

Pantheon Report

Generated at 2019-01-17 07:43:10 (UTC).

Tested in mahimahi: mm-delay 30 mm-link 12mbps.trace 12mbps.trace
--uplink-queue=droptail --uplink-queue-args=bytes=30000

Repeated the test of 21 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

System info:

```
Linux 4.15.0-1026-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 @ c80a283586bf7b0cc1fe08c69c8f60d56498f81c
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ c3eee875824760ec5b2fd207fefe166e1afe2170
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
```


scheme	# runs	mean avg tput (Mbit/s)	mean 95th-%ile delay (ms)	mean loss rate (%)
		flow 1	flow 1	flow 1
TCP BBR	3	11.68	49.09	2.87
Copa	3	11.03	46.54	1.42
TCP Cubic	3	11.77	48.52	0.40
FillP	3	11.36	50.65	2.90
FillP-Sheep	3	10.35	48.96	1.53
Indigo	3	11.80	46.43	4.30
Indigo-MusesC3	3	11.70	43.75	0.27
Indigo-MusesC5	3	8.49	50.65	2.26
Indigo-MusesD	3	4.88	35.94	0.04
Indigo-MusesT	3	11.86	44.14	0.28
LEDBAT	3	8.83	49.46	1.13
PCC-Allegro	3	9.75	33.60	0.84
PCC-Expr	3	11.25	50.63	1.46
QUIC Cubic	3	11.66	49.84	0.36
SReAM	3	0.21	31.75	0.09
Sprout	3	4.41	48.84	7.91
TaoVA-100x	3	11.13	32.95	0.81
TCP Vegas	3	11.85	36.76	0.30
Verus	3	6.77	51.64	87.69
PCC-Vivace	3	10.88	39.75	0.35
WebRTC media	3	0.05	41.03	0.00

Run 1: Statistics of TCP BBR

Start at: 2019-01-17 07:10:55

End at: 2019-01-17 07:11:25

Below is generated by plot.py at 2019-01-17 07:40:32

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.68 Mbit/s (97.3% utilization)

95th percentile per-packet one-way delay: 49.086 ms

Loss rate: 2.86%

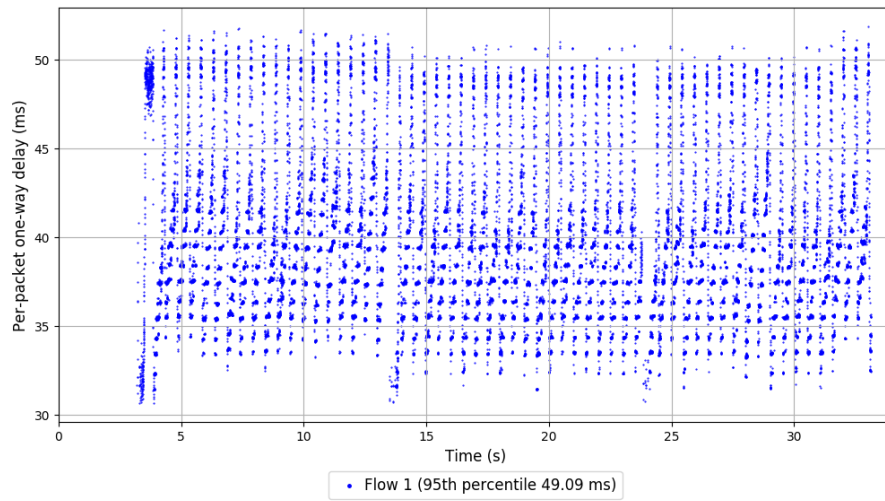
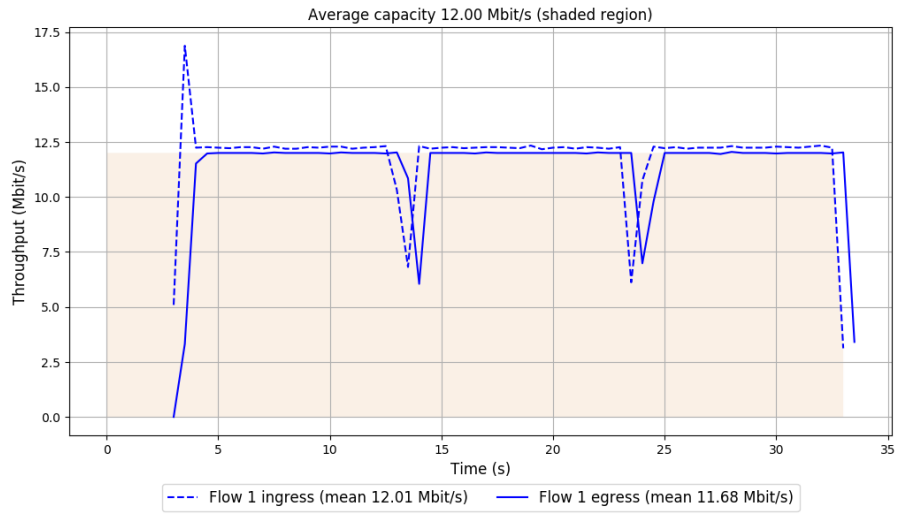
-- Flow 1:

Average throughput: 11.68 Mbit/s

95th percentile per-packet one-way delay: 49.086 ms

Loss rate: 2.86%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2019-01-17 07:23:22

End at: 2019-01-17 07:23:52

Below is generated by plot.py at 2019-01-17 07:40:34

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.68 Mbit/s (97.3% utilization)

95th percentile per-packet one-way delay: 49.108 ms

Loss rate: 2.90%

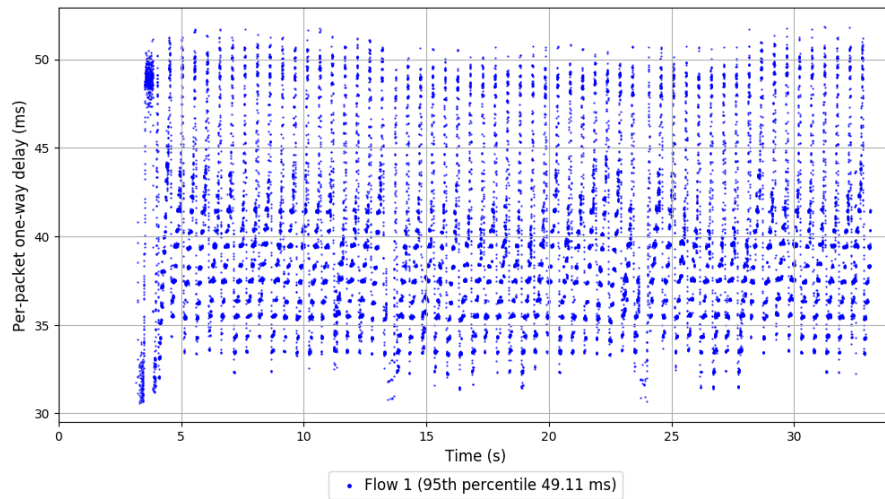
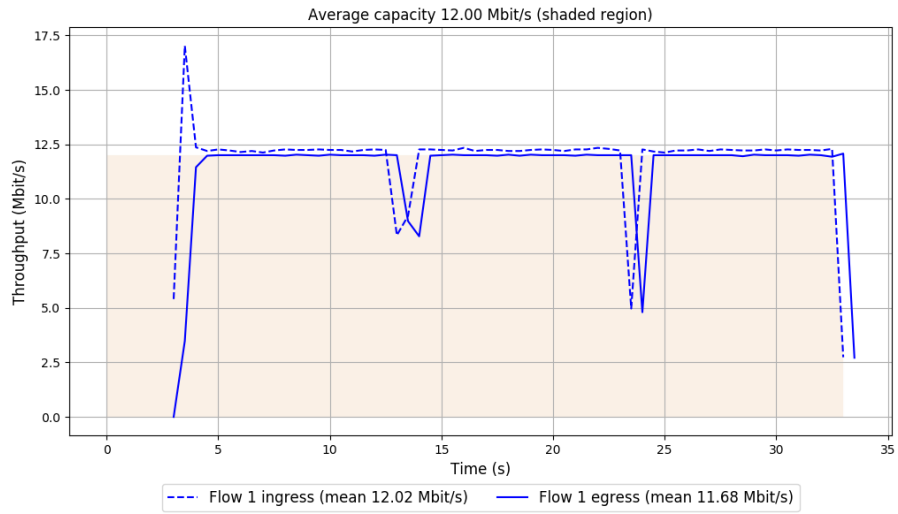
-- Flow 1:

Average throughput: 11.68 Mbit/s

95th percentile per-packet one-way delay: 49.108 ms

Loss rate: 2.90%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2019-01-17 07:35:50

End at: 2019-01-17 07:36:20

Below is generated by plot.py at 2019-01-17 07:40:34

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.68 Mbit/s (97.3% utilization)

95th percentile per-packet one-way delay: 49.079 ms

Loss rate: 2.86%

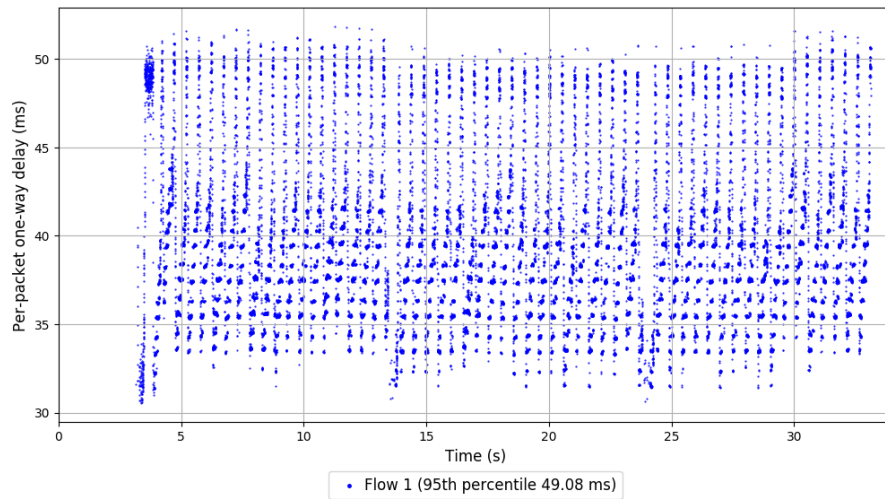
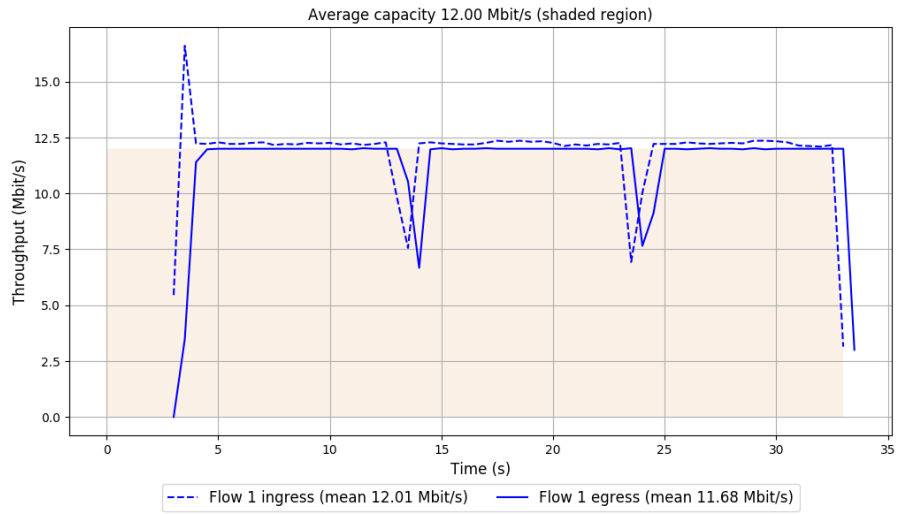
-- Flow 1:

Average throughput: 11.68 Mbit/s

95th percentile per-packet one-way delay: 49.079 ms

Loss rate: 2.86%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of Copa

Start at: 2019-01-17 07:04:24

End at: 2019-01-17 07:04:54

Below is generated by plot.py at 2019-01-17 07:40:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 10.72 Mbit/s (89.3% utilization)

95th percentile per-packet one-way delay: 47.924 ms

Loss rate: 1.82%

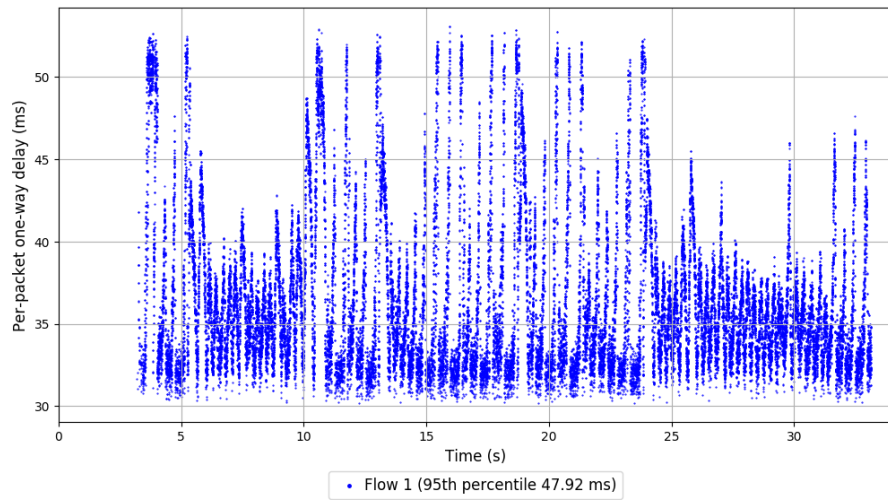
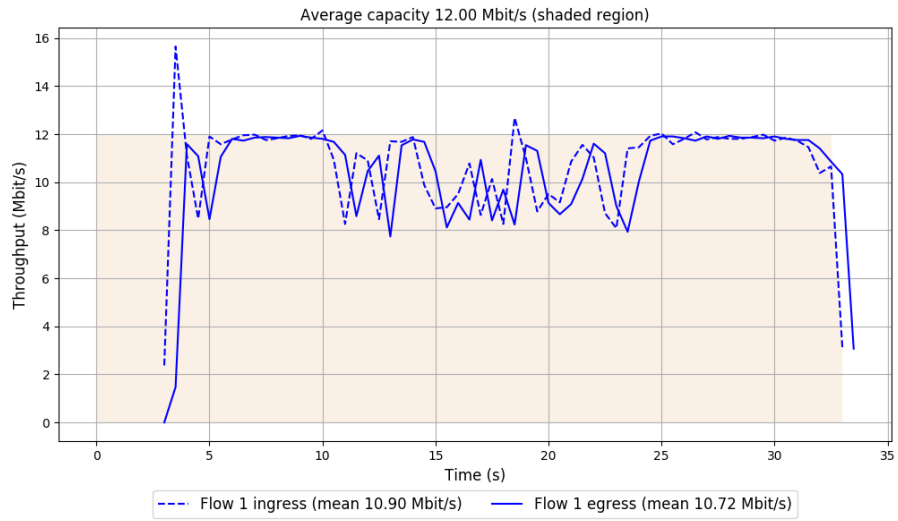
-- Flow 1:

Average throughput: 10.72 Mbit/s

95th percentile per-packet one-way delay: 47.924 ms

Loss rate: 1.82%

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

Start at: 2019-01-17 07:16:50

End at: 2019-01-17 07:17:20

Below is generated by plot.py at 2019-01-17 07:40:46

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.31 Mbit/s (94.3% utilization)

95th percentile per-packet one-way delay: 45.267 ms

Loss rate: 1.07%

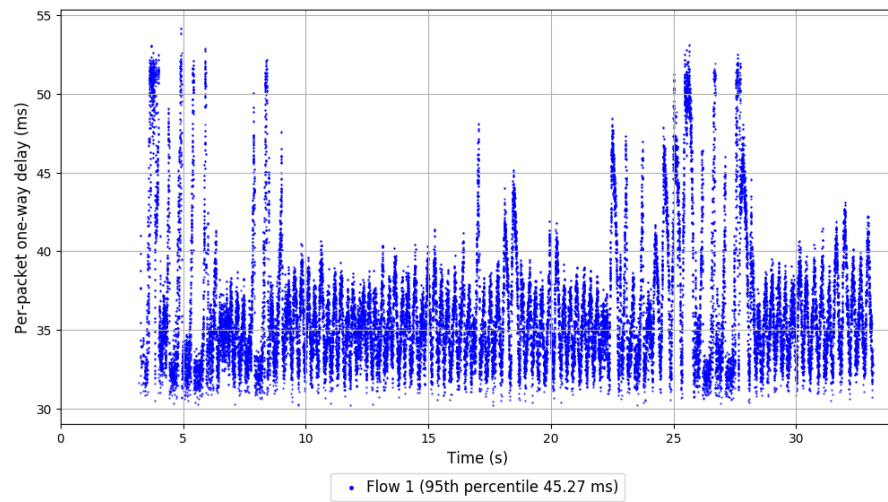
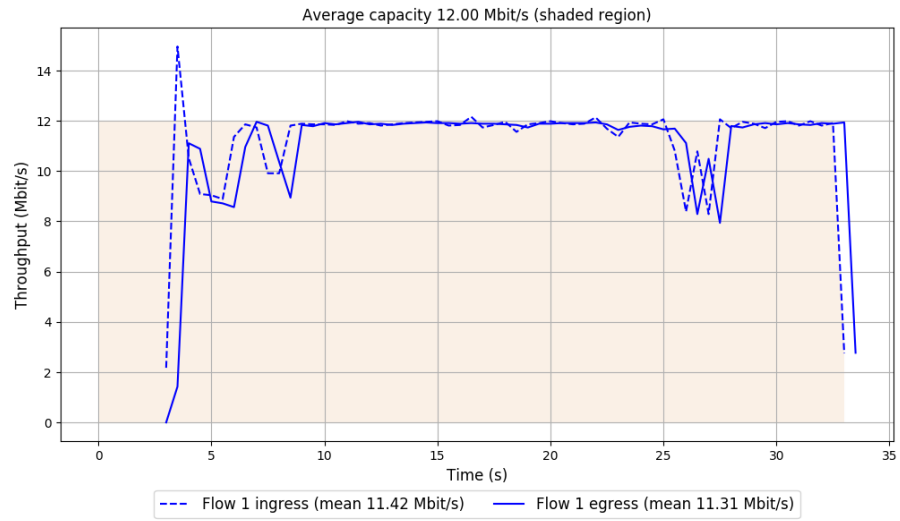
-- Flow 1:

Average throughput: 11.31 Mbit/s

95th percentile per-packet one-way delay: 45.267 ms

Loss rate: 1.07%

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

Start at: 2019-01-17 07:29:18

End at: 2019-01-17 07:29:48

Below is generated by plot.py at 2019-01-17 07:40:46

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.07 Mbit/s (92.2% utilization)

95th percentile per-packet one-way delay: 46.426 ms

Loss rate: 1.38%

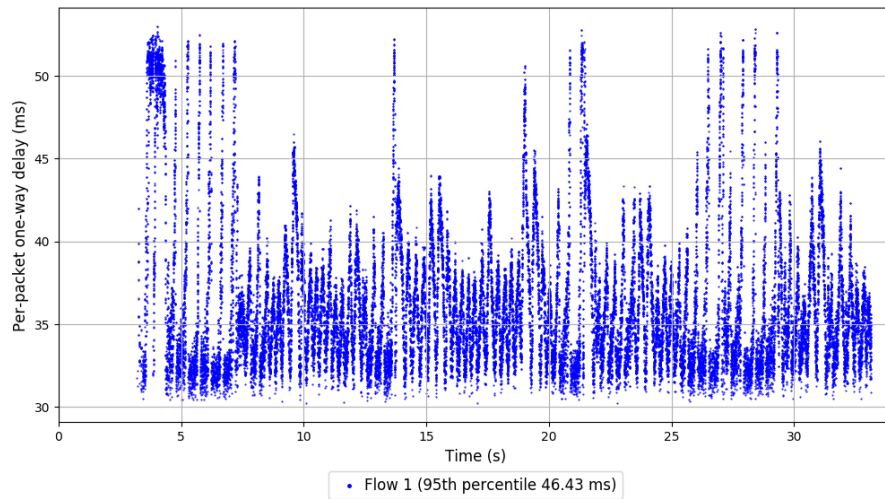
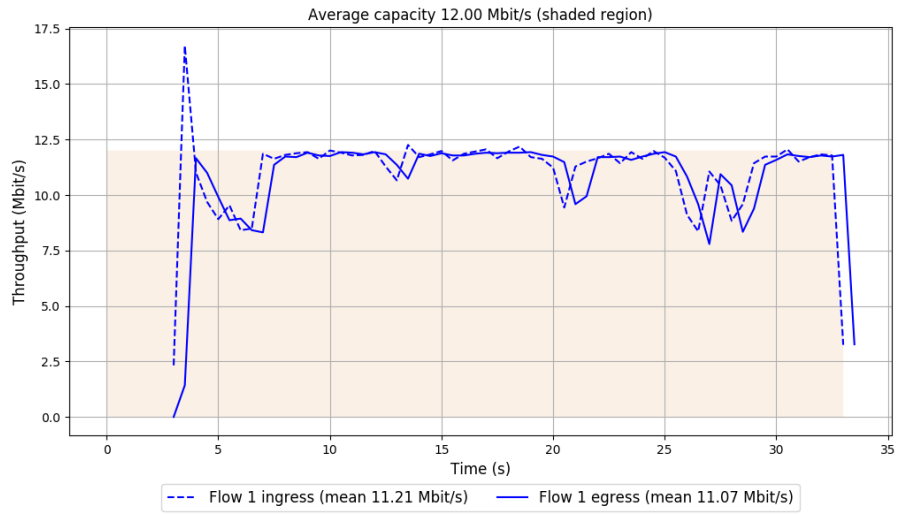
-- Flow 1:

Average throughput: 11.07 Mbit/s

95th percentile per-packet one-way delay: 46.426 ms

Loss rate: 1.38%

Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2019-01-17 07:06:11

End at: 2019-01-17 07:06:41

Below is generated by plot.py at 2019-01-17 07:40:46

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.77 Mbit/s (98.1% utilization)

95th percentile per-packet one-way delay: 48.482 ms

Loss rate: 0.41%

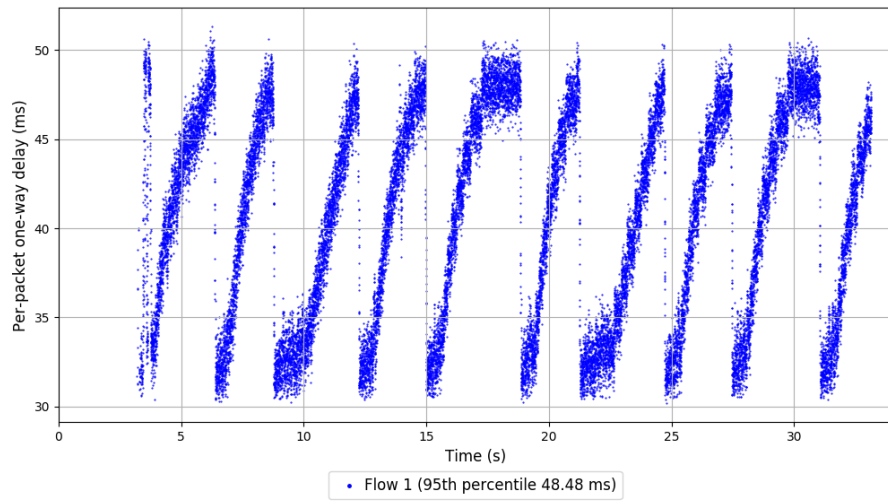
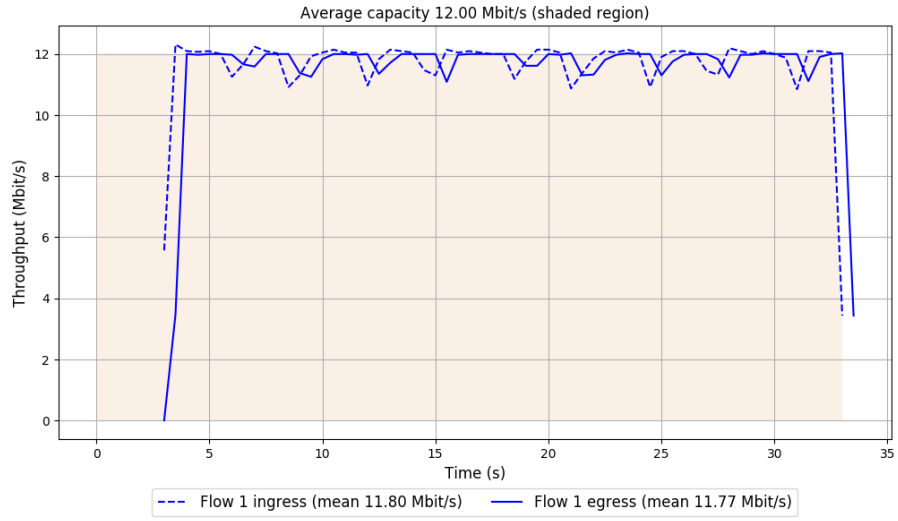
-- Flow 1:

Average throughput: 11.77 Mbit/s

95th percentile per-packet one-way delay: 48.482 ms

Loss rate: 0.41%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2019-01-17 07:18:37

End at: 2019-01-17 07:19:07

Below is generated by plot.py at 2019-01-17 07:40:46

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.77 Mbit/s (98.1% utilization)

95th percentile per-packet one-way delay: 48.556 ms

Loss rate: 0.37%

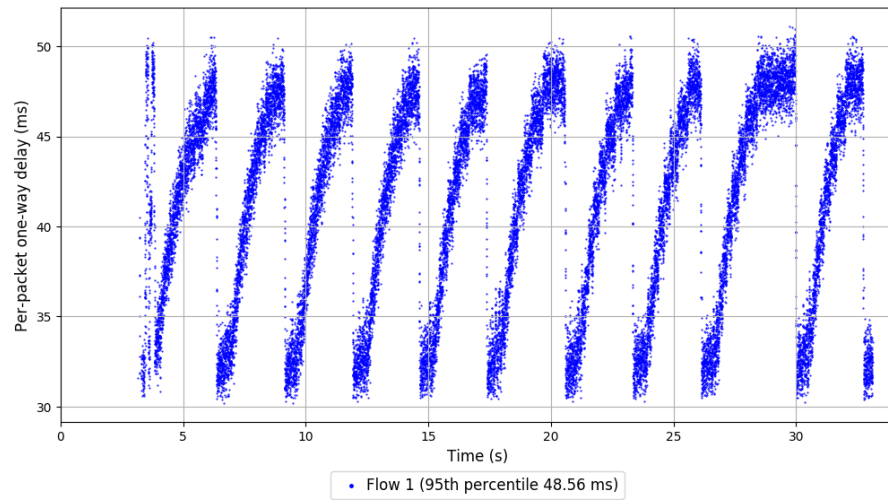
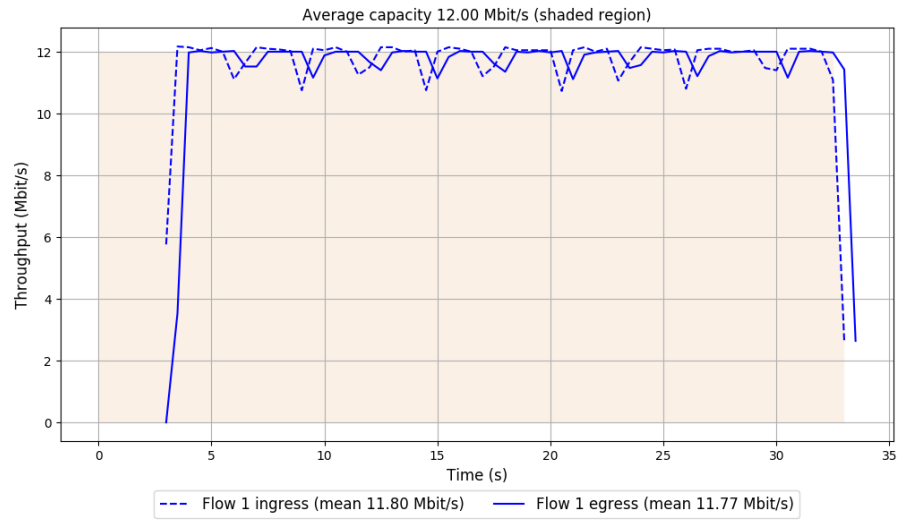
-- Flow 1:

Average throughput: 11.77 Mbit/s

95th percentile per-packet one-way delay: 48.556 ms

Loss rate: 0.37%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2019-01-17 07:31:05

End at: 2019-01-17 07:31:35

Below is generated by plot.py at 2019-01-17 07:40:57

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.78 Mbit/s (98.1% utilization)

95th percentile per-packet one-way delay: 48.536 ms

Loss rate: 0.42%

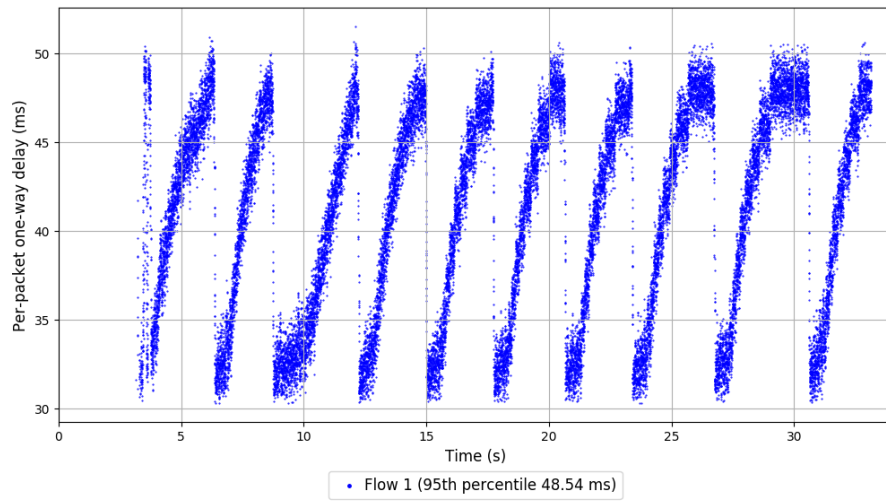
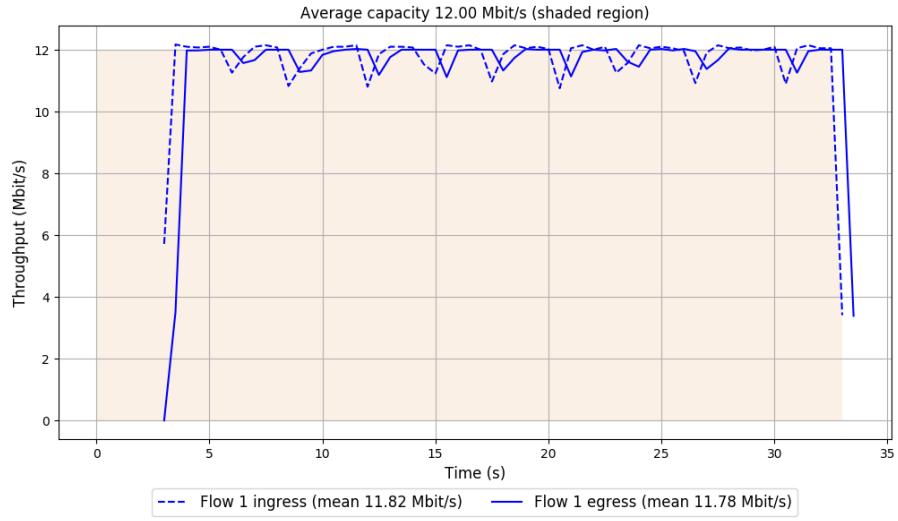
-- Flow 1:

Average throughput: 11.78 Mbit/s

95th percentile per-packet one-way delay: 48.536 ms

Loss rate: 0.42%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of FillP

Start at: 2019-01-17 07:09:44

End at: 2019-01-17 07:10:14

Below is generated by plot.py at 2019-01-17 07:41:00

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.37 Mbit/s (94.8% utilization)

95th percentile per-packet one-way delay: 50.628 ms

Loss rate: 2.64%

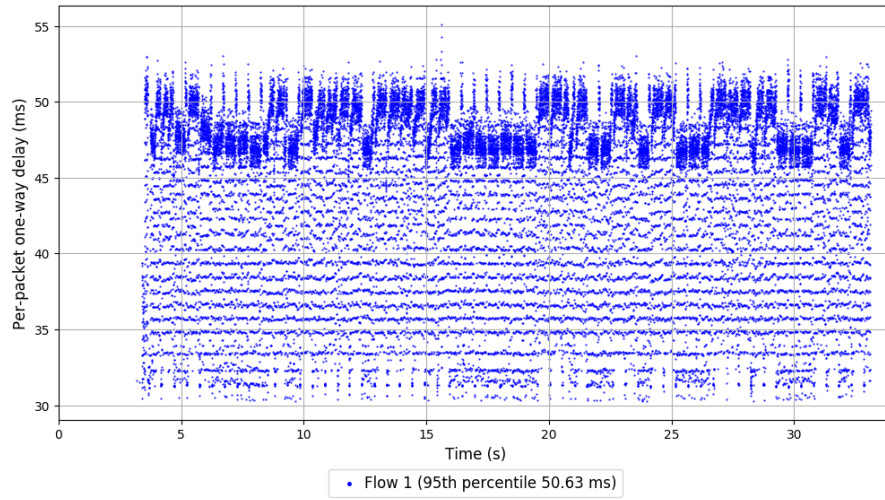
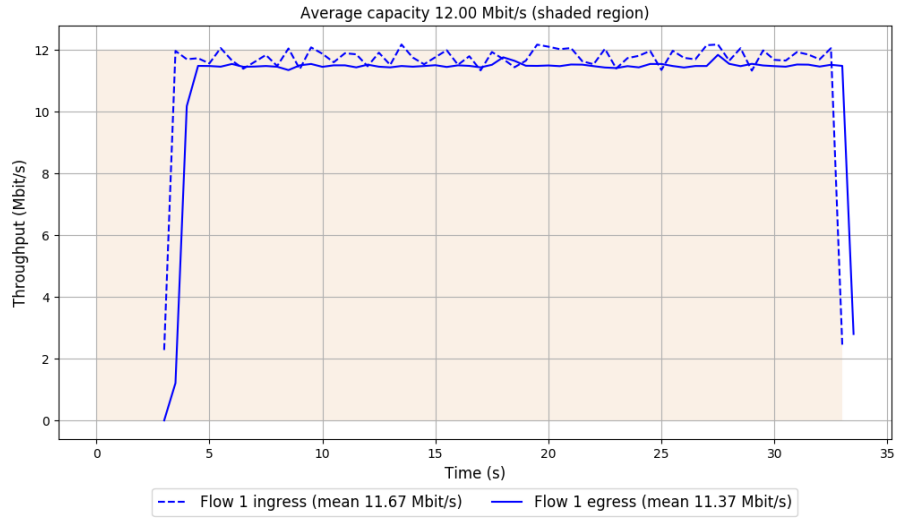
-- Flow 1:

Average throughput: 11.37 Mbit/s

95th percentile per-packet one-way delay: 50.628 ms

Loss rate: 2.64%

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2019-01-17 07:22:11

End at: 2019-01-17 07:22:41

Below is generated by plot.py at 2019-01-17 07:41:00

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.34 Mbit/s (94.5% utilization)

95th percentile per-packet one-way delay: 50.573 ms

Loss rate: 2.84%

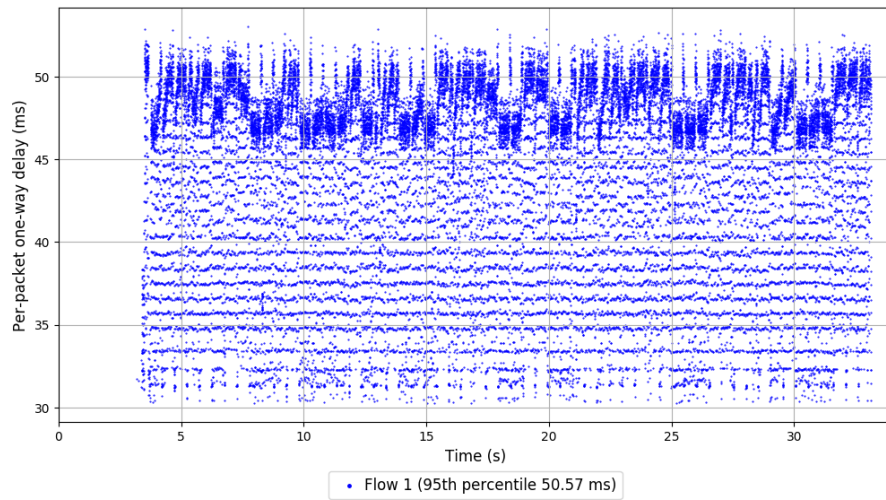
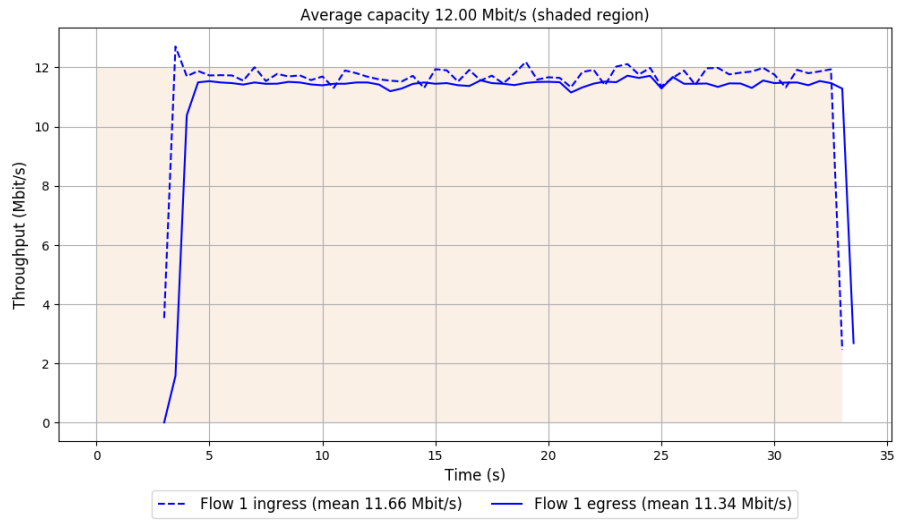
-- Flow 1:

Average throughput: 11.34 Mbit/s

95th percentile per-packet one-way delay: 50.573 ms

Loss rate: 2.84%

Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

Start at: 2019-01-17 07:34:39

End at: 2019-01-17 07:35:09

Below is generated by plot.py at 2019-01-17 07:41:01

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.37 Mbit/s (94.7% utilization)

95th percentile per-packet one-way delay: 50.747 ms

Loss rate: 3.21%

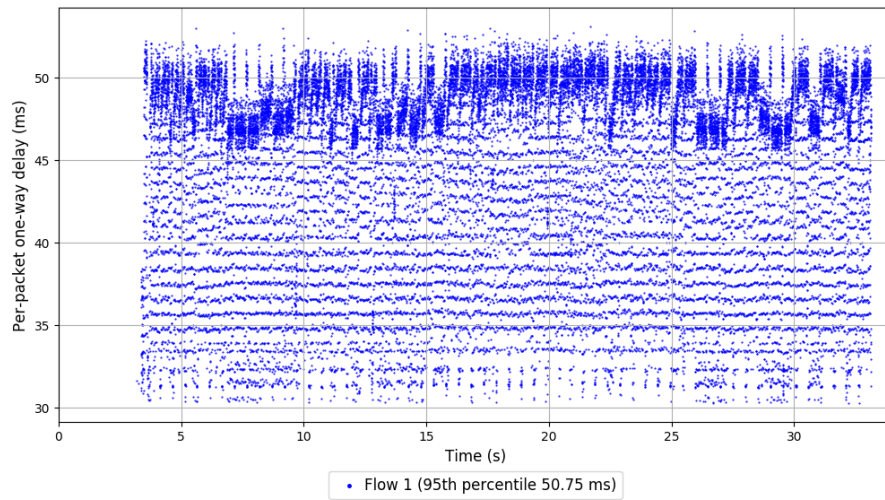
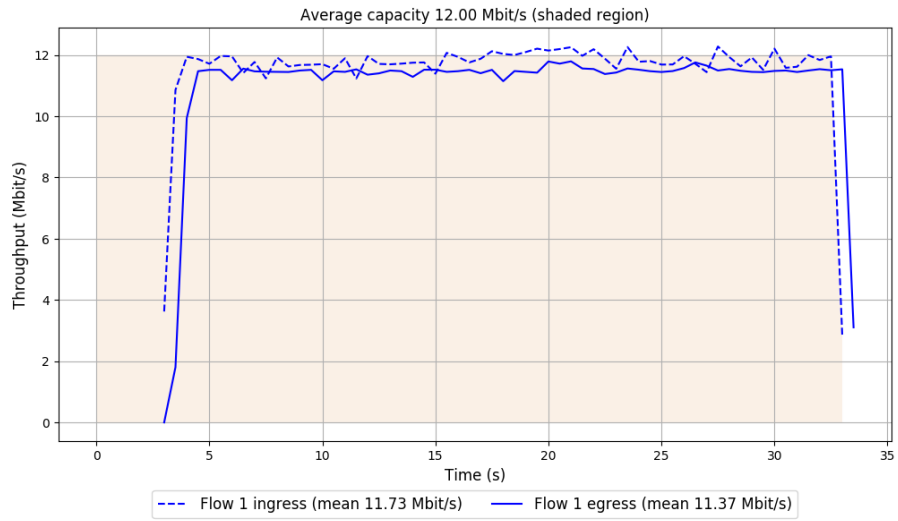
-- Flow 1:

Average throughput: 11.37 Mbit/s

95th percentile per-packet one-way delay: 50.747 ms

Loss rate: 3.21%

Run 3: Report of FillP — Data Link



Run 1: Statistics of FillP-Sheep

Start at: 2019-01-17 07:05:00

End at: 2019-01-17 07:05:30

Below is generated by plot.py at 2019-01-17 07:41:01

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 10.28 Mbit/s (85.7% utilization)

95th percentile per-packet one-way delay: 48.899 ms

Loss rate: 1.53%

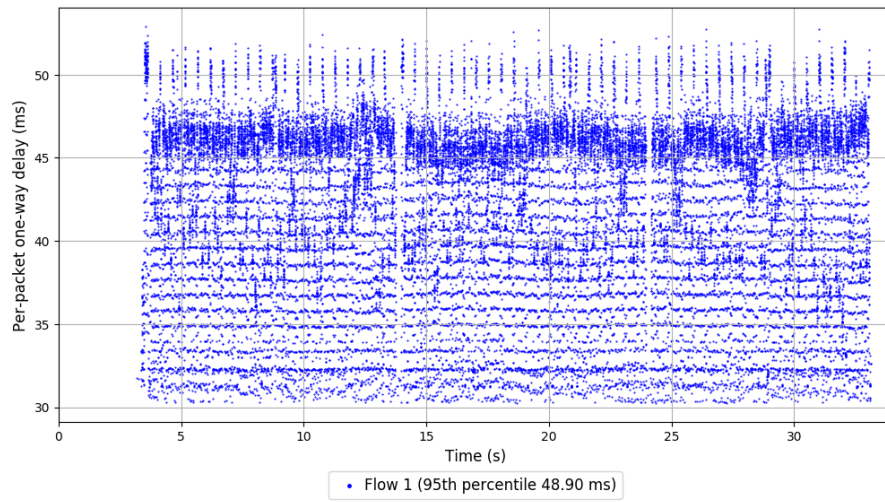
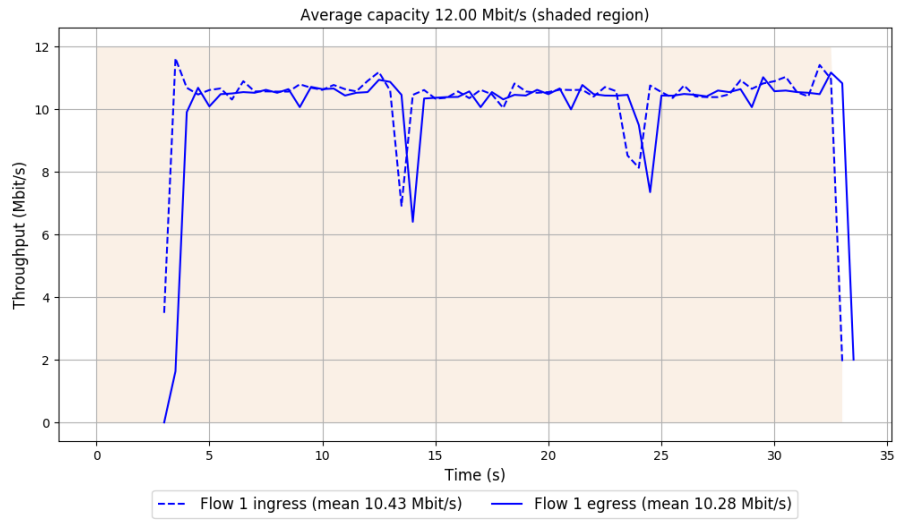
-- Flow 1:

Average throughput: 10.28 Mbit/s

95th percentile per-packet one-way delay: 48.899 ms

Loss rate: 1.53%

Run 1: Report of FillP-Sheep — Data Link



Run 2: Statistics of FillP-Sheep

Start at: 2019-01-17 07:17:26

End at: 2019-01-17 07:17:56

Below is generated by plot.py at 2019-01-17 07:41:09

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 10.40 Mbit/s (86.6% utilization)

95th percentile per-packet one-way delay: 48.898 ms

Loss rate: 1.47%

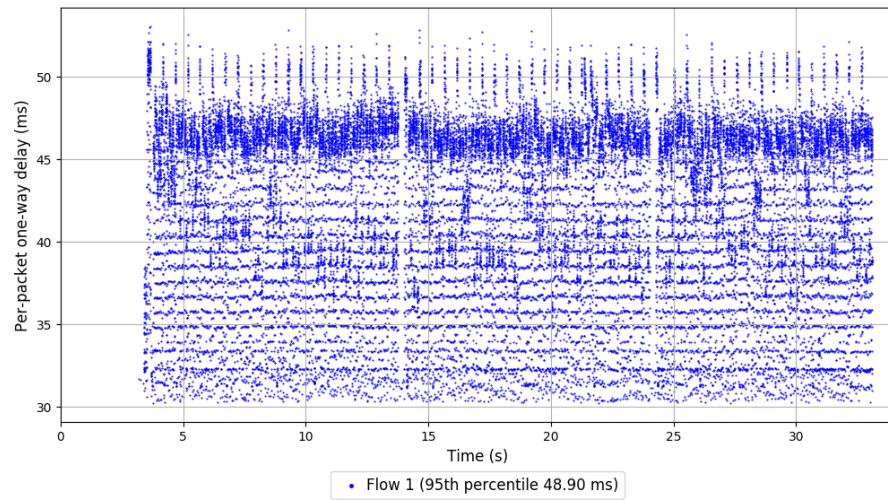
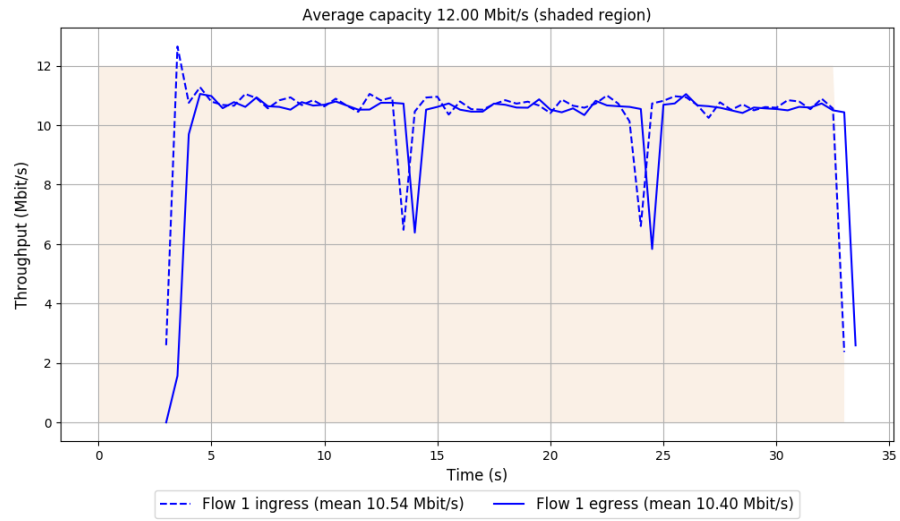
-- Flow 1:

Average throughput: 10.40 Mbit/s

95th percentile per-packet one-way delay: 48.898 ms

Loss rate: 1.47%

Run 2: Report of FillP-Sheep — Data Link



Run 3: Statistics of FillP-Sheep

Start at: 2019-01-17 07:29:54

End at: 2019-01-17 07:30:24

Below is generated by plot.py at 2019-01-17 07:41:10

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 10.37 Mbit/s (86.5% utilization)

95th percentile per-packet one-way delay: 49.074 ms

Loss rate: 1.59%

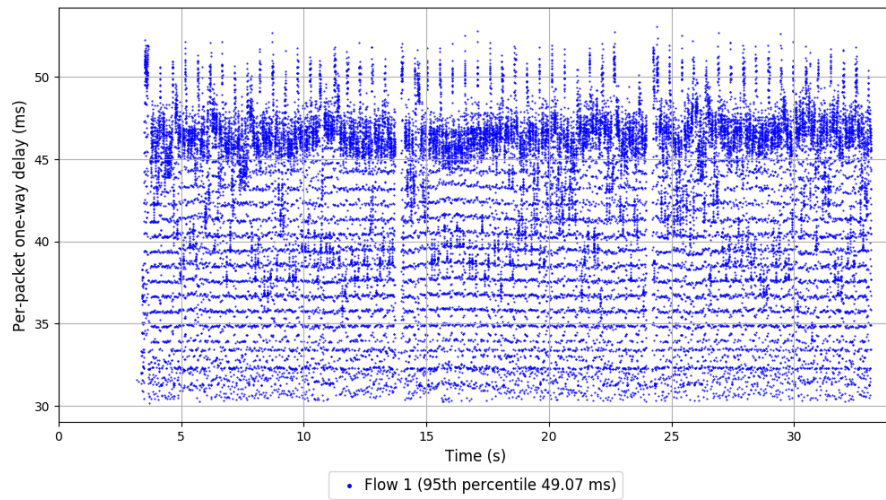
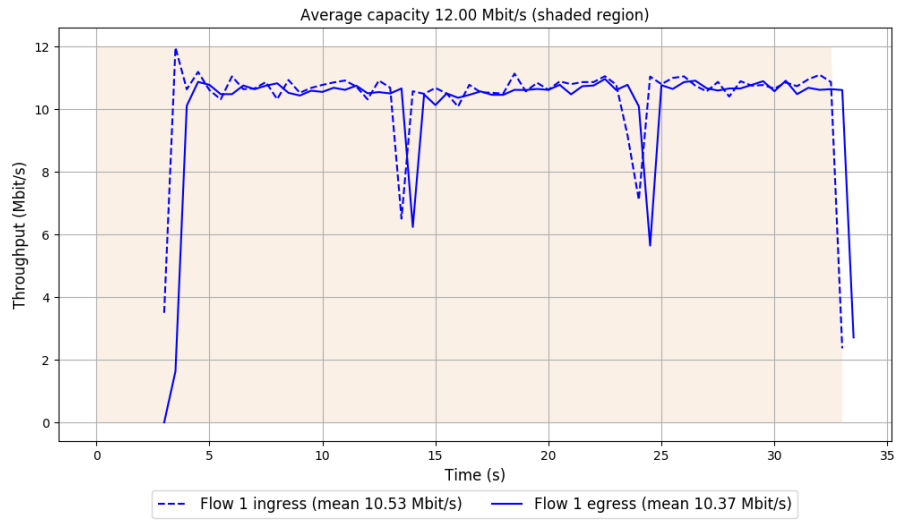
-- Flow 1:

Average throughput: 10.37 Mbit/s

95th percentile per-packet one-way delay: 49.074 ms

Loss rate: 1.59%

Run 3: Report of FillP-Sheep — Data Link



Run 1: Statistics of Indigo

Start at: 2019-01-17 07:03:12

End at: 2019-01-17 07:03:42

Below is generated by plot.py at 2019-01-17 07:41:10

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.82 Mbit/s (98.5% utilization)

95th percentile per-packet one-way delay: 46.150 ms

Loss rate: 3.91%

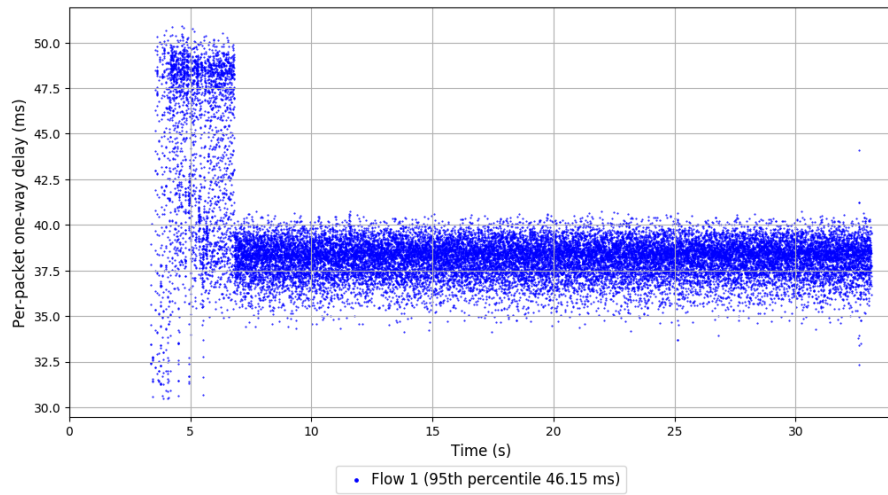
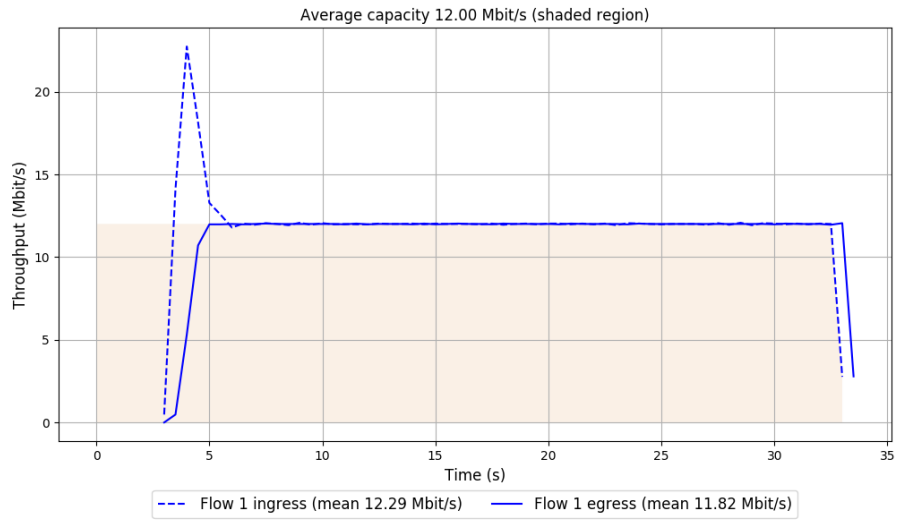
-- Flow 1:

Average throughput: 11.82 Mbit/s

95th percentile per-packet one-way delay: 46.150 ms

Loss rate: 3.91%

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2019-01-17 07:15:38

End at: 2019-01-17 07:16:08

Below is generated by plot.py at 2019-01-17 07:41:20

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.78 Mbit/s (98.2% utilization)

95th percentile per-packet one-way delay: 45.866 ms

Loss rate: 4.42%

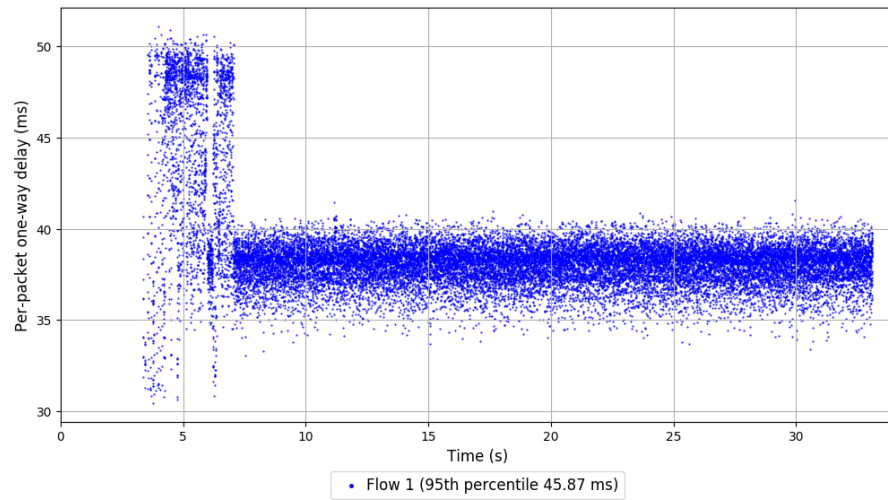
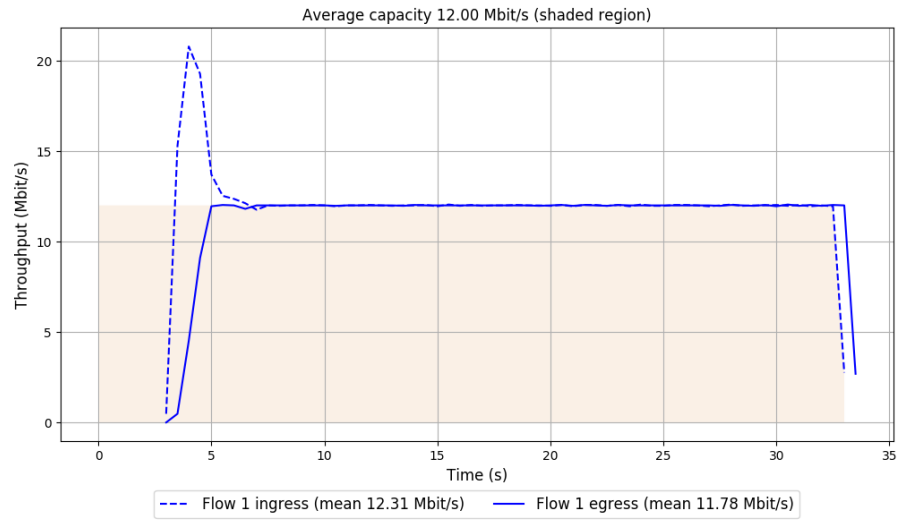
-- Flow 1:

Average throughput: 11.78 Mbit/s

95th percentile per-packet one-way delay: 45.866 ms

Loss rate: 4.42%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2019-01-17 07:28:06

End at: 2019-01-17 07:28:36

Below is generated by plot.py at 2019-01-17 07:41:21

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.81 Mbit/s (98.4% utilization)

95th percentile per-packet one-way delay: 47.268 ms

Loss rate: 4.57%

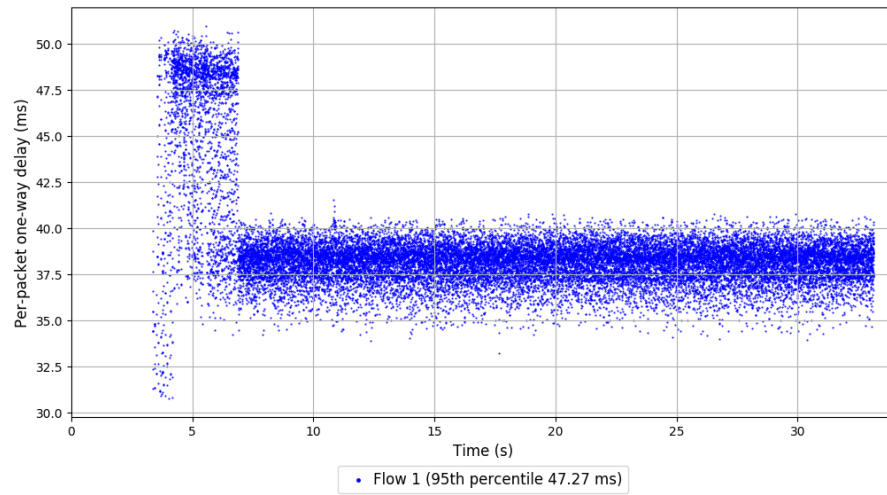
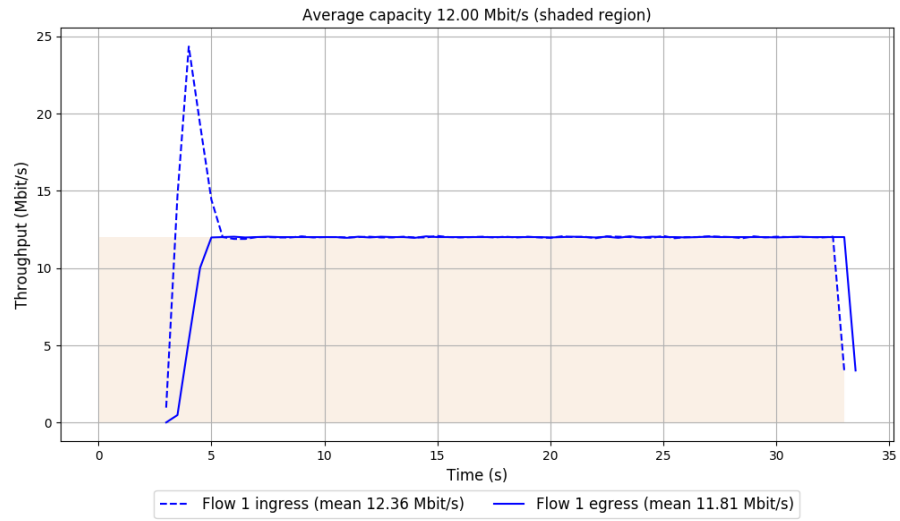
-- Flow 1:

Average throughput: 11.81 Mbit/s

95th percentile per-packet one-way delay: 47.268 ms

Loss rate: 4.57%

Run 3: Report of Indigo — Data Link



Run 1: Statistics of Indigo-MusesC3

Start at: 2019-01-17 07:12:06

End at: 2019-01-17 07:12:36

Below is generated by plot.py at 2019-01-17 07:41:23

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.69 Mbit/s (97.4% utilization)

95th percentile per-packet one-way delay: 44.840 ms

Loss rate: 0.35%

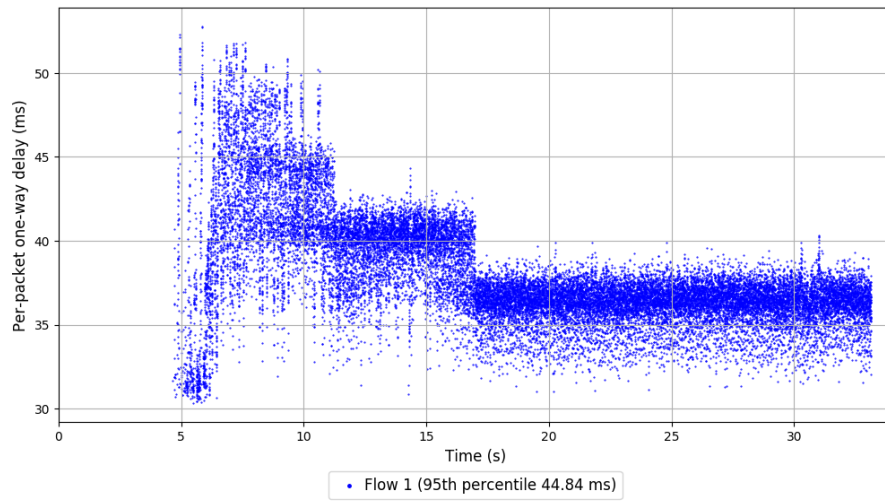
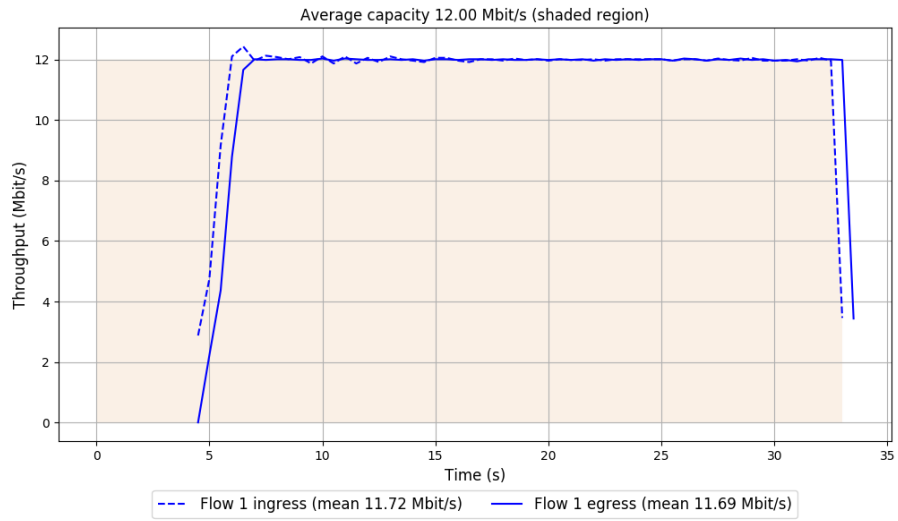
-- Flow 1:

Average throughput: 11.69 Mbit/s

95th percentile per-packet one-way delay: 44.840 ms

Loss rate: 0.35%

Run 1: Report of Indigo-MusesC3 — Data Link



Run 2: Statistics of Indigo-MusesC3

Start at: 2019-01-17 07:24:34

End at: 2019-01-17 07:25:04

Below is generated by plot.py at 2019-01-17 07:41:23

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.79 Mbit/s (98.2% utilization)

95th percentile per-packet one-way delay: 43.241 ms

Loss rate: 0.23%

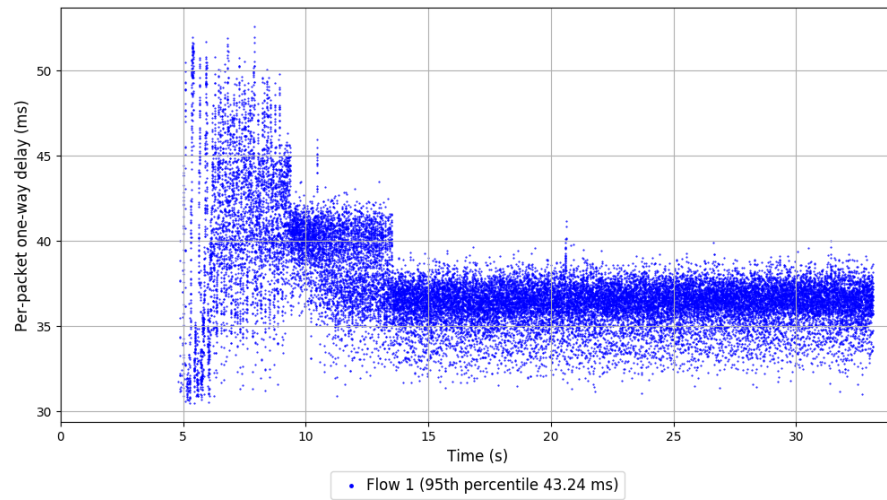
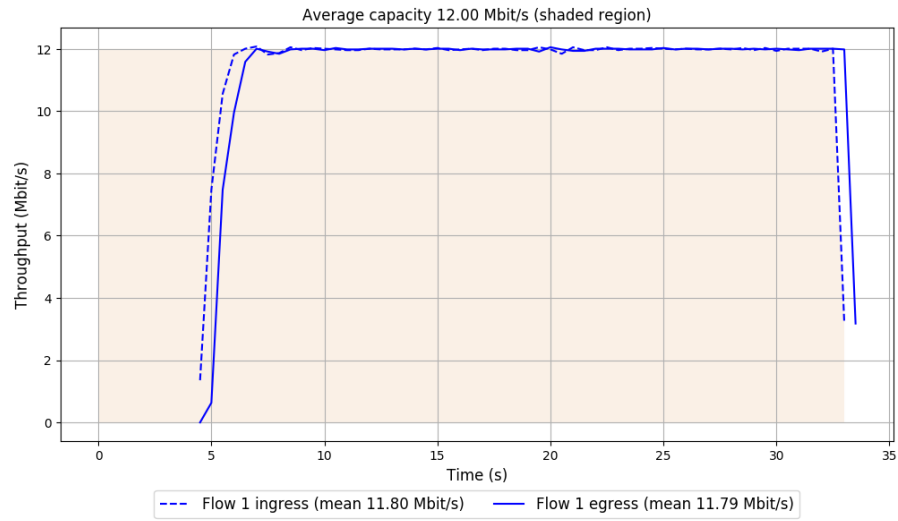
-- Flow 1:

Average throughput: 11.79 Mbit/s

95th percentile per-packet one-way delay: 43.241 ms

Loss rate: 0.23%

Run 2: Report of Indigo-MusesC3 — Data Link



Run 3: Statistics of Indigo-MusesC3

Start at: 2019-01-17 07:37:01

End at: 2019-01-17 07:37:31

Below is generated by plot.py at 2019-01-17 07:41:23

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.62 Mbit/s (96.8% utilization)

95th percentile per-packet one-way delay: 43.180 ms

Loss rate: 0.23%

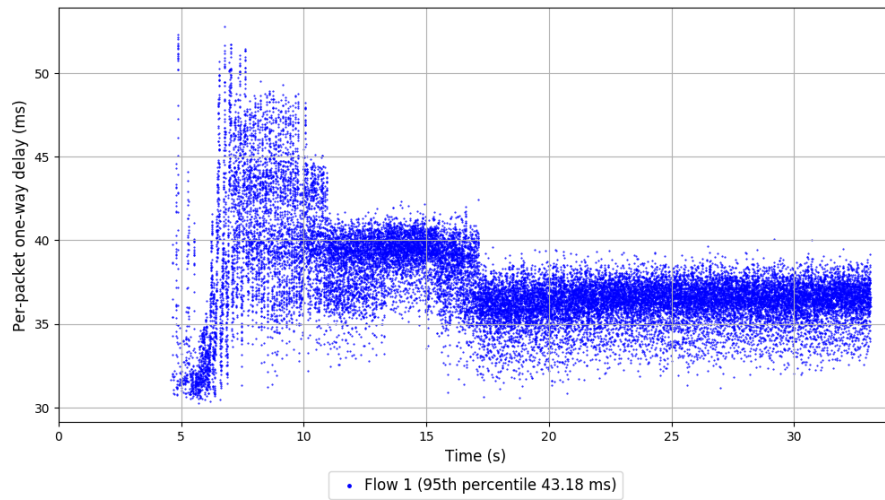
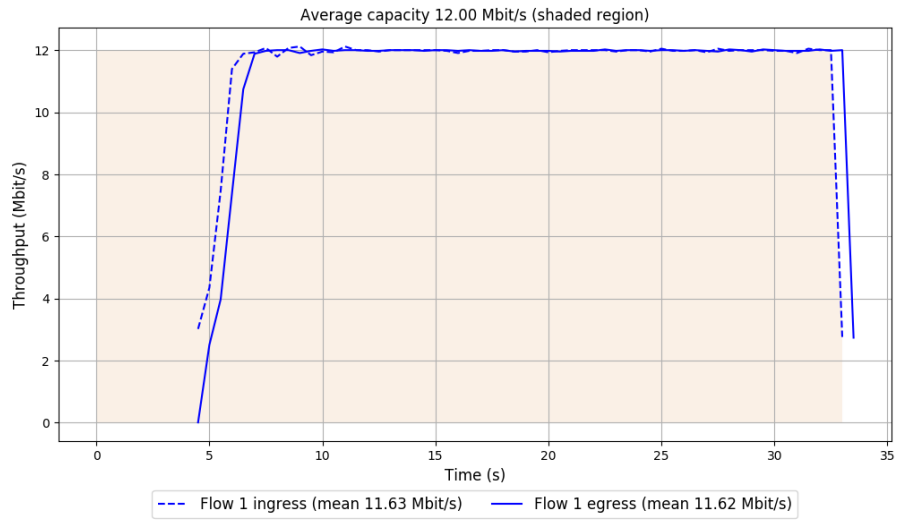
-- Flow 1:

Average throughput: 11.62 Mbit/s

95th percentile per-packet one-way delay: 43.180 ms

Loss rate: 0.23%

Run 3: Report of Indigo-MusesC3 — Data Link



Run 1: Statistics of Indigo-MusesC5

Start at: 2019-01-17 07:07:57

End at: 2019-01-17 07:08:27

Below is generated by plot.py at 2019-01-17 07:41:29

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 8.36 Mbit/s (69.7% utilization)

95th percentile per-packet one-way delay: 50.639 ms

Loss rate: 2.32%

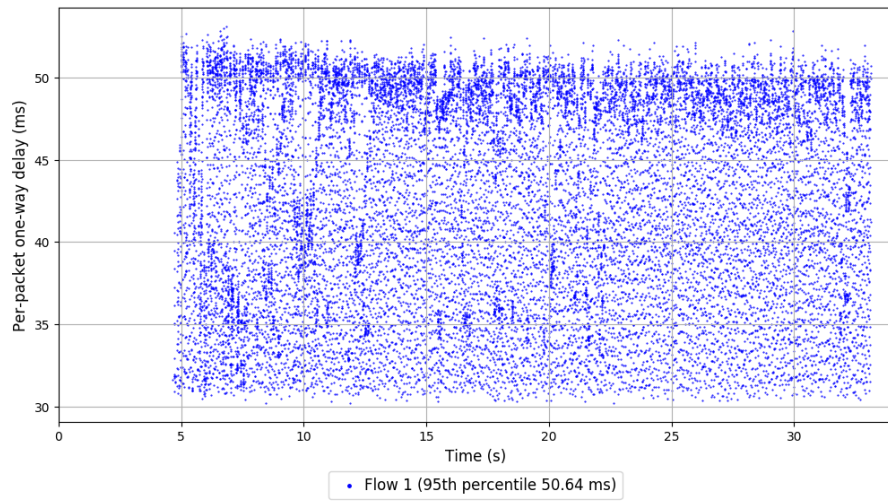
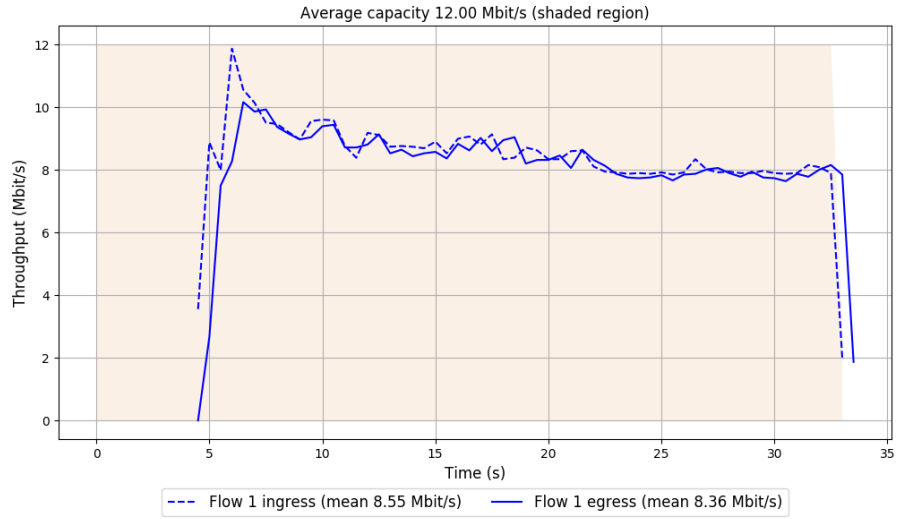
-- Flow 1:

Average throughput: 8.36 Mbit/s

95th percentile per-packet one-way delay: 50.639 ms

Loss rate: 2.32%

Run 1: Report of Indigo-MusesC5 — Data Link



Run 2: Statistics of Indigo-MusesC5

Start at: 2019-01-17 07:20:24

End at: 2019-01-17 07:20:54

Below is generated by plot.py at 2019-01-17 07:41:29

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 8.81 Mbit/s (73.4% utilization)

95th percentile per-packet one-way delay: 50.668 ms

Loss rate: 2.40%

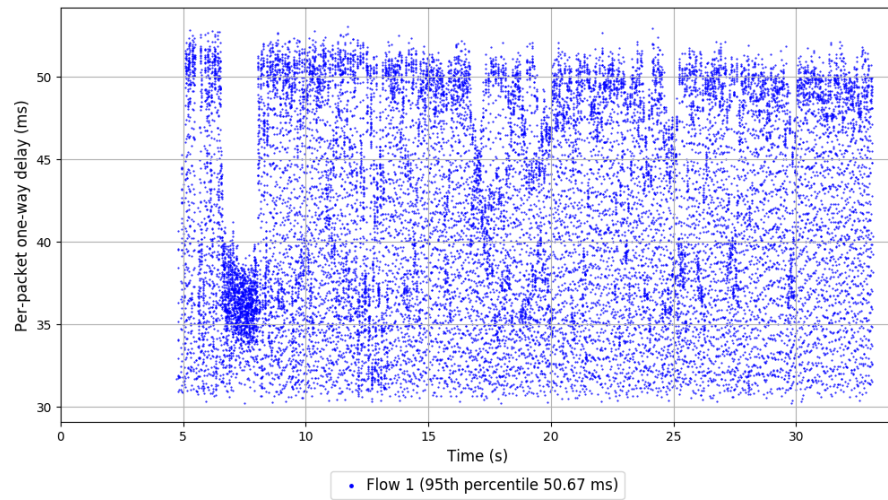
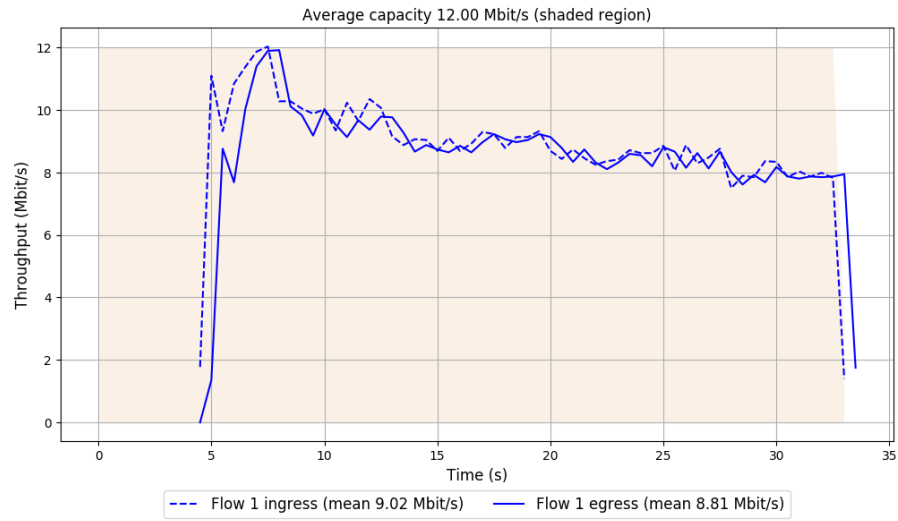
-- Flow 1:

Average throughput: 8.81 Mbit/s

95th percentile per-packet one-way delay: 50.668 ms

Loss rate: 2.40%

Run 2: Report of Indigo-MusesC5 — Data Link



Run 3: Statistics of Indigo-MusesC5

Start at: 2019-01-17 07:32:51

End at: 2019-01-17 07:33:21

Below is generated by plot.py at 2019-01-17 07:41:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 8.30 Mbit/s (69.1% utilization)

95th percentile per-packet one-way delay: 50.653 ms

Loss rate: 2.06%

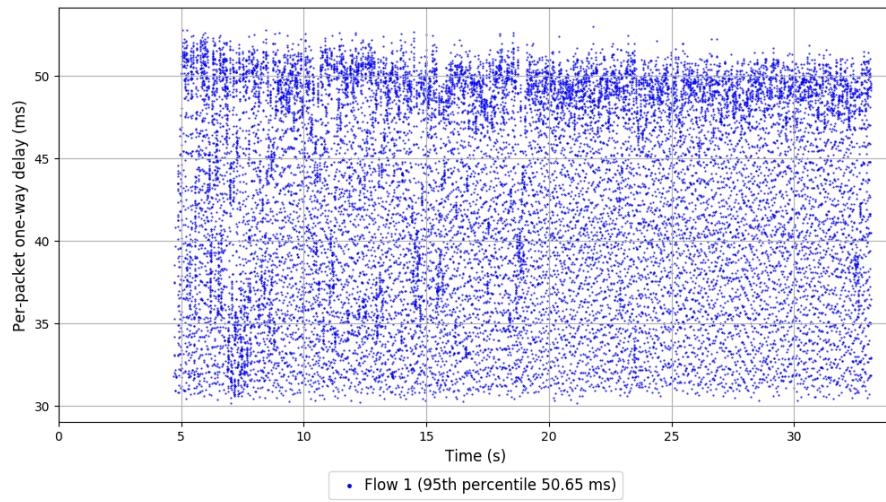
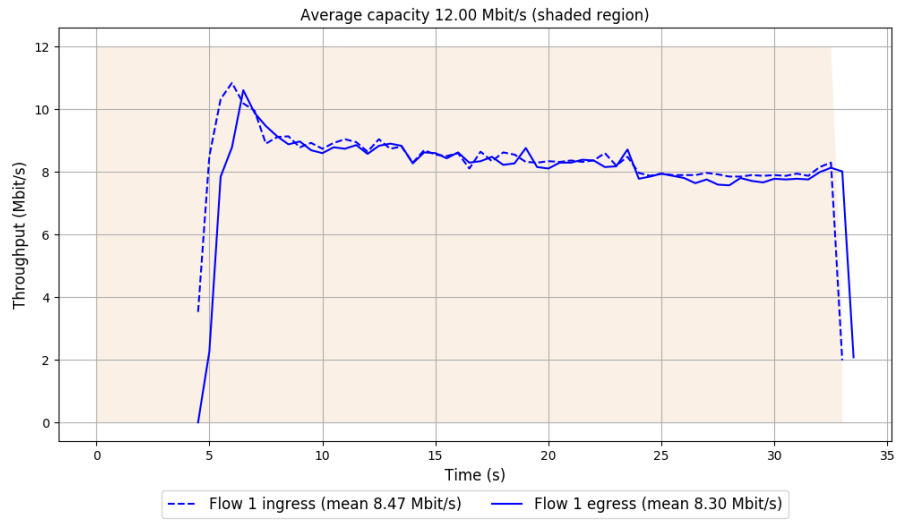
-- Flow 1:

Average throughput: 8.30 Mbit/s

95th percentile per-packet one-way delay: 50.653 ms

Loss rate: 2.06%

Run 3: Report of Indigo-MusesC5 — Data Link



Run 1: Statistics of Indigo-MusesD

Start at: 2019-01-17 07:02:37

End at: 2019-01-17 07:03:07

Below is generated by plot.py at 2019-01-17 07:41:34

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 5.29 Mbit/s (44.1% utilization)

95th percentile per-packet one-way delay: 36.221 ms

Loss rate: 0.05%

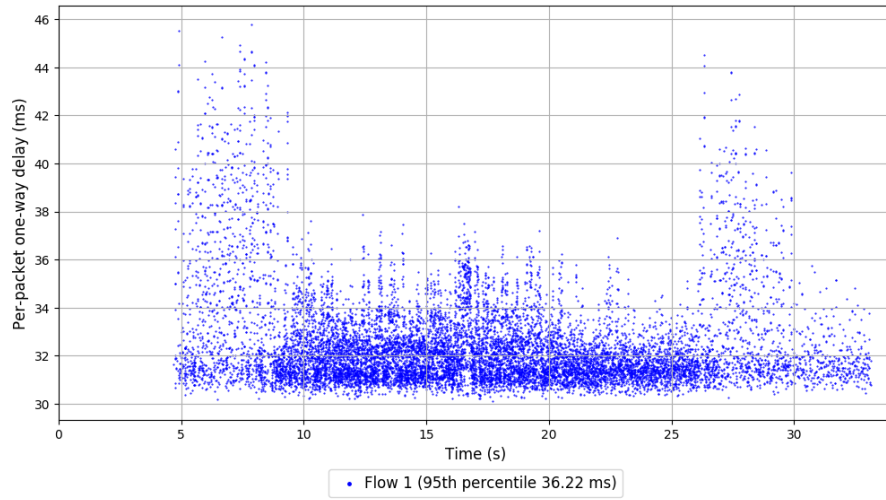
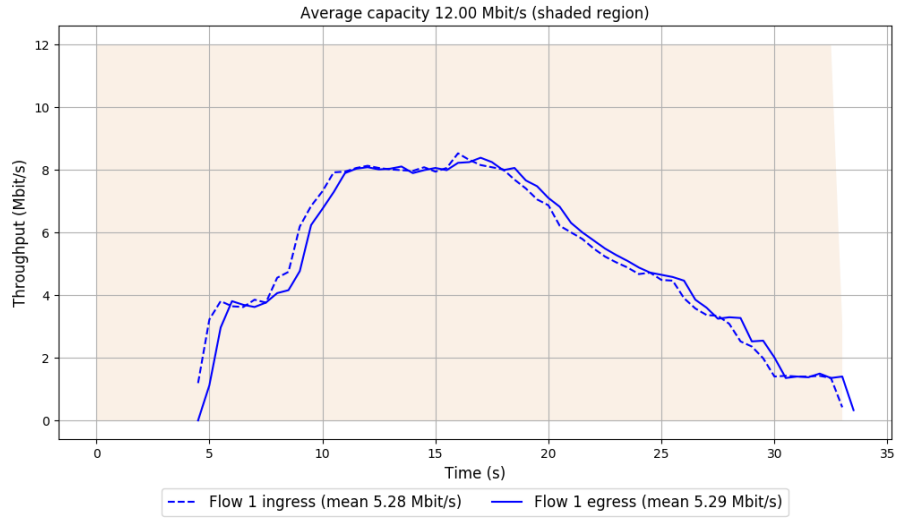
-- Flow 1:

Average throughput: 5.29 Mbit/s

95th percentile per-packet one-way delay: 36.221 ms

Loss rate: 0.05%

Run 1: Report of Indigo-MusesD — Data Link



Run 2: Statistics of Indigo-MusesD

Start at: 2019-01-17 07:15:03

End at: 2019-01-17 07:15:33

Below is generated by plot.py at 2019-01-17 07:41:36

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 4.48 Mbit/s (37.3% utilization)

95th percentile per-packet one-way delay: 35.018 ms

Loss rate: 0.03%

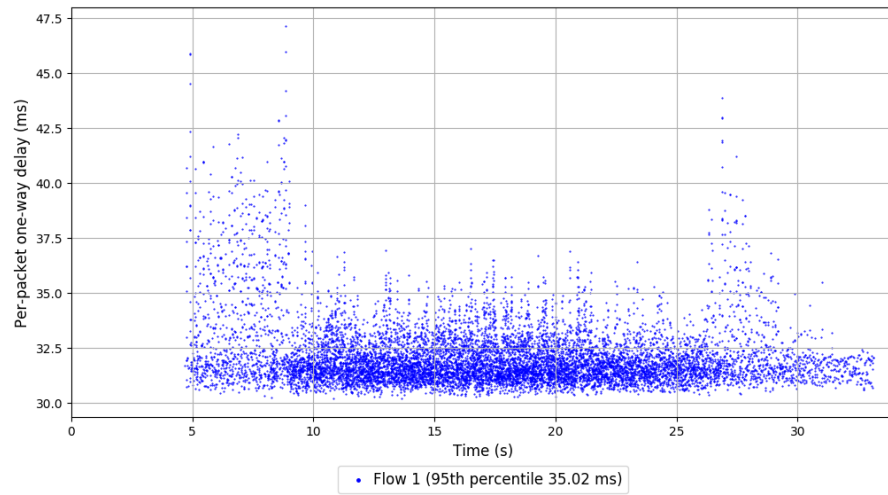
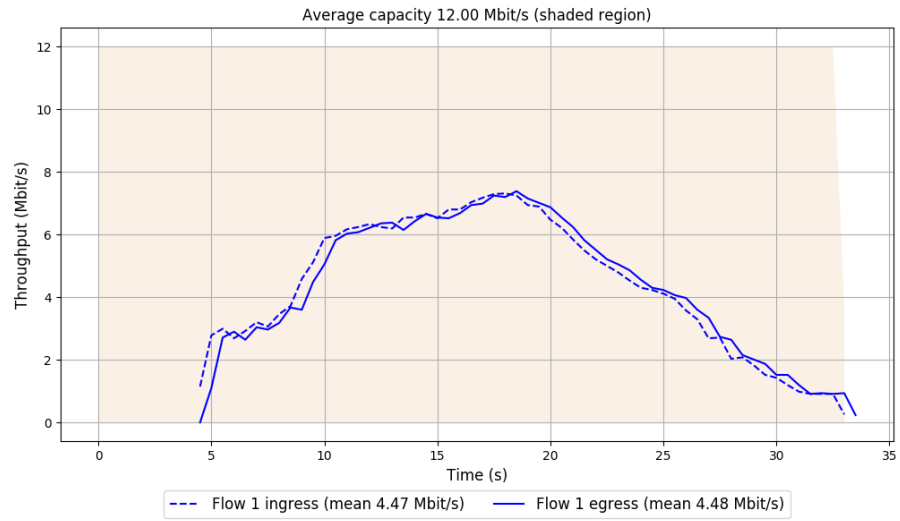
-- Flow 1:

Average throughput: 4.48 Mbit/s

95th percentile per-packet one-way delay: 35.018 ms

Loss rate: 0.03%

Run 2: Report of Indigo-MusesD — Data Link



Run 3: Statistics of Indigo-MusesD

Start at: 2019-01-17 07:27:31

End at: 2019-01-17 07:28:01

Below is generated by plot.py at 2019-01-17 07:41:37

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 4.86 Mbit/s (40.5% utilization)

95th percentile per-packet one-way delay: 36.571 ms

Loss rate: 0.03%

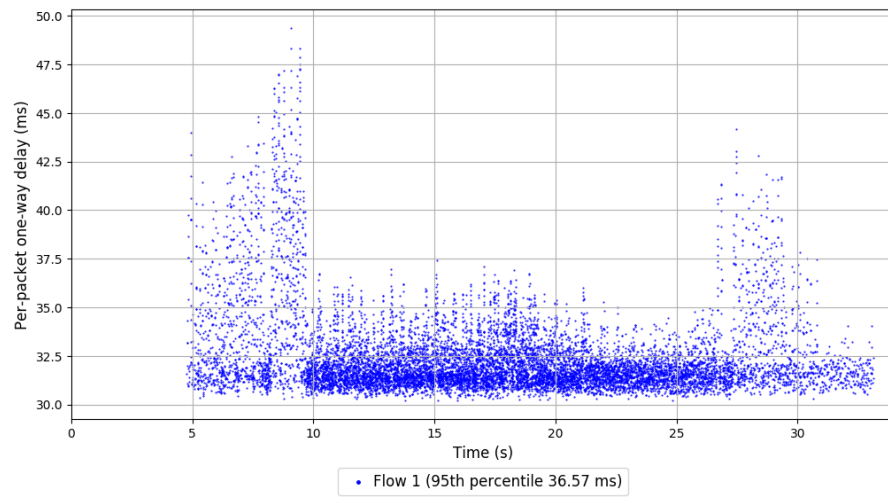
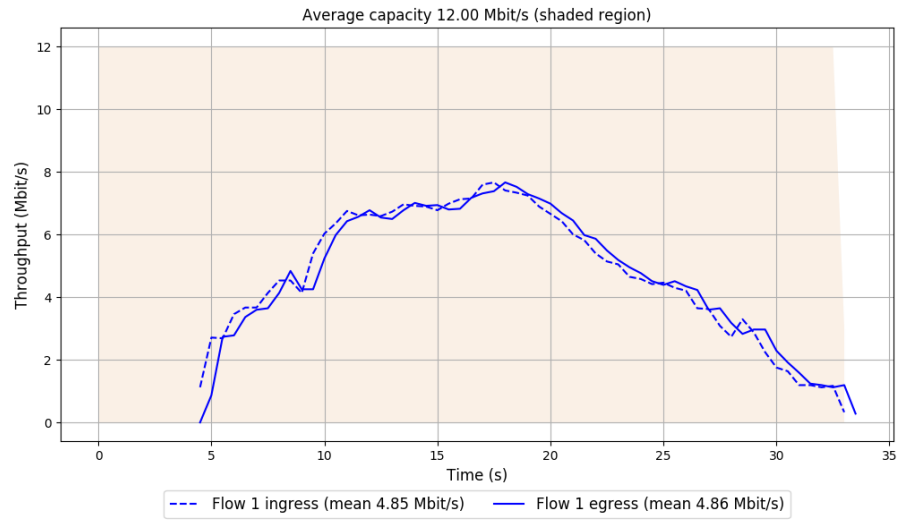
-- Flow 1:

Average throughput: 4.86 Mbit/s

95th percentile per-packet one-way delay: 36.571 ms

Loss rate: 0.03%

Run 3: Report of Indigo-MusesD — Data Link



Run 1: Statistics of Indigo-MuseST

Start at: 2019-01-17 07:11:31

End at: 2019-01-17 07:12:01

Below is generated by plot.py at 2019-01-17 07:41:46

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.85 Mbit/s (98.7% utilization)

95th percentile per-packet one-way delay: 43.013 ms

Loss rate: 0.37%

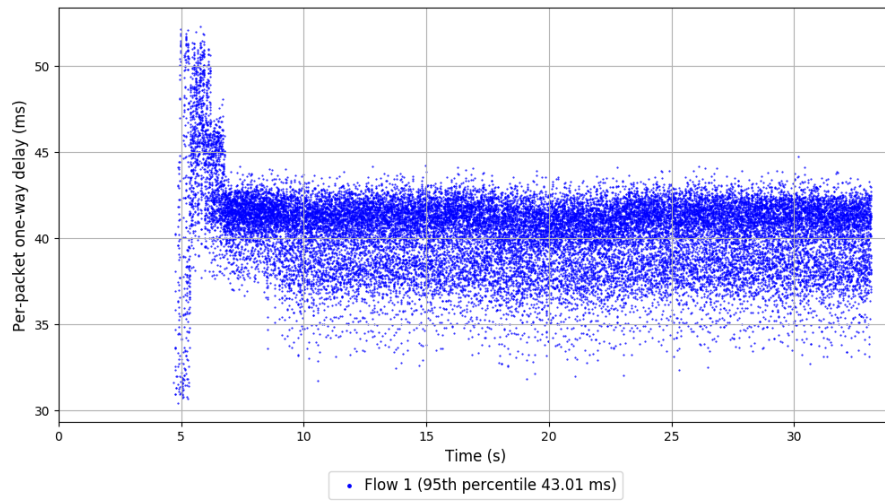
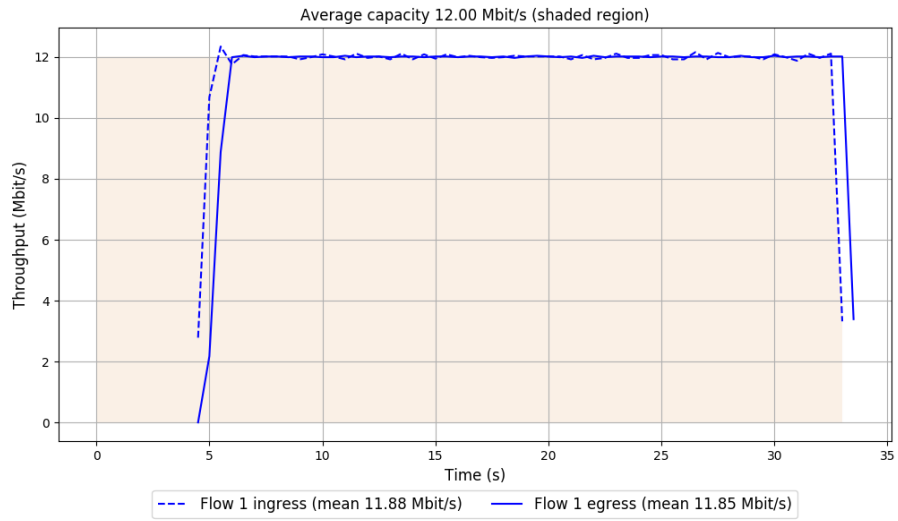
-- Flow 1:

Average throughput: 11.85 Mbit/s

95th percentile per-packet one-way delay: 43.013 ms

Loss rate: 0.37%

Run 1: Report of Indigo-MusesT — Data Link



Run 2: Statistics of Indigo-MuseST

Start at: 2019-01-17 07:23:58

End at: 2019-01-17 07:24:28

Below is generated by plot.py at 2019-01-17 07:41:47

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.86 Mbit/s (98.8% utilization)

95th percentile per-packet one-way delay: 44.606 ms

Loss rate: 0.24%

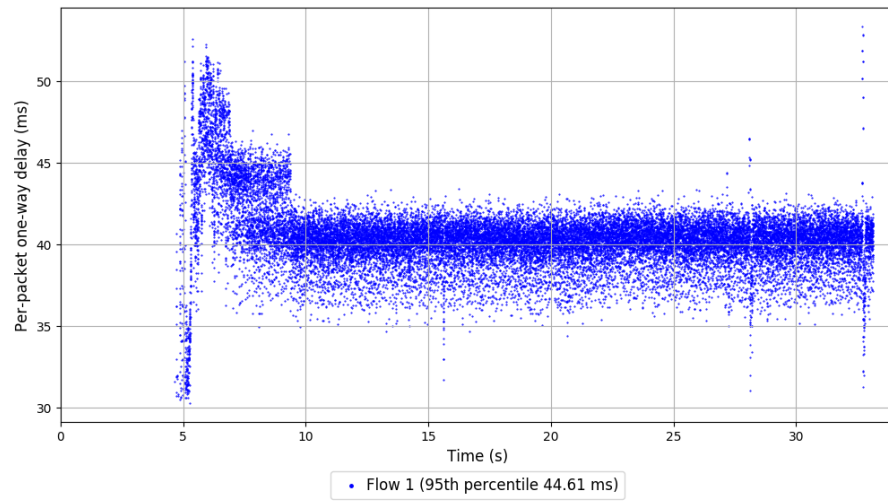
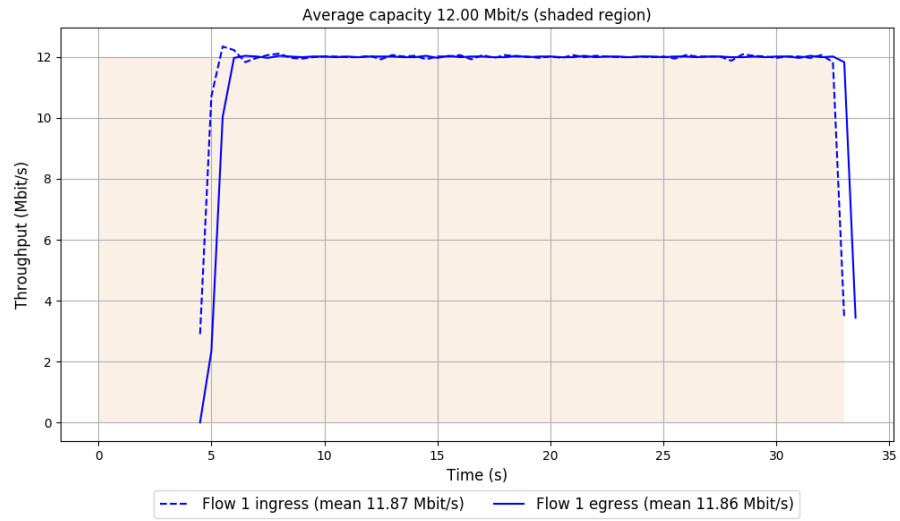
-- Flow 1:

Average throughput: 11.86 Mbit/s

95th percentile per-packet one-way delay: 44.606 ms

Loss rate: 0.24%

Run 2: Report of Indigo-MusesT — Data Link



Run 3: Statistics of Indigo-MusesT

Start at: 2019-01-17 07:36:25

End at: 2019-01-17 07:36:55

Below is generated by plot.py at 2019-01-17 07:41:52

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.87 Mbit/s (98.9% utilization)

95th percentile per-packet one-way delay: 44.811 ms

Loss rate: 0.23%

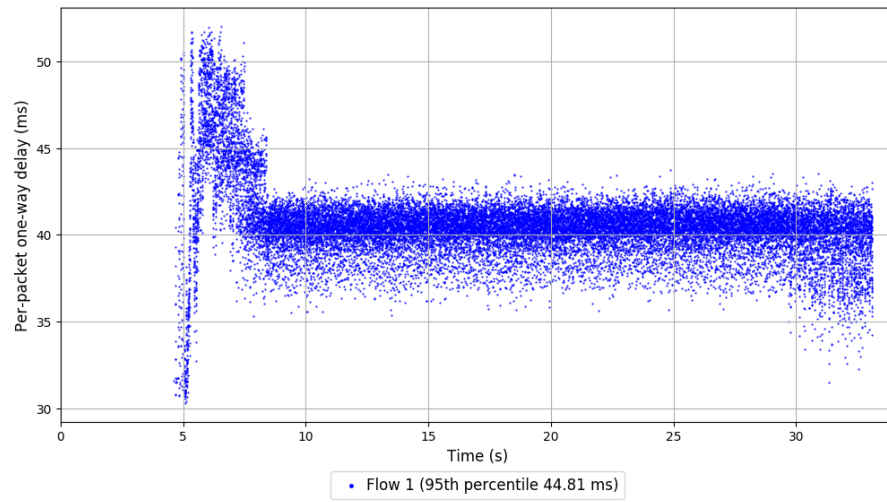
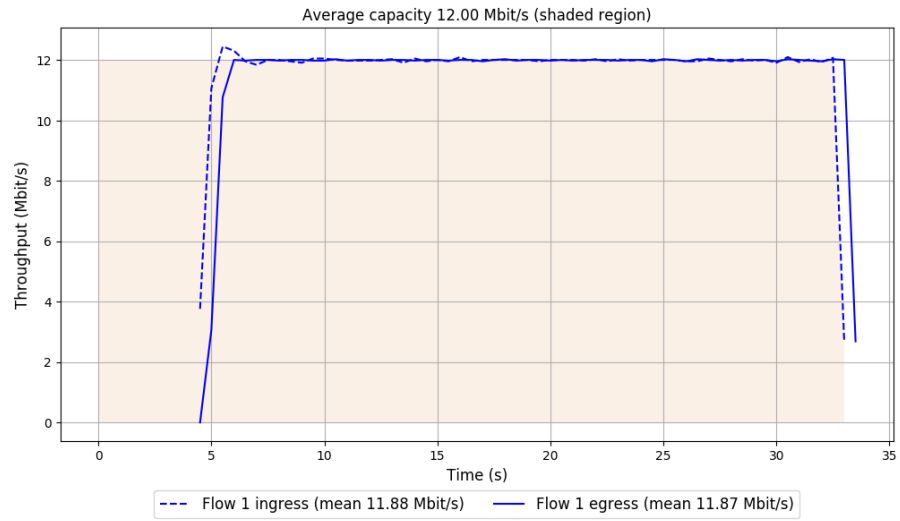
-- Flow 1:

Average throughput: 11.87 Mbit/s

95th percentile per-packet one-way delay: 44.811 ms

Loss rate: 0.23%

Run 3: Report of Indigo-MusesT — Data Link



Run 1: Statistics of LEDBAT

Start at: 2019-01-17 07:06:46

End at: 2019-01-17 07:07:16

Below is generated by plot.py at 2019-01-17 07:41:52

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 8.85 Mbit/s (73.7% utilization)

95th percentile per-packet one-way delay: 49.490 ms

Loss rate: 1.13%

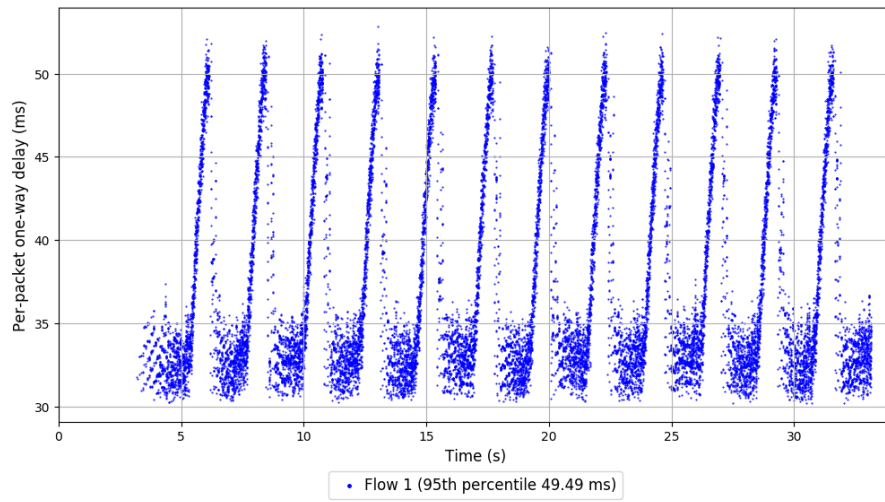
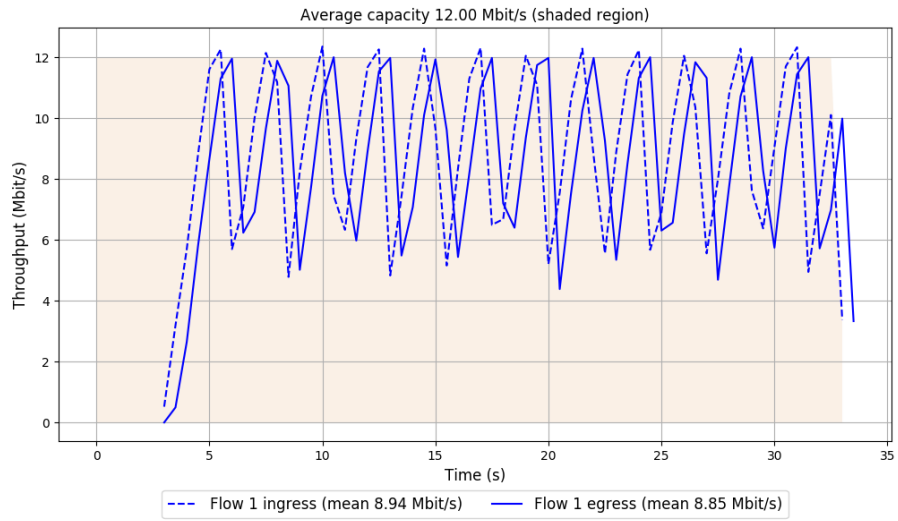
-- Flow 1:

Average throughput: 8.85 Mbit/s

95th percentile per-packet one-way delay: 49.490 ms

Loss rate: 1.13%

Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2019-01-17 07:19:13

End at: 2019-01-17 07:19:43

Below is generated by plot.py at 2019-01-17 07:41:52

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 8.80 Mbit/s (73.4% utilization)

95th percentile per-packet one-way delay: 49.416 ms

Loss rate: 1.15%

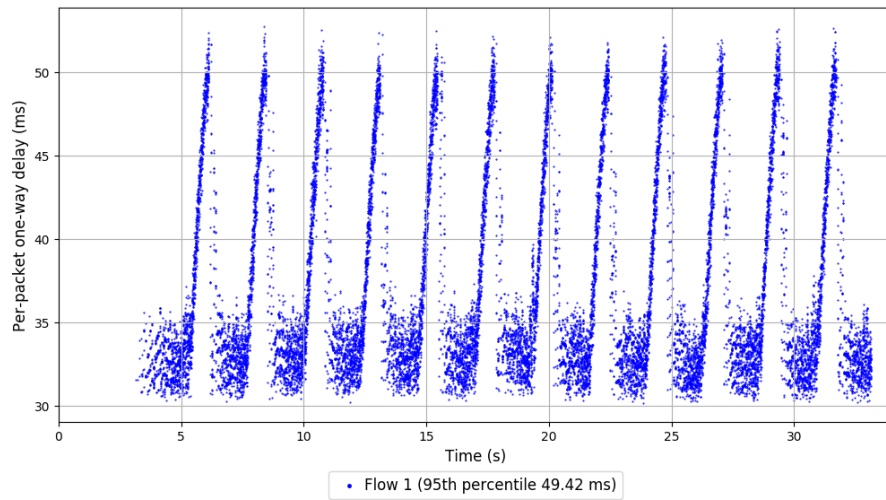
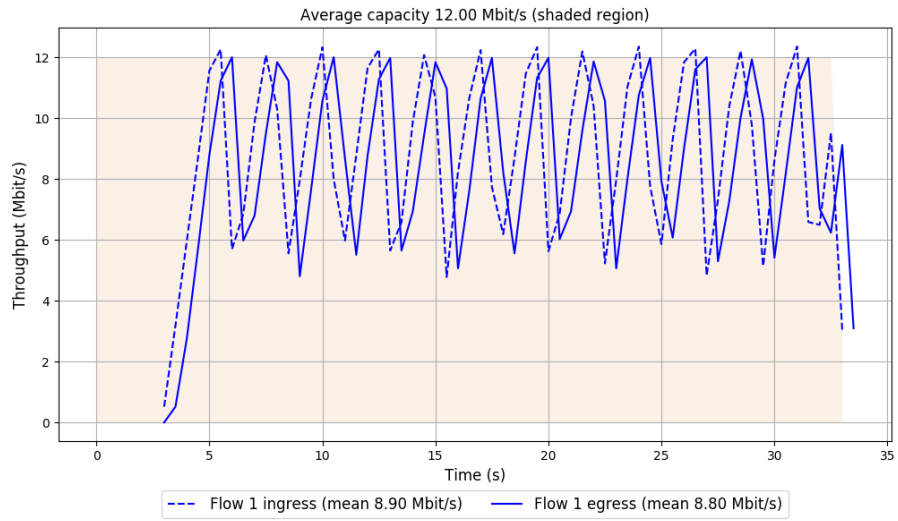
-- Flow 1:

Average throughput: 8.80 Mbit/s

95th percentile per-packet one-way delay: 49.416 ms

Loss rate: 1.15%

Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2019-01-17 07:31:40

End at: 2019-01-17 07:32:10

Below is generated by plot.py at 2019-01-17 07:41:53

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 8.84 Mbit/s (73.7% utilization)

95th percentile per-packet one-way delay: 49.464 ms

Loss rate: 1.12%

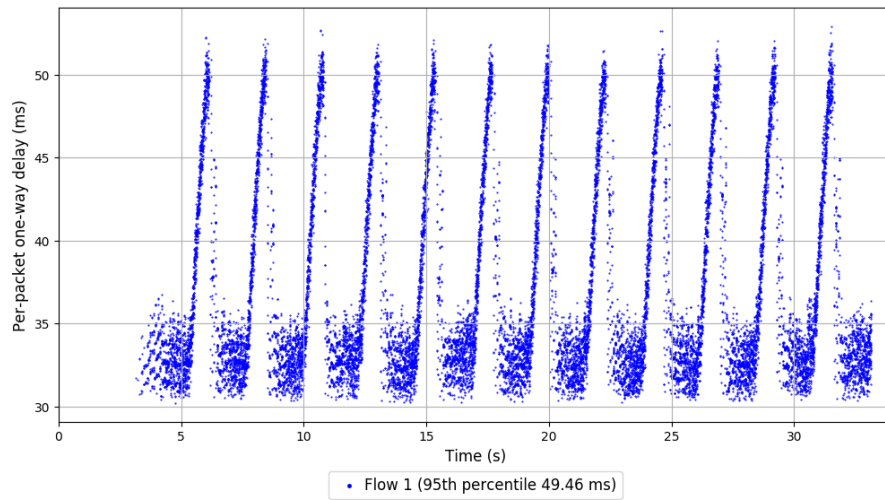
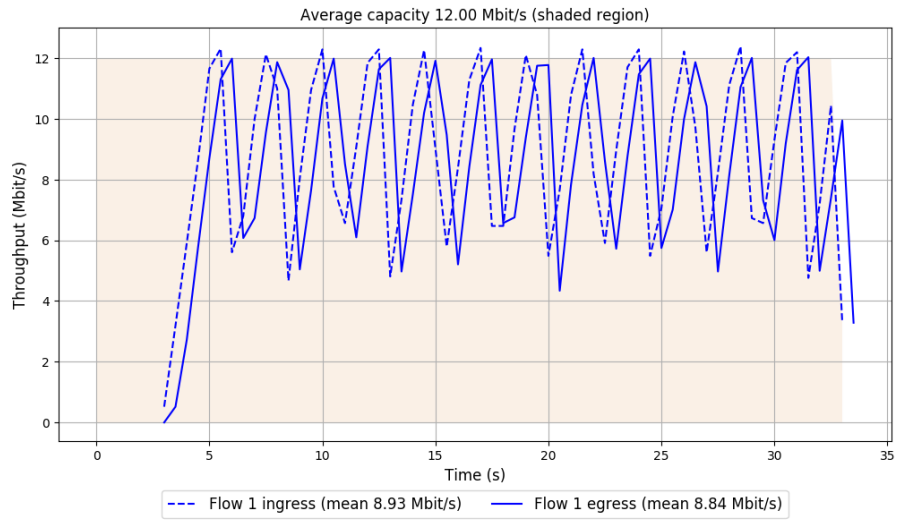
-- Flow 1:

Average throughput: 8.84 Mbit/s

95th percentile per-packet one-way delay: 49.464 ms

Loss rate: 1.12%

Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of PCC-Allegro

Start at: 2019-01-17 07:10:20

End at: 2019-01-17 07:10:50

Below is generated by plot.py at 2019-01-17 07:41:58

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 10.53 Mbit/s (87.7% utilization)

95th percentile per-packet one-way delay: 34.699 ms

Loss rate: 0.73%

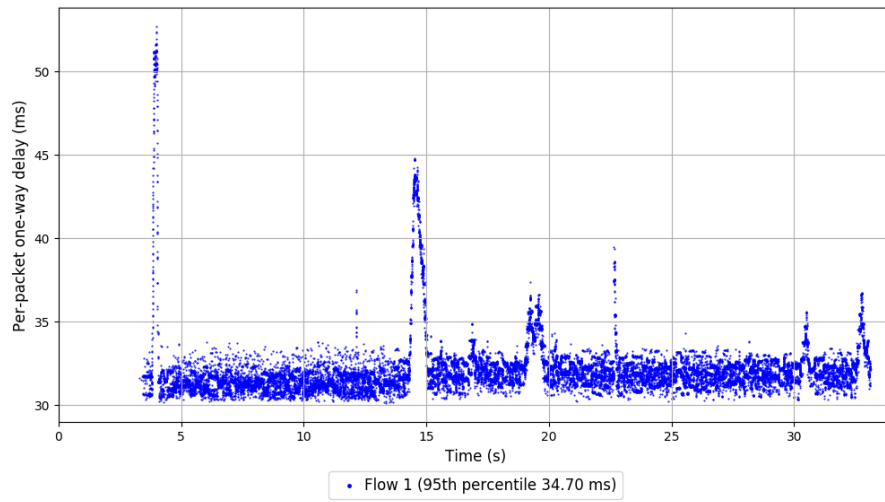
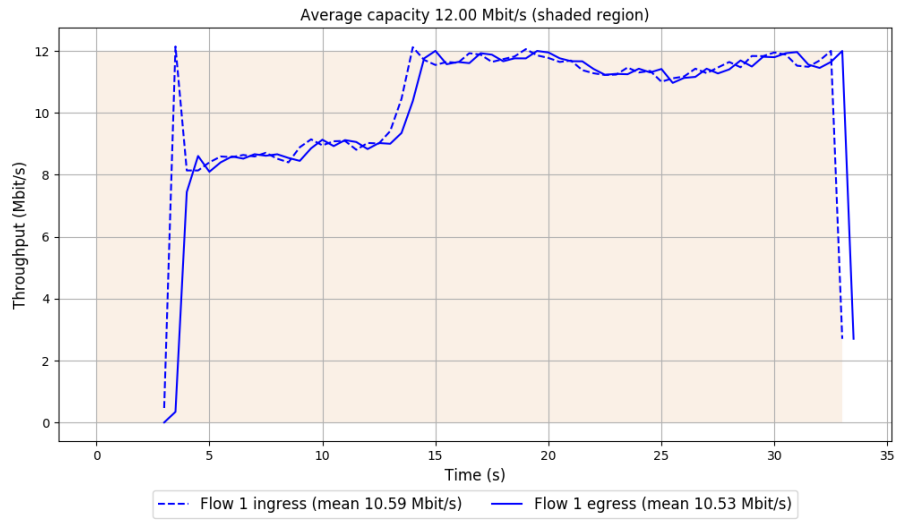
-- Flow 1:

Average throughput: 10.53 Mbit/s

95th percentile per-packet one-way delay: 34.699 ms

Loss rate: 0.73%

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2019-01-17 07:22:47

End at: 2019-01-17 07:23:17

Below is generated by plot.py at 2019-01-17 07:41:58

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 9.62 Mbit/s (80.2% utilization)

95th percentile per-packet one-way delay: 33.510 ms

Loss rate: 0.90%

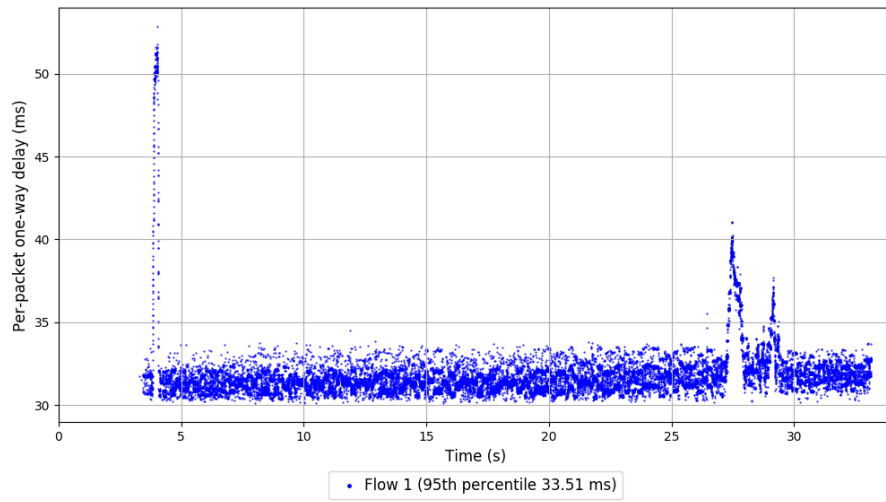
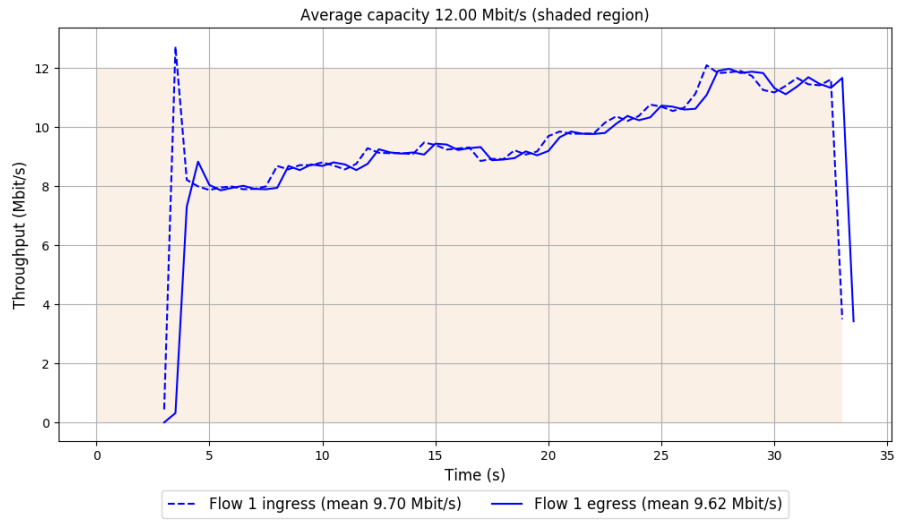
-- Flow 1:

Average throughput: 9.62 Mbit/s

95th percentile per-packet one-way delay: 33.510 ms

Loss rate: 0.90%

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

Start at: 2019-01-17 07:35:14

End at: 2019-01-17 07:35:44

Below is generated by plot.py at 2019-01-17 07:42:05

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 9.10 Mbit/s (75.8% utilization)

95th percentile per-packet one-way delay: 32.600 ms

Loss rate: 0.90%

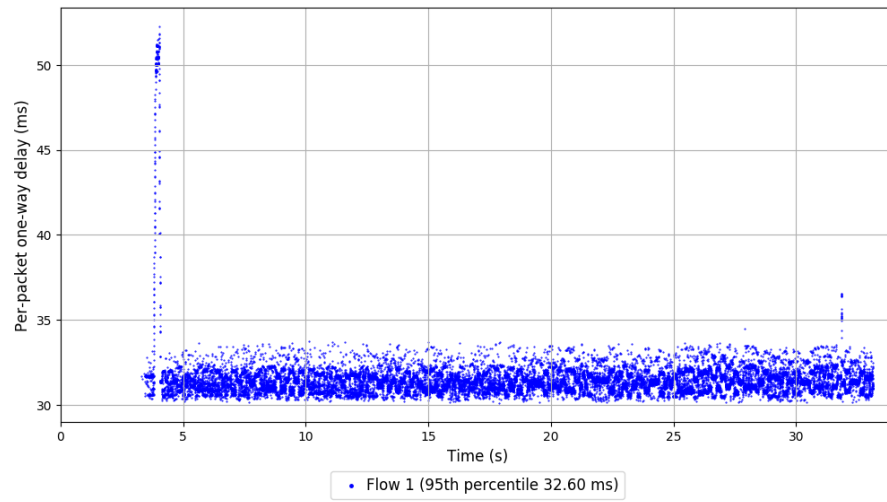
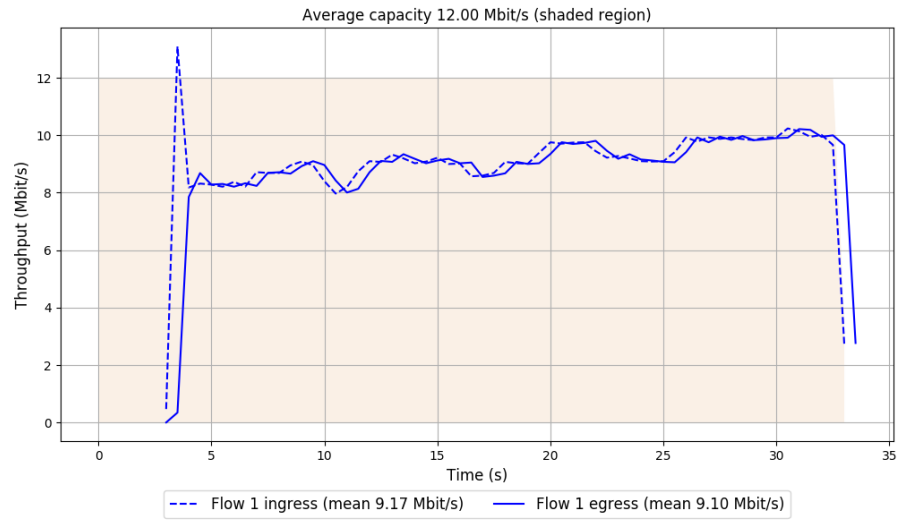
-- Flow 1:

Average throughput: 9.10 Mbit/s

95th percentile per-packet one-way delay: 32.600 ms

Loss rate: 0.90%

Run 3: Report of PCC-Allegro — Data Link



Run 1: Statistics of PCC-Expr

Start at: 2019-01-17 07:03:48

End at: 2019-01-17 07:04:18

Below is generated by plot.py at 2019-01-17 07:42:23

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.35 Mbit/s (94.6% utilization)

95th percentile per-packet one-way delay: 50.580 ms

Loss rate: 1.67%

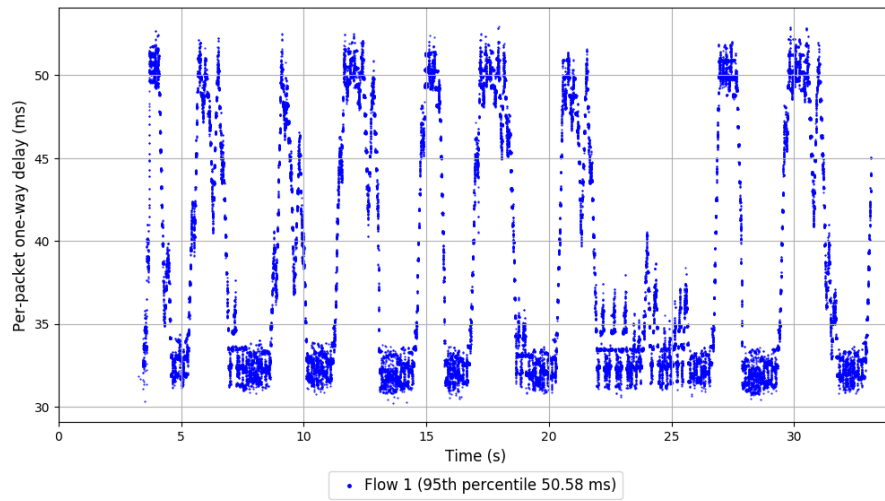
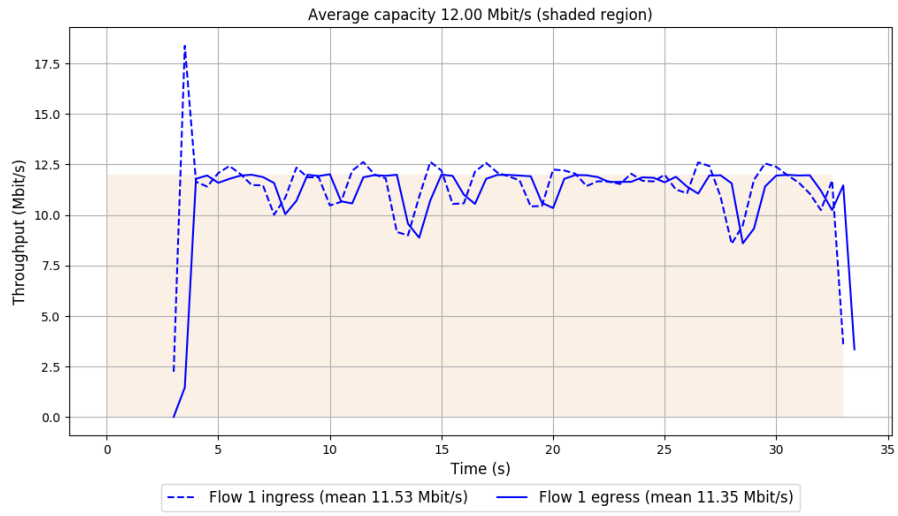
-- Flow 1:

Average throughput: 11.35 Mbit/s

95th percentile per-packet one-way delay: 50.580 ms

Loss rate: 1.67%

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

Start at: 2019-01-17 07:16:14

End at: 2019-01-17 07:16:44

Below is generated by plot.py at 2019-01-17 07:42:26

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.37 Mbit/s (94.8% utilization)

95th percentile per-packet one-way delay: 50.631 ms

Loss rate: 1.71%

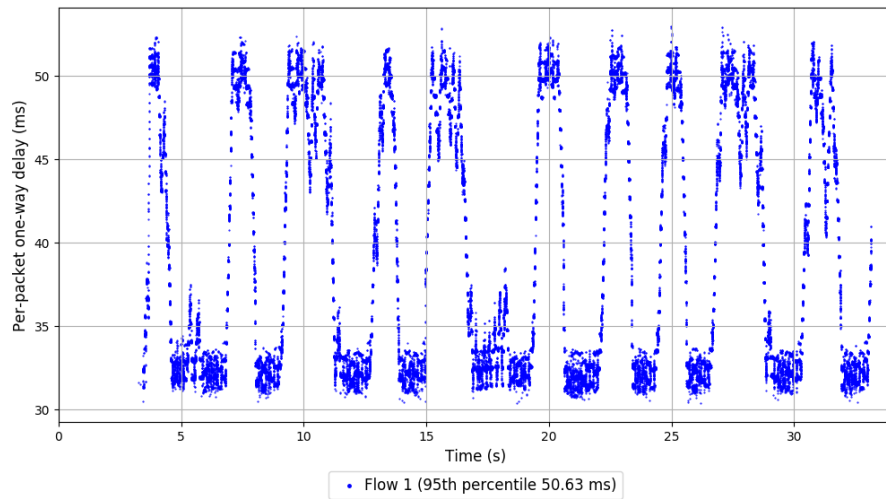
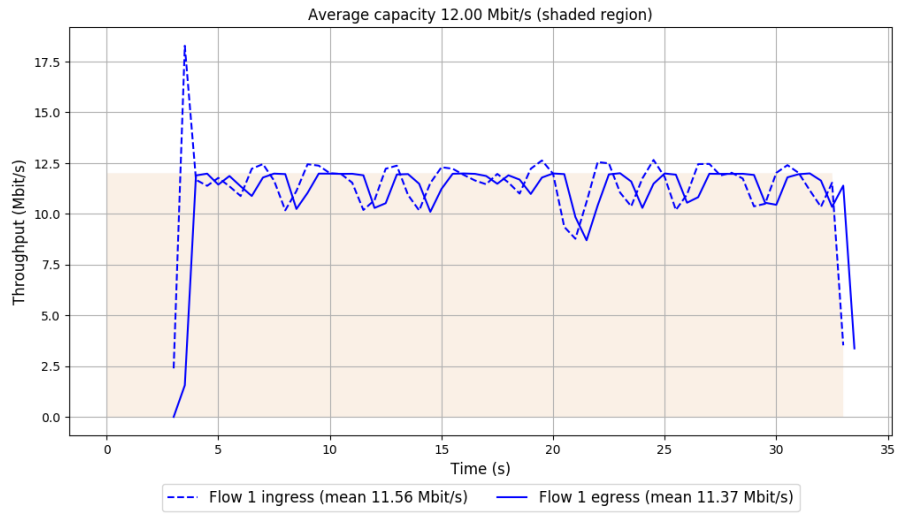
-- Flow 1:

Average throughput: 11.37 Mbit/s

95th percentile per-packet one-way delay: 50.631 ms

Loss rate: 1.71%

Run 2: Report of PCC-Expr — Data Link



Run 3: Statistics of PCC-Expr

Start at: 2019-01-17 07:28:42

End at: 2019-01-17 07:29:12

Below is generated by plot.py at 2019-01-17 07:42:26

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.03 Mbit/s (91.9% utilization)

95th percentile per-packet one-way delay: 50.675 ms

Loss rate: 1.01%

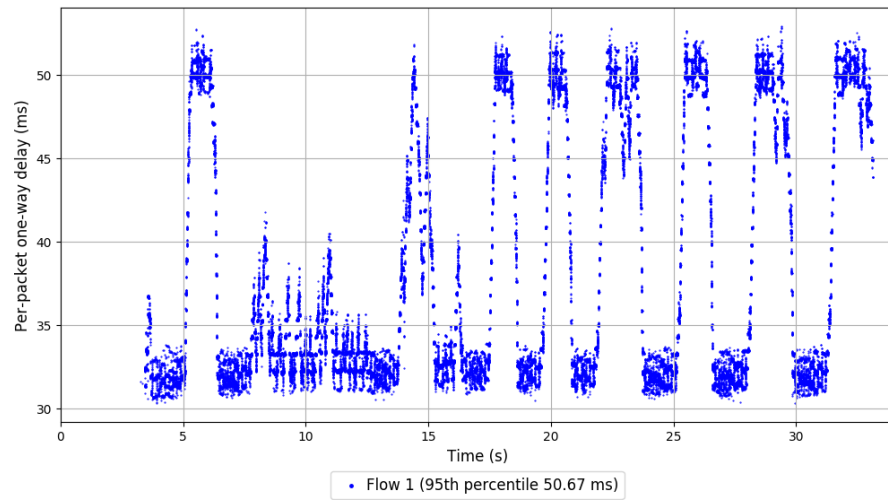
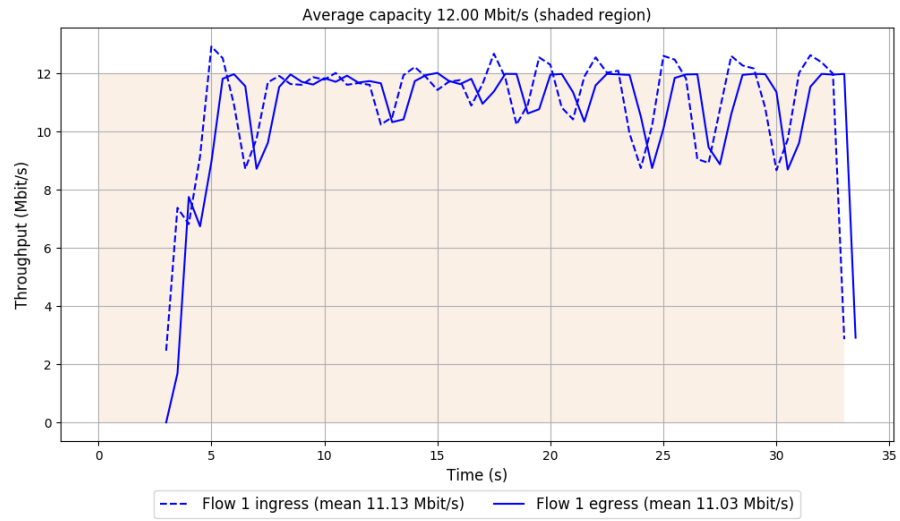
-- Flow 1:

Average throughput: 11.03 Mbit/s

95th percentile per-packet one-way delay: 50.675 ms

Loss rate: 1.01%

Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2019-01-17 07:12:42

End at: 2019-01-17 07:13:12

Below is generated by plot.py at 2019-01-17 07:42:26

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.66 Mbit/s (97.1% utilization)

95th percentile per-packet one-way delay: 49.841 ms

Loss rate: 0.33%

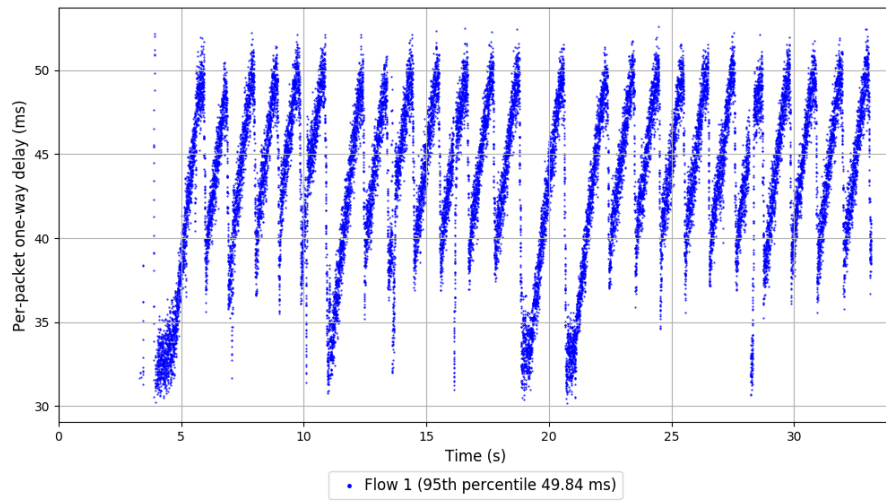
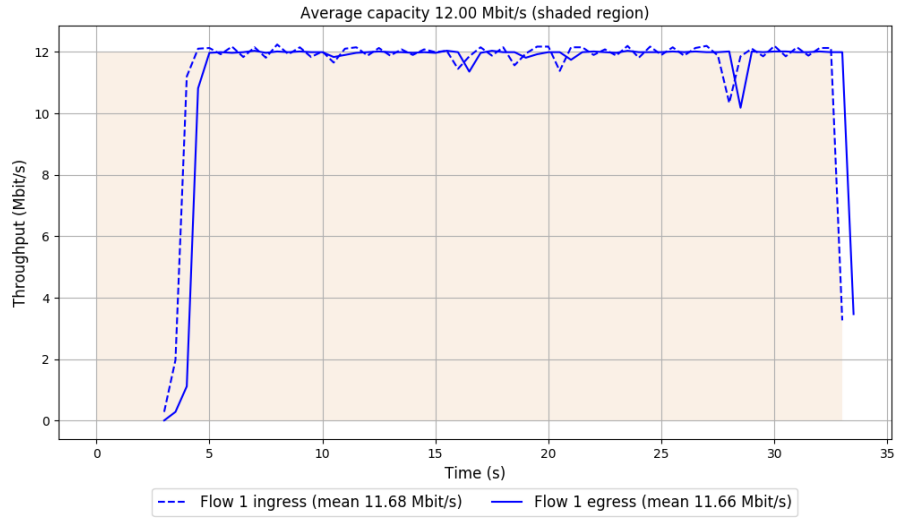
-- Flow 1:

Average throughput: 11.66 Mbit/s

95th percentile per-packet one-way delay: 49.841 ms

Loss rate: 0.33%

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2019-01-17 07:25:09

End at: 2019-01-17 07:25:39

Below is generated by plot.py at 2019-01-17 07:42:26

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.65 Mbit/s (97.1% utilization)

95th percentile per-packet one-way delay: 49.887 ms

Loss rate: 0.38%

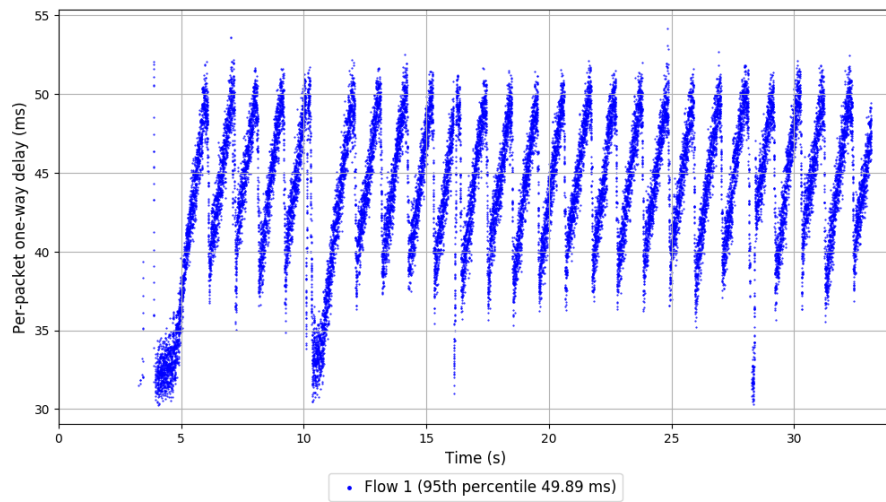
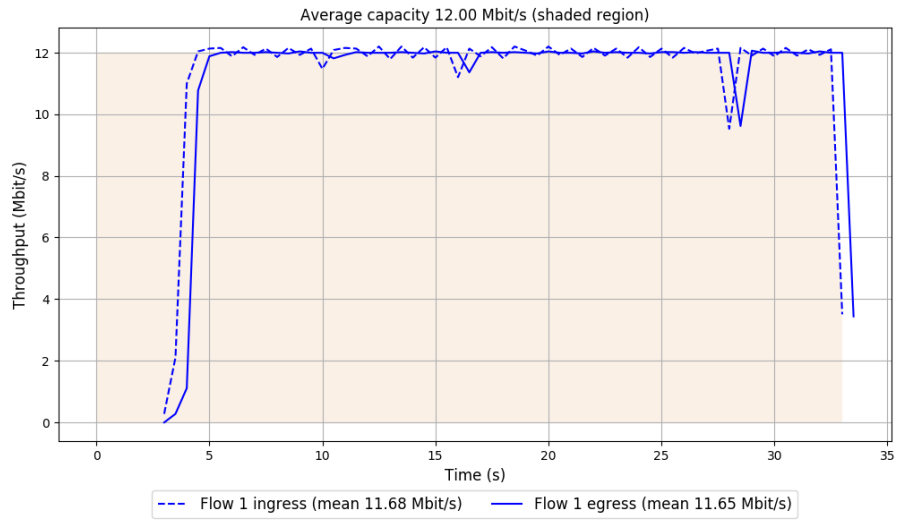
-- Flow 1:

Average throughput: 11.65 Mbit/s

95th percentile per-packet one-way delay: 49.887 ms

Loss rate: 0.38%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2019-01-17 07:37:36

End at: 2019-01-17 07:38:06

Below is generated by plot.py at 2019-01-17 07:42:26

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.67 Mbit/s (97.2% utilization)

95th percentile per-packet one-way delay: 49.794 ms

Loss rate: 0.37%

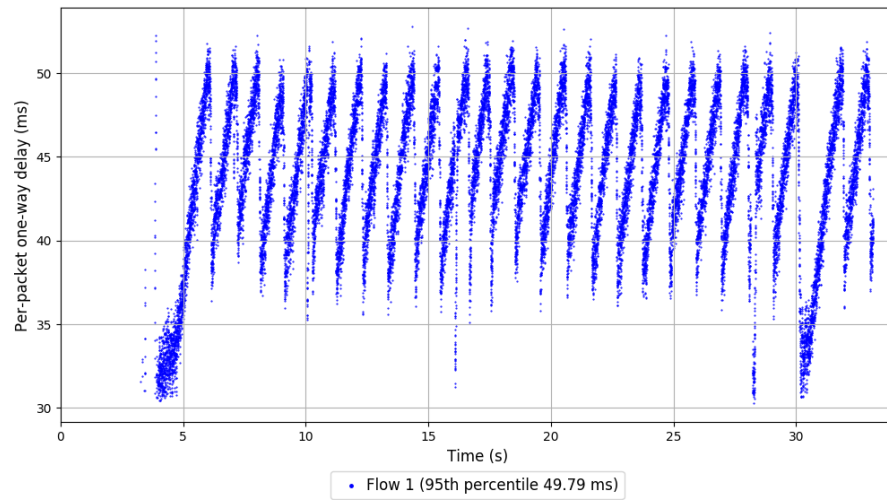
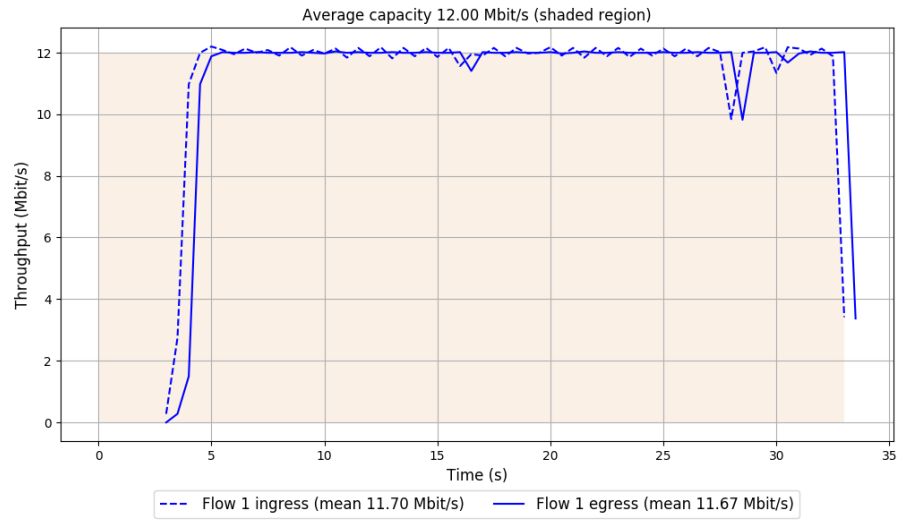
-- Flow 1:

Average throughput: 11.67 Mbit/s

95th percentile per-packet one-way delay: 49.794 ms

Loss rate: 0.37%

Run 3: Report of QUIC Cubic — Data Link



Run 1: Statistics of SCReAM

Start at: 2019-01-17 07:13:52

End at: 2019-01-17 07:14:22

Below is generated by plot.py at 2019-01-17 07:42:26

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.21 Mbit/s (1.8% utilization)

95th percentile per-packet one-way delay: 31.926 ms

Loss rate: 0.13%

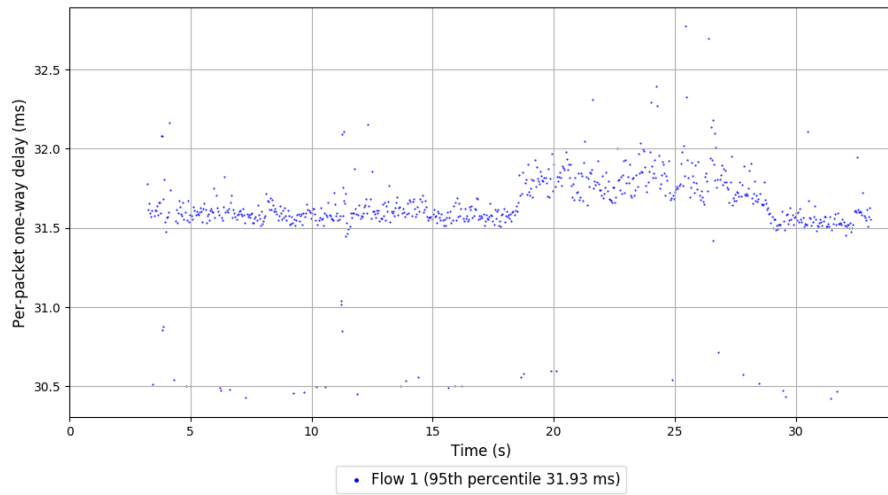
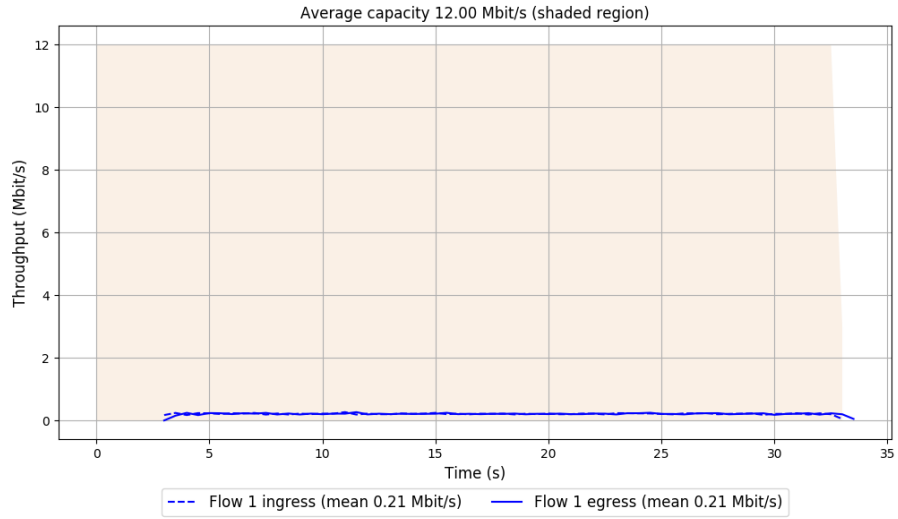
-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 31.926 ms

Loss rate: 0.13%

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2019-01-17 07:26:20

End at: 2019-01-17 07:26:50

Below is generated by plot.py at 2019-01-17 07:42:26

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.21 Mbit/s (1.8% utilization)

95th percentile per-packet one-way delay: 31.680 ms

Loss rate: 0.13%

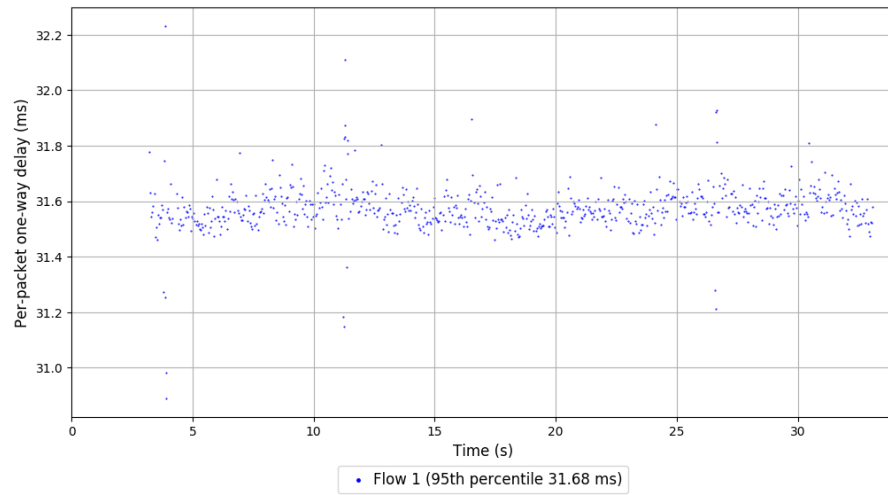
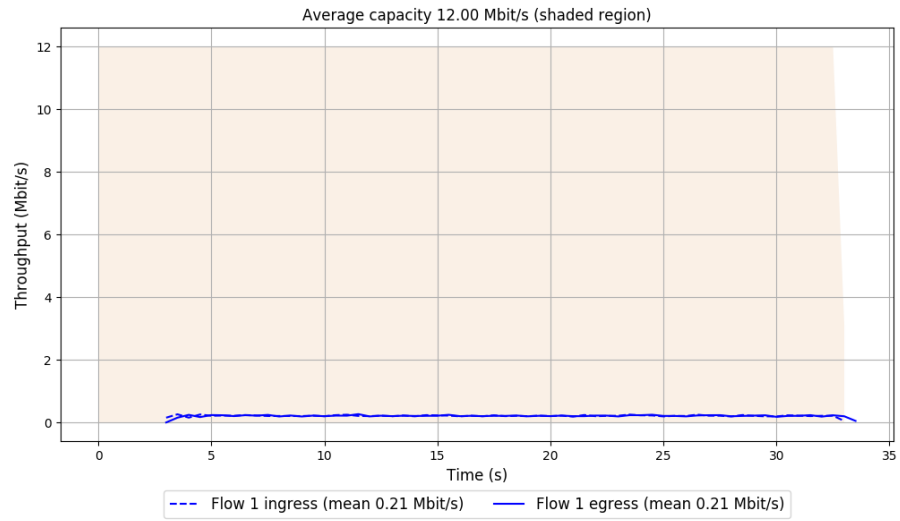
-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 31.680 ms

Loss rate: 0.13%

Run 2: Report of SCReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2019-01-17 07:38:47

End at: 2019-01-17 07:39:17

Below is generated by plot.py at 2019-01-17 07:42:26

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.21 Mbit/s (1.8% utilization)

95th percentile per-packet one-way delay: 31.653 ms

Loss rate: 0.00%

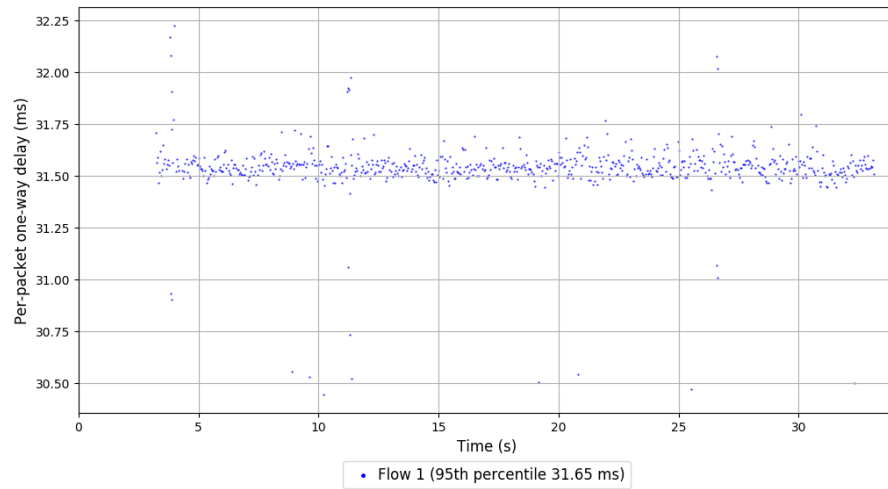
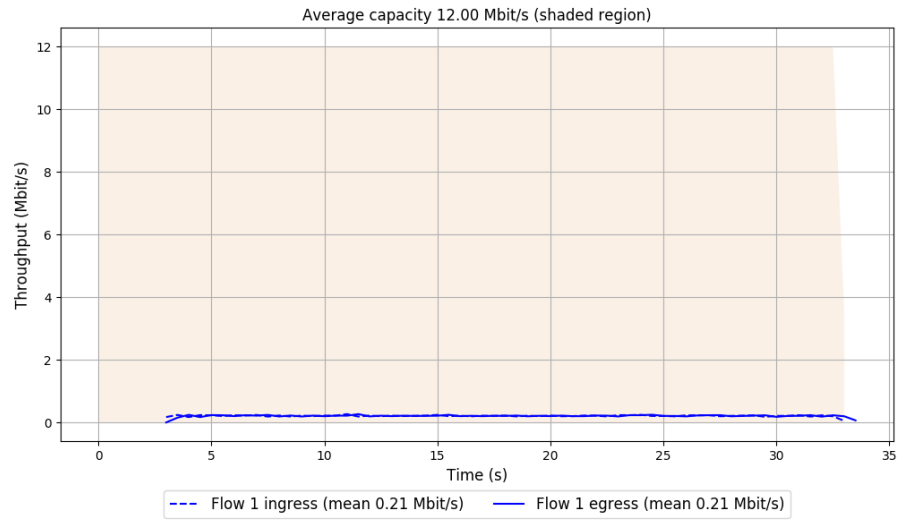
-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 31.653 ms

Loss rate: 0.00%

Run 3: Report of SCReAM — Data Link



Run 1: Statistics of Sprout

Start at: 2019-01-17 07:07:22

End at: 2019-01-17 07:07:52

Below is generated by plot.py at 2019-01-17 07:42:28

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 4.36 Mbit/s (36.3% utilization)

95th percentile per-packet one-way delay: 48.793 ms

Loss rate: 7.54%

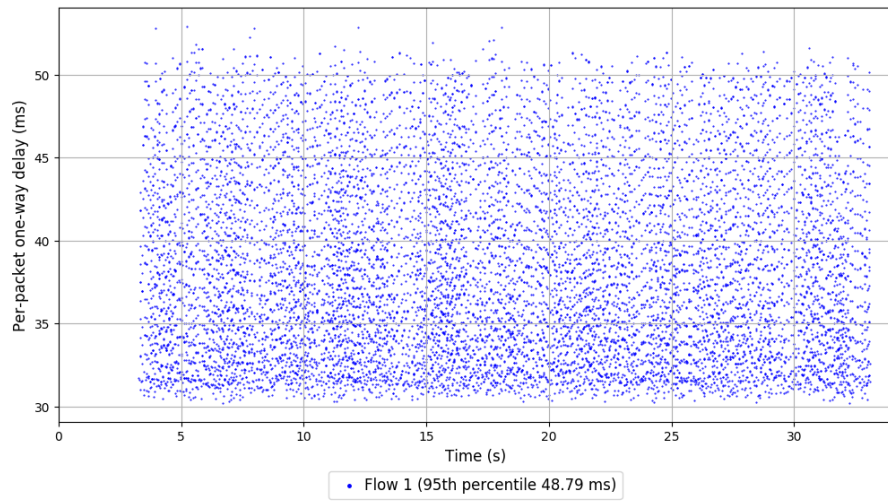
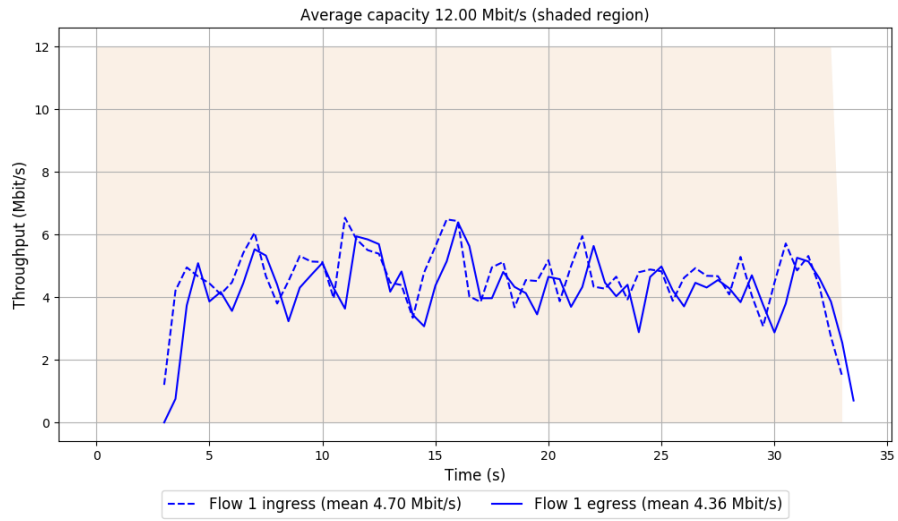
-- Flow 1:

Average throughput: 4.36 Mbit/s

95th percentile per-packet one-way delay: 48.793 ms

Loss rate: 7.54%

Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

Start at: 2019-01-17 07:19:48

End at: 2019-01-17 07:20:18

Below is generated by plot.py at 2019-01-17 07:42:29

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 4.56 Mbit/s (38.0% utilization)

95th percentile per-packet one-way delay: 48.863 ms

Loss rate: 8.19%

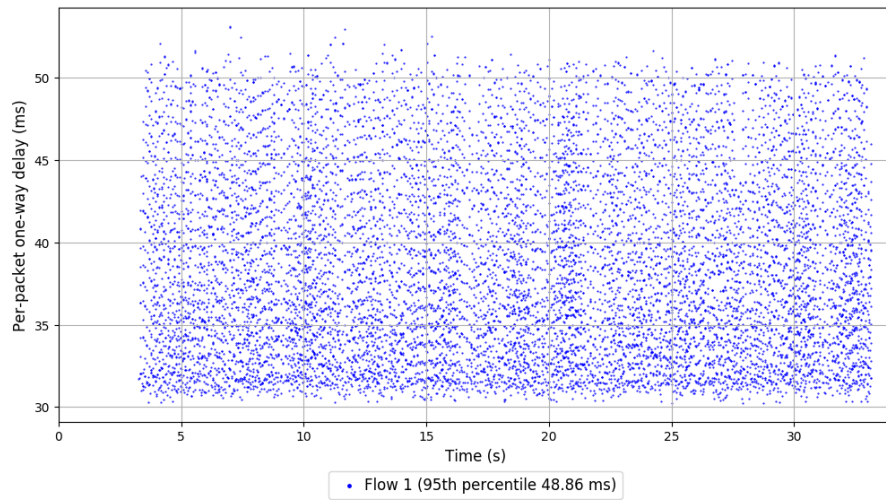
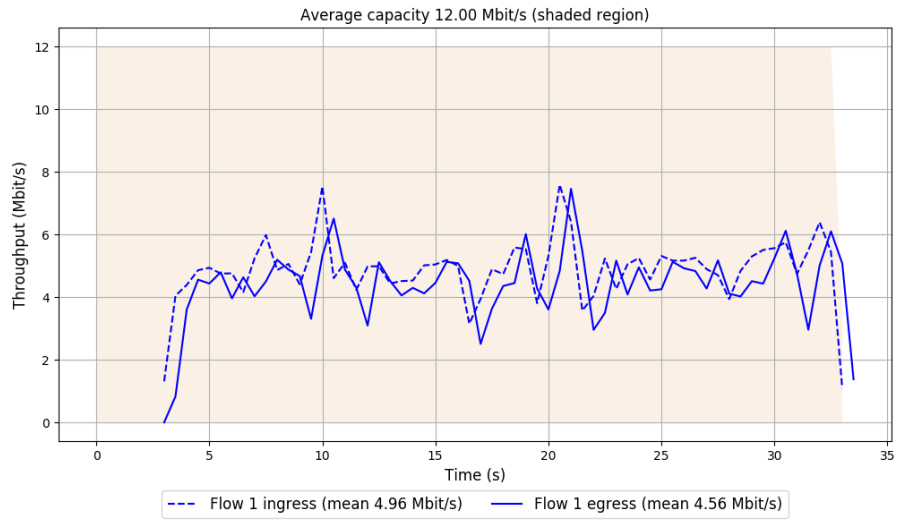
-- Flow 1:

Average throughput: 4.56 Mbit/s

95th percentile per-packet one-way delay: 48.863 ms

Loss rate: 8.19%

Run 2: Report of Sprout — Data Link



Run 3: Statistics of Sprout

Start at: 2019-01-17 07:32:16

End at: 2019-01-17 07:32:46

Below is generated by plot.py at 2019-01-17 07:42:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 4.30 Mbit/s (35.8% utilization)

95th percentile per-packet one-way delay: 48.852 ms

Loss rate: 7.99%

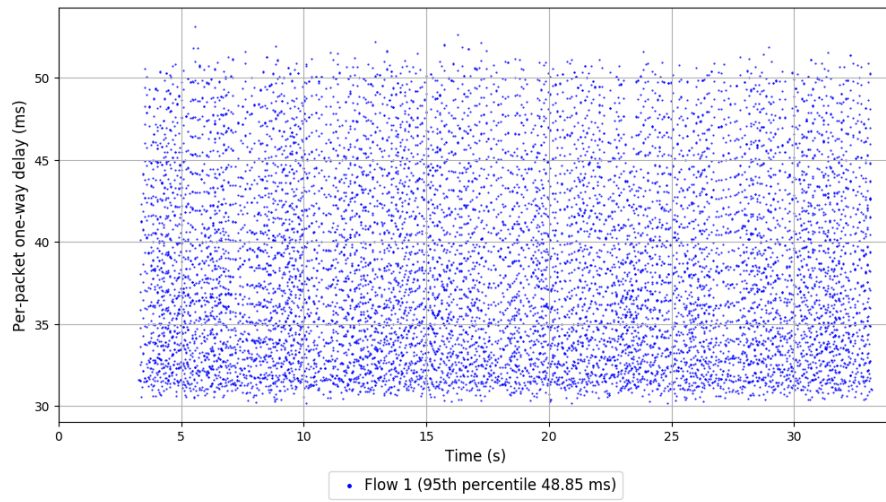
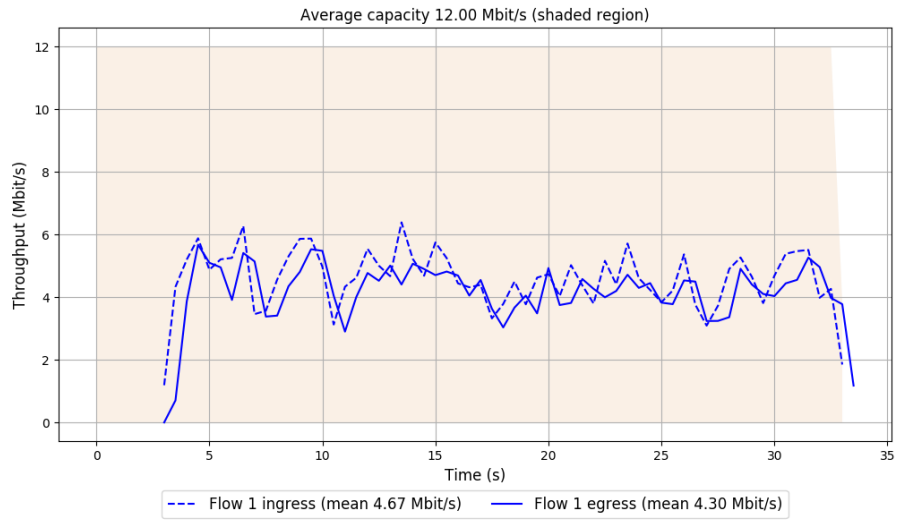
-- Flow 1:

Average throughput: 4.30 Mbit/s

95th percentile per-packet one-way delay: 48.852 ms

Loss rate: 7.99%

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

Start at: 2019-01-17 07:14:27

End at: 2019-01-17 07:14:57

Below is generated by plot.py at 2019-01-17 07:42:51

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.14 Mbit/s (92.8% utilization)

95th percentile per-packet one-way delay: 33.023 ms

Loss rate: 0.86%

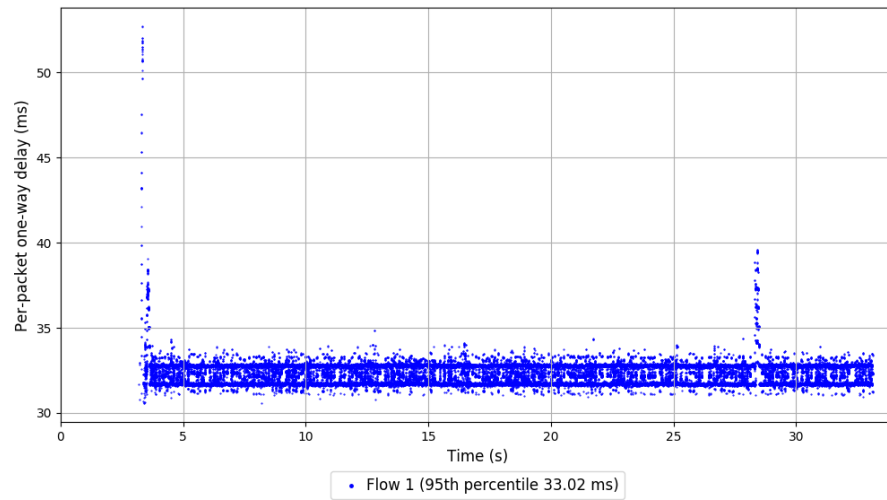
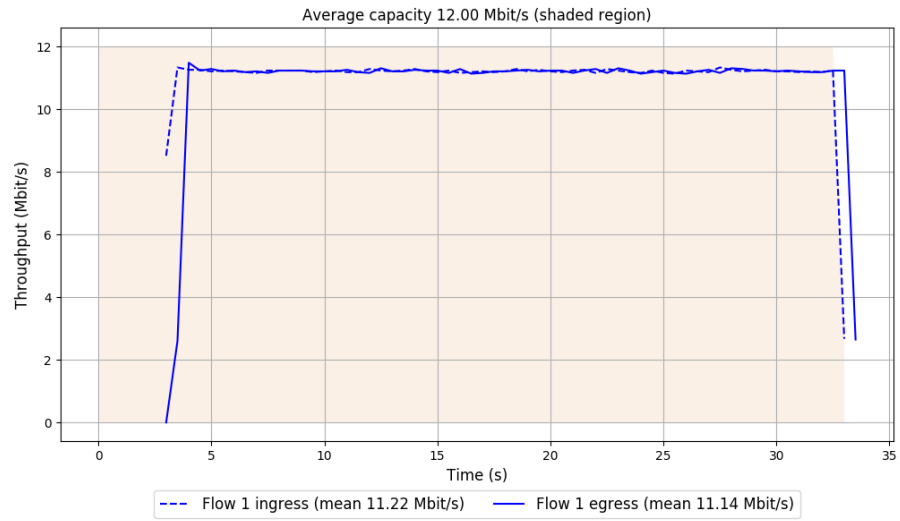
-- Flow 1:

Average throughput: 11.14 Mbit/s

95th percentile per-packet one-way delay: 33.023 ms

Loss rate: 0.86%

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



Run 2: Statistics of TaoVA-100x

Start at: 2019-01-17 07:26:55

End at: 2019-01-17 07:27:25

Below is generated by plot.py at 2019-01-17 07:42:55

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.14 Mbit/s (92.8% utilization)

95th percentile per-packet one-way delay: 32.973 ms

Loss rate: 0.72%

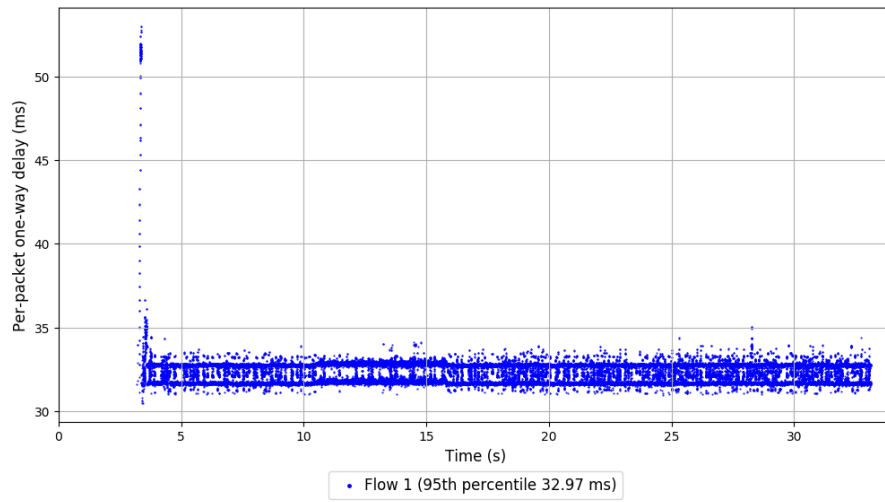
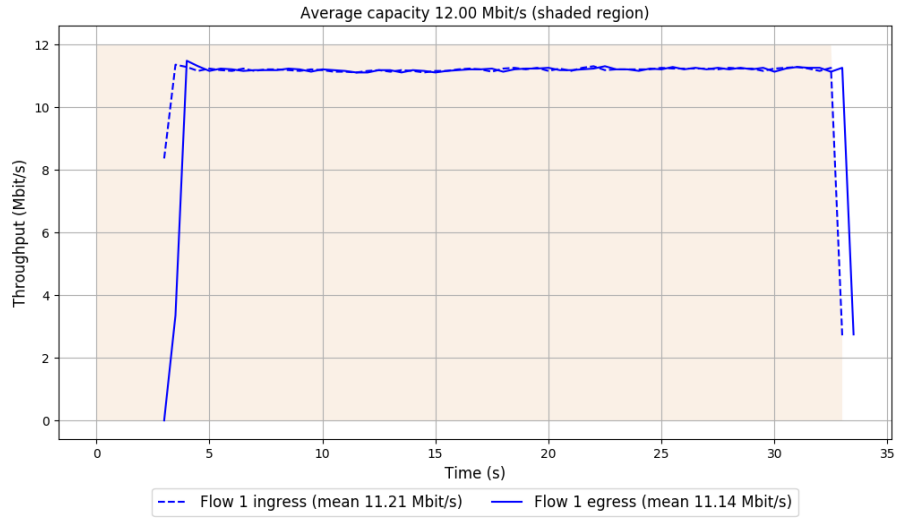
-- Flow 1:

Average throughput: 11.14 Mbit/s

95th percentile per-packet one-way delay: 32.973 ms

Loss rate: 0.72%

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



Run 3: Statistics of TaoVA-100x

Start at: 2019-01-17 07:39:22

End at: 2019-01-17 07:39:52

Below is generated by plot.py at 2019-01-17 07:42:56

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.11 Mbit/s (92.6% utilization)

95th percentile per-packet one-way delay: 32.840 ms

Loss rate: 0.86%

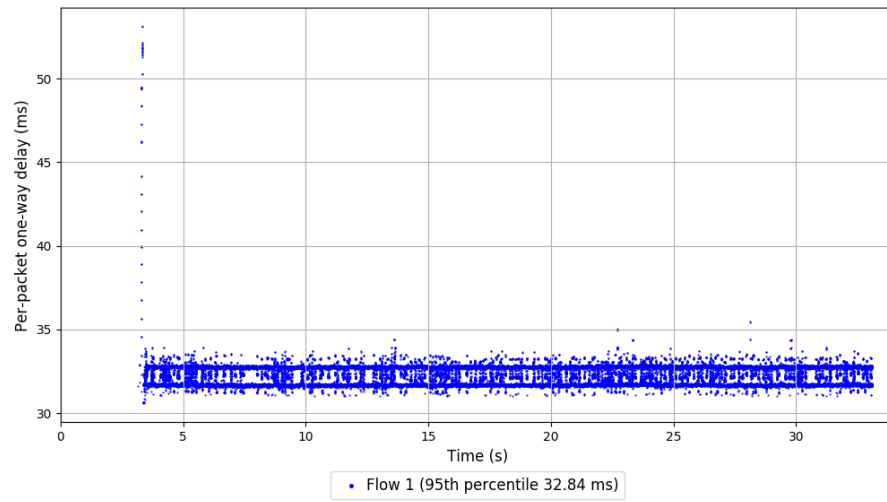
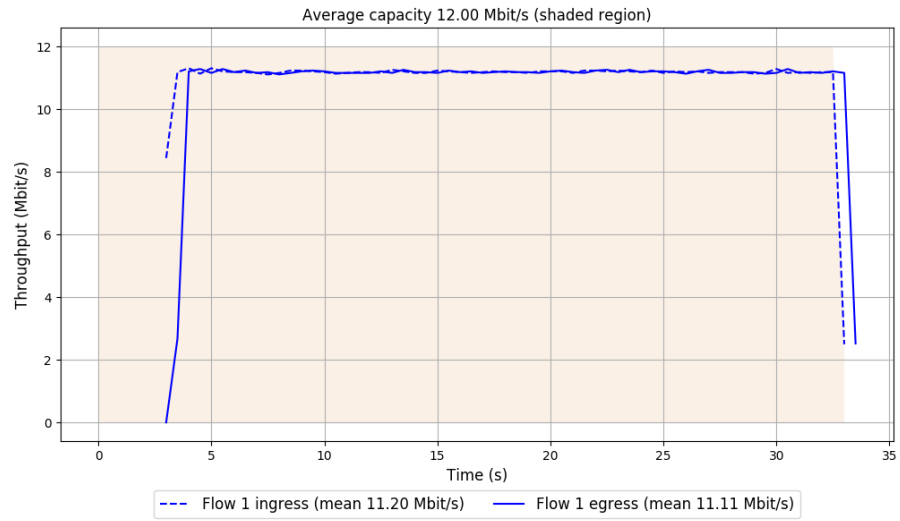
-- Flow 1:

Average throughput: 11.11 Mbit/s

95th percentile per-packet one-way delay: 32.840 ms

Loss rate: 0.86%

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



Run 1: Statistics of TCP Vegas

Start at: 2019-01-17 07:05:35

End at: 2019-01-17 07:06:05

Below is generated by plot.py at 2019-01-17 07:42:56

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.92 Mbit/s (99.3% utilization)

95th percentile per-packet one-way delay: 35.839 ms

Loss rate: 0.30%

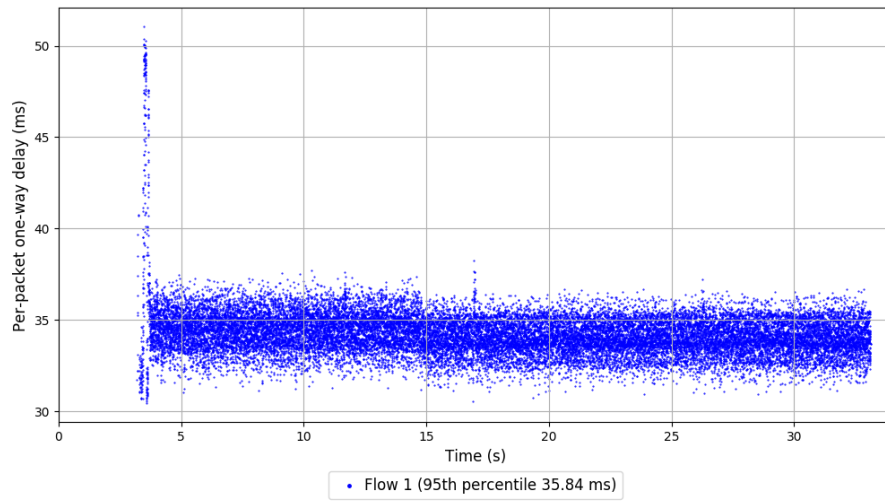
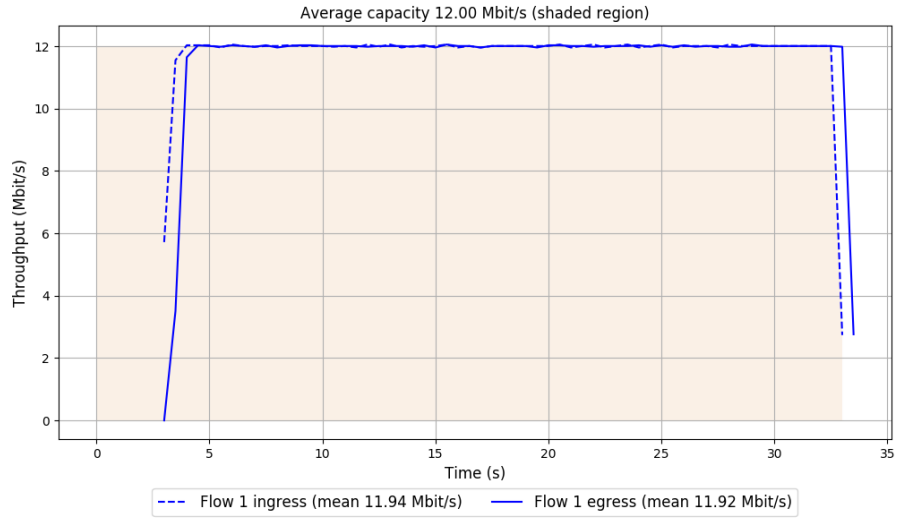
-- Flow 1:

Average throughput: 11.92 Mbit/s

95th percentile per-packet one-way delay: 35.839 ms

Loss rate: 0.30%

Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2019-01-17 07:18:02

End at: 2019-01-17 07:18:32

Below is generated by plot.py at 2019-01-17 07:42:56

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.92 Mbit/s (99.3% utilization)

95th percentile per-packet one-way delay: 37.454 ms

Loss rate: 0.29%

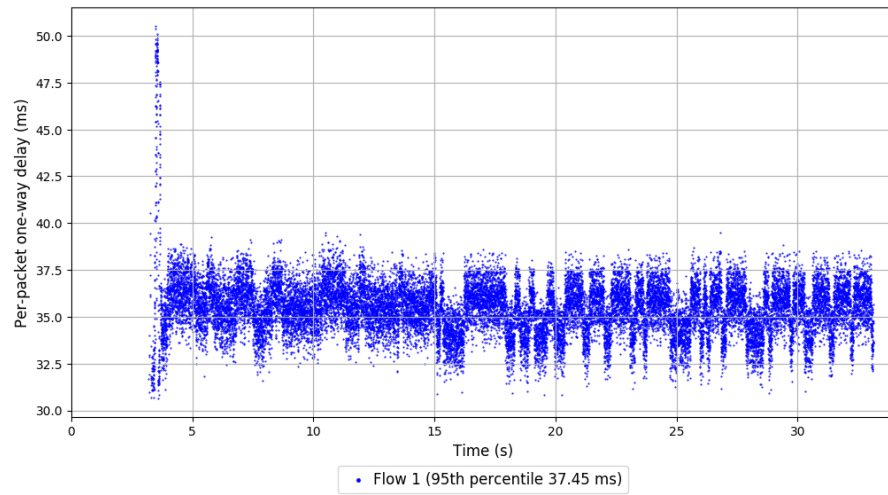
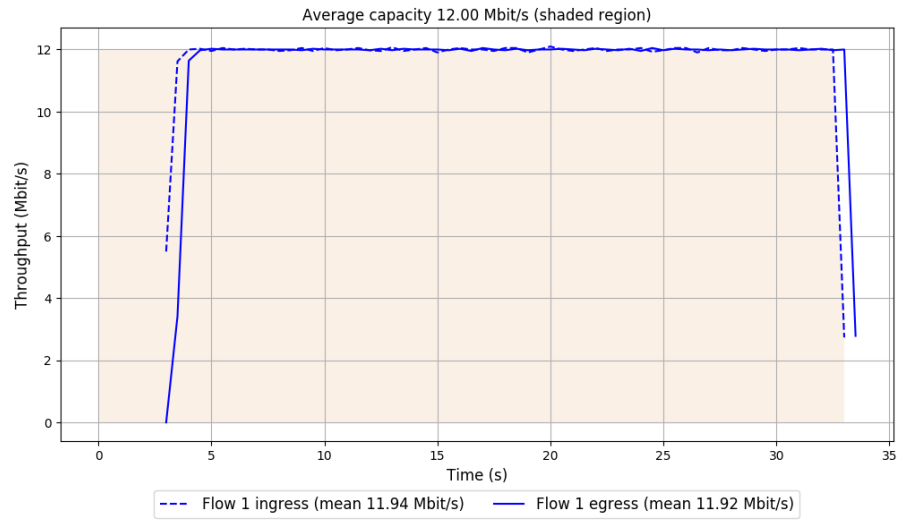
-- Flow 1:

Average throughput: 11.92 Mbit/s

95th percentile per-packet one-way delay: 37.454 ms

Loss rate: 0.29%

Run 2: Report of TCP Vegas — Data Link



Run 3: Statistics of TCP Vegas

Start at: 2019-01-17 07:30:29

End at: 2019-01-17 07:30:59

Below is generated by plot.py at 2019-01-17 07:42:56

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.71 Mbit/s (97.6% utilization)

95th percentile per-packet one-way delay: 36.997 ms

Loss rate: 0.32%

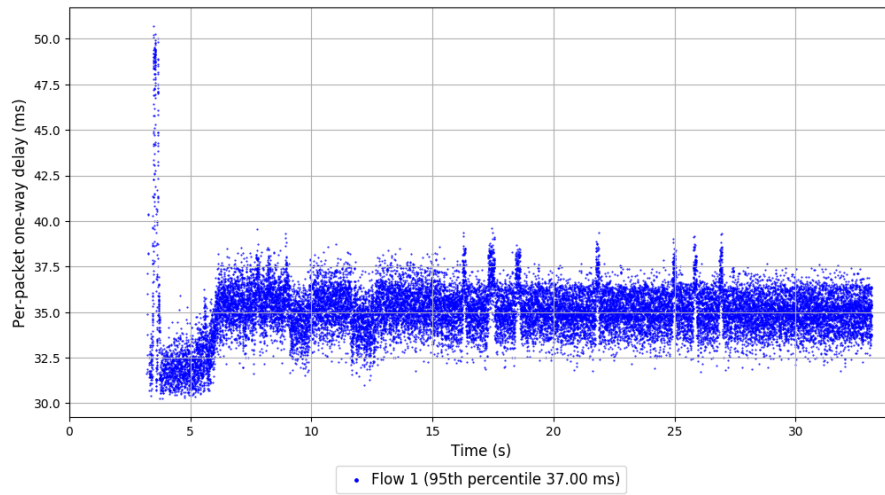
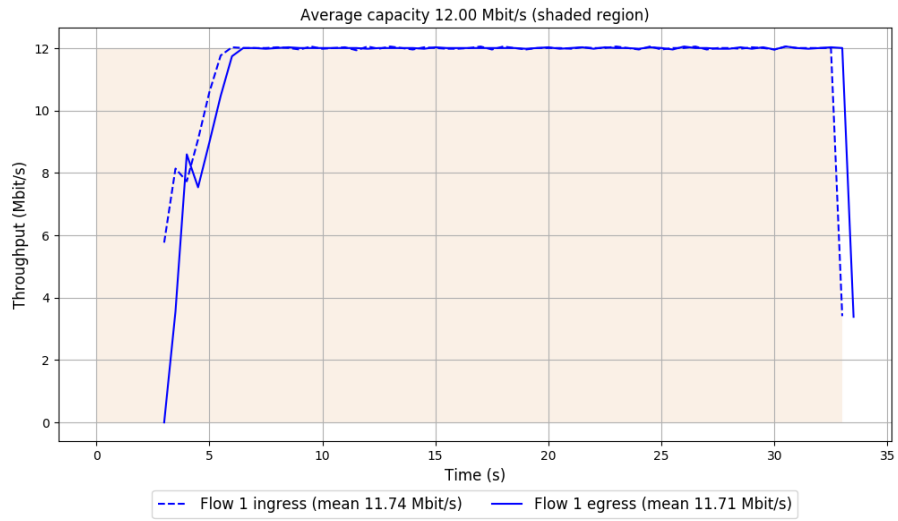
-- Flow 1:

Average throughput: 11.71 Mbit/s

95th percentile per-packet one-way delay: 36.997 ms

Loss rate: 0.32%

Run 3: Report of TCP Vegas — Data Link



Run 1: Statistics of Verus

Start at: 2019-01-17 07:09:08

End at: 2019-01-17 07:09:38

Below is generated by plot.py at 2019-01-17 07:42:56

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 7.01 Mbit/s (58.4% utilization)

95th percentile per-packet one-way delay: 51.491 ms

Loss rate: 80.55%

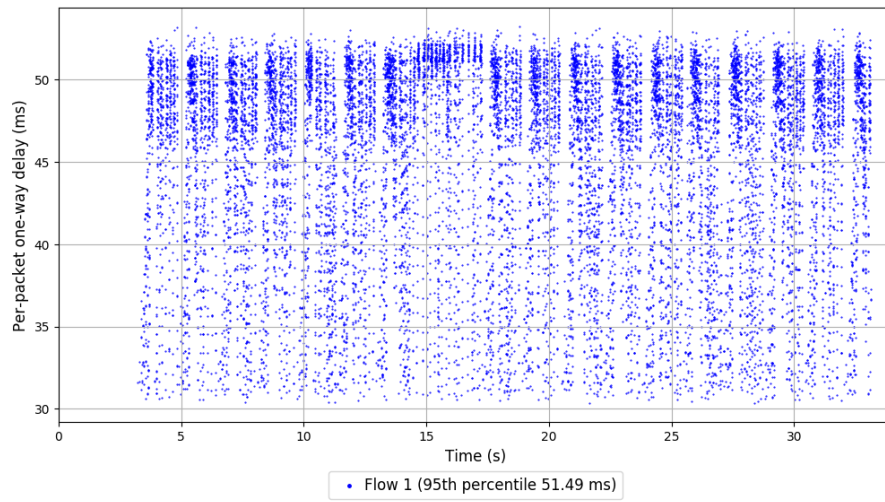
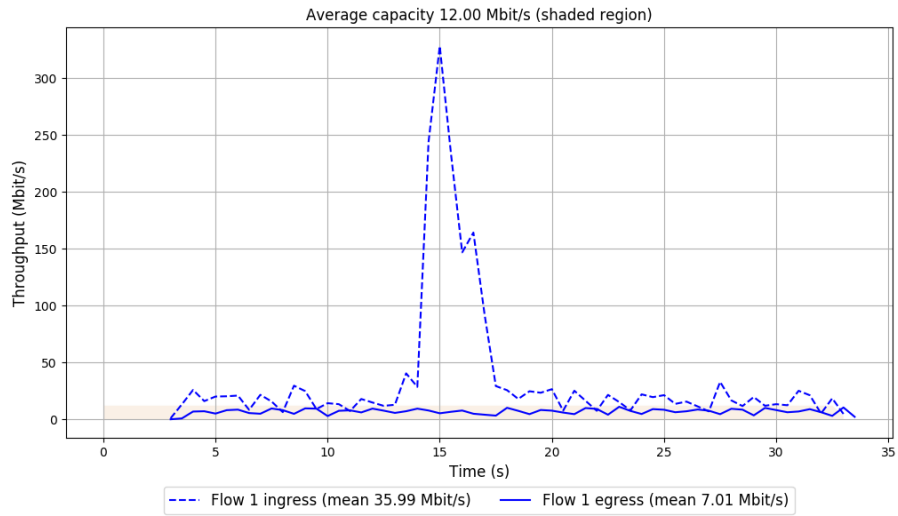
-- Flow 1:

Average throughput: 7.01 Mbit/s

95th percentile per-packet one-way delay: 51.491 ms

Loss rate: 80.55%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2019-01-17 07:21:35

End at: 2019-01-17 07:22:05

Below is generated by plot.py at 2019-01-17 07:43:08

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 6.50 Mbit/s (54.2% utilization)

95th percentile per-packet one-way delay: 51.787 ms

Loss rate: 91.27%

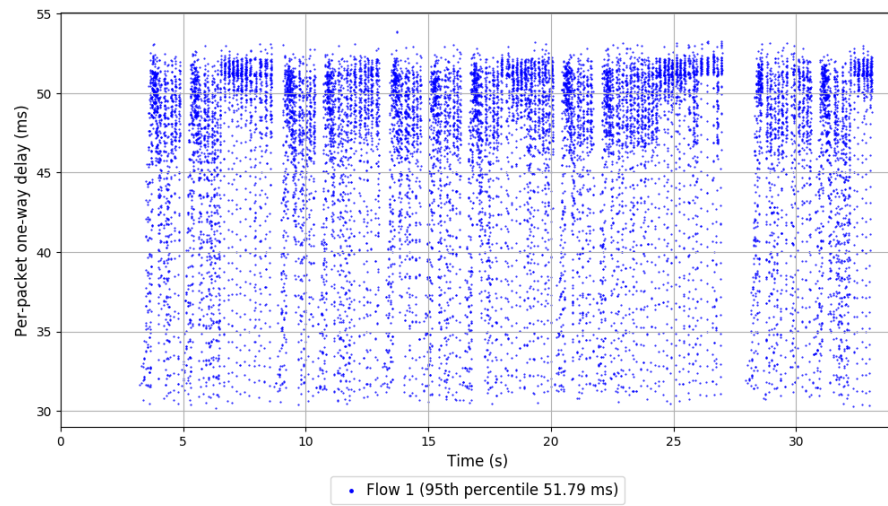
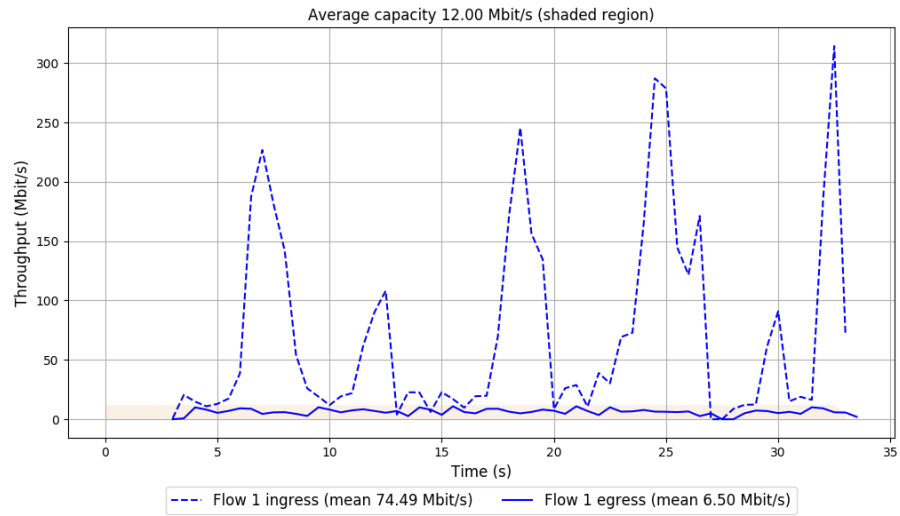
-- Flow 1:

Average throughput: 6.50 Mbit/s

95th percentile per-packet one-way delay: 51.787 ms

Loss rate: 91.27%

Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2019-01-17 07:34:02

End at: 2019-01-17 07:34:32

Below is generated by plot.py at 2019-01-17 07:43:09

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 6.79 Mbit/s (56.6% utilization)

95th percentile per-packet one-way delay: 51.651 ms

Loss rate: 91.25%

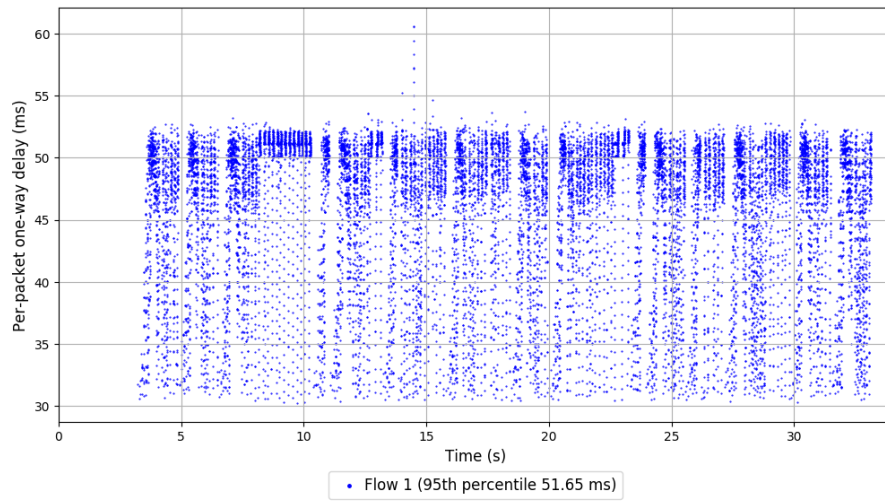
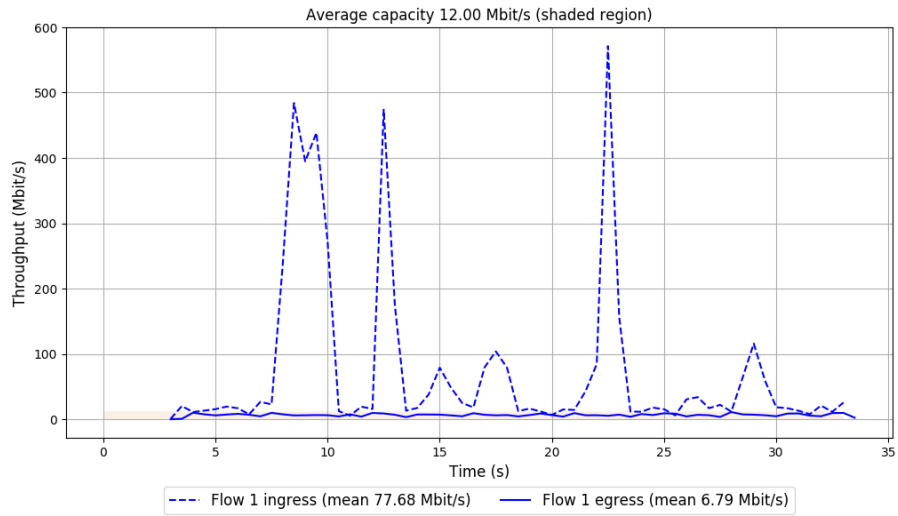
-- Flow 1:

Average throughput: 6.79 Mbit/s

95th percentile per-packet one-way delay: 51.651 ms

Loss rate: 91.25%

Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

Start at: 2019-01-17 07:08:32

End at: 2019-01-17 07:09:02

Below is generated by plot.py at 2019-01-17 07:43:09

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 10.90 Mbit/s (90.8% utilization)

95th percentile per-packet one-way delay: 35.985 ms

Loss rate: 0.18%

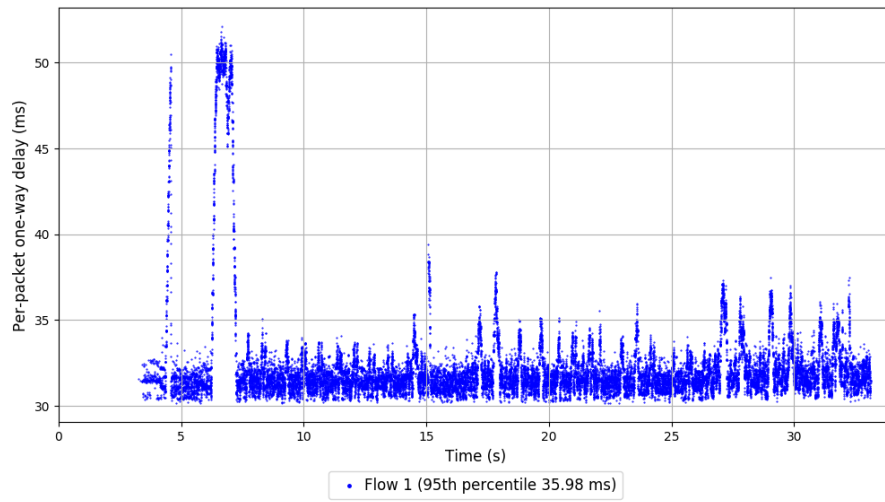
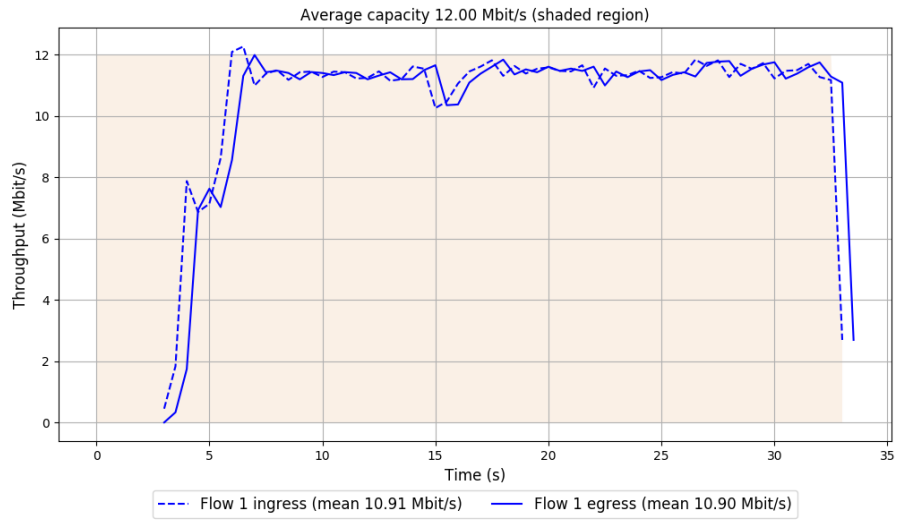
-- Flow 1:

Average throughput: 10.90 Mbit/s

95th percentile per-packet one-way delay: 35.985 ms

Loss rate: 0.18%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2019-01-17 07:20:59

End at: 2019-01-17 07:21:29

Below is generated by plot.py at 2019-01-17 07:43:09

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 10.77 Mbit/s (89.8% utilization)

95th percentile per-packet one-way delay: 47.693 ms

Loss rate: 0.69%

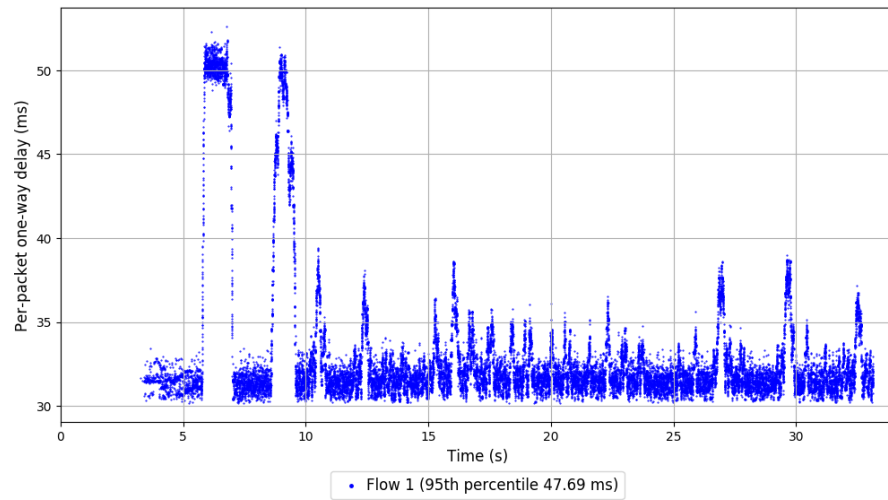
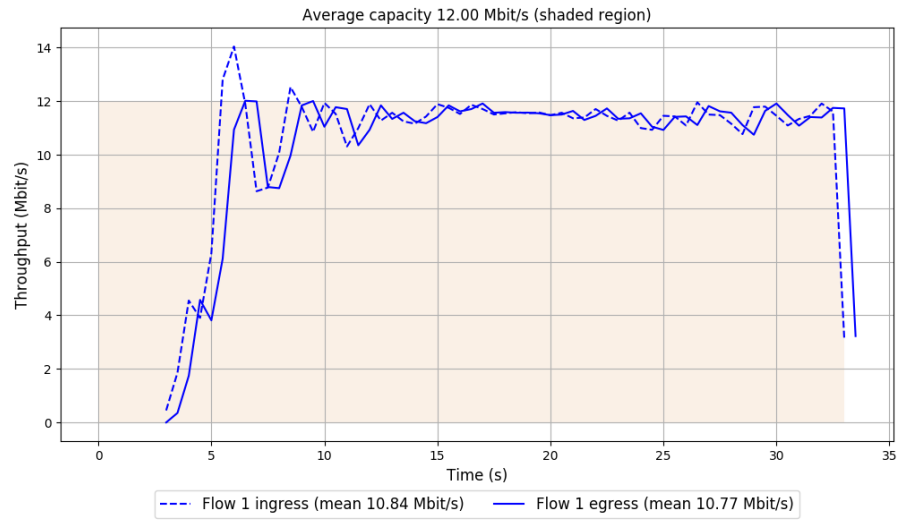
-- Flow 1:

Average throughput: 10.77 Mbit/s

95th percentile per-packet one-way delay: 47.693 ms

Loss rate: 0.69%

Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

Start at: 2019-01-17 07:33:26

End at: 2019-01-17 07:33:56

Below is generated by plot.py at 2019-01-17 07:43:09

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 10.96 Mbit/s (91.4% utilization)

95th percentile per-packet one-way delay: 35.580 ms

Loss rate: 0.19%

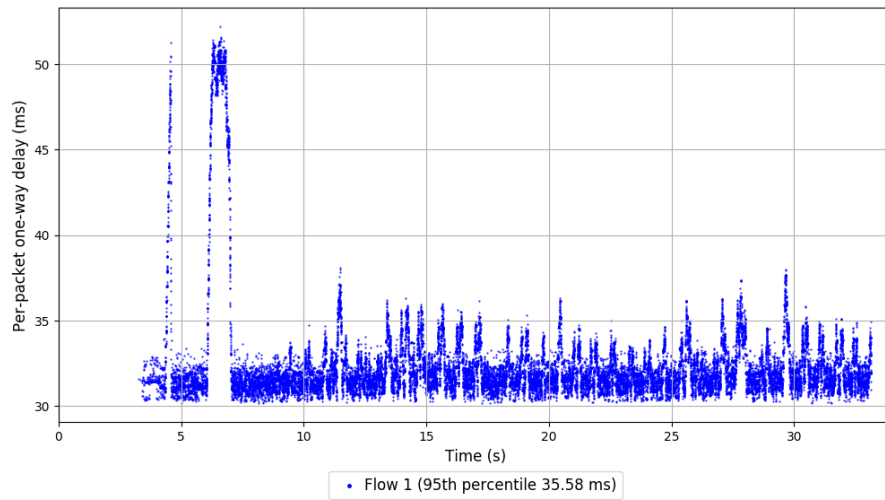
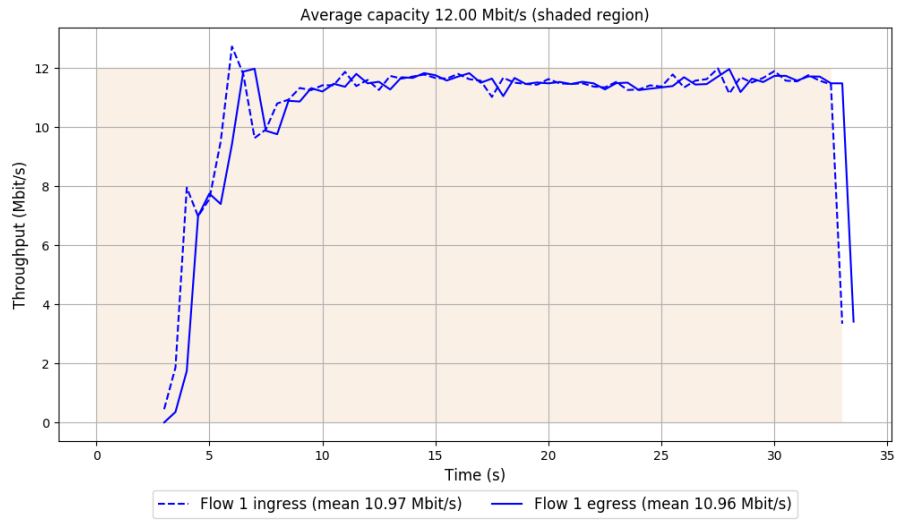
-- Flow 1:

Average throughput: 10.96 Mbit/s

95th percentile per-packet one-way delay: 35.580 ms

Loss rate: 0.19%

Run 3: Report of PCC-Vivace — Data Link



Run 1: Statistics of WebRTC media

Start at: 2019-01-17 07:13:17

End at: 2019-01-17 07:13:47

Below is generated by plot.py at 2019-01-17 07:43:09

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.05 Mbit/s (0.4% utilization)

95th percentile per-packet one-way delay: 40.782 ms

Loss rate: 0.00%

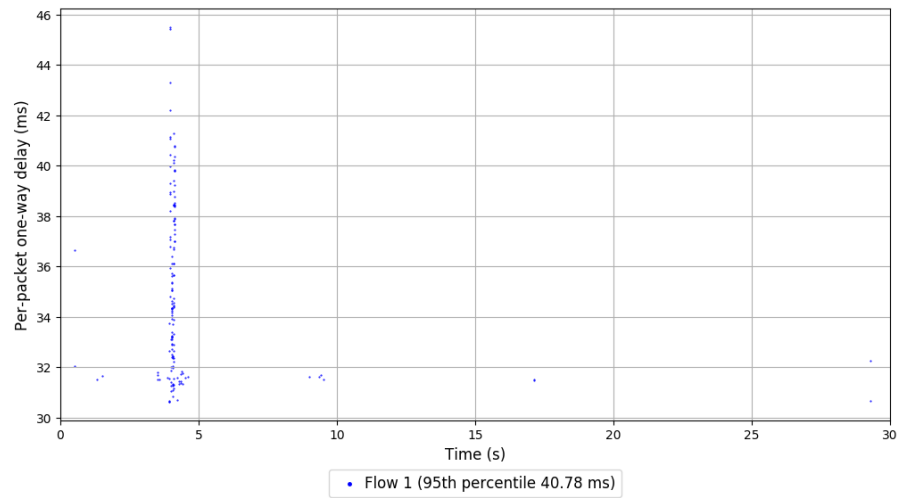
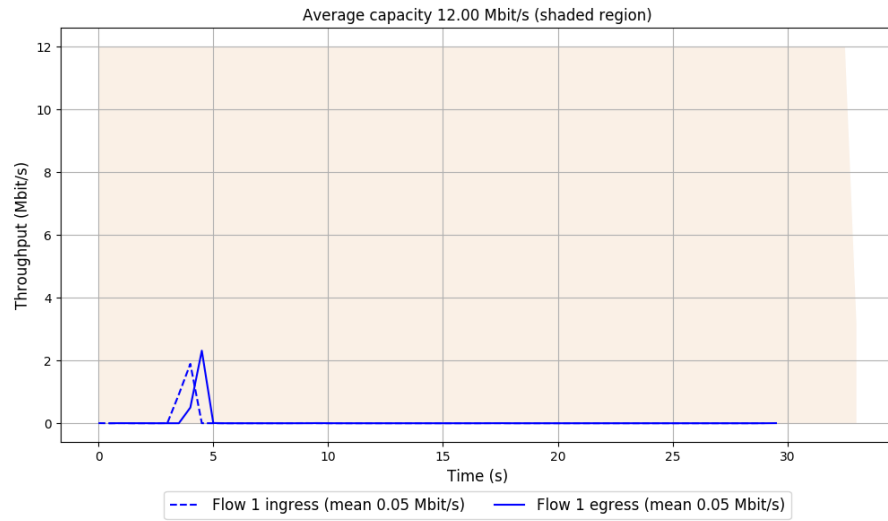
-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 40.782 ms

Loss rate: 0.00%

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2019-01-17 07:25:45

End at: 2019-01-17 07:26:15

Below is generated by plot.py at 2019-01-17 07:43:09

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.05 Mbit/s (0.4% utilization)

95th percentile per-packet one-way delay: 40.765 ms

Loss rate: 0.00%

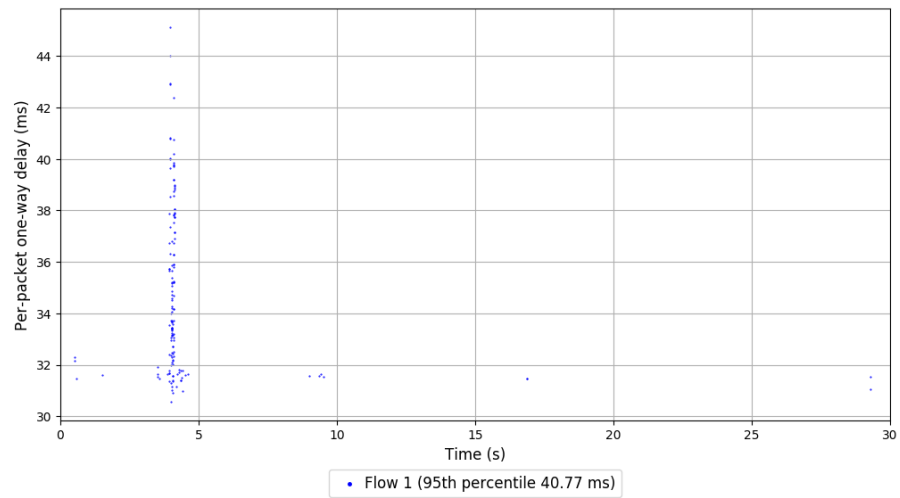
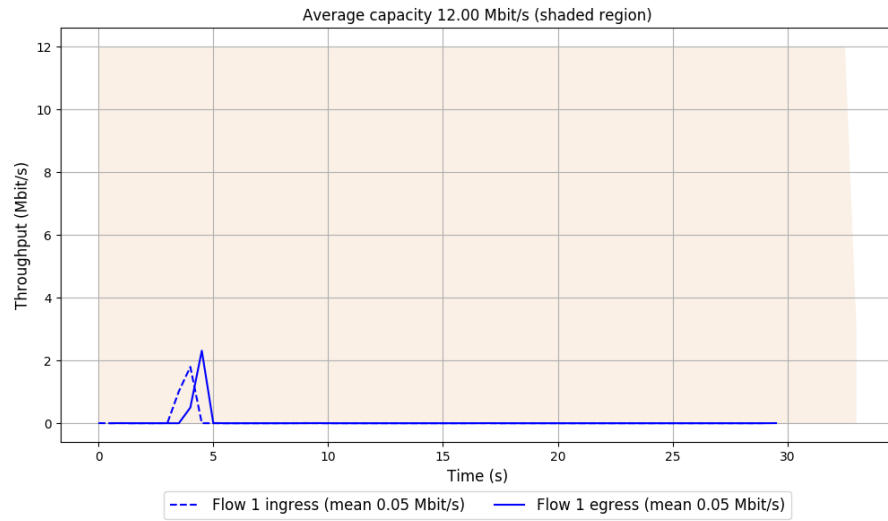
-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 40.765 ms

Loss rate: 0.00%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2019-01-17 07:38:12

End at: 2019-01-17 07:38:42

Below is generated by plot.py at 2019-01-17 07:43:09

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.05 Mbit/s (0.4% utilization)

95th percentile per-packet one-way delay: 41.547 ms

Loss rate: 0.00%

-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 41.547 ms

Loss rate: 0.00%

Run 3: Report of WebRTC media — Data Link

