

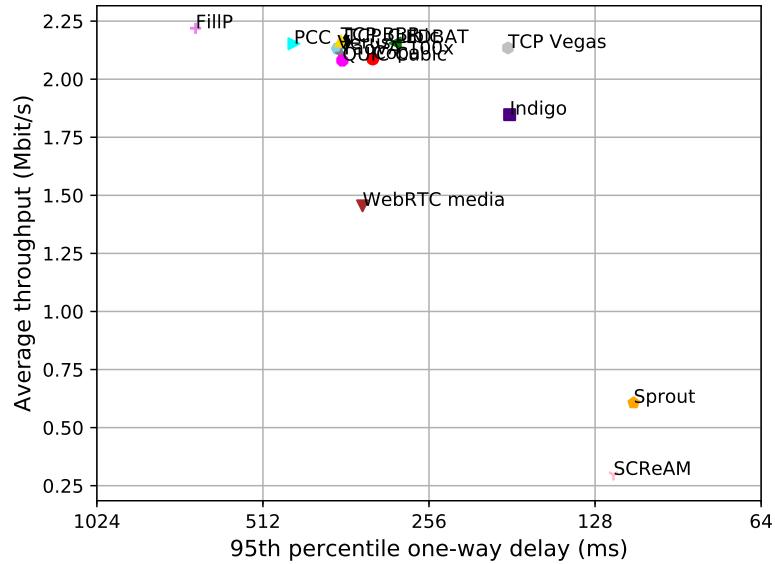
Pantheon Report

Generated at 2018-01-02 22:08:06 (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 3 flows with 10-second interval between two flows.
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.

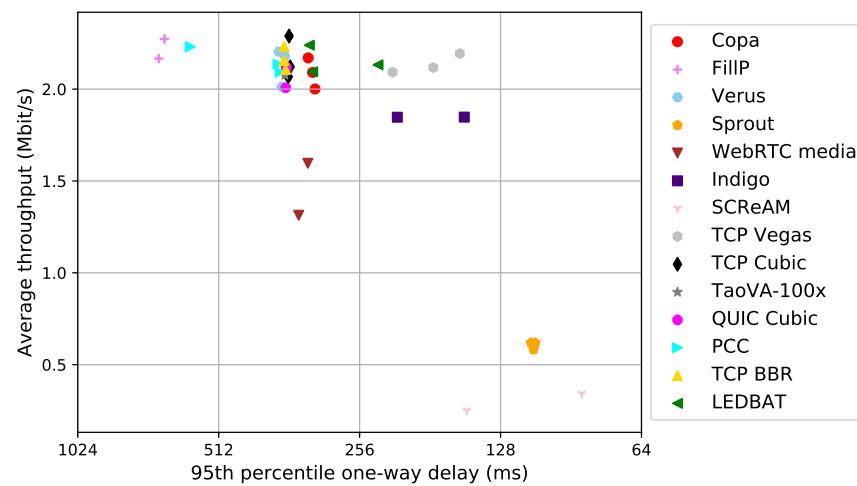
Git summary:

```
branch: master @ 904a5750834816b1e46a2c86405d707788d27c16
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/fillp @ dcaef6b00654e660f73f7ed679d2eab61ce08639
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 @ b3465b942e2826f2b179eab4a906ce6bb7cf3cf
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 @ f1a14bffe749737437f61b1eaeeb30b267cde681
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 India ppp0 to AWS India 1 Ethernet, 3 runs of 30s each per scheme
3 flows with 10s interval between flows (mean of all runs by scheme)



test from India ppp0 to AWS India 1 Ethernet, 3 runs of 30s each per scheme
3 flows with 10s interval between flows



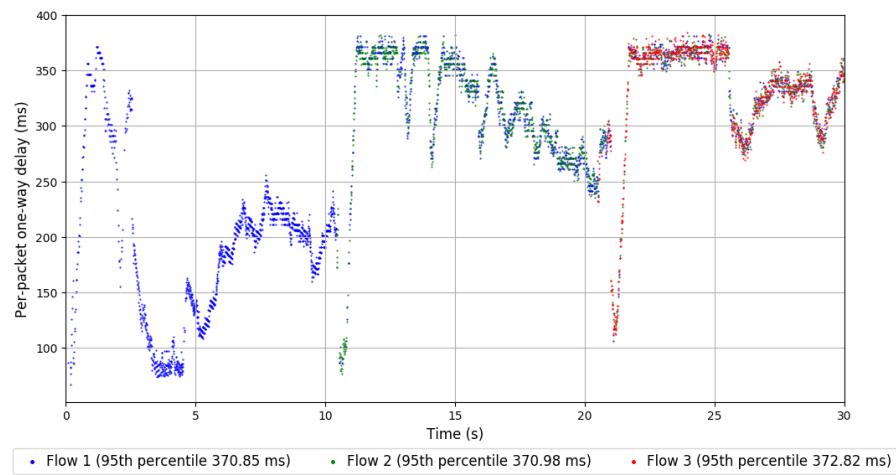
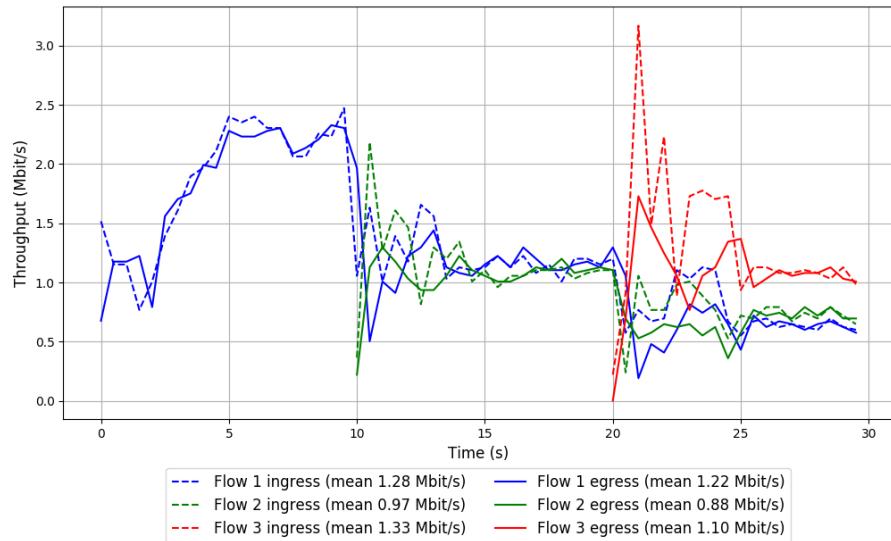
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	1.27	0.87	0.99	368.61	370.81	371.37	5.90	12.35	19.53
TCP Cubic		1.44	0.80	0.59	361.95	363.53	363.60	2.20	3.76	6.49
LEDBAT		1.10	1.22	0.81	238.32	295.16	308.09	0.23	0.97	4.50
PCC		1.21	1.01	0.88	375.61	431.17	761.43	50.76	62.67	92.04
QUIC Cubic		1.38	0.71	0.72	367.04	367.82	369.02	4.27	8.36	11.00
SCReAM		0.12	0.16	0.21	119.52	120.90	93.50	0.27	0.30	0.72
WebRTC media		0.68	0.56	0.23	301.02	350.28	352.27	0.98	1.59	4.29
Sprout		0.32	0.30	0.27	110.41	108.57	108.99	0.56	0.32	1.75
TaoVA-100x		1.35	0.88	0.71	364.57	389.68	374.74	9.22	33.28	45.72
TCP Vegas		1.09	1.02	1.12	184.08	183.98	169.53	0.64	0.75	1.65
Verus		1.60	0.74	0.21	371.30	382.85	403.37	28.85	65.19	77.04
Copa		1.33	0.91	0.64	310.38	338.28	327.94	0.55	1.18	3.22
FillP		1.32	1.00	0.81	376.74	772.61	665.47	95.85	97.97	99.20
Indigo		0.82	1.02	1.09	215.67	131.64	187.72	1.27	0.81	3.48

Run 1: Statistics of TCP BBR

```
Start at: 2018-01-02 20:42:22
End at: 2018-01-02 20:42:52
Local clock offset: 2.756 ms
Remote clock offset: -15.31 ms

# Below is generated by plot.py at 2018-01-02 22:07:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.16 Mbit/s
95th percentile per-packet one-way delay: 371.147 ms
Loss rate: 9.35%
-- Flow 1:
Average throughput: 1.22 Mbit/s
95th percentile per-packet one-way delay: 370.852 ms
Loss rate: 5.18%
-- Flow 2:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 370.978 ms
Loss rate: 10.68%
-- Flow 3:
Average throughput: 1.10 Mbit/s
95th percentile per-packet one-way delay: 372.818 ms
Loss rate: 19.54%
```

Run 1: Report of TCP BBR — Data Link

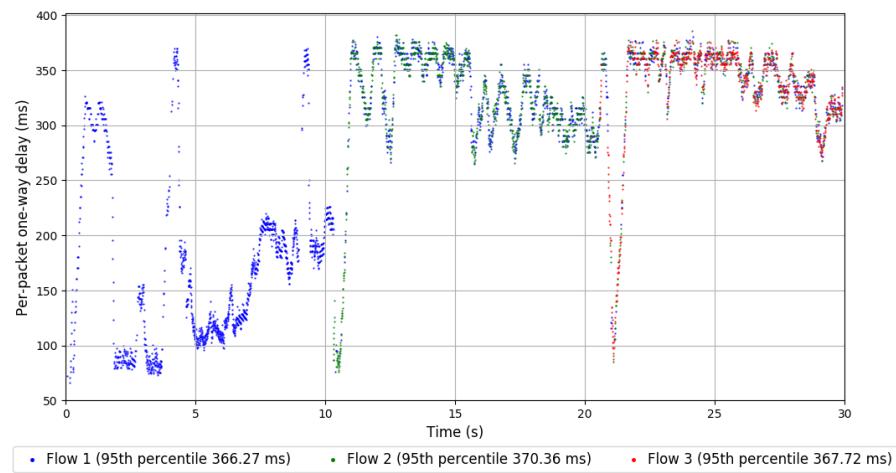
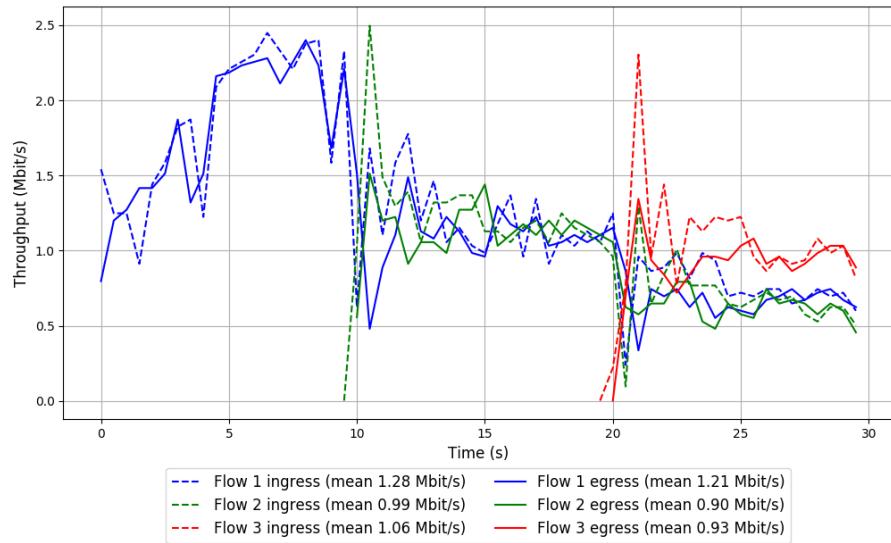


Run 2: Statistics of TCP BBR

```
Start at: 2018-01-02 20:59:05
End at: 2018-01-02 20:59:35
Local clock offset: 1.736 ms
Remote clock offset: -15.906 ms

# Below is generated by plot.py at 2018-01-02 22:07:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.11 Mbit/s
95th percentile per-packet one-way delay: 368.252 ms
Loss rate: 8.36%
-- Flow 1:
Average throughput: 1.21 Mbit/s
95th percentile per-packet one-way delay: 366.266 ms
Loss rate: 5.88%
-- Flow 2:
Average throughput: 0.90 Mbit/s
95th percentile per-packet one-way delay: 370.357 ms
Loss rate: 9.85%
-- Flow 3:
Average throughput: 0.93 Mbit/s
95th percentile per-packet one-way delay: 367.721 ms
Loss rate: 14.63%
```

Run 2: Report of TCP BBR — Data Link

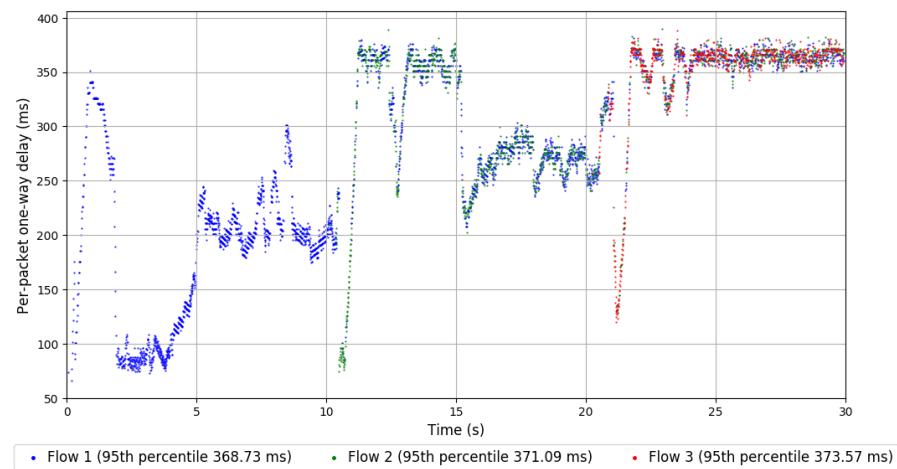
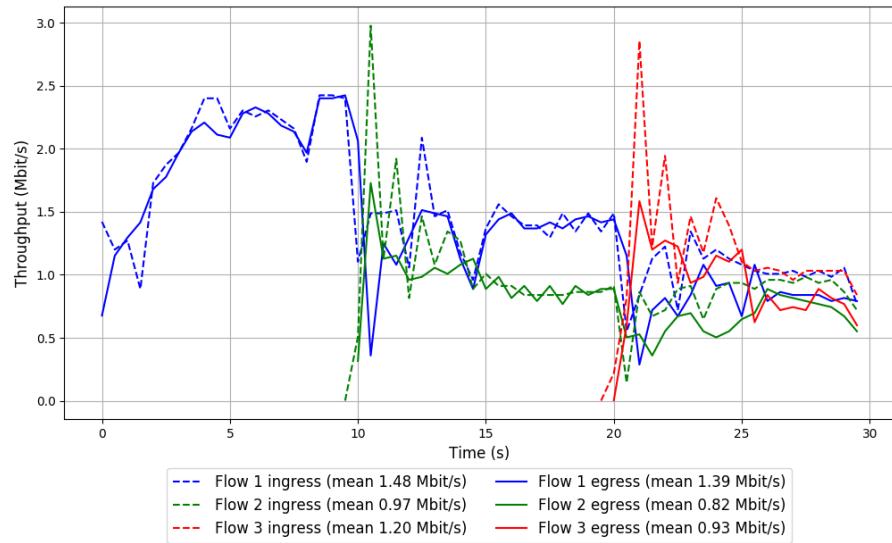


Run 3: Statistics of TCP BBR

```
Start at: 2018-01-02 21:15:38
End at: 2018-01-02 21:16:08
Local clock offset: 2.821 ms
Remote clock offset: -14.974 ms

# Below is generated by plot.py at 2018-01-02 22:07:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.23 Mbit/s
95th percentile per-packet one-way delay: 370.821 ms
Loss rate: 11.98%
-- Flow 1:
Average throughput: 1.39 Mbit/s
95th percentile per-packet one-way delay: 368.727 ms
Loss rate: 6.64%
-- Flow 2:
Average throughput: 0.82 Mbit/s
95th percentile per-packet one-way delay: 371.091 ms
Loss rate: 16.53%
-- Flow 3:
Average throughput: 0.93 Mbit/s
95th percentile per-packet one-way delay: 373.573 ms
Loss rate: 24.41%
```

Run 3: Report of TCP BBR — Data Link

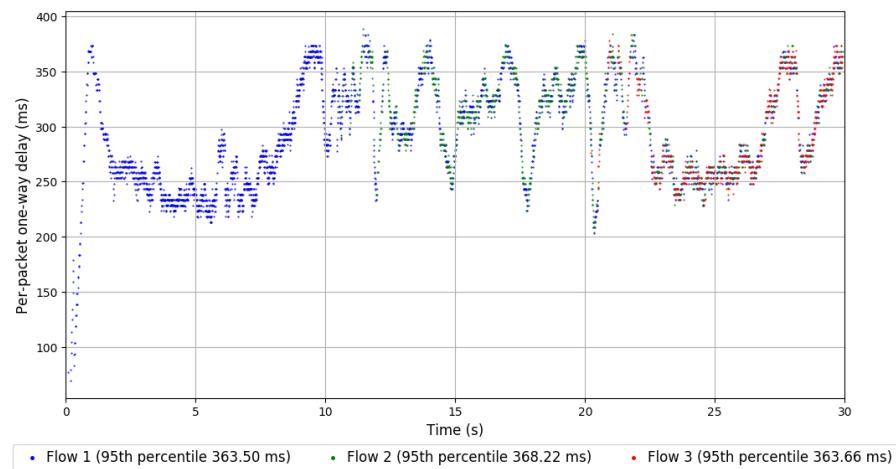
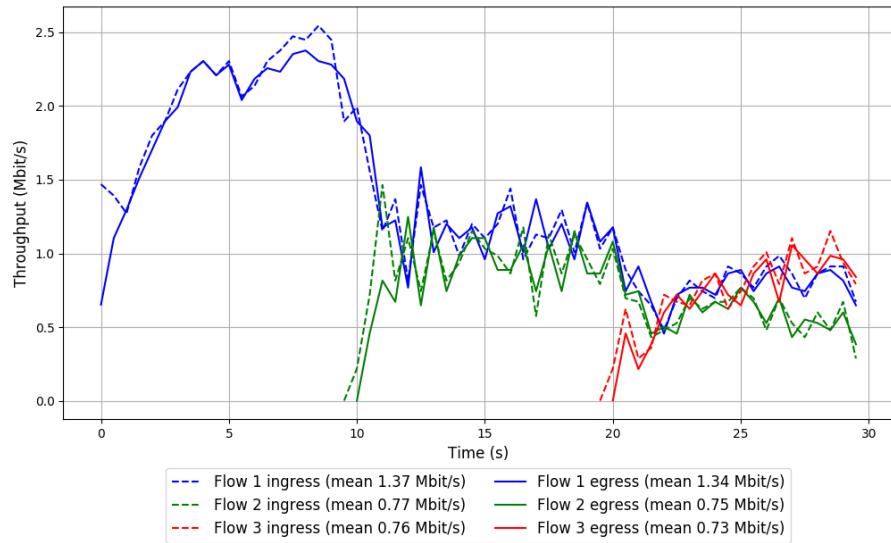


Run 1: Statistics of TCP Cubic

```
Start at: 2018-01-02 20:35:45
End at: 2018-01-02 20:36:15
Local clock offset: 2.432 ms
Remote clock offset: -15.85 ms

# Below is generated by plot.py at 2018-01-02 22:07:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.07 Mbit/s
95th percentile per-packet one-way delay: 363.723 ms
Loss rate: 3.53%
-- Flow 1:
Average throughput: 1.34 Mbit/s
95th percentile per-packet one-way delay: 363.501 ms
Loss rate: 2.75%
-- Flow 2:
Average throughput: 0.75 Mbit/s
95th percentile per-packet one-way delay: 368.217 ms
Loss rate: 4.37%
-- Flow 3:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 363.662 ms
Loss rate: 6.06%
```

Run 1: Report of TCP Cubic — Data Link

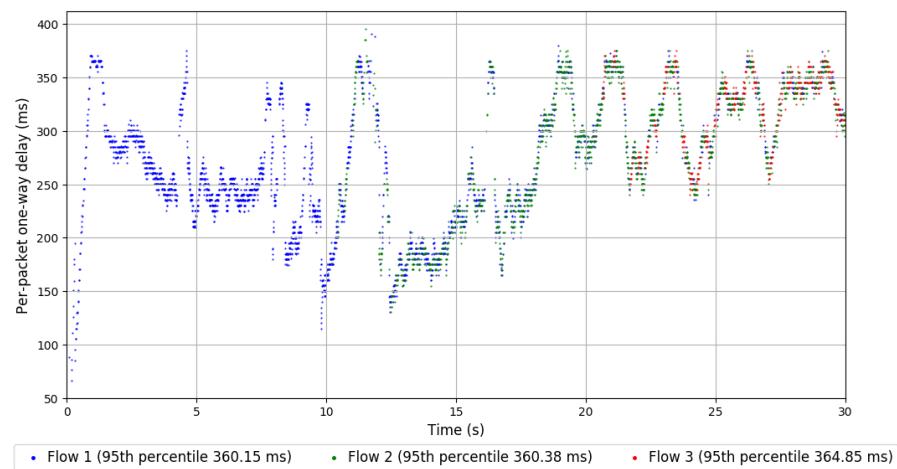
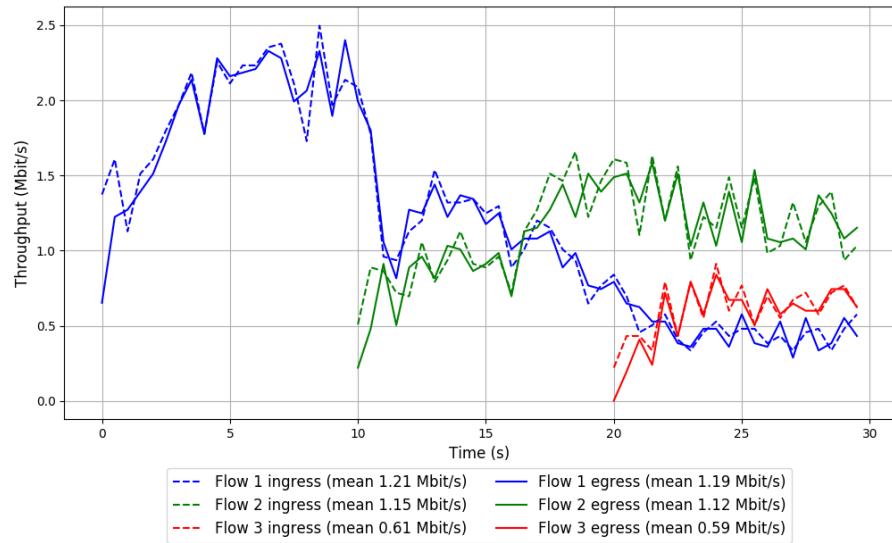


Run 2: Statistics of TCP Cubic

```
Start at: 2018-01-02 20:52:28
End at: 2018-01-02 20:52:58
Local clock offset: 1.005 ms
Remote clock offset: -14.261 ms

# Below is generated by plot.py at 2018-01-02 22:07:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.12 Mbit/s
95th percentile per-packet one-way delay: 360.302 ms
Loss rate: 2.80%
-- Flow 1:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 360.155 ms
Loss rate: 1.89%
-- Flow 2:
Average throughput: 1.12 Mbit/s
95th percentile per-packet one-way delay: 360.384 ms
Loss rate: 3.29%
-- Flow 3:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 364.854 ms
Loss rate: 6.35%
```

Run 2: Report of TCP Cubic — Data Link

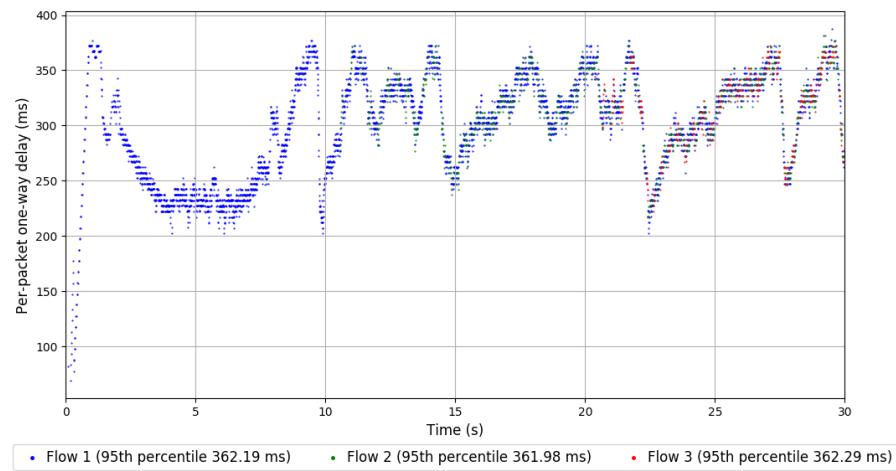
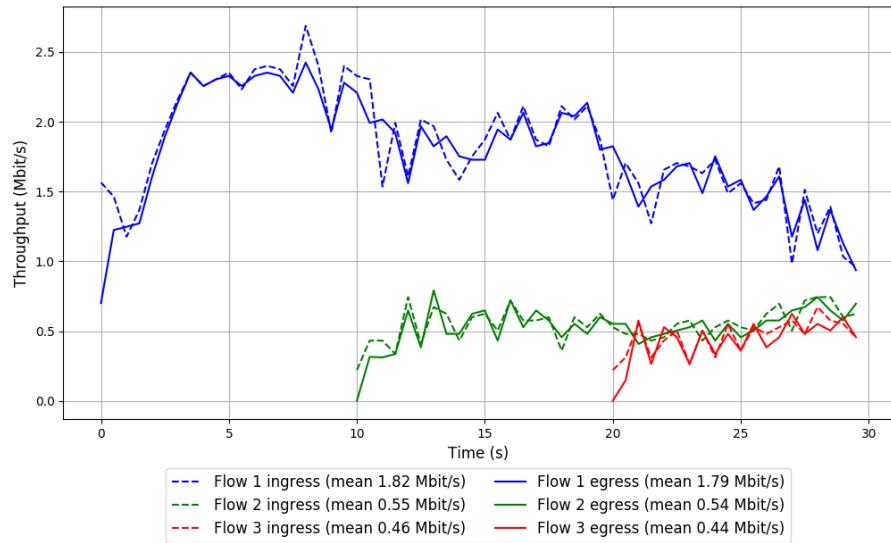


Run 3: Statistics of TCP Cubic

```
Start at: 2018-01-02 21:09:02
End at: 2018-01-02 21:09:32
Local clock offset: 2.023 ms
Remote clock offset: -15.067 ms

# Below is generated by plot.py at 2018-01-02 22:07:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.29 Mbit/s
95th percentile per-packet one-way delay: 362.187 ms
Loss rate: 2.55%
-- Flow 1:
Average throughput: 1.79 Mbit/s
95th percentile per-packet one-way delay: 362.192 ms
Loss rate: 1.95%
-- Flow 2:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 361.979 ms
Loss rate: 3.61%
-- Flow 3:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 362.289 ms
Loss rate: 7.06%
```

Run 3: Report of TCP Cubic — Data Link

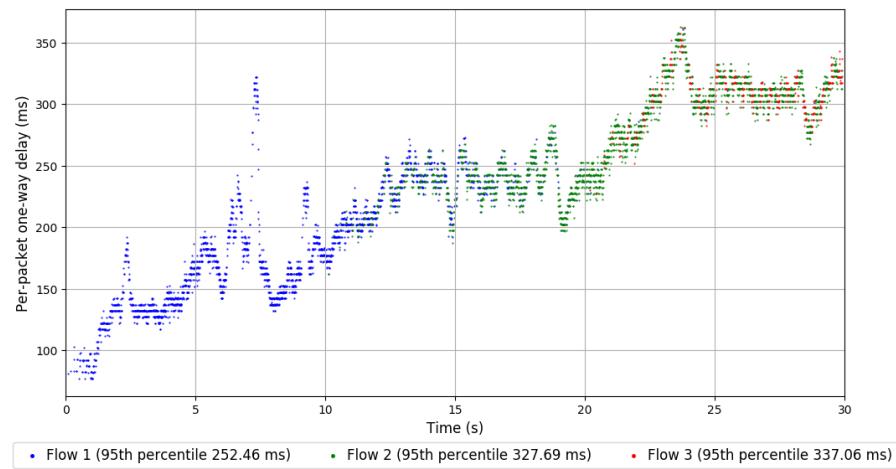
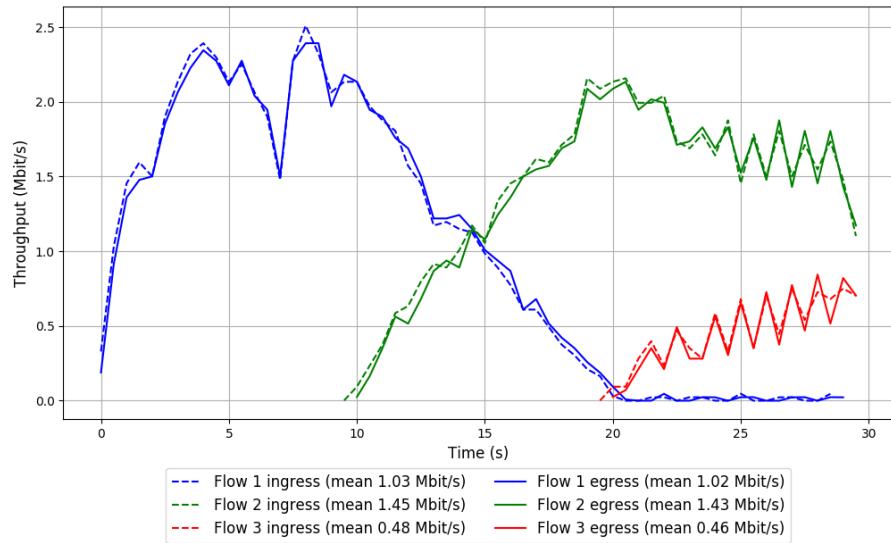


```
Run 1: Statistics of LEDBAT
```

```
Start at: 2018-01-02 20:31:10
End at: 2018-01-02 20:31:40
Local clock offset: 1.025 ms
Remote clock offset: -14.51 ms

# Below is generated by plot.py at 2018-01-02 22:07:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.09 Mbit/s
95th percentile per-packet one-way delay: 322.530 ms
Loss rate: 1.11%
-- Flow 1:
Average throughput: 1.02 Mbit/s
95th percentile per-packet one-way delay: 252.460 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 1.43 Mbit/s
95th percentile per-packet one-way delay: 327.688 ms
Loss rate: 1.71%
-- Flow 3:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 337.058 ms
Loss rate: 4.47%
```

Run 1: Report of LEDBAT — Data Link

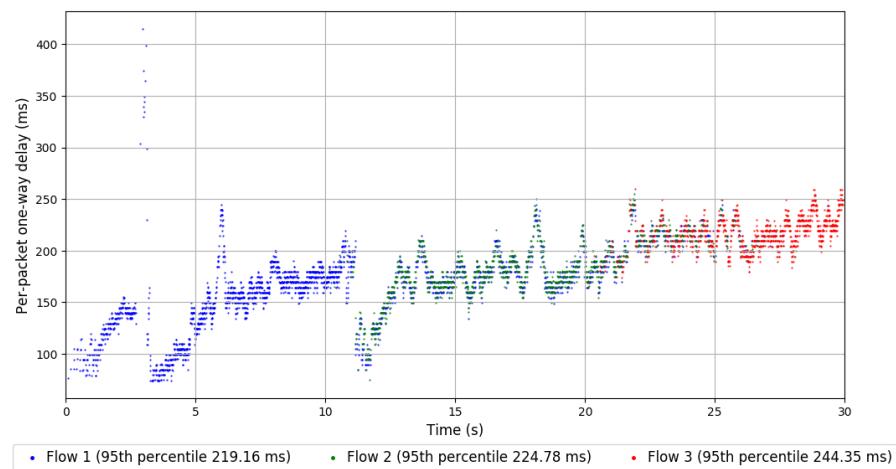
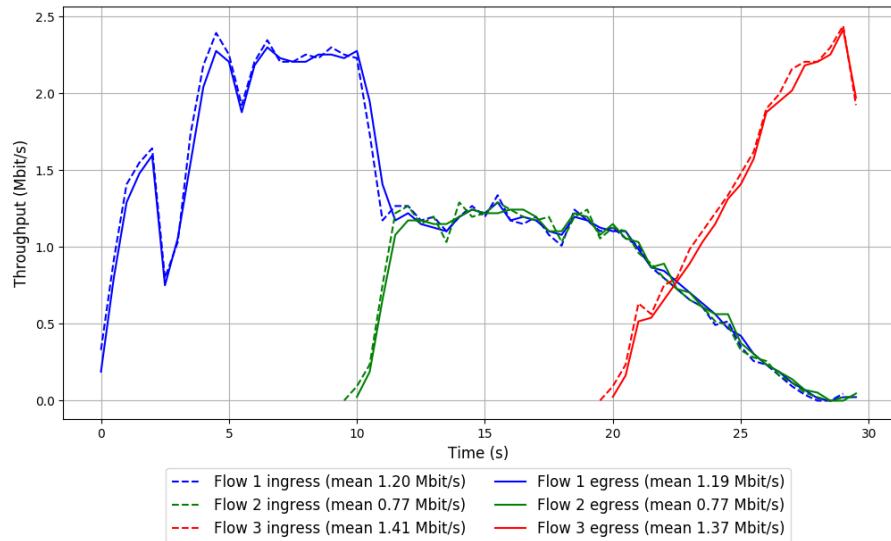


Run 2: Statistics of LEDBAT

```
Start at: 2018-01-02 20:48:02
End at: 2018-01-02 20:48:32
Local clock offset: 1.924 ms
Remote clock offset: -16.466 ms

# Below is generated by plot.py at 2018-01-02 22:07:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.13 Mbit/s
95th percentile per-packet one-way delay: 233.891 ms
Loss rate: 1.18%
-- Flow 1:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 219.161 ms
Loss rate: 0.70%
-- Flow 2:
Average throughput: 0.77 Mbit/s
95th percentile per-packet one-way delay: 224.778 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 1.37 Mbit/s
95th percentile per-packet one-way delay: 244.347 ms
Loss rate: 3.69%
```

Run 2: Report of LEDBAT — Data Link

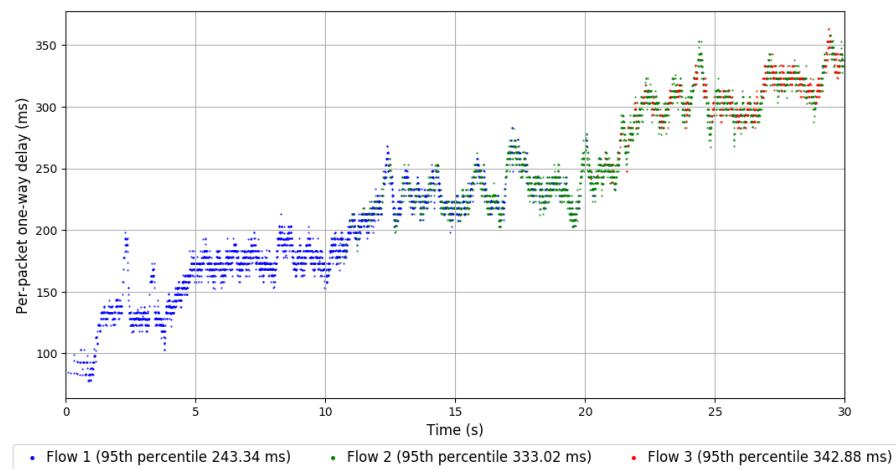
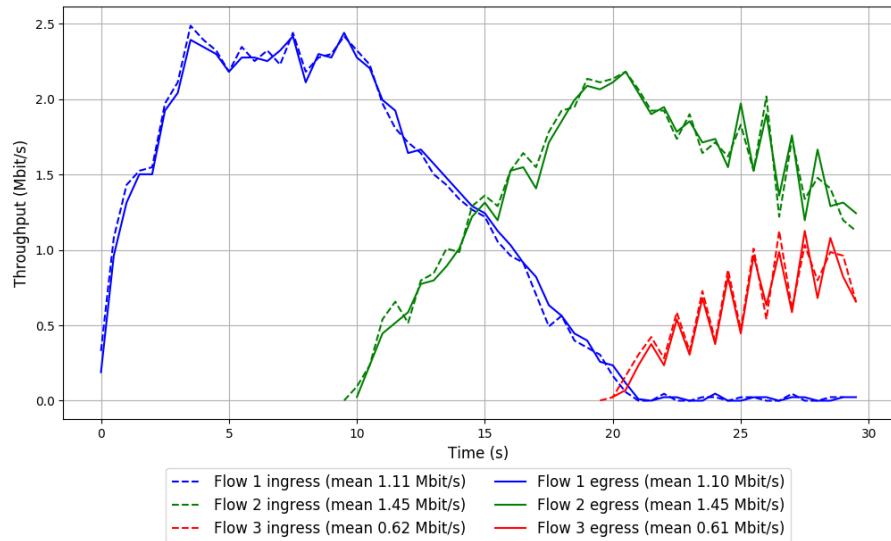


Run 3: Statistics of LEDBAT

```
Start at: 2018-01-02 21:04:38
End at: 2018-01-02 21:05:08
Local clock offset: 4.149 ms
Remote clock offset: -12.846 ms

# Below is generated by plot.py at 2018-01-02 22:07:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.24 Mbit/s
95th percentile per-packet one-way delay: 327.866 ms
Loss rate: 1.01%
-- Flow 1:
Average throughput: 1.10 Mbit/s
95th percentile per-packet one-way delay: 243.337 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 1.45 Mbit/s
95th percentile per-packet one-way delay: 333.022 ms
Loss rate: 1.21%
-- Flow 3:
Average throughput: 0.61 Mbit/s
95th percentile per-packet one-way delay: 342.875 ms
Loss rate: 5.34%
```

Run 3: Report of LEDBAT — Data Link

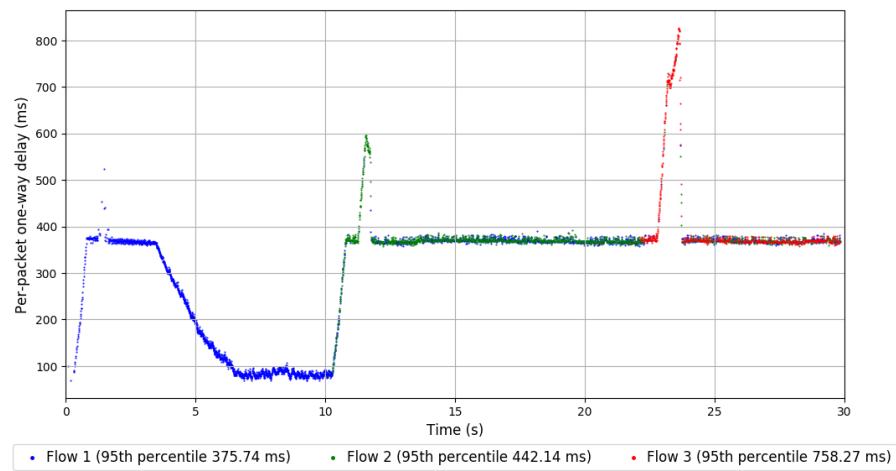
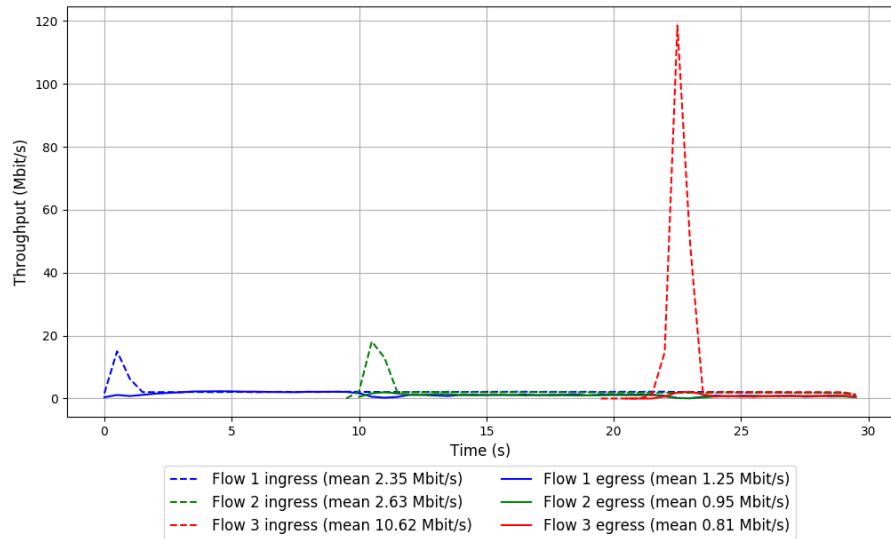


Run 1: Statistics of PCC

```
Start at: 2018-01-02 20:33:22
End at: 2018-01-02 20:33:52
Local clock offset: 2.671 ms
Remote clock offset: -15.612 ms

# Below is generated by plot.py at 2018-01-02 22:07:37
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.14 Mbit/s
95th percentile per-packet one-way delay: 382.453 ms
Loss rate: 72.00%
-- Flow 1:
Average throughput: 1.25 Mbit/s
95th percentile per-packet one-way delay: 375.741 ms
Loss rate: 46.94%
-- Flow 2:
Average throughput: 0.95 Mbit/s
95th percentile per-packet one-way delay: 442.138 ms
Loss rate: 63.93%
-- Flow 3:
Average throughput: 0.81 Mbit/s
95th percentile per-packet one-way delay: 758.274 ms
Loss rate: 92.81%
```

Run 1: Report of PCC — Data Link

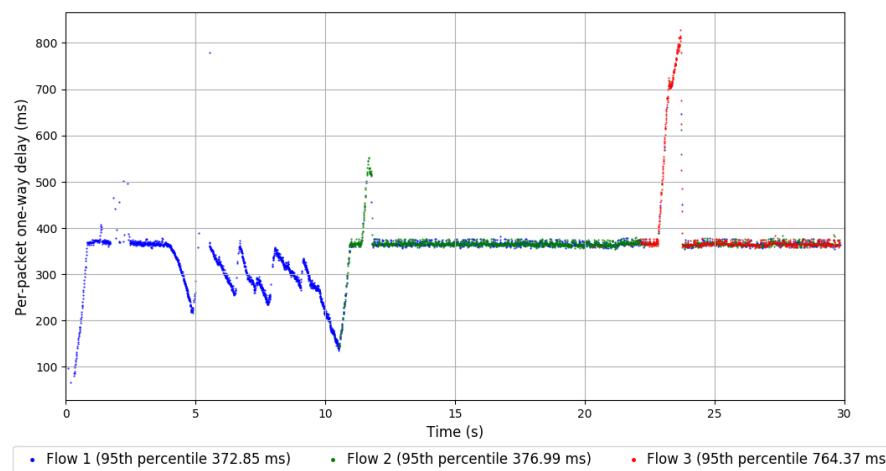
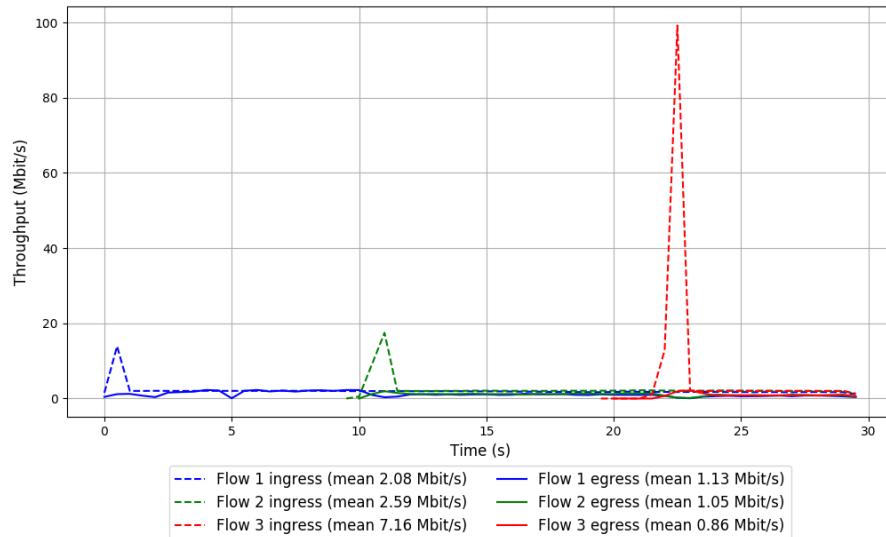


Run 2: Statistics of PCC

```
Start at: 2018-01-02 20:50:14
End at: 2018-01-02 20:50:44
Local clock offset: 0.69 ms
Remote clock offset: -14.134 ms

# Below is generated by plot.py at 2018-01-02 22:07:37
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.09 Mbit/s
95th percentile per-packet one-way delay: 378.284 ms
Loss rate: 66.16%
-- Flow 1:
Average throughput: 1.13 Mbit/s
95th percentile per-packet one-way delay: 372.850 ms
Loss rate: 45.99%
-- Flow 2:
Average throughput: 1.05 Mbit/s
95th percentile per-packet one-way delay: 376.990 ms
Loss rate: 59.92%
-- Flow 3:
Average throughput: 0.86 Mbit/s
95th percentile per-packet one-way delay: 764.371 ms
Loss rate: 88.45%
```

Run 2: Report of PCC — Data Link

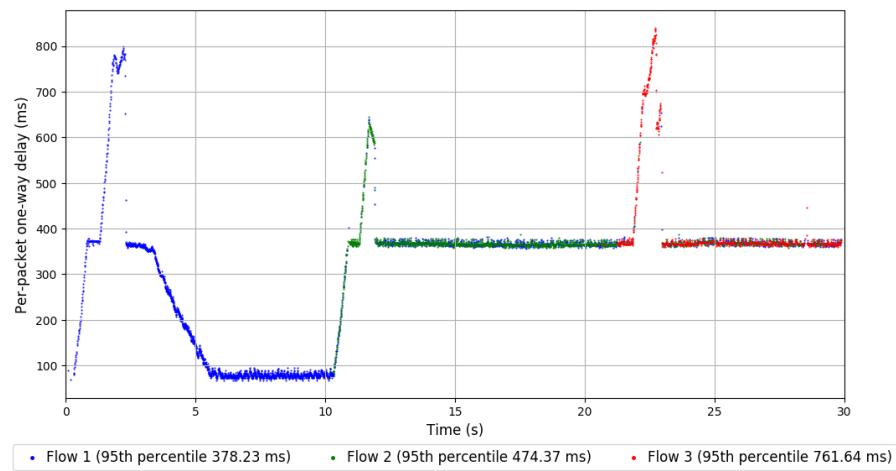
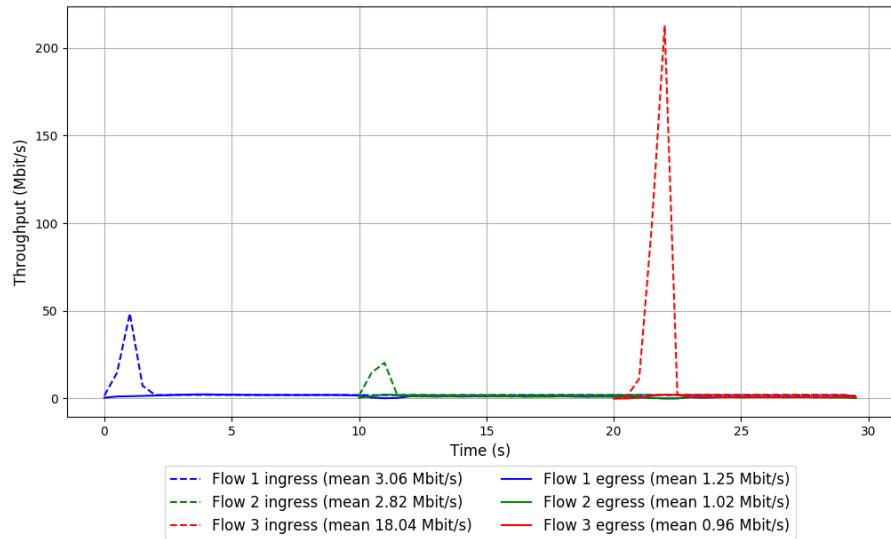


Run 3: Statistics of PCC

```
Start at: 2018-01-02 21:06:50
End at: 2018-01-02 21:07:20
Local clock offset: 3.426 ms
Remote clock offset: -13.346 ms

# Below is generated by plot.py at 2018-01-02 22:07:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.23 Mbit/s
95th percentile per-packet one-way delay: 588.905 ms
Loss rate: 79.56%
-- Flow 1:
Average throughput: 1.25 Mbit/s
95th percentile per-packet one-way delay: 378.226 ms
Loss rate: 59.36%
-- Flow 2:
Average throughput: 1.02 Mbit/s
95th percentile per-packet one-way delay: 474.369 ms
Loss rate: 64.17%
-- Flow 3:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 761.638 ms
Loss rate: 94.85%
```

Run 3: Report of PCC — Data Link

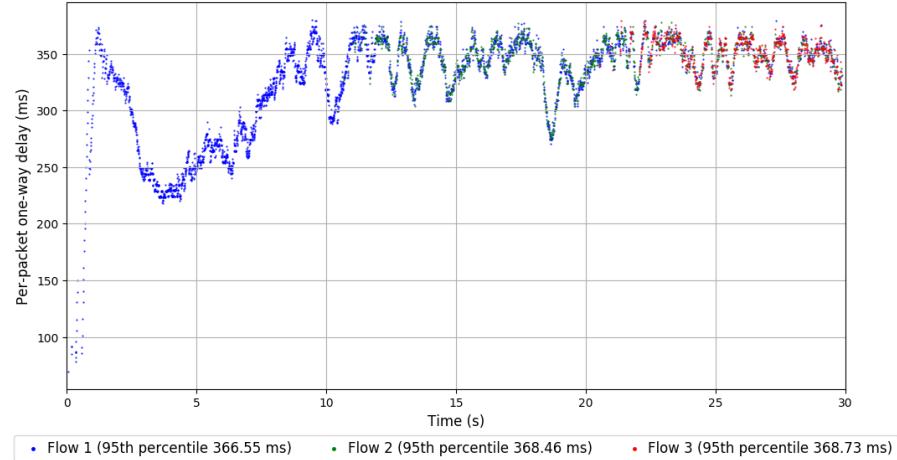
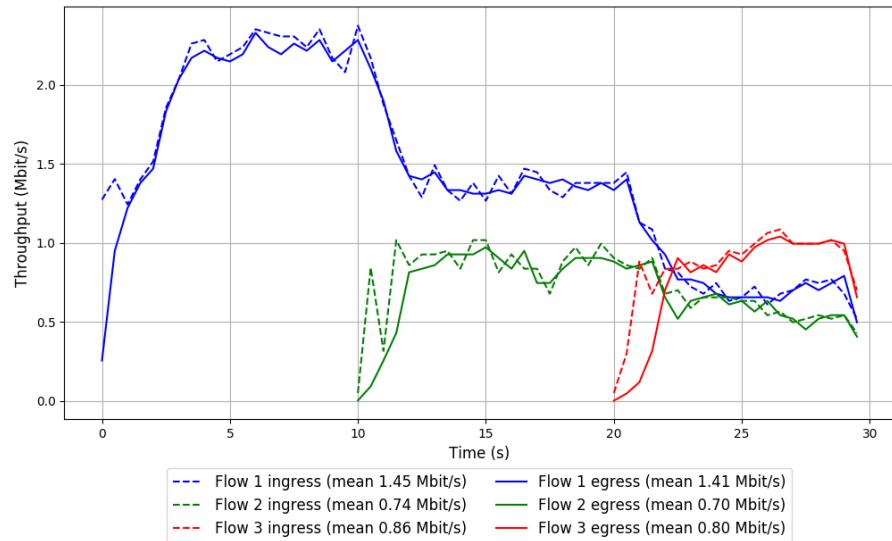


```
Run 1: Statistics of QUIC Cubic
```

```
Start at: 2018-01-02 20:30:04
End at: 2018-01-02 20:30:34
Local clock offset: 1.919 ms
Remote clock offset: -15.034 ms

# Below is generated by plot.py at 2018-01-02 22:07:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.12 Mbit/s
95th percentile per-packet one-way delay: 367.477 ms
Loss rate: 4.68%
-- Flow 1:
Average throughput: 1.41 Mbit/s
95th percentile per-packet one-way delay: 366.554 ms
Loss rate: 2.73%
-- Flow 2:
Average throughput: 0.70 Mbit/s
95th percentile per-packet one-way delay: 368.463 ms
Loss rate: 7.07%
-- Flow 3:
Average throughput: 0.80 Mbit/s
95th percentile per-packet one-way delay: 368.727 ms
Loss rate: 10.49%
```

Run 1: Report of QUIC Cubic — Data Link

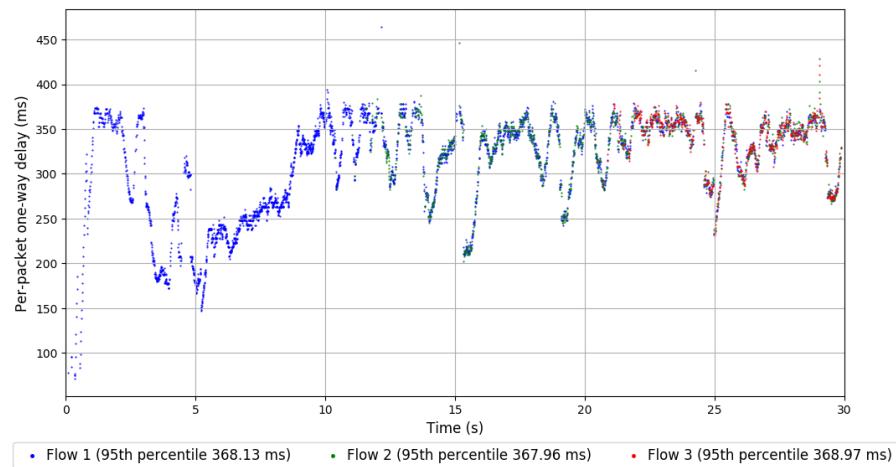
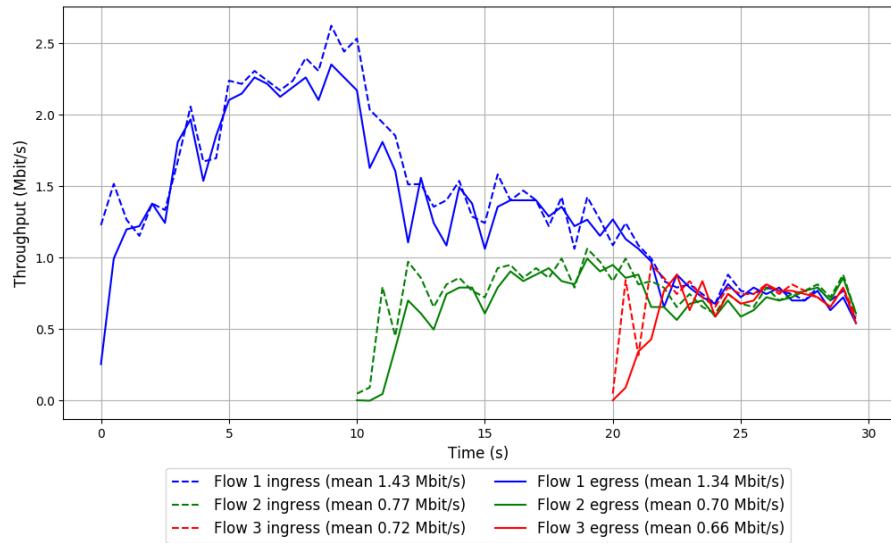


Run 2: Statistics of QUIC Cubic

```
Start at: 2018-01-02 20:46:56
End at: 2018-01-02 20:47:26
Local clock offset: 1.408 ms
Remote clock offset: -15.12 ms

# Below is generated by plot.py at 2018-01-02 22:07:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.01 Mbit/s
95th percentile per-packet one-way delay: 368.192 ms
Loss rate: 7.92%
-- Flow 1:
Average throughput: 1.34 Mbit/s
95th percentile per-packet one-way delay: 368.133 ms
Loss rate: 6.54%
-- Flow 2:
Average throughput: 0.70 Mbit/s
95th percentile per-packet one-way delay: 367.959 ms
Loss rate: 10.03%
-- Flow 3:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 368.969 ms
Loss rate: 11.67%
```

Run 2: Report of QUIC Cubic — Data Link

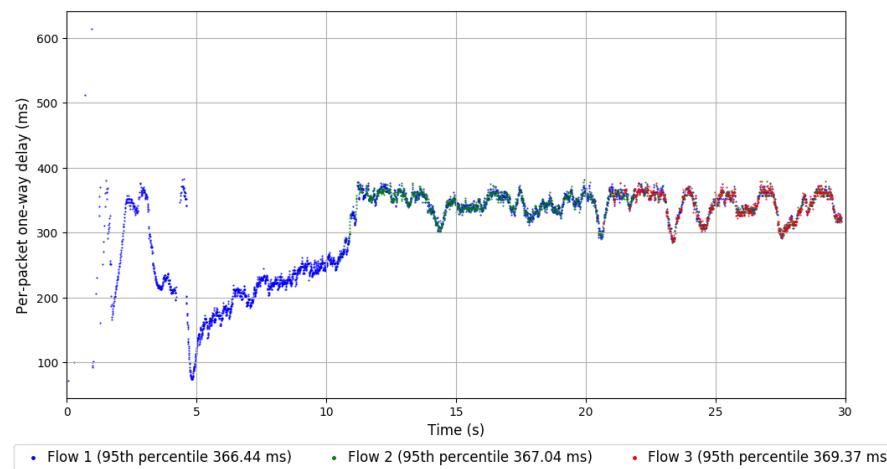
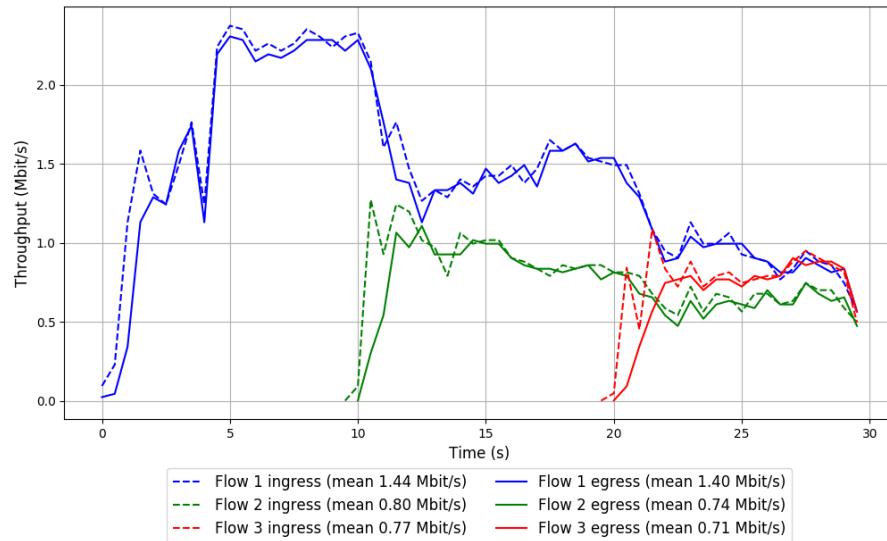


Run 3: Statistics of QUIC Cubic

```
Start at: 2018-01-02 21:03:32
End at: 2018-01-02 21:04:02
Local clock offset: 0.415 ms
Remote clock offset: -15.007 ms

# Below is generated by plot.py at 2018-01-02 22:07:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.11 Mbit/s
95th percentile per-packet one-way delay: 366.893 ms
Loss rate: 5.45%
-- Flow 1:
Average throughput: 1.40 Mbit/s
95th percentile per-packet one-way delay: 366.443 ms
Loss rate: 3.55%
-- Flow 2:
Average throughput: 0.74 Mbit/s
95th percentile per-packet one-way delay: 367.035 ms
Loss rate: 7.99%
-- Flow 3:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 369.374 ms
Loss rate: 10.85%
```

Run 3: Report of QUIC Cubic — Data Link

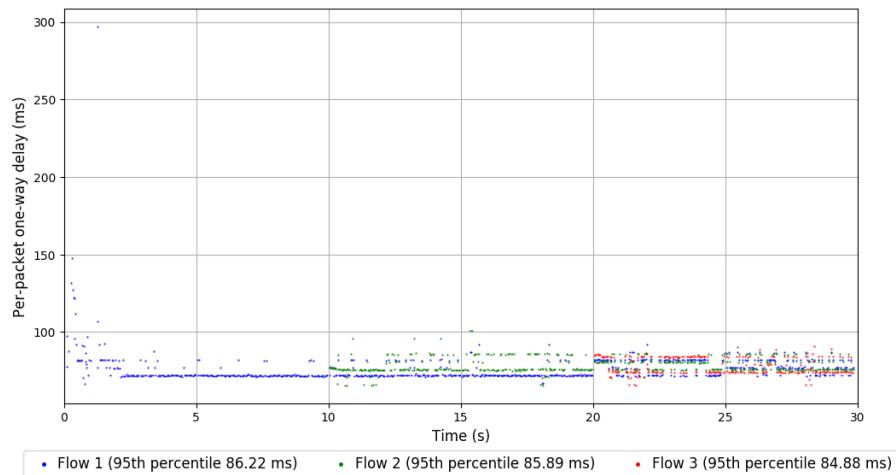
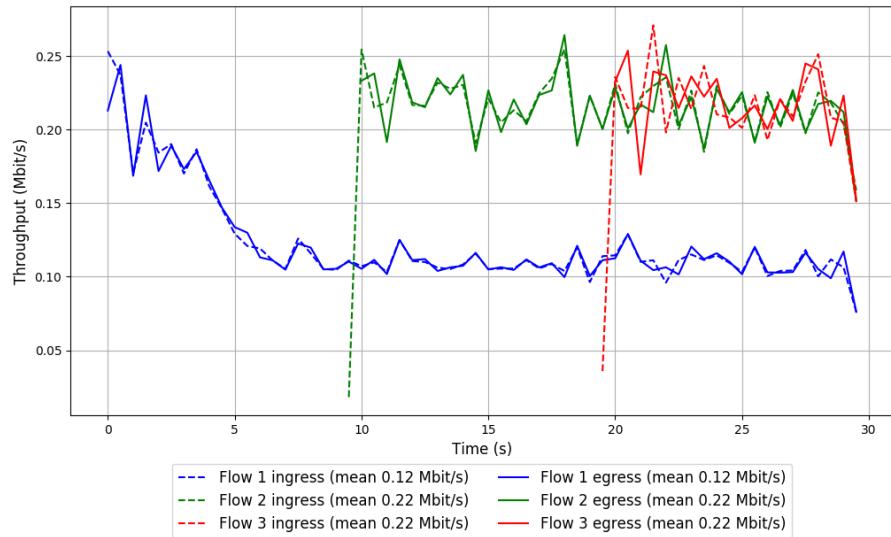


```
Run 1: Statistics of SCReAM
```

```
Start at: 2018-01-02 20:37:57
End at: 2018-01-02 20:38:27
Local clock offset: 1.547 ms
Remote clock offset: -15.04 ms

# Below is generated by plot.py at 2018-01-02 22:07:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 85.851 ms
Loss rate: 0.42%
-- Flow 1:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 86.220 ms
Loss rate: 0.23%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 85.892 ms
Loss rate: 0.43%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 84.880 ms
Loss rate: 0.74%
```

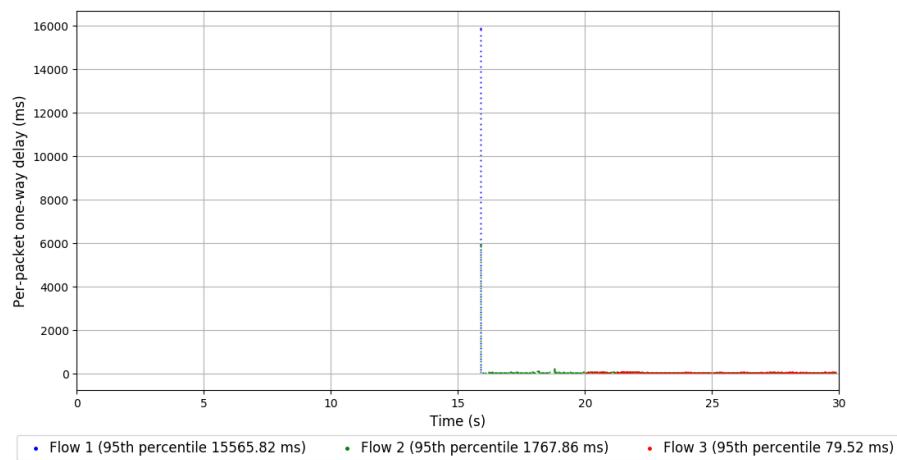
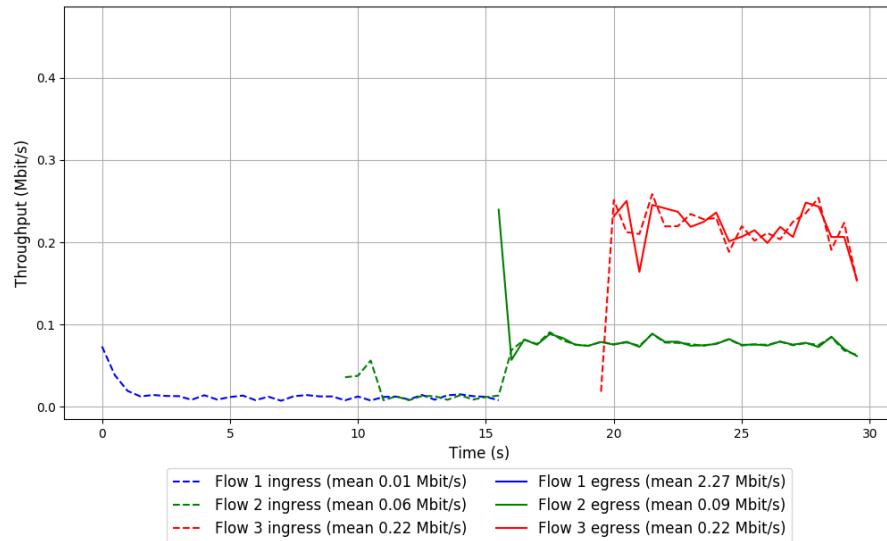
Run 1: Report of SCReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2018-01-02 20:54:41
End at: 2018-01-02 20:55:11
Local clock offset: -0.542 ms
Remote clock offset: -13.278 ms

Run 2: Report of SCReAM — Data Link

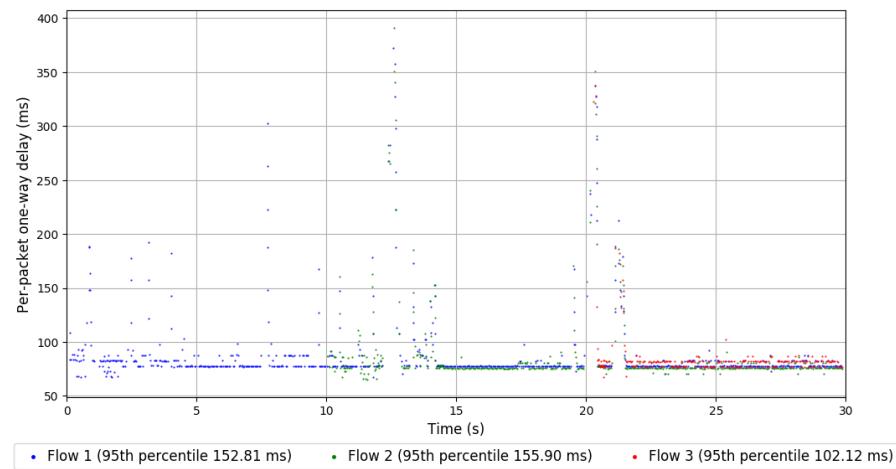
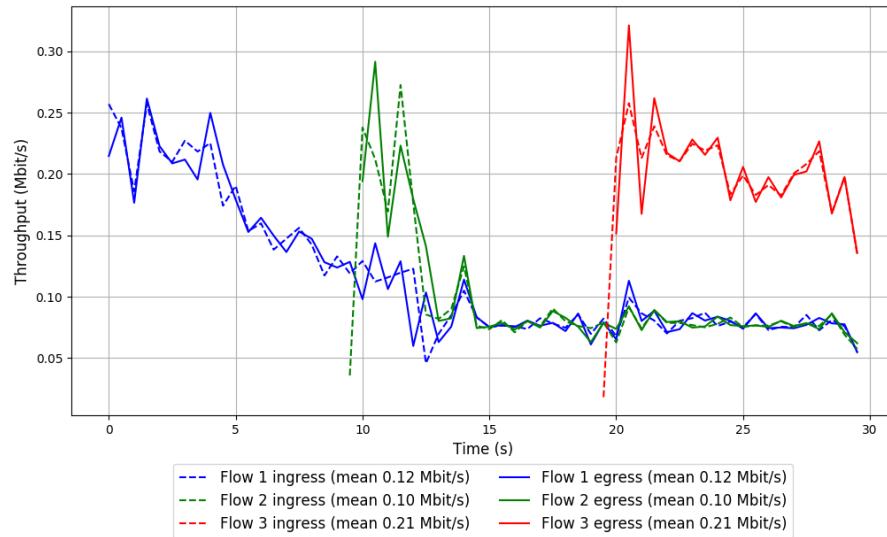


Run 3: Statistics of SCReAM

```
Start at: 2018-01-02 21:11:14
End at: 2018-01-02 21:11:44
Local clock offset: 3.05 ms
Remote clock offset: -15.822 ms

# Below is generated by plot.py at 2018-01-02 22:07:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 151.215 ms
Loss rate: 0.38%
-- Flow 1:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 152.811 ms
Loss rate: 0.30%
-- Flow 2:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 155.900 ms
Loss rate: 0.17%
-- Flow 3:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 102.117 ms
Loss rate: 0.70%
```

Run 3: Report of SCReAM — Data Link



Run 1: Statistics of WebRTC media

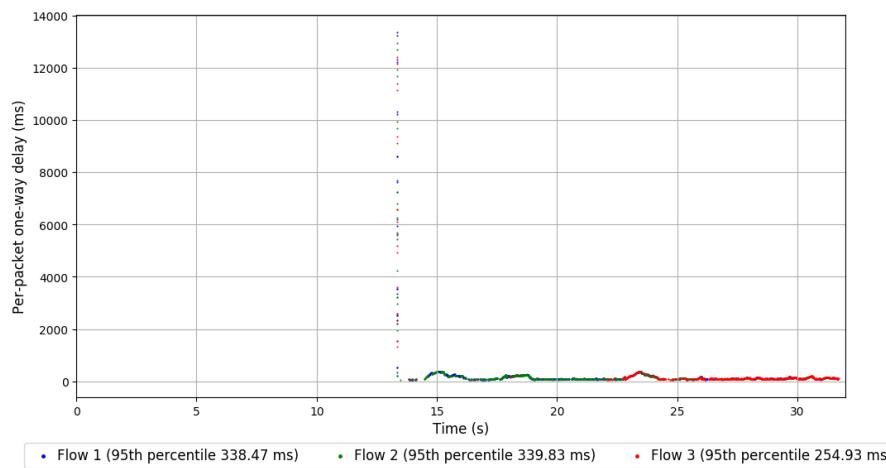
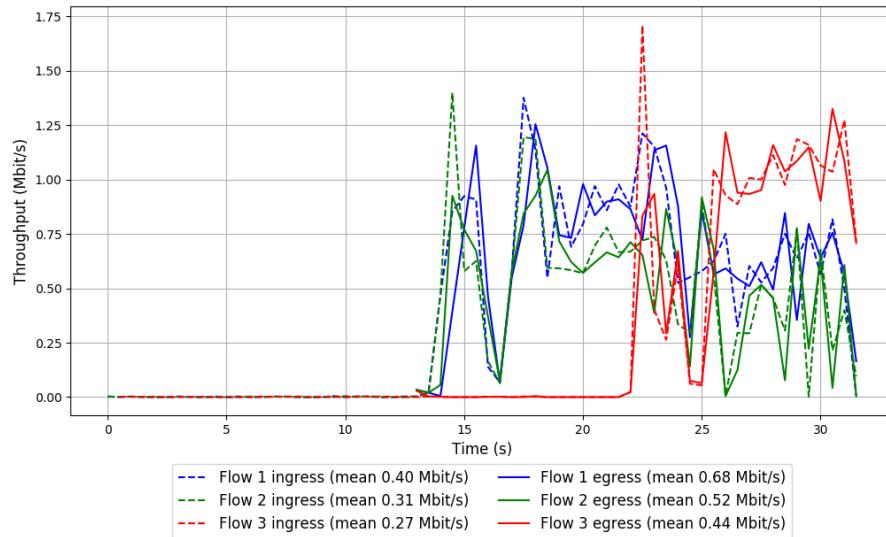
Start at: 2018-01-02 20:41:16

End at: 2018-01-02 20:41:46

Local clock offset: 2.251 ms

Remote clock offset: -14.202 ms

Run 1: Report of WebRTC media — Data Link

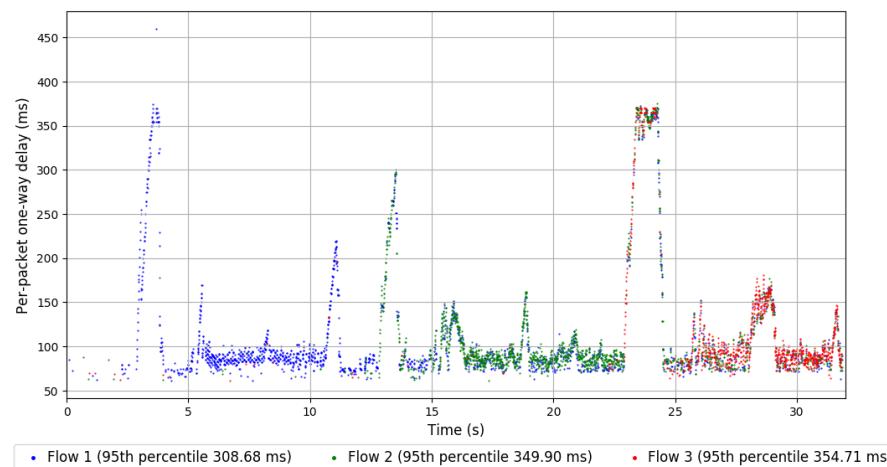
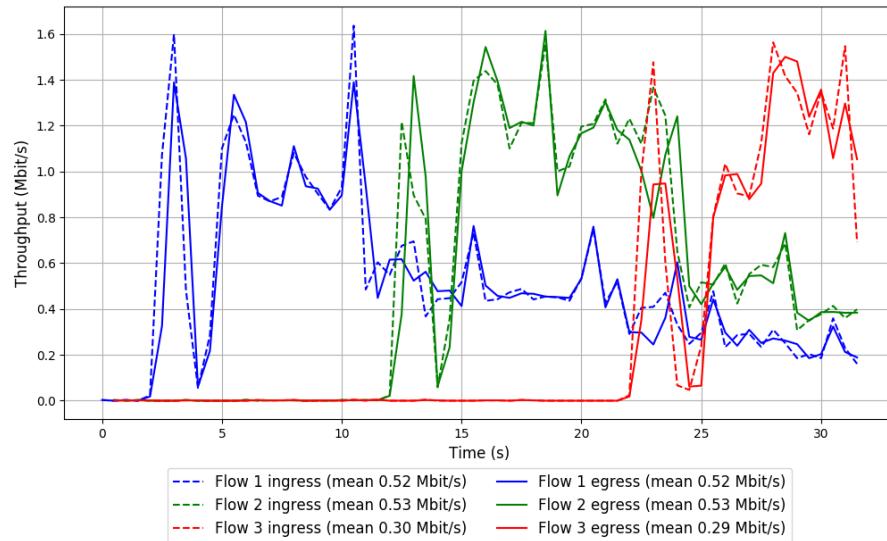


Run 2: Statistics of WebRTC media

```
Start at: 2018-01-02 20:57:59
End at: 2018-01-02 20:58:29
Local clock offset: -0.1 ms
Remote clock offset: -16.53 ms

# Below is generated by plot.py at 2018-01-02 22:07:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.31 Mbit/s
95th percentile per-packet one-way delay: 345.467 ms
Loss rate: 1.93%
-- Flow 1:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 308.676 ms
Loss rate: 1.53%
-- Flow 2:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 349.902 ms
Loss rate: 1.80%
-- Flow 3:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 354.715 ms
Loss rate: 2.89%
```

Run 2: Report of WebRTC media — Data Link

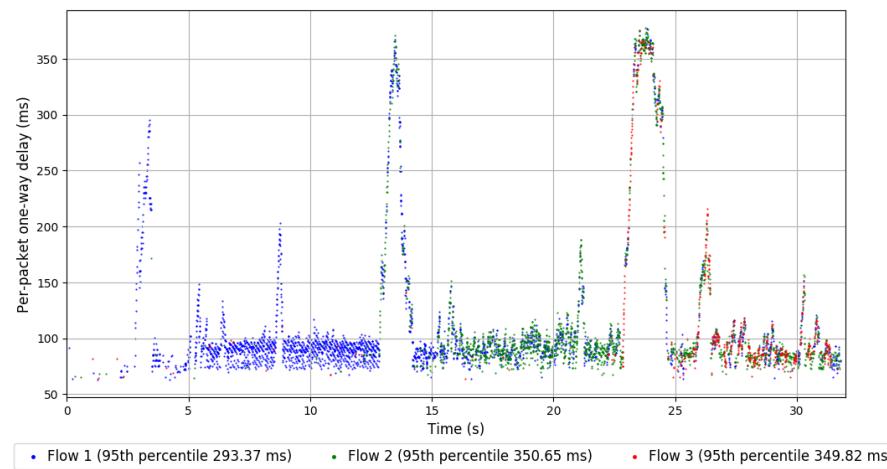
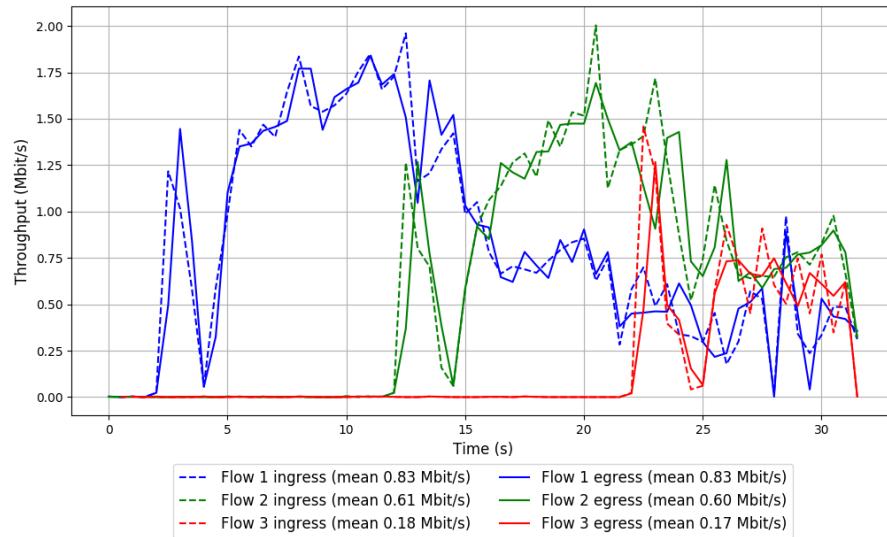


```
Run 3: Statistics of WebRTC media
```

```
Start at: 2018-01-02 21:14:32
End at: 2018-01-02 21:15:02
Local clock offset: 2.896 ms
Remote clock offset: -14.335 ms

# Below is generated by plot.py at 2018-01-02 22:07:43
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.60 Mbit/s
95th percentile per-packet one-way delay: 330.261 ms
Loss rate: 1.36%
-- Flow 1:
Average throughput: 0.83 Mbit/s
95th percentile per-packet one-way delay: 293.371 ms
Loss rate: 0.43%
-- Flow 2:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 350.655 ms
Loss rate: 1.38%
-- Flow 3:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 349.820 ms
Loss rate: 5.68%
```

Run 3: Report of WebRTC media — Data Link

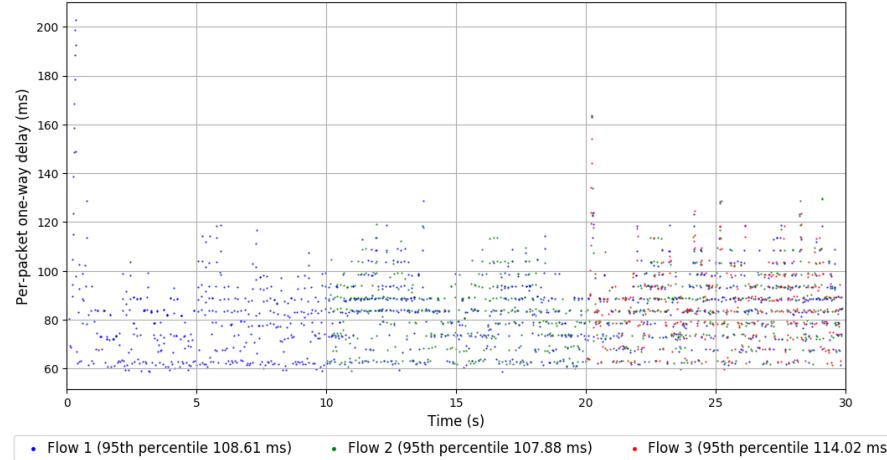
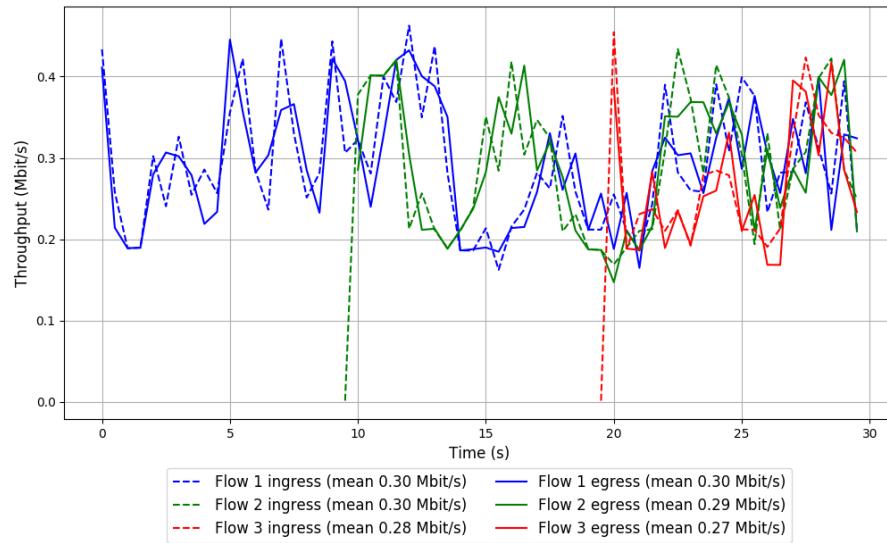


Run 1: Statistics of Sprout

```
Start at: 2018-01-02 20:36:51
End at: 2018-01-02 20:37:21
Local clock offset: 0.258 ms
Remote clock offset: -14.2 ms

# Below is generated by plot.py at 2018-01-02 22:07:43
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 108.844 ms
Loss rate: 0.66%
-- Flow 1:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 108.608 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 107.877 ms
Loss rate: 0.37%
-- Flow 3:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 114.020 ms
Loss rate: 2.98%
```

Run 1: Report of Sprout — Data Link

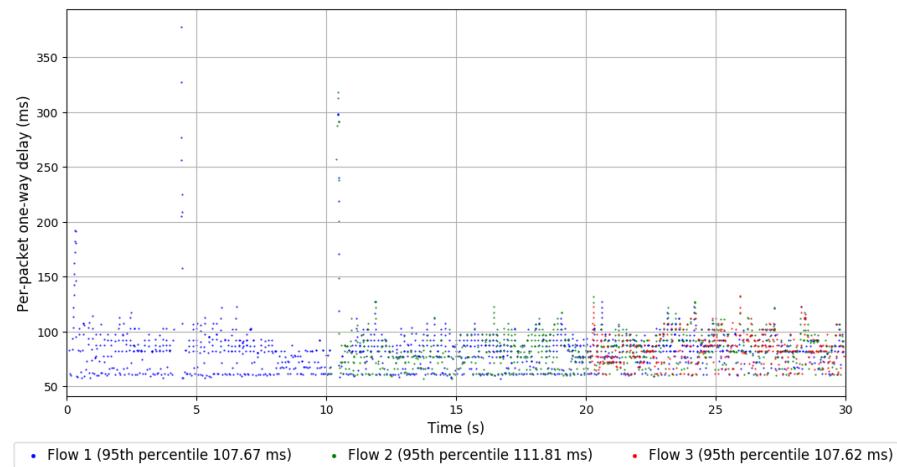
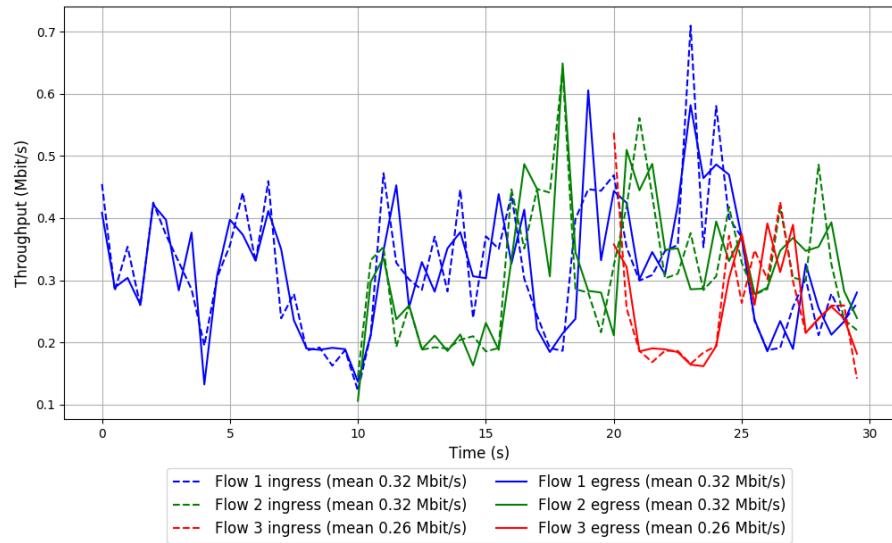


Run 2: Statistics of Sprout

```
Start at: 2018-01-02 20:53:35
End at: 2018-01-02 20:54:05
Local clock offset: -0.161 ms
Remote clock offset: -13.543 ms

# Below is generated by plot.py at 2018-01-02 22:07:43
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.62 Mbit/s
95th percentile per-packet one-way delay: 107.855 ms
Loss rate: 0.44%
-- Flow 1:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 107.668 ms
Loss rate: 0.47%
-- Flow 2:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 111.805 ms
Loss rate: 0.01%
-- Flow 3:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 107.625 ms
Loss rate: 1.40%
```

Run 2: Report of Sprout — Data Link

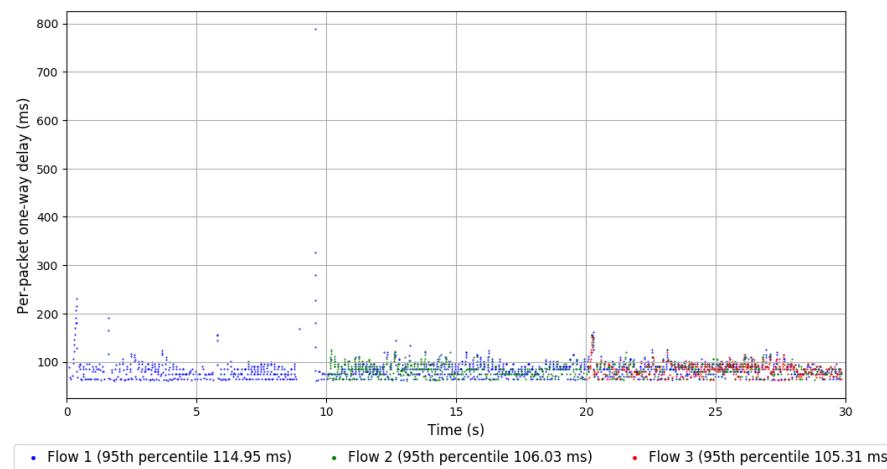
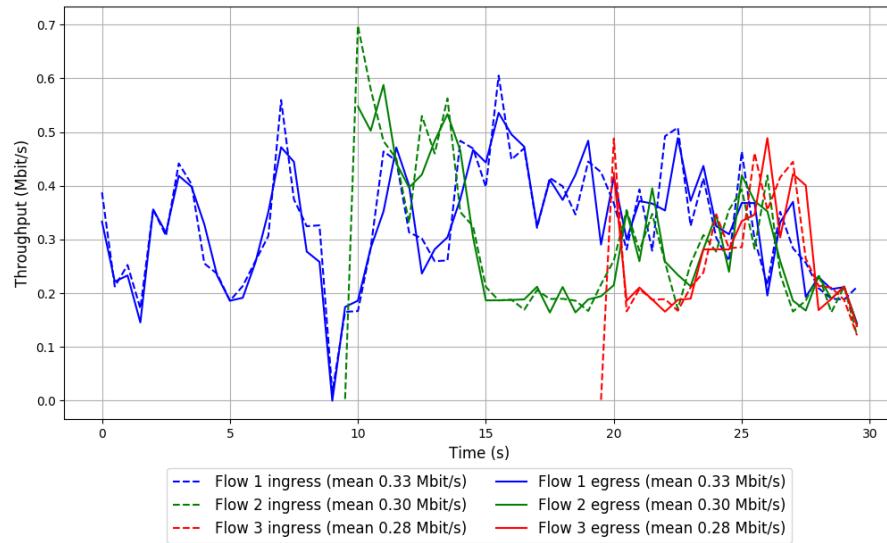


Run 3: Statistics of Sprout

```
Start at: 2018-01-02 21:10:08
End at: 2018-01-02 21:10:38
Local clock offset: 4.047 ms
Remote clock offset: -12.336 ms

# Below is generated by plot.py at 2018-01-02 22:07:43
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.62 Mbit/s
95th percentile per-packet one-way delay: 110.224 ms
Loss rate: 0.88%
-- Flow 1:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 114.947 ms
Loss rate: 1.07%
-- Flow 2:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 106.025 ms
Loss rate: 0.58%
-- Flow 3:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 105.313 ms
Loss rate: 0.86%
```

Run 3: Report of Sprout — Data Link

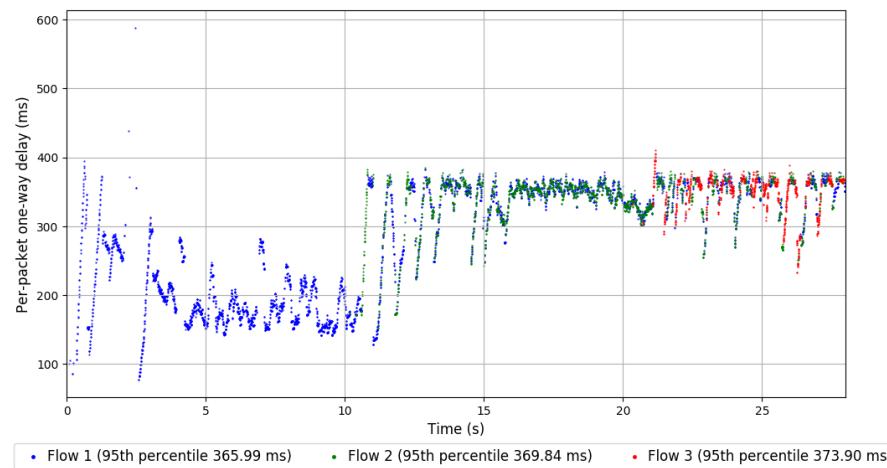
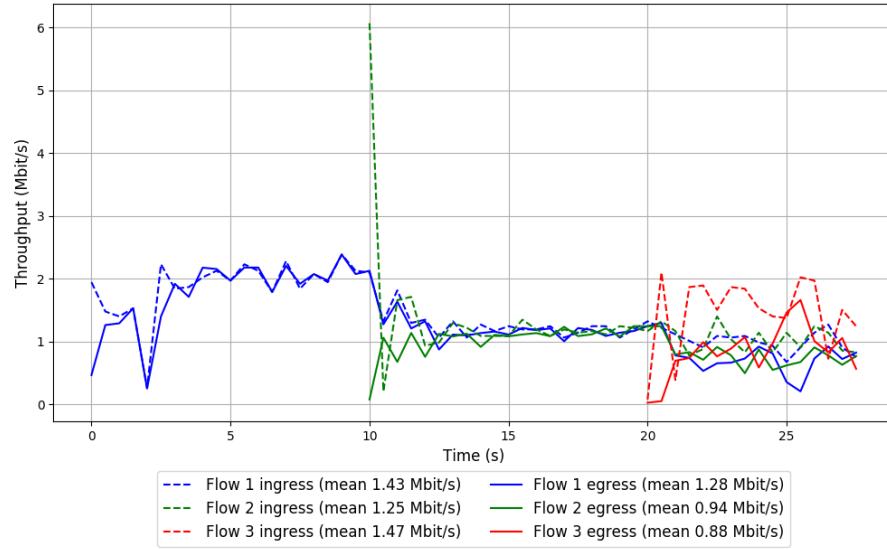


Run 1: Statistics of TaoVA-100x

```
Start at: 2018-01-02 20:40:09
End at: 2018-01-02 20:40:39
Local clock offset: 0.544 ms
Remote clock offset: -15.689 ms

# Below is generated by plot.py at 2018-01-02 22:07:47
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.12 Mbit/s
95th percentile per-packet one-way delay: 368.628 ms
Loss rate: 19.91%
-- Flow 1:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 365.992 ms
Loss rate: 10.00%
-- Flow 2:
Average throughput: 0.94 Mbit/s
95th percentile per-packet one-way delay: 369.837 ms
Loss rate: 25.62%
-- Flow 3:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 373.904 ms
Loss rate: 42.69%
```

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

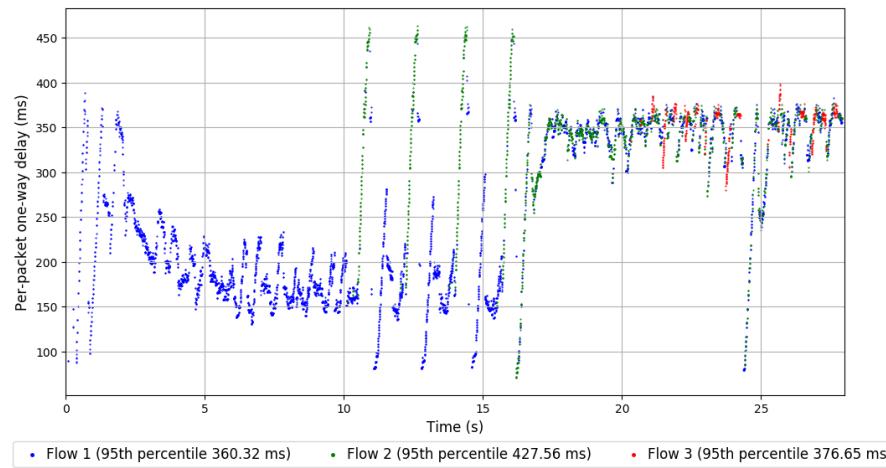
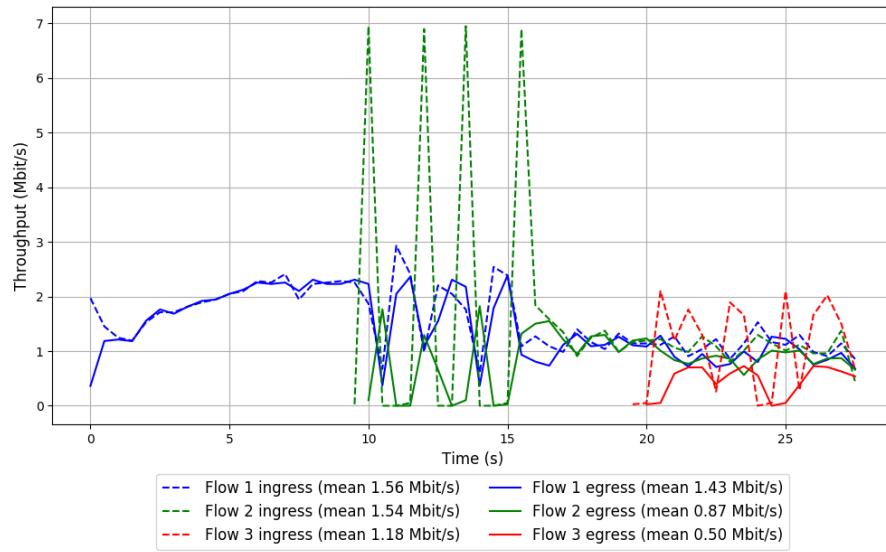


Run 2: Statistics of TaoVA-100x

```
Start at: 2018-01-02 20:56:53
End at: 2018-01-02 20:57:23
Local clock offset: -0.618 ms
Remote clock offset: -14.268 ms

# Below is generated by plot.py at 2018-01-02 22:07:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.13 Mbit/s
95th percentile per-packet one-way delay: 369.630 ms
Loss rate: 26.45%
-- Flow 1:
Average throughput: 1.43 Mbit/s
95th percentile per-packet one-way delay: 360.320 ms
Loss rate: 8.36%
-- Flow 2:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 427.556 ms
Loss rate: 43.66%
-- Flow 3:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 376.652 ms
Loss rate: 60.23%
```

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

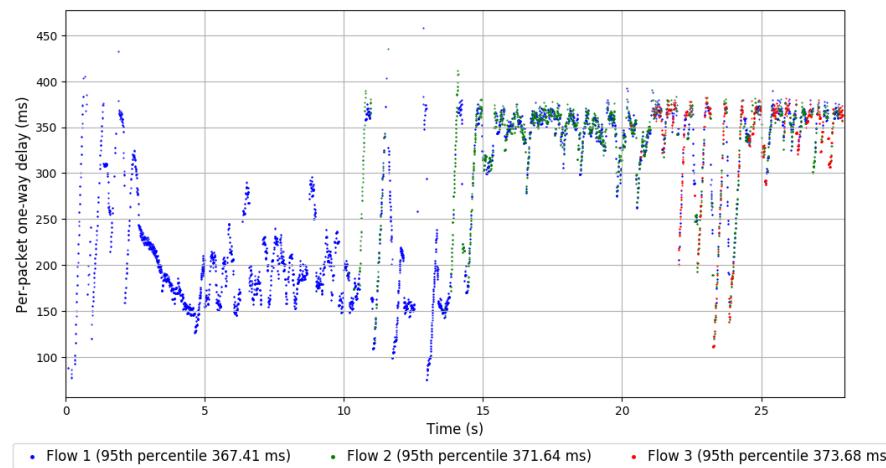
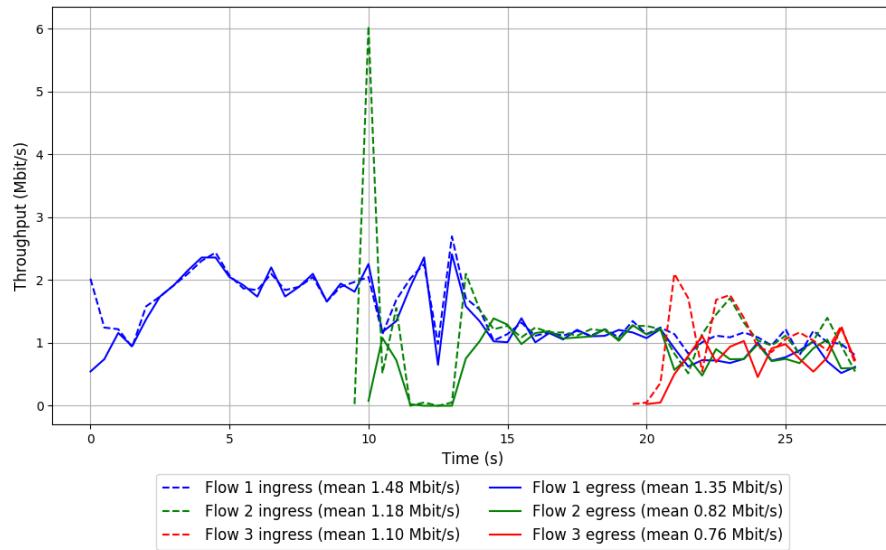


Run 3: Statistics of TaoVA-100x

```
Start at: 2018-01-02 21:13:26
End at: 2018-01-02 21:13:56
Local clock offset: 3.198 ms
Remote clock offset: -14.853 ms

# Below is generated by plot.py at 2018-01-02 22:07:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.08 Mbit/s
95th percentile per-packet one-way delay: 369.611 ms
Loss rate: 18.69%
-- Flow 1:
Average throughput: 1.35 Mbit/s
95th percentile per-packet one-way delay: 367.410 ms
Loss rate: 9.29%
-- Flow 2:
Average throughput: 0.82 Mbit/s
95th percentile per-packet one-way delay: 371.640 ms
Loss rate: 30.57%
-- Flow 3:
Average throughput: 0.76 Mbit/s
95th percentile per-packet one-way delay: 373.678 ms
Loss rate: 34.23%
```

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

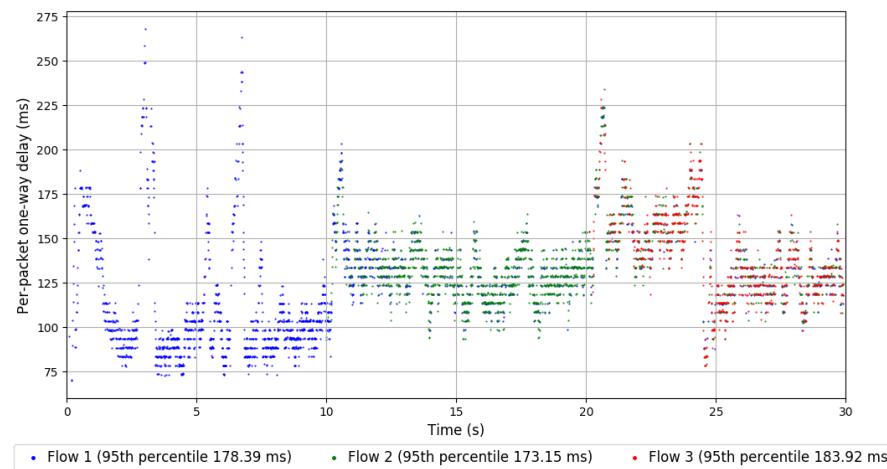
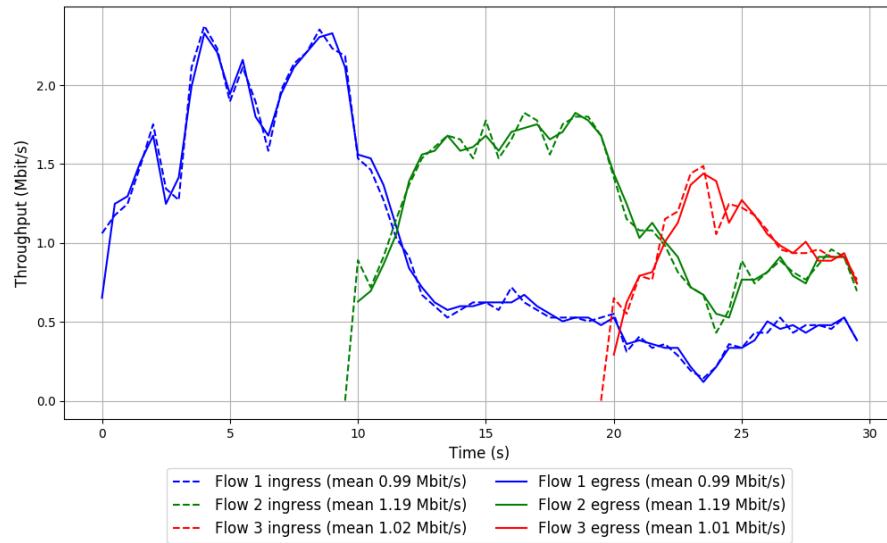


Run 1: Statistics of TCP Vegas

```
Start at: 2018-01-02 20:32:16
End at: 2018-01-02 20:32:46
Local clock offset: 3.237 ms
Remote clock offset: -14.06 ms

# Below is generated by plot.py at 2018-01-02 22:07:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.12 Mbit/s
95th percentile per-packet one-way delay: 178.258 ms
Loss rate: 0.57%
-- Flow 1:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 178.388 ms
Loss rate: 0.24%
-- Flow 2:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 173.152 ms
Loss rate: 0.51%
-- Flow 3:
Average throughput: 1.01 Mbit/s
95th percentile per-packet one-way delay: 183.920 ms
Loss rate: 1.66%
```

Run 1: Report of TCP Vegas — Data Link

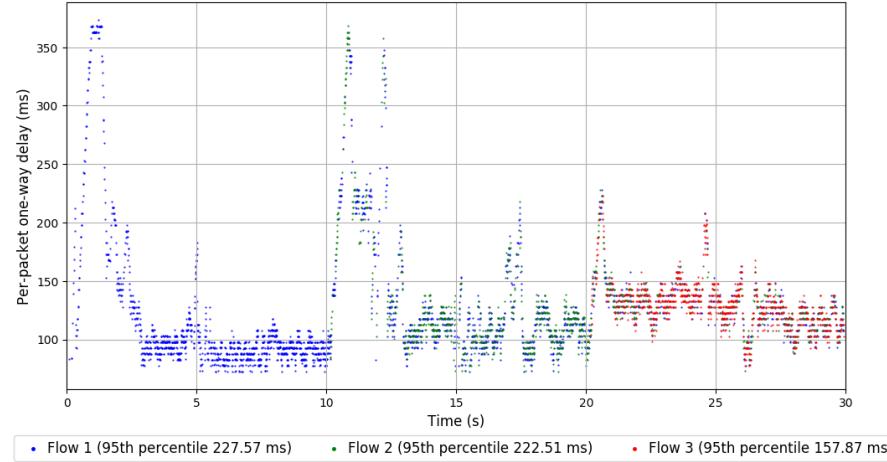
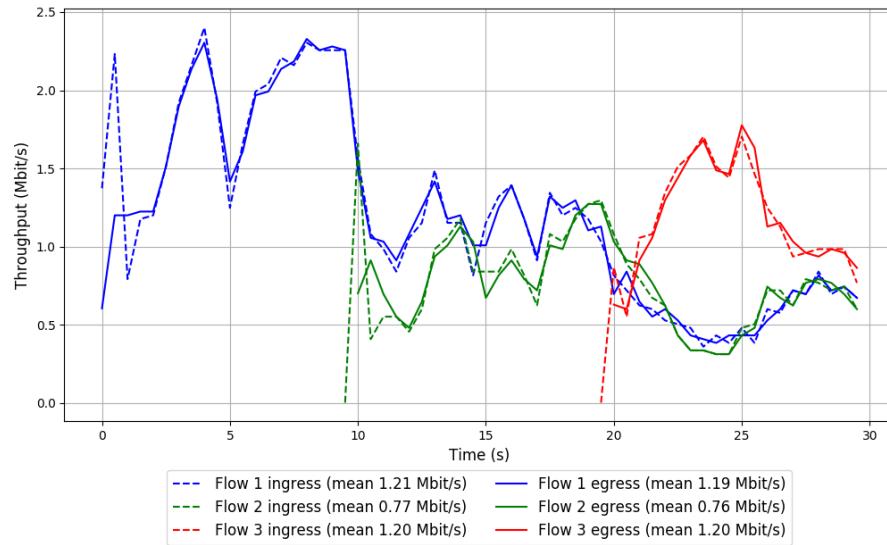


Run 2: Statistics of TCP Vegas

```
Start at: 2018-01-02 20:49:08
End at: 2018-01-02 20:49:38
Local clock offset: 1.804 ms
Remote clock offset: -15.103 ms

# Below is generated by plot.py at 2018-01-02 22:07:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.09 Mbit/s
95th percentile per-packet one-way delay: 217.705 ms
Loss rate: 1.42%
-- Flow 1:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 227.567 ms
Loss rate: 1.56%
-- Flow 2:
Average throughput: 0.76 Mbit/s
95th percentile per-packet one-way delay: 222.512 ms
Loss rate: 1.41%
-- Flow 3:
Average throughput: 1.20 Mbit/s
95th percentile per-packet one-way delay: 157.869 ms
Loss rate: 1.01%
```

Run 2: Report of TCP Vegas — Data Link

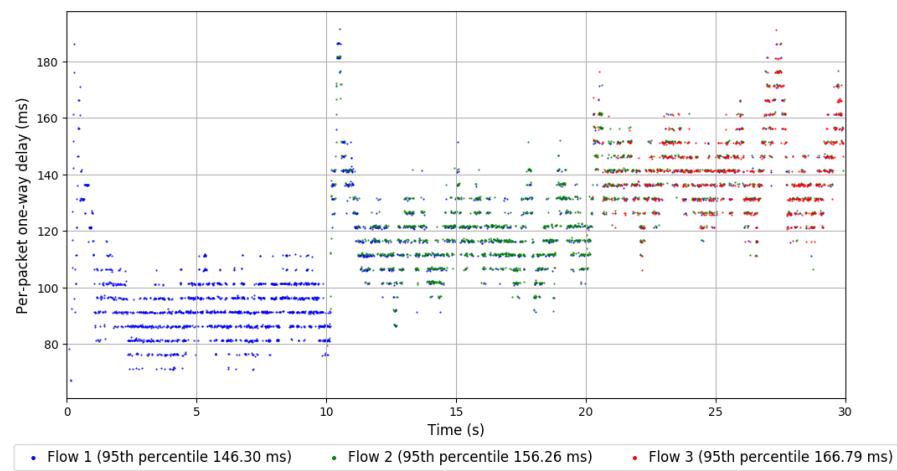
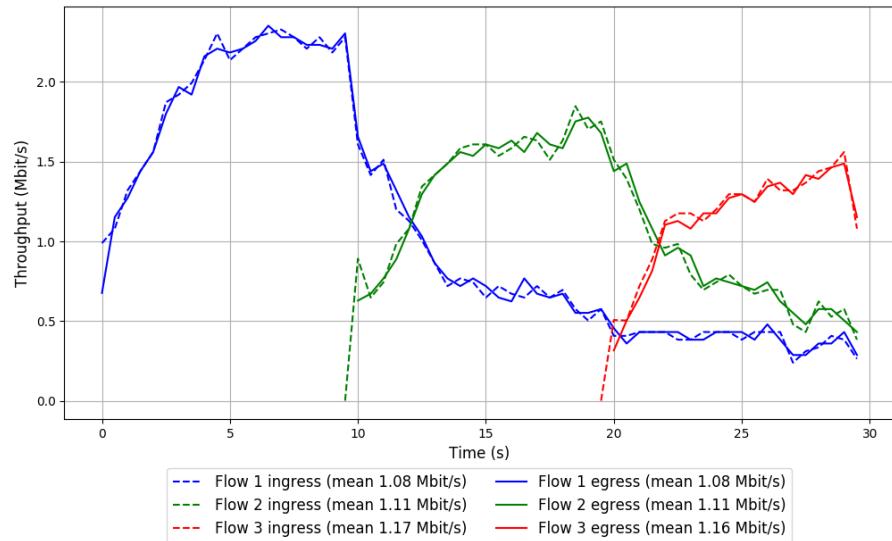


Run 3: Statistics of TCP Vegas

```
Start at: 2018-01-02 21:05:44
End at: 2018-01-02 21:06:14
Local clock offset: 1.295 ms
Remote clock offset: -14.259 ms

# Below is generated by plot.py at 2018-01-02 22:07:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.19 Mbit/s
95th percentile per-packet one-way delay: 156.392 ms
Loss rate: 0.57%
-- Flow 1:
Average throughput: 1.08 Mbit/s
95th percentile per-packet one-way delay: 146.296 ms
Loss rate: 0.11%
-- Flow 2:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 156.264 ms
Loss rate: 0.33%
-- Flow 3:
Average throughput: 1.16 Mbit/s
95th percentile per-packet one-way delay: 166.788 ms
Loss rate: 2.27%
```

Run 3: Report of TCP Vegas — Data Link

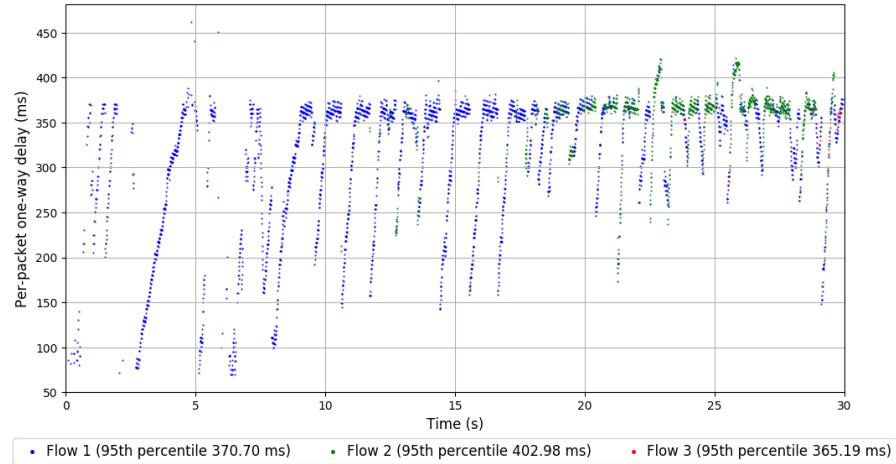
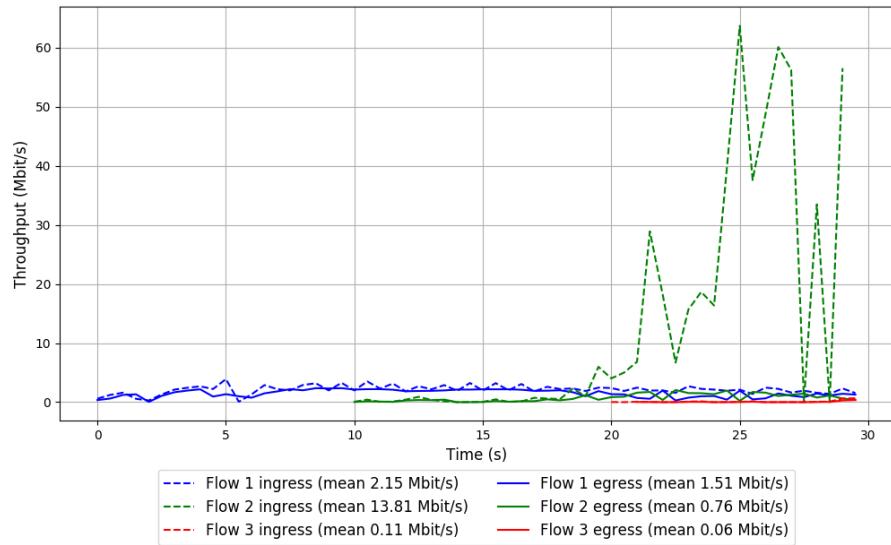


Run 1: Statistics of Verus

```
Start at: 2018-01-02 20:34:29
End at: 2018-01-02 20:34:59
Local clock offset: 1.266 ms
Remote clock offset: -13.066 ms

# Below is generated by plot.py at 2018-01-02 22:07:53
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.01 Mbit/s
95th percentile per-packet one-way delay: 375.422 ms
Loss rate: 81.83%
-- Flow 1:
Average throughput: 1.51 Mbit/s
95th percentile per-packet one-way delay: 370.704 ms
Loss rate: 29.76%
-- Flow 2:
Average throughput: 0.76 Mbit/s
95th percentile per-packet one-way delay: 402.980 ms
Loss rate: 94.48%
-- Flow 3:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 365.190 ms
Loss rate: 54.55%
```

Run 1: Report of Verus — Data Link

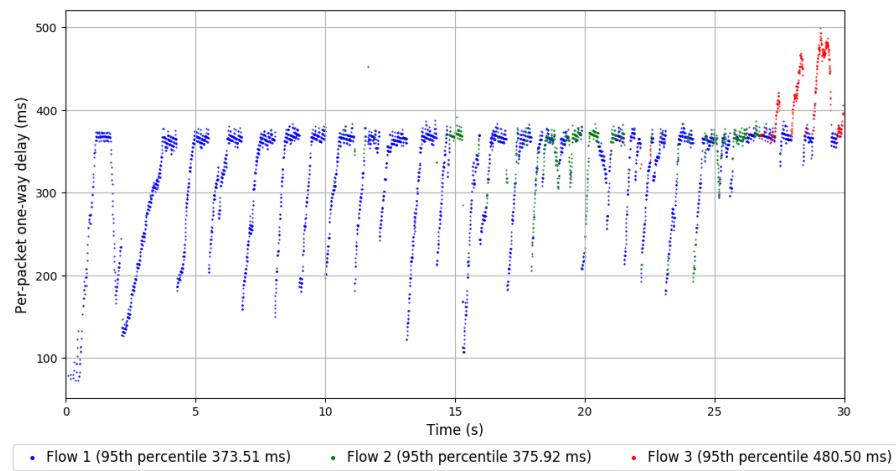
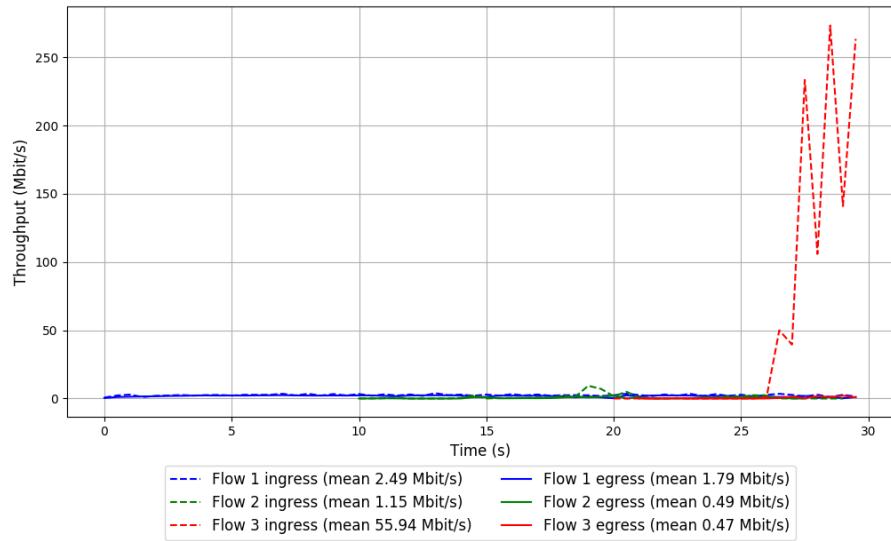


Run 2: Statistics of Verus

```
Start at: 2018-01-02 20:51:20
End at: 2018-01-02 20:51:50
Local clock offset: 3.261 ms
Remote clock offset: -14.365 ms

# Below is generated by plot.py at 2018-01-02 22:07:59
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.20 Mbit/s
95th percentile per-packet one-way delay: 381.070 ms
Loss rate: 89.88%
-- Flow 1:
Average throughput: 1.79 Mbit/s
95th percentile per-packet one-way delay: 373.515 ms
Loss rate: 28.63%
-- Flow 2:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 375.918 ms
Loss rate: 60.68%
-- Flow 3:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 480.498 ms
Loss rate: 99.27%
```

Run 2: Report of Verus — Data Link

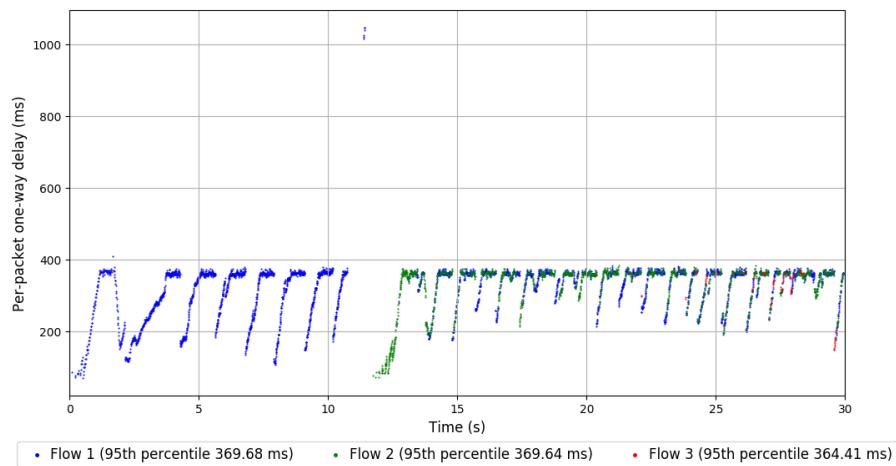
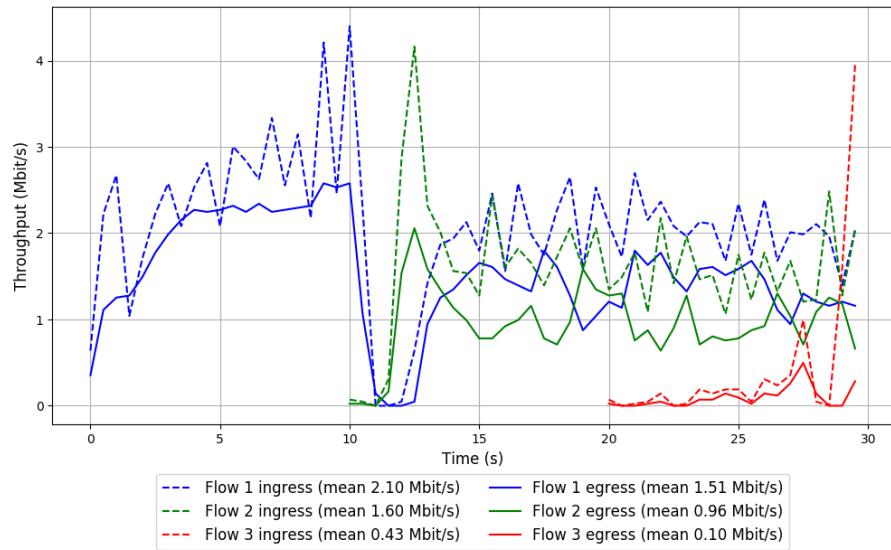


Run 3: Statistics of Verus

```
Start at: 2018-01-02 21:07:56
End at: 2018-01-02 21:08:26
Local clock offset: -0.094 ms
Remote clock offset: -13.706 ms

# Below is generated by plot.py at 2018-01-02 22:07:59
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.18 Mbit/s
95th percentile per-packet one-way delay: 369.660 ms
Loss rate: 34.23%
-- Flow 1:
Average throughput: 1.51 Mbit/s
95th percentile per-packet one-way delay: 369.678 ms
Loss rate: 28.16%
-- Flow 2:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 369.643 ms
Loss rate: 40.42%
-- Flow 3:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 364.414 ms
Loss rate: 77.29%
```

Run 3: Report of Verus — Data Link

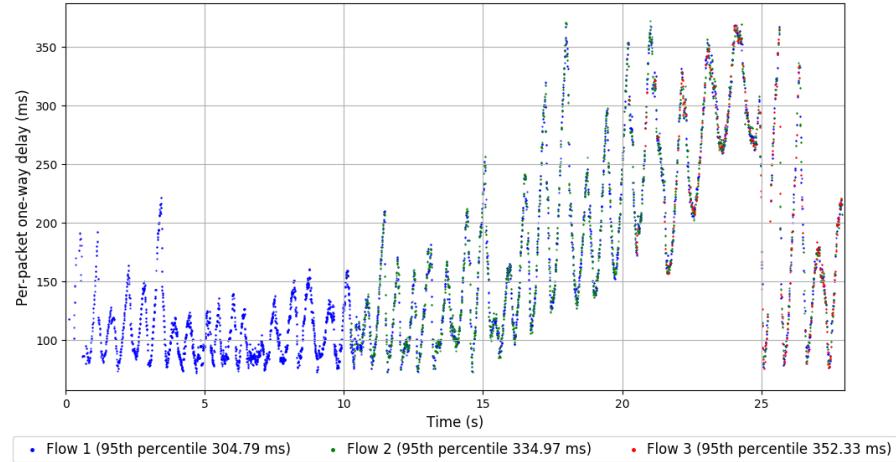
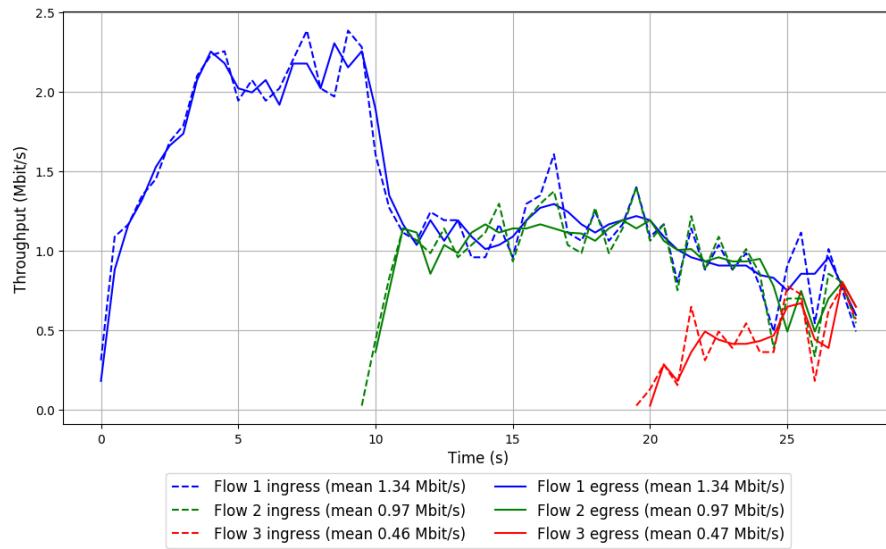


Run 1: Statistics of Copa

```
Start at: 2018-01-02 20:39:03
End at: 2018-01-02 20:39:33
Local clock offset: 0.135 ms
Remote clock offset: -16.35 ms

# Below is generated by plot.py at 2018-01-02 22:07:59
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.09 Mbit/s
95th percentile per-packet one-way delay: 322.699 ms
Loss rate: 0.71%
-- Flow 1:
Average throughput: 1.34 Mbit/s
95th percentile per-packet one-way delay: 304.788 ms
Loss rate: 0.43%
-- Flow 2:
Average throughput: 0.97 Mbit/s
95th percentile per-packet one-way delay: 334.970 ms
Loss rate: 0.74%
-- Flow 3:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 352.326 ms
Loss rate: 3.30%
```

Run 1: Report of Copa — Data Link

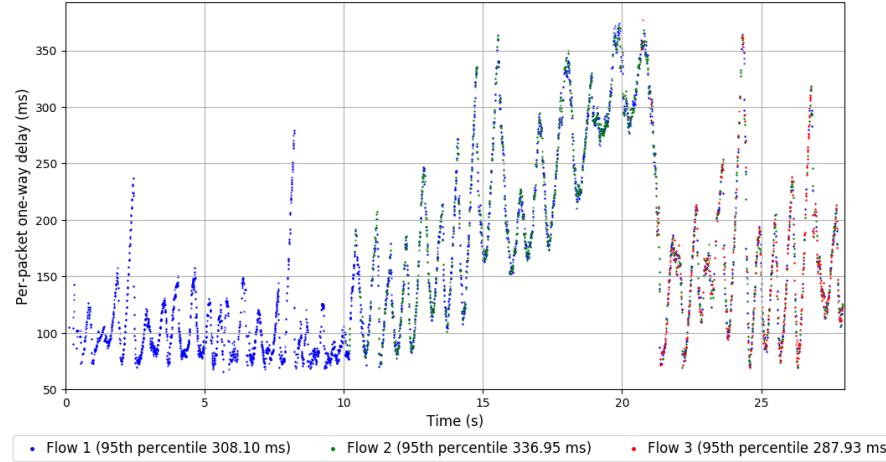
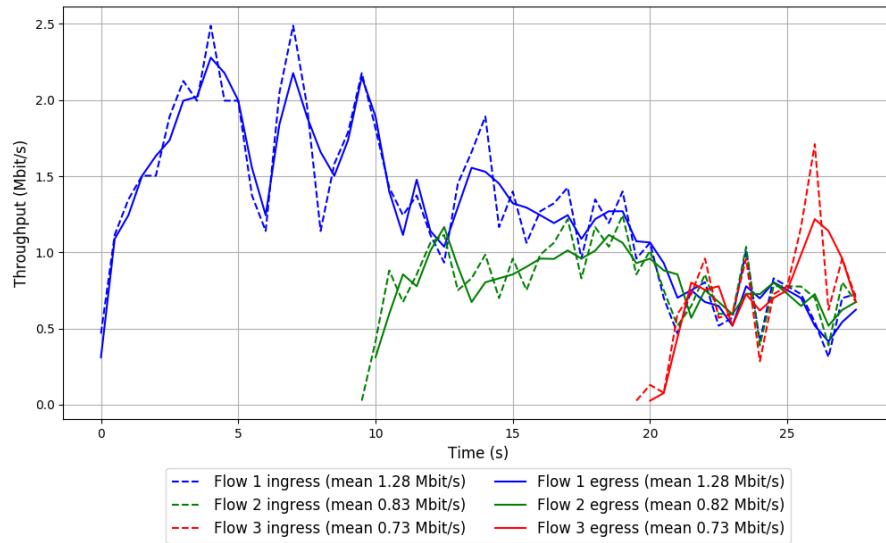


Run 2: Statistics of Copa

```
Start at: 2018-01-02 20:55:46
End at: 2018-01-02 20:56:16
Local clock offset: -0.451 ms
Remote clock offset: -13.447 ms

# Below is generated by plot.py at 2018-01-02 22:07:59
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.00 Mbit/s
95th percentile per-packet one-way delay: 318.702 ms
Loss rate: 1.29%
-- Flow 1:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 308.099 ms
Loss rate: 0.68%
-- Flow 2:
Average throughput: 0.82 Mbit/s
95th percentile per-packet one-way delay: 336.954 ms
Loss rate: 1.85%
-- Flow 3:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 287.931 ms
Loss rate: 3.63%
```

Run 2: Report of Copa — Data Link

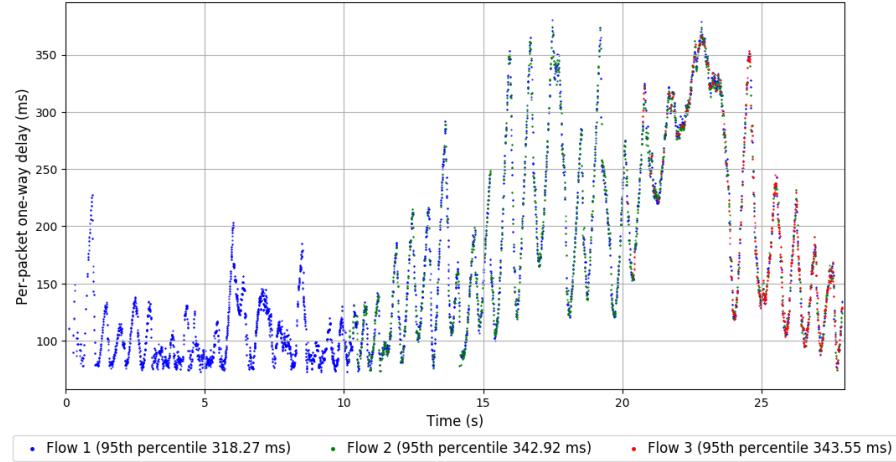
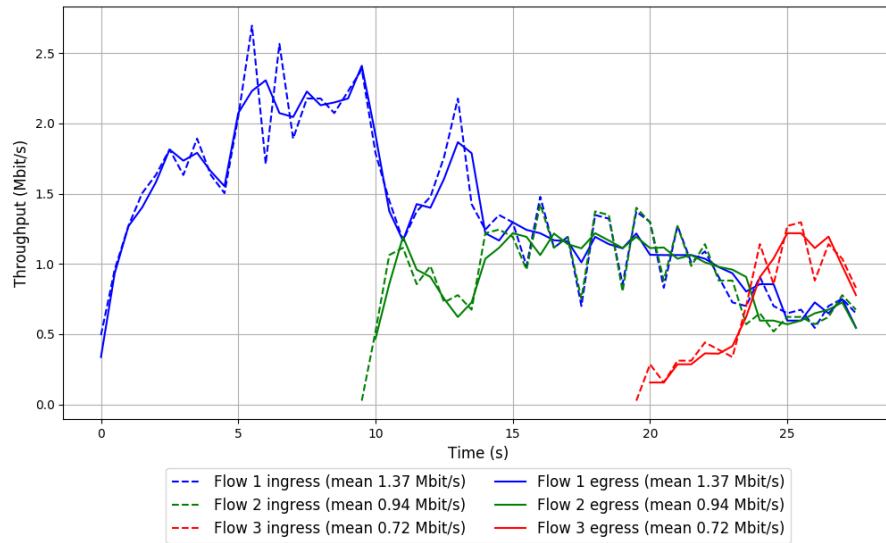


Run 3: Statistics of Copa

```
Start at: 2018-01-02 21:12:20
End at: 2018-01-02 21:12:50
Local clock offset: 3.949 ms
Remote clock offset: -13.495 ms

# Below is generated by plot.py at 2018-01-02 22:07:59
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.17 Mbit/s
95th percentile per-packet one-way delay: 329.767 ms
Loss rate: 0.86%
-- Flow 1:
Average throughput: 1.37 Mbit/s
95th percentile per-packet one-way delay: 318.268 ms
Loss rate: 0.53%
-- Flow 2:
Average throughput: 0.94 Mbit/s
95th percentile per-packet one-way delay: 342.918 ms
Loss rate: 0.96%
-- Flow 3:
Average throughput: 0.72 Mbit/s
95th percentile per-packet one-way delay: 343.548 ms
Loss rate: 2.74%
```

Run 3: Report of Copa — Data Link

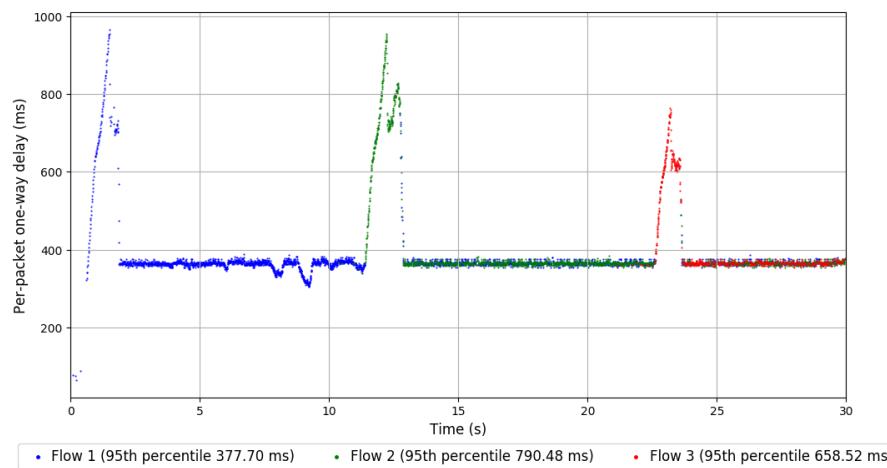
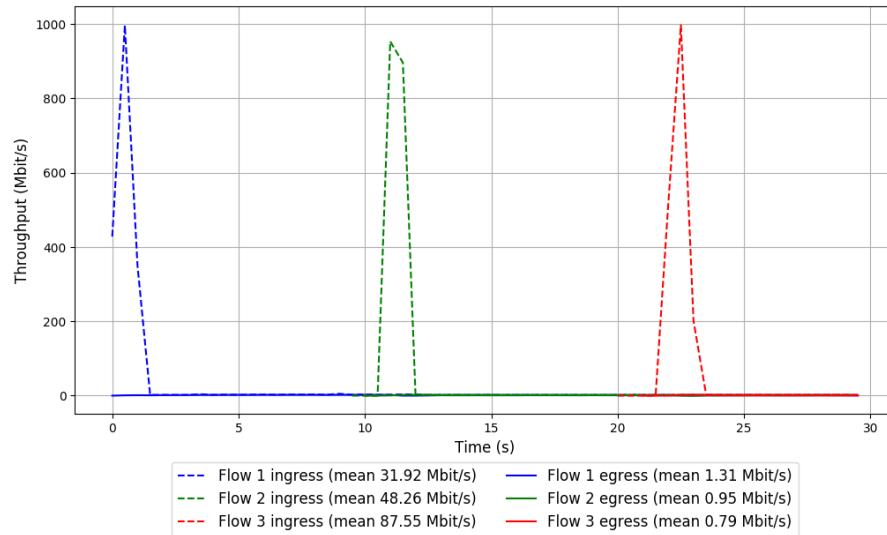


```
Run 1: Statistics of FillP

Start at: 2018-01-02 20:43:28
End at: 2018-01-02 20:43:58
Local clock offset: 3.815 ms
Remote clock offset: -14.205 ms

# Below is generated by plot.py at 2018-01-02 22:08:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.17 Mbit/s
95th percentile per-packet one-way delay: 687.601 ms
Loss rate: 97.68%
-- Flow 1:
Average throughput: 1.31 Mbit/s
95th percentile per-packet one-way delay: 377.699 ms
Loss rate: 95.91%
-- Flow 2:
Average throughput: 0.95 Mbit/s
95th percentile per-packet one-way delay: 790.484 ms
Loss rate: 98.07%
-- Flow 3:
Average throughput: 0.79 Mbit/s
95th percentile per-packet one-way delay: 658.520 ms
Loss rate: 99.19%
```

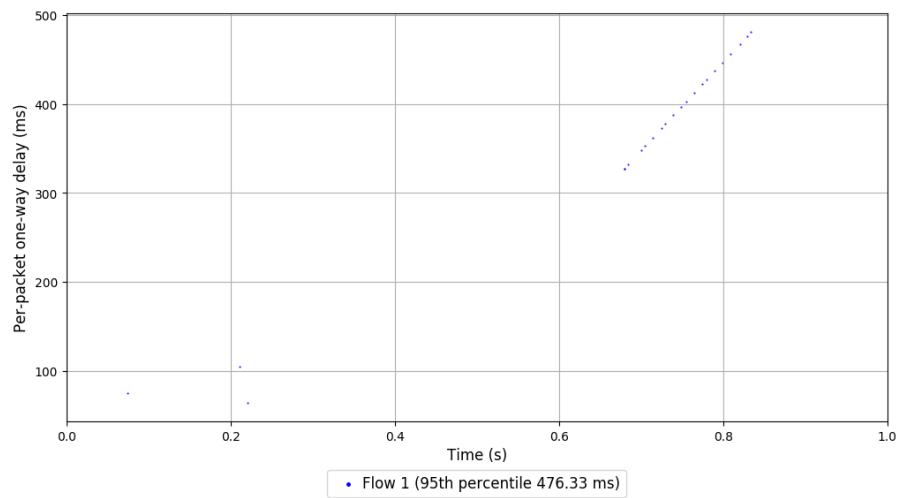
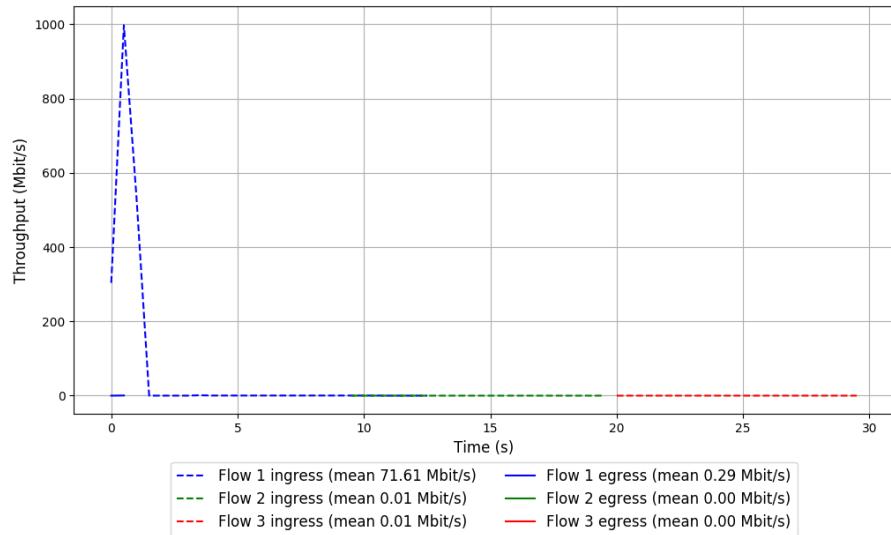
Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2018-01-02 21:00:11
End at: 2018-01-02 21:00:41
Local clock offset: -0.269 ms
Remote clock offset: -16.478 ms

Run 2: Report of FillP — Data Link

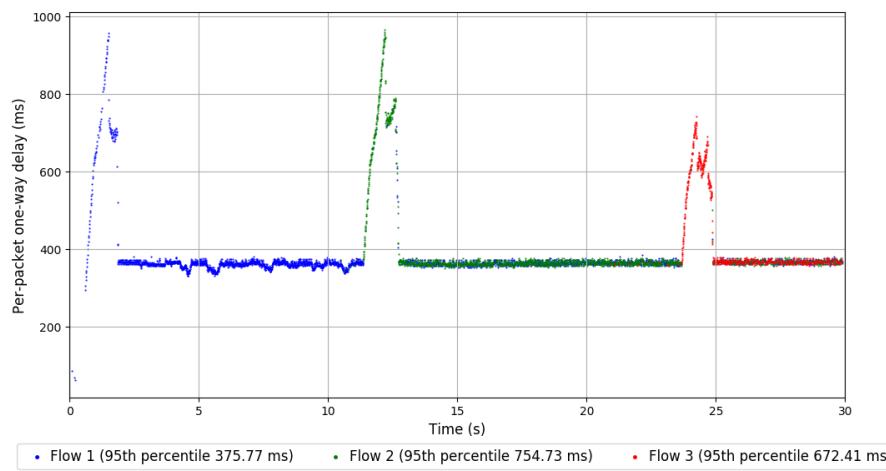
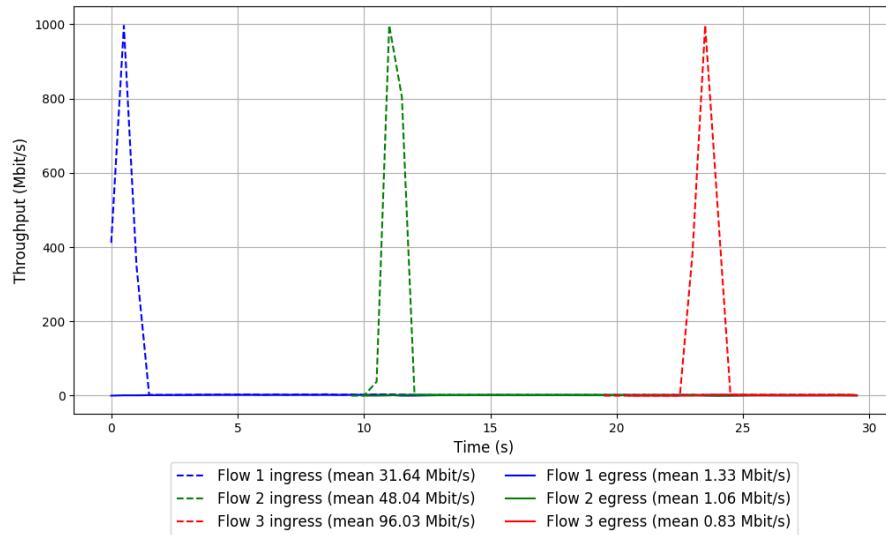


Run 3: Statistics of FillP

```
Start at: 2018-01-02 21:16:44
End at: 2018-01-02 21:17:14
Local clock offset: 0.669 ms
Remote clock offset: -14.965 ms

# Below is generated by plot.py at 2018-01-02 22:08:04
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.27 Mbit/s
95th percentile per-packet one-way delay: 668.643 ms
Loss rate: 97.63%
-- Flow 1:
Average throughput: 1.33 Mbit/s
95th percentile per-packet one-way delay: 375.774 ms
Loss rate: 95.80%
-- Flow 2:
Average throughput: 1.06 Mbit/s
95th percentile per-packet one-way delay: 754.728 ms
Loss rate: 97.86%
-- Flow 3:
Average throughput: 0.83 Mbit/s
95th percentile per-packet one-way delay: 672.414 ms
Loss rate: 99.22%
```

Run 3: Report of FillP — Data Link

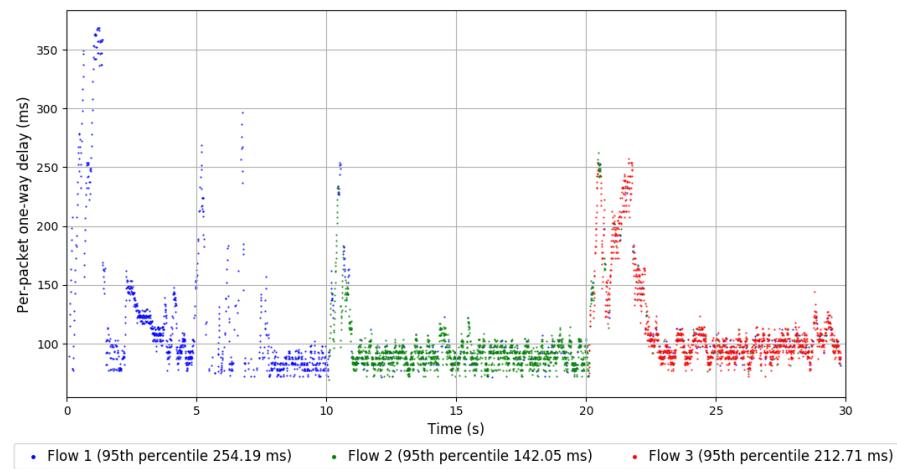
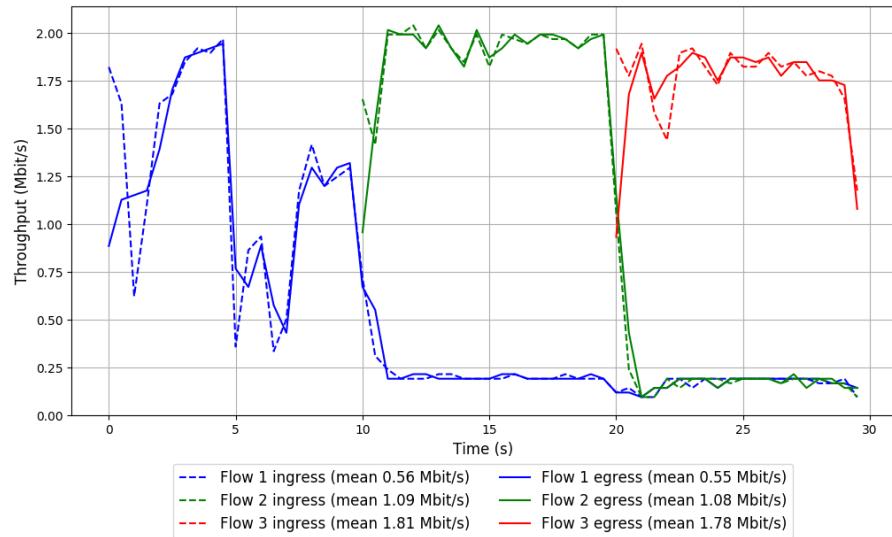


Run 1: Statistics of Indigo

```
Start at: 2018-01-02 20:28:57
End at: 2018-01-02 20:29:27
Local clock offset: 2.141 ms
Remote clock offset: -14.032 ms

# Below is generated by plot.py at 2018-01-02 22:08:04
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.85 Mbit/s
95th percentile per-packet one-way delay: 212.678 ms
Loss rate: 1.51%
-- Flow 1:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 254.185 ms
Loss rate: 1.94%
-- Flow 2:
Average throughput: 1.08 Mbit/s
95th percentile per-packet one-way delay: 142.051 ms
Loss rate: 0.56%
-- Flow 3:
Average throughput: 1.78 Mbit/s
95th percentile per-packet one-way delay: 212.710 ms
Loss rate: 2.24%
```

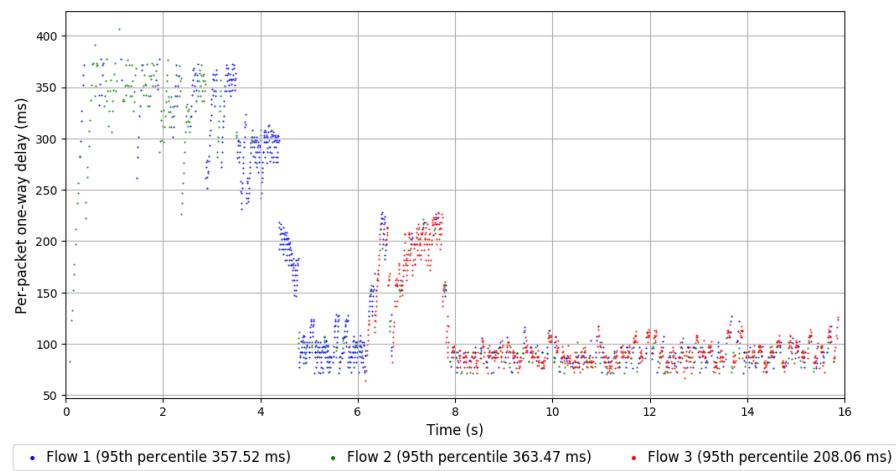
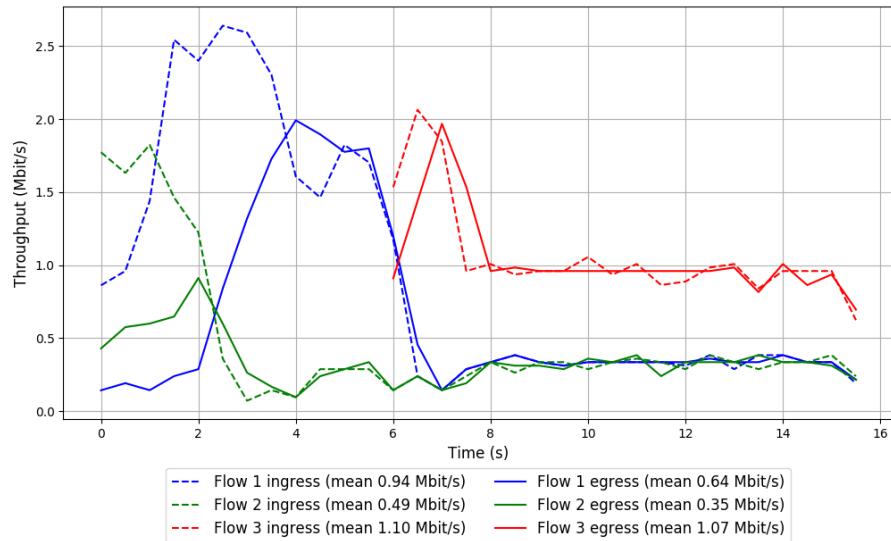
Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-01-02 20:45:50
End at: 2018-01-02 20:46:20
Local clock offset: -0.04 ms
Remote clock offset: -16.434 ms

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

```
Start at: 2018-01-02 21:02:25
End at: 2018-01-02 21:02:55
Local clock offset: 0.235 ms
Remote clock offset: -15.362 ms

# Below is generated by plot.py at 2018-01-02 22:08:04
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.85 Mbit/s
95th percentile per-packet one-way delay: 152.997 ms
Loss rate: 1.06%
-- Flow 1:
Average throughput: 1.08 Mbit/s
95th percentile per-packet one-way delay: 177.150 ms
Loss rate: 0.60%
-- Flow 2:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 121.223 ms
Loss rate: 1.06%
-- Flow 3:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 162.727 ms
Loss rate: 4.72%
```

Run 3: Report of Indigo — Data Link

