

Pantheon Report

Generated at 2017-10-12 19:05:26 (UTC).

Data path: Stanford ppp0 (*remote*) → AWS California 1 Ethernet (*local*).

Repeated the test of 14 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

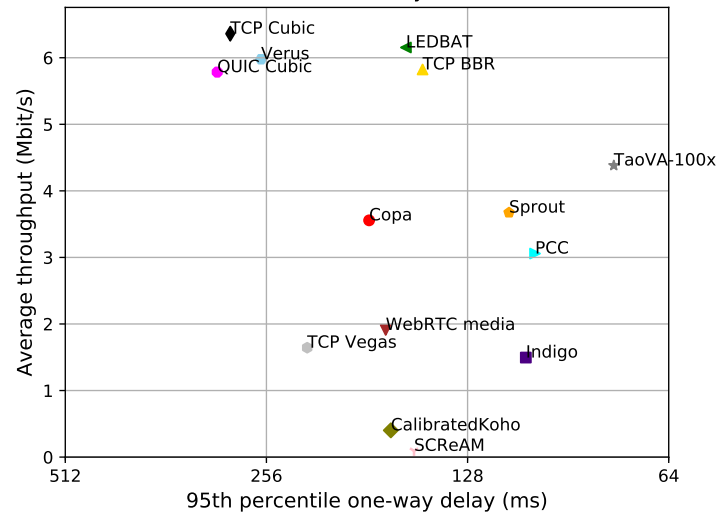
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo_fast**).

NTP offsets were measured against `time.stanford.edu` and have been applied to correct the timestamps in logs.

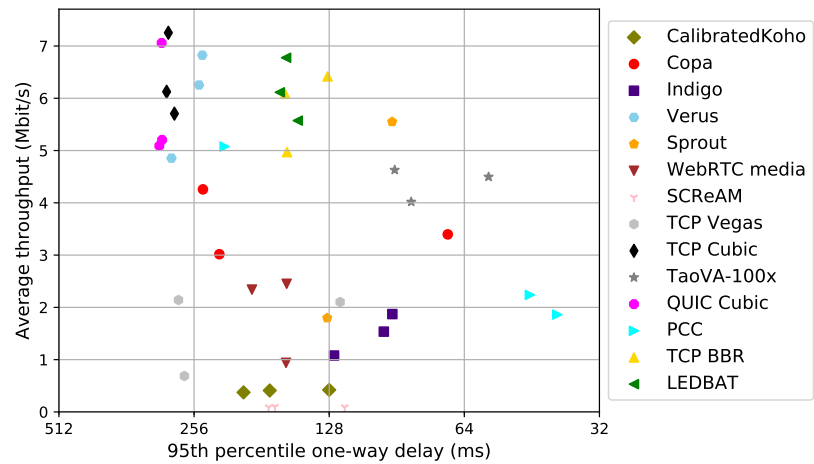
Git summary:

```
branch: indigos @ 45998d6404be7c5106956530acb9cfc43bd06e7d
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/genericCC @ f7ca42f251bf49b432bb71de6d13fa903515c366
third_party/indigo @ b19f3730105f9aa95452552af924e3719b03cc55
third_party/indigo-cellular @ aee99e8eb842cb053f8c9a80e28cd256a930bbc2
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89
third_party/indigo-no-cwnd @ 3e58442c04028a11d7b02456e137604633ba2d6c
third_party/indigo-no-delivery-rate @ 57caa40858b964906edff4876d5a7e5bfff666c5
third_party/indigo-no-queuing-delay @ 03455460fd1a8ffbdad86fab936fdca204b80db
third_party/indigo-no-send-rate @ b39dfa6b2c5f19cb7cd89626cb4f5bb81f9fecda
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
  M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ baf443516dea3eeddeccaf9b916cc313273ca4f4
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/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885
third_party/sourdough @ f1a14bffe749737437f61b1eaaeb30b267cde681
third_party/sprout @ 6f2efe6e088d91066a9f023df375eee2665089ce
  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/webrtc @ a488197ddd041ace68a42849b2540ad834825f42
```

test from Stanford ppp0 to AWS California 1 Ethernet, 3 runs of 30s each per scheme
(mean of all runs by scheme)



test from Stanford ppp0 to AWS California 1 Ethernet, 3 runs of 30s each per scheme



scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	5.83	149.47	0.45
TCP Cubic	3	6.36	289.98	1.09
LEDBAT	3	6.15	158.32	0.57
PCC	3	3.06	101.44	0.16
QUIC Cubic	3	5.78	303.30	2.83
SCReAM	3	0.09	153.94	2.05
WebRTC media	3	1.91	169.74	0.76
Sprout	2	3.67	110.97	1.30
TaoVA-100x	3	4.38	77.34	0.53
TCP Vegas	3	1.64	222.45	2.92
Verus	3	5.97	260.79	2.16
Copa	3	3.56	179.71	0.56
CalibratedKoho	3	0.40	166.75	3.00
Indigo	3	1.50	104.72	0.30

Run 1: Statistics of TCP BBR

Start at: 2017-10-12 17:30:04

End at: 2017-10-12 17:30:34

Local clock offset: 1.579 ms

Remote clock offset: -2.868 ms

Below is generated by plot.py at 2017-10-12 19:04:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 6.42 Mbit/s

95th percentile per-packet one-way delay: 129.065 ms

Loss rate: 0.40%

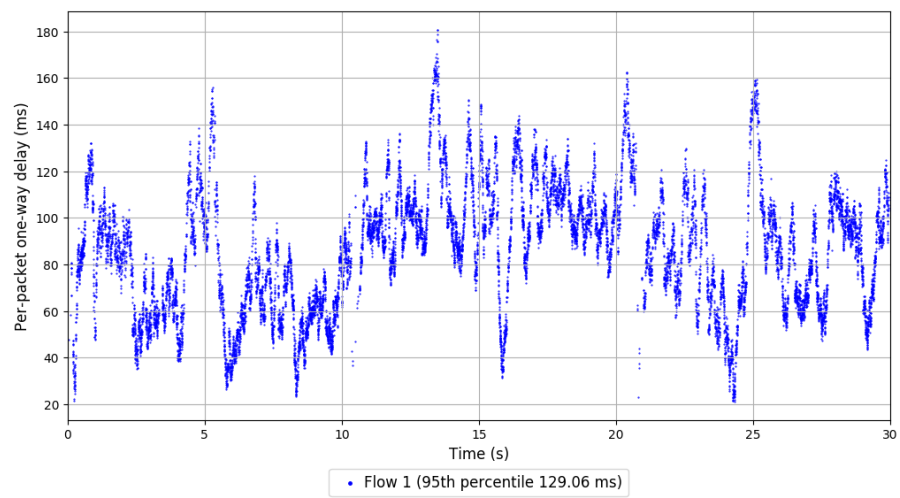
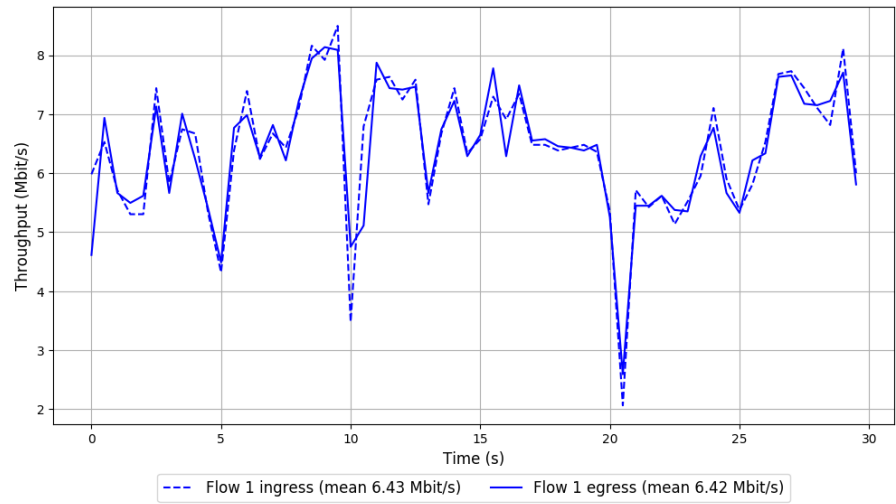
-- Flow 1:

Average throughput: 6.42 Mbit/s

95th percentile per-packet one-way delay: 129.065 ms

Loss rate: 0.40%

Run 1: Report of TCP BBR — Data Link

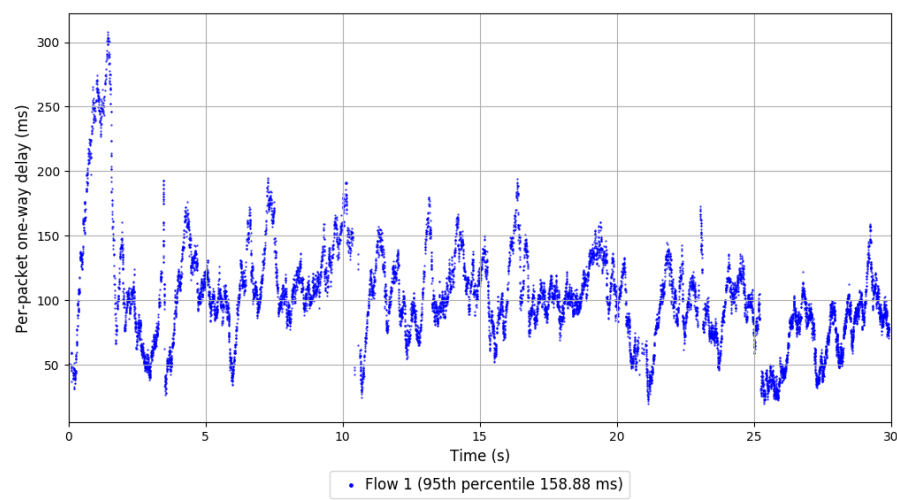
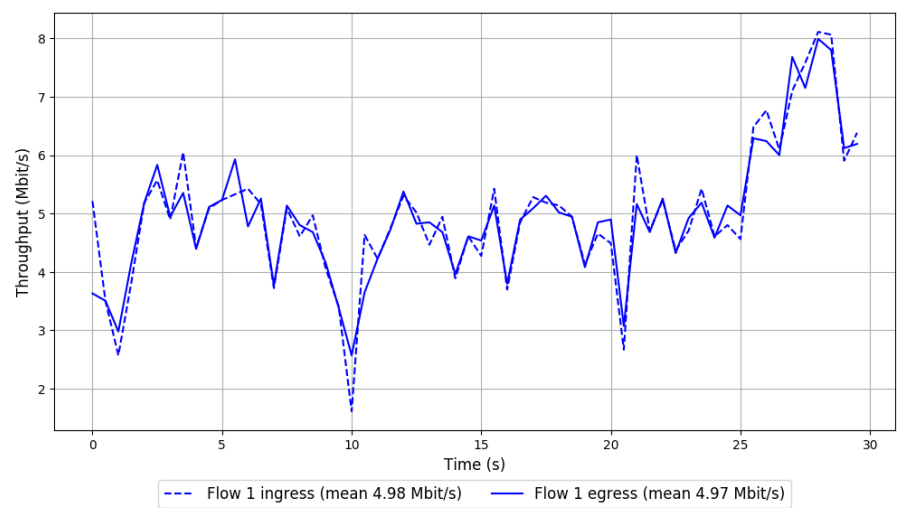


Run 2: Statistics of TCP BBR

Start at: 2017-10-12 17:46:30
End at: 2017-10-12 17:47:00
Local clock offset: 1.587 ms
Remote clock offset: -2.693 ms

Below is generated by plot.py at 2017-10-12 19:04:50
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.97 Mbit/s
95th percentile per-packet one-way delay: 158.881 ms
Loss rate: 0.47%
-- Flow 1:
Average throughput: 4.97 Mbit/s
95th percentile per-packet one-way delay: 158.881 ms
Loss rate: 0.47%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2017-10-12 18:02:57

End at: 2017-10-12 18:03:27

Local clock offset: 1.386 ms

Remote clock offset: -2.537 ms

Below is generated by plot.py at 2017-10-12 19:04:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 6.09 Mbit/s

95th percentile per-packet one-way delay: 160.460 ms

Loss rate: 0.47%

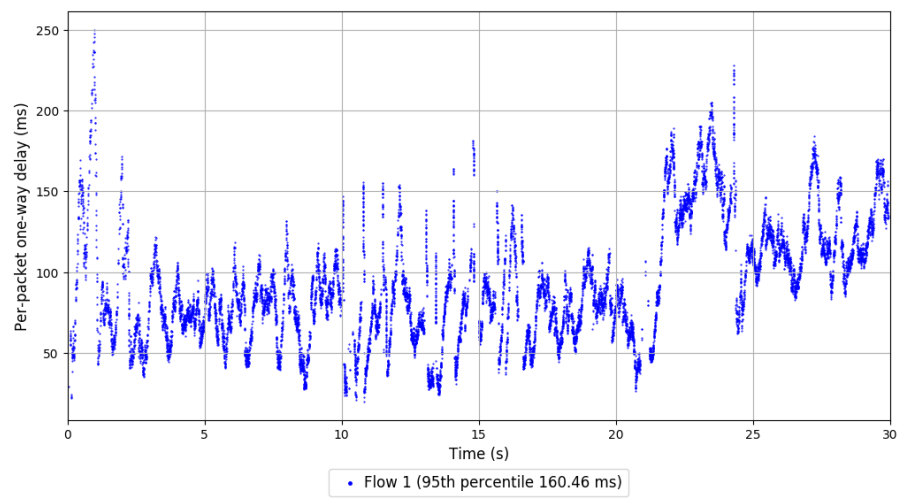
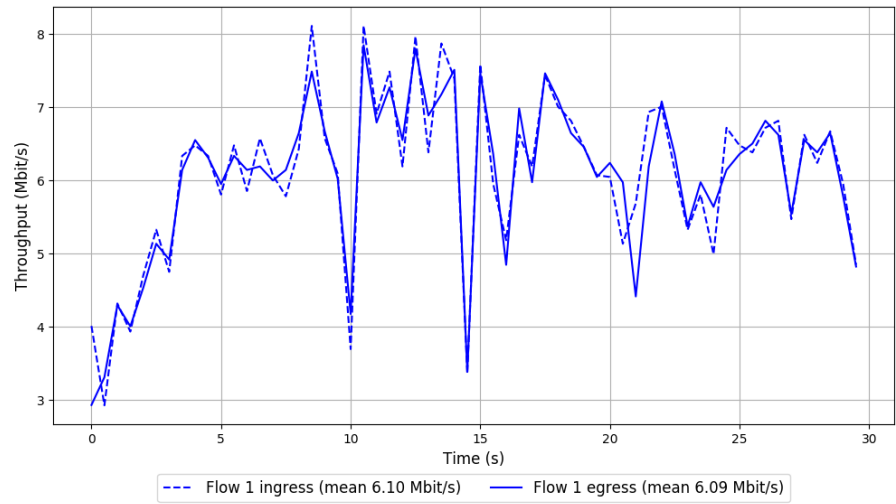
-- Flow 1:

Average throughput: 6.09 Mbit/s

95th percentile per-packet one-way delay: 160.460 ms

Loss rate: 0.47%

Run 3: Report of TCP BBR — Data Link

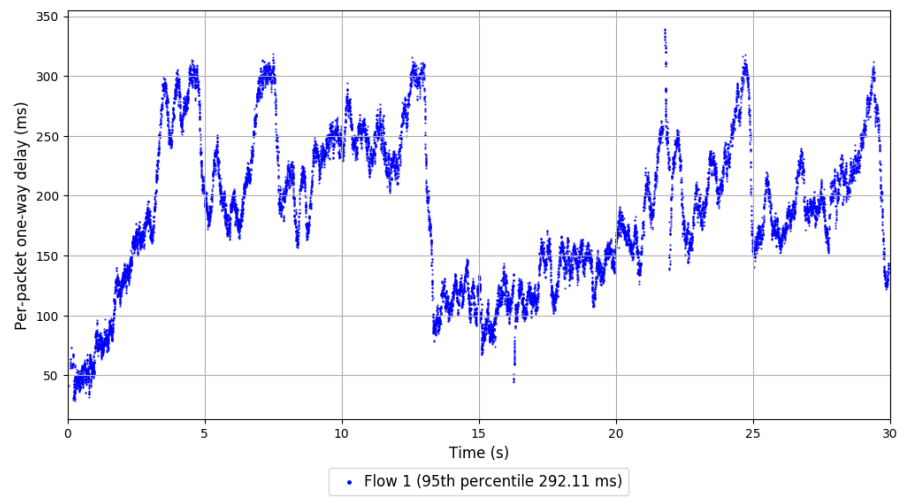
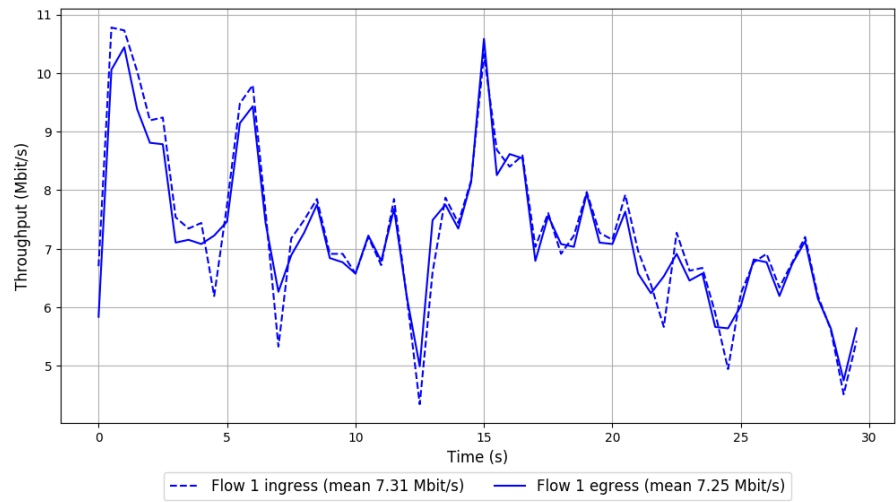


Run 1: Statistics of TCP Cubic

Start at: 2017-10-12 17:38:17
End at: 2017-10-12 17:38:48
Local clock offset: 1.641 ms
Remote clock offset: -2.743 ms

Below is generated by plot.py at 2017-10-12 19:04:51
Datalink statistics
-- Total of 1 flow:
Average throughput: 7.25 Mbit/s
95th percentile per-packet one-way delay: 292.105 ms
Loss rate: 0.90%
-- Flow 1:
Average throughput: 7.25 Mbit/s
95th percentile per-packet one-way delay: 292.105 ms
Loss rate: 0.90%

Run 1: Report of TCP Cubic — Data Link

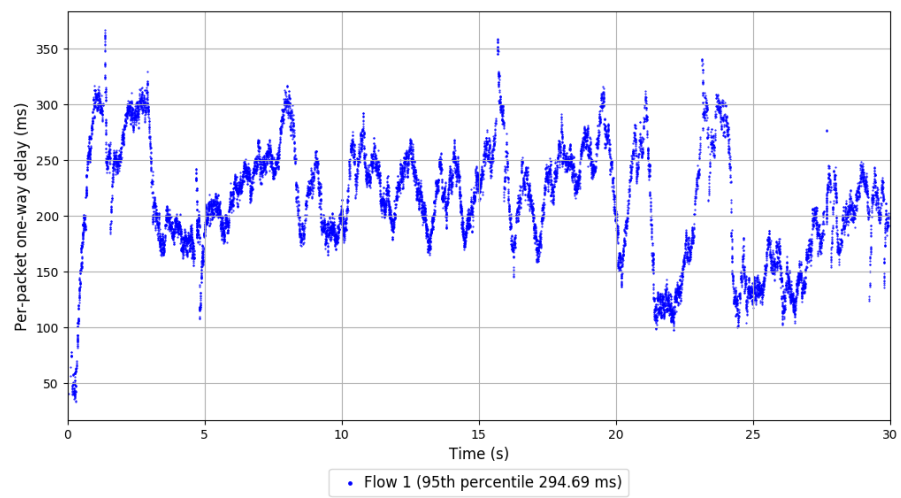
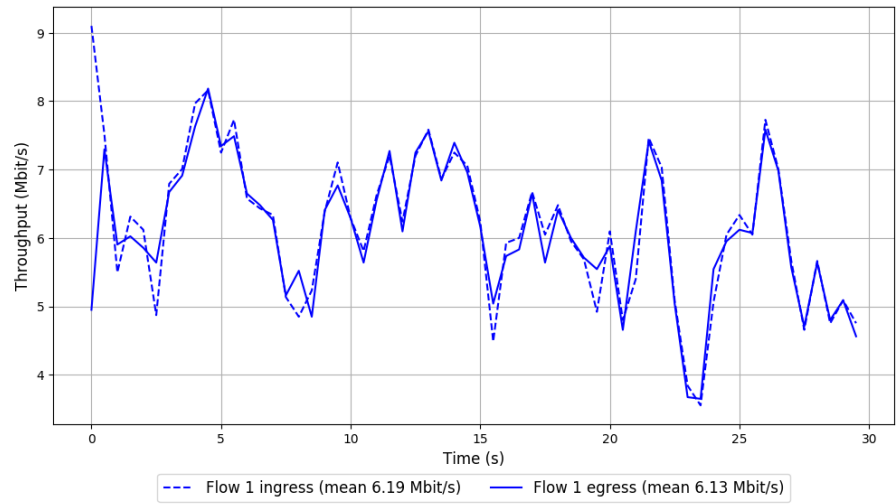


Run 2: Statistics of TCP Cubic

Start at: 2017-10-12 17:54:44
End at: 2017-10-12 17:55:14
Local clock offset: 1.478 ms
Remote clock offset: -2.663 ms

Below is generated by plot.py at 2017-10-12 19:04:51
Datalink statistics
-- Total of 1 flow:
Average throughput: 6.13 Mbit/s
95th percentile per-packet one-way delay: 294.689 ms
Loss rate: 1.22%
-- Flow 1:
Average throughput: 6.13 Mbit/s
95th percentile per-packet one-way delay: 294.689 ms
Loss rate: 1.22%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2017-10-12 18:11:10

End at: 2017-10-12 18:11:40

Local clock offset: 1.229 ms

Remote clock offset: -2.43 ms

Below is generated by plot.py at 2017-10-12 19:04:51

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.71 Mbit/s

95th percentile per-packet one-way delay: 283.144 ms

Loss rate: 1.15%

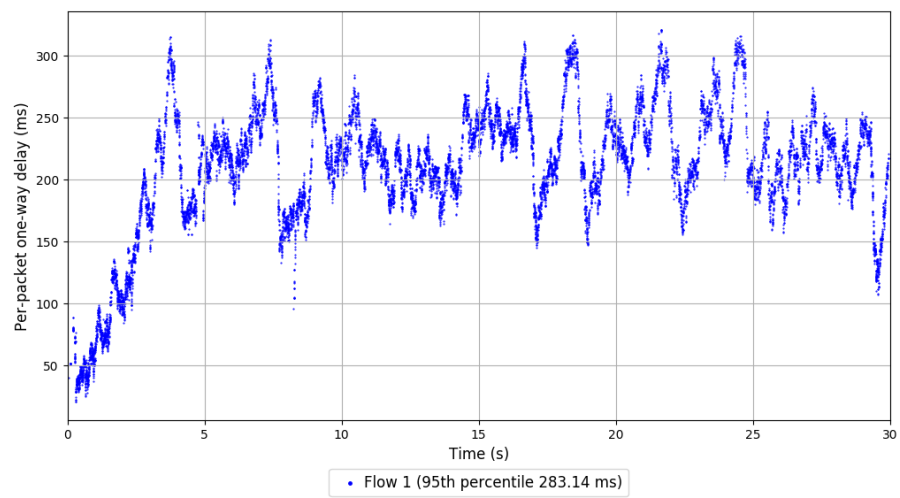
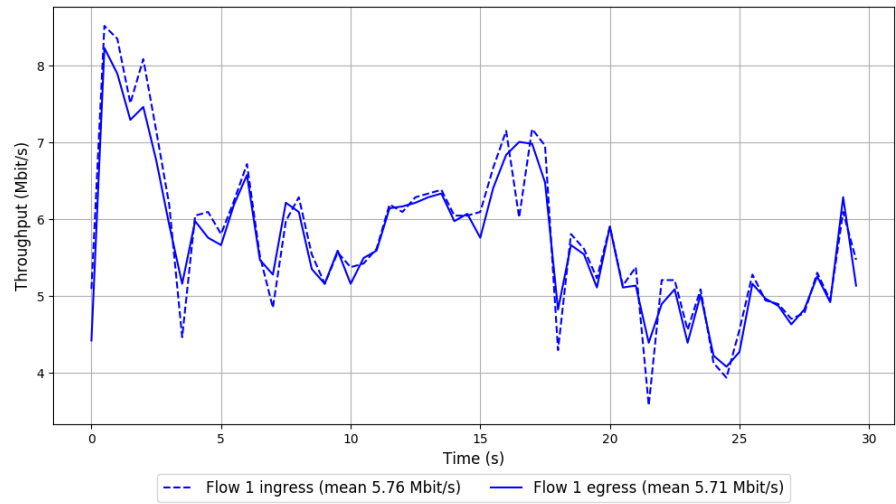
-- Flow 1:

Average throughput: 5.71 Mbit/s

95th percentile per-packet one-way delay: 283.144 ms

Loss rate: 1.15%

Run 3: Report of TCP Cubic — Data Link

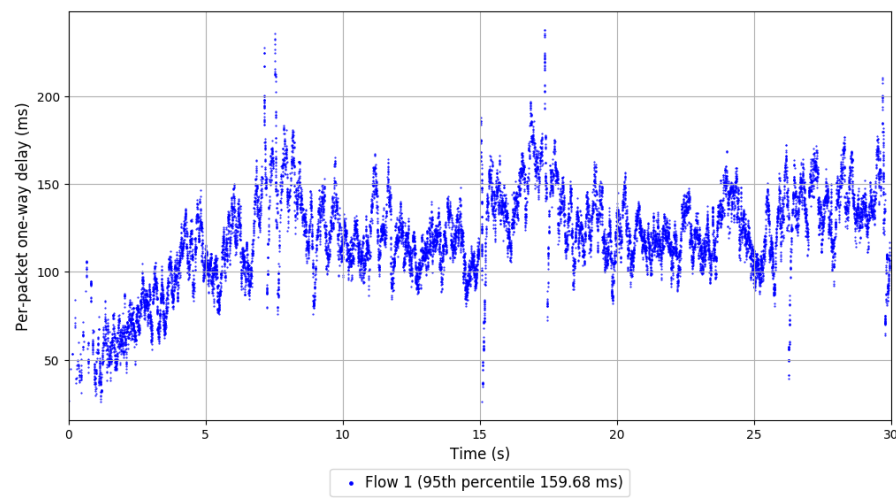
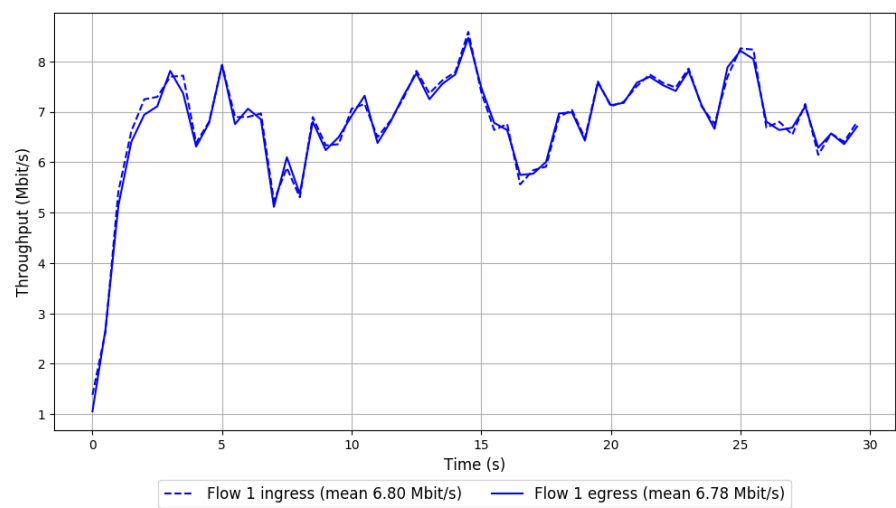


```
Run 1: Statistics of LEDBAT

Start at: 2017-10-12 17:41:48
End at: 2017-10-12 17:42:18
Local clock offset: 1.631 ms
Remote clock offset: -2.748 ms

# Below is generated by plot.py at 2017-10-12 19:04:51
# Datalink statistics
-- Total of 1 flow:
Average throughput: 6.78 Mbit/s
95th percentile per-packet one-way delay: 159.680 ms
Loss rate: 0.48%
-- Flow 1:
Average throughput: 6.78 Mbit/s
95th percentile per-packet one-way delay: 159.680 ms
Loss rate: 0.48%
```


Run 1: Report of LEDBAT — Data Link

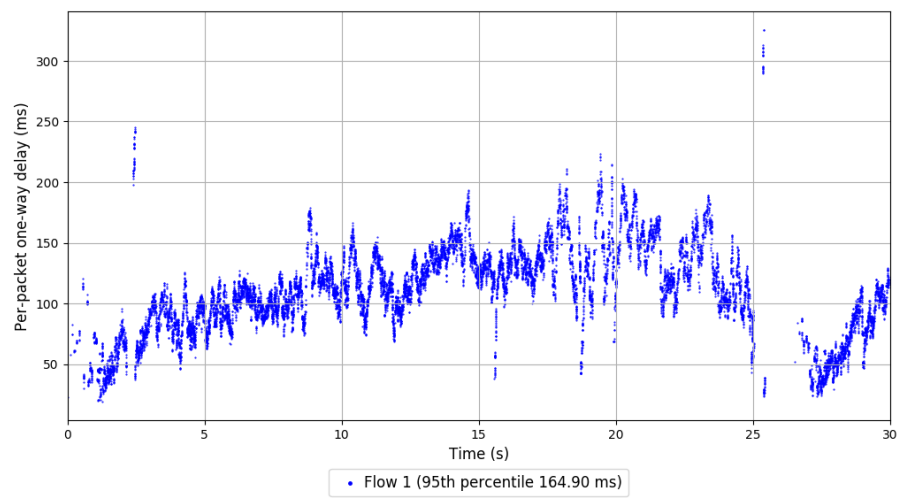
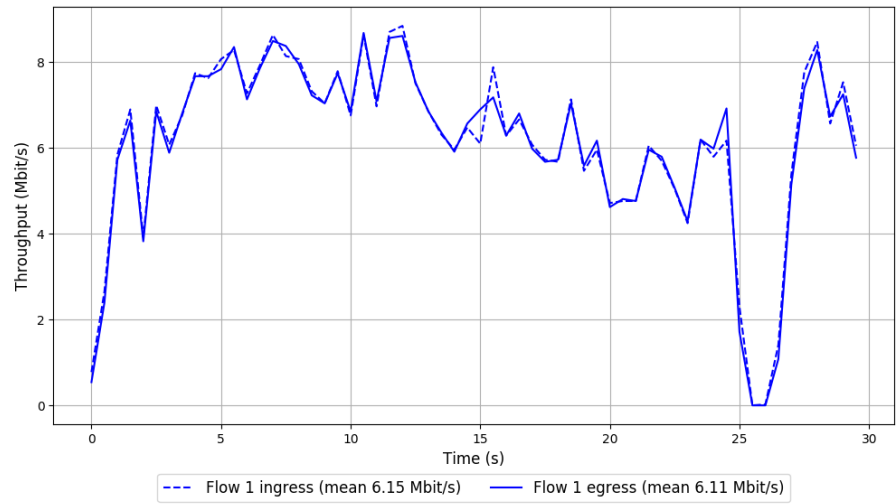


Run 2: Statistics of LEDBAT

Start at: 2017-10-12 17:58:15
End at: 2017-10-12 17:58:45
Local clock offset: 1.381 ms
Remote clock offset: -2.607 ms

Below is generated by plot.py at 2017-10-12 19:04:51
Datalink statistics
-- Total of 1 flow:
Average throughput: 6.11 Mbit/s
95th percentile per-packet one-way delay: 164.900 ms
Loss rate: 0.71%
-- Flow 1:
Average throughput: 6.11 Mbit/s
95th percentile per-packet one-way delay: 164.900 ms
Loss rate: 0.71%

Run 2: Report of LEDBAT — Data Link

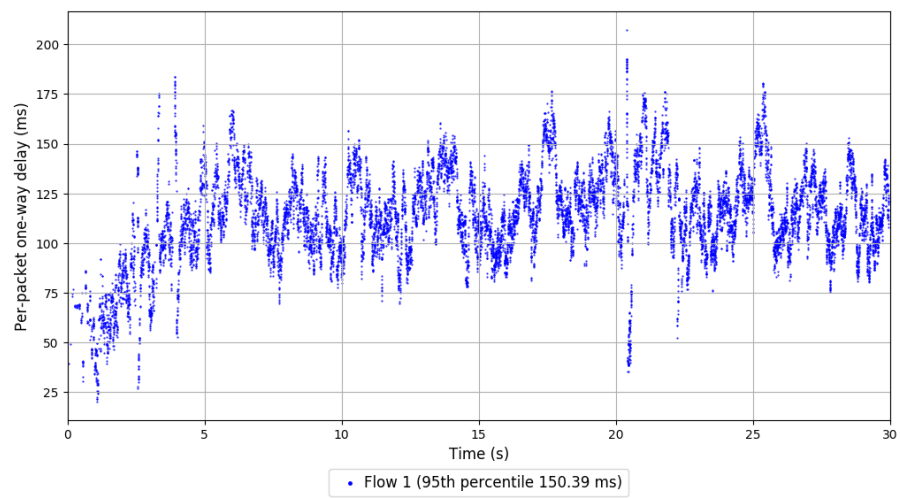
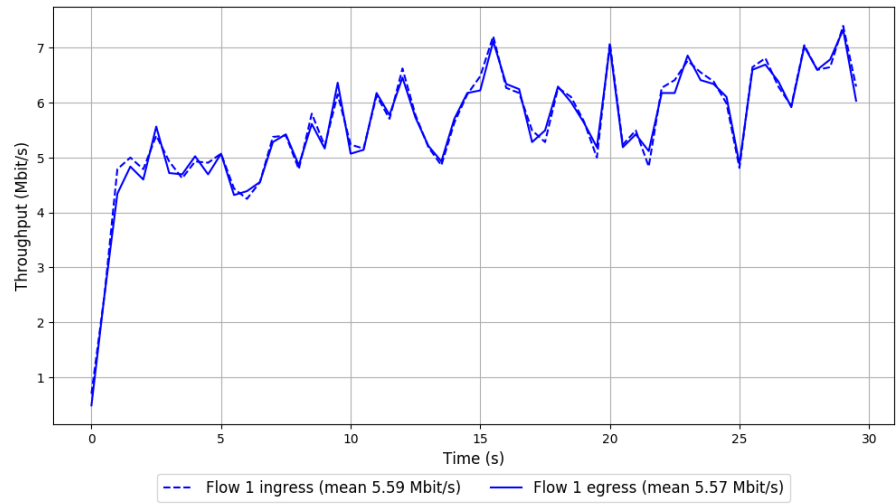


Run 3: Statistics of LEDBAT

Start at: 2017-10-12 18:14:41
End at: 2017-10-12 18:15:11
Local clock offset: 1.297 ms
Remote clock offset: -2.412 ms

Below is generated by plot.py at 2017-10-12 19:05:00
Datalink statistics
-- Total of 1 flow:
Average throughput: 5.57 Mbit/s
95th percentile per-packet one-way delay: 150.392 ms
Loss rate: 0.52%
-- Flow 1:
Average throughput: 5.57 Mbit/s
95th percentile per-packet one-way delay: 150.392 ms
Loss rate: 0.52%

Run 3: Report of LEDBAT — Data Link

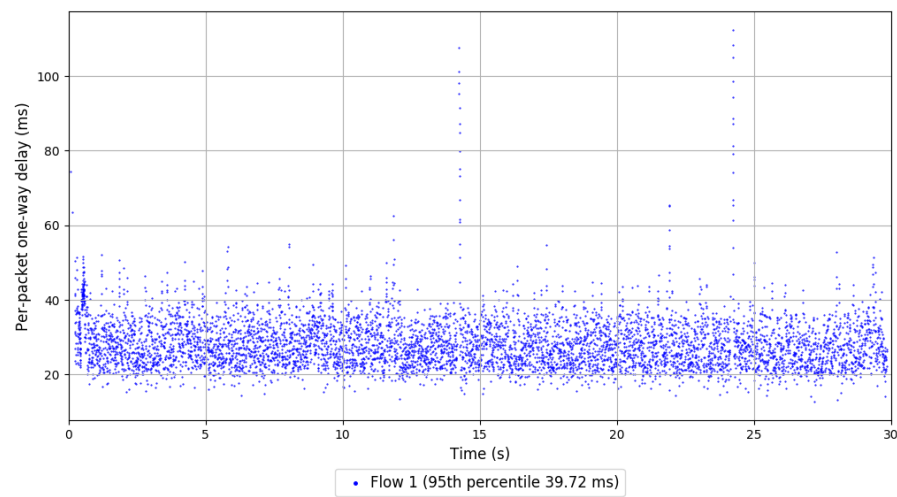
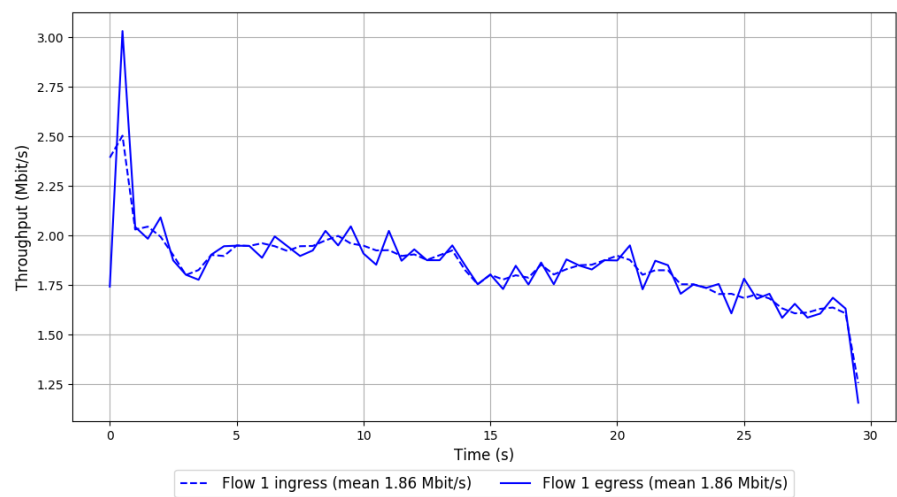


Run 1: Statistics of PCC

Start at: 2017-10-12 17:35:56
End at: 2017-10-12 17:36:26
Local clock offset: 1.56 ms
Remote clock offset: -2.774 ms

Below is generated by plot.py at 2017-10-12 19:05:00
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.86 Mbit/s
95th percentile per-packet one-way delay: 39.724 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 1.86 Mbit/s
95th percentile per-packet one-way delay: 39.724 ms
Loss rate: 0.13%

Run 1: Report of PCC — Data Link

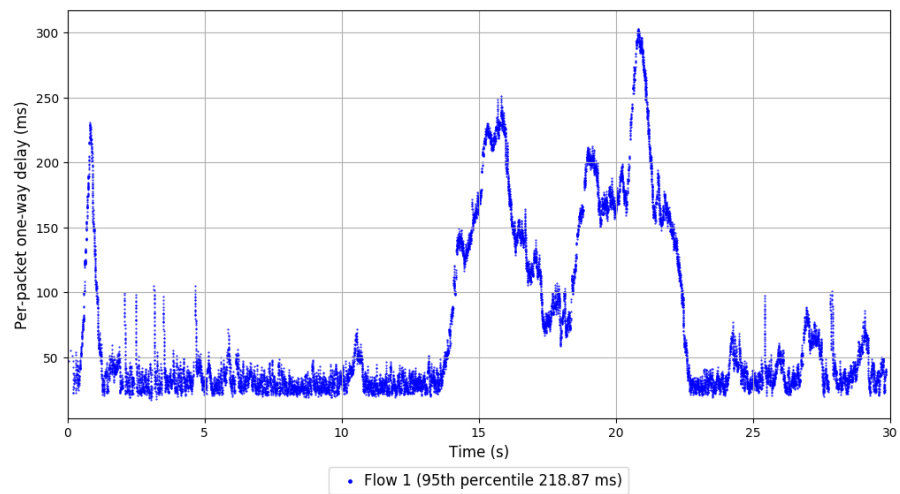
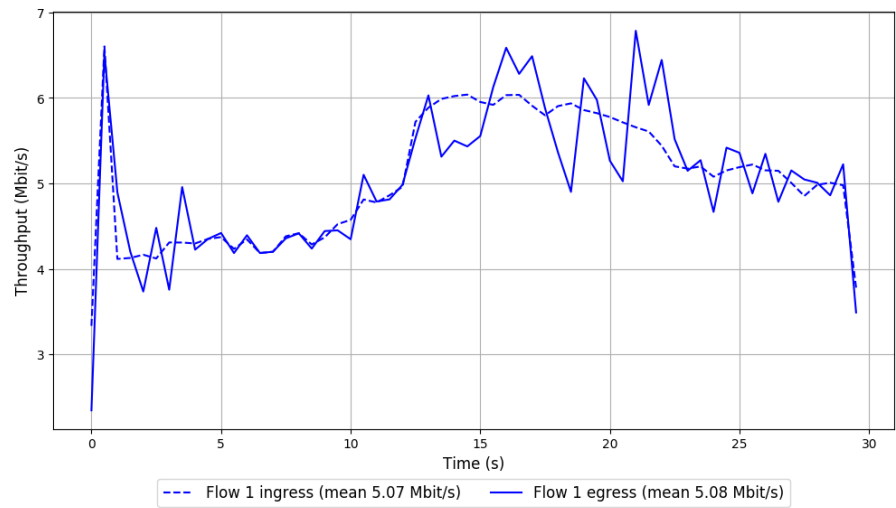


Run 2: Statistics of PCC

Start at: 2017-10-12 17:52:23
End at: 2017-10-12 17:52:53
Local clock offset: 1.506 ms
Remote clock offset: -2.655 ms

Below is generated by plot.py at 2017-10-12 19:05:02
Datalink statistics
-- Total of 1 flow:
Average throughput: 5.08 Mbit/s
95th percentile per-packet one-way delay: 218.871 ms
Loss rate: 0.19%
-- Flow 1:
Average throughput: 5.08 Mbit/s
95th percentile per-packet one-way delay: 218.871 ms
Loss rate: 0.19%

Run 2: Report of PCC — Data Link

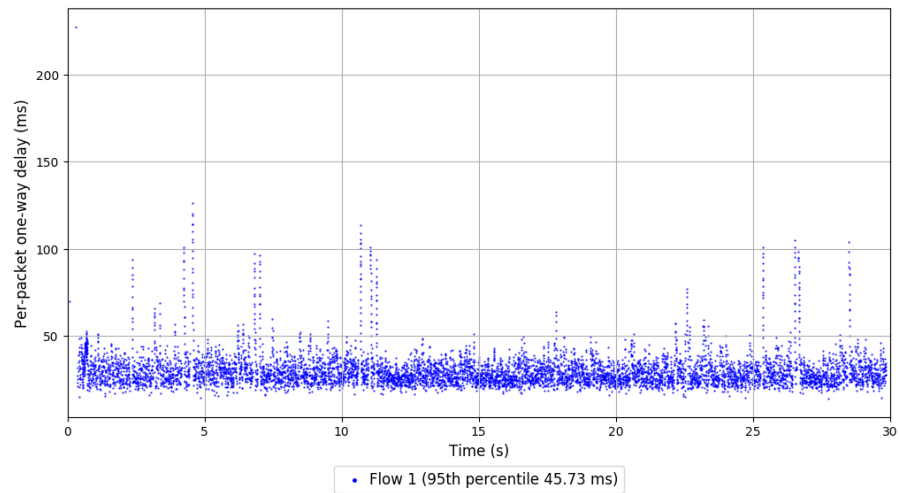
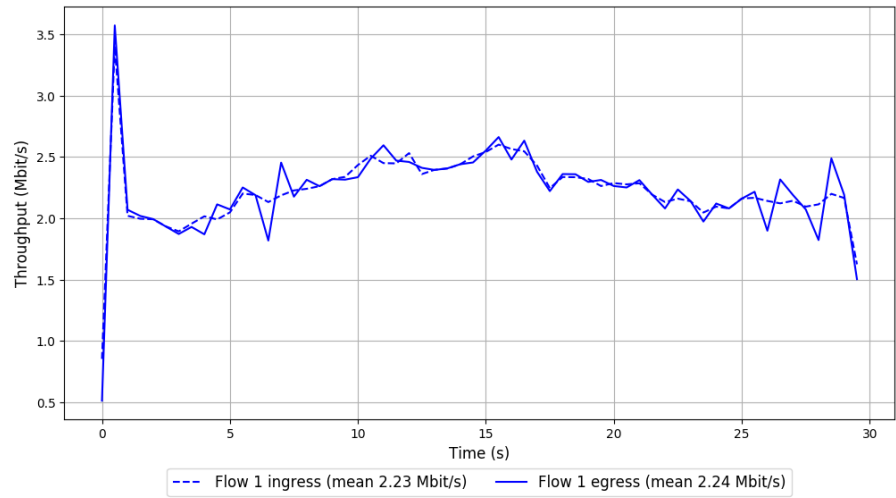


Run 3: Statistics of PCC

Start at: 2017-10-12 18:08:49
End at: 2017-10-12 18:09:19
Local clock offset: 1.242 ms
Remote clock offset: -2.556 ms

Below is generated by plot.py at 2017-10-12 19:05:02
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.24 Mbit/s
95th percentile per-packet one-way delay: 45.726 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 2.24 Mbit/s
95th percentile per-packet one-way delay: 45.726 ms
Loss rate: 0.16%

Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2017-10-12 17:33:35

End at: 2017-10-12 17:34:05

Local clock offset: 1.657 ms

Remote clock offset: -2.783 ms

Below is generated by plot.py at 2017-10-12 19:05:02

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.09 Mbit/s

95th percentile per-packet one-way delay: 305.943 ms

Loss rate: 4.25%

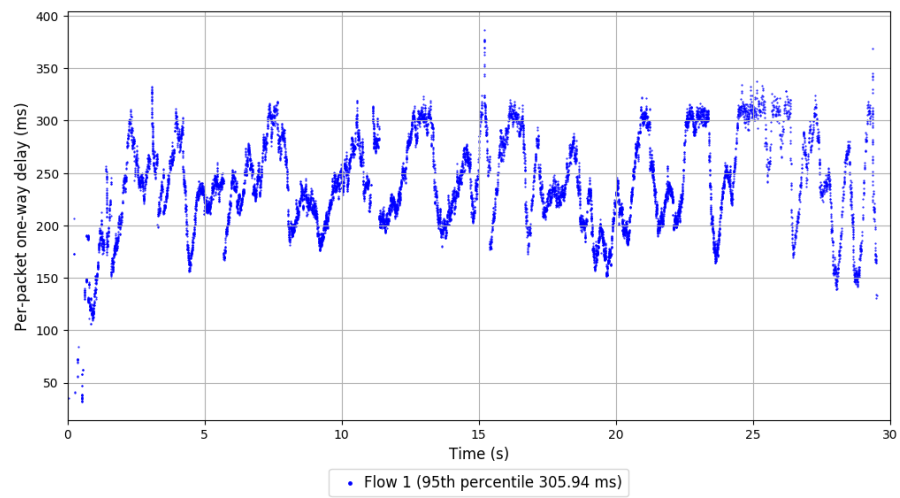
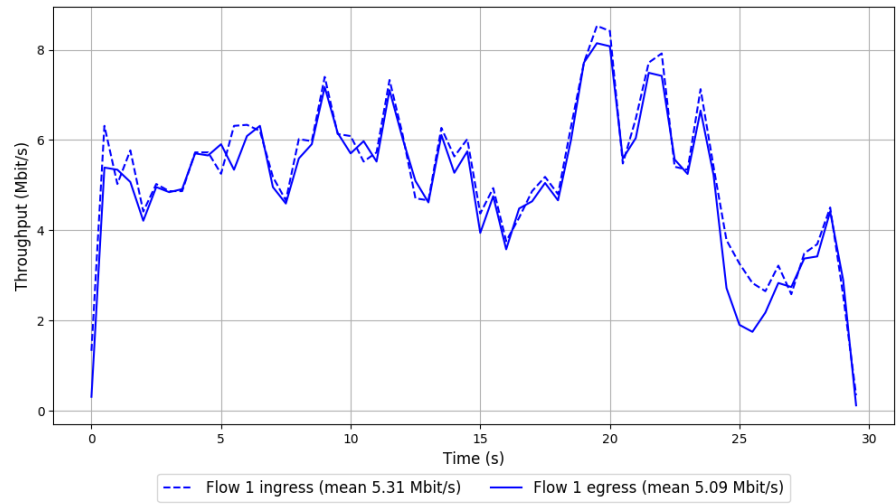
-- Flow 1:

Average throughput: 5.09 Mbit/s

95th percentile per-packet one-way delay: 305.943 ms

Loss rate: 4.25%

Run 1: Report of QUIC Cubic — Data Link

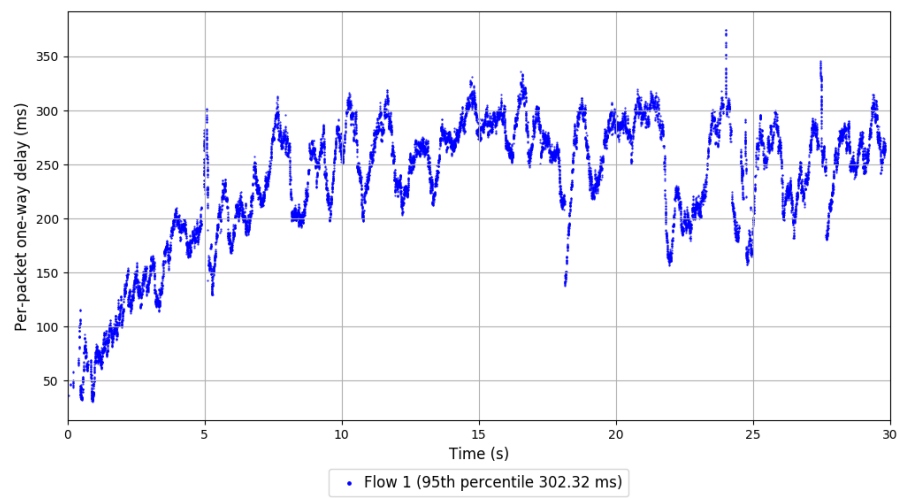
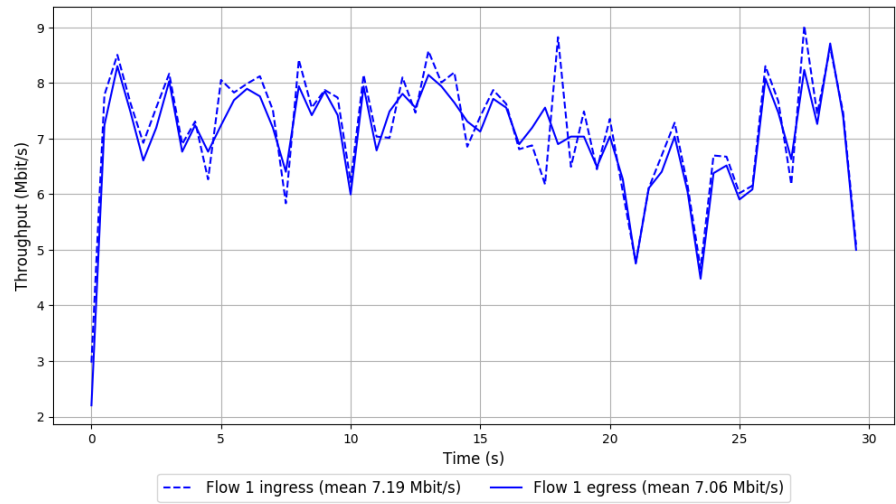


Run 2: Statistics of QUIC Cubic

Start at: 2017-10-12 17:50:01
End at: 2017-10-12 17:50:31
Local clock offset: 1.551 ms
Remote clock offset: -2.741 ms

Below is generated by plot.py at 2017-10-12 19:05:05
Datalink statistics
-- Total of 1 flow:
Average throughput: 7.06 Mbit/s
95th percentile per-packet one-way delay: 302.316 ms
Loss rate: 1.97%
-- Flow 1:
Average throughput: 7.06 Mbit/s
95th percentile per-packet one-way delay: 302.316 ms
Loss rate: 1.97%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2017-10-12 18:06:28

End at: 2017-10-12 18:06:58

Local clock offset: 1.276 ms

Remote clock offset: -2.519 ms

Below is generated by plot.py at 2017-10-12 19:05:05

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.20 Mbit/s

95th percentile per-packet one-way delay: 301.655 ms

Loss rate: 2.26%

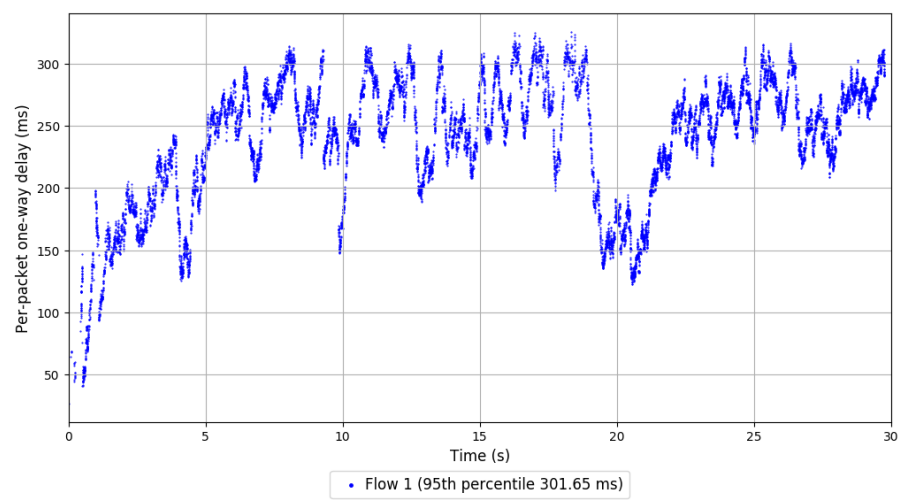
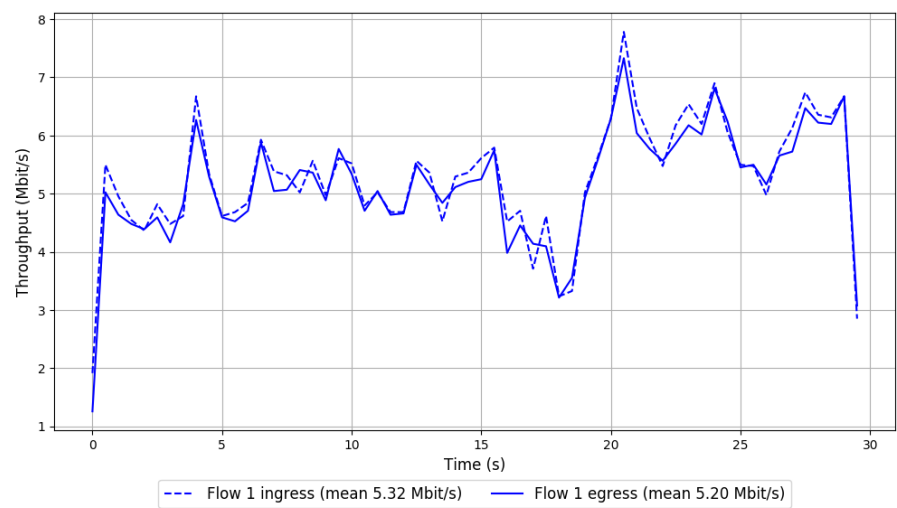
-- Flow 1:

Average throughput: 5.20 Mbit/s

95th percentile per-packet one-way delay: 301.655 ms

Loss rate: 2.26%

Run 3: Report of QUIC Cubic — Data Link

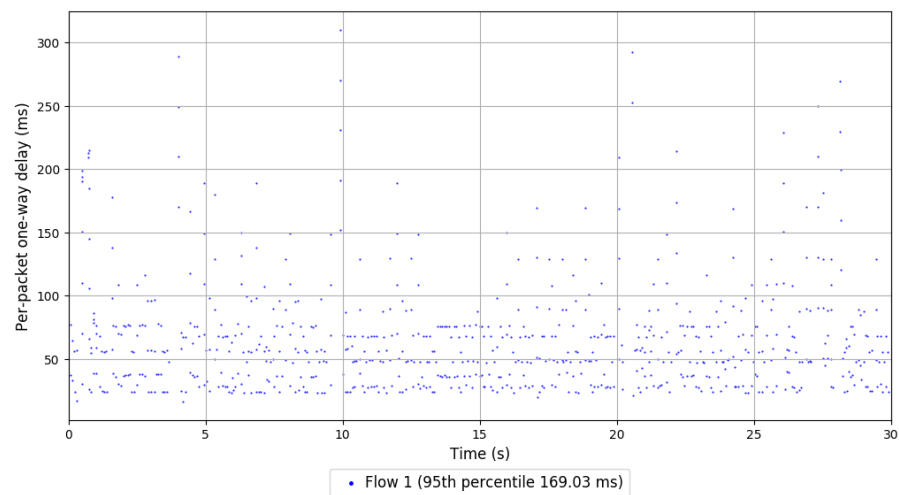
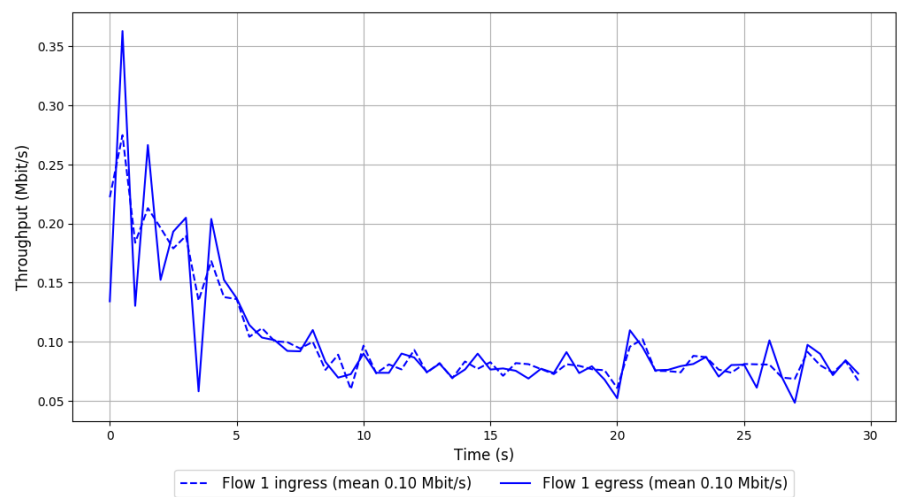


Run 1: Statistics of SCReAM

Start at: 2017-10-12 17:39:28
End at: 2017-10-12 17:39:58
Local clock offset: 1.614 ms
Remote clock offset: -2.703 ms

Below is generated by plot.py at 2017-10-12 19:05:05
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 169.028 ms
Loss rate: 0.94%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 169.028 ms
Loss rate: 0.94%

Run 1: Report of SReAM — Data Link

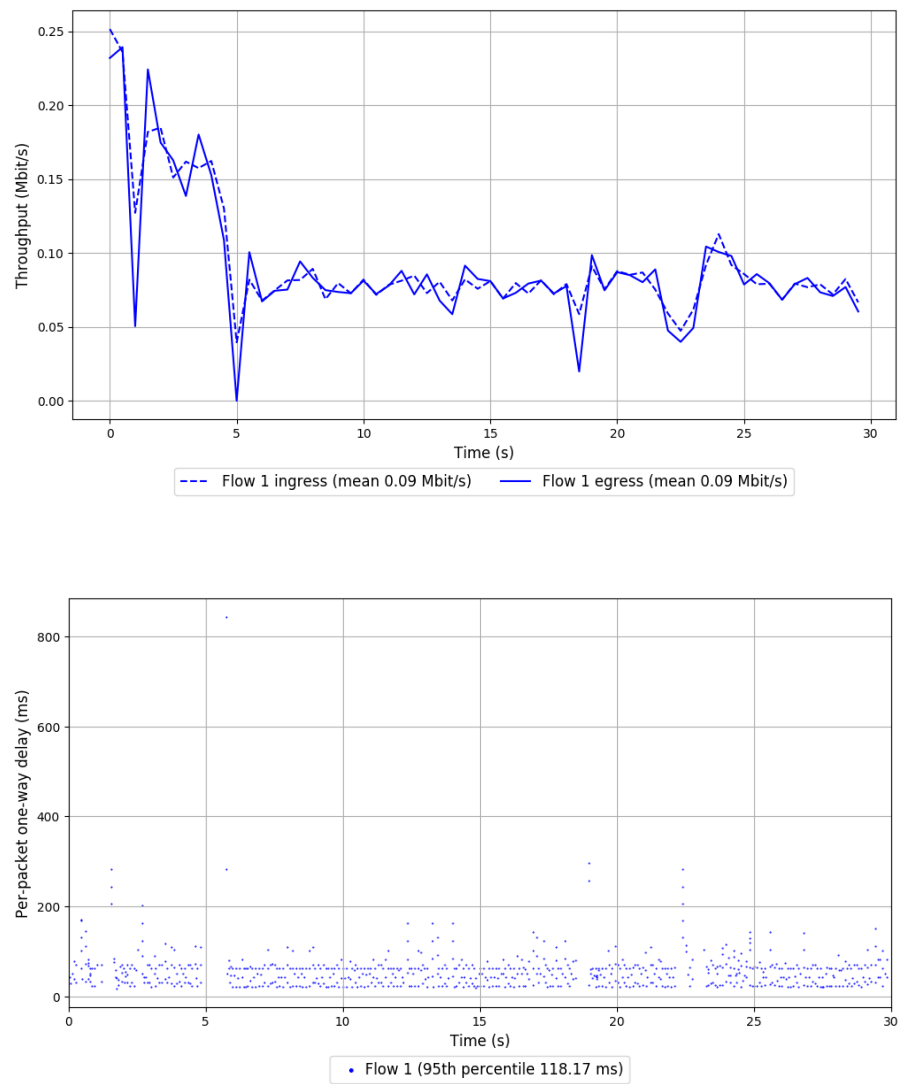


Run 2: Statistics of SCReAM

Start at: 2017-10-12 17:55:54
End at: 2017-10-12 17:56:24
Local clock offset: 1.457 ms
Remote clock offset: -2.588 ms

Below is generated by plot.py at 2017-10-12 19:05:05
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 118.167 ms
Loss rate: 2.97%
-- Flow 1:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 118.167 ms
Loss rate: 2.97%

Run 2: Report of SReAM — Data Link

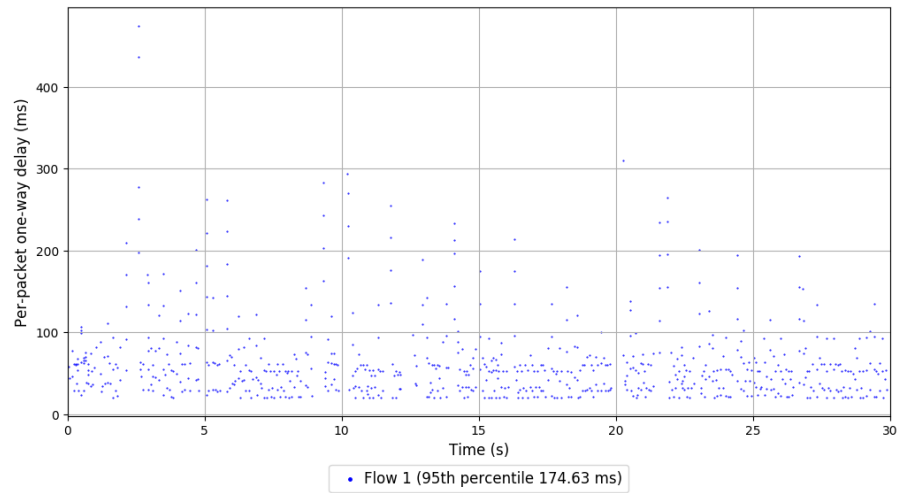
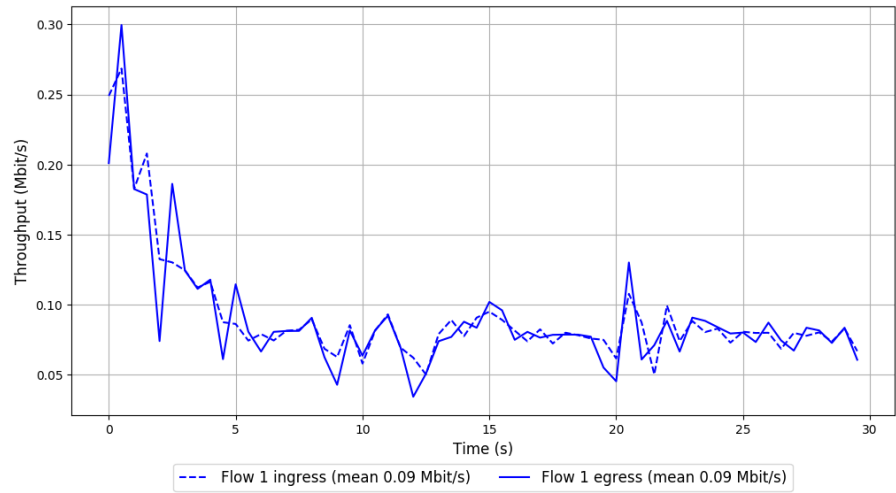


Run 3: Statistics of SCReAM

Start at: 2017-10-12 18:12:20
End at: 2017-10-12 18:12:50
Local clock offset: 1.311 ms
Remote clock offset: -2.467 ms

Below is generated by plot.py at 2017-10-12 19:05:05
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 174.631 ms
Loss rate: 2.24%
-- Flow 1:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 174.631 ms
Loss rate: 2.24%

Run 3: Report of SReAM — Data Link

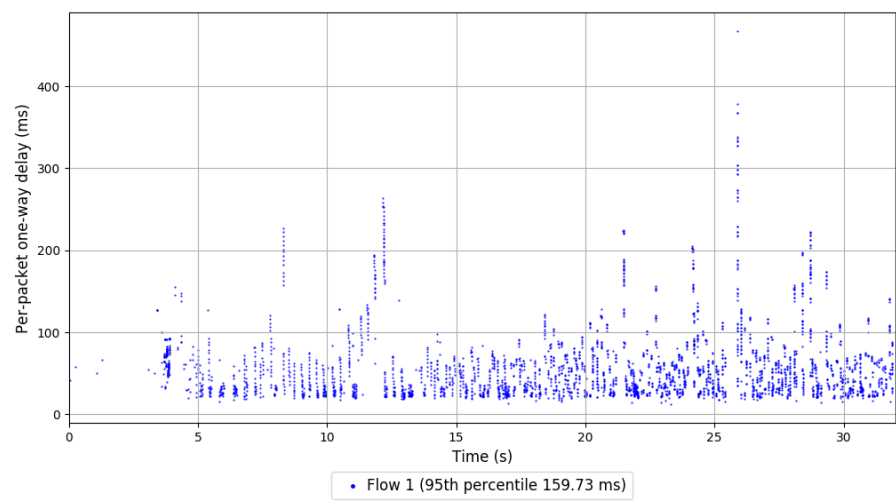
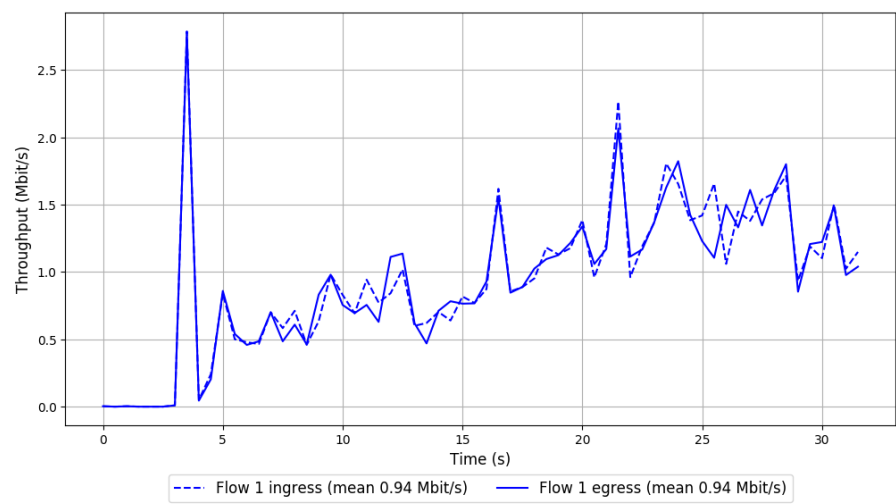


Run 1: Statistics of WebRTC media

Start at: 2017-10-12 17:27:43
End at: 2017-10-12 17:28:13
Local clock offset: 1.564 ms
Remote clock offset: -2.978 ms

Below is generated by plot.py at 2017-10-12 19:05:05
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.94 Mbit/s
95th percentile per-packet one-way delay: 159.730 ms
Loss rate: 0.78%
-- Flow 1:
Average throughput: 0.94 Mbit/s
95th percentile per-packet one-way delay: 159.730 ms
Loss rate: 0.78%

Run 1: Report of WebRTC media — Data Link

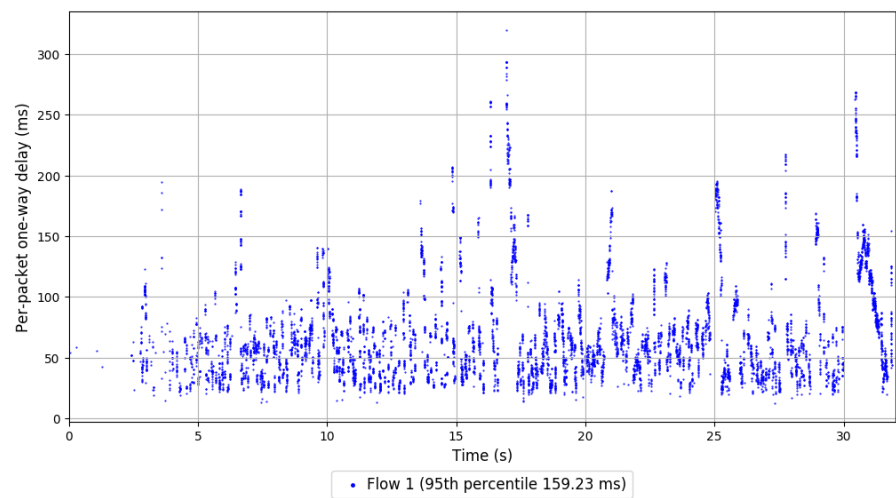
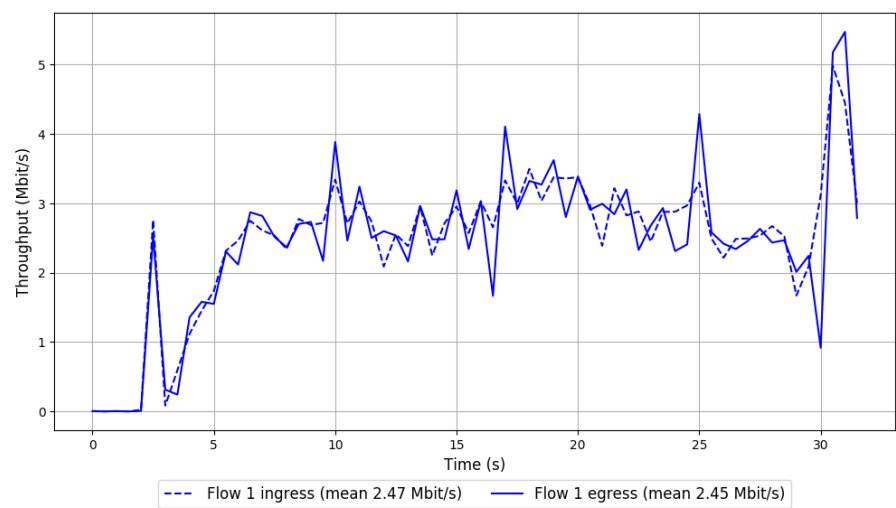


Run 2: Statistics of WebRTC media

Start at: 2017-10-12 17:44:09
End at: 2017-10-12 17:44:39
Local clock offset: 1.613 ms
Remote clock offset: -2.799 ms

Below is generated by plot.py at 2017-10-12 19:05:05
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.45 Mbit/s
95th percentile per-packet one-way delay: 159.232 ms
Loss rate: 0.90%
-- Flow 1:
Average throughput: 2.45 Mbit/s
95th percentile per-packet one-way delay: 159.232 ms
Loss rate: 0.90%

Run 2: Report of WebRTC media — Data Link

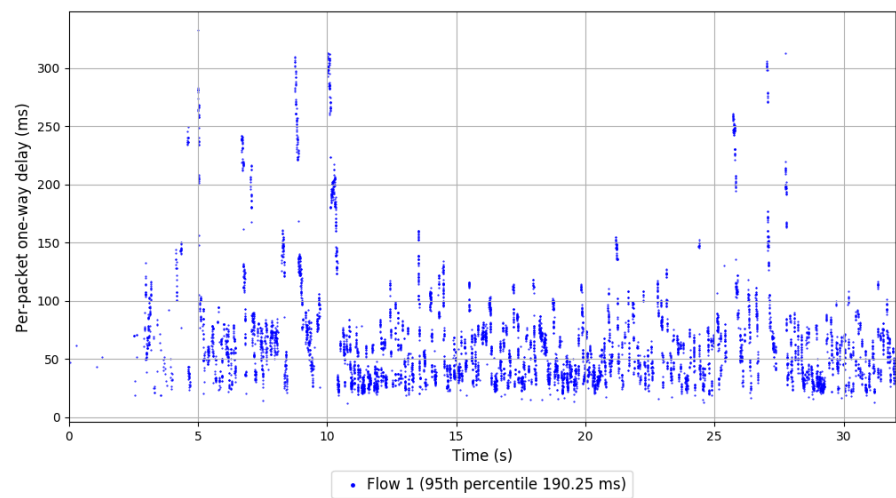
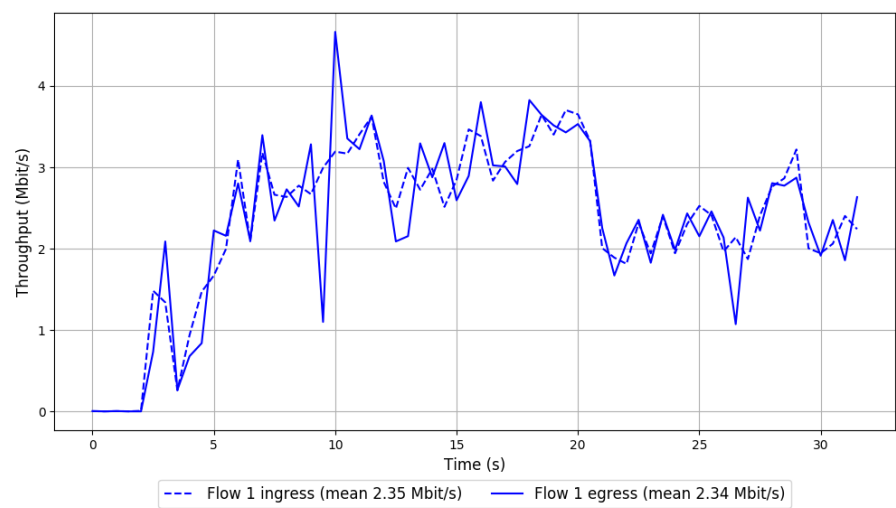


Run 3: Statistics of WebRTC media

Start at: 2017-10-12 18:00:36
End at: 2017-10-12 18:01:06
Local clock offset: 1.437 ms
Remote clock offset: -2.578 ms

Below is generated by plot.py at 2017-10-12 19:05:05
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.34 Mbit/s
95th percentile per-packet one-way delay: 190.254 ms
Loss rate: 0.59%
-- Flow 1:
Average throughput: 2.34 Mbit/s
95th percentile per-packet one-way delay: 190.254 ms
Loss rate: 0.59%

Run 3: Report of WebRTC media — Data Link

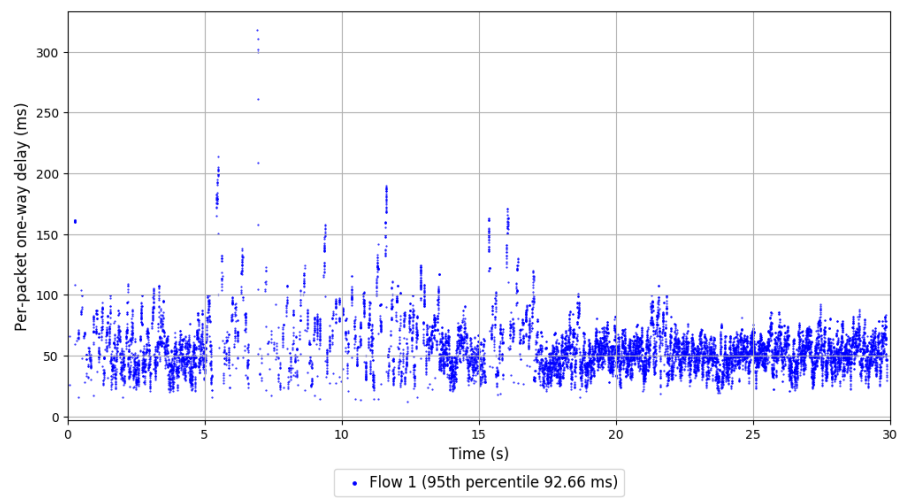
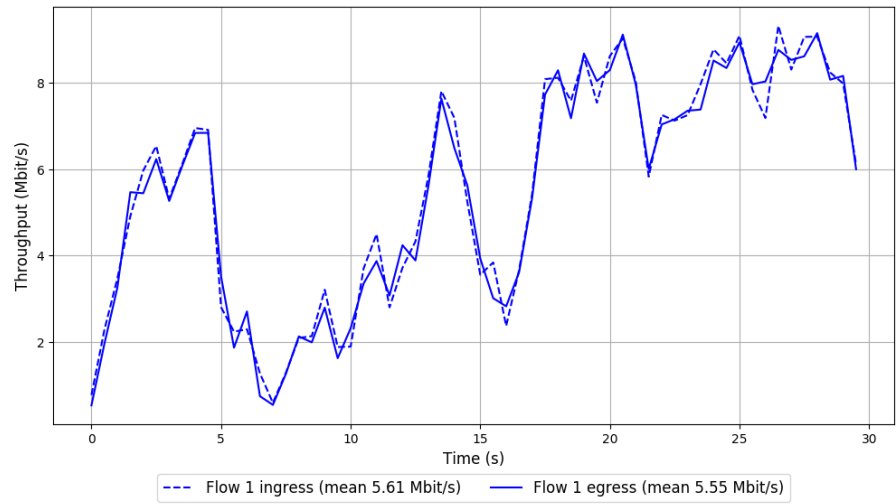


Run 1: Statistics of Sprout

Start at: 2017-10-12 17:40:38
End at: 2017-10-12 17:41:08
Local clock offset: 1.561 ms
Remote clock offset: -2.696 ms

Below is generated by plot.py at 2017-10-12 19:05:10
Datalink statistics
-- Total of 1 flow:
Average throughput: 5.55 Mbit/s
95th percentile per-packet one-way delay: 92.664 ms
Loss rate: 1.25%
-- Flow 1:
Average throughput: 5.55 Mbit/s
95th percentile per-packet one-way delay: 92.664 ms
Loss rate: 1.25%

Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

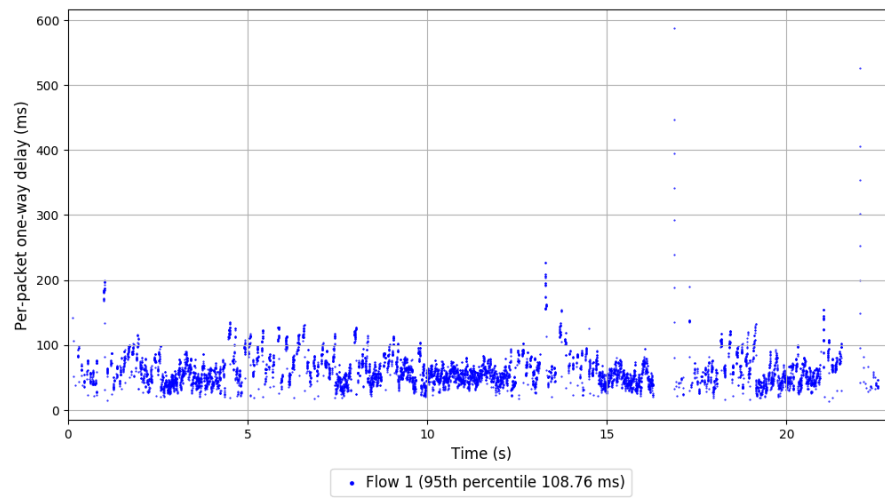
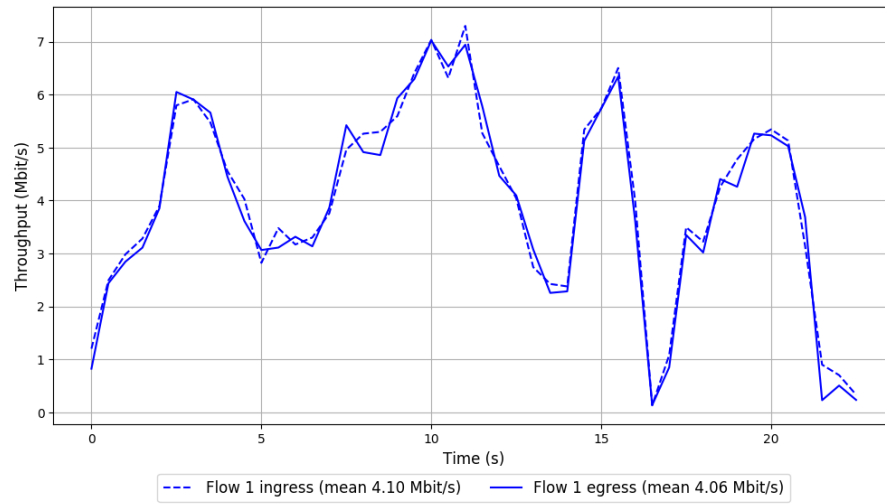
Start at: 2017-10-12 17:57:05

End at: 2017-10-12 17:57:35

Local clock offset: 1.456 ms

Remote clock offset: -2.662 ms

Run 2: Report of Sprout — Data Link

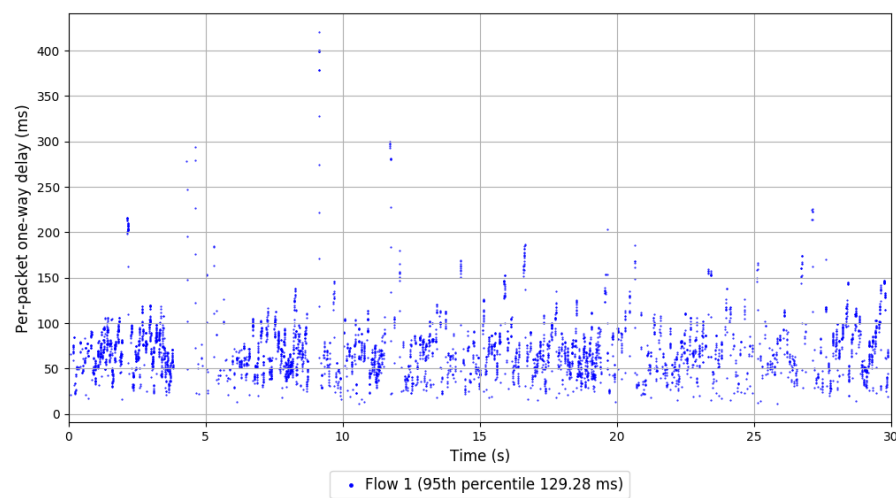
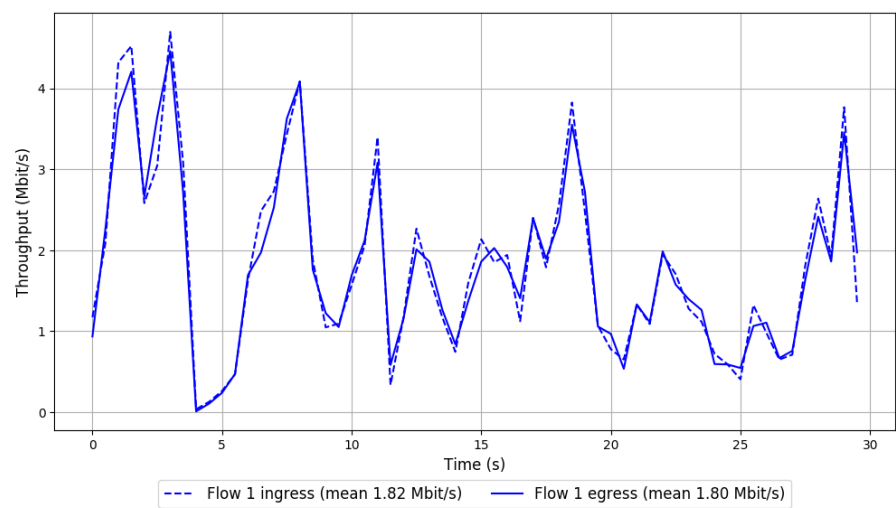


Run 3: Statistics of Sprout

Start at: 2017-10-12 18:13:30
End at: 2017-10-12 18:14:00
Local clock offset: 1.297 ms
Remote clock offset: -2.422 ms

Below is generated by plot.py at 2017-10-12 19:05:10
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.80 Mbit/s
95th percentile per-packet one-way delay: 129.284 ms
Loss rate: 1.35%
-- Flow 1:
Average throughput: 1.80 Mbit/s
95th percentile per-packet one-way delay: 129.284 ms
Loss rate: 1.35%

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

Start at: 2017-10-12 17:37:07

End at: 2017-10-12 17:37:37

Local clock offset: 1.558 ms

Remote clock offset: -2.794 ms

Below is generated by plot.py at 2017-10-12 19:05:16

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.63 Mbit/s

95th percentile per-packet one-way delay: 91.467 ms

Loss rate: 0.30%

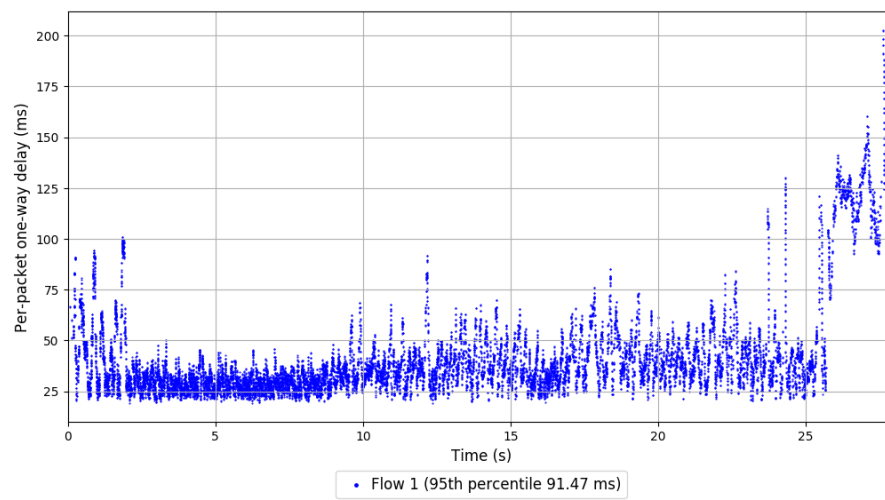
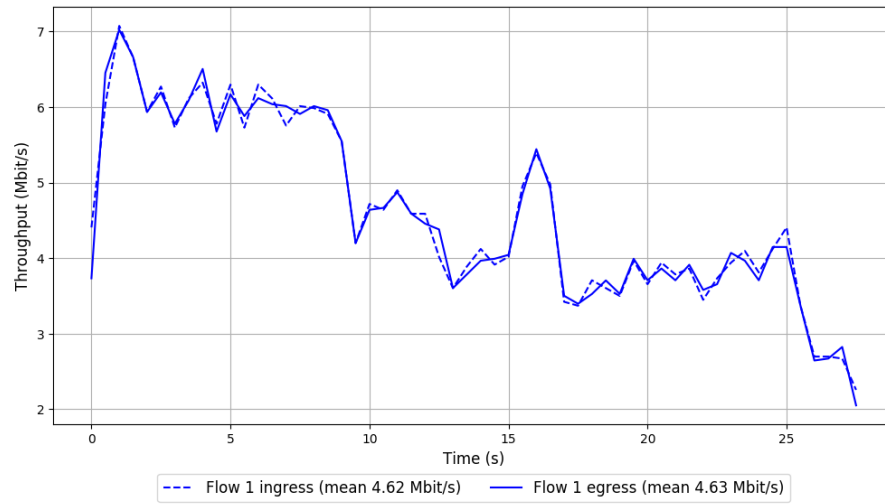
-- Flow 1:

Average throughput: 4.63 Mbit/s

95th percentile per-packet one-way delay: 91.467 ms

Loss rate: 0.30%

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



Run 2: Statistics of TaoVA-100x

Start at: 2017-10-12 17:53:33

End at: 2017-10-12 17:54:03

Local clock offset: 1.501 ms

Remote clock offset: -2.684 ms

Below is generated by plot.py at 2017-10-12 19:05:16

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.02 Mbit/s

95th percentile per-packet one-way delay: 84.035 ms

Loss rate: 0.35%

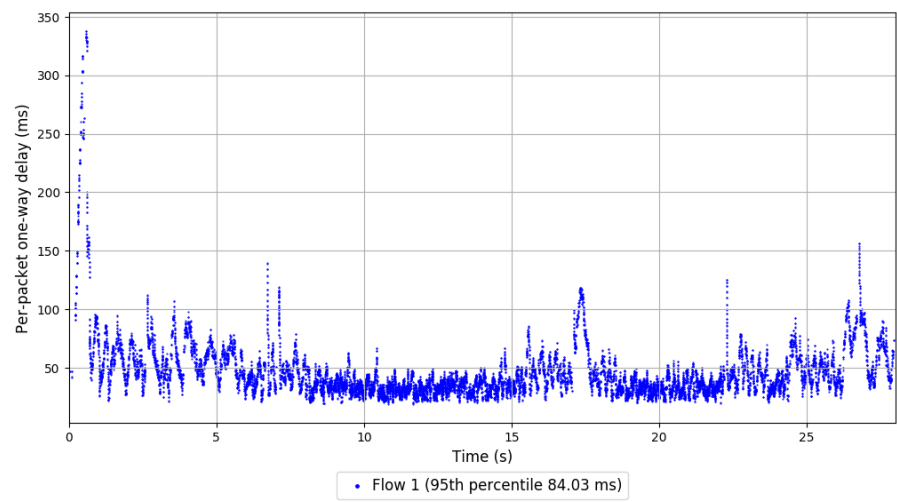
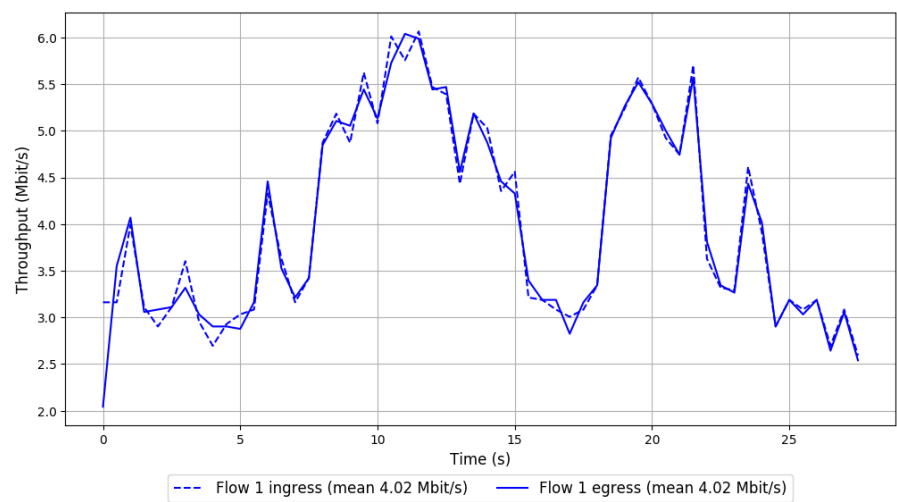
-- Flow 1:

Average throughput: 4.02 Mbit/s

95th percentile per-packet one-way delay: 84.035 ms

Loss rate: 0.35%

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



Run 3: Statistics of TaoVA-100x

Start at: 2017-10-12 18:09:59

End at: 2017-10-12 18:10:29

Local clock offset: 1.318 ms

Remote clock offset: -2.528 ms

Below is generated by plot.py at 2017-10-12 19:05:18

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.50 Mbit/s

95th percentile per-packet one-way delay: 56.518 ms

Loss rate: 0.93%

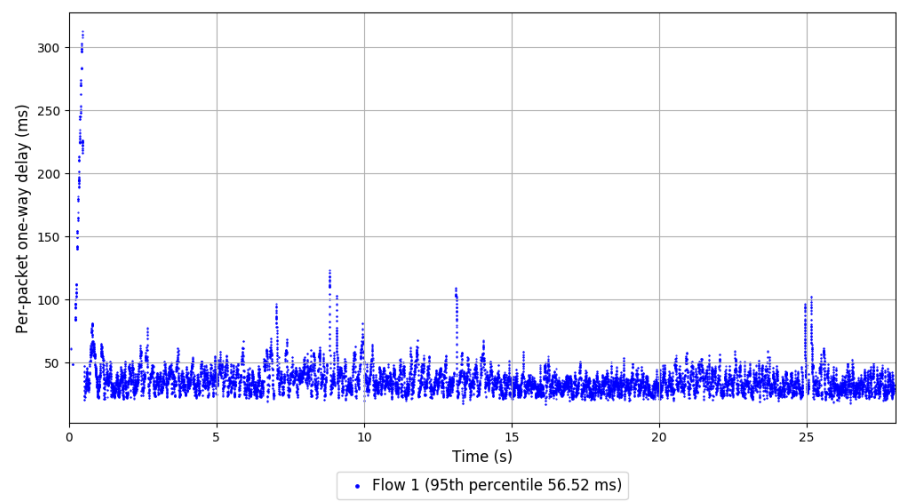
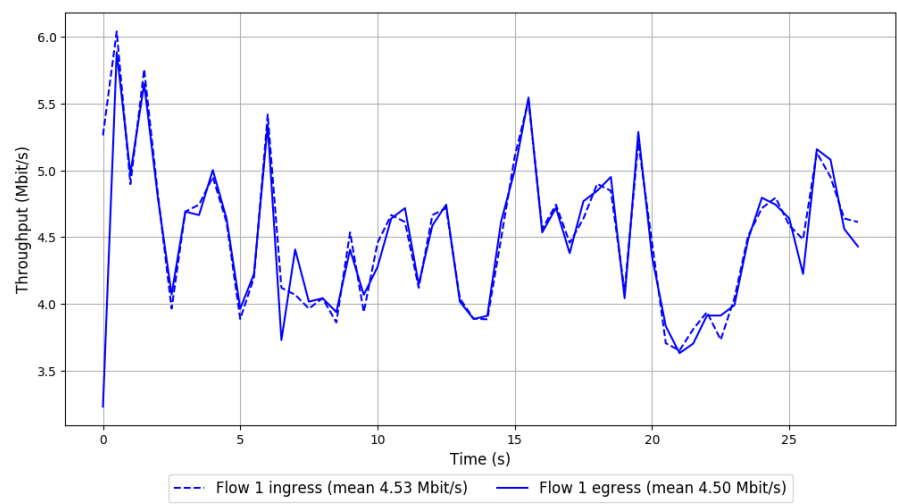
-- Flow 1:

Average throughput: 4.50 Mbit/s

95th percentile per-packet one-way delay: 56.518 ms

Loss rate: 0.93%

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

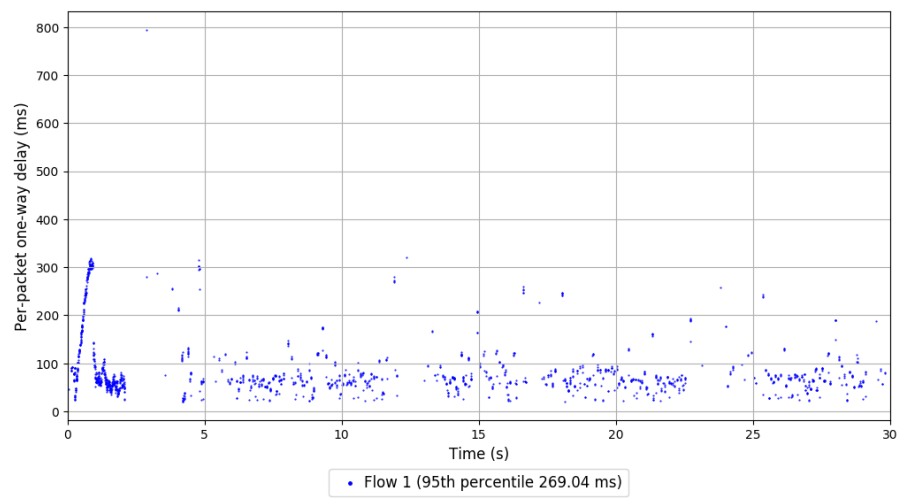
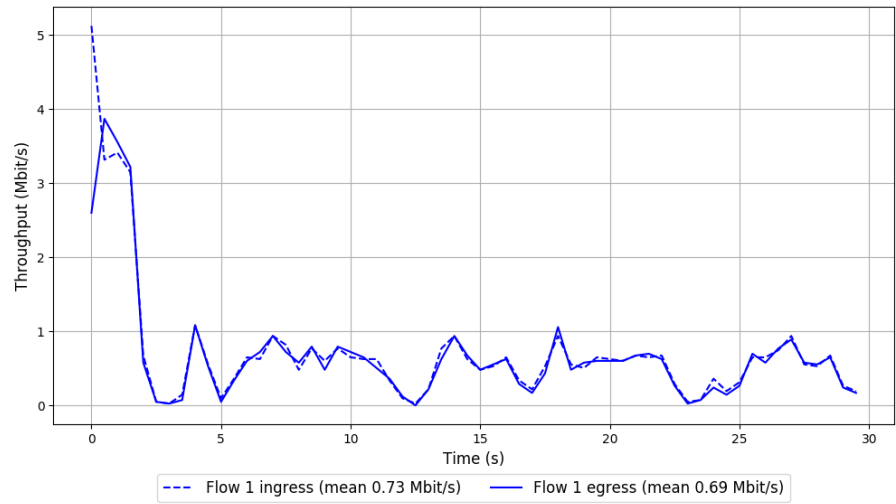


Run 1: Statistics of TCP Vegas

Start at: 2017-10-12 17:26:33
End at: 2017-10-12 17:27:03
Local clock offset: 1.587 ms
Remote clock offset: -2.978 ms

Below is generated by plot.py at 2017-10-12 19:05:18
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.69 Mbit/s
95th percentile per-packet one-way delay: 269.042 ms
Loss rate: 6.01%
-- Flow 1:
Average throughput: 0.69 Mbit/s
95th percentile per-packet one-way delay: 269.042 ms
Loss rate: 6.01%

Run 1: Report of TCP Vegas — Data Link

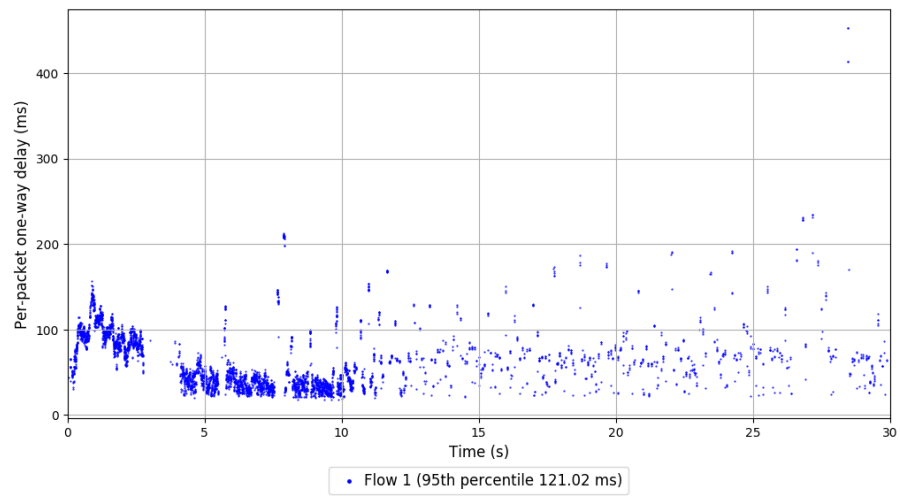
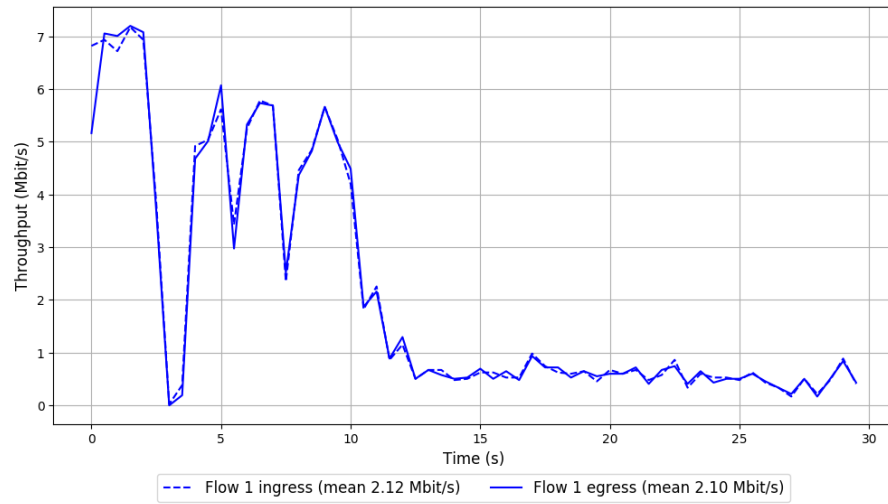


Run 2: Statistics of TCP Vegas

Start at: 2017-10-12 17:42:59
End at: 2017-10-12 17:43:29
Local clock offset: 1.615 ms
Remote clock offset: -2.777 ms

Below is generated by plot.py at 2017-10-12 19:05:18
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.10 Mbit/s
95th percentile per-packet one-way delay: 121.017 ms
Loss rate: 1.06%
-- Flow 1:
Average throughput: 2.10 Mbit/s
95th percentile per-packet one-way delay: 121.017 ms
Loss rate: 1.06%

Run 2: Report of TCP Vegas — Data Link

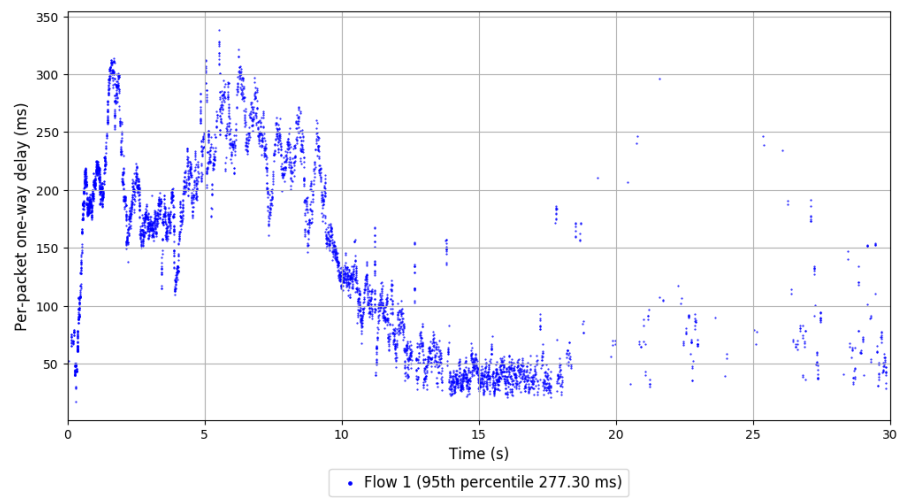
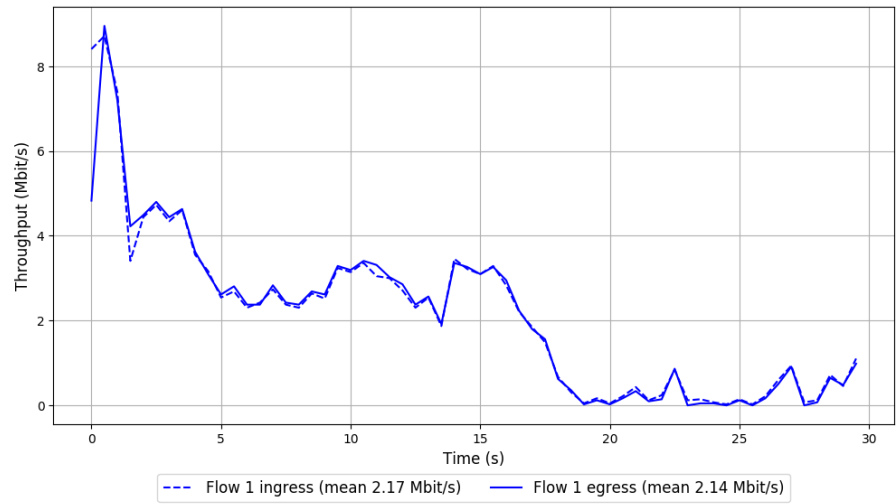


Run 3: Statistics of TCP Vegas

Start at: 2017-10-12 17:59:26
End at: 2017-10-12 17:59:56
Local clock offset: 1.434 ms
Remote clock offset: -2.579 ms

Below is generated by plot.py at 2017-10-12 19:05:18
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.14 Mbit/s
95th percentile per-packet one-way delay: 277.301 ms
Loss rate: 1.68%
-- Flow 1:
Average throughput: 2.14 Mbit/s
95th percentile per-packet one-way delay: 277.301 ms
Loss rate: 1.68%

Run 3: Report of TCP Vegas — Data Link

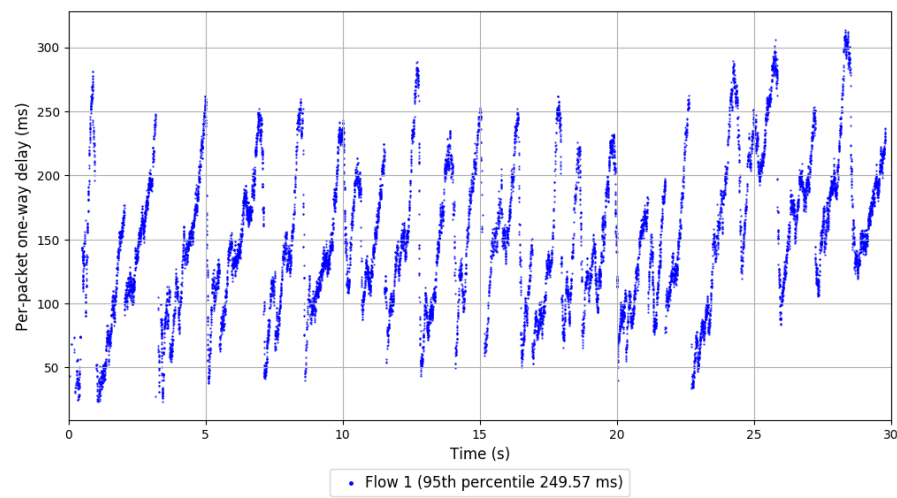
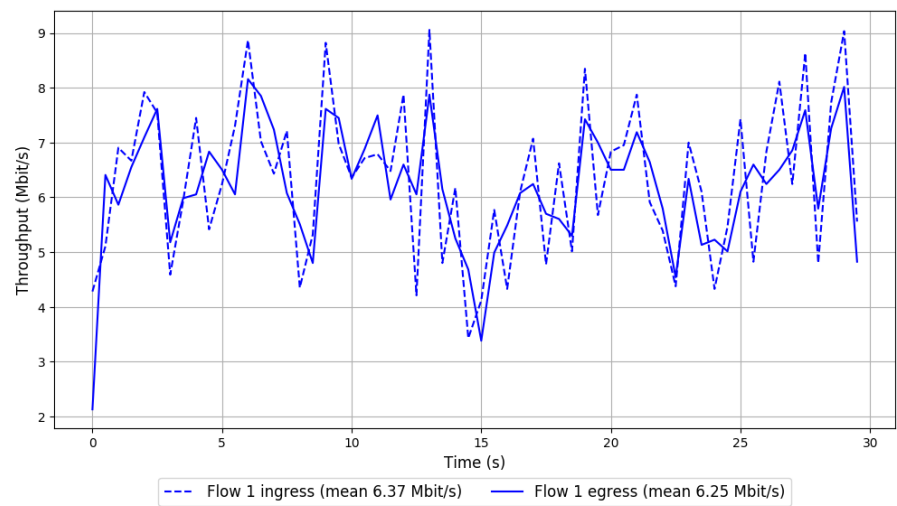


Run 1: Statistics of Verus

Start at: 2017-10-12 17:34:46
End at: 2017-10-12 17:35:16
Local clock offset: 1.64 ms
Remote clock offset: -2.814 ms

Below is generated by plot.py at 2017-10-12 19:05:18
Datalink statistics
-- Total of 1 flow:
Average throughput: 6.25 Mbit/s
95th percentile per-packet one-way delay: 249.570 ms
Loss rate: 1.94%
-- Flow 1:
Average throughput: 6.25 Mbit/s
95th percentile per-packet one-way delay: 249.570 ms
Loss rate: 1.94%

Run 1: Report of Verus — Data Link

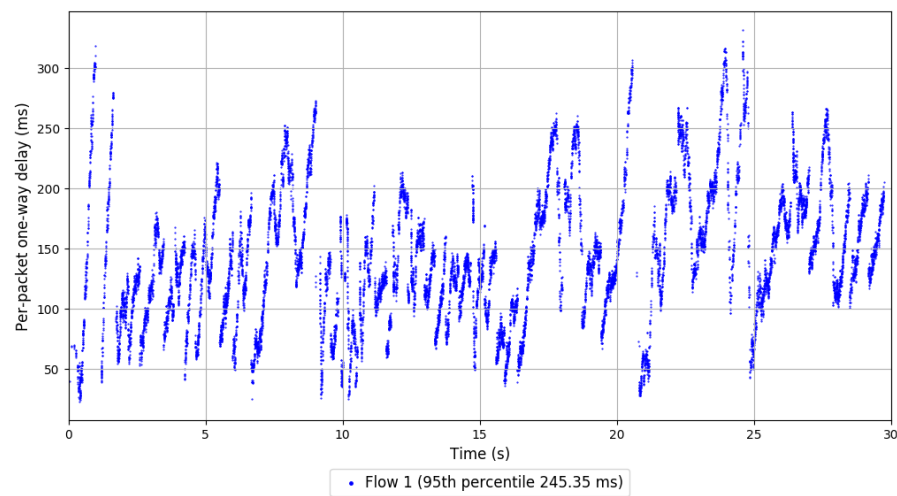
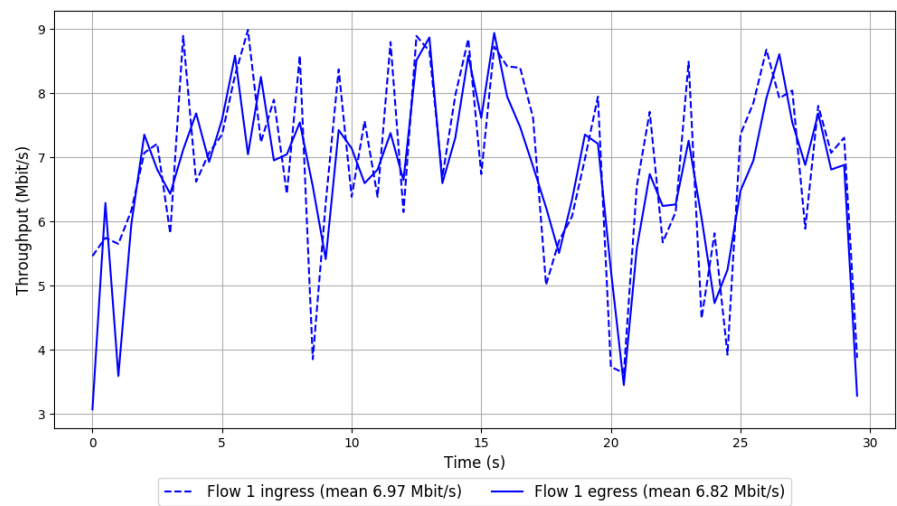


Run 2: Statistics of Verus

Start at: 2017-10-12 17:51:12
End at: 2017-10-12 17:51:42
Local clock offset: 1.442 ms
Remote clock offset: -2.671 ms

Below is generated by plot.py at 2017-10-12 19:05:20
Datalink statistics
-- Total of 1 flow:
Average throughput: 6.82 Mbit/s
95th percentile per-packet one-way delay: 245.352 ms
Loss rate: 2.29%
-- Flow 1:
Average throughput: 6.82 Mbit/s
95th percentile per-packet one-way delay: 245.352 ms
Loss rate: 2.29%

Run 2: Report of Verus — Data Link

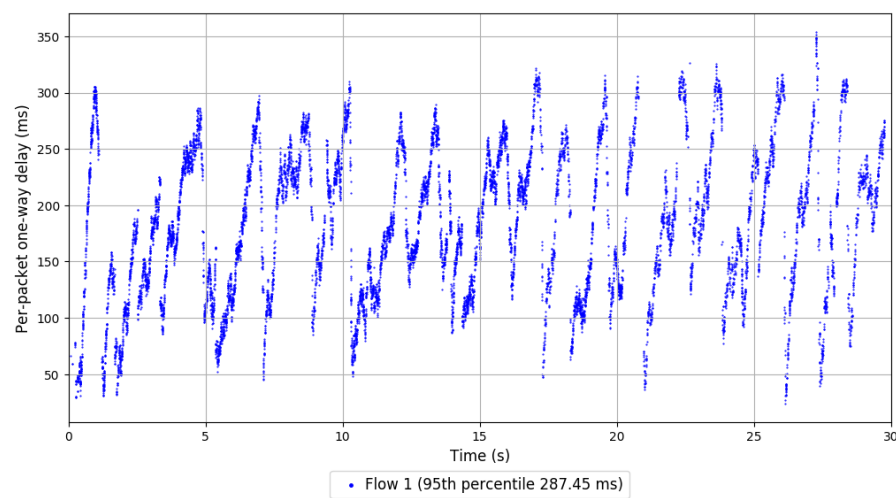
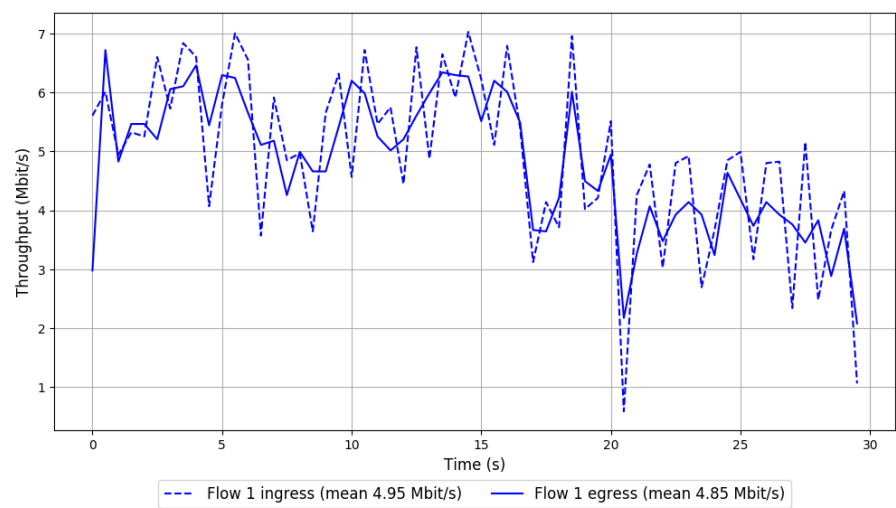


Run 3: Statistics of Verus

Start at: 2017-10-12 18:07:38
End at: 2017-10-12 18:08:08
Local clock offset: 1.353 ms
Remote clock offset: -2.574 ms

Below is generated by plot.py at 2017-10-12 19:05:20
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.85 Mbit/s
95th percentile per-packet one-way delay: 287.449 ms
Loss rate: 2.25%
-- Flow 1:
Average throughput: 4.85 Mbit/s
95th percentile per-packet one-way delay: 287.449 ms
Loss rate: 2.25%

Run 3: Report of Verus — Data Link

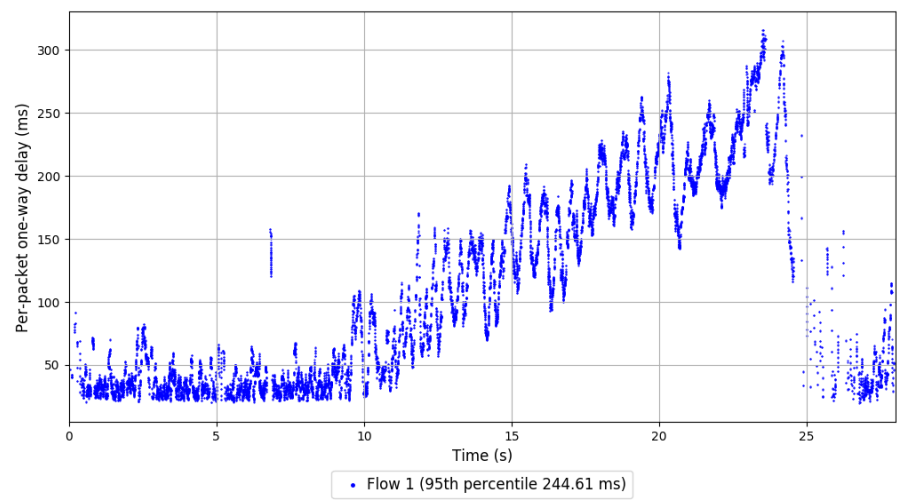
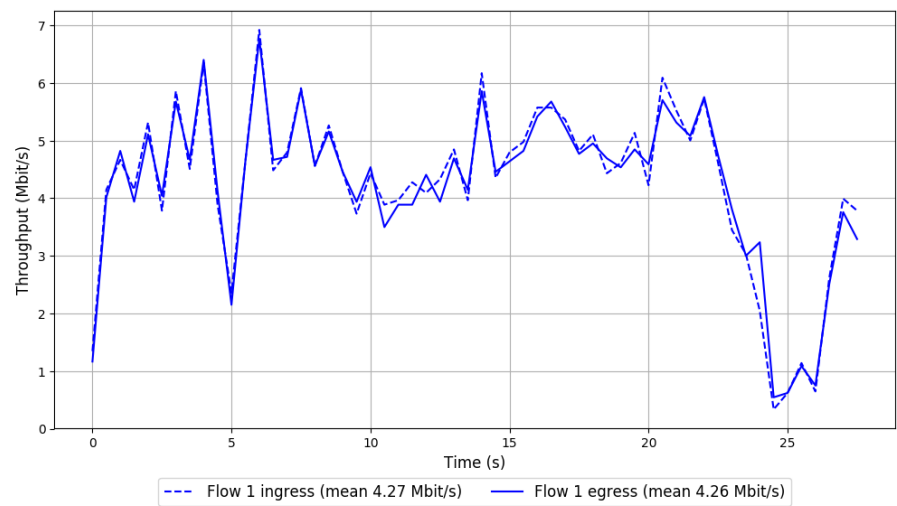


Run 1: Statistics of Copa

Start at: 2017-10-12 17:31:15
End at: 2017-10-12 17:31:45
Local clock offset: 1.573 ms
Remote clock offset: -2.908 ms

Below is generated by plot.py at 2017-10-12 19:05:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.26 Mbit/s
95th percentile per-packet one-way delay: 244.614 ms
Loss rate: 0.46%
-- Flow 1:
Average throughput: 4.26 Mbit/s
95th percentile per-packet one-way delay: 244.614 ms
Loss rate: 0.46%

Run 1: Report of Copa — Data Link

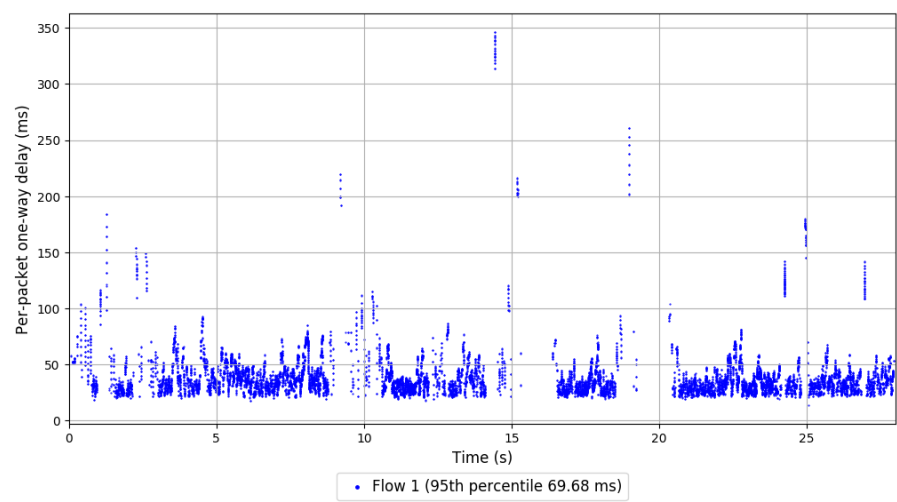
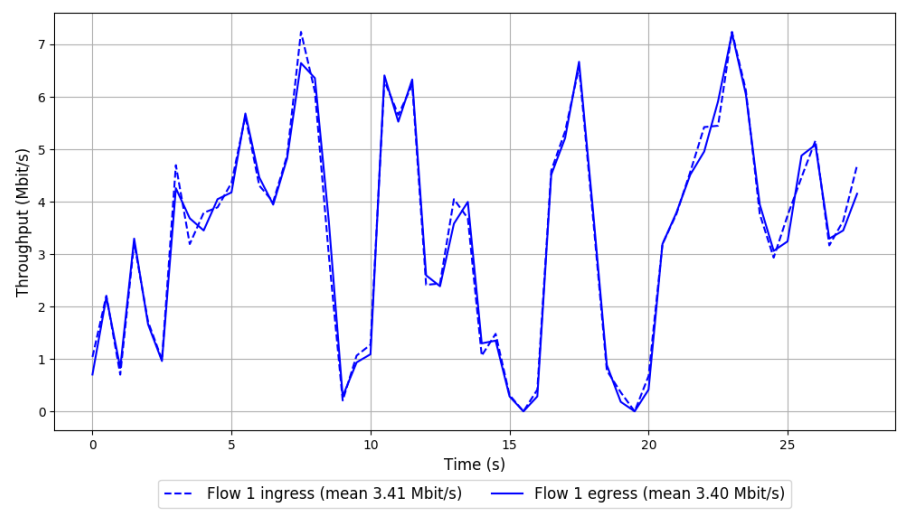


Run 2: Statistics of Copa

Start at: 2017-10-12 17:47:41
End at: 2017-10-12 17:48:11
Local clock offset: 1.57 ms
Remote clock offset: -2.693 ms

Below is generated by plot.py at 2017-10-12 19:05:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.40 Mbit/s
95th percentile per-packet one-way delay: 69.679 ms
Loss rate: 0.65%
-- Flow 1:
Average throughput: 3.40 Mbit/s
95th percentile per-packet one-way delay: 69.679 ms
Loss rate: 0.65%

Run 2: Report of Copa — Data Link

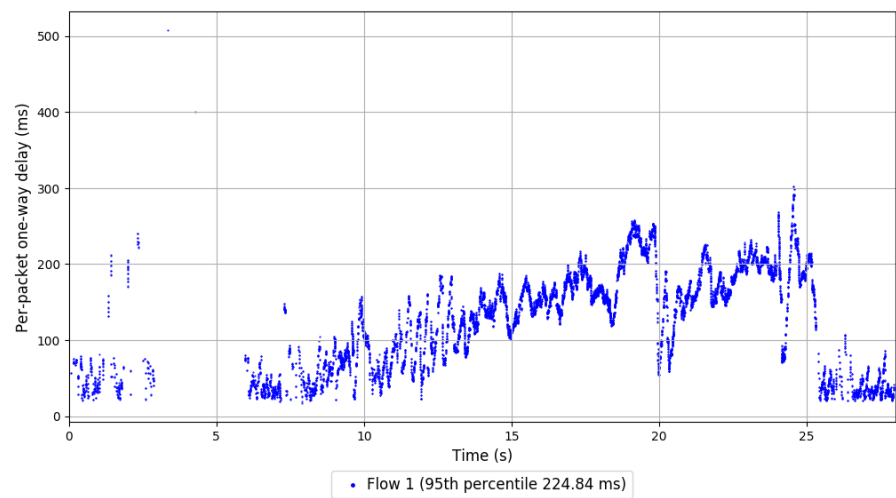
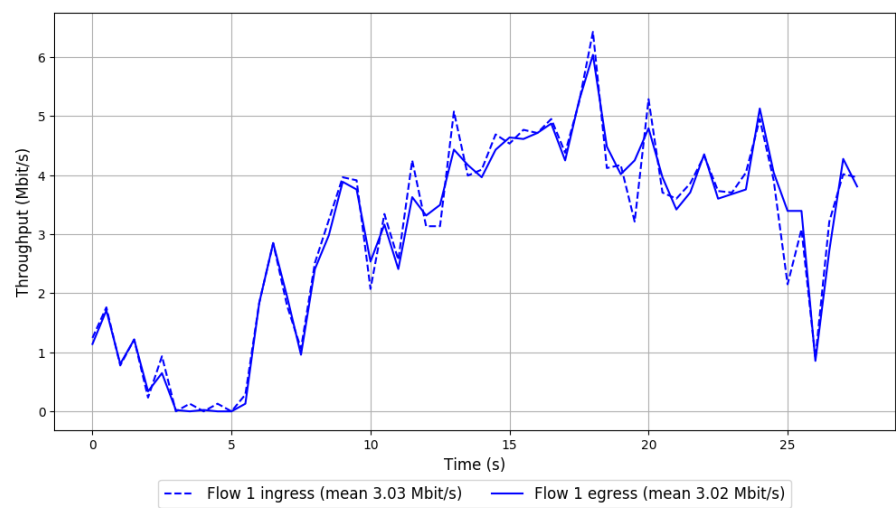


Run 3: Statistics of Copa

Start at: 2017-10-12 18:04:07
End at: 2017-10-12 18:04:37
Local clock offset: 1.304 ms
Remote clock offset: -2.542 ms

Below is generated by plot.py at 2017-10-12 19:05:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.02 Mbit/s
95th percentile per-packet one-way delay: 224.837 ms
Loss rate: 0.57%
-- Flow 1:
Average throughput: 3.02 Mbit/s
95th percentile per-packet one-way delay: 224.837 ms
Loss rate: 0.57%

Run 3: Report of Copa — Data Link

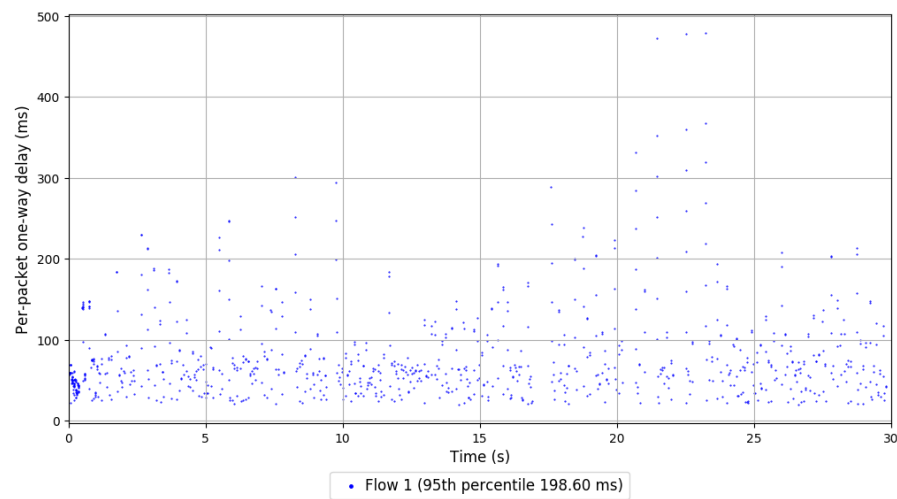
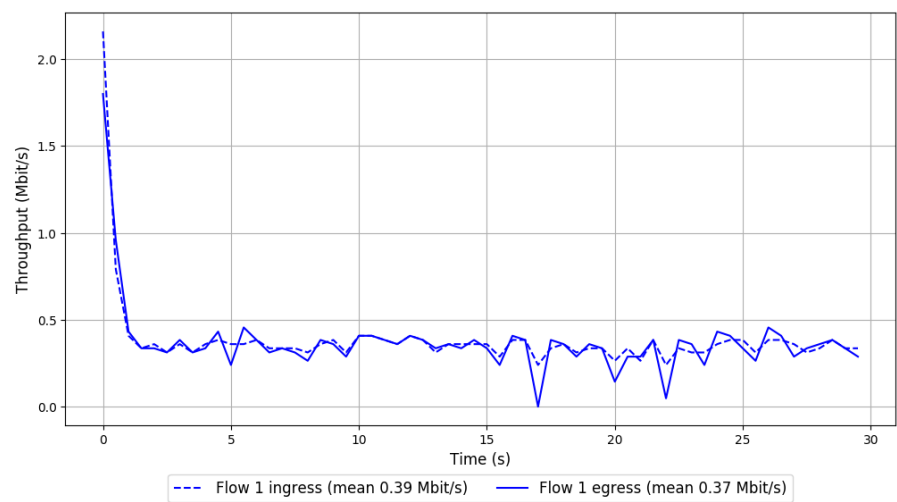


Run 1: Statistics of CalibratedKoho

Start at: 2017-10-12 17:32:25
End at: 2017-10-12 17:32:55
Local clock offset: 1.647 ms
Remote clock offset: -2.907 ms

Below is generated by plot.py at 2017-10-12 19:05:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 198.601 ms
Loss rate: 3.43%
-- Flow 1:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 198.601 ms
Loss rate: 3.43%

Run 1: Report of CalibratedKoho — Data Link

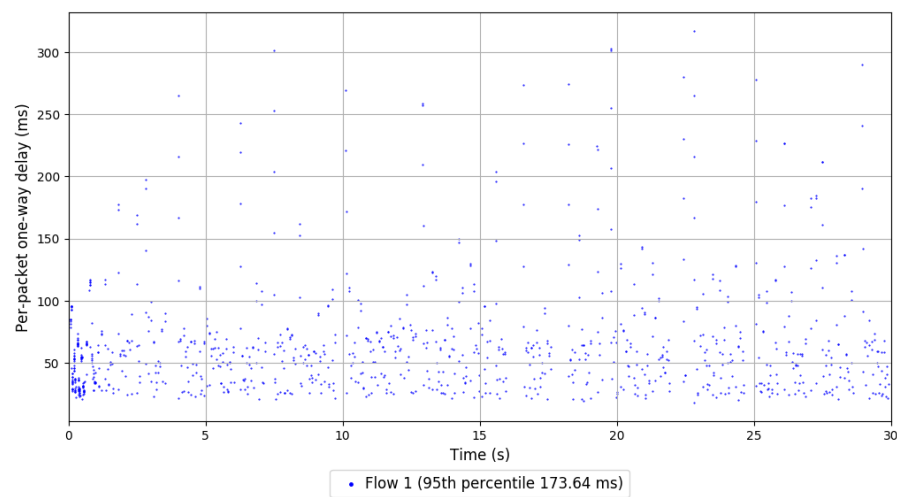
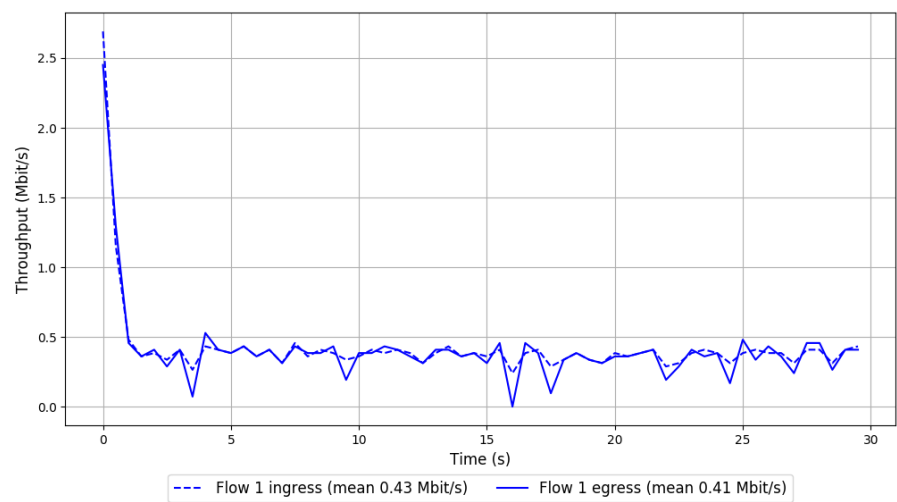


Run 2: Statistics of CalibratedKoho

Start at: 2017-10-12 17:48:51
End at: 2017-10-12 17:49:21
Local clock offset: 1.523 ms
Remote clock offset: -2.709 ms

Below is generated by plot.py at 2017-10-12 19:05:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 173.642 ms
Loss rate: 4.05%
-- Flow 1:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 173.642 ms
Loss rate: 4.05%

Run 2: Report of CalibratedKoho — Data Link

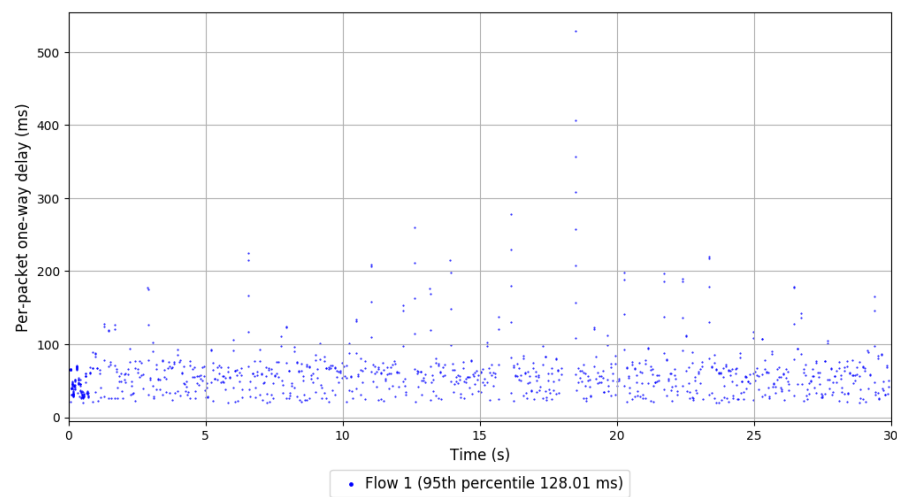
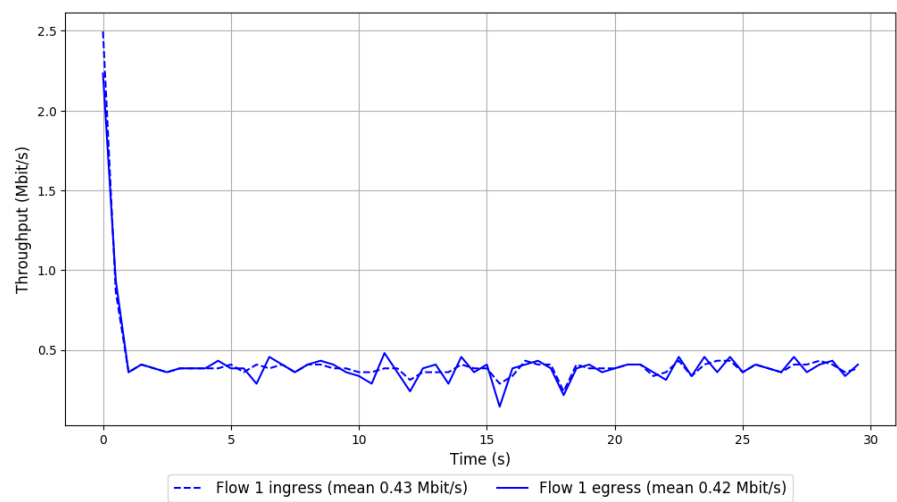


Run 3: Statistics of CalibratedKoho

Start at: 2017-10-12 18:05:17
End at: 2017-10-12 18:05:48
Local clock offset: 1.374 ms
Remote clock offset: -2.524 ms

Below is generated by plot.py at 2017-10-12 19:05:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 128.011 ms
Loss rate: 1.51%
-- Flow 1:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 128.011 ms
Loss rate: 1.51%

Run 3: Report of CalibratedKoho — Data Link



Run 1: Statistics of Indigo

Start at: 2017-10-12 17:28:54

End at: 2017-10-12 17:29:24

Local clock offset: 1.658 ms

Remote clock offset: -2.976 ms

Below is generated by plot.py at 2017-10-12 19:05:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.54 Mbit/s

95th percentile per-packet one-way delay: 96.726 ms

Loss rate: 0.76%

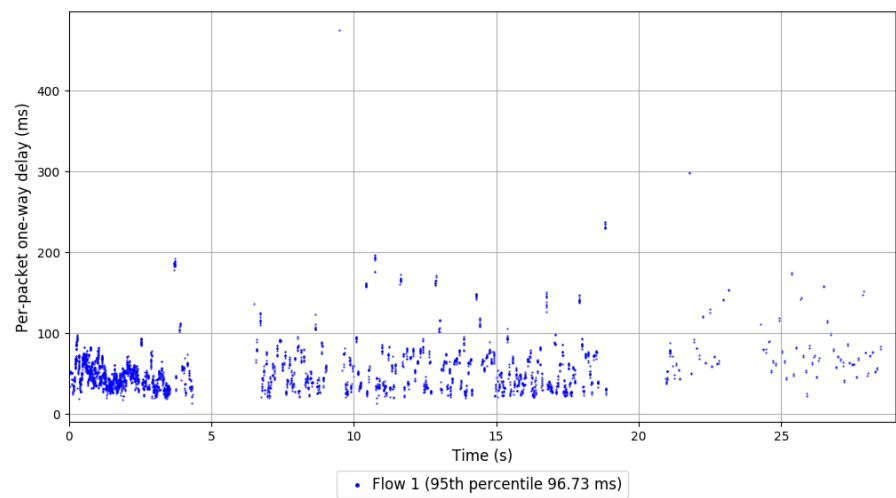
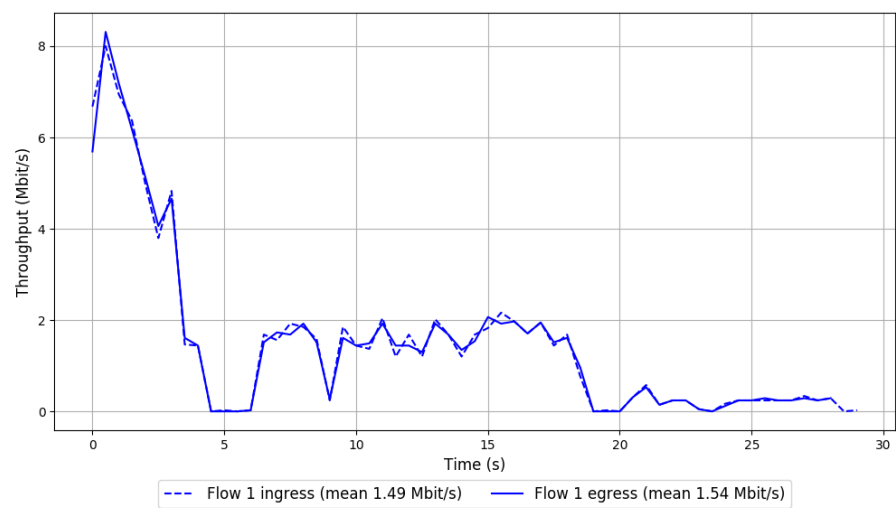
-- Flow 1:

Average throughput: 1.54 Mbit/s

95th percentile per-packet one-way delay: 96.726 ms

Loss rate: 0.76%

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2017-10-12 17:45:20

End at: 2017-10-12 17:45:50

Local clock offset: 1.577 ms

Remote clock offset: -2.804 ms

Below is generated by plot.py at 2017-10-12 19:05:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.08 Mbit/s

95th percentile per-packet one-way delay: 124.851 ms

Loss rate: 0.11%

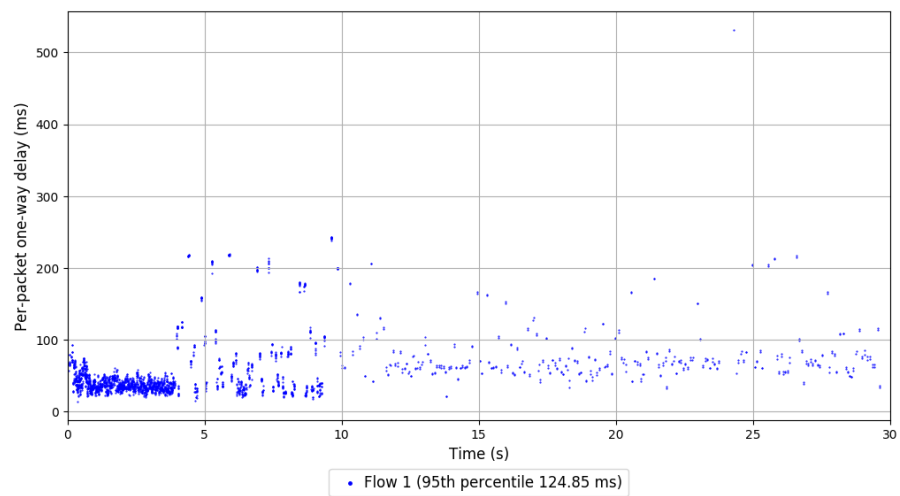
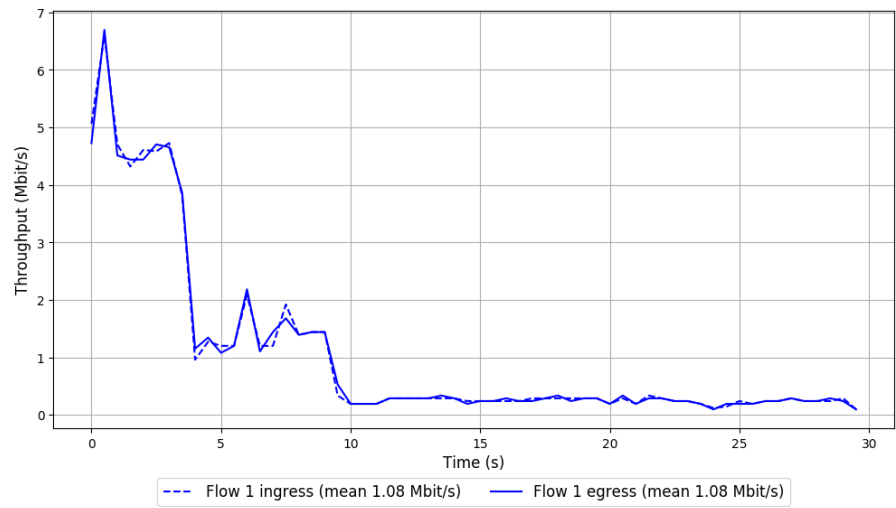
-- Flow 1:

Average throughput: 1.08 Mbit/s

95th percentile per-packet one-way delay: 124.851 ms

Loss rate: 0.11%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2017-10-12 18:01:46

End at: 2017-10-12 18:02:16

Local clock offset: 1.423 ms

Remote clock offset: -2.572 ms

Below is generated by plot.py at 2017-10-12 19:05:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.87 Mbit/s

95th percentile per-packet one-way delay: 92.585 ms

Loss rate: 0.04%

-- Flow 1:

Average throughput: 1.87 Mbit/s

95th percentile per-packet one-way delay: 92.585 ms

Loss rate: 0.04%

Run 3: Report of Indigo — Data Link

