Pantheon Report

Generated at 2018-07-03 17:47:43 (UTC).

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

Repeated the test of 17 congestion control schemes 3 times.

Each test lasted for 30 seconds running 3 flows with 10-second interval between two flows.
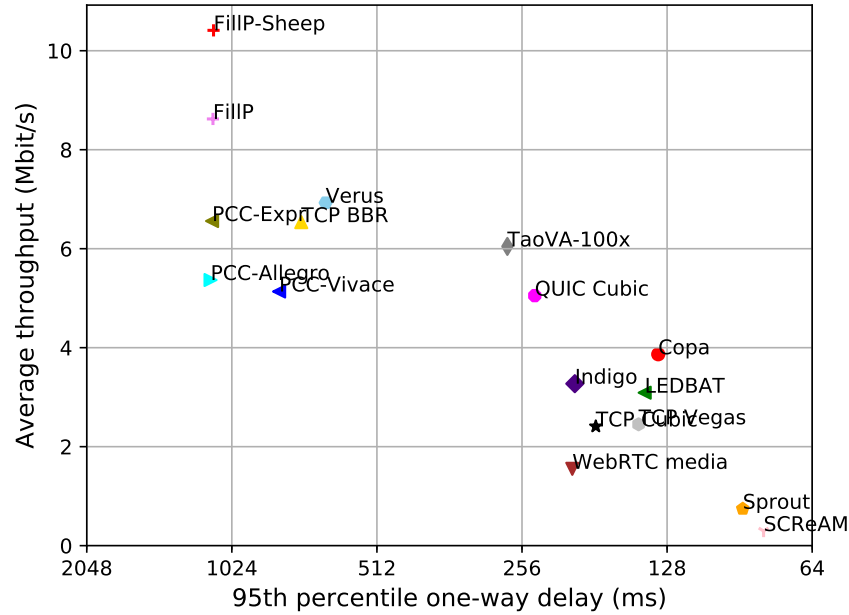
Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

NTP offsets were measured against `nets.org.sg` and have been applied to correct the timestamps in logs.
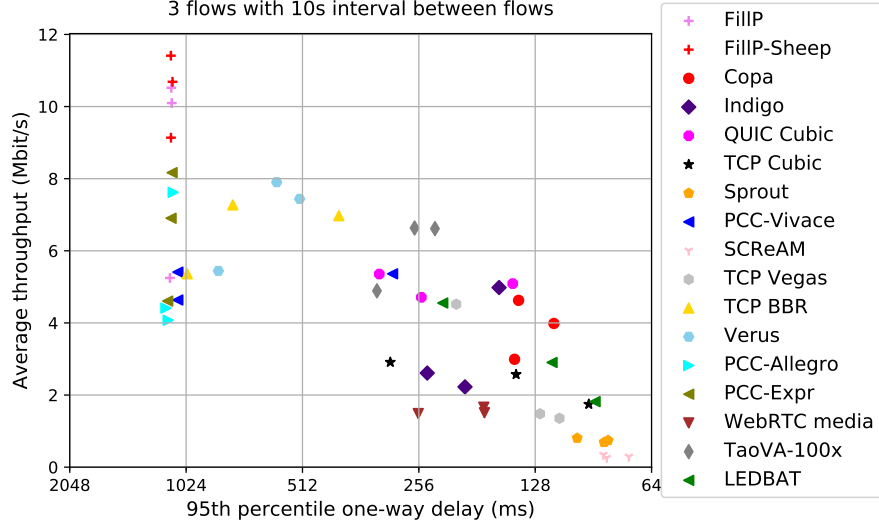
```
Git summary:
branch: master @ 9250dbeec7fb57193cdff1ba8c440b4e16ab30f0
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ 37162fe9af85249aeccac061c93e75640ef710b5
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdfe58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ 6f038ed31259d366f9840f65b82cbe8f464b1b39
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
 M receiver/src/buffer.h
 M receiver/src/core.cpp
 M sender/src/buffer.h
 M sender/src/core.cpp
third_party/pcc-experimental @ cd43e34e3f5f5613e8acd08fab92c4eb24f974ab
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream-reproduce @ f099118d1421aa3131bf11ff1964974e1da3bdb2
 M src/ScreamClient
 M src/ScreamServer
third_party/sprout @ 366e35c6178b01e31d4a46ad18c74f9415f19a26
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
 M src/verus.hpp
 M tools/plot.py
third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851
```

test from AWS India 1 to India ppp0, 3 runs of 30s each per scheme
3 flows with 10s interval between flows (mean of all runs by scheme)

test from AWS India 1 to India ppp0, 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	3.92	2.86	2.31	618.74	784.67	623.44	9.78	11.73	14.56
Copa	3	1.99	1.94	1.78	119.89	140.32	161.08	1.68	1.99	1.73
TCP Cubic	3	1.35	0.94	1.30	167.69	220.61	177.84	1.15	2.34	2.76
FillP	3	7.00	2.04	1.13	1123.03	1110.64	1101.05	64.10	34.51	37.70
FillP-Sheep	3	5.93	5.85	2.40	1105.35	1125.20	1130.11	20.71	45.50	62.59
Indigo	3	1.40	1.64	2.42	175.07	197.60	222.62	0.79	1.00	1.65
LEDBAT	3	1.57	1.50	1.62	142.86	135.97	154.48	2.10	2.28	2.66
PCC-Allegro	3	2.81	3.10	1.70	1105.69	1118.63	1304.02	31.89	48.28	98.31
PCC-Expr	3	3.70	3.15	2.71	1120.47	1127.94	1131.38	34.22	49.42	63.29
QUIC Cubic	3	2.76	2.49	1.95	210.25	232.97	338.65	1.31	1.57	2.63
SCReAM	3	0.14	0.14	0.17	77.39	83.78	90.24	0.57	1.19	1.25
Sprout	3	0.40	0.36	0.31	86.38	89.50	95.04	1.91	2.27	2.96
TaoVA-100x	3	3.29	2.87	2.58	229.10	294.55	383.02	2.31	2.53	3.30
TCP Vegas	3	1.12	1.43	1.17	136.90	131.92	172.14	2.94	2.86	1.74
Verus	3	4.48	2.59	2.28	675.50	679.12	631.82	6.95	4.45	6.28
PCC-Vivace	3	3.26	1.72	2.28	796.99	807.25	642.47	5.39	4.83	7.05
WebRTC media	3	0.77	0.58	0.20	217.78	236.55	194.01	0.82	1.08	1.89

```
Run 1: Statistics of TCP BBR

Start at: 2018-07-03 16:55:41
End at: 2018-07-03 16:56:11
Local clock offset: 3.454 ms
Remote clock offset: 6.744 ms


# Below is generated by plot.py at 2018-07-03 17:46:45
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.36 Mbit/s
95th percentile per-packet one-way delay: 1017.150 ms
Loss rate: 6.87%
-- Flow 1:
Average throughput: 2.74 Mbit/s
95th percentile per-packet one-way delay: 821.208 ms
Loss rate: 3.49%
-- Flow 2:
Average throughput: 3.02 Mbit/s
95th percentile per-packet one-way delay: 1069.598 ms
Loss rate: 9.79%
-- Flow 3:
Average throughput: 2.14 Mbit/s
95th percentile per-packet one-way delay: 512.585 ms
Loss rate: 11.27%
```
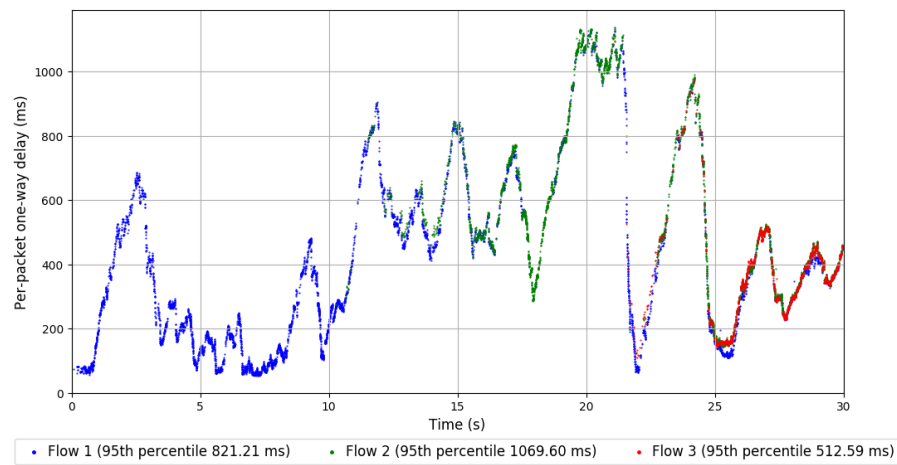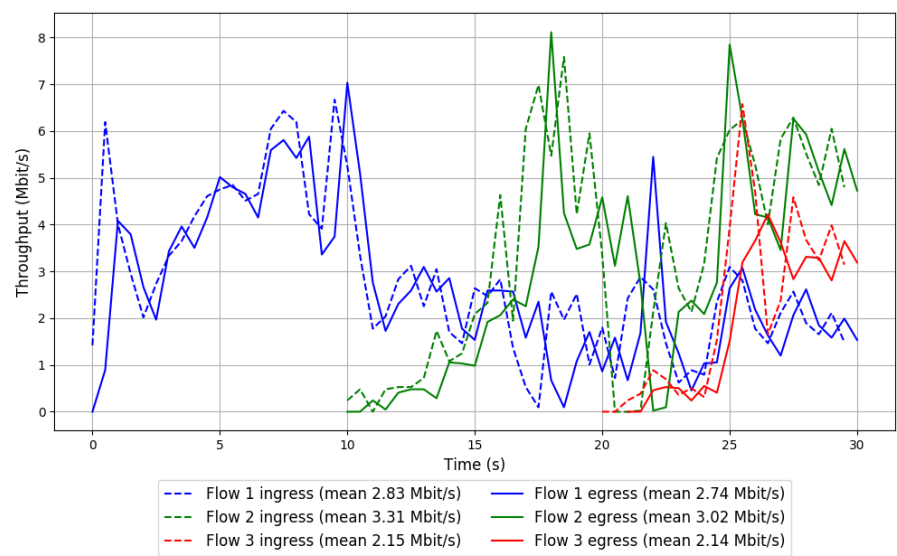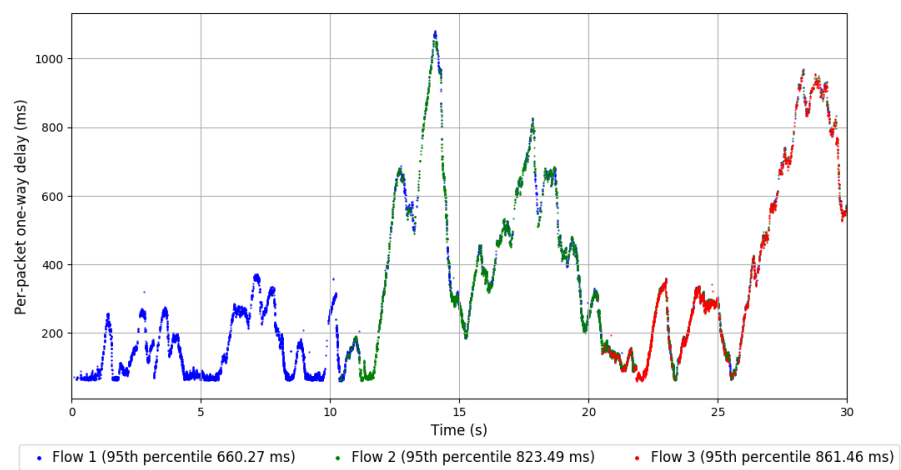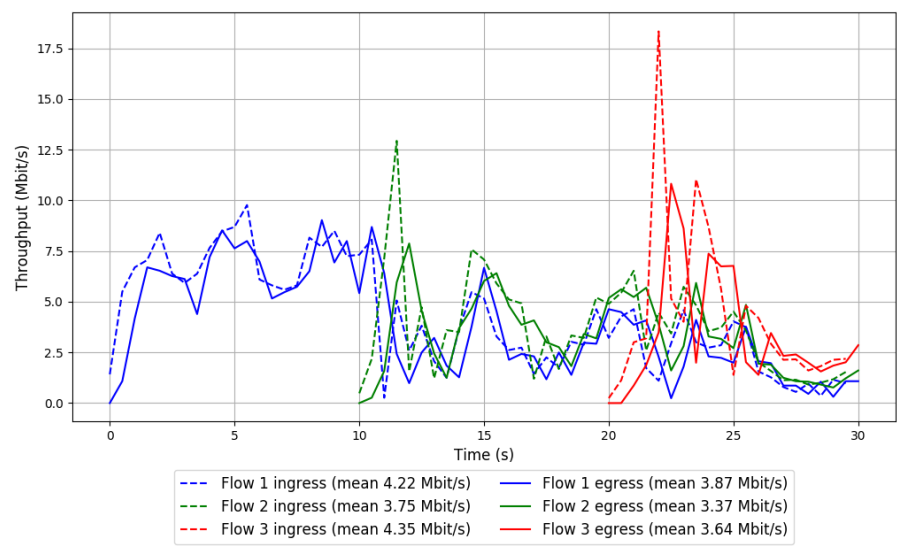
Run 1: Report of TCP BBR — Data Link

```
Run 2: Statistics of TCP BBR

Start at: 2018-07-03 17:14:29
End at: 2018-07-03 17:15:00
Local clock offset: 0.695 ms
Remote clock offset: 9.628 ms


# Below is generated by plot.py at 2018-07-03 17:46:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.27 Mbit/s
95th percentile per-packet one-way delay: 775.223 ms
Loss rate: 10.91%
-- Flow 1:
Average throughput: 3.87 Mbit/s
95th percentile per-packet one-way delay: 660.269 ms
Loss rate: 8.53%
-- Flow 2:
Average throughput: 3.37 Mbit/s
95th percentile per-packet one-way delay: 823.486 ms
Loss rate: 10.92%
-- Flow 3:
Average throughput: 3.64 Mbit/s
95th percentile per-packet one-way delay: 861.456 ms
Loss rate: 17.96%
```
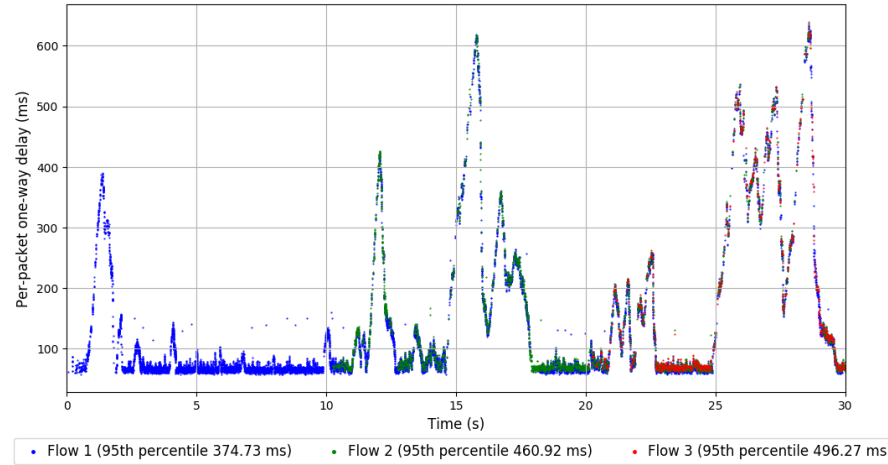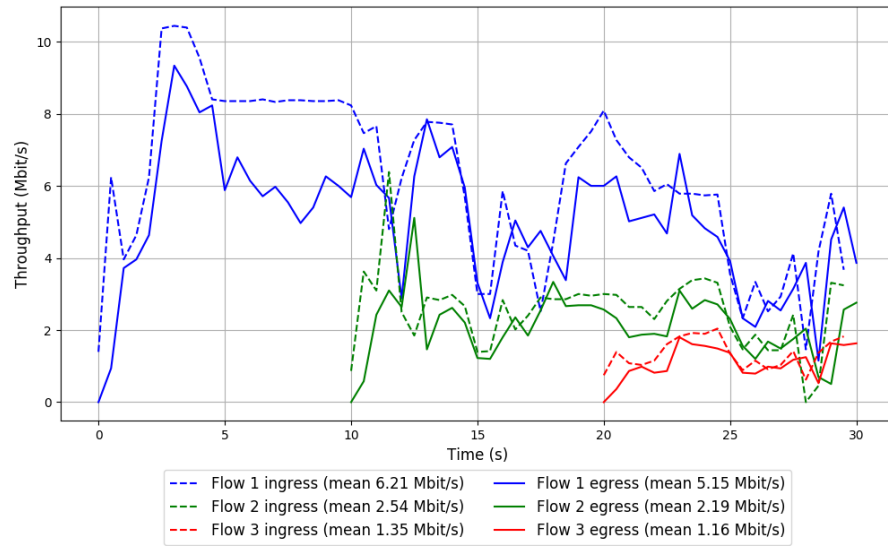
Run 2: Report of TCP BBR — Data Link

- Flow 1 ingress (mean 4.22 Mbit/s)
- Flow 1 egress (mean 3.87 Mbit/s)
- Flow 2 ingress (mean 3.75 Mbit/s)
- Flow 2 egress (mean 3.37 Mbit/s)
- Flow 3 ingress (mean 4.35 Mbit/s)
- Flow 3 egress (mean 3.64 Mbit/s)

- Flow 1 (95th percentile 660.27 ms)
- Flow 2 (95th percentile 823.49 ms)
- Flow 3 (95th percentile 861.46 ms)

```
Run 3: Statistics of TCP BBR

Start at: 2018-07-03 17:33:33
End at: 2018-07-03 17:34:03
Local clock offset: -0.996 ms
Remote clock offset: 12.679 ms


# Below is generated by plot.py at 2018-07-03 17:46:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.97 Mbit/s
95th percentile per-packet one-way delay: 412.298 ms
Loss rate: 16.59%
-- Flow 1:
Average throughput: 5.15 Mbit/s
95th percentile per-packet one-way delay: 374.732 ms
Loss rate: 17.33%
-- Flow 2:
Average throughput: 2.19 Mbit/s
95th percentile per-packet one-way delay: 460.920 ms
Loss rate: 14.47%
-- Flow 3:
Average throughput: 1.16 Mbit/s
95th percentile per-packet one-way delay: 496.275 ms
Loss rate: 14.44%
```
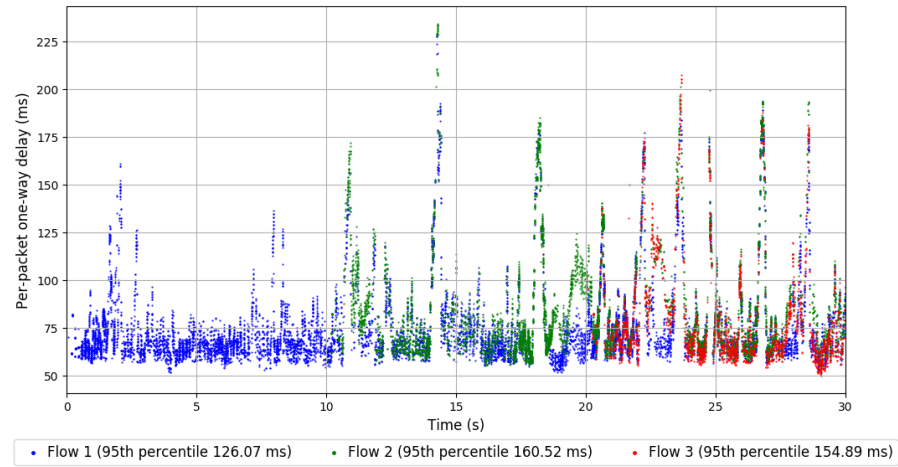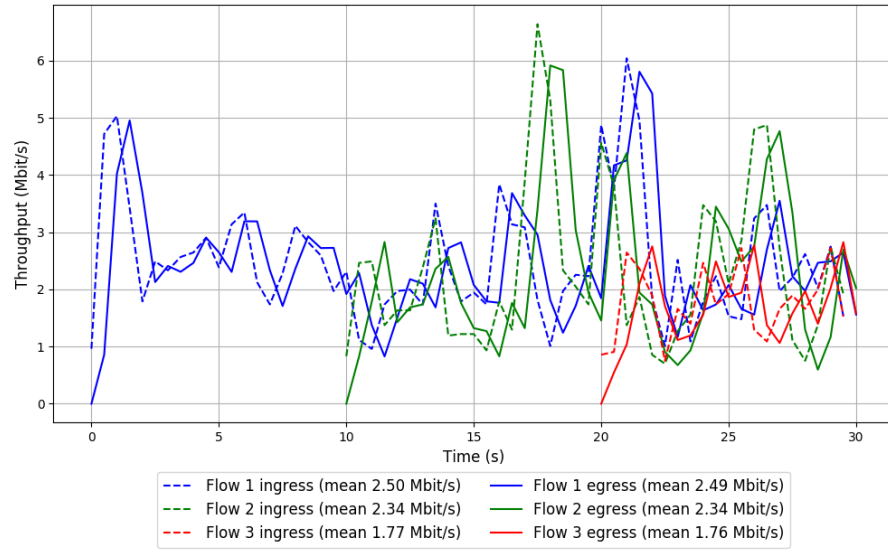
Run 3: Report of TCP BBR — Data Link

```
Run 1: Statistics of Copa

Start at: 2018-07-03 16:56:46
End at: 2018-07-03 16:57:16
Local clock offset: 6.965 ms
Remote clock offset: 7.08 ms


# Below is generated by plot.py at 2018-07-03 17:46:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.63 Mbit/s
95th percentile per-packet one-way delay: 141.341 ms
Loss rate: 0.61%
-- Flow 1:
Average throughput: 2.49 Mbit/s
95th percentile per-packet one-way delay: 126.068 ms
Loss rate: 0.61%
-- Flow 2:
Average throughput: 2.34 Mbit/s
95th percentile per-packet one-way delay: 160.517 ms
Loss rate: 0.56%
-- Flow 3:
Average throughput: 1.76 Mbit/s
95th percentile per-packet one-way delay: 154.886 ms
Loss rate: 0.76%
```
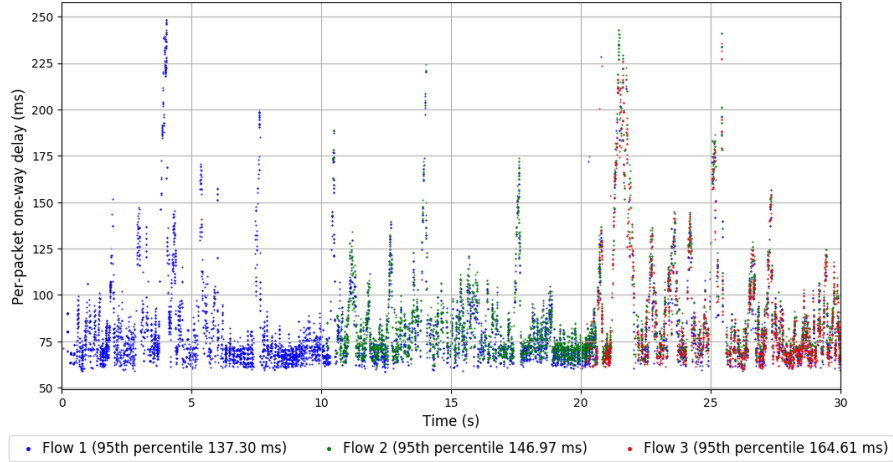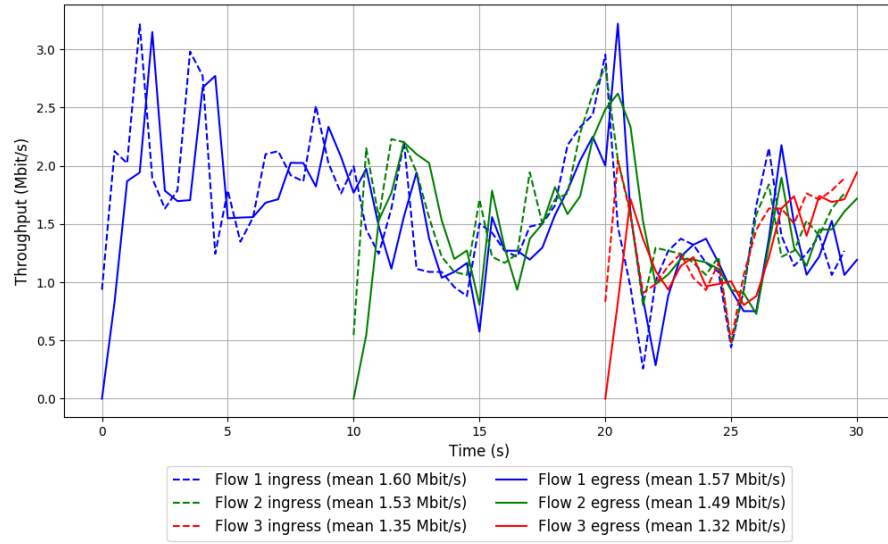
Run 1: Report of Copa — Data Link

```
Run 2: Statistics of Copa

Start at: 2018-07-03 17:15:35
End at: 2018-07-03 17:16:05
Local clock offset: -0.211 ms
Remote clock offset: 10.717 ms


# Below is generated by plot.py at 2018-07-03 17:46:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.99 Mbit/s
95th percentile per-packet one-way delay: 144.752 ms
Loss rate: 2.49%
-- Flow 1:
Average throughput: 1.57 Mbit/s
95th percentile per-packet one-way delay: 137.298 ms
Loss rate: 2.36%
-- Flow 2:
Average throughput: 1.49 Mbit/s
95th percentile per-packet one-way delay: 146.967 ms
Loss rate: 2.48%
-- Flow 3:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 164.609 ms
Loss rate: 2.93%
```
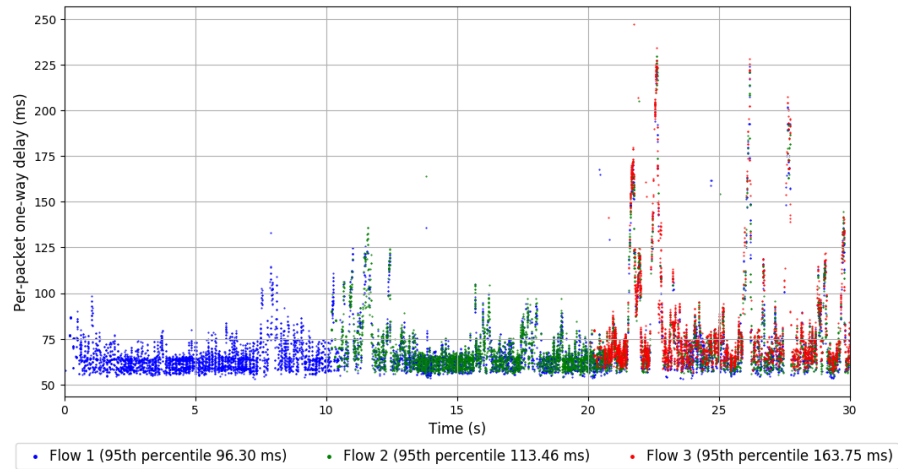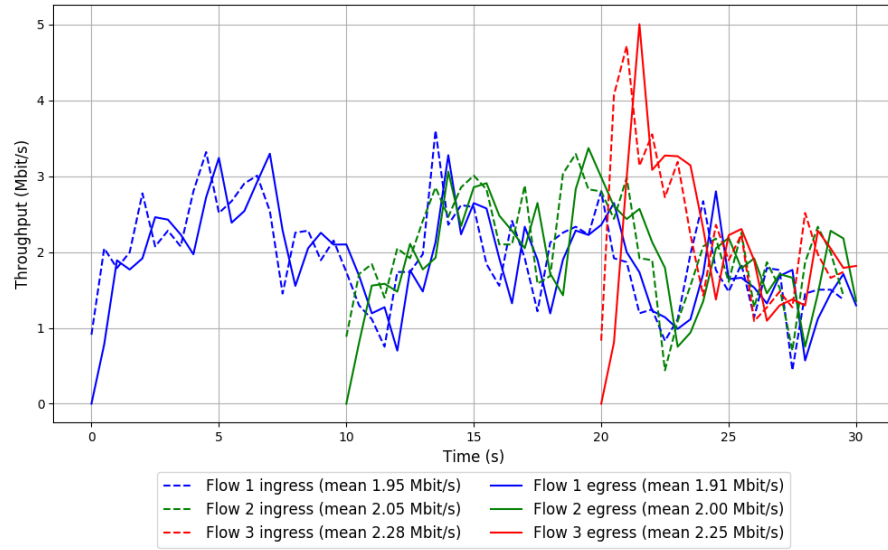
Run 2: Report of Copa — Data Link

Flow 1 ingress (mean 1.60 Mbit/s)   Flow 1 egress (mean 1.57 Mbit/s)
Flow 2 ingress (mean 1.53 Mbit/s)   Flow 2 egress (mean 1.49 Mbit/s)
Flow 3 ingress (mean 1.35 Mbit/s)   Flow 3 egress (mean 1.32 Mbit/s)

Flow 1 (95th percentile 137.30 ms)   Flow 2 (95th percentile 146.97 ms)   Flow 3 (95th percentile 164.61 ms)

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```
Run 3: Statistics of Copa

Start at: 2018-07-03 17:34:39
End at: 2018-07-03 17:35:09
Local clock offset: 1.345 ms
Remote clock offset: 12.405 ms


# Below is generated by plot.py at 2018-07-03 17:46:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.98 Mbit/s
95th percentile per-packet one-way delay: 114.507 ms
Loss rate: 2.25%
-- Flow 1:
Average throughput: 1.91 Mbit/s
95th percentile per-packet one-way delay: 96.304 ms
Loss rate: 2.06%
-- Flow 2:
Average throughput: 2.00 Mbit/s
95th percentile per-packet one-way delay: 113.462 ms
Loss rate: 2.93%
-- Flow 3:
Average throughput: 2.25 Mbit/s
95th percentile per-packet one-way delay: 163.750 ms
Loss rate: 1.51%
```
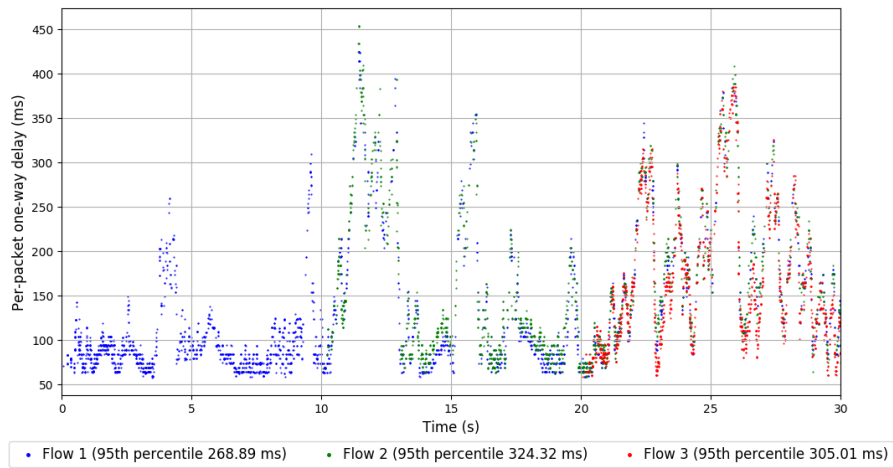
Run 3: Report of Copa — Data Link

```
Run 1: Statistics of TCP Cubic

Start at: 2018-07-03 16:59:04
End at: 2018-07-03 16:59:34
Local clock offset: 6.64 ms
Remote clock offset: 6.848 ms


# Below is generated by plot.py at 2018-07-03 17:46:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.91 Mbit/s
95th percentile per-packet one-way delay: 303.403 ms
Loss rate: 0.89%
-- Flow 1:
Average throughput: 1.27 Mbit/s
95th percentile per-packet one-way delay: 268.895 ms
Loss rate: 0.78%
-- Flow 2:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 324.322 ms
Loss rate: 0.88%
-- Flow 3:
Average throughput: 2.36 Mbit/s
95th percentile per-packet one-way delay: 305.013 ms
Loss rate: 1.06%
```
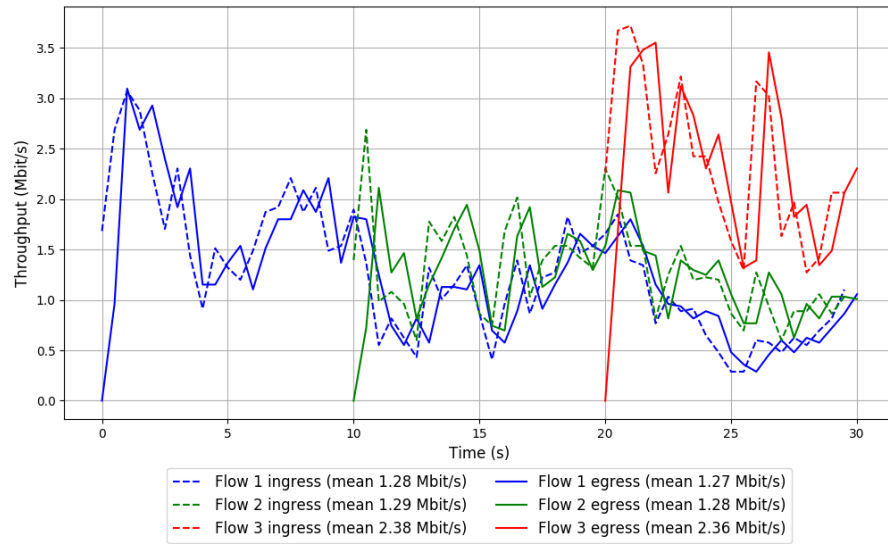
Run 1: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 1.28 Mbit/s) --- Flow 1 egress (mean 1.27 Mbit/s)
Flow 2 ingress (mean 1.29 Mbit/s) --- Flow 2 egress (mean 1.28 Mbit/s)
Flow 3 ingress (mean 2.38 Mbit/s) --- Flow 3 egress (mean 2.36 Mbit/s)

Flow 1 (95th percentile 268.89 ms)   Flow 2 (95th percentile 324.32 ms)   Flow 3 (95th percentile 305.01 ms)

```
Run 2: Statistics of TCP Cubic

Start at: 2018-07-03 17:17:46
End at: 2018-07-03 17:18:16
Local clock offset: -1.873 ms
Remote clock offset: 9.81 ms


# Below is generated by plot.py at 2018-07-03 17:46:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.75 Mbit/s
95th percentile per-packet one-way delay: 93.027 ms
Loss rate: 2.03%
-- Flow 1:
Average throughput: 0.85 Mbit/s
95th percentile per-packet one-way delay: 97.647 ms
Loss rate: 2.03%
-- Flow 2:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 79.060 ms
Loss rate: 1.97%
-- Flow 3:
Average throughput: 0.94 Mbit/s
95th percentile per-packet one-way delay: 93.129 ms
Loss rate: 2.15%
```
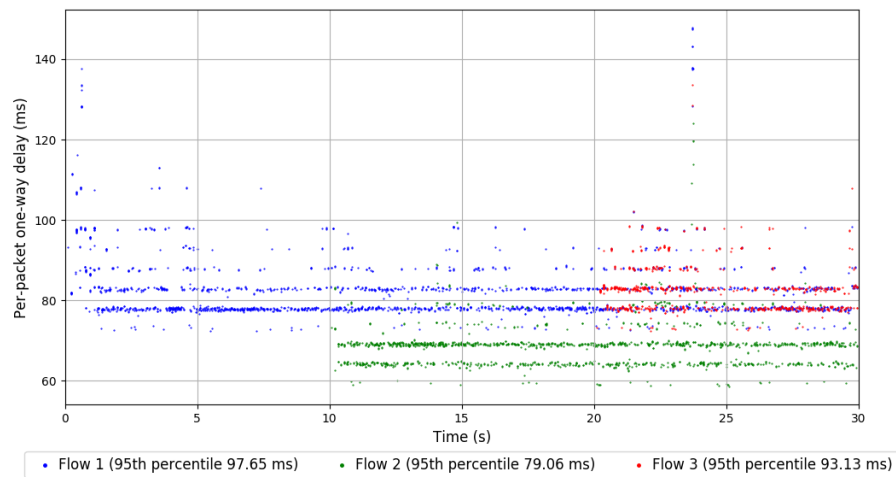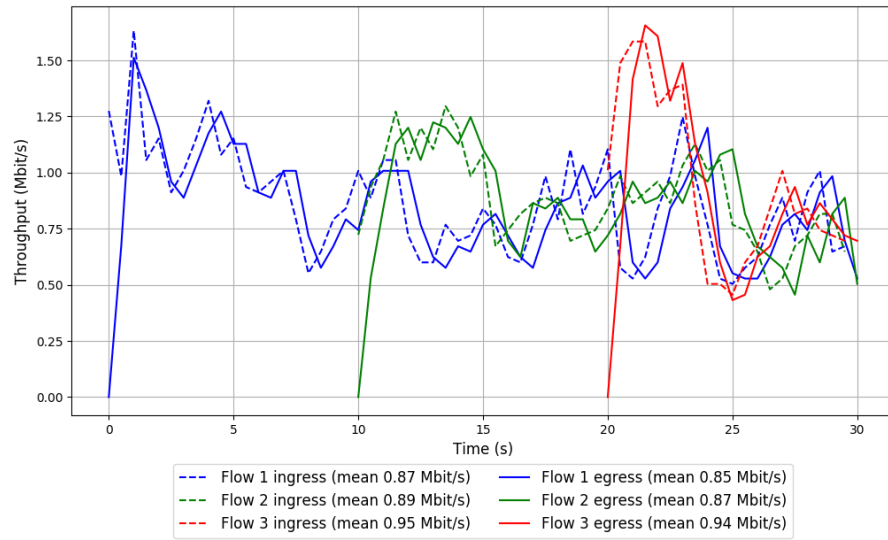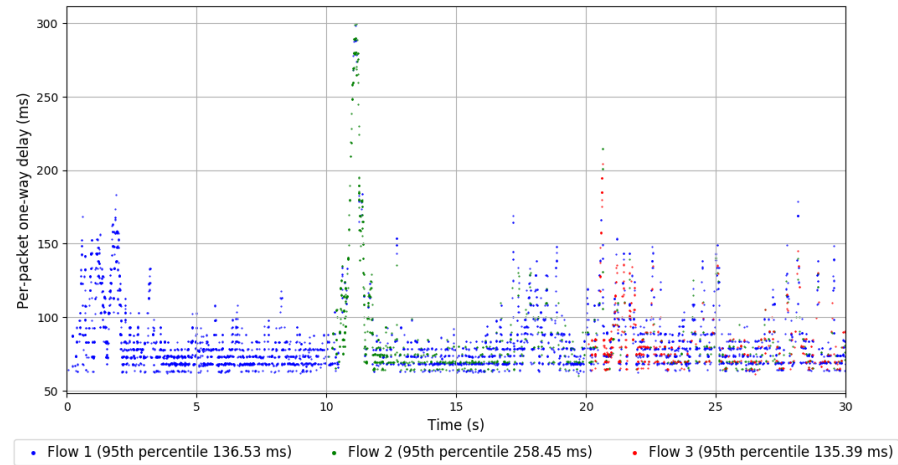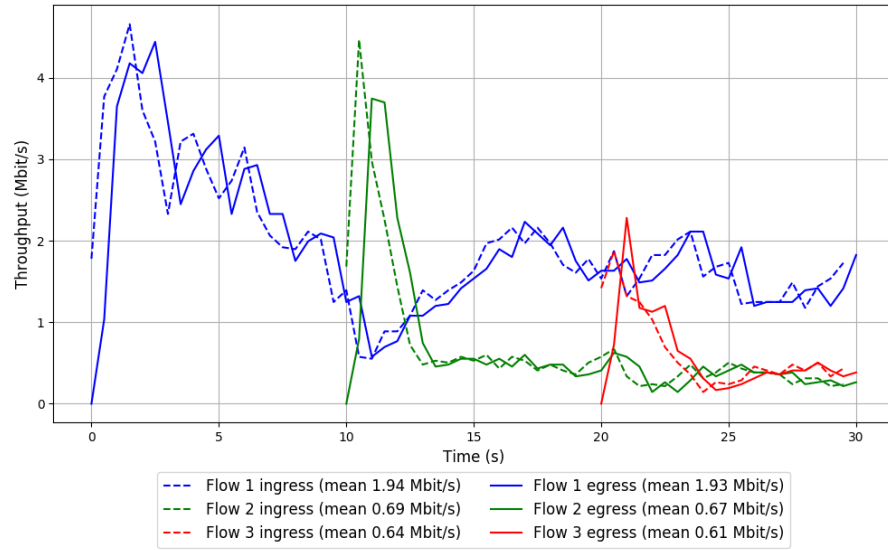
Run 2: Report of TCP Cubic — Data Link

```
Run 3: Statistics of TCP Cubic

Start at: 2018-07-03 17:36:51
End at: 2018-07-03 17:37:21
Local clock offset: -1.613 ms
Remote clock offset: 10.2 ms


# Below is generated by plot.py at 2018-07-03 17:46:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.57 Mbit/s
95th percentile per-packet one-way delay: 143.423 ms
Loss rate: 1.63%
-- Flow 1:
Average throughput: 1.93 Mbit/s
95th percentile per-packet one-way delay: 136.535 ms
Loss rate: 0.64%
-- Flow 2:
Average throughput: 0.67 Mbit/s
95th percentile per-packet one-way delay: 258.453 ms
Loss rate: 4.17%
-- Flow 3:
Average throughput: 0.61 Mbit/s
95th percentile per-packet one-way delay: 135.390 ms
Loss rate: 5.07%
```
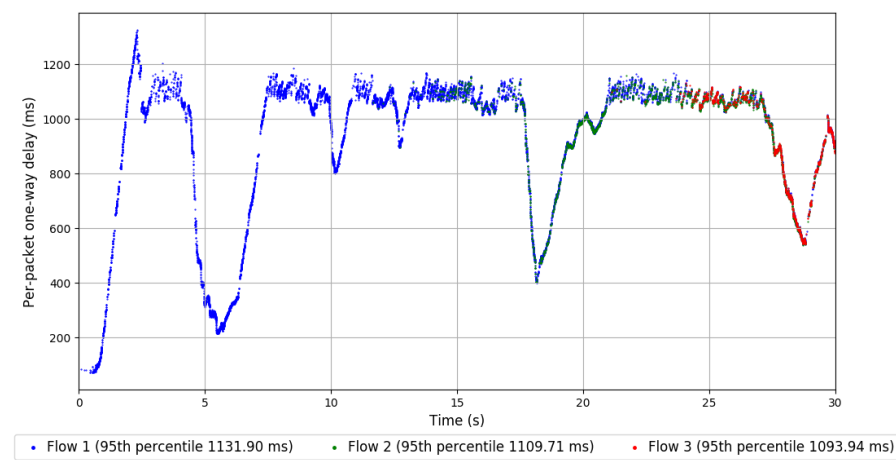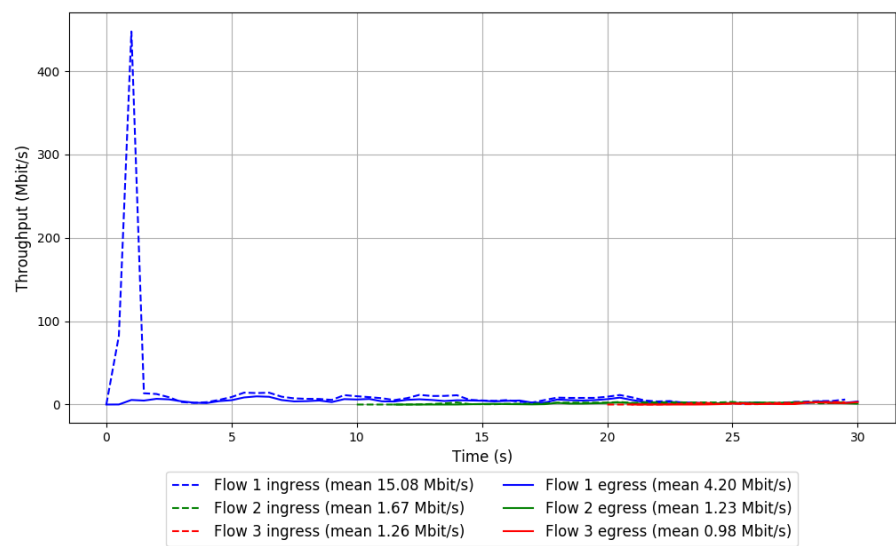
Run 3: Report of TCP Cubic — Data Link

Throughput (Mbit/s) vs Time (s)

Flow 1 ingress (mean 1.94 Mbit/s)   Flow 1 egress (mean 1.93 Mbit/s)
Flow 2 ingress (mean 0.69 Mbit/s)   Flow 2 egress (mean 0.67 Mbit/s)
Flow 3 ingress (mean 0.64 Mbit/s)   Flow 3 egress (mean 0.61 Mbit/s)

Per-packet one-way delay (ms) vs Time (s)

Flow 1 (95th percentile 136.53 ms)   Flow 2 (95th percentile 258.45 ms)   Flow 3 (95th percentile 135.39 ms)
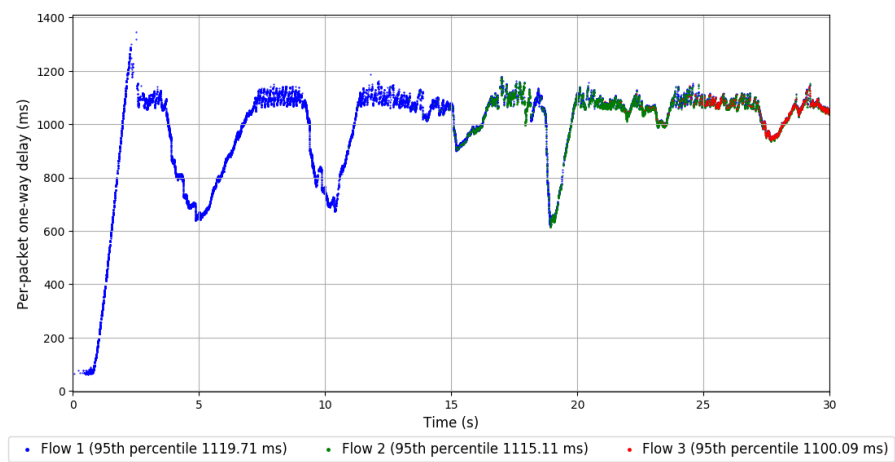
```
Run 1: Statistics of FillP

Start at: 2018-07-03 17:07:53
End at: 2018-07-03 17:08:23
Local clock offset: 4.012 ms
Remote clock offset: 8.666 ms


# Below is generated by plot.py at 2018-07-03 17:46:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.25 Mbit/s
95th percentile per-packet one-way delay: 1127.711 ms
Loss rate: 68.51%
-- Flow 1:
Average throughput: 4.20 Mbit/s
95th percentile per-packet one-way delay: 1131.901 ms
Loss rate: 72.21%
-- Flow 2:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 1109.710 ms
Loss rate: 32.59%
-- Flow 3:
Average throughput: 0.98 Mbit/s
95th percentile per-packet one-way delay: 1093.939 ms
Loss rate: 30.43%
```
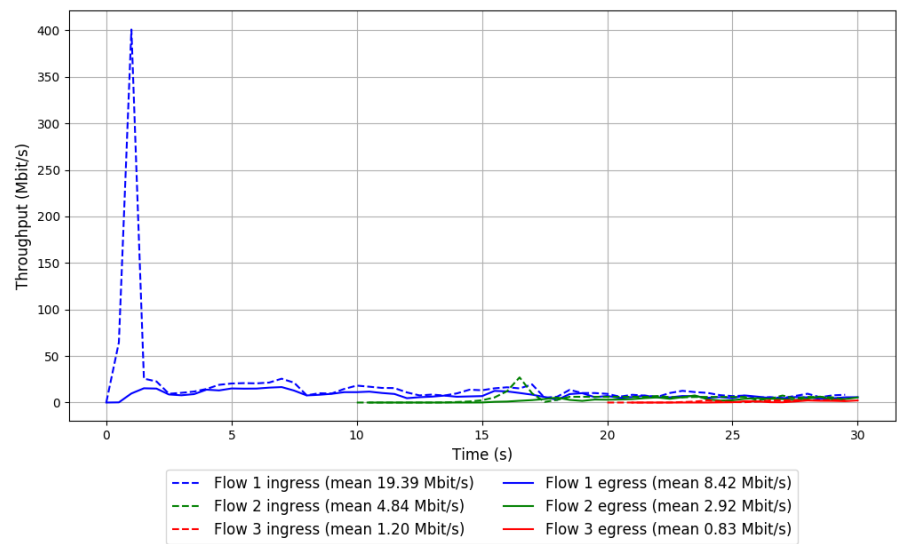
Run 1: Report of FillP — Data Link

Flow 1 ingress (mean 15.08 Mbit/s) --- Flow 1 egress (mean 4.20 Mbit/s)
Flow 2 ingress (mean 1.67 Mbit/s) --- Flow 2 egress (mean 1.23 Mbit/s)
Flow 3 ingress (mean 1.26 Mbit/s) --- Flow 3 egress (mean 0.98 Mbit/s)

• Flow 1 (95th percentile 1131.90 ms)   • Flow 2 (95th percentile 1109.71 ms)   • Flow 3 (95th percentile 1093.94 ms)

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```
Run 2: Statistics of FillP

Start at: 2018-07-03 17:26:55
End at: 2018-07-03 17:27:25
Local clock offset: -1.236 ms
Remote clock offset: 11.966 ms


# Below is generated by plot.py at 2018-07-03 17:47:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.52 Mbit/s
95th percentile per-packet one-way delay: 1118.651 ms
Loss rate: 54.33%
-- Flow 1:
Average throughput: 8.42 Mbit/s
95th percentile per-packet one-way delay: 1119.715 ms
Loss rate: 56.65%
-- Flow 2:
Average throughput: 2.92 Mbit/s
95th percentile per-packet one-way delay: 1115.105 ms
Loss rate: 42.38%
-- Flow 3:
Average throughput: 0.83 Mbit/s
95th percentile per-packet one-way delay: 1100.093 ms
Loss rate: 38.18%
```
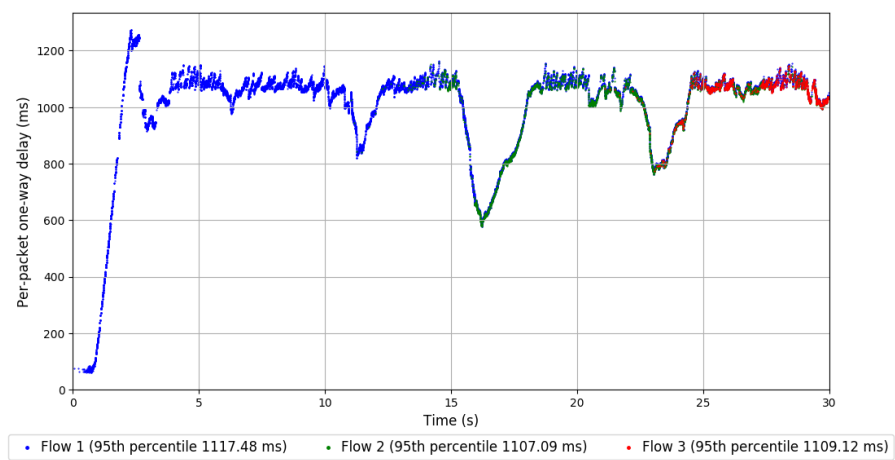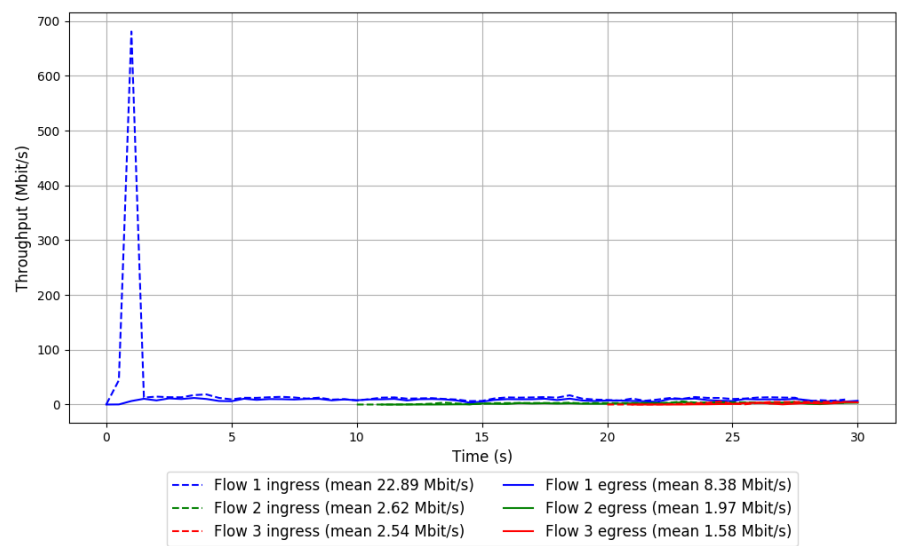
Run 2: Report of FillP — Data Link

Flow 1 ingress (mean 19.39 Mbit/s) --- Flow 1 egress (mean 8.42 Mbit/s) ---
Flow 2 ingress (mean 4.84 Mbit/s) --- Flow 2 egress (mean 2.92 Mbit/s) ---
Flow 3 ingress (mean 1.20 Mbit/s) --- Flow 3 egress (mean 0.83 Mbit/s) ---

Flow 1 (95th percentile 1119.71 ms) Flow 2 (95th percentile 1115.11 ms) Flow 3 (95th percentile 1100.09 ms)

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```
Run 3: Statistics of FillP

Start at: 2018-07-03 17:45:57
End at: 2018-07-03 17:46:27
Local clock offset: 1.609 ms
Remote clock offset: 2.911 ms


# Below is generated by plot.py at 2018-07-03 17:47:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.10 Mbit/s
95th percentile per-packet one-way delay: 1115.580 ms
Loss rate: 60.43%
-- Flow 1:
Average throughput: 8.38 Mbit/s
95th percentile per-packet one-way delay: 1117.483 ms
Loss rate: 63.44%
-- Flow 2:
Average throughput: 1.97 Mbit/s
95th percentile per-packet one-way delay: 1107.094 ms
Loss rate: 28.57%
-- Flow 3:
Average throughput: 1.58 Mbit/s
95th percentile per-packet one-way delay: 1109.123 ms
Loss rate: 44.50%
```
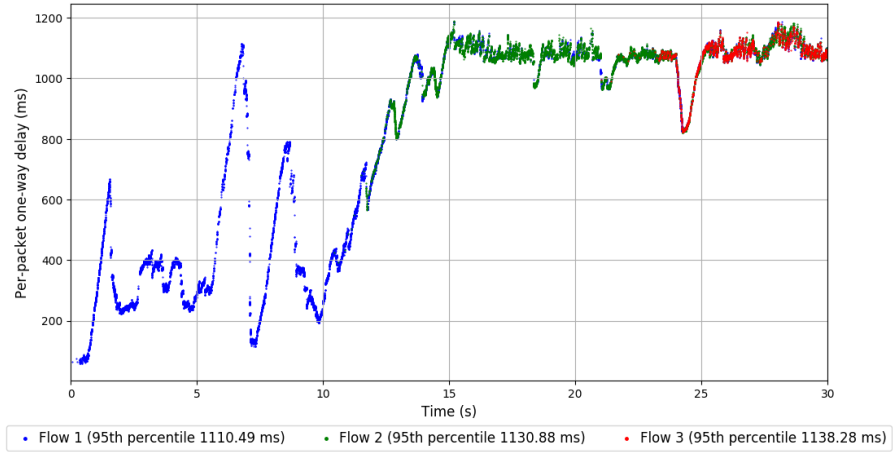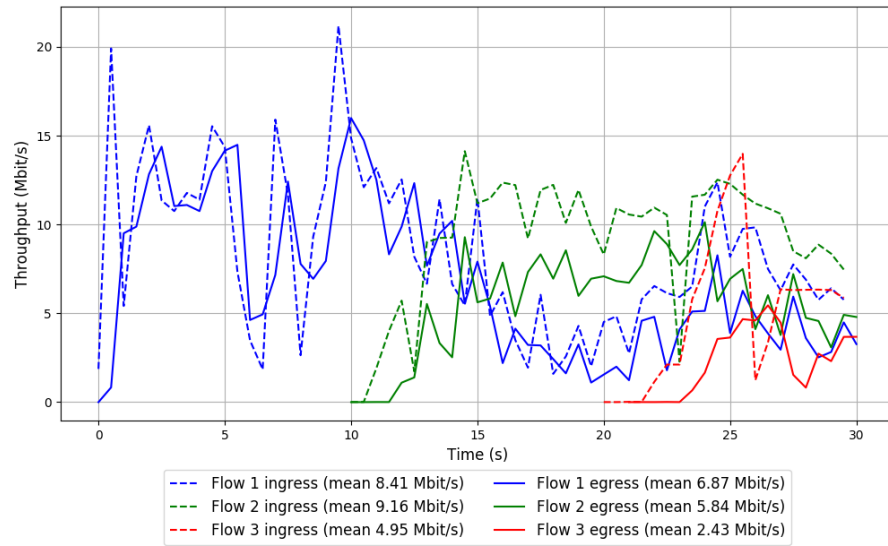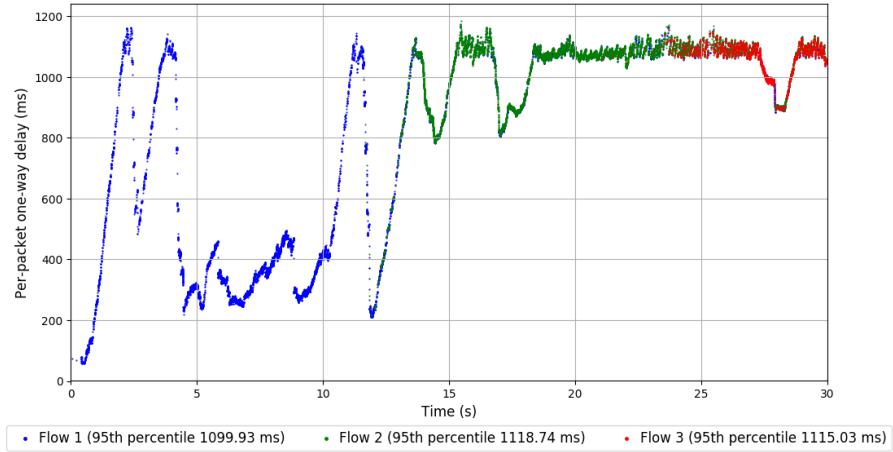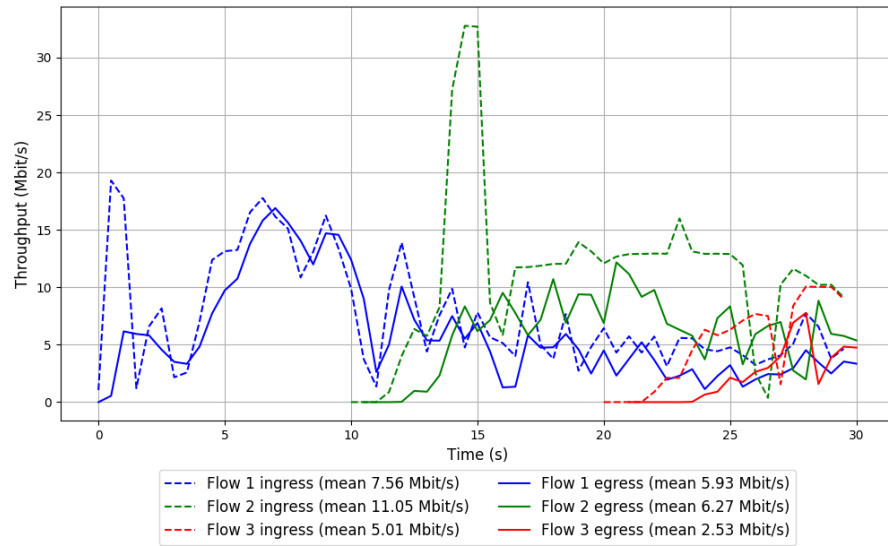
Run 3: Report of FillP — Data Link

Flow 1 ingress (mean 22.89 Mbit/s)   Flow 1 egress (mean 8.38 Mbit/s)
Flow 2 ingress (mean 2.62 Mbit/s)   Flow 2 egress (mean 1.97 Mbit/s)
Flow 3 ingress (mean 2.54 Mbit/s)   Flow 3 egress (mean 1.58 Mbit/s)

Flow 1 (95th percentile 1117.48 ms)   Flow 2 (95th percentile 1107.09 ms)   Flow 3 (95th percentile 1109.12 ms)

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```
Run 1: Statistics of FillP-Sheep

Start at: 2018-07-03 16:54:27
End at: 2018-07-03 16:54:57
Local clock offset: 4.194 ms
Remote clock offset: 6.702 ms


# Below is generated by plot.py at 2018-07-03 17:47:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 11.41 Mbit/s
95th percentile per-packet one-way delay: 1121.387 ms
Loss rate: 29.43%
-- Flow 1:
Average throughput: 6.87 Mbit/s
95th percentile per-packet one-way delay: 1110.492 ms
Loss rate: 18.38%
-- Flow 2:
Average throughput: 5.84 Mbit/s
95th percentile per-packet one-way delay: 1130.883 ms
Loss rate: 37.58%
-- Flow 3:
Average throughput: 2.43 Mbit/s
95th percentile per-packet one-way delay: 1138.276 ms
Loss rate: 55.78%
```

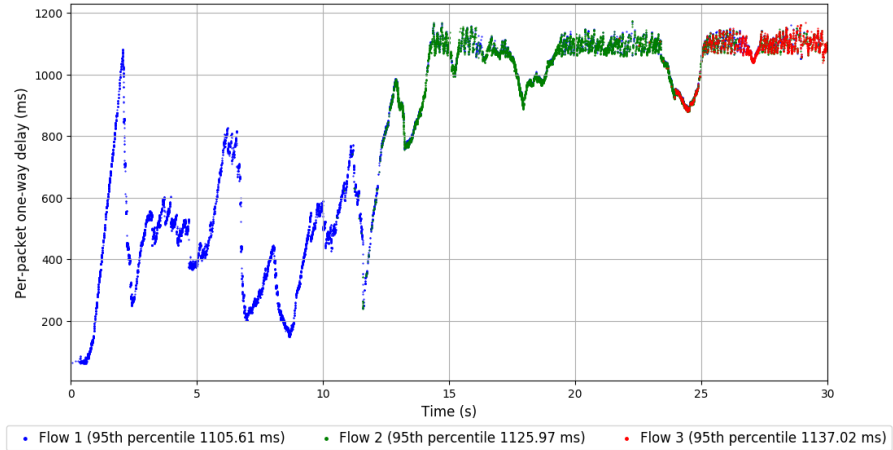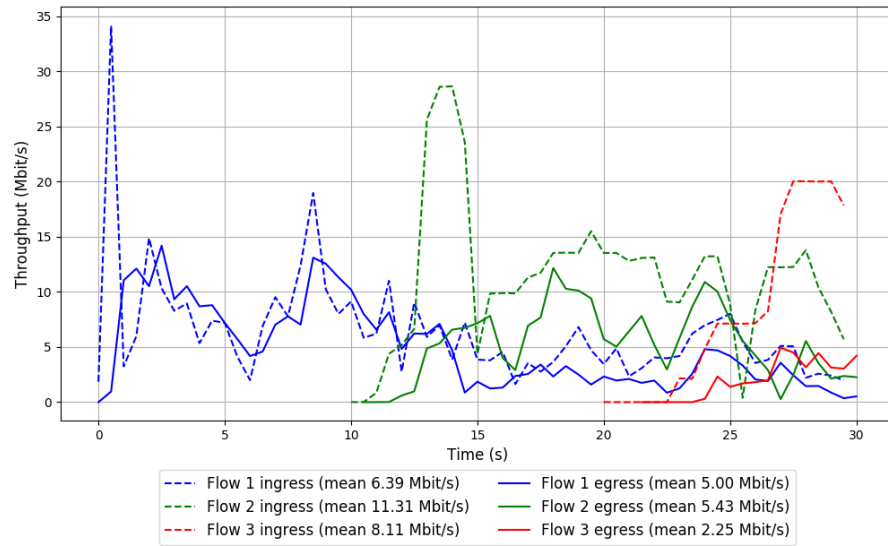Run 1: Report of FillP-Sheep — Data Link

- - - Flow 1 ingress (mean 8.41 Mbit/s)   —— Flow 1 egress (mean 6.87 Mbit/s)
- - - Flow 2 ingress (mean 9.16 Mbit/s)   —— Flow 2 egress (mean 5.84 Mbit/s)
- - - Flow 3 ingress (mean 4.95 Mbit/s)   —— Flow 3 egress (mean 2.43 Mbit/s)

• Flow 1 (95th percentile 1110.49 ms)   • Flow 2 (95th percentile 1130.88 ms)   • Flow 3 (95th percentile 1138.28 ms)

```
Run 2: Statistics of FillP-Sheep

Start at: 2018-07-03 17:13:23
End at: 2018-07-03 17:13:53
Local clock offset: 2.031 ms
Remote clock offset: 9.69 ms


# Below is generated by plot.py at 2018-07-03 17:47:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.69 Mbit/s
95th percentile per-packet one-way delay: 1110.427 ms
Loss rate: 35.68%
-- Flow 1:
Average throughput: 5.93 Mbit/s
95th percentile per-packet one-way delay: 1099.934 ms
Loss rate: 21.73%
-- Flow 2:
Average throughput: 6.27 Mbit/s
95th percentile per-packet one-way delay: 1118.738 ms
Loss rate: 45.68%
-- Flow 3:
Average throughput: 2.53 Mbit/s
95th percentile per-packet one-way delay: 1115.031 ms
Loss rate: 54.94%
```

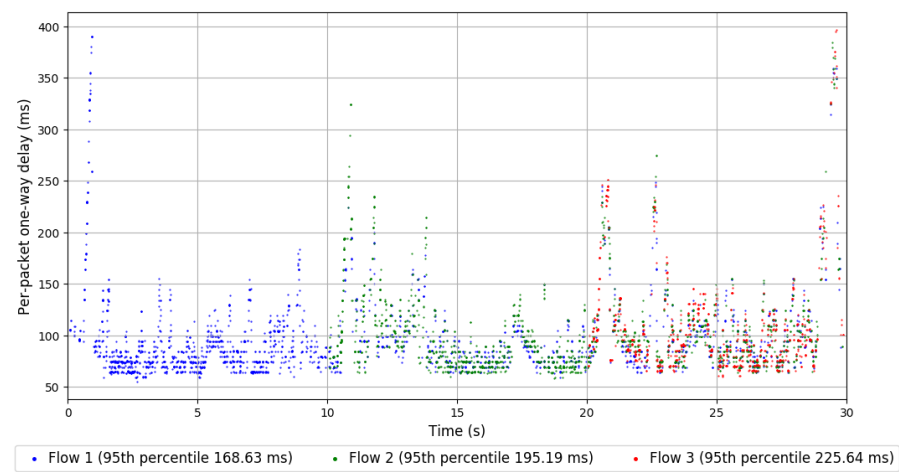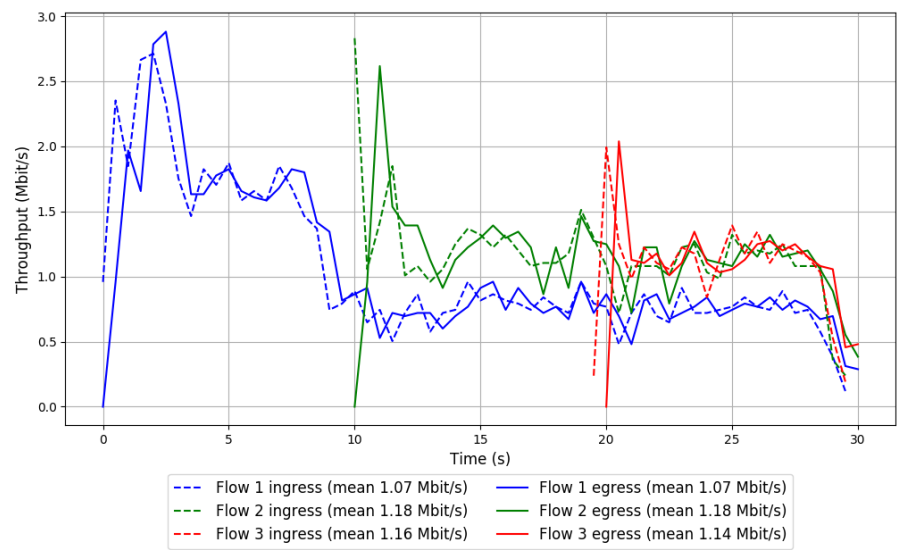Run 2: Report of FillP-Sheep — Data Link

- - - Flow 1 ingress (mean 7.56 Mbit/s) —— Flow 1 egress (mean 5.93 Mbit/s)
- - - Flow 2 ingress (mean 11.05 Mbit/s) —— Flow 2 egress (mean 6.27 Mbit/s)
- - - Flow 3 ingress (mean 5.01 Mbit/s) —— Flow 3 egress (mean 2.53 Mbit/s)

• Flow 1 (95th percentile 1099.93 ms)   • Flow 2 (95th percentile 1118.74 ms)   • Flow 3 (95th percentile 1115.03 ms)

```
Run 3: Statistics of FillP-Sheep

Start at: 2018-07-03 17:32:26
End at: 2018-07-03 17:32:56
Local clock offset: -0.913 ms
Remote clock offset: 12.636 ms


# Below is generated by plot.py at 2018-07-03 17:47:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 9.14 Mbit/s
95th percentile per-packet one-way delay: 1120.761 ms
Loss rate: 45.07%
-- Flow 1:
Average throughput: 5.00 Mbit/s
95th percentile per-packet one-way delay: 1105.611 ms
Loss rate: 22.02%
-- Flow 2:
Average throughput: 5.43 Mbit/s
95th percentile per-packet one-way delay: 1125.968 ms
Loss rate: 53.23%
-- Flow 3:
Average throughput: 2.25 Mbit/s
95th percentile per-packet one-way delay: 1137.020 ms
Loss rate: 77.04%
```
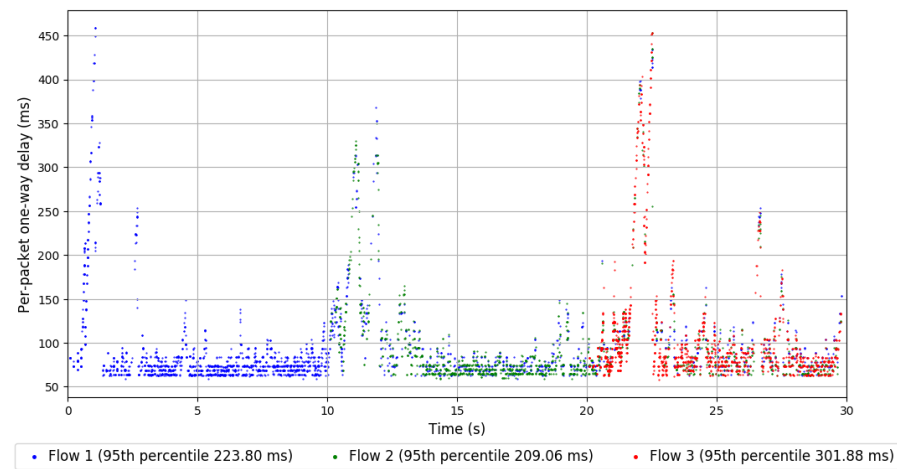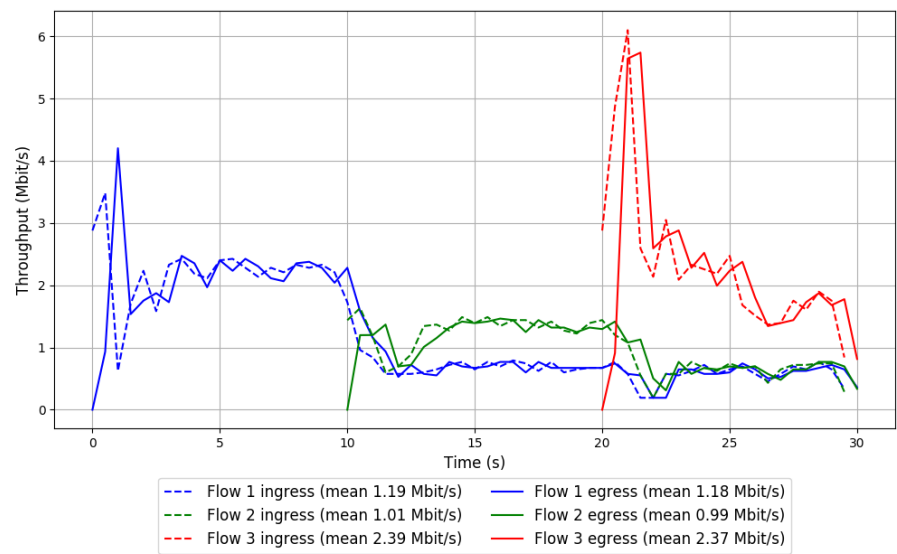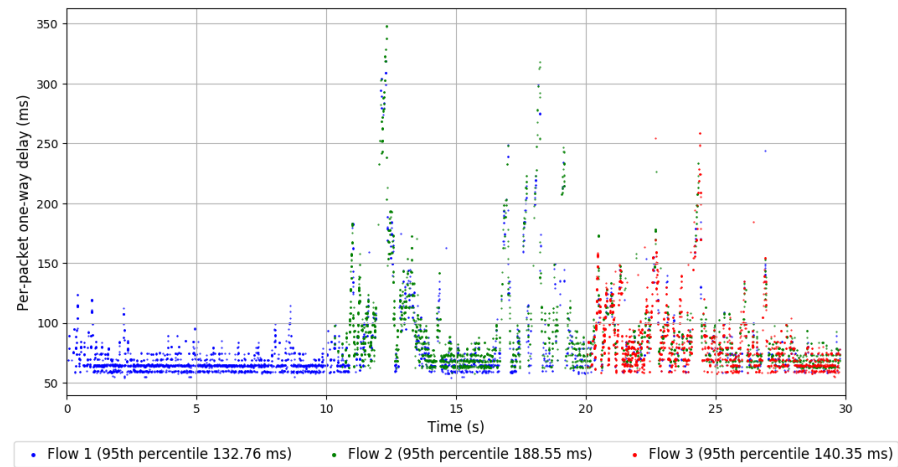
Run 3: Report of FillP-Sheep — Data Link

Flow 1 ingress (mean 6.39 Mbit/s) --- Flow 1 egress (mean 5.00 Mbit/s) ---
Flow 2 ingress (mean 11.31 Mbit/s) --- Flow 2 egress (mean 5.43 Mbit/s) ---
Flow 3 ingress (mean 8.11 Mbit/s) --- Flow 3 egress (mean 2.25 Mbit/s) ---

Flow 1 (95th percentile 1105.61 ms) • Flow 2 (95th percentile 1125.97 ms) • Flow 3 (95th percentile 1137.02 ms)
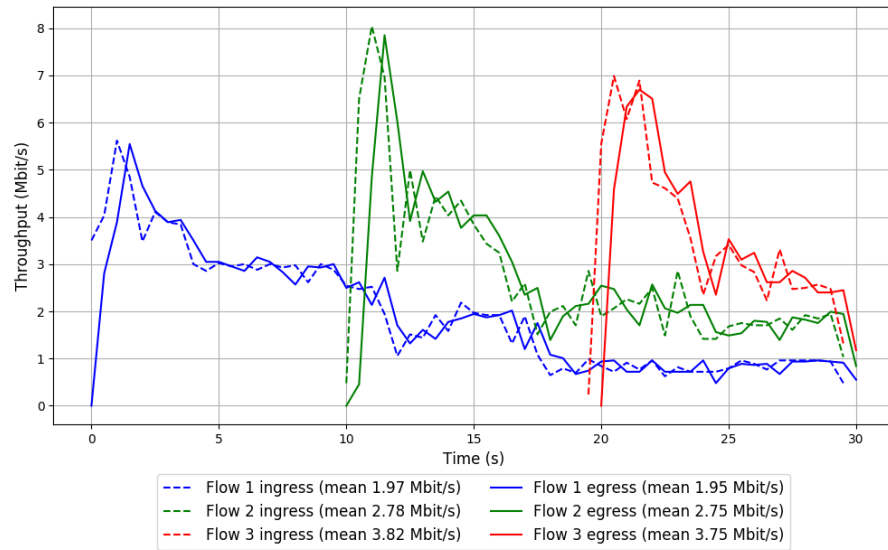
```
Run 1: Statistics of Indigo

Start at: 2018-07-03 16:51:09
End at: 2018-07-03 16:51:39
Local clock offset: 3.342 ms
Remote clock offset: 6.162 ms


# Below is generated by plot.py at 2018-07-03 17:47:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.23 Mbit/s
95th percentile per-packet one-way delay: 194.472 ms
Loss rate: 0.23%
-- Flow 1:
Average throughput: 1.07 Mbit/s
95th percentile per-packet one-way delay: 168.633 ms
Loss rate: 0.15%
-- Flow 2:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 195.185 ms
Loss rate: 0.10%
-- Flow 3:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 225.642 ms
Loss rate: 0.74%
```
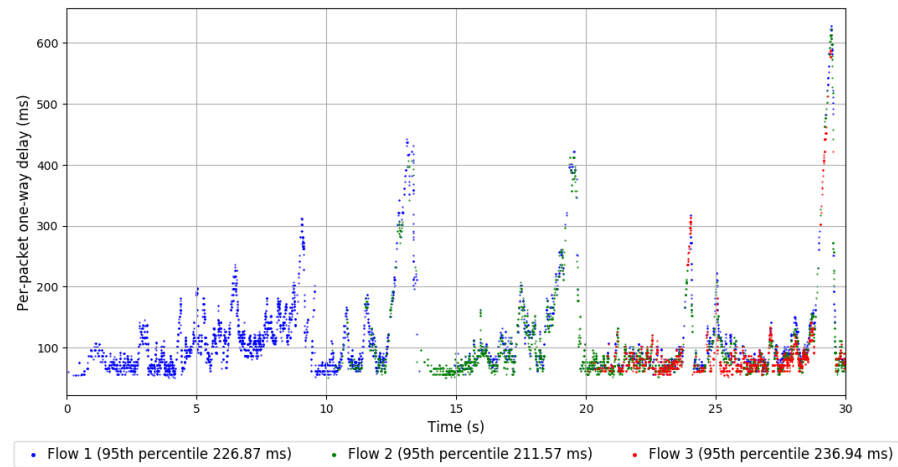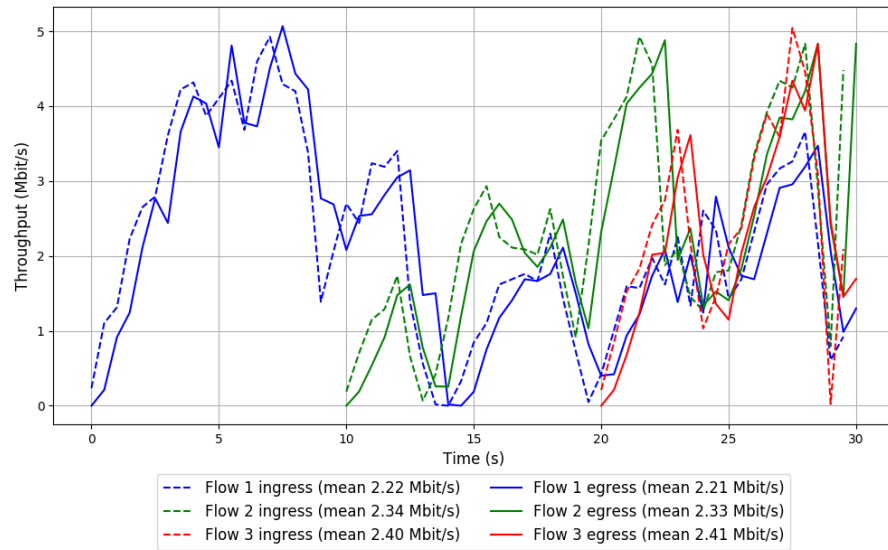
Run 1: Report of Indigo — Data Link

```
Run 2: Statistics of Indigo

Start at: 2018-07-03 17:10:05
End at: 2018-07-03 17:10:35
Local clock offset: 1.451 ms
Remote clock offset: 8.895 ms


# Below is generated by plot.py at 2018-07-03 17:47:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.61 Mbit/s
95th percentile per-packet one-way delay: 243.509 ms
Loss rate: 1.45%
-- Flow 1:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 223.804 ms
Loss rate: 0.95%
-- Flow 2:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 209.059 ms
Loss rate: 1.63%
-- Flow 3:
Average throughput: 2.37 Mbit/s
95th percentile per-packet one-way delay: 301.877 ms
Loss rate: 2.05%
```

Run 2: Report of Indigo — Data Link

```
Run 3: Statistics of Indigo

Start at: 2018-07-03 17:29:08
End at: 2018-07-03 17:29:38
Local clock offset: -0.269 ms
Remote clock offset: 11.556 ms


# Below is generated by plot.py at 2018-07-03 17:47:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.98 Mbit/s
95th percentile per-packet one-way delay: 158.736 ms
Loss rate: 1.49%
-- Flow 1:
Average throughput: 1.95 Mbit/s
95th percentile per-packet one-way delay: 132.763 ms
Loss rate: 1.27%
-- Flow 2:
Average throughput: 2.75 Mbit/s
95th percentile per-packet one-way delay: 188.547 ms
Loss rate: 1.28%
-- Flow 3:
Average throughput: 3.75 Mbit/s
95th percentile per-packet one-way delay: 140.354 ms
Loss rate: 2.16%
```
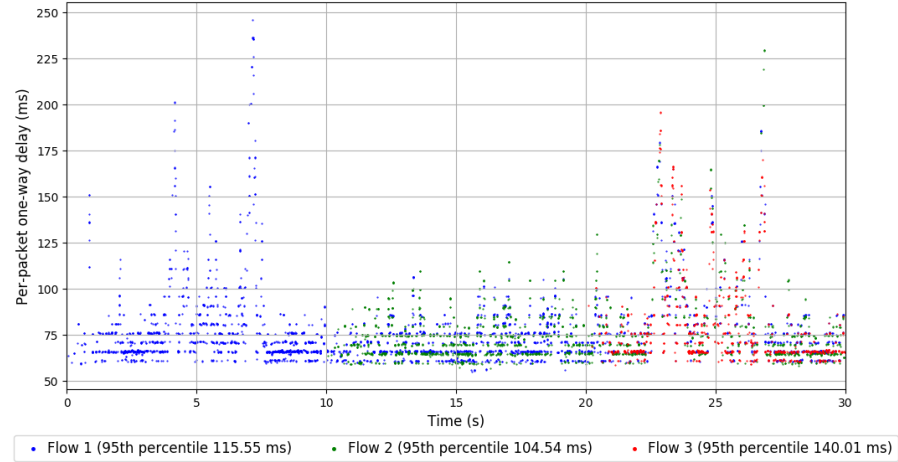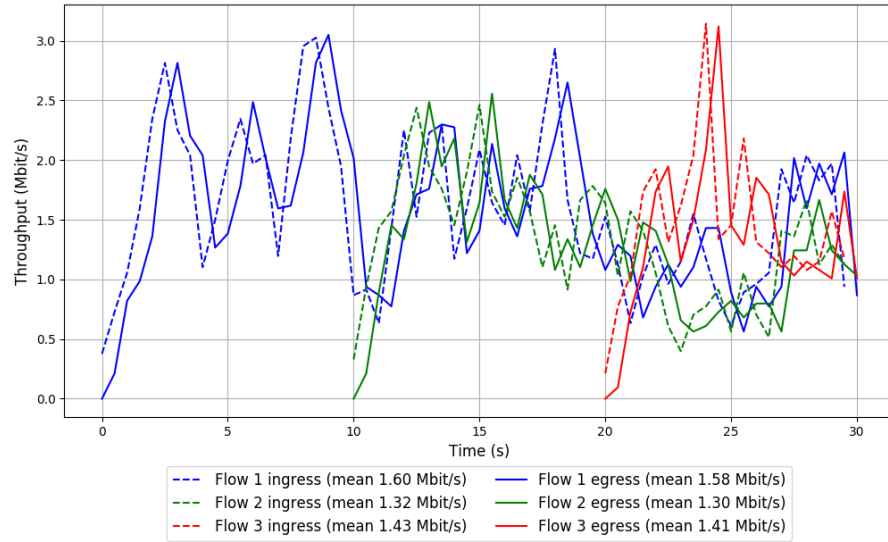
Run 3: Report of Indigo — Data Link

```
Run 1: Statistics of LEDBAT

Start at: 2018-07-03 16:50:01
End at: 2018-07-03 16:50:31
Local clock offset: 5.44 ms
Remote clock offset: 5.109 ms

# Below is generated by plot.py at 2018-07-03 17:47:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.55 Mbit/s
95th percentile per-packet one-way delay: 222.042 ms
Loss rate: 0.61%
-- Flow 1:
Average throughput: 2.21 Mbit/s
95th percentile per-packet one-way delay: 226.866 ms
Loss rate: 0.41%
-- Flow 2:
Average throughput: 2.33 Mbit/s
95th percentile per-packet one-way delay: 211.575 ms
Loss rate: 0.68%
-- Flow 3:
Average throughput: 2.41 Mbit/s
95th percentile per-packet one-way delay: 236.944 ms
Loss rate: 1.03%
```
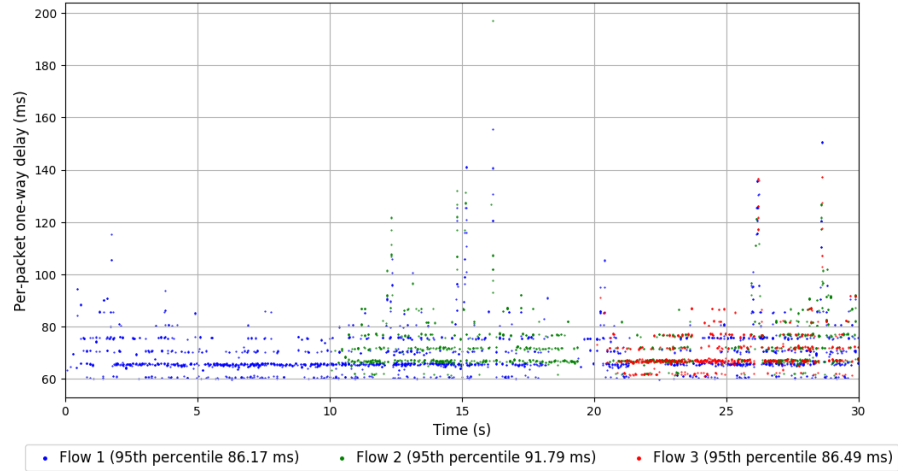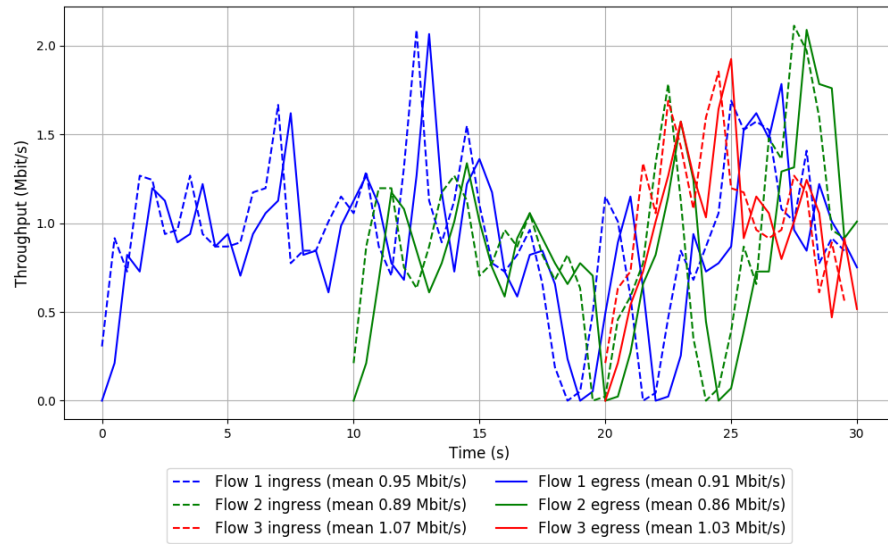
Run 1: Report of LEDBAT — Data Link

Flow 1 ingress (mean 2.22 Mbit/s)   Flow 1 egress (mean 2.21 Mbit/s)
Flow 2 ingress (mean 2.34 Mbit/s)   Flow 2 egress (mean 2.33 Mbit/s)
Flow 3 ingress (mean 2.40 Mbit/s)   Flow 3 egress (mean 2.41 Mbit/s)

Flow 1 (95th percentile 226.87 ms)   Flow 2 (95th percentile 211.57 ms)   Flow 3 (95th percentile 236.94 ms)

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```
Run 2: Statistics of LEDBAT

Start at: 2018-07-03 17:09:00
End at: 2018-07-03 17:09:30
Local clock offset: 1.828 ms
Remote clock offset: 9.474 ms


# Below is generated by plot.py at 2018-07-03 17:47:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.90 Mbit/s
95th percentile per-packet one-way delay: 115.804 ms
Loss rate: 2.04%
-- Flow 1:
Average throughput: 1.58 Mbit/s
95th percentile per-packet one-way delay: 115.547 ms
Loss rate: 1.76%
-- Flow 2:
Average throughput: 1.30 Mbit/s
95th percentile per-packet one-way delay: 104.540 ms
Loss rate: 2.44%
-- Flow 3:
Average throughput: 1.41 Mbit/s
95th percentile per-packet one-way delay: 140.007 ms
Loss rate: 2.22%
```
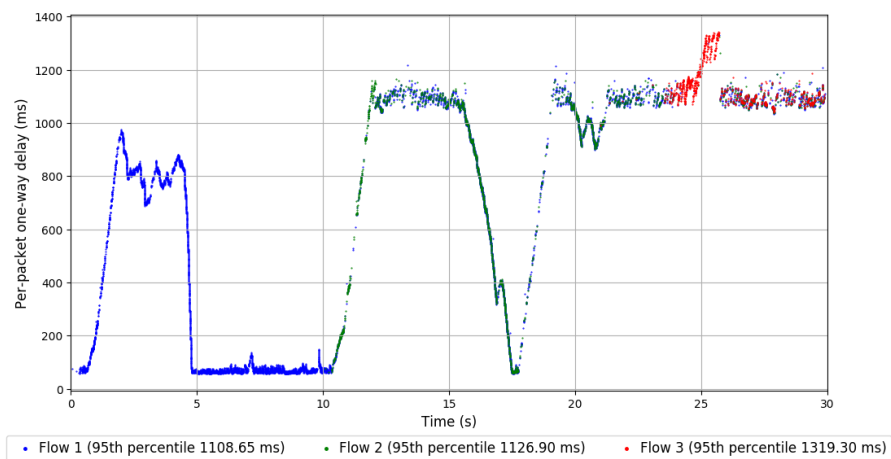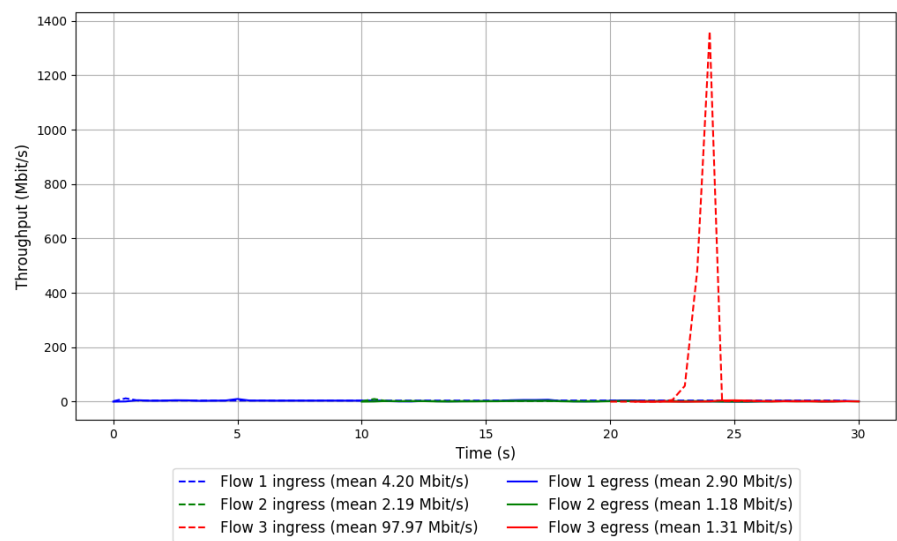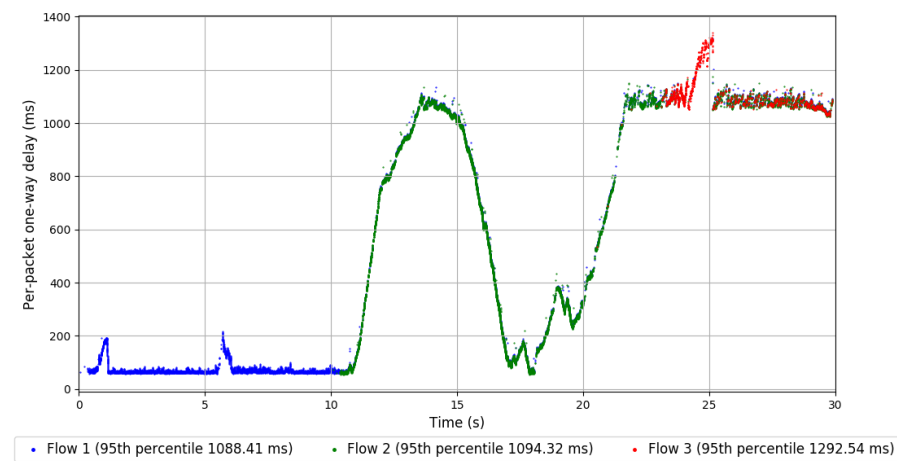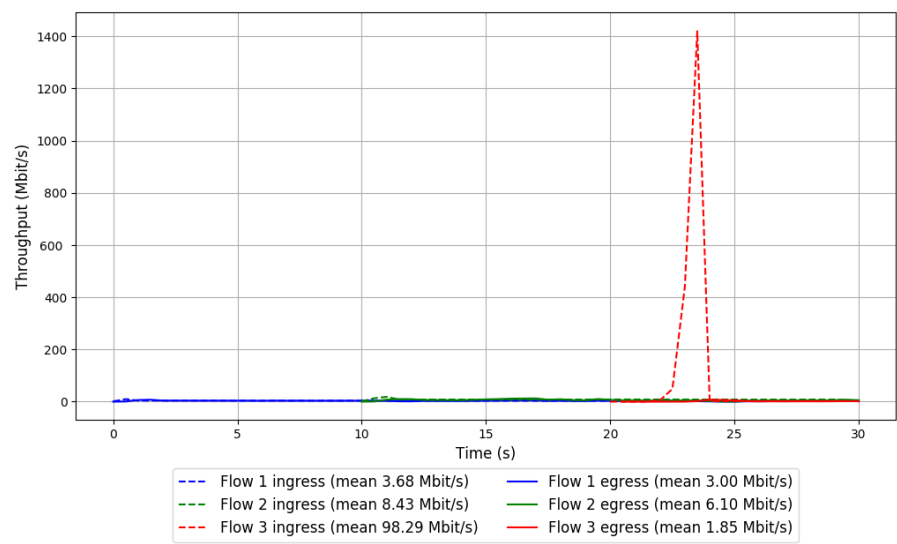
Run 2: Report of LEDBAT — Data Link

- Flow 1 ingress (mean 1.60 Mbit/s)
- Flow 1 egress (mean 1.58 Mbit/s)
- Flow 2 ingress (mean 1.32 Mbit/s)
- Flow 2 egress (mean 1.30 Mbit/s)
- Flow 3 ingress (mean 1.43 Mbit/s)
- Flow 3 egress (mean 1.41 Mbit/s)

- Flow 1 (95th percentile 115.55 ms)
- Flow 2 (95th percentile 104.54 ms)
- Flow 3 (95th percentile 140.01 ms)

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```
Run 3: Statistics of LEDBAT

Start at: 2018-07-03 17:28:03
End at: 2018-07-03 17:28:33
Local clock offset: -1.939 ms
Remote clock offset: 11.929 ms

# Below is generated by plot.py at 2018-07-03 17:47:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.82 Mbit/s
95th percentile per-packet one-way delay: 89.608 ms
Loss rate: 4.12%
-- Flow 1:
Average throughput: 0.91 Mbit/s
95th percentile per-packet one-way delay: 86.175 ms
Loss rate: 4.14%
-- Flow 2:
Average throughput: 0.86 Mbit/s
95th percentile per-packet one-way delay: 91.793 ms
Loss rate: 3.71%
-- Flow 3:
Average throughput: 1.03 Mbit/s
95th percentile per-packet one-way delay: 86.491 ms
Loss rate: 4.73%
```

Run 3: Report of LEDBAT — Data Link

Flow 1 ingress (mean 0.95 Mbit/s)   Flow 1 egress (mean 0.91 Mbit/s)
Flow 2 ingress (mean 0.89 Mbit/s)   Flow 2 egress (mean 0.86 Mbit/s)
Flow 3 ingress (mean 1.07 Mbit/s)   Flow 3 egress (mean 1.03 Mbit/s)

Flow 1 (95th percentile 86.17 ms)   Flow 2 (95th percentile 91.79 ms)   Flow 3 (95th percentile 86.49 ms)

```
Run 1: Statistics of PCC-Allegro

Start at: 2018-07-03 17:05:40
End at: 2018-07-03 17:06:10
Local clock offset: 2.767 ms
Remote clock offset: 8.546 ms


# Below is generated by plot.py at 2018-07-03 17:47:15
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.07 Mbit/s
95th percentile per-packet one-way delay: 1139.559 ms
Loss rate: 89.29%
-- Flow 1:
Average throughput: 2.90 Mbit/s
95th percentile per-packet one-way delay: 1108.648 ms
Loss rate: 31.06%
-- Flow 2:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 1126.897 ms
Loss rate: 46.44%
-- Flow 3:
Average throughput: 1.31 Mbit/s
95th percentile per-packet one-way delay: 1319.299 ms
Loss rate: 98.79%
```
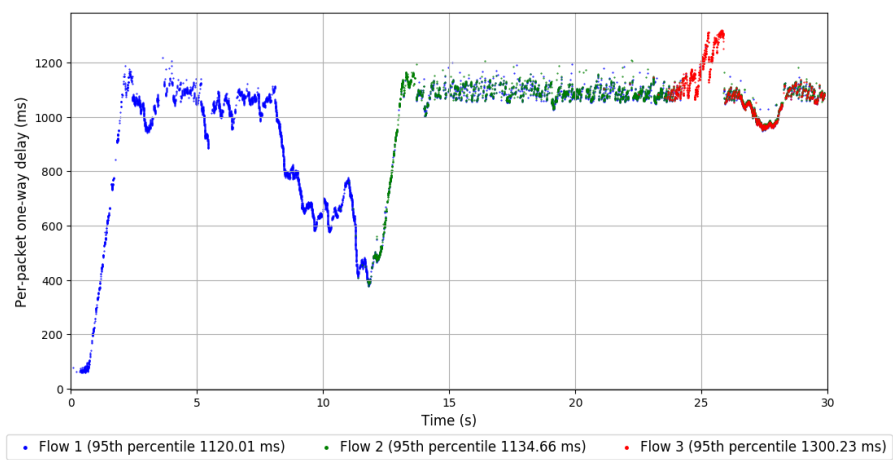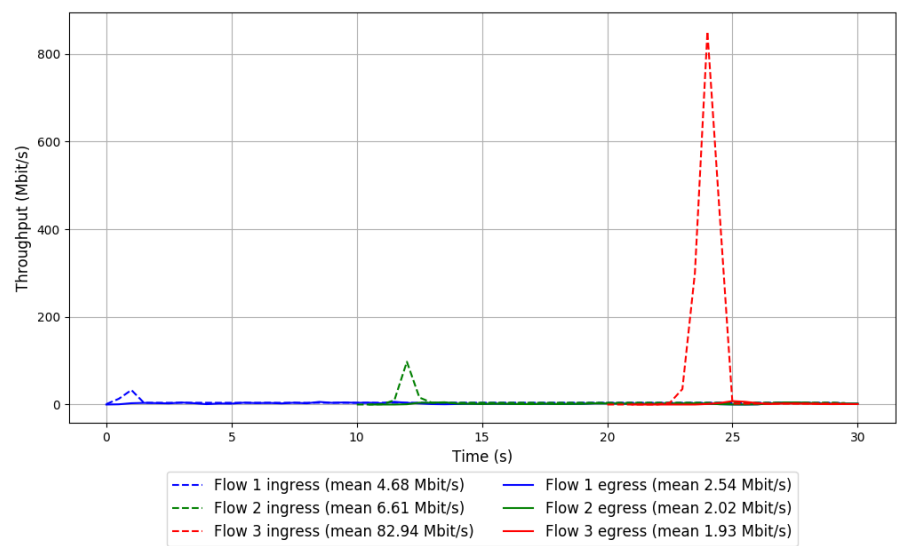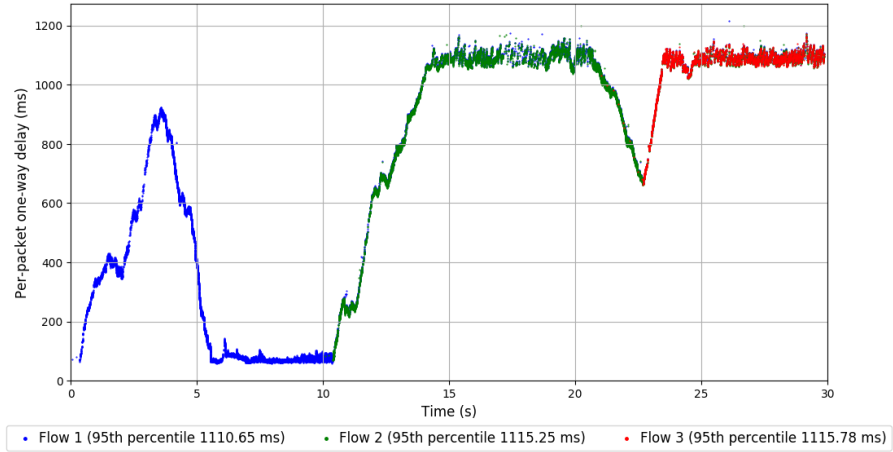
Run 1: Report of PCC-Allegro — Data Link

```
Run 2: Statistics of PCC-Allegro

Start at: 2018-07-03 17:24:42
End at: 2018-07-03 17:25:12
Local clock offset: 2.01 ms
Remote clock offset: 11.649 ms


# Below is generated by plot.py at 2018-07-03 17:47:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.62 Mbit/s
95th percentile per-packet one-way delay: 1105.992 ms
Loss rate: 81.77%
-- Flow 1:
Average throughput: 3.00 Mbit/s
95th percentile per-packet one-way delay: 1088.406 ms
Loss rate: 18.71%
-- Flow 2:
Average throughput: 6.10 Mbit/s
95th percentile per-packet one-way delay: 1094.320 ms
Loss rate: 27.96%
-- Flow 3:
Average throughput: 1.85 Mbit/s
95th percentile per-packet one-way delay: 1292.542 ms
Loss rate: 98.22%
```
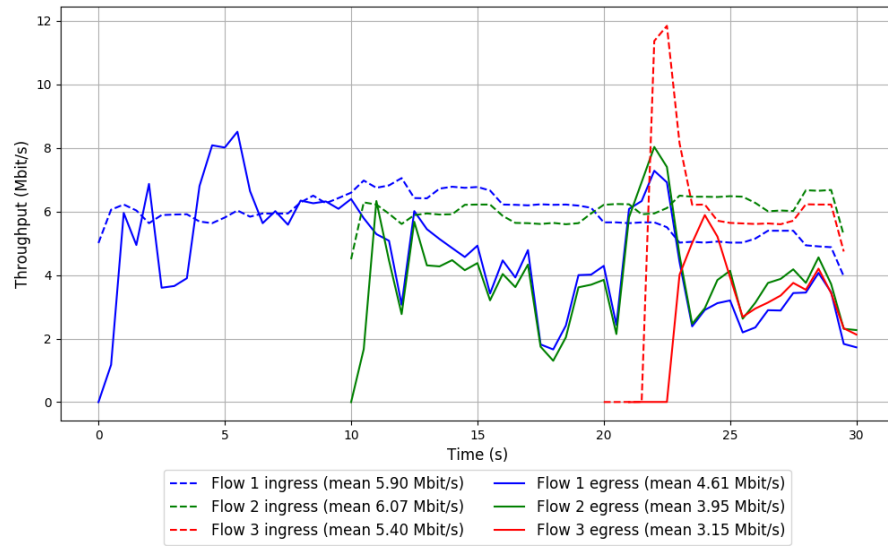
Run 2: Report of PCC-Allegro — Data Link

```
Run 3: Statistics of PCC-Allegro

Start at: 2018-07-03 17:43:44
End at: 2018-07-03 17:44:14
Local clock offset: 0.377 ms
Remote clock offset: 3.416 ms


# Below is generated by plot.py at 2018-07-03 17:47:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.41 Mbit/s
95th percentile per-packet one-way delay: 1155.026 ms
Loss rate: 87.93%
-- Flow 1:
Average throughput: 2.54 Mbit/s
95th percentile per-packet one-way delay: 1120.014 ms
Loss rate: 45.90%
-- Flow 2:
Average throughput: 2.02 Mbit/s
95th percentile per-packet one-way delay: 1134.663 ms
Loss rate: 70.45%
-- Flow 3:
Average throughput: 1.93 Mbit/s
95th percentile per-packet one-way delay: 1300.230 ms
Loss rate: 97.93%
```
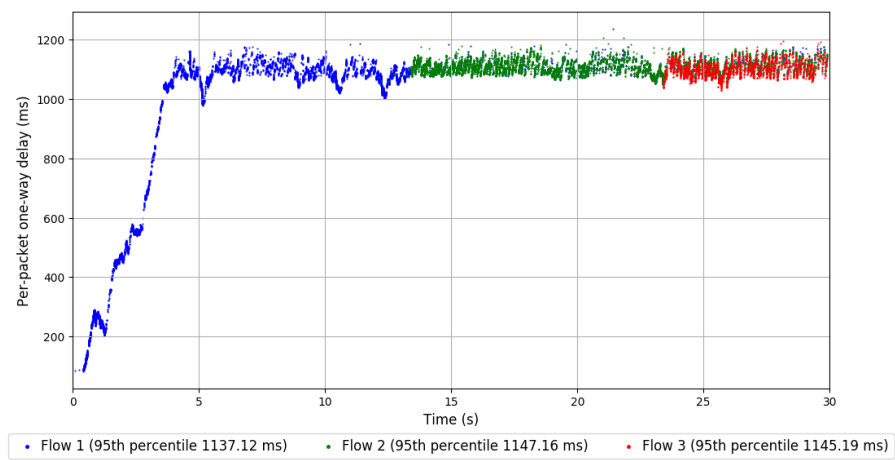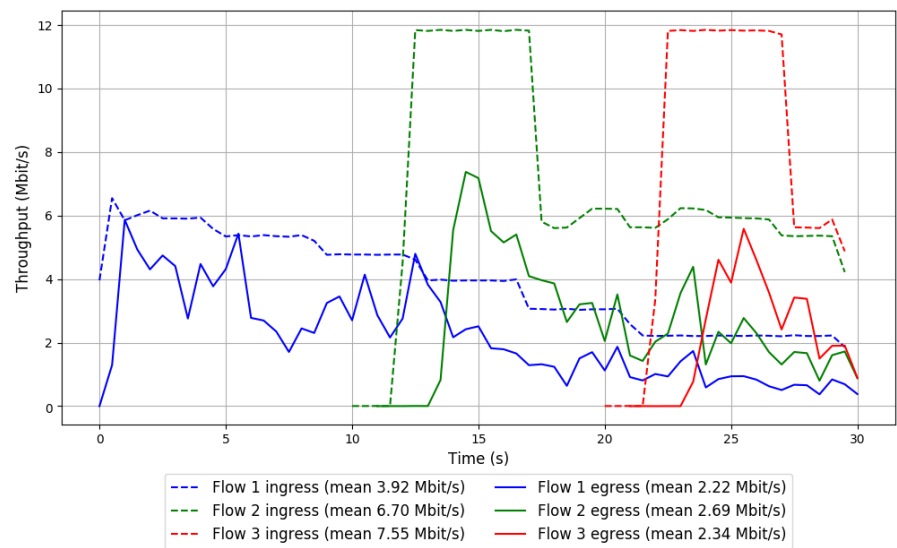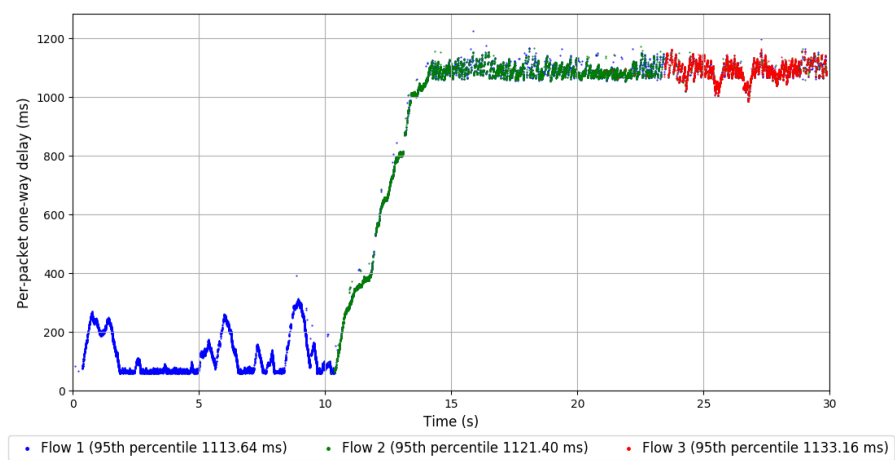
Run 3: Report of PCC-Allegro — Data Link

Throughput (Mbit/s) vs Time (s)

- - - Flow 1 ingress (mean 4.68 Mbit/s) ——— Flow 1 egress (mean 2.54 Mbit/s)
- - - Flow 2 ingress (mean 6.61 Mbit/s) ——— Flow 2 egress (mean 2.02 Mbit/s)
- - - Flow 3 ingress (mean 82.94 Mbit/s) ——— Flow 3 egress (mean 1.93 Mbit/s)

Per-packet one-way delay (ms) vs Time (s)

• Flow 1 (95th percentile 1120.01 ms)   • Flow 2 (95th percentile 1134.66 ms)   • Flow 3 (95th percentile 1300.23 ms)

```
Run 1: Statistics of PCC-Expr

Start at: 2018-07-03 17:01:15
End at: 2018-07-03 17:01:45
Local clock offset: 5.565 ms
Remote clock offset: 7.929 ms


# Below is generated by plot.py at 2018-07-03 17:47:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.17 Mbit/s
95th percentile per-packet one-way delay: 1113.454 ms
Loss rate: 30.56%
-- Flow 1:
Average throughput: 4.61 Mbit/s
95th percentile per-packet one-way delay: 1110.649 ms
Loss rate: 22.12%
-- Flow 2:
Average throughput: 3.95 Mbit/s
95th percentile per-packet one-way delay: 1115.254 ms
Loss rate: 35.21%
-- Flow 3:
Average throughput: 3.15 Mbit/s
95th percentile per-packet one-way delay: 1115.777 ms
Loss rate: 47.94%
```
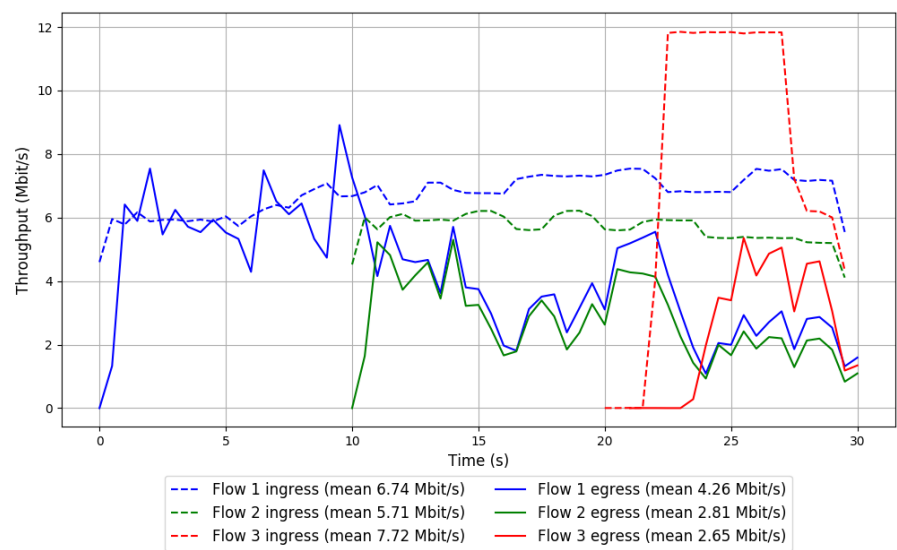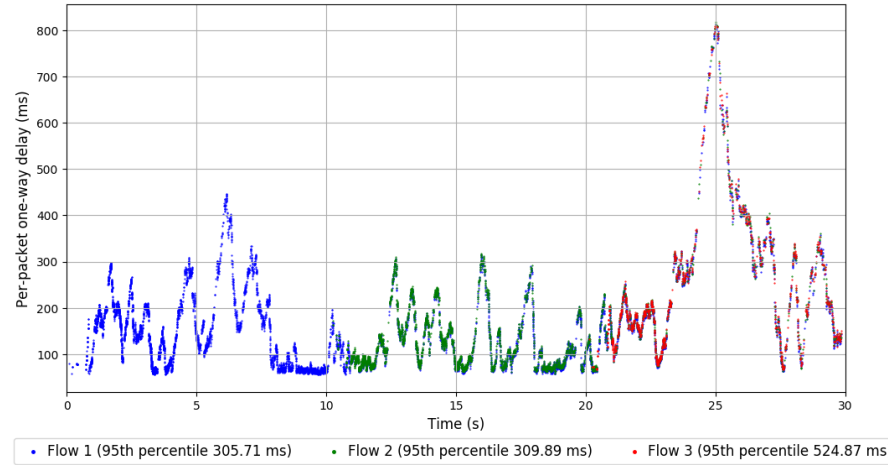
Run 1: Report of PCC-Expr — Data Link

```
Run 2: Statistics of PCC-Expr

Start at: 2018-07-03 17:20:11
End at: 2018-07-03 17:20:41
Local clock offset: -2.86 ms
Remote clock offset: 10.86 ms


# Below is generated by plot.py at 2018-07-03 17:47:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.61 Mbit/s
95th percentile per-packet one-way delay: 1142.848 ms
Loss rate: 57.74%
-- Flow 1:
Average throughput: 2.22 Mbit/s
95th percentile per-packet one-way delay: 1137.118 ms
Loss rate: 43.47%
-- Flow 2:
Average throughput: 2.69 Mbit/s
95th percentile per-packet one-way delay: 1147.156 ms
Loss rate: 62.10%
-- Flow 3:
Average throughput: 2.34 Mbit/s
95th percentile per-packet one-way delay: 1145.190 ms
Loss rate: 72.38%
```
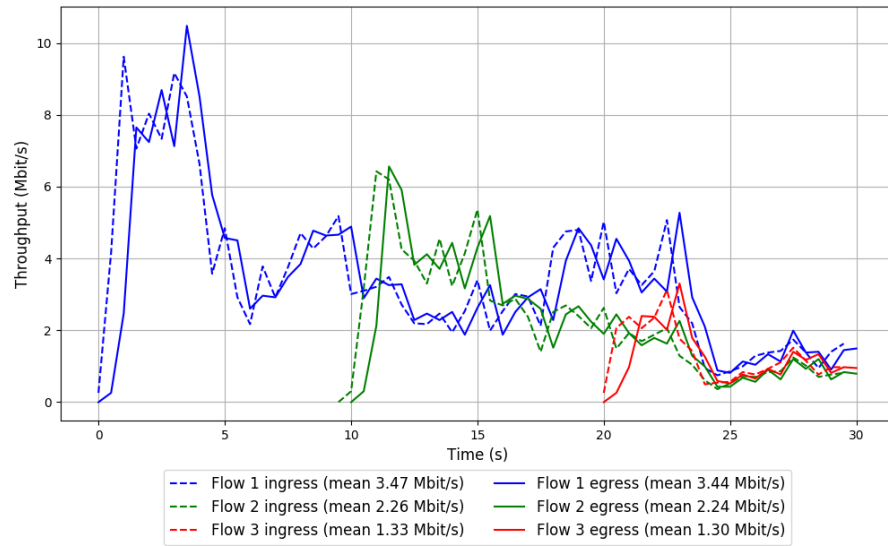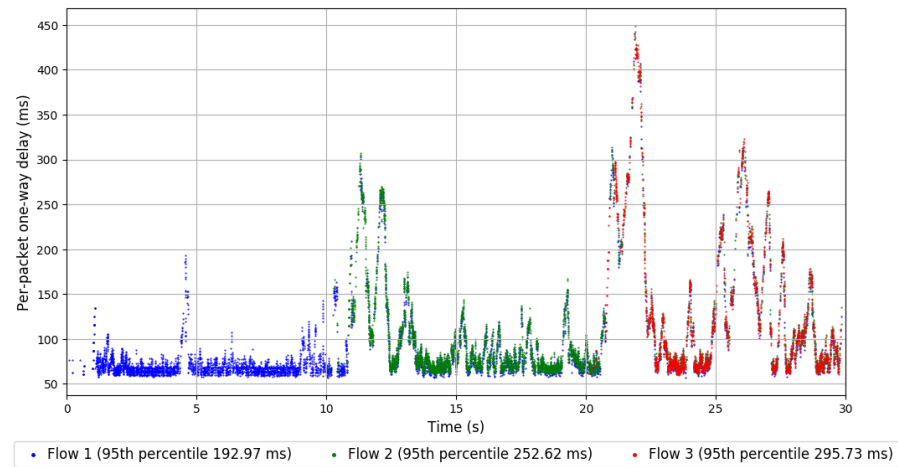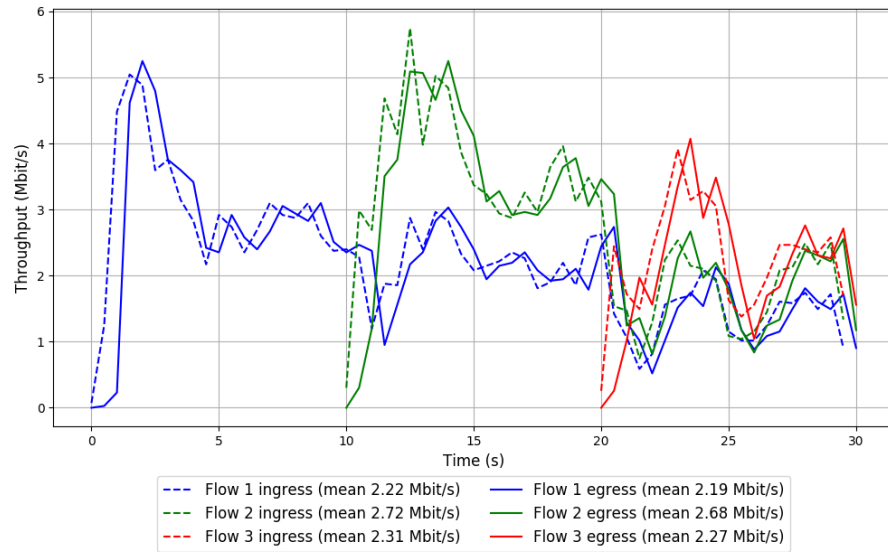
Run 2: Report of PCC-Expr — Data Link

```
Run 3: Statistics of PCC-Expr

Start at: 2018-07-03 17:39:02
End at: 2018-07-03 17:39:32
Local clock offset: -0.991 ms
Remote clock offset: 7.218 ms


# Below is generated by plot.py at 2018-07-03 17:47:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.90 Mbit/s
95th percentile per-packet one-way delay: 1120.162 ms
Loss rate: 47.42%
-- Flow 1:
Average throughput: 4.26 Mbit/s
95th percentile per-packet one-way delay: 1113.636 ms
Loss rate: 37.06%
-- Flow 2:
Average throughput: 2.81 Mbit/s
95th percentile per-packet one-way delay: 1121.400 ms
Loss rate: 50.96%
-- Flow 3:
Average throughput: 2.65 Mbit/s
95th percentile per-packet one-way delay: 1133.162 ms
Loss rate: 69.54%
```

Run 3: Report of PCC-Expr — Data Link

```
Run 1: Statistics of QUIC Cubic

Start at: 2018-07-03 17:04:33
End at: 2018-07-03 17:05:03
Local clock offset: 4.514 ms
Remote clock offset: 8.287 ms

# Below is generated by plot.py at 2018-07-03 17:47:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.36 Mbit/s
95th percentile per-packet one-way delay: 324.036 ms
Loss rate: 1.24%
-- Flow 1:
Average throughput: 3.44 Mbit/s
95th percentile per-packet one-way delay: 305.706 ms
Loss rate: 1.00%
-- Flow 2:
Average throughput: 2.24 Mbit/s
95th percentile per-packet one-way delay: 309.886 ms
Loss rate: 1.28%
-- Flow 3:
Average throughput: 1.30 Mbit/s
95th percentile per-packet one-way delay: 524.866 ms
Loss rate: 3.04%
```
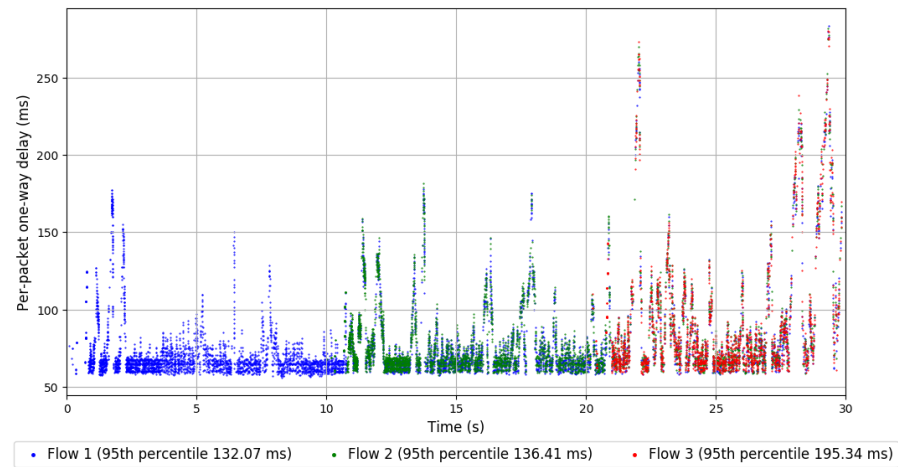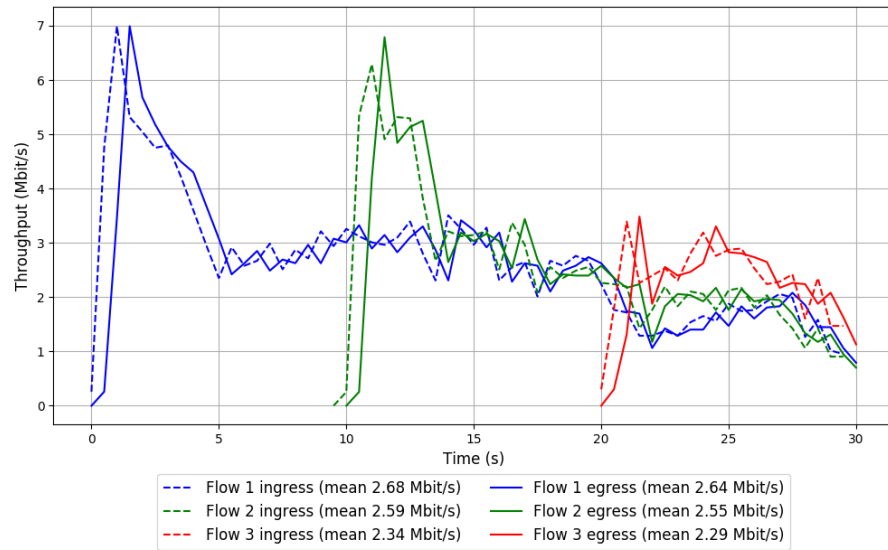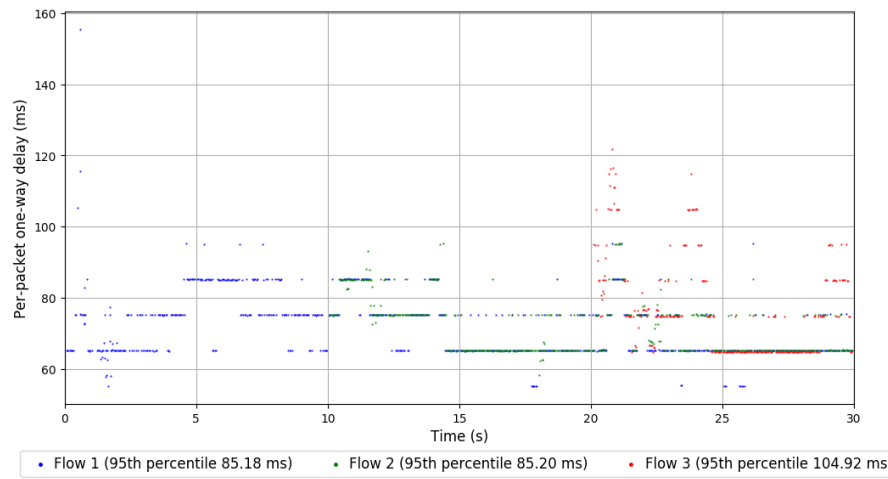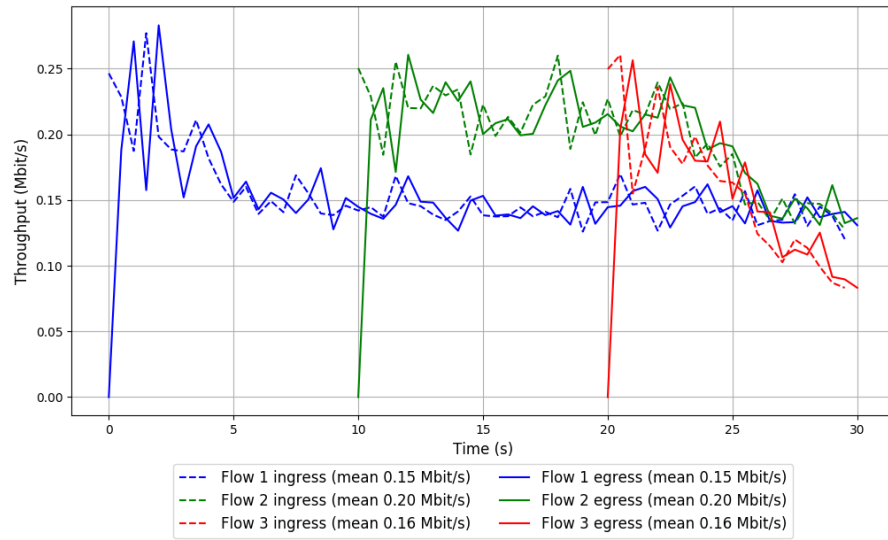
Run 1: Report of QUIC Cubic — Data Link

- - - Flow 1 ingress (mean 3.47 Mbit/s) ——— Flow 1 egress (mean 3.44 Mbit/s)
- - - Flow 2 ingress (mean 2.26 Mbit/s) ——— Flow 2 egress (mean 2.24 Mbit/s)
- - - Flow 3 ingress (mean 1.33 Mbit/s) ——— Flow 3 egress (mean 1.30 Mbit/s)

• Flow 1 (95th percentile 305.71 ms)   • Flow 2 (95th percentile 309.89 ms)   • Flow 3 (95th percentile 524.87 ms)

```
Run 2: Statistics of QUIC Cubic

Start at: 2018-07-03 17:23:36
End at: 2018-07-03 17:24:06
Local clock offset: -0.812 ms
Remote clock offset: 10.909 ms


# Below is generated by plot.py at 2018-07-03 17:47:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.71 Mbit/s
95th percentile per-packet one-way delay: 252.230 ms
Loss rate: 1.69%
-- Flow 1:
Average throughput: 2.19 Mbit/s
95th percentile per-packet one-way delay: 192.967 ms
Loss rate: 1.45%
-- Flow 2:
Average throughput: 2.68 Mbit/s
95th percentile per-packet one-way delay: 252.622 ms
Loss rate: 1.70%
-- Flow 3:
Average throughput: 2.27 Mbit/s
95th percentile per-packet one-way delay: 295.732 ms
Loss rate: 2.35%
```

Run 2: Report of QUIC Cubic — Data Link

```
Run 3: Statistics of QUIC Cubic

Start at: 2018-07-03 17:42:28
End at: 2018-07-03 17:42:58
Local clock offset: 0.652 ms
Remote clock offset: 4.43 ms


# Below is generated by plot.py at 2018-07-03 17:47:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.09 Mbit/s
95th percentile per-packet one-way delay: 146.304 ms
Loss rate: 1.72%
-- Flow 1:
Average throughput: 2.64 Mbit/s
95th percentile per-packet one-way delay: 132.067 ms
Loss rate: 1.48%
-- Flow 2:
Average throughput: 2.55 Mbit/s
95th percentile per-packet one-way delay: 136.415 ms
Loss rate: 1.74%
-- Flow 3:
Average throughput: 2.29 Mbit/s
95th percentile per-packet one-way delay: 195.341 ms
Loss rate: 2.51%
```
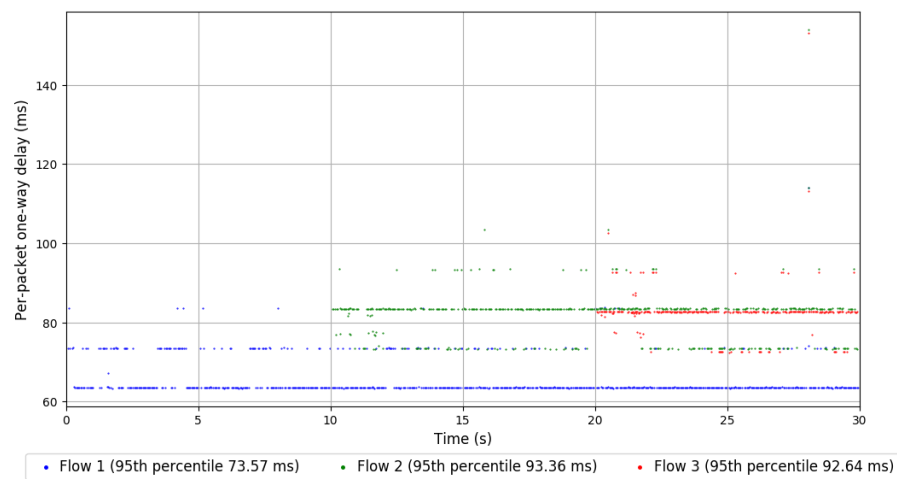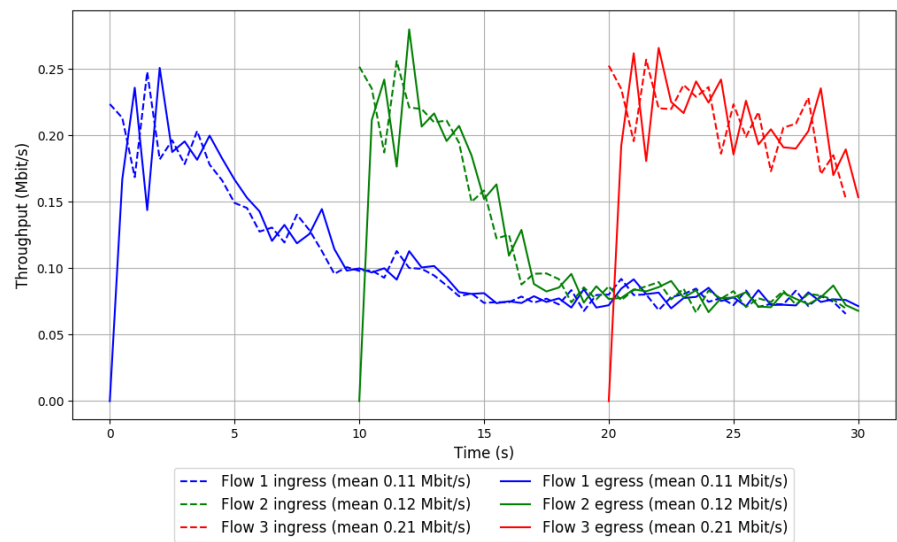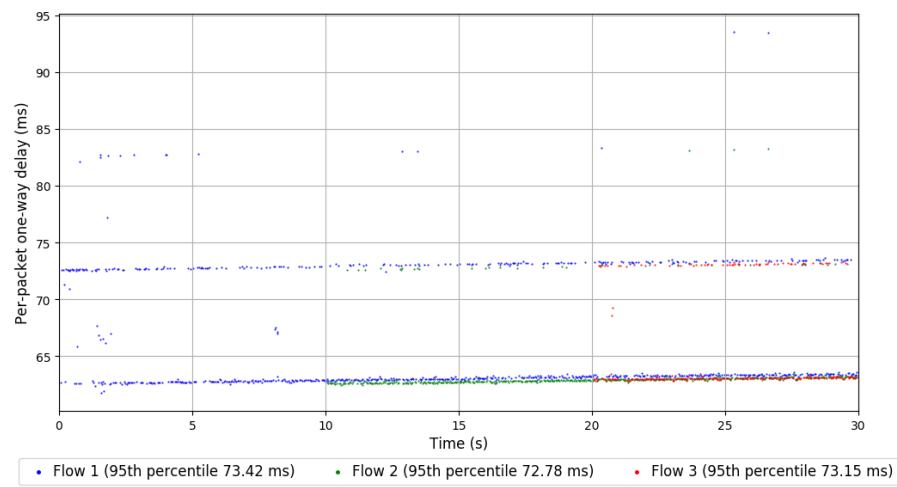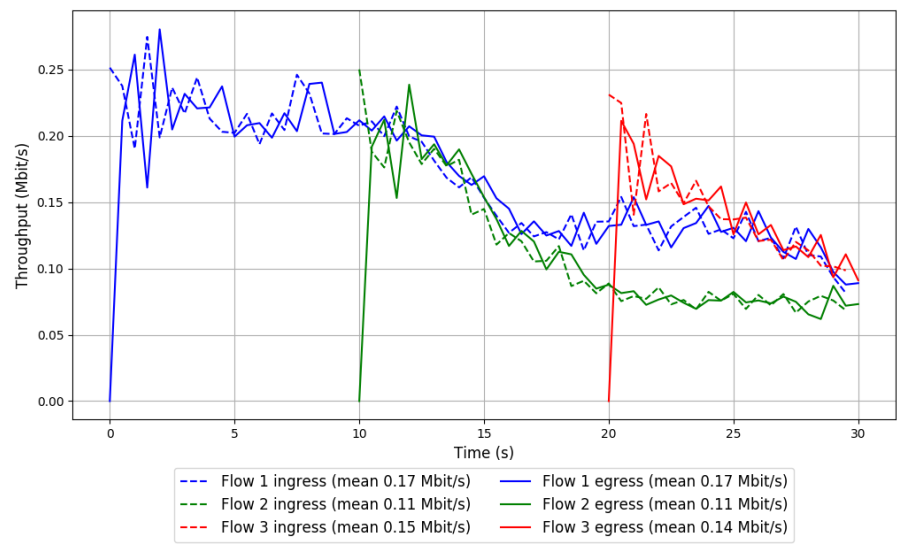
Run 3: Report of QUIC Cubic — Data Link

```
Run 1: Statistics of SCReAM

Start at: 2018-07-03 16:57:57
End at: 2018-07-03 16:58:27
Local clock offset: 4.557 ms
Remote clock offset: 7.967 ms


# Below is generated by plot.py at 2018-07-03 17:47:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 85.295 ms
Loss rate: 0.35%
-- Flow 1:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 85.181 ms
Loss rate: 0.51%
-- Flow 2:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 85.198 ms
Loss rate: 0.14%
-- Flow 3:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 104.915 ms
Loss rate: 0.42%
```

Run 1: Report of SCReAM — Data Link

```
Run 2: Statistics of SCReAM

Start at: 2018-07-03 17:16:41
End at: 2018-07-03 17:17:11
Local clock offset: 0.484 ms
Remote clock offset: 10.64 ms

# Below is generated by plot.py at 2018-07-03 17:47:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 83.571 ms
Loss rate: 1.20%
-- Flow 1:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 73.570 ms
Loss rate: 0.67%
-- Flow 2:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 93.359 ms
Loss rate: 2.10%
-- Flow 3:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 92.642 ms
Loss rate: 0.99%
```
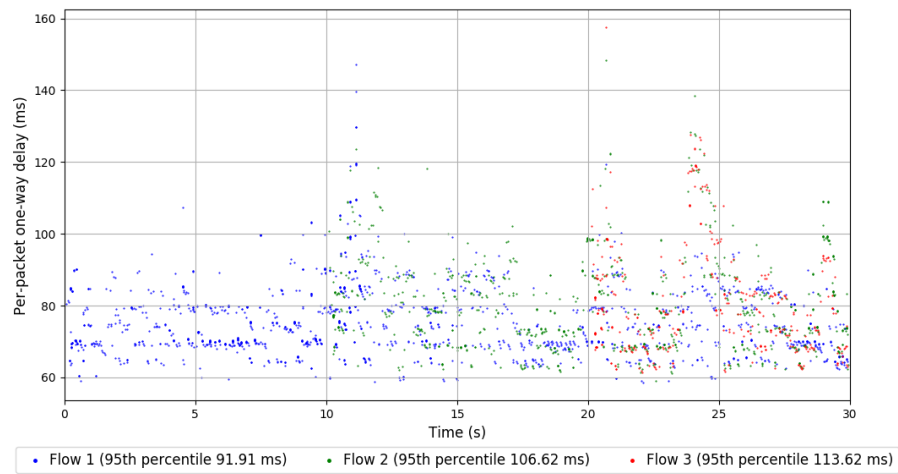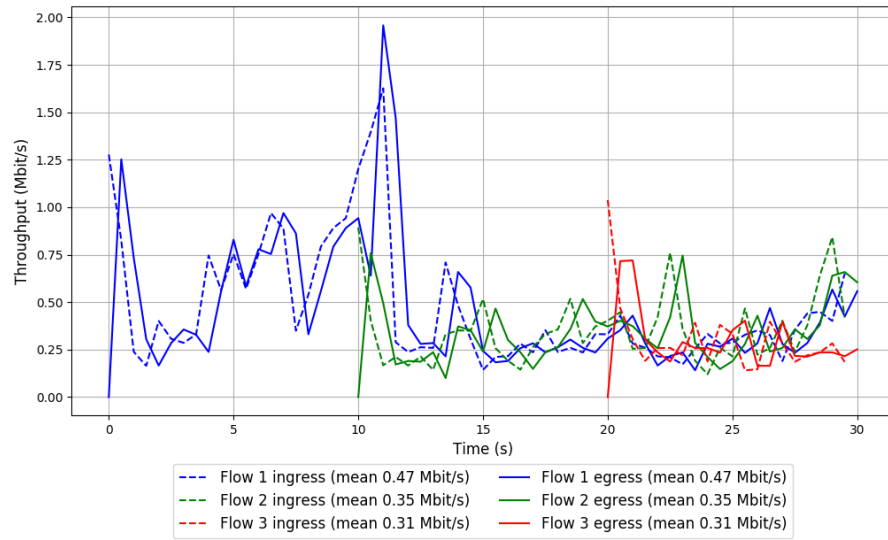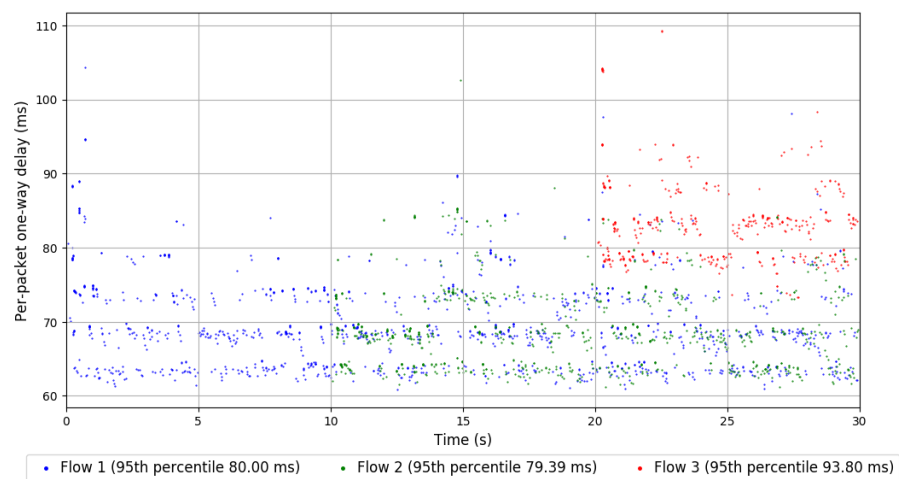
Run 2: Report of SCReAM — Data Link

```
Run 3: Statistics of SCReAM

Start at: 2018-07-03 17:35:45
End at: 2018-07-03 17:36:15
Local clock offset: -0.304 ms
Remote clock offset: 13.402 ms


# Below is generated by plot.py at 2018-07-03 17:47:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 73.288 ms
Loss rate: 1.03%
-- Flow 1:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 73.424 ms
Loss rate: 0.53%
-- Flow 2:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 72.783 ms
Loss rate: 1.32%
-- Flow 3:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 73.154 ms
Loss rate: 2.35%
```
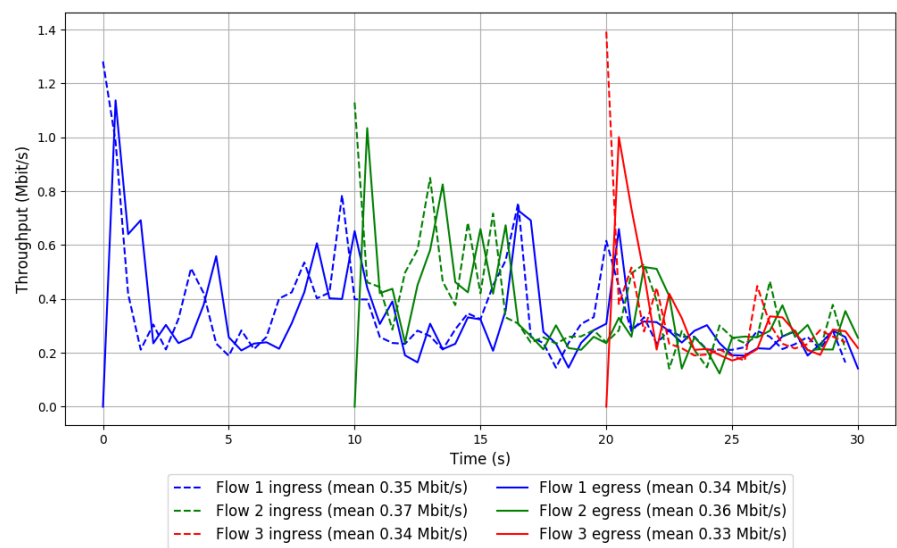
Run 3: Report of SCReAM — Data Link

```
Run 1: Statistics of Sprout

Start at: 2018-07-03 17:00:09
End at: 2018-07-03 17:00:39
Local clock offset: 2.906 ms
Remote clock offset: 8.404 ms


# Below is generated by plot.py at 2018-07-03 17:47:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.81 Mbit/s
95th percentile per-packet one-way delay: 99.672 ms
Loss rate: 0.94%
-- Flow 1:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 91.914 ms
Loss rate: 0.93%
-- Flow 2:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 106.620 ms
Loss rate: 0.97%
-- Flow 3:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 113.620 ms
Loss rate: 0.94%
```
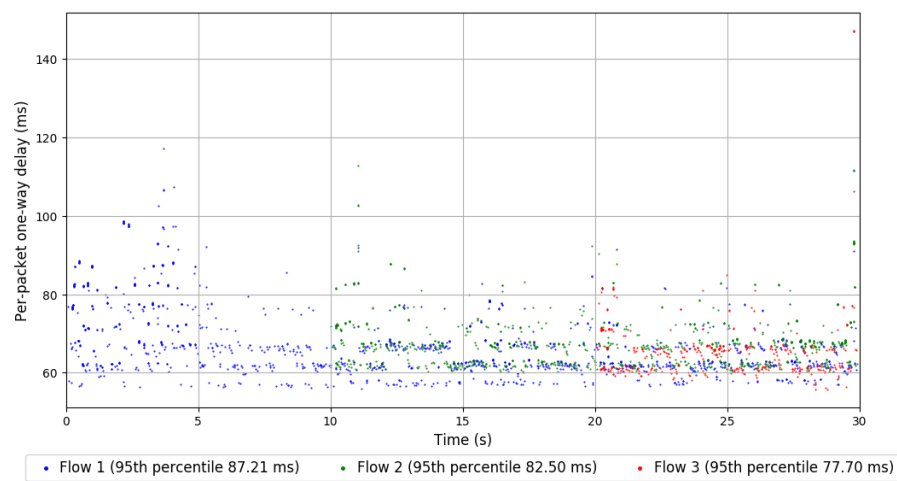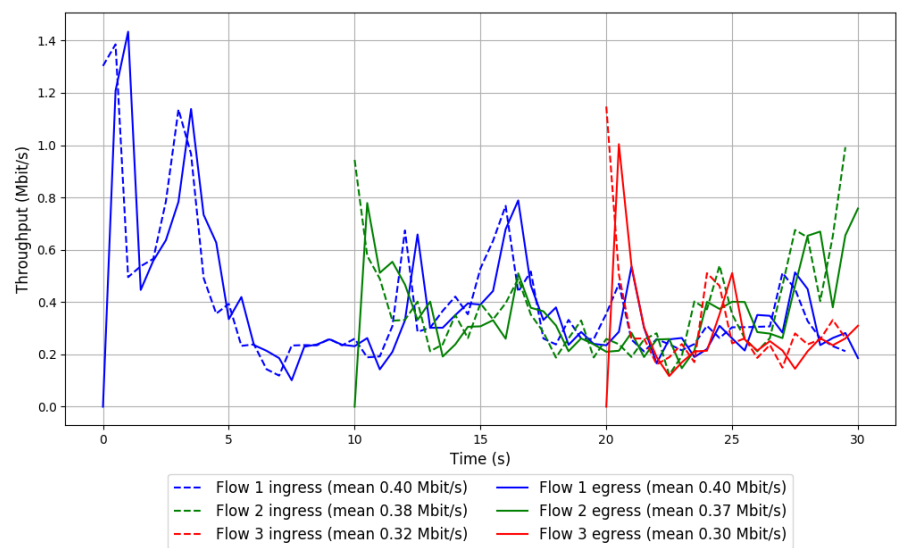
Run 1: Report of Sprout — Data Link

```
Run 2: Statistics of Sprout

Start at: 2018-07-03 17:19:06
End at: 2018-07-03 17:19:36
Local clock offset: -2.055 ms
Remote clock offset: 11.495 ms


# Below is generated by plot.py at 2018-07-03 17:47:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.69 Mbit/s
95th percentile per-packet one-way delay: 84.901 ms
Loss rate: 2.96%
-- Flow 1:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 80.001 ms
Loss rate: 3.21%
-- Flow 2:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 79.392 ms
Loss rate: 3.05%
-- Flow 3:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 93.798 ms
Loss rate: 1.95%
```

Run 2: Report of Sprout — Data Link

```
Run 3: Statistics of Sprout

Start at: 2018-07-03 17:37:57
End at: 2018-07-03 17:38:27
Local clock offset: 1.103 ms
Remote clock offset: 9.305 ms

# Below is generated by plot.py at 2018-07-03 17:47:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.74 Mbit/s
95th percentile per-packet one-way delay: 82.920 ms
Loss rate: 2.59%
-- Flow 1:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 87.214 ms
Loss rate: 1.58%
-- Flow 2:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 82.496 ms
Loss rate: 2.78%
-- Flow 3:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 77.699 ms
Loss rate: 5.98%
```
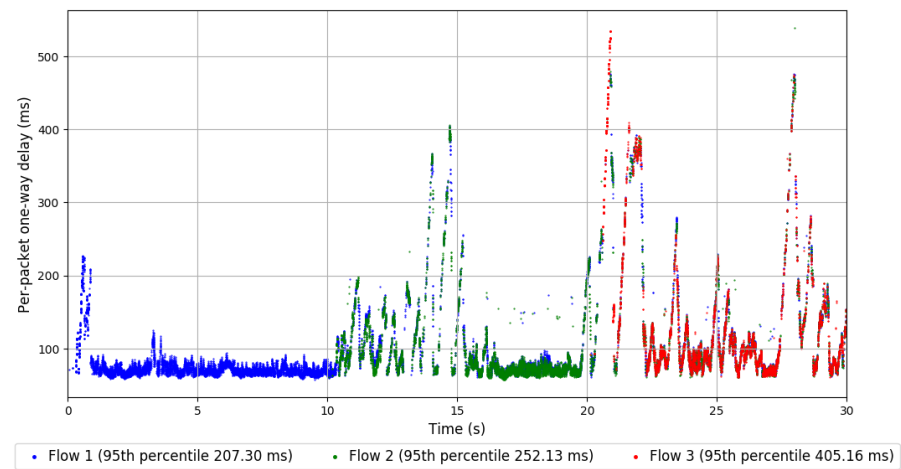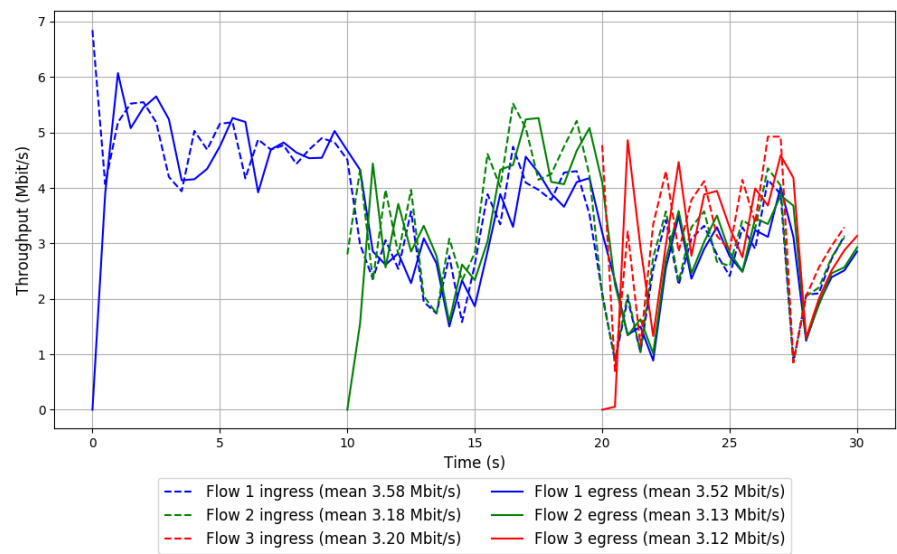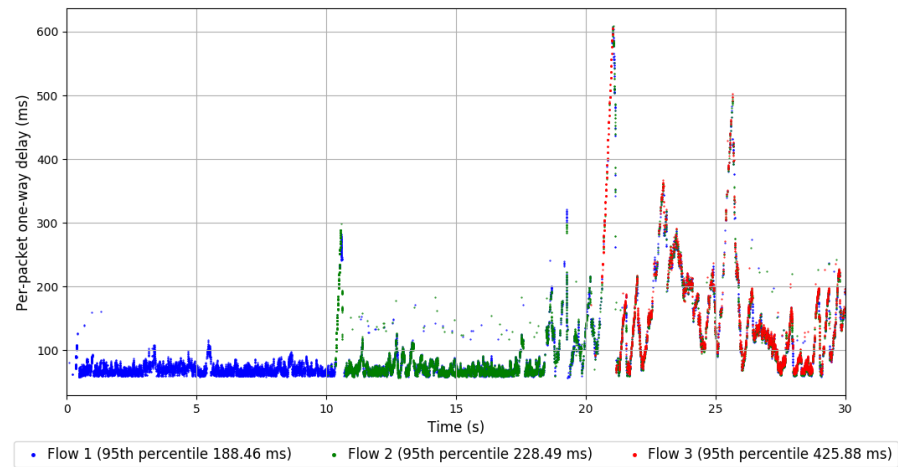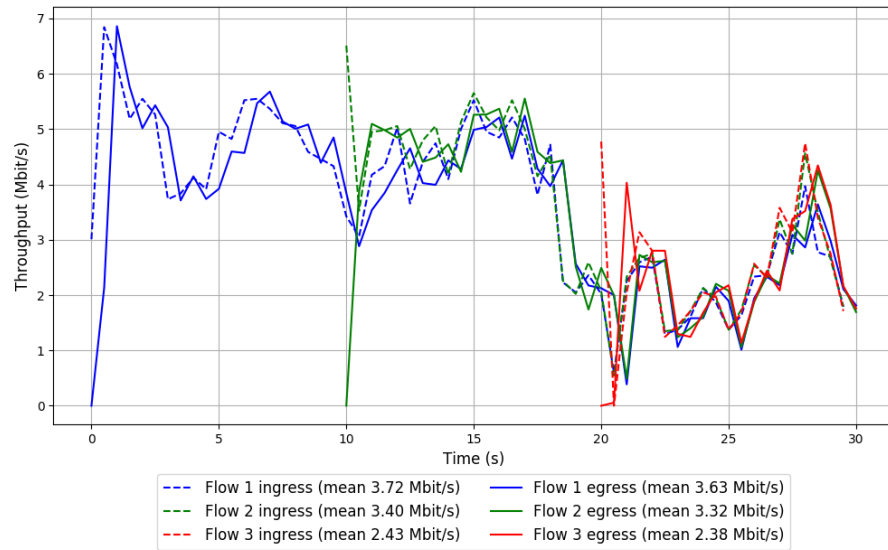
Run 3: Report of Sprout — Data Link

```
Run 1: Statistics of TaoVA-100x

Start at: 2018-07-03 17:03:27
End at: 2018-07-03 17:03:57
Local clock offset: 4.252 ms
Remote clock offset: 8.374 ms


# Below is generated by plot.py at 2018-07-03 17:47:37
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.63 Mbit/s
95th percentile per-packet one-way delay: 262.596 ms
Loss rate: 2.00%
-- Flow 1:
Average throughput: 3.52 Mbit/s
95th percentile per-packet one-way delay: 207.304 ms
Loss rate: 1.77%
-- Flow 2:
Average throughput: 3.13 Mbit/s
95th percentile per-packet one-way delay: 252.132 ms
Loss rate: 1.96%
-- Flow 3:
Average throughput: 3.12 Mbit/s
95th percentile per-packet one-way delay: 405.160 ms
Loss rate: 2.86%
```

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

```
Run 2: Statistics of TaoVA-100x

Start at: 2018-07-03 17:22:29
End at: 2018-07-03 17:22:59
Local clock offset: -1.182 ms
Remote clock offset: 10.947 ms


# Below is generated by plot.py at 2018-07-03 17:47:37
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.62 Mbit/s
95th percentile per-packet one-way delay: 232.566 ms
Loss rate: 2.83%
-- Flow 1:
Average throughput: 3.63 Mbit/s
95th percentile per-packet one-way delay: 188.457 ms
Loss rate: 2.70%
-- Flow 2:
Average throughput: 3.32 Mbit/s
95th percentile per-packet one-way delay: 228.485 ms
Loss rate: 2.68%
-- Flow 3:
Average throughput: 2.38 Mbit/s
95th percentile per-packet one-way delay: 425.879 ms
Loss rate: 3.85%
```
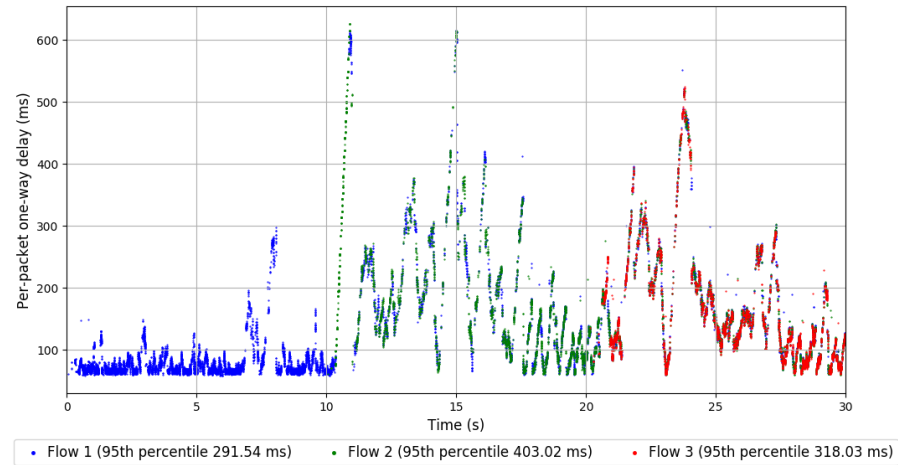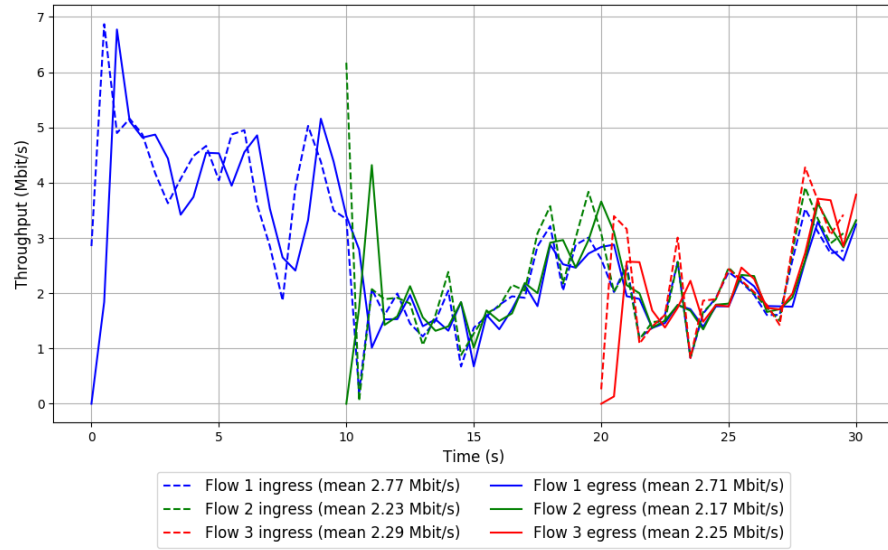
Run 2: Report of TaoVA-100x — Data Link

```
Run 3: Statistics of TaoVA-100x

Start at: 2018-07-03 17:41:21
End at: 2018-07-03 17:41:51
Local clock offset: -1.004 ms
Remote clock offset: 5.365 ms

# Below is generated by plot.py at 2018-07-03 17:47:37
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.89 Mbit/s
95th percentile per-packet one-way delay: 328.543 ms
Loss rate: 2.71%
-- Flow 1:
Average throughput: 2.71 Mbit/s
95th percentile per-packet one-way delay: 291.539 ms
Loss rate: 2.45%
-- Flow 2:
Average throughput: 2.17 Mbit/s
95th percentile per-packet one-way delay: 403.019 ms
Loss rate: 2.94%
-- Flow 3:
Average throughput: 2.25 Mbit/s
95th percentile per-packet one-way delay: 318.030 ms
Loss rate: 3.19%
```
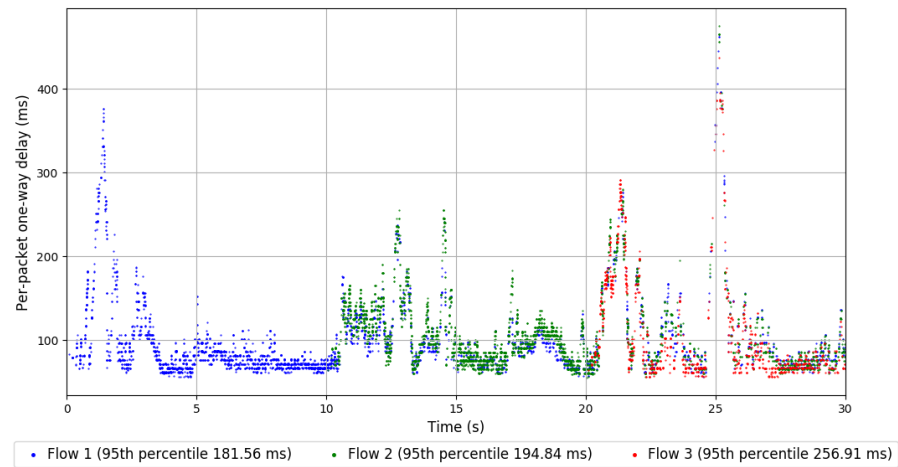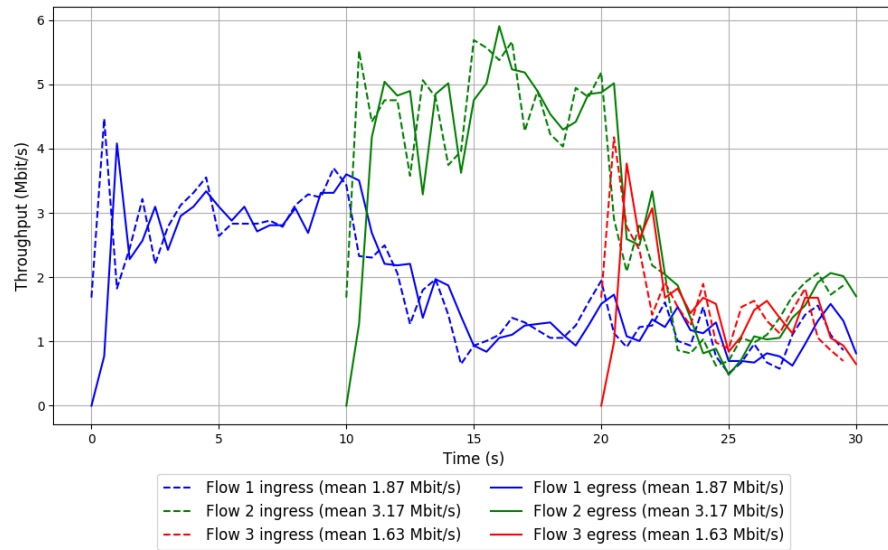
Run 3: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 2.77 Mbit/s) — Flow 1 egress (mean 2.71 Mbit/s)
Flow 2 ingress (mean 2.23 Mbit/s) — Flow 2 egress (mean 2.17 Mbit/s)
Flow 3 ingress (mean 2.29 Mbit/s) — Flow 3 egress (mean 2.25 Mbit/s)

Flow 1 (95th percentile 291.54 ms) · Flow 2 (95th percentile 403.02 ms) · Flow 3 (95th percentile 318.03 ms)

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```
Run 1: Statistics of TCP Vegas

Start at: 2018-07-03 16:52:15
End at: 2018-07-03 16:52:45
Local clock offset: 3.57 ms
Remote clock offset: 6.059 ms

# Below is generated by plot.py at 2018-07-03 17:47:37
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.52 Mbit/s
95th percentile per-packet one-way delay: 204.893 ms
Loss rate: 0.39%
-- Flow 1:
Average throughput: 1.87 Mbit/s
95th percentile per-packet one-way delay: 181.563 ms
Loss rate: 0.26%
-- Flow 2:
Average throughput: 3.17 Mbit/s
95th percentile per-packet one-way delay: 194.840 ms
Loss rate: 0.34%
-- Flow 3:
Average throughput: 1.63 Mbit/s
95th percentile per-packet one-way delay: 256.913 ms
Loss rate: 1.03%
```
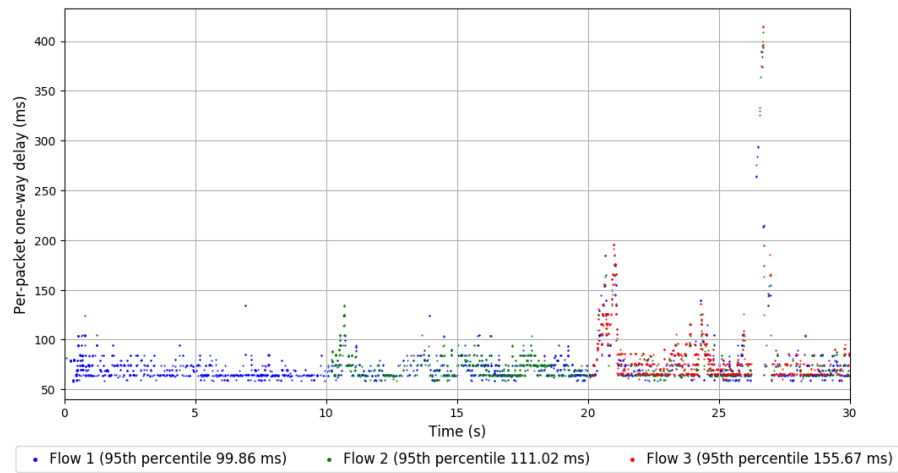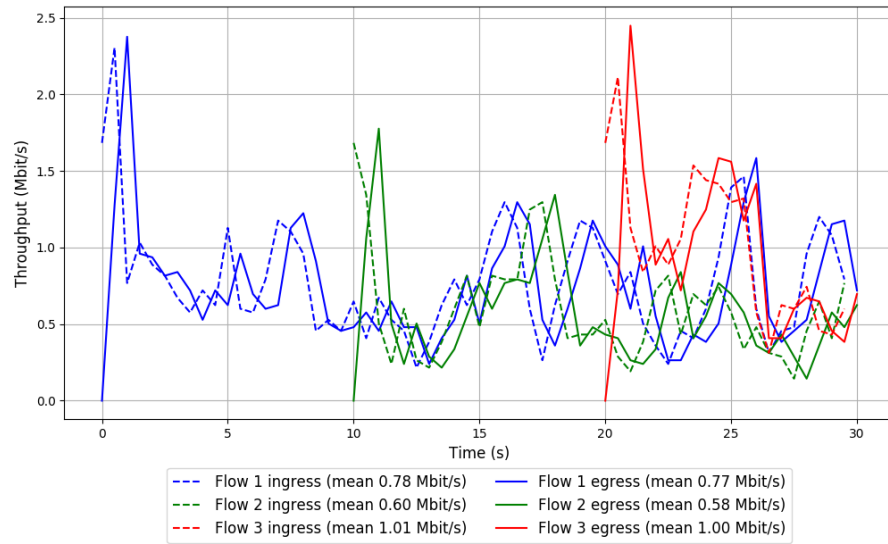
Run 1: Report of TCP Vegas — Data Link

```
Run 2: Statistics of TCP Vegas

Start at: 2018-07-03 17:11:11
End at: 2018-07-03 17:11:41
Local clock offset: 1.485 ms
Remote clock offset: 9.392 ms


# Below is generated by plot.py at 2018-07-03 17:47:37
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.48 Mbit/s
95th percentile per-packet one-way delay: 124.353 ms
Loss rate: 2.64%
-- Flow 1:
Average throughput: 0.77 Mbit/s
95th percentile per-packet one-way delay: 99.855 ms
Loss rate: 2.30%
-- Flow 2:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 111.024 ms
Loss rate: 4.00%
-- Flow 3:
Average throughput: 1.00 Mbit/s
95th percentile per-packet one-way delay: 155.673 ms
Loss rate: 1.79%
```

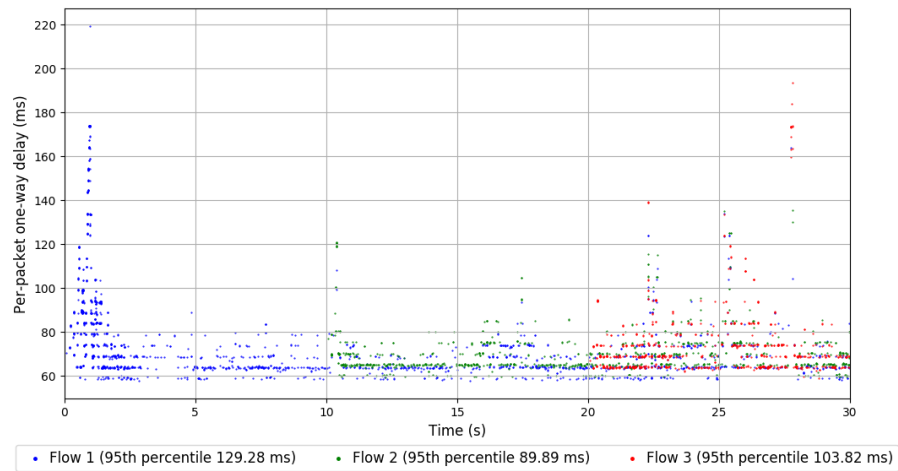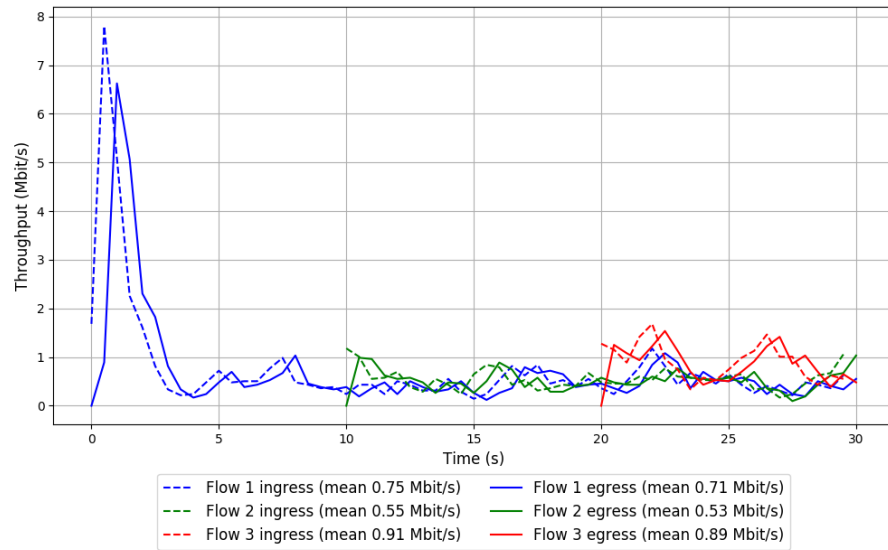Run 2: Report of TCP Vegas — Data Link

```
Run 3: Statistics of TCP Vegas

Start at: 2018-07-03 17:30:15
End at: 2018-07-03 17:30:45
Local clock offset: 0.849 ms
Remote clock offset: 12.946 ms


# Below is generated by plot.py at 2018-07-03 17:47:37
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.36 Mbit/s
95th percentile per-packet one-way delay: 110.774 ms
Loss rate: 4.92%
-- Flow 1:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 129.281 ms
Loss rate: 6.27%
-- Flow 2:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 89.894 ms
Loss rate: 4.25%
-- Flow 3:
Average throughput: 0.89 Mbit/s
95th percentile per-packet one-way delay: 103.824 ms
Loss rate: 2.39%
```
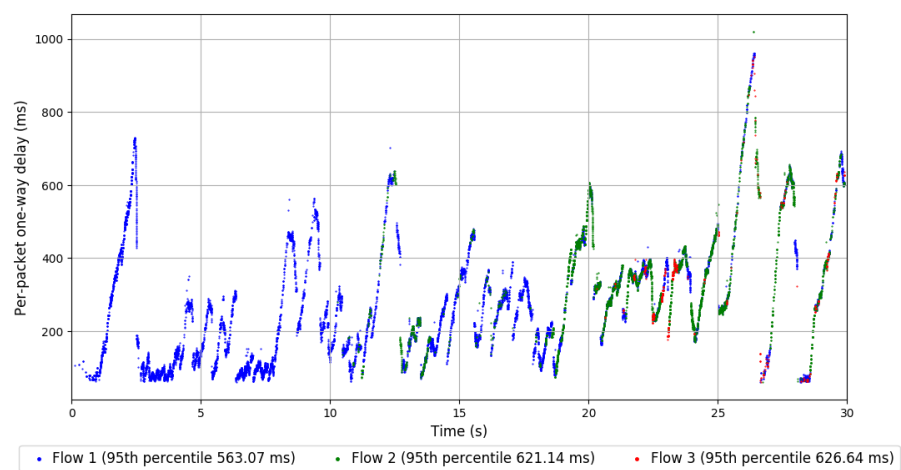
Run 3: Report of TCP Vegas — Data Link

```
Run 1: Statistics of Verus

Start at: 2018-07-03 17:02:21
End at: 2018-07-03 17:02:51
Local clock offset: 4.961 ms
Remote clock offset: 7.971 ms


# Below is generated by plot.py at 2018-07-03 17:47:37
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.90 Mbit/s
95th percentile per-packet one-way delay: 597.074 ms
Loss rate: 2.12%
-- Flow 1:
Average throughput: 5.42 Mbit/s
95th percentile per-packet one-way delay: 563.074 ms
Loss rate: 1.23%
-- Flow 2:
Average throughput: 3.43 Mbit/s
95th percentile per-packet one-way delay: 621.142 ms
Loss rate: 3.64%
-- Flow 3:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 626.642 ms
Loss rate: 7.41%
```
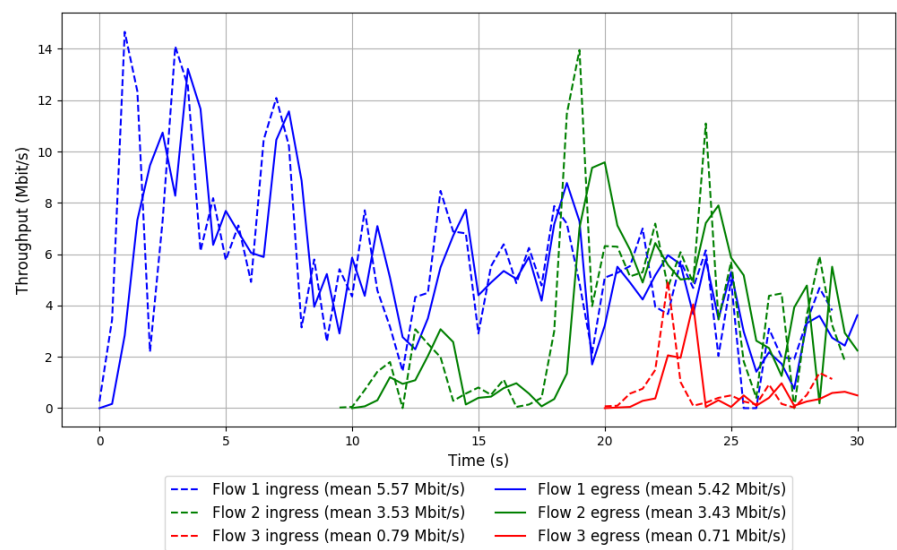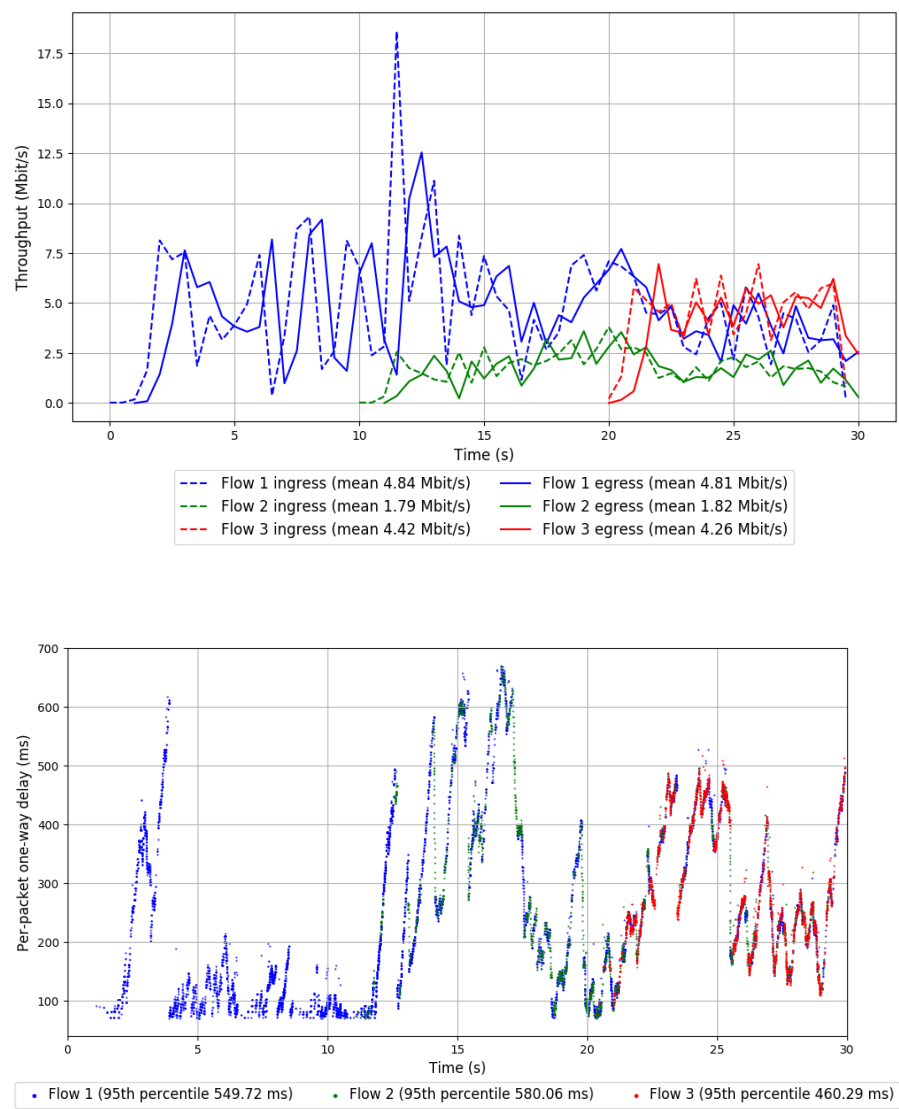
Run 1: Report of Verus — Data Link

Flow 1 ingress (mean 5.57 Mbit/s)   Flow 1 egress (mean 5.42 Mbit/s)
Flow 2 ingress (mean 3.53 Mbit/s)   Flow 2 egress (mean 3.43 Mbit/s)
Flow 3 ingress (mean 0.79 Mbit/s)   Flow 3 egress (mean 0.71 Mbit/s)

Flow 1 (95th percentile 563.07 ms)   Flow 2 (95th percentile 621.14 ms)   Flow 3 (95th percentile 626.64 ms)
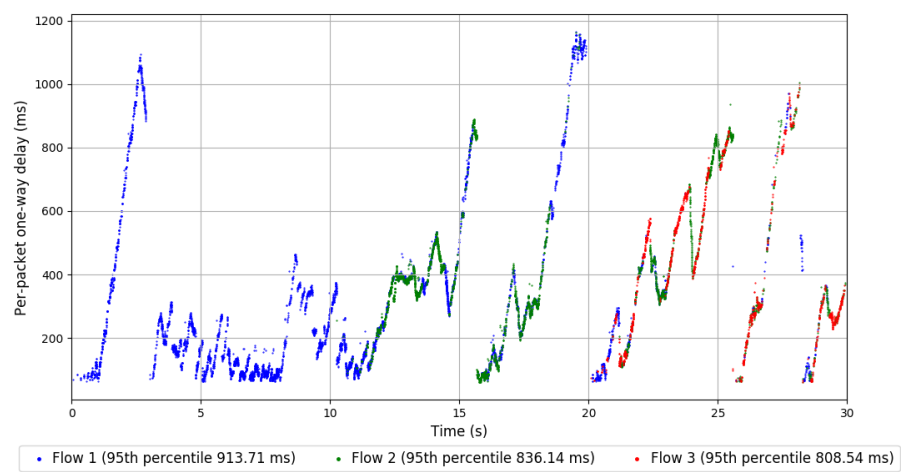
```
Run 2: Statistics of Verus

Start at: 2018-07-03 17:21:18
End at: 2018-07-03 17:21:48
Local clock offset: 2.057 ms
Remote clock offset: 11.493 ms


# Below is generated by plot.py at 2018-07-03 17:47:37
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.44 Mbit/s
95th percentile per-packet one-way delay: 520.730 ms
Loss rate: 3.48%
-- Flow 1:
Average throughput: 4.81 Mbit/s
95th percentile per-packet one-way delay: 549.715 ms
Loss rate: 3.00%
-- Flow 2:
Average throughput: 1.82 Mbit/s
95th percentile per-packet one-way delay: 580.062 ms
Loss rate: 4.08%
-- Flow 3:
Average throughput: 4.26 Mbit/s
95th percentile per-packet one-way delay: 460.293 ms
Loss rate: 4.58%
```
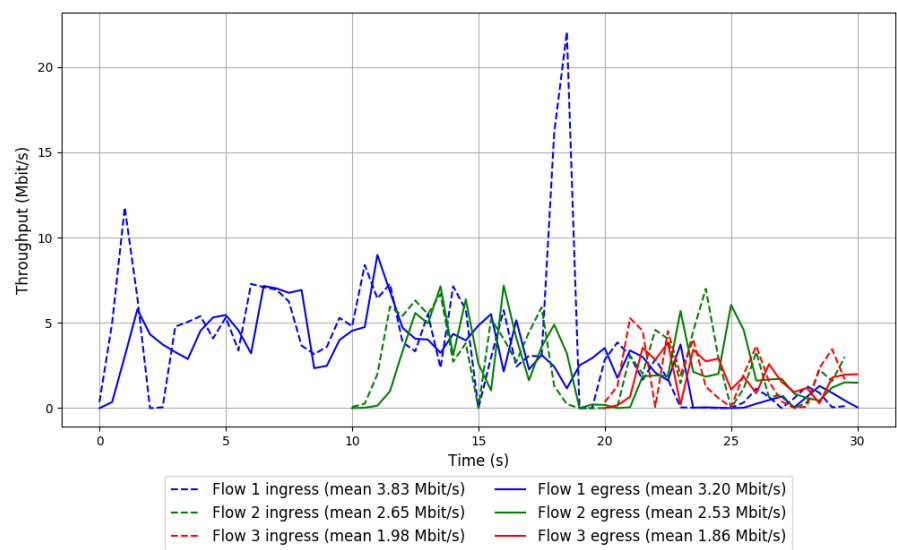
Run 2: Report of Verus — Data Link

```
Run 3: Statistics of Verus

Start at: 2018-07-03 17:40:14
End at: 2018-07-03 17:40:44
Local clock offset: -0.432 ms
Remote clock offset: 6.379 ms

# Below is generated by plot.py at 2018-07-03 17:47:37
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.44 Mbit/s
95th percentile per-packet one-way delay: 844.877 ms
Loss rate: 12.46%
-- Flow 1:
Average throughput: 3.20 Mbit/s
95th percentile per-packet one-way delay: 913.705 ms
Loss rate: 16.61%
-- Flow 2:
Average throughput: 2.53 Mbit/s
95th percentile per-packet one-way delay: 836.141 ms
Loss rate: 5.63%
-- Flow 3:
Average throughput: 1.86 Mbit/s
95th percentile per-packet one-way delay: 808.538 ms
Loss rate: 6.84%
```
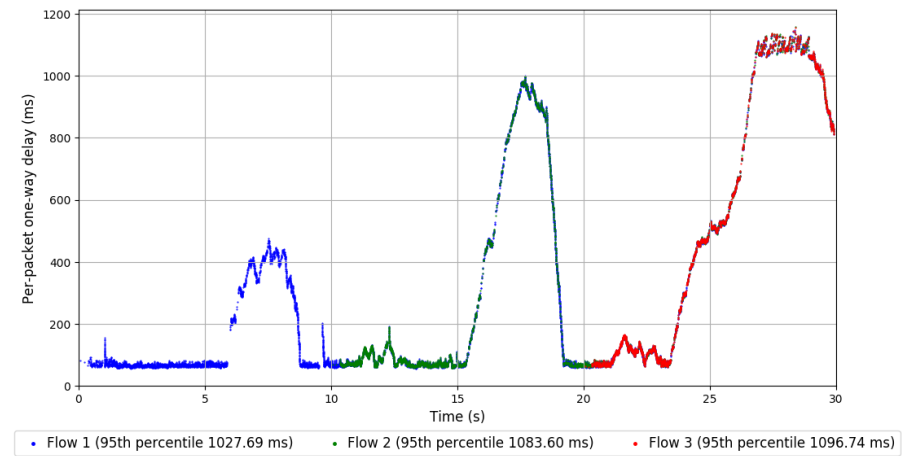
Run 3: Report of Verus — Data Link

```
Run 1: Statistics of PCC-Vivace

Start at: 2018-07-03 17:06:47
End at: 2018-07-03 17:07:17
Local clock offset: 3.696 ms
Remote clock offset: 8.886 ms


# Below is generated by plot.py at 2018-07-03 17:47:37
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.41 Mbit/s
95th percentile per-packet one-way delay: 1075.744 ms
Loss rate: 8.16%
-- Flow 1:
Average throughput: 3.44 Mbit/s
95th percentile per-packet one-way delay: 1027.693 ms
Loss rate: 5.02%
-- Flow 2:
Average throughput: 1.80 Mbit/s
95th percentile per-packet one-way delay: 1083.603 ms
Loss rate: 10.29%
-- Flow 3:
Average throughput: 2.33 Mbit/s
95th percentile per-packet one-way delay: 1096.738 ms
Loss rate: 17.35%
```
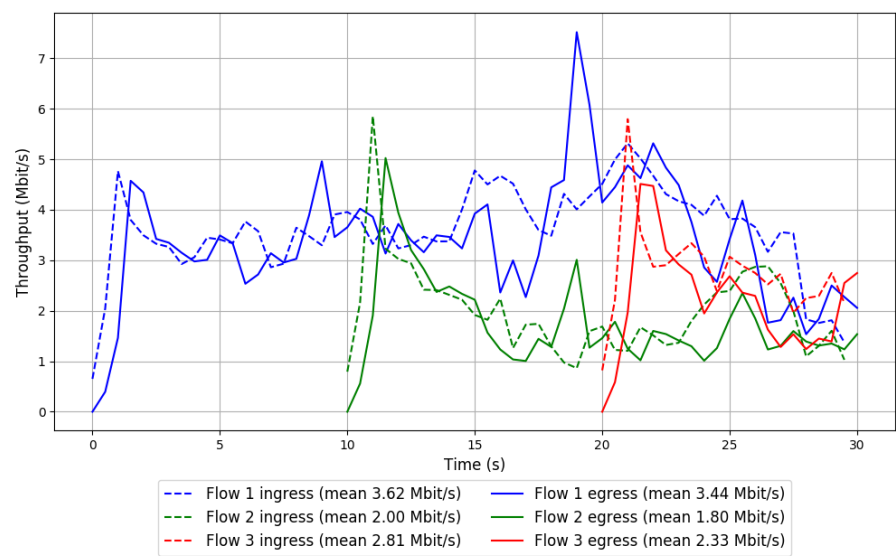
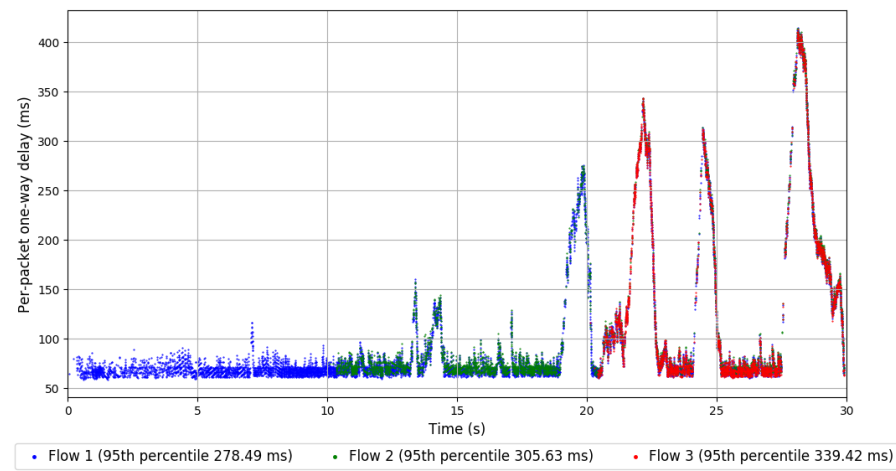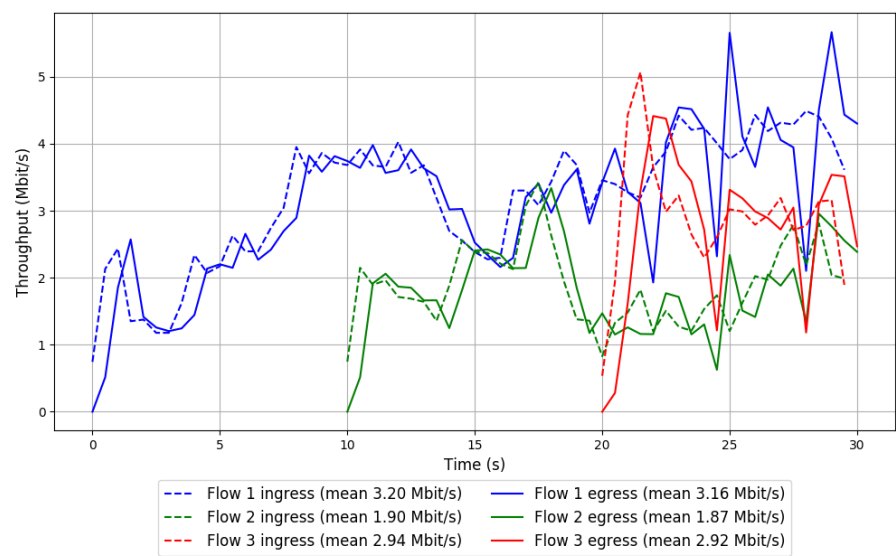Run 1: Report of PCC-Vivace — Data Link

```
Run 2: Statistics of PCC-Vivace

Start at: 2018-07-03 17:25:48
End at: 2018-07-03 17:26:18
Local clock offset: -3.099 ms
Remote clock offset: 11.298 ms


# Below is generated by plot.py at 2018-07-03 17:47:38
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.36 Mbit/s
95th percentile per-packet one-way delay: 299.404 ms
Loss rate: 1.55%
-- Flow 1:
Average throughput: 3.16 Mbit/s
95th percentile per-packet one-way delay: 278.487 ms
Loss rate: 1.36%
-- Flow 2:
Average throughput: 1.87 Mbit/s
95th percentile per-packet one-way delay: 305.626 ms
Loss rate: 1.90%
-- Flow 3:
Average throughput: 2.92 Mbit/s
95th percentile per-packet one-way delay: 339.416 ms
Loss rate: 1.72%
```

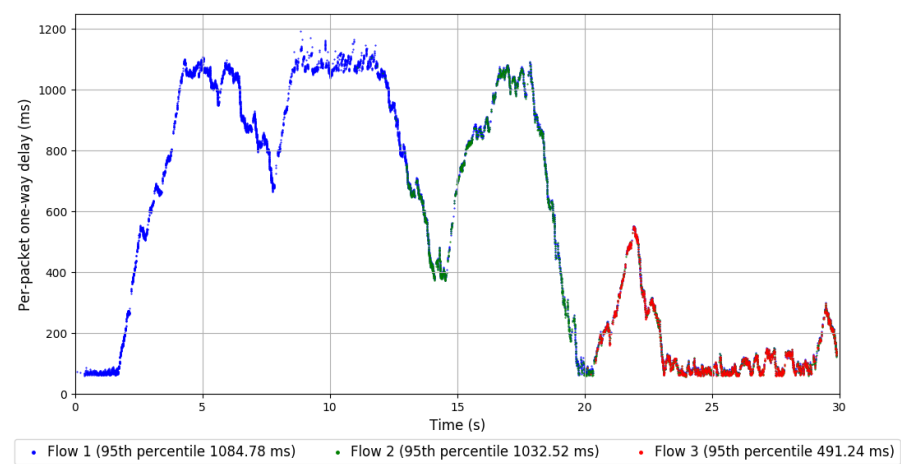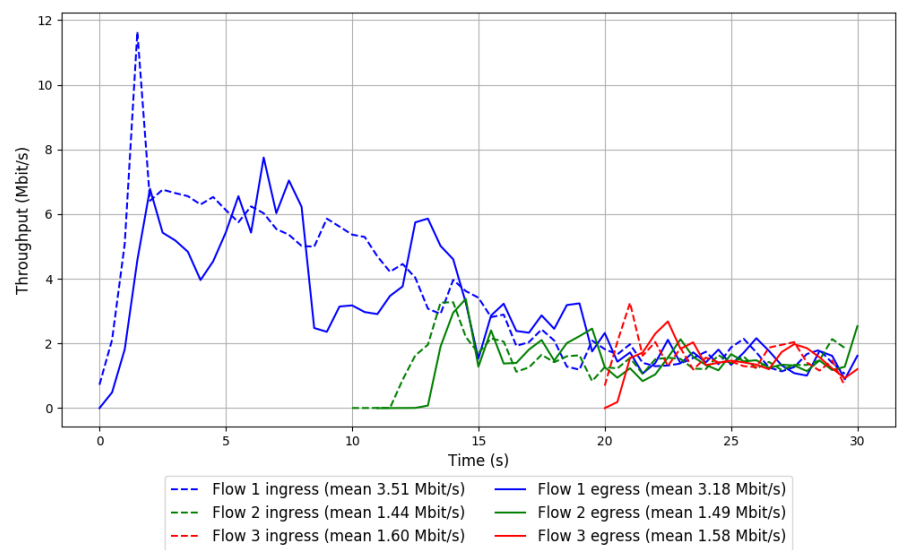Run 2: Report of PCC-Vivace — Data Link

```
Run 3: Statistics of PCC-Vivace

Start at: 2018-07-03 17:44:50
End at: 2018-07-03 17:45:20
Local clock offset: -6.949 ms
Remote clock offset: -3.823 ms


# Below is generated by plot.py at 2018-07-03 17:47:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.64 Mbit/s
95th percentile per-packet one-way delay: 1076.023 ms
Loss rate: 7.54%
-- Flow 1:
Average throughput: 3.18 Mbit/s
95th percentile per-packet one-way delay: 1084.777 ms
Loss rate: 9.80%
-- Flow 2:
Average throughput: 1.49 Mbit/s
95th percentile per-packet one-way delay: 1032.518 ms
Loss rate: 2.29%
-- Flow 3:
Average throughput: 1.58 Mbit/s
95th percentile per-packet one-way delay: 491.242 ms
Loss rate: 2.07%
```

Run 3: Report of PCC-Vivace — Data Link

```
Run 1: Statistics of WebRTC media

Start at: 2018-07-03 16:53:22
End at: 2018-07-03 16:53:52
Local clock offset: 4.834 ms
Remote clock offset: 6.387 ms


# Below is generated by plot.py at 2018-07-03 17:47:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.51 Mbit/s
95th percentile per-packet one-way delay: 173.193 ms
Loss rate: 0.39%
-- Flow 1:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 313.464 ms
Loss rate: 0.26%
-- Flow 2:
Average throughput: 0.64 Mbit/s
95th percentile per-packet one-way delay: 164.203 ms
Loss rate: 0.28%
-- Flow 3:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 132.456 ms
Loss rate: 1.27%
```
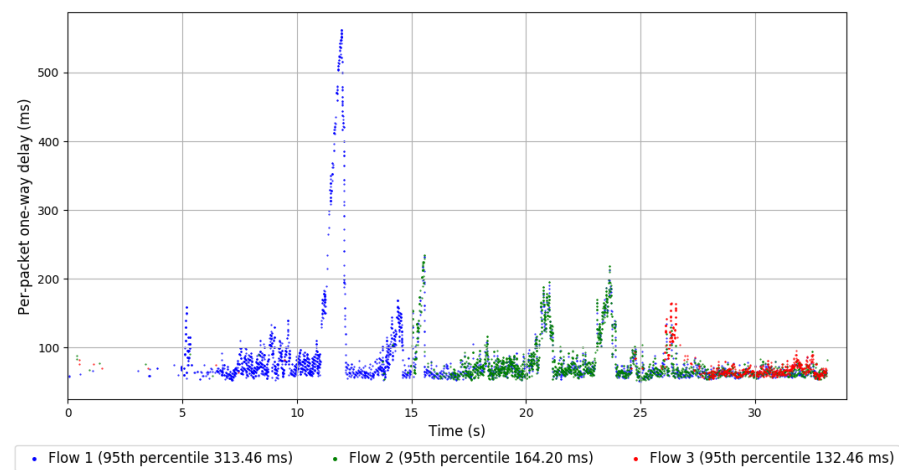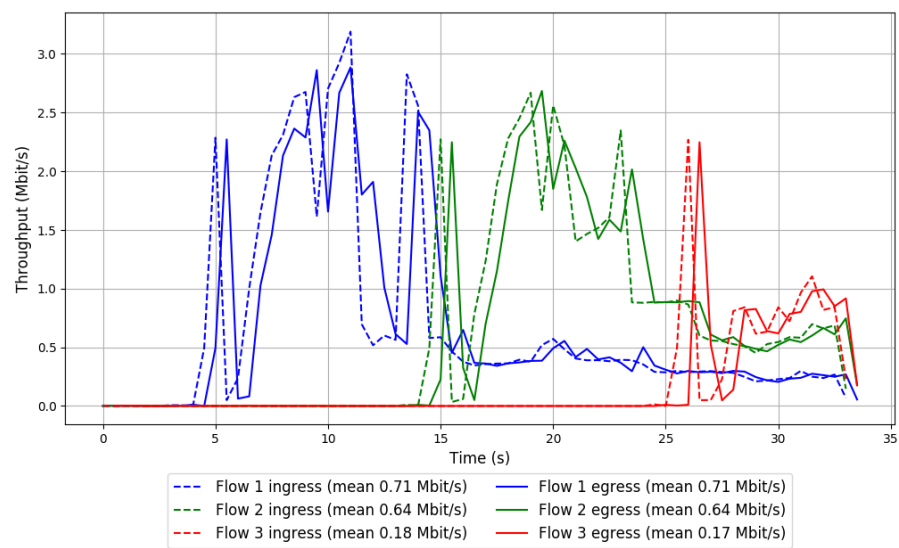
Run 1: Report of WebRTC media — Data Link

```
Run 2: Statistics of WebRTC media

Start at: 2018-07-03 17:12:17
End at: 2018-07-03 17:12:47
Local clock offset: 1.22 ms
Remote clock offset: 9.694 ms


# Below is generated by plot.py at 2018-07-03 17:47:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.49 Mbit/s
95th percentile per-packet one-way delay: 256.890 ms
Loss rate: 0.81%
-- Flow 1:
Average throughput: 0.67 Mbit/s
95th percentile per-packet one-way delay: 159.313 ms
Loss rate: 0.56%
-- Flow 2:
Average throughput: 0.63 Mbit/s
95th percentile per-packet one-way delay: 420.884 ms
Loss rate: 1.04%
-- Flow 3:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 255.549 ms
Loss rate: 0.94%
```
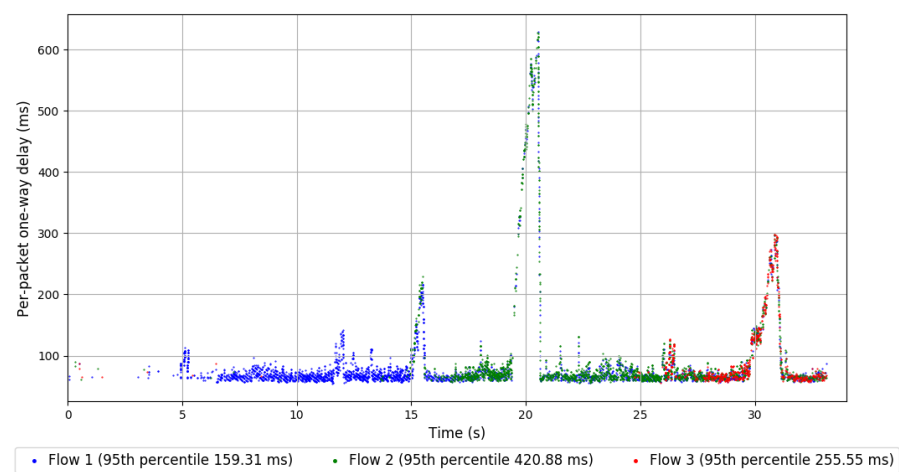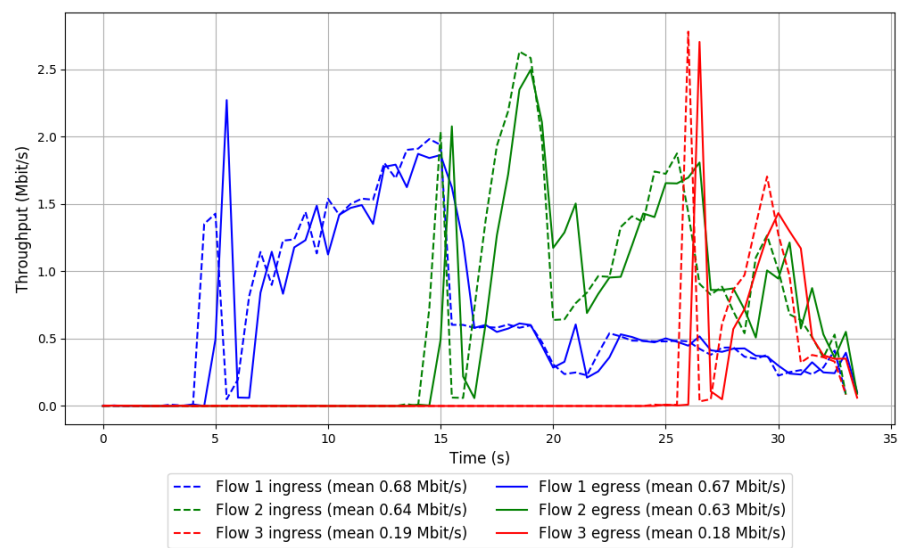
Run 2: Report of WebRTC media — Data Link

```
Run 3: Statistics of WebRTC media

Start at: 2018-07-03 17:31:20
End at: 2018-07-03 17:31:50
Local clock offset: 0.79 ms
Remote clock offset: 12.338 ms

# Below is generated by plot.py at 2018-07-03 17:47:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.66 Mbit/s
95th percentile per-packet one-way delay: 173.877 ms
Loss rate: 2.00%
-- Flow 1:
Average throughput: 0.93 Mbit/s
95th percentile per-packet one-way delay: 180.577 ms
Loss rate: 1.65%
-- Flow 2:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 124.578 ms
Loss rate: 1.91%
-- Flow 3:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 194.032 ms
Loss rate: 3.45%
```

Run 3: Report of WebRTC media — Data Link