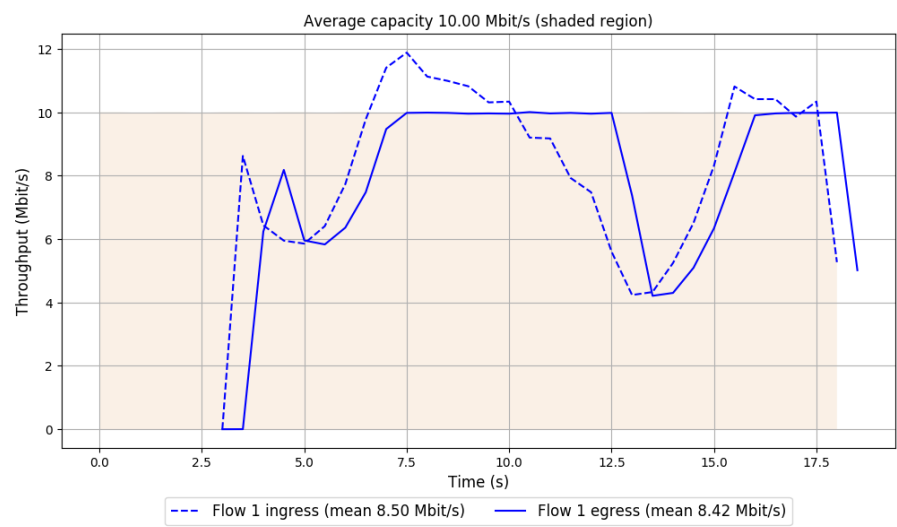
Run 2: Report of Aurora — Data Link

Average capacity 10.00 Mbit/s (shaded region)

Flow 1 ingress (mean 8.50 Mbit/s)   Flow 1 egress (mean 8.42 Mbit/s)

Flow 1 (95th percentile 401.33 ms)

```
Run 1: Statistics of TCP BBR

Start at: 2019-07-31 05:46:17
End at: 2019-07-31 05:46:32

# Below is generated by plot.py at 2019-07-31 05:53:26
# Datalink statistics
-- Total of 1 flow:
Average capacity: 10.00 Mbit/s
Average throughput: 9.56 Mbit/s (95.5% utilization)
95th percentile per-packet one-way delay: 256.540 ms
Loss rate: 0.92%
-- Flow 1:
Average throughput: 9.56 Mbit/s
95th percentile per-packet one-way delay: 256.540 ms
Loss rate: 0.92%
```
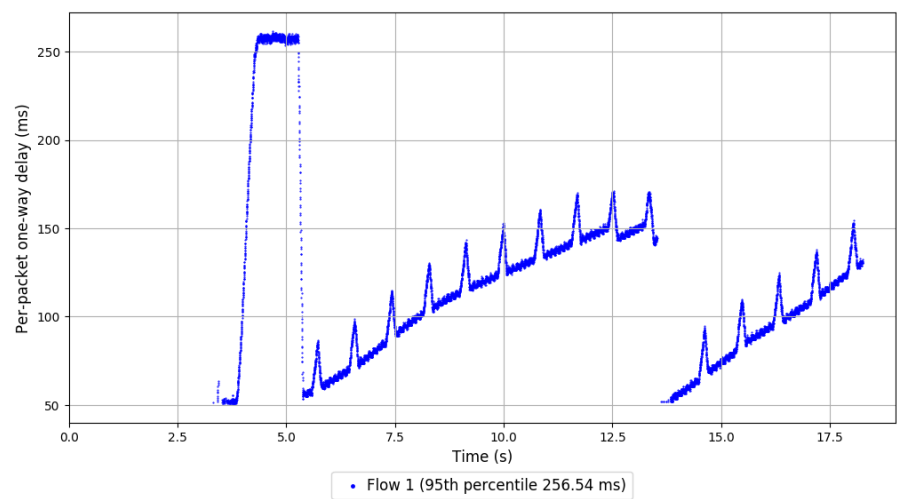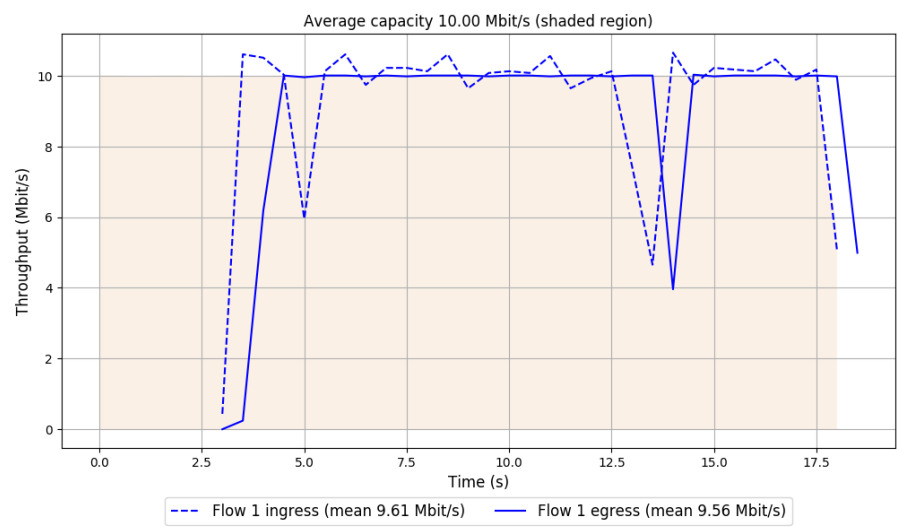
Run 1: Report of TCP BBR — Data Link

Average capacity 10.00 Mbit/s (shaded region)

Flow 1 ingress (mean 9.61 Mbit/s)   Flow 1 egress (mean 9.56 Mbit/s)

Flow 1 (95th percentile 256.54 ms)

```
Run 2: Statistics of TCP BBR

Start at: 2019-07-31 05:48:33
End at: 2019-07-31 05:48:48

# Below is generated by plot.py at 2019-07-31 05:53:26
# Datalink statistics
-- Total of 1 flow:
Average capacity: 10.00 Mbit/s
Average throughput: 9.56 Mbit/s (95.6% utilization)
95th percentile per-packet one-way delay: 255.437 ms
Loss rate: 0.88%
-- Flow 1:
Average throughput: 9.56 Mbit/s
95th percentile per-packet one-way delay: 255.437 ms
Loss rate: 0.88%
```
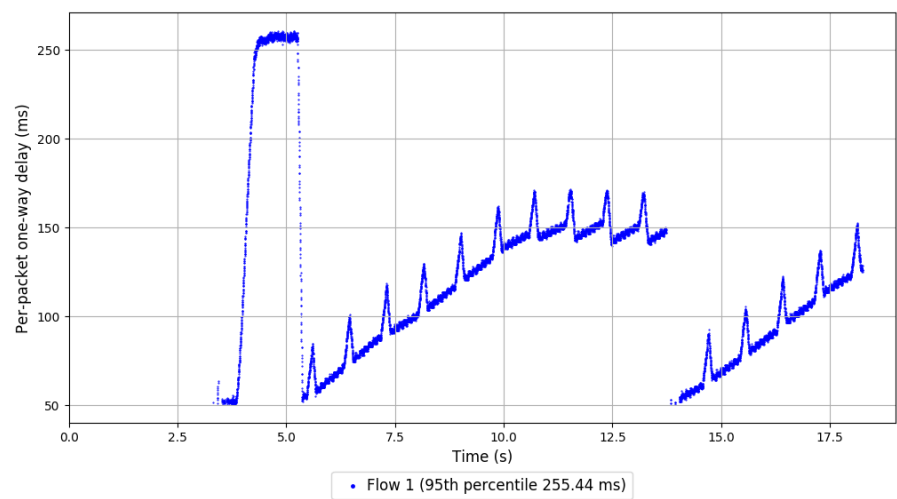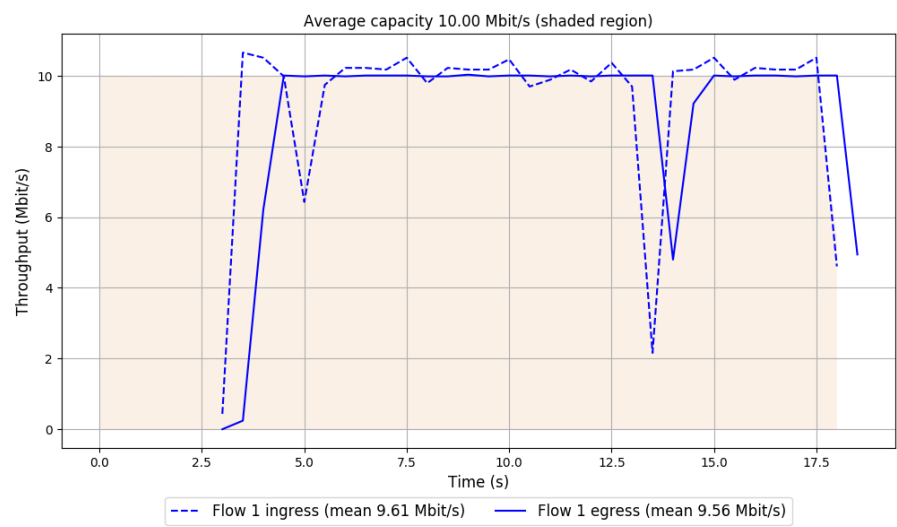
Run 2: Report of TCP BBR — Data Link

Average capacity 10.00 Mbit/s (shaded region)

Flow 1 ingress (mean 9.61 Mbit/s)   Flow 1 egress (mean 9.56 Mbit/s)

Flow 1 (95th percentile 255.44 ms)

```
Run 1: Statistics of Eagle

Start at: 2019-07-31 05:45:58
End at: 2019-07-31 05:46:13

# Below is generated by plot.py at 2019-07-31 05:53:26
# Datalink statistics
-- Total of 1 flow:
Average capacity: 10.00 Mbit/s
Average throughput: 8.11 Mbit/s (81.1% utilization)
95th percentile per-packet one-way delay: 326.440 ms
Loss rate: 0.20%
-- Flow 1:
Average throughput: 8.11 Mbit/s
95th percentile per-packet one-way delay: 326.440 ms
Loss rate: 0.20%
```
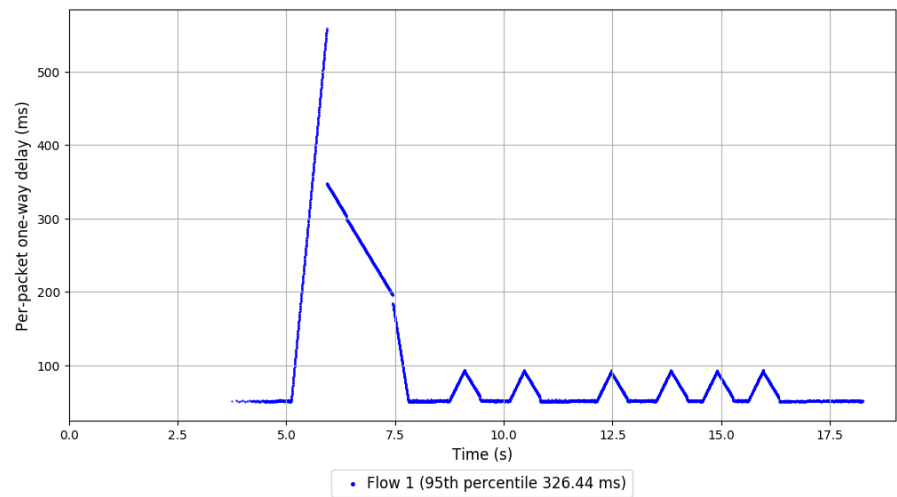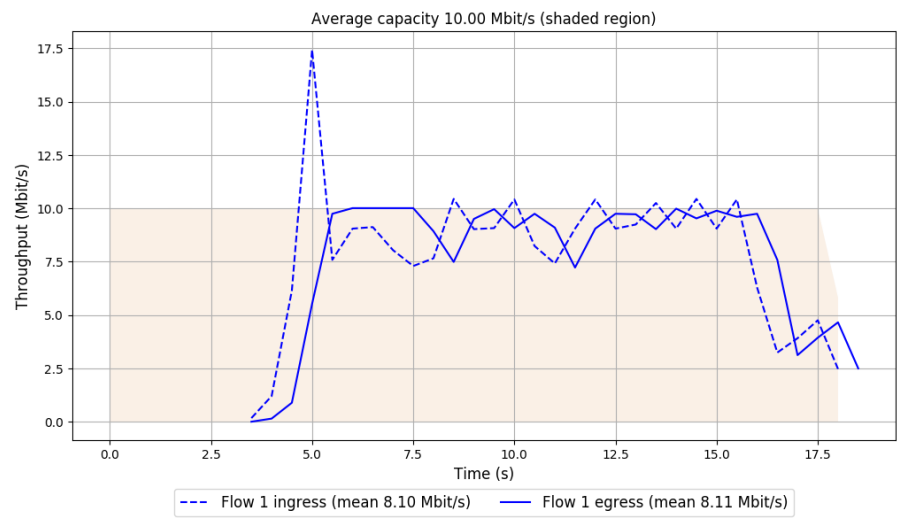
Run 1: Report of Eagle — Data Link

Average capacity 10.00 Mbit/s (shaded region)

Flow 1 ingress (mean 8.10 Mbit/s)   Flow 1 egress (mean 8.11 Mbit/s)

Flow 1 (95th percentile 326.44 ms)

```
Run 2: Statistics of Eagle

Start at: 2019-07-31 05:48:14
End at: 2019-07-31 05:48:29

# Below is generated by plot.py at 2019-07-31 05:53:26
# Datalink statistics
-- Total of 1 flow:
Average capacity: 10.00 Mbit/s
Average throughput: 8.68 Mbit/s (86.8% utilization)
95th percentile per-packet one-way delay: 324.112 ms
Loss rate: 2.17%
-- Flow 1:
Average throughput: 8.68 Mbit/s
95th percentile per-packet one-way delay: 324.112 ms
Loss rate: 2.17%
```
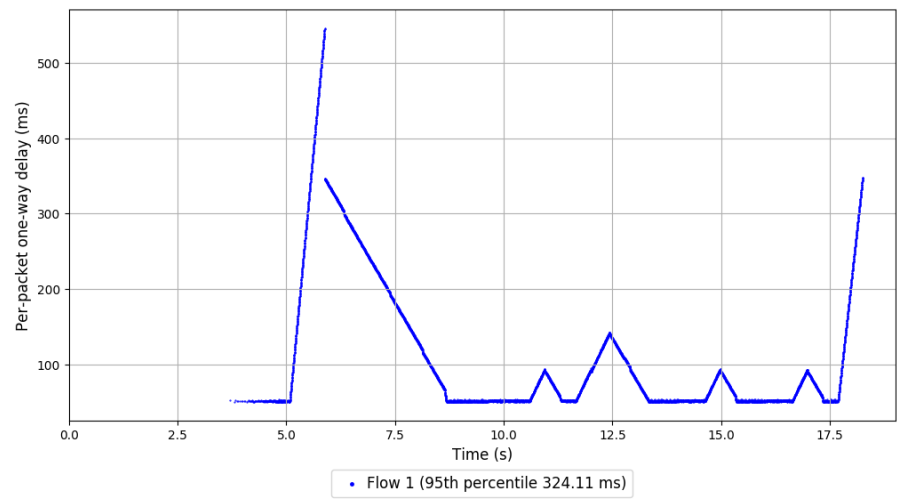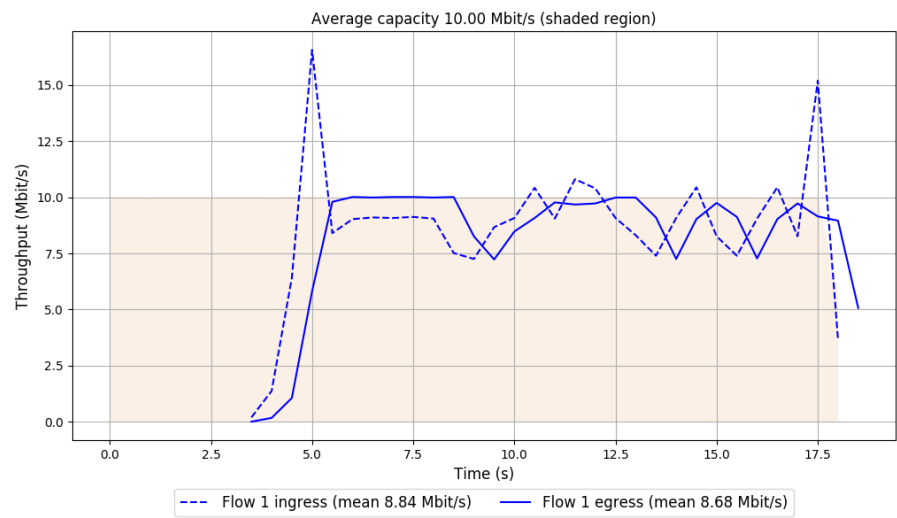
Run 2: Report of Eagle — Data Link

Average capacity 10.00 Mbit/s (shaded region)

Flow 1 ingress (mean 8.84 Mbit/s)   Flow 1 egress (mean 8.68 Mbit/s)

Flow 1 (95th percentile 324.11 ms)

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```
Run 1: Statistics of Indigo

Start at: 2019-07-31 05:46:56
End at: 2019-07-31 05:47:11

# Below is generated by plot.py at 2019-07-31 05:53:34
# Datalink statistics
-- Total of 1 flow:
Average capacity: 10.00 Mbit/s
Average throughput: 9.57 Mbit/s (95.7% utilization)
95th percentile per-packet one-way delay: 66.646 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 9.57 Mbit/s
95th percentile per-packet one-way delay: 66.646 ms
Loss rate: 0.40%
```
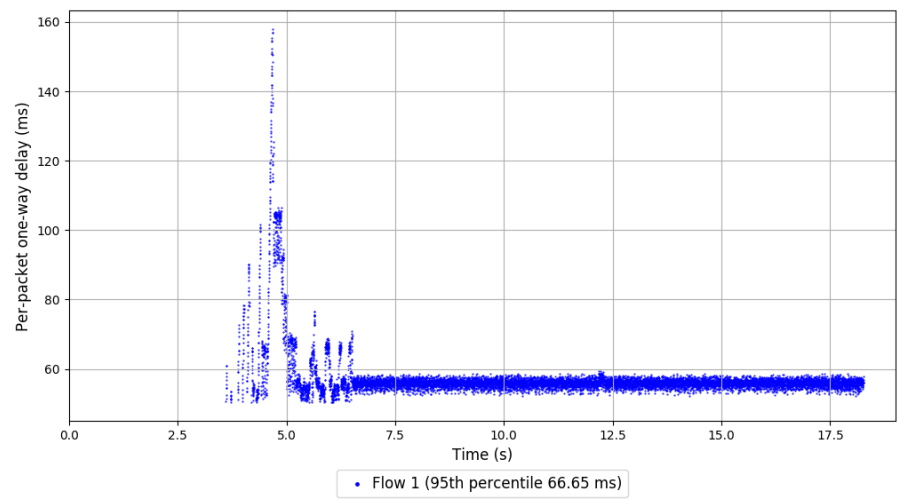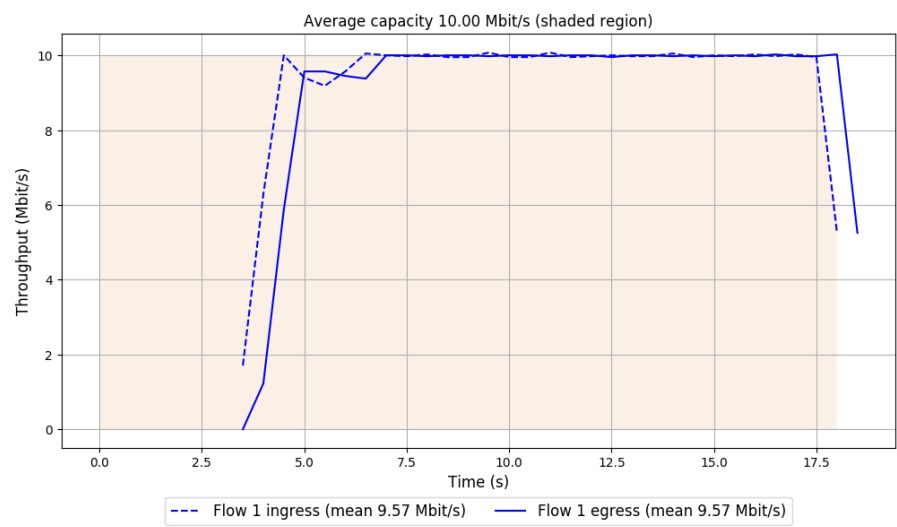
Run 1: Report of Indigo — Data Link

Average capacity 10.00 Mbit/s (shaded region)

Flow 1 ingress (mean 9.57 Mbit/s)   Flow 1 egress (mean 9.57 Mbit/s)

Flow 1 (95th percentile 66.65 ms)

```
Run 2: Statistics of Indigo

Start at: 2019-07-31 05:49:12
End at: 2019-07-31 05:49:27

# Below is generated by plot.py at 2019-07-31 05:53:34
# Datalink statistics
-- Total of 1 flow:
Average capacity: 10.00 Mbit/s
Average throughput: 8.85 Mbit/s (88.5% utilization)
95th percentile per-packet one-way delay: 64.292 ms
Loss rate: 0.43%
-- Flow 1:
Average throughput: 8.85 Mbit/s
95th percentile per-packet one-way delay: 64.292 ms
Loss rate: 0.43%
```
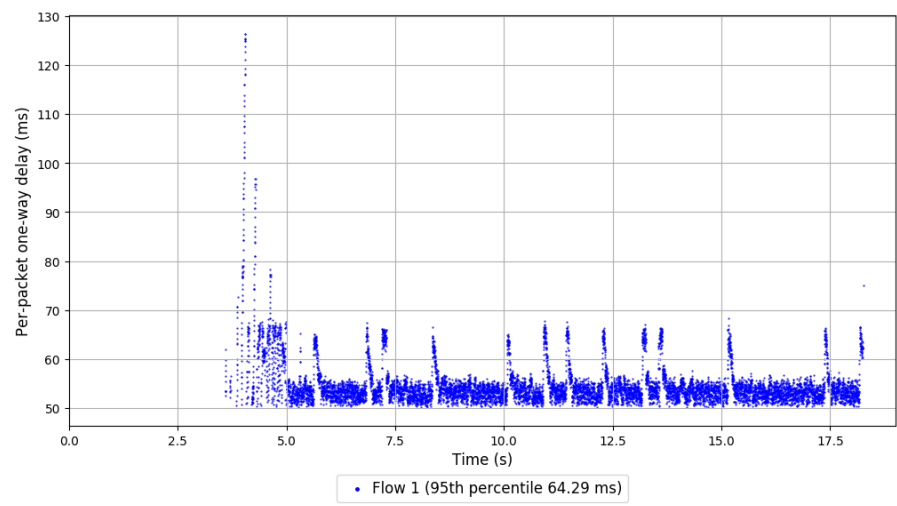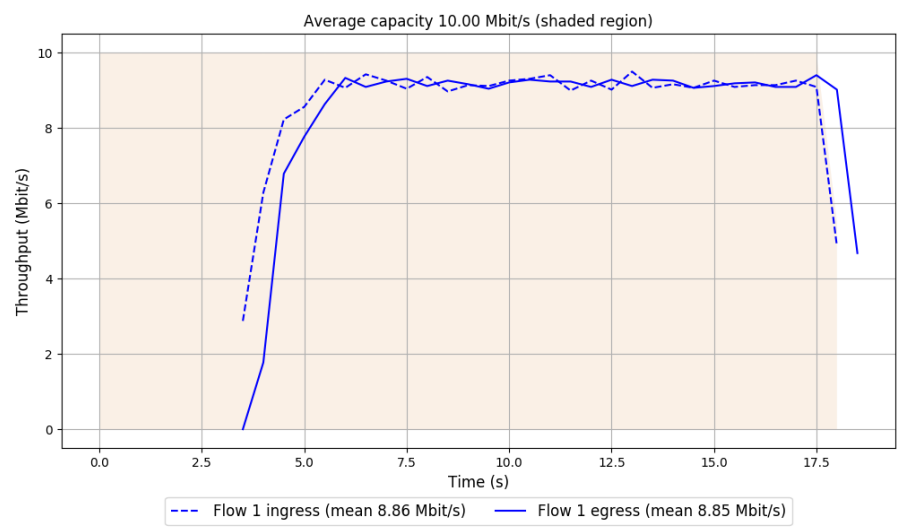
Run 2: Report of Indigo — Data Link

Average capacity 10.00 Mbit/s (shaded region)

Flow 1 ingress (mean 8.86 Mbit/s)   Flow 1 egress (mean 8.85 Mbit/s)
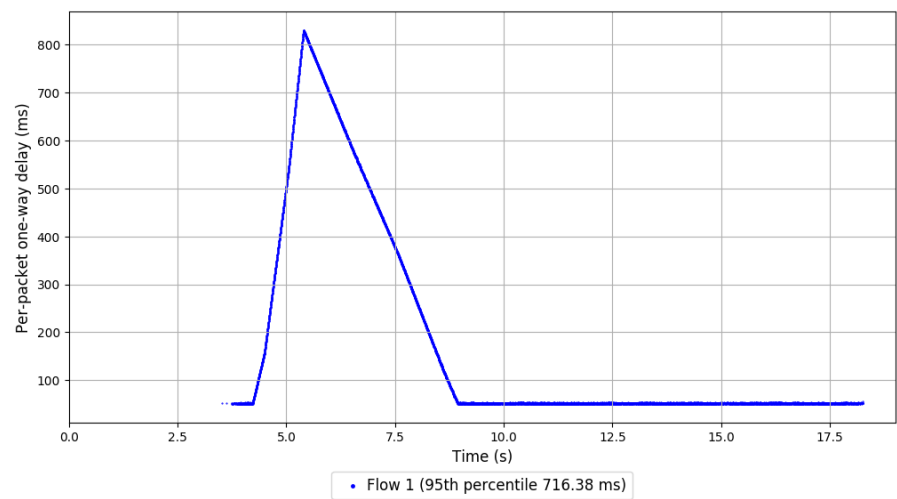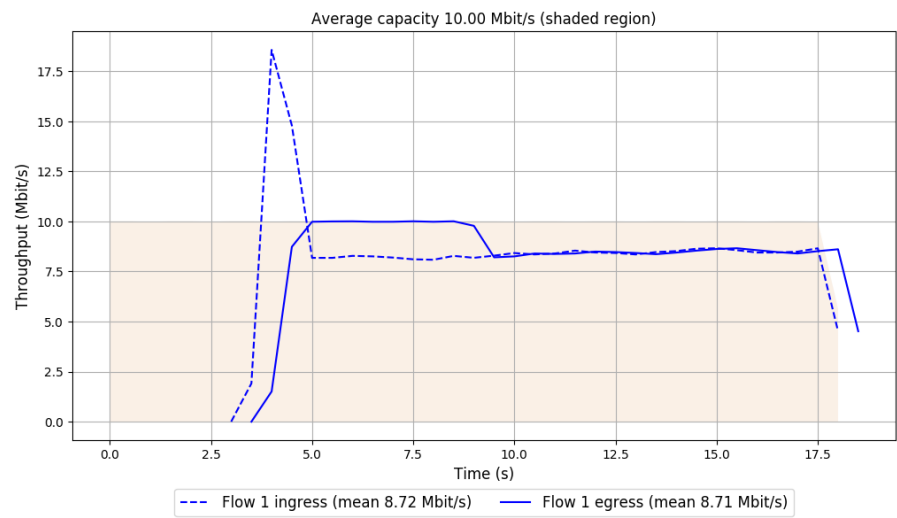

Flow 1 (95th percentile 64.29 ms)

```
Run 1: Statistics of PCC-Allegro

Start at: 2019-07-31 05:47:16
End at: 2019-07-31 05:47:31

# Below is generated by plot.py at 2019-07-31 05:53:34
# Datalink statistics
-- Total of 1 flow:
Average capacity: 10.00 Mbit/s
Average throughput: 8.71 Mbit/s (87.1% utilization)
95th percentile per-packet one-way delay: 716.375 ms
Loss rate: 0.37%
-- Flow 1:
Average throughput: 8.71 Mbit/s
95th percentile per-packet one-way delay: 716.375 ms
Loss rate: 0.37%
```

Run 1: Report of PCC-Allegro — Data Link

Average capacity 10.00 Mbit/s (shaded region)

Flow 1 ingress (mean 8.72 Mbit/s)   Flow 1 egress (mean 8.71 Mbit/s)

Flow 1 (95th percentile 716.38 ms)

```
Run 2: Statistics of PCC-Allegro

Start at: 2019-07-31 05:49:31
End at: 2019-07-31 05:49:47

# Below is generated by plot.py at 2019-07-31 05:53:34
# Datalink statistics
-- Total of 1 flow:
Average capacity: 10.00 Mbit/s
Average throughput: 8.34 Mbit/s (83.4% utilization)
95th percentile per-packet one-way delay: 752.117 ms
Loss rate: 0.34%
-- Flow 1:
Average throughput: 8.34 Mbit/s
95th percentile per-packet one-way delay: 752.117 ms
Loss rate: 0.34%
```
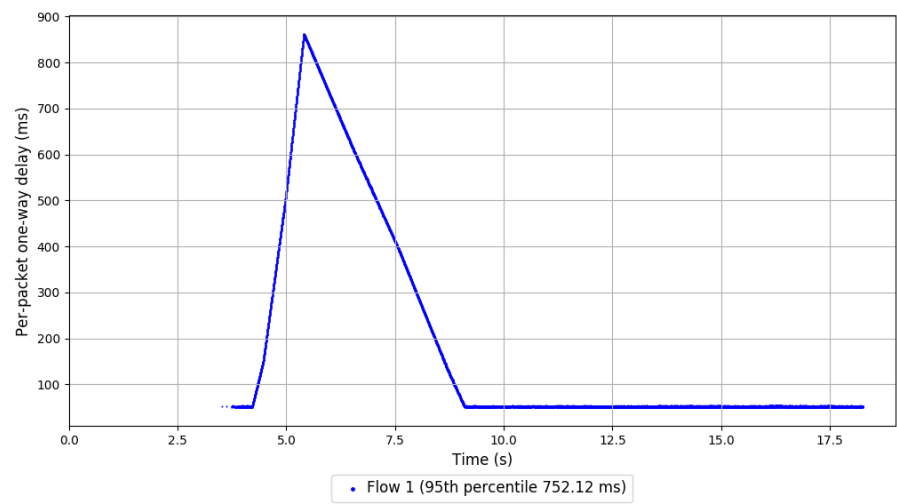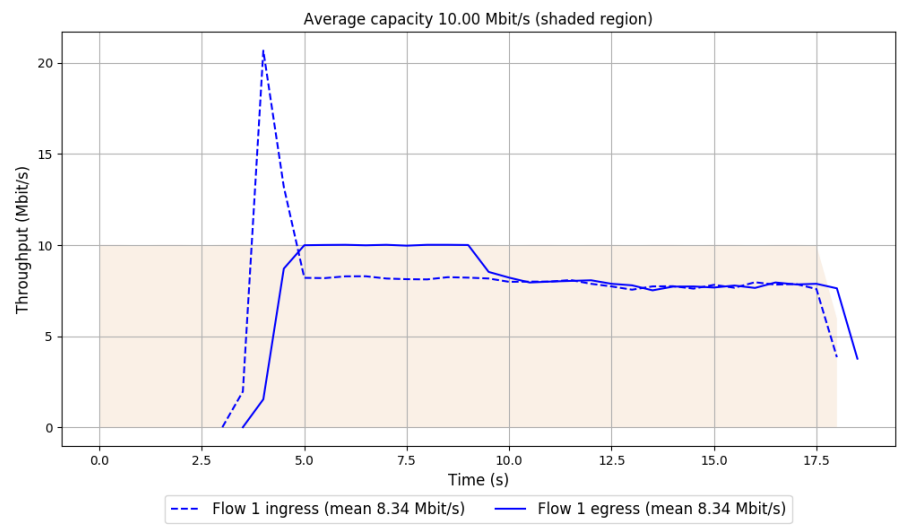
Run 2: Report of PCC-Allegro — Data Link

Average capacity 10.00 Mbit/s (shaded region)

- - - Flow 1 ingress (mean 8.34 Mbit/s) —— Flow 1 egress (mean 8.34 Mbit/s)

• Flow 1 (95th percentile 752.12 ms)

```
Run 1: Statistics of Sprout

Start at: 2019-07-31 05:47:55
End at: 2019-07-31 05:48:10

# Below is generated by plot.py at 2019-07-31 05:53:34
# Datalink statistics
-- Total of 1 flow:
Average capacity: 10.00 Mbit/s
Average throughput: 2.31 Mbit/s (23.1% utilization)
95th percentile per-packet one-way delay: 73.919 ms
Loss rate: 0.58%
-- Flow 1:
Average throughput: 2.31 Mbit/s
95th percentile per-packet one-way delay: 73.919 ms
Loss rate: 0.58%
```
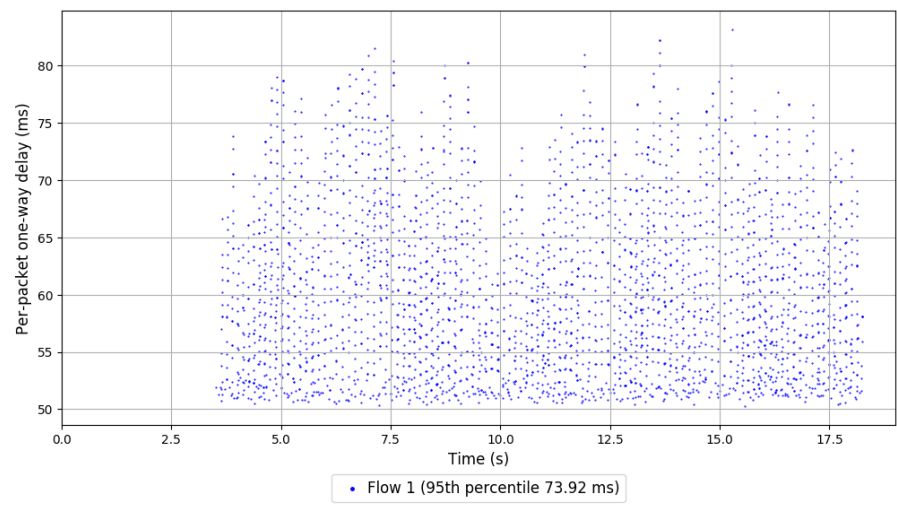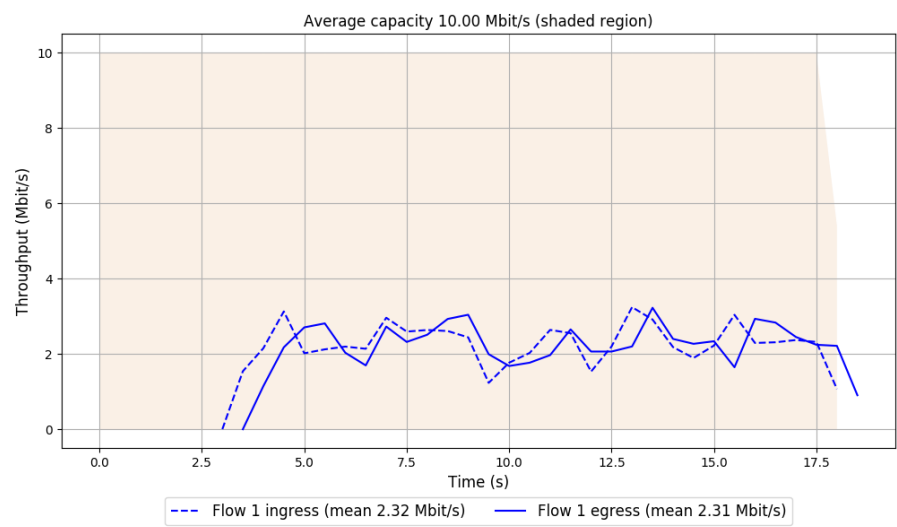
Run 1: Report of Sprout — Data Link

Average capacity 10.00 Mbit/s (shaded region)

Flow 1 ingress (mean 2.32 Mbit/s)   Flow 1 egress (mean 2.31 Mbit/s)

Flow 1 (95th percentile 73.92 ms)

```
Run 2: Statistics of Sprout

Start at: 2019-07-31 05:50:10
End at: 2019-07-31 05:50:25


# Below is generated by plot.py at 2019-07-31 05:53:34
# Datalink statistics
-- Total of 1 flow:
Average capacity: 10.00 Mbit/s
Average throughput: 2.59 Mbit/s (25.9% utilization)
95th percentile per-packet one-way delay: 75.805 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.59 Mbit/s
95th percentile per-packet one-way delay: 75.805 ms
Loss rate: 0.00%
```
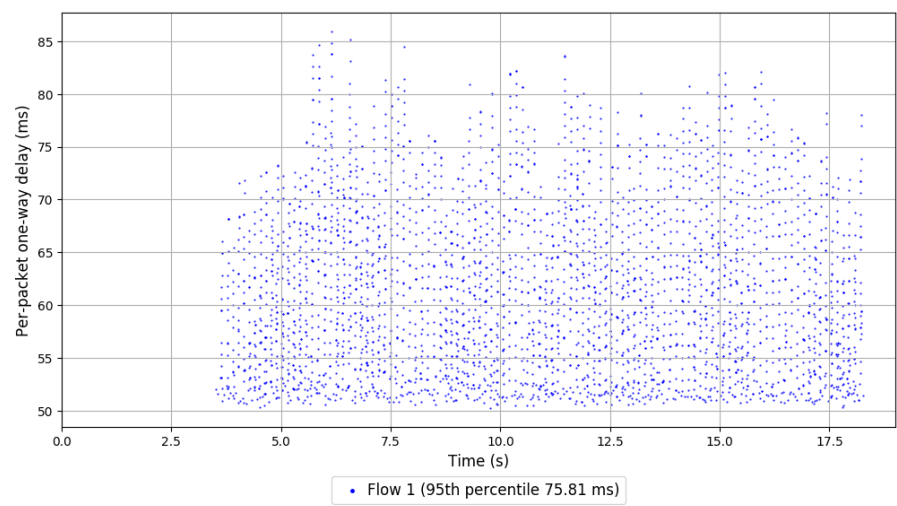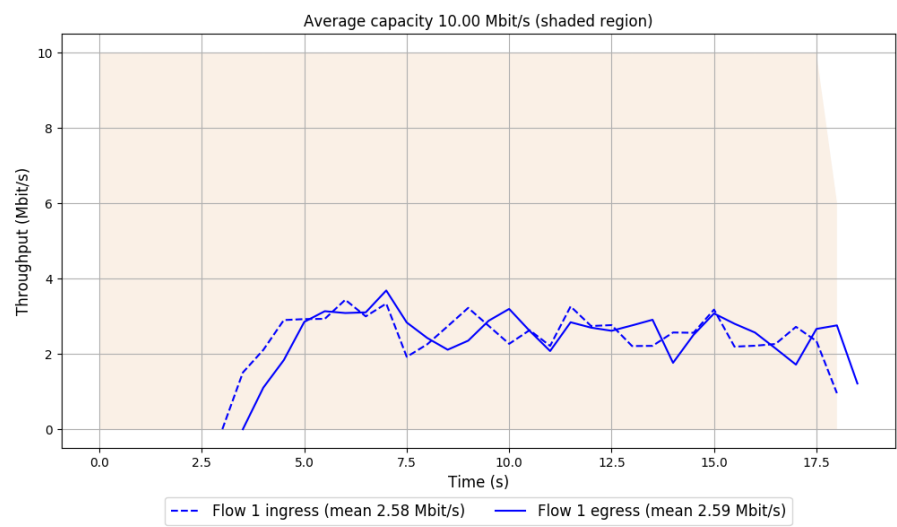
Run 2: Report of Sprout — Data Link

Average capacity 10.00 Mbit/s (shaded region)

Flow 1 ingress (mean 2.58 Mbit/s)   Flow 1 egress (mean 2.59 Mbit/s)

Flow 1 (95th percentile 75.81 ms)

```
Run 1: Statistics of PCC-Vivace

Start at: 2019-07-31 05:47:35
End at: 2019-07-31 05:47:50

# Below is generated by plot.py at 2019-07-31 05:53:37
# Datalink statistics
-- Total of 1 flow:
Average capacity: 10.00 Mbit/s
Average throughput: 8.50 Mbit/s (85.0% utilization)
95th percentile per-packet one-way delay: 89.041 ms
Loss rate: 0.39%
-- Flow 1:
Average throughput: 8.50 Mbit/s
95th percentile per-packet one-way delay: 89.041 ms
Loss rate: 0.39%
```
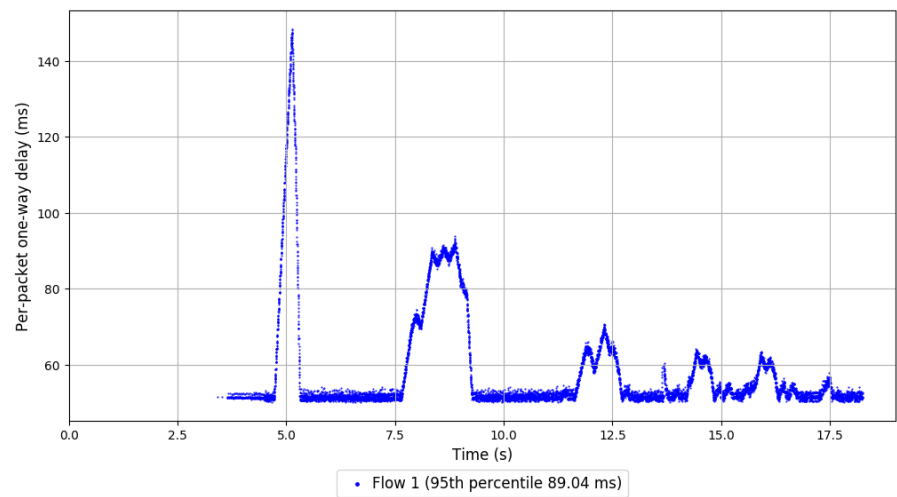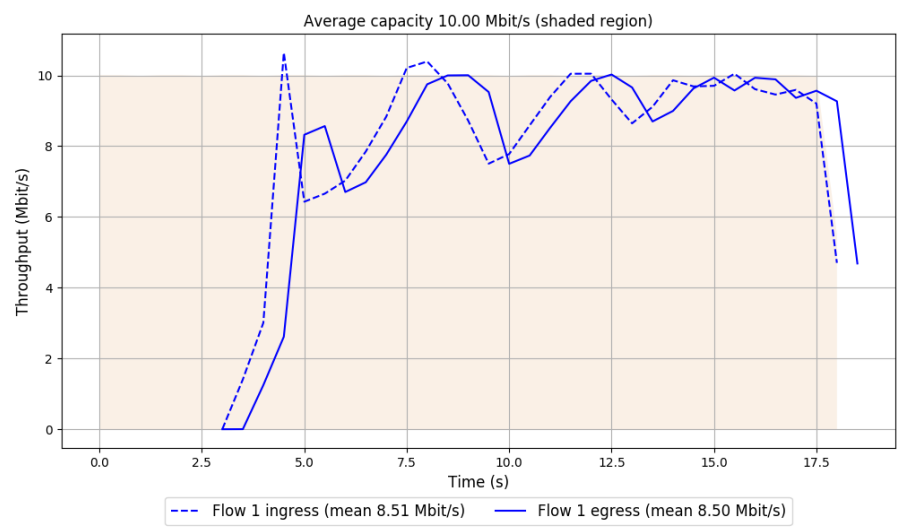
Run 1: Report of PCC-Vivace — Data Link

Average capacity 10.00 Mbit/s (shaded region)

Flow 1 ingress (mean 8.51 Mbit/s) ---- Flow 1 egress (mean 8.50 Mbit/s)

Flow 1 (95th percentile 89.04 ms)

```
Run 2: Statistics of PCC-Vivace

Start at: 2019-07-31 05:49:51
End at: 2019-07-31 05:50:06

# Below is generated by plot.py at 2019-07-31 05:53:37
# Datalink statistics
-- Total of 1 flow:
Average capacity: 10.00 Mbit/s
Average throughput: 8.52 Mbit/s (85.2% utilization)
95th percentile per-packet one-way delay: 88.518 ms
Loss rate: 0.43%
-- Flow 1:
Average throughput: 8.52 Mbit/s
95th percentile per-packet one-way delay: 88.518 ms
Loss rate: 0.43%
```

Run 2: Report of PCC-Vivace — Data Link

Average capacity 10.00 Mbit/s (shaded region)

Flow 1 ingress (mean 8.52 Mbit/s)   Flow 1 egress (mean 8.52 Mbit/s)

Flow 1 (95th percentile 88.52 ms)