

## Pantheon Report

Generated at 2018-09-25 05:29:32 (UTC).

Tested in mahimahi: mm-delay 51 mm-loss uplink 0.0006 mm-link 77.72mbps.trace  
77.72mbps.trace --uplink-queue=droptail --uplink-queue-args=packets=94

Repeated the test of 19 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

### System info:

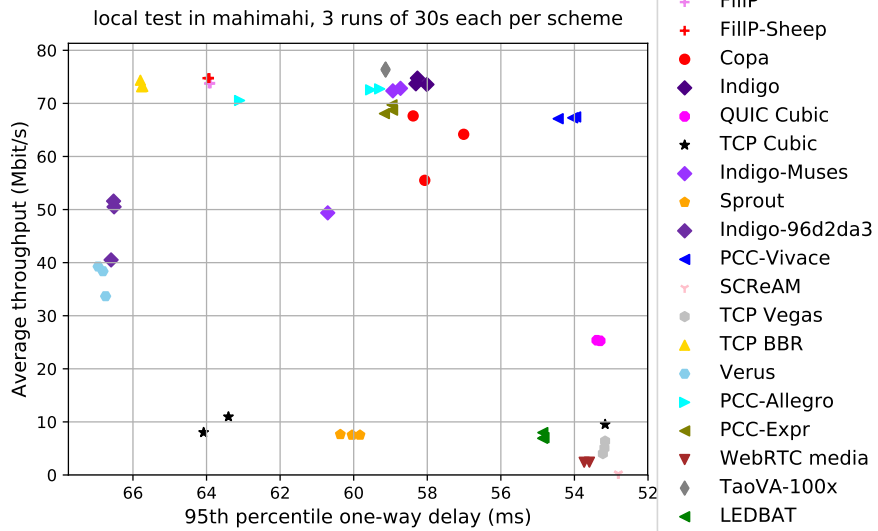
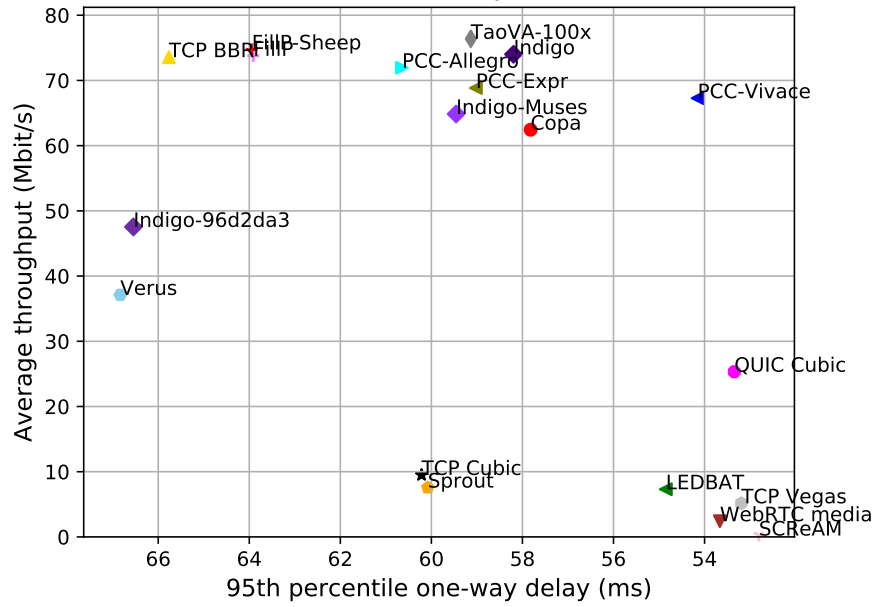
```
Linux 4.15.0-1019-gcp
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
net.ipv4.tcp_mem = 190986 254651 381972
```

### Git summary:

```
branch: muses @ 90192f6b64ce1a1191dcca0e9ff9ee24950674d7
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/indigo-96d2da3 @ 8413272d46f8aa0bcb967ed7048b6a8f994abb95
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 65ac1b19bbefed0c6349ae986009b4fa8643c40a
third_party/pantheon-tunnel @ cbfce6db5ff5740dafe1771f813cd646339e1952
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	3	73.57	65.77	3.81
Copa	3	62.44	57.82	1.67
TCP Cubic	3	9.50	60.22	1.48
FillP	3	73.77	63.91	9.23
FillP-Sheep	3	74.76	63.95	7.49
Indigo	3	74.00	58.20	1.60
Indigo-96d2da3	3	47.54	66.54	59.08
LEDBAT	3	7.31	54.85	0.19
Indigo-Muses	3	64.86	59.46	1.11
PCC-Allegro	3	71.94	60.64	1.61
PCC-Expr	3	68.85	59.02	1.42
QUIC Cubic	2	25.32	53.35	0.67
SReAM	3	0.21	52.81	0.22
Sprout	3	7.56	60.08	0.24
TaoVA-100x	3	76.38	59.13	10.07
TCP Vegas	3	5.15	53.19	0.29
Verus	3	37.11	66.83	81.11
PCC-Vivace	3	67.28	54.15	0.69
WebRTC media	2	2.41	53.66	0.24

Run 1: Statistics of TCP BBR

Start at: 2018-09-25 04:48:52

End at: 2018-09-25 04:49:22

# Below is generated by plot.py at 2018-09-25 05:21:17

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 73.14 Mbit/s (94.1% utilization)

95th percentile per-packet one-way delay: 65.764 ms

Loss rate: 3.74%

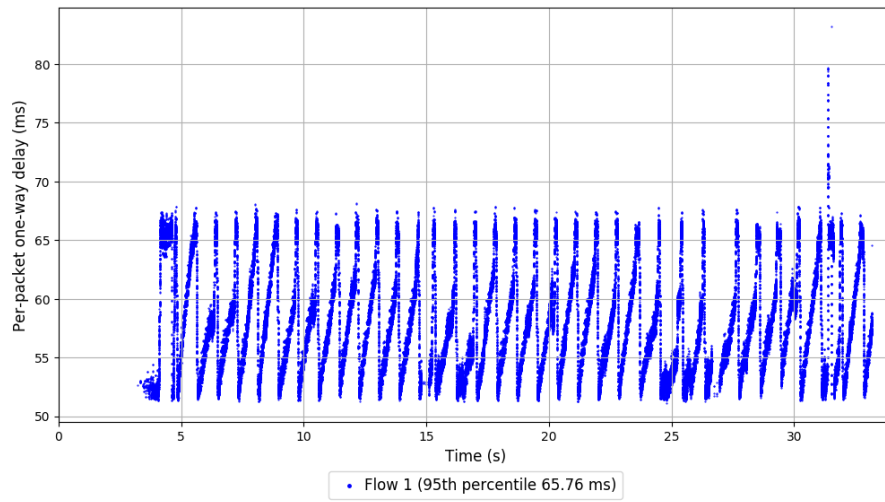
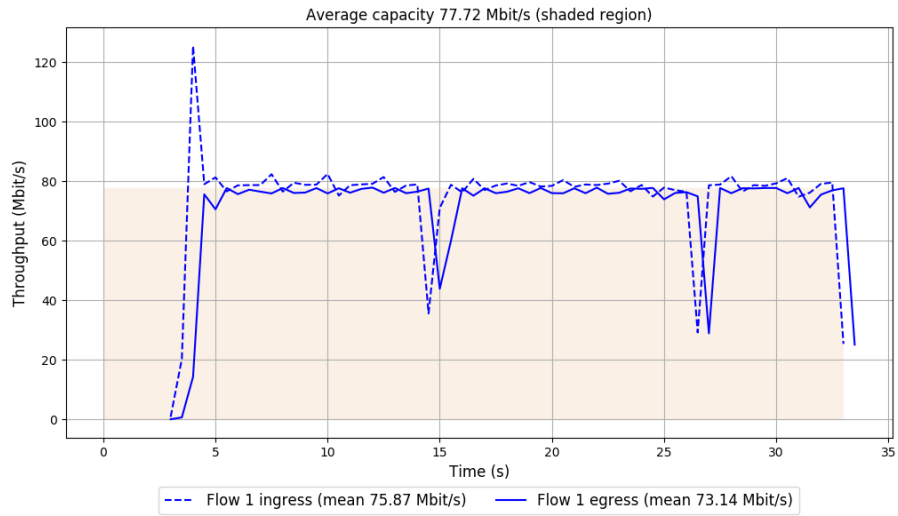
-- Flow 1:

Average throughput: 73.14 Mbit/s

95th percentile per-packet one-way delay: 65.764 ms

Loss rate: 3.74%

# Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-09-25 05:01:12

End at: 2018-09-25 05:01:42

# Below is generated by plot.py at 2018-09-25 05:21:17

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 73.20 Mbit/s (94.2% utilization)

95th percentile per-packet one-way delay: 65.733 ms

Loss rate: 3.97%

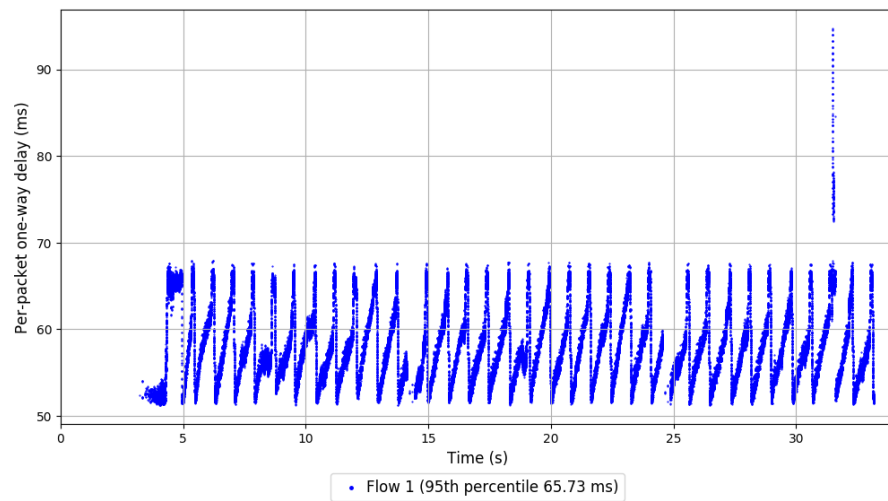
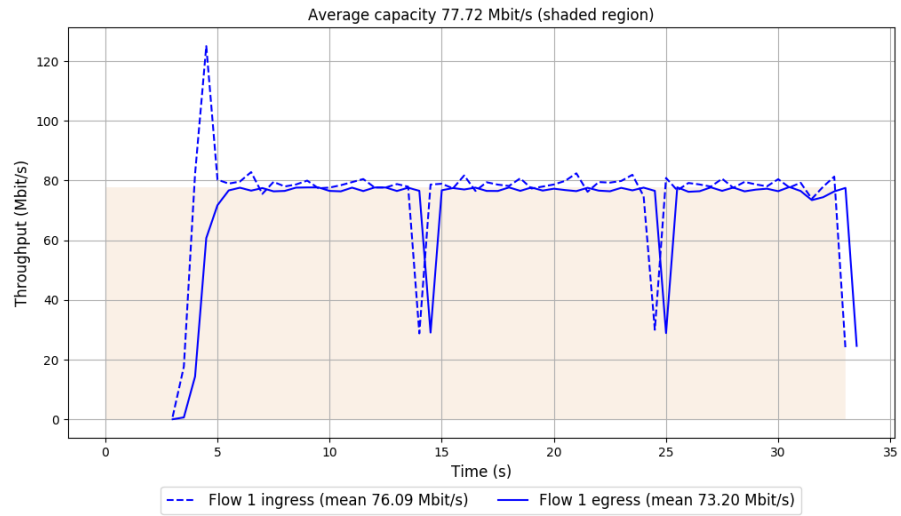
-- Flow 1:

Average throughput: 73.20 Mbit/s

95th percentile per-packet one-way delay: 65.733 ms

Loss rate: 3.97%

## Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-09-25 05:13:32

End at: 2018-09-25 05:14:02

# Below is generated by plot.py at 2018-09-25 05:21:18

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 74.37 Mbit/s (95.7% utilization)

95th percentile per-packet one-way delay: 65.798 ms

Loss rate: 3.72%

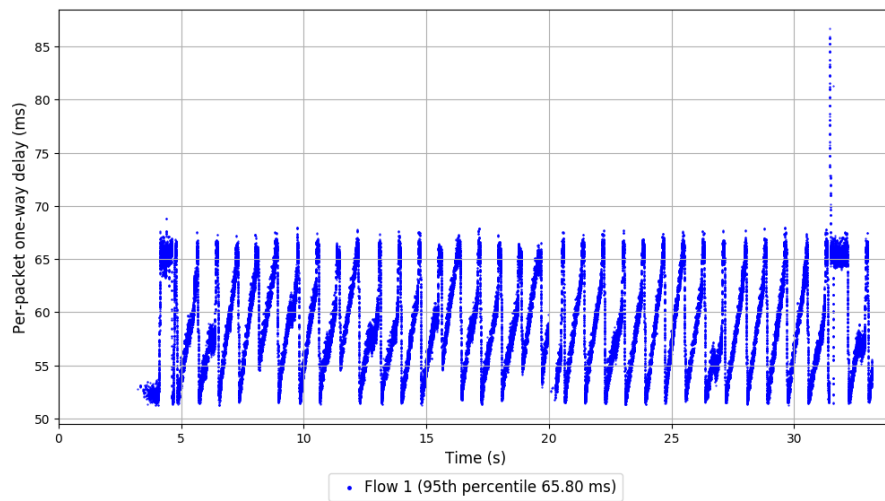
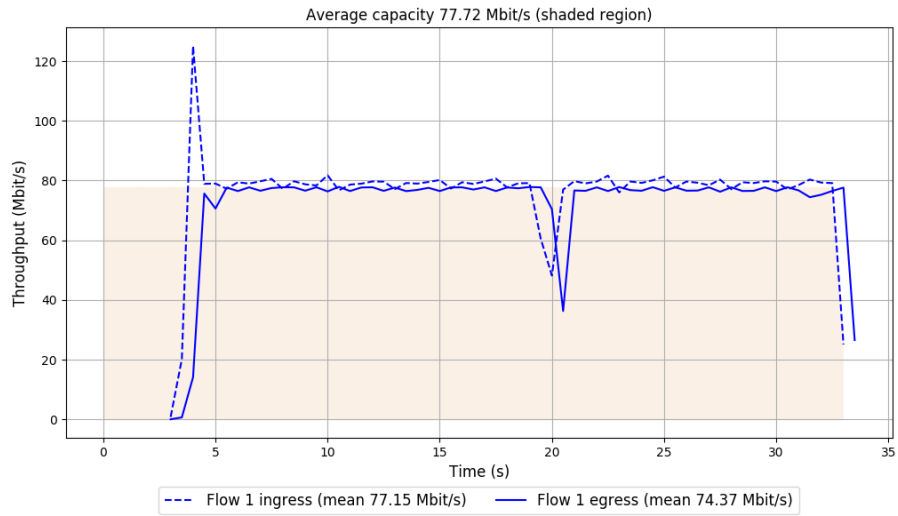
-- Flow 1:

Average throughput: 74.37 Mbit/s

95th percentile per-packet one-way delay: 65.798 ms

Loss rate: 3.72%

### Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of Copa

Start at: 2018-09-25 04:51:23

End at: 2018-09-25 04:51:53

# Below is generated by plot.py at 2018-09-25 05:22:15

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 67.64 Mbit/s (87.0% utilization)

95th percentile per-packet one-way delay: 58.384 ms

Loss rate: 2.11%

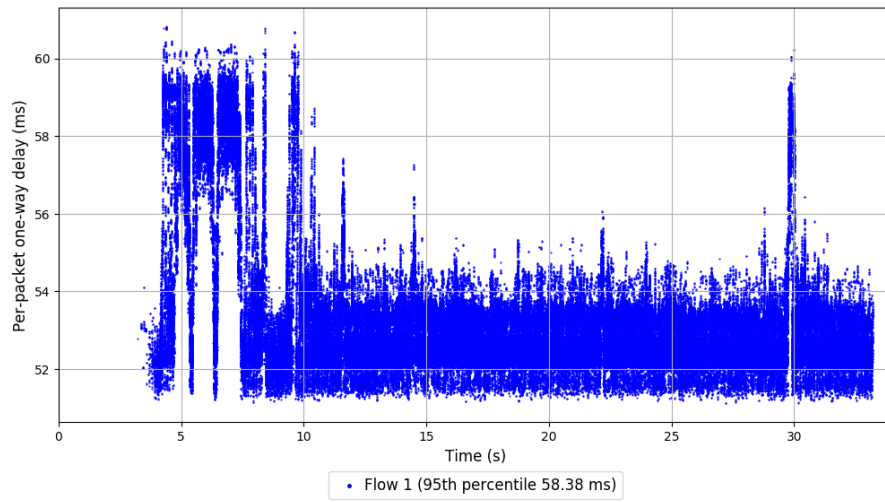
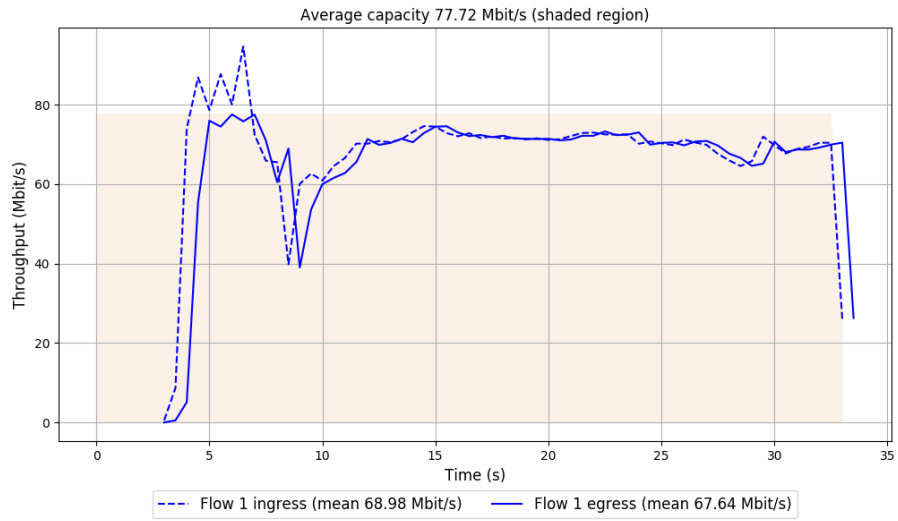
-- Flow 1:

Average throughput: 67.64 Mbit/s

95th percentile per-packet one-way delay: 58.384 ms

Loss rate: 2.11%

# Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

Start at: 2018-09-25 05:03:45

End at: 2018-09-25 05:04:15

# Below is generated by plot.py at 2018-09-25 05:22:15

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 64.18 Mbit/s (82.6% utilization)

95th percentile per-packet one-way delay: 57.010 ms

Loss rate: 1.02%

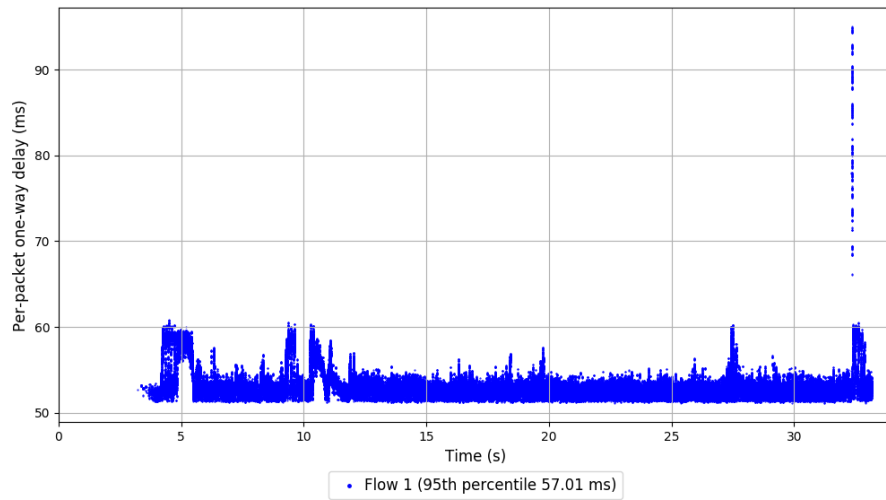
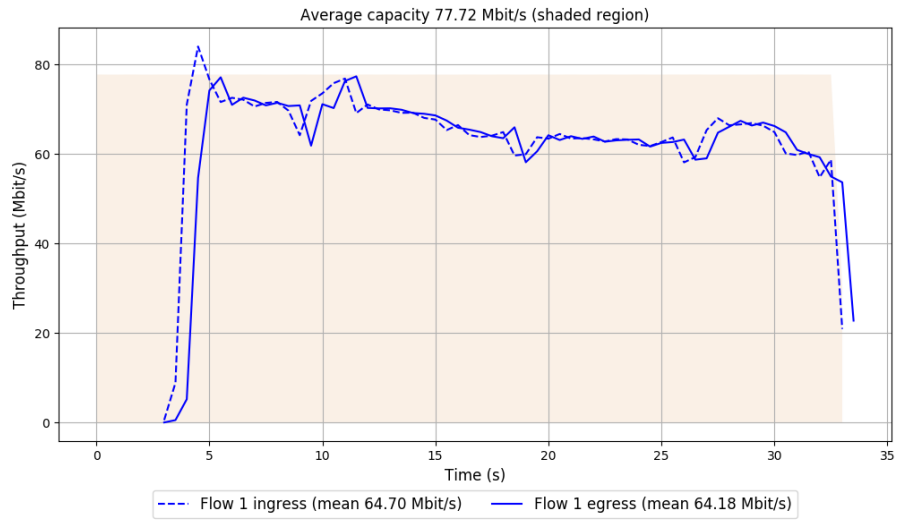
-- Flow 1:

Average throughput: 64.18 Mbit/s

95th percentile per-packet one-way delay: 57.010 ms

Loss rate: 1.02%

## Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

Start at: 2018-09-25 05:16:05

End at: 2018-09-25 05:16:35

# Below is generated by plot.py at 2018-09-25 05:22:15

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 55.51 Mbit/s (71.4% utilization)

95th percentile per-packet one-way delay: 58.068 ms

Loss rate: 1.89%

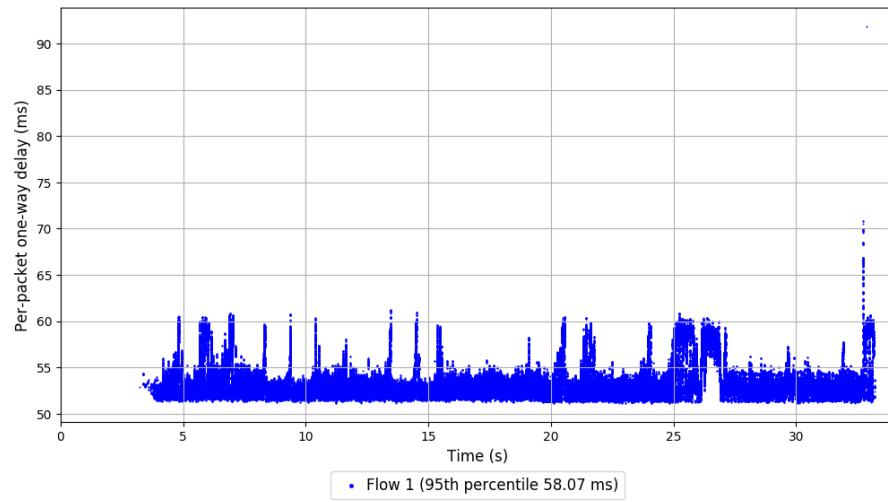
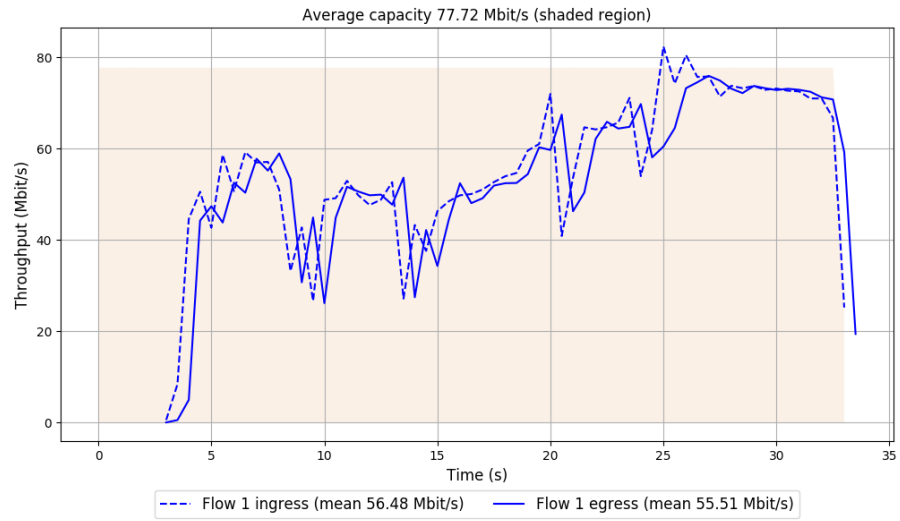
-- Flow 1:

Average throughput: 55.51 Mbit/s

95th percentile per-packet one-way delay: 58.068 ms

Loss rate: 1.89%

### Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-09-25 04:44:56

End at: 2018-09-25 04:45:26

# Below is generated by plot.py at 2018-09-25 05:22:15

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 8.01 Mbit/s (10.3% utilization)

95th percentile per-packet one-way delay: 64.079 ms

Loss rate: 2.41%

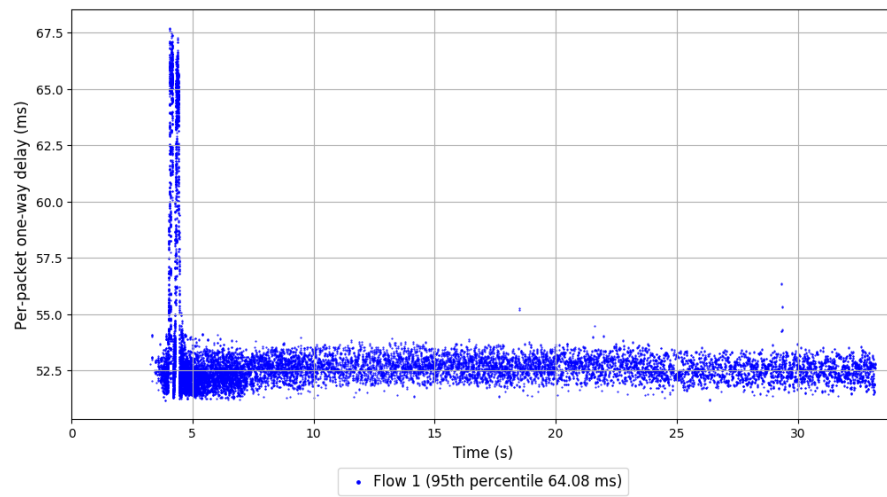
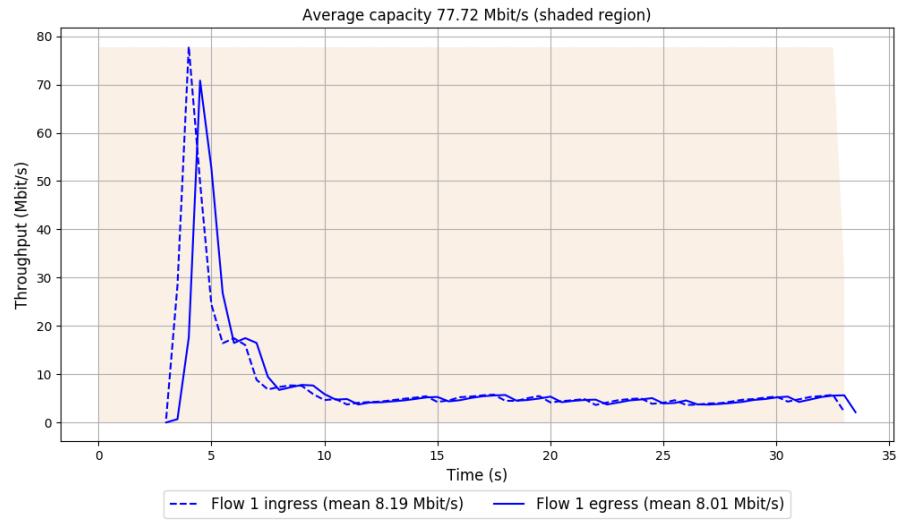
-- Flow 1:

Average throughput: 8.01 Mbit/s

95th percentile per-packet one-way delay: 64.079 ms

Loss rate: 2.41%

### Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-09-25 04:57:18

End at: 2018-09-25 04:57:48

# Below is generated by plot.py at 2018-09-25 05:22:15

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 10.96 Mbit/s (14.1% utilization)

95th percentile per-packet one-way delay: 63.404 ms

Loss rate: 1.85%

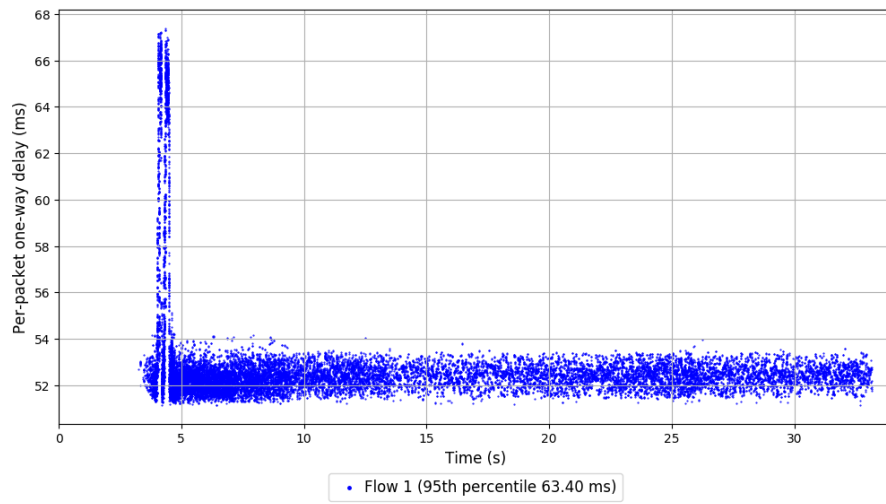
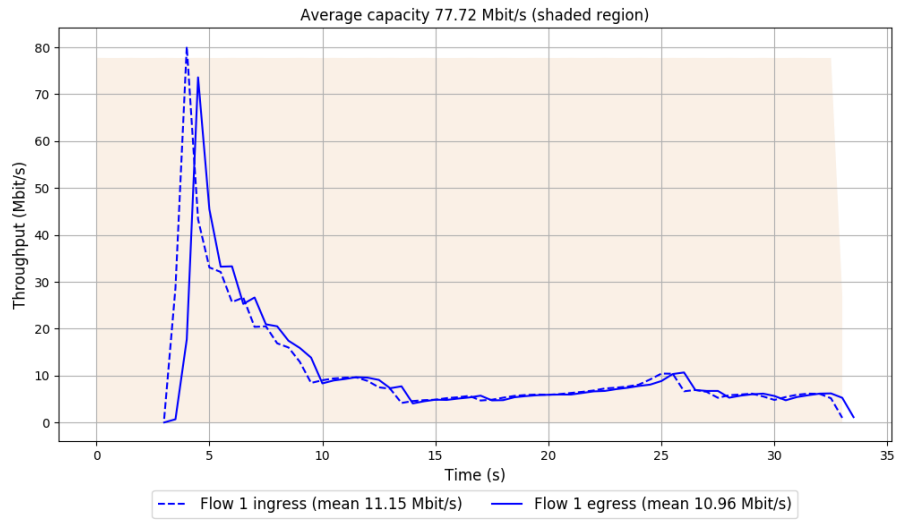
-- Flow 1:

Average throughput: 10.96 Mbit/s

95th percentile per-packet one-way delay: 63.404 ms

Loss rate: 1.85%

## Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-09-25 05:09:39

End at: 2018-09-25 05:10:09

# Below is generated by plot.py at 2018-09-25 05:22:15

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 9.53 Mbit/s (12.3% utilization)

95th percentile per-packet one-way delay: 53.165 ms

Loss rate: 0.18%

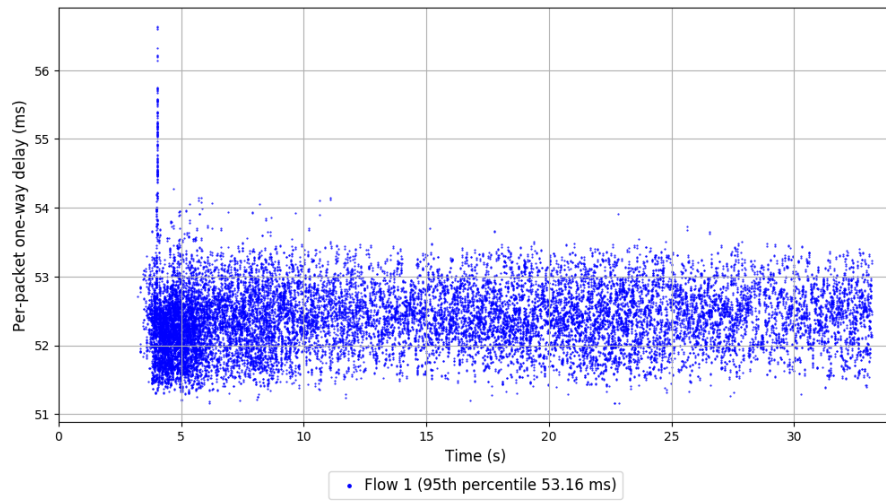
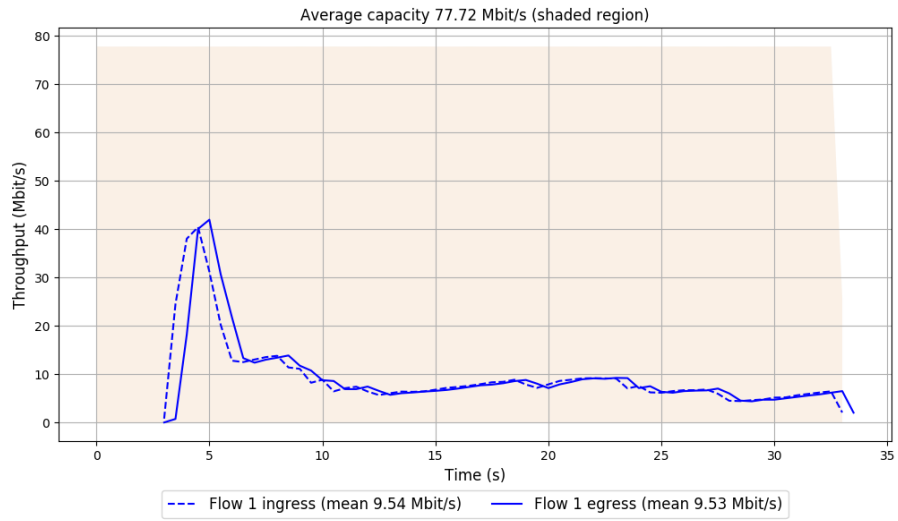
-- Flow 1:

Average throughput: 9.53 Mbit/s

95th percentile per-packet one-way delay: 53.165 ms

Loss rate: 0.18%

### Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of FillP

Start at: 2018-09-25 04:41:42

End at: 2018-09-25 04:42:12

# Below is generated by plot.py at 2018-09-25 05:22:18

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 73.75 Mbit/s (94.9% utilization)

95th percentile per-packet one-way delay: 63.937 ms

Loss rate: 9.14%

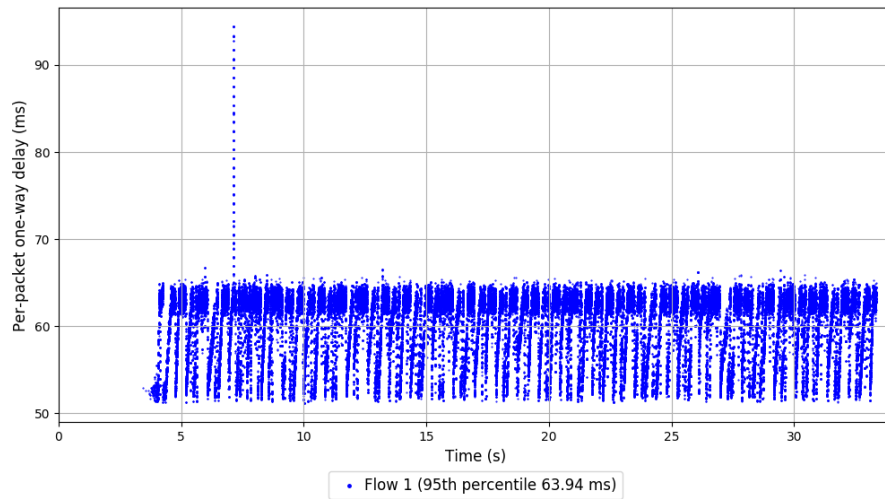
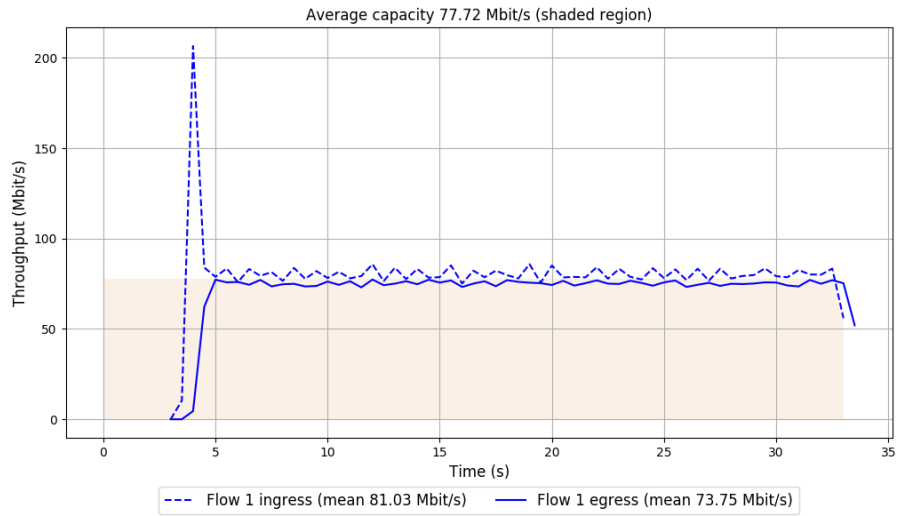
-- Flow 1:

Average throughput: 73.75 Mbit/s

95th percentile per-packet one-way delay: 63.937 ms

Loss rate: 9.14%

# Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2018-09-25 04:54:05

End at: 2018-09-25 04:54:35

# Below is generated by plot.py at 2018-09-25 05:22:59

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 73.83 Mbit/s (95.0% utilization)

95th percentile per-packet one-way delay: 63.899 ms

Loss rate: 9.44%

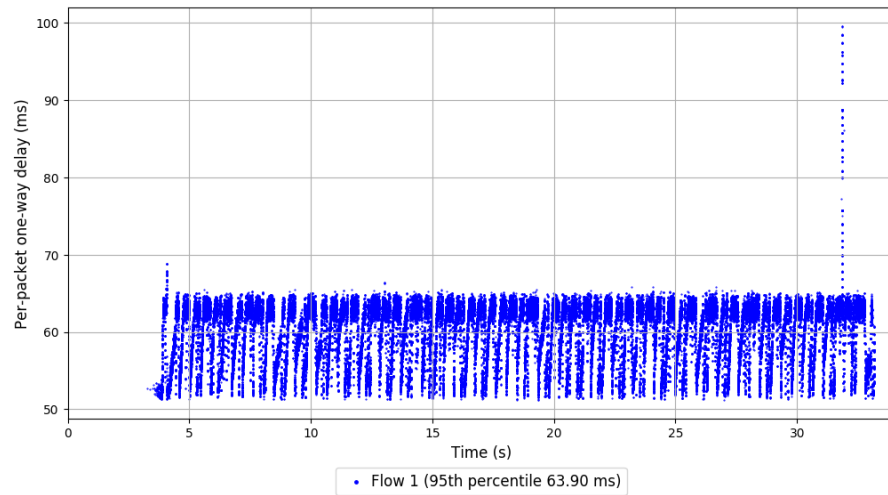
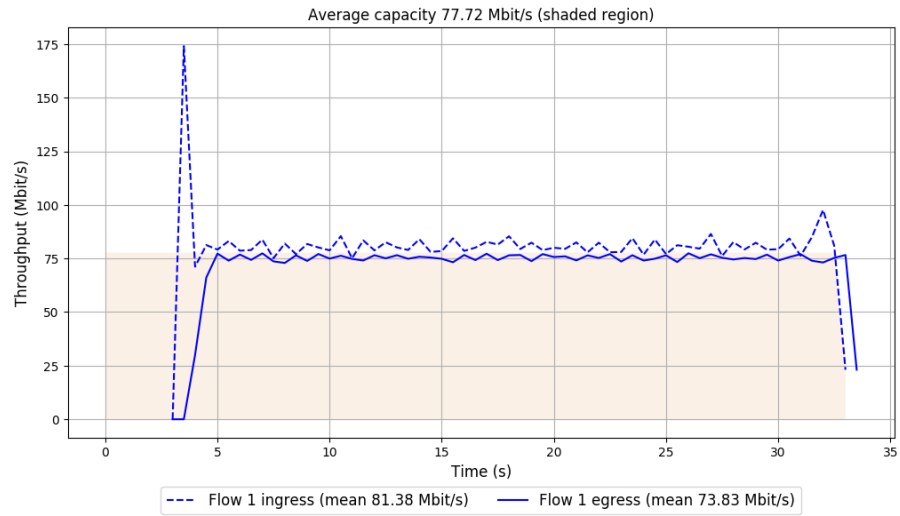
-- Flow 1:

Average throughput: 73.83 Mbit/s

95th percentile per-packet one-way delay: 63.899 ms

Loss rate: 9.44%

## Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

Start at: 2018-09-25 05:06:27

End at: 2018-09-25 05:06:57

# Below is generated by plot.py at 2018-09-25 05:23:14

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 73.74 Mbit/s (94.9% utilization)

95th percentile per-packet one-way delay: 63.899 ms

Loss rate: 9.11%

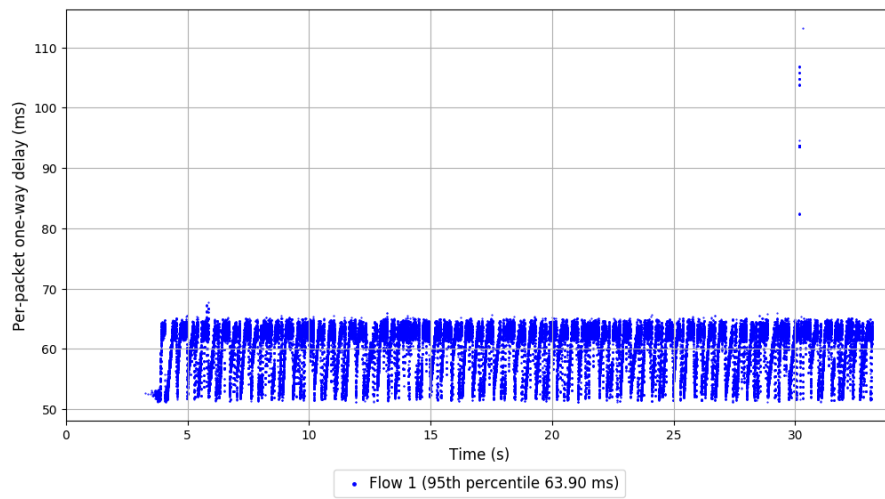
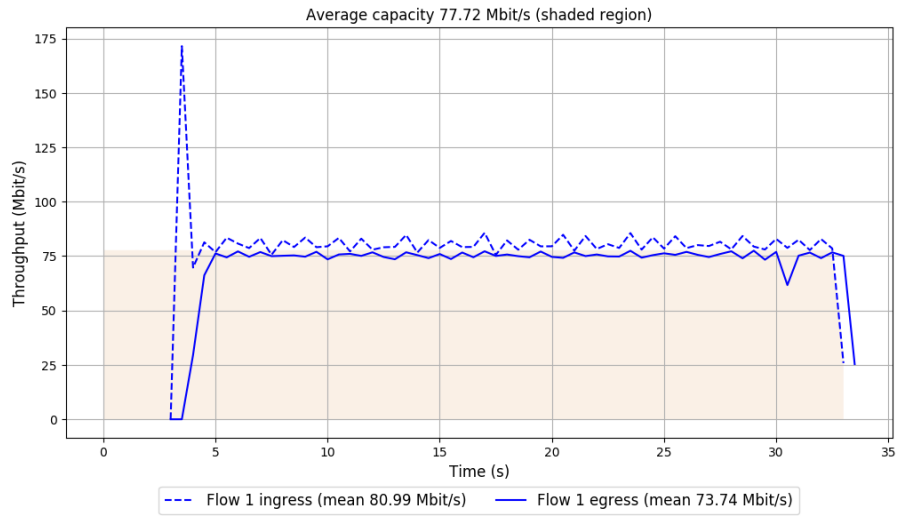
-- Flow 1:

Average throughput: 73.74 Mbit/s

95th percentile per-packet one-way delay: 63.899 ms

Loss rate: 9.11%

### Run 3: Report of FillP — Data Link



Run 1: Statistics of FillP-Sheep

Start at: 2018-09-25 04:49:32

End at: 2018-09-25 04:50:02

# Below is generated by plot.py at 2018-09-25 05:23:15

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 74.75 Mbit/s (96.2% utilization)

95th percentile per-packet one-way delay: 63.979 ms

Loss rate: 8.33%

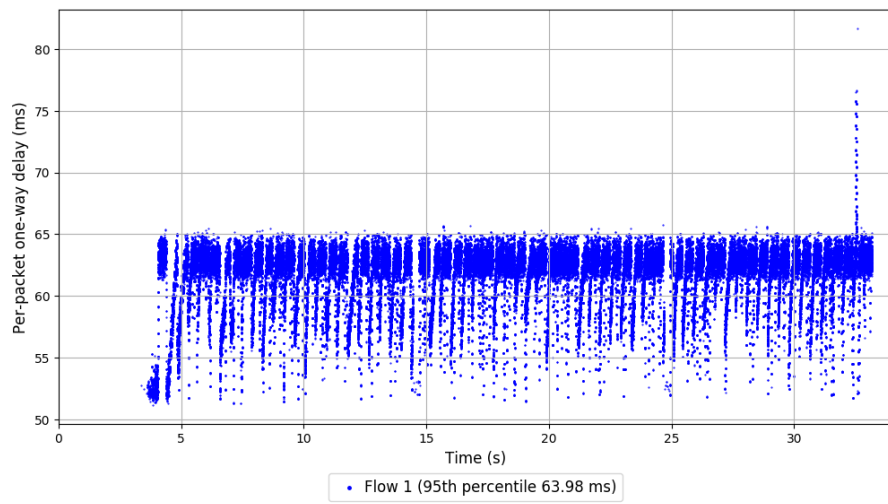
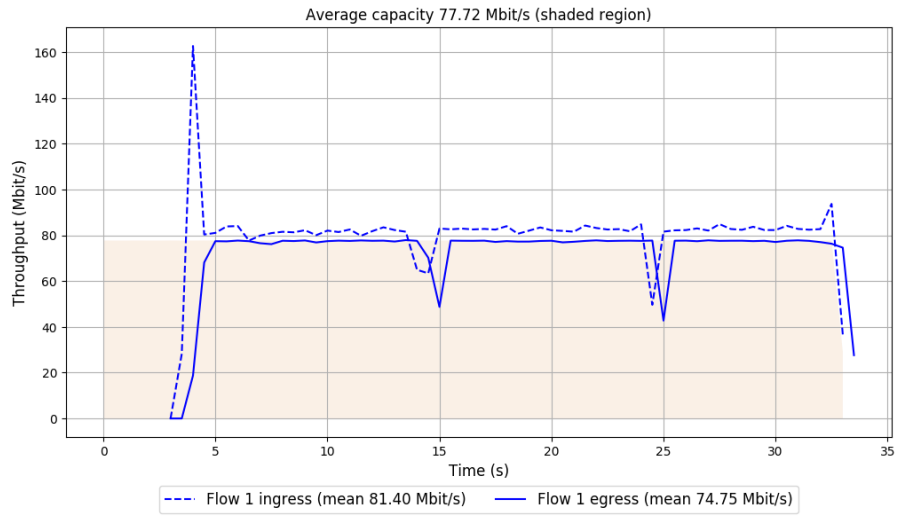
-- Flow 1:

Average throughput: 74.75 Mbit/s

95th percentile per-packet one-way delay: 63.979 ms

Loss rate: 8.33%

# Run 1: Report of FillP-Sheep — Data Link



Run 2: Statistics of FillP-Sheep

Start at: 2018-09-25 05:01:52

End at: 2018-09-25 05:02:22

# Below is generated by plot.py at 2018-09-25 05:23:16

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 74.76 Mbit/s (96.2% utilization)

95th percentile per-packet one-way delay: 63.929 ms

Loss rate: 7.11%

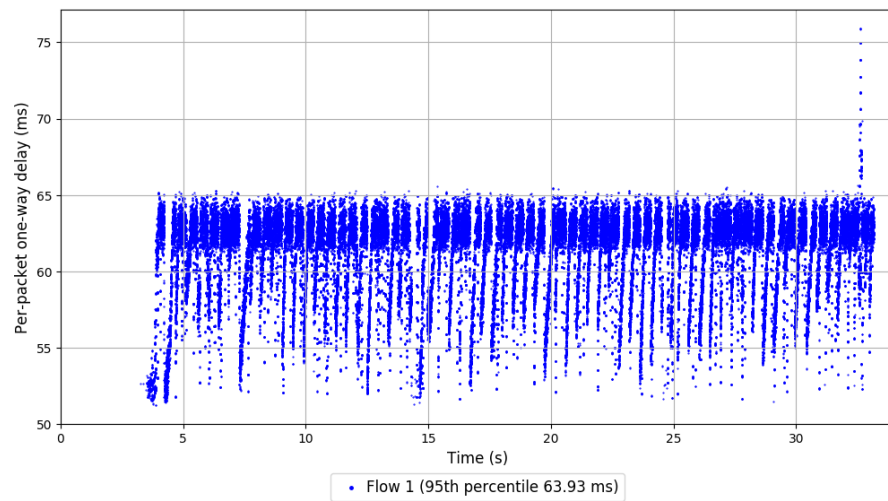
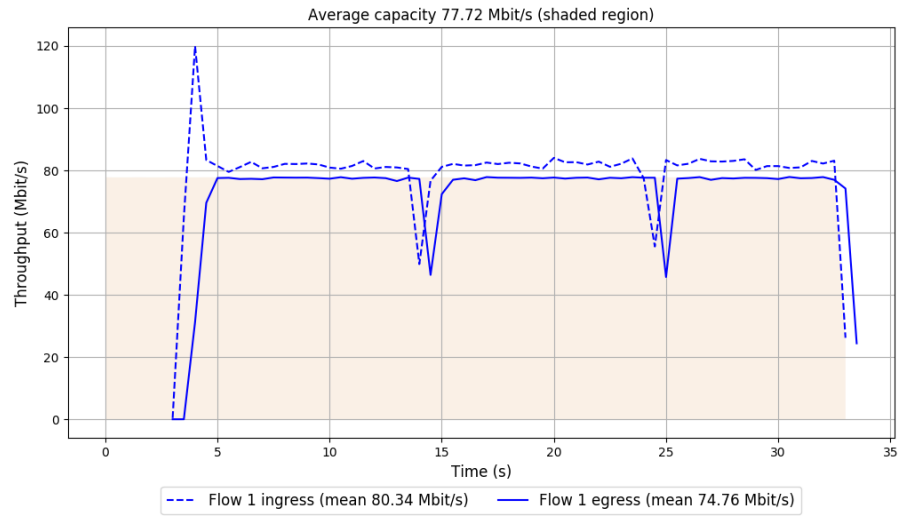
-- Flow 1:

Average throughput: 74.76 Mbit/s

95th percentile per-packet one-way delay: 63.929 ms

Loss rate: 7.11%

## Run 2: Report of FillP-Sheep — Data Link



Run 3: Statistics of FillP-Sheep

Start at: 2018-09-25 05:14:12

End at: 2018-09-25 05:14:42

# Below is generated by plot.py at 2018-09-25 05:23:51

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 74.77 Mbit/s (96.2% utilization)

95th percentile per-packet one-way delay: 63.930 ms

Loss rate: 7.04%

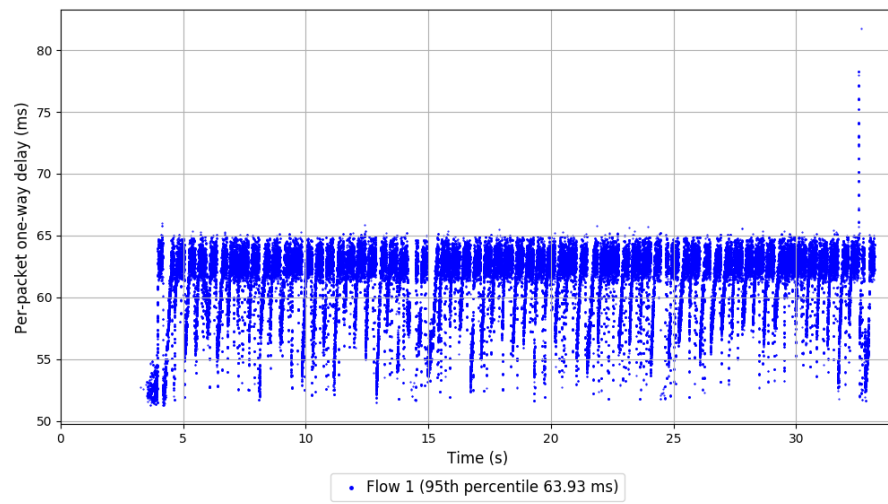
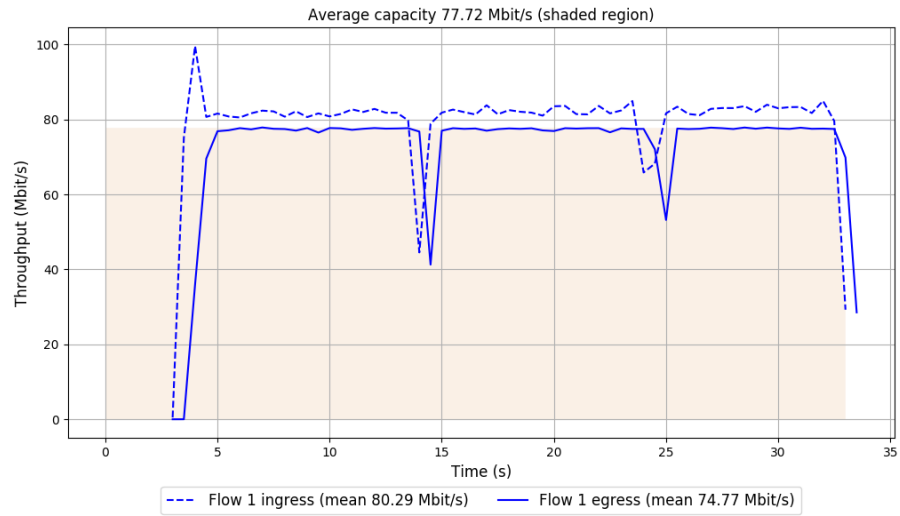
-- Flow 1:

Average throughput: 74.77 Mbit/s

95th percentile per-packet one-way delay: 63.930 ms

Loss rate: 7.04%

### Run 3: Report of FillP-Sheep — Data Link



Run 1: Statistics of Indigo

Start at: 2018-09-25 04:44:15

End at: 2018-09-25 04:44:45

# Below is generated by plot.py at 2018-09-25 05:23:51

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 73.69 Mbit/s (94.8% utilization)

95th percentile per-packet one-way delay: 58.311 ms

Loss rate: 1.69%

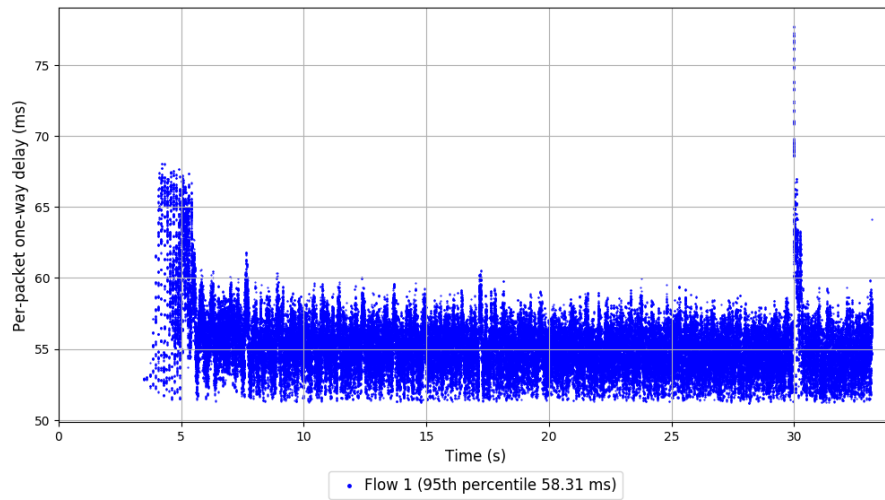
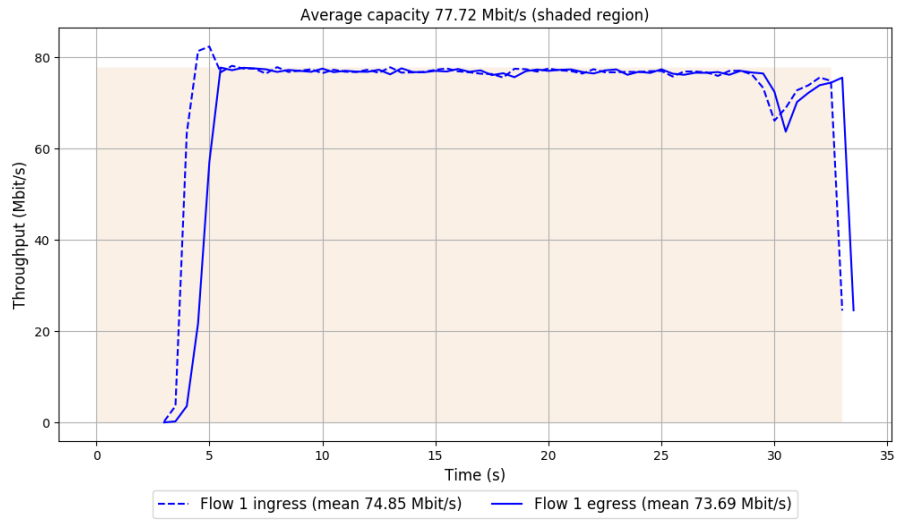
-- Flow 1:

Average throughput: 73.69 Mbit/s

95th percentile per-packet one-way delay: 58.311 ms

Loss rate: 1.69%

# Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-09-25 04:56:37

End at: 2018-09-25 04:57:07

# Below is generated by plot.py at 2018-09-25 05:23:55

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 74.76 Mbit/s (96.2% utilization)

95th percentile per-packet one-way delay: 58.268 ms

Loss rate: 1.63%

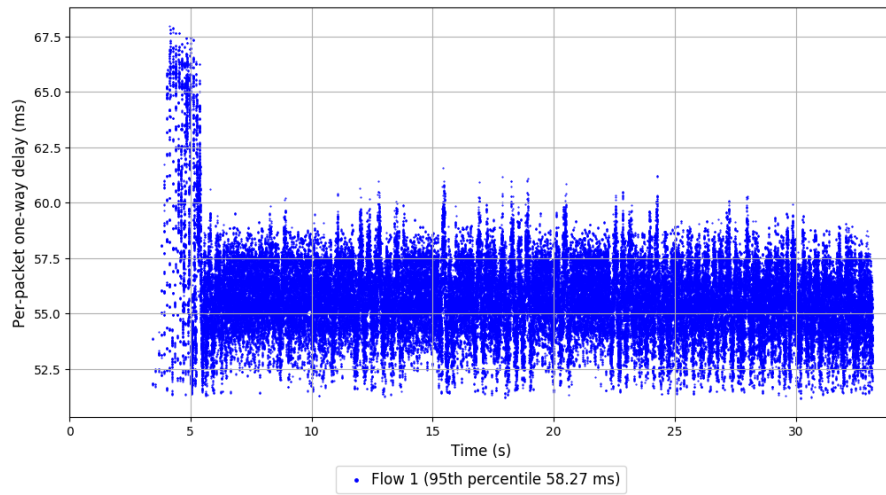
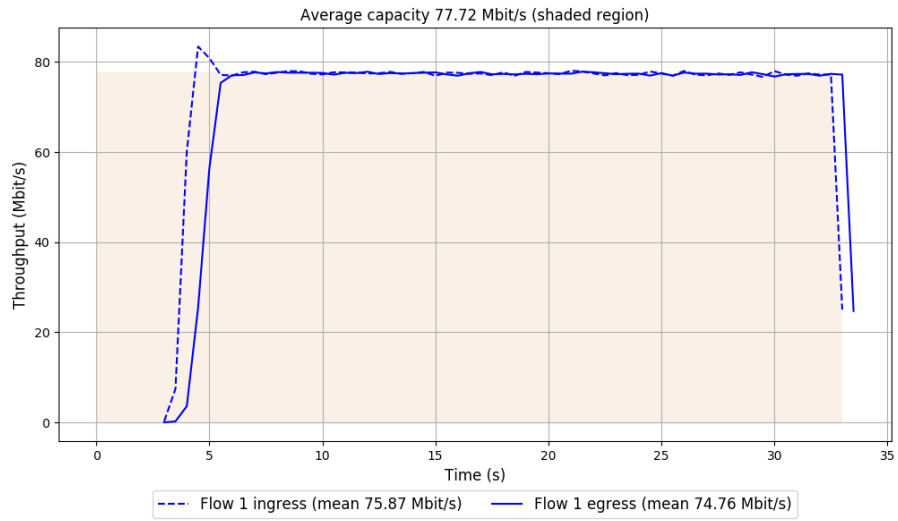
-- Flow 1:

Average throughput: 74.76 Mbit/s

95th percentile per-packet one-way delay: 58.268 ms

Loss rate: 1.63%

## Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-09-25 05:08:58

End at: 2018-09-25 05:09:28

# Below is generated by plot.py at 2018-09-25 05:23:56

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 73.56 Mbit/s (94.6% utilization)

95th percentile per-packet one-way delay: 58.009 ms

Loss rate: 1.47%

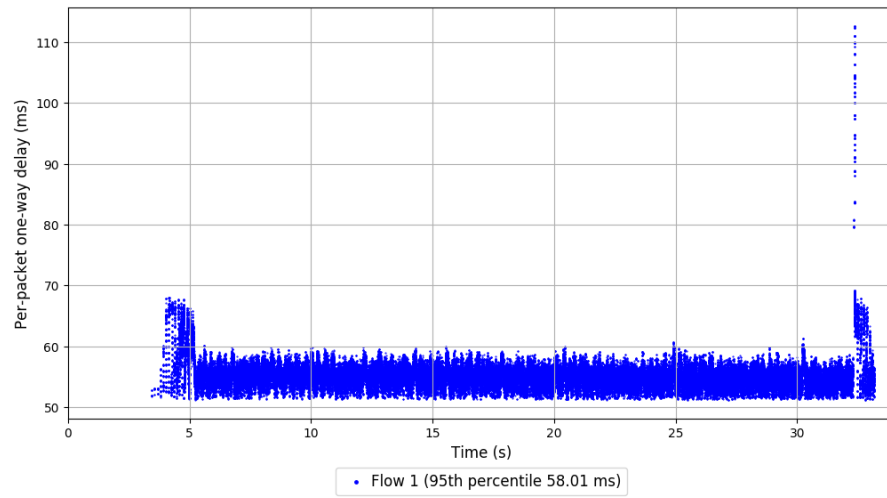
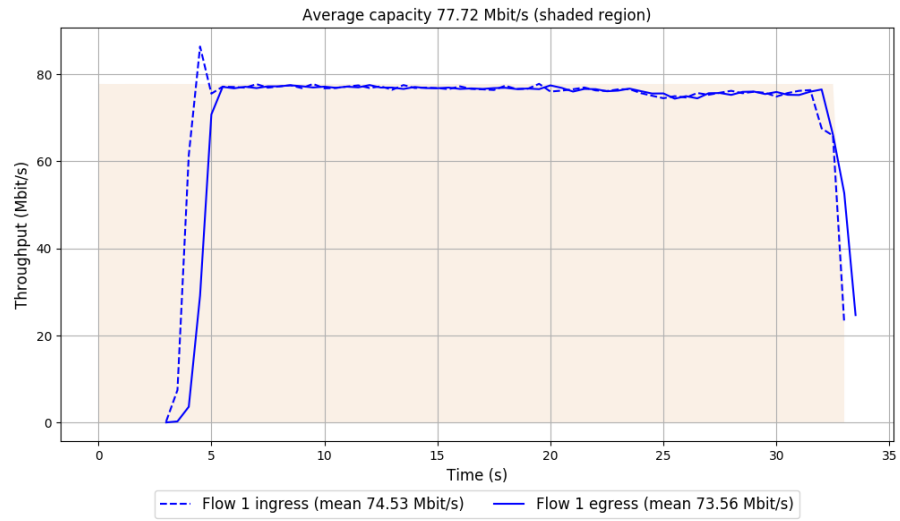
-- Flow 1:

Average throughput: 73.56 Mbit/s

95th percentile per-packet one-way delay: 58.009 ms

Loss rate: 1.47%

### Run 3: Report of Indigo — Data Link



Run 1: Statistics of Indigo-96d2da3

Start at: 2018-09-25 04:52:44

End at: 2018-09-25 04:53:14

# Below is generated by plot.py at 2018-09-25 05:24:24

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 51.59 Mbit/s (66.4% utilization)

95th percentile per-packet one-way delay: 66.527 ms

Loss rate: 52.90%

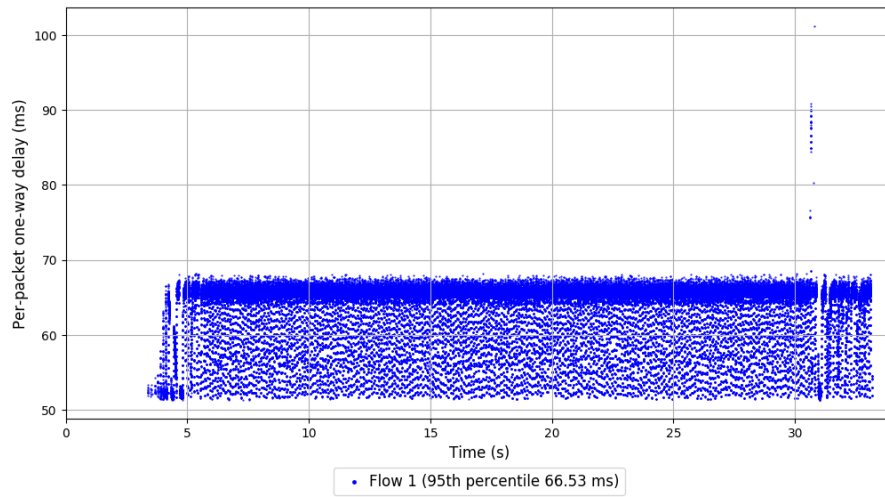
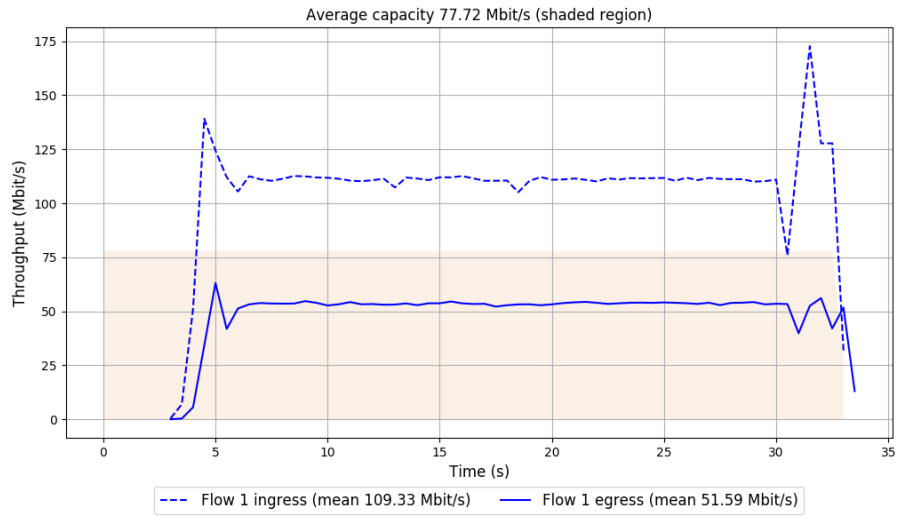
-- Flow 1:

Average throughput: 51.59 Mbit/s

95th percentile per-packet one-way delay: 66.527 ms

Loss rate: 52.90%

Run 1: Report of Indigo-96d2da3 — Data Link



Run 2: Statistics of Indigo-96d2da3

Start at: 2018-09-25 05:05:05

End at: 2018-09-25 05:05:35

# Below is generated by plot.py at 2018-09-25 05:24:44

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 50.51 Mbit/s (65.0% utilization)

95th percentile per-packet one-way delay: 66.513 ms

Loss rate: 54.53%

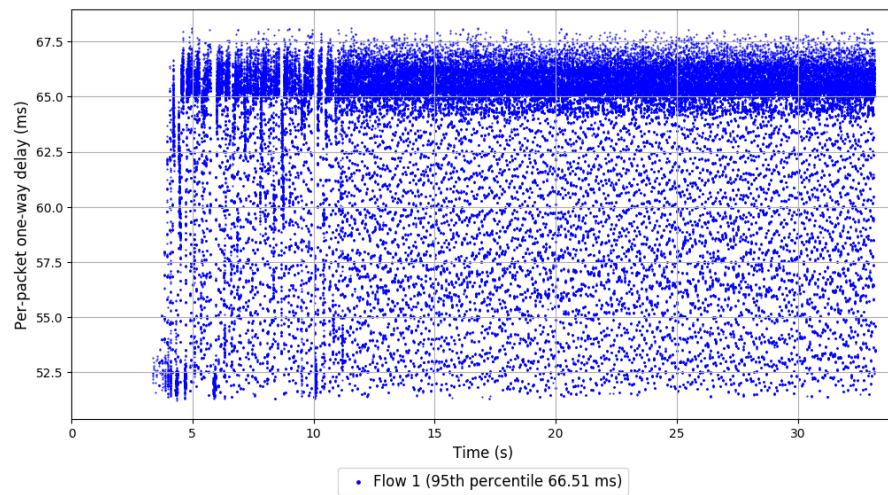
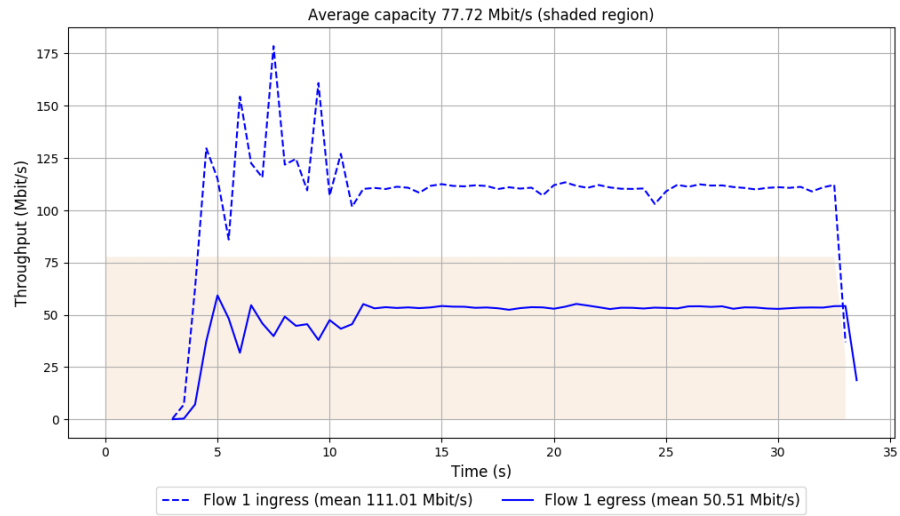
-- Flow 1:

Average throughput: 50.51 Mbit/s

95th percentile per-packet one-way delay: 66.513 ms

Loss rate: 54.53%

## Run 2: Report of Indigo-96d2da3 — Data Link



Run 3: Statistics of Indigo-96d2da3

Start at: 2018-09-25 05:17:25

End at: 2018-09-25 05:17:55

# Below is generated by plot.py at 2018-09-25 05:24:49

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 40.51 Mbit/s (52.1% utilization)

95th percentile per-packet one-way delay: 66.594 ms

Loss rate: 69.80%

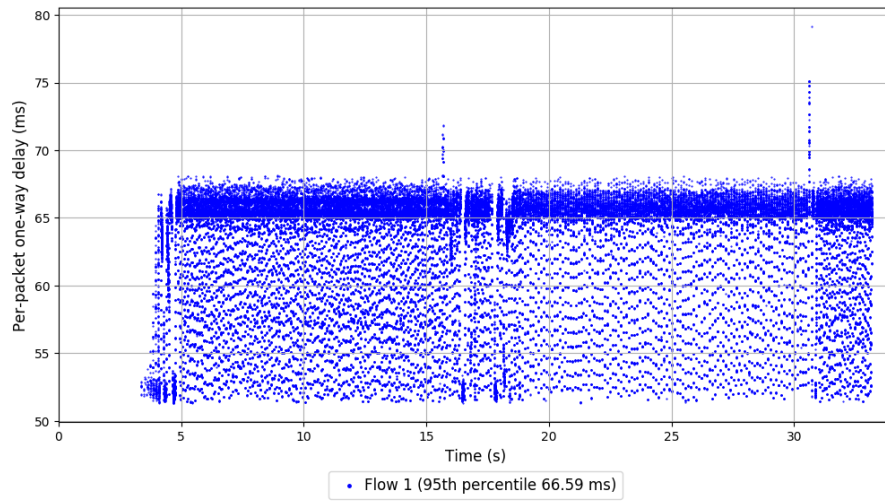
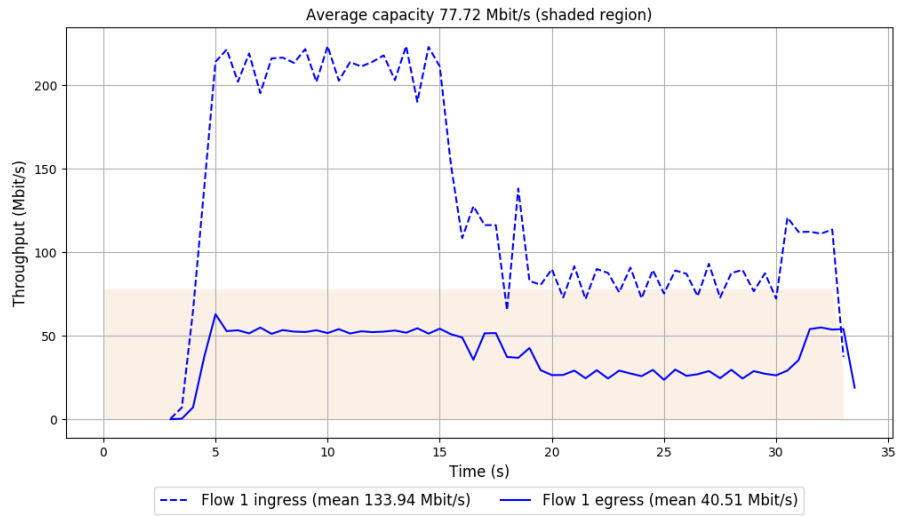
-- Flow 1:

Average throughput: 40.51 Mbit/s

95th percentile per-packet one-way delay: 66.594 ms

Loss rate: 69.80%

### Run 3: Report of Indigo-96d2da3 — Data Link



Run 1: Statistics of LEDBAT

Start at: 2018-09-25 04:46:58

End at: 2018-09-25 04:47:28

# Below is generated by plot.py at 2018-09-25 05:24:49

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 7.99 Mbit/s (10.3% utilization)

95th percentile per-packet one-way delay: 54.860 ms

Loss rate: 0.05%

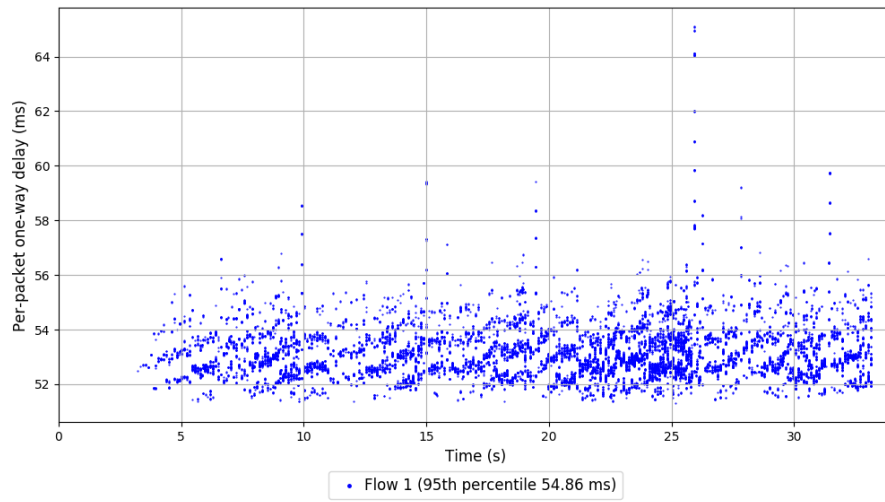
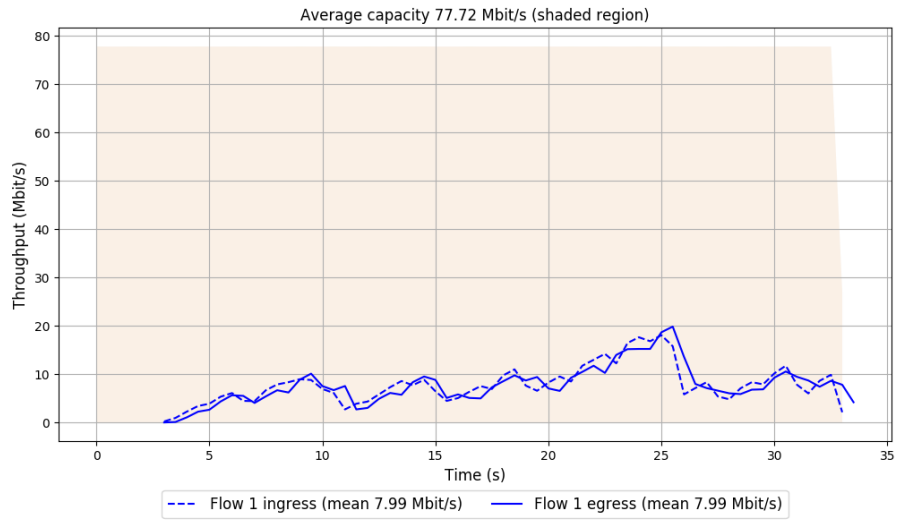
-- Flow 1:

Average throughput: 7.99 Mbit/s

95th percentile per-packet one-way delay: 54.860 ms

Loss rate: 0.05%

# Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2018-09-25 04:59:18

End at: 2018-09-25 04:59:48

# Below is generated by plot.py at 2018-09-25 05:24:49

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 6.91 Mbit/s (8.9% utilization)

95th percentile per-packet one-way delay: 54.865 ms

Loss rate: 0.08%

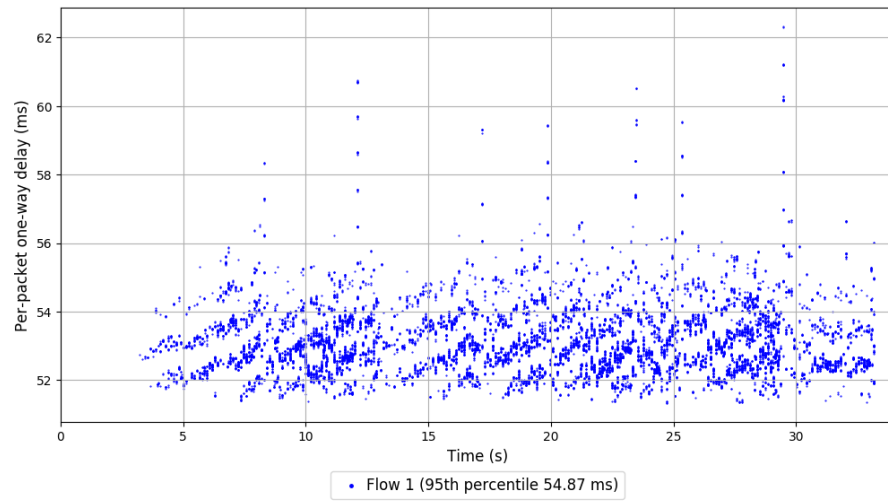
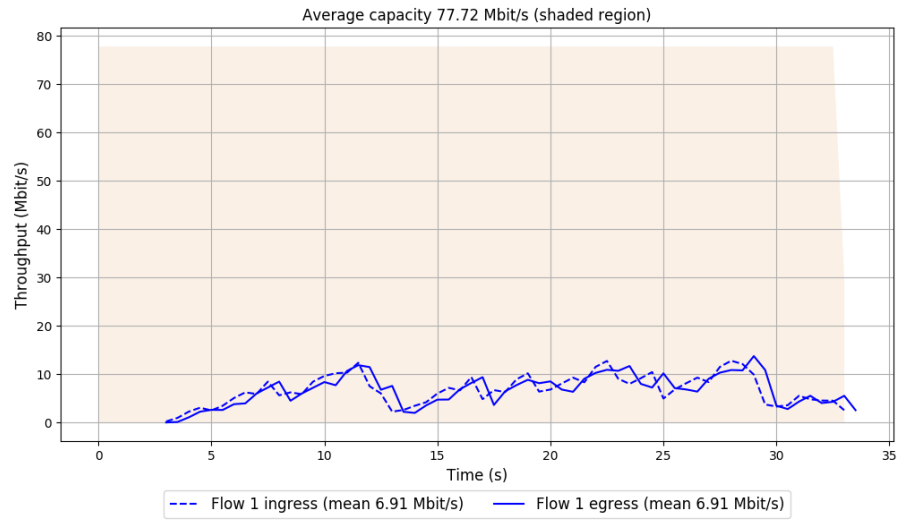
-- Flow 1:

Average throughput: 6.91 Mbit/s

95th percentile per-packet one-way delay: 54.865 ms

Loss rate: 0.08%

## Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2018-09-25 05:11:39

End at: 2018-09-25 05:12:09

# Below is generated by plot.py at 2018-09-25 05:24:49

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 7.04 Mbit/s (9.1% utilization)

95th percentile per-packet one-way delay: 54.829 ms

Loss rate: 0.44%

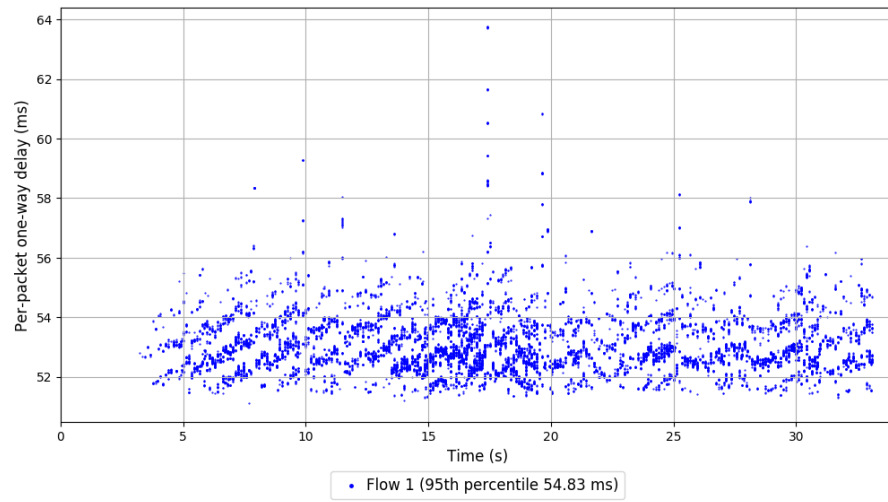
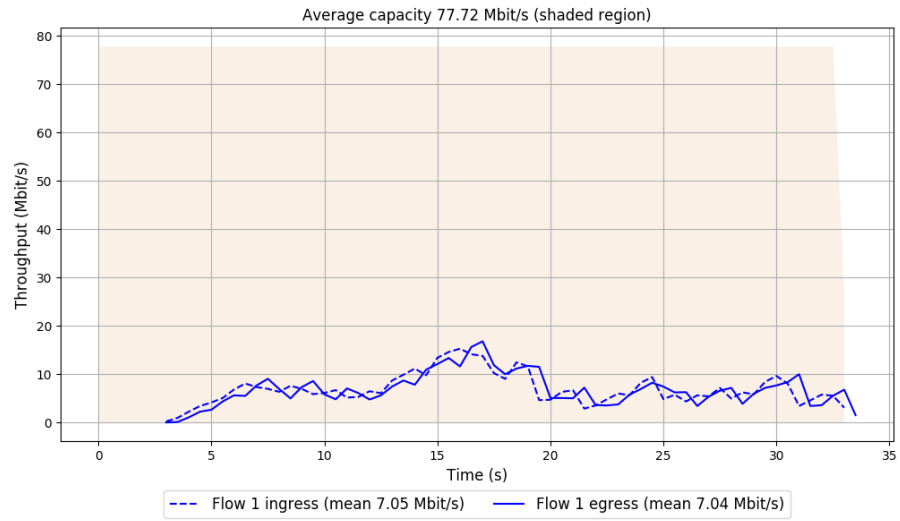
-- Flow 1:

Average throughput: 7.04 Mbit/s

95th percentile per-packet one-way delay: 54.829 ms

Loss rate: 0.44%

### Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of Indigo-Muses

Start at: 2018-09-25 04:43:01

End at: 2018-09-25 04:43:31

# Below is generated by plot.py at 2018-09-25 05:24:58

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 49.38 Mbit/s (63.5% utilization)

95th percentile per-packet one-way delay: 60.706 ms

Loss rate: 1.03%

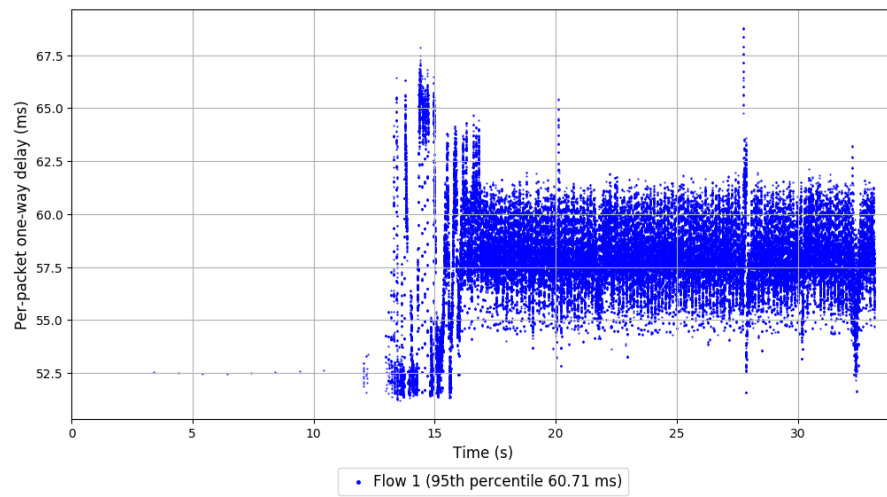
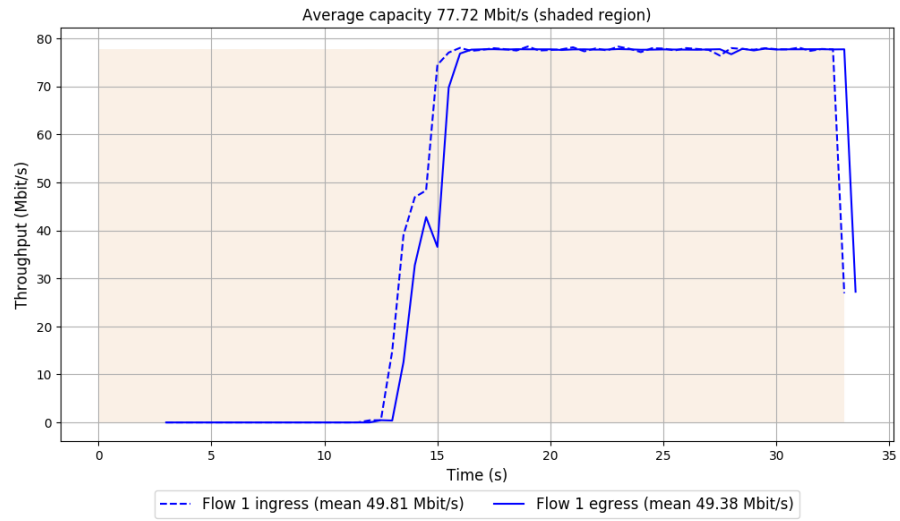
-- Flow 1:

Average throughput: 49.38 Mbit/s

95th percentile per-packet one-way delay: 60.706 ms

Loss rate: 1.03%

# Run 1: Report of Indigo-Muses — Data Link



Run 2: Statistics of Indigo-Muses

Start at: 2018-09-25 04:55:21

End at: 2018-09-25 04:55:51

# Below is generated by plot.py at 2018-09-25 05:25:21

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 72.36 Mbit/s (93.1% utilization)

95th percentile per-packet one-way delay: 58.936 ms

Loss rate: 1.29%

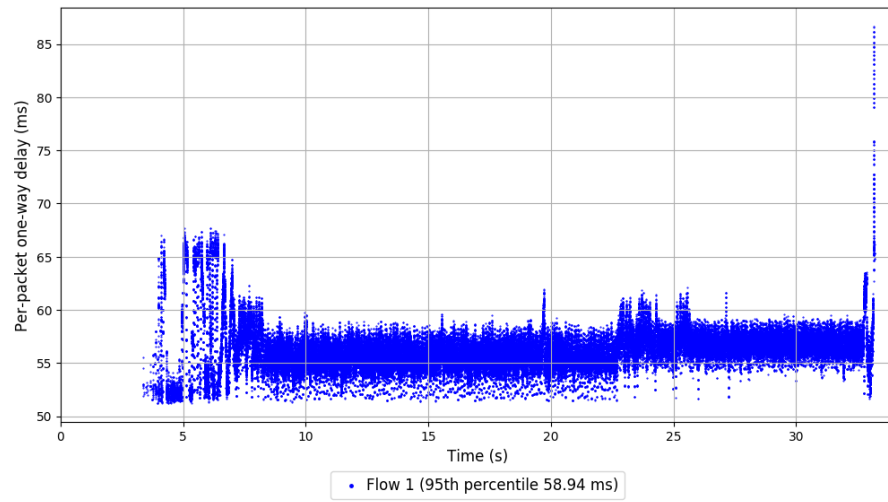
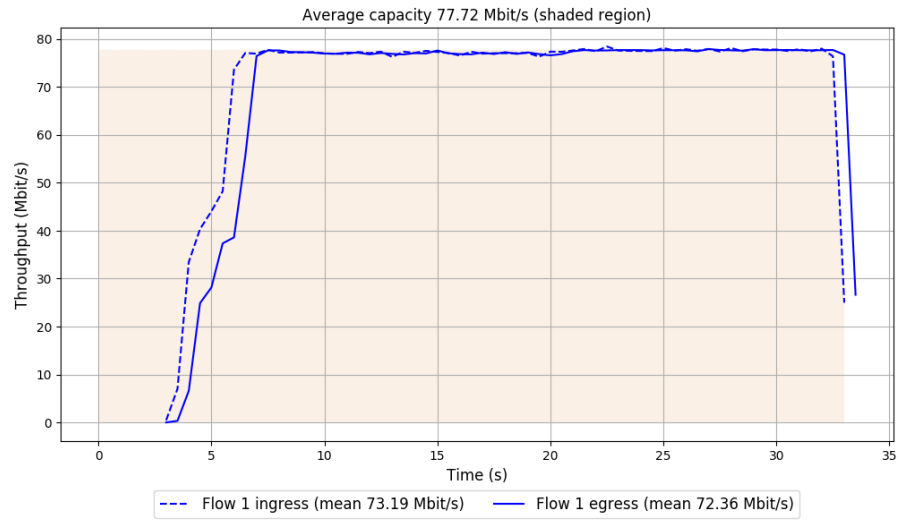
-- Flow 1:

Average throughput: 72.36 Mbit/s

95th percentile per-packet one-way delay: 58.936 ms

Loss rate: 1.29%

## Run 2: Report of Indigo-Muses — Data Link



Run 3: Statistics of Indigo-Muses

Start at: 2018-09-25 05:07:42

End at: 2018-09-25 05:08:12

# Below is generated by plot.py at 2018-09-25 05:25:23

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 72.84 Mbit/s (93.7% utilization)

95th percentile per-packet one-way delay: 58.728 ms

Loss rate: 1.02%

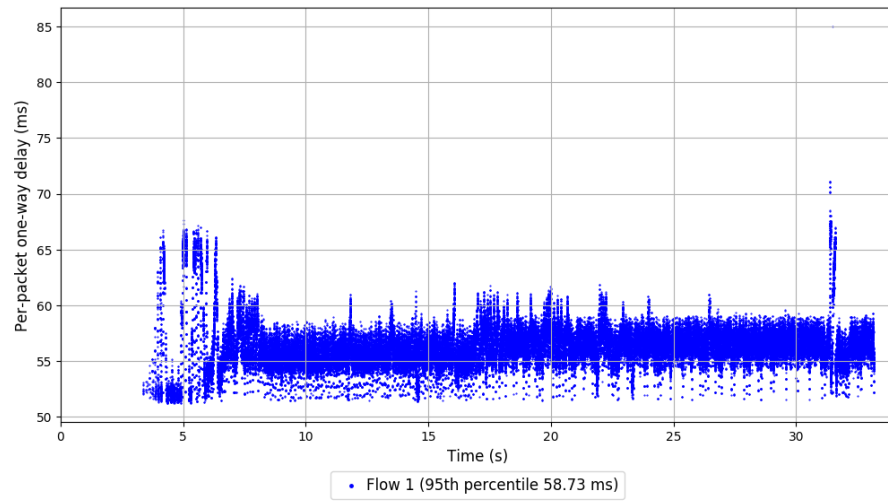
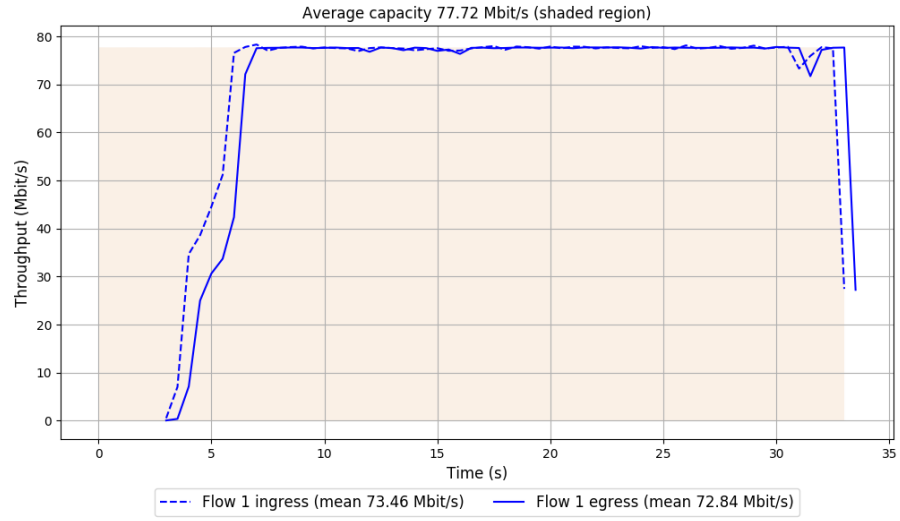
-- Flow 1:

Average throughput: 72.84 Mbit/s

95th percentile per-packet one-way delay: 58.728 ms

Loss rate: 1.02%

### Run 3: Report of Indigo-Muses — Data Link



Run 1: Statistics of PCC-Allegro

Start at: 2018-09-25 04:52:05

End at: 2018-09-25 04:52:35

# Below is generated by plot.py at 2018-09-25 05:25:49

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 72.73 Mbit/s (93.6% utilization)

95th percentile per-packet one-way delay: 59.294 ms

Loss rate: 1.58%

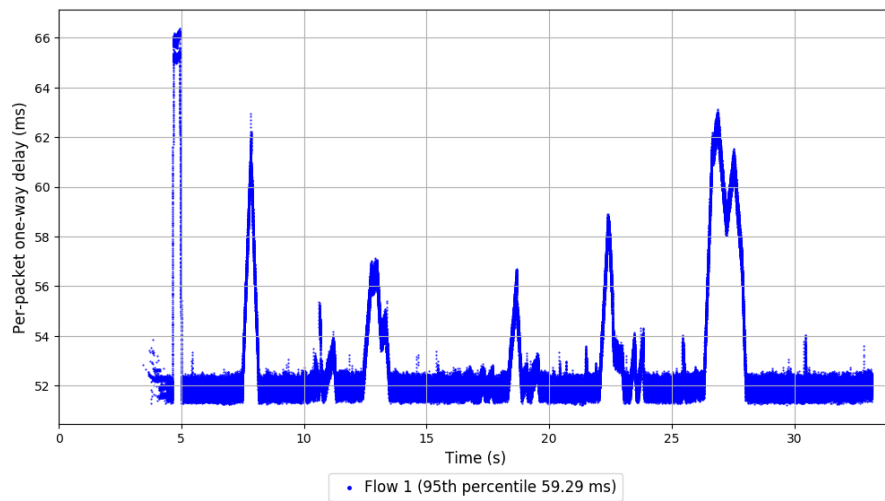
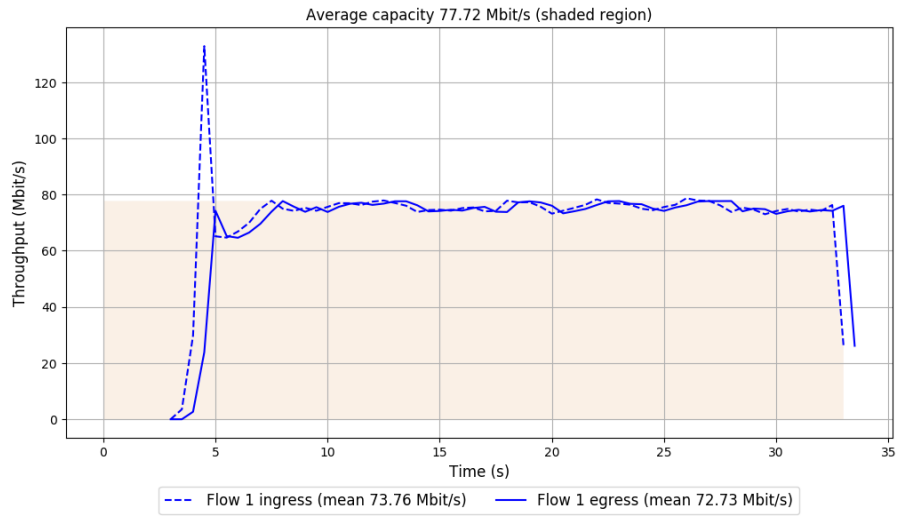
-- Flow 1:

Average throughput: 72.73 Mbit/s

95th percentile per-packet one-way delay: 59.294 ms

Loss rate: 1.58%

# Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2018-09-25 05:04:27

End at: 2018-09-25 05:04:57

# Below is generated by plot.py at 2018-09-25 05:25:52

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 70.55 Mbit/s (90.8% utilization)

95th percentile per-packet one-way delay: 63.101 ms

Loss rate: 1.63%

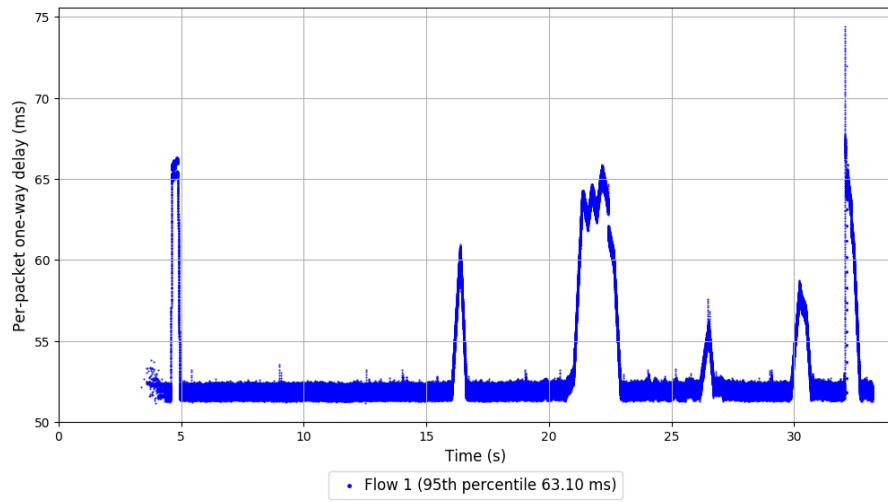
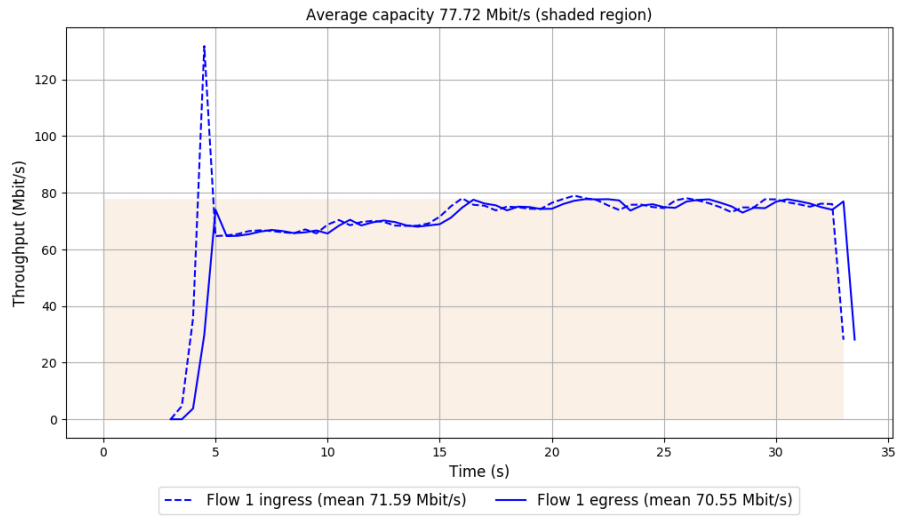
-- Flow 1:

Average throughput: 70.55 Mbit/s

95th percentile per-packet one-way delay: 63.101 ms

Loss rate: 1.63%

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

Start at: 2018-09-25 05:16:46

End at: 2018-09-25 05:17:16

# Below is generated by plot.py at 2018-09-25 05:25:57

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 72.55 Mbit/s (93.3% utilization)

95th percentile per-packet one-way delay: 59.539 ms

Loss rate: 1.61%

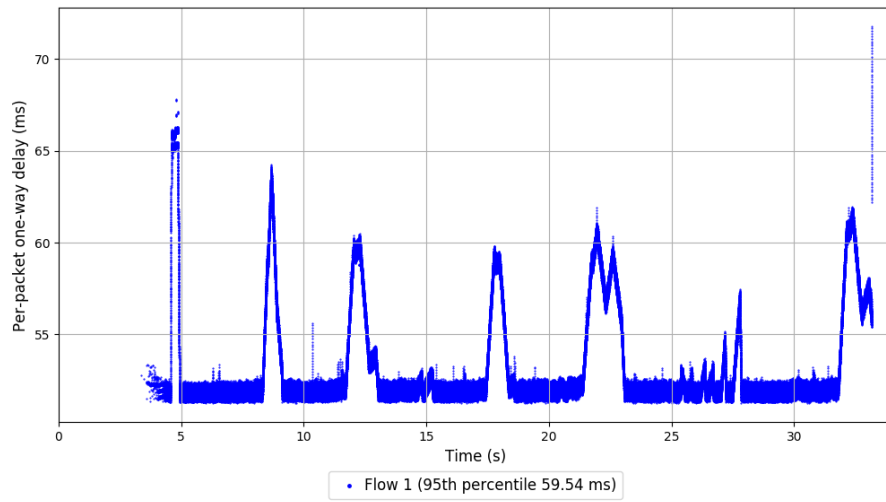
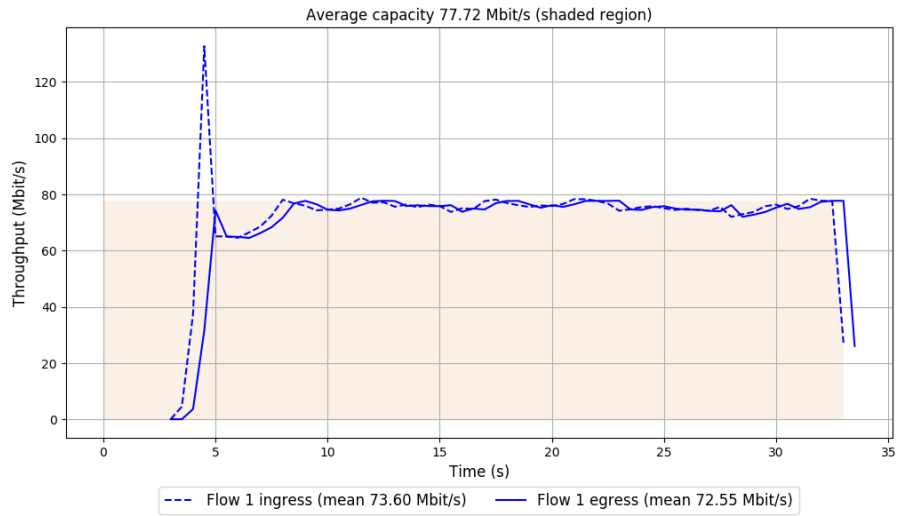
-- Flow 1:

Average throughput: 72.55 Mbit/s

95th percentile per-packet one-way delay: 59.539 ms

Loss rate: 1.61%

### Run 3: Report of PCC-Allegro — Data Link



Run 1: Statistics of PCC-Expr

Start at: 2018-09-25 04:53:23

End at: 2018-09-25 04:53:53

# Below is generated by plot.py at 2018-09-25 05:27:12

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 68.73 Mbit/s (88.4% utilization)

95th percentile per-packet one-way delay: 58.944 ms

Loss rate: 1.22%

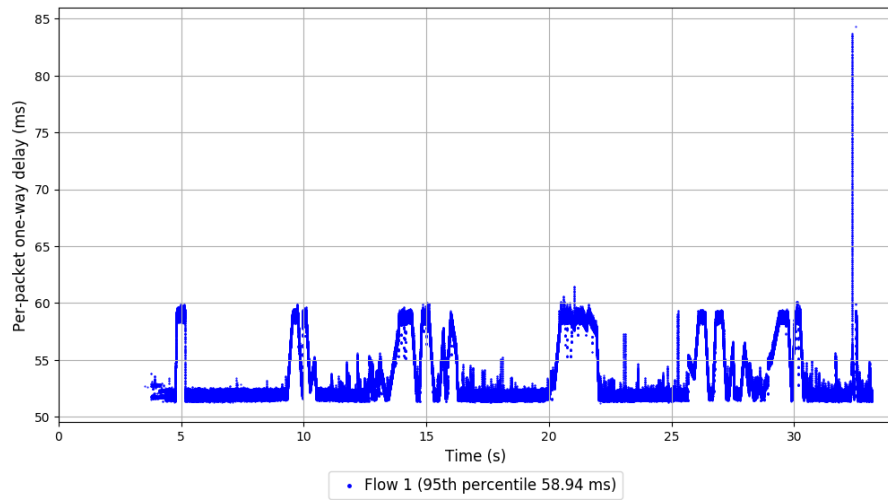
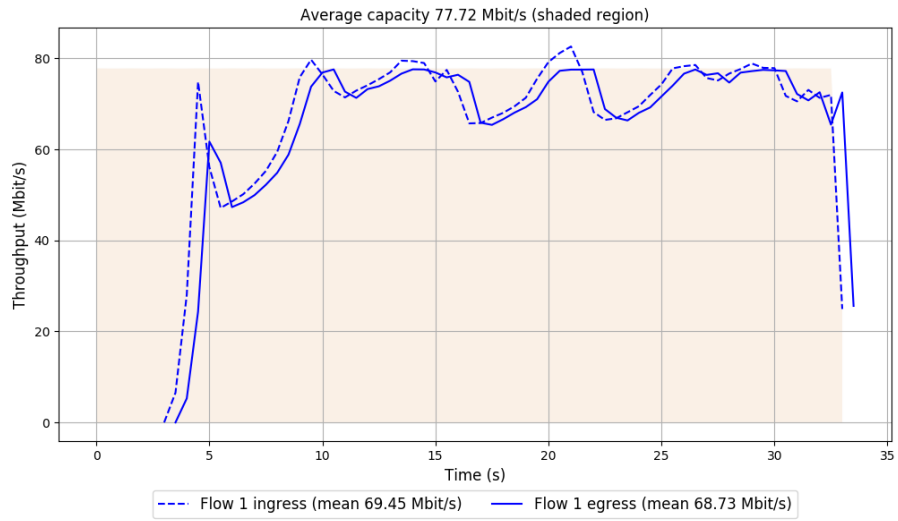
-- Flow 1:

Average throughput: 68.73 Mbit/s

95th percentile per-packet one-way delay: 58.944 ms

Loss rate: 1.22%

# Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

Start at: 2018-09-25 05:05:45

End at: 2018-09-25 05:06:15

# Below is generated by plot.py at 2018-09-25 05:27:14

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 68.08 Mbit/s (87.6% utilization)

95th percentile per-packet one-way delay: 59.166 ms

Loss rate: 1.79%

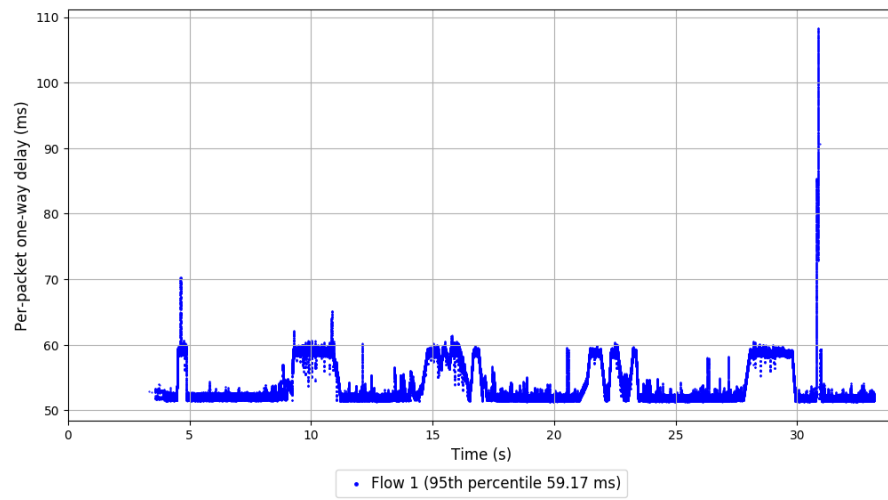
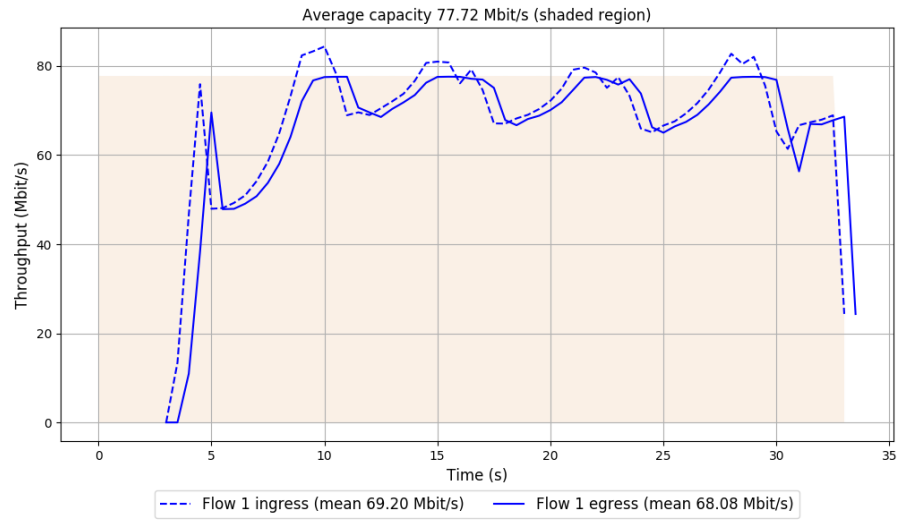
-- Flow 1:

Average throughput: 68.08 Mbit/s

95th percentile per-packet one-way delay: 59.166 ms

Loss rate: 1.79%

## Run 2: Report of PCC-Expr — Data Link



Run 3: Statistics of PCC-Expr

Start at: 2018-09-25 05:18:05

End at: 2018-09-25 05:18:35

# Below is generated by plot.py at 2018-09-25 05:27:26

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 69.73 Mbit/s (89.7% utilization)

95th percentile per-packet one-way delay: 58.960 ms

Loss rate: 1.25%

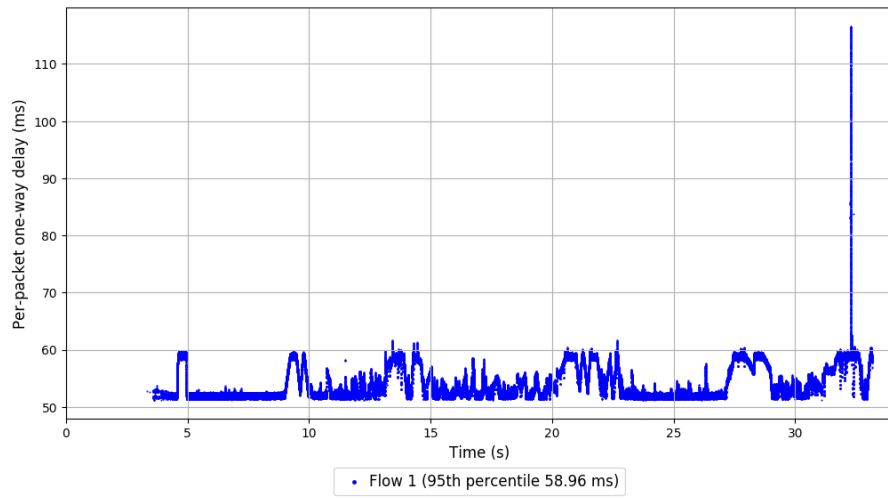
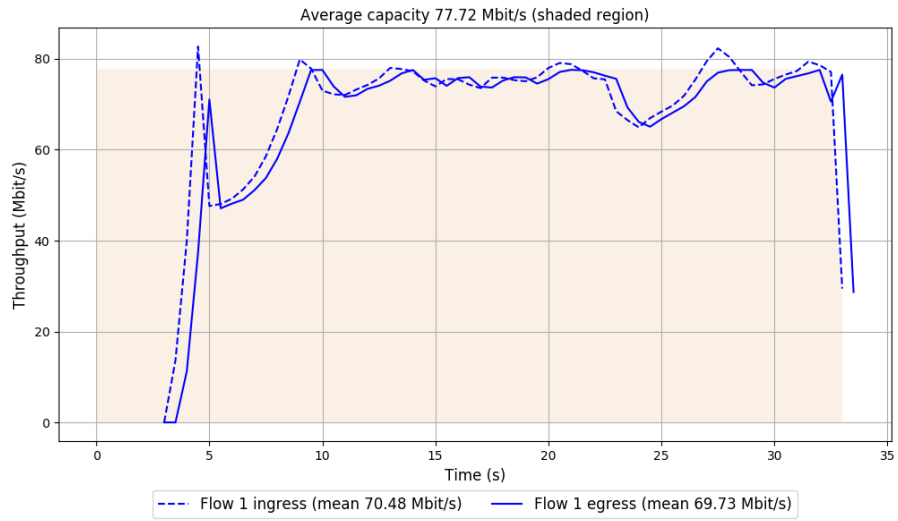
-- Flow 1:

Average throughput: 69.73 Mbit/s

95th percentile per-packet one-way delay: 58.960 ms

Loss rate: 1.25%

### Run 3: Report of PCC-Expr — Data Link

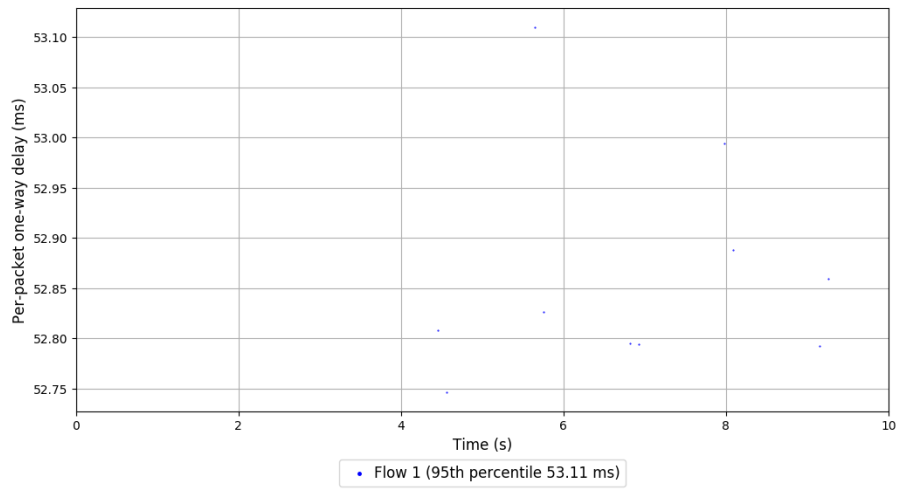
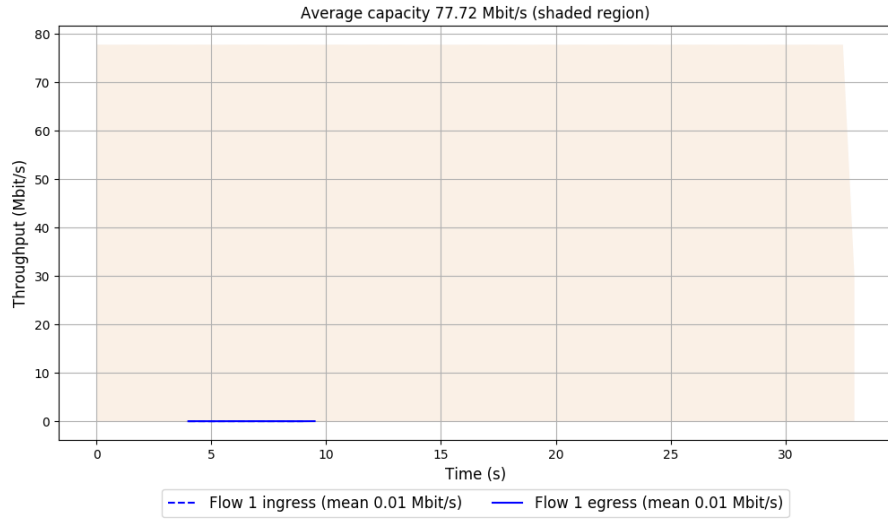


Run 1: Statistics of QUIC Cubic

Start at: 2018-09-25 04:50:11

End at: 2018-09-25 04:50:41

# Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-09-25 05:02:31

End at: 2018-09-25 05:03:01

# Below is generated by plot.py at 2018-09-25 05:27:26

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 25.27 Mbit/s (32.5% utilization)

95th percentile per-packet one-way delay: 53.300 ms

Loss rate: 0.72%

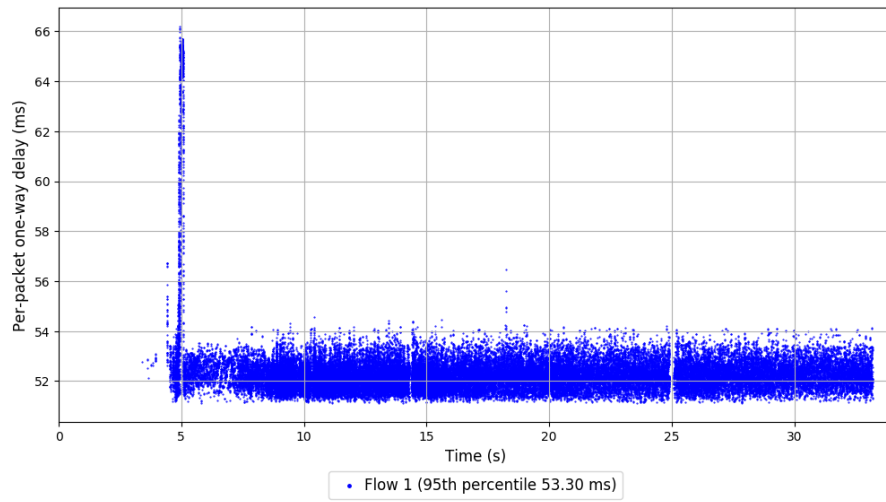
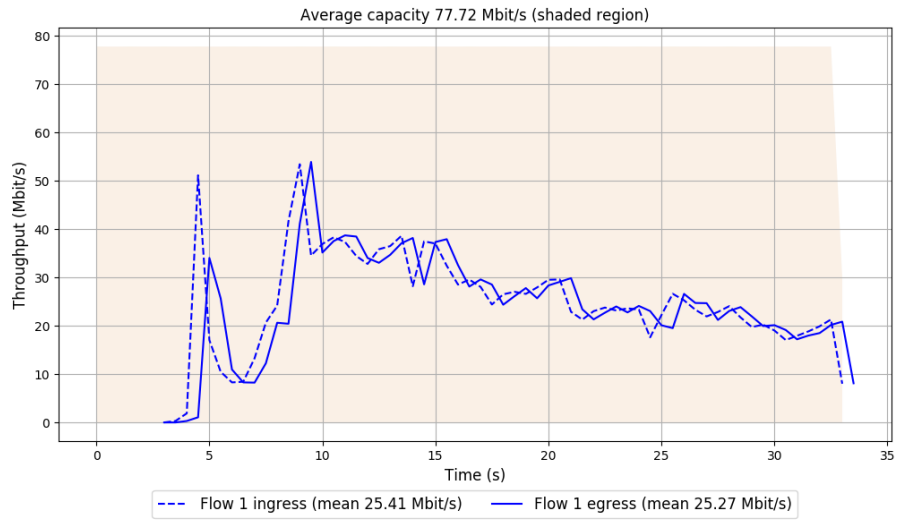
-- Flow 1:

Average throughput: 25.27 Mbit/s

95th percentile per-packet one-way delay: 53.300 ms

Loss rate: 0.72%

## Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2018-09-25 05:14:52

End at: 2018-09-25 05:15:22

# Below is generated by plot.py at 2018-09-25 05:27:26

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 25.38 Mbit/s (32.7% utilization)

95th percentile per-packet one-way delay: 53.393 ms

Loss rate: 0.61%

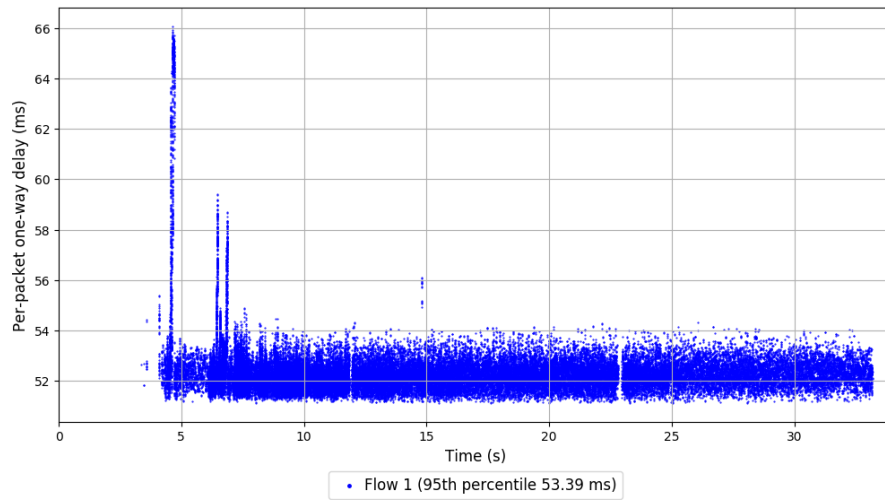
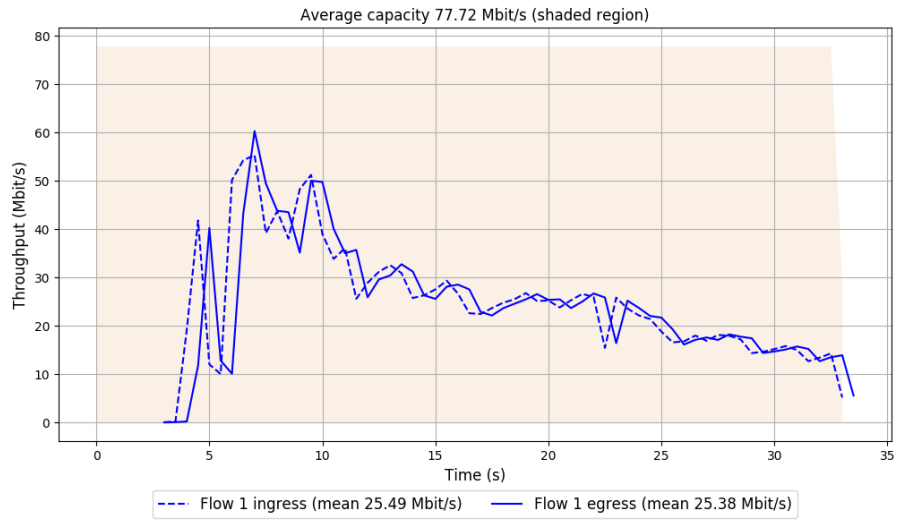
-- Flow 1:

Average throughput: 25.38 Mbit/s

95th percentile per-packet one-way delay: 53.393 ms

Loss rate: 0.61%

### Run 3: Report of QUIC Cubic — Data Link



Run 1: Statistics of SCReAM

Start at: 2018-09-25 04:50:47

End at: 2018-09-25 04:51:17

# Below is generated by plot.py at 2018-09-25 05:27:26

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 0.21 Mbit/s (0.3% utilization)

95th percentile per-packet one-way delay: 52.808 ms

Loss rate: 0.26%

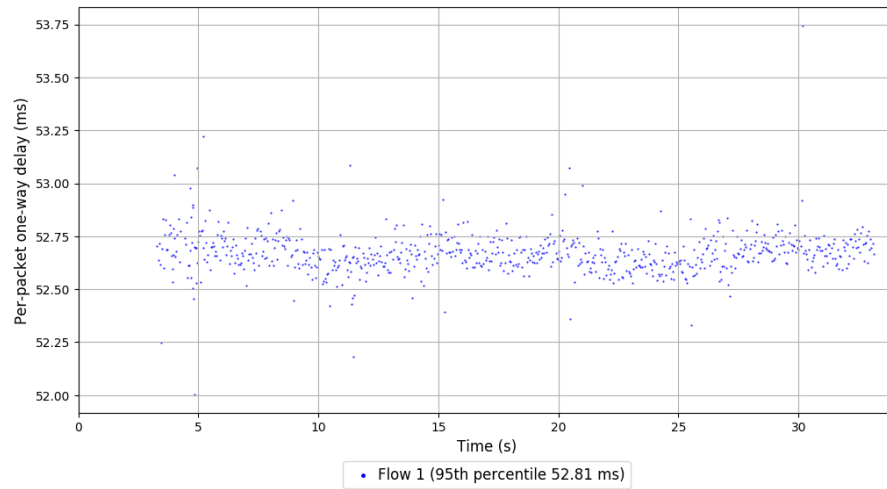
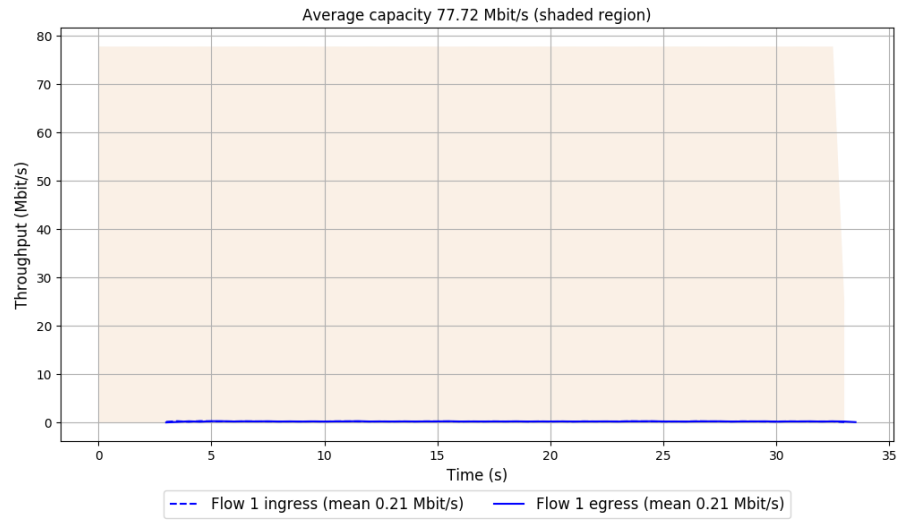
-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 52.808 ms

Loss rate: 0.26%

# Run 1: Report of SCReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2018-09-25 05:03:09

End at: 2018-09-25 05:03:39

# Below is generated by plot.py at 2018-09-25 05:27:26

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 0.21 Mbit/s (0.3% utilization)

95th percentile per-packet one-way delay: 52.815 ms

Loss rate: 0.26%

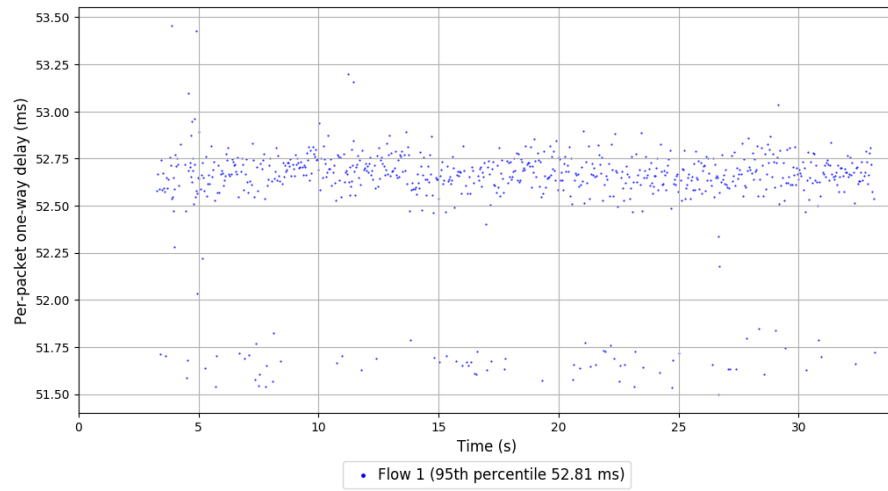
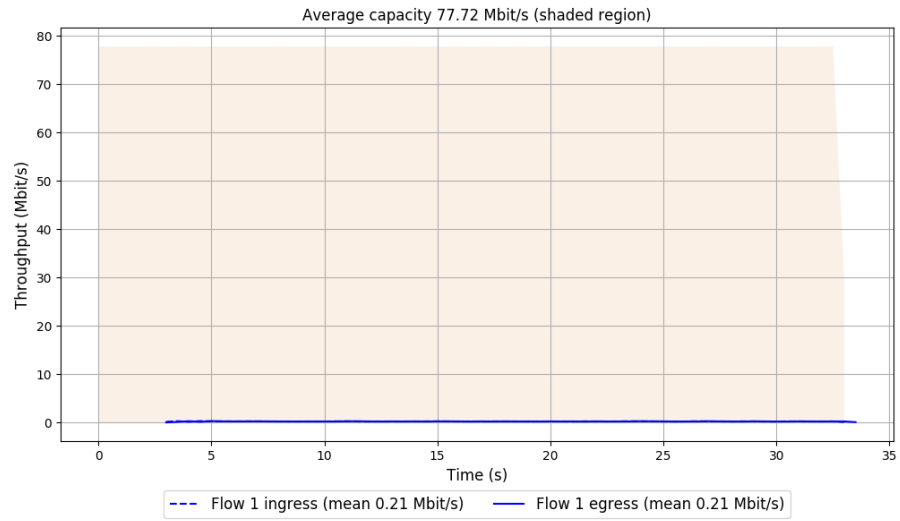
-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 52.815 ms

Loss rate: 0.26%

## Run 2: Report of SCReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2018-09-25 05:15:29

End at: 2018-09-25 05:15:59

# Below is generated by plot.py at 2018-09-25 05:27:26

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 0.21 Mbit/s (0.3% utilization)

95th percentile per-packet one-way delay: 52.797 ms

Loss rate: 0.13%

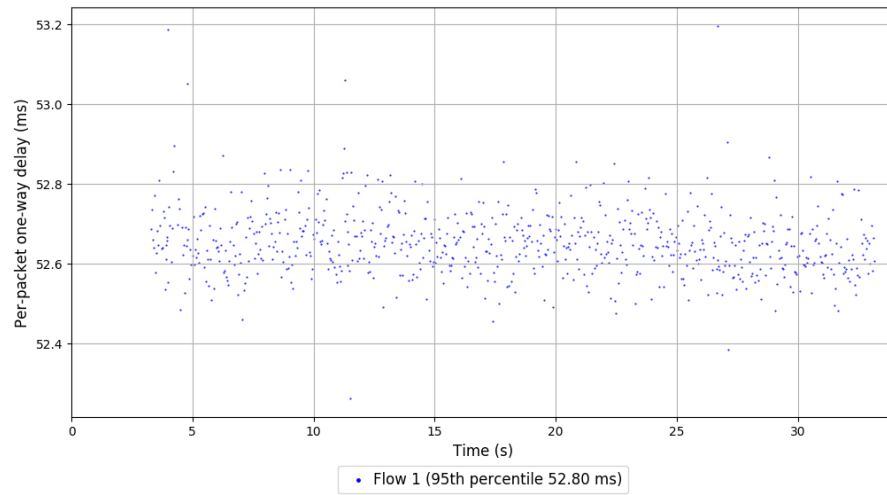
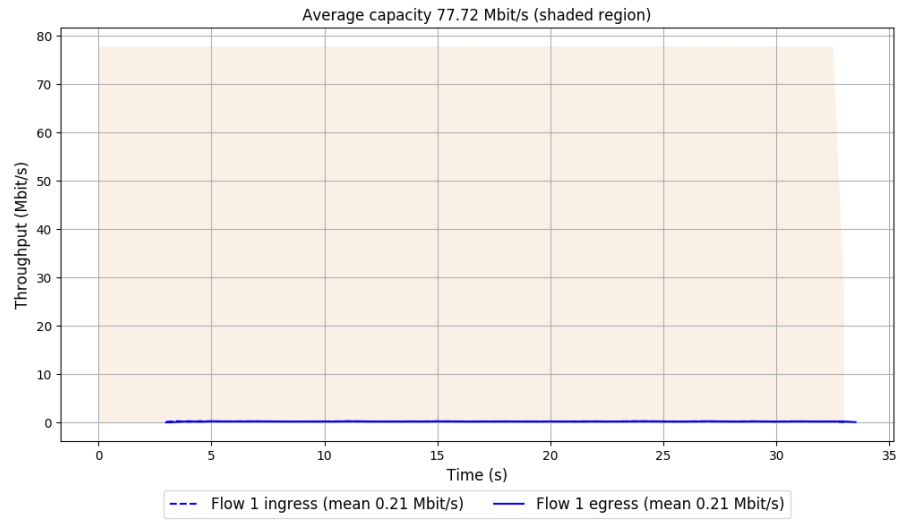
-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 52.797 ms

Loss rate: 0.13%

### Run 3: Report of SCReAM — Data Link



Run 1: Statistics of Sprout

Start at: 2018-09-25 04:47:35

End at: 2018-09-25 04:48:05

# Below is generated by plot.py at 2018-09-25 05:27:26

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 7.64 Mbit/s (9.8% utilization)

95th percentile per-packet one-way delay: 60.363 ms

Loss rate: 0.08%

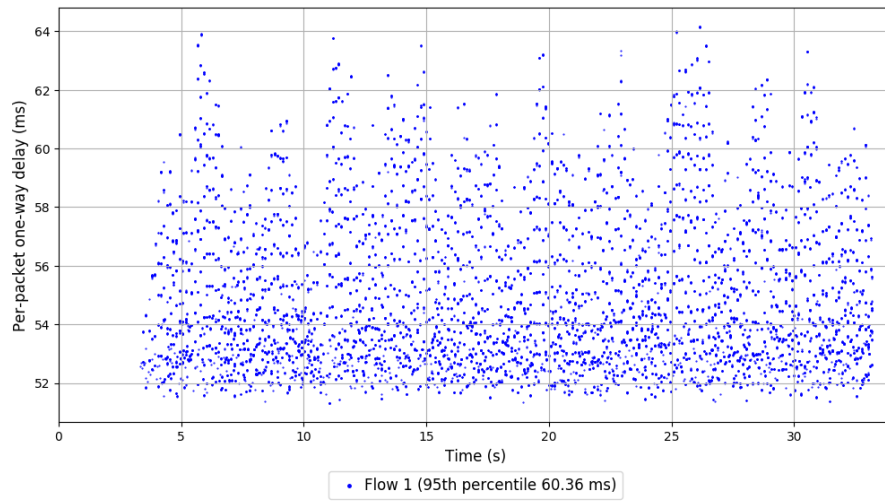
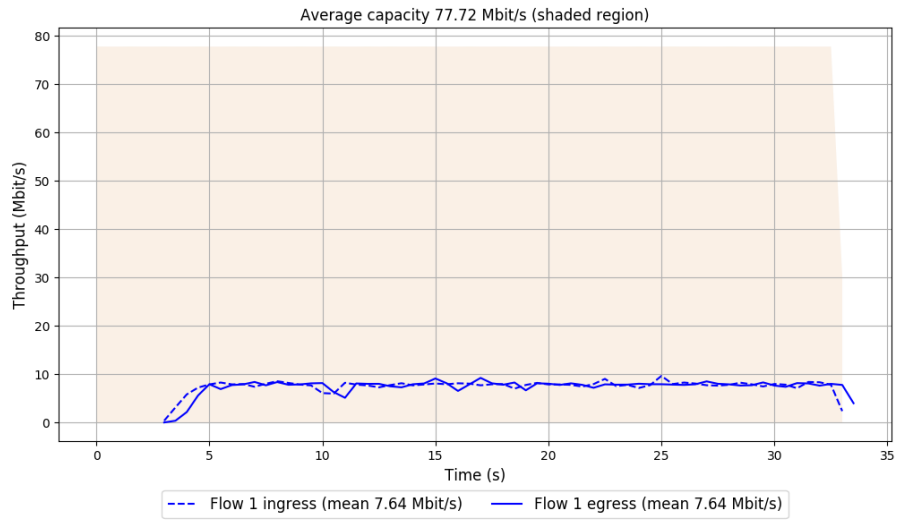
-- Flow 1:

Average throughput: 7.64 Mbit/s

95th percentile per-packet one-way delay: 60.363 ms

Loss rate: 0.08%

# Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

Start at: 2018-09-25 04:59:54

End at: 2018-09-25 05:00:24

# Below is generated by plot.py at 2018-09-25 05:27:26

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 7.53 Mbit/s (9.7% utilization)

95th percentile per-packet one-way delay: 59.829 ms

Loss rate: 0.42%

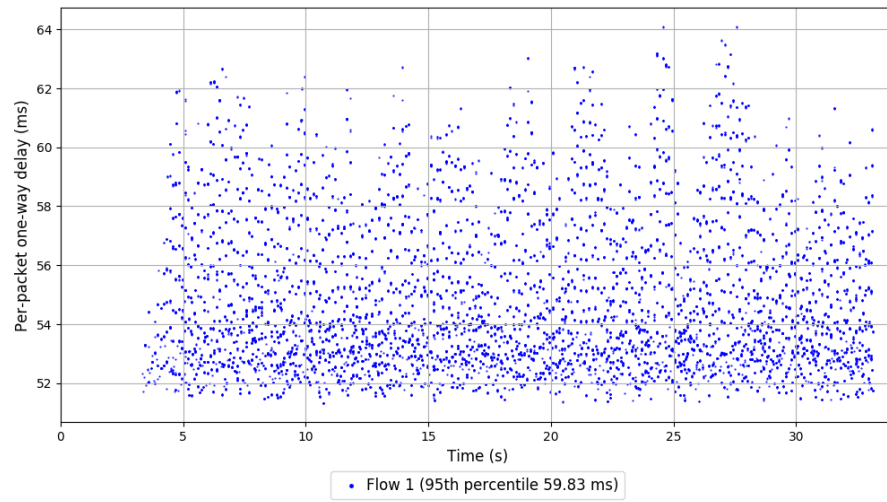
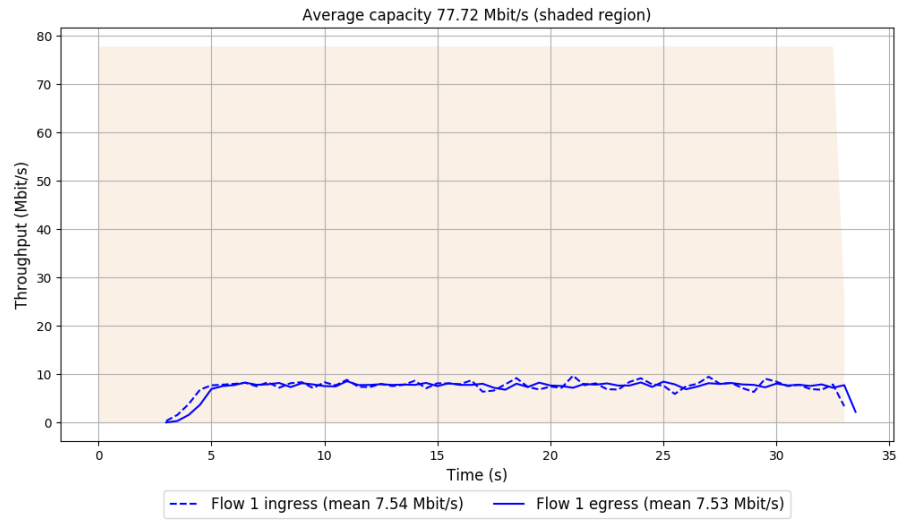
-- Flow 1:

Average throughput: 7.53 Mbit/s

95th percentile per-packet one-way delay: 59.829 ms

Loss rate: 0.42%

## Run 2: Report of Sprout — Data Link



Run 3: Statistics of Sprout

Start at: 2018-09-25 05:12:15

End at: 2018-09-25 05:12:45

# Below is generated by plot.py at 2018-09-25 05:27:26

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 7.52 Mbit/s (9.7% utilization)

95th percentile per-packet one-way delay: 60.045 ms

Loss rate: 0.22%

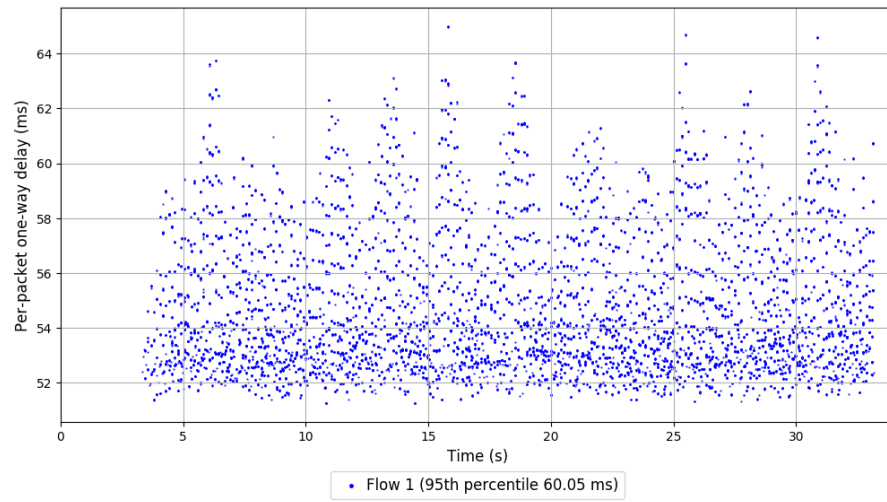
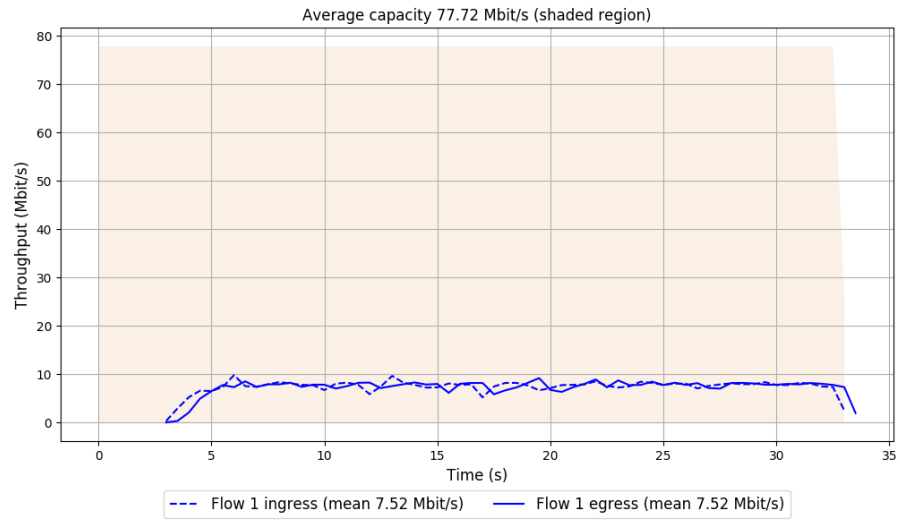
-- Flow 1:

Average throughput: 7.52 Mbit/s

95th percentile per-packet one-way delay: 60.045 ms

Loss rate: 0.22%

### Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

Start at: 2018-09-25 04:45:33

End at: 2018-09-25 04:46:03

# Below is generated by plot.py at 2018-09-25 05:29:09

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 76.27 Mbit/s (98.1% utilization)

95th percentile per-packet one-way delay: 59.132 ms

Loss rate: 10.10%

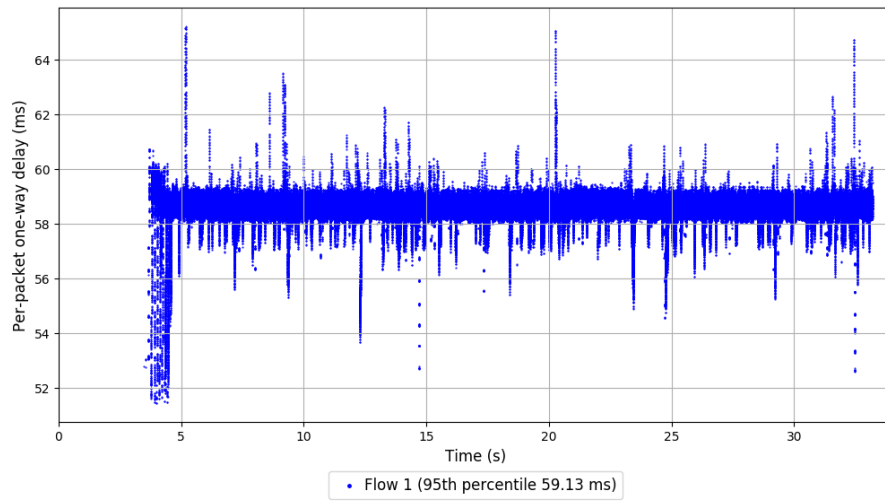
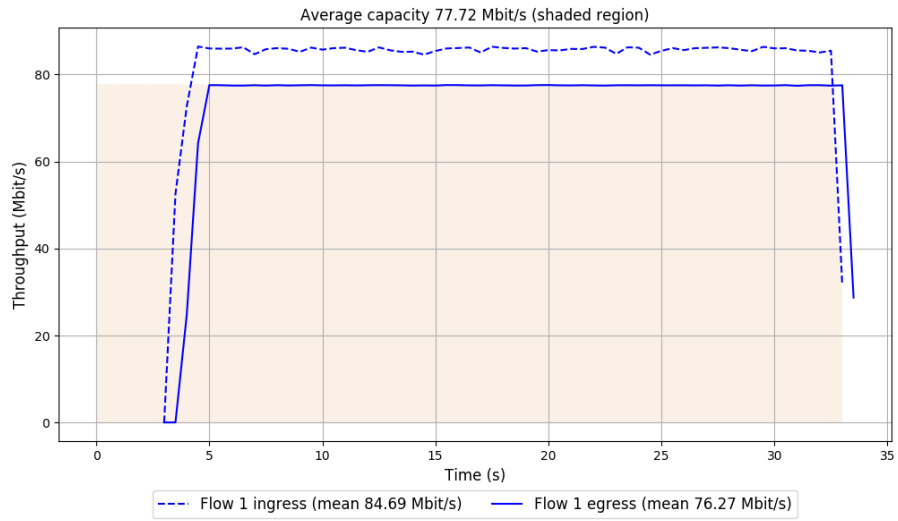
-- Flow 1:

Average throughput: 76.27 Mbit/s

95th percentile per-packet one-way delay: 59.132 ms

Loss rate: 10.10%

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



Run 2: Statistics of TaoVA-100x

Start at: 2018-09-25 04:57:54

End at: 2018-09-25 04:58:24

# Below is generated by plot.py at 2018-09-25 05:29:20

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 76.47 Mbit/s (98.4% utilization)

95th percentile per-packet one-way delay: 59.132 ms

Loss rate: 10.06%

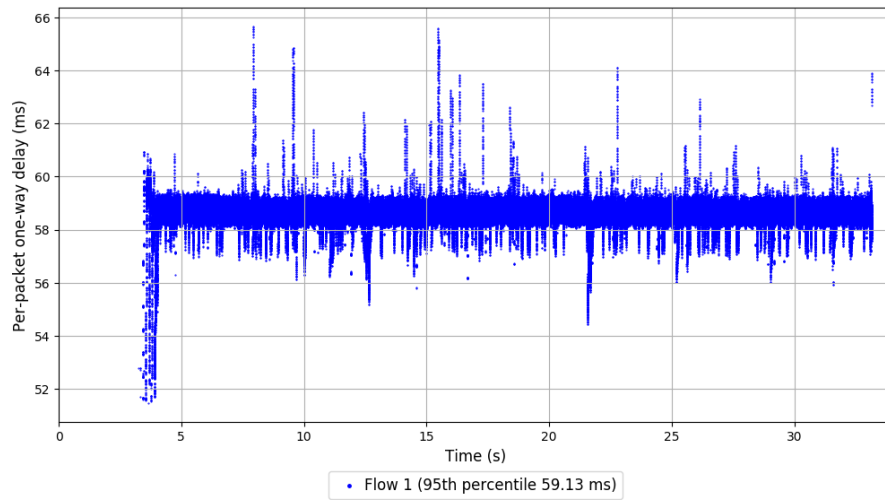
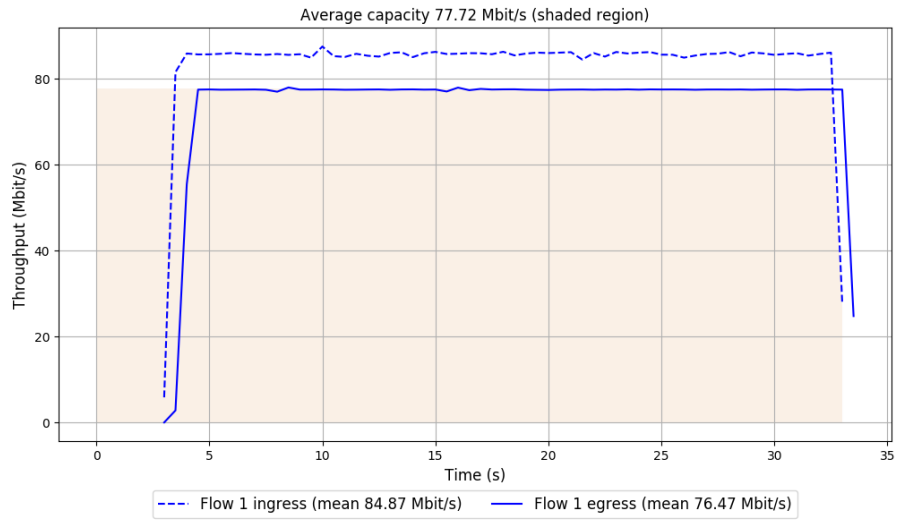
-- Flow 1:

Average throughput: 76.47 Mbit/s

95th percentile per-packet one-way delay: 59.132 ms

Loss rate: 10.06%

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



Run 3: Statistics of TaoVA-100x

Start at: 2018-09-25 05:10:16

End at: 2018-09-25 05:10:46

# Below is generated by plot.py at 2018-09-25 05:29:25

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 76.39 Mbit/s (98.3% utilization)

95th percentile per-packet one-way delay: 59.139 ms

Loss rate: 10.06%

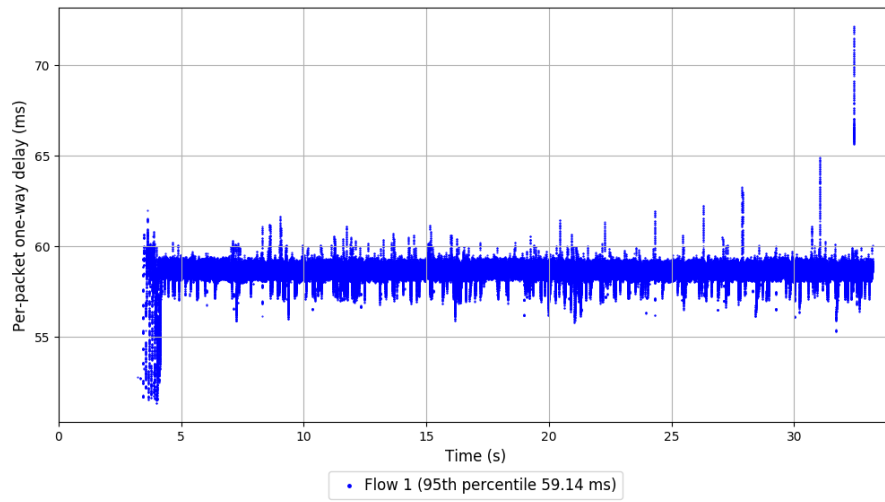
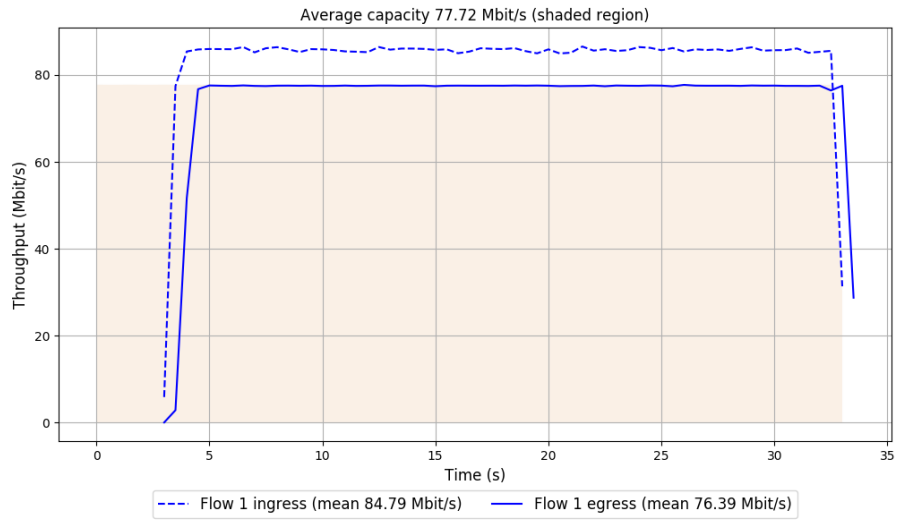
-- Flow 1:

Average throughput: 76.39 Mbit/s

95th percentile per-packet one-way delay: 59.139 ms

Loss rate: 10.06%

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



Run 1: Statistics of TCP Vegas

Start at: 2018-09-25 04:43:39

End at: 2018-09-25 04:44:09

# Below is generated by plot.py at 2018-09-25 05:29:25

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 4.02 Mbit/s (5.2% utilization)

95th percentile per-packet one-way delay: 53.227 ms

Loss rate: 0.37%

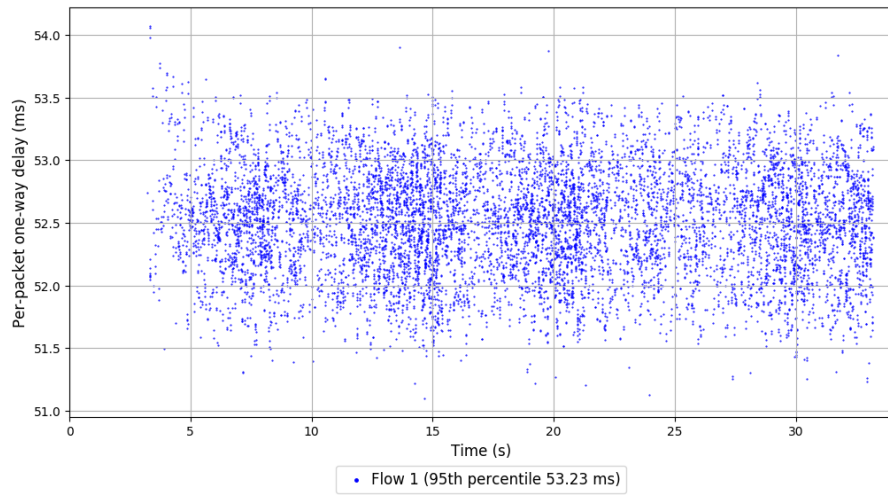
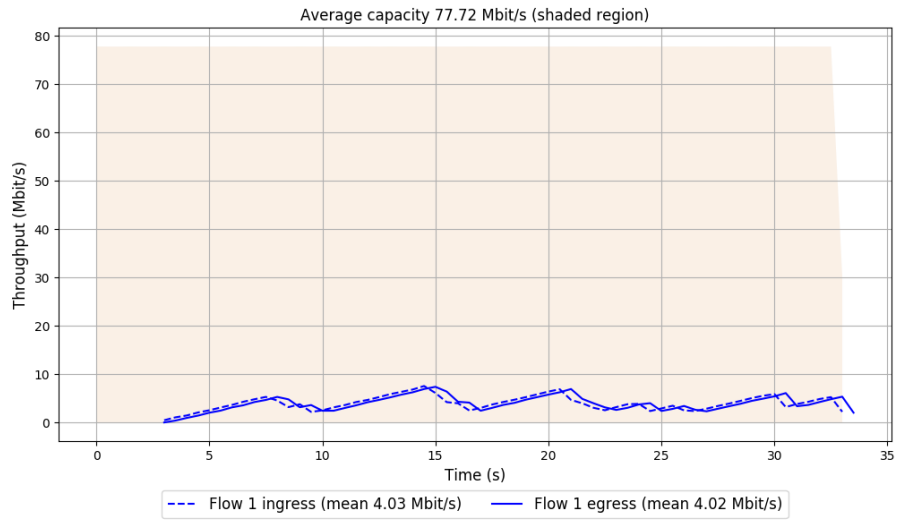
-- Flow 1:

Average throughput: 4.02 Mbit/s

95th percentile per-packet one-way delay: 53.227 ms

Loss rate: 0.37%

# Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2018-09-25 04:56:01

End at: 2018-09-25 04:56:31

# Below is generated by plot.py at 2018-09-25 05:29:25

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 5.06 Mbit/s (6.5% utilization)

95th percentile per-packet one-way delay: 53.184 ms

Loss rate: 0.31%

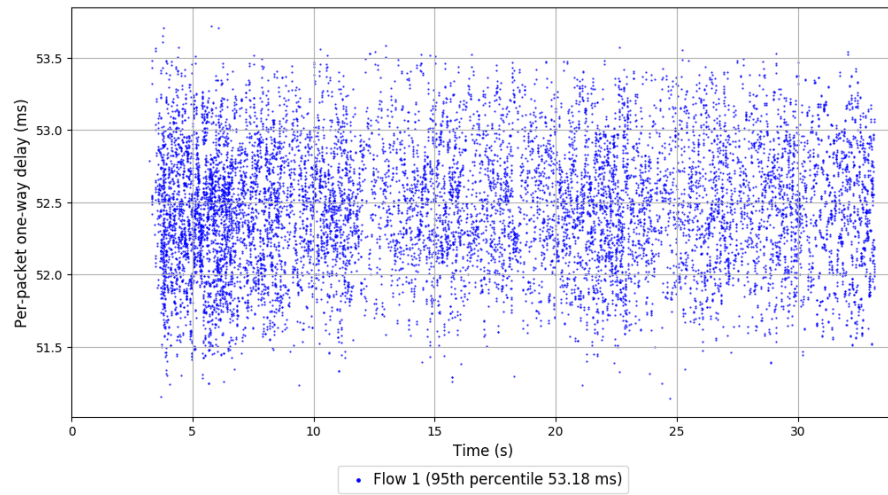
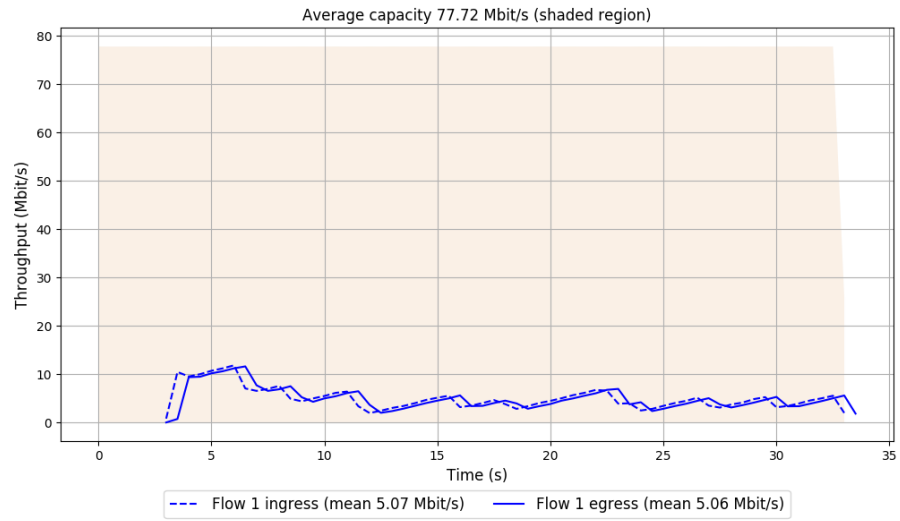
-- Flow 1:

Average throughput: 5.06 Mbit/s

95th percentile per-packet one-way delay: 53.184 ms

Loss rate: 0.31%

## Run 2: Report of TCP Vegas — Data Link



Run 3: Statistics of TCP Vegas

Start at: 2018-09-25 05:08:22

End at: 2018-09-25 05:08:52

# Below is generated by plot.py at 2018-09-25 05:29:25

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 6.38 Mbit/s (8.2% utilization)

95th percentile per-packet one-way delay: 53.167 ms

Loss rate: 0.19%

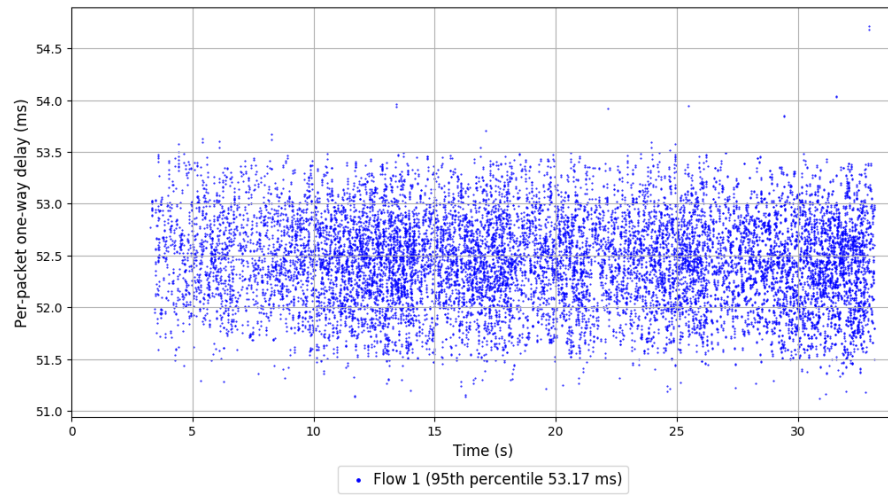
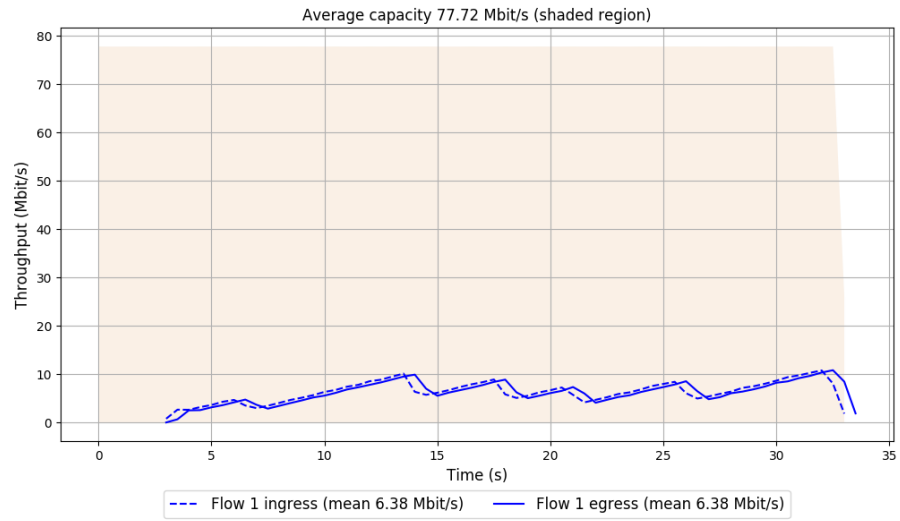
-- Flow 1:

Average throughput: 6.38 Mbit/s

95th percentile per-packet one-way delay: 53.167 ms

Loss rate: 0.19%

### Run 3: Report of TCP Vegas — Data Link



Run 1: Statistics of Verus

Start at: 2018-09-25 04:46:15

End at: 2018-09-25 04:46:45

# Below is generated by plot.py at 2018-09-25 05:29:25

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 39.27 Mbit/s (50.5% utilization)

95th percentile per-packet one-way delay: 66.946 ms

Loss rate: 86.46%

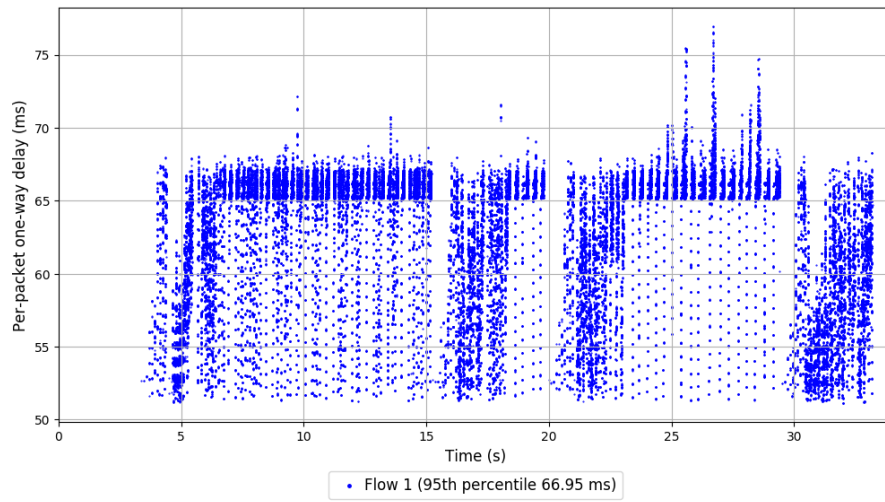
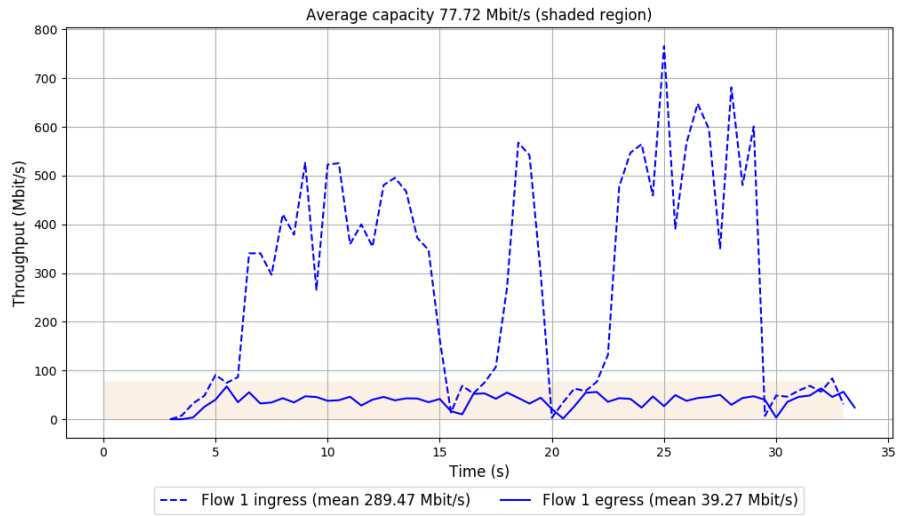
-- Flow 1:

Average throughput: 39.27 Mbit/s

95th percentile per-packet one-way delay: 66.946 ms

Loss rate: 86.46%

# Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2018-09-25 04:58:37

End at: 2018-09-25 04:59:07

# Below is generated by plot.py at 2018-09-25 05:29:25

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 38.38 Mbit/s (49.4% utilization)

95th percentile per-packet one-way delay: 66.815 ms

Loss rate: 79.64%

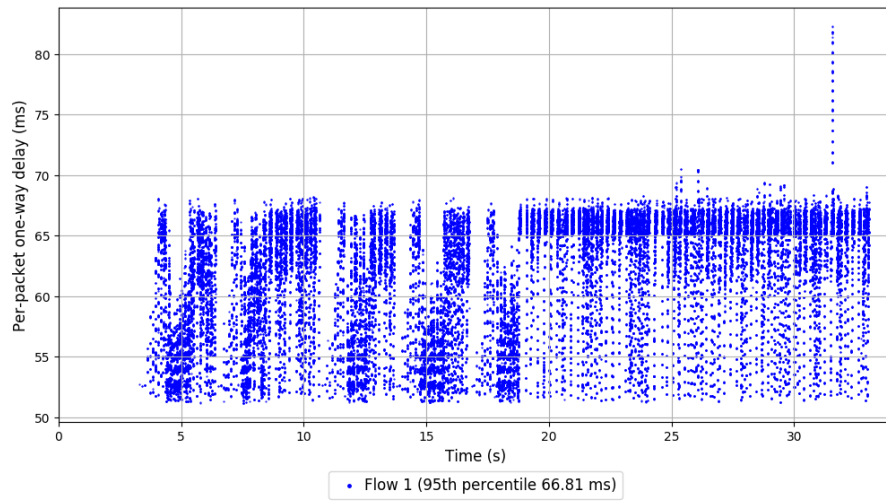
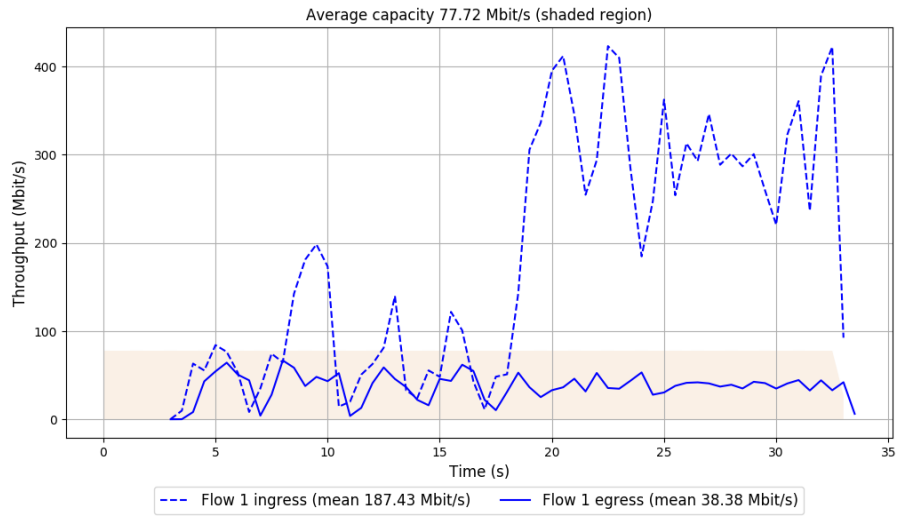
-- Flow 1:

Average throughput: 38.38 Mbit/s

95th percentile per-packet one-way delay: 66.815 ms

Loss rate: 79.64%

## Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2018-09-25 05:10:59

End at: 2018-09-25 05:11:29

# Below is generated by plot.py at 2018-09-25 05:29:25

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 33.68 Mbit/s (43.3% utilization)

95th percentile per-packet one-way delay: 66.743 ms

Loss rate: 77.24%

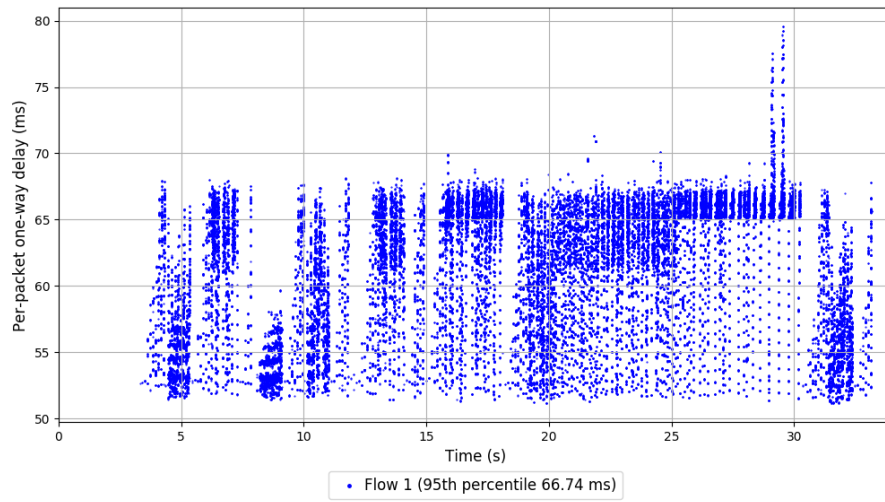
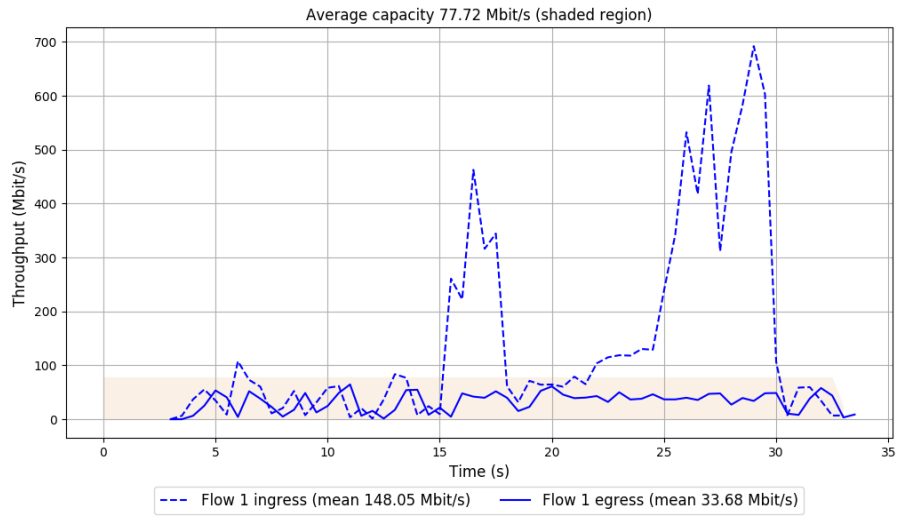
-- Flow 1:

Average throughput: 33.68 Mbit/s

95th percentile per-packet one-way delay: 66.743 ms

Loss rate: 77.24%

### Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

Start at: 2018-09-25 04:48:11

End at: 2018-09-25 04:48:41

# Below is generated by plot.py at 2018-09-25 05:29:25

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 67.45 Mbit/s (86.8% utilization)

95th percentile per-packet one-way delay: 53.967 ms

Loss rate: 0.62%

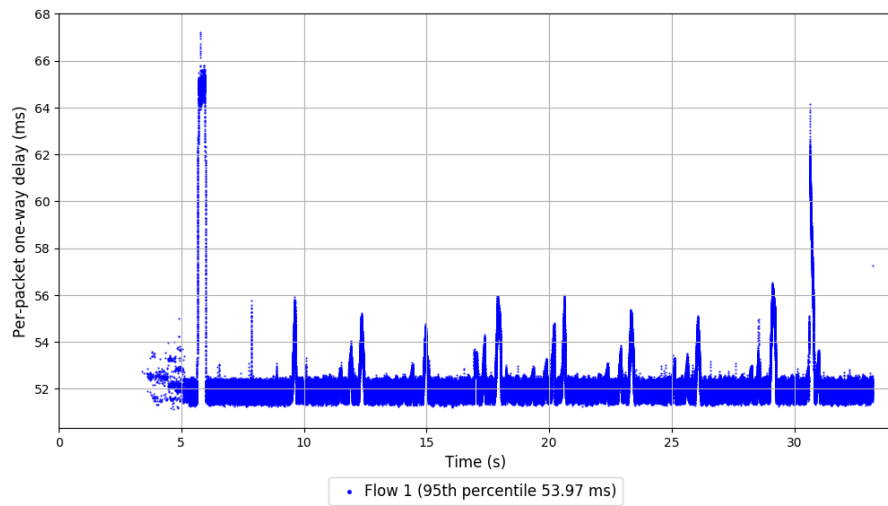
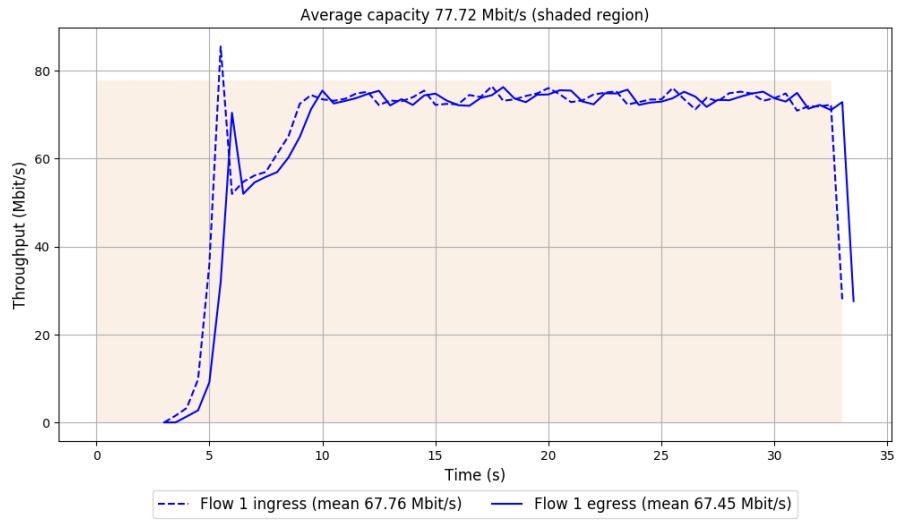
-- Flow 1:

Average throughput: 67.45 Mbit/s

95th percentile per-packet one-way delay: 53.967 ms

Loss rate: 0.62%

# Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2018-09-25 05:00:31

End at: 2018-09-25 05:01:01

# Below is generated by plot.py at 2018-09-25 05:29:25

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 67.28 Mbit/s (86.6% utilization)

95th percentile per-packet one-way delay: 54.048 ms

Loss rate: 0.62%

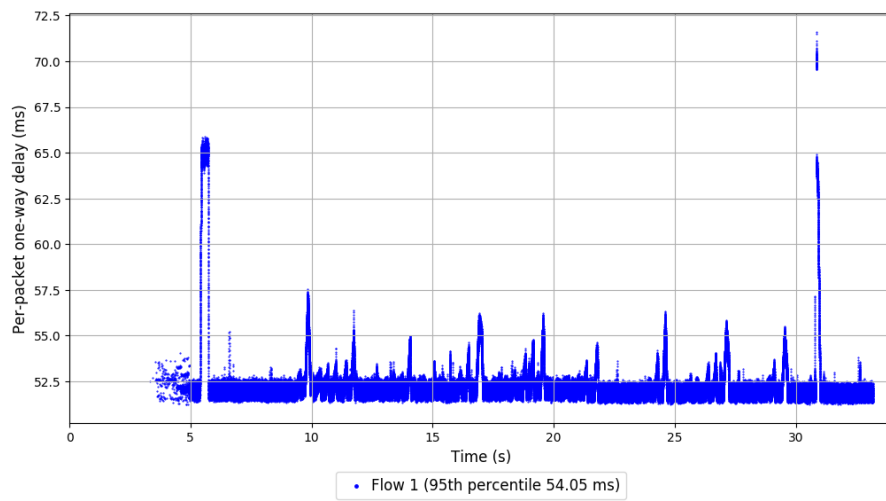
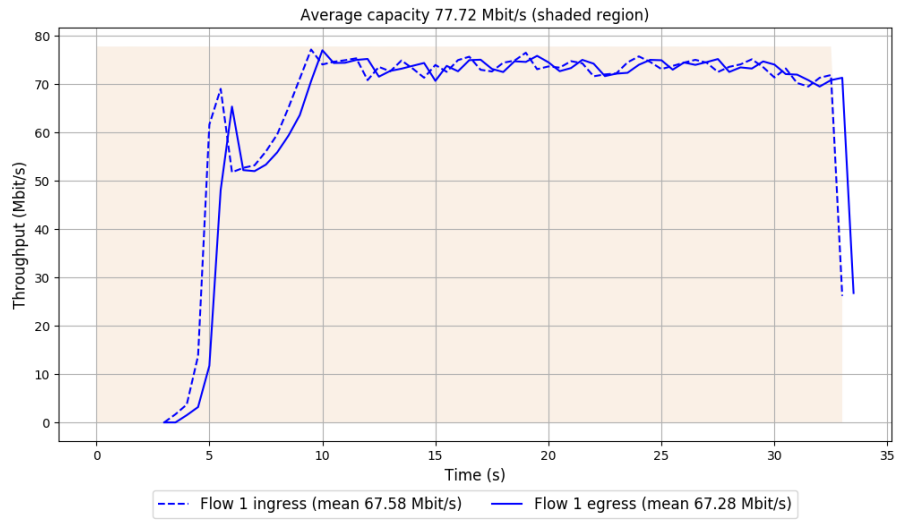
-- Flow 1:

Average throughput: 67.28 Mbit/s

95th percentile per-packet one-way delay: 54.048 ms

Loss rate: 0.62%

## Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

Start at: 2018-09-25 05:12:52

End at: 2018-09-25 05:13:22

# Below is generated by plot.py at 2018-09-25 05:29:30

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 67.11 Mbit/s (86.4% utilization)

95th percentile per-packet one-way delay: 54.443 ms

Loss rate: 0.82%

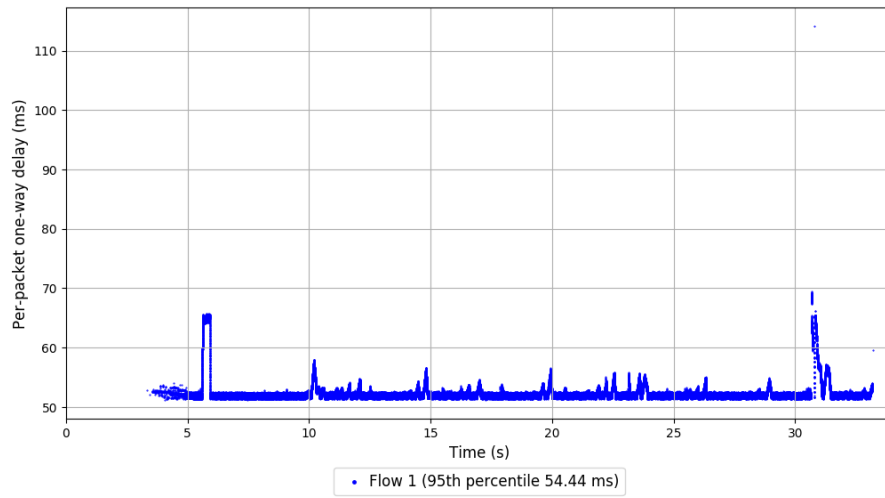
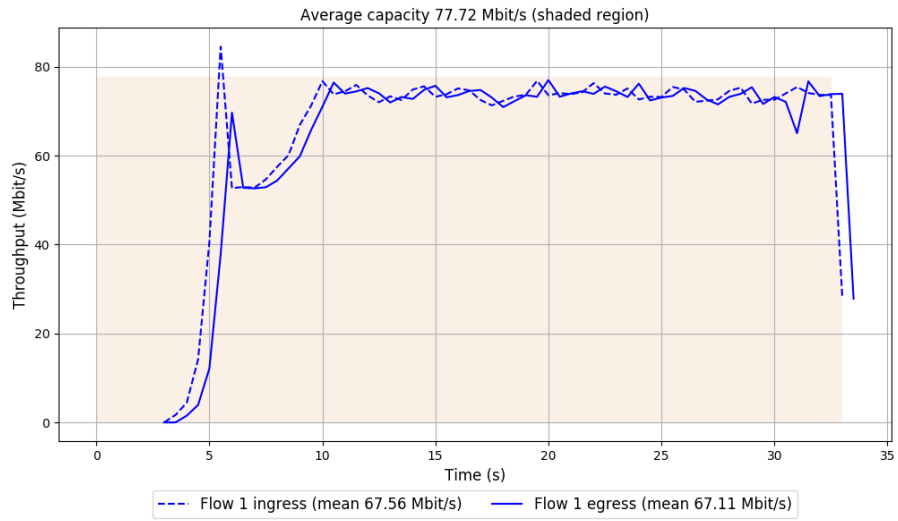
-- Flow 1:

Average throughput: 67.11 Mbit/s

95th percentile per-packet one-way delay: 54.443 ms

Loss rate: 0.82%

### Run 3: Report of PCC-Vivace — Data Link

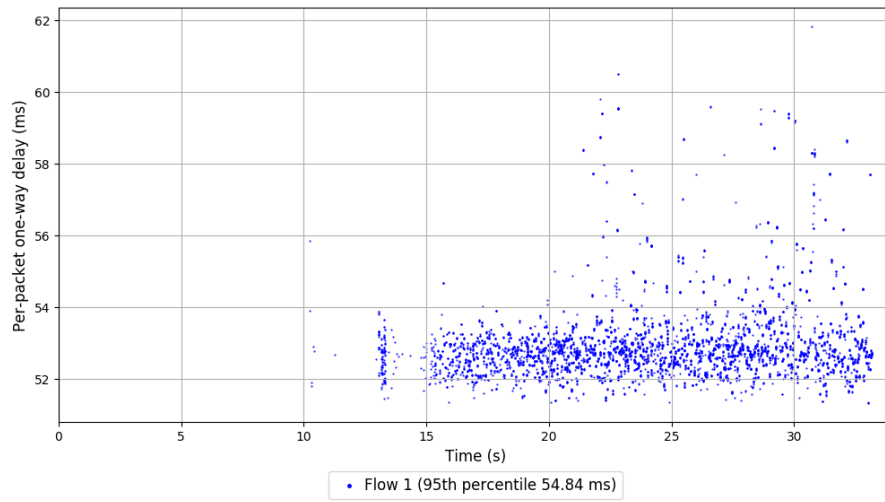
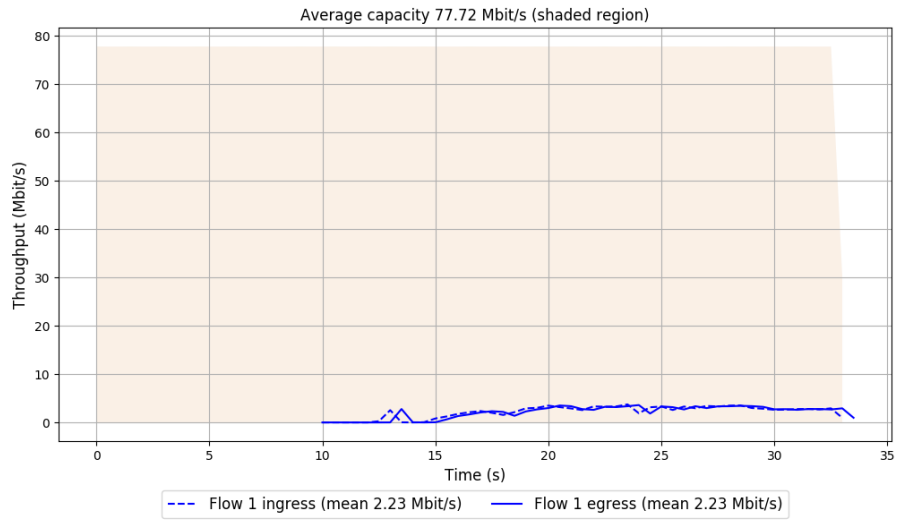


Run 1: Statistics of WebRTC media

Start at: 2018-09-25 04:42:24

End at: 2018-09-25 04:42:54

# Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2018-09-25 04:54:44

End at: 2018-09-25 04:55:14

# Below is generated by plot.py at 2018-09-25 05:29:30

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 2.41 Mbit/s (3.1% utilization)

95th percentile per-packet one-way delay: 53.593 ms

Loss rate: 0.20%

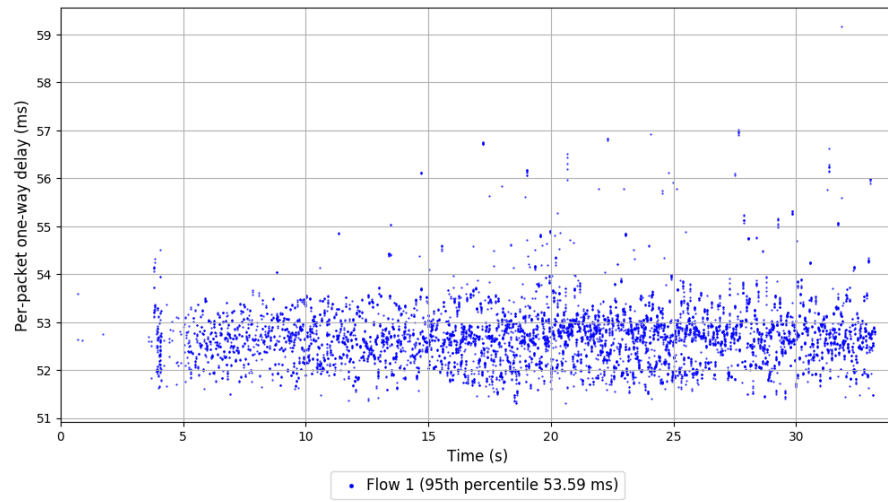
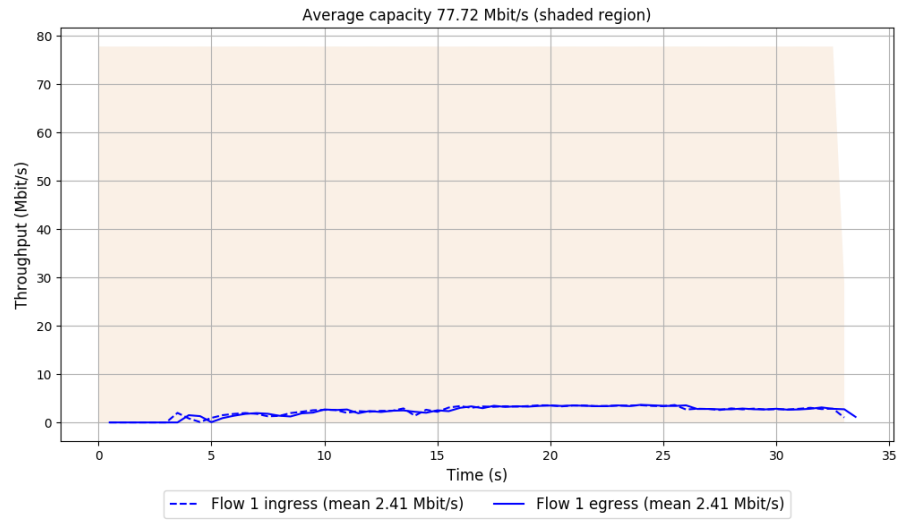
-- Flow 1:

Average throughput: 2.41 Mbit/s

95th percentile per-packet one-way delay: 53.593 ms

Loss rate: 0.20%

## Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2018-09-25 05:07:06

End at: 2018-09-25 05:07:36

# Below is generated by plot.py at 2018-09-25 05:29:30

# Datalink statistics

-- Total of 1 flow:

Average capacity: 77.72 Mbit/s

Average throughput: 2.40 Mbit/s (3.1% utilization)

95th percentile per-packet one-way delay: 53.735 ms

Loss rate: 0.27%

-- Flow 1:

Average throughput: 2.40 Mbit/s

95th percentile per-packet one-way delay: 53.735 ms

Loss rate: 0.27%

### Run 3: Report of WebRTC media — Data Link

