

## Pantheon Report

Generated at 2019-01-17 09:36:18 (UTC).

Tested in mahimahi: mm-delay 10 mm-link 108mbps.trace 108mbps.trace  
--uplink-queue=droptail --uplink-queue-args=packets=1 --downlink-queue=droptail  
--downlink-queue-args=packets=1

Repeated the test of 21 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

### System info:

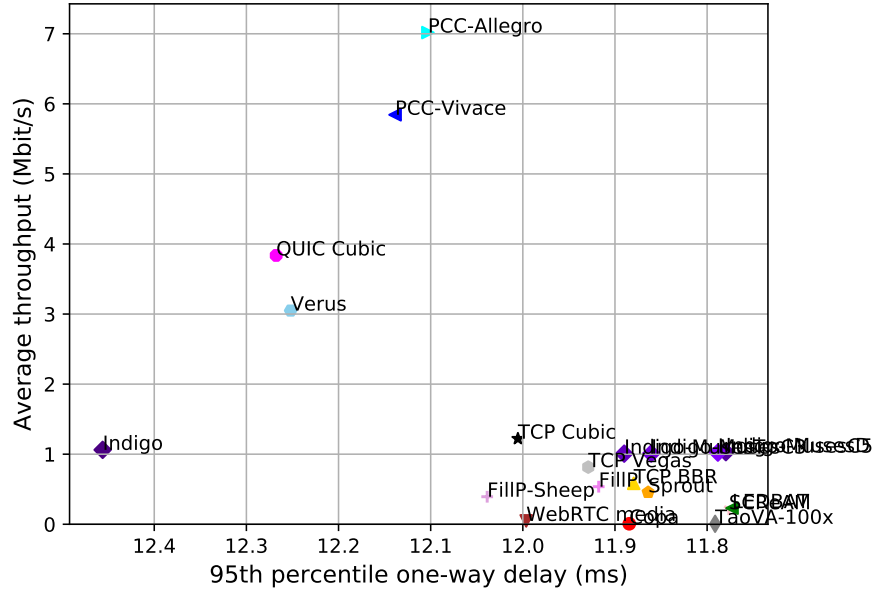
Linux 4.15.0-1026-gcp  
net.core.default\_qdisc = fq  
net.core.rmem\_default = 16777216  
net.core.rmem\_max = 536870912  
net.core.wmem\_default = 16777216  
net.core.wmem\_max = 536870912  
net.ipv4.tcp\_rmem = 4096 16777216 536870912  
net.ipv4.tcp\_wmem = 4096 16777216 536870912

### Git summary:

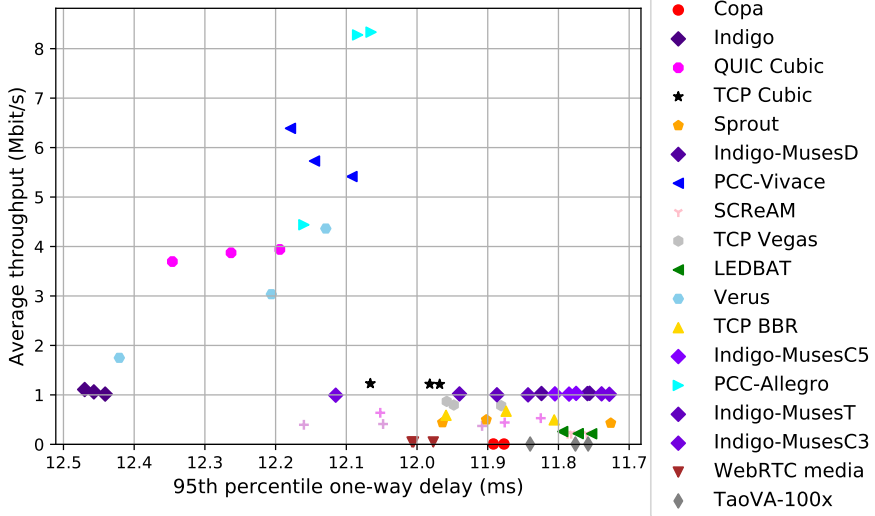
branch: muses @ c80a283586bf7b0cc1fe08c69c8f60d56498f81c  
third\_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519  
third\_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9  
third\_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4  
third\_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d  
third\_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf  
third\_party/muses @ c3eee875824760ec5b2fd207fefe166e1afe2170  
third\_party/pantheon-tunnel @ f866d3f58d27afd942717625ee3a354cc2e802bd  
third\_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1  
M receiver/src/buffer.h  
M receiver/src/core.cpp  
M sender/src/buffer.h  
M sender/src/core.cpp  
third\_party/pcc-experimental @ cd43e34e3f5f5613e8acd08fab92c4eb24f974ab  
third\_party/proto-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)



local test in mahimahi, 3 runs of 30s each per 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	0.58	11.88	32.91
Copa	2	0.01	11.88	89.71
TCP Cubic	3	1.22	12.01	8.63
FillP	3	0.54	11.92	47.55
FillP-Sheep	3	0.39	12.04	37.24
Indigo	3	1.06	12.46	96.08
Indigo-MusesC3	3	1.01	11.86	16.60
Indigo-MusesC5	3	1.02	11.79	17.00
Indigo-MusesD	3	1.03	11.78	23.26
Indigo-MusesT	3	1.01	11.89	20.48
LEDBAT	3	0.23	11.77	49.62
PCC-Allegro	3	7.02	12.10	3.38
PCC-Expr	0	N/A	N/A	N/A
QUIC Cubic	3	3.84	12.27	8.58
SReAM	3	0.21	11.78	0.04
Sprout	3	0.46	11.86	11.41
TaoVA-100x	3	0.01	11.79	51.91
TCP Vegas	3	0.82	11.93	16.70
Verus	3	3.05	12.25	98.51
PCC-Vivace	3	5.84	12.14	0.57
WebRTC media	3	0.05	12.00	22.09

Run 1: Statistics of TCP BBR

Start at: 2019-01-17 08:55:35

End at: 2019-01-17 08:56:05

# Below is generated by plot.py at 2019-01-17 09:31:38

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.67 Mbit/s (0.6% utilization)

95th percentile per-packet one-way delay: 11.874 ms

Loss rate: 34.07%

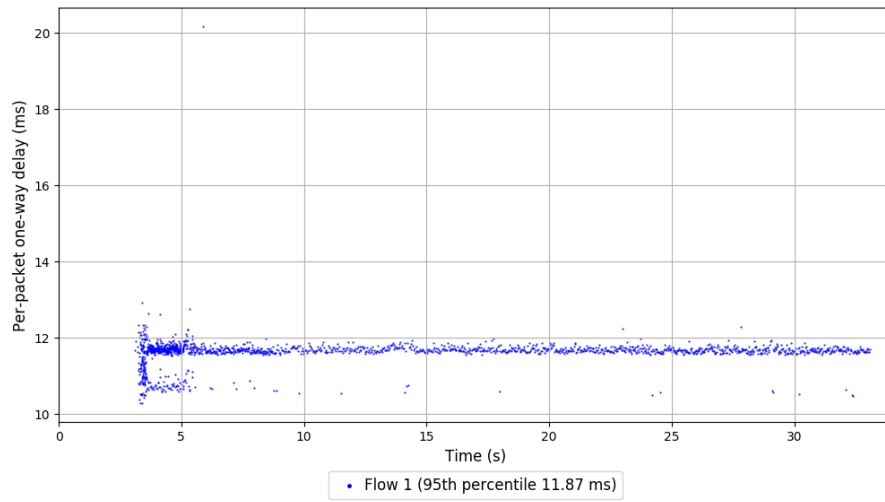
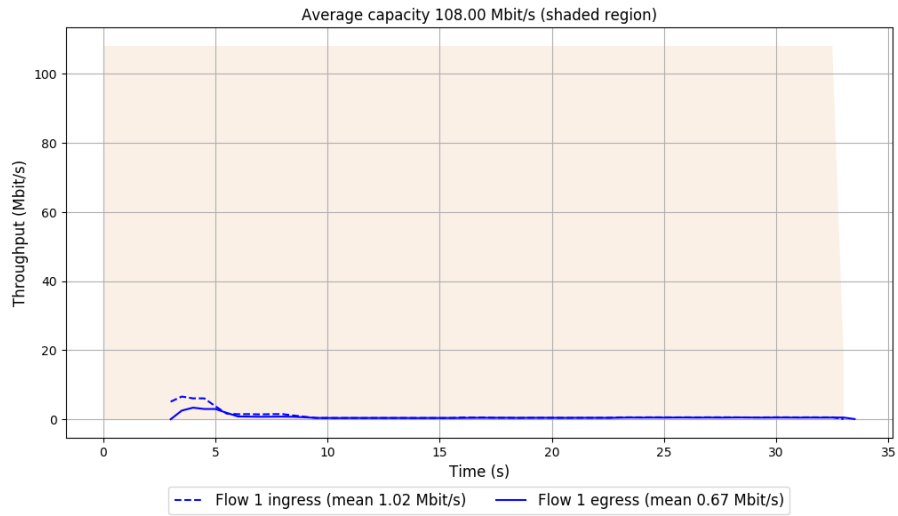
-- Flow 1:

Average throughput: 0.67 Mbit/s

95th percentile per-packet one-way delay: 11.874 ms

Loss rate: 34.07%

# Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2019-01-17 09:08:33

End at: 2019-01-17 09:09:03

# Below is generated by plot.py at 2019-01-17 09:31:38

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.59 Mbit/s (0.5% utilization)

95th percentile per-packet one-way delay: 11.959 ms

Loss rate: 33.86%

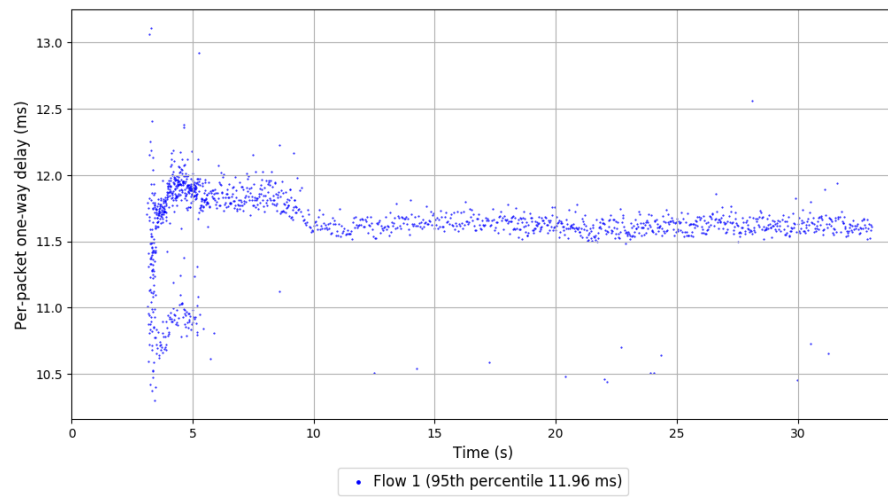
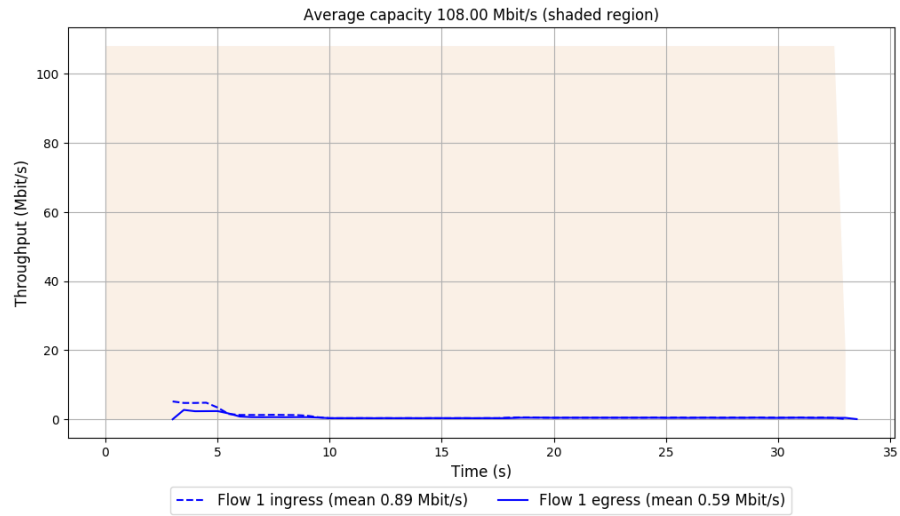
-- Flow 1:

Average throughput: 0.59 Mbit/s

95th percentile per-packet one-way delay: 11.959 ms

Loss rate: 33.86%

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



Run 3: Statistics of TCP BBR

Start at: 2019-01-17 09:21:30

End at: 2019-01-17 09:22:00

# Below is generated by plot.py at 2019-01-17 09:31:38

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.49 Mbit/s (0.5% utilization)

95th percentile per-packet one-way delay: 11.806 ms

Loss rate: 30.81%

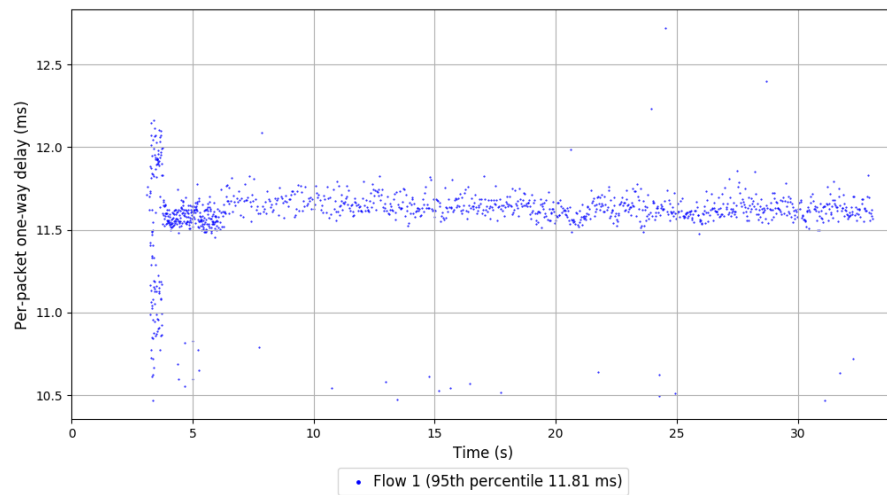
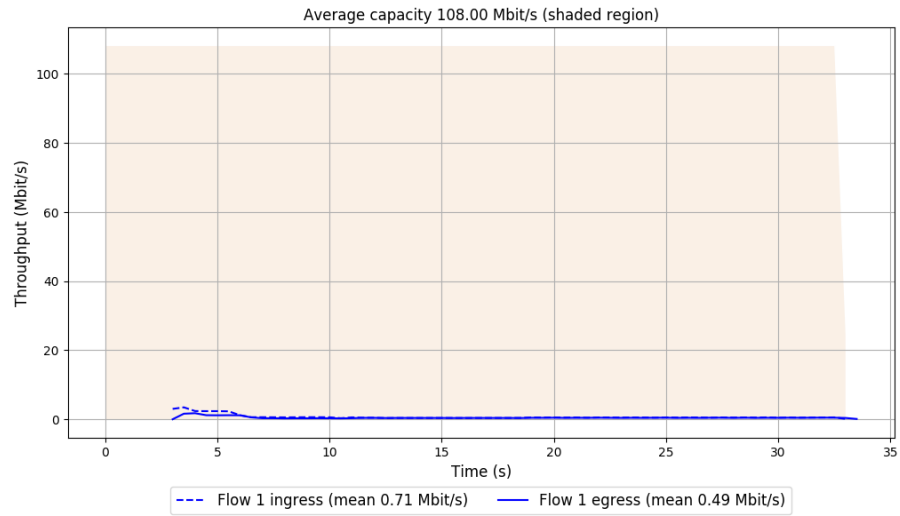
-- Flow 1:

Average throughput: 0.49 Mbit/s

95th percentile per-packet one-way delay: 11.806 ms

Loss rate: 30.81%

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

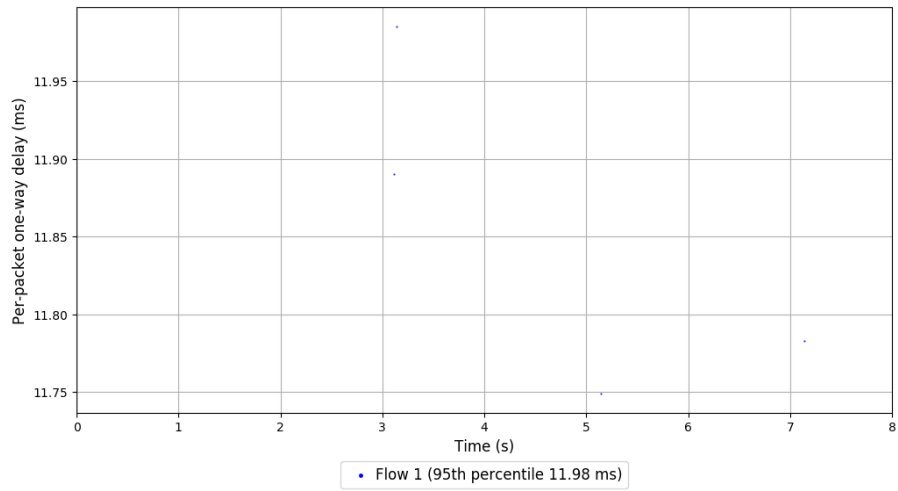
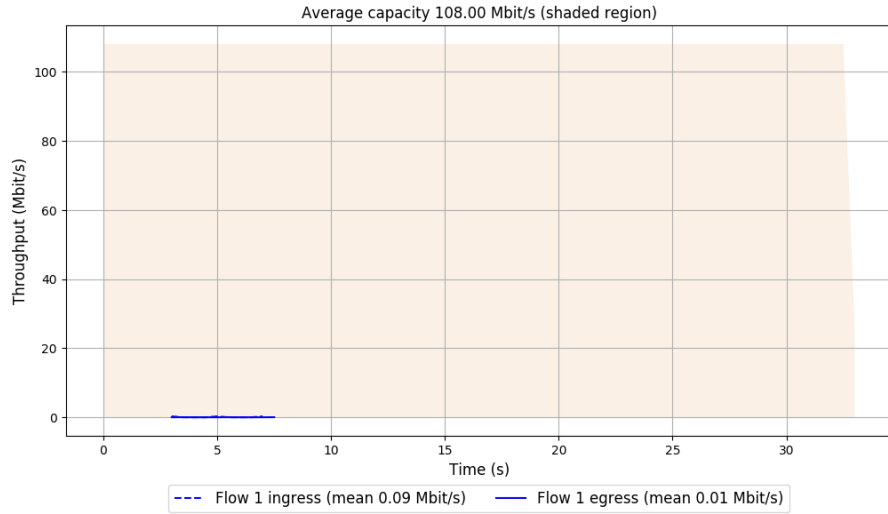


Run 1: Statistics of Copa

Start at: 2019-01-17 09:03:41

End at: 2019-01-17 09:04:11

# Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

Start at: 2019-01-17 09:16:39

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

# Below is generated by plot.py at 2019-01-17 09:31:38

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.01 Mbit/s (0.0% utilization)

95th percentile per-packet one-way delay: 11.892 ms

Loss rate: 89.06%

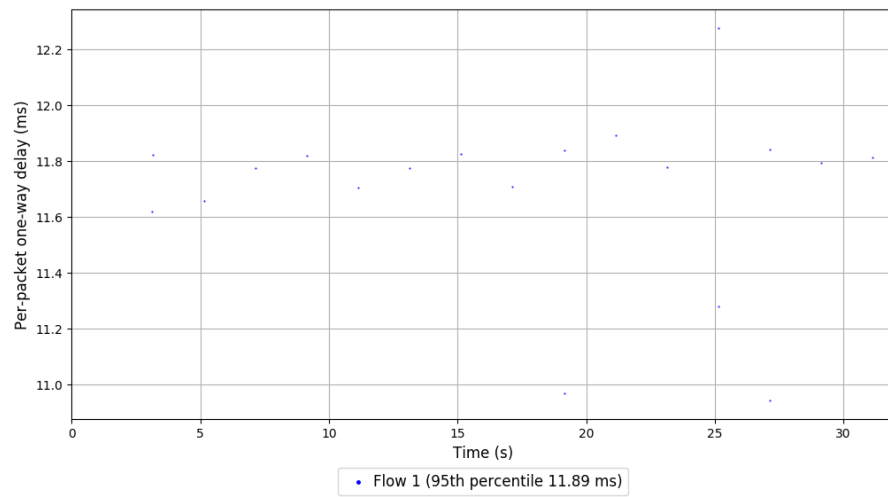
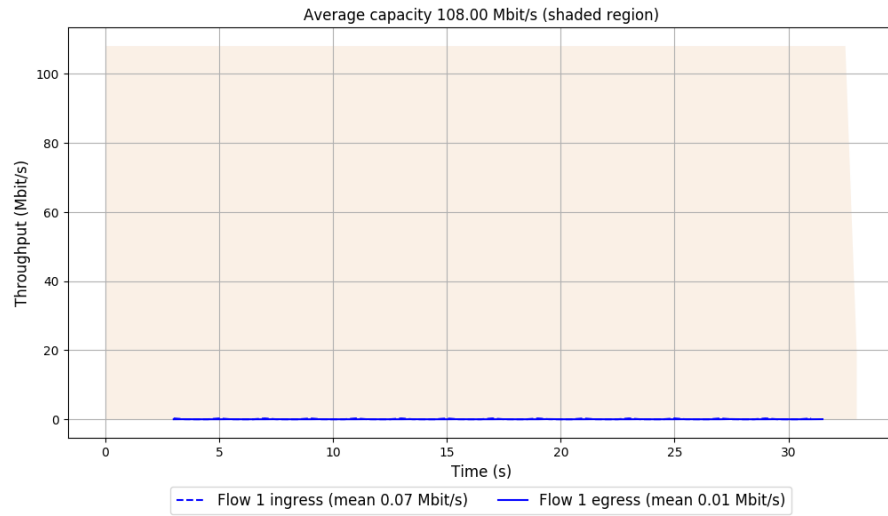
-- Flow 1:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 11.892 ms

Loss rate: 89.06%

## Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

Start at: 2019-01-17 09:29:34

End at: 2019-01-17 09:30:04

# Below is generated by plot.py at 2019-01-17 09:31:38

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.01 Mbit/s (0.0% utilization)

95th percentile per-packet one-way delay: 11.877 ms

Loss rate: 90.36%

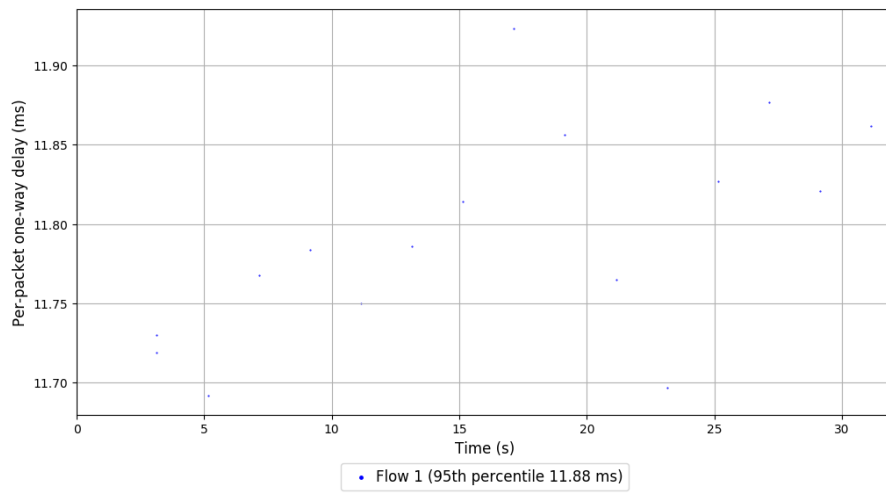
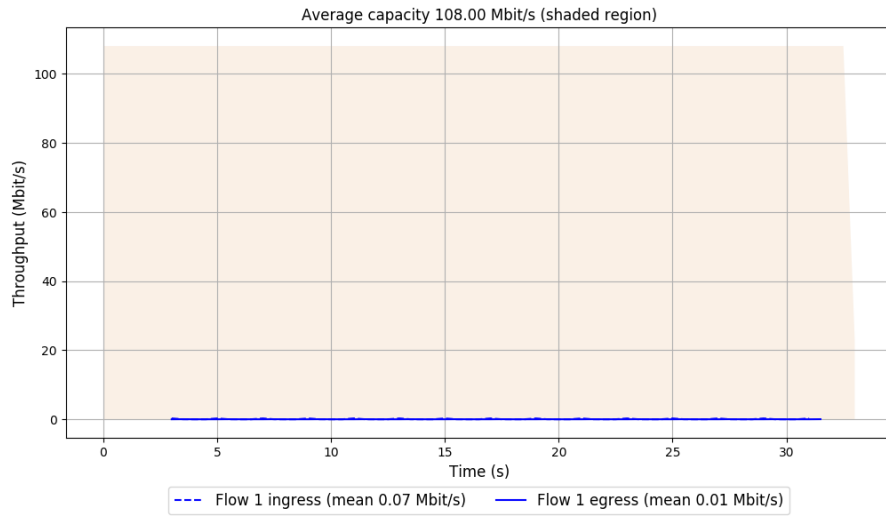
-- Flow 1:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 11.877 ms

Loss rate: 90.36%

### Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2019-01-17 08:58:12

End at: 2019-01-17 08:58:42

# Below is generated by plot.py at 2019-01-17 09:31:39

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.23 Mbit/s (1.1% utilization)

95th percentile per-packet one-way delay: 12.066 ms

Loss rate: 8.36%

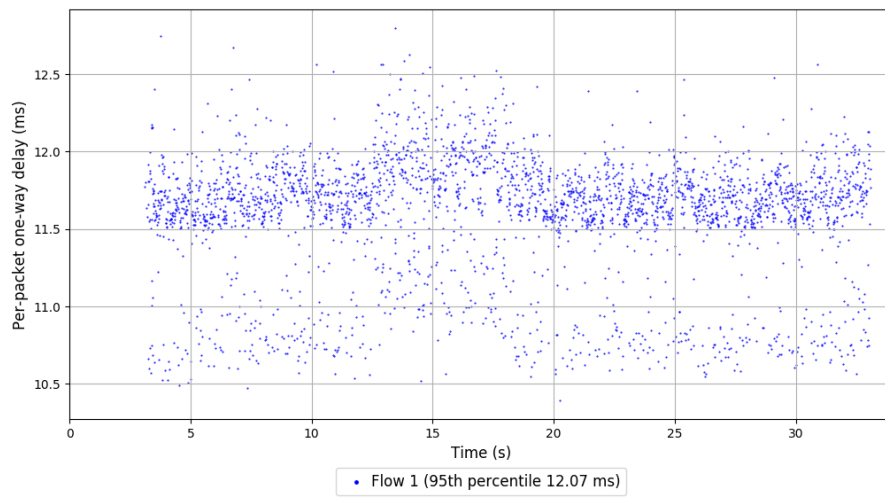
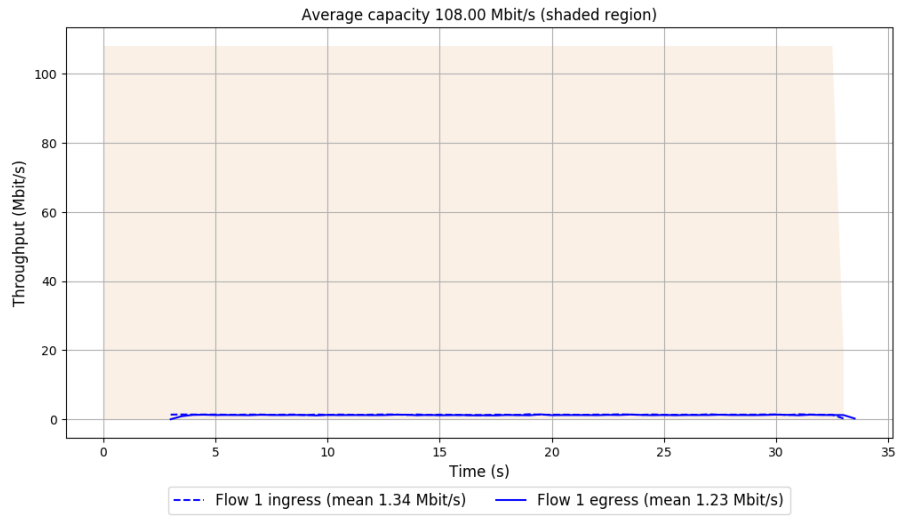
-- Flow 1:

Average throughput: 1.23 Mbit/s

95th percentile per-packet one-way delay: 12.066 ms

Loss rate: 8.36%

# Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2019-01-17 09:11:09

End at: 2019-01-17 09:11:39

# Below is generated by plot.py at 2019-01-17 09:31:39

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.21 Mbit/s (1.1% utilization)

95th percentile per-packet one-way delay: 11.968 ms

Loss rate: 8.83%

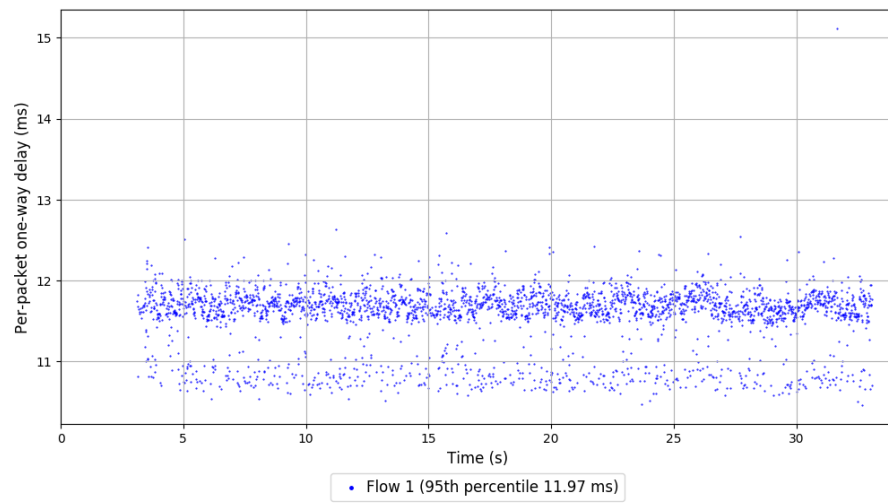
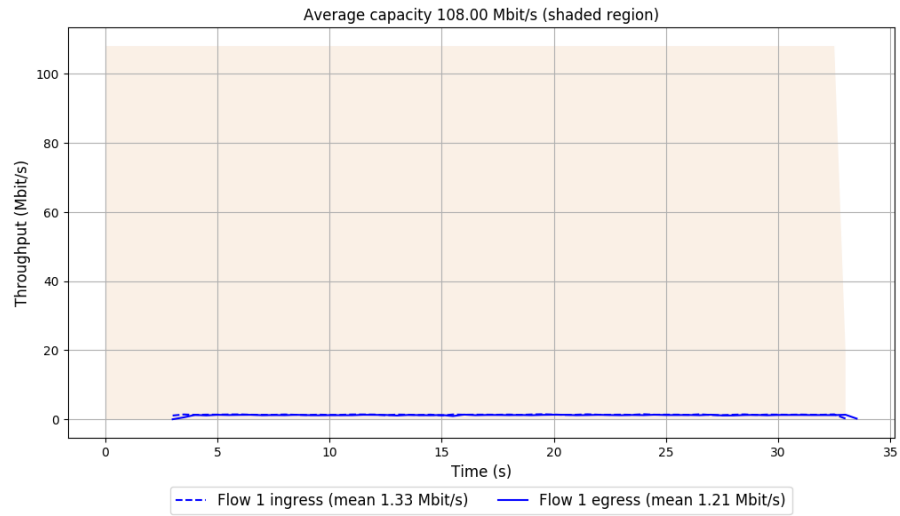
-- Flow 1:

Average throughput: 1.21 Mbit/s

95th percentile per-packet one-way delay: 11.968 ms

Loss rate: 8.83%

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



Run 3: Statistics of TCP Cubic

Start at: 2019-01-17 09:24:04

End at: 2019-01-17 09:24:34

# Below is generated by plot.py at 2019-01-17 09:32:03

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.22 Mbit/s (1.1% utilization)

95th percentile per-packet one-way delay: 11.982 ms

Loss rate: 8.70%

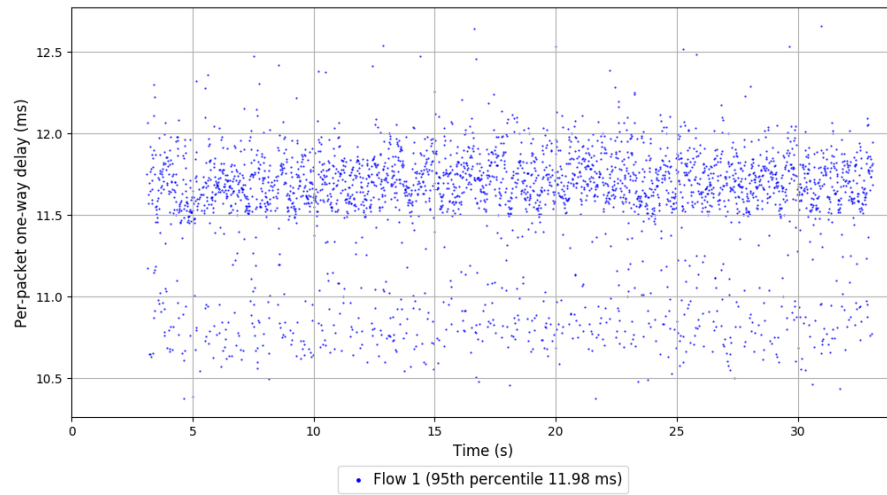
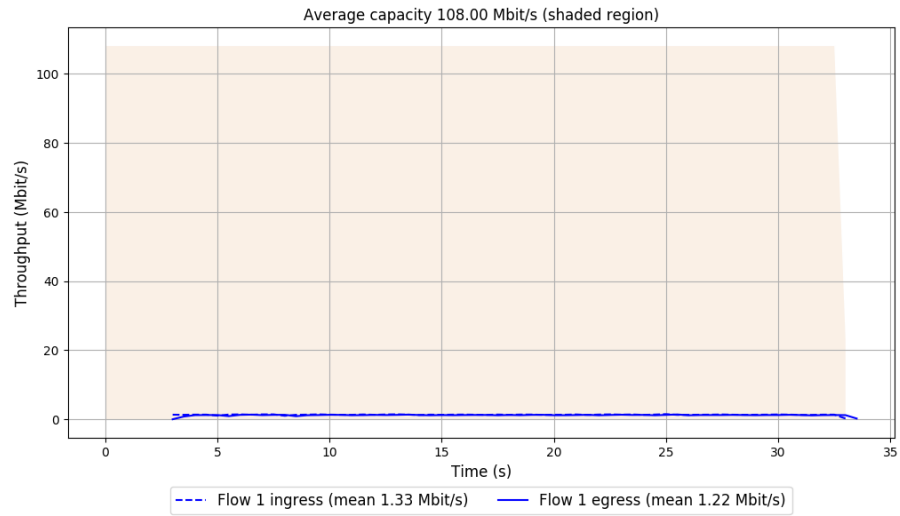
-- Flow 1:

Average throughput: 1.22 Mbit/s

95th percentile per-packet one-way delay: 11.982 ms

Loss rate: 8.70%

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



Run 1: Statistics of FillP

Start at: 2019-01-17 08:54:22

End at: 2019-01-17 08:54:52

# Below is generated by plot.py at 2019-01-17 09:32:07

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.64 Mbit/s (0.6% utilization)

95th percentile per-packet one-way delay: 12.052 ms

Loss rate: 50.29%

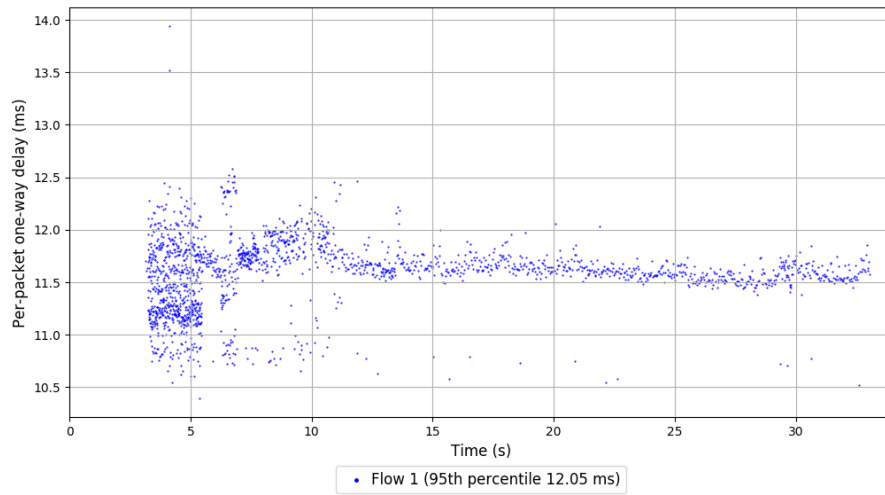
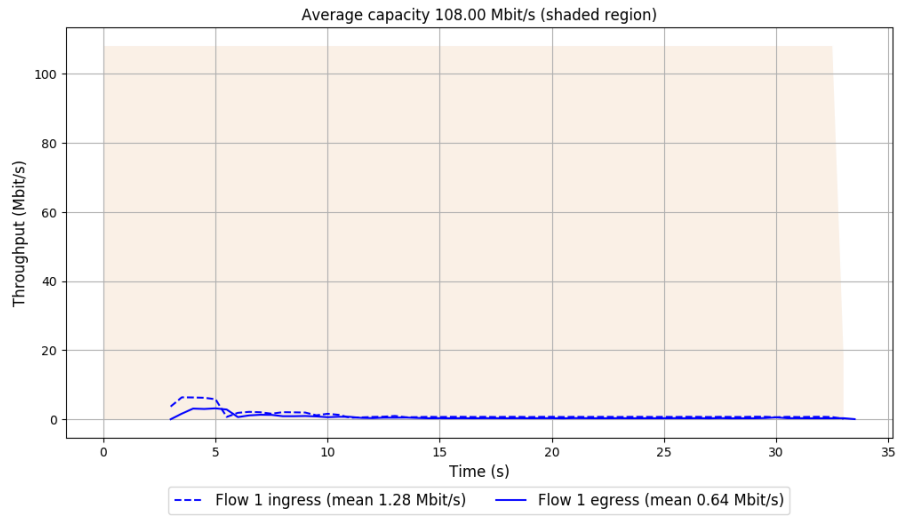
-- Flow 1:

Average throughput: 0.64 Mbit/s

95th percentile per-packet one-way delay: 12.052 ms

Loss rate: 50.29%

# Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2019-01-17 09:07:20

End at: 2019-01-17 09:07:50

# Below is generated by plot.py at 2019-01-17 09:32:09

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.53 Mbit/s (0.5% utilization)

95th percentile per-packet one-way delay: 11.825 ms

Loss rate: 44.59%

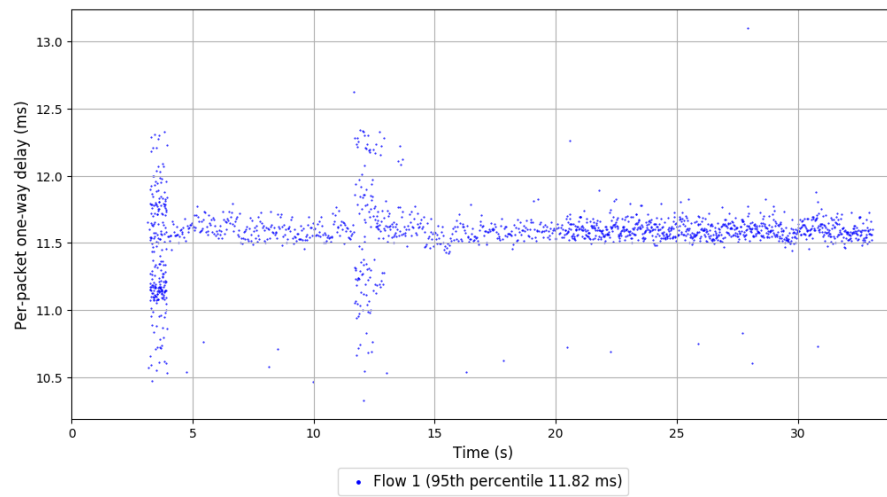
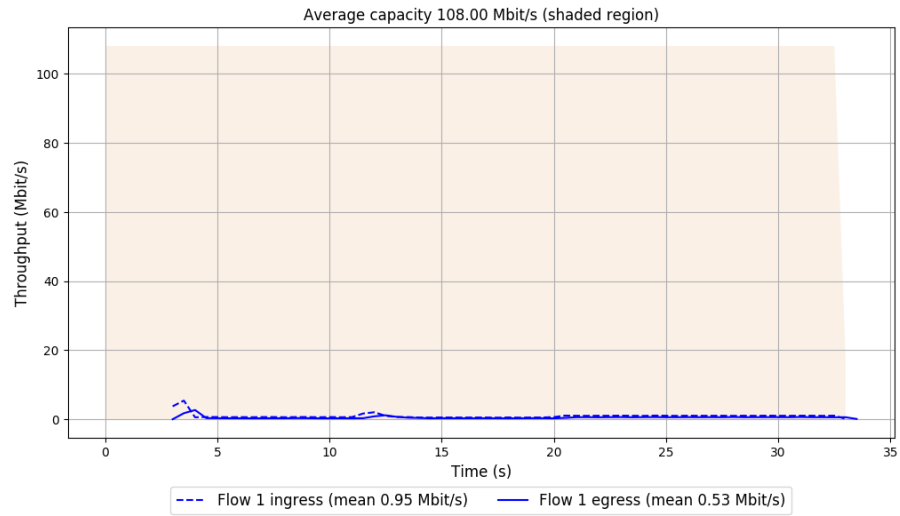
-- Flow 1:

Average throughput: 0.53 Mbit/s

95th percentile per-packet one-way delay: 11.825 ms

Loss rate: 44.59%

## Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

Start at: 2019-01-17 09:20:17

End at: 2019-01-17 09:20:47

# Below is generated by plot.py at 2019-01-17 09:32:09

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.44 Mbit/s (0.4% utilization)

95th percentile per-packet one-way delay: 11.876 ms

Loss rate: 47.78%

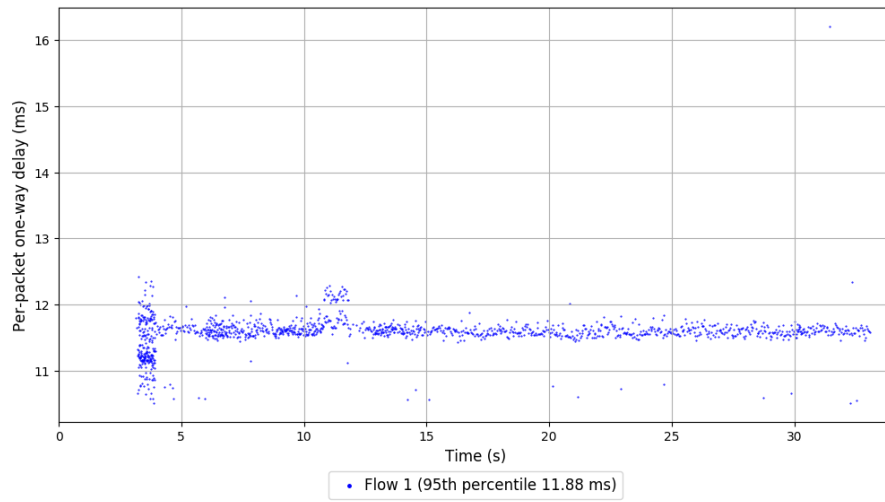
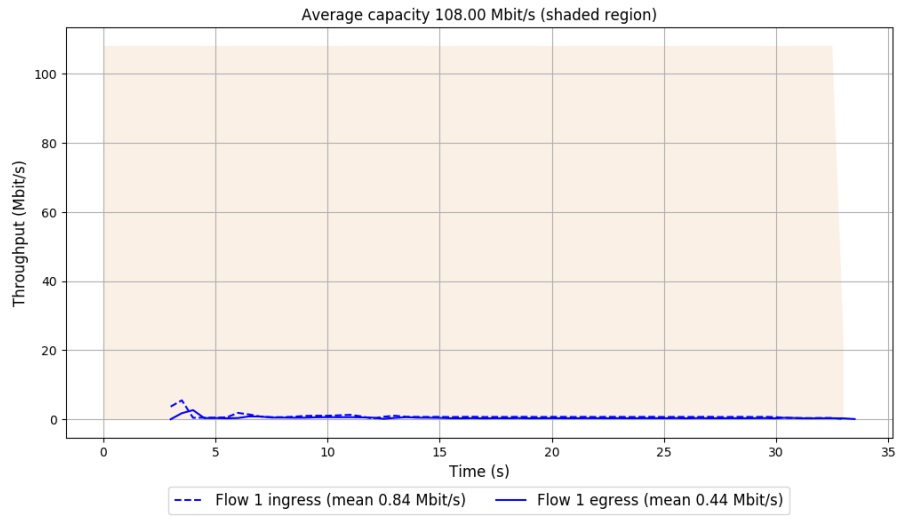
-- Flow 1:

Average throughput: 0.44 Mbit/s

95th percentile per-packet one-way delay: 11.876 ms

Loss rate: 47.78%

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



Run 1: Statistics of FillP-Sheep

Start at: 2019-01-17 08:52:33

End at: 2019-01-17 08:53:03

# Below is generated by plot.py at 2019-01-17 09:32:09

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.37 Mbit/s (0.3% utilization)

95th percentile per-packet one-way delay: 11.908 ms

Loss rate: 34.60%

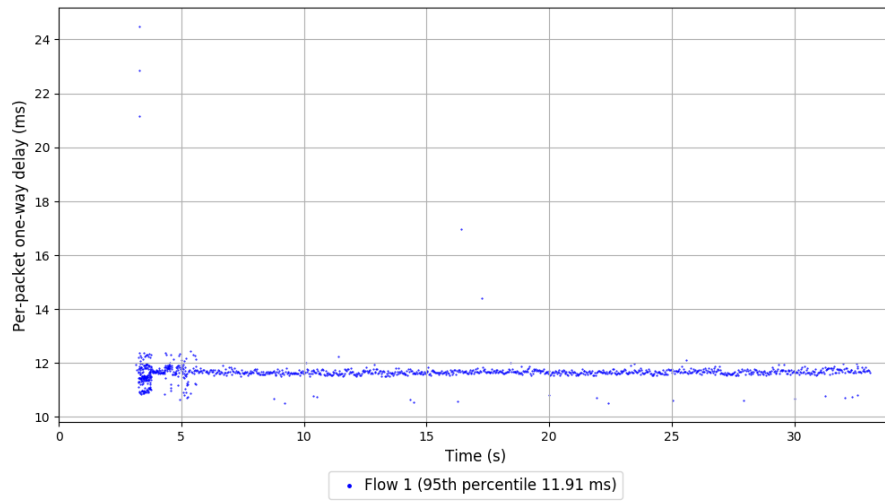
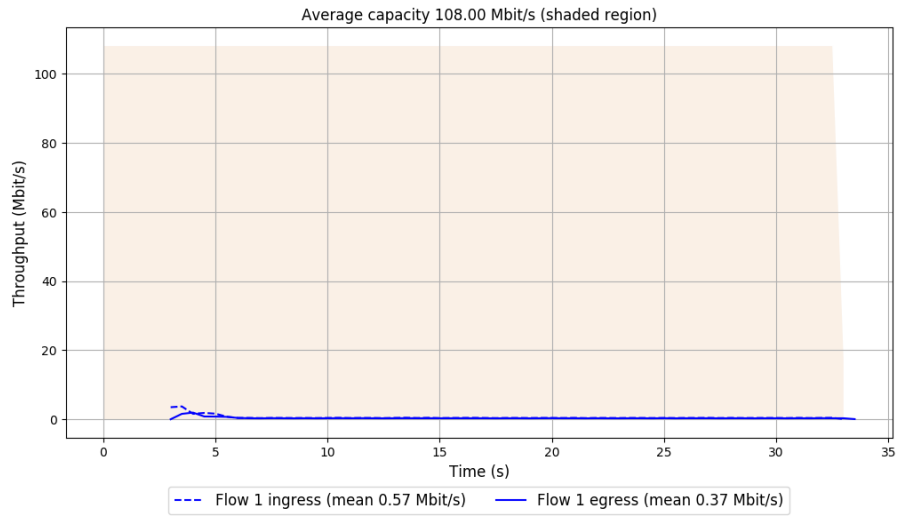
-- Flow 1:

Average throughput: 0.37 Mbit/s

95th percentile per-packet one-way delay: 11.908 ms

Loss rate: 34.60%

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



Run 2: Statistics of FillP-Sheep

Start at: 2019-01-17 09:05:30

End at: 2019-01-17 09:06:00

# Below is generated by plot.py at 2019-01-17 09:32:10

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.40 Mbit/s (0.4% utilization)

95th percentile per-packet one-way delay: 12.160 ms

Loss rate: 39.63%

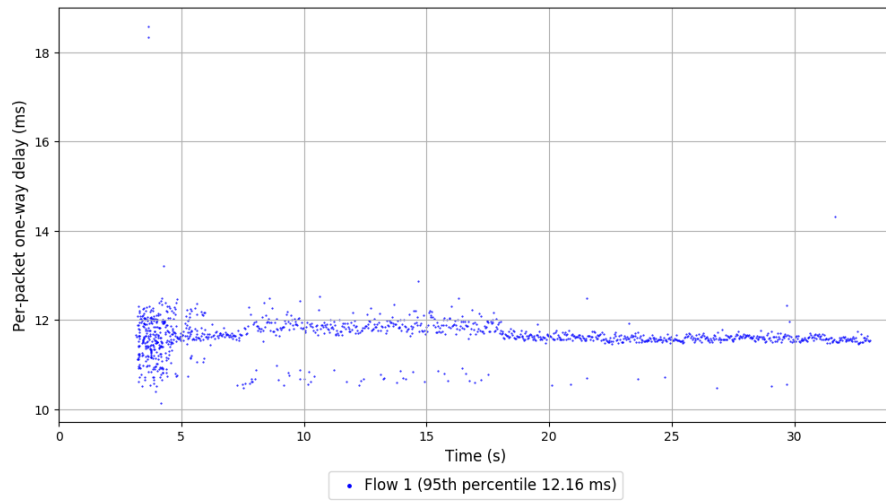
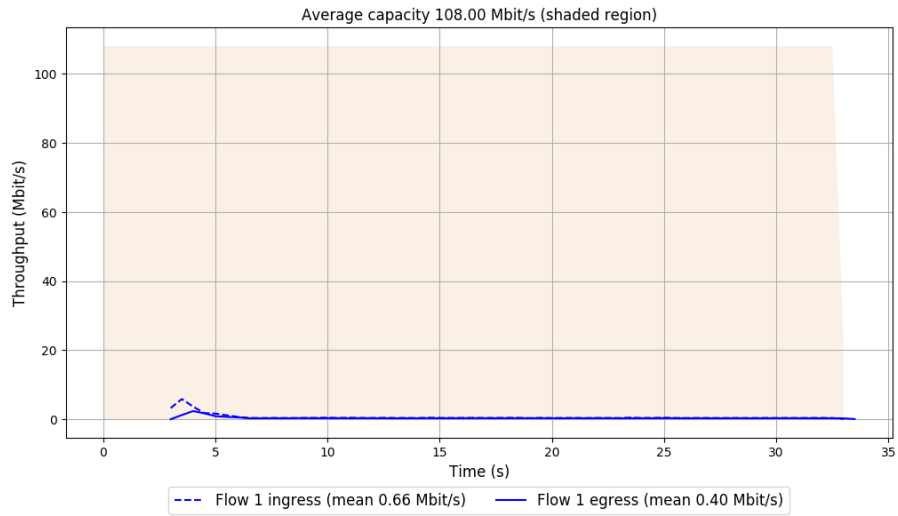
-- Flow 1:

Average throughput: 0.40 Mbit/s

95th percentile per-packet one-way delay: 12.160 ms

Loss rate: 39.63%

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



Run 3: Statistics of FillP-Sheep

Start at: 2019-01-17 09:18:28

End at: 2019-01-17 09:18:58

# Below is generated by plot.py at 2019-01-17 09:32:10

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.41 Mbit/s (0.4% utilization)

95th percentile per-packet one-way delay: 12.048 ms

Loss rate: 37.48%

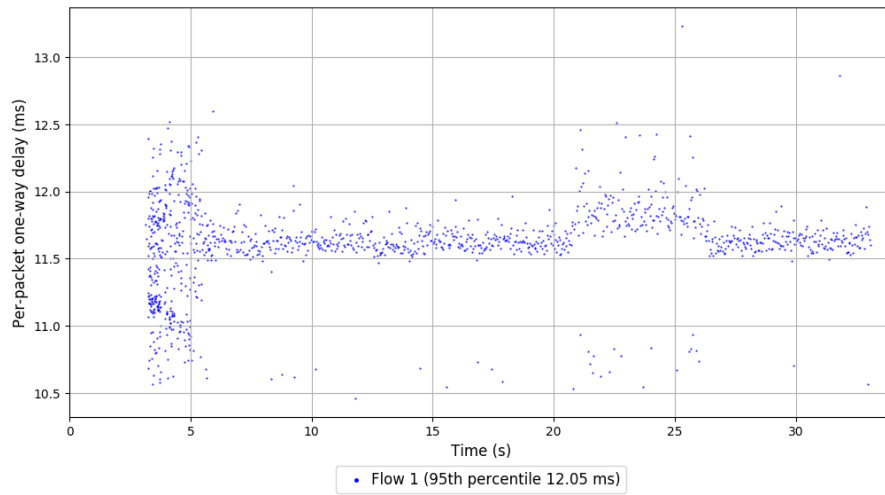
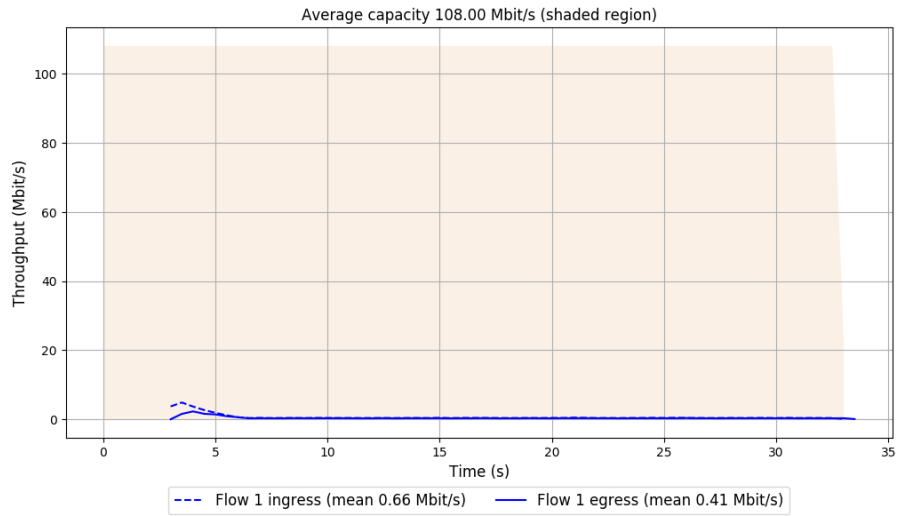
-- Flow 1:

Average throughput: 0.41 Mbit/s

95th percentile per-packet one-way delay: 12.048 ms

Loss rate: 37.48%

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



Run 1: Statistics of Indigo

Start at: 2019-01-17 08:59:25

End at: 2019-01-17 08:59:55

# Below is generated by plot.py at 2019-01-17 09:32:16

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.02 Mbit/s (0.9% utilization)

95th percentile per-packet one-way delay: 12.441 ms

Loss rate: 96.03%

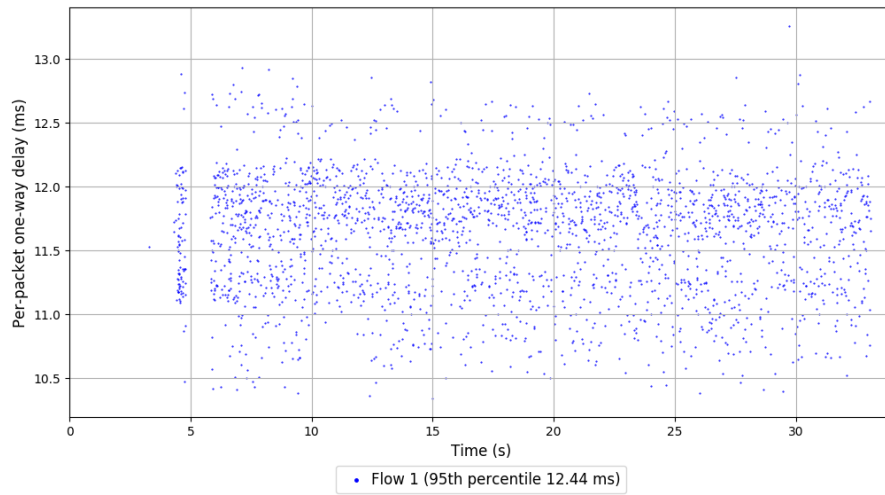
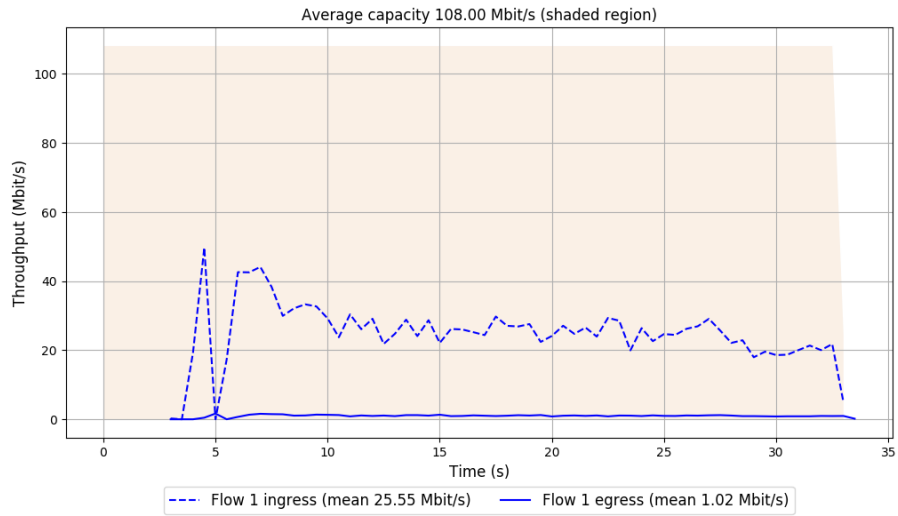
-- Flow 1:

Average throughput: 1.02 Mbit/s

95th percentile per-packet one-way delay: 12.441 ms

Loss rate: 96.03%

# Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2019-01-17 09:12:22

End at: 2019-01-17 09:12:52

# Below is generated by plot.py at 2019-01-17 09:32:45

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.11 Mbit/s (1.0% utilization)

95th percentile per-packet one-way delay: 12.470 ms

Loss rate: 96.13%

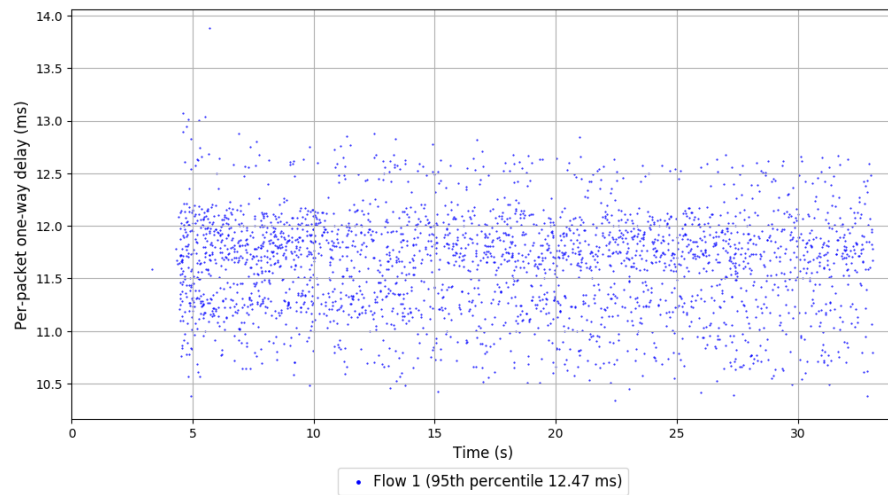
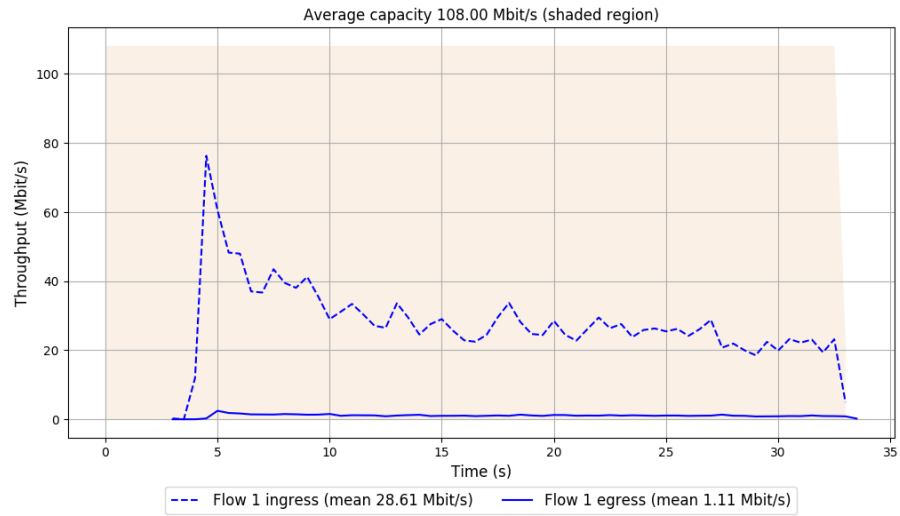
-- Flow 1:

Average throughput: 1.11 Mbit/s

95th percentile per-packet one-way delay: 12.470 ms

Loss rate: 96.13%

## Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

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

End at: 2019-01-17 09:25:47

# Below is generated by plot.py at 2019-01-17 09:32:48

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.06 Mbit/s (1.0% utilization)

95th percentile per-packet one-way delay: 12.457 ms

Loss rate: 96.09%

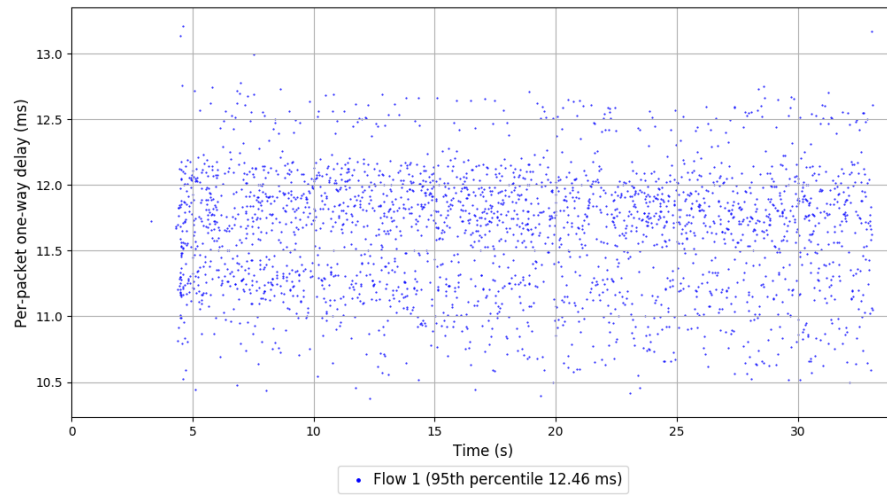
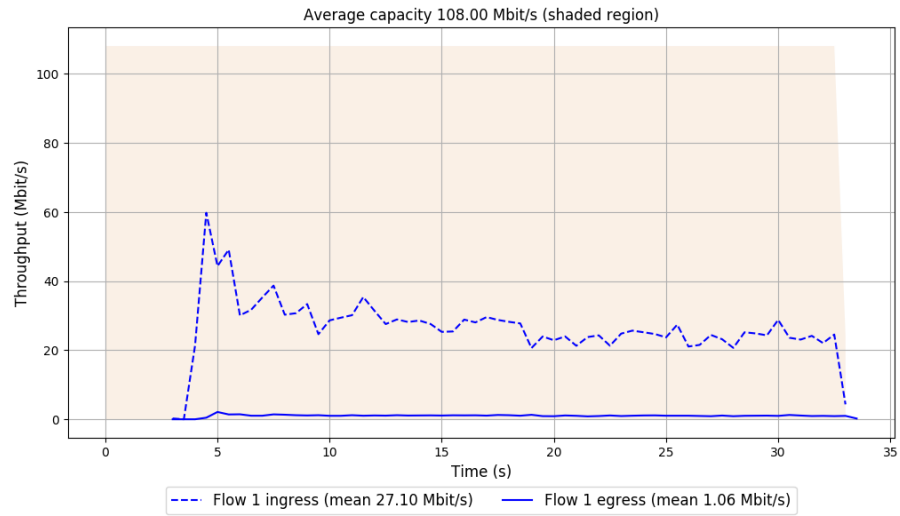
-- Flow 1:

Average throughput: 1.06 Mbit/s

95th percentile per-packet one-way delay: 12.457 ms

Loss rate: 96.09%

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



Run 1: Statistics of Indigo-MusesC3

Start at: 2019-01-17 08:53:09

End at: 2019-01-17 08:53:39

# Below is generated by plot.py at 2019-01-17 09:32:48

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.99 Mbit/s (0.9% utilization)

95th percentile per-packet one-way delay: 12.115 ms

Loss rate: 16.36%

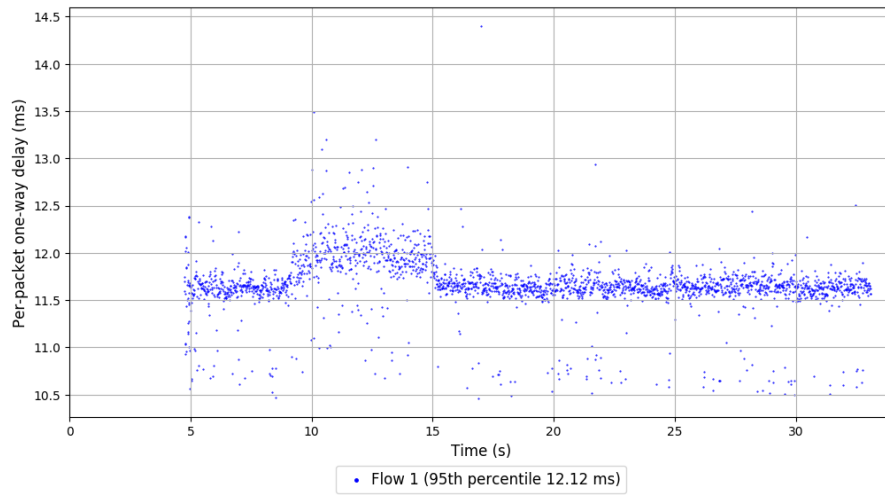
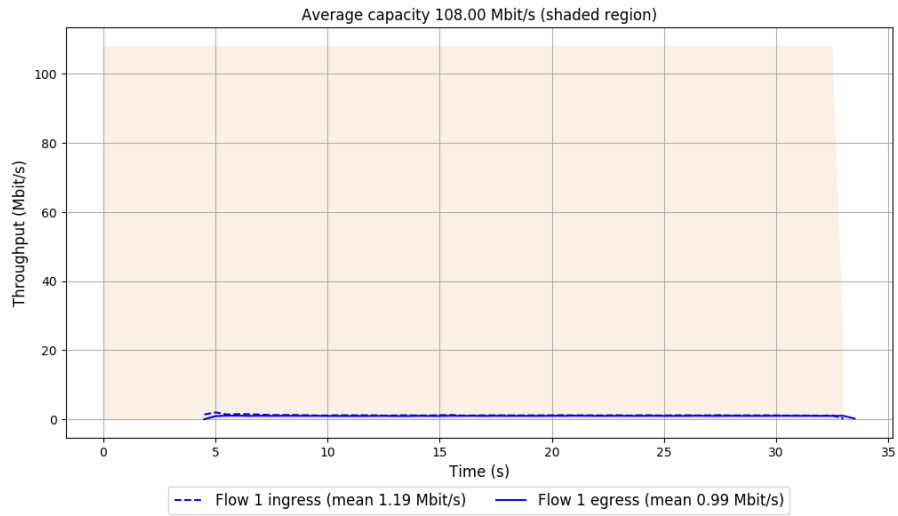
-- Flow 1:

Average throughput: 0.99 Mbit/s

95th percentile per-packet one-way delay: 12.115 ms

Loss rate: 16.36%

# Run 1: Report of Indigo-MusesC3 — Data Link



Run 2: Statistics of Indigo-MusesC3

Start at: 2019-01-17 09:06:07

End at: 2019-01-17 09:06:37

# Below is generated by plot.py at 2019-01-17 09:32:48

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.02 Mbit/s (0.9% utilization)

95th percentile per-packet one-way delay: 11.739 ms

Loss rate: 15.74%

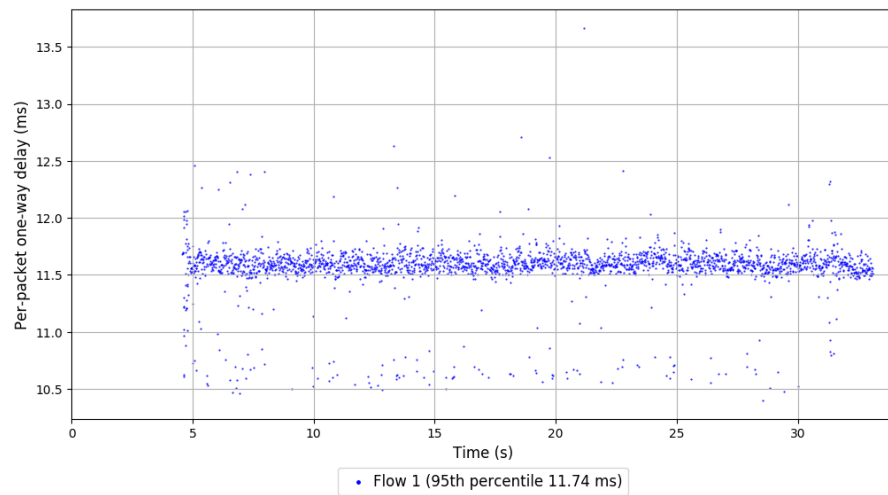
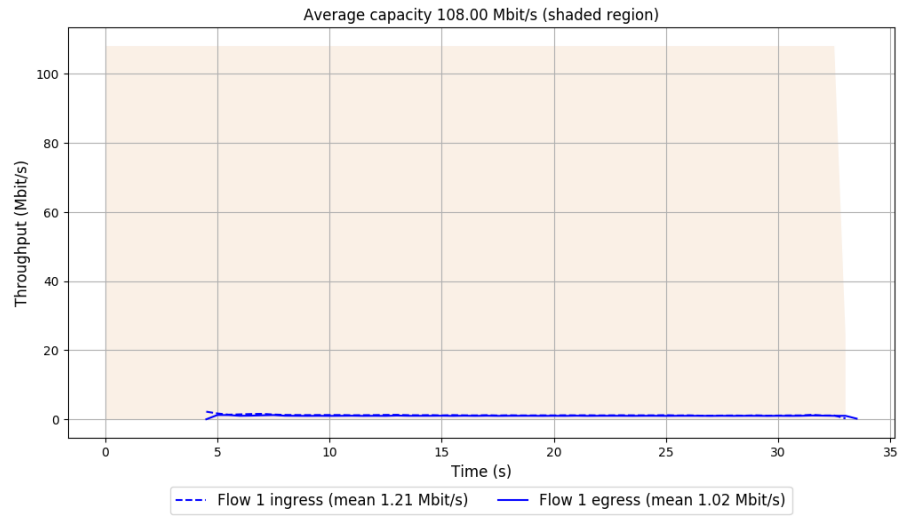
-- Flow 1:

Average throughput: 1.02 Mbit/s

95th percentile per-packet one-way delay: 11.739 ms

Loss rate: 15.74%

## Run 2: Report of Indigo-MusesC3 — Data Link



Run 3: Statistics of Indigo-MusesC3

Start at: 2019-01-17 09:19:04

End at: 2019-01-17 09:19:34

# Below is generated by plot.py at 2019-01-17 09:32:48

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.01 Mbit/s (0.9% utilization)

95th percentile per-packet one-way delay: 11.728 ms

Loss rate: 17.69%

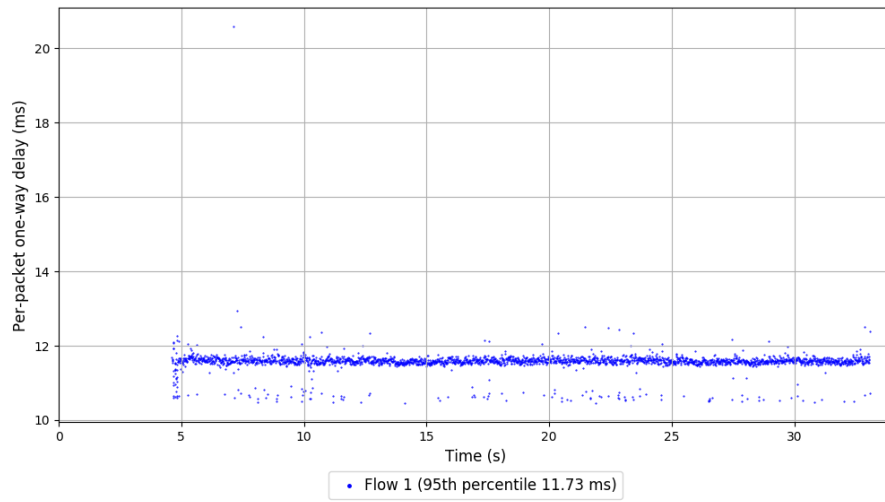
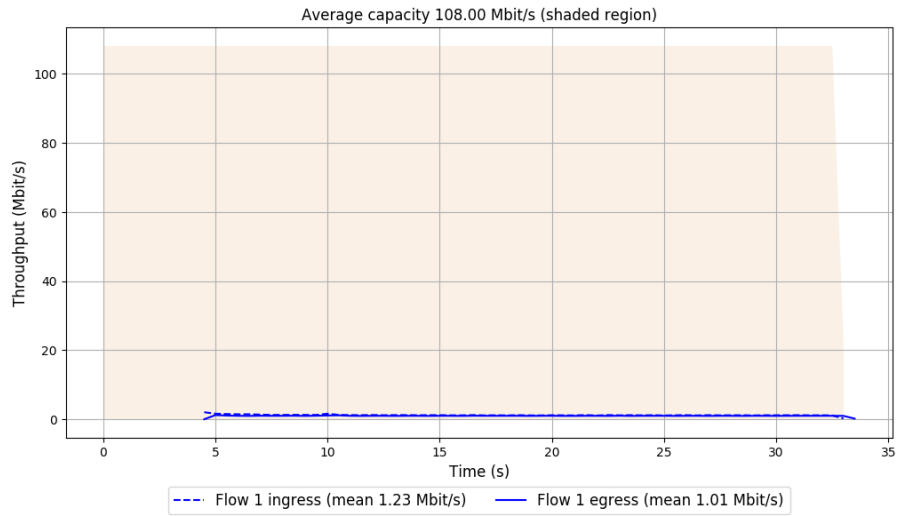
-- Flow 1:

Average throughput: 1.01 Mbit/s

95th percentile per-packet one-way delay: 11.728 ms

Loss rate: 17.69%

### Run 3: Report of Indigo-MusesC3 — Data Link



Run 1: Statistics of Indigo-MusesC5

Start at: 2019-01-17 08:56:52

End at: 2019-01-17 08:57:22

# Below is generated by plot.py at 2019-01-17 09:32:48

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.02 Mbit/s (0.9% utilization)

95th percentile per-packet one-way delay: 11.785 ms

Loss rate: 19.41%

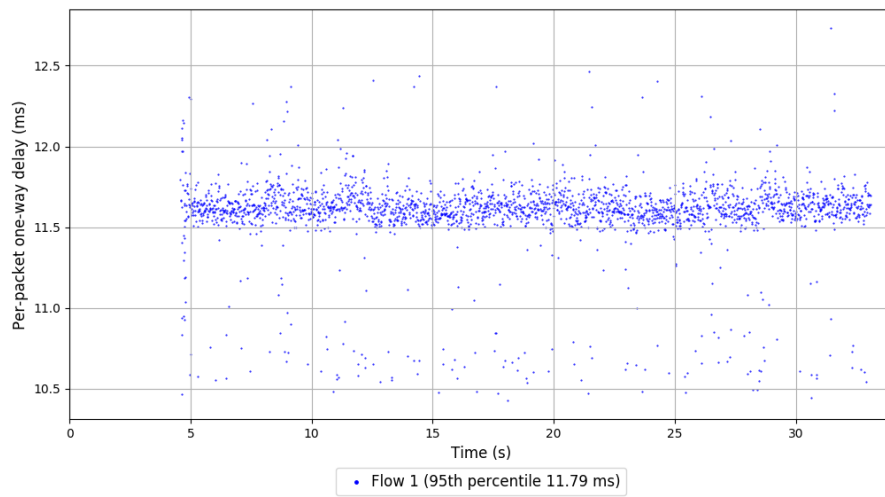
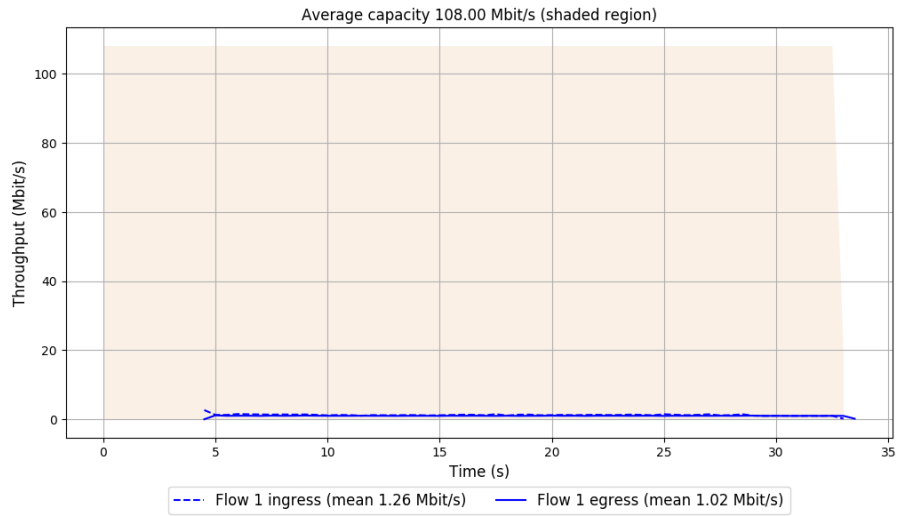
-- Flow 1:

Average throughput: 1.02 Mbit/s

95th percentile per-packet one-way delay: 11.785 ms

Loss rate: 19.41%

# Run 1: Report of Indigo-MusesC5 — Data Link



Run 2: Statistics of Indigo-MusesC5

Start at: 2019-01-17 09:09:52

End at: 2019-01-17 09:10:22

# Below is generated by plot.py at 2019-01-17 09:32:48

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.02 Mbit/s (0.9% utilization)

95th percentile per-packet one-way delay: 11.805 ms

Loss rate: 15.75%

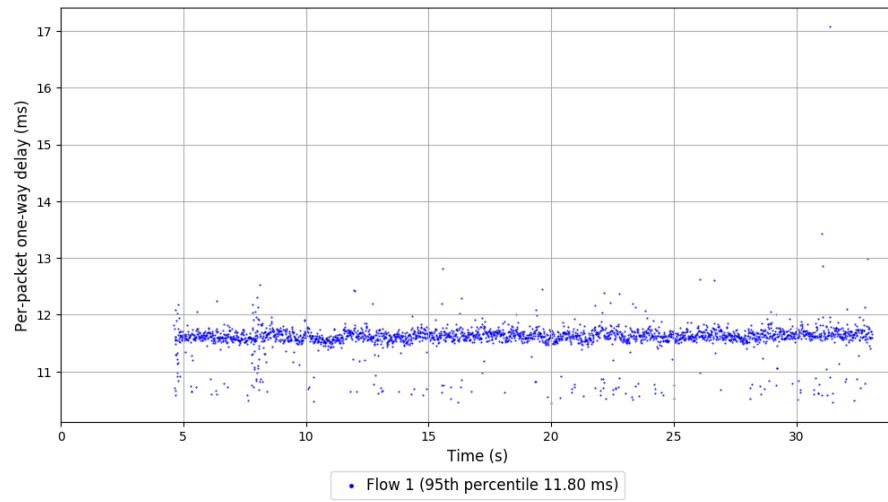
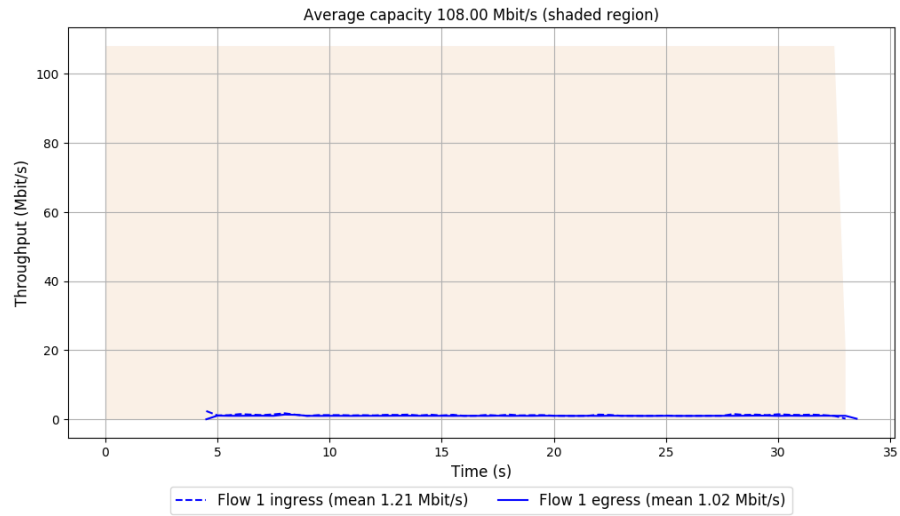
-- Flow 1:

Average throughput: 1.02 Mbit/s

95th percentile per-packet one-way delay: 11.805 ms

Loss rate: 15.75%

## Run 2: Report of Indigo-MusesC5 — Data Link



Run 3: Statistics of Indigo-MusesC5

Start at: 2019-01-17 09:22:50

End at: 2019-01-17 09:23:20

# Below is generated by plot.py at 2019-01-17 09:32:49

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.03 Mbit/s (1.0% utilization)

95th percentile per-packet one-way delay: 11.775 ms

Loss rate: 15.83%

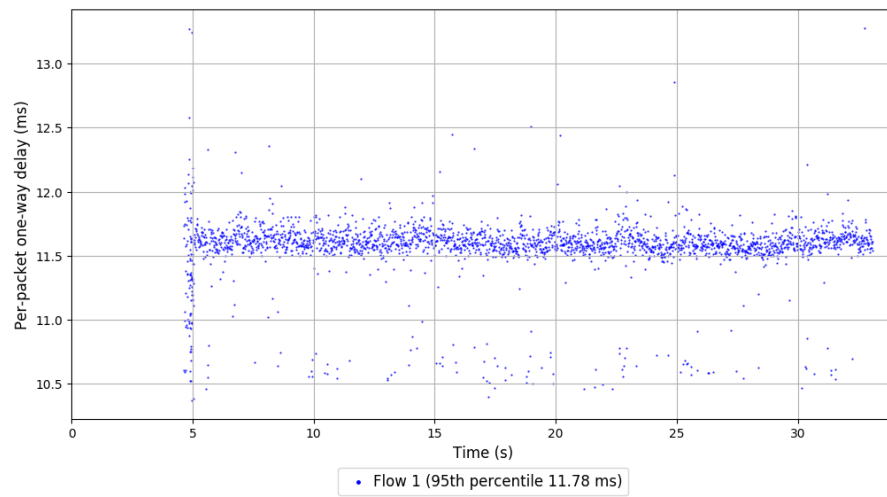
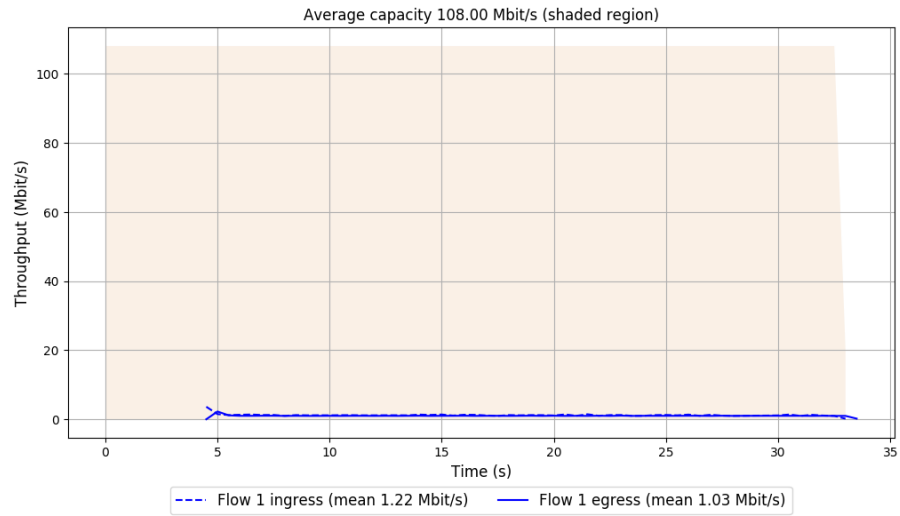
-- Flow 1:

Average throughput: 1.03 Mbit/s

95th percentile per-packet one-way delay: 11.775 ms

Loss rate: 15.83%

### Run 3: Report of Indigo-MusesC5 — Data Link



Run 1: Statistics of Indigo-MusesD

Start at: 2019-01-17 08:53:45

End at: 2019-01-17 08:54:15

# Below is generated by plot.py at 2019-01-17 09:33:12

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.03 Mbit/s (1.0% utilization)

95th percentile per-packet one-way delay: 11.824 ms

Loss rate: 24.21%

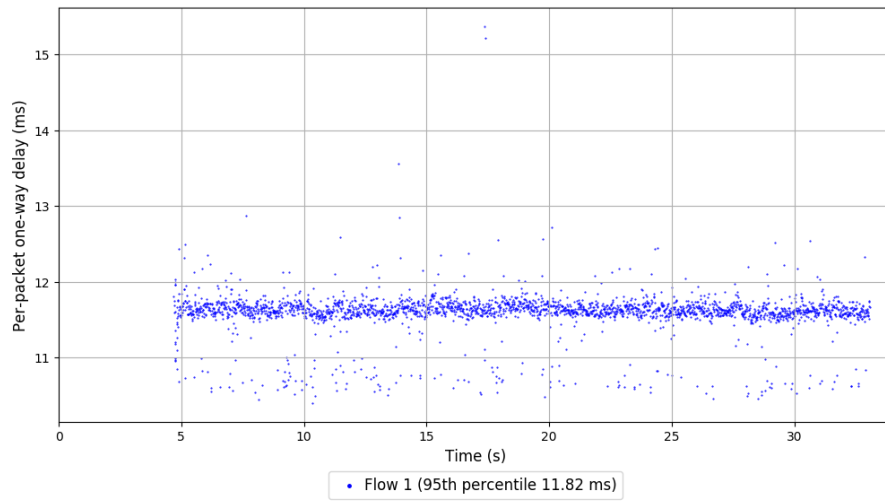
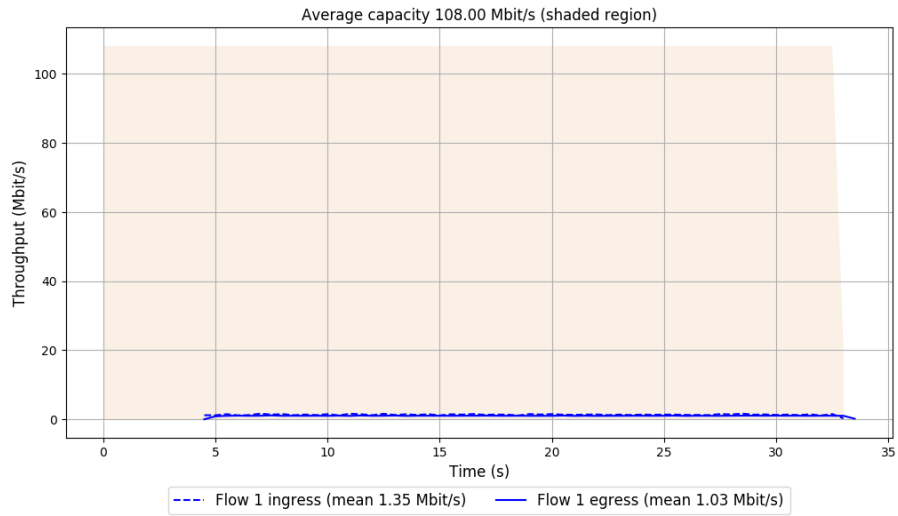
-- Flow 1:

Average throughput: 1.03 Mbit/s

95th percentile per-packet one-way delay: 11.824 ms

Loss rate: 24.21%

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



Run 2: Statistics of Indigo-MusesD

Start at: 2019-01-17 09:06:43

End at: 2019-01-17 09:07:13

# Below is generated by plot.py at 2019-01-17 09:33:13

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.03 Mbit/s (1.0% utilization)

95th percentile per-packet one-way delay: 11.756 ms

Loss rate: 24.46%

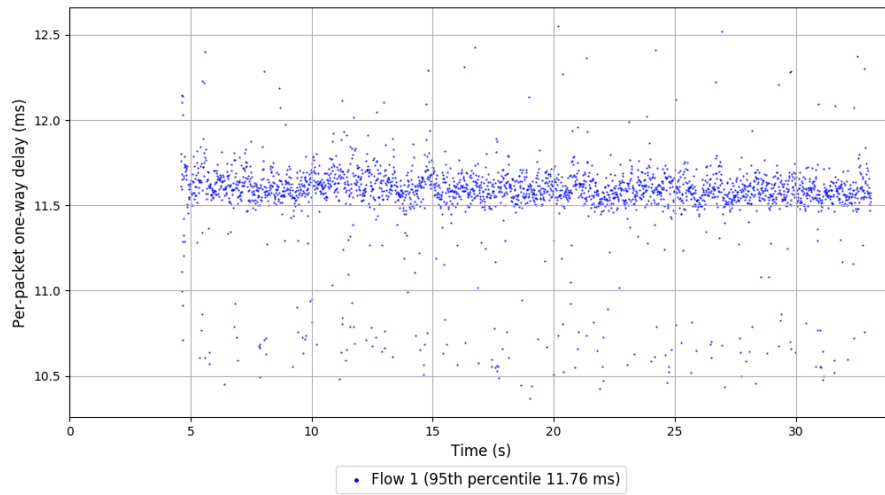
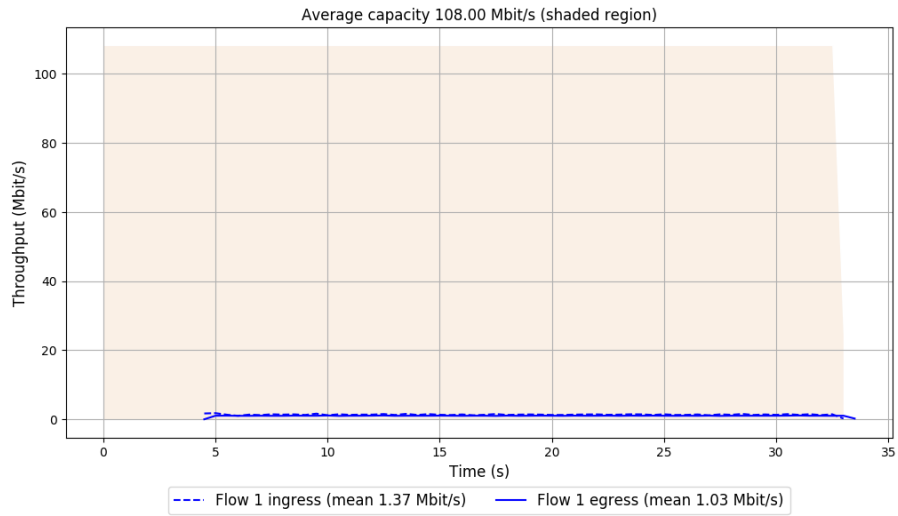
-- Flow 1:

Average throughput: 1.03 Mbit/s

95th percentile per-packet one-way delay: 11.756 ms

Loss rate: 24.46%

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



Run 3: Statistics of Indigo-MusesD

Start at: 2019-01-17 09:19:41

End at: 2019-01-17 09:20:11

# Below is generated by plot.py at 2019-01-17 09:33:14

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.03 Mbit/s (1.0% utilization)

95th percentile per-packet one-way delay: 11.759 ms

Loss rate: 21.11%

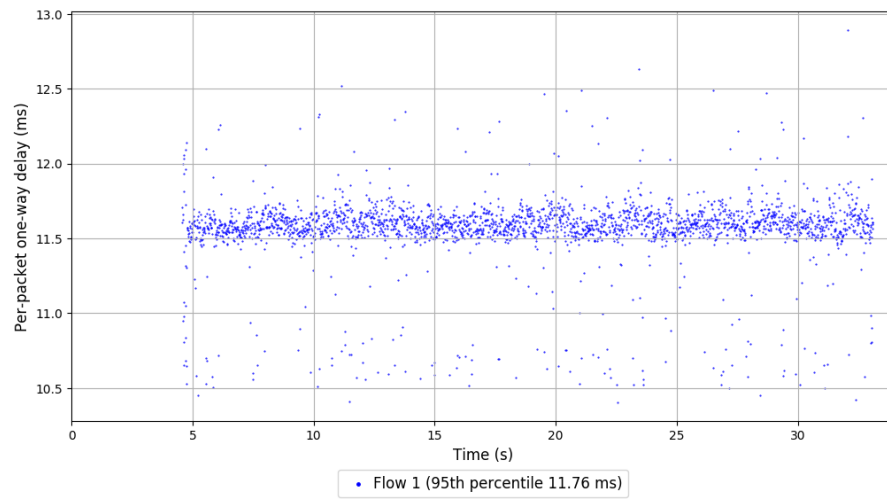
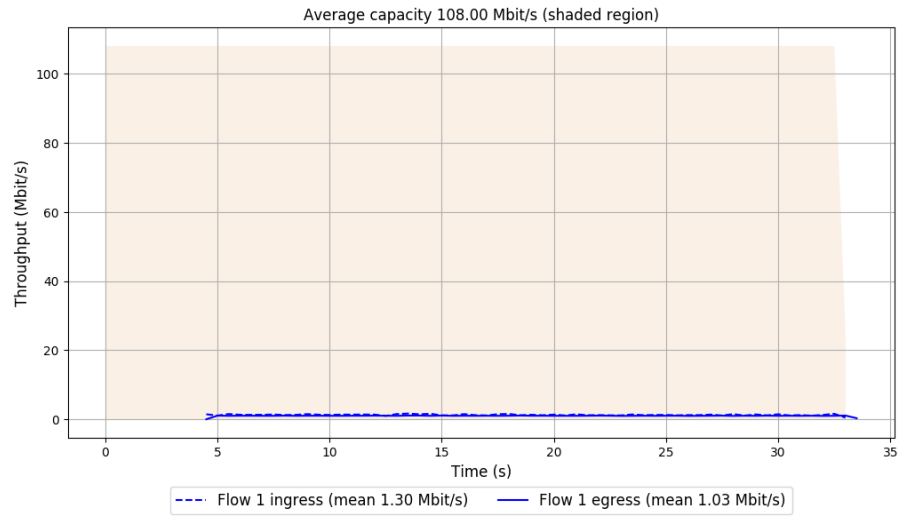
-- Flow 1:

Average throughput: 1.03 Mbit/s

95th percentile per-packet one-way delay: 11.759 ms

Loss rate: 21.11%

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



Run 1: Statistics of Indigo-MuseST

Start at: 2019-01-17 09:03:05

End at: 2019-01-17 09:03:35

# Below is generated by plot.py at 2019-01-17 09:33:14

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.00 Mbit/s (0.9% utilization)

95th percentile per-packet one-way delay: 11.887 ms

Loss rate: 20.70%

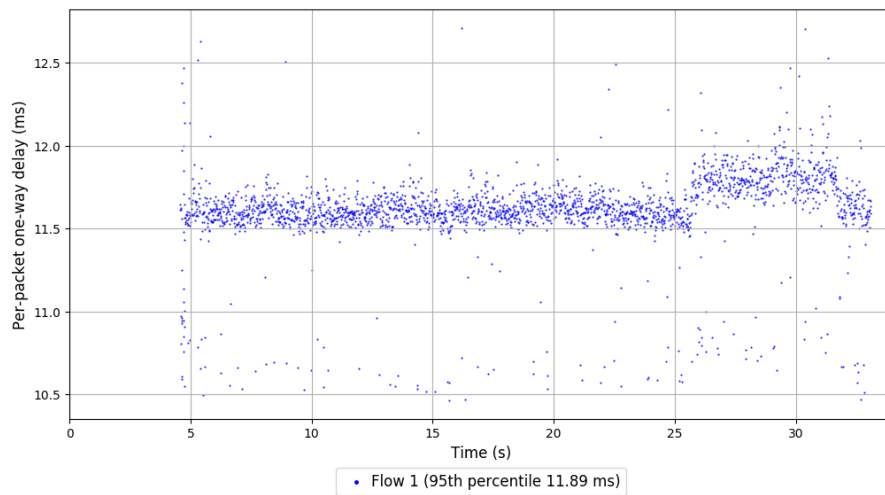
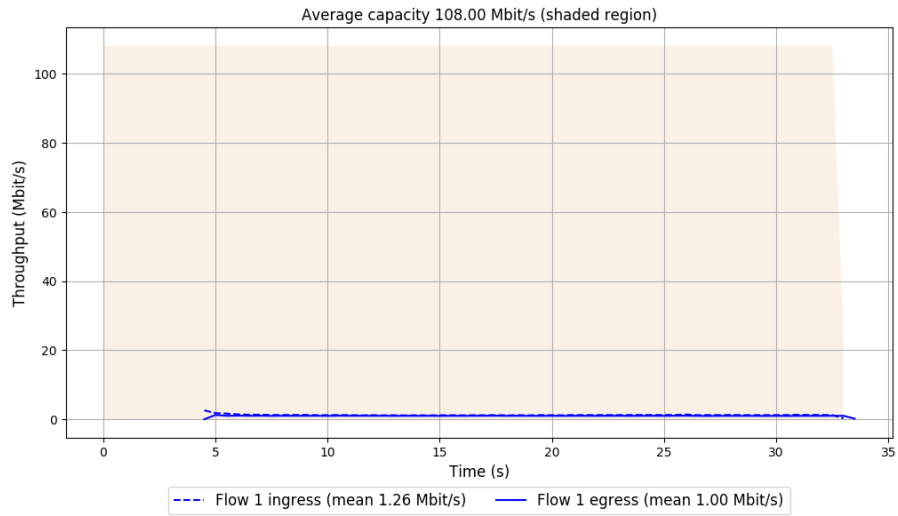
-- Flow 1:

Average throughput: 1.00 Mbit/s

95th percentile per-packet one-way delay: 11.887 ms

Loss rate: 20.70%

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



Run 2: Statistics of Indigo-MuseST

Start at: 2019-01-17 09:16:02

End at: 2019-01-17 09:16:32

# Below is generated by plot.py at 2019-01-17 09:33:14

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.00 Mbit/s (0.9% utilization)

95th percentile per-packet one-way delay: 11.843 ms

Loss rate: 20.50%

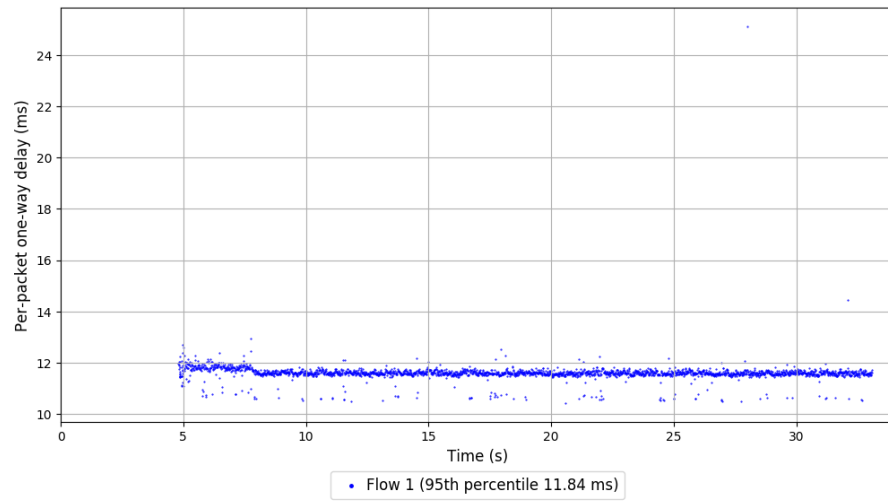
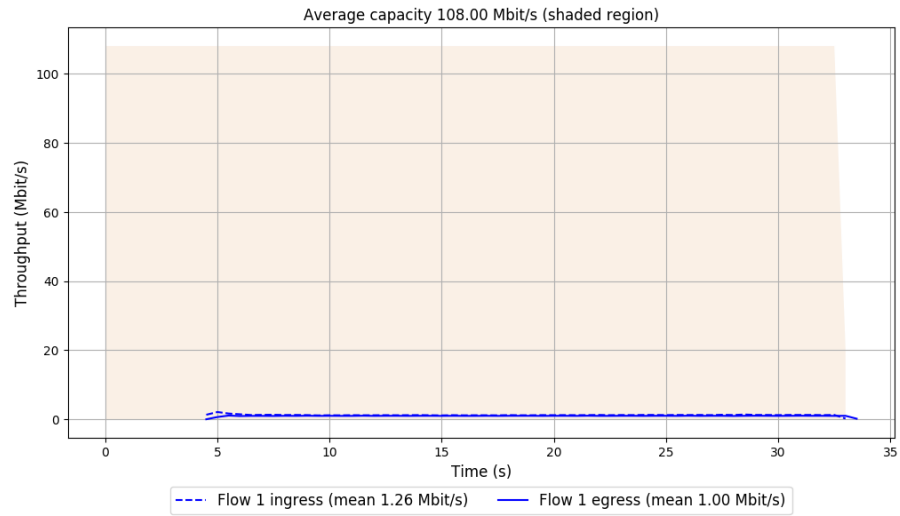
-- Flow 1:

Average throughput: 1.00 Mbit/s

95th percentile per-packet one-way delay: 11.843 ms

Loss rate: 20.50%

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



Run 3: Statistics of Indigo-MuseST

Start at: 2019-01-17 09:28:57

End at: 2019-01-17 09:29:27

# Below is generated by plot.py at 2019-01-17 09:33:18

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.02 Mbit/s (0.9% utilization)

95th percentile per-packet one-way delay: 11.940 ms

Loss rate: 20.23%

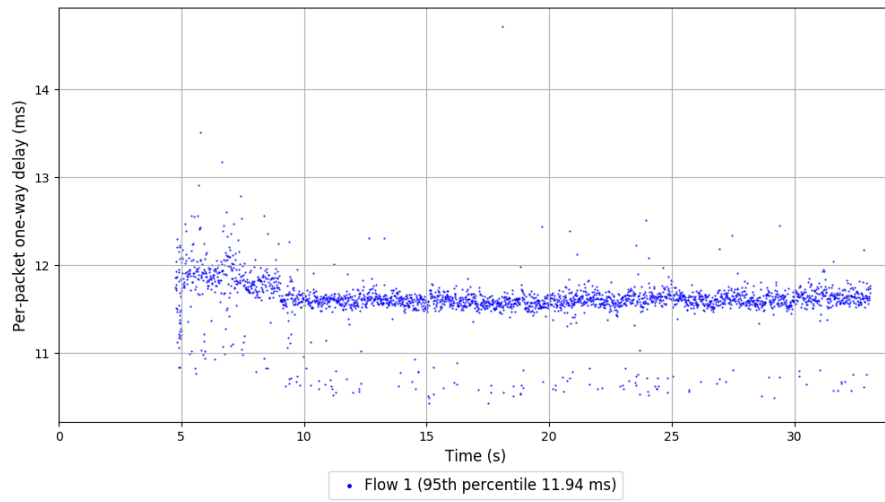
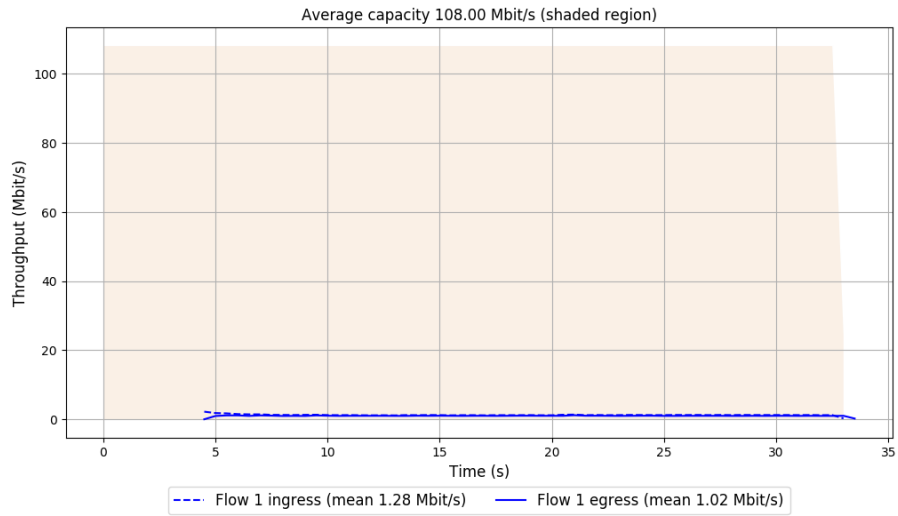
-- Flow 1:

Average throughput: 1.02 Mbit/s

95th percentile per-packet one-way delay: 11.940 ms

Loss rate: 20.23%

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



Run 1: Statistics of LEDBAT

Start at: 2019-01-17 09:04:17

End at: 2019-01-17 09:04:47

# Below is generated by plot.py at 2019-01-17 09:33:21

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.26 Mbit/s (0.2% utilization)

95th percentile per-packet one-way delay: 11.794 ms

Loss rate: 50.04%

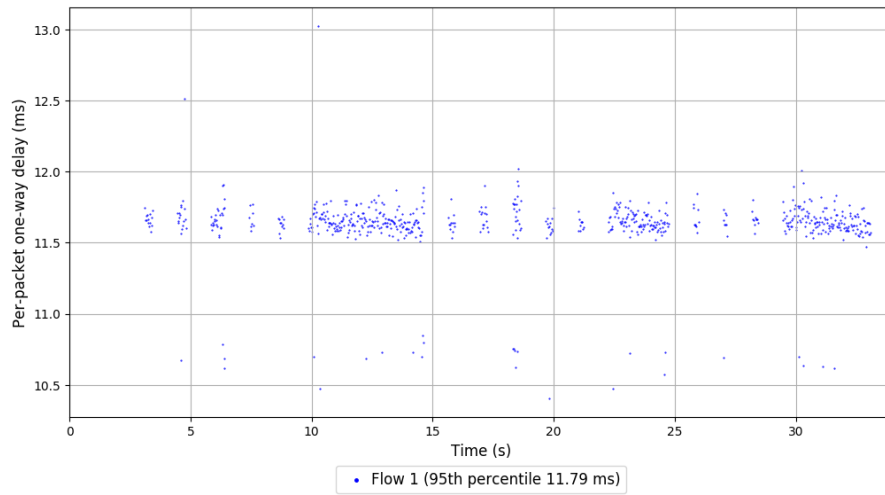
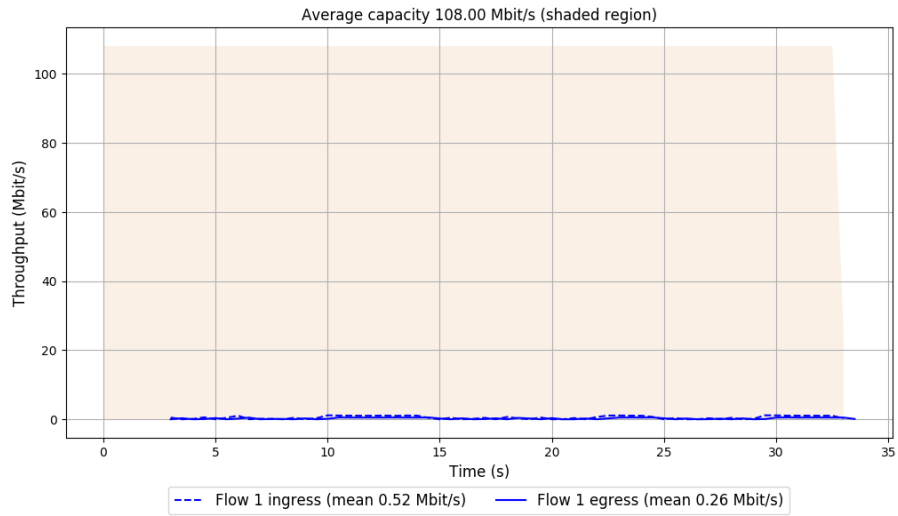
-- Flow 1:

Average throughput: 0.26 Mbit/s

95th percentile per-packet one-way delay: 11.794 ms

Loss rate: 50.04%

# Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2019-01-17 09:17:15

End at: 2019-01-17 09:17:45

# Below is generated by plot.py at 2019-01-17 09:33:21

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.22 Mbit/s (0.2% utilization)

95th percentile per-packet one-way delay: 11.772 ms

Loss rate: 49.00%

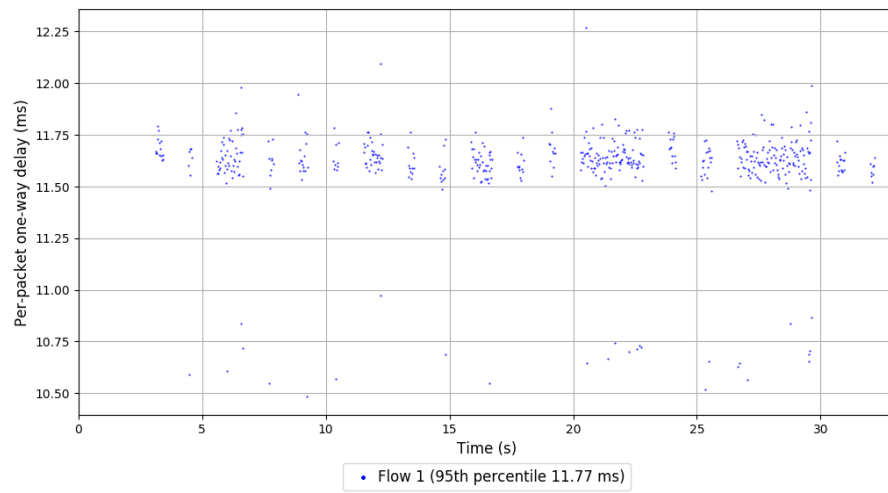
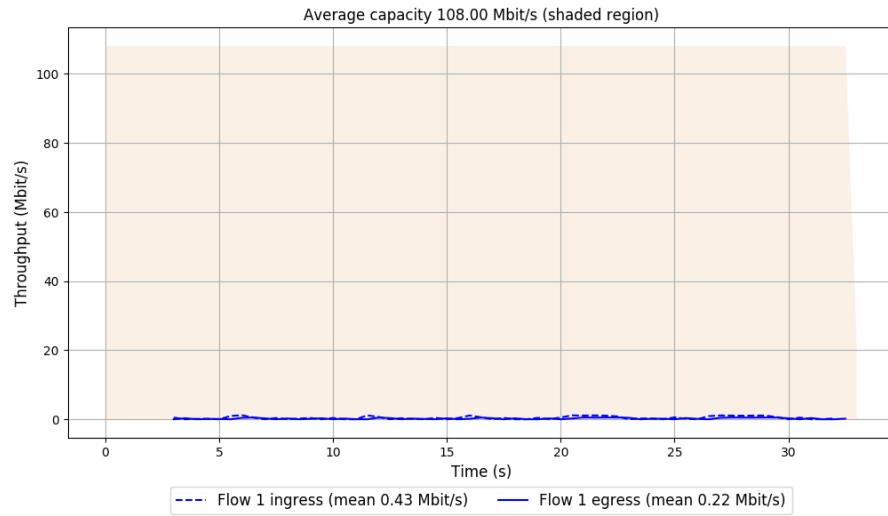
-- Flow 1:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 11.772 ms

Loss rate: 49.00%

## Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2019-01-17 09:30:10

End at: 2019-01-17 09:30:40

# Below is generated by plot.py at 2019-01-17 09:33:44

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.21 Mbit/s (0.2% utilization)

95th percentile per-packet one-way delay: 11.753 ms

Loss rate: 49.81%

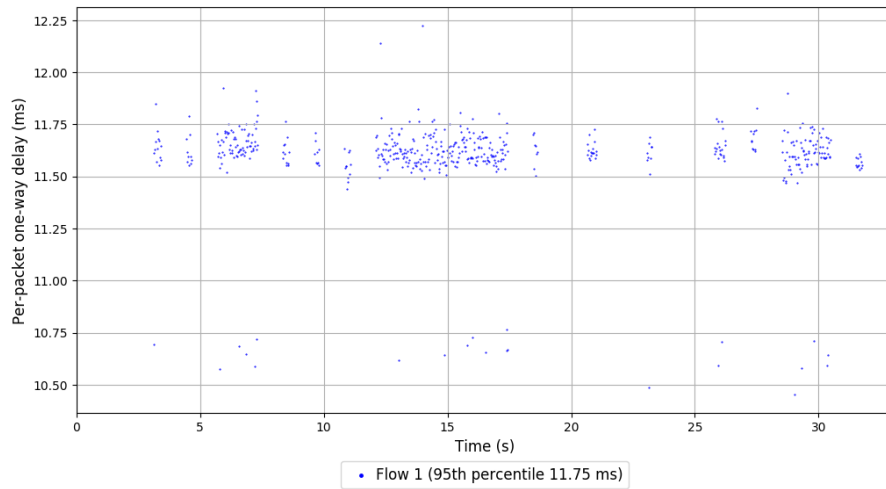
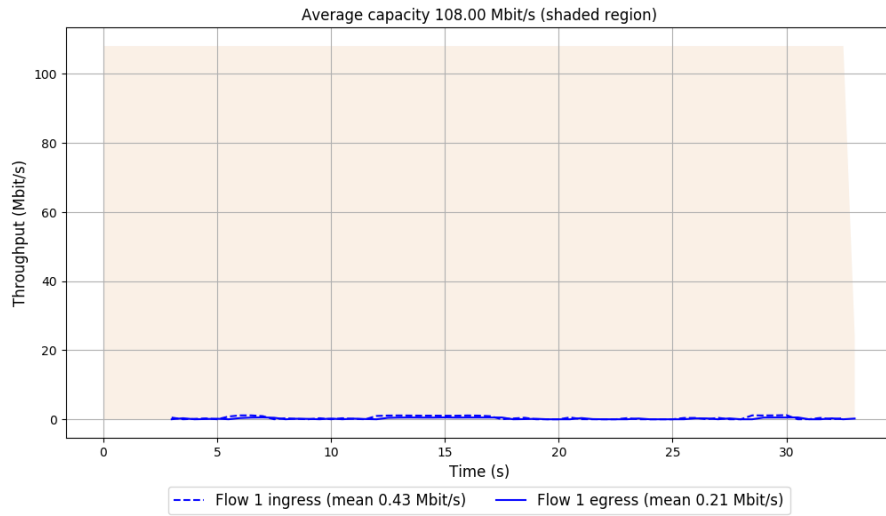
-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 11.753 ms

Loss rate: 49.81%

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



Run 1: Statistics of PCC-Allegro

Start at: 2019-01-17 09:02:28

End at: 2019-01-17 09:02:58

# Below is generated by plot.py at 2019-01-17 09:33:54

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 8.28 Mbit/s (7.7% utilization)

95th percentile per-packet one-way delay: 12.084 ms

Loss rate: 3.48%

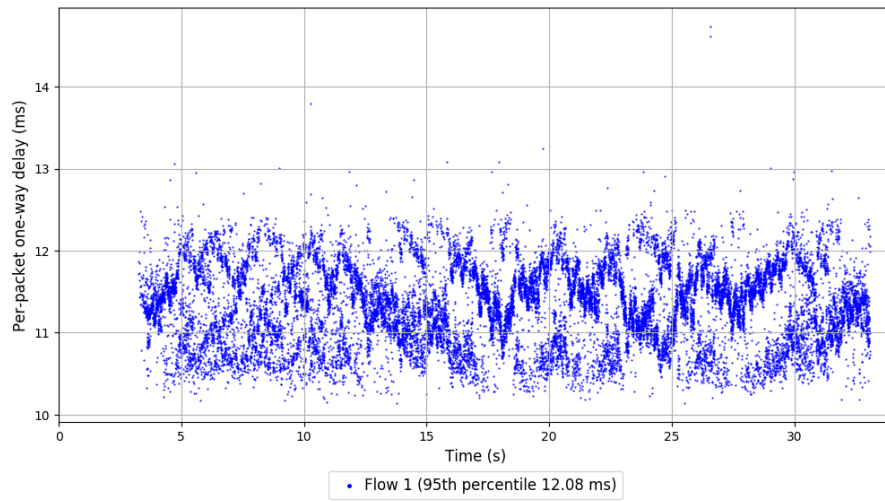
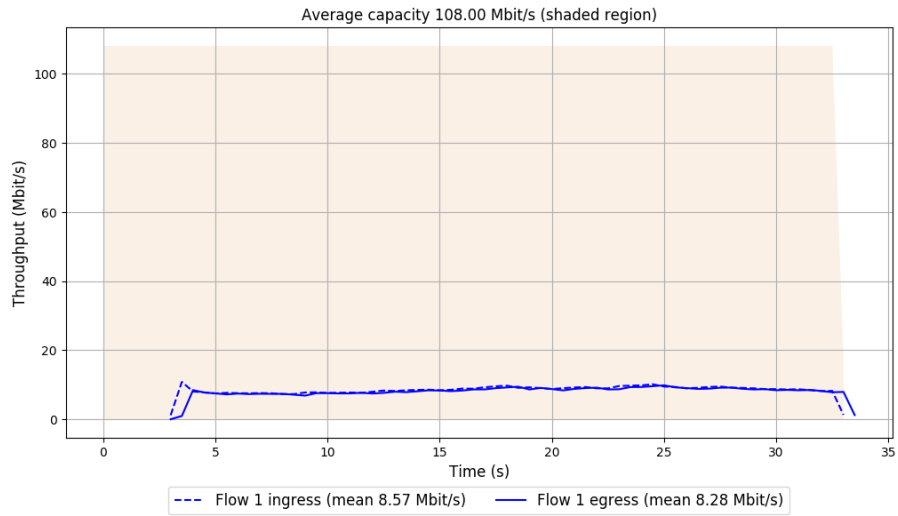
-- Flow 1:

Average throughput: 8.28 Mbit/s

95th percentile per-packet one-way delay: 12.084 ms

Loss rate: 3.48%

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



Run 2: Statistics of PCC-Allegro

Start at: 2019-01-17 09:15:25

End at: 2019-01-17 09:15:55

# Below is generated by plot.py at 2019-01-17 09:33:54

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 8.33 Mbit/s (7.7% utilization)

95th percentile per-packet one-way delay: 12.065 ms

Loss rate: 3.53%

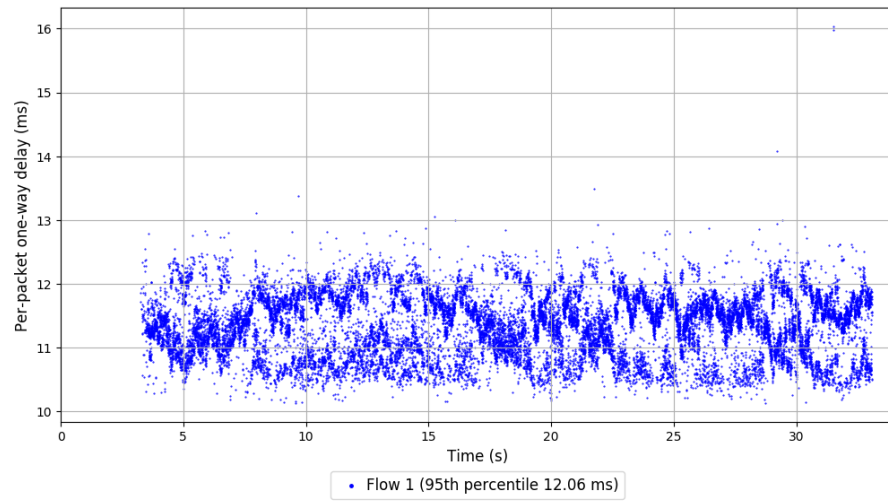
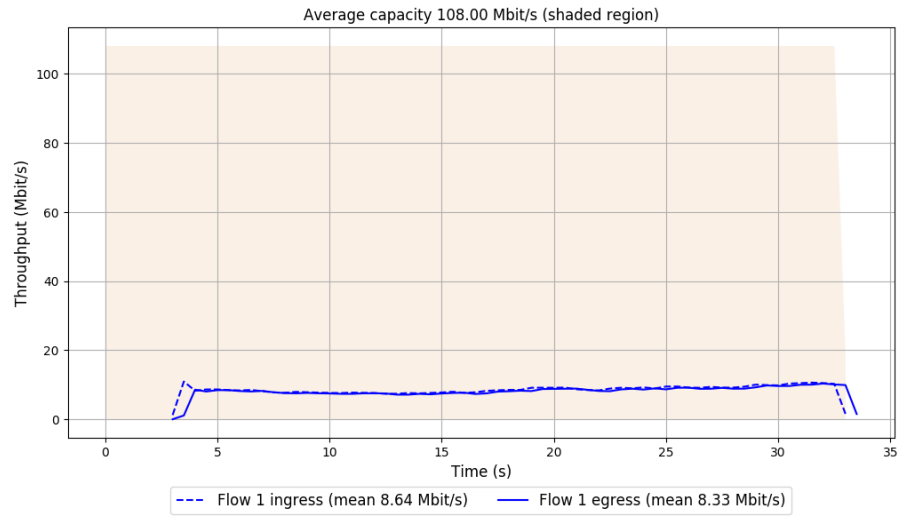
-- Flow 1:

Average throughput: 8.33 Mbit/s

95th percentile per-packet one-way delay: 12.065 ms

Loss rate: 3.53%

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



Run 3: Statistics of PCC-Allegro

Start at: 2019-01-17 09:28:21

End at: 2019-01-17 09:28:51

# Below is generated by plot.py at 2019-01-17 09:33:54

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 4.44 Mbit/s (4.1% utilization)

95th percentile per-packet one-way delay: 12.160 ms

Loss rate: 3.14%

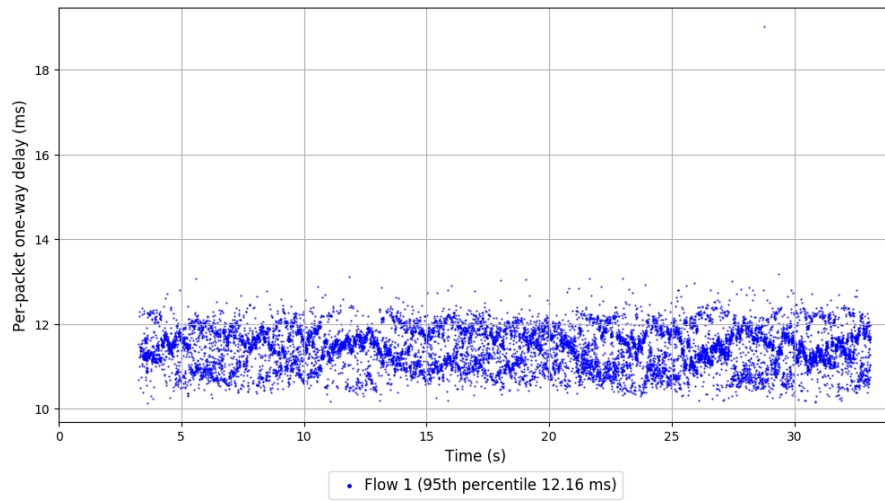
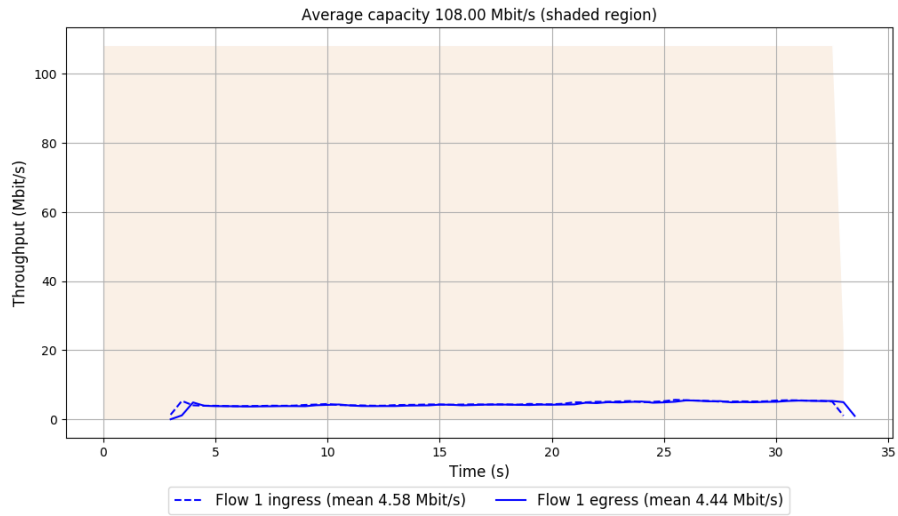
-- Flow 1:

Average throughput: 4.44 Mbit/s

95th percentile per-packet one-way delay: 12.160 ms

Loss rate: 3.14%

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

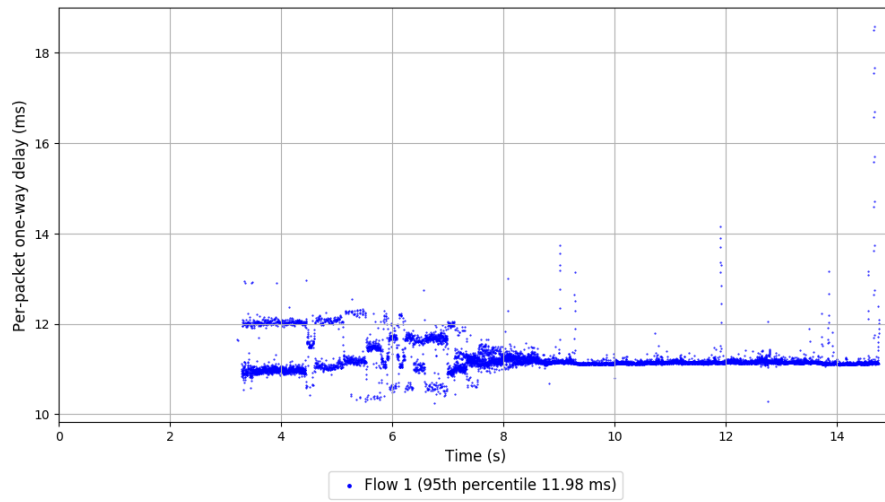
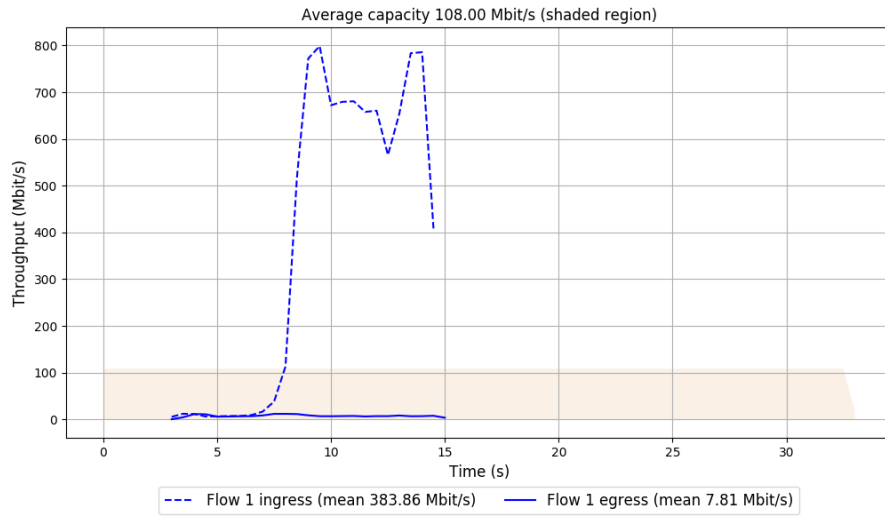


Run 1: Statistics of PCC-Expr

Start at: 2019-01-17 08:56:11

End at: 2019-01-17 08:56:41

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

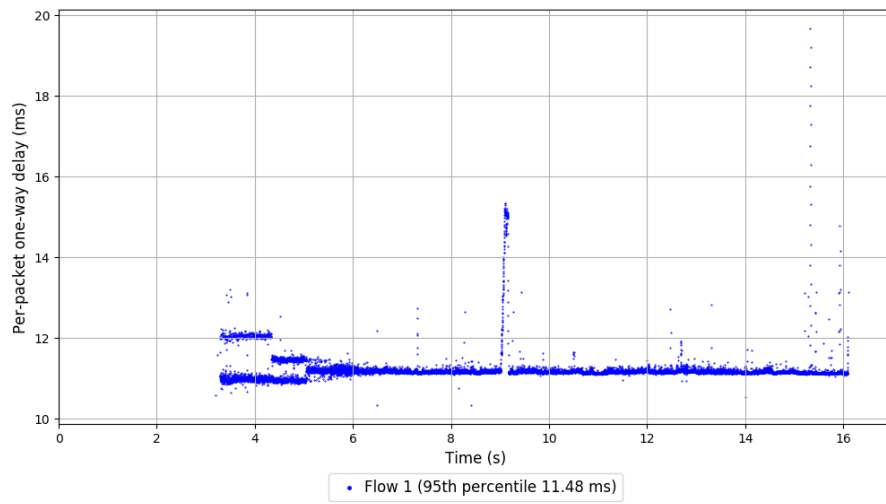
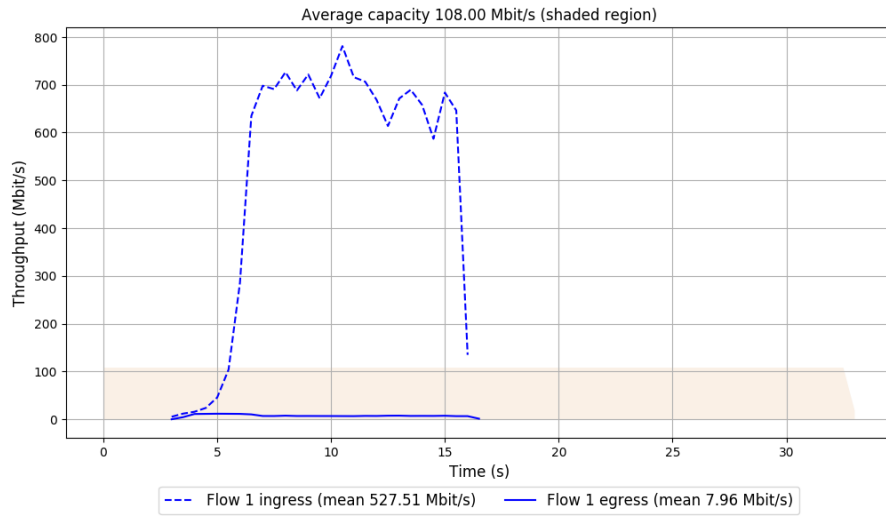


Run 2: Statistics of PCC-Expr

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

End at: 2019-01-17 09:09:39

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

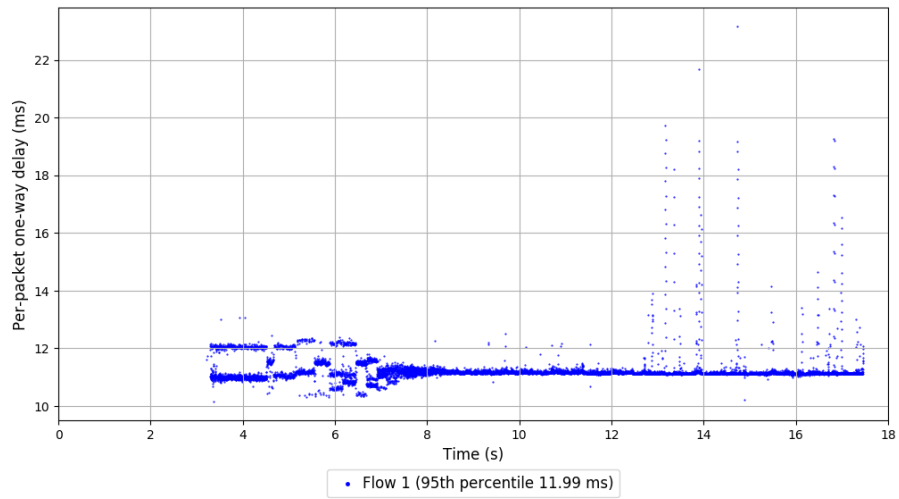
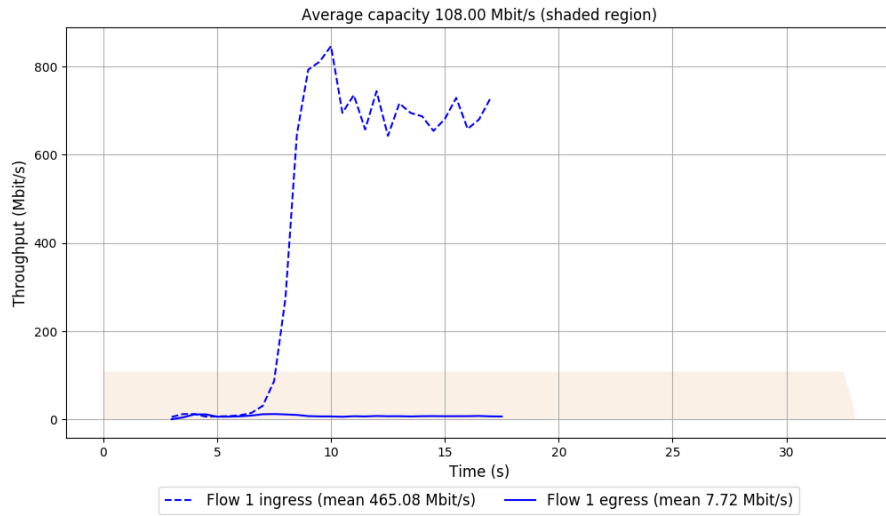


Run 3: Statistics of PCC-Expr

Start at: 2019-01-17 09:22:07

End at: 2019-01-17 09:22:37

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



Run 1: Statistics of QUIC Cubic

Start at: 2019-01-17 08:54:58

End at: 2019-01-17 08:55:28

# Below is generated by plot.py at 2019-01-17 09:35:39

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 3.70 Mbit/s (3.4% utilization)

95th percentile per-packet one-way delay: 12.346 ms

Loss rate: 8.74%

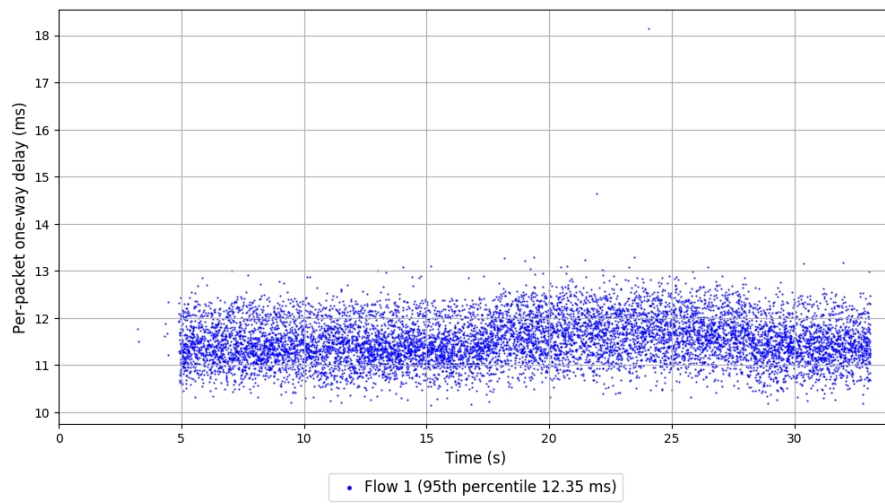
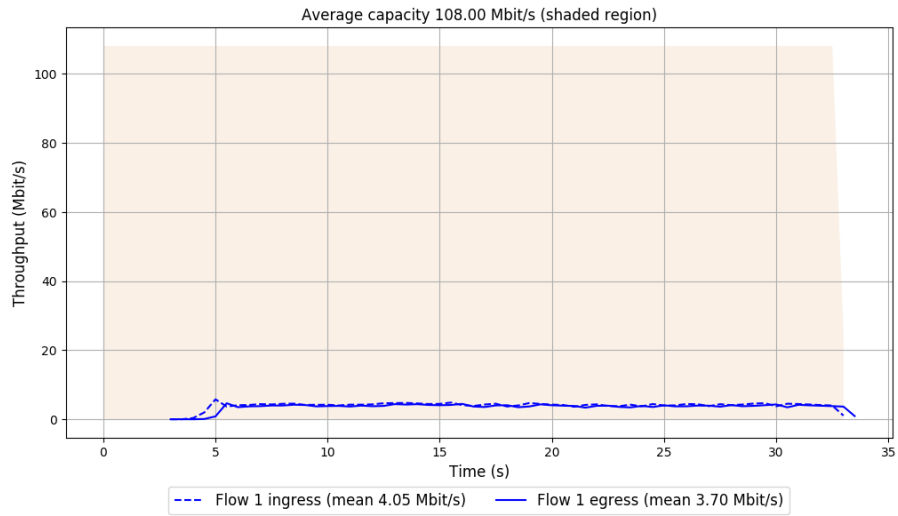
-- Flow 1:

Average throughput: 3.70 Mbit/s

95th percentile per-packet one-way delay: 12.346 ms

Loss rate: 8.74%

# Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2019-01-17 09:07:56

End at: 2019-01-17 09:08:26

# Below is generated by plot.py at 2019-01-17 09:35:39

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 3.94 Mbit/s (3.6% utilization)

95th percentile per-packet one-way delay: 12.194 ms

Loss rate: 8.39%

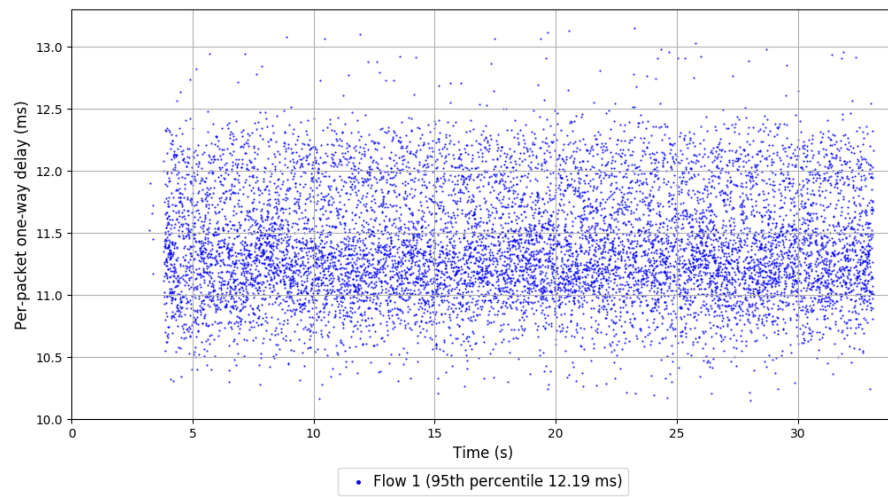
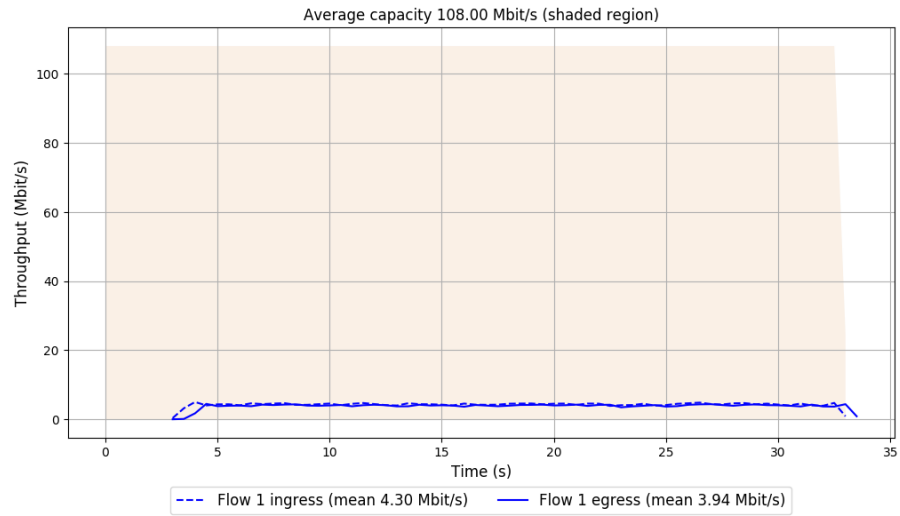
-- Flow 1:

Average throughput: 3.94 Mbit/s

95th percentile per-packet one-way delay: 12.194 ms

Loss rate: 8.39%

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



Run 3: Statistics of QUIC Cubic

Start at: 2019-01-17 09:20:54

End at: 2019-01-17 09:21:24

# Below is generated by plot.py at 2019-01-17 09:35:39

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 3.87 Mbit/s (3.6% utilization)

95th percentile per-packet one-way delay: 12.263 ms

Loss rate: 8.60%

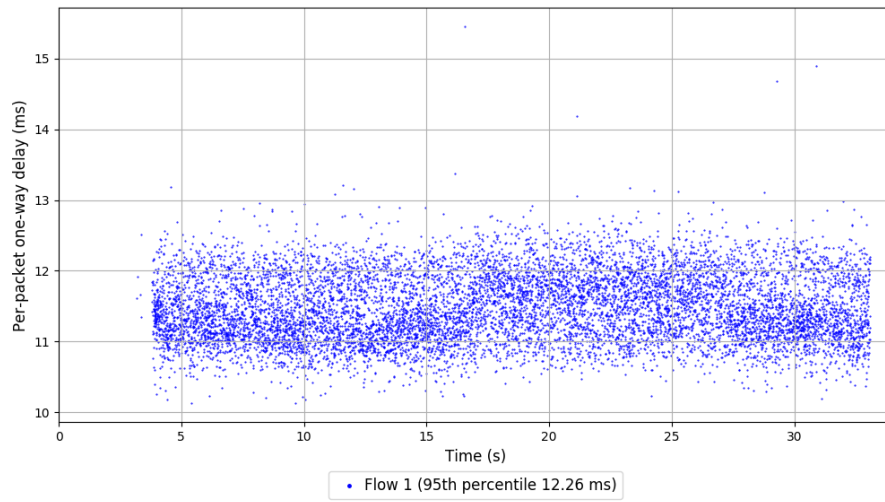
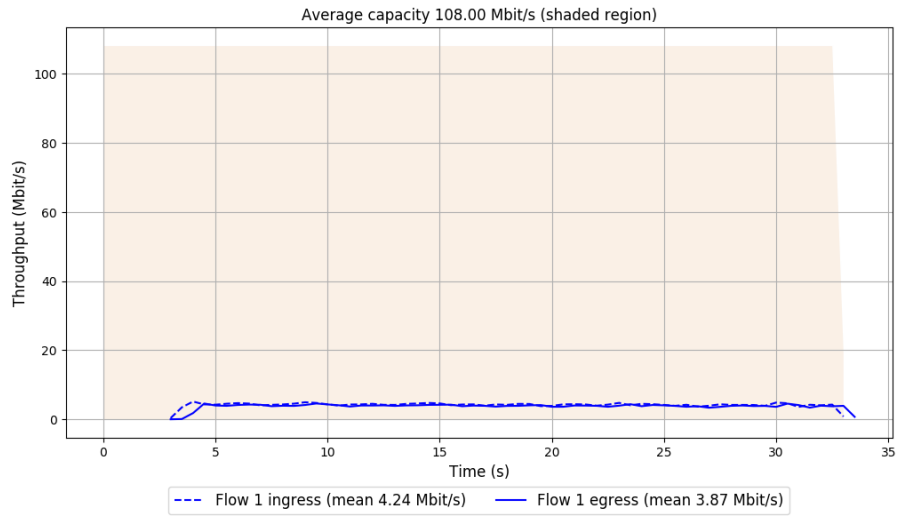
-- Flow 1:

Average throughput: 3.87 Mbit/s

95th percentile per-packet one-way delay: 12.263 ms

Loss rate: 8.60%

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



Run 1: Statistics of SCReAM

Start at: 2019-01-17 09:01:15

End at: 2019-01-17 09:01:45

# Below is generated by plot.py at 2019-01-17 09:35:39

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.21 Mbit/s (0.2% utilization)

95th percentile per-packet one-way delay: 11.782 ms

Loss rate: 0.13%

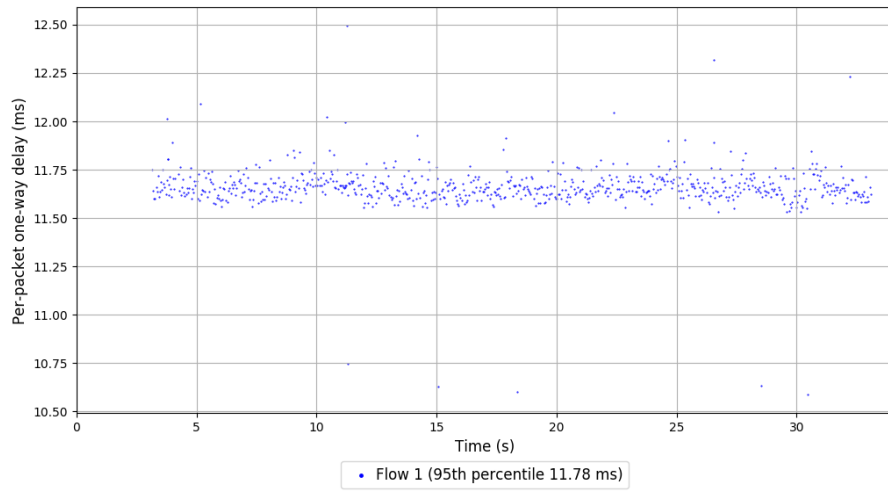
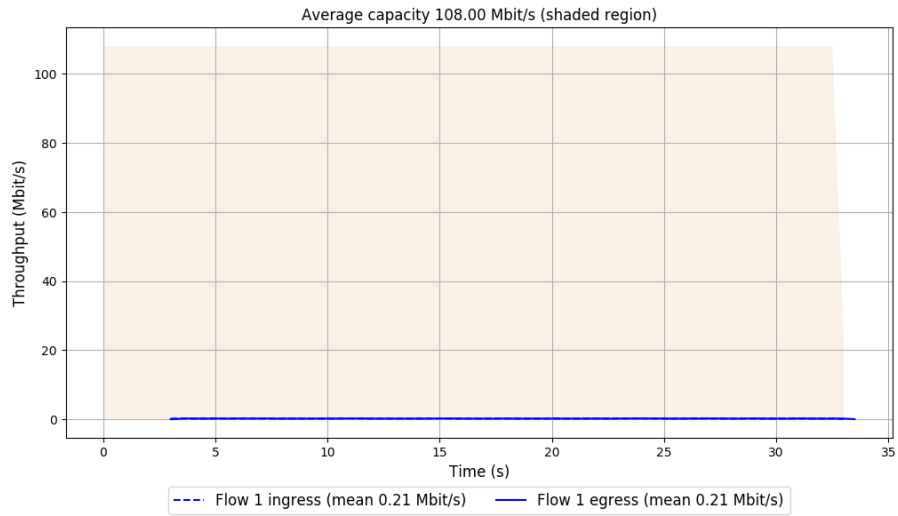
-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 11.782 ms

Loss rate: 0.13%

# Run 1: Report of SCReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2019-01-17 09:14:12

End at: 2019-01-17 09:14:42

# Below is generated by plot.py at 2019-01-17 09:35:39

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.21 Mbit/s (0.2% utilization)

95th percentile per-packet one-way delay: 11.787 ms

Loss rate: 0.00%

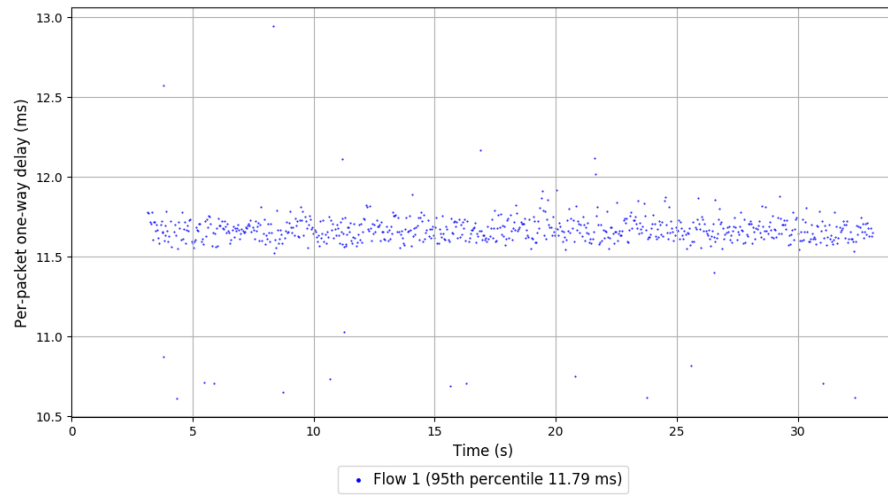
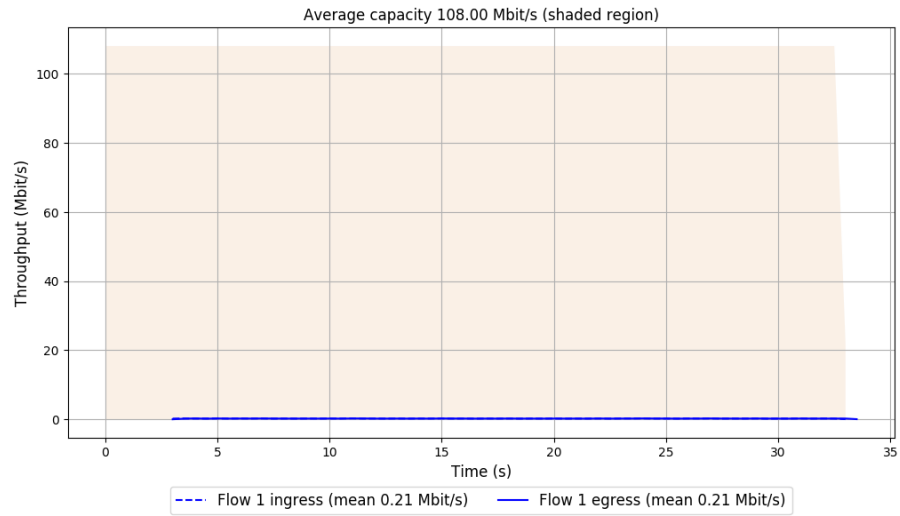
-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 11.787 ms

Loss rate: 0.00%

## Run 2: Report of SReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2019-01-17 09:27:08

End at: 2019-01-17 09:27:38

# Below is generated by plot.py at 2019-01-17 09:35:39

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.21 Mbit/s (0.2% utilization)

95th percentile per-packet one-way delay: 11.760 ms

Loss rate: 0.00%

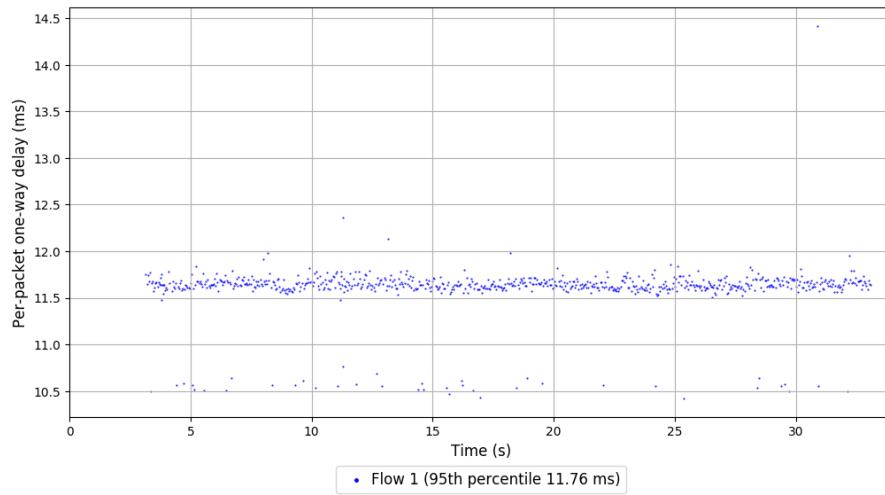
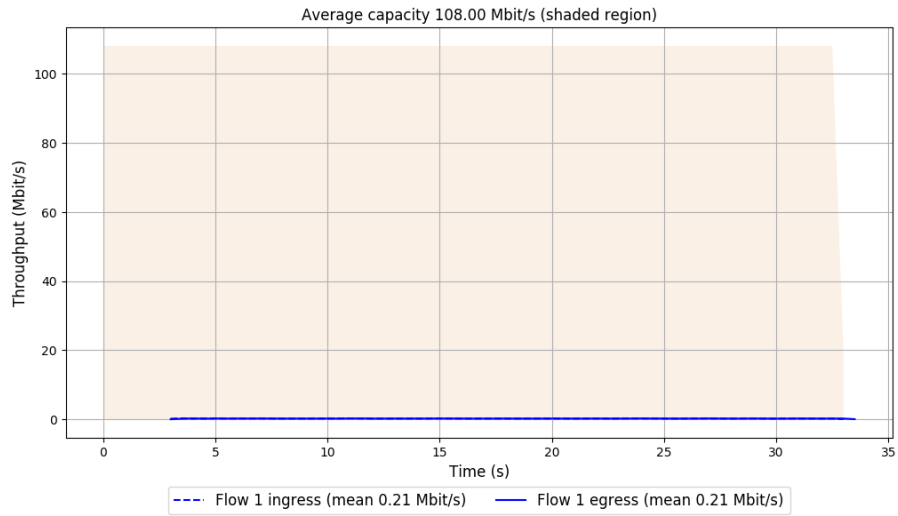
-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 11.760 ms

Loss rate: 0.00%

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



Run 1: Statistics of Sprout

Start at: 2019-01-17 09:00:02

End at: 2019-01-17 09:00:32

# Below is generated by plot.py at 2019-01-17 09:35:39

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.50 Mbit/s (0.5% utilization)

95th percentile per-packet one-way delay: 11.902 ms

Loss rate: 7.10%

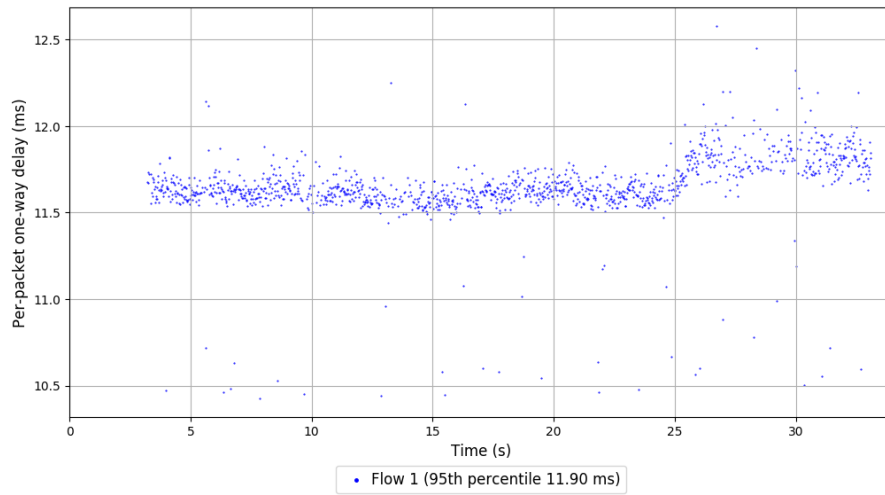
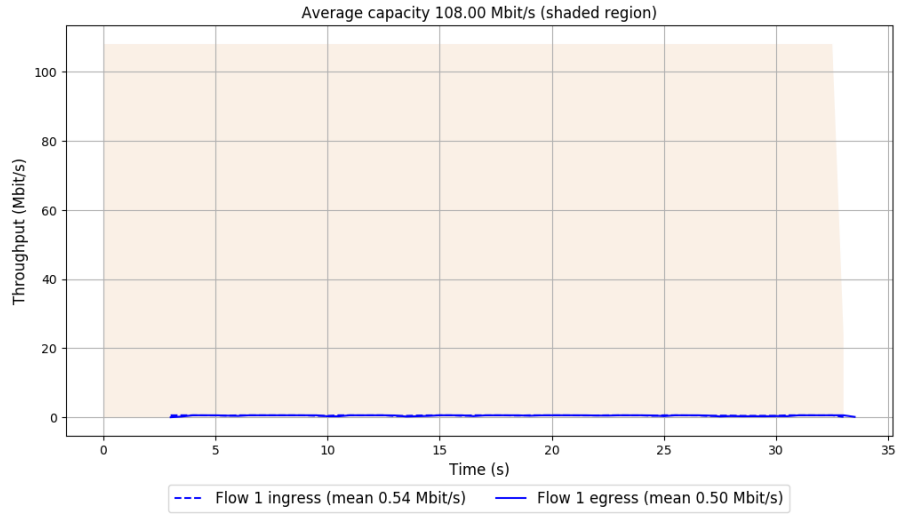
-- Flow 1:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 11.902 ms

Loss rate: 7.10%

# Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

Start at: 2019-01-17 09:12:59

End at: 2019-01-17 09:13:29

# Below is generated by plot.py at 2019-01-17 09:35:39

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.43 Mbit/s (0.4% utilization)

95th percentile per-packet one-way delay: 11.726 ms

Loss rate: 14.24%

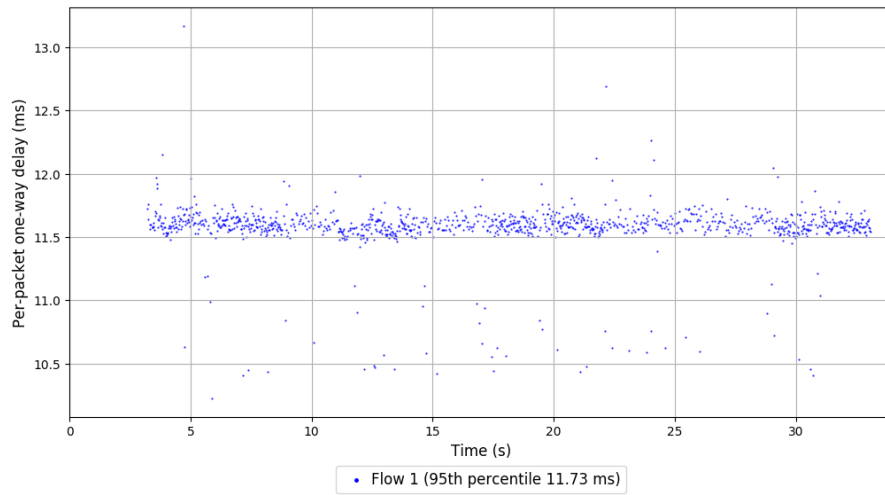
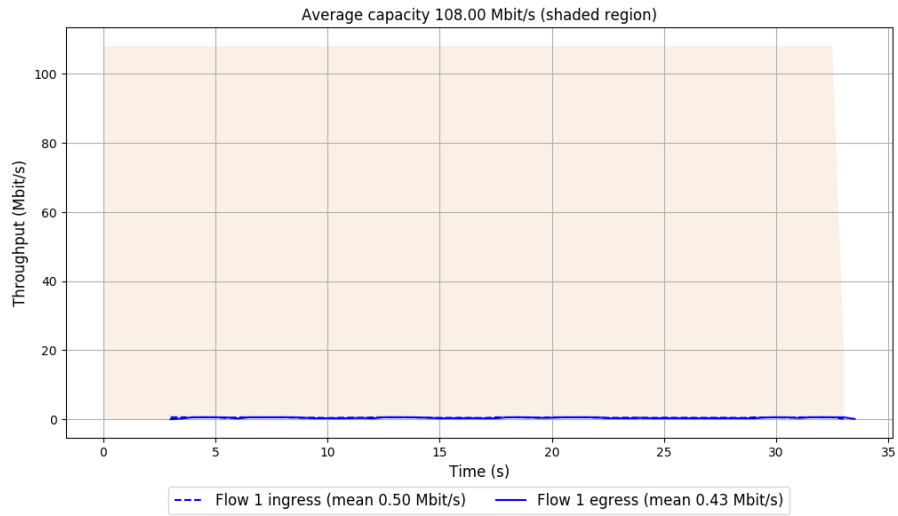
-- Flow 1:

Average throughput: 0.43 Mbit/s

95th percentile per-packet one-way delay: 11.726 ms

Loss rate: 14.24%

## Run 2: Report of Sprout — Data Link



Run 3: Statistics of Sprout

Start at: 2019-01-17 09:25:54

End at: 2019-01-17 09:26:24

# Below is generated by plot.py at 2019-01-17 09:35:39

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.44 Mbit/s (0.4% utilization)

95th percentile per-packet one-way delay: 11.964 ms

Loss rate: 12.90%

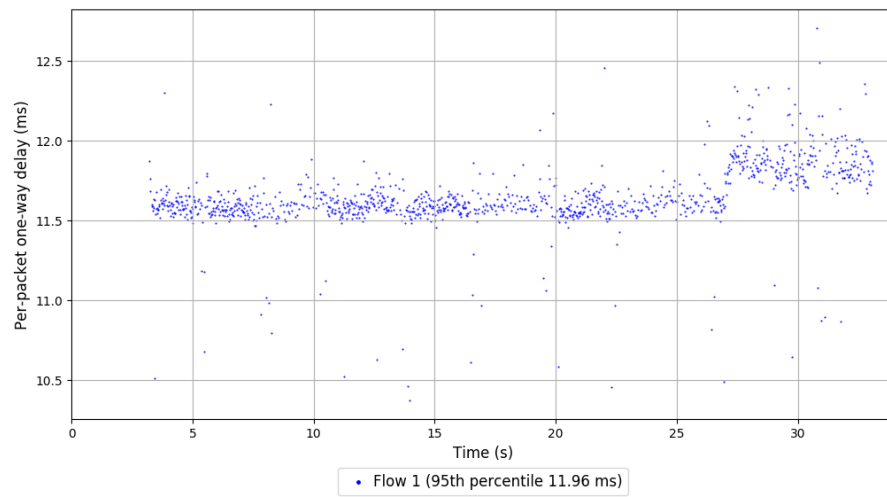
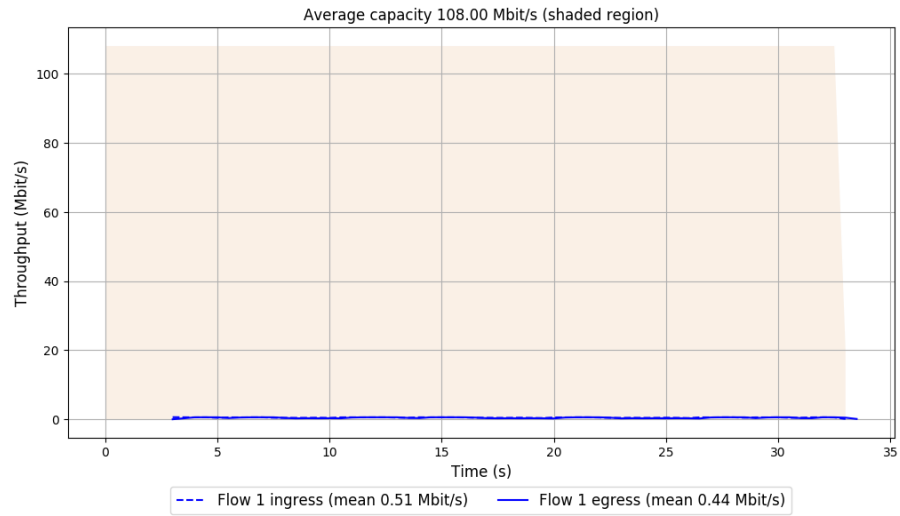
-- Flow 1:

Average throughput: 0.44 Mbit/s

95th percentile per-packet one-way delay: 11.964 ms

Loss rate: 12.90%

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



Run 1: Statistics of TaoVA-100x

Start at: 2019-01-17 08:51:56

End at: 2019-01-17 08:52:26

# Below is generated by plot.py at 2019-01-17 09:35:39

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.01 Mbit/s (0.0% utilization)

95th percentile per-packet one-way delay: 11.840 ms

Loss rate: 51.91%

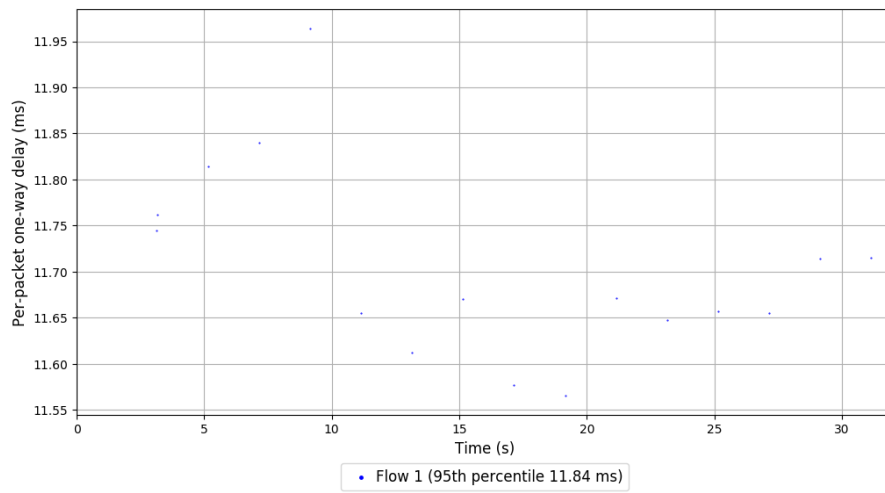
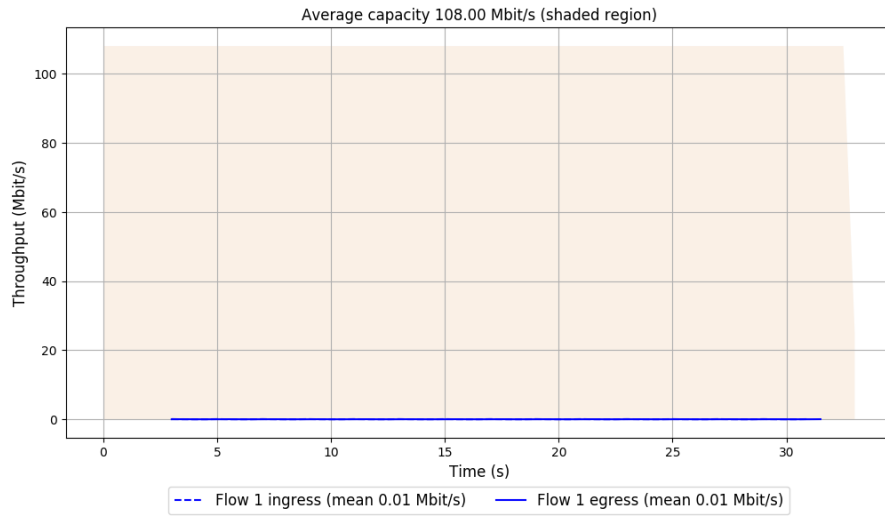
-- Flow 1:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 11.840 ms

Loss rate: 51.91%

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



Run 2: Statistics of TaoVA-100x

Start at: 2019-01-17 09:04:54

End at: 2019-01-17 09:05:24

# Below is generated by plot.py at 2019-01-17 09:35:39

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.01 Mbit/s (0.0% utilization)

95th percentile per-packet one-way delay: 11.776 ms

Loss rate: 51.91%

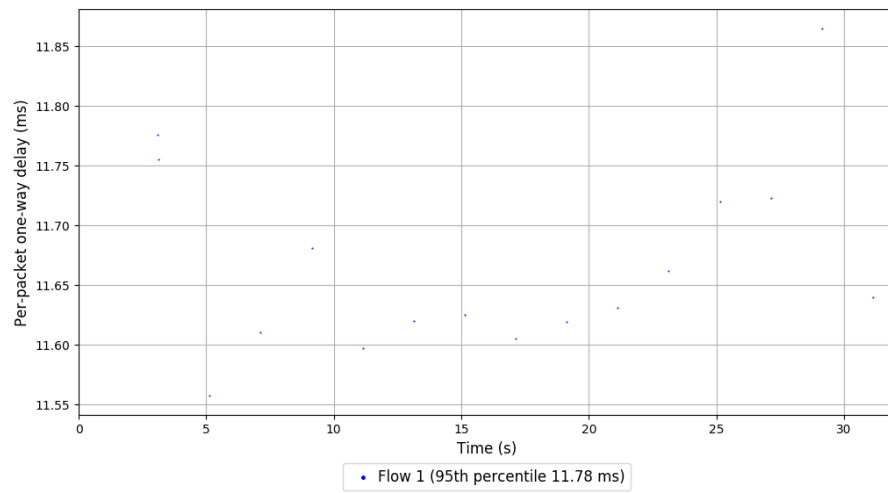
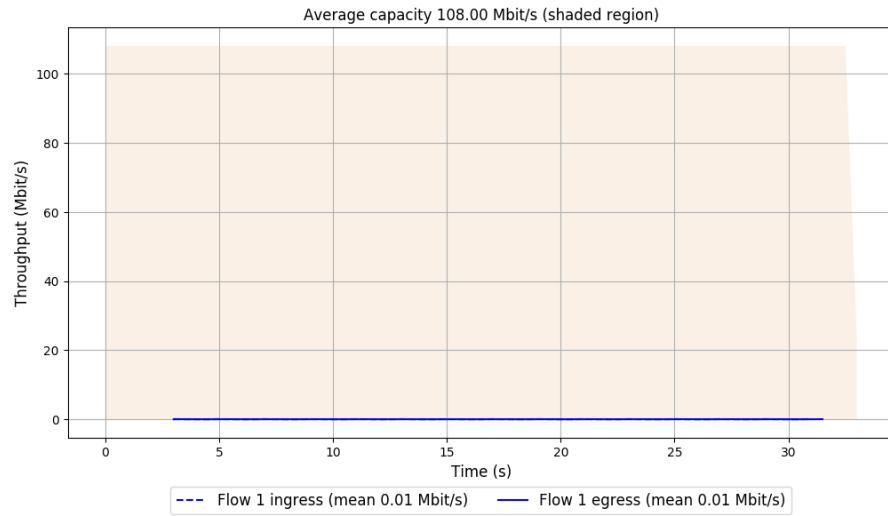
-- Flow 1:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 11.776 ms

Loss rate: 51.91%

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



Run 3: Statistics of TaoVA-100x

Start at: 2019-01-17 09:17:51

End at: 2019-01-17 09:18:21

# Below is generated by plot.py at 2019-01-17 09:35:39

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.01 Mbit/s (0.0% utilization)

95th percentile per-packet one-way delay: 11.758 ms

Loss rate: 51.91%

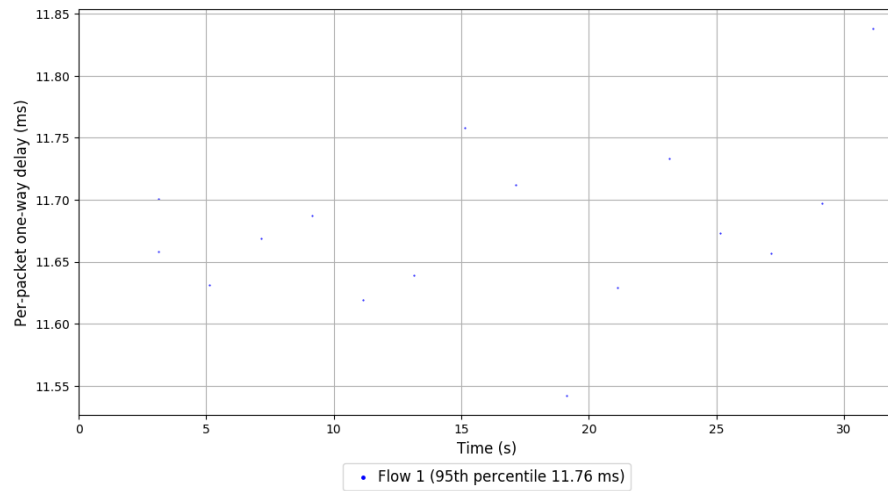
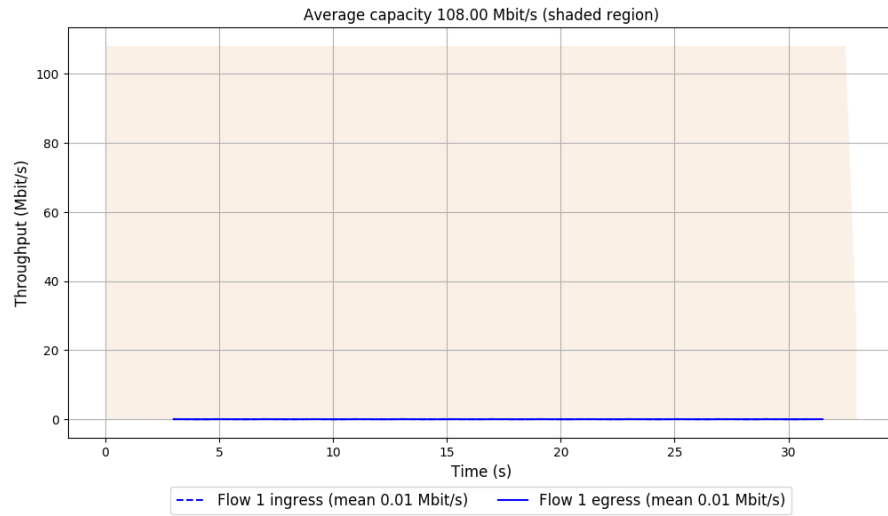
-- Flow 1:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 11.758 ms

Loss rate: 51.91%

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



Run 1: Statistics of TCP Vegas

Start at: 2019-01-17 08:58:48

End at: 2019-01-17 08:59:18

# Below is generated by plot.py at 2019-01-17 09:35:39

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.80 Mbit/s (0.7% utilization)

95th percentile per-packet one-way delay: 11.948 ms

Loss rate: 17.18%

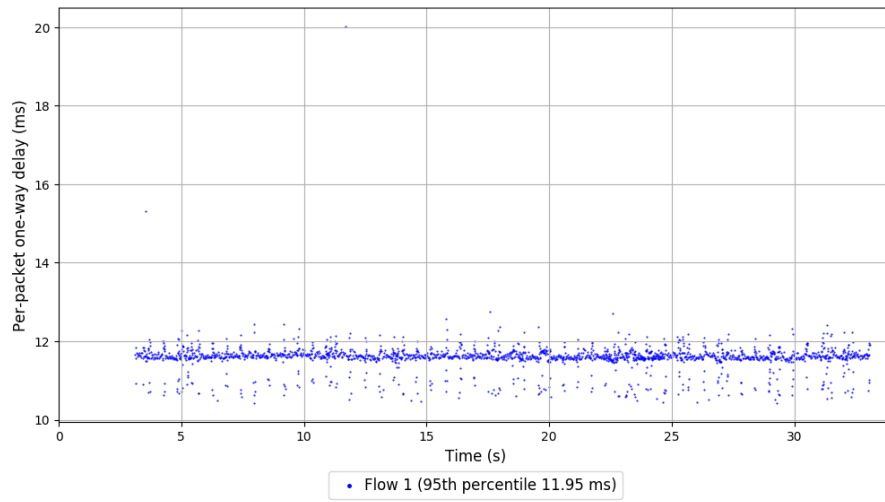
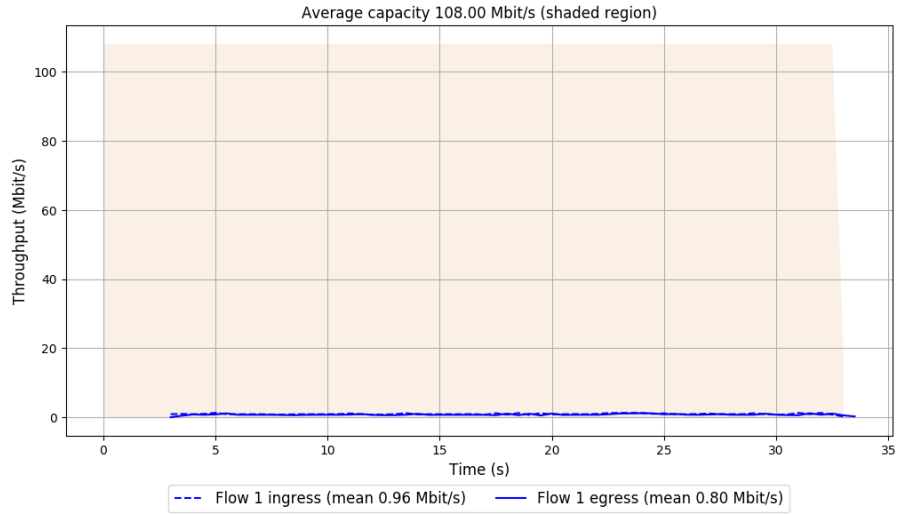
-- Flow 1:

Average throughput: 0.80 Mbit/s

95th percentile per-packet one-way delay: 11.948 ms

Loss rate: 17.18%

# Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2019-01-17 09:11:46

End at: 2019-01-17 09:12:16

# Below is generated by plot.py at 2019-01-17 09:35:39

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.87 Mbit/s (0.8% utilization)

95th percentile per-packet one-way delay: 11.958 ms

Loss rate: 15.37%

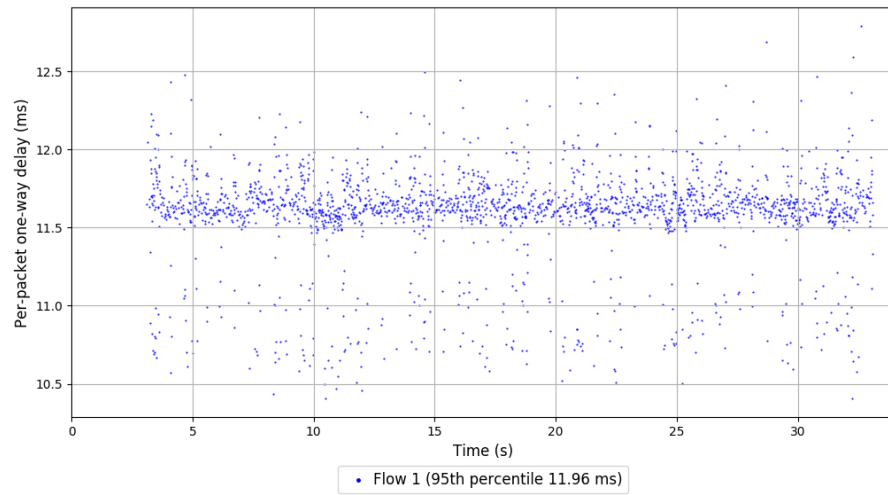
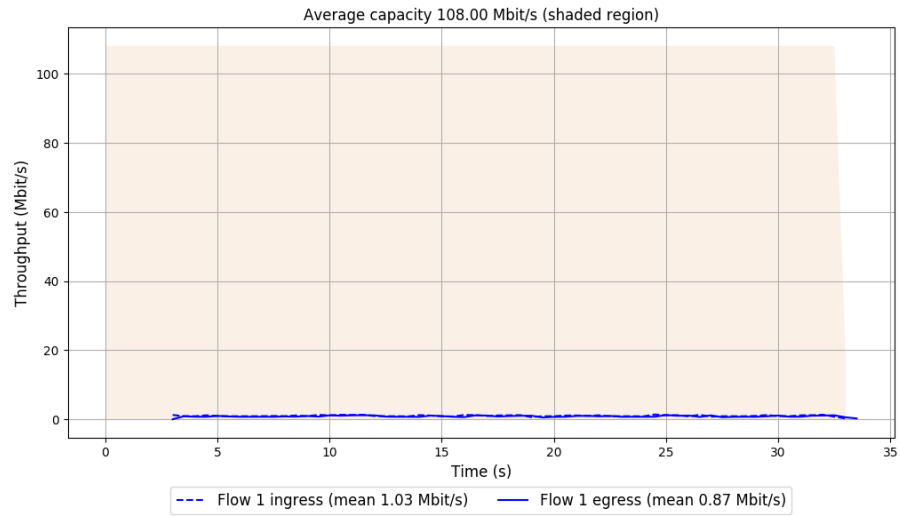
-- Flow 1:

Average throughput: 0.87 Mbit/s

95th percentile per-packet one-way delay: 11.958 ms

Loss rate: 15.37%

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



Run 3: Statistics of TCP Vegas

Start at: 2019-01-17 09:24:41

End at: 2019-01-17 09:25:11

# Below is generated by plot.py at 2019-01-17 09:35:39

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.78 Mbit/s (0.7% utilization)

95th percentile per-packet one-way delay: 11.881 ms

Loss rate: 17.55%

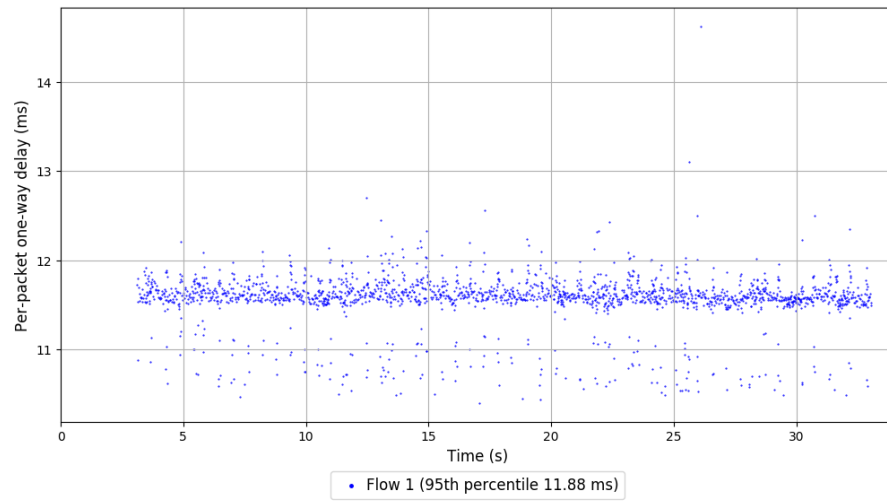
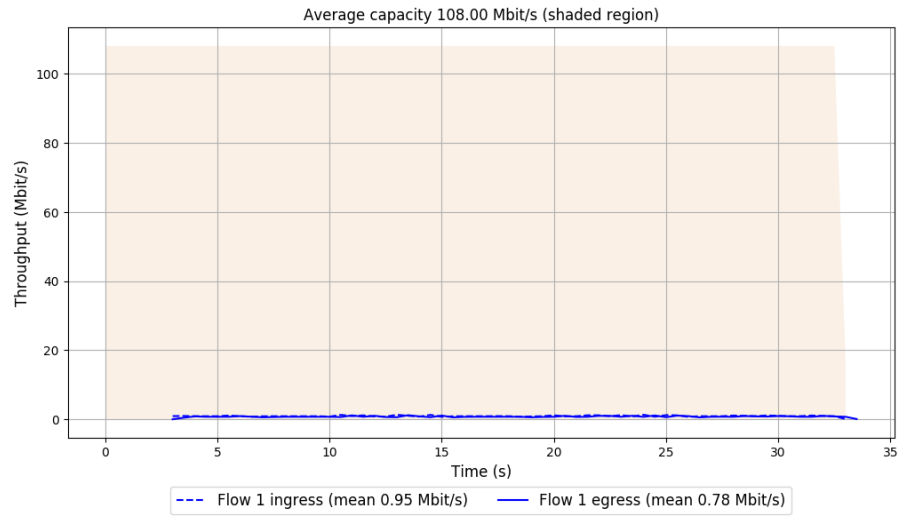
-- Flow 1:

Average throughput: 0.78 Mbit/s

95th percentile per-packet one-way delay: 11.881 ms

Loss rate: 17.55%

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



Run 1: Statistics of Verus

Start at: 2019-01-17 08:57:29

End at: 2019-01-17 08:57:59

# Below is generated by plot.py at 2019-01-17 09:36:16

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 4.36 Mbit/s (4.0% utilization)

95th percentile per-packet one-way delay: 12.129 ms

Loss rate: 98.90%

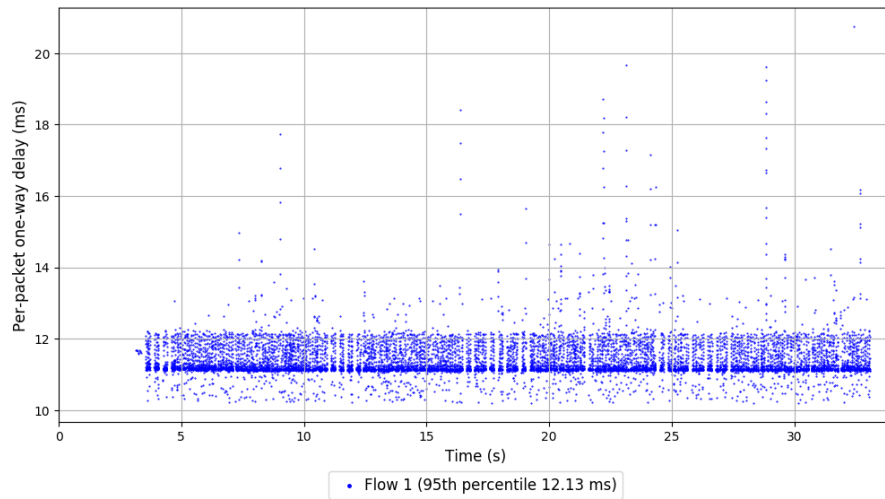
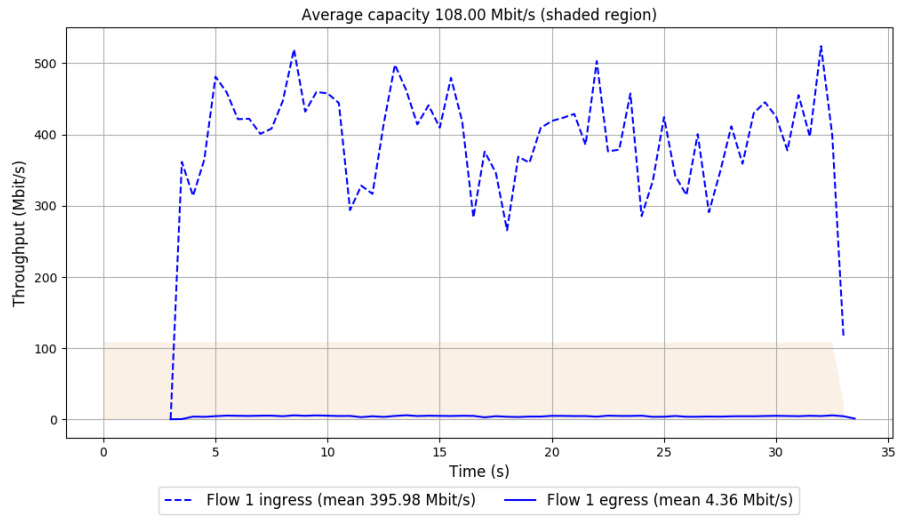
-- Flow 1:

Average throughput: 4.36 Mbit/s

95th percentile per-packet one-way delay: 12.129 ms

Loss rate: 98.90%

# Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2019-01-17 09:10:29

End at: 2019-01-17 09:10:59

# Below is generated by plot.py at 2019-01-17 09:36:16

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 3.04 Mbit/s (2.8% utilization)

95th percentile per-packet one-way delay: 12.206 ms

Loss rate: 98.70%

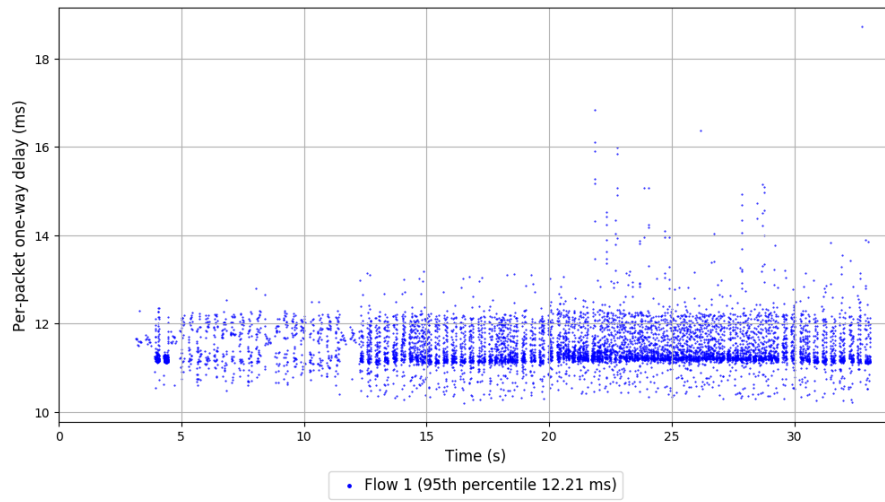
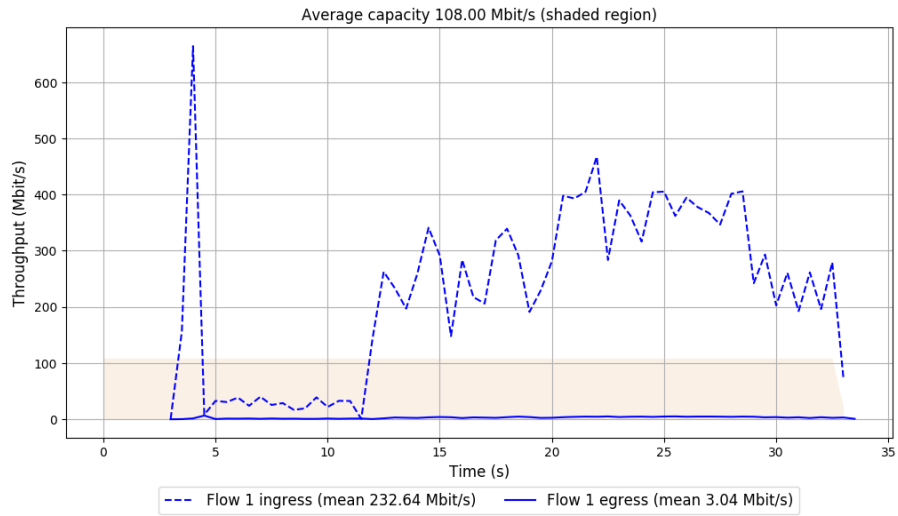
-- Flow 1:

Average throughput: 3.04 Mbit/s

95th percentile per-packet one-way delay: 12.206 ms

Loss rate: 98.70%

## Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2019-01-17 09:23:26

End at: 2019-01-17 09:23:56

# Below is generated by plot.py at 2019-01-17 09:36:16

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.75 Mbit/s (1.6% utilization)

95th percentile per-packet one-way delay: 12.421 ms

Loss rate: 97.94%

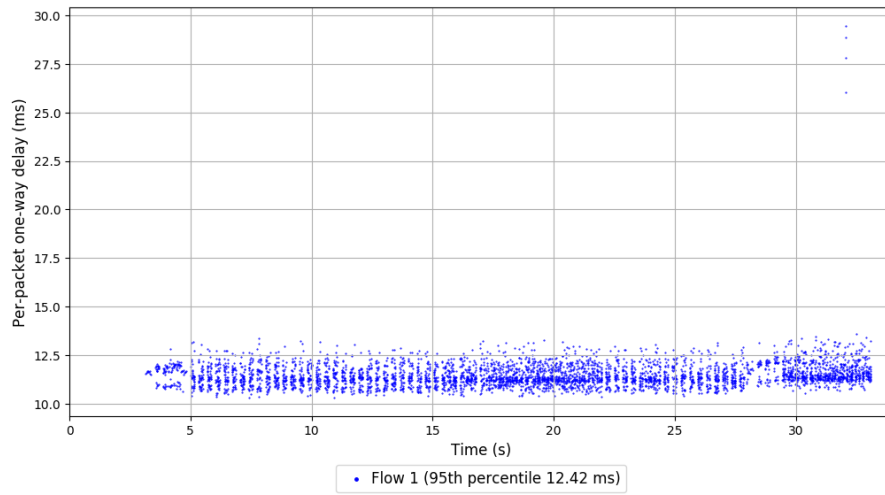
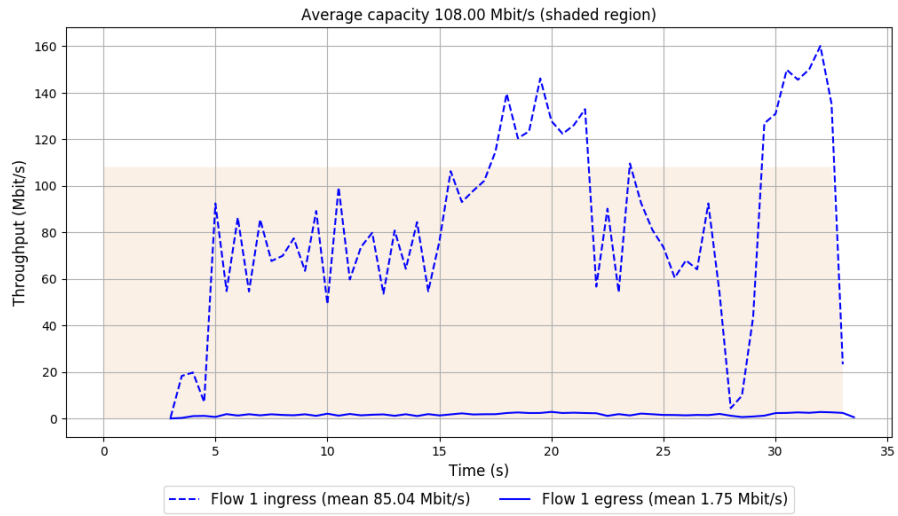
-- Flow 1:

Average throughput: 1.75 Mbit/s

95th percentile per-packet one-way delay: 12.421 ms

Loss rate: 97.94%

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



Run 1: Statistics of PCC-Vivace

Start at: 2019-01-17 09:00:38

End at: 2019-01-17 09:01:08

# Below is generated by plot.py at 2019-01-17 09:36:16

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 5.73 Mbit/s (5.3% utilization)

95th percentile per-packet one-way delay: 12.145 ms

Loss rate: 0.16%

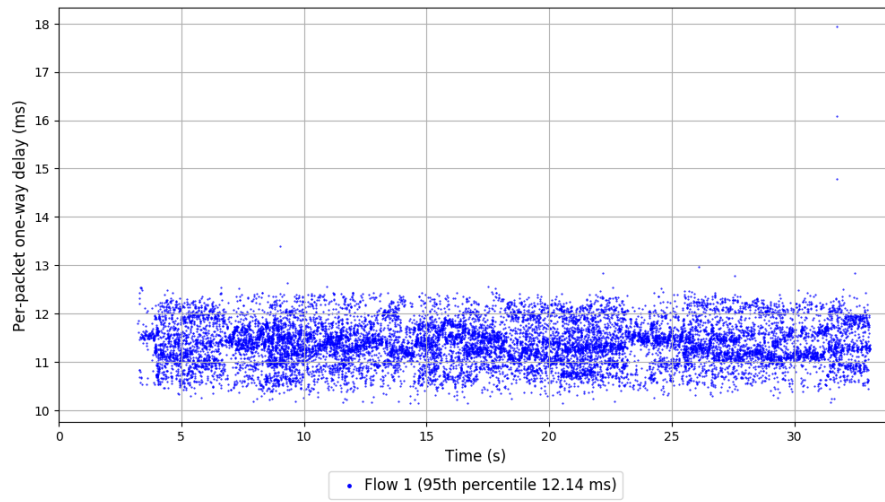
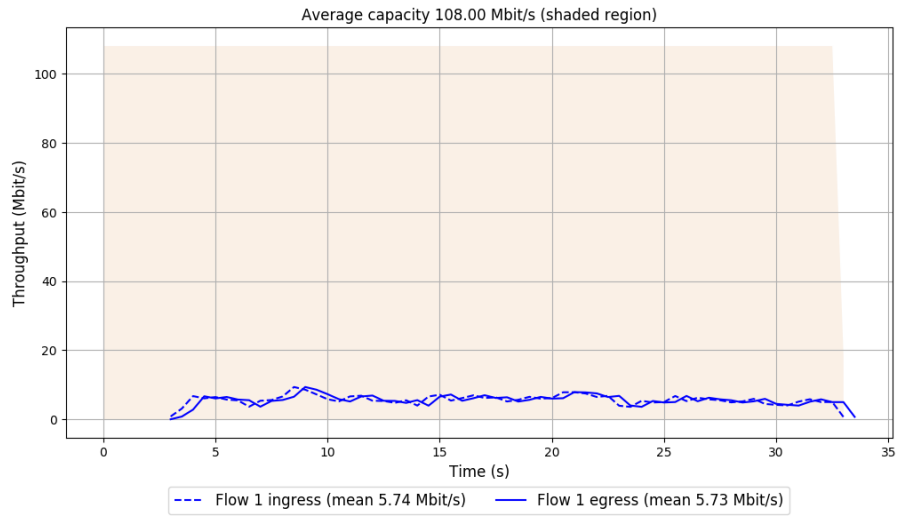
-- Flow 1:

Average throughput: 5.73 Mbit/s

95th percentile per-packet one-way delay: 12.145 ms

Loss rate: 0.16%

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



Run 2: Statistics of PCC-Vivace

Start at: 2019-01-17 09:13:36

End at: 2019-01-17 09:14:06

# Below is generated by plot.py at 2019-01-17 09:36:16

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 6.39 Mbit/s (5.9% utilization)

95th percentile per-packet one-way delay: 12.179 ms

Loss rate: 0.97%

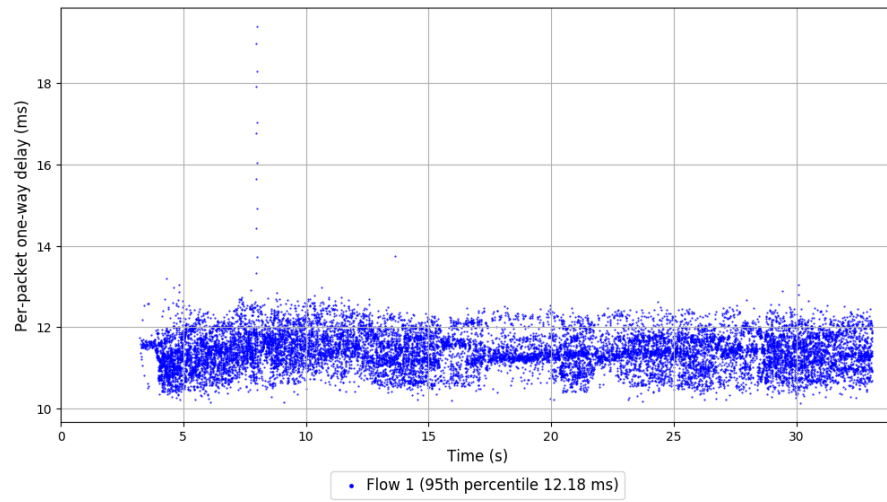
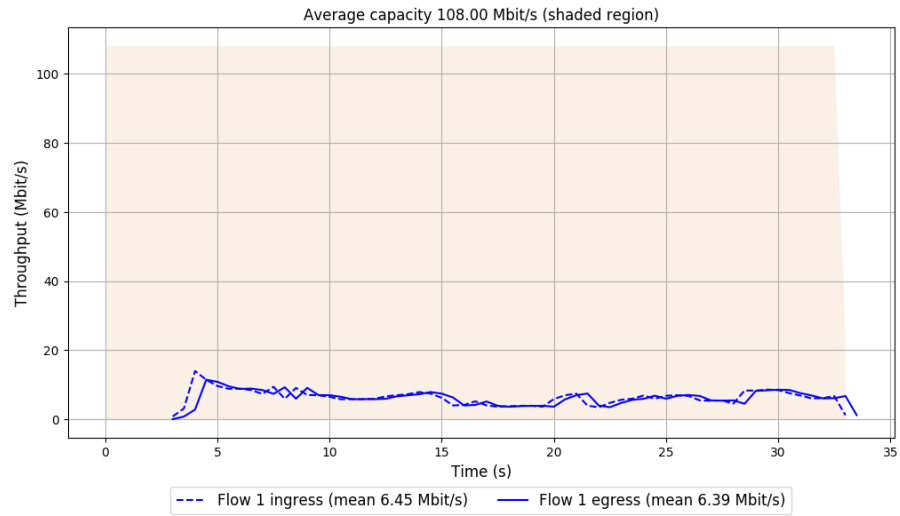
-- Flow 1:

Average throughput: 6.39 Mbit/s

95th percentile per-packet one-way delay: 12.179 ms

Loss rate: 0.97%

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



Run 3: Statistics of PCC-Vivace

Start at: 2019-01-17 09:26:31

End at: 2019-01-17 09:27:01

# Below is generated by plot.py at 2019-01-17 09:36:16

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 5.41 Mbit/s (5.0% utilization)

95th percentile per-packet one-way delay: 12.092 ms

Loss rate: 0.57%

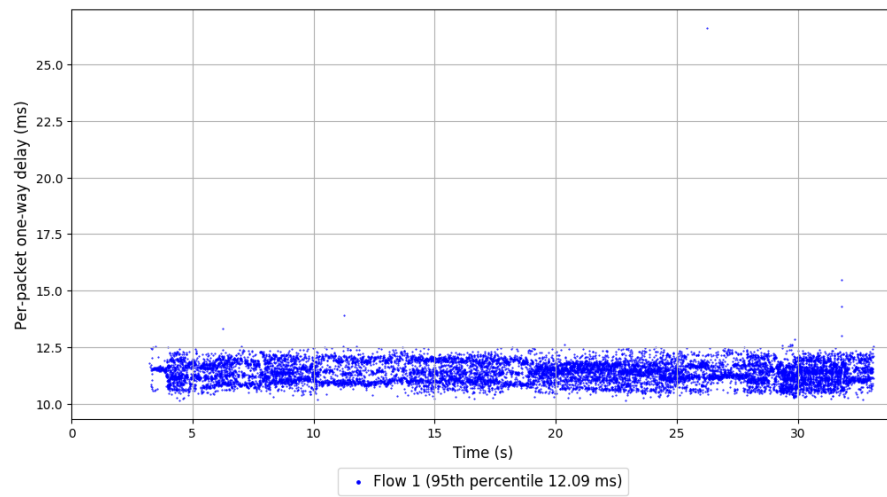
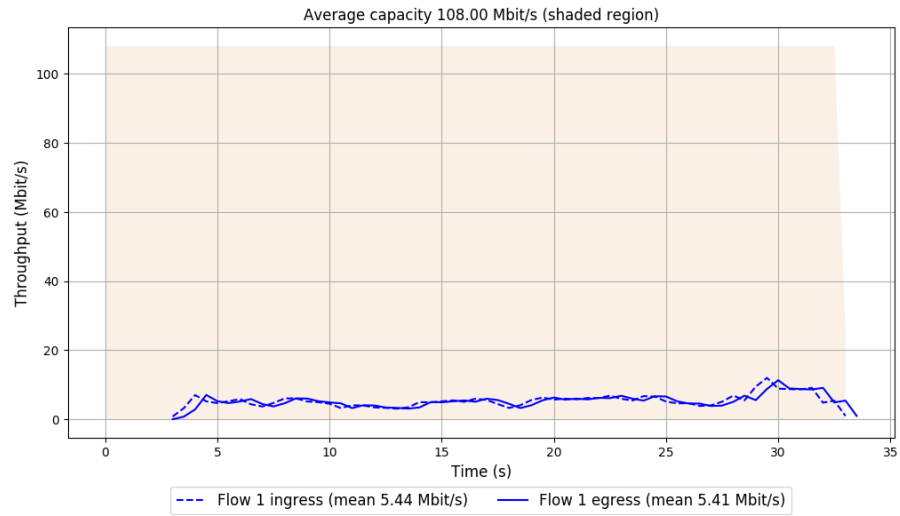
-- Flow 1:

Average throughput: 5.41 Mbit/s

95th percentile per-packet one-way delay: 12.092 ms

Loss rate: 0.57%

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



Run 1: Statistics of WebRTC media

Start at: 2019-01-17 09:01:51

End at: 2019-01-17 09:02:21

# Below is generated by plot.py at 2019-01-17 09:36:16

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.05 Mbit/s (0.0% utilization)

95th percentile per-packet one-way delay: 12.005 ms

Loss rate: 25.60%

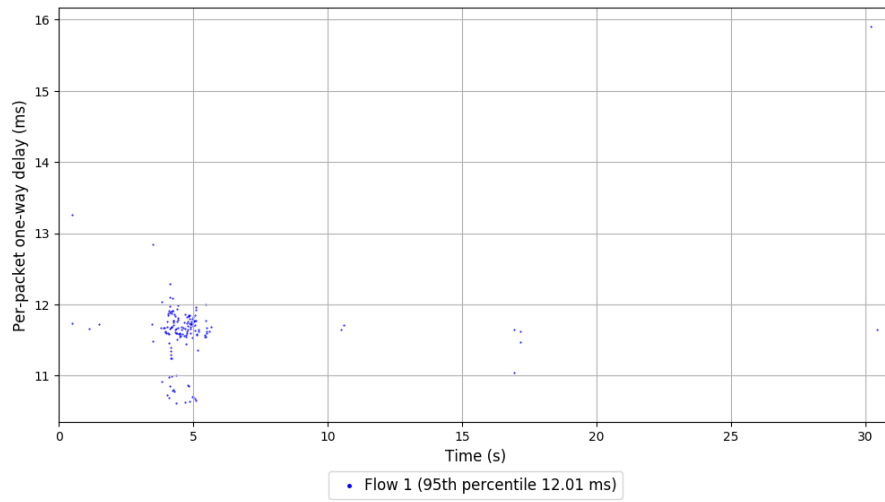
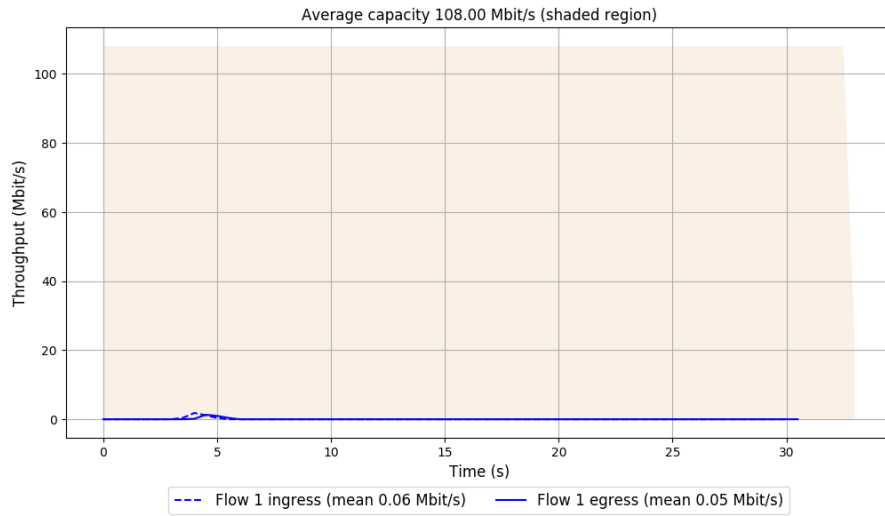
-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 12.005 ms

Loss rate: 25.60%

# Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2019-01-17 09:14:49

End at: 2019-01-17 09:15:19

# Below is generated by plot.py at 2019-01-17 09:36:16

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.05 Mbit/s (0.0% utilization)

95th percentile per-packet one-way delay: 12.007 ms

Loss rate: 20.63%

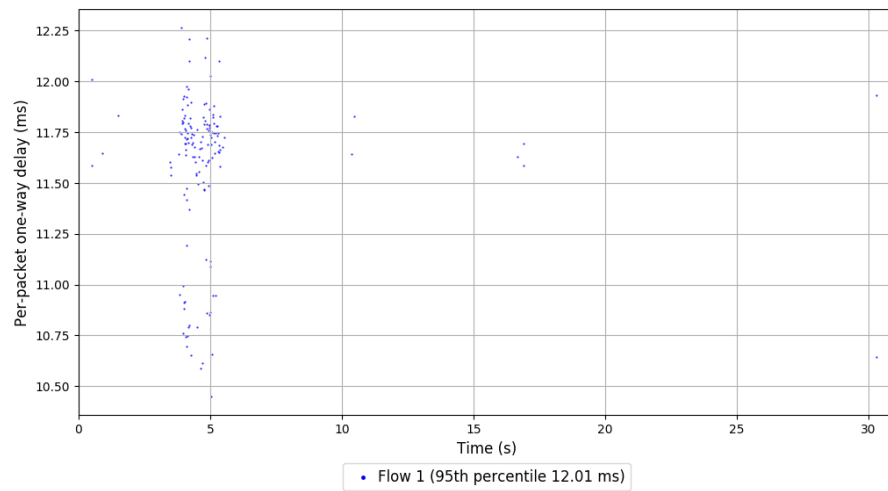
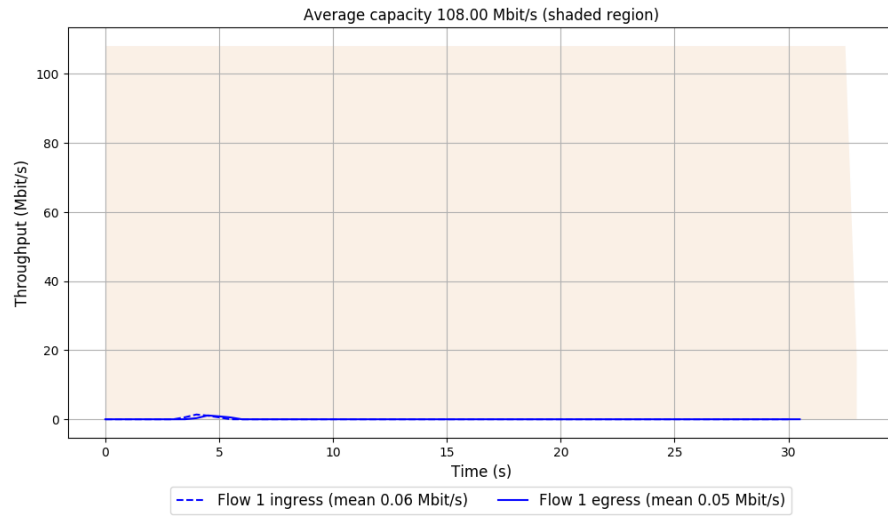
-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 12.007 ms

Loss rate: 20.63%

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



Run 3: Statistics of WebRTC media

Start at: 2019-01-17 09:27:44

End at: 2019-01-17 09:28:14

# Below is generated by plot.py at 2019-01-17 09:36:16

# Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.05 Mbit/s (0.0% utilization)

95th percentile per-packet one-way delay: 11.977 ms

Loss rate: 20.04%

-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 11.977 ms

Loss rate: 20.04%

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

