

Pantheon Report

Generated at 2019-07-11 19:13:20 (UTC).

Tested in mahimahi: mm-delay 88 mm-link 2.64mbps-poisson.trace 2.64mbps-poisson.trace
--uplink-queue=droptail --uplink-queue-args=packets=130

Repeated the test of 24 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

System info:

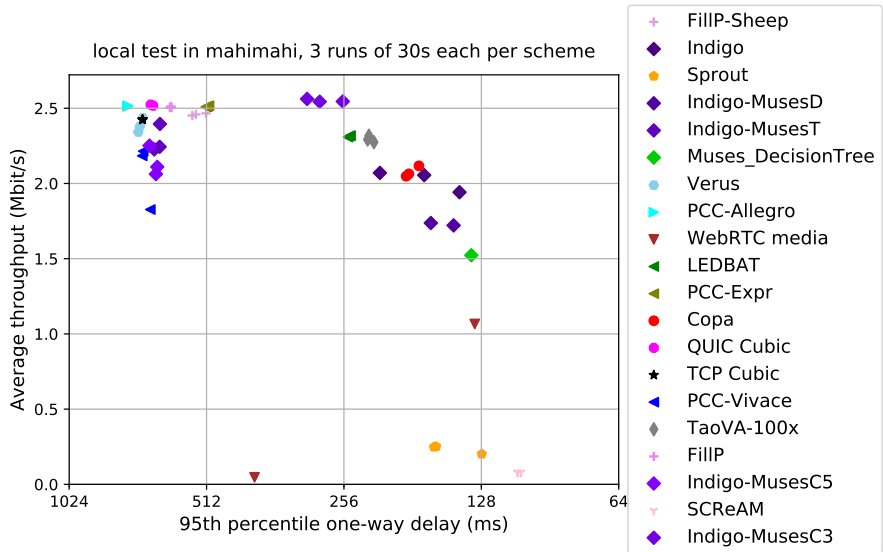
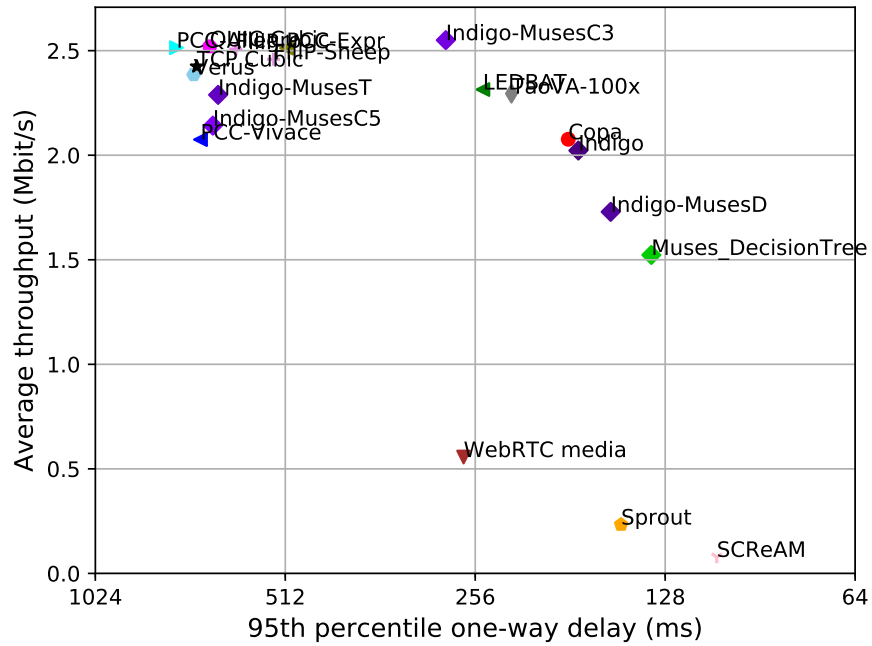
```
Linux 4.15.0-1034-gcp
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
```

Git summary:

```
branch: muses @ 2076e1149a241f3edb4365d686df32342bf9561f
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 5ce721187ad823da20955337730c746486ca4966
third_party/muses_dtree @ 11c9498ecb1596b02ccd896791a02d03172af7ed
M helpers/__init__.pyc
M helpers/context.pyc
M helpers/utls.pyc
third_party/pantheon-tunnel @ f866d3f58d27afd942717625ee3a354cc2e802bd
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
M receiver/src/buffer.h
M receiver/src/core.cpp
M sender/src/buffer.h
M sender/src/core.cpp
third_party/pcc-experimental @ cd43e34e3f5f5613e8acd08fab92c4eb24f974ab
third_party/proto-quick @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream-reproduce @ f099118d1421aa3131bf11ff1964974e1da3bdb2
M src/ScreamClient
M src/ScreamServer
third_party/sprout @ 366e35c6178b01e31d4a46ad18c74f9415f19a26
M src/examples/cellsim.cc
M src/examples/sproutbt2.cc
M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
```

```
M src/verus.hpp
M tools/plot.py
third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851
```

local test in mahimahi, 3 runs of 30s each per scheme
(mean of all runs by scheme)



scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	0	N/A	N/A	N/A
Copa	3	2.08	182.31	0.34
TCP Cubic	3	2.42	707.00	2.97
FillP	3	2.50	613.29	16.69
FillP-Sheep	3	2.46	534.57	9.29
Indigo	3	2.02	175.73	0.38
Indigo-MusesC3	3	2.55	285.03	0.87
Indigo-MusesC5	3	2.14	666.78	26.12
Indigo-MusesD	2	1.73	156.18	0.19
Indigo-MusesT	3	2.29	654.25	10.22
LEDBAT	3	2.32	248.98	0.67
Muses_DecisionTree	1	1.52	134.63	0.52
Muses_DecisionTreeH0	0	N/A	N/A	N/A
Muses_DecisionTreeR0	0	N/A	N/A	N/A
PCC-Allegro	3	2.51	761.56	85.64
PCC-Expr	3	2.51	509.84	53.76
QUIC Cubic	2	2.52	674.53	3.32
SCReAM	3	0.08	106.03	0.29
Sprout	3	0.23	150.35	0.27
TaoVA-100x	3	2.29	224.32	1.15
TCP Vegas	0	N/A	N/A	N/A
Verus	3	2.39	715.19	8.73
PCC-Vivace	3	2.07	697.69	13.00
WebRTC media	2	0.56	267.10	0.12

Run 1: Statistics of TCP BBR

Start at: 2019-07-11 18:42:02

End at: 2019-07-11 18:42:32

Run 1: Report of TCP BBR — Data Link

Figure is missing

Figure is missing

Run 2: Statistics of TCP BBR

Start at: 2019-07-11 18:56:07

End at: 2019-07-11 18:56:37

Run 2: Report of TCP BBR — Data Link

Figure is missing

Figure is missing

Run 3: Statistics of TCP BBR

Start at: 2019-07-11 19:10:13

End at: 2019-07-11 19:10:43

Run 3: Report of TCP BBR — Data Link

Figure is missing

Figure is missing

Run 1: Statistics of Copa

Start at: 2019-07-11 18:37:55

End at: 2019-07-11 18:38:25

Below is generated by plot.py at 2019-07-11 19:12:11

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.05 Mbit/s (90.1% utilization)

95th percentile per-packet one-way delay: 187.037 ms

Loss rate: 0.33%

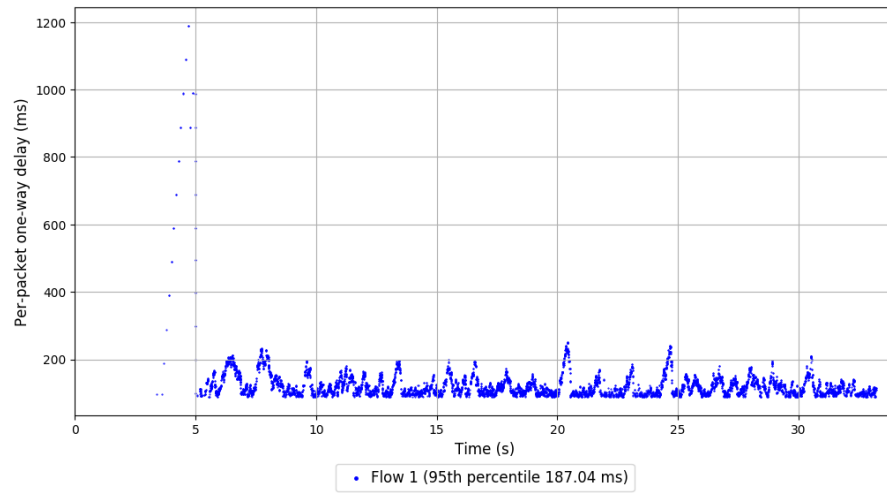
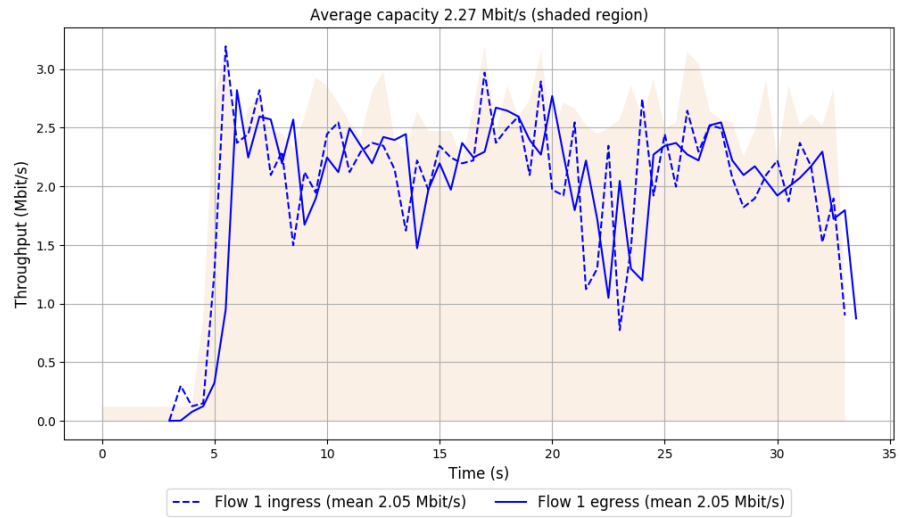
-- Flow 1:

Average throughput: 2.05 Mbit/s

95th percentile per-packet one-way delay: 187.037 ms

Loss rate: 0.33%

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

Start at: 2019-07-11 18:51:59

End at: 2019-07-11 18:52:30

Below is generated by plot.py at 2019-07-11 19:12:12

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.06 Mbit/s (90.8% utilization)

95th percentile per-packet one-way delay: 184.509 ms

Loss rate: 0.46%

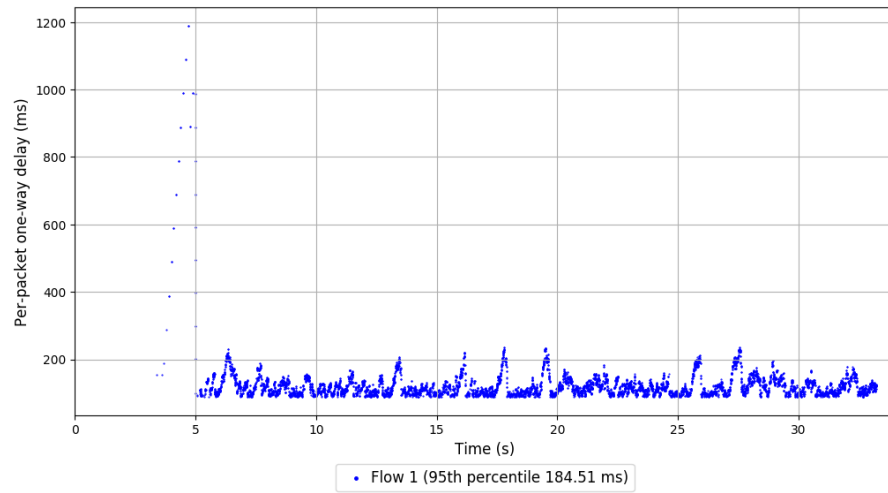
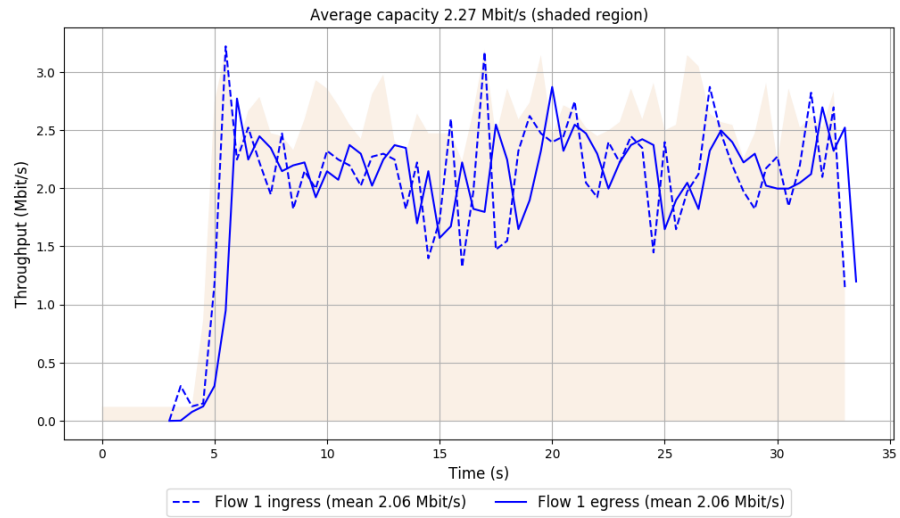
-- Flow 1:

Average throughput: 2.06 Mbit/s

95th percentile per-packet one-way delay: 184.509 ms

Loss rate: 0.46%

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

Start at: 2019-07-11 19:06:05

End at: 2019-07-11 19:06:35

Below is generated by plot.py at 2019-07-11 19:12:13

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.12 Mbit/s (93.2% utilization)

95th percentile per-packet one-way delay: 175.377 ms

Loss rate: 0.24%

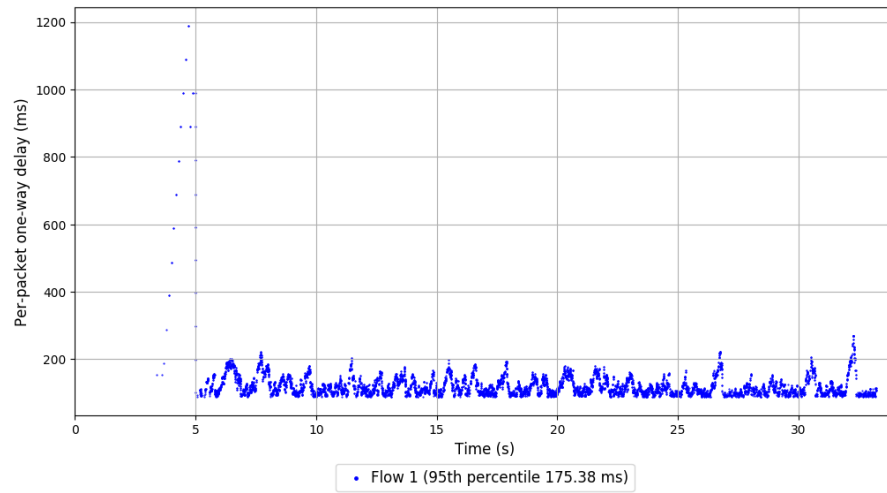
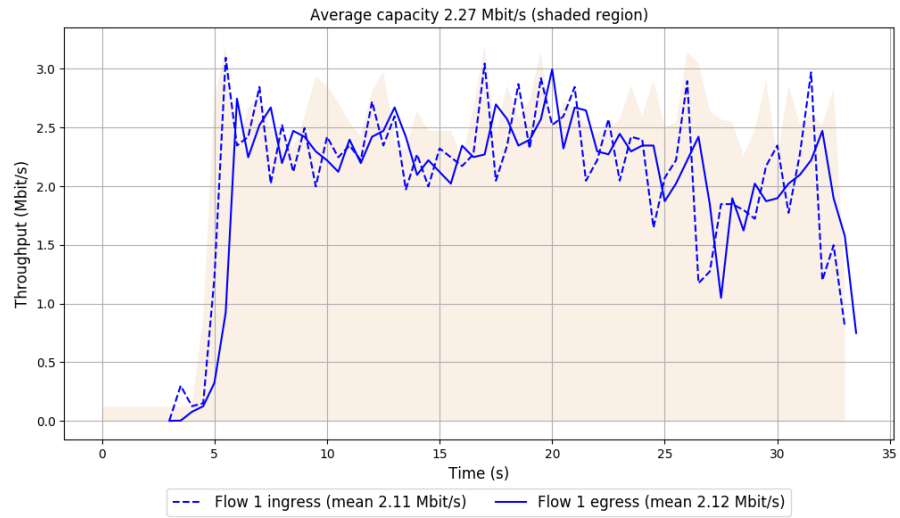
-- Flow 1:

Average throughput: 2.12 Mbit/s

95th percentile per-packet one-way delay: 175.377 ms

Loss rate: 0.24%

Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2019-07-11 18:42:37

End at: 2019-07-11 18:43:07

Below is generated by plot.py at 2019-07-11 19:12:13

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.42 Mbit/s (106.7% utilization)

95th percentile per-packet one-way delay: 707.138 ms

Loss rate: 3.03%

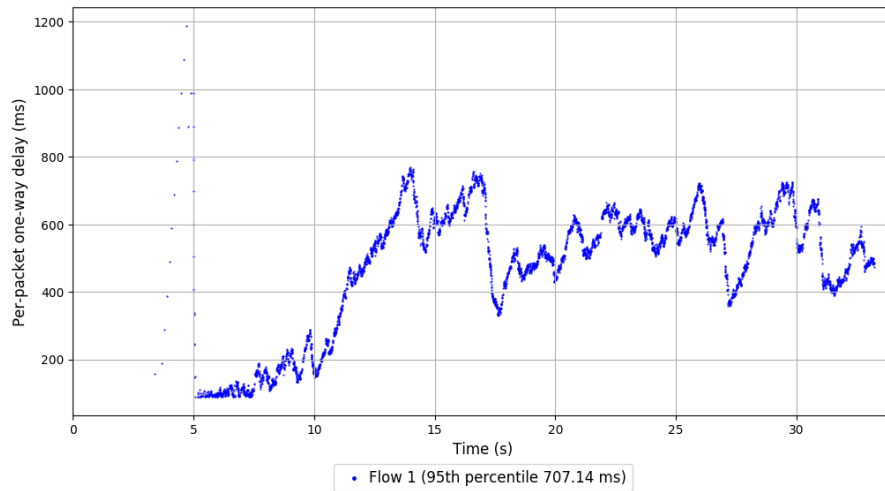
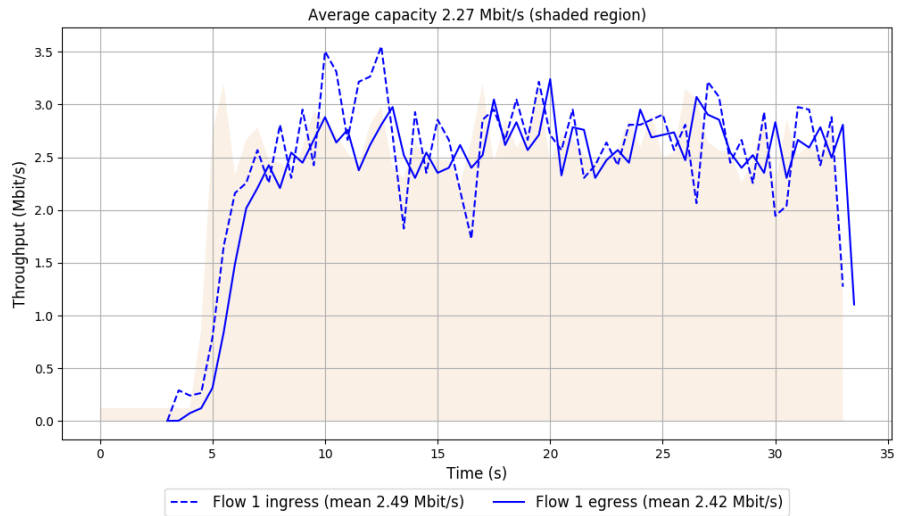
-- Flow 1:

Average throughput: 2.42 Mbit/s

95th percentile per-packet one-way delay: 707.138 ms

Loss rate: 3.03%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2019-07-11 18:56:42

End at: 2019-07-11 18:57:12

Below is generated by plot.py at 2019-07-11 19:12:13

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.42 Mbit/s (106.7% utilization)

95th percentile per-packet one-way delay: 707.390 ms

Loss rate: 2.89%

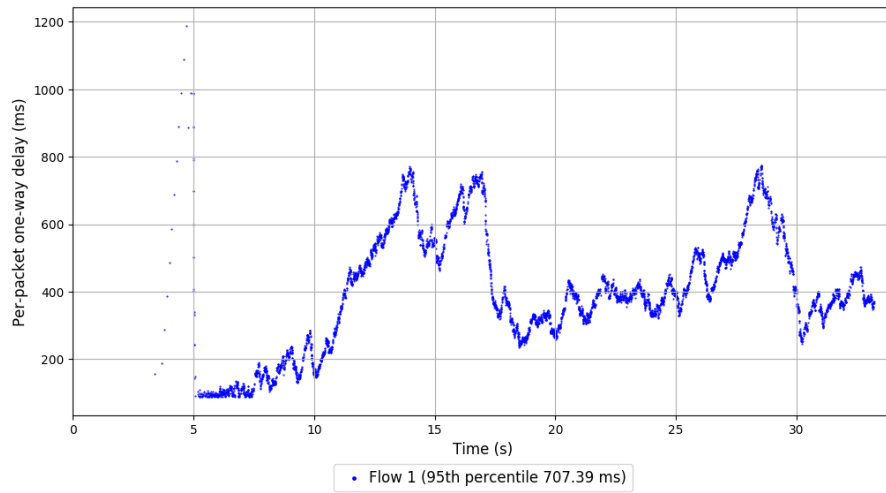
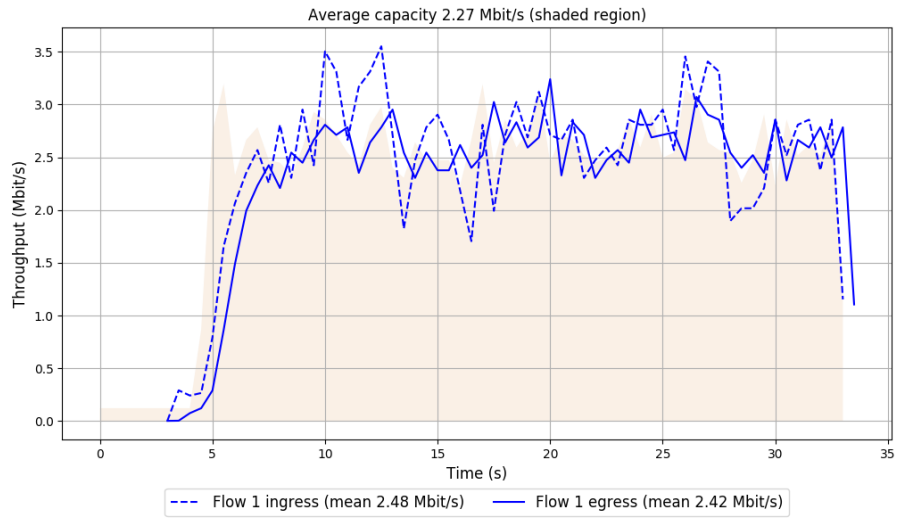
-- Flow 1:

Average throughput: 2.42 Mbit/s

95th percentile per-packet one-way delay: 707.390 ms

Loss rate: 2.89%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2019-07-11 19:10:48

End at: 2019-07-11 19:11:18

Below is generated by plot.py at 2019-07-11 19:12:13

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.43 Mbit/s (106.8% utilization)

95th percentile per-packet one-way delay: 706.483 ms

Loss rate: 2.99%

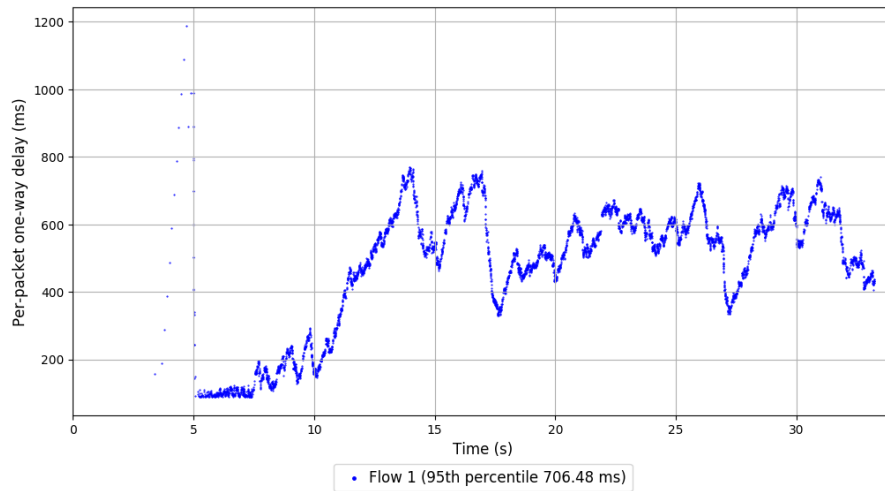
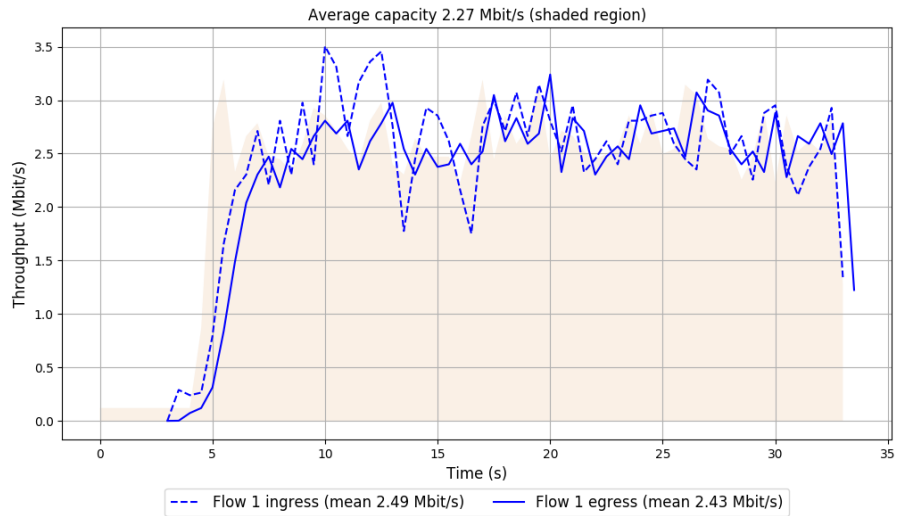
-- Flow 1:

Average throughput: 2.43 Mbit/s

95th percentile per-packet one-way delay: 706.483 ms

Loss rate: 2.99%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of FillP

Start at: 2019-07-11 18:33:48

End at: 2019-07-11 18:34:18

Below is generated by plot.py at 2019-07-11 19:12:13

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.51 Mbit/s (110.6% utilization)

95th percentile per-packet one-way delay: 612.843 ms

Loss rate: 15.52%

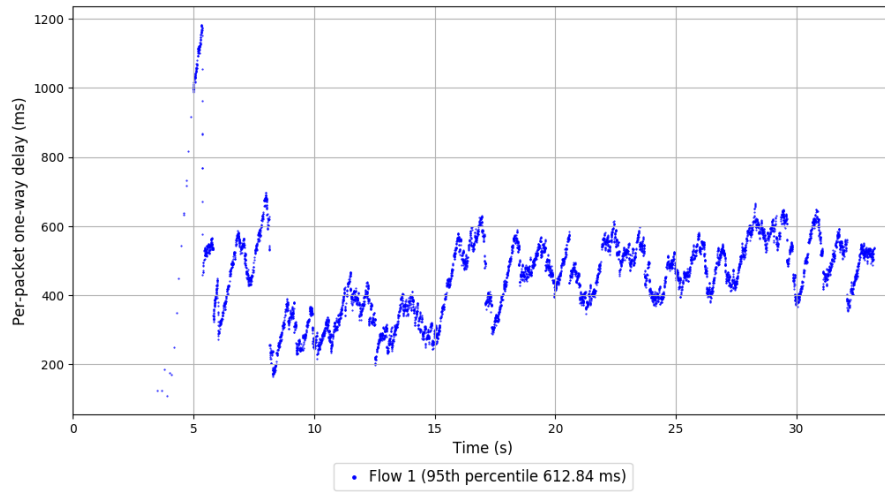
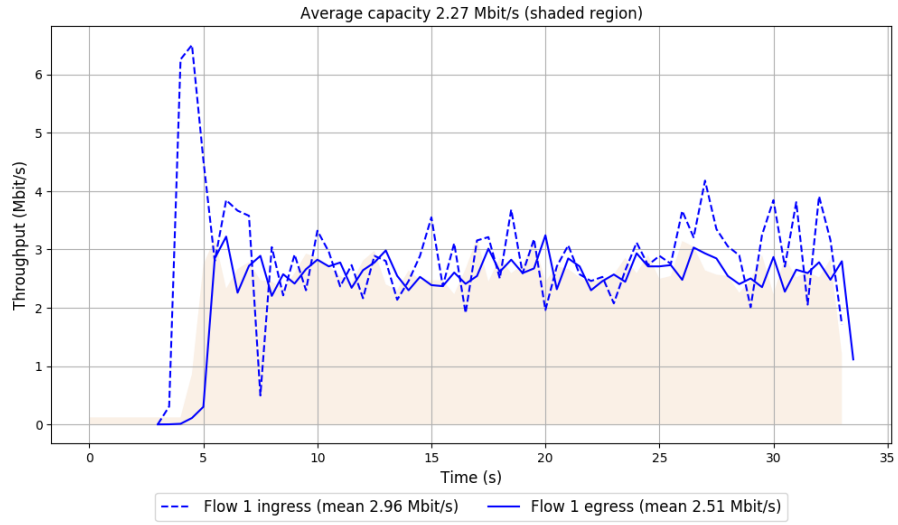
-- Flow 1:

Average throughput: 2.51 Mbit/s

95th percentile per-packet one-way delay: 612.843 ms

Loss rate: 15.52%

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2019-07-11 18:47:53

End at: 2019-07-11 18:48:23

Below is generated by plot.py at 2019-07-11 19:12:13

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.50 Mbit/s (110.2% utilization)

95th percentile per-packet one-way delay: 610.882 ms

Loss rate: 17.79%

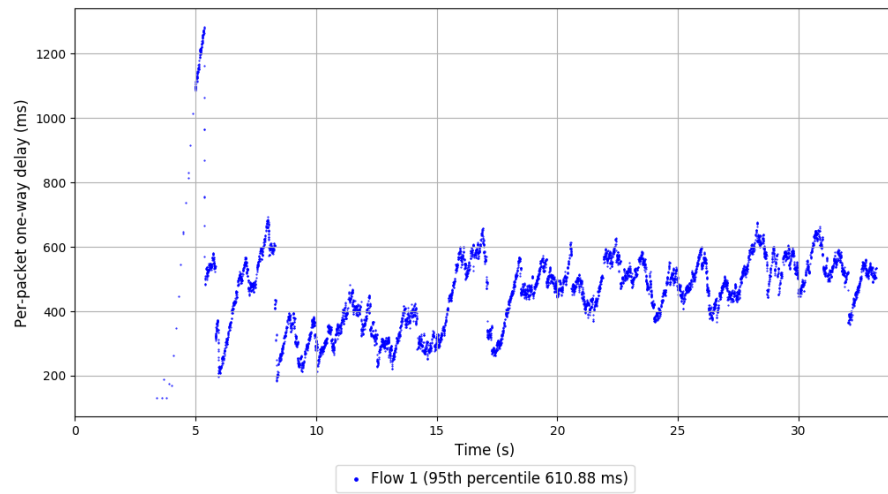
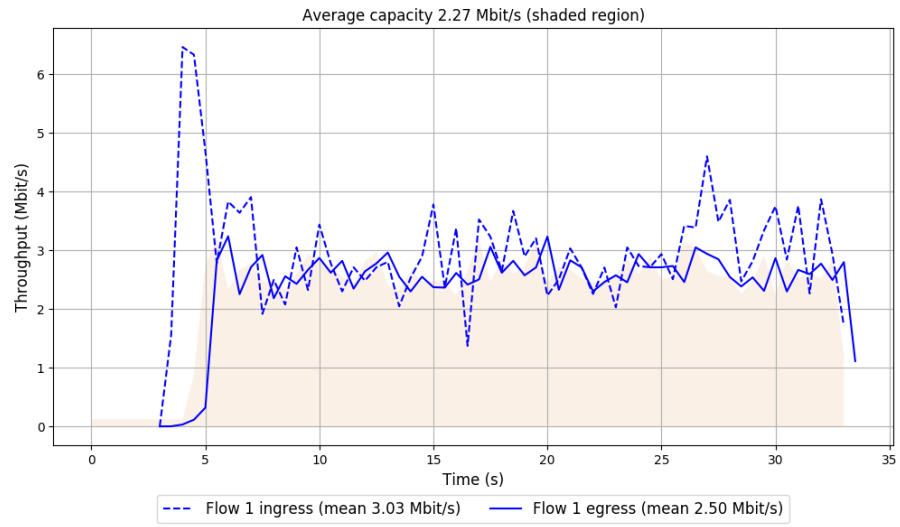
-- Flow 1:

Average throughput: 2.50 Mbit/s

95th percentile per-packet one-way delay: 610.882 ms

Loss rate: 17.79%

Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

Start at: 2019-07-11 19:01:59

End at: 2019-07-11 19:02:29

Below is generated by plot.py at 2019-07-11 19:12:20

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.50 Mbit/s (110.2% utilization)

95th percentile per-packet one-way delay: 616.133 ms

Loss rate: 16.76%

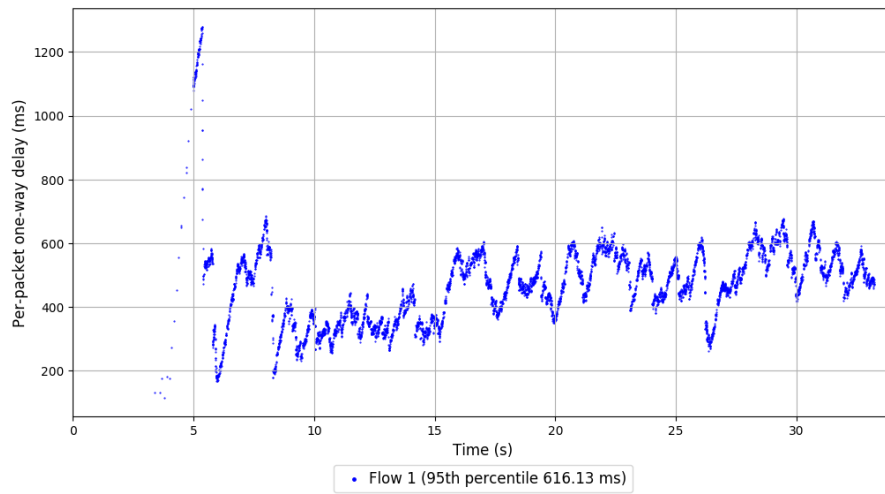
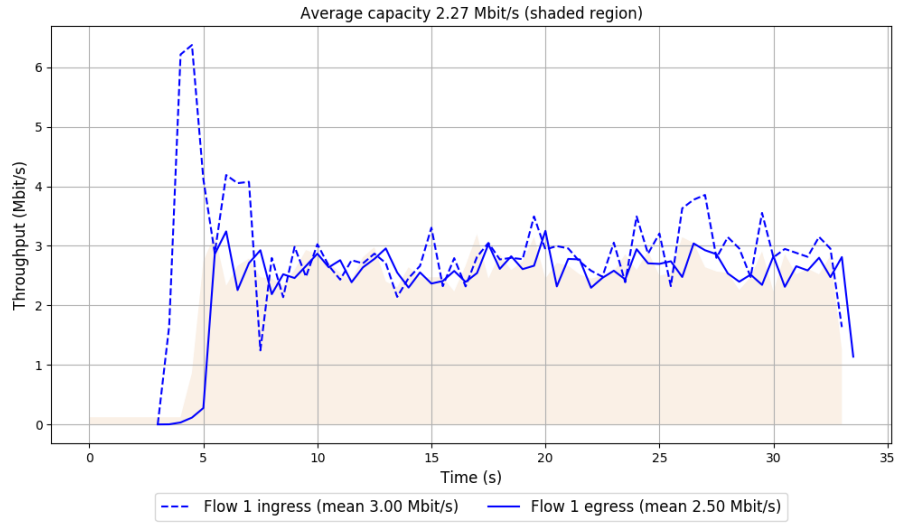
-- Flow 1:

Average throughput: 2.50 Mbit/s

95th percentile per-packet one-way delay: 616.133 ms

Loss rate: 16.76%

Run 3: Report of FillP — Data Link



Run 1: Statistics of FillP-Sheep

Start at: 2019-07-11 18:35:34

End at: 2019-07-11 18:36:04

Below is generated by plot.py at 2019-07-11 19:12:21

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.47 Mbit/s (108.5% utilization)

95th percentile per-packet one-way delay: 513.352 ms

Loss rate: 8.53%

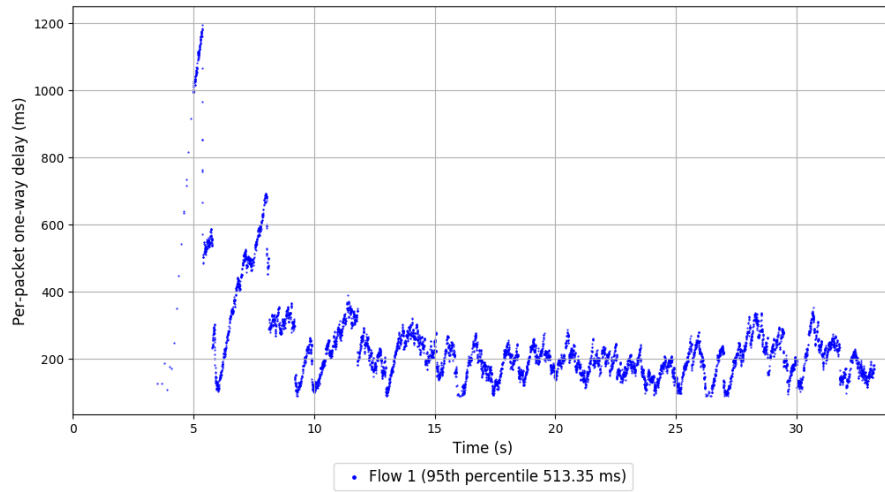
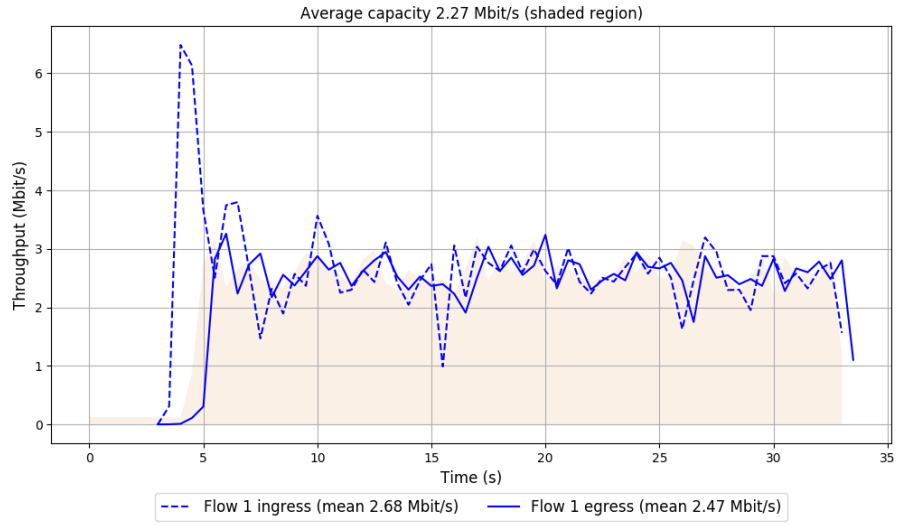
-- Flow 1:

Average throughput: 2.47 Mbit/s

95th percentile per-packet one-way delay: 513.352 ms

Loss rate: 8.53%

Run 1: Report of FillP-Sheep — Data Link



Run 2: Statistics of FillP-Sheep

Start at: 2019-07-11 18:49:39

End at: 2019-07-11 18:50:09

Below is generated by plot.py at 2019-07-11 19:12:22

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.46 Mbit/s (108.2% utilization)

95th percentile per-packet one-way delay: 540.218 ms

Loss rate: 9.50%

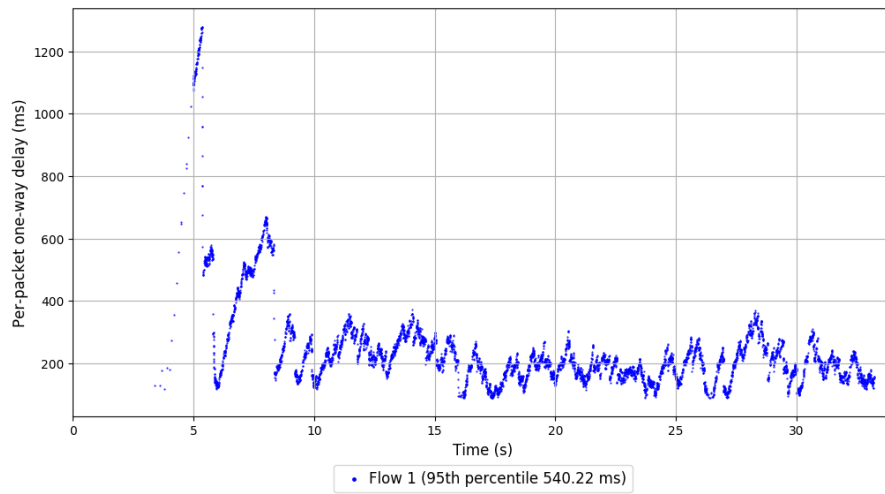
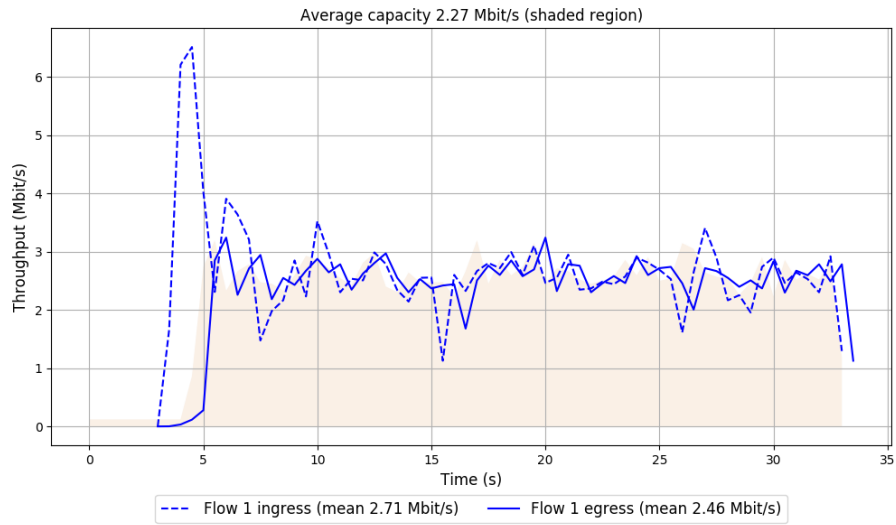
-- Flow 1:

Average throughput: 2.46 Mbit/s

95th percentile per-packet one-way delay: 540.218 ms

Loss rate: 9.50%

Run 2: Report of FillP-Sheep — Data Link



Run 3: Statistics of FillP-Sheep

Start at: 2019-07-11 19:03:44

End at: 2019-07-11 19:04:14

Below is generated by plot.py at 2019-07-11 19:12:22

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.45 Mbit/s (107.9% utilization)

95th percentile per-packet one-way delay: 550.131 ms

Loss rate: 9.83%

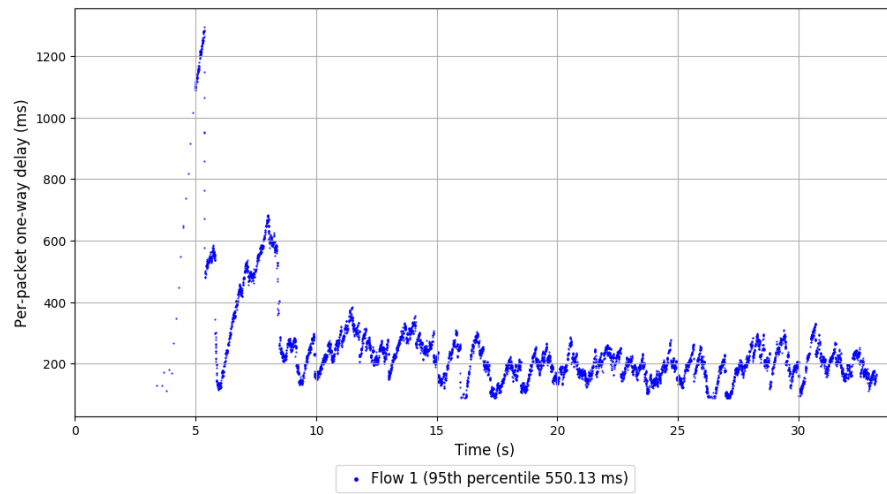
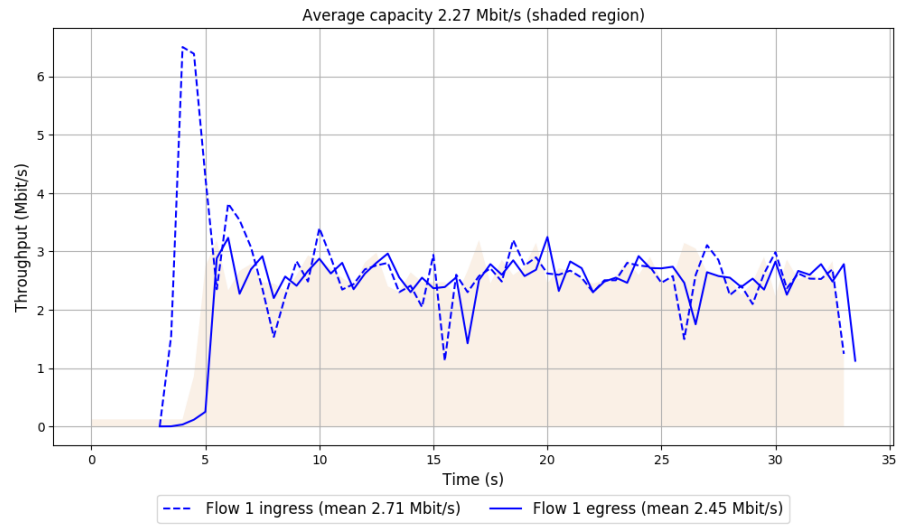
-- Flow 1:

Average throughput: 2.45 Mbit/s

95th percentile per-packet one-way delay: 550.131 ms

Loss rate: 9.83%

Run 3: Report of FillP-Sheep — Data Link



Run 1: Statistics of Indigo

Start at: 2019-07-11 18:39:41

End at: 2019-07-11 18:40:11

Below is generated by plot.py at 2019-07-11 19:12:22

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.07 Mbit/s (91.1% utilization)

95th percentile per-packet one-way delay: 213.513 ms

Loss rate: 0.45%

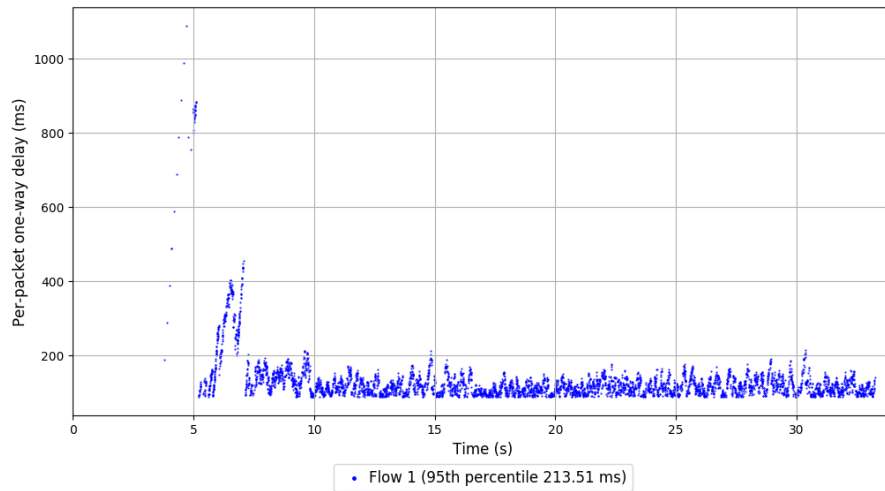
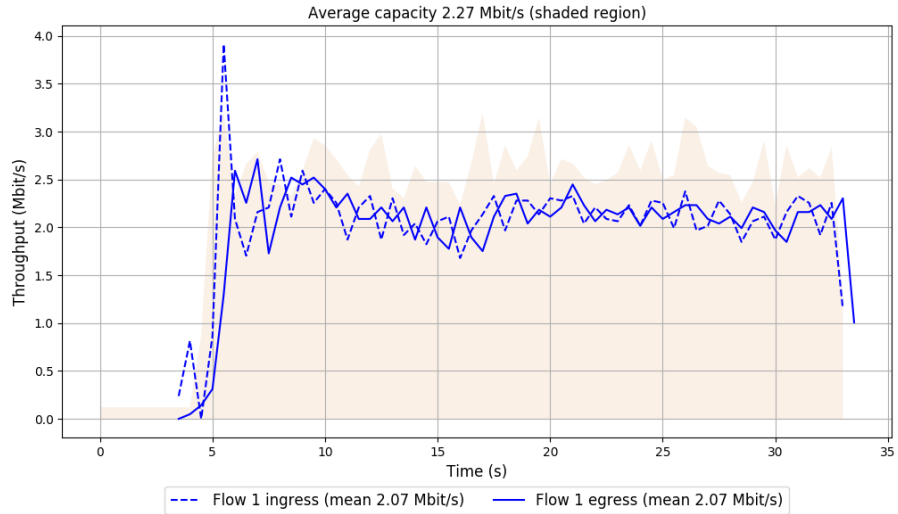
-- Flow 1:

Average throughput: 2.07 Mbit/s

95th percentile per-packet one-way delay: 213.513 ms

Loss rate: 0.45%

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2019-07-11 18:53:46

End at: 2019-07-11 18:54:16

Below is generated by plot.py at 2019-07-11 19:12:22

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 1.94 Mbit/s (85.5% utilization)

95th percentile per-packet one-way delay: 142.882 ms

Loss rate: 0.31%

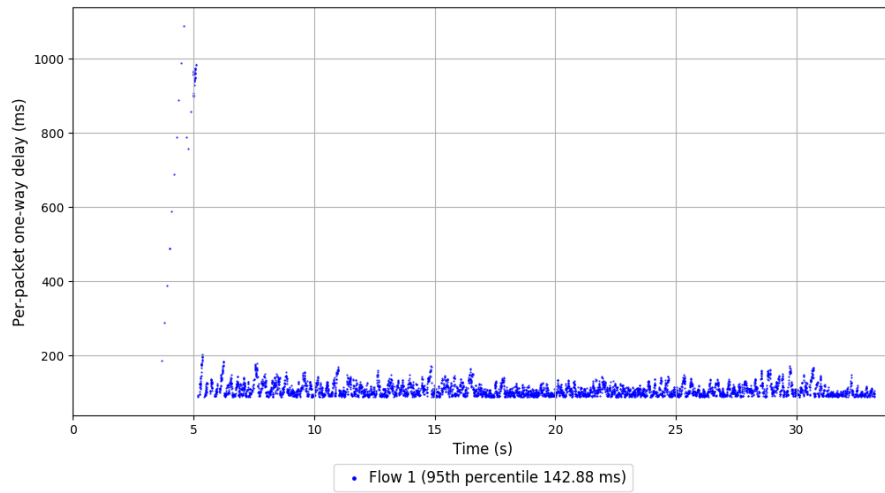
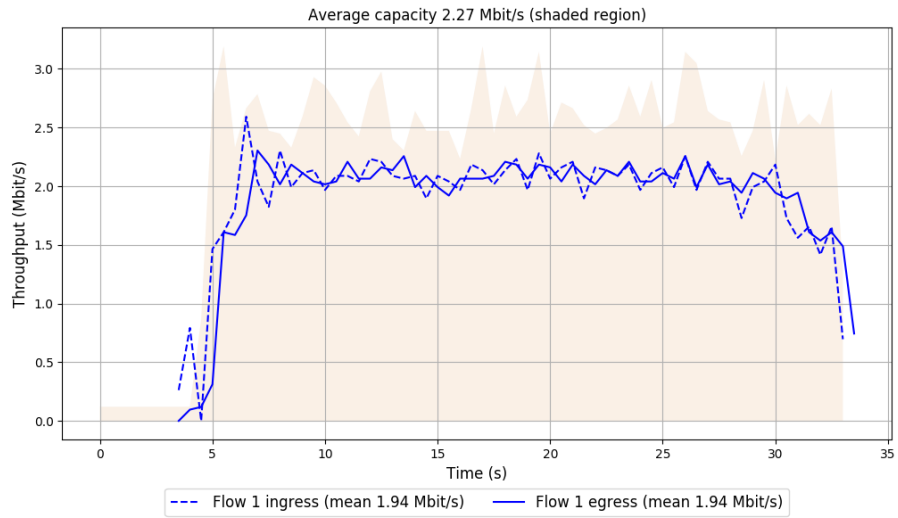
-- Flow 1:

Average throughput: 1.94 Mbit/s

95th percentile per-packet one-way delay: 142.882 ms

Loss rate: 0.31%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2019-07-11 19:07:51

End at: 2019-07-11 19:08:21

Below is generated by plot.py at 2019-07-11 19:12:22

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.06 Mbit/s (90.5% utilization)

95th percentile per-packet one-way delay: 170.786 ms

Loss rate: 0.38%

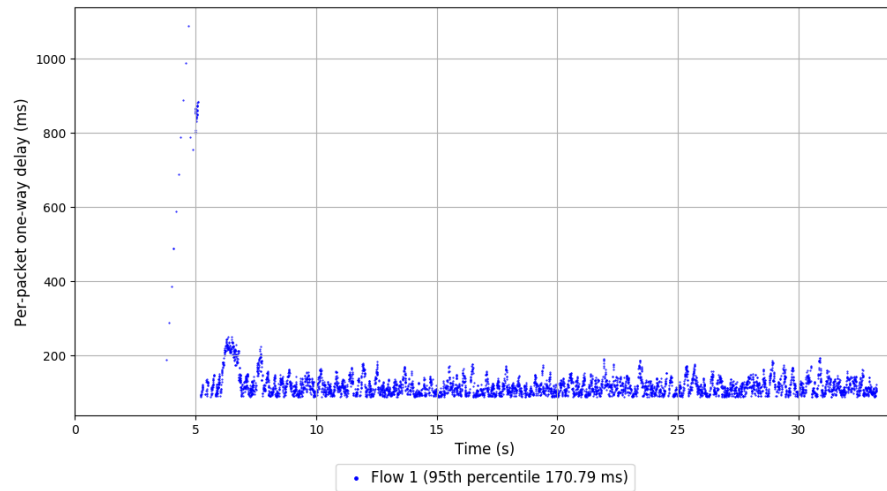
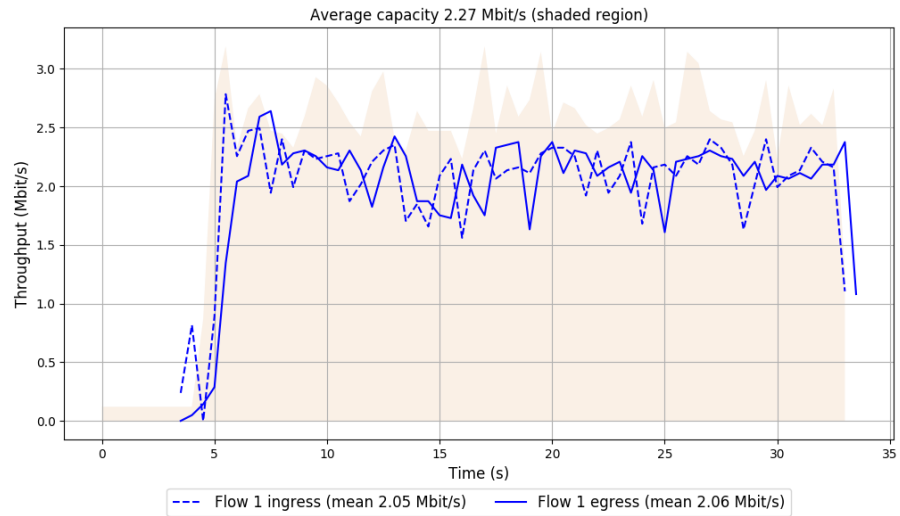
-- Flow 1:

Average throughput: 2.06 Mbit/s

95th percentile per-packet one-way delay: 170.786 ms

Loss rate: 0.38%

Run 3: Report of Indigo — Data Link



Run 1: Statistics of Indigo-MusesC3

Start at: 2019-07-11 18:38:30

End at: 2019-07-11 18:39:00

Below is generated by plot.py at 2019-07-11 19:12:23

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.56 Mbit/s (112.7% utilization)

95th percentile per-packet one-way delay: 308.340 ms

Loss rate: 1.10%

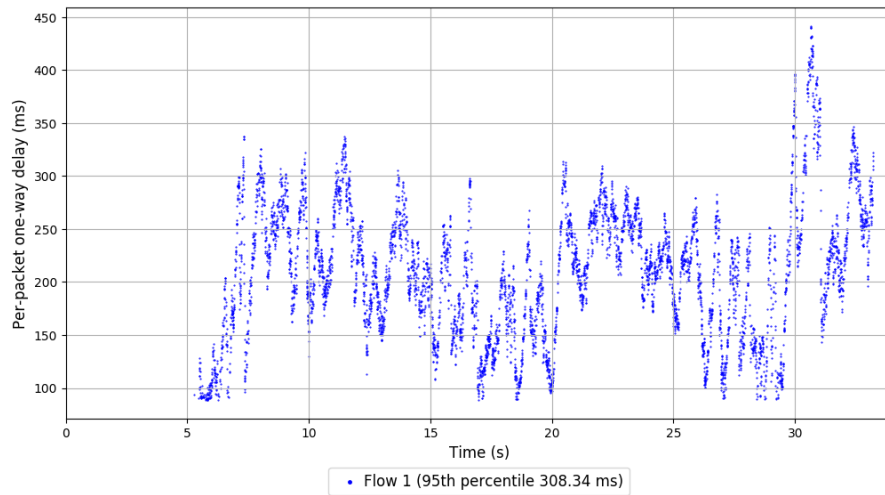
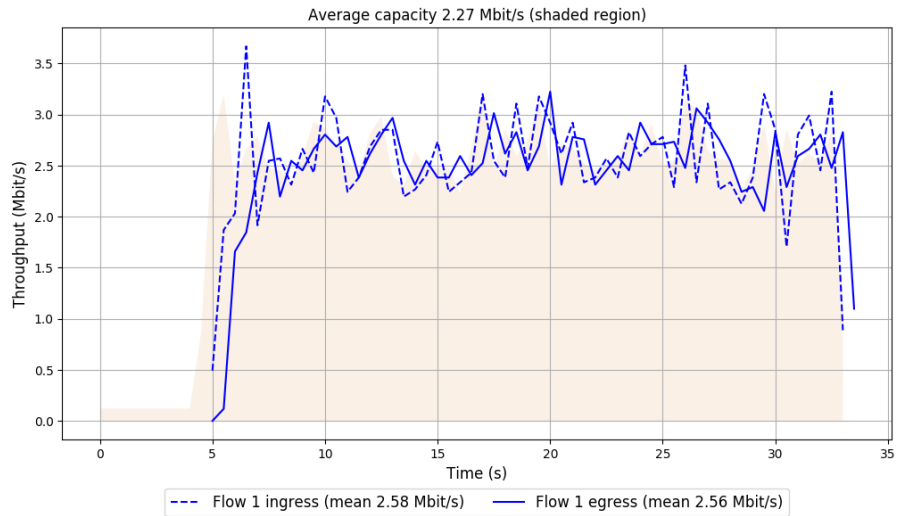
-- Flow 1:

Average throughput: 2.56 Mbit/s

95th percentile per-packet one-way delay: 308.340 ms

Loss rate: 1.10%

Run 1: Report of Indigo-MusesC3 — Data Link



Run 2: Statistics of Indigo-MusesC3

Start at: 2019-07-11 18:52:35

End at: 2019-07-11 18:53:05

Below is generated by plot.py at 2019-07-11 19:12:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.55 Mbit/s (112.0% utilization)

95th percentile per-packet one-way delay: 257.479 ms

Loss rate: 0.82%

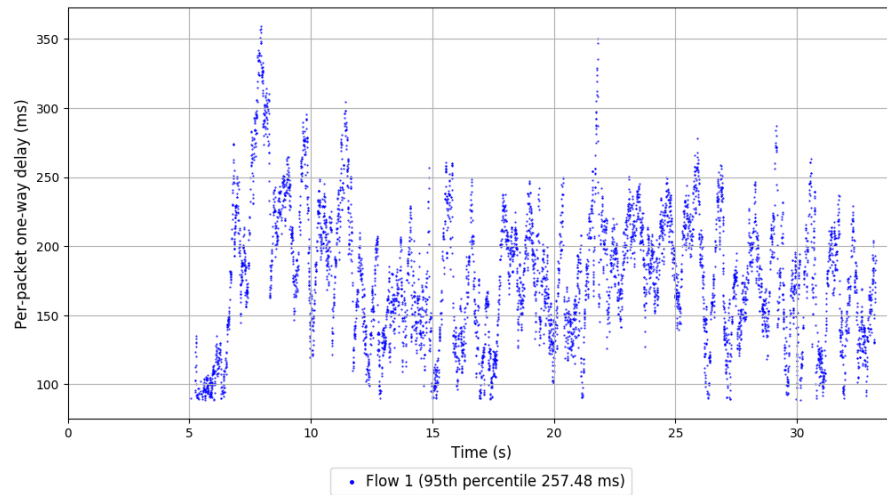
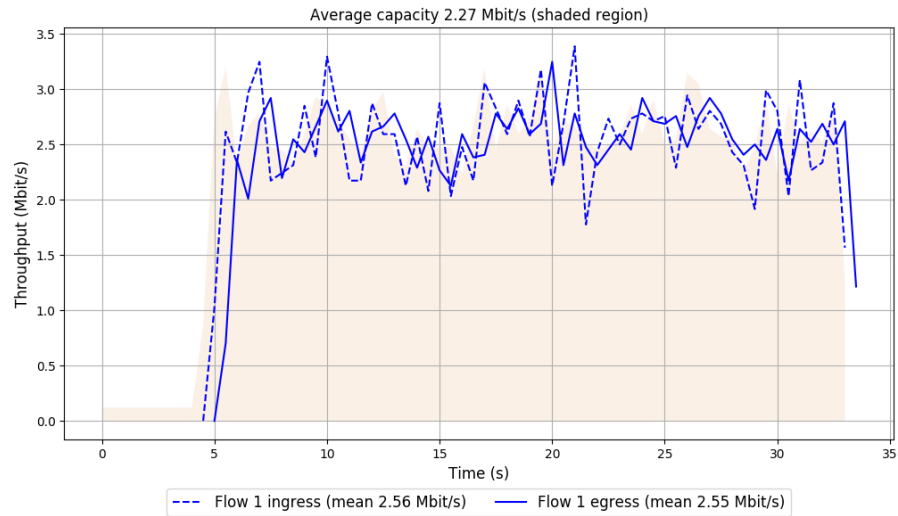
-- Flow 1:

Average throughput: 2.55 Mbit/s

95th percentile per-packet one-way delay: 257.479 ms

Loss rate: 0.82%

Run 2: Report of Indigo-MusesC3 — Data Link



Run 3: Statistics of Indigo-MusesC3

Start at: 2019-07-11 19:06:40

End at: 2019-07-11 19:07:10

Below is generated by plot.py at 2019-07-11 19:12:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.54 Mbit/s (111.9% utilization)

95th percentile per-packet one-way delay: 289.276 ms

Loss rate: 0.69%

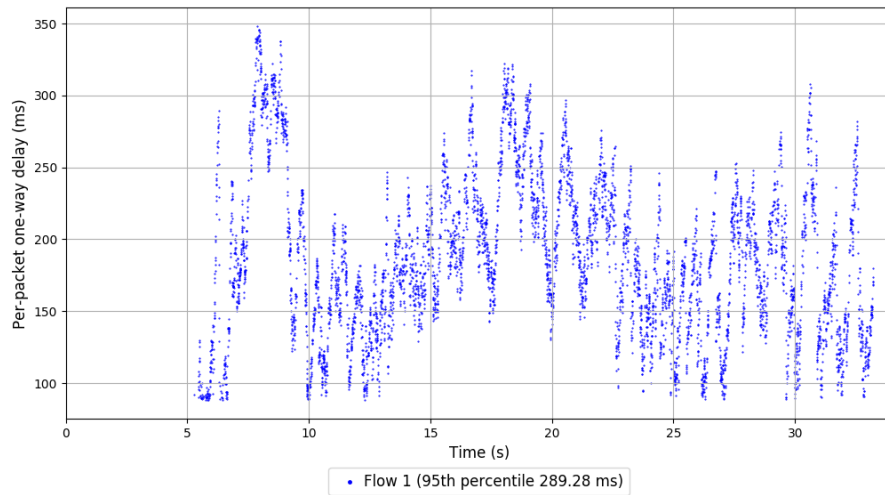
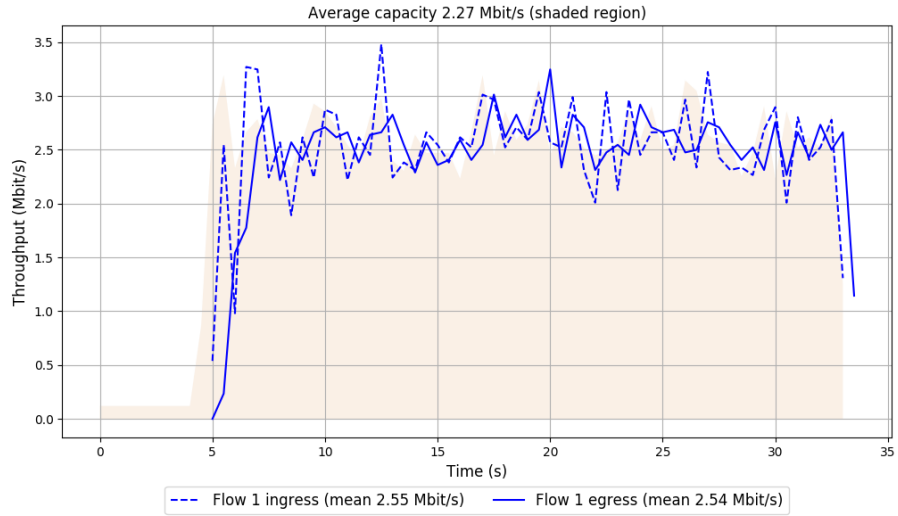
-- Flow 1:

Average throughput: 2.54 Mbit/s

95th percentile per-packet one-way delay: 289.276 ms

Loss rate: 0.69%

Run 3: Report of Indigo-MusesC3 — Data Link



Run 1: Statistics of Indigo-MusesC5

Start at: 2019-07-11 18:37:19

End at: 2019-07-11 18:37:50

Below is generated by plot.py at 2019-07-11 19:12:31

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.06 Mbit/s (90.8% utilization)

95th percentile per-packet one-way delay: 661.026 ms

Loss rate: 21.59%

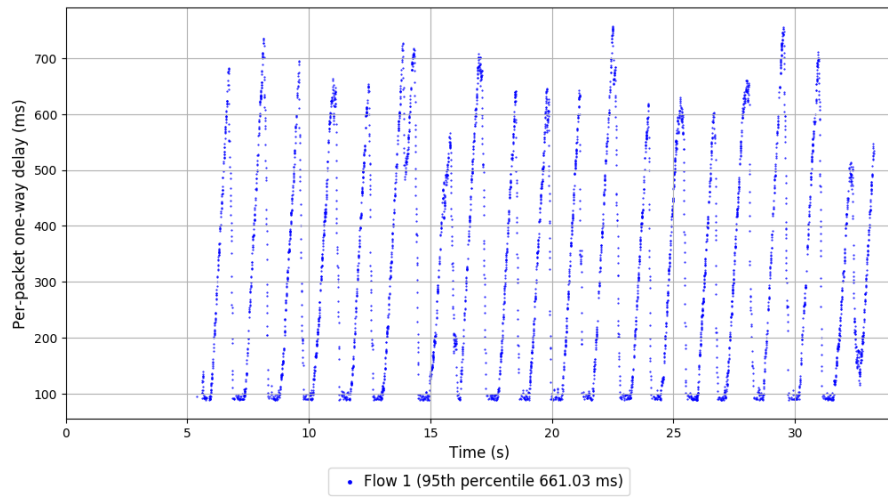
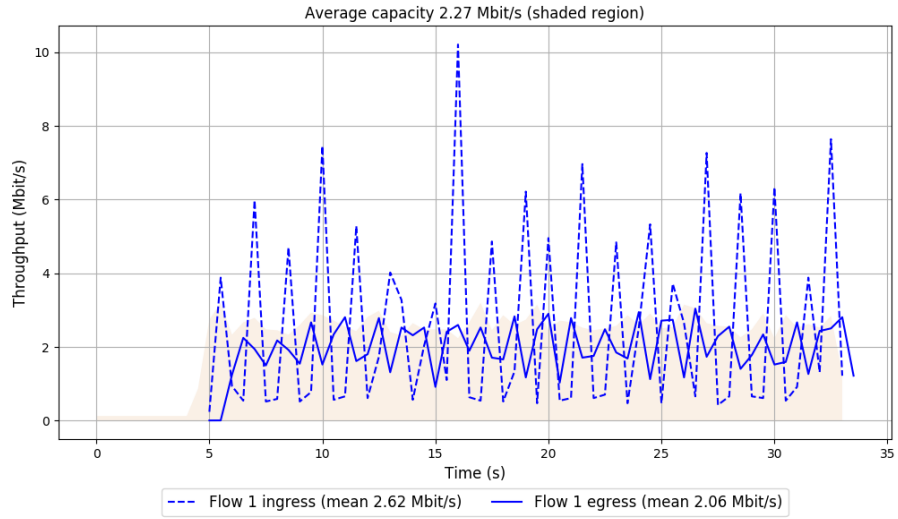
-- Flow 1:

Average throughput: 2.06 Mbit/s

95th percentile per-packet one-way delay: 661.026 ms

Loss rate: 21.59%

Run 1: Report of Indigo-MusesC5 — Data Link



Run 2: Statistics of Indigo-MusesC5

Start at: 2019-07-11 18:51:24

End at: 2019-07-11 18:51:54

Below is generated by plot.py at 2019-07-11 19:12:32

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.11 Mbit/s (92.9% utilization)

95th percentile per-packet one-way delay: 656.575 ms

Loss rate: 22.55%

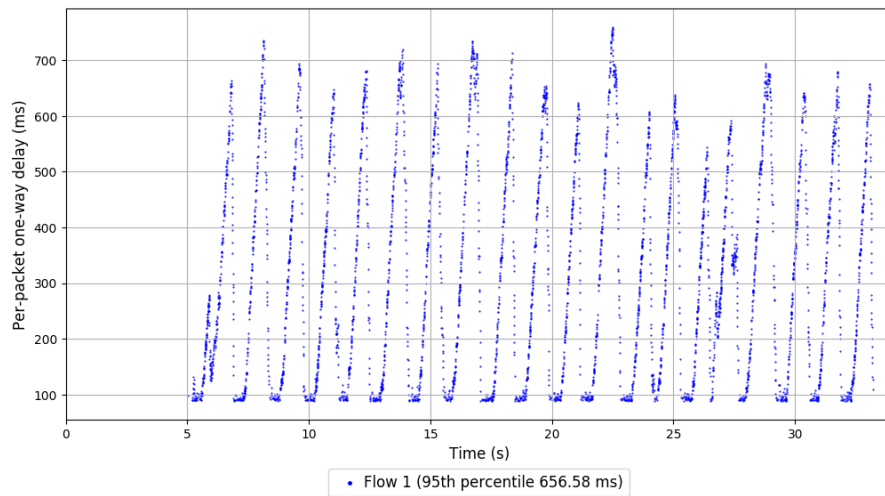
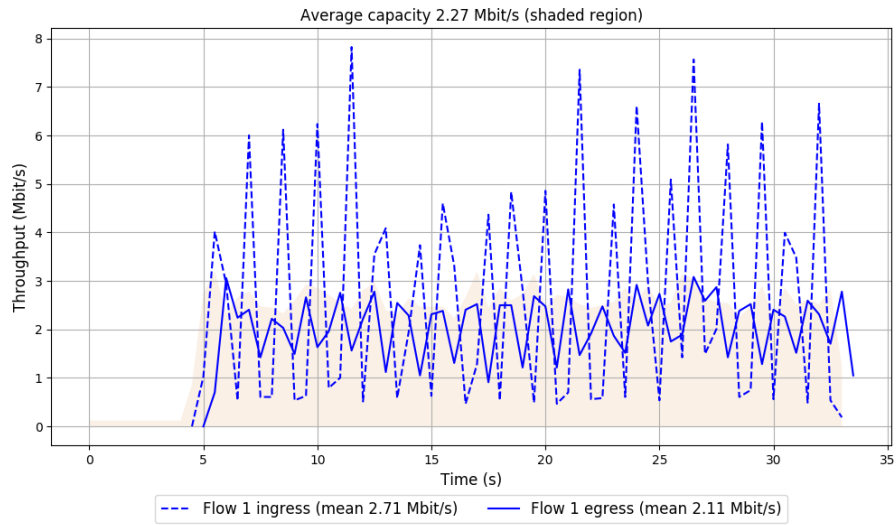
-- Flow 1:

Average throughput: 2.11 Mbit/s

95th percentile per-packet one-way delay: 656.575 ms

Loss rate: 22.55%

Run 2: Report of Indigo-MusesC5 — Data Link



Run 3: Statistics of Indigo-MusesC5

Start at: 2019-07-11 19:05:30

End at: 2019-07-11 19:06:00

Below is generated by plot.py at 2019-07-11 19:12:32

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.25 Mbit/s (99.1% utilization)

95th percentile per-packet one-way delay: 682.726 ms

Loss rate: 34.23%

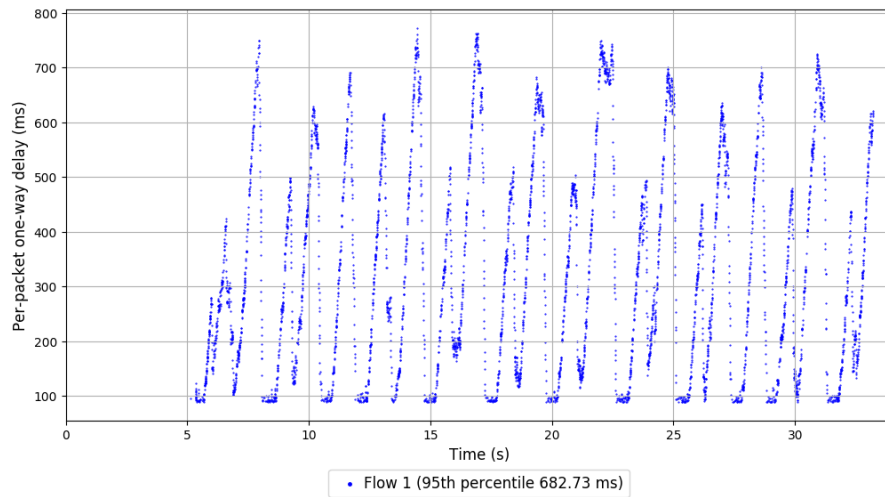
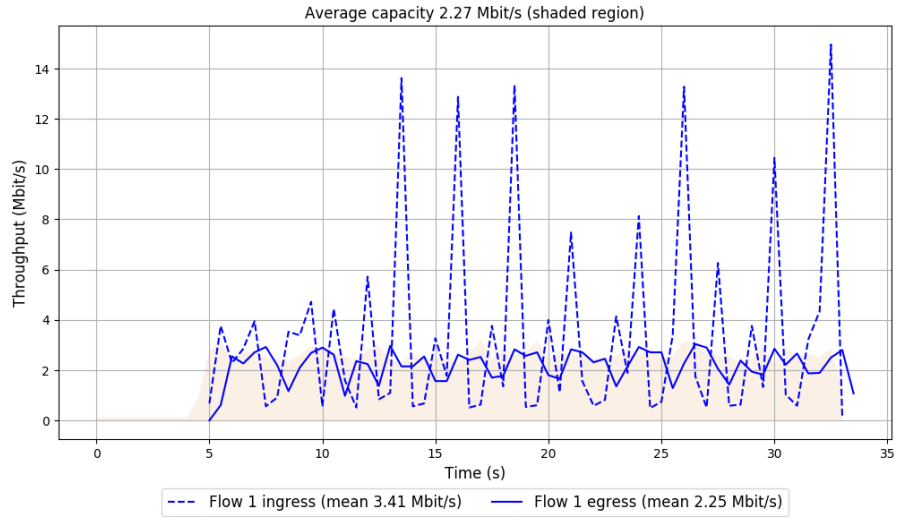
-- Flow 1:

Average throughput: 2.25 Mbit/s

95th percentile per-packet one-way delay: 682.726 ms

Loss rate: 34.23%

Run 3: Report of Indigo-MusesC5 — Data Link

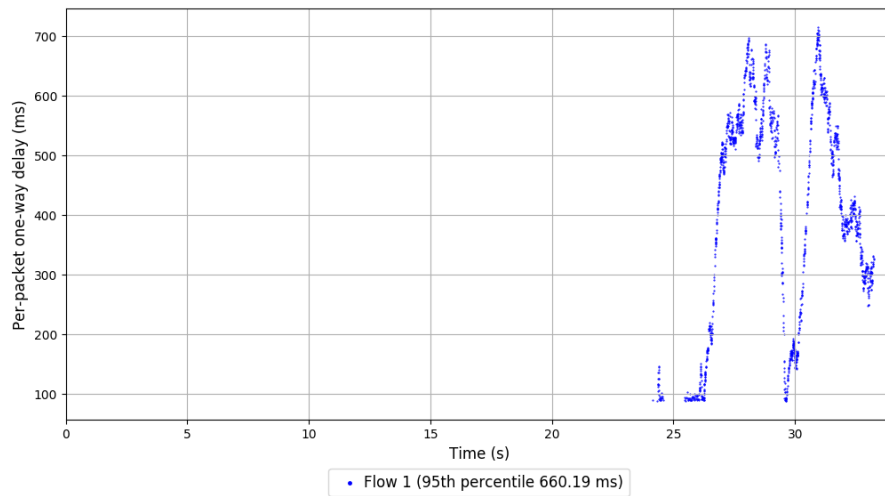
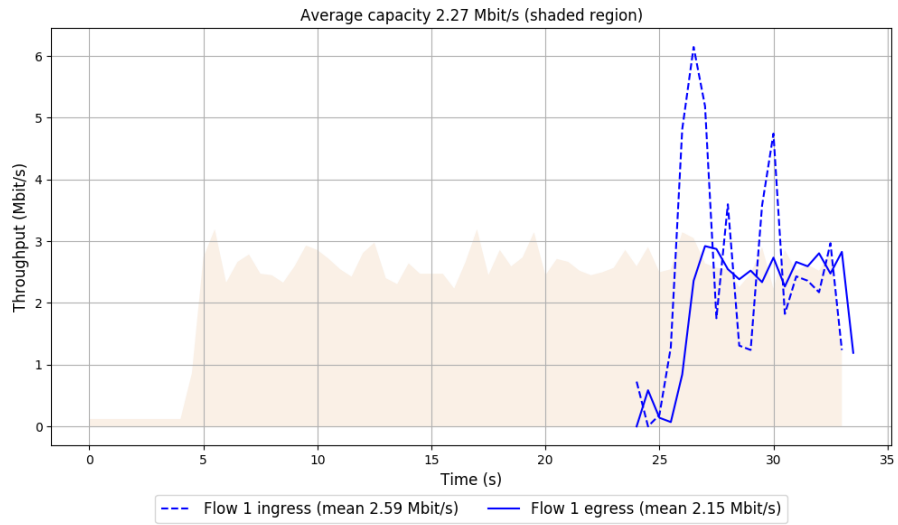


Run 1: Statistics of Indigo-MusesD

Start at: 2019-07-11 18:32:38

End at: 2019-07-11 18:33:08

Run 1: Report of Indigo-MusesD — Data Link



Run 2: Statistics of Indigo-MusesD

Start at: 2019-07-11 18:46:43

End at: 2019-07-11 18:47:13

Below is generated by plot.py at 2019-07-11 19:12:32

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 1.74 Mbit/s (76.4% utilization)

95th percentile per-packet one-way delay: 165.131 ms

Loss rate: 0.19%

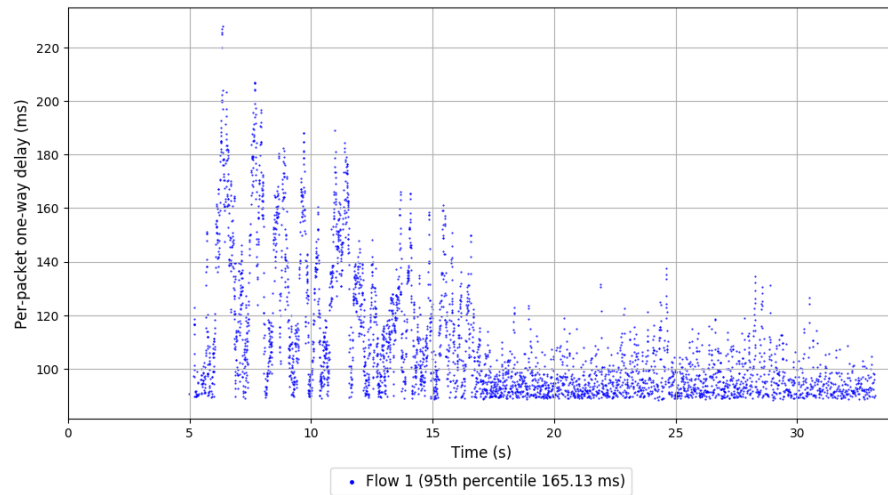
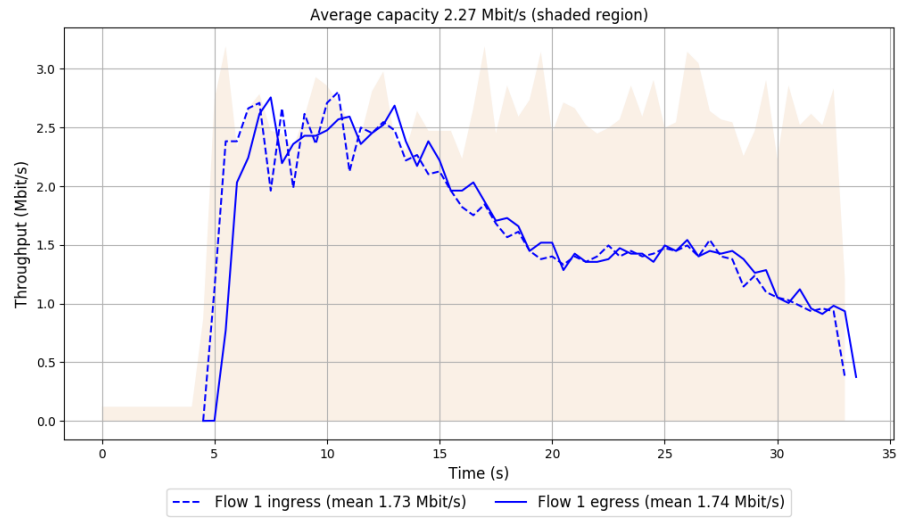
-- Flow 1:

Average throughput: 1.74 Mbit/s

95th percentile per-packet one-way delay: 165.131 ms

Loss rate: 0.19%

Run 2: Report of Indigo-MusesD — Data Link



Run 3: Statistics of Indigo-MusesD

Start at: 2019-07-11 19:00:48

End at: 2019-07-11 19:01:18

Below is generated by plot.py at 2019-07-11 19:12:32

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 1.72 Mbit/s (75.8% utilization)

95th percentile per-packet one-way delay: 147.220 ms

Loss rate: 0.19%

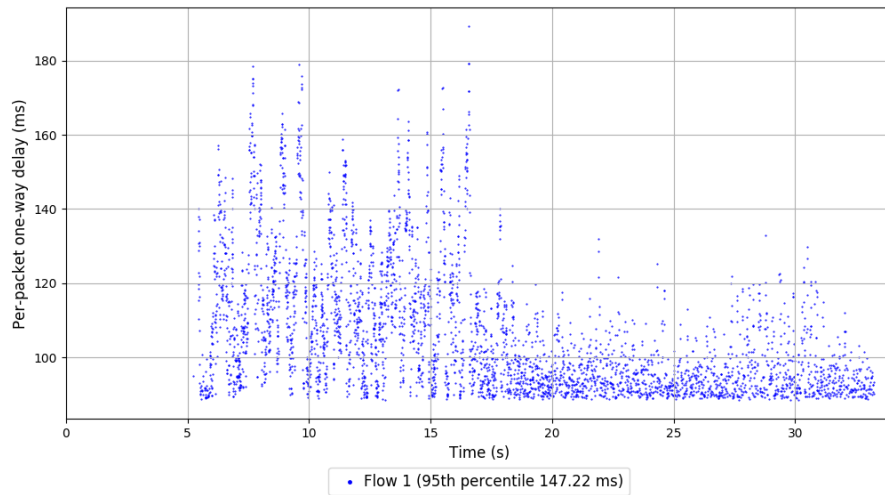
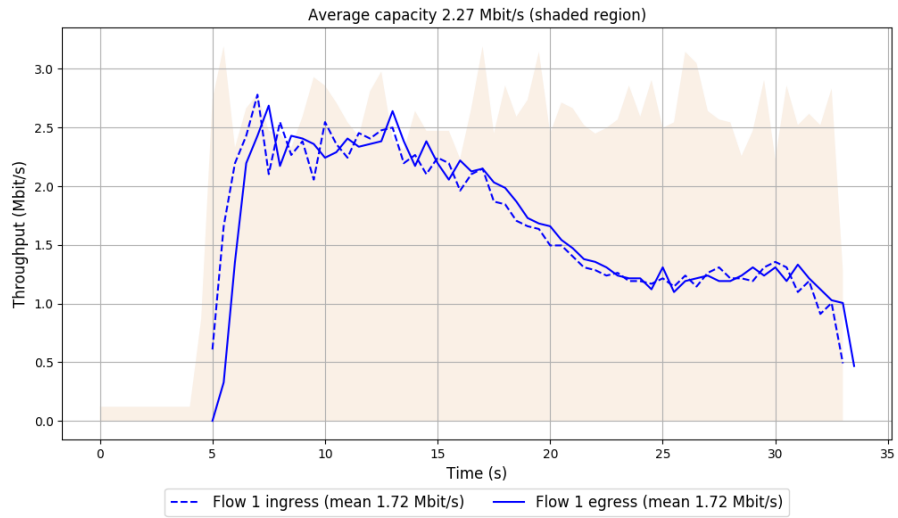
-- Flow 1:

Average throughput: 1.72 Mbit/s

95th percentile per-packet one-way delay: 147.220 ms

Loss rate: 0.19%

Run 3: Report of Indigo-MusesD — Data Link



Run 1: Statistics of Indigo-MuseST

Start at: 2019-07-11 18:40:16

End at: 2019-07-11 18:40:46

Below is generated by plot.py at 2019-07-11 19:12:35

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.24 Mbit/s (98.8% utilization)

95th percentile per-packet one-way delay: 648.660 ms

Loss rate: 7.10%

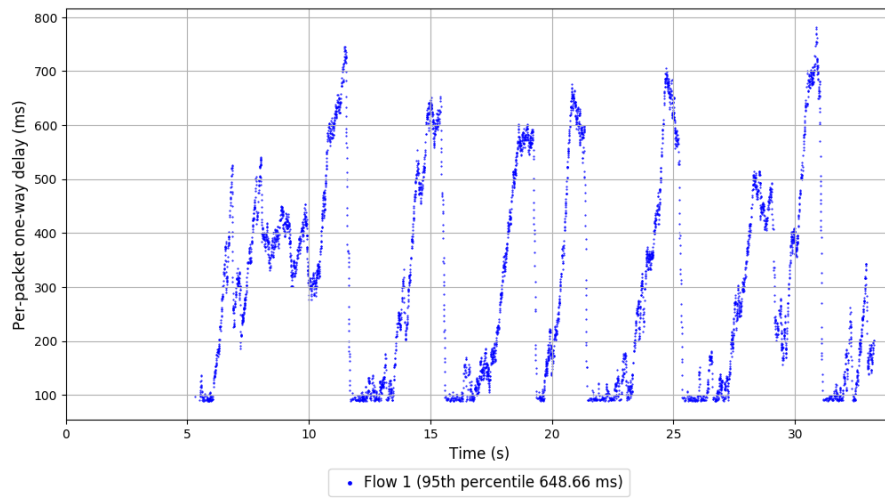
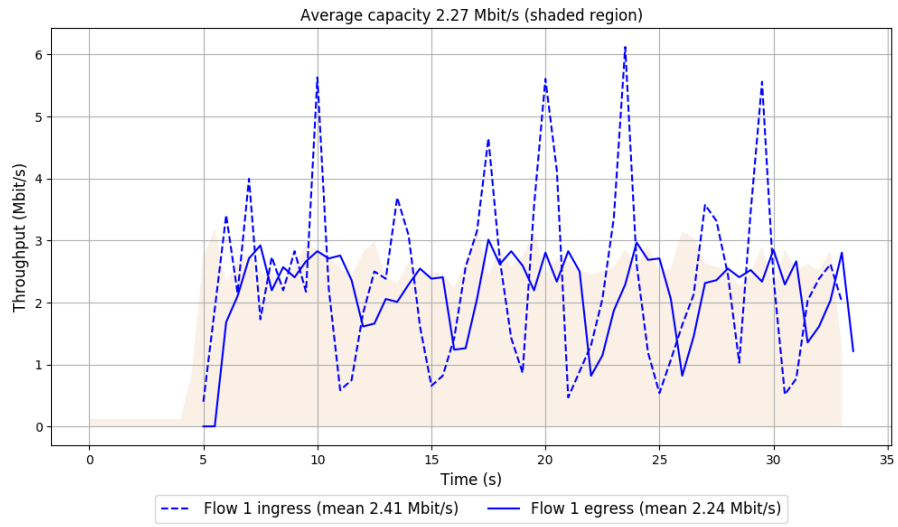
-- Flow 1:

Average throughput: 2.24 Mbit/s

95th percentile per-packet one-way delay: 648.660 ms

Loss rate: 7.10%

Run 1: Report of Indigo-MusesT — Data Link



Run 2: Statistics of Indigo-MuseST

Start at: 2019-07-11 18:54:21

End at: 2019-07-11 18:54:51

Below is generated by plot.py at 2019-07-11 19:12:41

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.23 Mbit/s (98.0% utilization)

95th percentile per-packet one-way delay: 666.404 ms

Loss rate: 13.36%

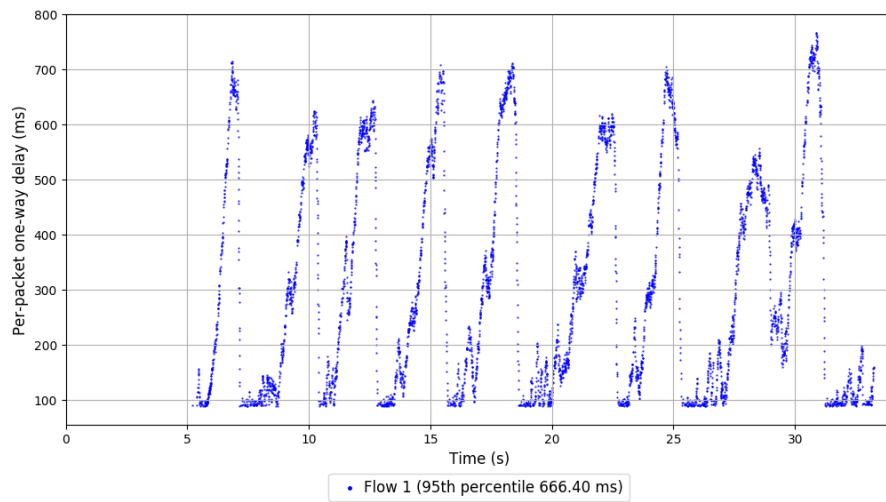
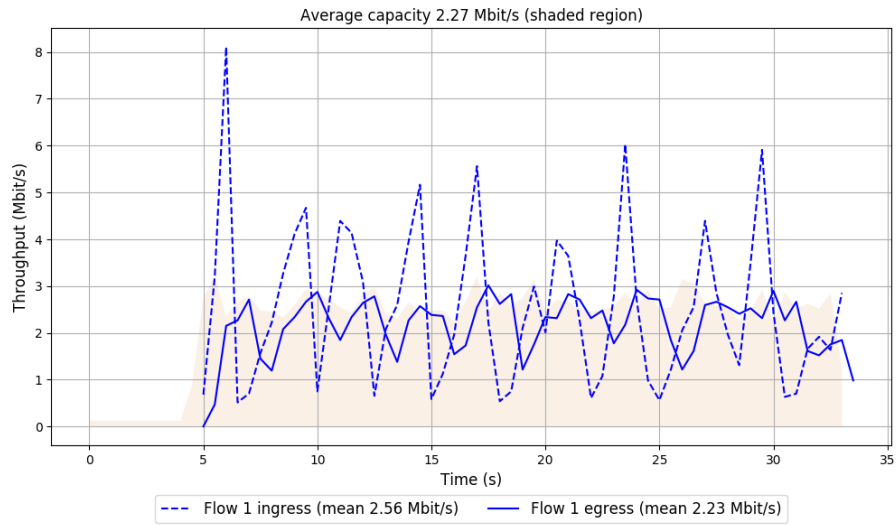
-- Flow 1:

Average throughput: 2.23 Mbit/s

95th percentile per-packet one-way delay: 666.404 ms

Loss rate: 13.36%

Run 2: Report of Indigo-MusesT — Data Link



Run 3: Statistics of Indigo-MuseST

Start at: 2019-07-11 19:08:27

End at: 2019-07-11 19:08:57

Below is generated by plot.py at 2019-07-11 19:12:42

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.40 Mbit/s (105.4% utilization)

95th percentile per-packet one-way delay: 647.697 ms

Loss rate: 10.19%

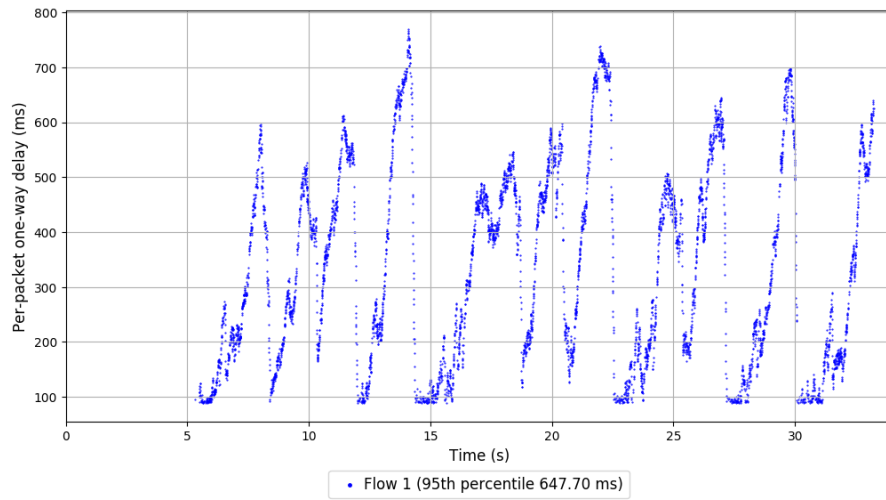
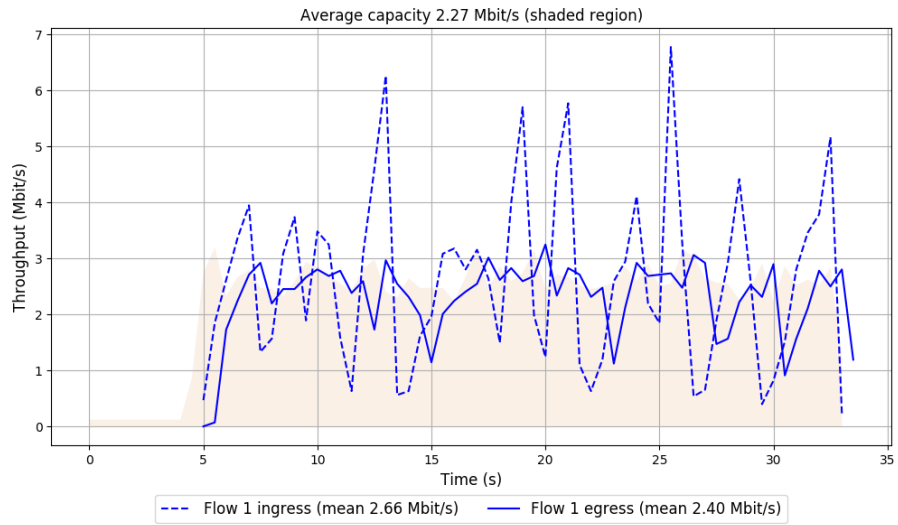
-- Flow 1:

Average throughput: 2.40 Mbit/s

95th percentile per-packet one-way delay: 647.697 ms

Loss rate: 10.19%

Run 3: Report of Indigo-MusesT — Data Link



Run 1: Statistics of LEDBAT

Start at: 2019-07-11 18:36:44

End at: 2019-07-11 18:37:14

Below is generated by plot.py at 2019-07-11 19:12:43

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.32 Mbit/s (102.0% utilization)

95th percentile per-packet one-way delay: 247.674 ms

Loss rate: 0.69%

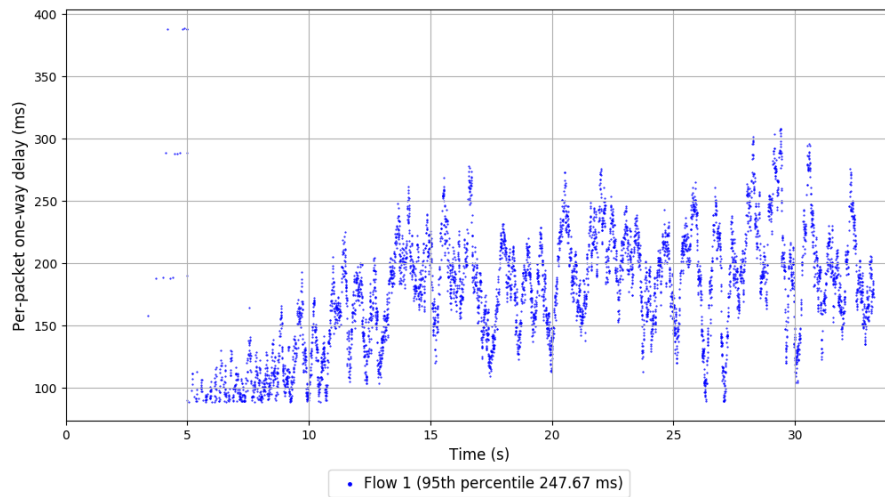
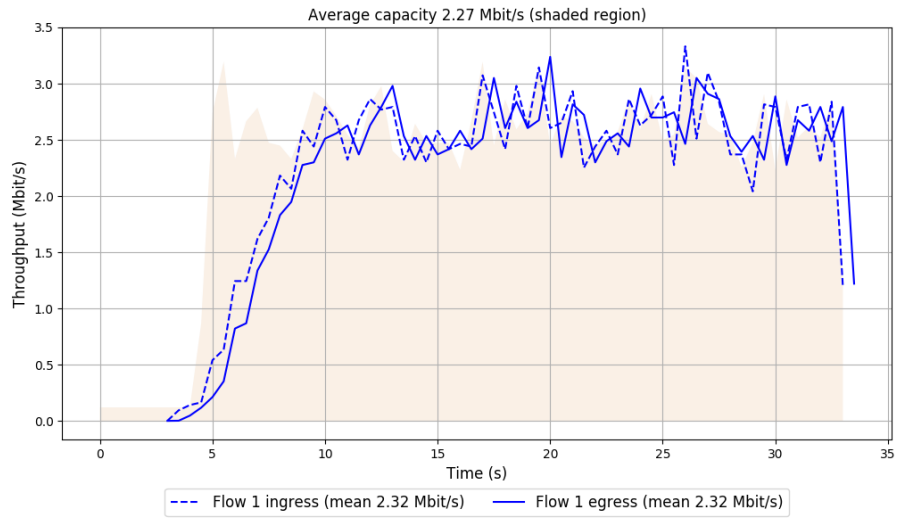
-- Flow 1:

Average throughput: 2.32 Mbit/s

95th percentile per-packet one-way delay: 247.674 ms

Loss rate: 0.69%

Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2019-07-11 18:50:49

End at: 2019-07-11 18:51:19

Below is generated by plot.py at 2019-07-11 19:12:43

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.31 Mbit/s (101.6% utilization)

95th percentile per-packet one-way delay: 250.847 ms

Loss rate: 0.69%

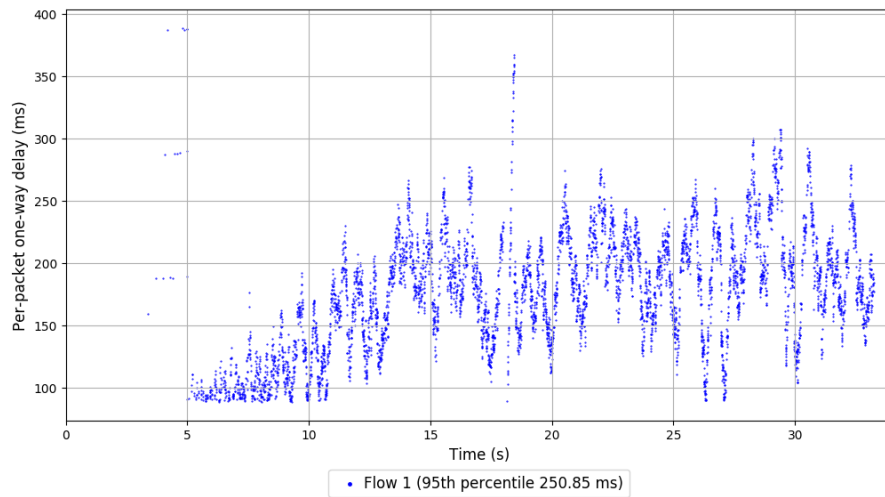
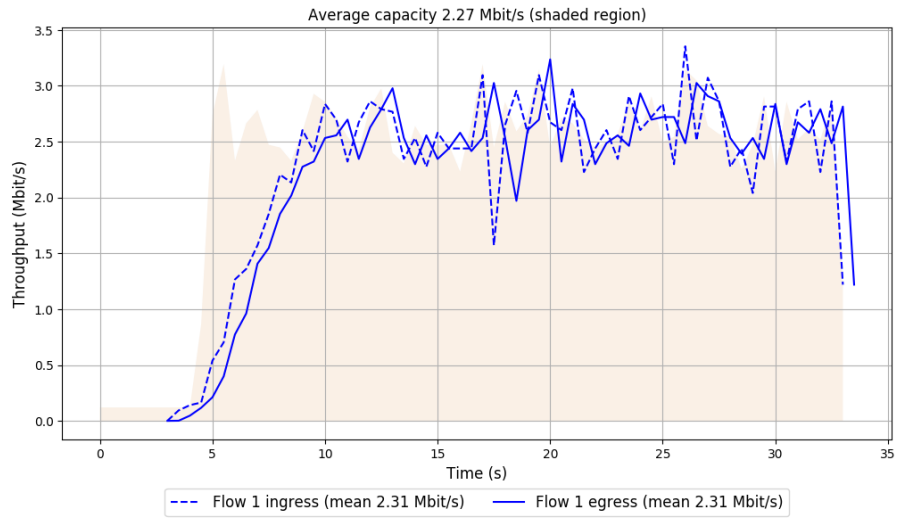
-- Flow 1:

Average throughput: 2.31 Mbit/s

95th percentile per-packet one-way delay: 250.847 ms

Loss rate: 0.69%

Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2019-07-11 19:04:55

End at: 2019-07-11 19:05:25

Below is generated by plot.py at 2019-07-11 19:12:43

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.32 Mbit/s (102.0% utilization)

95th percentile per-packet one-way delay: 248.419 ms

Loss rate: 0.62%

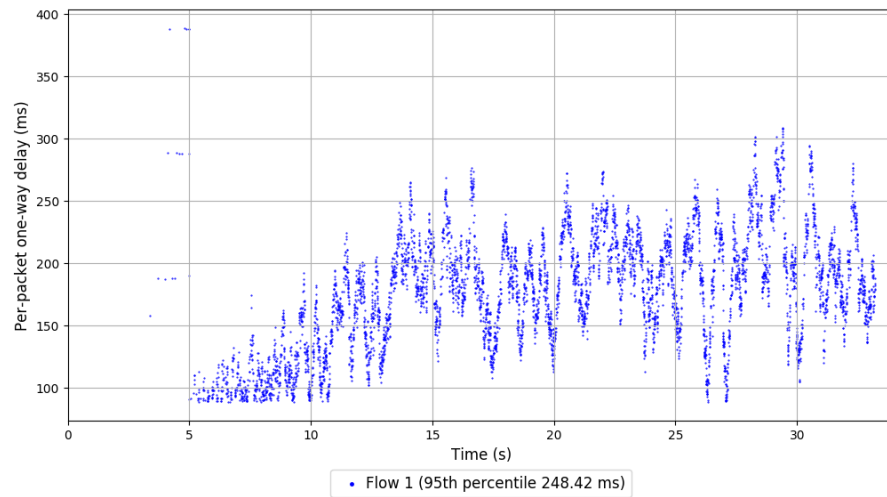
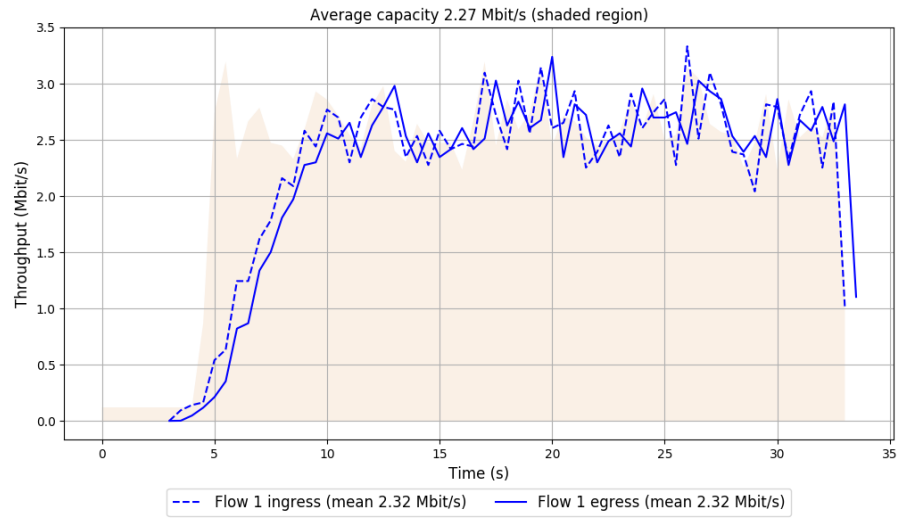
-- Flow 1:

Average throughput: 2.32 Mbit/s

95th percentile per-packet one-way delay: 248.419 ms

Loss rate: 0.62%

Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of Muses_DecisionTree

Start at: 2019-07-11 18:31:28

End at: 2019-07-11 18:31:58

Below is generated by plot.py at 2019-07-11 19:12:43

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 1.52 Mbit/s (67.0% utilization)

95th percentile per-packet one-way delay: 134.630 ms

Loss rate: 0.52%

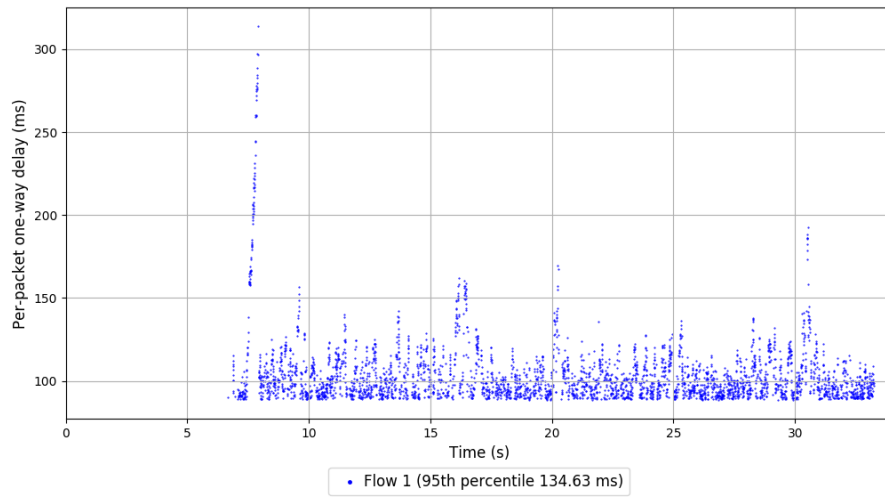
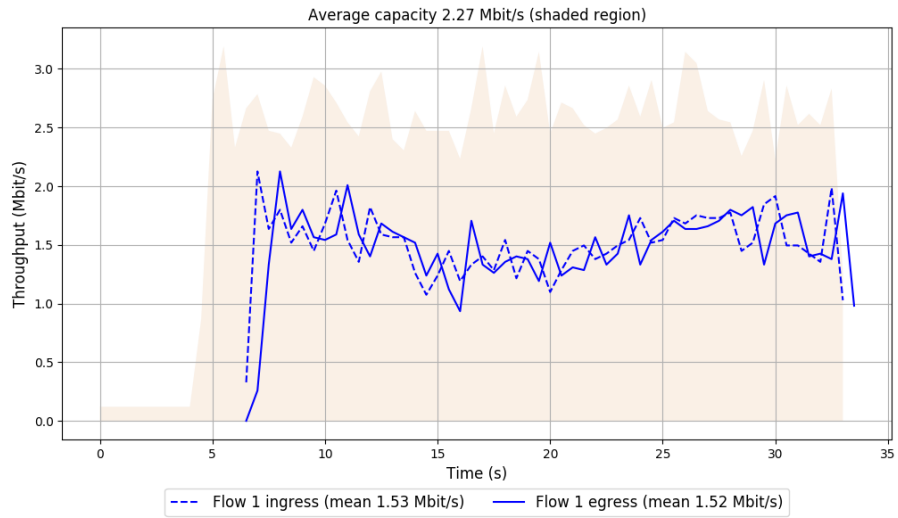
-- Flow 1:

Average throughput: 1.52 Mbit/s

95th percentile per-packet one-way delay: 134.630 ms

Loss rate: 0.52%

Run 1: Report of Muses_DecisionTree — Data Link

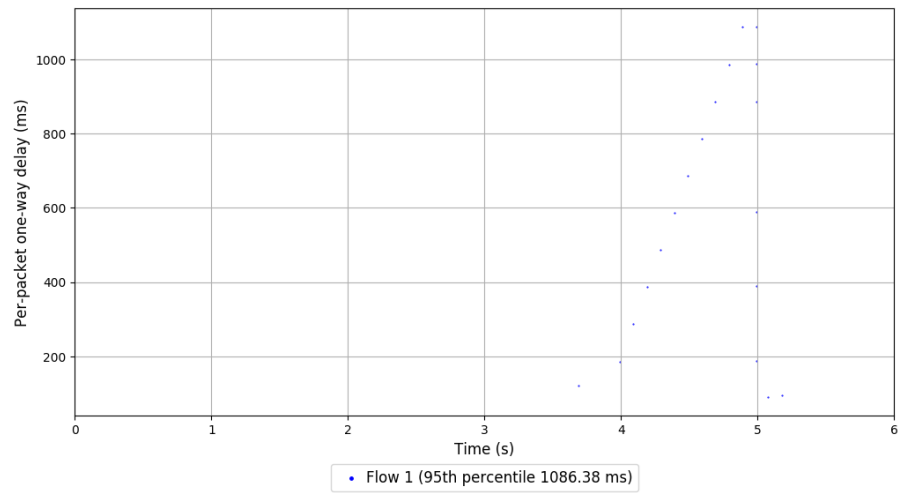
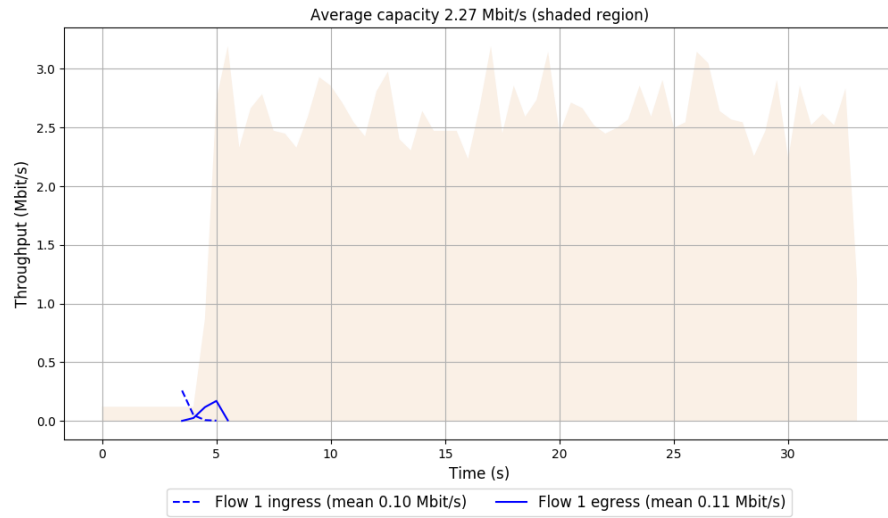


Run 2: Statistics of Muses_DecisionTree

Start at: 2019-07-11 18:45:33

End at: 2019-07-11 18:46:03

Run 2: Report of Muses_DecisionTree — Data Link

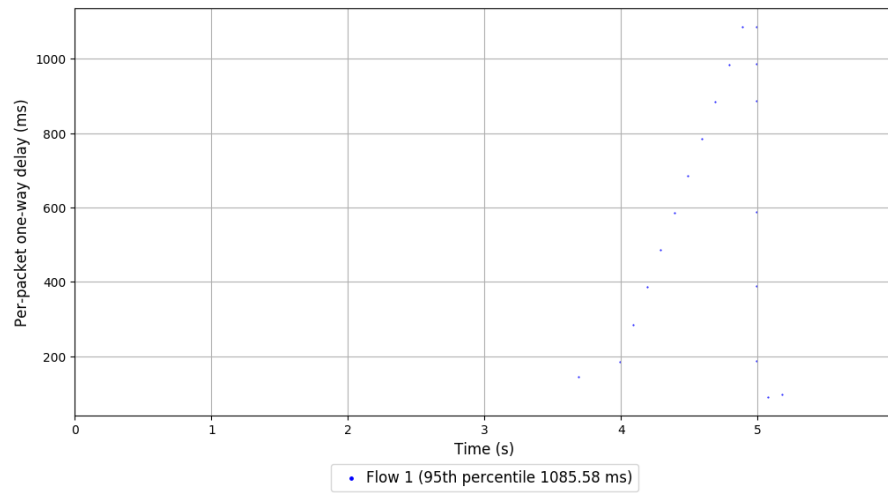
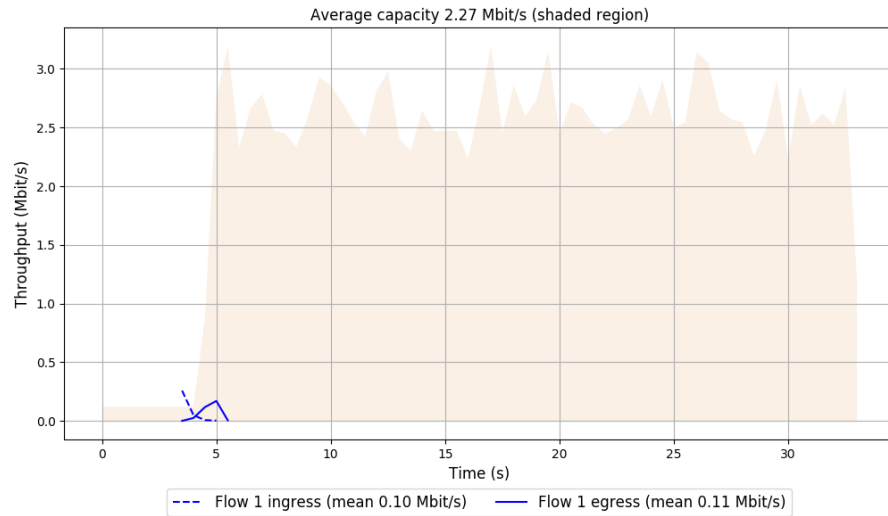


Run 3: Statistics of Muses_DecisionTree

Start at: 2019-07-11 18:59:38

End at: 2019-07-11 19:00:08

Run 3: Report of Muses_DecisionTree — Data Link



Run 1: Statistics of Muses_DecisionTreeH0

Start at: 2019-07-11 18:30:17

End at: 2019-07-11 18:30:47

Run 1: Report of Muses_DecisionTreeH0 — Data Link

Figure is missing

Figure is missing

Run 2: Statistics of Muses_DecisionTreeH0

Start at: 2019-07-11 18:44:23

End at: 2019-07-11 18:44:53

Run 2: Report of Muses_DecisionTreeH0 — Data Link

Figure is missing

Figure is missing

Run 3: Statistics of Muses_DecisionTreeH0

Start at: 2019-07-11 18:58:28

End at: 2019-07-11 18:58:58

Run 3: Report of Muses_DecisionTreeH0 — Data Link

Figure is missing

Figure is missing

Run 1: Statistics of Muses_DecisionTreeR0

Start at: 2019-07-11 18:32:03

End at: 2019-07-11 18:32:33

Run 1: Report of Muses_DecisionTreeR0 — Data Link

Figure is missing

Figure is missing

Run 2: Statistics of Muses_DecisionTreeR0

Start at: 2019-07-11 18:46:08

End at: 2019-07-11 18:46:38

Run 2: Report of Muses_DecisionTreeR0 — Data Link

Figure is missing

Figure is missing

Run 3: Statistics of Muses_DecisionTreeR0

Start at: 2019-07-11 19:00:13

End at: 2019-07-11 19:00:43

Run 3: Report of Muses_DecisionTreeR0 — Data Link

Figure is missing

Figure is missing

Run 1: Statistics of PCC-Allegro

Start at: 2019-07-11 18:39:05

End at: 2019-07-11 18:39:35

Below is generated by plot.py at 2019-07-11 19:12:55

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.51 Mbit/s (110.7% utilization)

95th percentile per-packet one-way delay: 763.414 ms

Loss rate: 86.32%

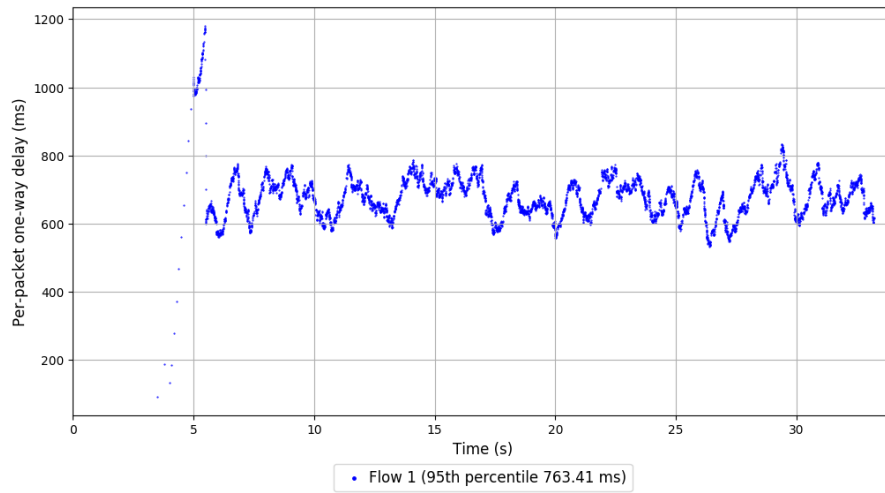
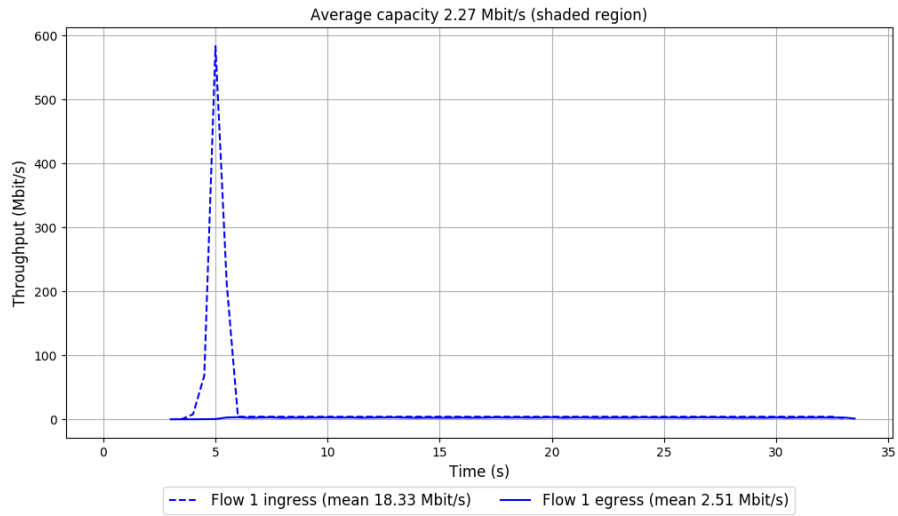
-- Flow 1:

Average throughput: 2.51 Mbit/s

95th percentile per-packet one-way delay: 763.414 ms

Loss rate: 86.32%

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2019-07-11 18:53:10

End at: 2019-07-11 18:53:40

Below is generated by plot.py at 2019-07-11 19:12:57

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.51 Mbit/s (110.6% utilization)

95th percentile per-packet one-way delay: 761.975 ms

Loss rate: 84.46%

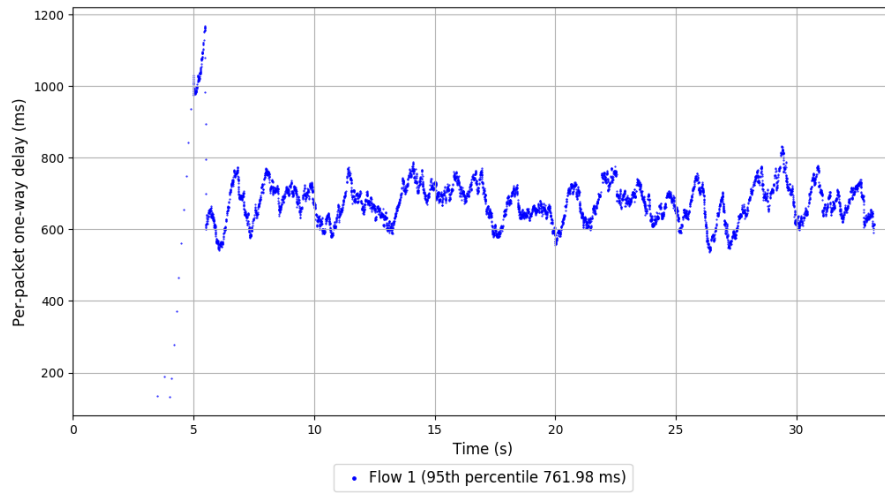
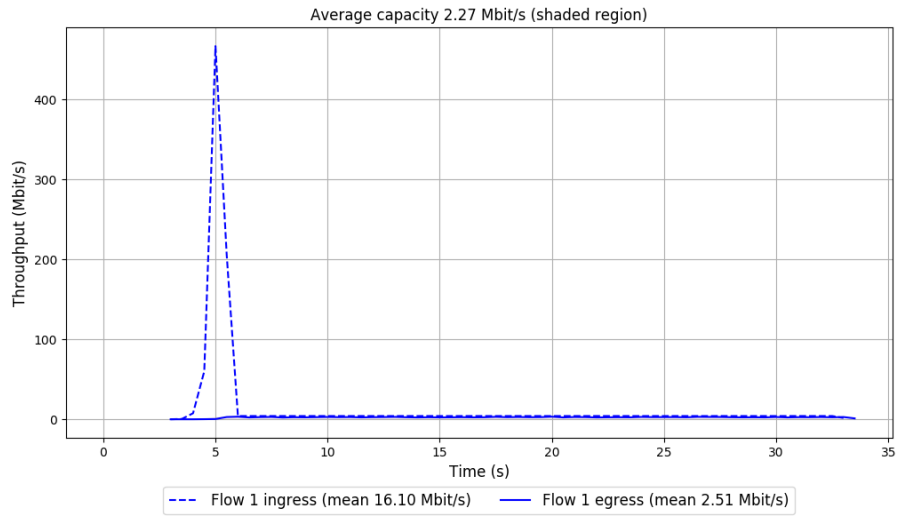
-- Flow 1:

Average throughput: 2.51 Mbit/s

95th percentile per-packet one-way delay: 761.975 ms

Loss rate: 84.46%

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

Start at: 2019-07-11 19:07:16

End at: 2019-07-11 19:07:46

Below is generated by plot.py at 2019-07-11 19:13:01

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.51 Mbit/s (110.7% utilization)

95th percentile per-packet one-way delay: 759.293 ms

Loss rate: 86.13%

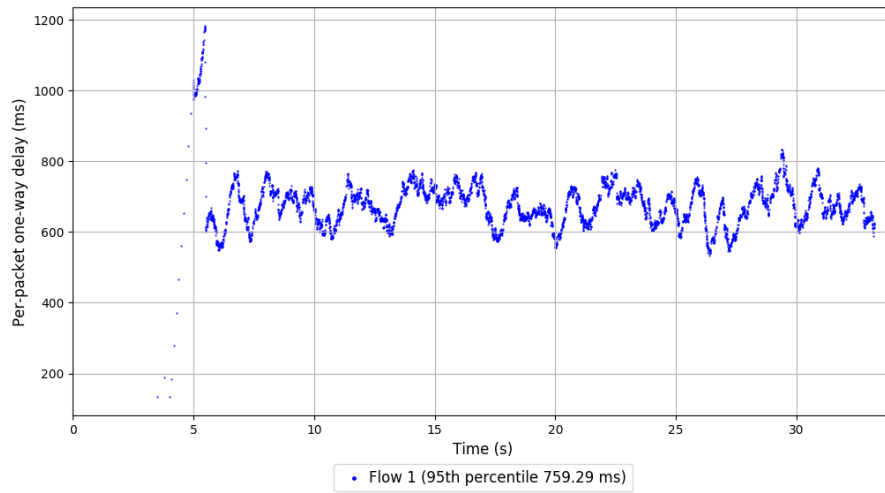
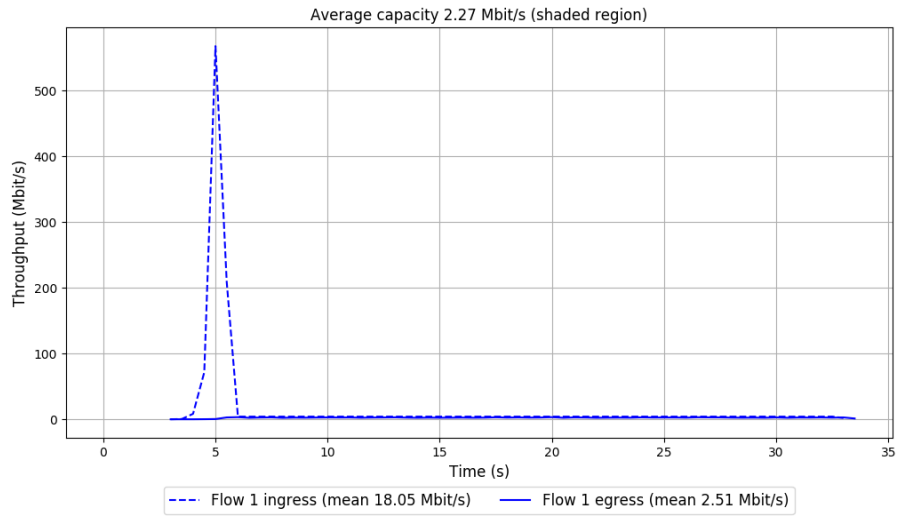
-- Flow 1:

Average throughput: 2.51 Mbit/s

95th percentile per-packet one-way delay: 759.293 ms

Loss rate: 86.13%

Run 3: Report of PCC-Allegro — Data Link



Run 1: Statistics of PCC-Expr

Start at: 2019-07-11 18:40:51

End at: 2019-07-11 18:41:21

Below is generated by plot.py at 2019-07-11 19:13:01

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.52 Mbit/s (110.8% utilization)

95th percentile per-packet one-way delay: 505.749 ms

Loss rate: 49.93%

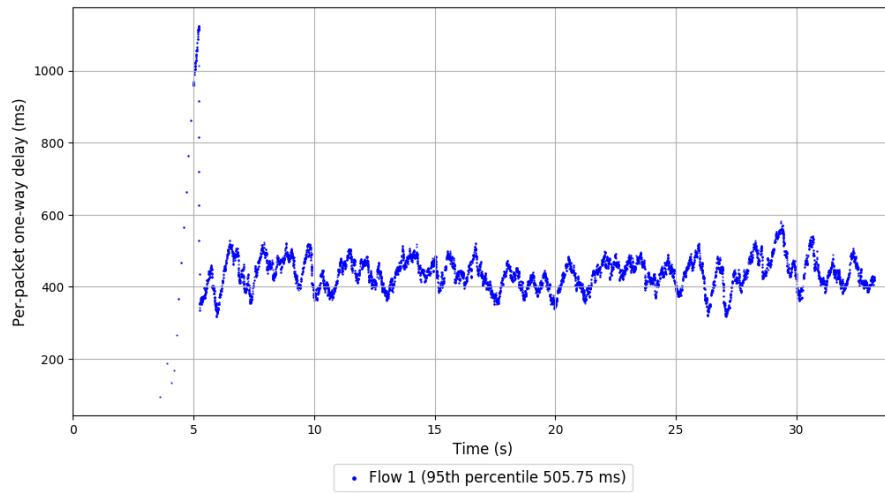
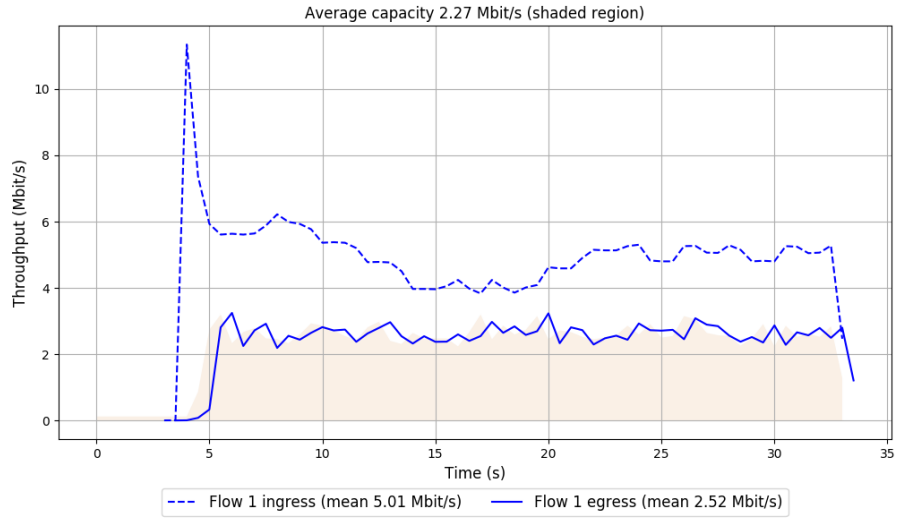
-- Flow 1:

Average throughput: 2.52 Mbit/s

95th percentile per-packet one-way delay: 505.749 ms

Loss rate: 49.93%

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

Start at: 2019-07-11 18:54:56

End at: 2019-07-11 18:55:26

Below is generated by plot.py at 2019-07-11 19:13:01

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.51 Mbit/s (110.4% utilization)

95th percentile per-packet one-way delay: 514.085 ms

Loss rate: 57.70%

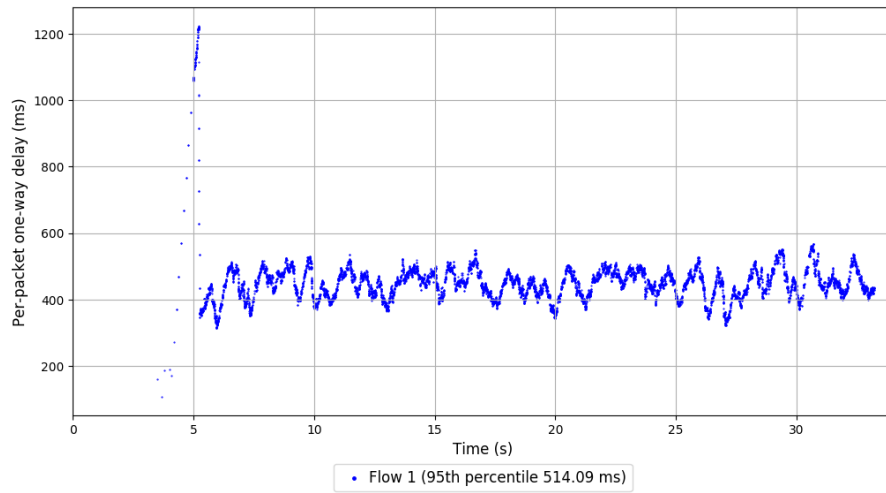
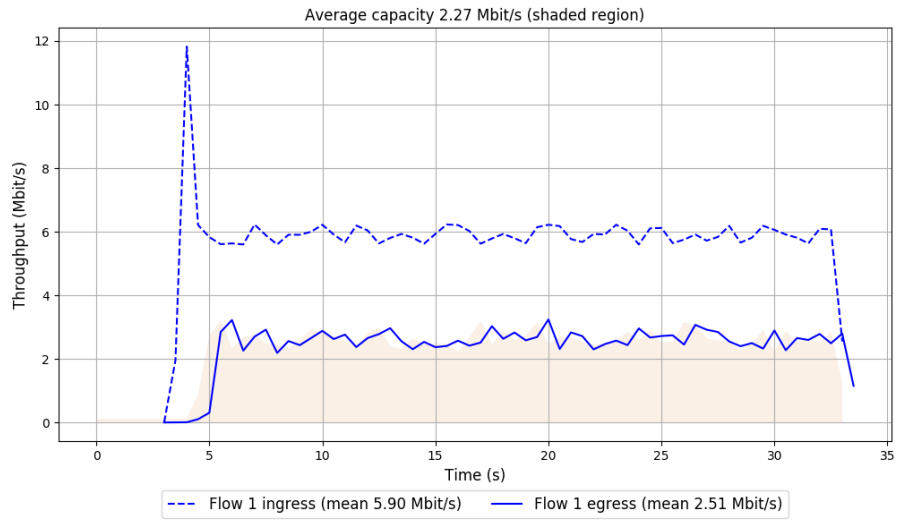
-- Flow 1:

Average throughput: 2.51 Mbit/s

95th percentile per-packet one-way delay: 514.085 ms

Loss rate: 57.70%

Run 2: Report of PCC-Expr — Data Link



Run 3: Statistics of PCC-Expr

Start at: 2019-07-11 19:09:02

End at: 2019-07-11 19:09:32

Below is generated by plot.py at 2019-07-11 19:13:01

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.51 Mbit/s (110.4% utilization)

95th percentile per-packet one-way delay: 509.682 ms

Loss rate: 53.66%

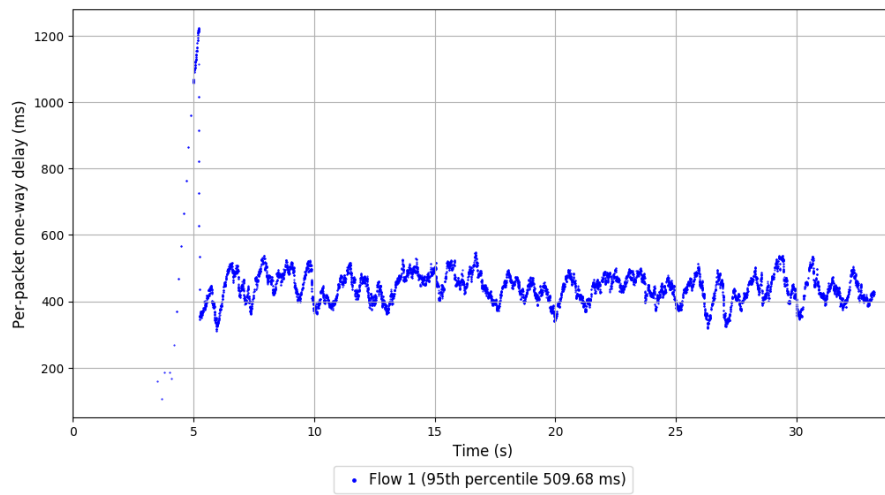
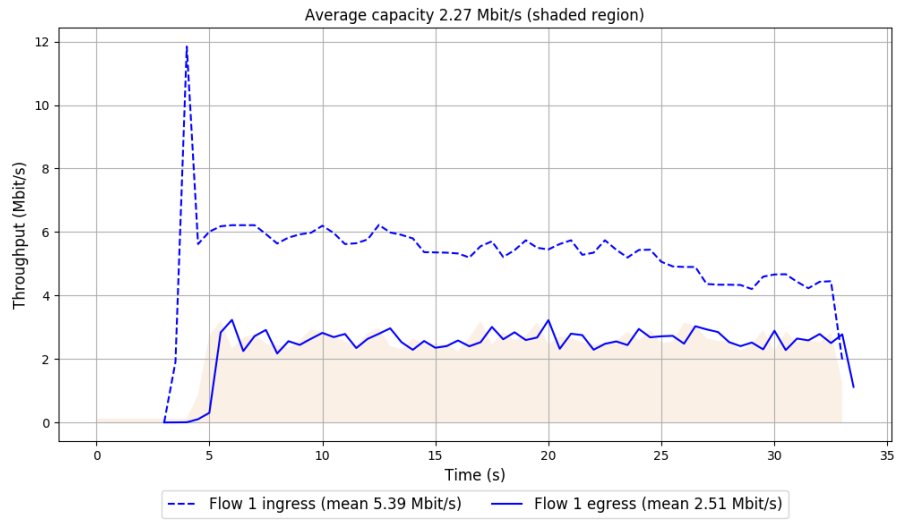
-- Flow 1:

Average throughput: 2.51 Mbit/s

95th percentile per-packet one-way delay: 509.682 ms

Loss rate: 53.66%

Run 3: Report of PCC-Expr — Data Link

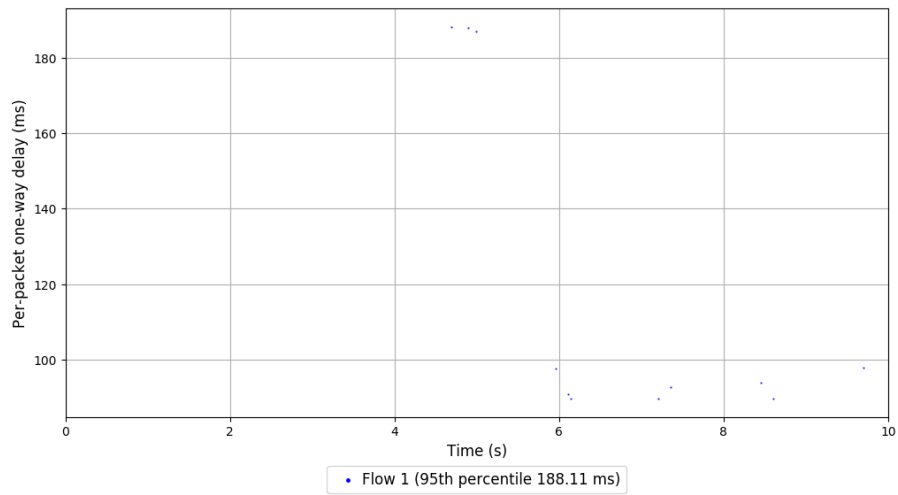
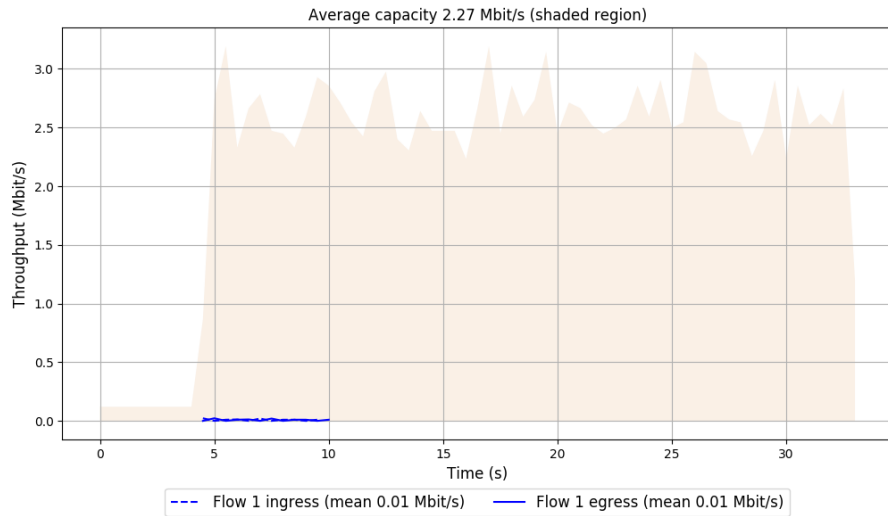


Run 1: Statistics of QUIC Cubic

Start at: 2019-07-11 18:41:27

End at: 2019-07-11 18:41:57

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2019-07-11 18:55:32

End at: 2019-07-11 18:56:02

Below is generated by plot.py at 2019-07-11 19:13:01

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.52 Mbit/s (111.1% utilization)

95th percentile per-packet one-way delay: 679.001 ms

Loss rate: 2.99%

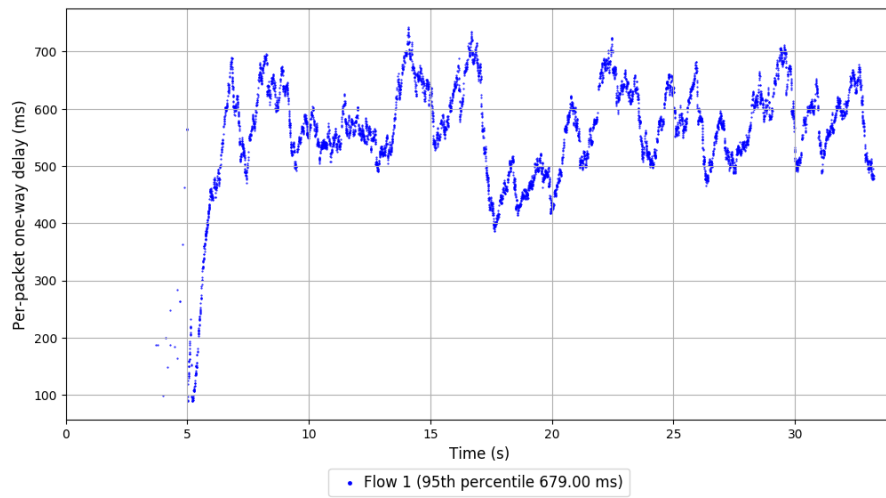
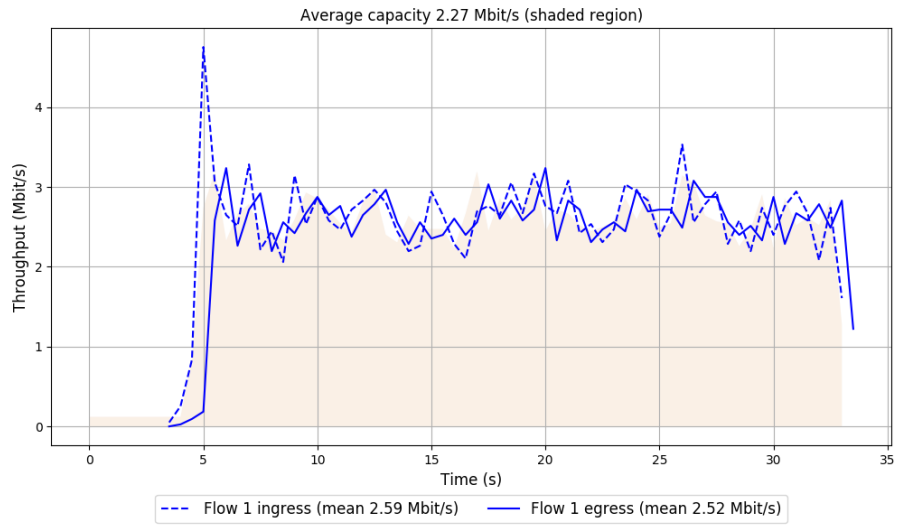
-- Flow 1:

Average throughput: 2.52 Mbit/s

95th percentile per-packet one-way delay: 679.001 ms

Loss rate: 2.99%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2019-07-11 19:09:37

End at: 2019-07-11 19:10:07

Below is generated by plot.py at 2019-07-11 19:13:01

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.52 Mbit/s (110.8% utilization)

95th percentile per-packet one-way delay: 670.061 ms

Loss rate: 3.64%

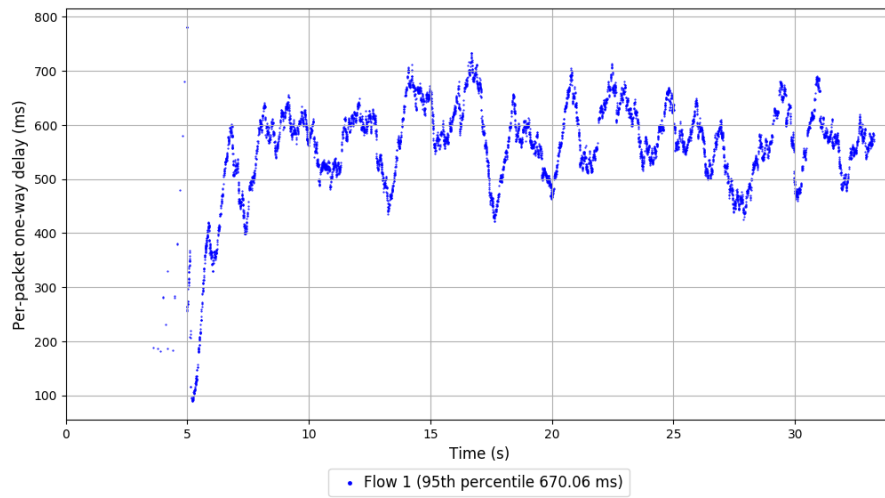
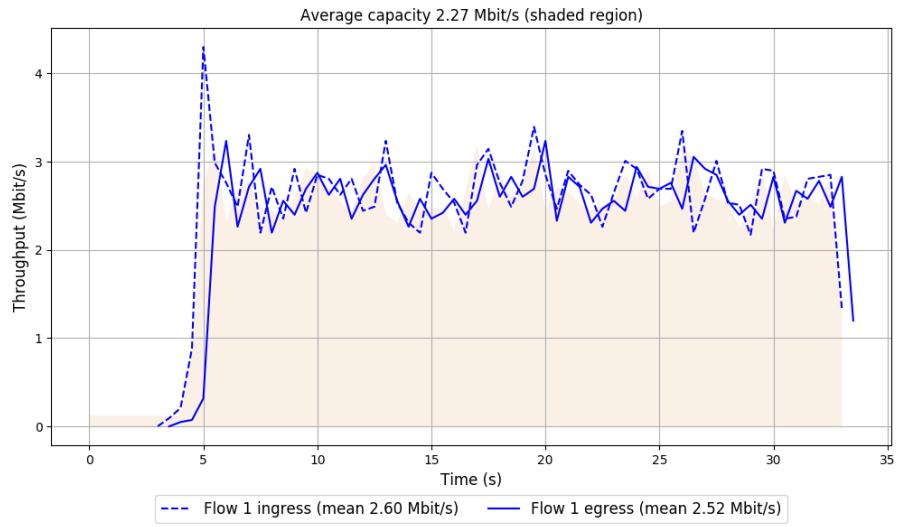
-- Flow 1:

Average throughput: 2.52 Mbit/s

95th percentile per-packet one-way delay: 670.061 ms

Loss rate: 3.64%

Run 3: Report of QUIC Cubic — Data Link



Run 1: Statistics of SCReAM

Start at: 2019-07-11 18:36:09

End at: 2019-07-11 18:36:39

Below is generated by plot.py at 2019-07-11 19:13:01

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 0.08 Mbit/s (3.5% utilization)

95th percentile per-packet one-way delay: 106.726 ms

Loss rate: 0.38%

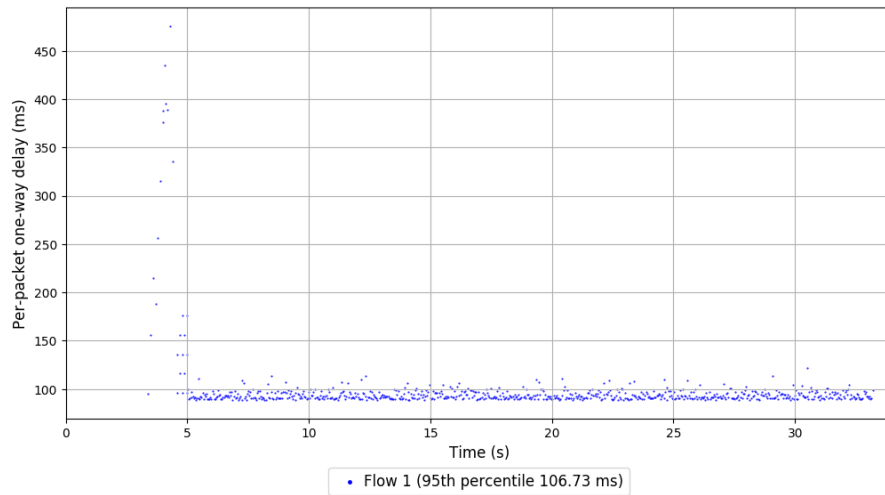
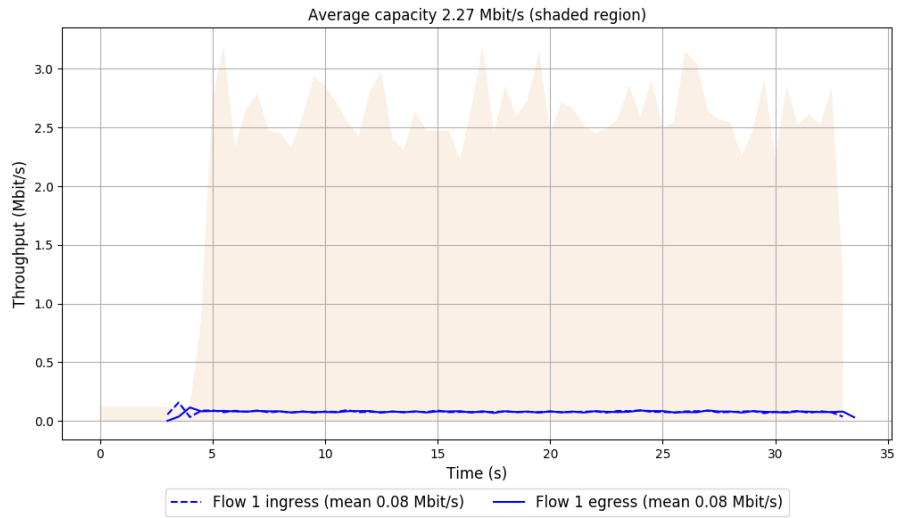
-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 106.726 ms

Loss rate: 0.38%

Run 1: Report of SCReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2019-07-11 18:50:14

End at: 2019-07-11 18:50:44

Below is generated by plot.py at 2019-07-11 19:13:01

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 0.08 Mbit/s (3.5% utilization)

95th percentile per-packet one-way delay: 106.584 ms

Loss rate: 0.25%

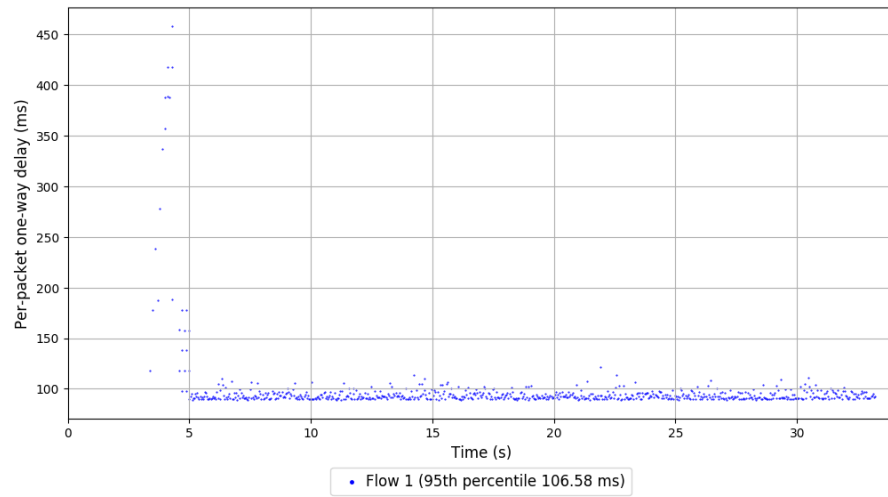
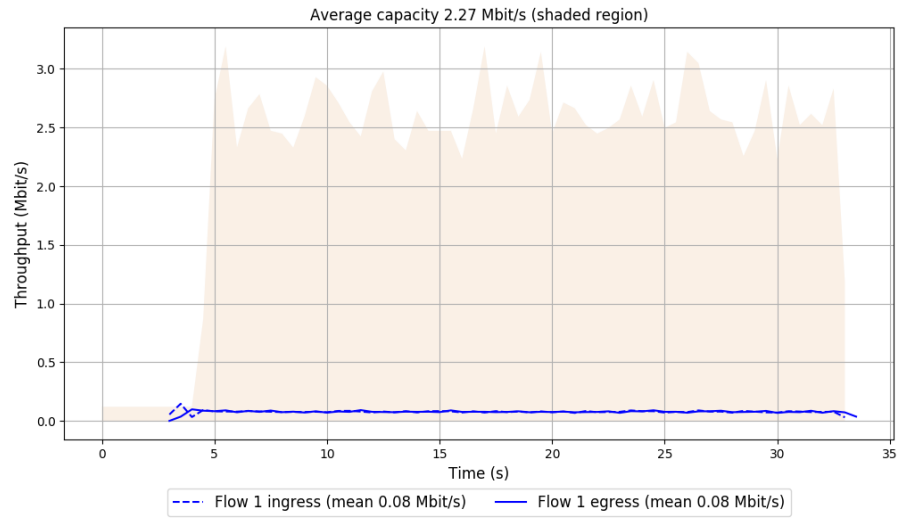
-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 106.584 ms

Loss rate: 0.25%

Run 2: Report of SCReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2019-07-11 19:04:20

End at: 2019-07-11 19:04:50

Below is generated by plot.py at 2019-07-11 19:13:01

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 0.08 Mbit/s (3.5% utilization)

95th percentile per-packet one-way delay: 104.781 ms

Loss rate: 0.25%

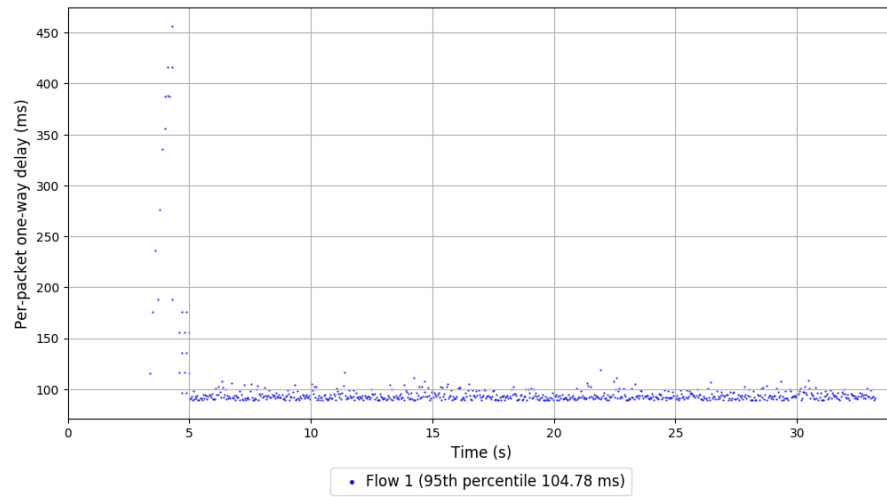
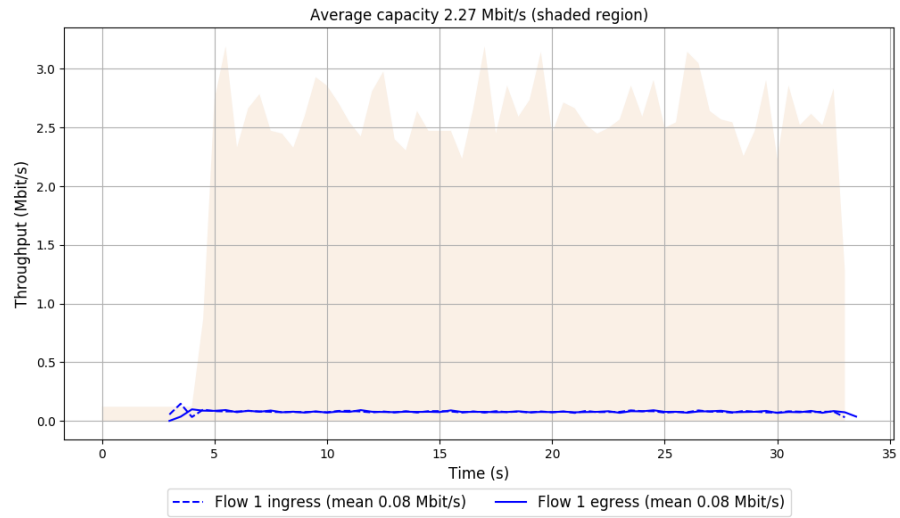
-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 104.781 ms

Loss rate: 0.25%

Run 3: Report of SCReAM — Data Link



Run 1: Statistics of Sprout

Start at: 2019-07-11 18:33:13

End at: 2019-07-11 18:33:43

Below is generated by plot.py at 2019-07-11 19:13:03

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 0.25 Mbit/s (10.9% utilization)

95th percentile per-packet one-way delay: 162.520 ms

Loss rate: 0.63%

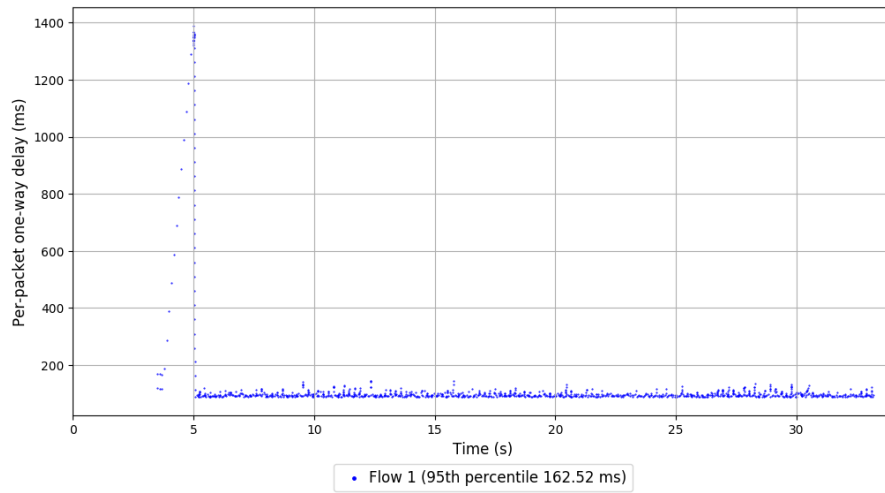
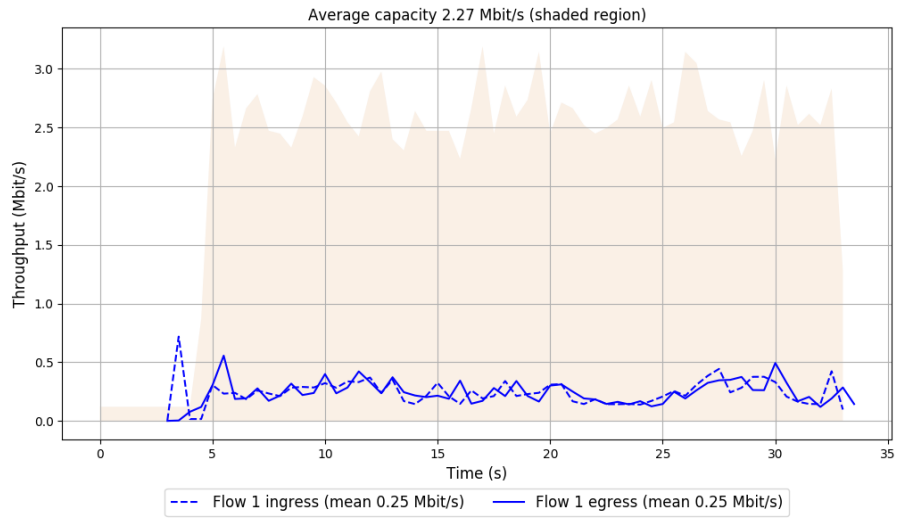
-- Flow 1:

Average throughput: 0.25 Mbit/s

95th percentile per-packet one-way delay: 162.520 ms

Loss rate: 0.63%

Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

Start at: 2019-07-11 18:47:18

End at: 2019-07-11 18:47:48

Below is generated by plot.py at 2019-07-11 19:13:03

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 0.25 Mbit/s (11.0% utilization)

95th percentile per-packet one-way delay: 160.805 ms

Loss rate: 0.16%

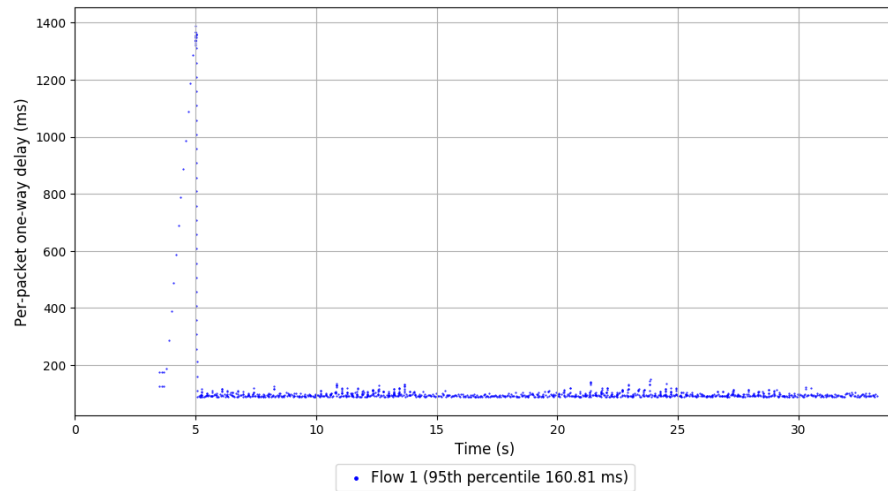
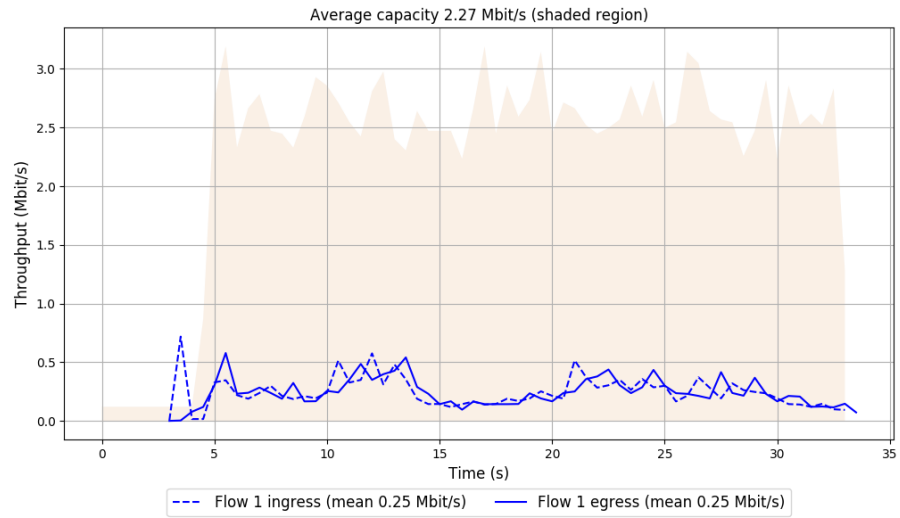
-- Flow 1:

Average throughput: 0.25 Mbit/s

95th percentile per-packet one-way delay: 160.805 ms

Loss rate: 0.16%

Run 2: Report of Sprout — Data Link



Run 3: Statistics of Sprout

Start at: 2019-07-11 19:01:23

End at: 2019-07-11 19:01:53

Below is generated by plot.py at 2019-07-11 19:13:03

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 0.20 Mbit/s (8.9% utilization)

95th percentile per-packet one-way delay: 127.729 ms

Loss rate: 0.01%

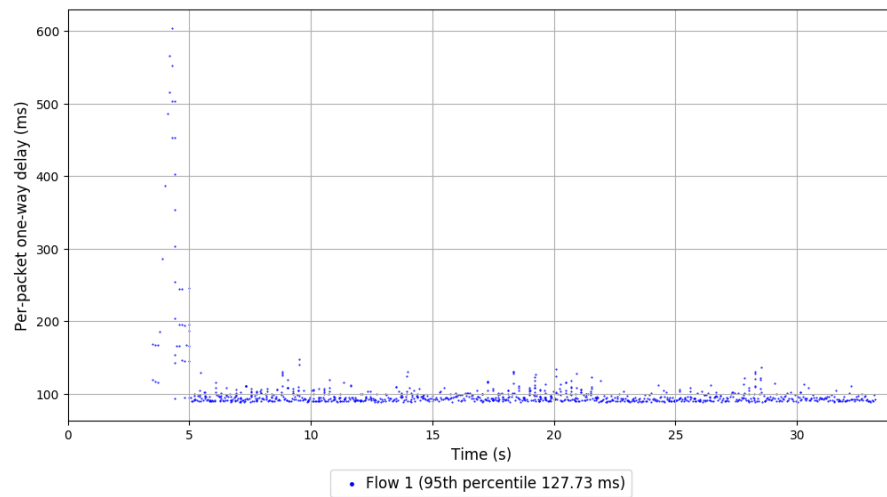
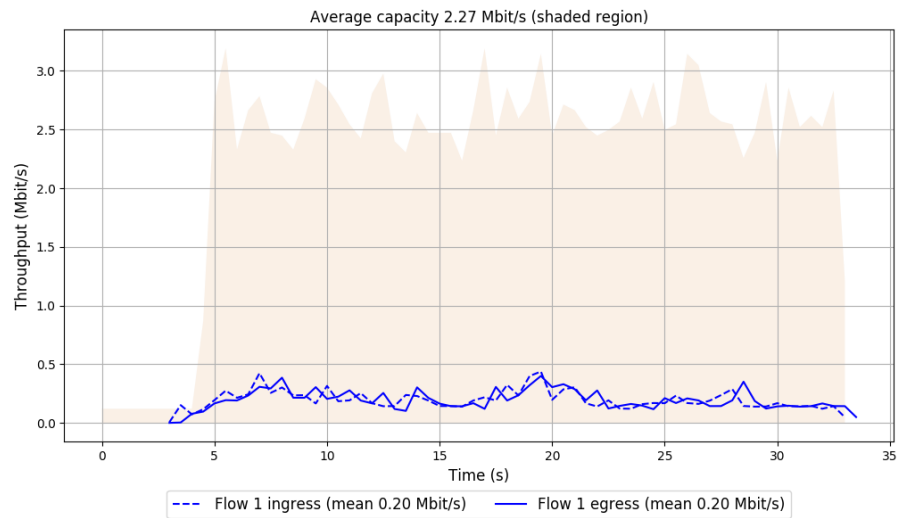
-- Flow 1:

Average throughput: 0.20 Mbit/s

95th percentile per-packet one-way delay: 127.729 ms

Loss rate: 0.01%

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

Start at: 2019-07-11 18:43:12

End at: 2019-07-11 18:43:42

Below is generated by plot.py at 2019-07-11 19:13:12

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.29 Mbit/s (100.9% utilization)

95th percentile per-packet one-way delay: 227.179 ms

Loss rate: 1.17%

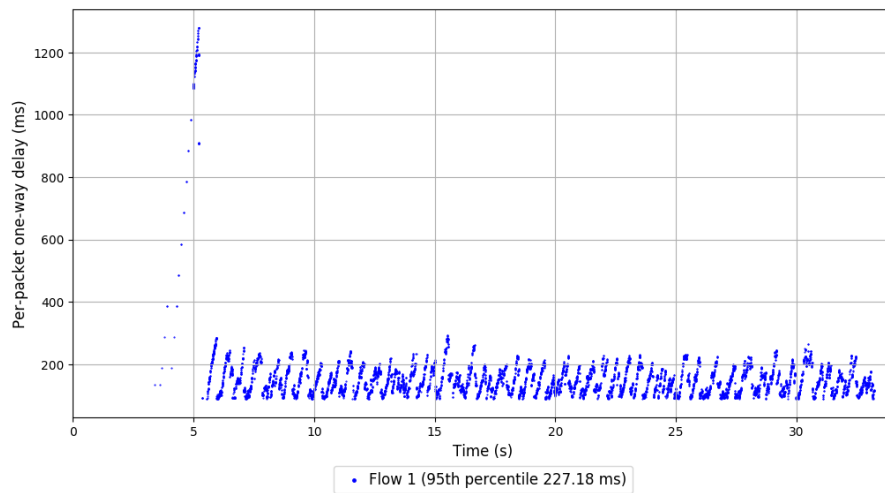
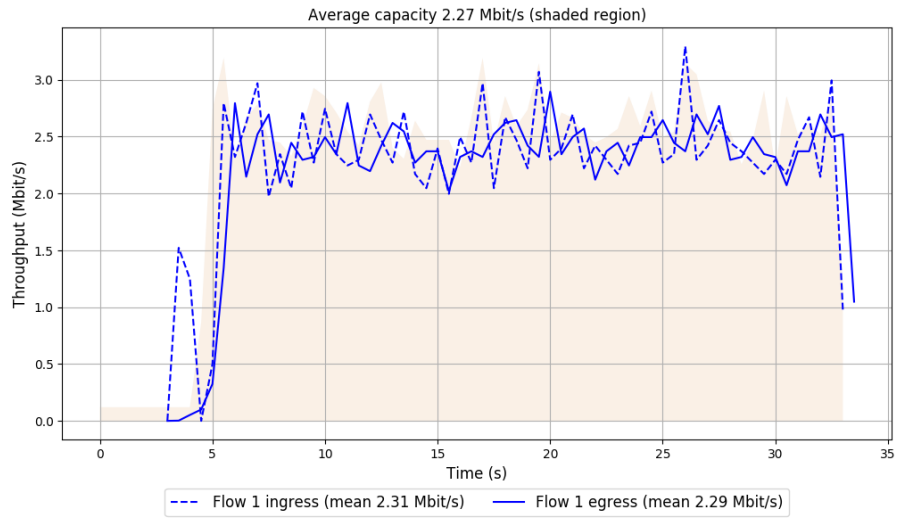
-- Flow 1:

Average throughput: 2.29 Mbit/s

95th percentile per-packet one-way delay: 227.179 ms

Loss rate: 1.17%

Run 1: Report of TaoVA-100x — Data Link



Run 2: Statistics of TaoVA-100x

Start at: 2019-07-11 18:57:17

End at: 2019-07-11 18:57:47

Below is generated by plot.py at 2019-07-11 19:13:13

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.32 Mbit/s (102.0% utilization)

95th percentile per-packet one-way delay: 225.696 ms

Loss rate: 1.07%

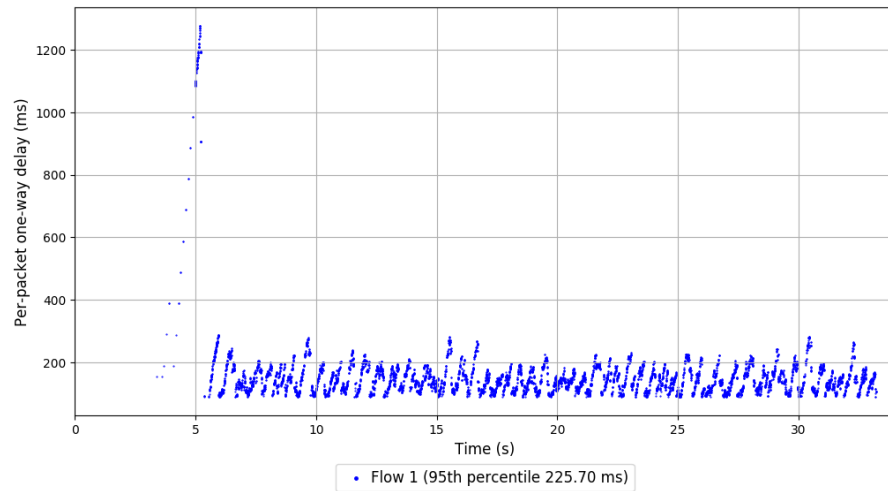
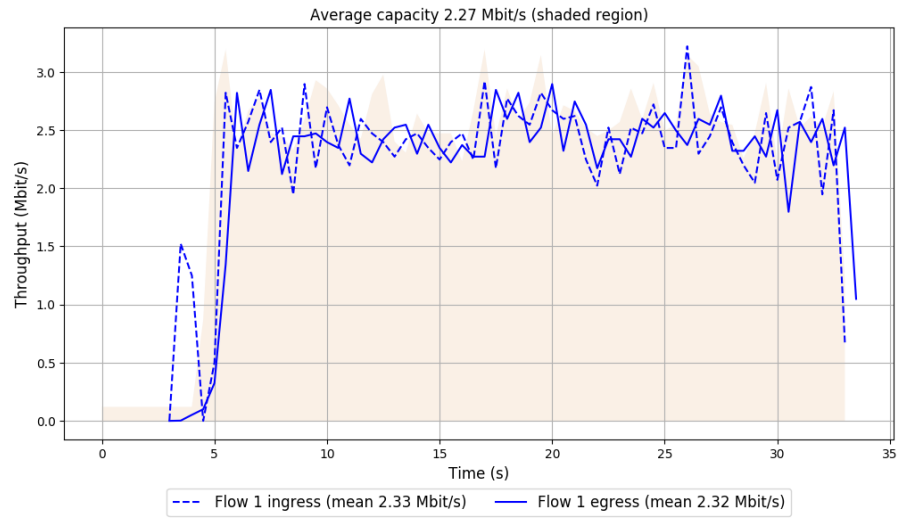
-- Flow 1:

Average throughput: 2.32 Mbit/s

95th percentile per-packet one-way delay: 225.696 ms

Loss rate: 1.07%

Run 2: Report of TaoVA-100x — Data Link



Run 3: Statistics of TaoVA-100x

Start at: 2019-07-11 19:11:23

End at: 2019-07-11 19:11:53

Below is generated by plot.py at 2019-07-11 19:13:14

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.27 Mbit/s (100.1% utilization)

95th percentile per-packet one-way delay: 220.083 ms

Loss rate: 1.20%

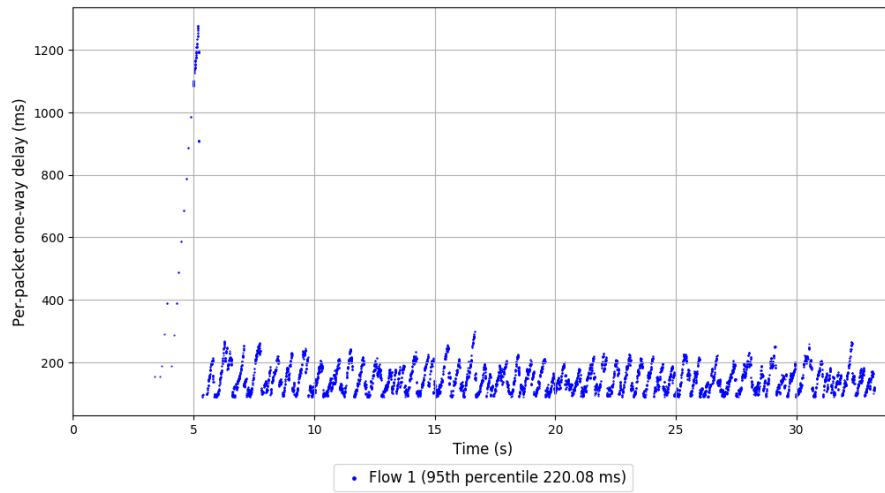
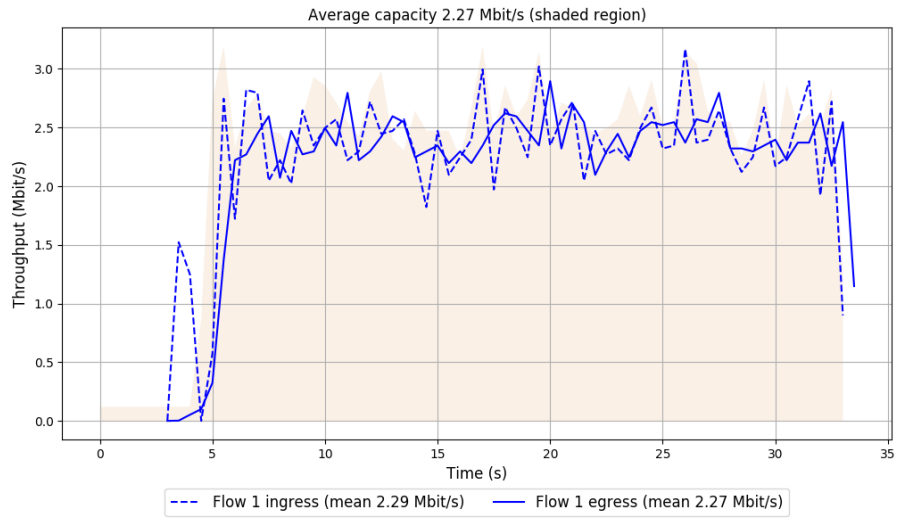
-- Flow 1:

Average throughput: 2.27 Mbit/s

95th percentile per-packet one-way delay: 220.083 ms

Loss rate: 1.20%

Run 3: Report of TaoVA-100x — Data Link



Run 1: Statistics of TCP Vegas

Start at: 2019-07-11 18:34:59

End at: 2019-07-11 18:35:29

Run 1: Report of TCP Vegas — Data Link

Figure is missing

Figure is missing

Run 2: Statistics of TCP Vegas

Start at: 2019-07-11 18:49:04

End at: 2019-07-11 18:49:34

Run 2: Report of TCP Vegas — Data Link

Figure is missing

Figure is missing

Run 3: Statistics of TCP Vegas

Start at: 2019-07-11 19:03:09

End at: 2019-07-11 19:03:39

Run 3: Report of TCP Vegas — Data Link

Figure is missing

Figure is missing

Run 1: Statistics of Verus

Start at: 2019-07-11 18:34:24

End at: 2019-07-11 18:34:54

Below is generated by plot.py at 2019-07-11 19:13:14

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.38 Mbit/s (104.7% utilization)

95th percentile per-packet one-way delay: 716.447 ms

Loss rate: 8.60%

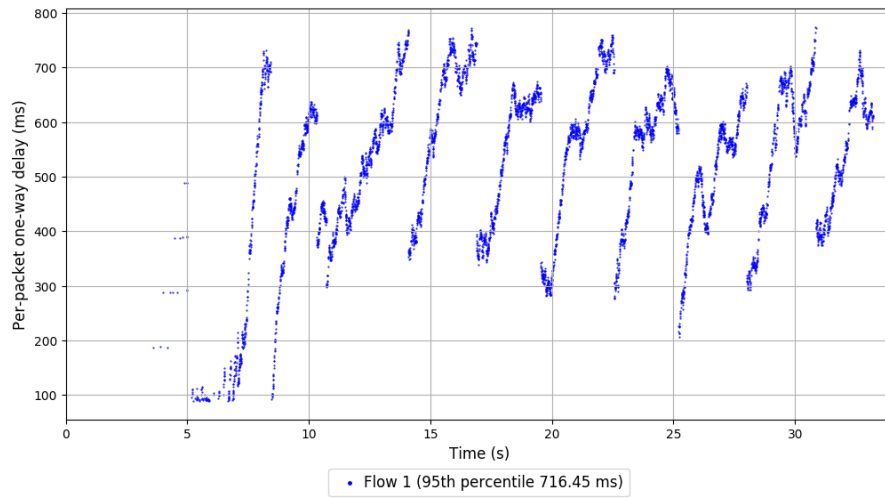
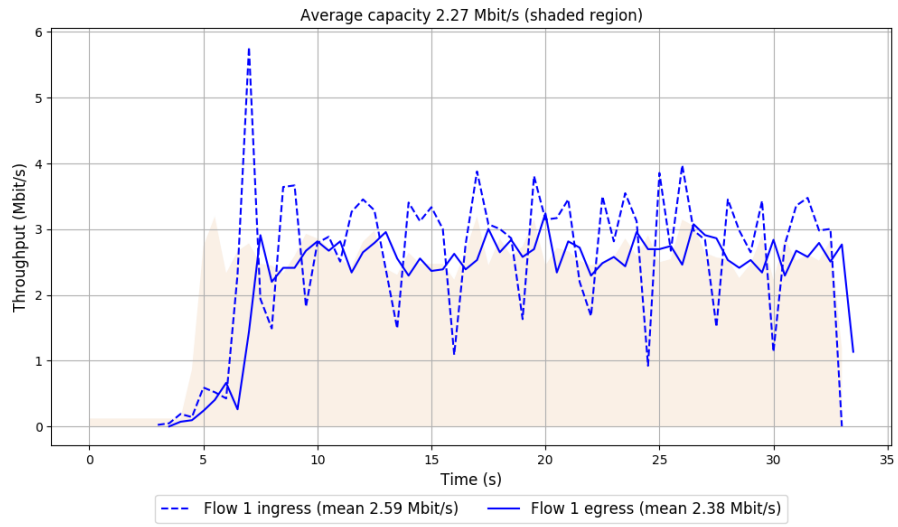
-- Flow 1:

Average throughput: 2.38 Mbit/s

95th percentile per-packet one-way delay: 716.447 ms

Loss rate: 8.60%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2019-07-11 18:48:28

End at: 2019-07-11 18:48:58

Below is generated by plot.py at 2019-07-11 19:13:14

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.34 Mbit/s (103.1% utilization)

95th percentile per-packet one-way delay: 722.704 ms

Loss rate: 9.24%

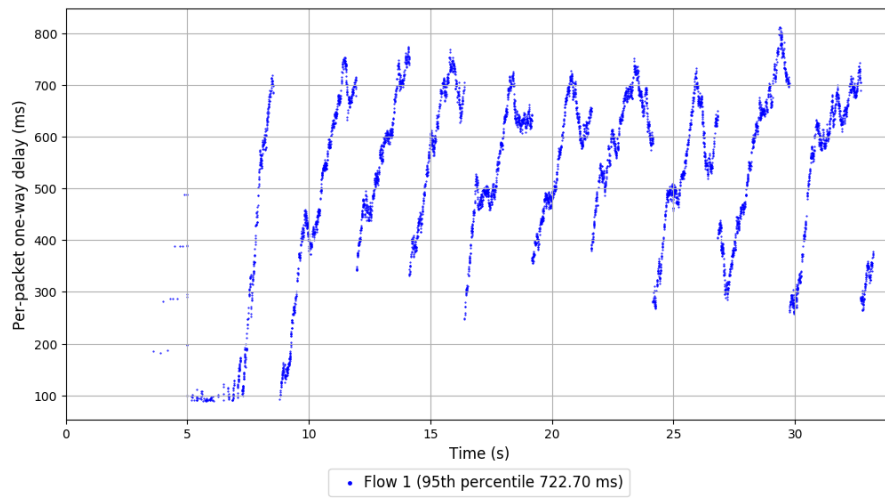
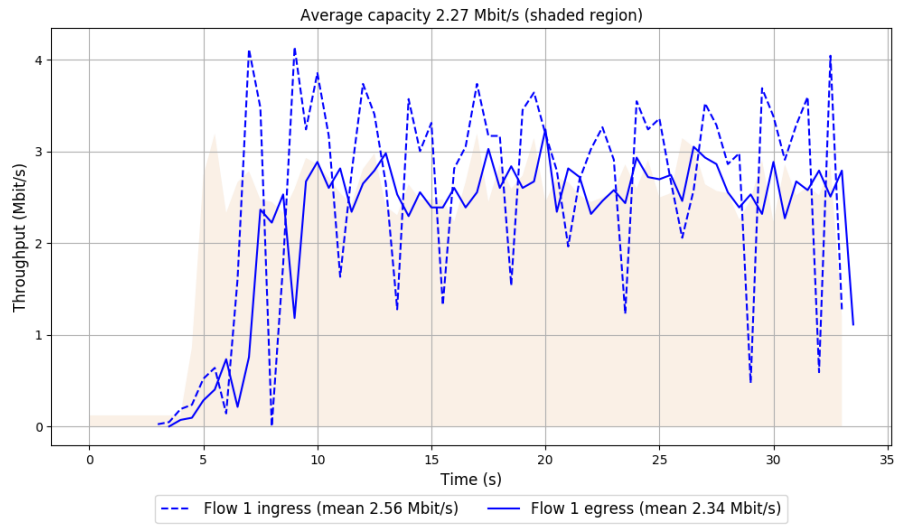
-- Flow 1:

Average throughput: 2.34 Mbit/s

95th percentile per-packet one-way delay: 722.704 ms

Loss rate: 9.24%

Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2019-07-11 19:02:34

End at: 2019-07-11 19:03:04

Below is generated by plot.py at 2019-07-11 19:13:14

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.44 Mbit/s (107.2% utilization)

95th percentile per-packet one-way delay: 706.432 ms

Loss rate: 8.35%

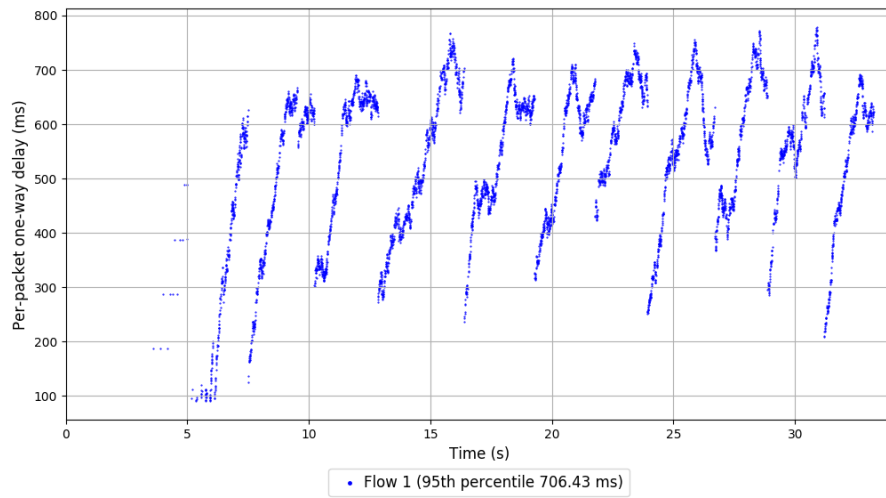
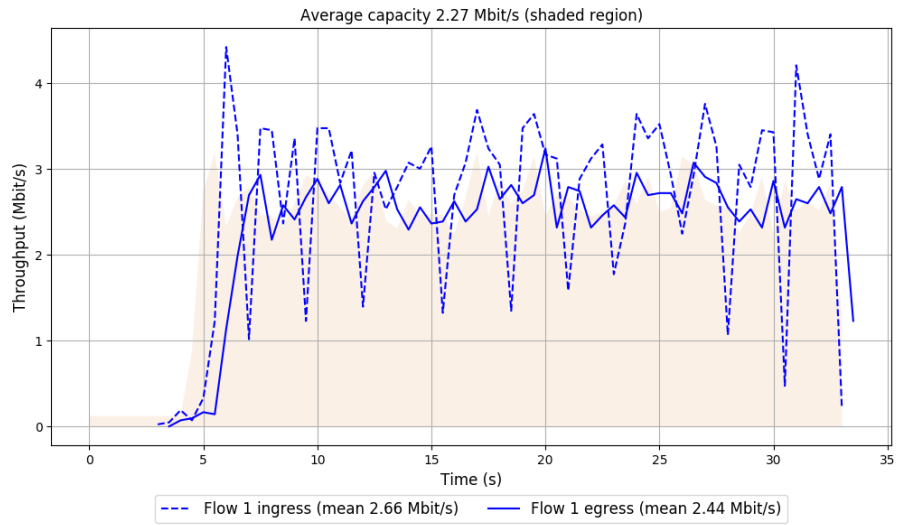
-- Flow 1:

Average throughput: 2.44 Mbit/s

95th percentile per-packet one-way delay: 706.432 ms

Loss rate: 8.35%

Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

Start at: 2019-07-11 18:30:53

End at: 2019-07-11 18:31:23

Below is generated by plot.py at 2019-07-11 19:13:14

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 1.83 Mbit/s (80.4% utilization)

95th percentile per-packet one-way delay: 679.990 ms

Loss rate: 11.98%

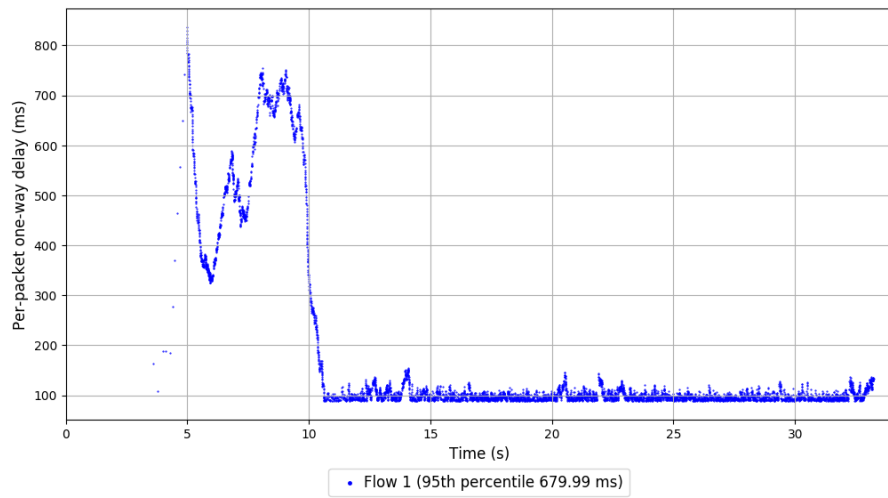
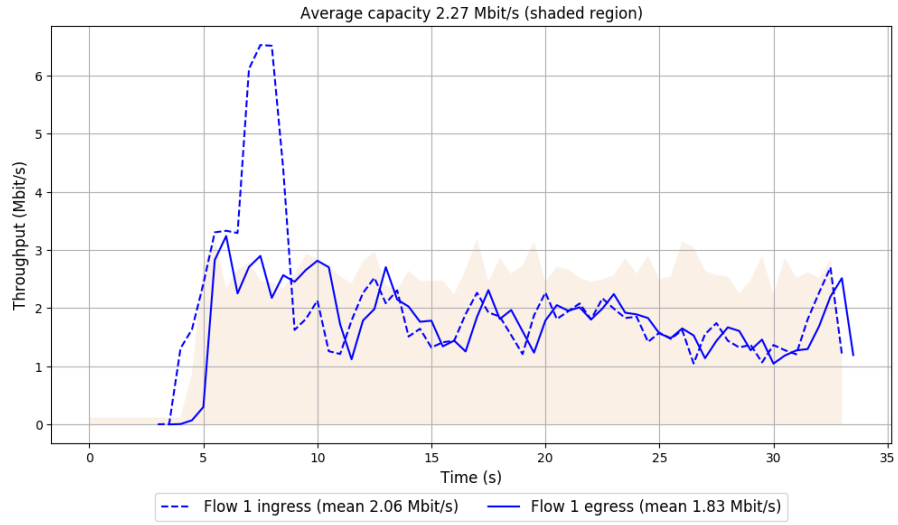
-- Flow 1:

Average throughput: 1.83 Mbit/s

95th percentile per-packet one-way delay: 679.990 ms

Loss rate: 11.98%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2019-07-11 18:44:58

End at: 2019-07-11 18:45:28

Below is generated by plot.py at 2019-07-11 19:13:14

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.21 Mbit/s (97.4% utilization)

95th percentile per-packet one-way delay: 704.856 ms

Loss rate: 12.75%

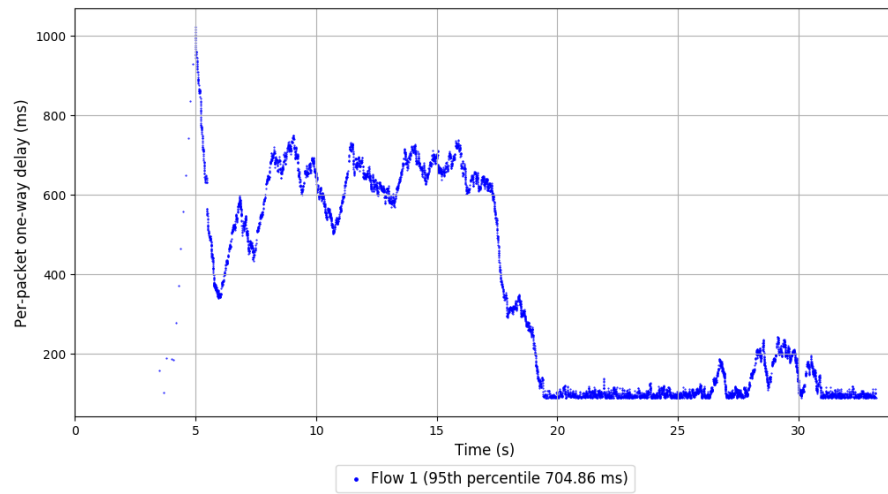
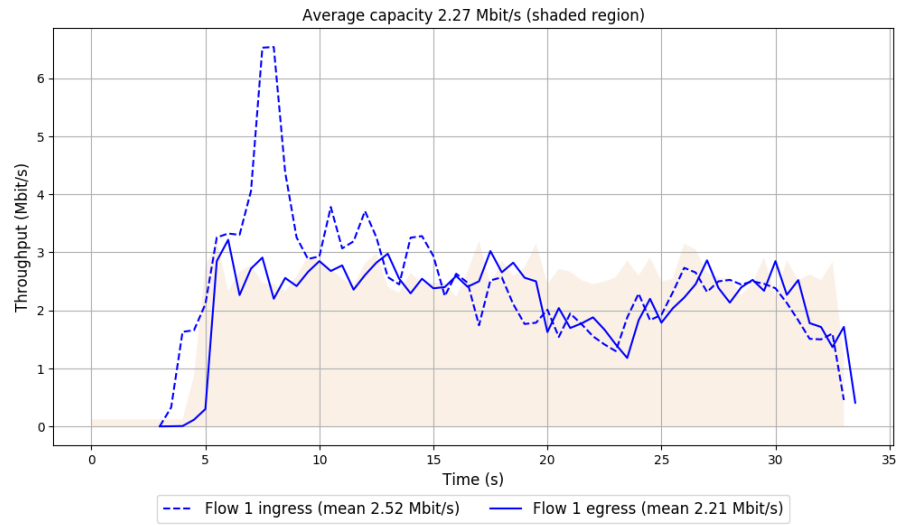
-- Flow 1:

Average throughput: 2.21 Mbit/s

95th percentile per-packet one-way delay: 704.856 ms

Loss rate: 12.75%

Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

Start at: 2019-07-11 18:59:03

End at: 2019-07-11 18:59:33

Below is generated by plot.py at 2019-07-11 19:13:18

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 2.18 Mbit/s (96.1% utilization)

95th percentile per-packet one-way delay: 708.223 ms

Loss rate: 14.28%

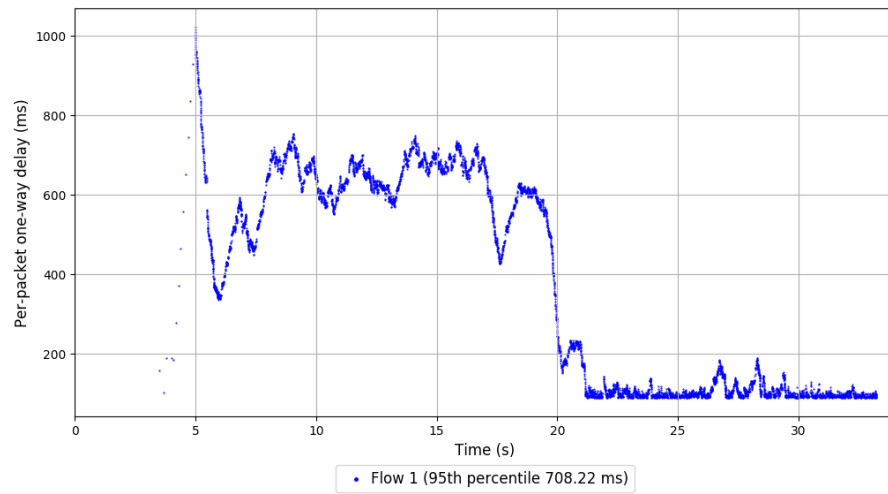
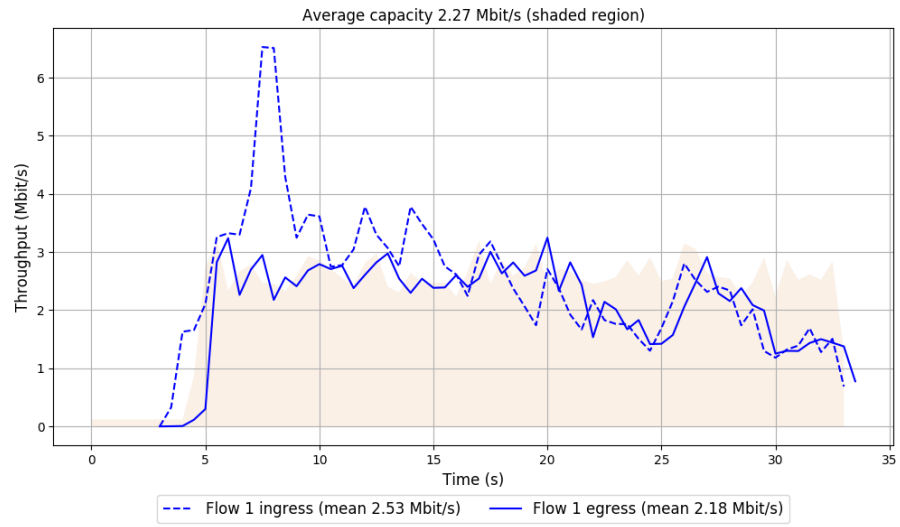
-- Flow 1:

Average throughput: 2.18 Mbit/s

95th percentile per-packet one-way delay: 708.223 ms

Loss rate: 14.28%

Run 3: Report of PCC-Vivace — Data Link

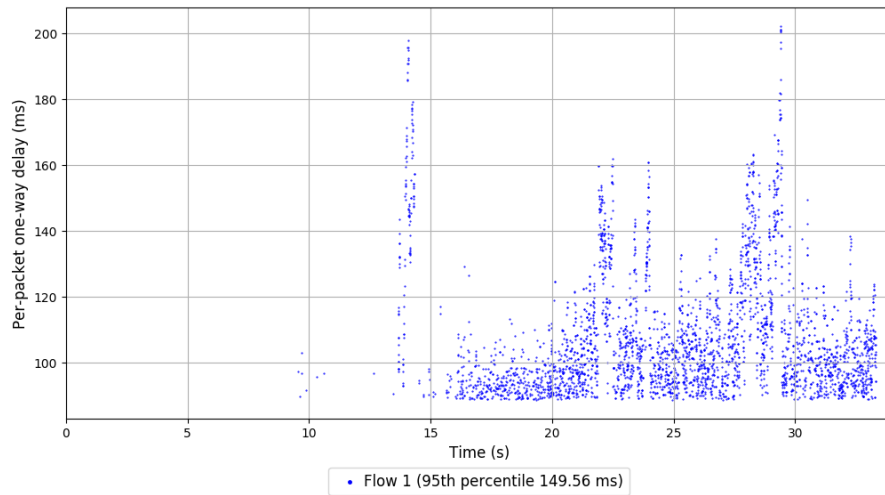
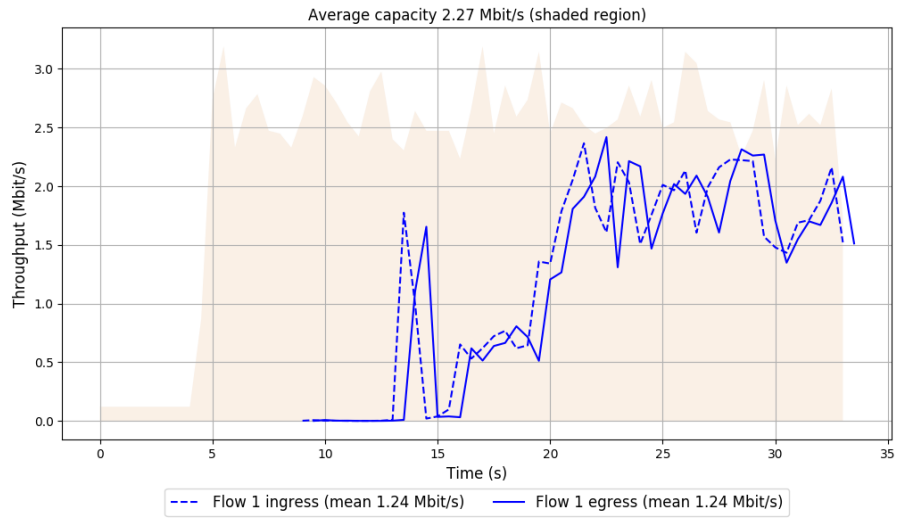


Run 1: Statistics of WebRTC media

Start at: 2019-07-11 18:29:38

End at: 2019-07-11 18:30:08

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2019-07-11 18:43:47

End at: 2019-07-11 18:44:17

Below is generated by plot.py at 2019-07-11 19:13:18

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 1.07 Mbit/s (46.9% utilization)

95th percentile per-packet one-way delay: 132.327 ms

Loss rate: 0.24%

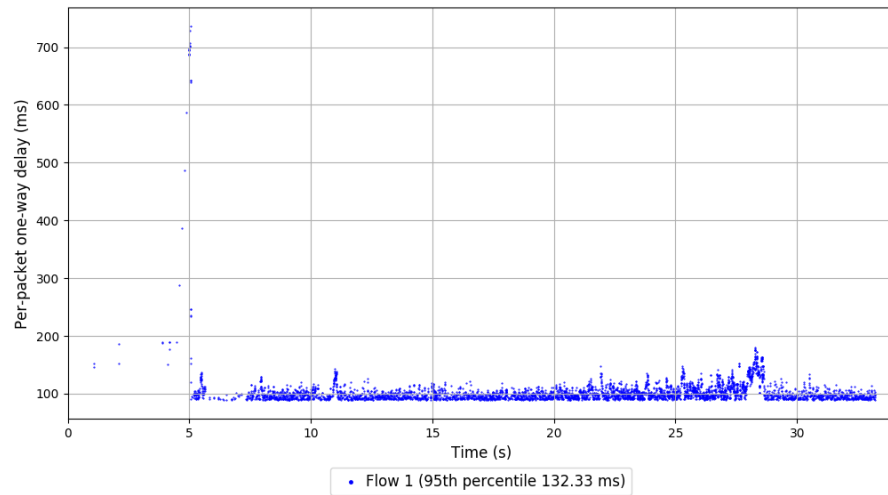
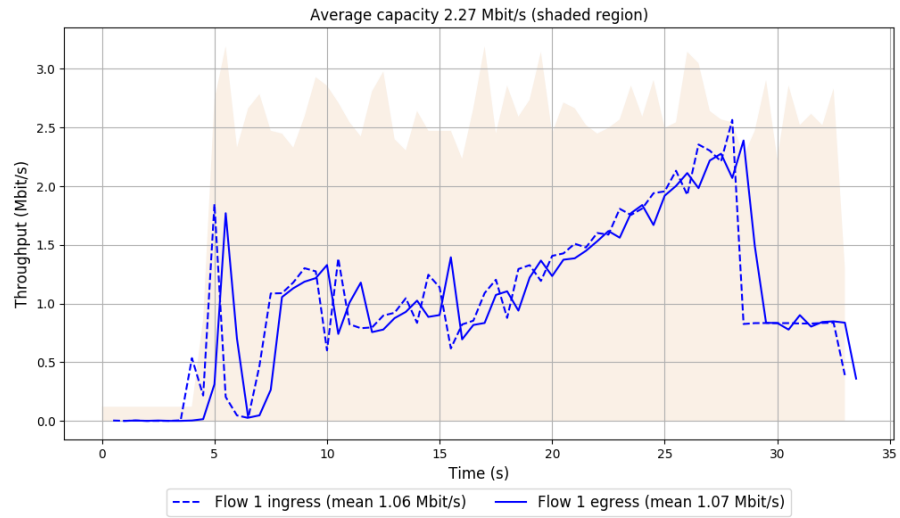
-- Flow 1:

Average throughput: 1.07 Mbit/s

95th percentile per-packet one-way delay: 132.327 ms

Loss rate: 0.24%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2019-07-11 18:57:52

End at: 2019-07-11 18:58:23

Below is generated by plot.py at 2019-07-11 19:13:18

Datalink statistics

-- Total of 1 flow:

Average capacity: 2.27 Mbit/s

Average throughput: 0.05 Mbit/s (2.1% utilization)

95th percentile per-packet one-way delay: 401.867 ms

Loss rate: 0.00%

-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 401.867 ms

Loss rate: 0.00%

Run 3: Report of WebRTC media — Data Link

