

## Pantheon Report

Generated at 2018-01-16 00:12:52 (UTC).

Data path: India ppp0 (*remote*) → AWS India 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).

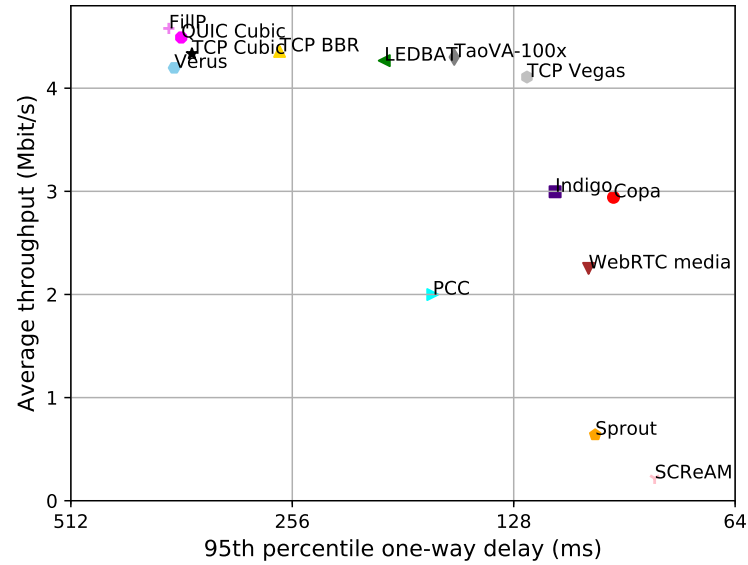
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo\_fast**).

NTP offsets were measured against **nets.org.sg** and have been applied to correct the timestamps in logs.

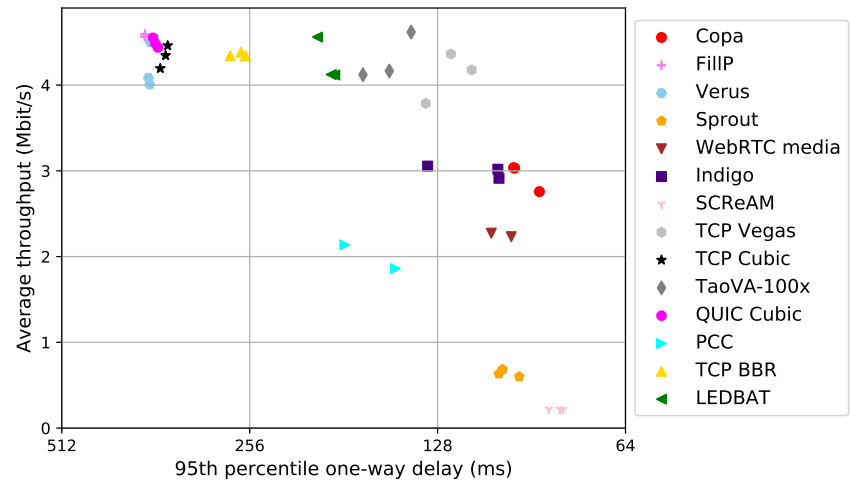
Git summary:

```
branch: master @ af8abdfba95588b0c5f2aeca9e856a1656b0c598
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/fillp @ ec9585325218d5048c4d4152fa42240af54c6e67
third_party/genericCC @ 80b516c448f795fd6e9675f7177b69c622f07da8
third_party/indigo @ b19f3730105f9aa95452552af924e3719b03cc55
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
  M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ fb1053193c2861da659ba9013db26744ccfcf993
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/vivace @ 423cbca3e8ea1d599e7b5cf725835e8a2b6bfac6
third_party/webrtc @ a488197ddd041ace68a42849b2540ad834825f42
```

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



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



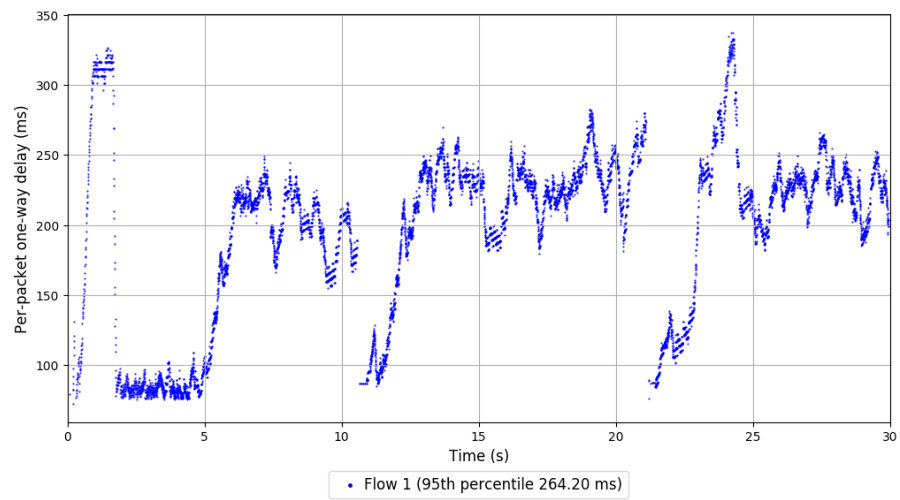
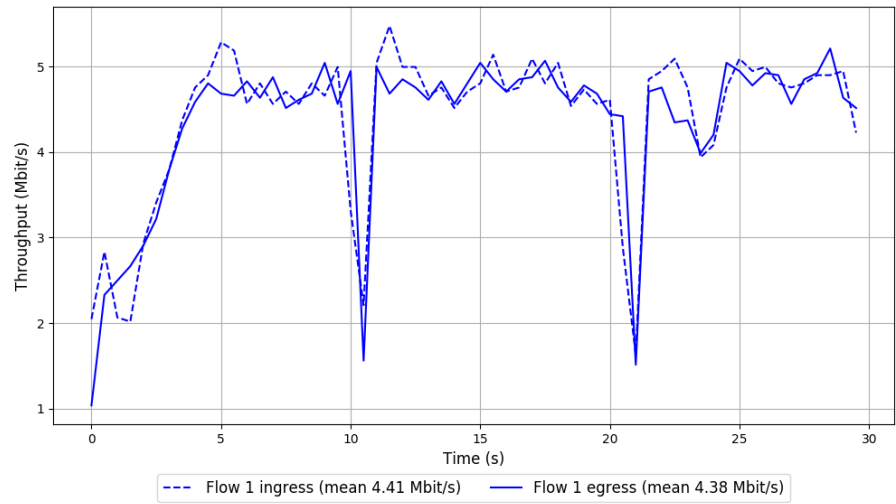
scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	4.35	266.40	0.74
TCP Cubic	3	4.33	350.50	1.81
LEDBAT	3	4.27	191.96	0.81
PCC	2	2.00	164.90	4.95
QUIC Cubic	3	4.49	362.44	2.95
SCReAM	3	0.22	82.34	0.21
WebRTC media	2	2.25	101.26	0.29
Sprout	3	0.64	99.18	0.70
TaoVA-100x	3	4.30	154.20	1.38
TCP Vegas	3	4.11	122.80	0.90
Verus	3	4.20	370.48	30.62
Copa	3	2.94	93.65	0.26
FillP	2	4.57	376.74	86.89
Indigo	3	3.00	112.44	0.48

Run 1: Statistics of TCP BBR

Start at: 2018-01-15 22:45:18  
End at: 2018-01-15 22:45:48  
Local clock offset: -16.519 ms  
Remote clock offset: -19.798 ms

# Below is generated by plot.py at 2018-01-16 00:12:16  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.38 Mbit/s  
95th percentile per-packet one-way delay: 264.202 ms  
Loss rate: 0.75%  
-- Flow 1:  
Average throughput: 4.38 Mbit/s  
95th percentile per-packet one-way delay: 264.202 ms  
Loss rate: 0.75%

# Run 1: Report of TCP BBR — Data Link

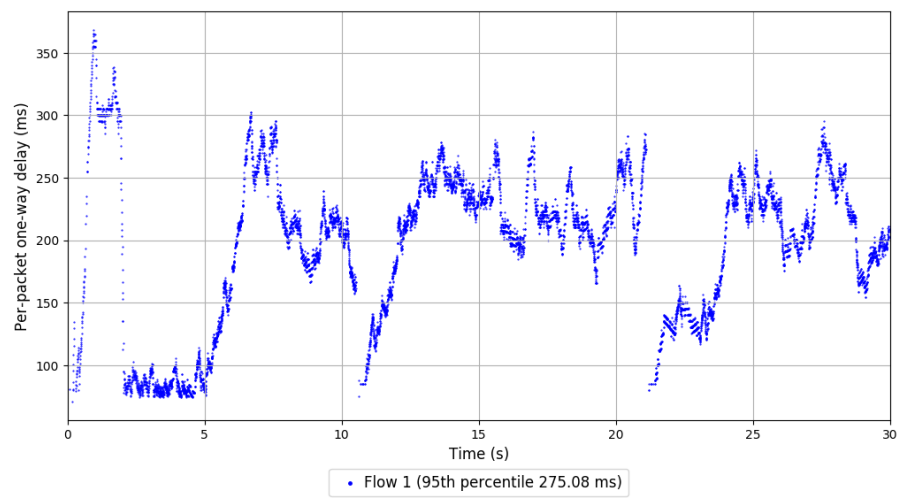
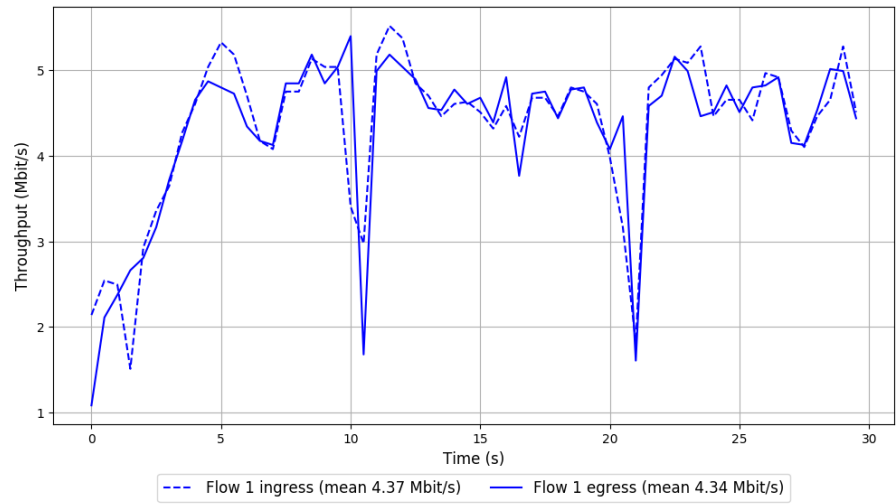


Run 2: Statistics of TCP BBR

Start at: 2018-01-15 23:01:37  
End at: 2018-01-15 23:02:07  
Local clock offset: -26.702 ms  
Remote clock offset: -20.504 ms

# Below is generated by plot.py at 2018-01-16 00:12:16  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.34 Mbit/s  
95th percentile per-packet one-way delay: 275.079 ms  
Loss rate: 0.80%  
-- Flow 1:  
Average throughput: 4.34 Mbit/s  
95th percentile per-packet one-way delay: 275.079 ms  
Loss rate: 0.80%

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



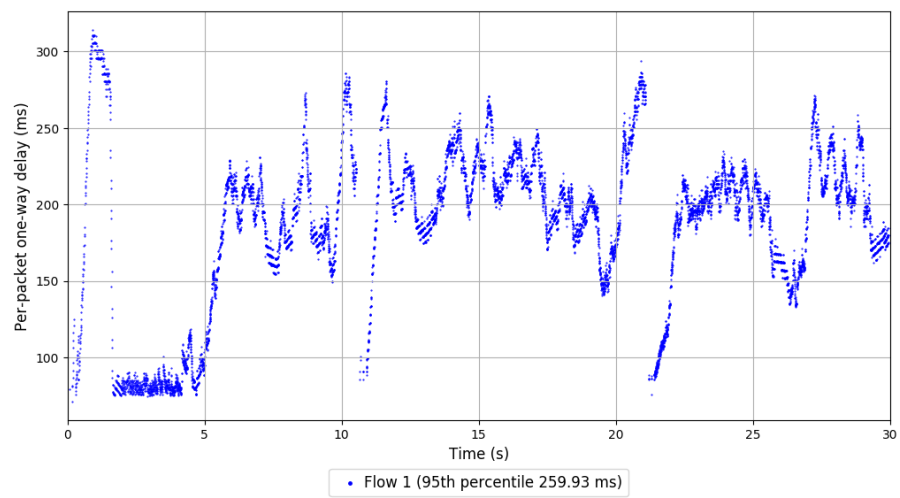
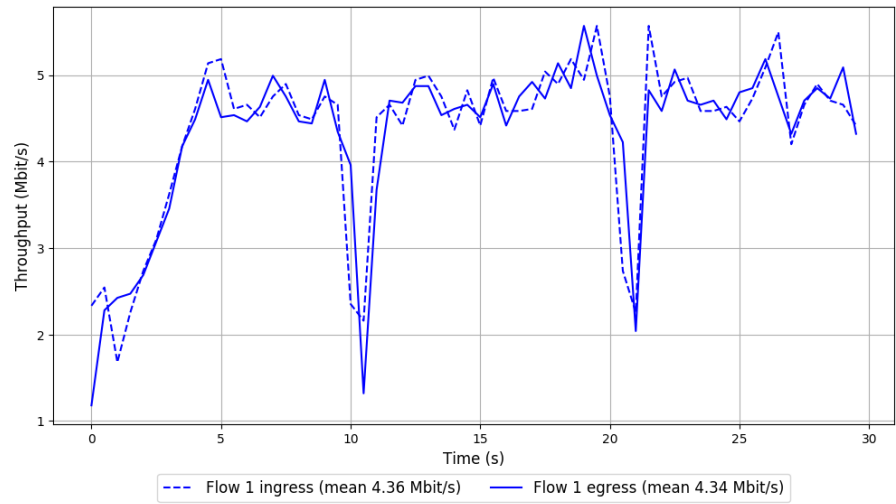
Run 3: Statistics of TCP BBR

Start at: 2018-01-15 23:17:56  
End at: 2018-01-15 23:18:26  
Local clock offset: -17.276 ms  
Remote clock offset: -18.291 ms

# Below is generated by plot.py at 2018-01-16 00:12:16  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.34 Mbit/s  
95th percentile per-packet one-way delay: 259.934 ms  
Loss rate: 0.66%  
-- Flow 1:  
Average throughput: 4.34 Mbit/s  
95th percentile per-packet one-way delay: 259.934 ms  
Loss rate: 0.66%



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

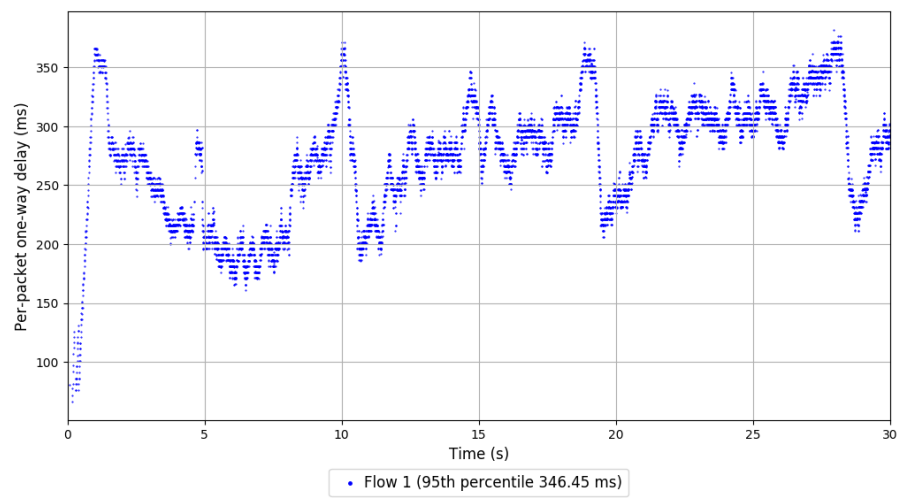
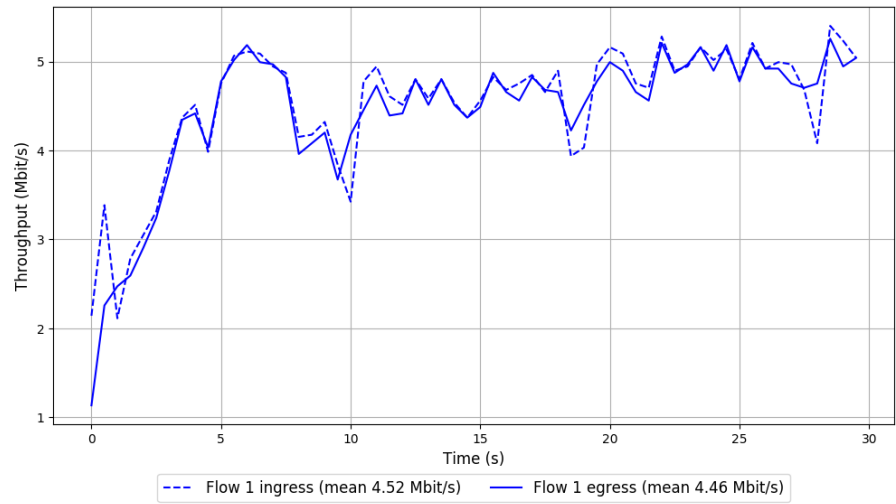


Run 1: Statistics of TCP Cubic

Start at: 2018-01-15 22:47:30  
End at: 2018-01-15 22:48:00  
Local clock offset: -20.302 ms  
Remote clock offset: -20.601 ms

# Below is generated by plot.py at 2018-01-16 00:12:16  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.46 Mbit/s  
95th percentile per-packet one-way delay: 346.454 ms  
Loss rate: 1.46%  
-- Flow 1:  
Average throughput: 4.46 Mbit/s  
95th percentile per-packet one-way delay: 346.454 ms  
Loss rate: 1.46%

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

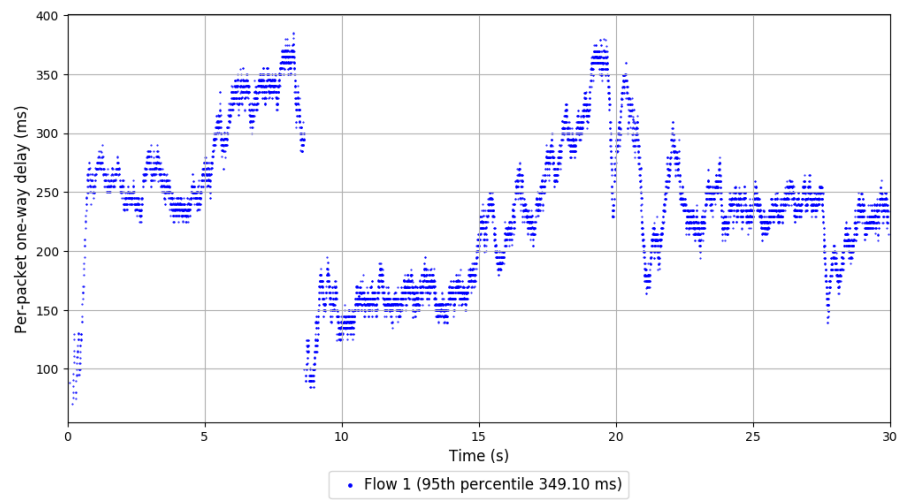
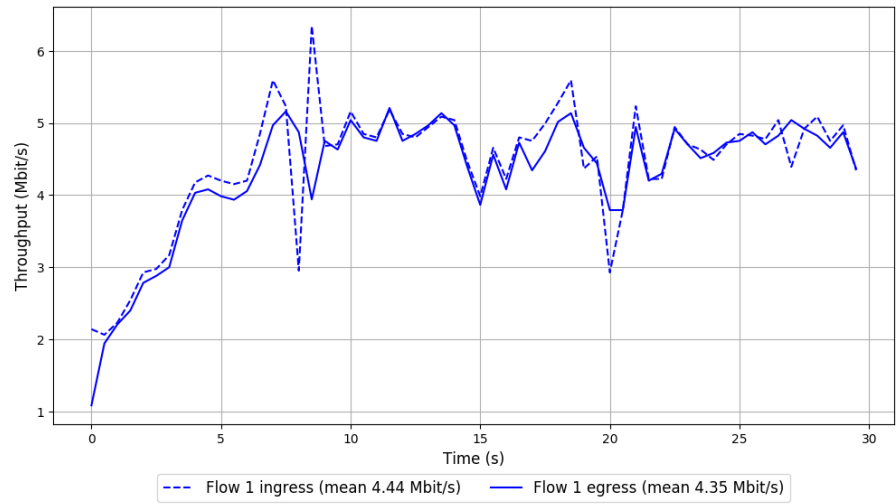


Run 2: Statistics of TCP Cubic

Start at: 2018-01-15 23:03:48  
End at: 2018-01-15 23:04:18  
Local clock offset: -23.889 ms  
Remote clock offset: -19.904 ms

# Below is generated by plot.py at 2018-01-16 00:12:16  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.35 Mbit/s  
95th percentile per-packet one-way delay: 349.098 ms  
Loss rate: 2.26%  
-- Flow 1:  
Average throughput: 4.35 Mbit/s  
95th percentile per-packet one-way delay: 349.098 ms  
Loss rate: 2.26%

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

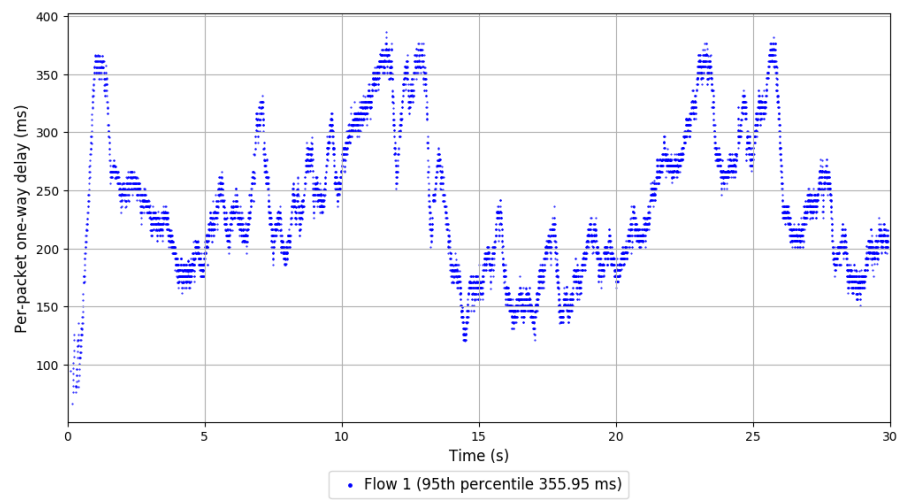
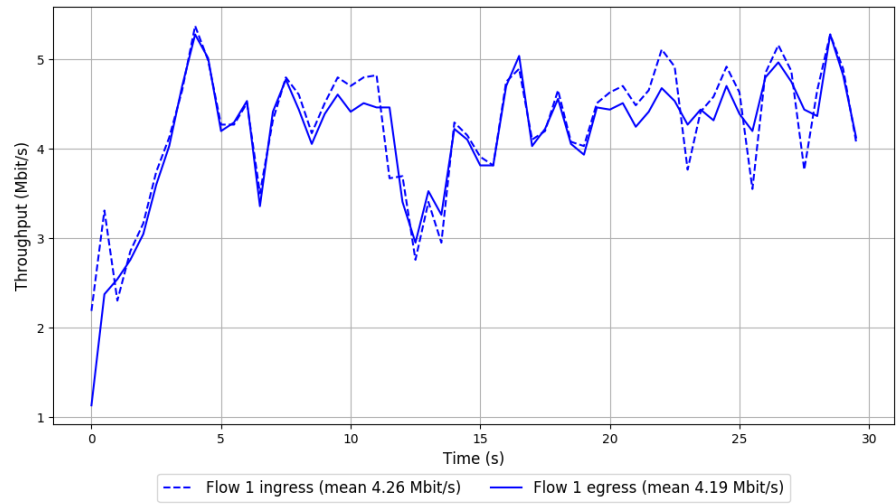


Run 3: Statistics of TCP Cubic

Start at: 2018-01-15 23:20:07  
End at: 2018-01-15 23:20:37  
Local clock offset: -18.349 ms  
Remote clock offset: -18.757 ms

# Below is generated by plot.py at 2018-01-16 00:12:16  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.19 Mbit/s  
95th percentile per-packet one-way delay: 355.949 ms  
Loss rate: 1.72%  
-- Flow 1:  
Average throughput: 4.19 Mbit/s  
95th percentile per-packet one-way delay: 355.949 ms  
Loss rate: 1.72%

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



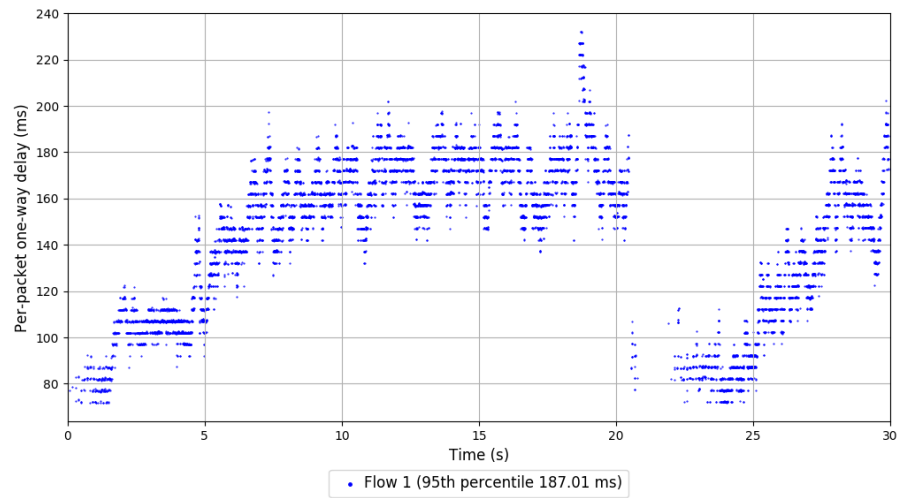
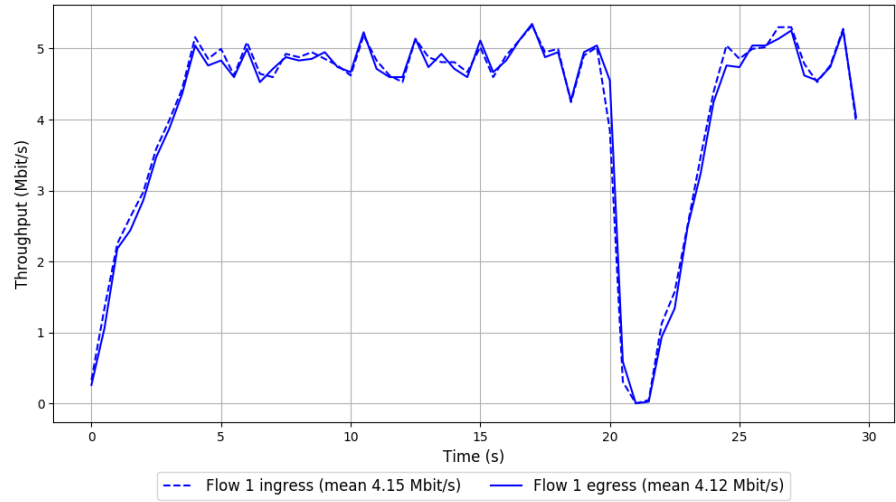
```
Run 1: Statistics of LEDBAT

Start at: 2018-01-15 22:43:06
End at: 2018-01-15 22:43:36
Local clock offset: -13.856 ms
Remote clock offset: -18.064 ms

# Below is generated by plot.py at 2018-01-16 00:12:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 4.12 Mbit/s
95th percentile per-packet one-way delay: 187.015 ms
Loss rate: 0.90%
-- Flow 1:
Average throughput: 4.12 Mbit/s
95th percentile per-packet one-way delay: 187.015 ms
Loss rate: 0.90%
```



# Run 1: Report of LEDBAT — Data Link

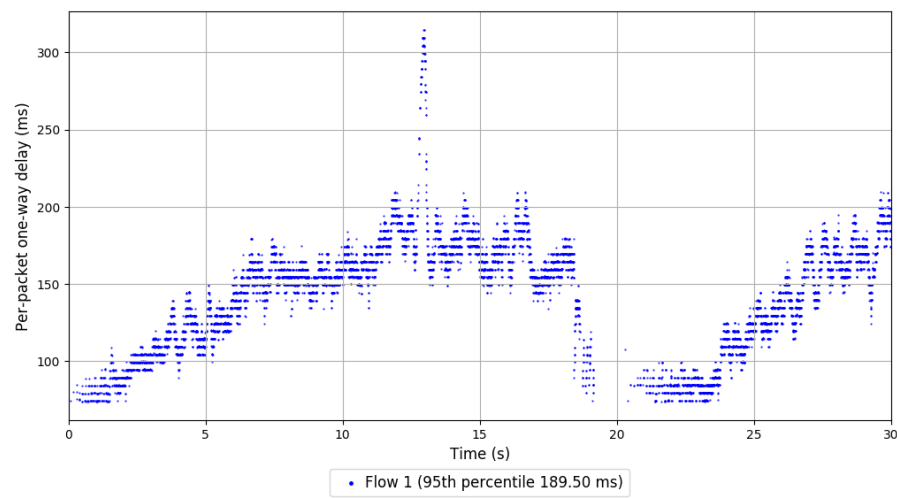
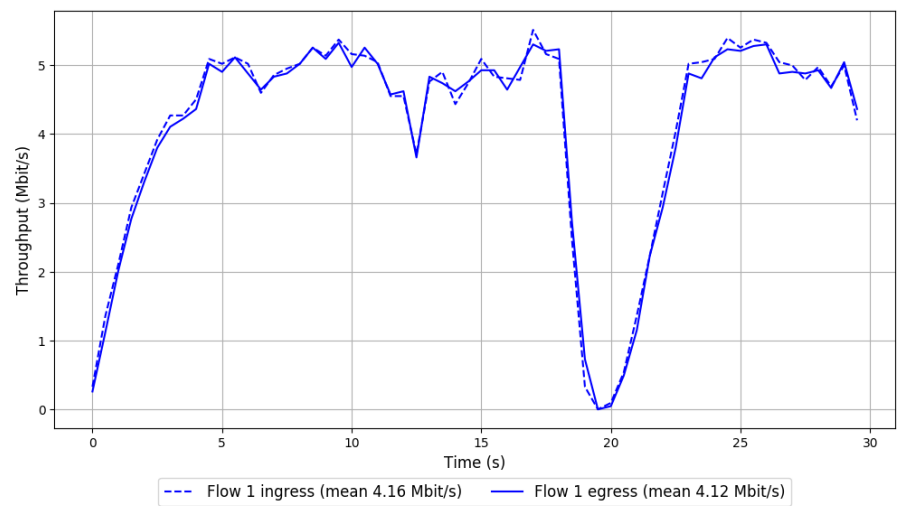


Run 2: Statistics of LEDBAT

Start at: 2018-01-15 22:59:26  
End at: 2018-01-15 22:59:56  
Local clock offset: -26.158 ms  
Remote clock offset: -19.717 ms

# Below is generated by plot.py at 2018-01-16 00:12:16  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.12 Mbit/s  
95th percentile per-packet one-way delay: 189.501 ms  
Loss rate: 0.97%  
-- Flow 1:  
Average throughput: 4.12 Mbit/s  
95th percentile per-packet one-way delay: 189.501 ms  
Loss rate: 0.97%

Run 2: Report of LEDBAT — Data Link

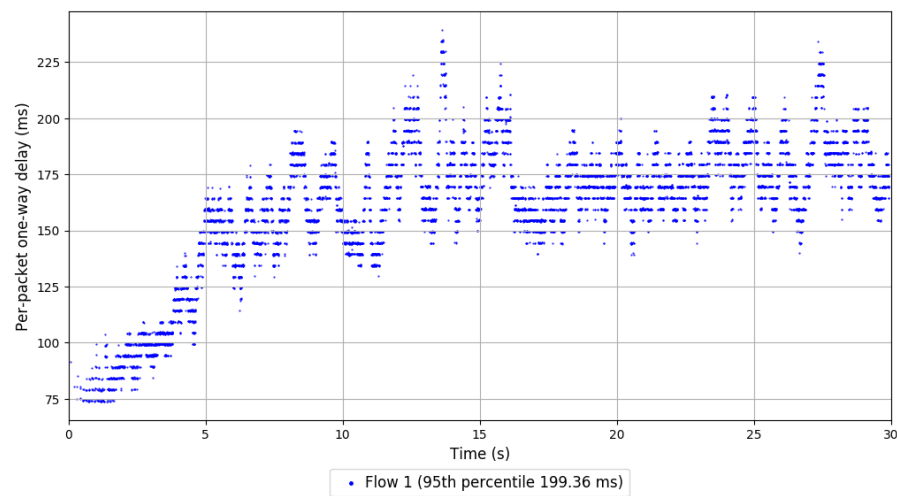
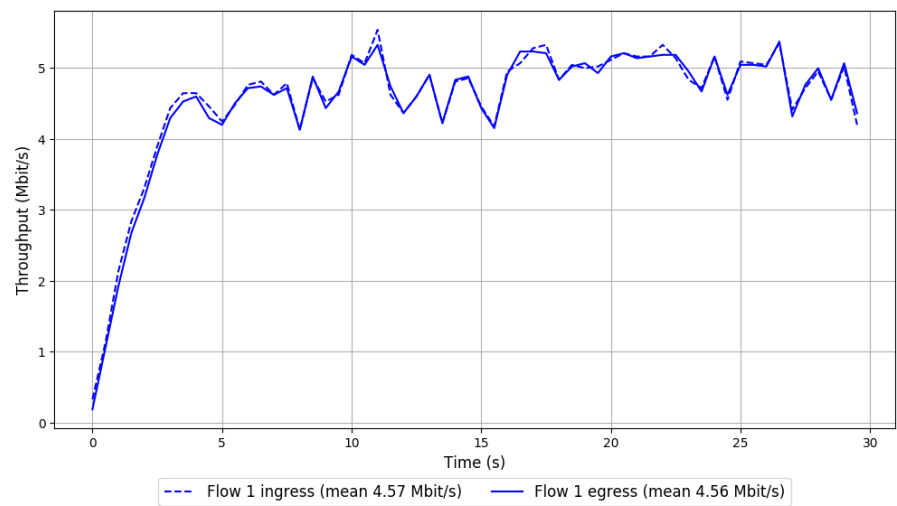


Run 3: Statistics of LEDBAT

Start at: 2018-01-15 23:15:45  
End at: 2018-01-15 23:16:15  
Local clock offset: -19.195 ms  
Remote clock offset: -19.023 ms

# Below is generated by plot.py at 2018-01-16 00:12:23  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.56 Mbit/s  
95th percentile per-packet one-way delay: 199.360 ms  
Loss rate: 0.57%  
-- Flow 1:  
Average throughput: 4.56 Mbit/s  
95th percentile per-packet one-way delay: 199.360 ms  
Loss rate: 0.57%

Run 3: Report of LEDBAT — Data Link

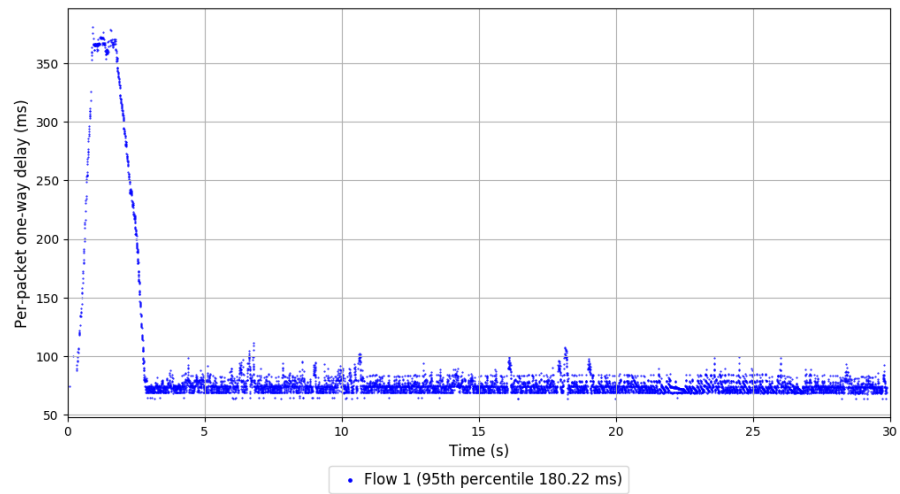
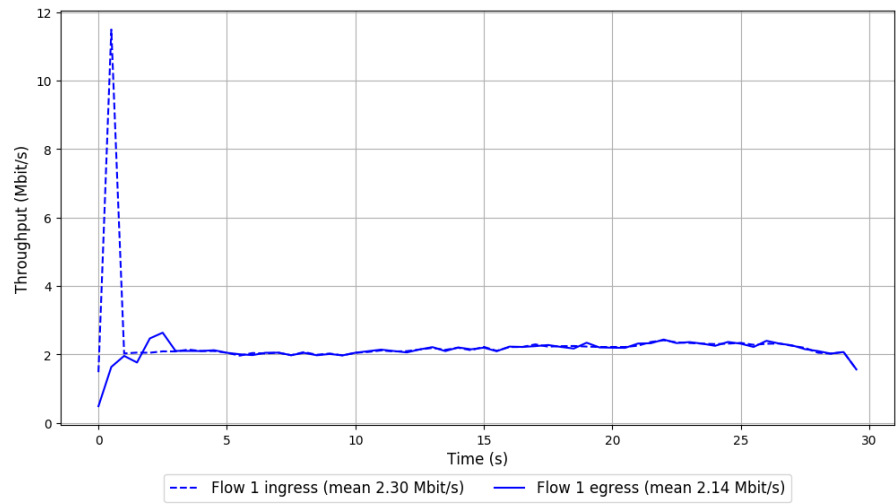


```
Run 1: Statistics of PCC

Start at: 2018-01-15 22:34:25
End at: 2018-01-15 22:34:55
Local clock offset: -16.781 ms
Remote clock offset: -19.375 ms

# Below is generated by plot.py at 2018-01-16 00:12:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.14 Mbit/s
95th percentile per-packet one-way delay: 180.222 ms
Loss rate: 7.44%
-- Flow 1:
Average throughput: 2.14 Mbit/s
95th percentile per-packet one-way delay: 180.222 ms
Loss rate: 7.44%
```

### Run 1: Report of PCC — Data Link

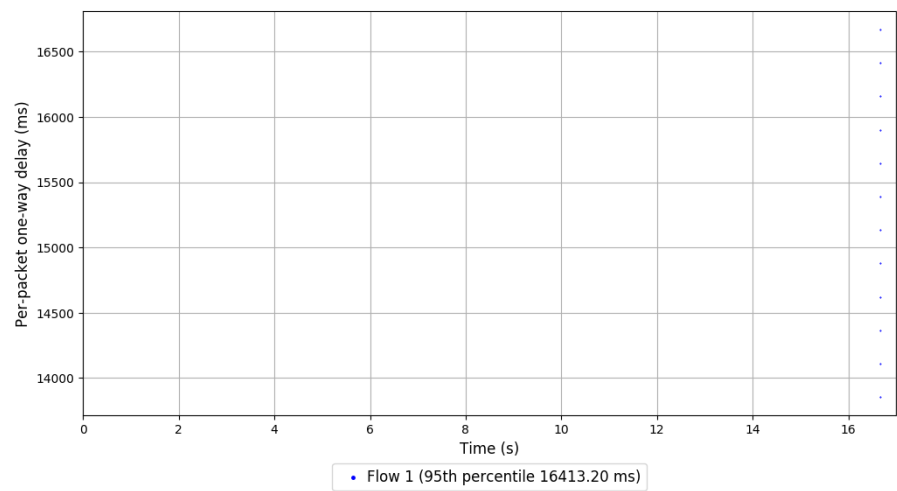
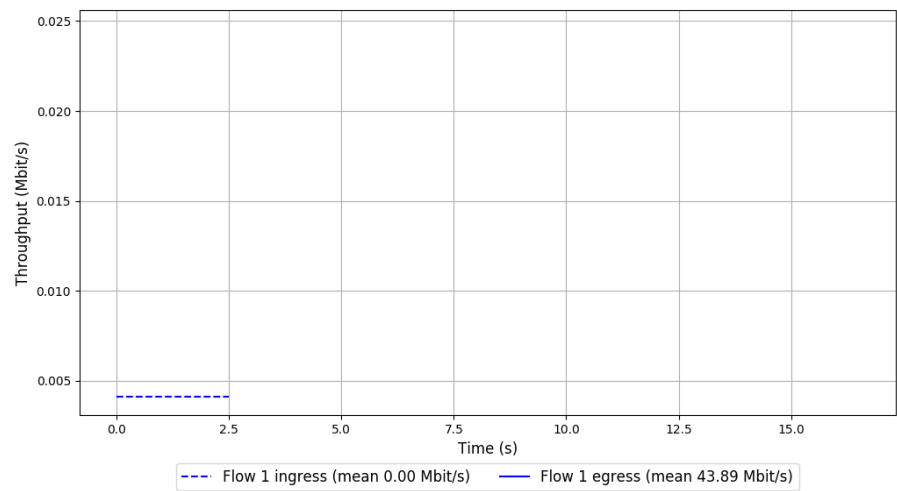


Run 2: Statistics of PCC

Start at: 2018-01-15 22:50:46  
End at: 2018-01-15 22:51:16  
Local clock offset: -20.662 ms  
Remote clock offset: -19.608 ms



Run 2: Report of PCC — Data Link

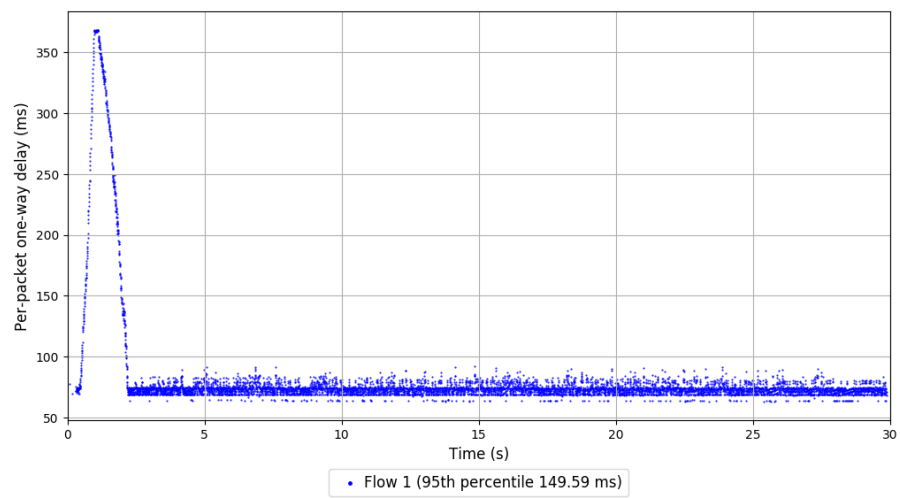
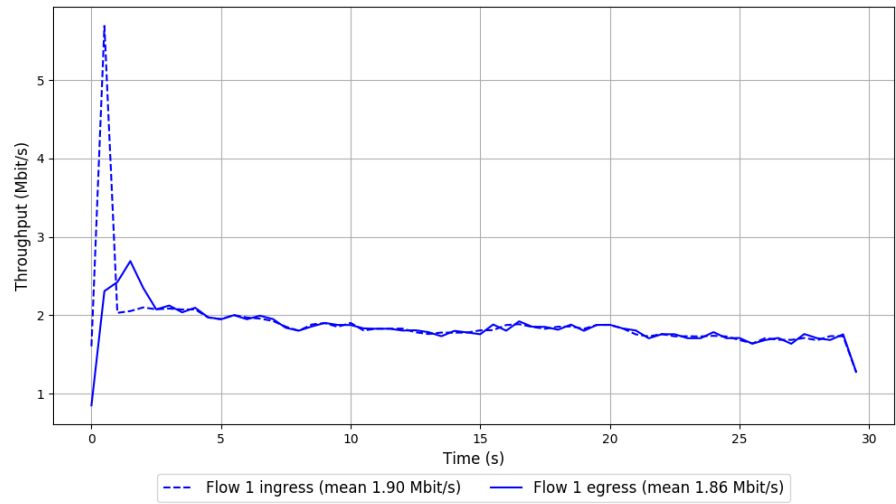


Run 3: Statistics of PCC

Start at: 2018-01-15 23:07:04  
End at: 2018-01-15 23:07:34  
Local clock offset: -20.561 ms  
Remote clock offset: -19.701 ms

# Below is generated by plot.py at 2018-01-16 00:12:23  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.86 Mbit/s  
95th percentile per-packet one-way delay: 149.587 ms  
Loss rate: 2.45%  
-- Flow 1:  
Average throughput: 1.86 Mbit/s  
95th percentile per-packet one-way delay: 149.587 ms  
Loss rate: 2.45%

### Run 3: Report of PCC — Data Link

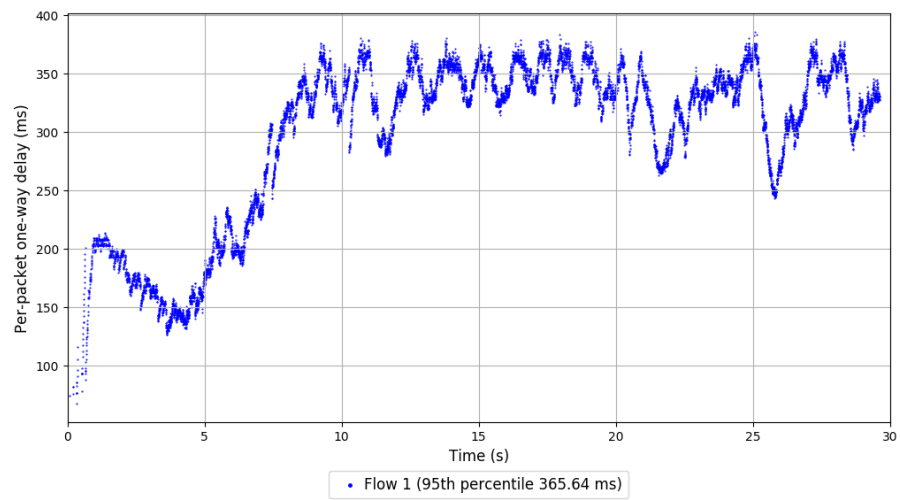
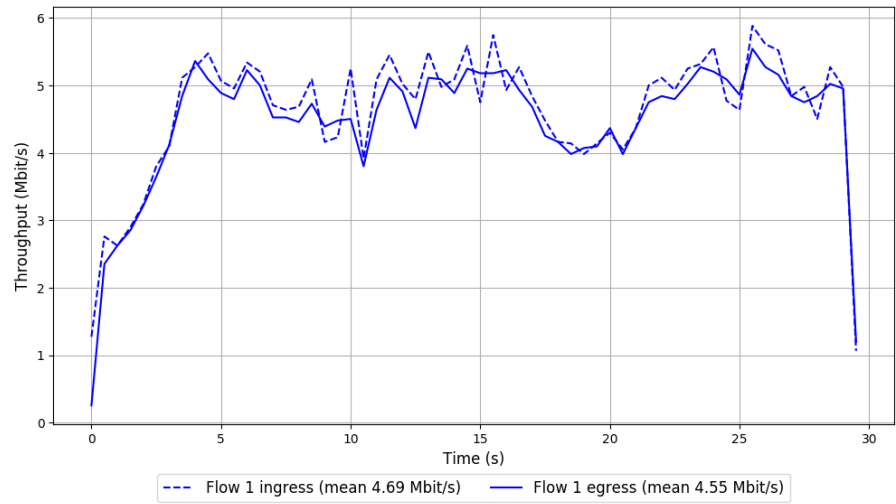


Run 1: Statistics of QUIC Cubic

Start at: 2018-01-15 22:48:35  
End at: 2018-01-15 22:49:05  
Local clock offset: -21.093 ms  
Remote clock offset: -18.798 ms

# Below is generated by plot.py at 2018-01-16 00:12:27  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.55 Mbit/s  
95th percentile per-packet one-way delay: 365.639 ms  
Loss rate: 3.15%  
-- Flow 1:  
Average throughput: 4.55 Mbit/s  
95th percentile per-packet one-way delay: 365.639 ms  
Loss rate: 3.15%

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

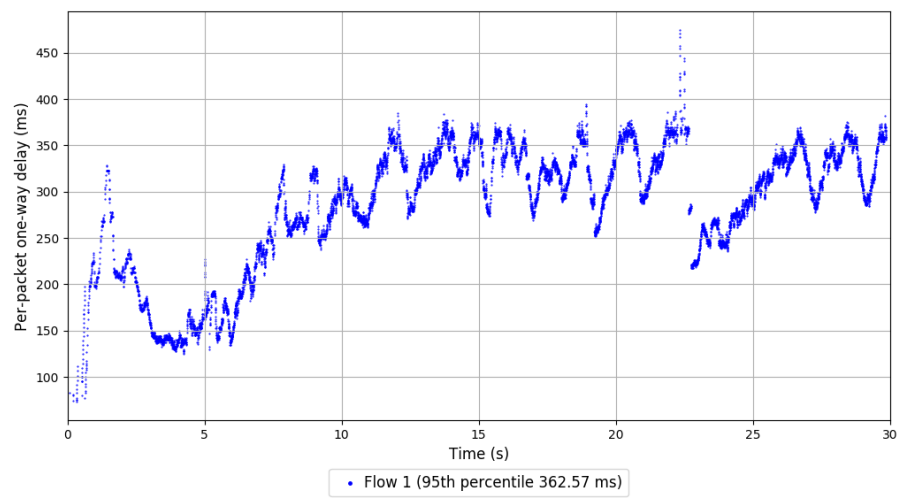
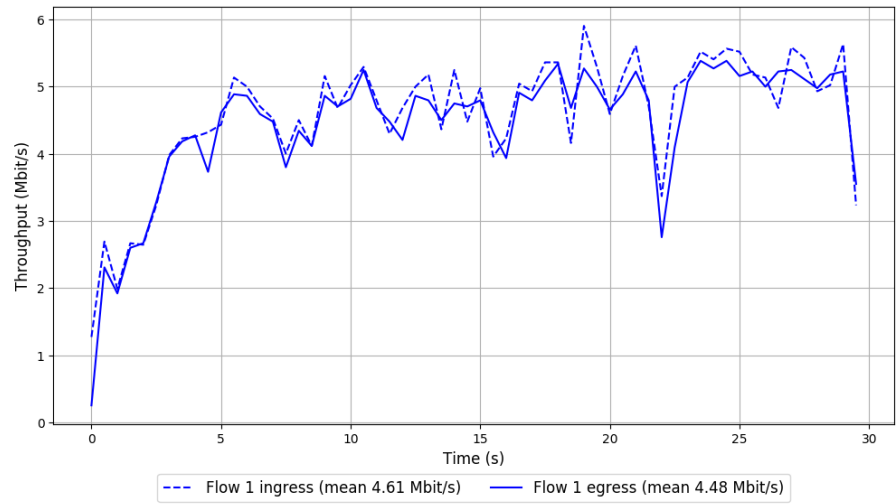


Run 2: Statistics of QUIC Cubic

Start at: 2018-01-15 23:04:53  
End at: 2018-01-15 23:05:23  
Local clock offset: -24.342 ms  
Remote clock offset: -19.875 ms

# Below is generated by plot.py at 2018-01-16 00:12:28  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.48 Mbit/s  
95th percentile per-packet one-way delay: 362.571 ms  
Loss rate: 3.08%  
-- Flow 1:  
Average throughput: 4.48 Mbit/s  
95th percentile per-packet one-way delay: 362.571 ms  
Loss rate: 3.08%

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



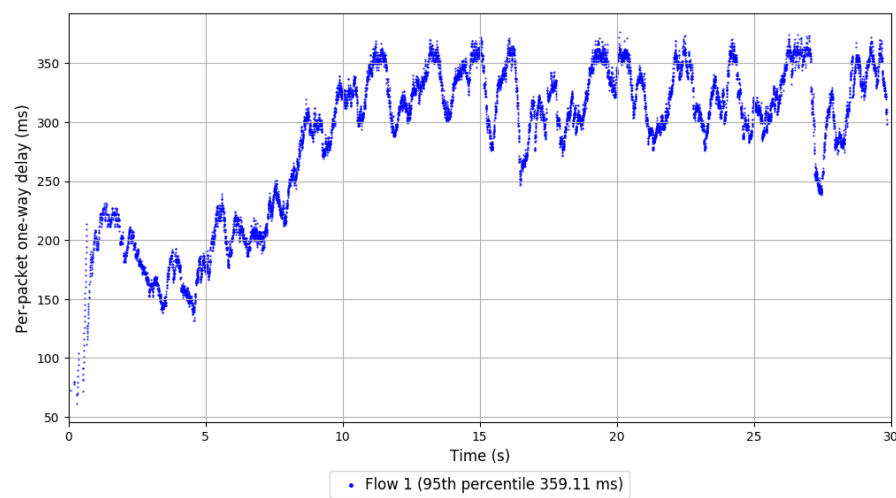
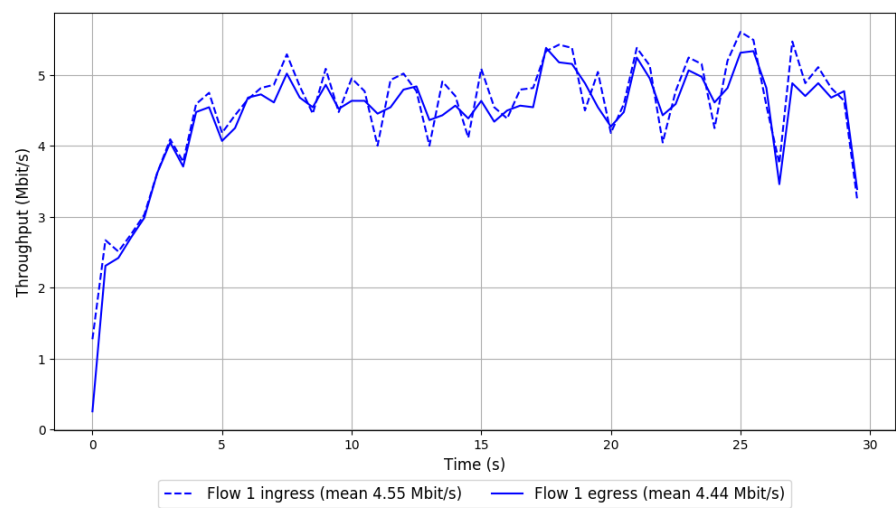
Run 3: Statistics of QUIC Cubic

Start at: 2018-01-15 23:21:13  
End at: 2018-01-15 23:21:43  
Local clock offset: -22.008 ms  
Remote clock offset: -18.108 ms

# Below is generated by plot.py at 2018-01-16 00:12:28  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.44 Mbit/s  
95th percentile per-packet one-way delay: 359.110 ms  
Loss rate: 2.62%  
-- Flow 1:  
Average throughput: 4.44 Mbit/s  
95th percentile per-packet one-way delay: 359.110 ms  
Loss rate: 2.62%



Run 3: Report of QUIC Cubic — Data Link

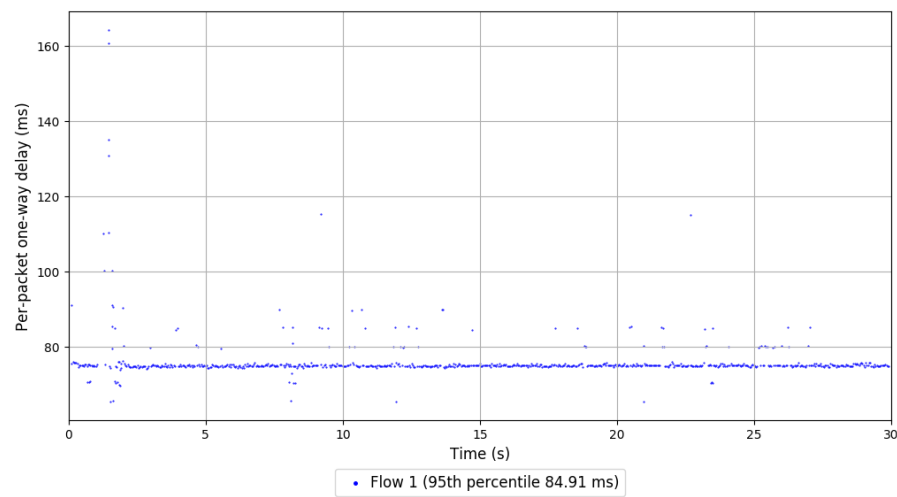
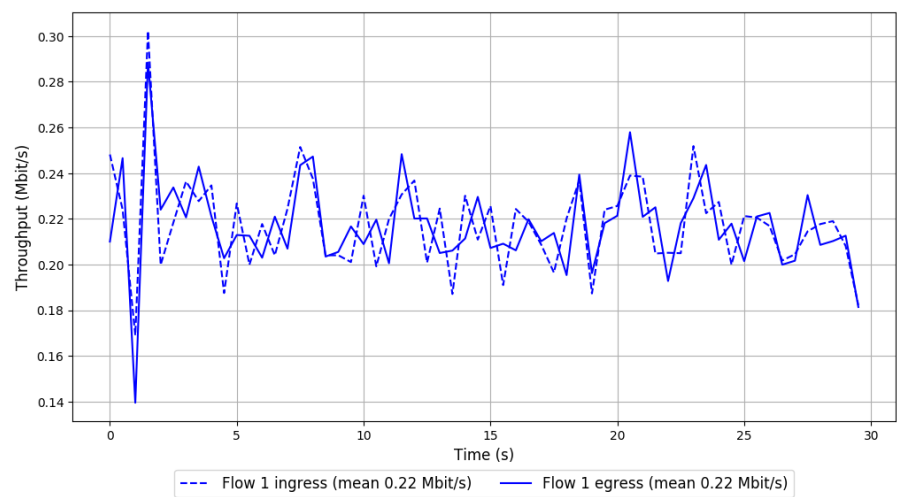


```
Run 1: Statistics of SCReAM

Start at: 2018-01-15 22:39:51
End at: 2018-01-15 22:40:21
Local clock offset: -17.269 ms
Remote clock offset: -26.425 ms

# Below is generated by plot.py at 2018-01-16 00:12:28
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 84.911 ms
Loss rate: 0.25%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 84.911 ms
Loss rate: 0.25%
```

Run 1: Report of SReAM — Data Link

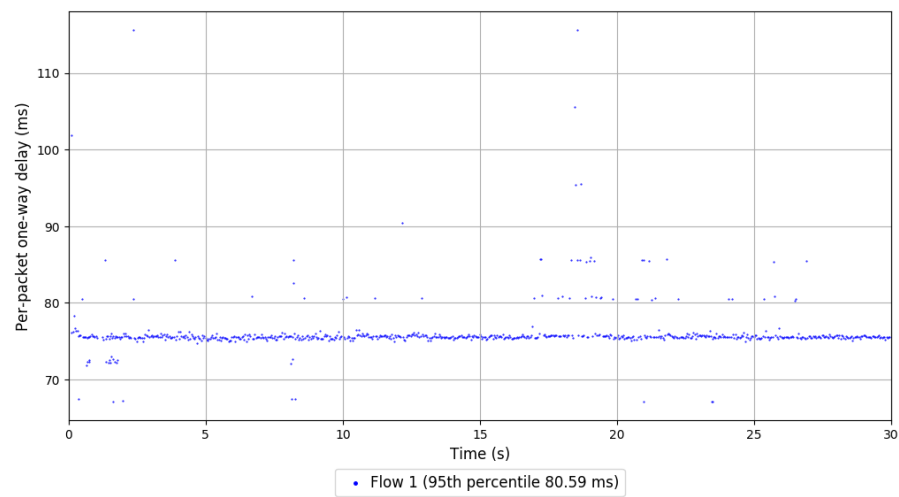
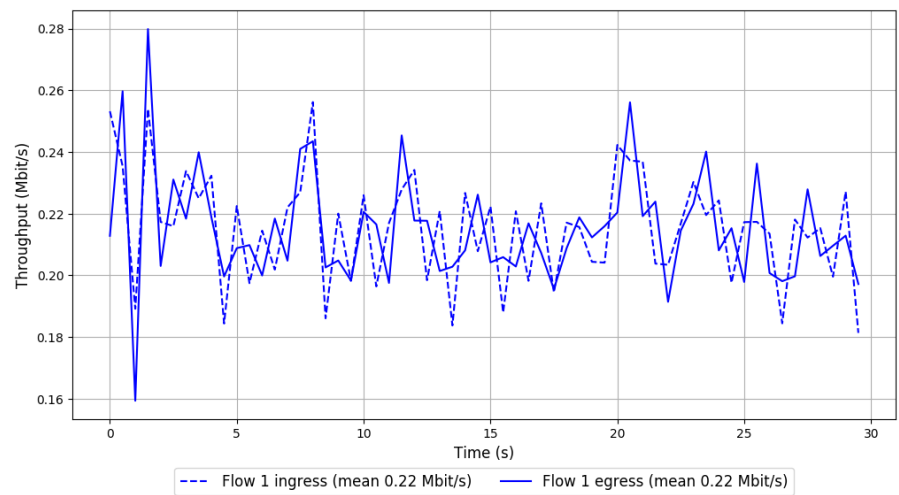


Run 2: Statistics of SCReAM

Start at: 2018-01-15 22:56:11  
End at: 2018-01-15 22:56:41  
Local clock offset: -24.08 ms  
Remote clock offset: -21.339 ms

# Below is generated by plot.py at 2018-01-16 00:12:28  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.22 Mbit/s  
95th percentile per-packet one-way delay: 80.586 ms  
Loss rate: 0.13%  
-- Flow 1:  
Average throughput: 0.22 Mbit/s  
95th percentile per-packet one-way delay: 80.586 ms  
Loss rate: 0.13%

Run 2: Report of SReAM — Data Link

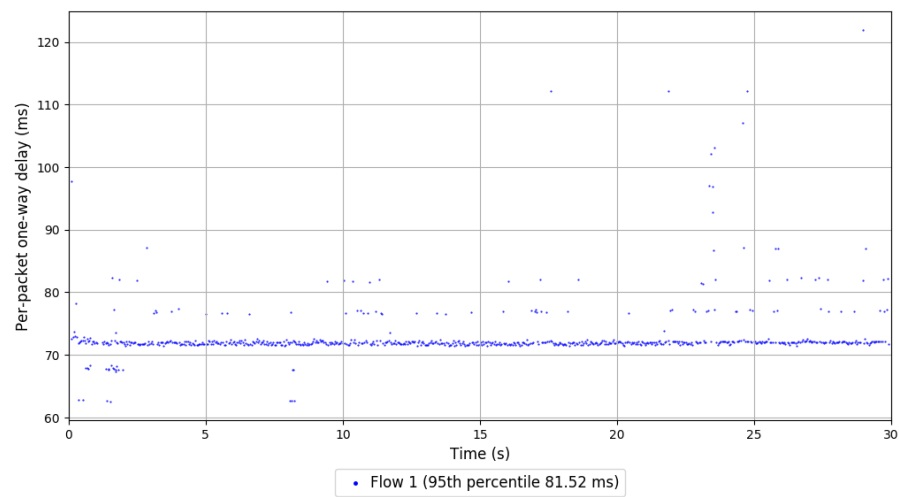
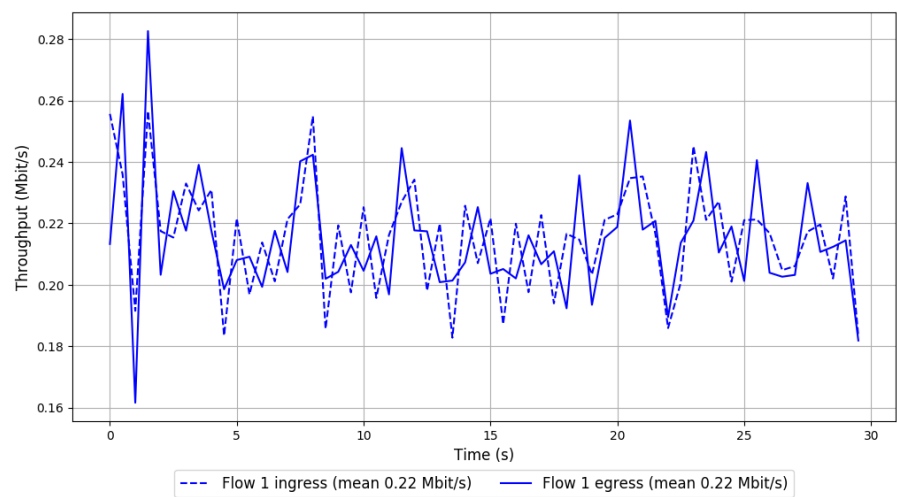


Run 3: Statistics of SCReAM

Start at: 2018-01-15 23:12:30  
End at: 2018-01-15 23:13:00  
Local clock offset: -20.433 ms  
Remote clock offset: -18.834 ms

# Below is generated by plot.py at 2018-01-16 00:12:28  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.22 Mbit/s  
95th percentile per-packet one-way delay: 81.517 ms  
Loss rate: 0.26%  
-- Flow 1:  
Average throughput: 0.22 Mbit/s  
95th percentile per-packet one-way delay: 81.517 ms  
Loss rate: 0.26%

Run 3: Report of SReAM — Data Link



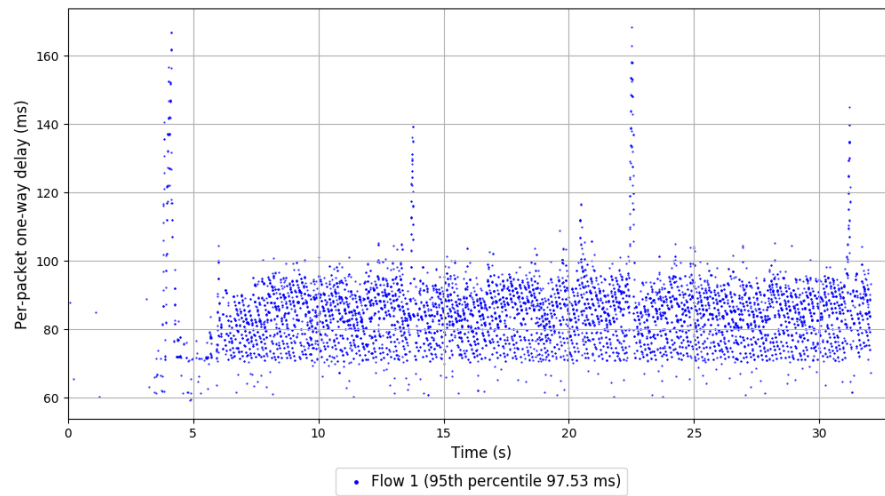
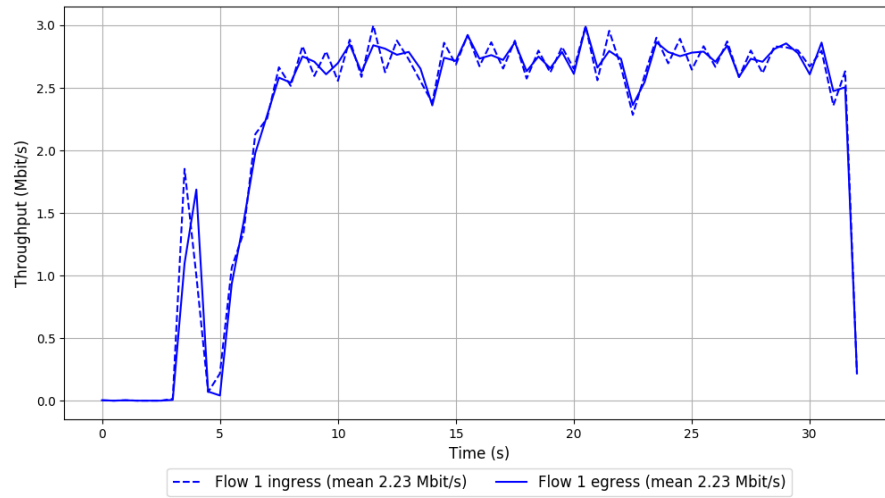
```
Run 1: Statistics of WebRTC media

Start at: 2018-01-15 22:40:56
End at: 2018-01-15 22:41:26
Local clock offset: -14.116 ms
Remote clock offset: -18.946 ms

# Below is generated by plot.py at 2018-01-16 00:12:28
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.23 Mbit/s
95th percentile per-packet one-way delay: 97.528 ms
Loss rate: 0.35%
-- Flow 1:
Average throughput: 2.23 Mbit/s
95th percentile per-packet one-way delay: 97.528 ms
Loss rate: 0.35%
```



### Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

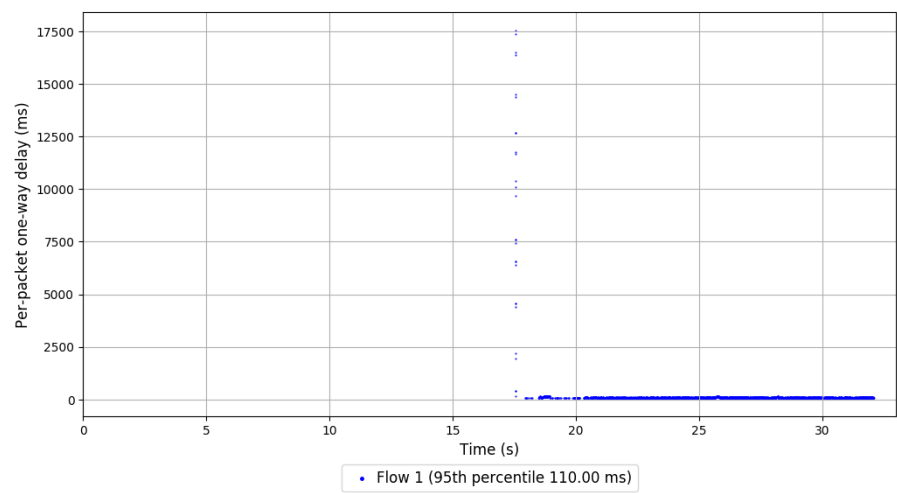
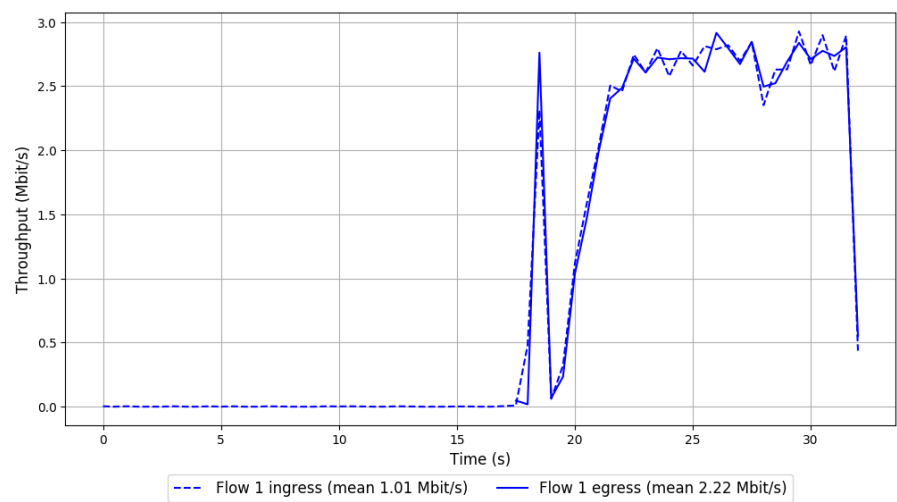
Start at: 2018-01-15 22:57:16

End at: 2018-01-15 22:57:46

Local clock offset: -24.061 ms

Remote clock offset: -18.743 ms

Run 2: Report of WebRTC media — Data Link

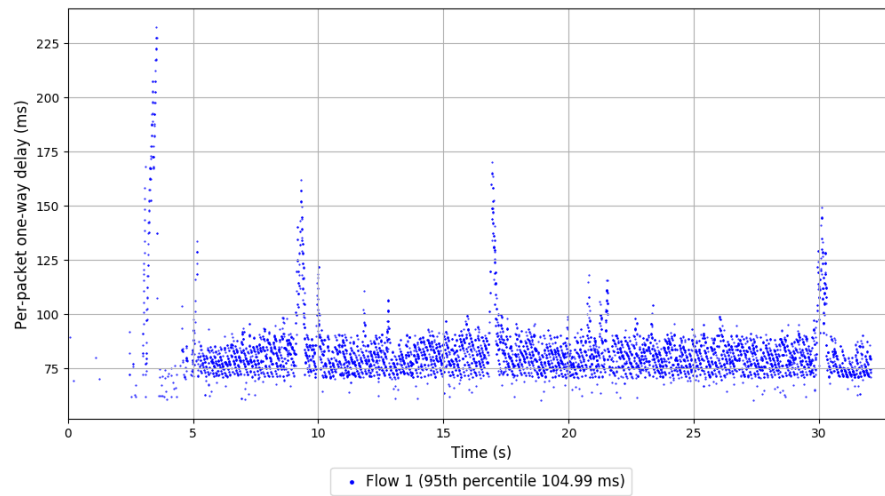
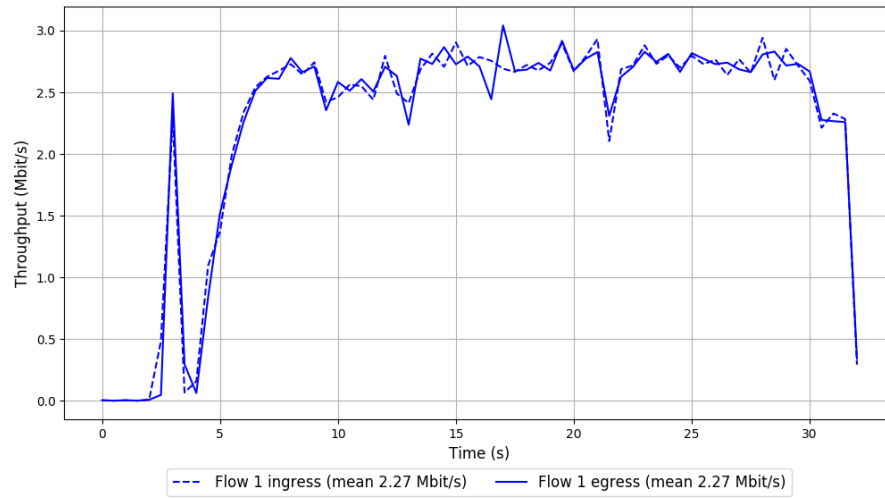


Run 3: Statistics of WebRTC media

Start at: 2018-01-15 23:13:35  
End at: 2018-01-15 23:14:05  
Local clock offset: -20.62 ms  
Remote clock offset: -18.236 ms

# Below is generated by plot.py at 2018-01-16 00:12:29  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 2.27 Mbit/s  
95th percentile per-packet one-way delay: 104.992 ms  
Loss rate: 0.24%  
-- Flow 1:  
Average throughput: 2.27 Mbit/s  
95th percentile per-packet one-way delay: 104.992 ms  
Loss rate: 0.24%

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

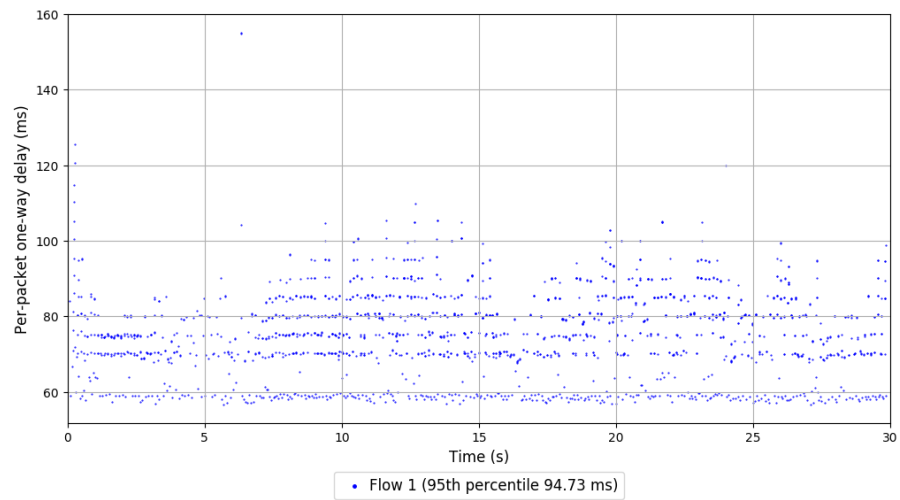
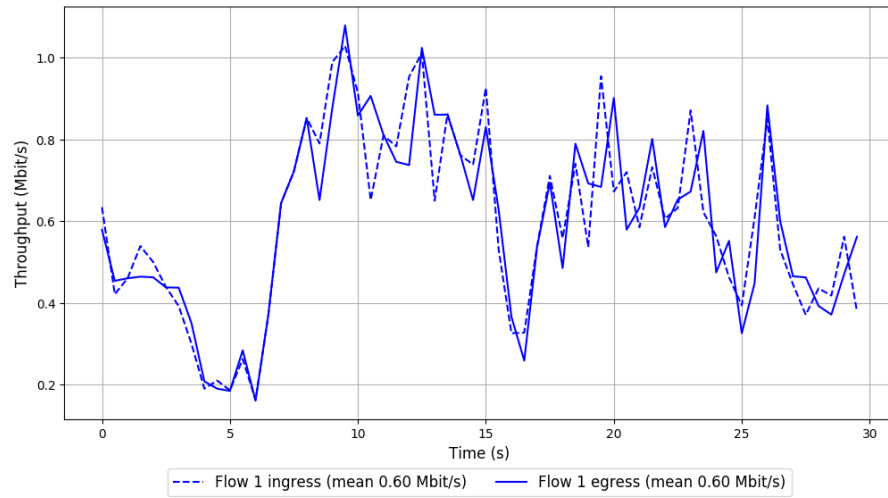


Run 1: Statistics of Sprout

Start at: 2018-01-15 22:37:41  
End at: 2018-01-15 22:38:11  
Local clock offset: -14.73 ms  
Remote clock offset: -17.763 ms

# Below is generated by plot.py at 2018-01-16 00:12:29  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.60 Mbit/s  
95th percentile per-packet one-way delay: 94.730 ms  
Loss rate: 0.38%  
-- Flow 1:  
Average throughput: 0.60 Mbit/s  
95th percentile per-packet one-way delay: 94.730 ms  
Loss rate: 0.38%

## Run 1: Report of Sprout — Data Link



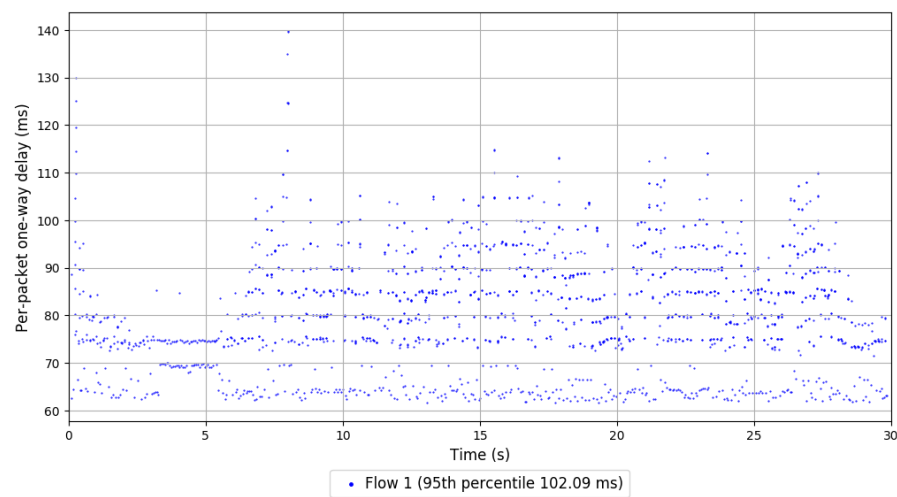
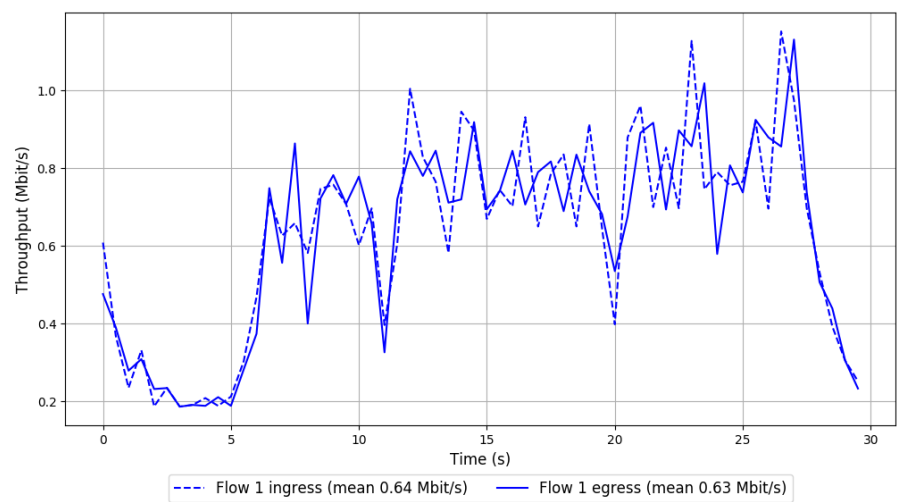
Run 2: Statistics of Sprout

Start at: 2018-01-15 22:54:01  
End at: 2018-01-15 22:54:31  
Local clock offset: -22.09 ms  
Remote clock offset: -20.444 ms

# Below is generated by plot.py at 2018-01-16 00:12:29  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.63 Mbit/s  
95th percentile per-packet one-way delay: 102.094 ms  
Loss rate: 0.49%  
-- Flow 1:  
Average throughput: 0.63 Mbit/s  
95th percentile per-packet one-way delay: 102.094 ms  
Loss rate: 0.49%



Run 2: Report of Sprout — Data Link

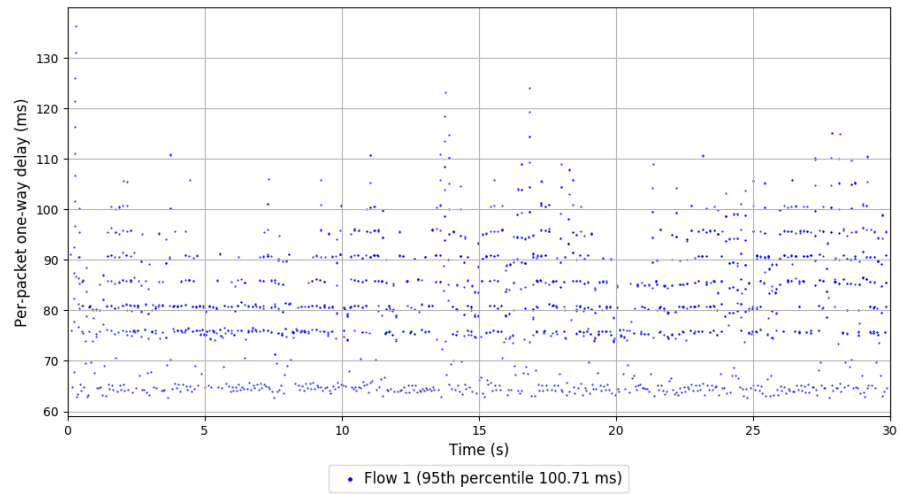
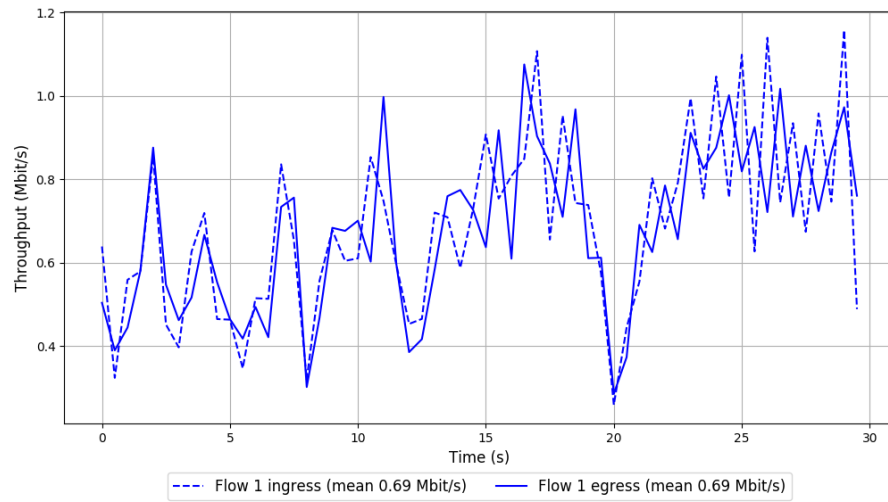


Run 3: Statistics of Sprout

Start at: 2018-01-15 23:10:19  
End at: 2018-01-15 23:10:49  
Local clock offset: -19.299 ms  
Remote clock offset: -19.521 ms

# Below is generated by plot.py at 2018-01-16 00:12:29  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.69 Mbit/s  
95th percentile per-packet one-way delay: 100.709 ms  
Loss rate: 1.23%  
-- Flow 1:  
Average throughput: 0.69 Mbit/s  
95th percentile per-packet one-way delay: 100.709 ms  
Loss rate: 1.23%

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

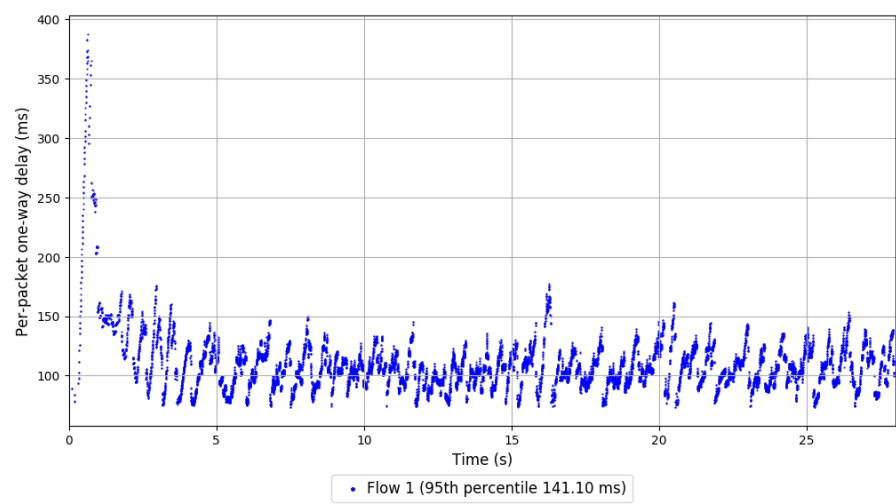
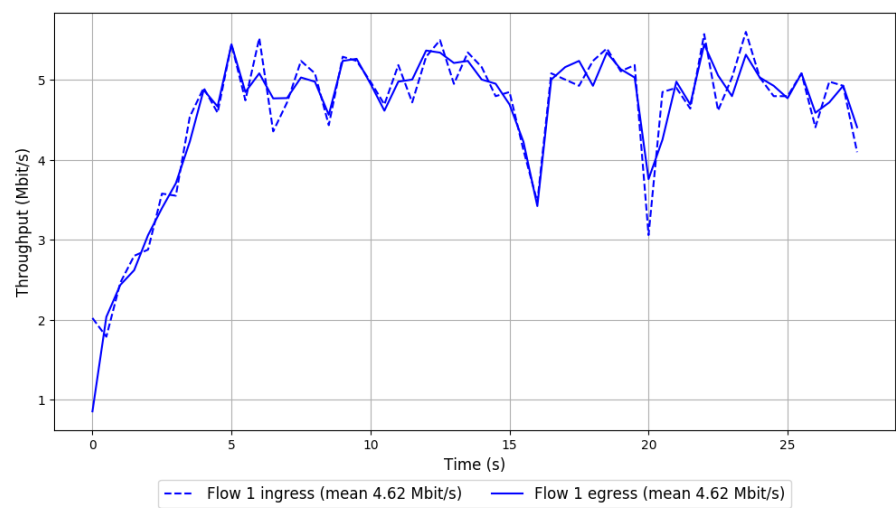


Run 1: Statistics of TaoVA-100x

Start at: 2018-01-15 22:49:40  
End at: 2018-01-15 22:50:10  
Local clock offset: -23.797 ms  
Remote clock offset: -19.774 ms

# Below is generated by plot.py at 2018-01-16 00:12:38  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.62 Mbit/s  
95th percentile per-packet one-way delay: 141.104 ms  
Loss rate: 0.43%  
-- Flow 1:  
Average throughput: 4.62 Mbit/s  
95th percentile per-packet one-way delay: 141.104 ms  
Loss rate: 0.43%

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

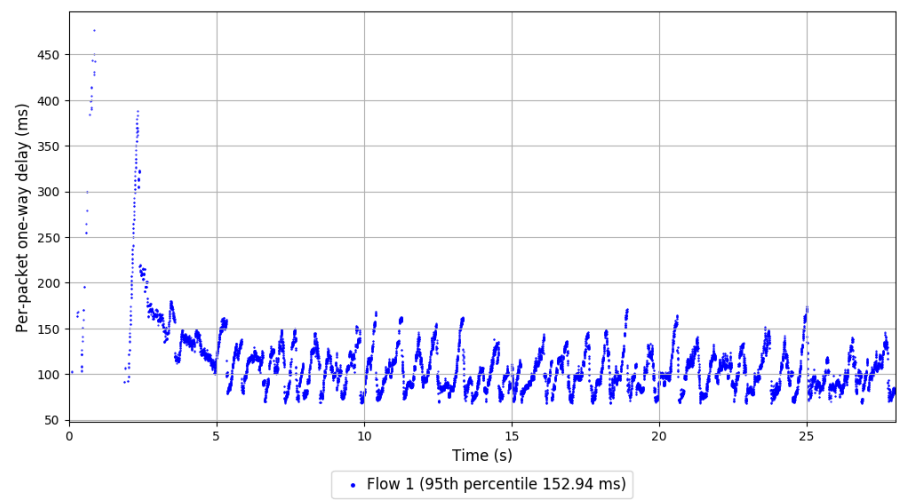
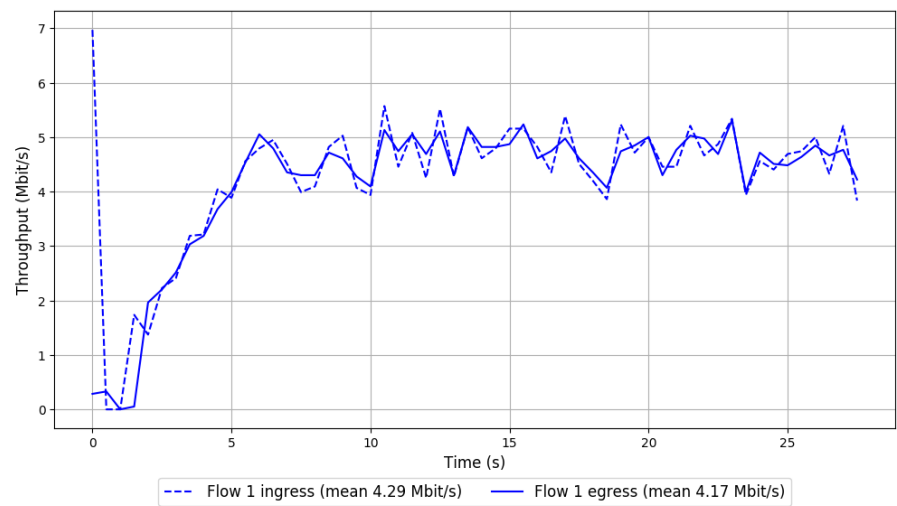


Run 2: Statistics of TaoVA-100x

Start at: 2018-01-15 23:05:58  
End at: 2018-01-15 23:06:28  
Local clock offset: -22.289 ms  
Remote clock offset: -18.7 ms

# Below is generated by plot.py at 2018-01-16 00:12:39  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.17 Mbit/s  
95th percentile per-packet one-way delay: 152.943 ms  
Loss rate: 3.15%  
-- Flow 1:  
Average throughput: 4.17 Mbit/s  
95th percentile per-packet one-way delay: 152.943 ms  
Loss rate: 3.15%

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



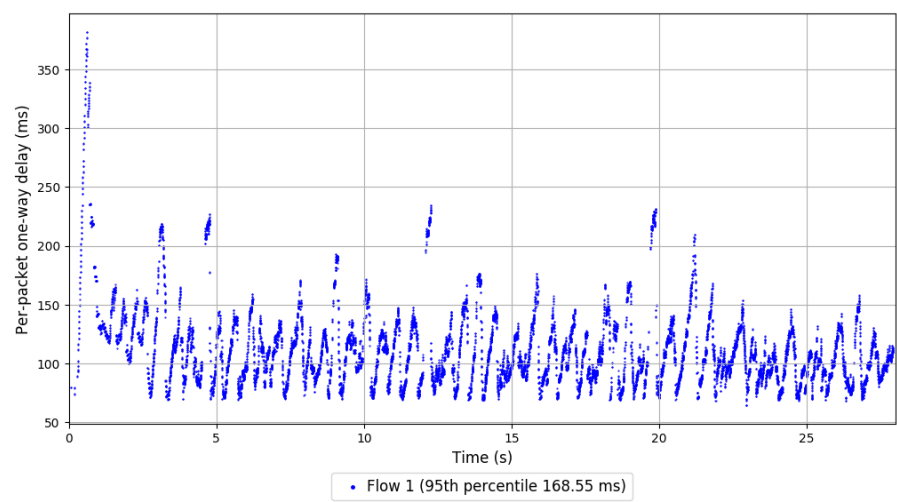
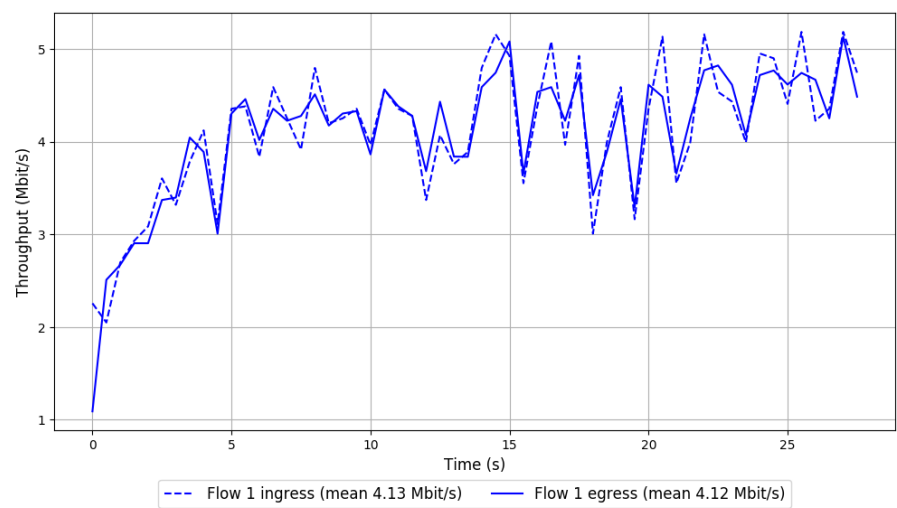
Run 3: Statistics of TaoVA-100x

Start at: 2018-01-15 23:22:18  
End at: 2018-01-15 23:22:48  
Local clock offset: -20.911 ms  
Remote clock offset: -18.546 ms

# Below is generated by plot.py at 2018-01-16 00:12:39  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.12 Mbit/s  
95th percentile per-packet one-way delay: 168.553 ms  
Loss rate: 0.56%  
-- Flow 1:  
Average throughput: 4.12 Mbit/s  
95th percentile per-packet one-way delay: 168.553 ms  
Loss rate: 0.56%



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

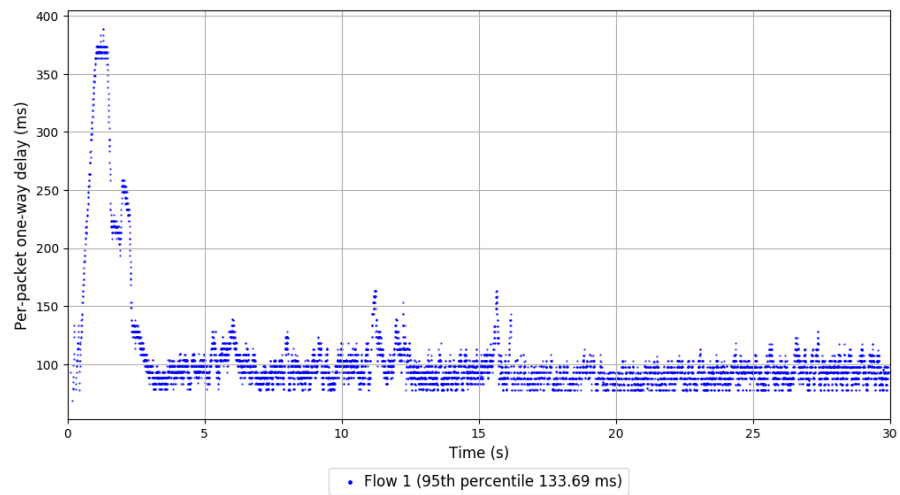
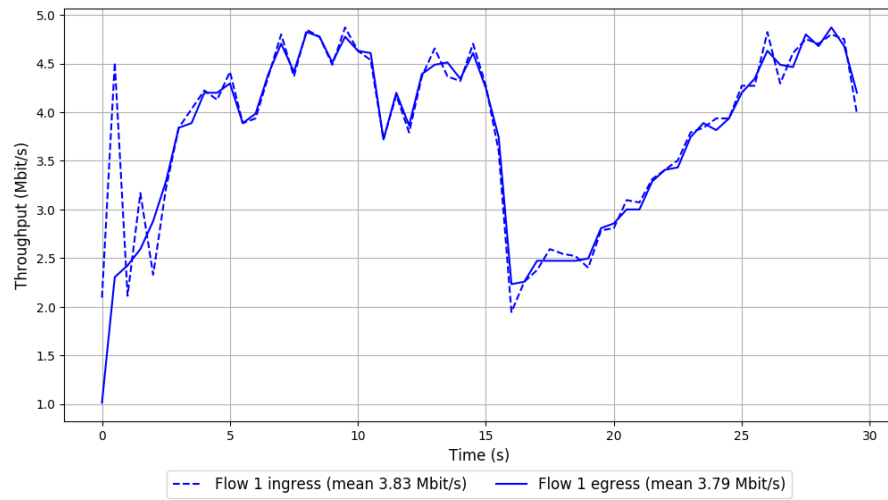


Run 1: Statistics of TCP Vegas

Start at: 2018-01-15 22:35:30  
End at: 2018-01-15 22:36:01  
Local clock offset: -16.349 ms  
Remote clock offset: -20.683 ms

# Below is generated by plot.py at 2018-01-16 00:12:39  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 3.79 Mbit/s  
95th percentile per-packet one-way delay: 133.688 ms  
Loss rate: 1.30%  
-- Flow 1:  
Average throughput: 3.79 Mbit/s  
95th percentile per-packet one-way delay: 133.688 ms  
Loss rate: 1.30%

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

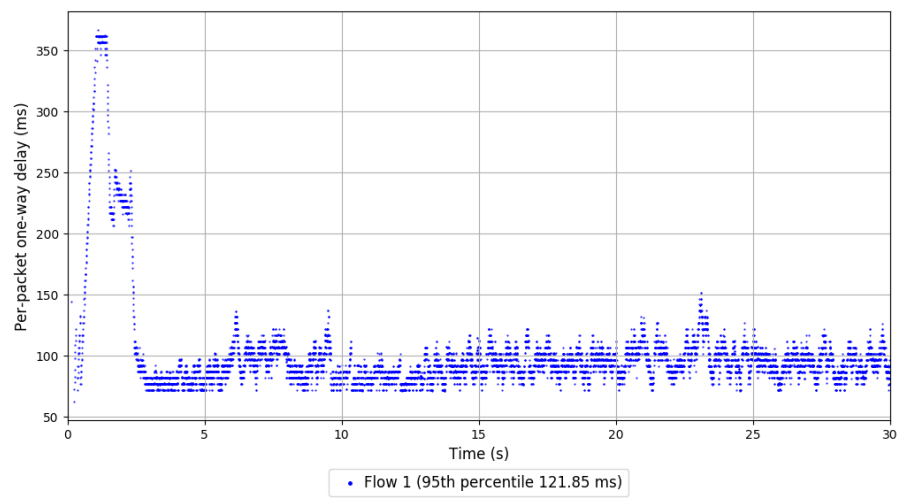
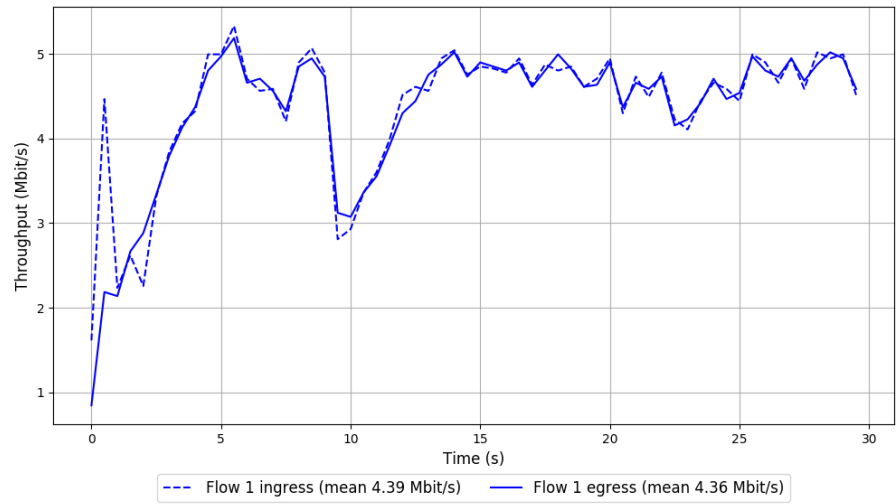


Run 2: Statistics of TCP Vegas

Start at: 2018-01-15 22:51:50  
End at: 2018-01-15 22:52:20  
Local clock offset: -24.384 ms  
Remote clock offset: -17.952 ms

# Below is generated by plot.py at 2018-01-16 00:12:39  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.36 Mbit/s  
95th percentile per-packet one-way delay: 121.846 ms  
Loss rate: 1.05%  
-- Flow 1:  
Average throughput: 4.36 Mbit/s  
95th percentile per-packet one-way delay: 121.846 ms  
Loss rate: 1.05%

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

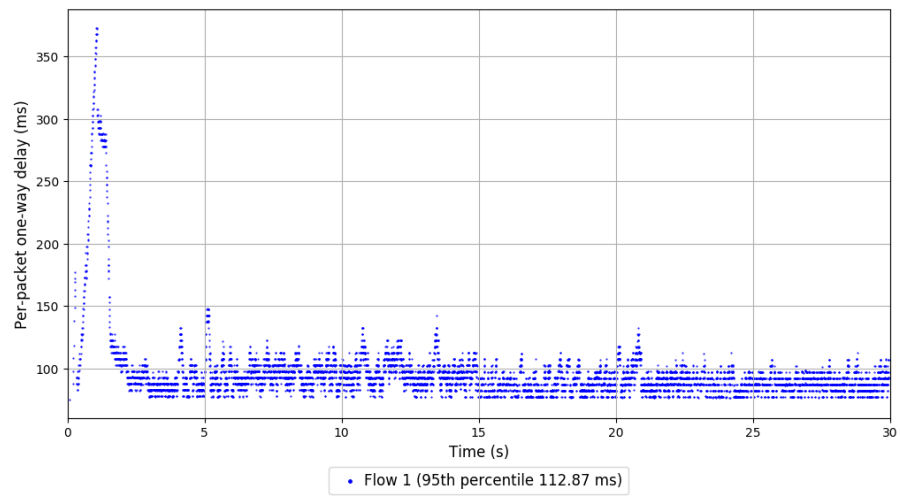
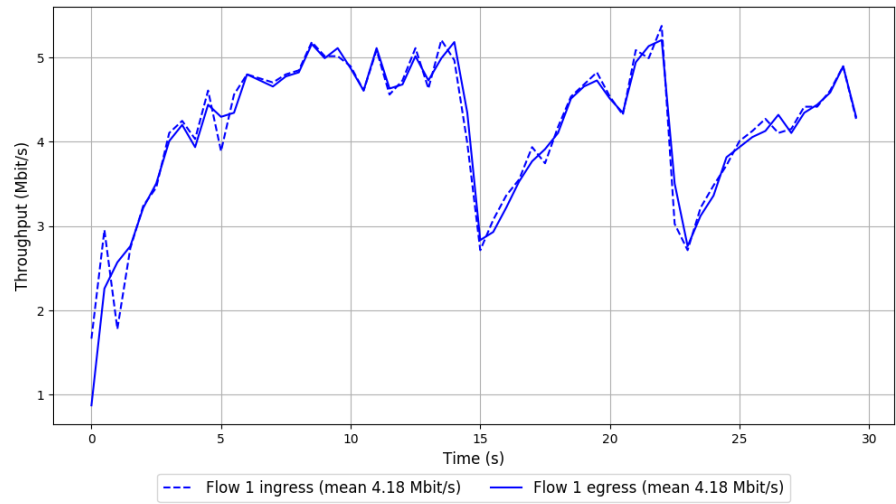


Run 3: Statistics of TCP Vegas

Start at: 2018-01-15 23:08:09  
End at: 2018-01-15 23:08:39  
Local clock offset: -20.208 ms  
Remote clock offset: -19.971 ms

# Below is generated by plot.py at 2018-01-16 00:12:39  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.18 Mbit/s  
95th percentile per-packet one-way delay: 112.868 ms  
Loss rate: 0.35%  
-- Flow 1:  
Average throughput: 4.18 Mbit/s  
95th percentile per-packet one-way delay: 112.868 ms  
Loss rate: 0.35%

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



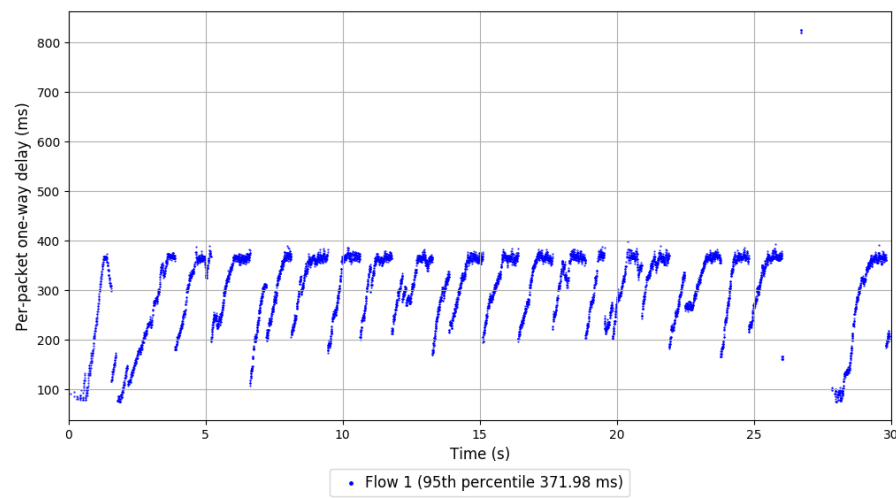
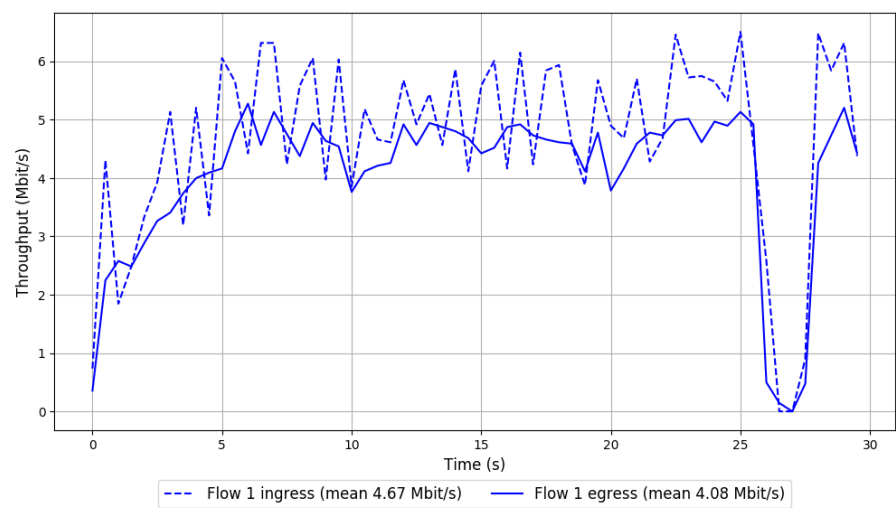
Run 1: Statistics of Verus

Start at: 2018-01-15 22:38:46  
End at: 2018-01-15 22:39:16  
Local clock offset: -13.264 ms  
Remote clock offset: -19.33 ms

# Below is generated by plot.py at 2018-01-16 00:12:39  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.08 Mbit/s  
95th percentile per-packet one-way delay: 371.982 ms  
Loss rate: 12.83%  
-- Flow 1:  
Average throughput: 4.08 Mbit/s  
95th percentile per-packet one-way delay: 371.982 ms  
Loss rate: 12.83%



Run 1: Report of Verus — Data Link

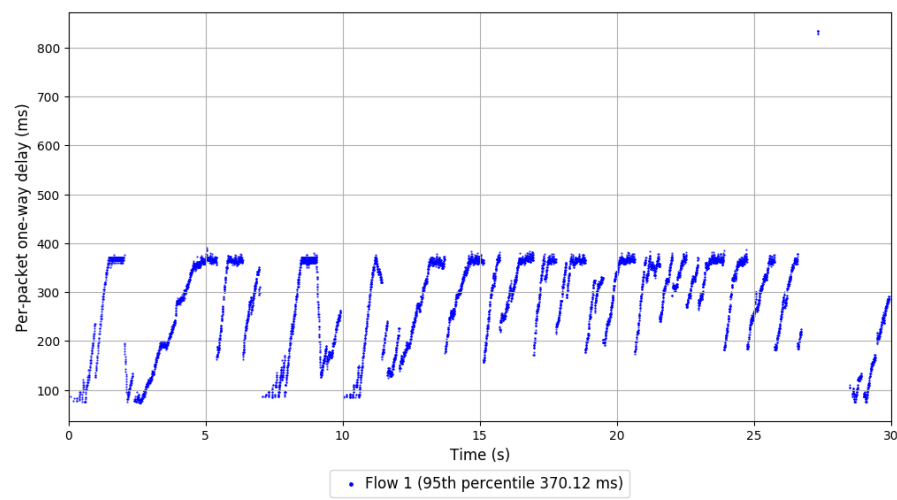
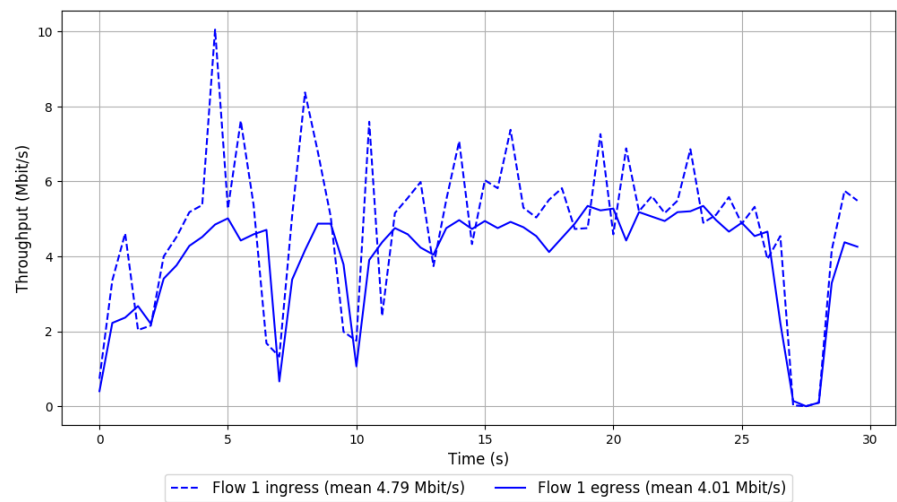


Run 2: Statistics of Verus

Start at: 2018-01-15 22:55:06  
End at: 2018-01-15 22:55:36  
Local clock offset: -20.936 ms  
Remote clock offset: -19.837 ms

# Below is generated by plot.py at 2018-01-16 00:12:39  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.01 Mbit/s  
95th percentile per-packet one-way delay: 370.116 ms  
Loss rate: 16.59%  
-- Flow 1:  
Average throughput: 4.01 Mbit/s  
95th percentile per-packet one-way delay: 370.116 ms  
Loss rate: 16.59%

Run 2: Report of Verus — Data Link

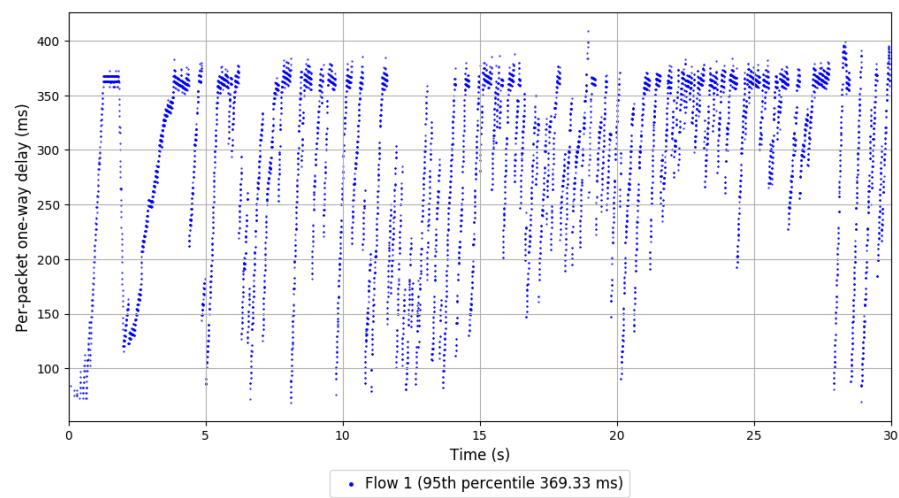
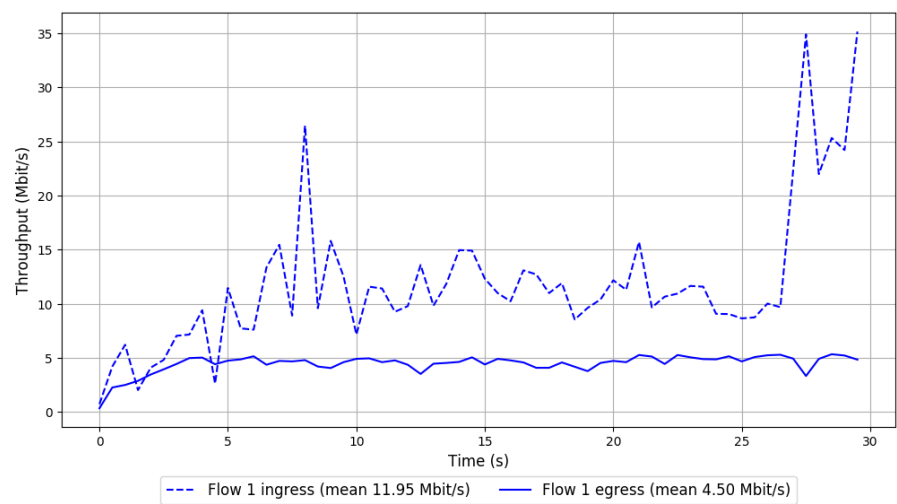


Run 3: Statistics of Verus

Start at: 2018-01-15 23:11:24  
End at: 2018-01-15 23:11:54  
Local clock offset: -17.68 ms  
Remote clock offset: -18.582 ms

# Below is generated by plot.py at 2018-01-16 00:12:45  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.50 Mbit/s  
95th percentile per-packet one-way delay: 369.329 ms  
Loss rate: 62.44%  
-- Flow 1:  
Average throughput: 4.50 Mbit/s  
95th percentile per-packet one-way delay: 369.329 ms  
Loss rate: 62.44%

Run 3: Report of Verus — Data Link

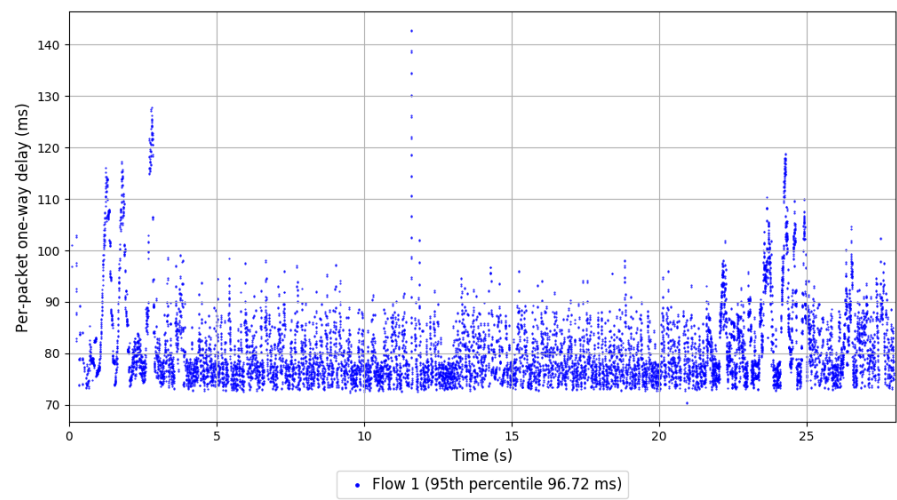
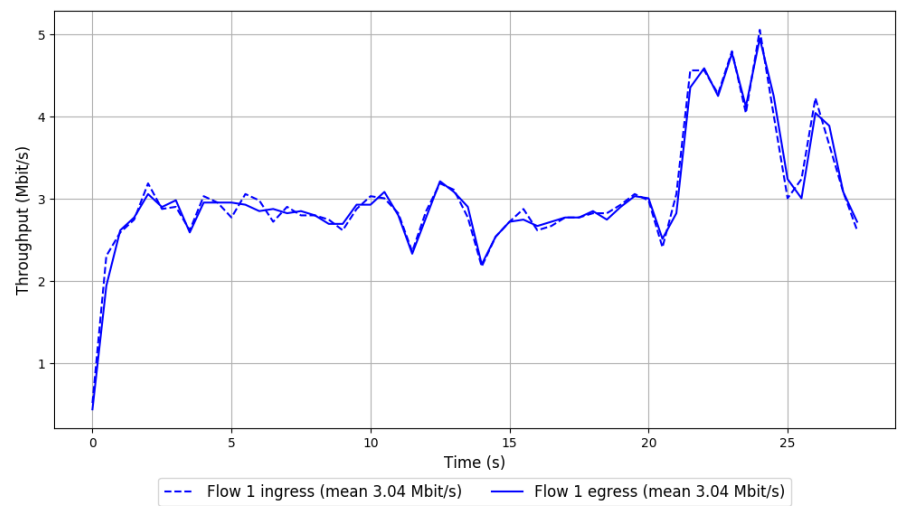


Run 1: Statistics of Copa

Start at: 2018-01-15 22:44:12  
End at: 2018-01-15 22:44:42  
Local clock offset: -17.42 ms  
Remote clock offset: -18.637 ms

# Below is generated by plot.py at 2018-01-16 00:12:45  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 3.04 Mbit/s  
95th percentile per-packet one-way delay: 96.717 ms  
Loss rate: 0.29%  
-- Flow 1:  
Average throughput: 3.04 Mbit/s  
95th percentile per-packet one-way delay: 96.717 ms  
Loss rate: 0.29%

Run 1: Report of Copa — Data Link



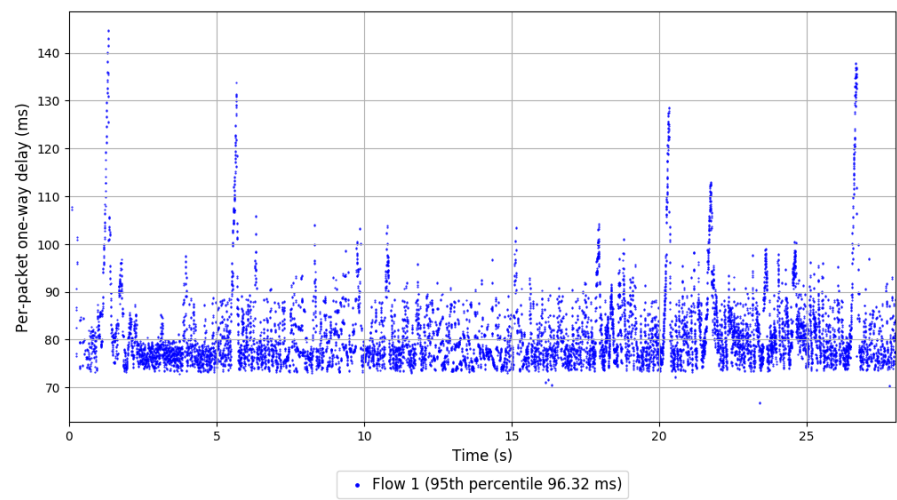
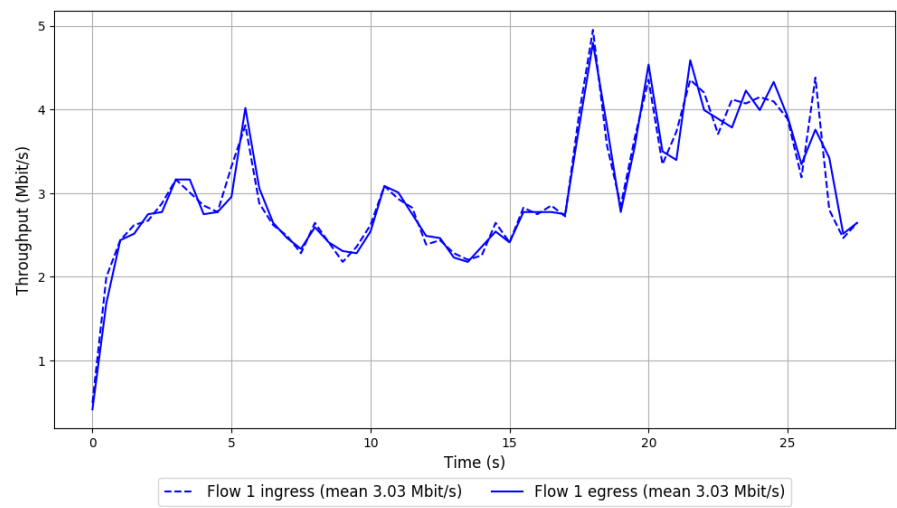
Run 2: Statistics of Copa

Start at: 2018-01-15 23:00:31  
End at: 2018-01-15 23:01:01  
Local clock offset: -23.149 ms  
Remote clock offset: -20.669 ms

# Below is generated by plot.py at 2018-01-16 00:12:45  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 3.03 Mbit/s  
95th percentile per-packet one-way delay: 96.320 ms  
Loss rate: 0.24%  
-- Flow 1:  
Average throughput: 3.03 Mbit/s  
95th percentile per-packet one-way delay: 96.320 ms  
Loss rate: 0.24%



Run 2: Report of Copa — Data Link

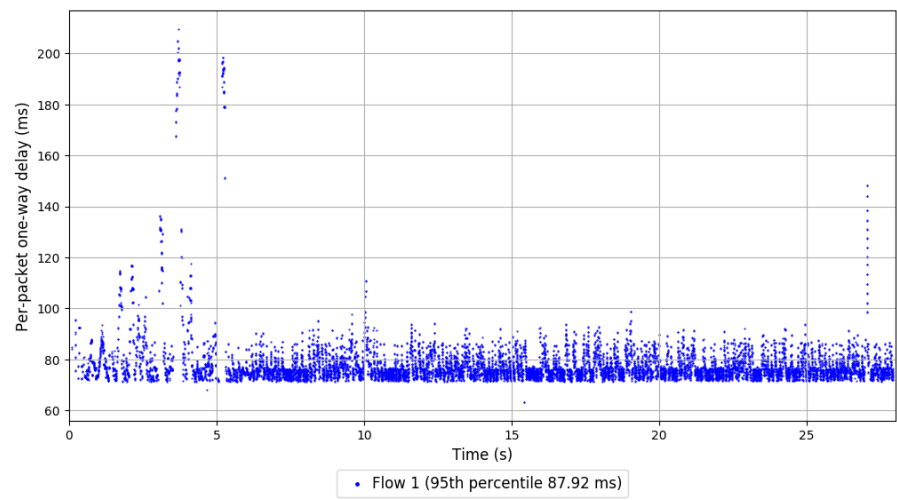
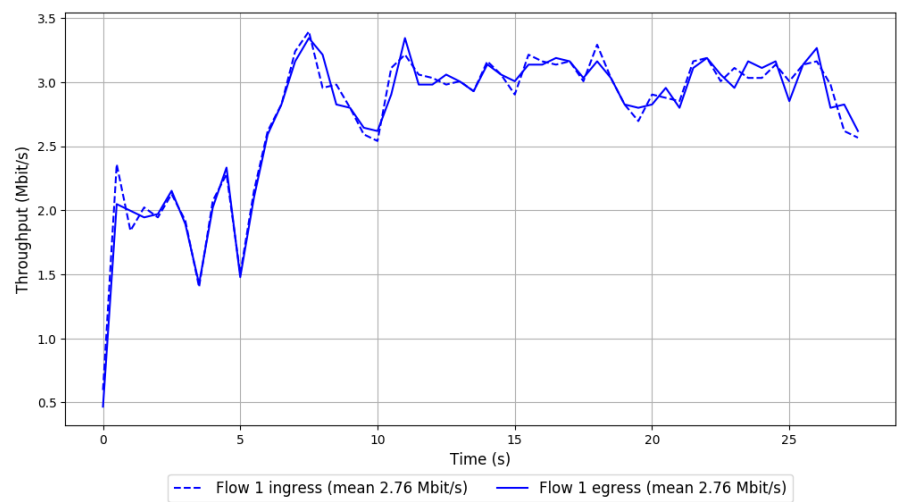


Run 3: Statistics of Copa

Start at: 2018-01-15 23:16:50  
End at: 2018-01-15 23:17:21  
Local clock offset: -17.078 ms  
Remote clock offset: -18.942 ms

# Below is generated by plot.py at 2018-01-16 00:12:45  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 2.76 Mbit/s  
95th percentile per-packet one-way delay: 87.925 ms  
Loss rate: 0.24%  
-- Flow 1:  
Average throughput: 2.76 Mbit/s  
95th percentile per-packet one-way delay: 87.925 ms  
Loss rate: 0.24%

Run 3: Report of Copa — Data Link

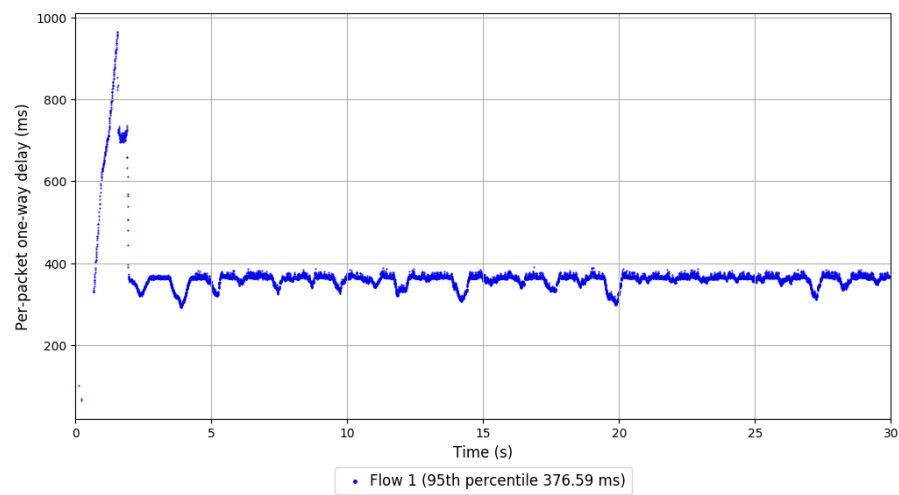
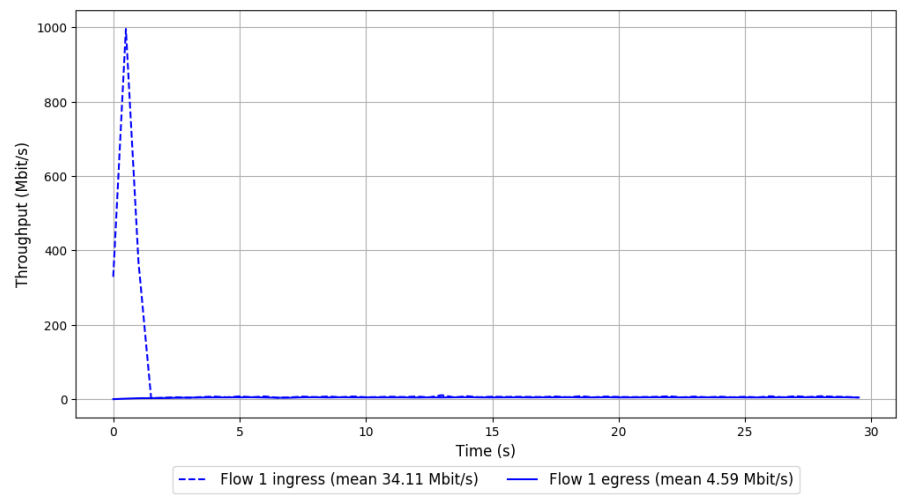


Run 1: Statistics of FillP

Start at: 2018-01-15 22:46:23  
End at: 2018-01-15 22:46:53  
Local clock offset: -20.391 ms  
Remote clock offset: -21.144 ms

# Below is generated by plot.py at 2018-01-16 00:12:50  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.59 Mbit/s  
95th percentile per-packet one-way delay: 376.586 ms  
Loss rate: 86.57%  
-- Flow 1:  
Average throughput: 4.59 Mbit/s  
95th percentile per-packet one-way delay: 376.586 ms  
Loss rate: 86.57%

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

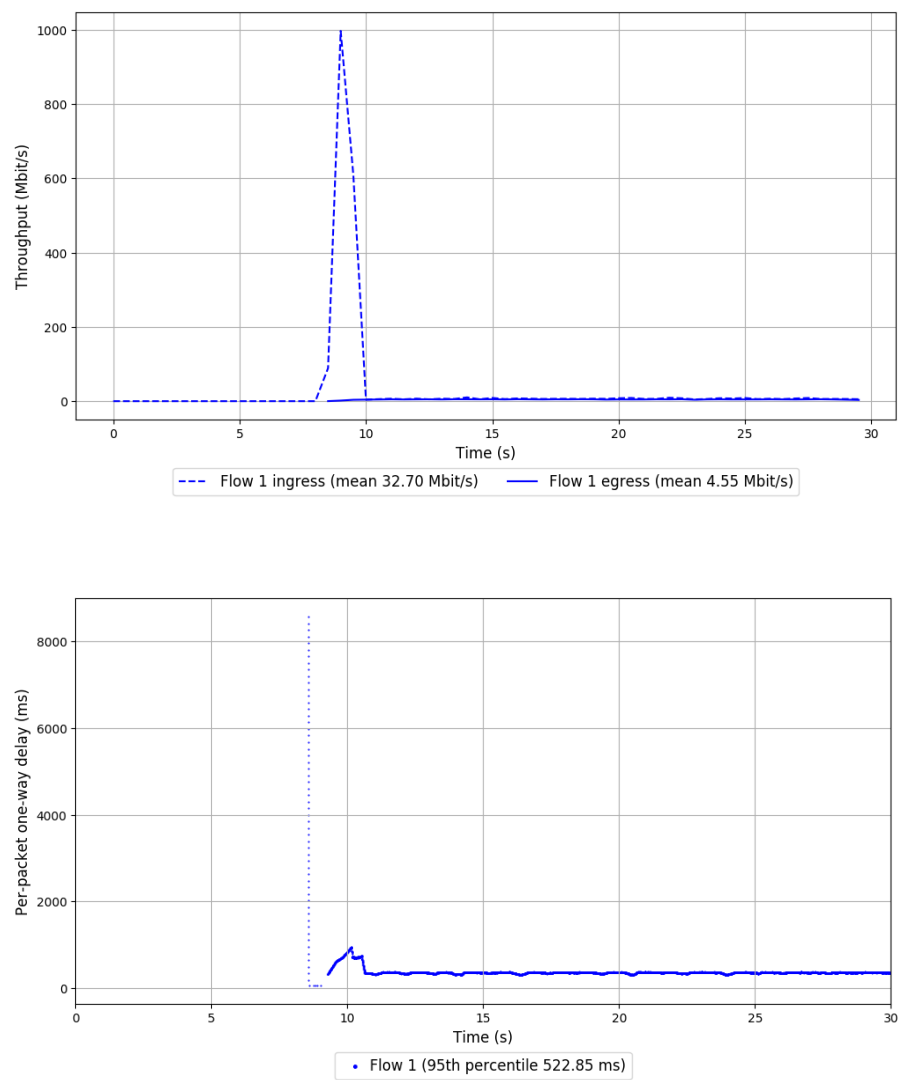
Start at: 2018-01-15 23:02:42

End at: 2018-01-15 23:03:12

Local clock offset: -25.385 ms

Remote clock offset: -18.512 ms

Run 2: Report of FillP — Data Link



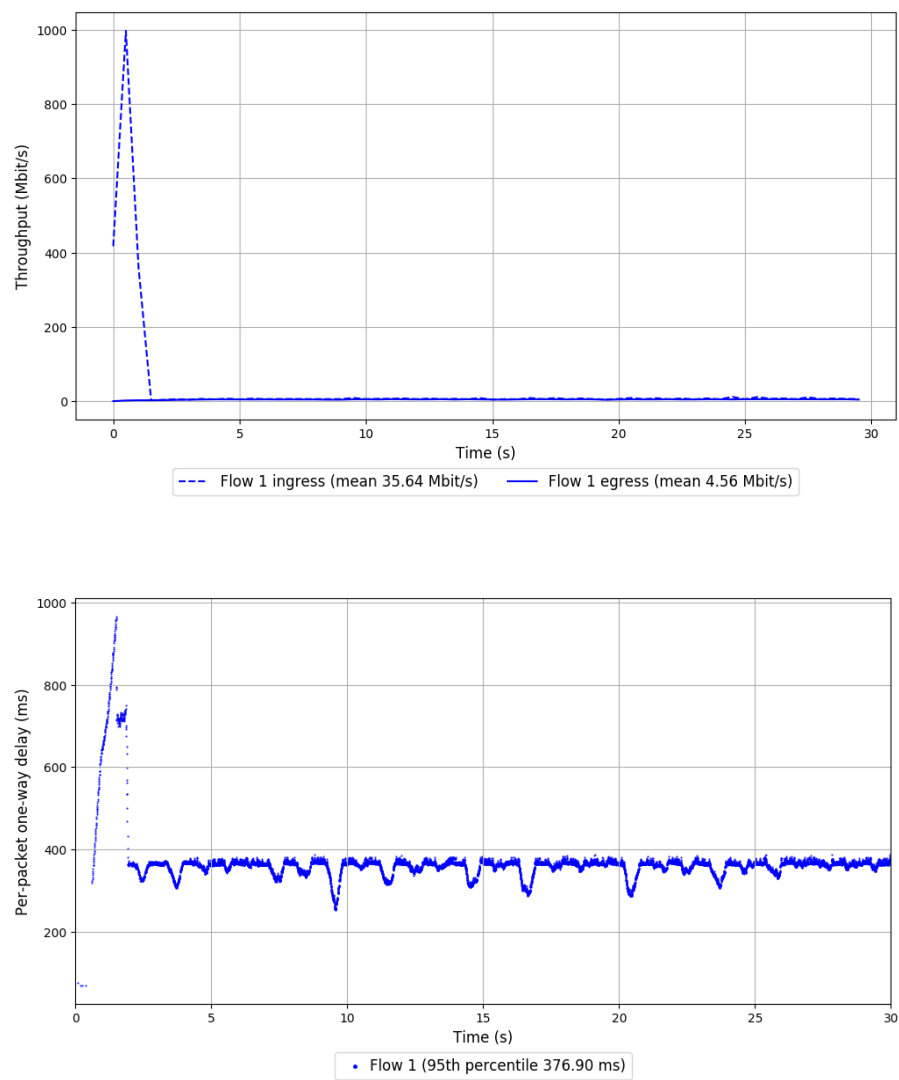
Run 3: Statistics of FillP

Start at: 2018-01-15 23:19:01  
End at: 2018-01-15 23:19:31  
Local clock offset: -18.941 ms  
Remote clock offset: -18.905 ms

# Below is generated by plot.py at 2018-01-16 00:12:50  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.56 Mbit/s  
95th percentile per-packet one-way delay: 376.898 ms  
Loss rate: 87.22%  
-- Flow 1:  
Average throughput: 4.56 Mbit/s  
95th percentile per-packet one-way delay: 376.898 ms  
Loss rate: 87.22%



Run 3: Report of FillP — Data Link

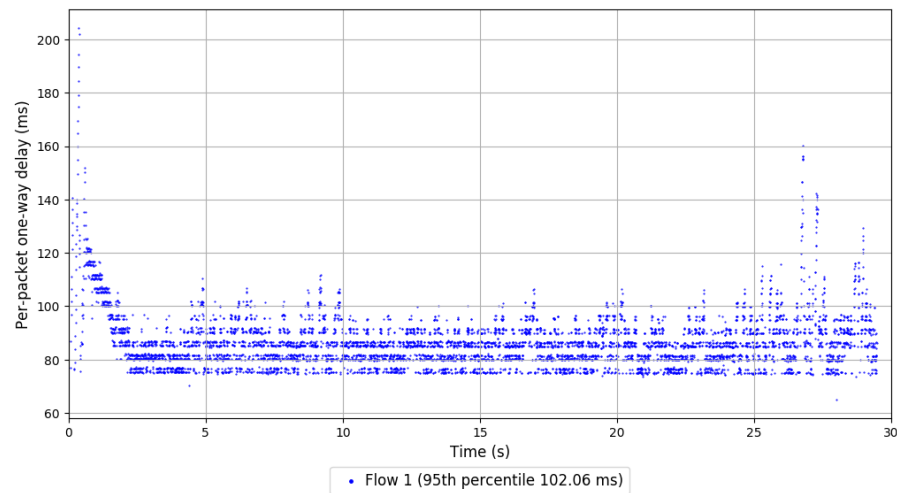
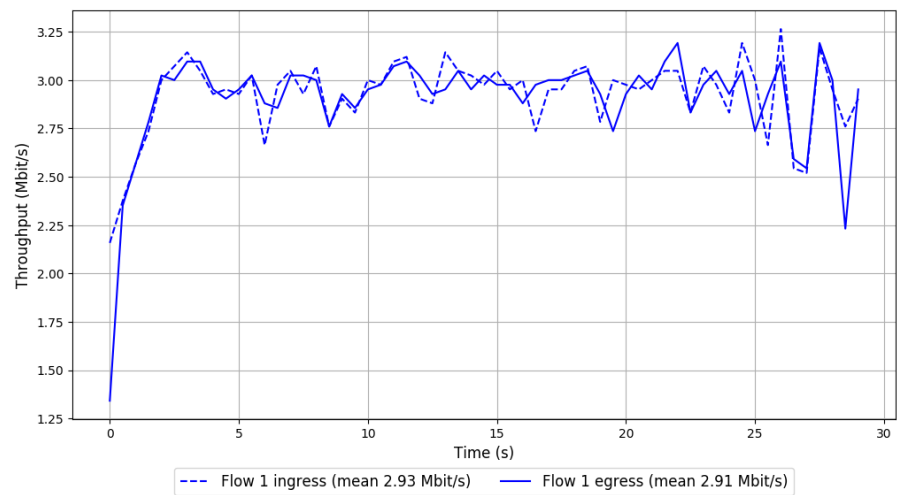


```
Run 1: Statistics of Indigo

Start at: 2018-01-15 22:36:36
End at: 2018-01-15 22:37:06
Local clock offset: -14.711 ms
Remote clock offset: -18.877 ms

# Below is generated by plot.py at 2018-01-16 00:12:50
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.91 Mbit/s
95th percentile per-packet one-way delay: 102.057 ms
Loss rate: 0.72%
-- Flow 1:
Average throughput: 2.91 Mbit/s
95th percentile per-packet one-way delay: 102.057 ms
Loss rate: 0.72%
```

Run 1: Report of Indigo — Data Link

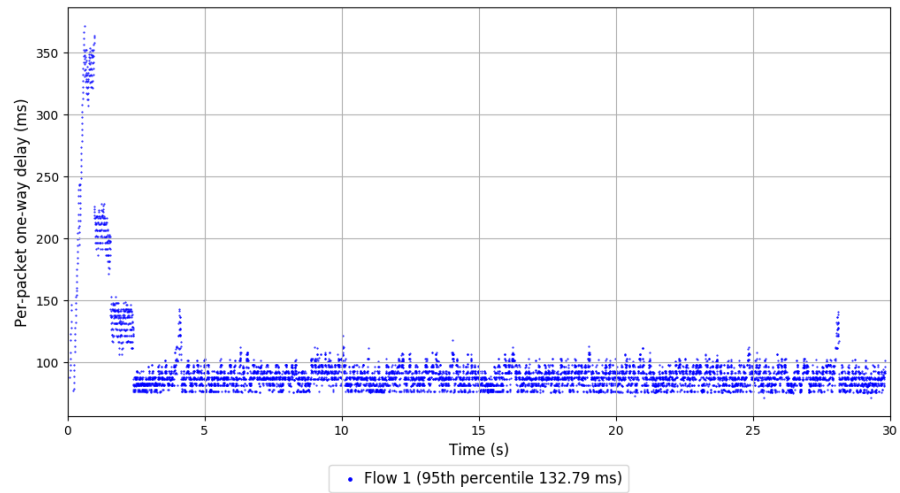
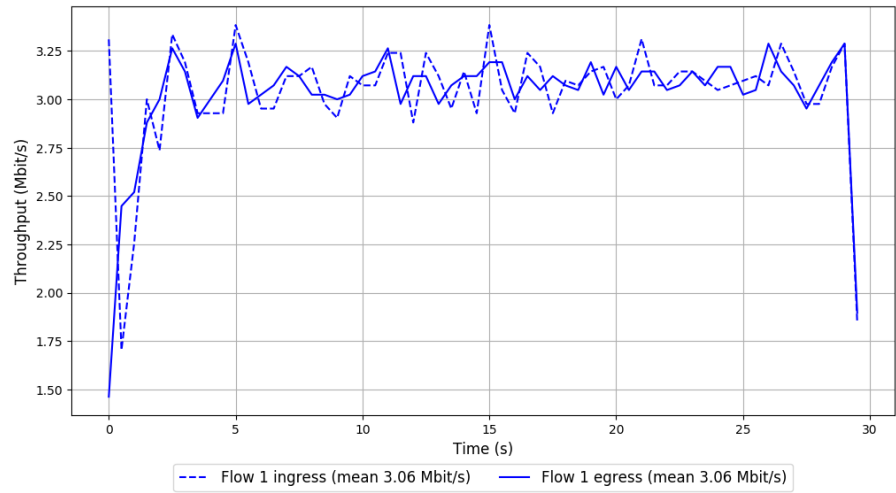


Run 2: Statistics of Indigo

Start at: 2018-01-15 22:52:55  
End at: 2018-01-15 22:53:26  
Local clock offset: -21.234 ms  
Remote clock offset: -17.817 ms

# Below is generated by plot.py at 2018-01-16 00:12:50  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 3.06 Mbit/s  
95th percentile per-packet one-way delay: 132.787 ms  
Loss rate: 0.36%  
-- Flow 1:  
Average throughput: 3.06 Mbit/s  
95th percentile per-packet one-way delay: 132.787 ms  
Loss rate: 0.36%

## Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-01-15 23:09:14  
End at: 2018-01-15 23:09:44  
Local clock offset: -18.448 ms  
Remote clock offset: -20.608 ms

# Below is generated by plot.py at 2018-01-16 00:12:50  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 3.02 Mbit/s  
95th percentile per-packet one-way delay: 102.491 ms  
Loss rate: 0.35%  
-- Flow 1:  
Average throughput: 3.02 Mbit/s  
95th percentile per-packet one-way delay: 102.491 ms  
Loss rate: 0.35%

Run 3: Report of Indigo — Data Link

