

Pantheon Report

Generated at 2019-07-11 20:21:31 (UTC).

Tested in mahimahi: mm-delay 50 mm-link 12mbps.trace 12mbps.trace
--uplink-queue=droptail --uplink-queue-args=packets=1 --downlink-queue=droptail
--downlink-queue-args=packets=1

Repeated the test of 24 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

System info:

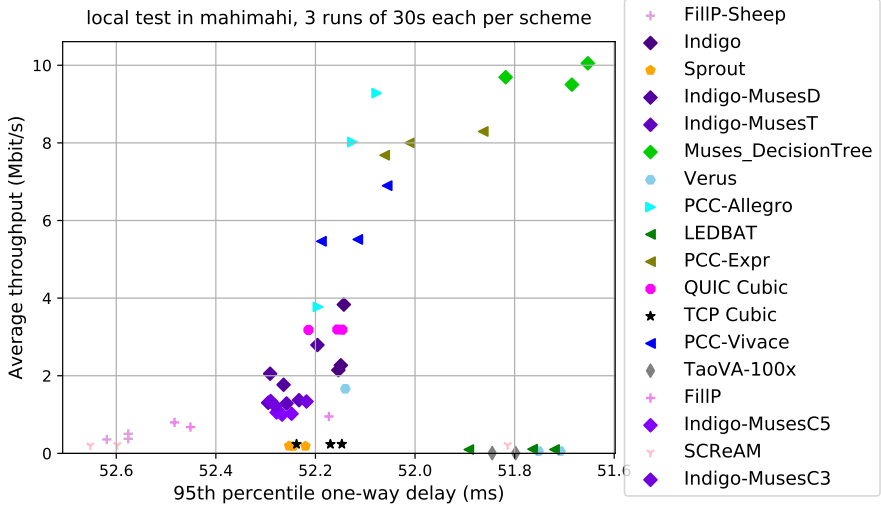
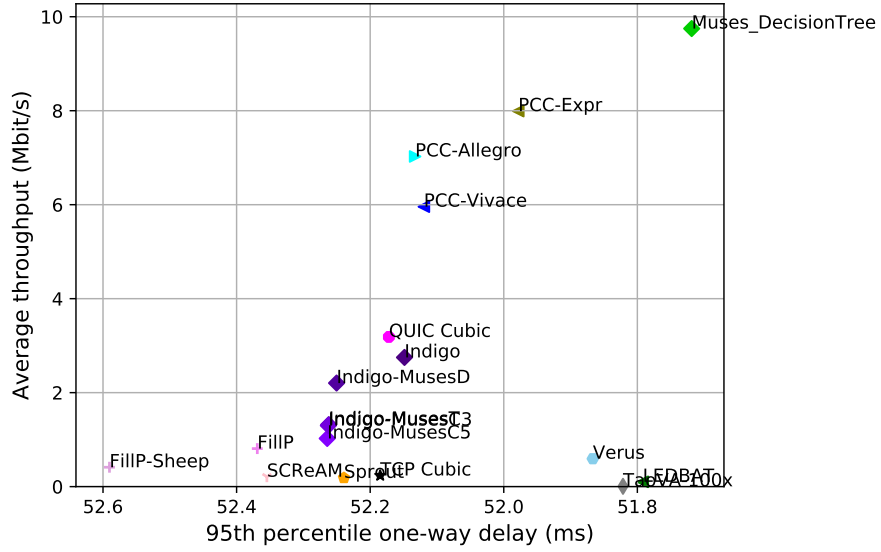
```
Linux 4.15.0-1034-gcp
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
```

Git summary:

```
branch: muses @ 2076e1149a241f3edb4365d686df32342bf9561f
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
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)	mean 95th-%ile delay (ms)	mean loss rate (%)
		flow 1	flow 1	flow 1
TCP BBR	0	N/A	N/A	N/A
Copa	0	N/A	N/A	N/A
TCP Cubic	3	0.24	52.19	13.18
FillP	3	0.81	52.37	49.24
FillP-Sheep	3	0.41	52.59	35.93
Indigo	3	2.75	52.15	97.45
Indigo-MusesC3	3	1.30	52.26	30.60
Indigo-MusesC5	3	1.03	52.26	37.22
Indigo-MusesD	3	2.20	52.25	46.70
Indigo-MusesT	3	1.32	52.26	25.94
LEDBAT	3	0.10	51.79	48.33
Muses_DecisionTree	3	9.75	51.72	98.46
Muses_DecisionTreeH0	0	N/A	N/A	N/A
Muses_DecisionTreeR0	0	N/A	N/A	N/A
PCC-Allegro	3	7.02	52.13	2.94
PCC-Expr	3	7.99	51.98	36.31
QUIC Cubic	3	3.19	52.17	1.54
SCReAM	3	0.21	52.35	0.23
Sprout	3	0.19	52.24	7.36
TaoVA-100x	2	0.01	51.82	51.91
TCP Vegas	0	N/A	N/A	N/A
Verus	3	0.59	51.87	62.19
PCC-Vivace	3	5.96	52.12	0.54
WebRTC media	0	N/A	N/A	N/A

Run 1: Statistics of TCP BBR

Start at: 2019-07-11 19:39:52

End at: 2019-07-11 19:40:22

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 19:54:10

End at: 2019-07-11 19:54:40

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 20:08:27

End at: 2019-07-11 20:08:57

Run 3: Report of TCP BBR — Data Link

Figure is missing

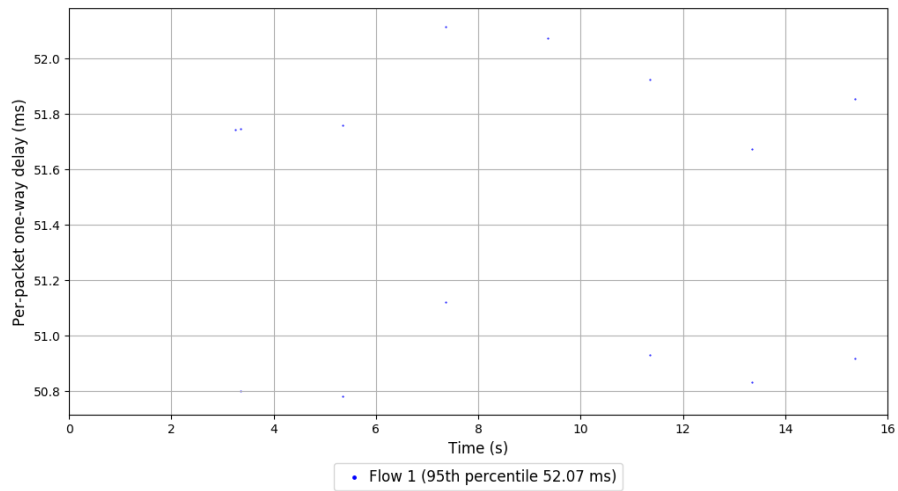
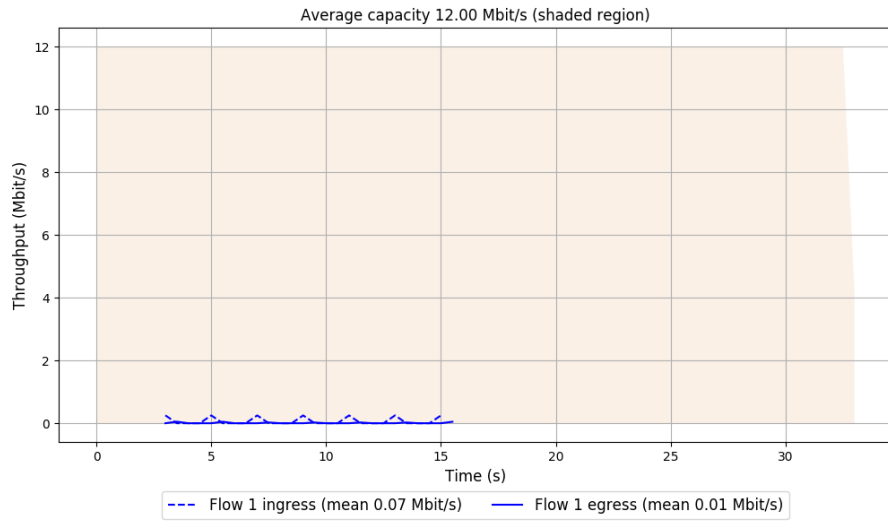
Figure is missing

Run 1: Statistics of Copa

Start at: 2019-07-11 19:45:45

End at: 2019-07-11 19:46:15

Run 1: Report of Copa — Data Link

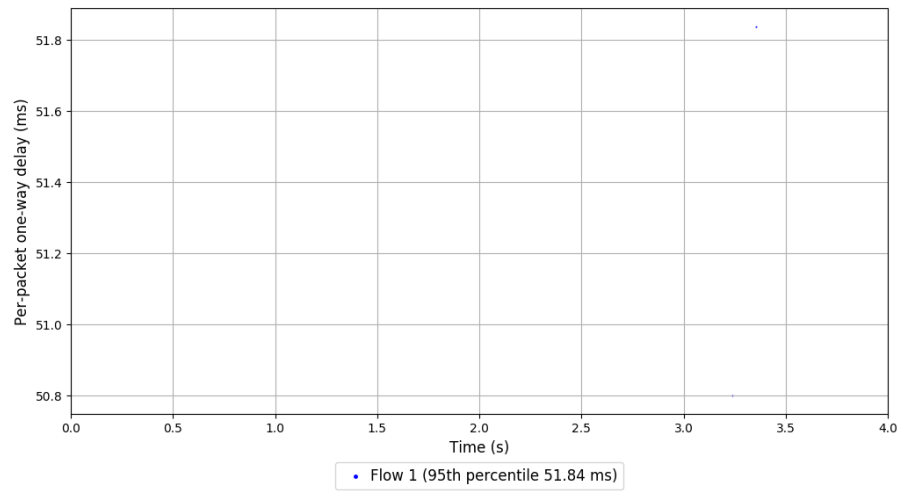
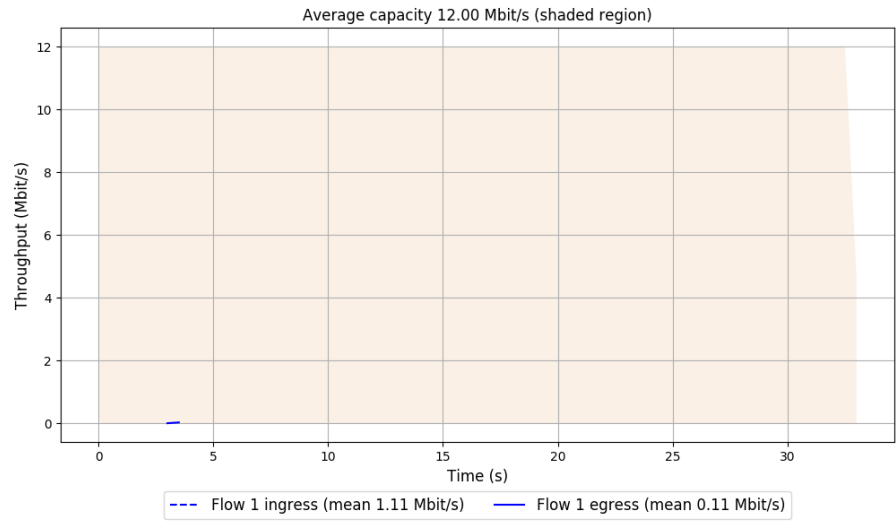


Run 2: Statistics of Copa

Start at: 2019-07-11 20:00:04

End at: 2019-07-11 20:00:34

Run 2: Report of Copa — Data Link

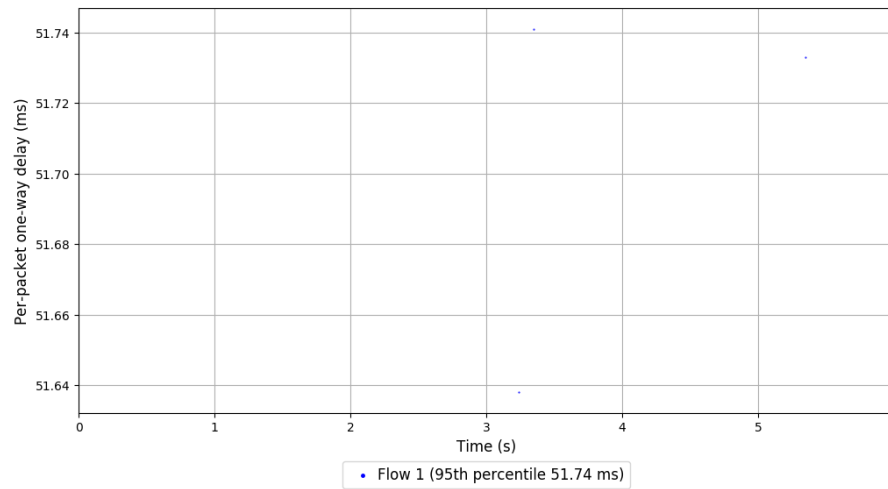
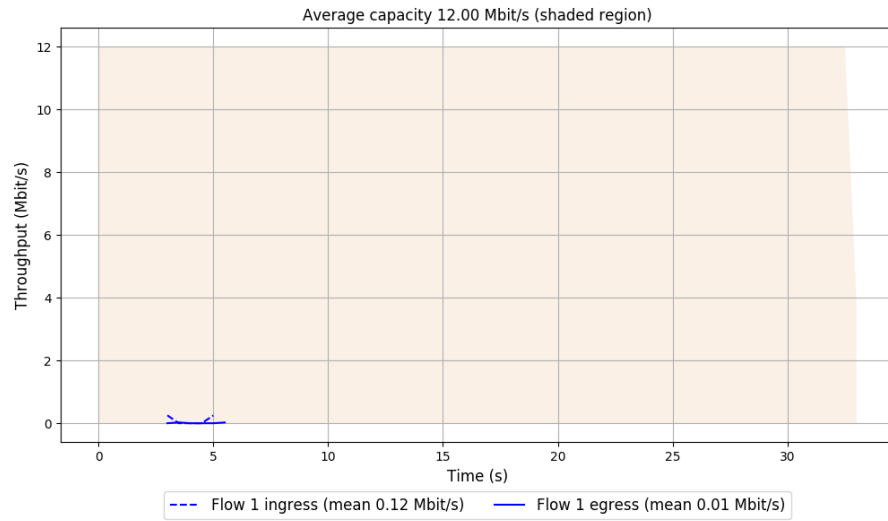


Run 3: Statistics of Copa

Start at: 2019-07-11 20:14:21

End at: 2019-07-11 20:14:51

Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2019-07-11 19:37:32

End at: 2019-07-11 19:38:02

Below is generated by plot.py at 2019-07-11 20:18:58

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.24 Mbit/s (2.0% utilization)

95th percentile per-packet one-way delay: 52.238 ms

Loss rate: 13.40%

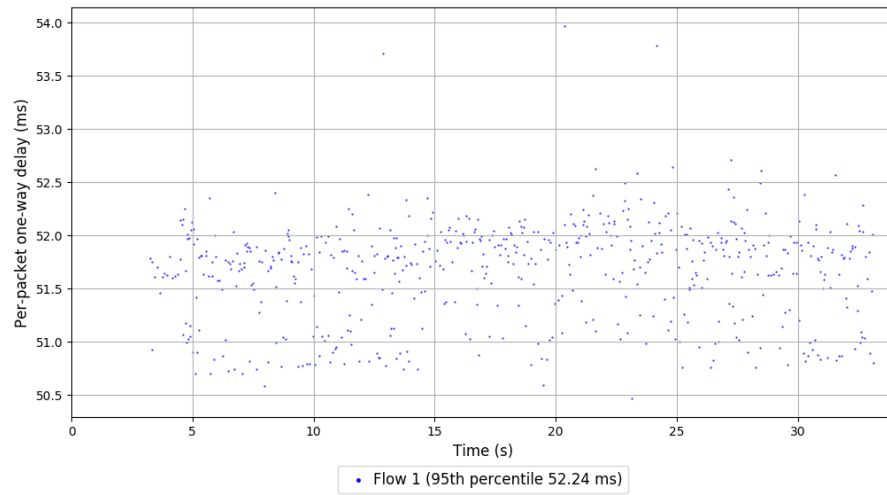
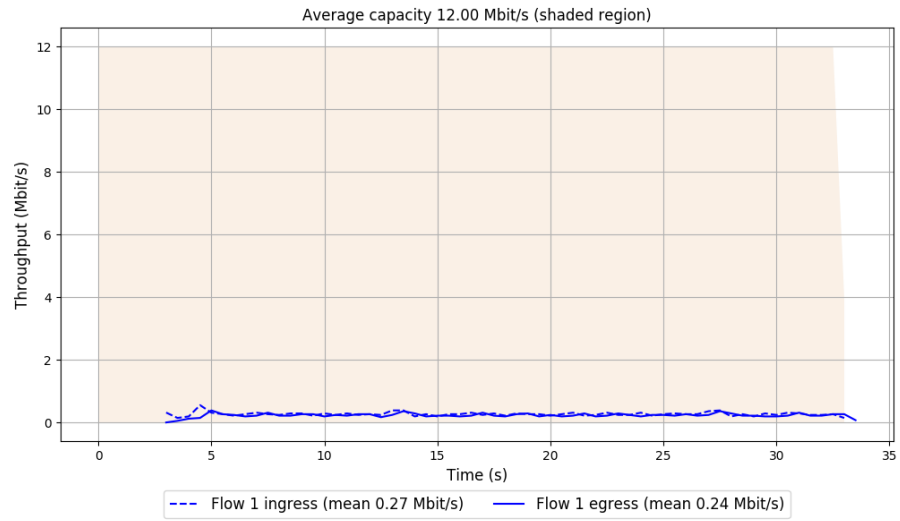
-- Flow 1:

Average throughput: 0.24 Mbit/s

95th percentile per-packet one-way delay: 52.238 ms

Loss rate: 13.40%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2019-07-11 19:51:48

End at: 2019-07-11 19:52:18

Below is generated by plot.py at 2019-07-11 20:18:59

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.24 Mbit/s (2.0% utilization)

95th percentile per-packet one-way delay: 52.147 ms

Loss rate: 13.03%

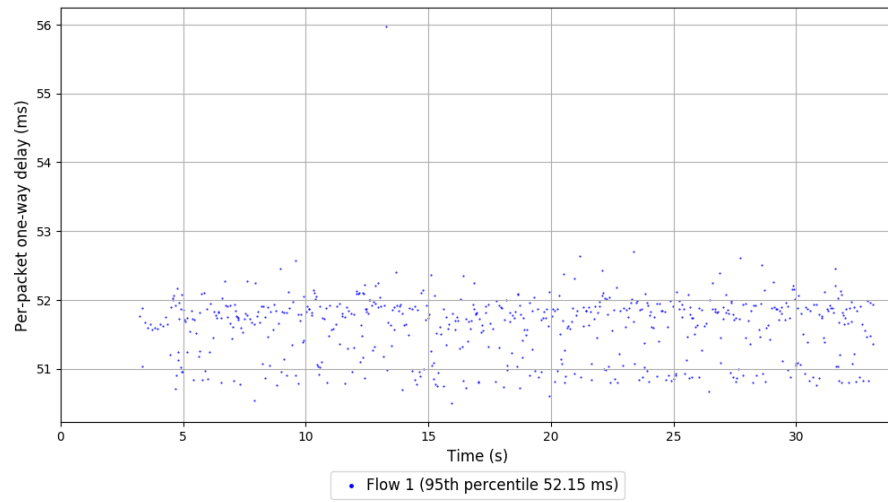
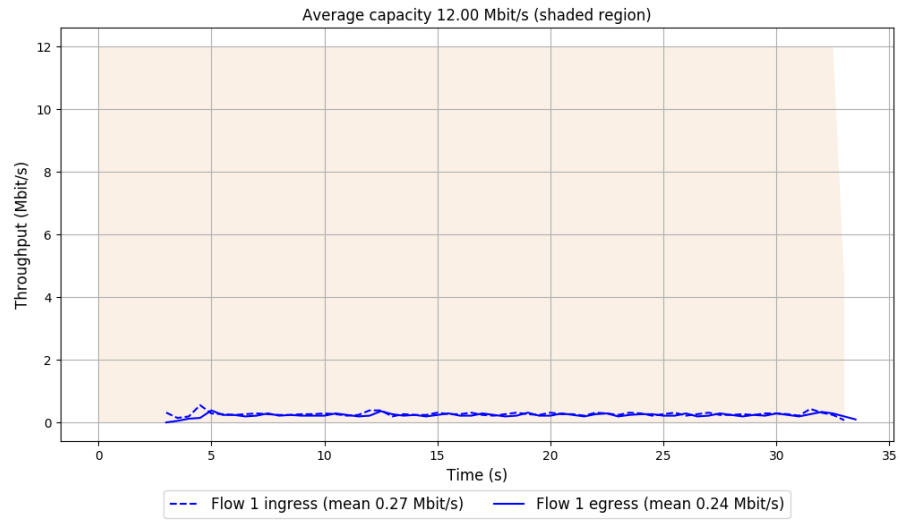
-- Flow 1:

Average throughput: 0.24 Mbit/s

95th percentile per-packet one-way delay: 52.147 ms

Loss rate: 13.03%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2019-07-11 20:06:06

End at: 2019-07-11 20:06:36

Below is generated by plot.py at 2019-07-11 20:18:59

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.24 Mbit/s (2.0% utilization)

95th percentile per-packet one-way delay: 52.170 ms

Loss rate: 13.12%

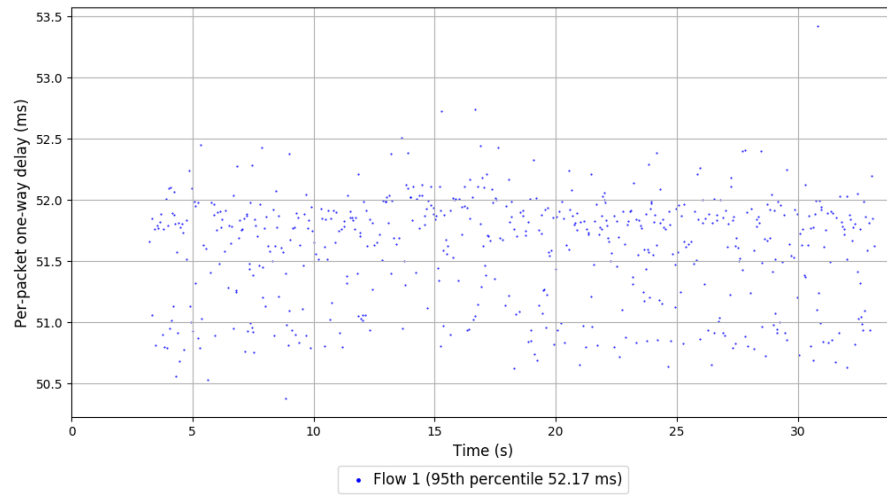
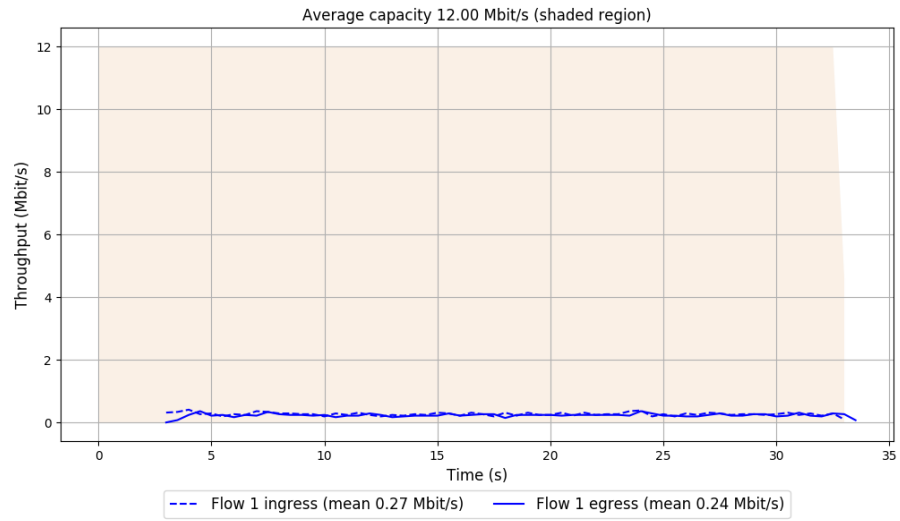
-- Flow 1:

Average throughput: 0.24 Mbit/s

95th percentile per-packet one-way delay: 52.170 ms

Loss rate: 13.12%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of FillP

Start at: 2019-07-11 19:46:56

End at: 2019-07-11 19:47:26

Below is generated by plot.py at 2019-07-11 20:19:00

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.68 Mbit/s (5.6% utilization)

95th percentile per-packet one-way delay: 52.451 ms

Loss rate: 51.74%

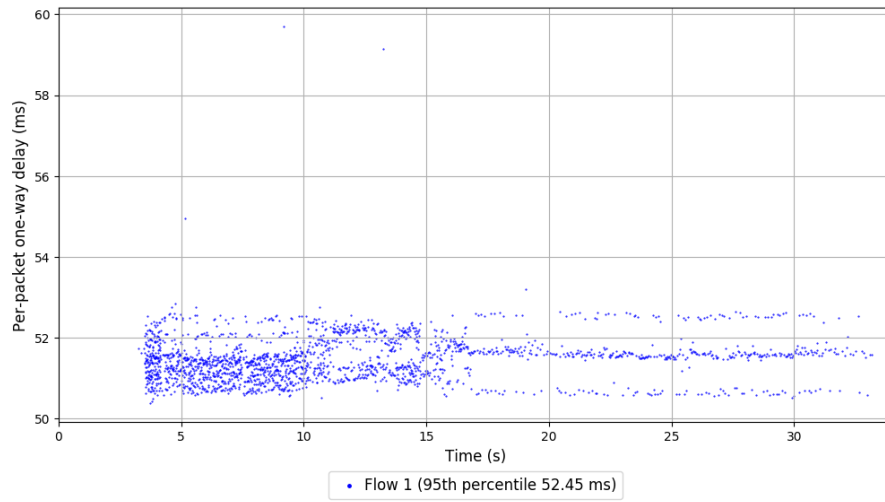
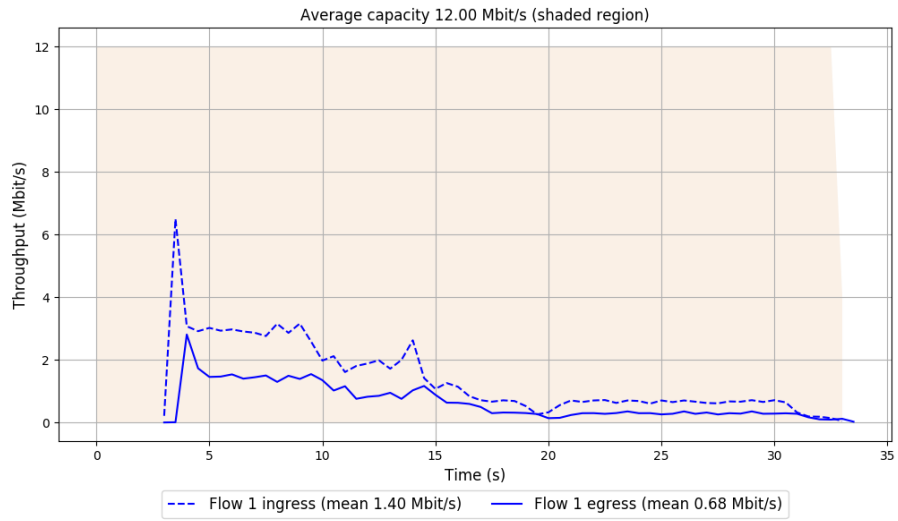
-- Flow 1:

Average throughput: 0.68 Mbit/s

95th percentile per-packet one-way delay: 52.451 ms

Loss rate: 51.74%

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2019-07-11 20:01:14

End at: 2019-07-11 20:01:44

Below is generated by plot.py at 2019-07-11 20:19:00

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.80 Mbit/s (6.7% utilization)

95th percentile per-packet one-way delay: 52.483 ms

Loss rate: 49.66%

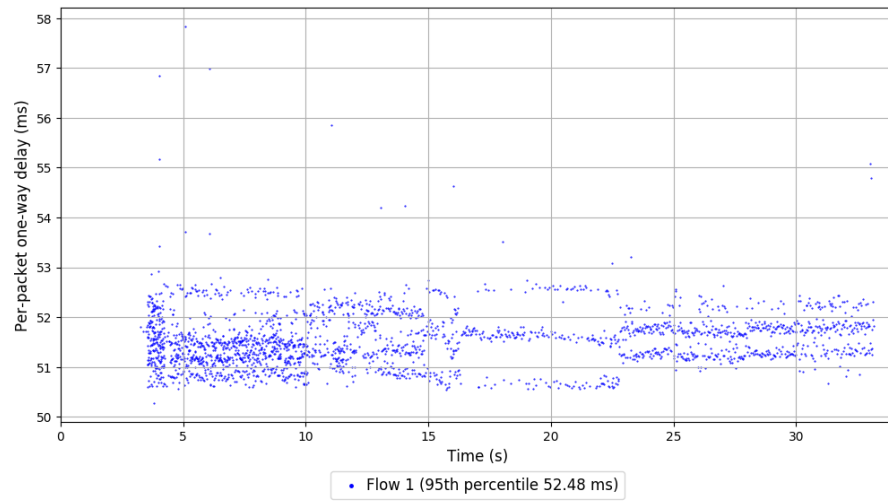
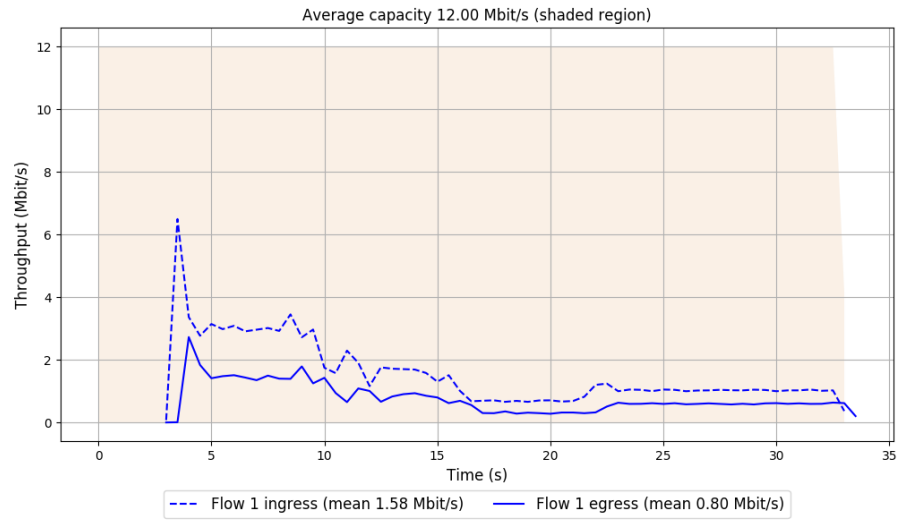
-- Flow 1:

Average throughput: 0.80 Mbit/s

95th percentile per-packet one-way delay: 52.483 ms

Loss rate: 49.66%

Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

Start at: 2019-07-11 20:15:32

End at: 2019-07-11 20:16:02

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

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.95 Mbit/s (7.9% utilization)

95th percentile per-packet one-way delay: 52.173 ms

Loss rate: 46.32%

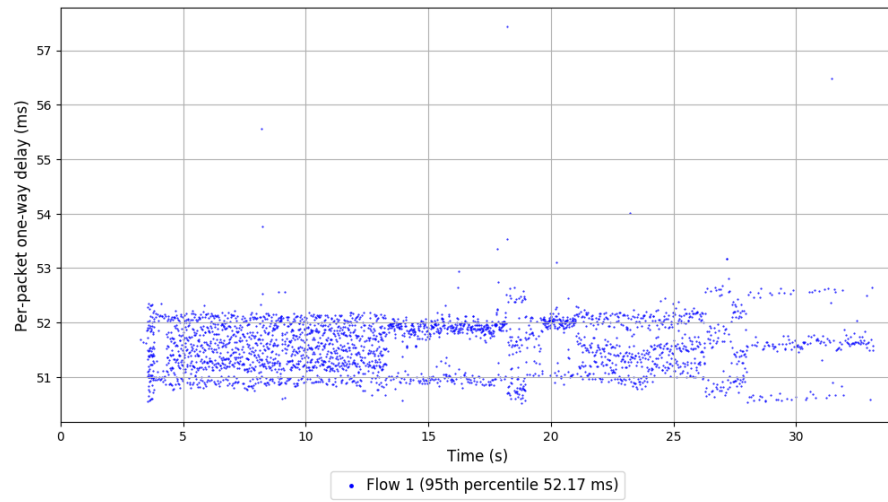
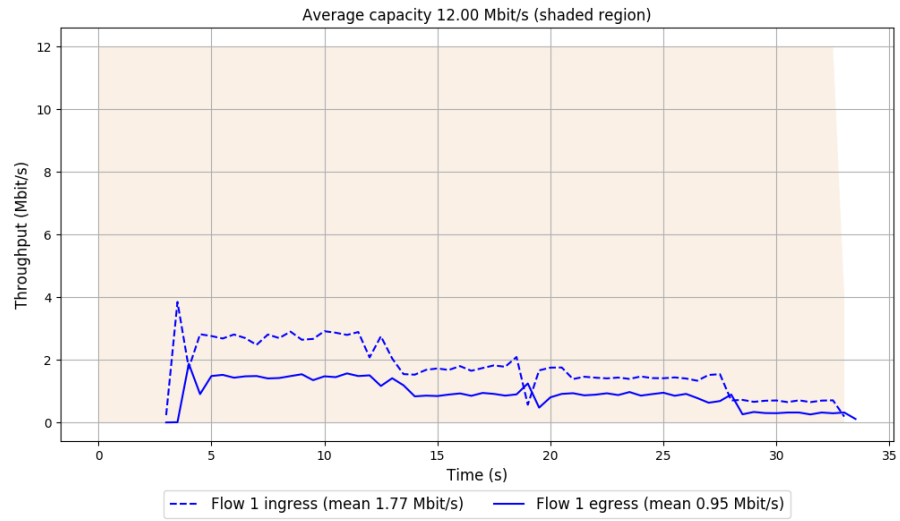
-- Flow 1:

Average throughput: 0.95 Mbit/s

95th percentile per-packet one-way delay: 52.173 ms

Loss rate: 46.32%

Run 3: Report of FillP — Data Link



Run 1: Statistics of FillP-Sheep

Start at: 2019-07-11 19:36:11

End at: 2019-07-11 19:36:41

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

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.50 Mbit/s (4.2% utilization)

95th percentile per-packet one-way delay: 52.576 ms

Loss rate: 41.24%

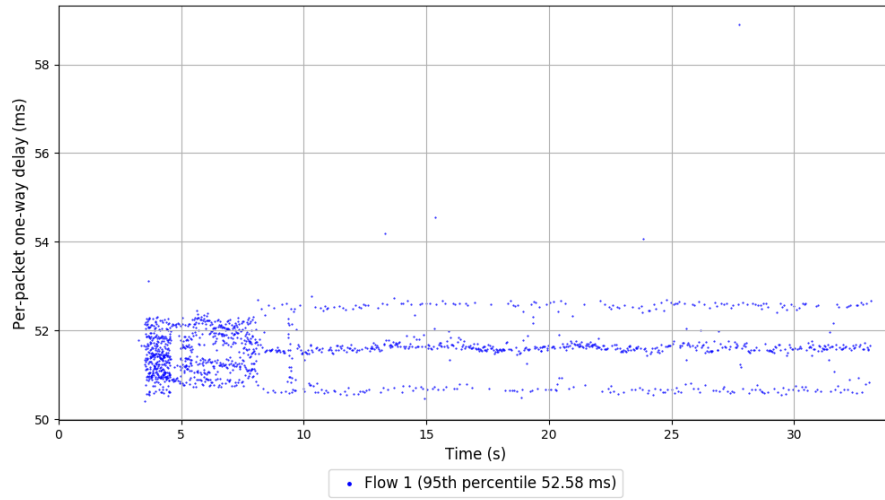
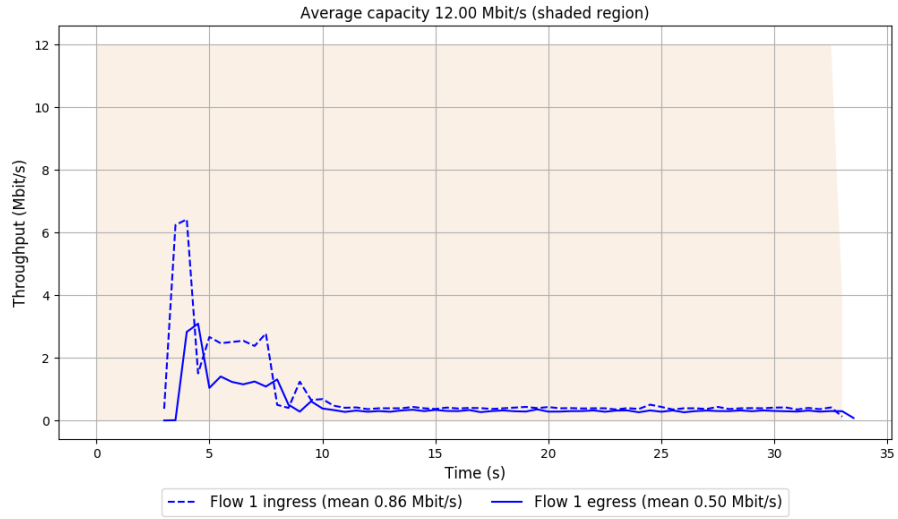
-- Flow 1:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 52.576 ms

Loss rate: 41.24%

Run 1: Report of FillP-Sheep — Data Link



Run 2: Statistics of FillP-Sheep

Start at: 2019-07-11 19:50:27

End at: 2019-07-11 19:50:57

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

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.36 Mbit/s (3.0% utilization)

95th percentile per-packet one-way delay: 52.619 ms

Loss rate: 32.49%

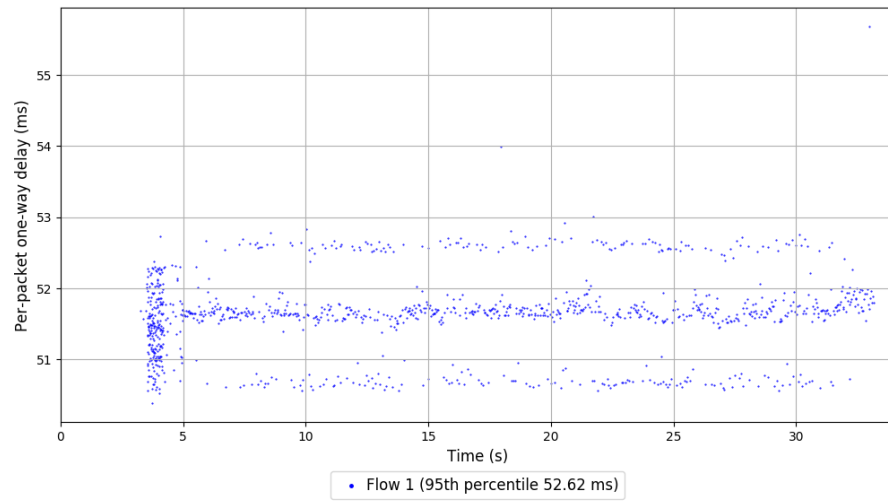
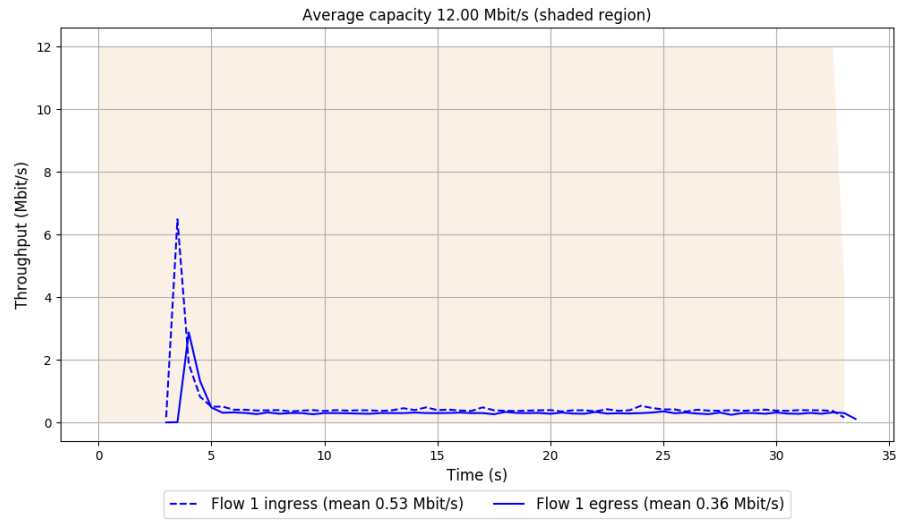
-- Flow 1:

Average throughput: 0.36 Mbit/s

95th percentile per-packet one-way delay: 52.619 ms

Loss rate: 32.49%

Run 2: Report of FillP-Sheep — Data Link



Run 3: Statistics of FillP-Sheep

Start at: 2019-07-11 20:04:46

End at: 2019-07-11 20:05:16

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

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.38 Mbit/s (3.1% utilization)

95th percentile per-packet one-way delay: 52.576 ms

Loss rate: 34.07%

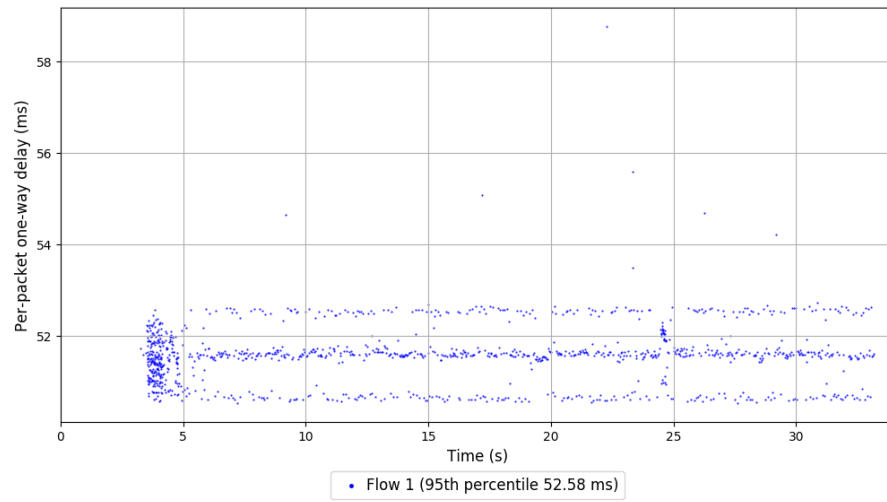
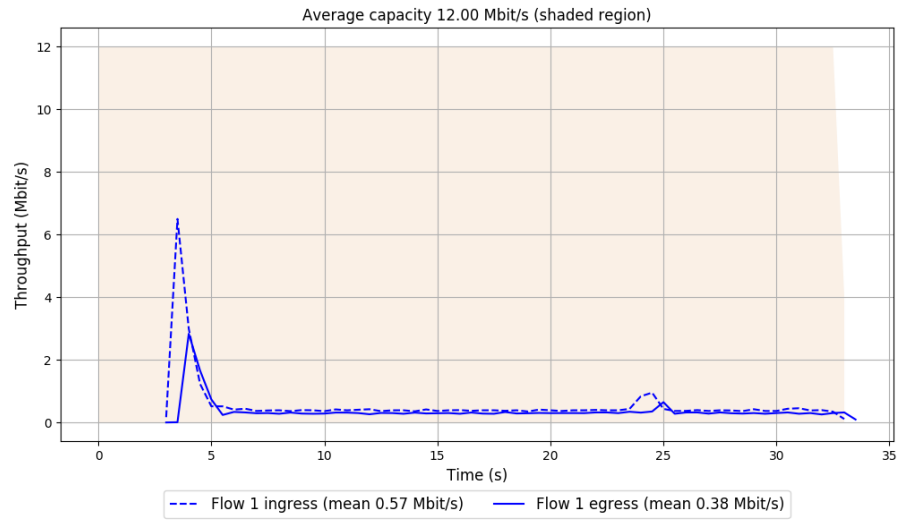
-- Flow 1:

Average throughput: 0.38 Mbit/s

95th percentile per-packet one-way delay: 52.576 ms

Loss rate: 34.07%

Run 3: Report of FillP-Sheep — Data Link



Run 1: Statistics of Indigo

Start at: 2019-07-11 19:44:34

End at: 2019-07-11 19:45:04

Below is generated by plot.py at 2019-07-11 20:19:42

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 2.27 Mbit/s (18.9% utilization)

95th percentile per-packet one-way delay: 52.149 ms

Loss rate: 97.46%

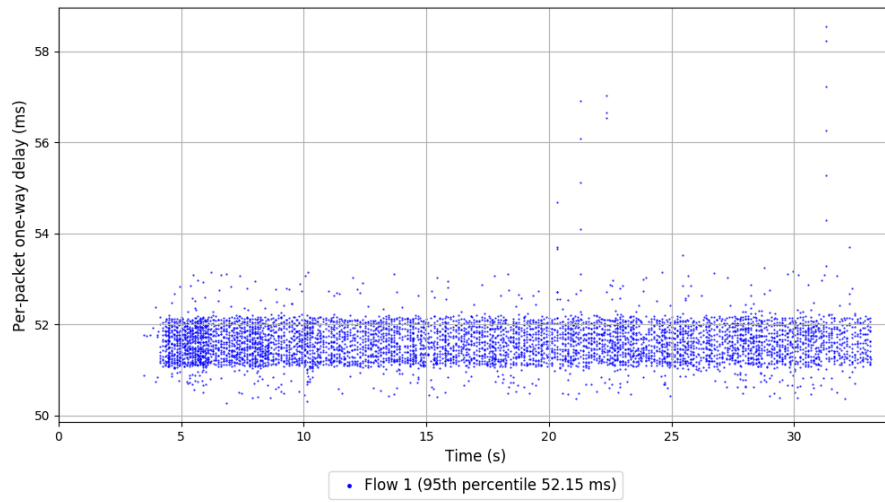
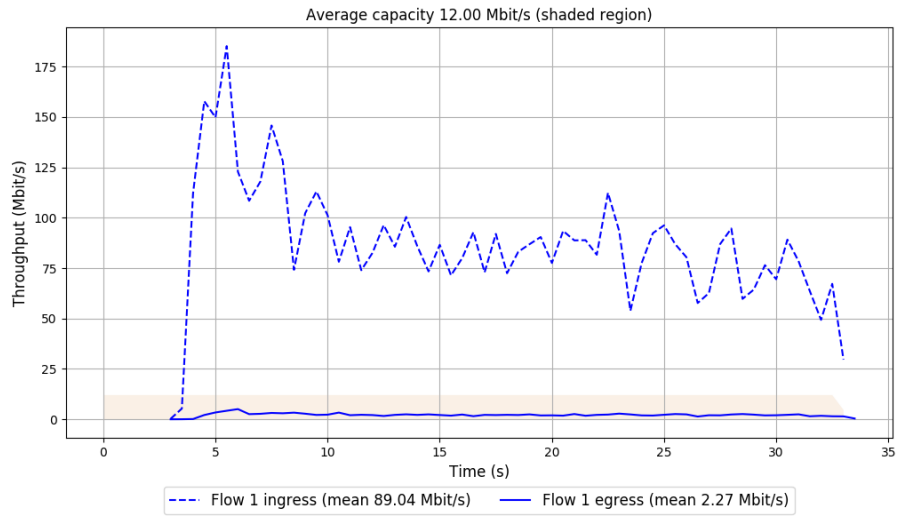
-- Flow 1:

Average throughput: 2.27 Mbit/s

95th percentile per-packet one-way delay: 52.149 ms

Loss rate: 97.46%

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2019-07-11 19:58:52

End at: 2019-07-11 19:59:22

Below is generated by plot.py at 2019-07-11 20:19:42

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 2.15 Mbit/s (17.9% utilization)

95th percentile per-packet one-way delay: 52.154 ms

Loss rate: 97.45%

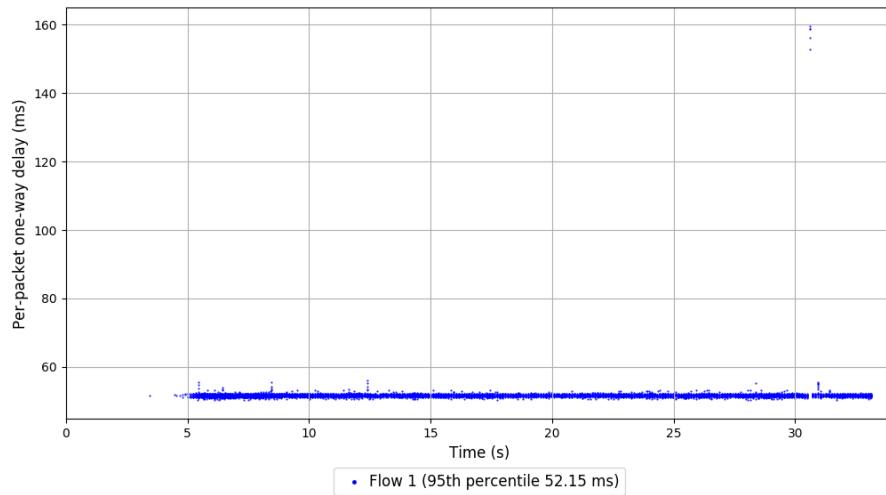
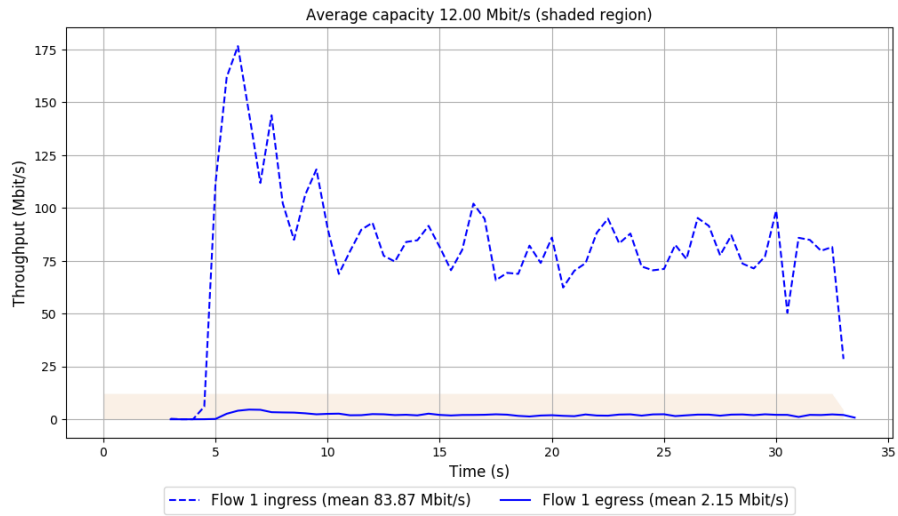
-- Flow 1:

Average throughput: 2.15 Mbit/s

95th percentile per-packet one-way delay: 52.154 ms

Loss rate: 97.45%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2019-07-11 20:13:09

End at: 2019-07-11 20:13:39

Below is generated by plot.py at 2019-07-11 20:20:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 3.83 Mbit/s (31.9% utilization)

95th percentile per-packet one-way delay: 52.143 ms

Loss rate: 97.44%

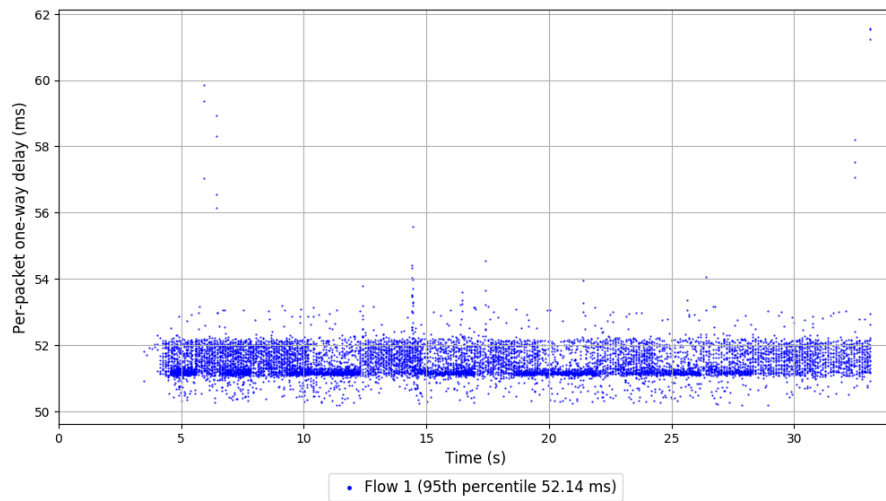
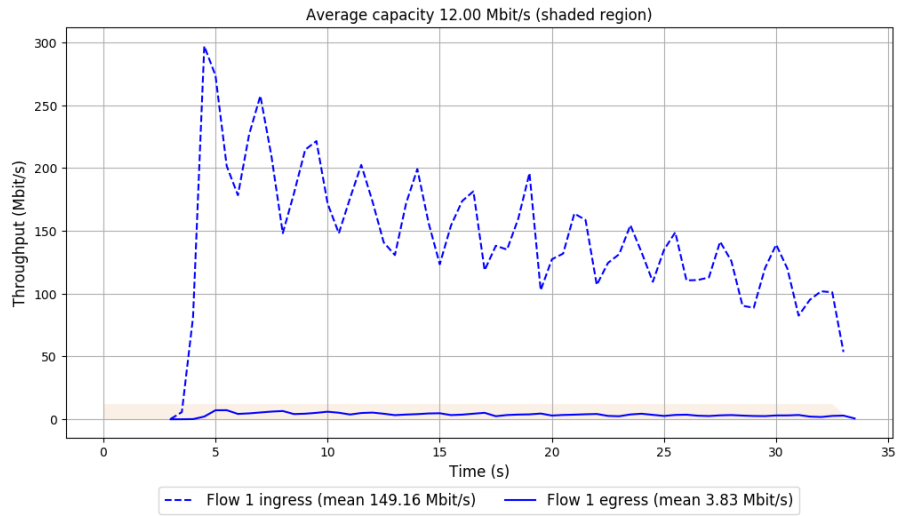
-- Flow 1:

Average throughput: 3.83 Mbit/s

95th percentile per-packet one-way delay: 52.143 ms

Loss rate: 97.44%

Run 3: Report of Indigo — Data Link



Run 1: Statistics of Indigo-MusesC3

Start at: 2019-07-11 19:45:10

End at: 2019-07-11 19:45:40

Below is generated by plot.py at 2019-07-11 20:20:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 1.34 Mbit/s (11.1% utilization)

95th percentile per-packet one-way delay: 52.218 ms

Loss rate: 30.15%

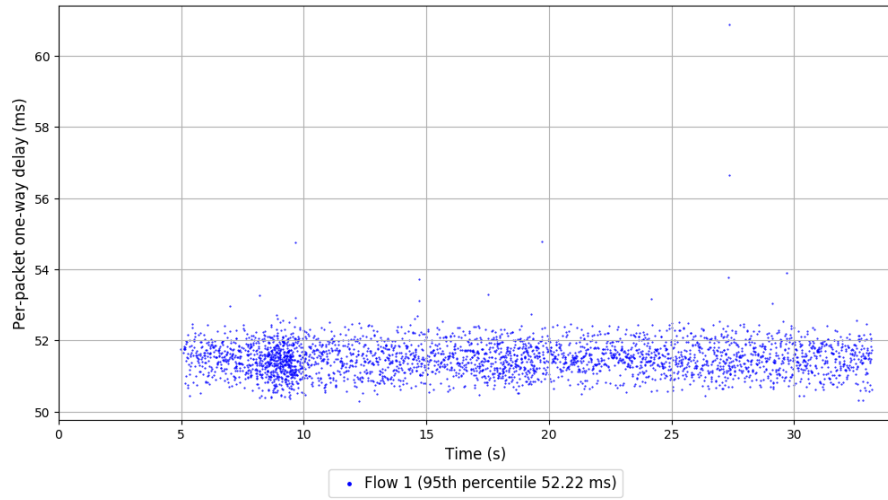
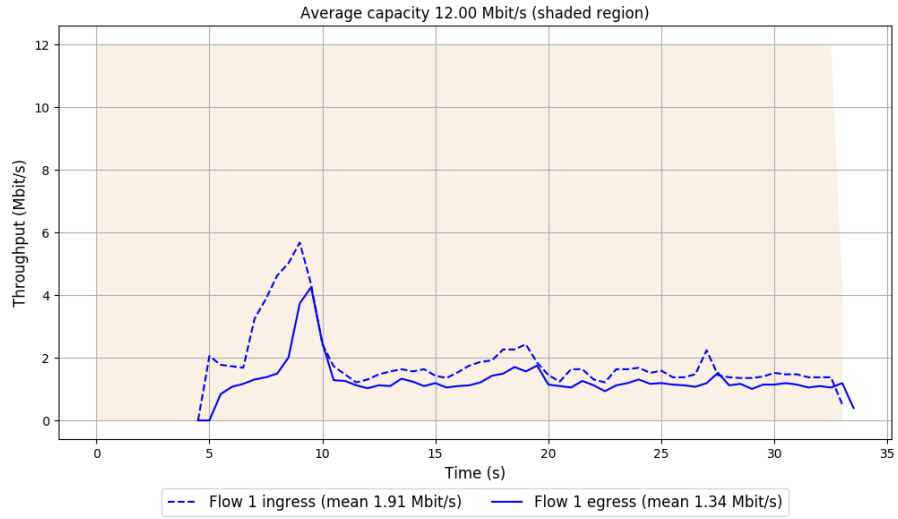
-- Flow 1:

Average throughput: 1.34 Mbit/s

95th percentile per-packet one-way delay: 52.218 ms

Loss rate: 30.15%

Run 1: Report of Indigo-MusesC3 — Data Link



Run 2: Statistics of Indigo-MusesC3

Start at: 2019-07-11 19:59:28

End at: 2019-07-11 19:59:58

Below is generated by plot.py at 2019-07-11 20:20:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 1.21 Mbit/s (10.1% utilization)

95th percentile per-packet one-way delay: 52.280 ms

Loss rate: 31.14%

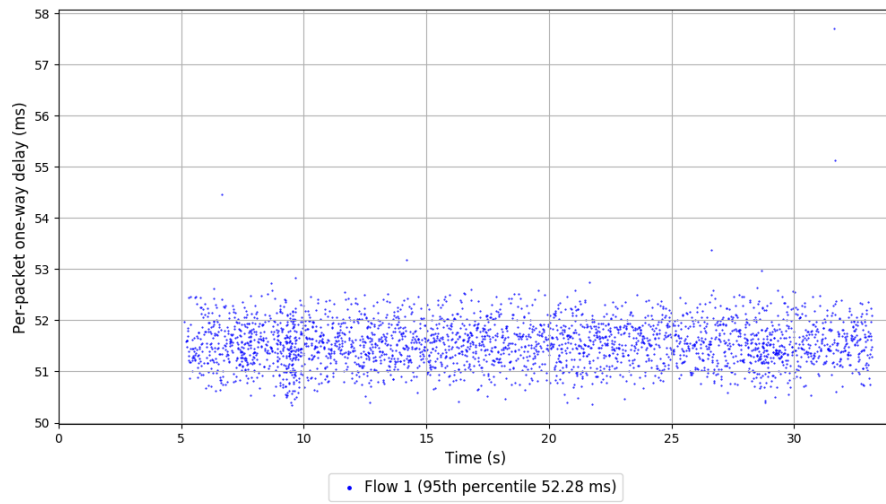
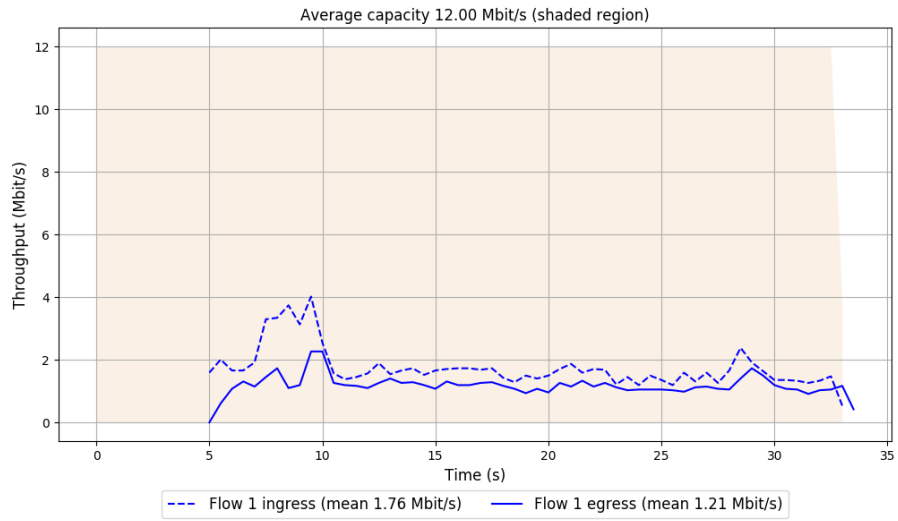
-- Flow 1:

Average throughput: 1.21 Mbit/s

95th percentile per-packet one-way delay: 52.280 ms

Loss rate: 31.14%

Run 2: Report of Indigo-MusesC3 — Data Link



Run 3: Statistics of Indigo-MusesC3

Start at: 2019-07-11 20:13:46

End at: 2019-07-11 20:14:16

Below is generated by plot.py at 2019-07-11 20:20:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 1.35 Mbit/s (11.2% utilization)

95th percentile per-packet one-way delay: 52.290 ms

Loss rate: 30.50%

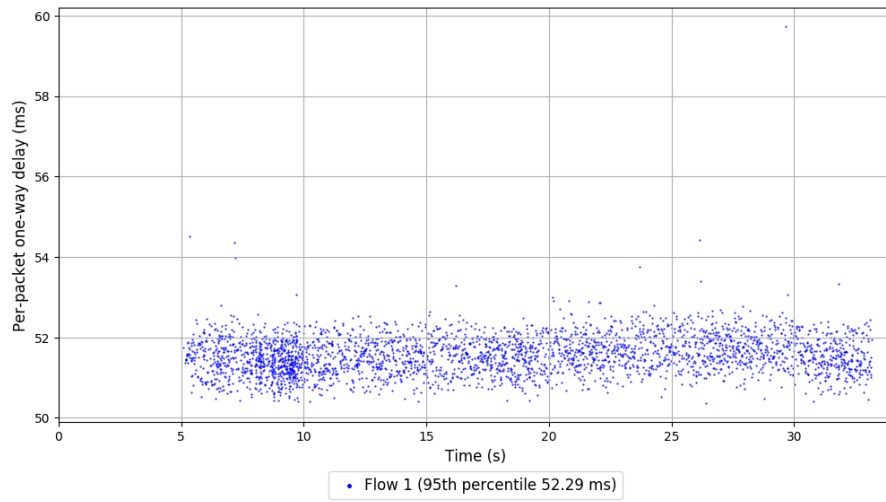
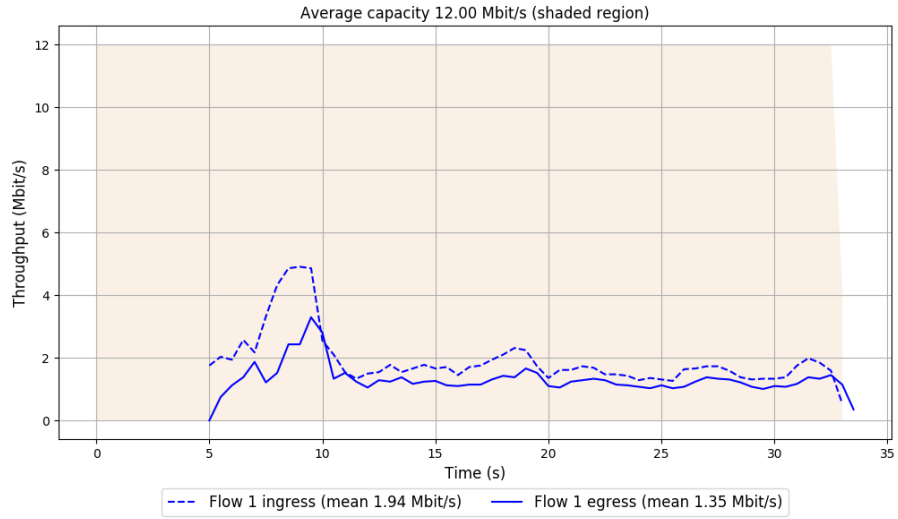
-- Flow 1:

Average throughput: 1.35 Mbit/s

95th percentile per-packet one-way delay: 52.290 ms

Loss rate: 30.50%

Run 3: Report of Indigo-MusesC3 — Data Link



Run 1: Statistics of Indigo-MusesC5

Start at: 2019-07-11 19:43:23

End at: 2019-07-11 19:43:53

Below is generated by plot.py at 2019-07-11 20:20:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 1.02 Mbit/s (8.5% utilization)

95th percentile per-packet one-way delay: 52.248 ms

Loss rate: 35.08%

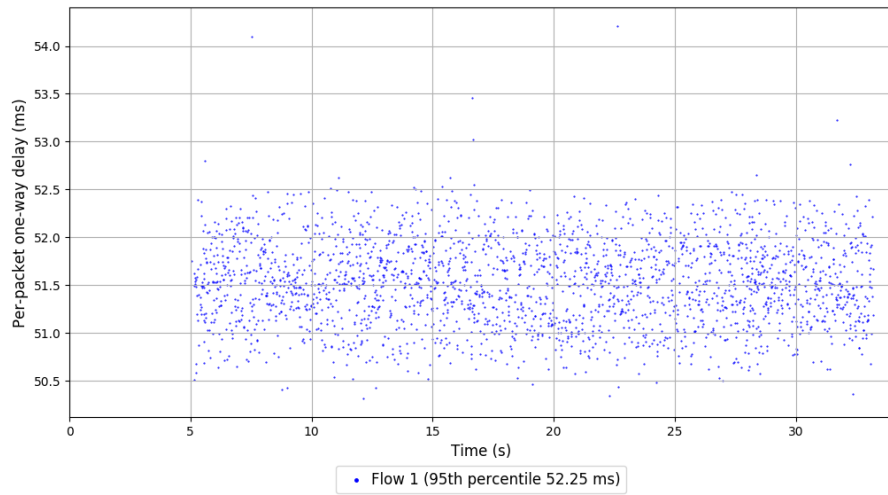
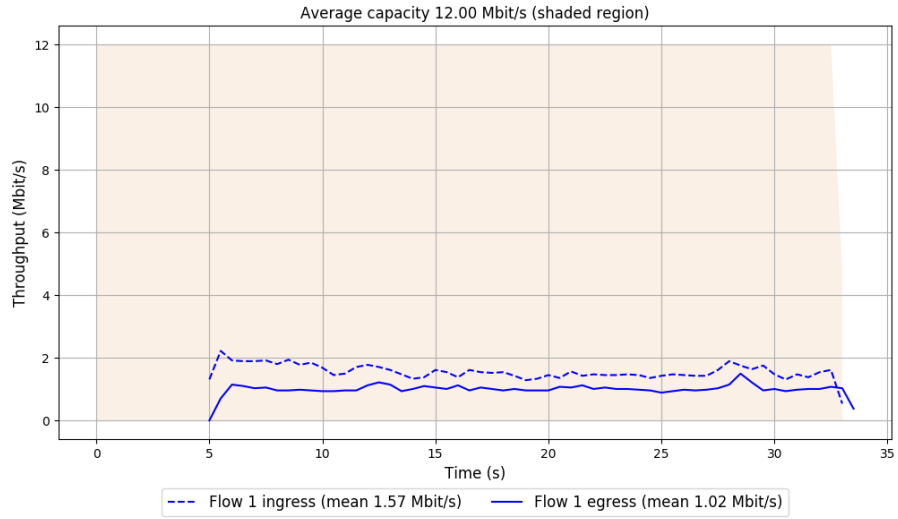
-- Flow 1:

Average throughput: 1.02 Mbit/s

95th percentile per-packet one-way delay: 52.248 ms

Loss rate: 35.08%

Run 1: Report of Indigo-MusesC5 — Data Link



Run 2: Statistics of Indigo-MusesC5

Start at: 2019-07-11 19:57:41

End at: 2019-07-11 19:58:11

Below is generated by plot.py at 2019-07-11 20:20:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 1.00 Mbit/s (8.3% utilization)

95th percentile per-packet one-way delay: 52.267 ms

Loss rate: 40.85%

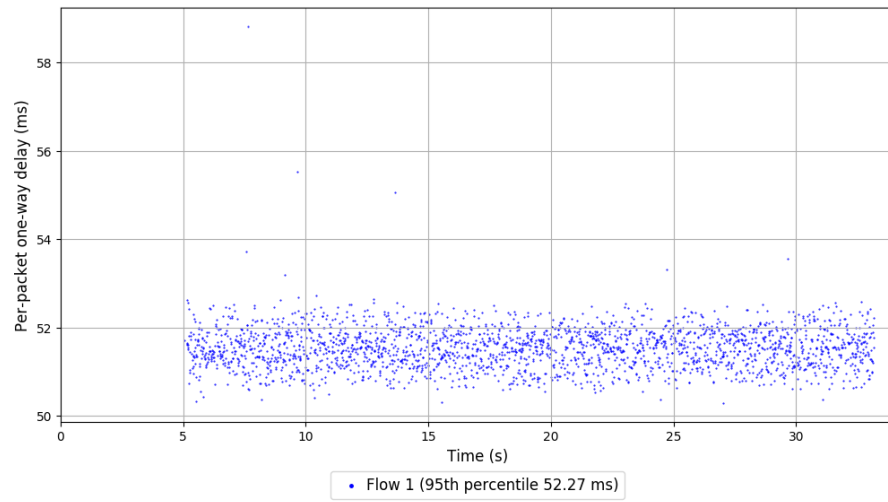
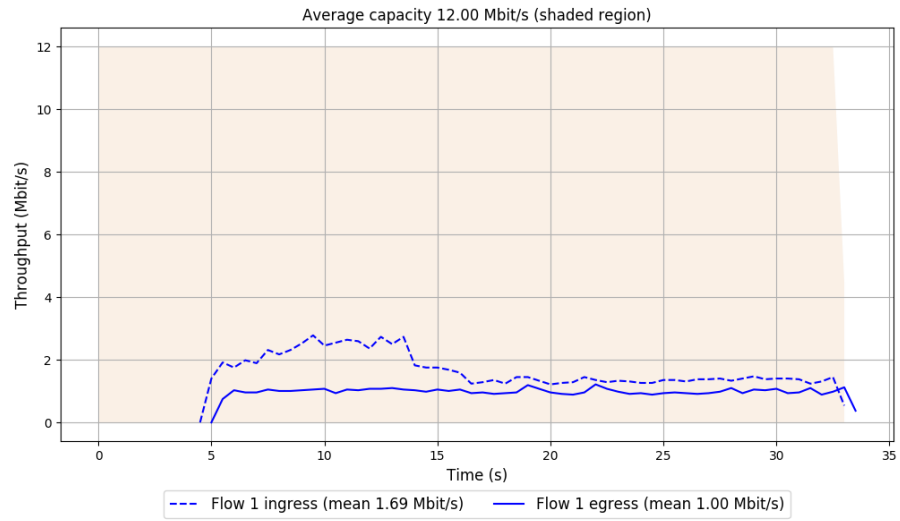
-- Flow 1:

Average throughput: 1.00 Mbit/s

95th percentile per-packet one-way delay: 52.267 ms

Loss rate: 40.85%

Run 2: Report of Indigo-MusesC5 — Data Link



Run 3: Statistics of Indigo-MusesC5

Start at: 2019-07-11 20:11:58

End at: 2019-07-11 20:12:28

Below is generated by plot.py at 2019-07-11 20:20:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 1.06 Mbit/s (8.8% utilization)

95th percentile per-packet one-way delay: 52.278 ms

Loss rate: 35.72%

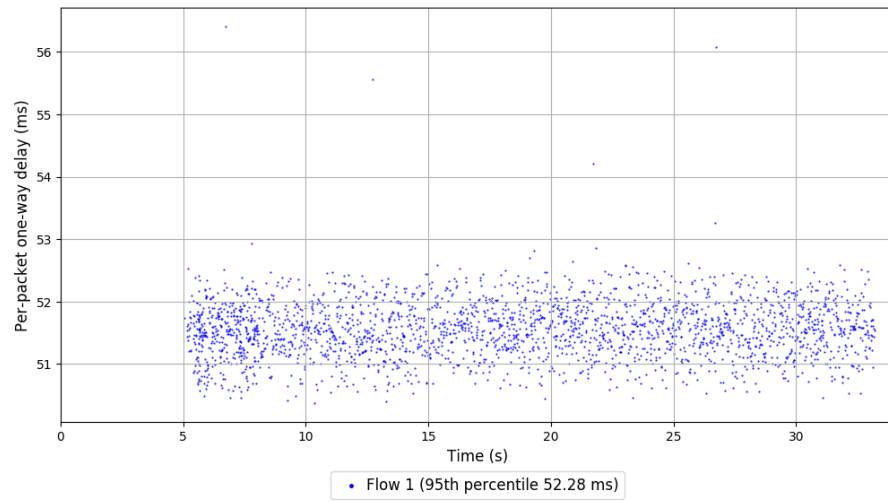
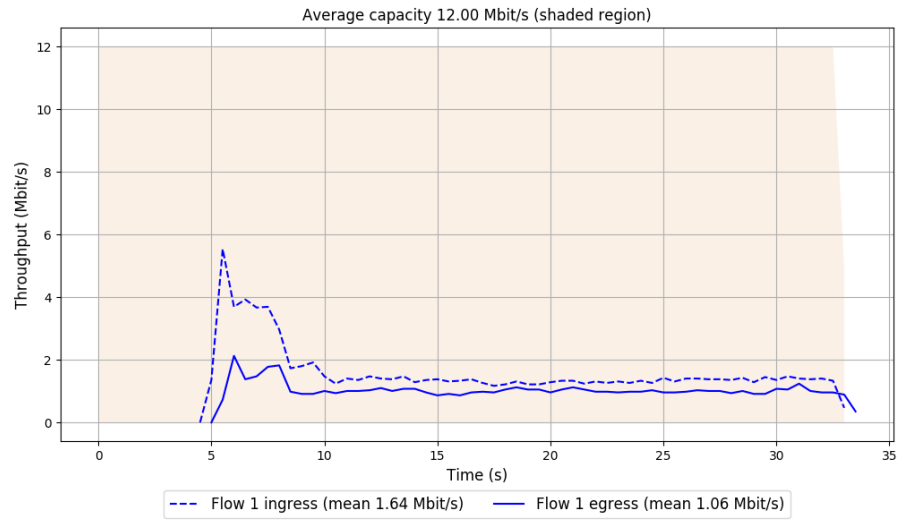
-- Flow 1:

Average throughput: 1.06 Mbit/s

95th percentile per-packet one-way delay: 52.278 ms

Loss rate: 35.72%

Run 3: Report of Indigo-MusesC5 — Data Link



Run 1: Statistics of Indigo-MusesD

Start at: 2019-07-11 19:42:48

End at: 2019-07-11 19:43:18

Below is generated by plot.py at 2019-07-11 20:20:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 2.05 Mbit/s (17.1% utilization)

95th percentile per-packet one-way delay: 52.291 ms

Loss rate: 45.25%

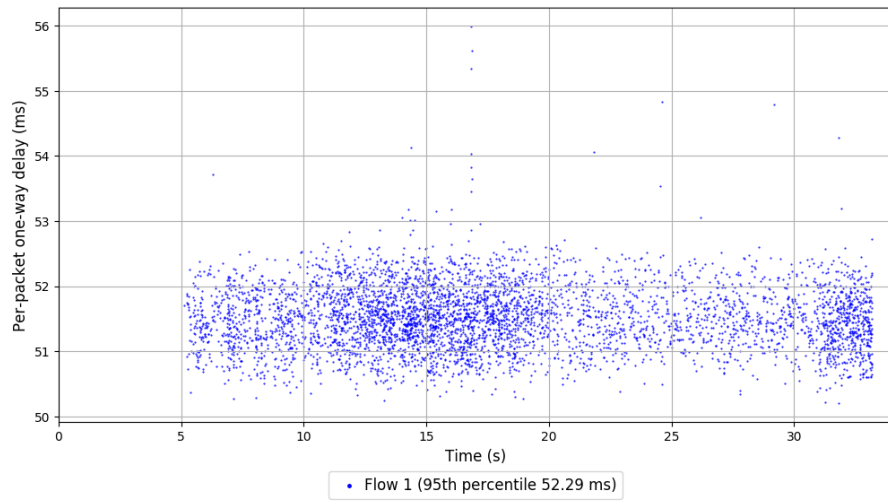
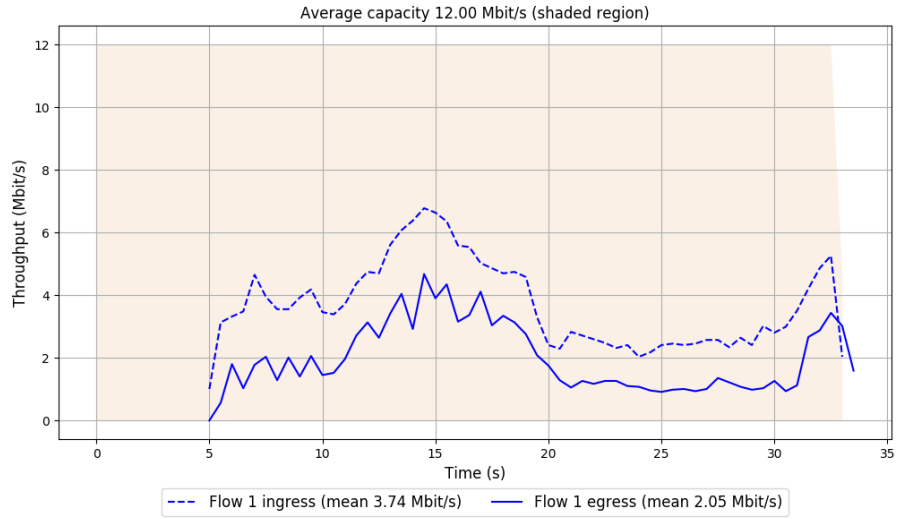
-- Flow 1:

Average throughput: 2.05 Mbit/s

95th percentile per-packet one-way delay: 52.291 ms

Loss rate: 45.25%

Run 1: Report of Indigo-MusesD — Data Link



Run 2: Statistics of Indigo-MusesD

Start at: 2019-07-11 19:57:06

End at: 2019-07-11 19:57:36

Below is generated by plot.py at 2019-07-11 20:20:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 1.77 Mbit/s (14.7% utilization)

95th percentile per-packet one-way delay: 52.264 ms

Loss rate: 51.46%

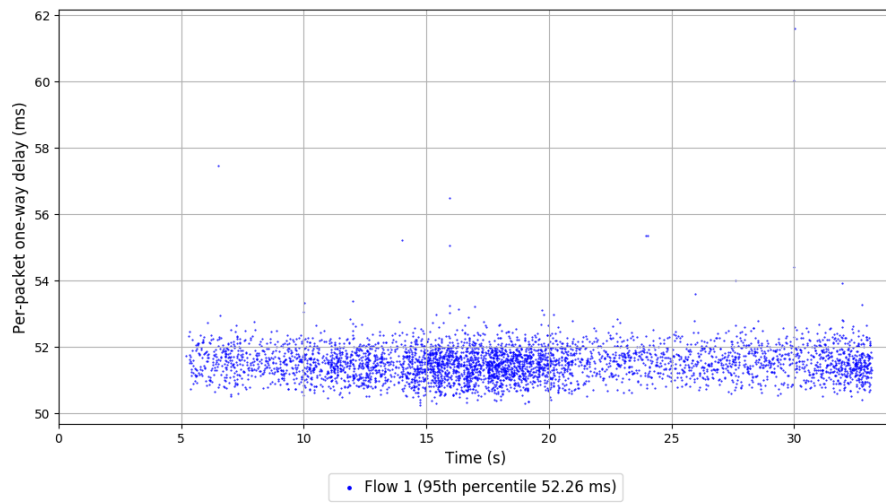
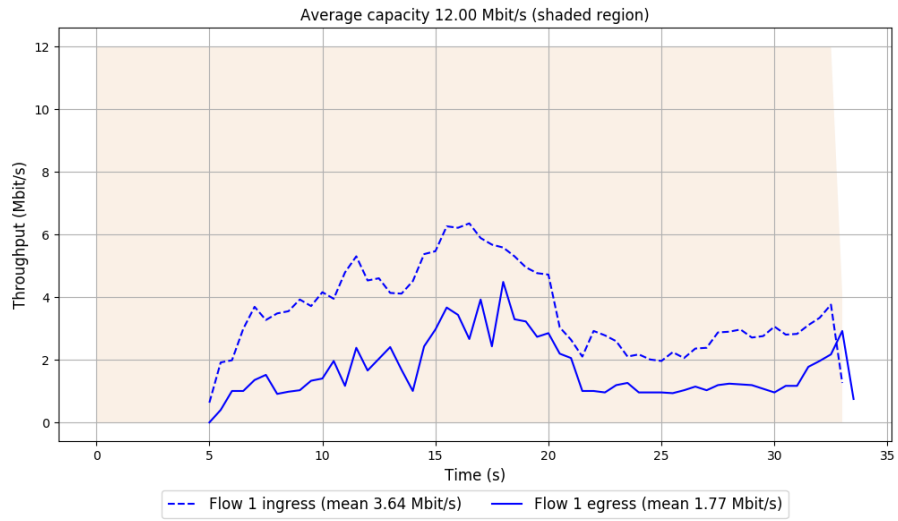
-- Flow 1:

Average throughput: 1.77 Mbit/s

95th percentile per-packet one-way delay: 52.264 ms

Loss rate: 51.46%

Run 2: Report of Indigo-MusesD — Data Link



Run 3: Statistics of Indigo-MusesD

Start at: 2019-07-11 20:11:23

End at: 2019-07-11 20:11:53

Below is generated by plot.py at 2019-07-11 20:20:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 2.79 Mbit/s (23.3% utilization)

95th percentile per-packet one-way delay: 52.196 ms

Loss rate: 43.40%

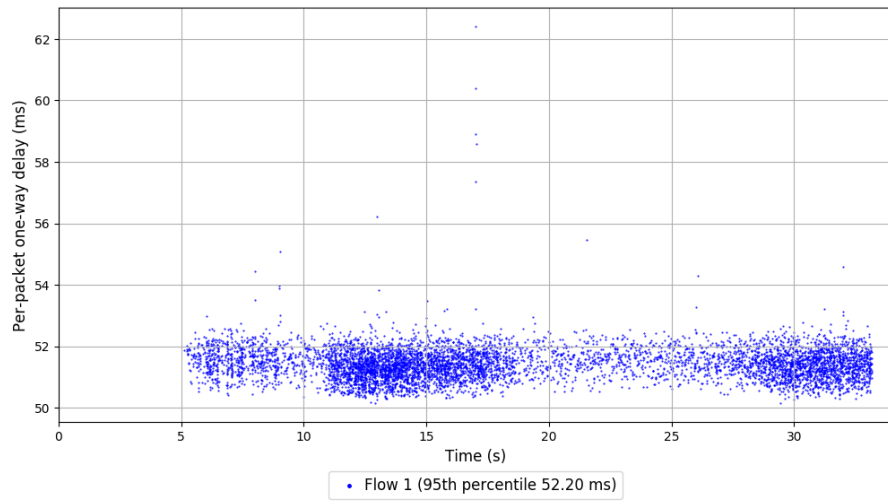
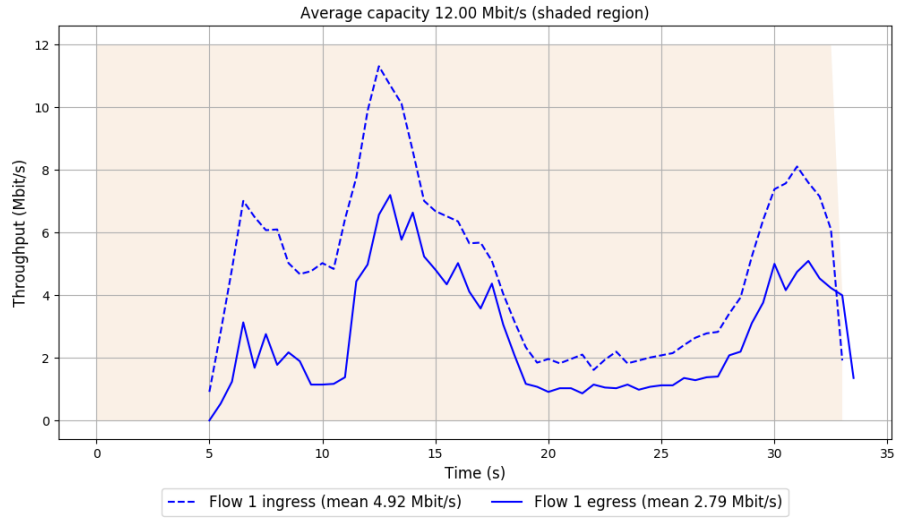
-- Flow 1:

Average throughput: 2.79 Mbit/s

95th percentile per-packet one-way delay: 52.196 ms

Loss rate: 43.40%

Run 3: Report of Indigo-MusesD — Data Link



Run 1: Statistics of Indigo-MuseST

Start at: 2019-07-11 19:48:41

End at: 2019-07-11 19:49:11

Below is generated by plot.py at 2019-07-11 20:20:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 1.37 Mbit/s (11.4% utilization)

95th percentile per-packet one-way delay: 52.233 ms

Loss rate: 27.54%

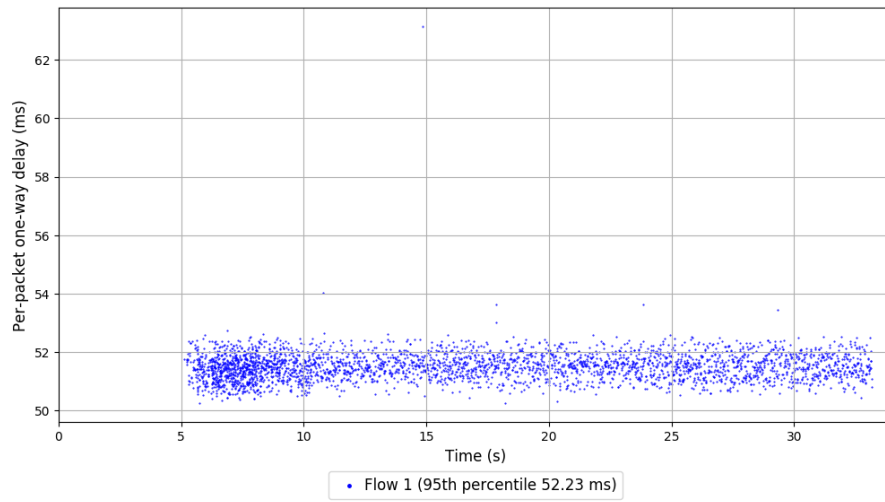
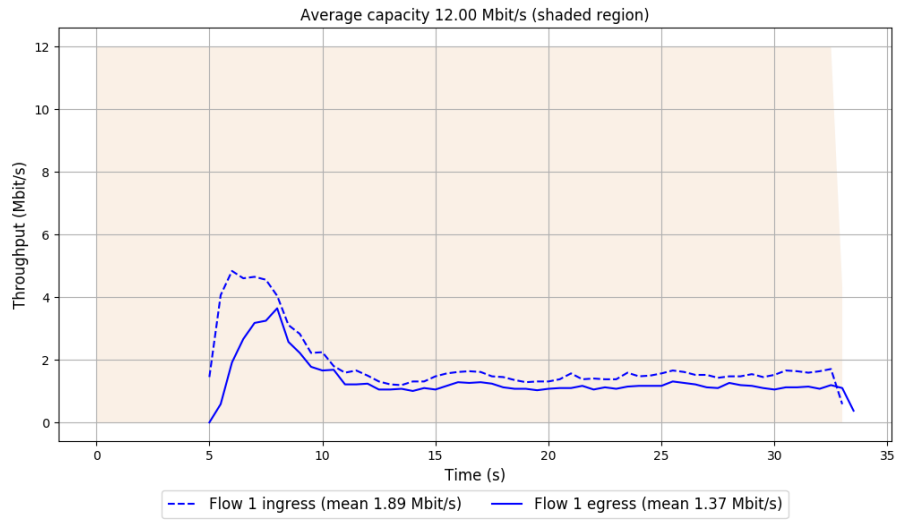
-- Flow 1:

Average throughput: 1.37 Mbit/s

95th percentile per-packet one-way delay: 52.233 ms

Loss rate: 27.54%

Run 1: Report of Indigo-MusesT — Data Link



Run 2: Statistics of Indigo-MuseST

Start at: 2019-07-11 20:03:00

End at: 2019-07-11 20:03:30

Below is generated by plot.py at 2019-07-11 20:20:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 1.29 Mbit/s (10.7% utilization)

95th percentile per-packet one-way delay: 52.258 ms

Loss rate: 25.09%

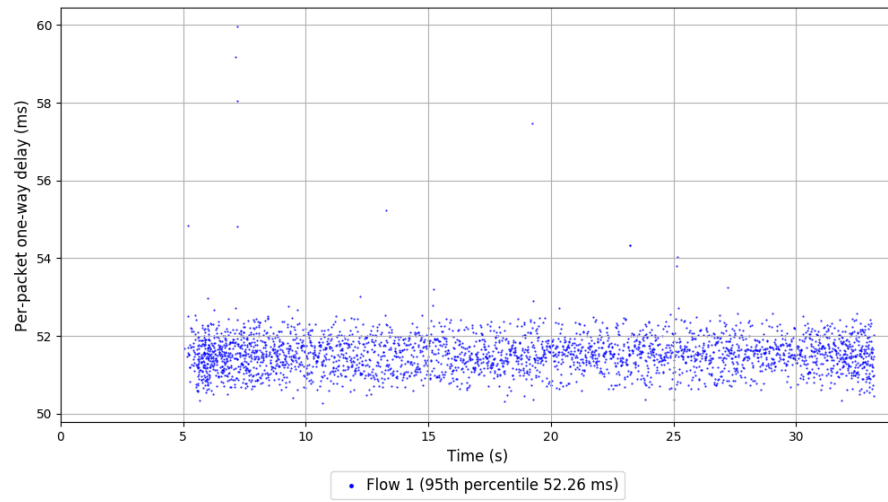
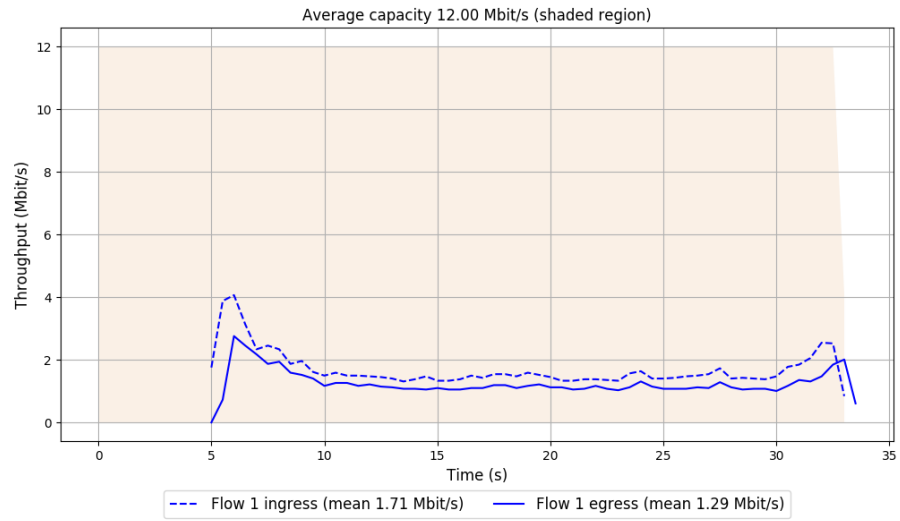
-- Flow 1:

Average throughput: 1.29 Mbit/s

95th percentile per-packet one-way delay: 52.258 ms

Loss rate: 25.09%

Run 2: Report of Indigo-MusesT — Data Link



Run 3: Statistics of Indigo-MuseST

Start at: 2019-07-11 20:17:24

End at: 2019-07-11 20:17:54

Below is generated by plot.py at 2019-07-11 20:20:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 1.30 Mbit/s (10.9% utilization)

95th percentile per-packet one-way delay: 52.295 ms

Loss rate: 25.20%

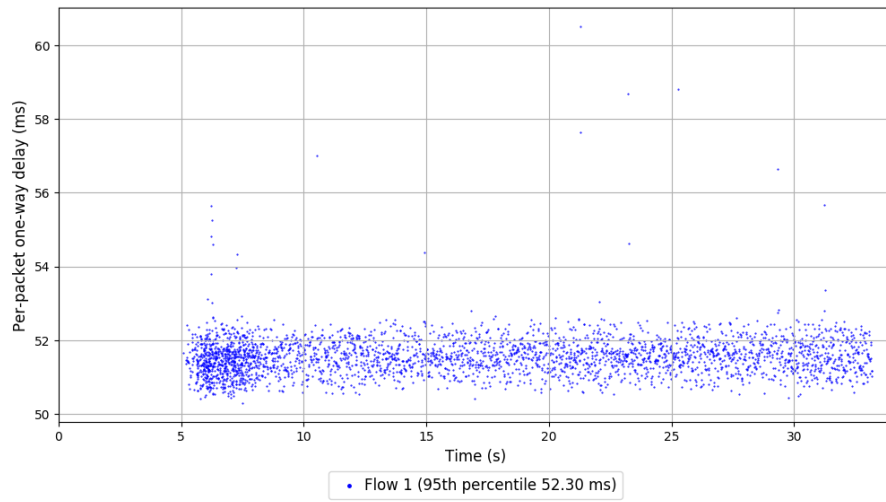
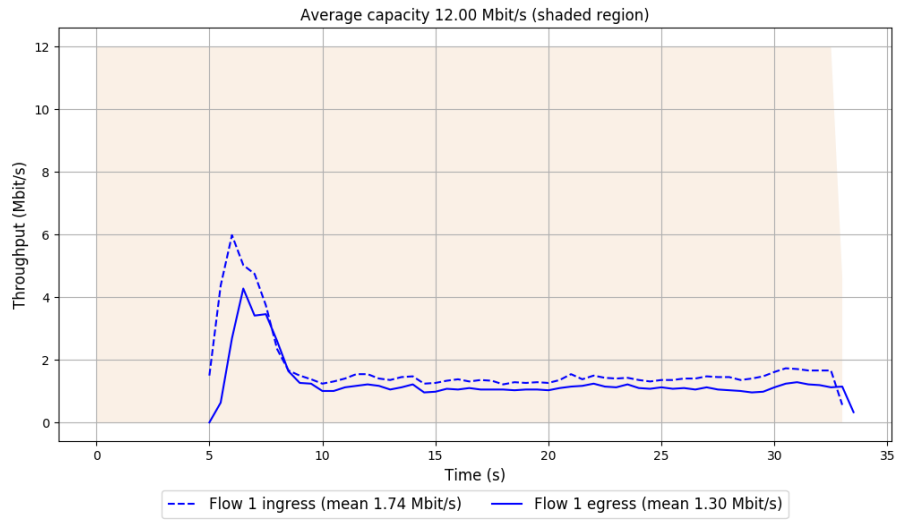
-- Flow 1:

Average throughput: 1.30 Mbit/s

95th percentile per-packet one-way delay: 52.295 ms

Loss rate: 25.20%

Run 3: Report of Indigo-MusesT — Data Link



Run 1: Statistics of LEDBAT

Start at: 2019-07-11 19:43:59

End at: 2019-07-11 19:44:29

Below is generated by plot.py at 2019-07-11 20:20:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.10 Mbit/s (0.8% utilization)

95th percentile per-packet one-way delay: 51.720 ms

Loss rate: 48.05%

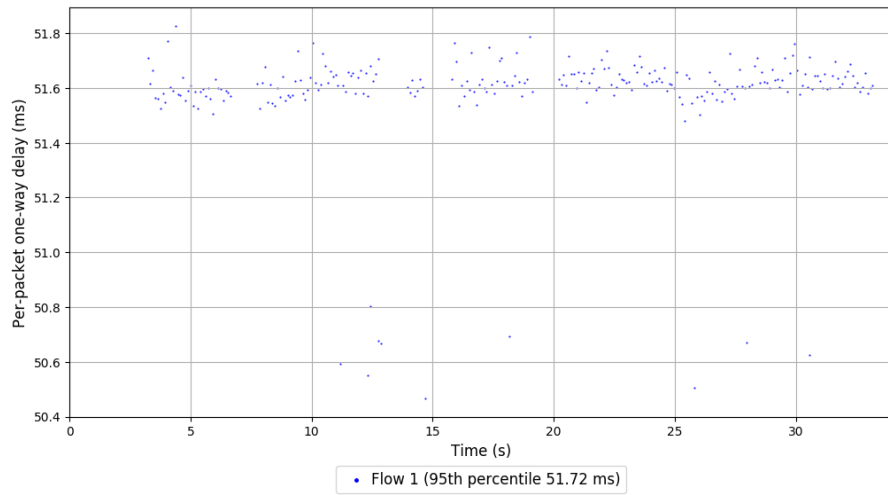
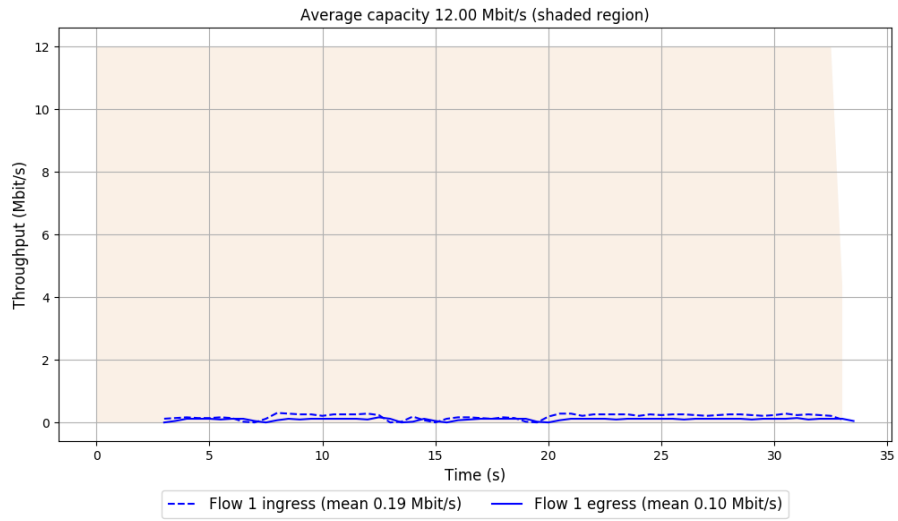
-- Flow 1:

Average throughput: 0.10 Mbit/s

95th percentile per-packet one-way delay: 51.720 ms

Loss rate: 48.05%

Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2019-07-11 19:58:16

End at: 2019-07-11 19:58:46

Below is generated by plot.py at 2019-07-11 20:20:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.10 Mbit/s (0.8% utilization)

95th percentile per-packet one-way delay: 51.892 ms

Loss rate: 47.03%

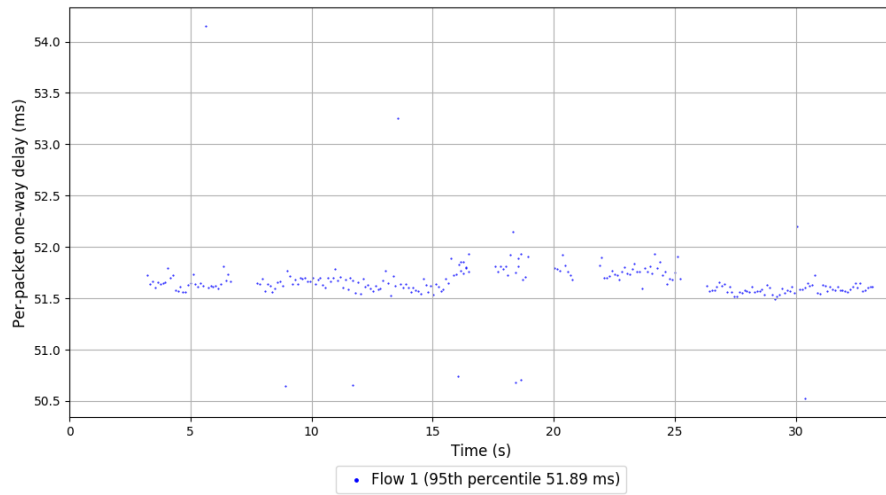
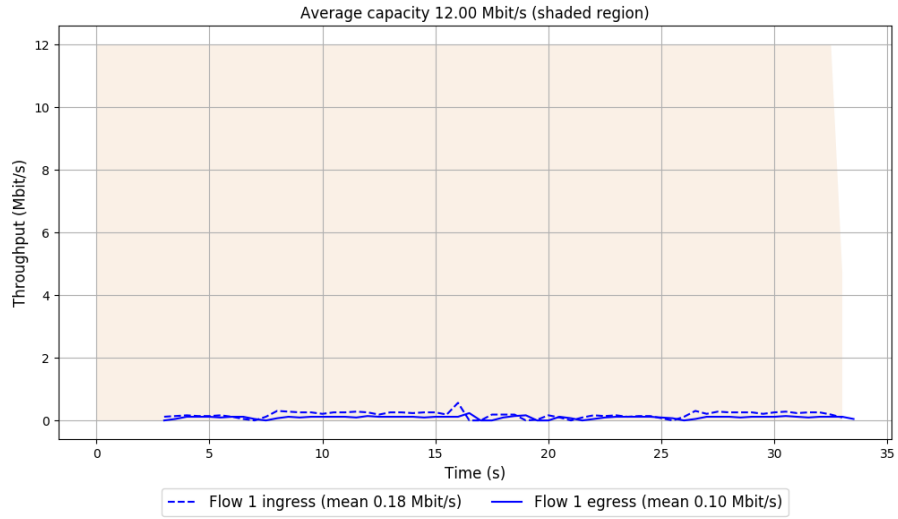
-- Flow 1:

Average throughput: 0.10 Mbit/s

95th percentile per-packet one-way delay: 51.892 ms

Loss rate: 47.03%

Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2019-07-11 20:12:33

End at: 2019-07-11 20:13:03

Below is generated by plot.py at 2019-07-11 20:20:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.11 Mbit/s (0.9% utilization)

95th percentile per-packet one-way delay: 51.764 ms

Loss rate: 49.90%

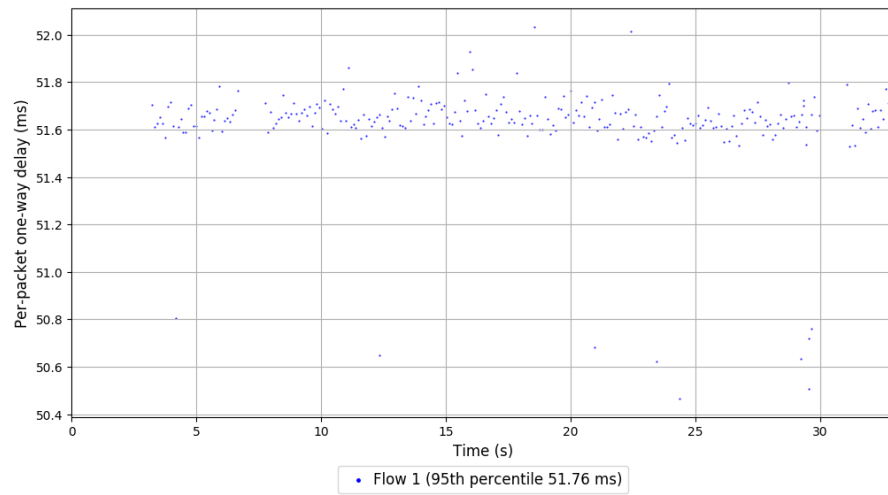
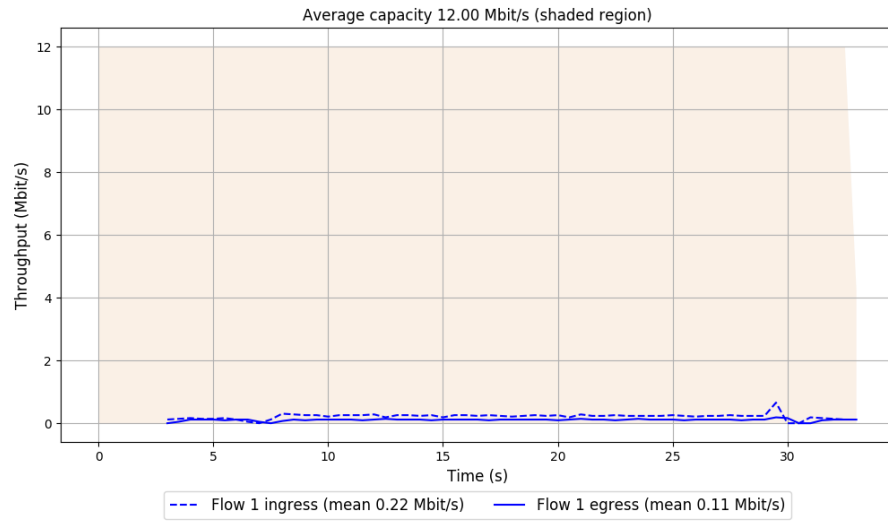
-- Flow 1:

Average throughput: 0.11 Mbit/s

95th percentile per-packet one-way delay: 51.764 ms

Loss rate: 49.90%

Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of Muses_DecisionTree

Start at: 2019-07-11 19:36:46

End at: 2019-07-11 19:37:16

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 10.05 Mbit/s (83.8% utilization)

95th percentile per-packet one-way delay: 51.653 ms

Loss rate: 98.52%

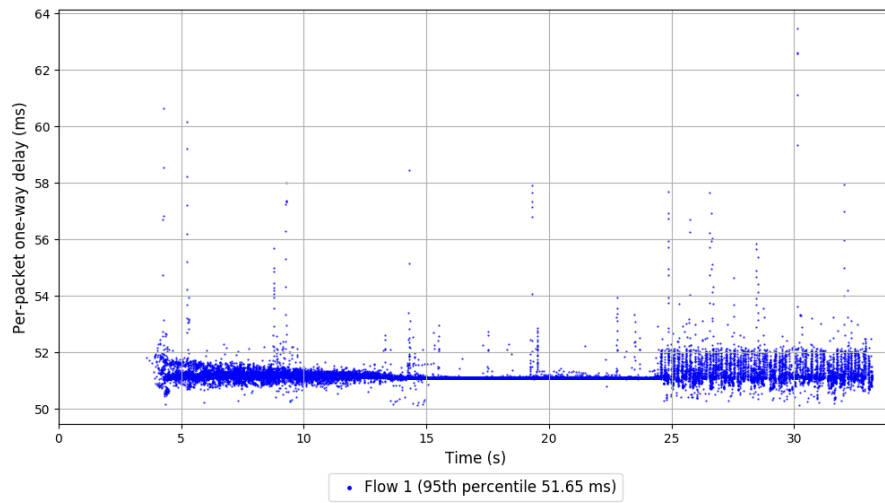
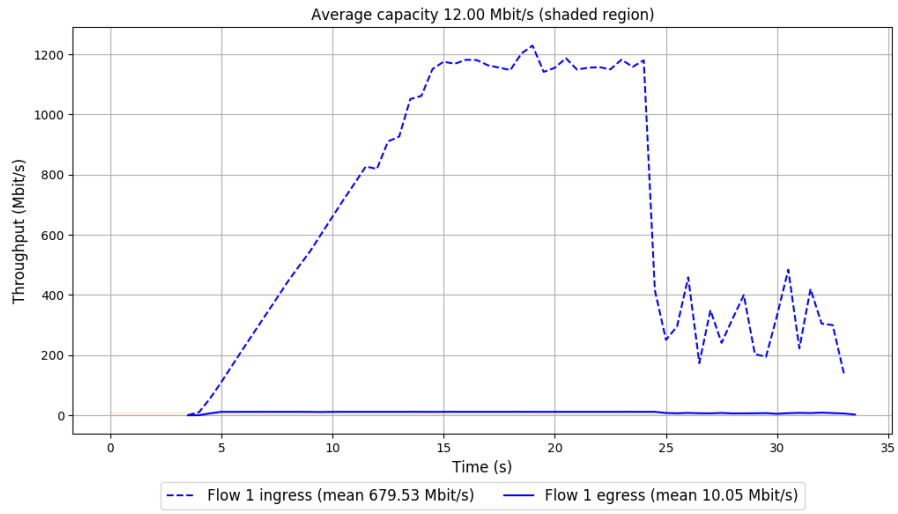
-- Flow 1:

Average throughput: 10.05 Mbit/s

95th percentile per-packet one-way delay: 51.653 ms

Loss rate: 98.52%

Run 1: Report of Muses_DecisionTree — Data Link



Run 2: Statistics of Muses_DecisionTree

Start at: 2019-07-11 19:51:02

End at: 2019-07-11 19:51:32

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 9.50 Mbit/s (79.2% utilization)

95th percentile per-packet one-way delay: 51.685 ms

Loss rate: 98.45%

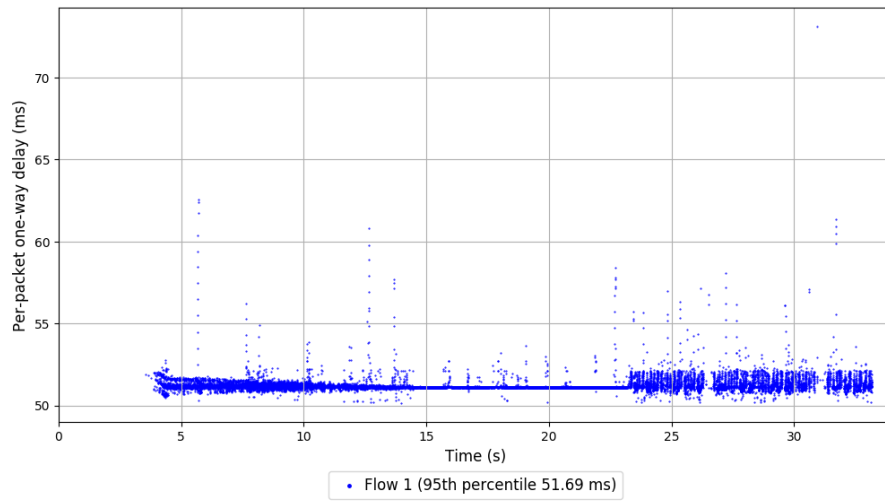
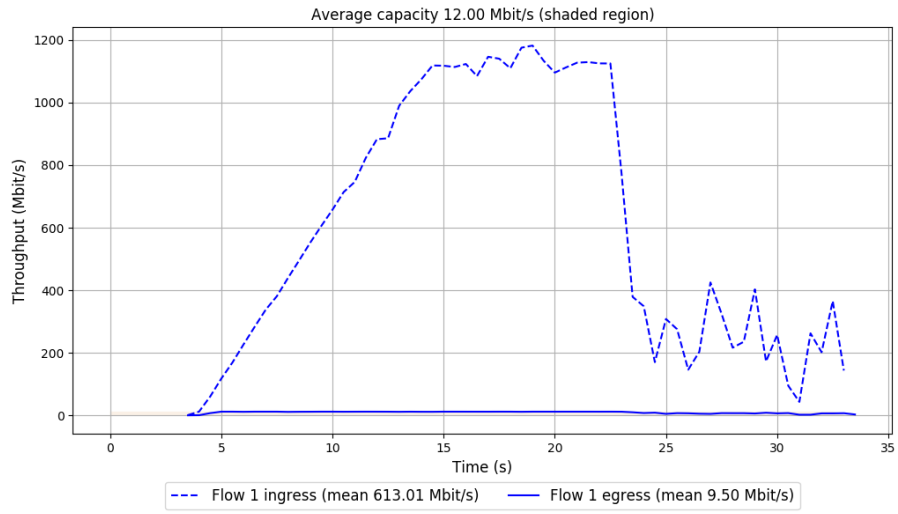
-- Flow 1:

Average throughput: 9.50 Mbit/s

95th percentile per-packet one-way delay: 51.685 ms

Loss rate: 98.45%

Run 2: Report of Muses_DecisionTree — Data Link



Run 3: Statistics of Muses_DecisionTree

Start at: 2019-07-11 20:05:21

End at: 2019-07-11 20:05:51

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 9.69 Mbit/s (80.8% utilization)

95th percentile per-packet one-way delay: 51.818 ms

Loss rate: 98.40%

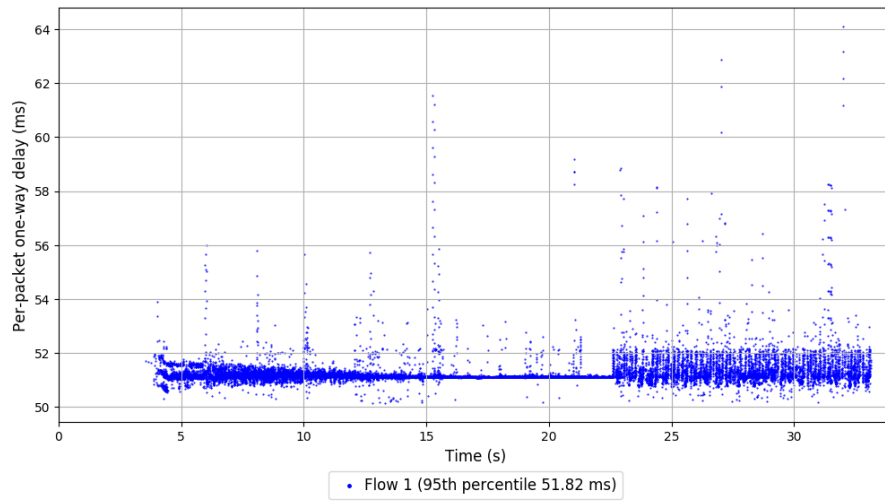
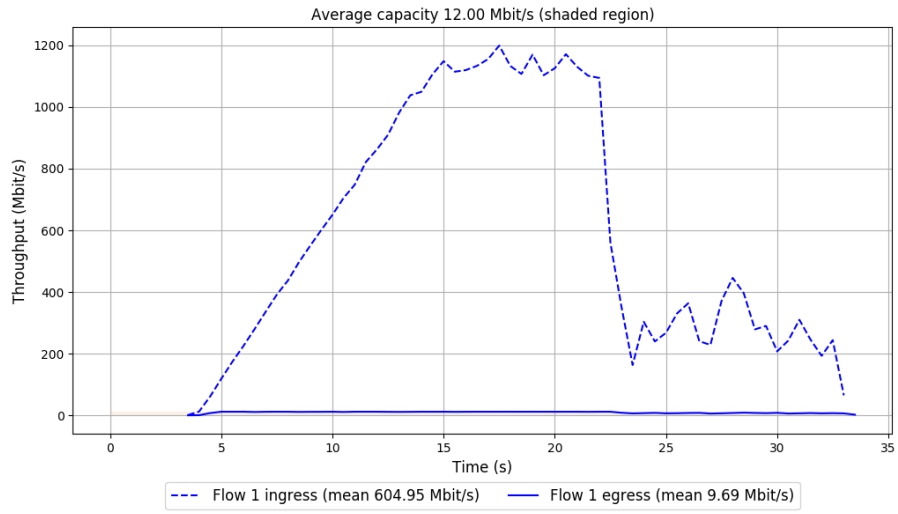
-- Flow 1:

Average throughput: 9.69 Mbit/s

95th percentile per-packet one-way delay: 51.818 ms

Loss rate: 98.40%

Run 3: Report of Muses_DecisionTree — Data Link



Run 1: Statistics of Muses_DecisionTreeH0

Start at: 2019-07-11 19:38:42

End at: 2019-07-11 19:39:12

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 19:53:00

End at: 2019-07-11 19:53:30

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 20:07:17

End at: 2019-07-11 20:07:47

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 19:41:03

End at: 2019-07-11 19:41:33

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 19:55:20

End at: 2019-07-11 19:55:50

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 20:09:37

End at: 2019-07-11 20:10:07

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 19:42:13

End at: 2019-07-11 19:42:43

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 3.77 Mbit/s (31.5% utilization)

95th percentile per-packet one-way delay: 52.195 ms

Loss rate: 2.89%

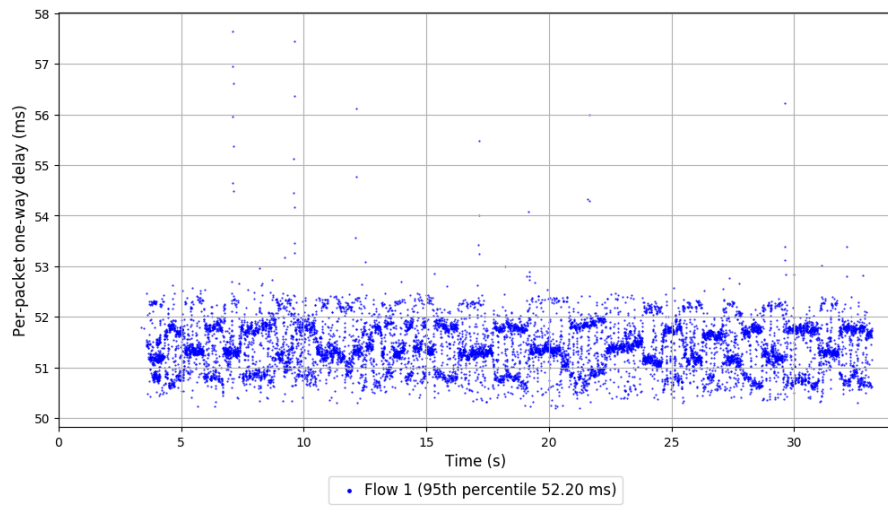
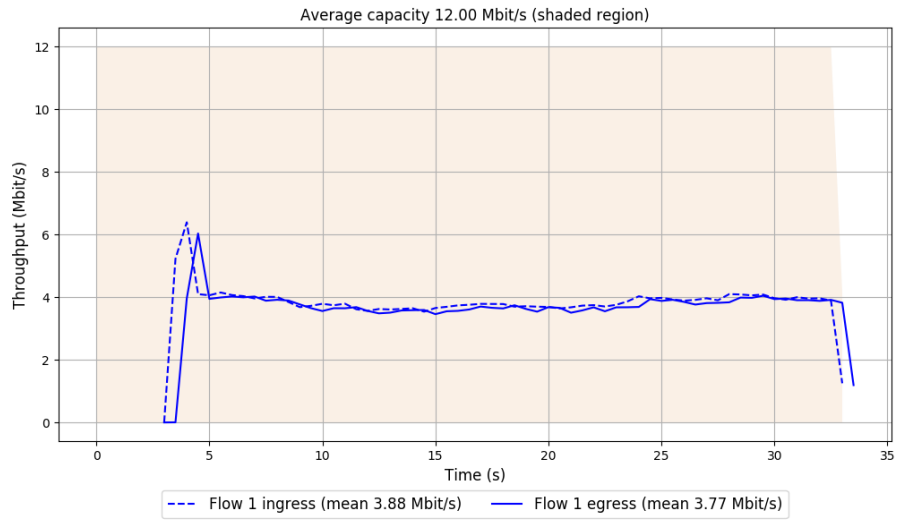
-- Flow 1:

Average throughput: 3.77 Mbit/s

95th percentile per-packet one-way delay: 52.195 ms

Loss rate: 2.89%

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2019-07-11 19:56:30

End at: 2019-07-11 19:57:01

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 8.02 Mbit/s (66.8% utilization)

95th percentile per-packet one-way delay: 52.126 ms

Loss rate: 2.98%

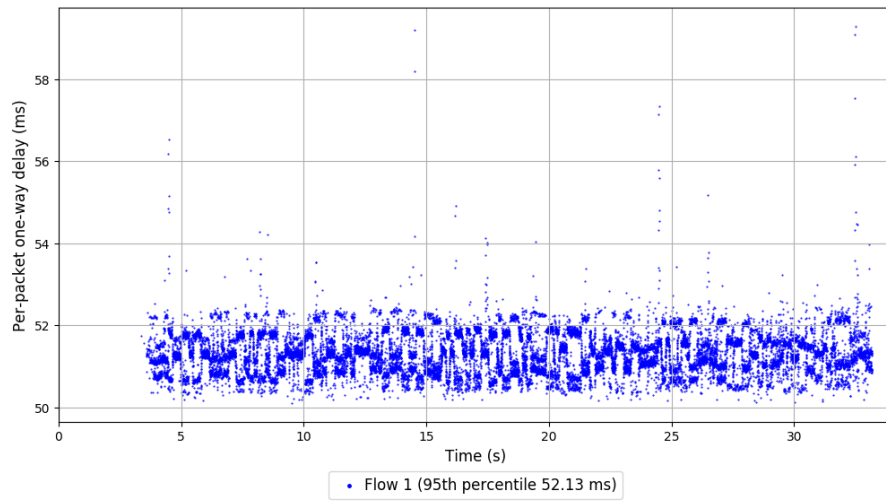
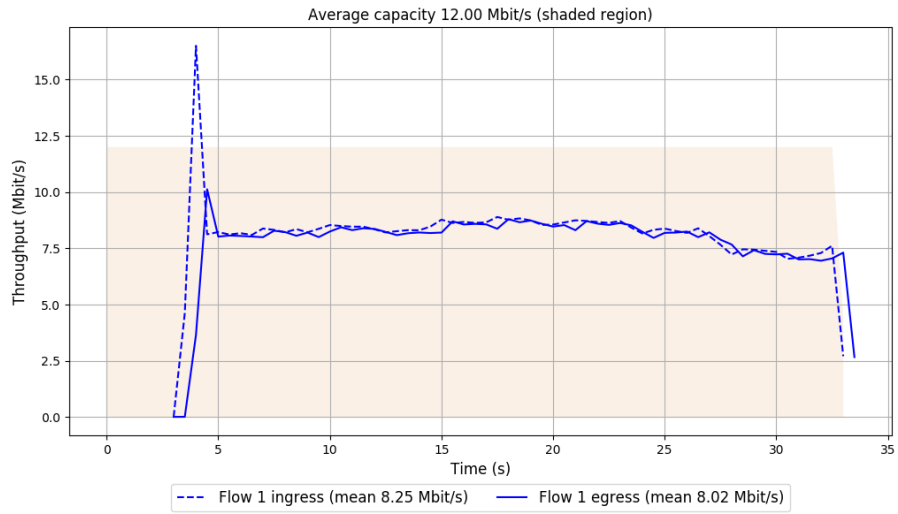
-- Flow 1:

Average throughput: 8.02 Mbit/s

95th percentile per-packet one-way delay: 52.126 ms

Loss rate: 2.98%

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

Start at: 2019-07-11 20:10:47

End at: 2019-07-11 20:11:17

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 9.28 Mbit/s (77.4% utilization)

95th percentile per-packet one-way delay: 52.077 ms

Loss rate: 2.95%

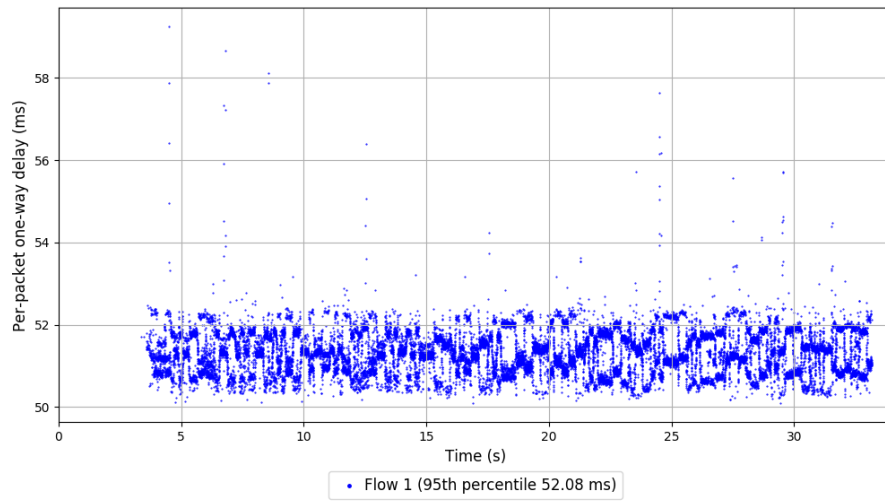
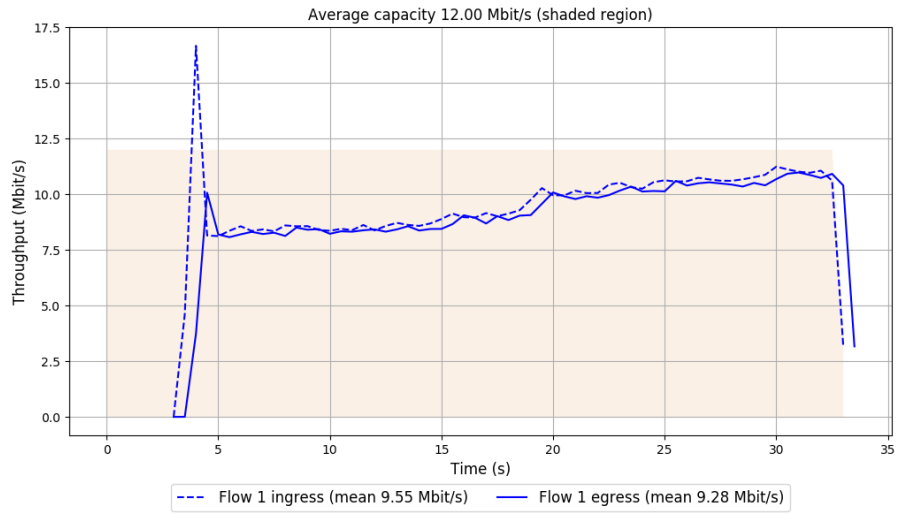
-- Flow 1:

Average throughput: 9.28 Mbit/s

95th percentile per-packet one-way delay: 52.077 ms

Loss rate: 2.95%

Run 3: Report of PCC-Allegro — Data Link



Run 1: Statistics of PCC-Expr

Start at: 2019-07-11 19:47:31

End at: 2019-07-11 19:48:01

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 8.00 Mbit/s (66.7% utilization)

95th percentile per-packet one-way delay: 52.011 ms

Loss rate: 6.34%

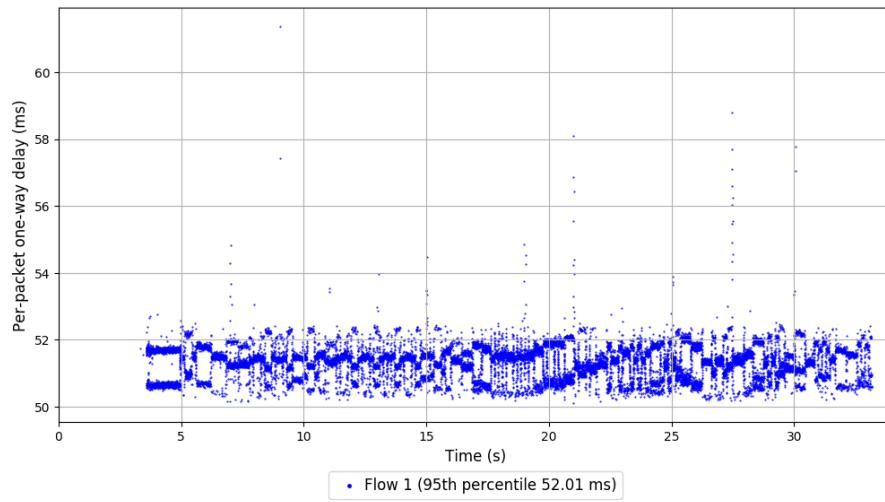
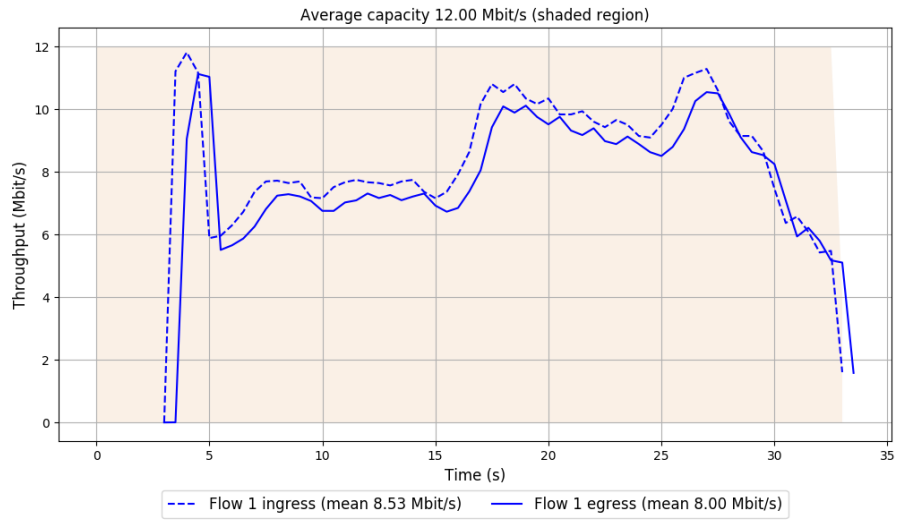
-- Flow 1:

Average throughput: 8.00 Mbit/s

95th percentile per-packet one-way delay: 52.011 ms

Loss rate: 6.34%

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

Start at: 2019-07-11 20:01:49

End at: 2019-07-11 20:02:19

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 7.68 Mbit/s (64.0% utilization)

95th percentile per-packet one-way delay: 52.061 ms

Loss rate: 6.44%

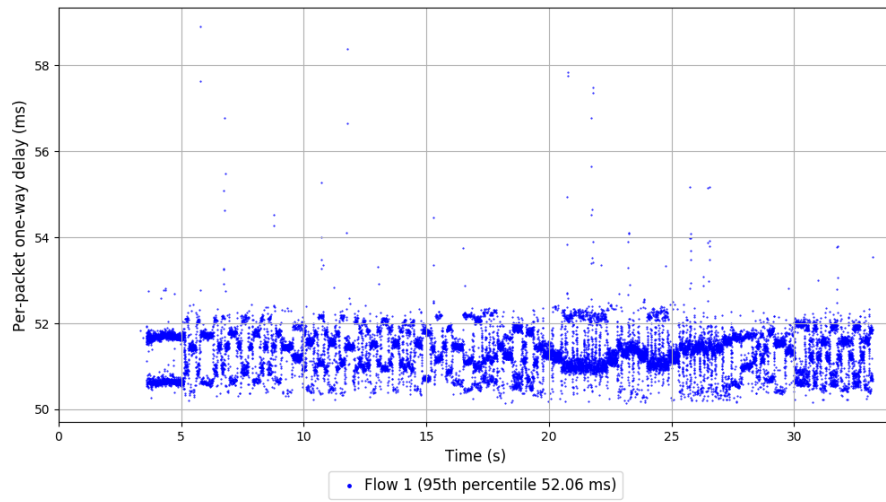
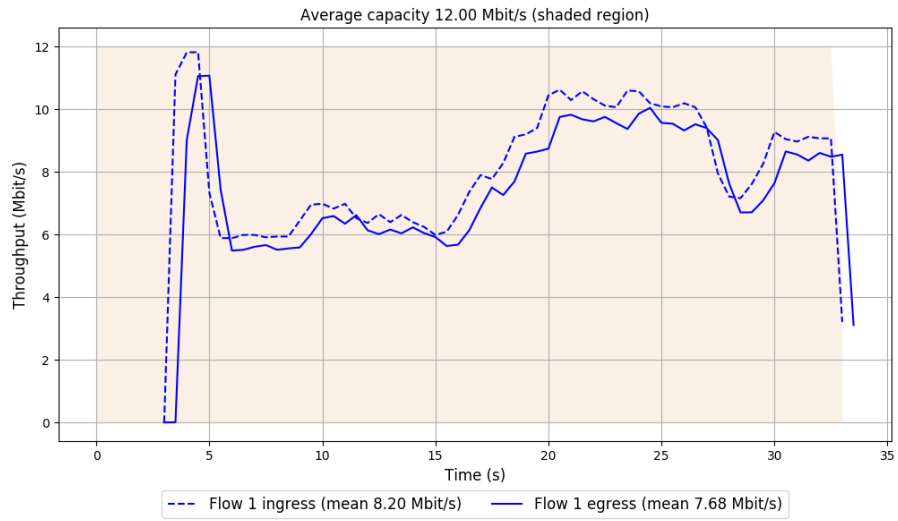
-- Flow 1:

Average throughput: 7.68 Mbit/s

95th percentile per-packet one-way delay: 52.061 ms

Loss rate: 6.44%

Run 2: Report of PCC-Expr — Data Link



Run 3: Statistics of PCC-Expr

Start at: 2019-07-11 20:16:07

End at: 2019-07-11 20:16:37

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 8.29 Mbit/s (69.1% utilization)

95th percentile per-packet one-way delay: 51.863 ms

Loss rate: 96.14%

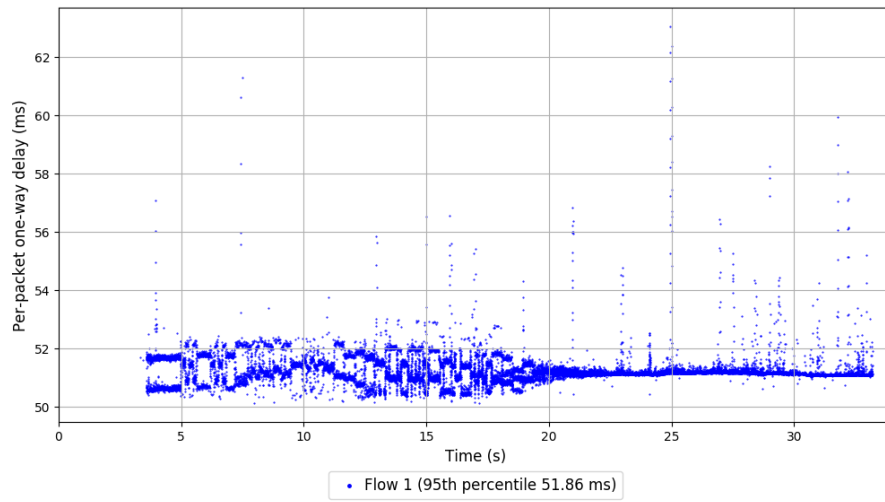
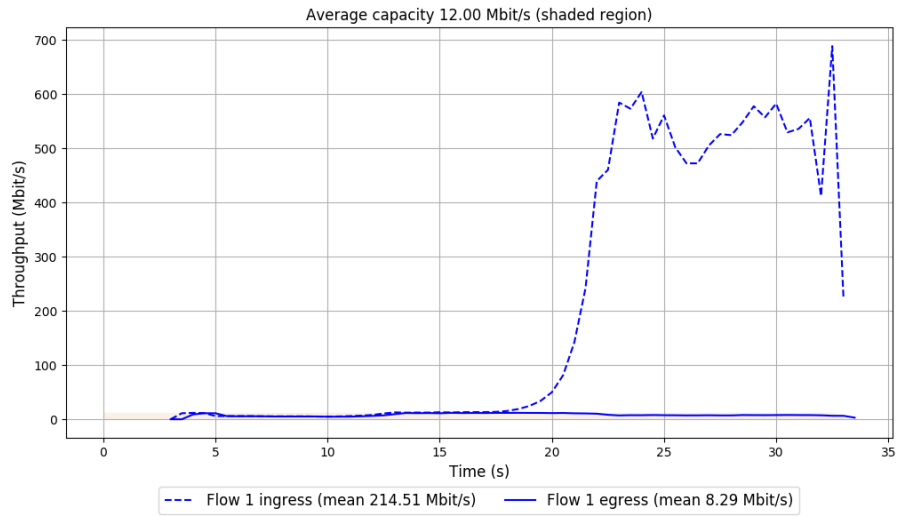
-- Flow 1:

Average throughput: 8.29 Mbit/s

95th percentile per-packet one-way delay: 51.863 ms

Loss rate: 96.14%

Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2019-07-11 19:41:38

End at: 2019-07-11 19:42:08

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 3.19 Mbit/s (26.6% utilization)

95th percentile per-packet one-way delay: 52.146 ms

Loss rate: 1.47%

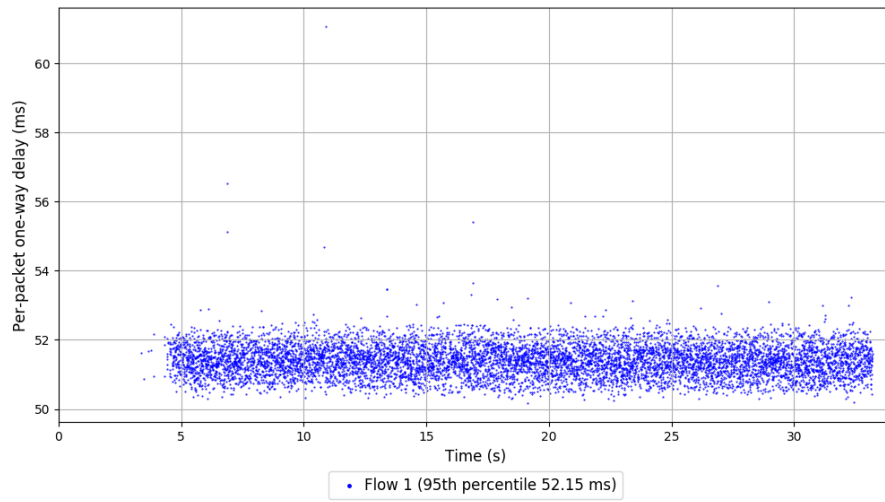
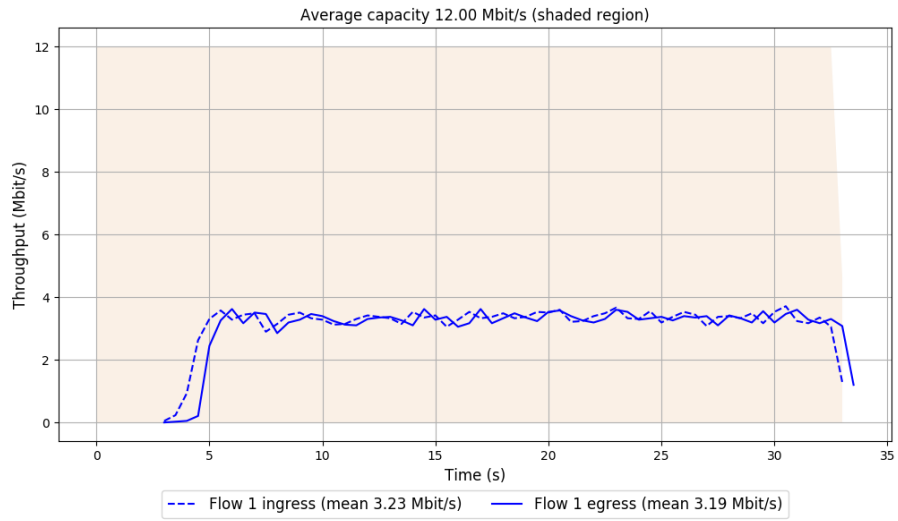
-- Flow 1:

Average throughput: 3.19 Mbit/s

95th percentile per-packet one-way delay: 52.146 ms

Loss rate: 1.47%

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

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

End at: 2019-07-11 19:56:25

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 3.18 Mbit/s (26.5% utilization)

95th percentile per-packet one-way delay: 52.214 ms

Loss rate: 1.61%

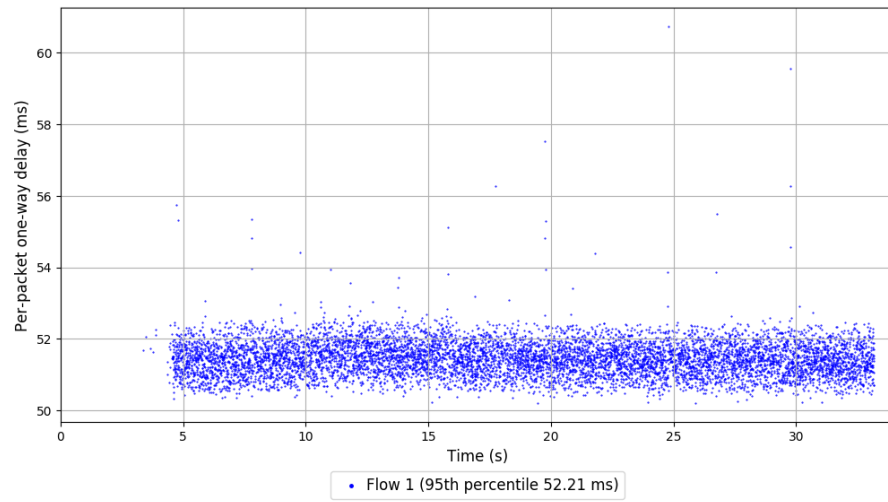
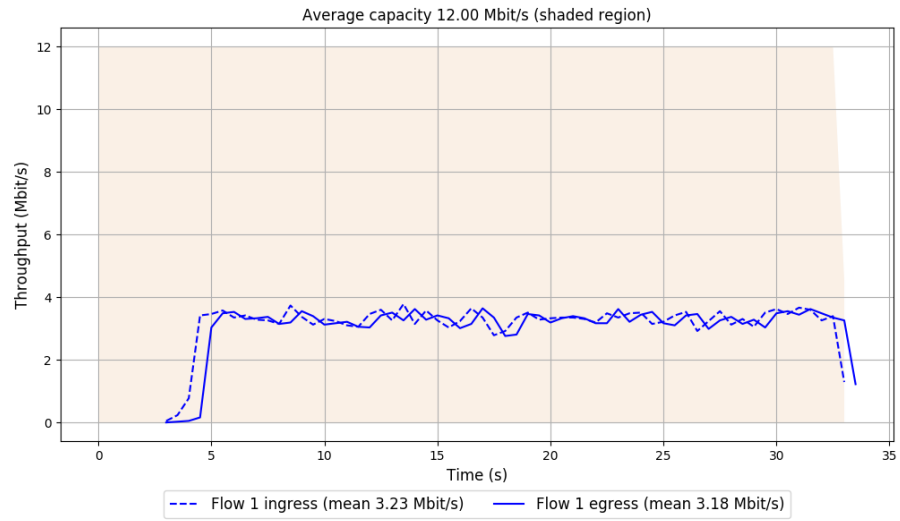
-- Flow 1:

Average throughput: 3.18 Mbit/s

95th percentile per-packet one-way delay: 52.214 ms

Loss rate: 1.61%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2019-07-11 20:10:12

End at: 2019-07-11 20:10:42

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 3.19 Mbit/s (26.6% utilization)

95th percentile per-packet one-way delay: 52.156 ms

Loss rate: 1.55%

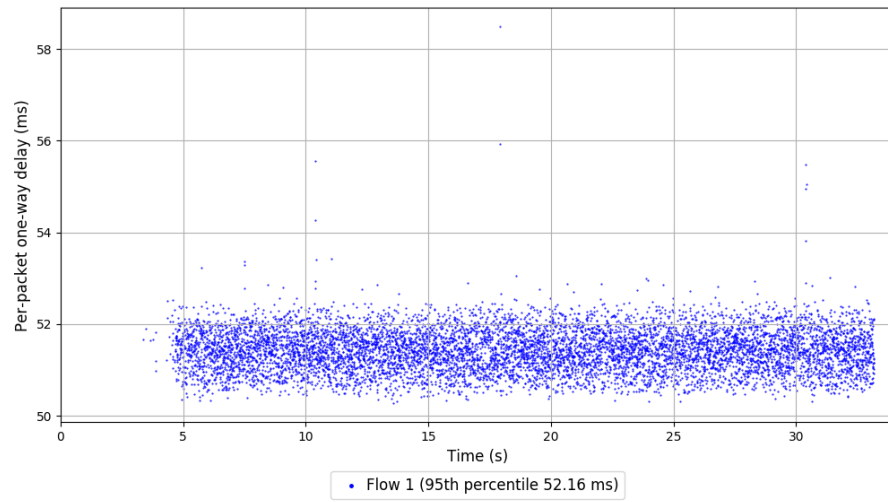
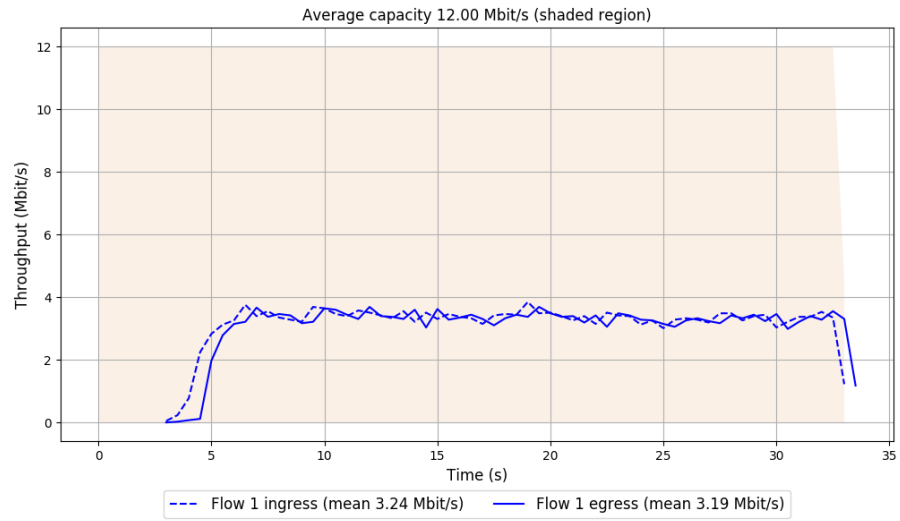
-- Flow 1:

Average throughput: 3.19 Mbit/s

95th percentile per-packet one-way delay: 52.156 ms

Loss rate: 1.55%

Run 3: Report of QUIC Cubic — Data Link



Run 1: Statistics of SCReAM

Start at: 2019-07-11 19:39:17

End at: 2019-07-11 19:39:47

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.20 Mbit/s (1.7% utilization)

95th percentile per-packet one-way delay: 52.652 ms

Loss rate: 0.30%

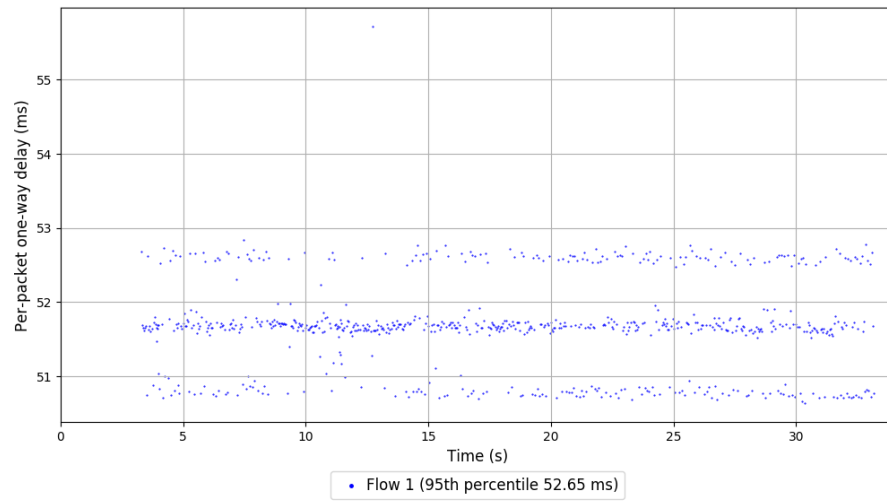
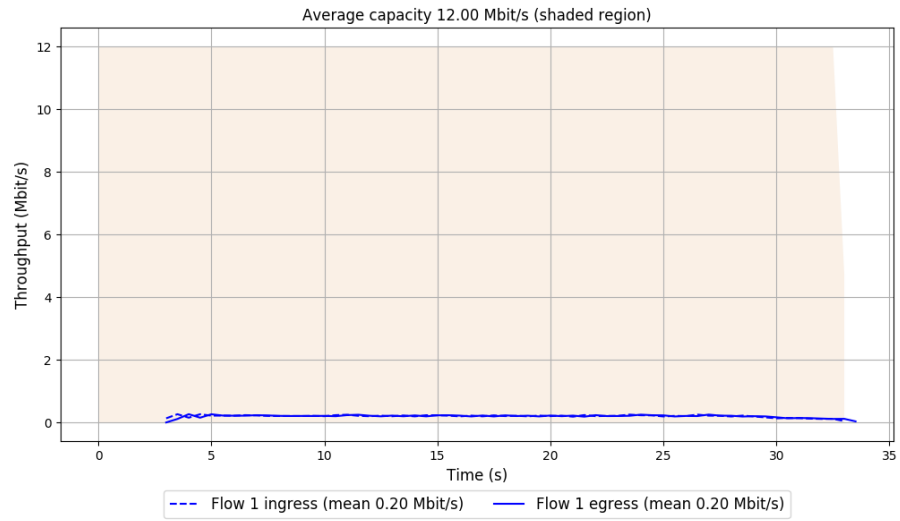
-- Flow 1:

Average throughput: 0.20 Mbit/s

95th percentile per-packet one-way delay: 52.652 ms

Loss rate: 0.30%

Run 1: Report of SCReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2019-07-11 19:53:35

End at: 2019-07-11 19:54:05

Below is generated by plot.py at 2019-07-11 20:21:30

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: 51.814 ms

Loss rate: 0.13%

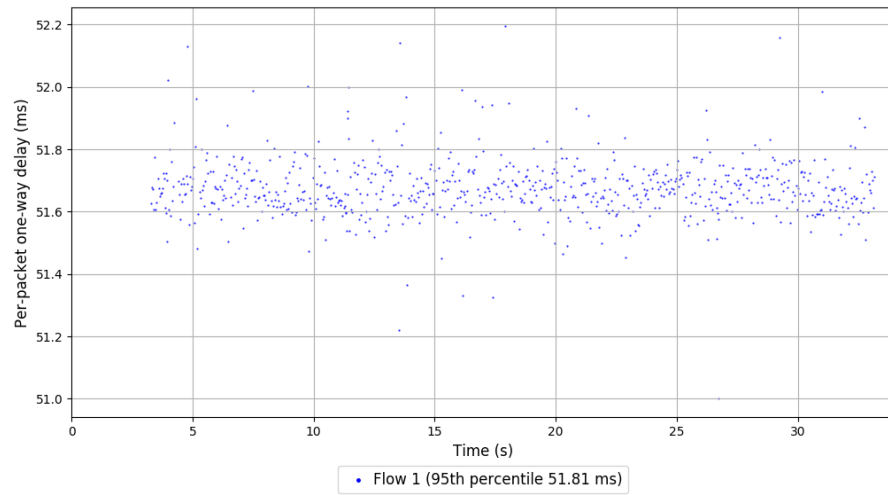
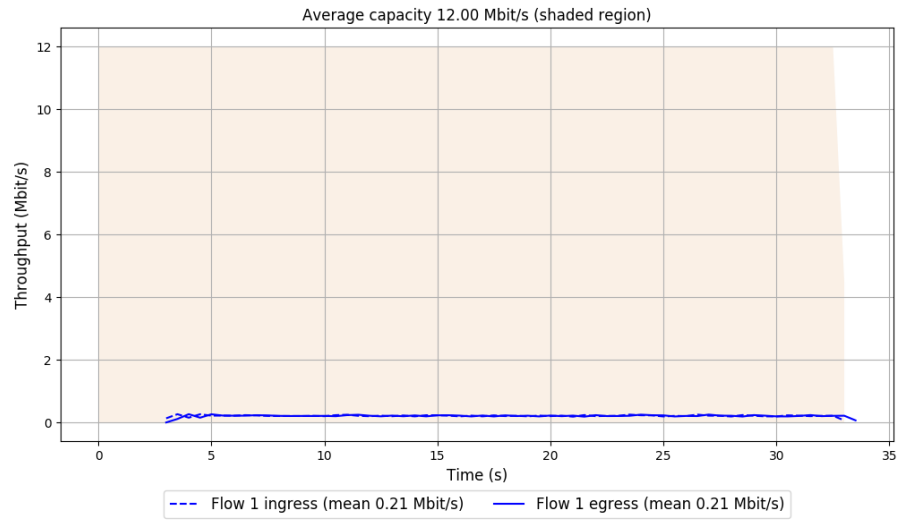
-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 51.814 ms

Loss rate: 0.13%

Run 2: Report of SCReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2019-07-11 20:07:52

End at: 2019-07-11 20:08:22

Below is generated by plot.py at 2019-07-11 20:21:30

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: 52.598 ms

Loss rate: 0.26%

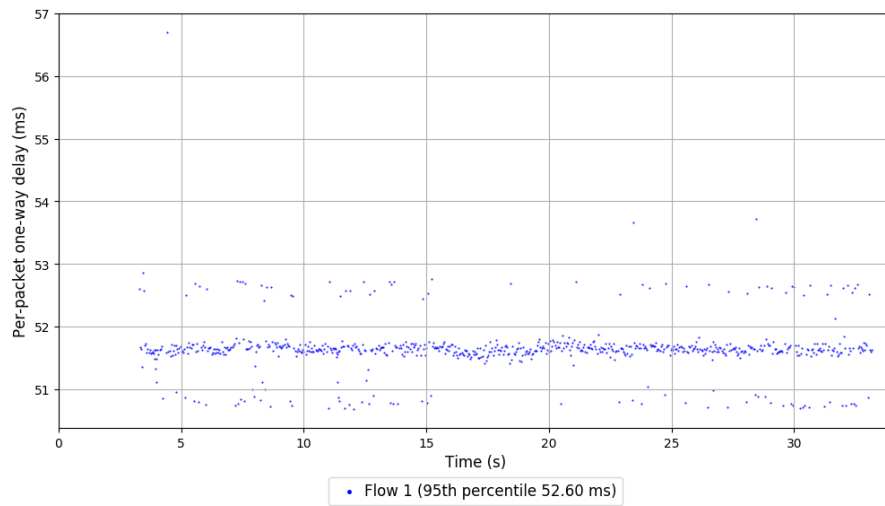
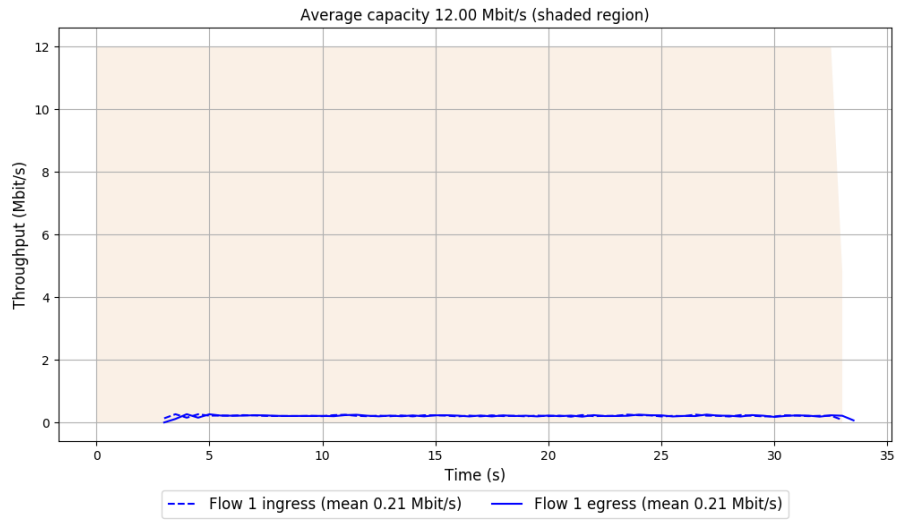
-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 52.598 ms

Loss rate: 0.26%

Run 3: Report of SCReAM — Data Link



Run 1: Statistics of Sprout

Start at: 2019-07-11 19:40:27

End at: 2019-07-11 19:40:57

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.18 Mbit/s (1.5% utilization)

95th percentile per-packet one-way delay: 52.245 ms

Loss rate: 7.11%

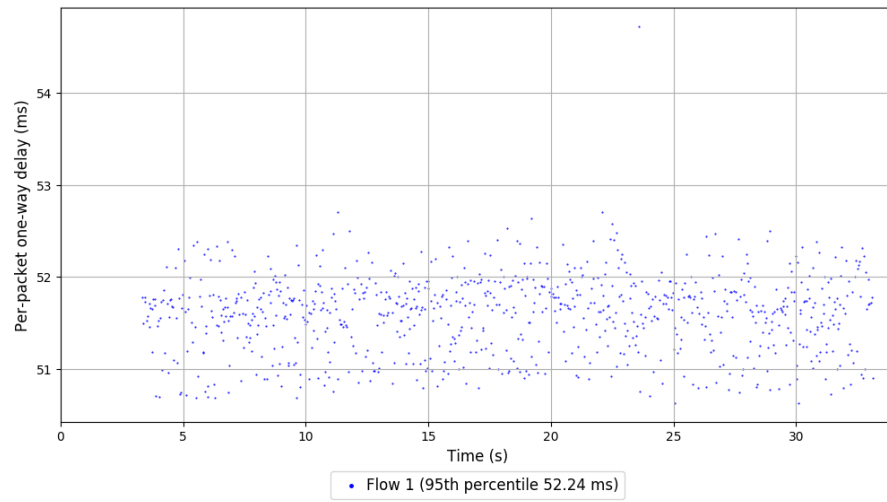
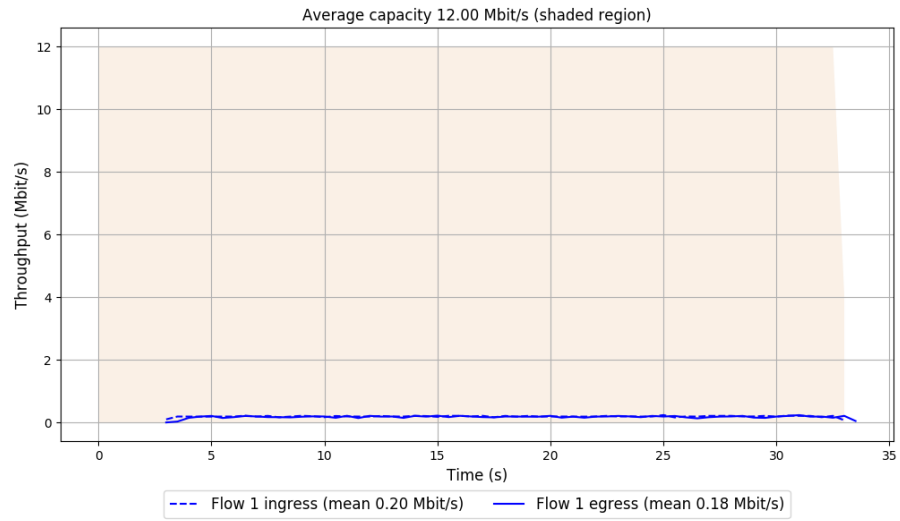
-- Flow 1:

Average throughput: 0.18 Mbit/s

95th percentile per-packet one-way delay: 52.245 ms

Loss rate: 7.11%

Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

Start at: 2019-07-11 19:54:45

End at: 2019-07-11 19:55:15

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.19 Mbit/s (1.5% utilization)

95th percentile per-packet one-way delay: 52.220 ms

Loss rate: 7.60%

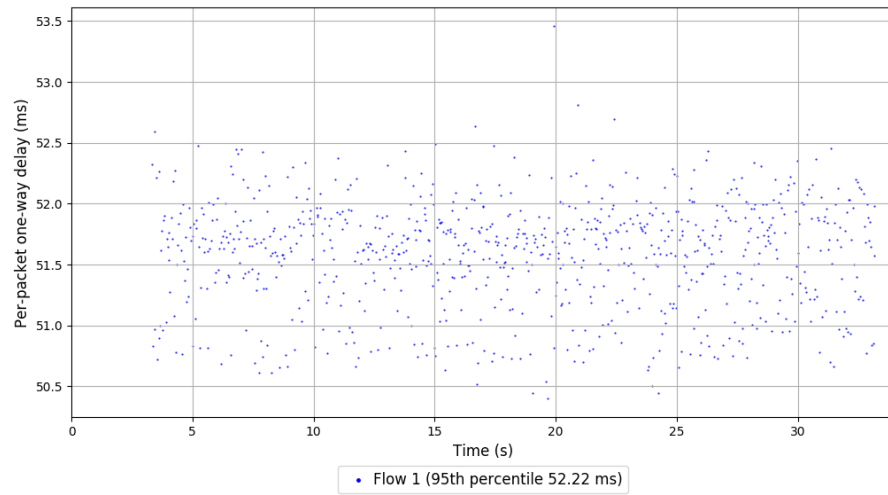
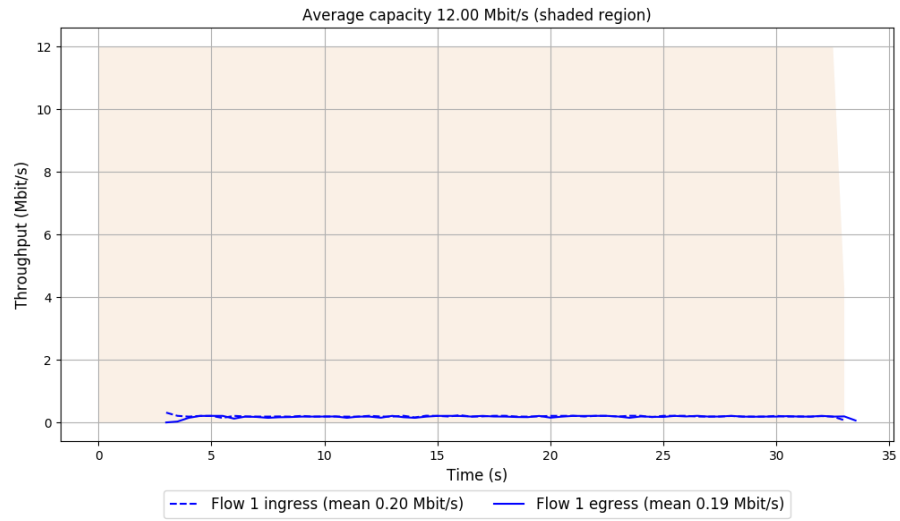
-- Flow 1:

Average throughput: 0.19 Mbit/s

95th percentile per-packet one-way delay: 52.220 ms

Loss rate: 7.60%

Run 2: Report of Sprout — Data Link



Run 3: Statistics of Sprout

Start at: 2019-07-11 20:09:02

End at: 2019-07-11 20:09:32

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.19 Mbit/s (1.6% utilization)

95th percentile per-packet one-way delay: 52.253 ms

Loss rate: 7.37%

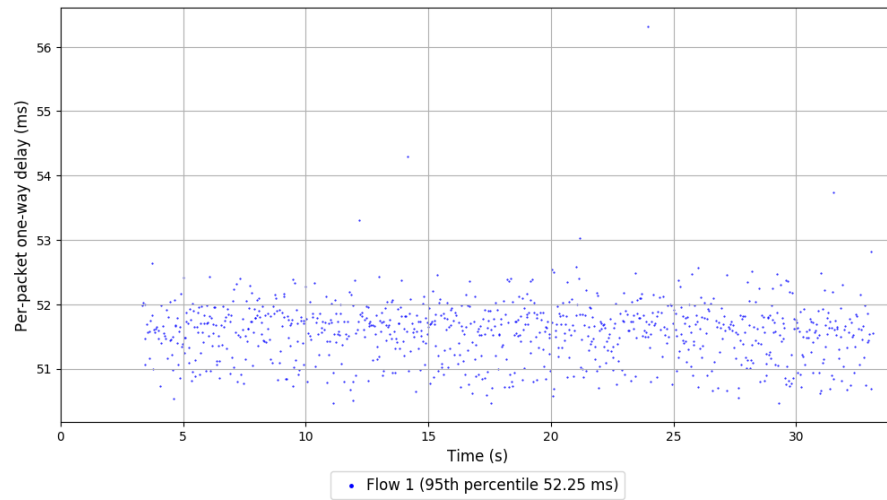
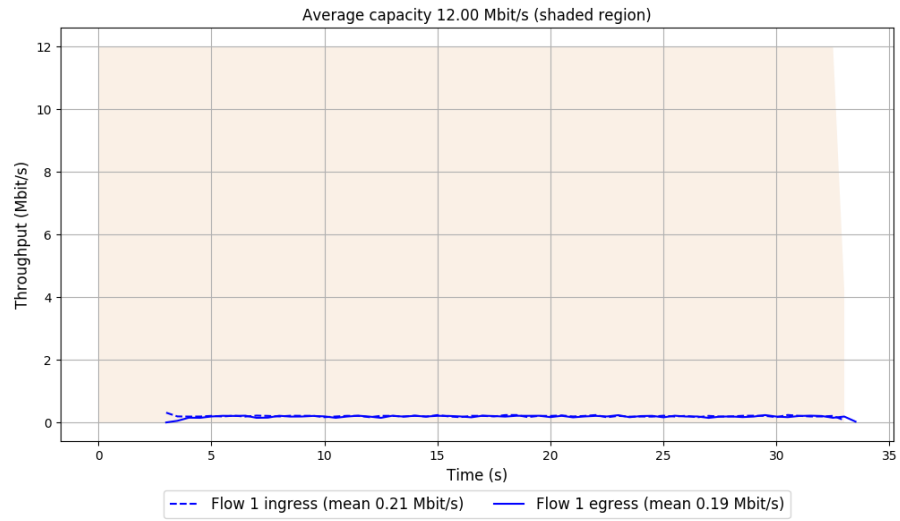
-- Flow 1:

Average throughput: 0.19 Mbit/s

95th percentile per-packet one-way delay: 52.253 ms

Loss rate: 7.37%

Run 3: Report of Sprout — Data Link

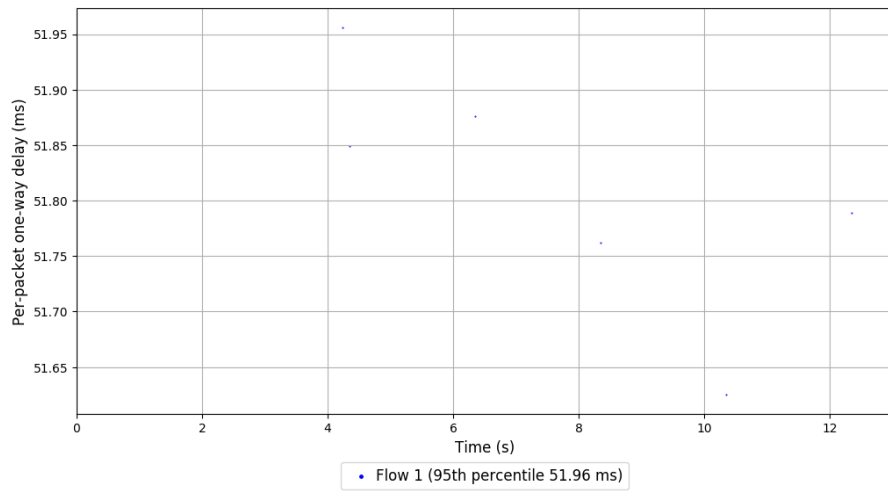
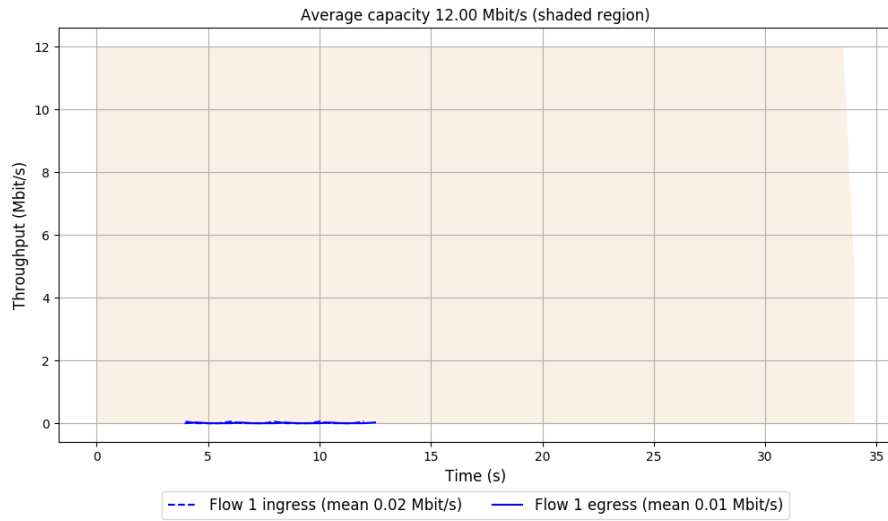


Run 1: Statistics of TaoVA-100x

Start at: 2019-07-11 19:35:35

End at: 2019-07-11 19:36:05

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



Run 2: Statistics of TaoVA-100x

Start at: 2019-07-11 19:49:52

End at: 2019-07-11 19:50:22

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.01 Mbit/s (0.1% utilization)

95th percentile per-packet one-way delay: 51.845 ms

Loss rate: 51.91%

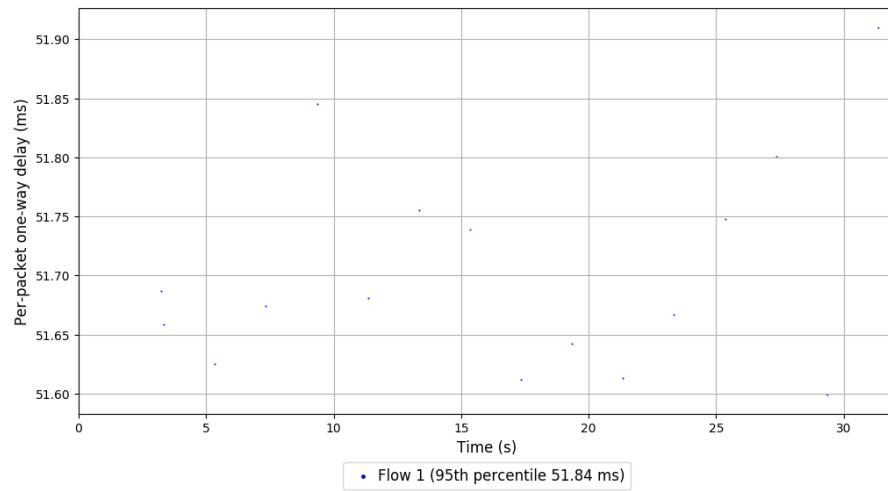
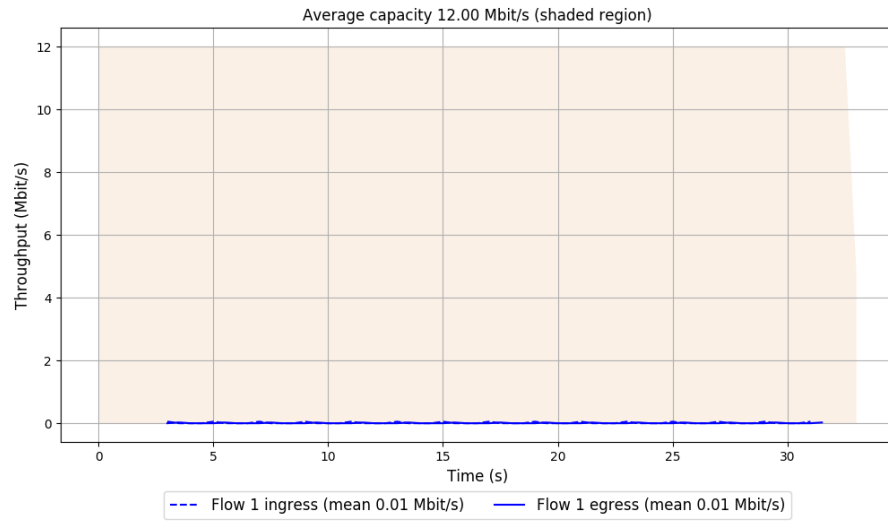
-- Flow 1:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 51.845 ms

Loss rate: 51.91%

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



Run 3: Statistics of TaoVA-100x

Start at: 2019-07-11 20:04:10

End at: 2019-07-11 20:04:41

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.01 Mbit/s (0.1% utilization)

95th percentile per-packet one-way delay: 51.798 ms

Loss rate: 51.91%

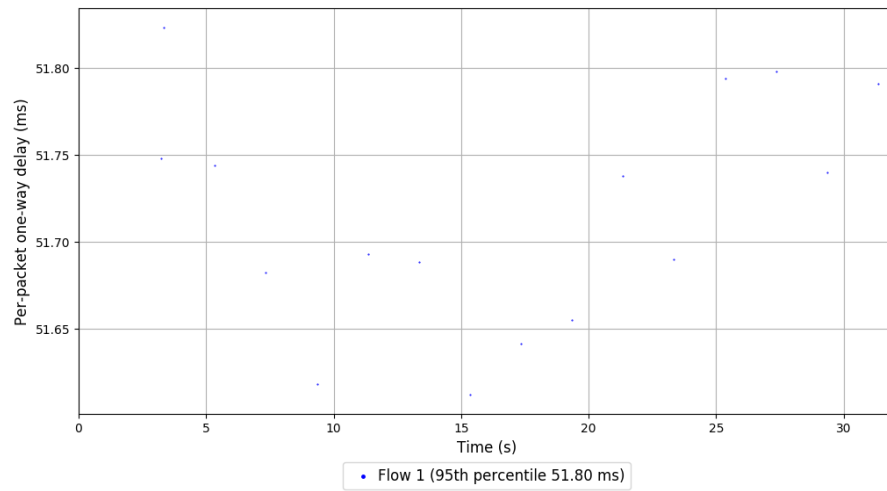
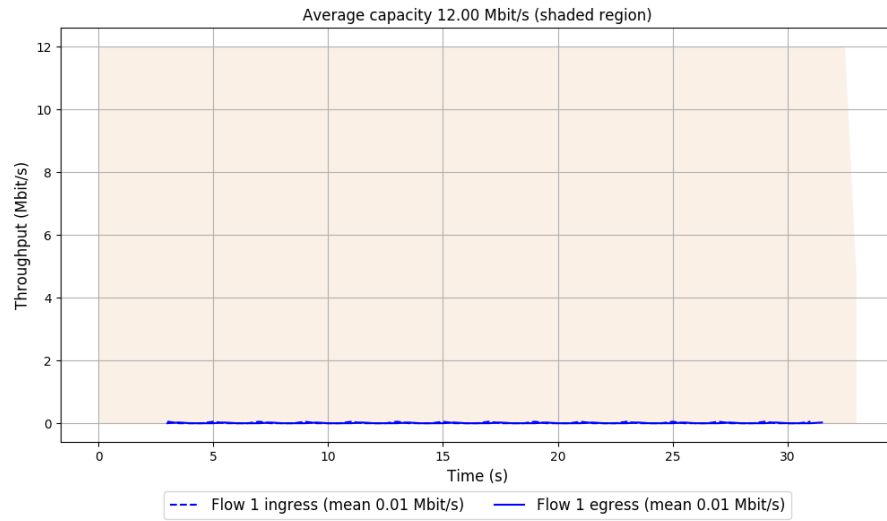
-- Flow 1:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 51.798 ms

Loss rate: 51.91%

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



Run 1: Statistics of TCP Vegas

Start at: 2019-07-11 19:48:06

End at: 2019-07-11 19:48:36

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 20:02:25

End at: 2019-07-11 20:02:55

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 20:16:49

End at: 2019-07-11 20:17:19

Run 3: Report of TCP Vegas — Data Link

Figure is missing

Figure is missing

Run 1: Statistics of Verus

Start at: 2019-07-11 19:38:07

End at: 2019-07-11 19:38:37

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.06 Mbit/s (0.5% utilization)

95th percentile per-packet one-way delay: 51.708 ms

Loss rate: 44.11%

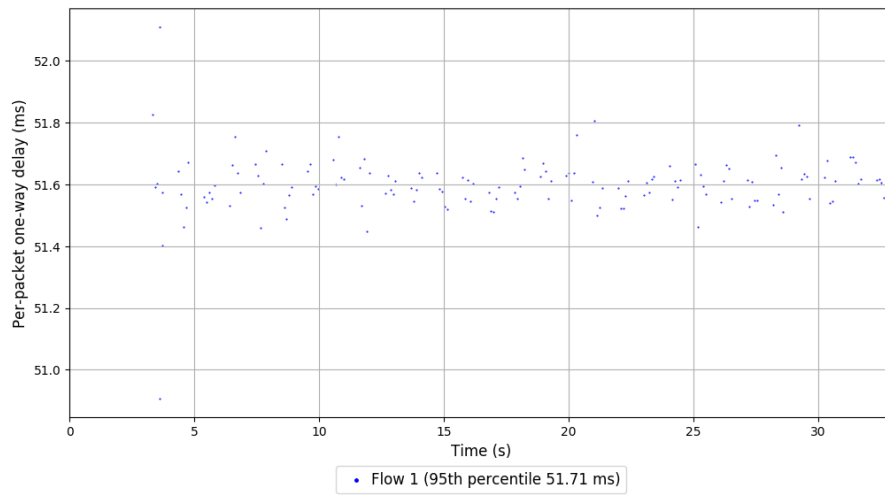
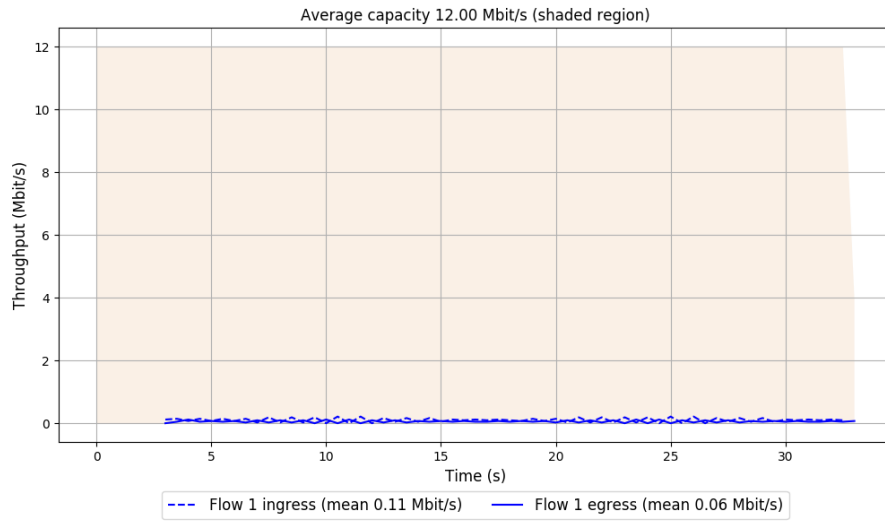
-- Flow 1:

Average throughput: 0.06 Mbit/s

95th percentile per-packet one-way delay: 51.708 ms

Loss rate: 44.11%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2019-07-11 19:52:23

End at: 2019-07-11 19:52:53

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 1.66 Mbit/s (13.9% utilization)

95th percentile per-packet one-way delay: 52.140 ms

Loss rate: 98.41%

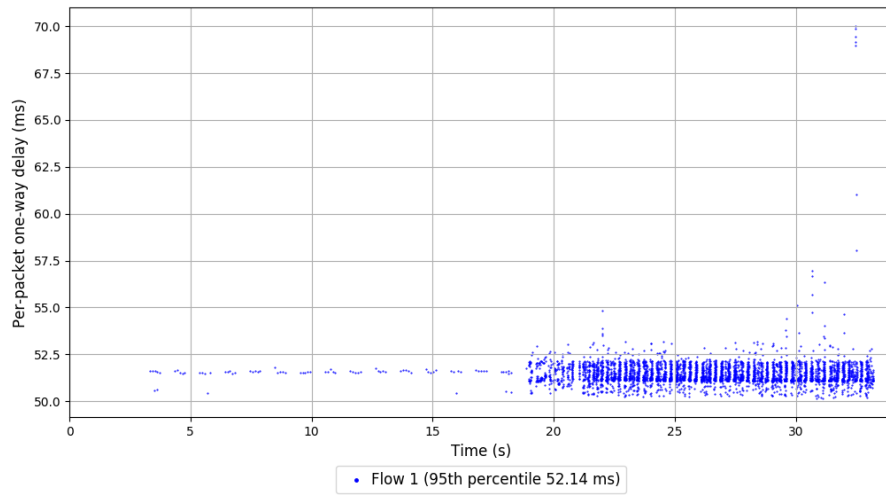
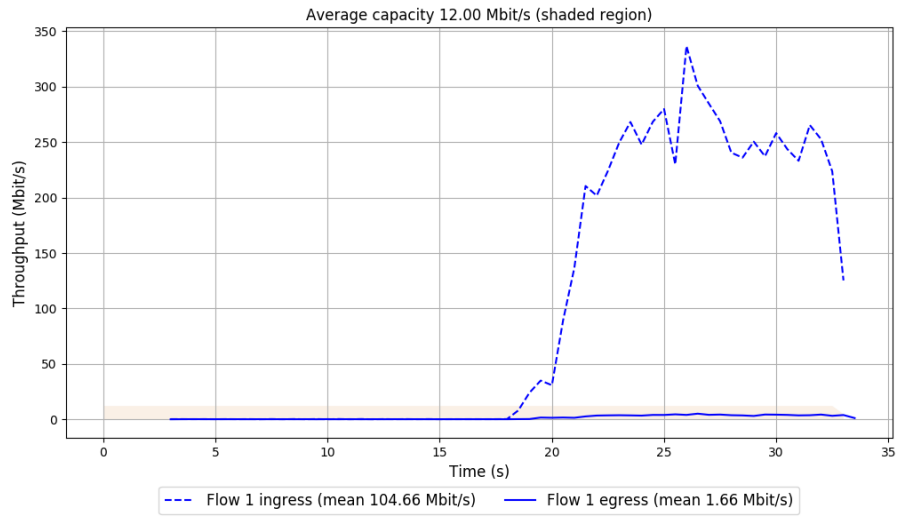
-- Flow 1:

Average throughput: 1.66 Mbit/s

95th percentile per-packet one-way delay: 52.140 ms

Loss rate: 98.41%

Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2019-07-11 20:06:42

End at: 2019-07-11 20:07:12

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 0.06 Mbit/s (0.5% utilization)

95th percentile per-packet one-way delay: 51.752 ms

Loss rate: 44.06%

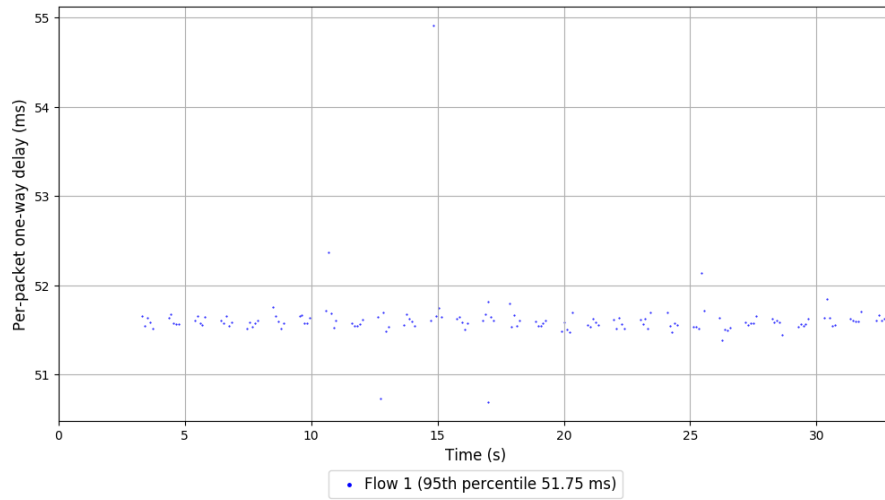
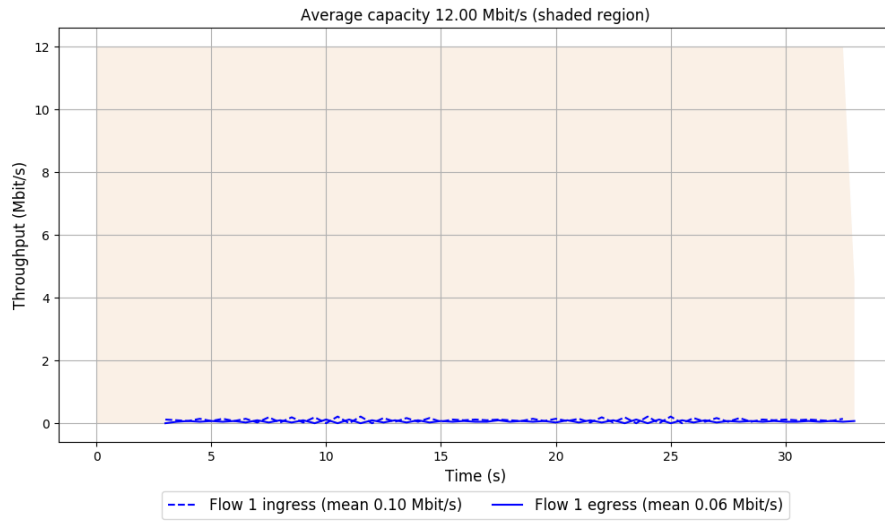
-- Flow 1:

Average throughput: 0.06 Mbit/s

95th percentile per-packet one-way delay: 51.752 ms

Loss rate: 44.06%

Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

Start at: 2019-07-11 19:49:16

End at: 2019-07-11 19:49:46

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 6.90 Mbit/s (57.5% utilization)

95th percentile per-packet one-way delay: 52.056 ms

Loss rate: 0.31%

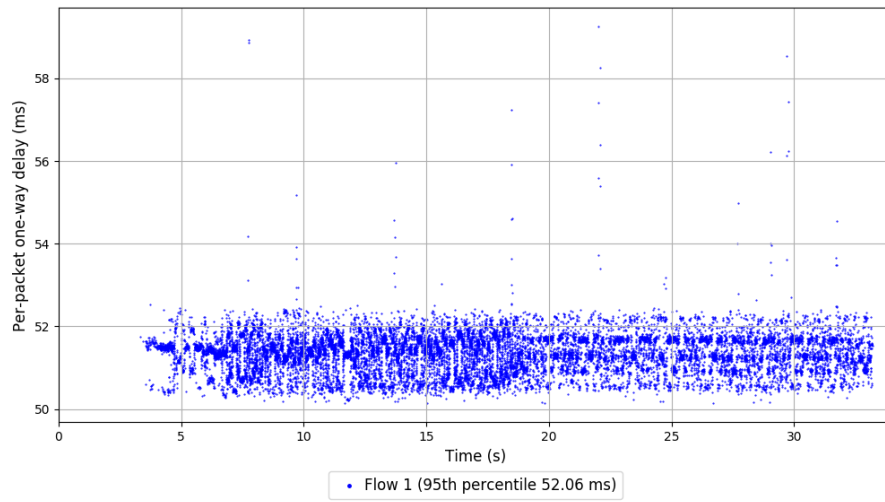
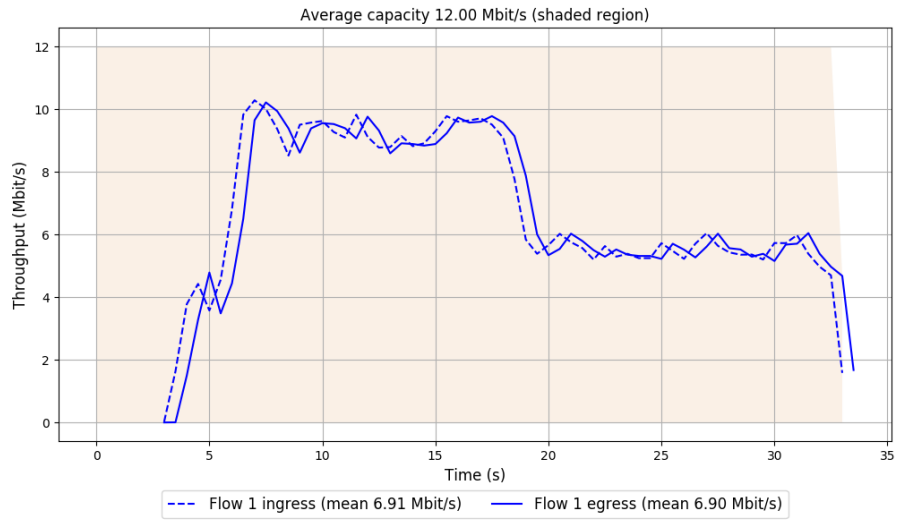
-- Flow 1:

Average throughput: 6.90 Mbit/s

95th percentile per-packet one-way delay: 52.056 ms

Loss rate: 0.31%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2019-07-11 20:03:35

End at: 2019-07-11 20:04:05

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 5.46 Mbit/s (45.5% utilization)

95th percentile per-packet one-way delay: 52.188 ms

Loss rate: 0.81%

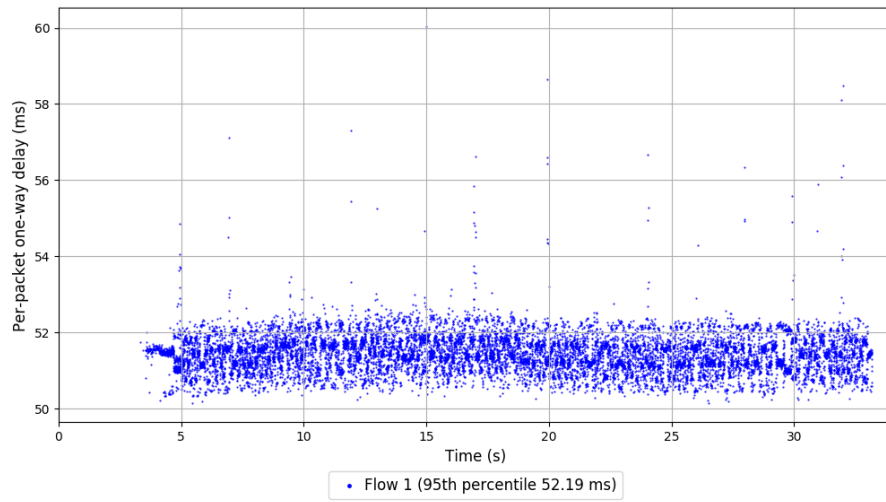
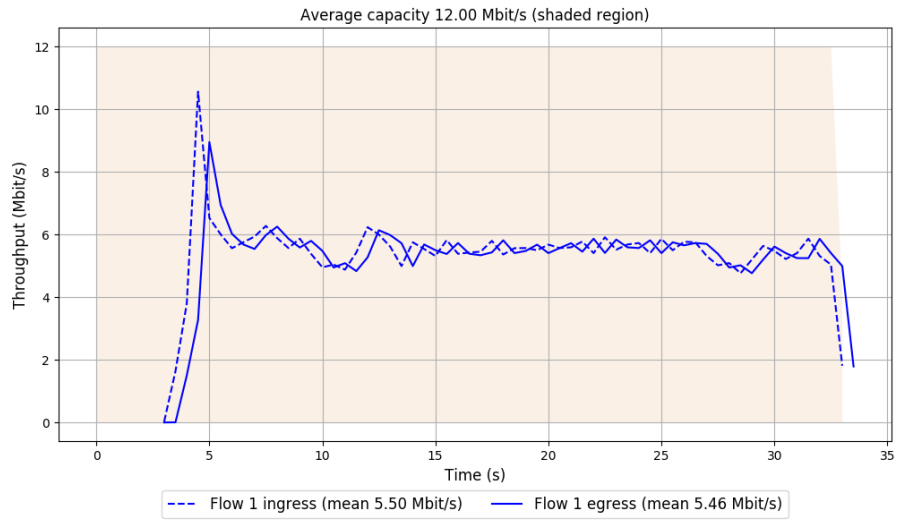
-- Flow 1:

Average throughput: 5.46 Mbit/s

95th percentile per-packet one-way delay: 52.188 ms

Loss rate: 0.81%

Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

Start at: 2019-07-11 20:17:59

End at: 2019-07-11 20:18:29

Below is generated by plot.py at 2019-07-11 20:21:30

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 5.51 Mbit/s (45.9% utilization)

95th percentile per-packet one-way delay: 52.115 ms

Loss rate: 0.51%

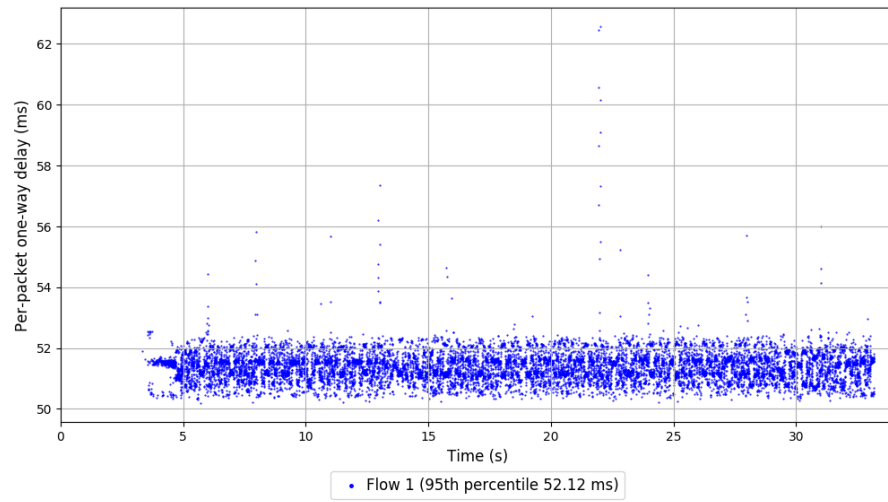
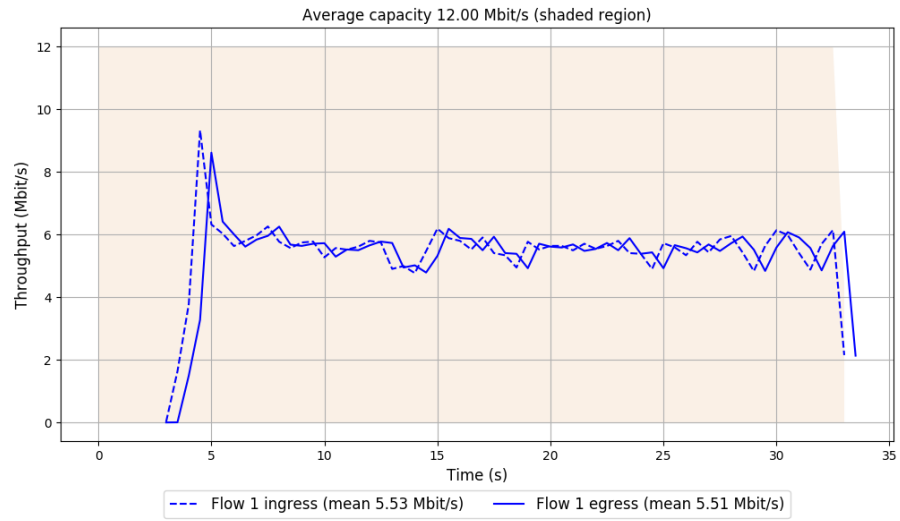
-- Flow 1:

Average throughput: 5.51 Mbit/s

95th percentile per-packet one-way delay: 52.115 ms

Loss rate: 0.51%

Run 3: Report of PCC-Vivace — Data Link

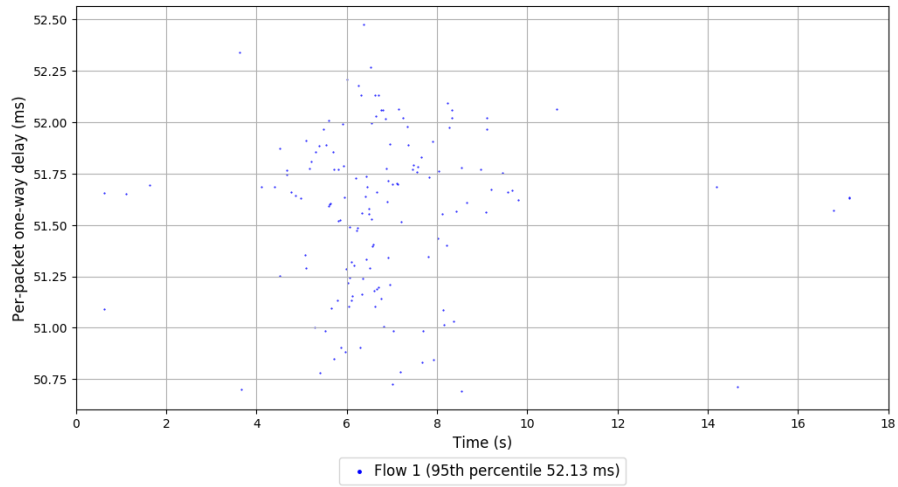
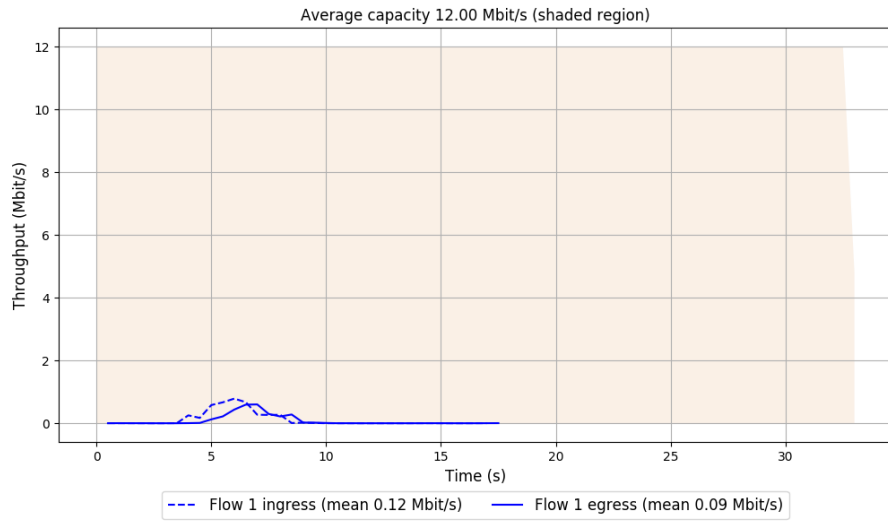


Run 1: Statistics of WebRTC media

Start at: 2019-07-11 19:46:21

End at: 2019-07-11 19:46:51

Run 1: Report of WebRTC media — Data Link

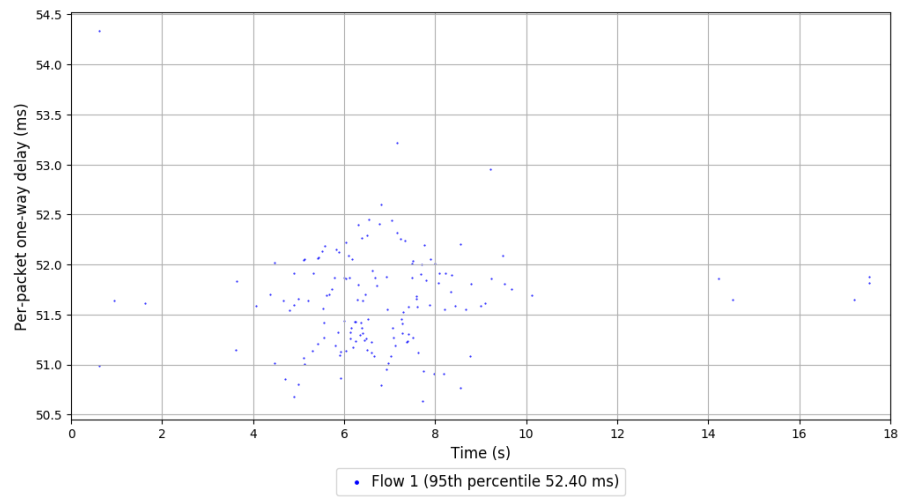
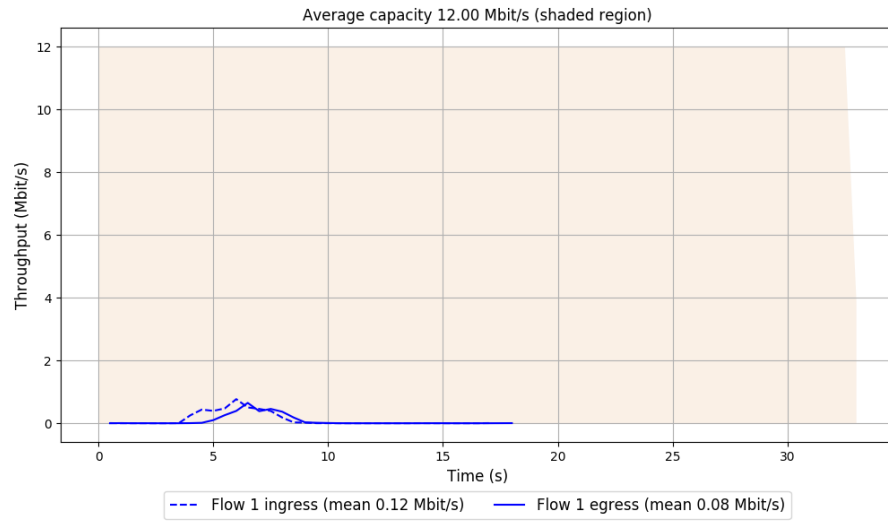


Run 2: Statistics of WebRTC media

Start at: 2019-07-11 20:00:39

End at: 2019-07-11 20:01:09

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2019-07-11 20:14:57

End at: 2019-07-11 20:15:27

Run 3: Report of WebRTC media — Data Link

