Pantheon Report

Generated at 2018-09-06 08:40:22 (UTC).

Data path: AWS Brazil 2 on `ens5` (*local*) →Colombia cellular on `ppp0` (*remote*).

Repeated the test of 18 congestion control schemes 3 times.

Each test lasted for 30 seconds running 3 flows with 10-second interval between two flows.

NTP offsets were measured against `gps.ntp.br` and have been applied to correct the timestamps in logs.

```
System info:
Linux 4.15.0-1020-aws
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
net.ipv4.tcp_mem = 536870912 536870912 536870912

Git summary:
branch: muses @ f392ce15d580343f4432c3d7e068b3290f03eb4a
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdfe58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ a28d20fb82a95a965a3da65fd1eb71b8994e9b84
third_party/pantheon-tunnel @ cbfce6db5ff5740dafe1771f813cd646339e1952
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
```
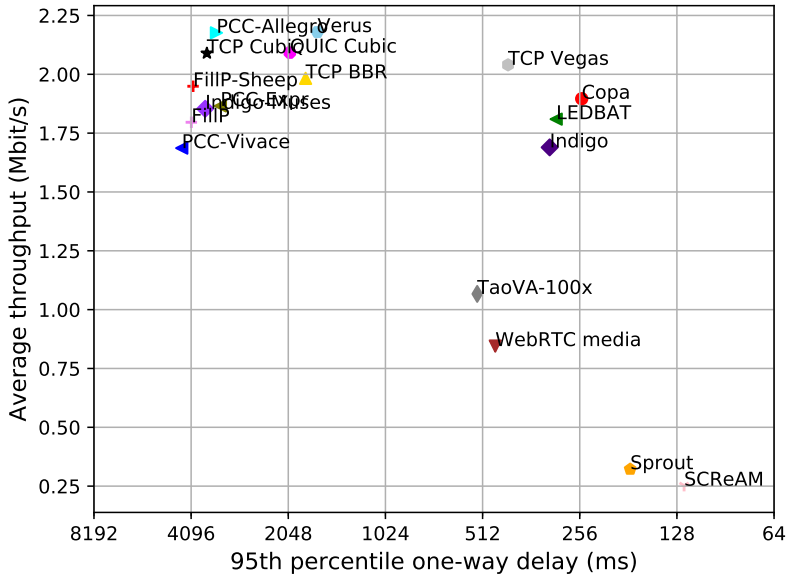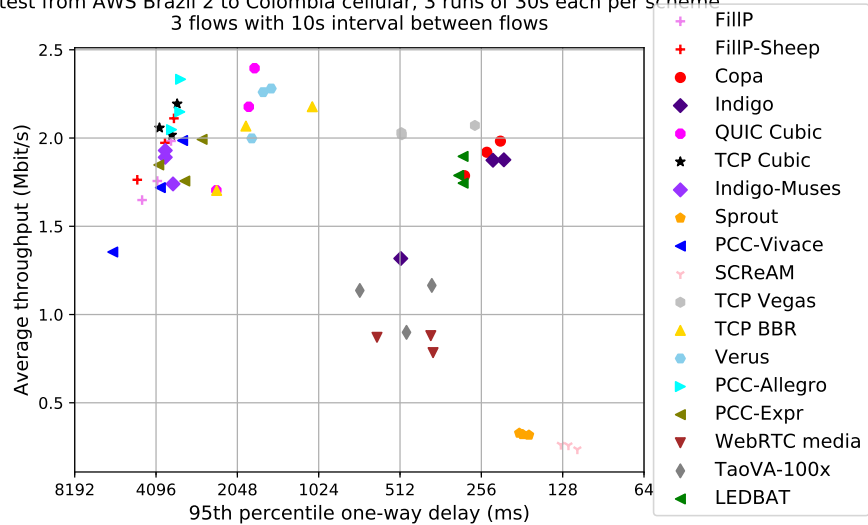
```
third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851
```

test from AWS Brazil 2 to Colombia cellular, 3 runs of 30s each per scheme
3 flows with 10s interval between flows (mean of all runs by scheme)

test from AWS Brazil 2 to Colombia cellular, 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	0.45	1770.71	1835.77	1490.00	1.31	3.88	11.26
Copa	3	1.16	0.78	0.65	260.89	221.17	247.78	0.30	0.43	0.85
TCP Cubic	3	2.03	0.10	0.01	3655.03	3854.06	3991.54	14.08	24.13	50.41
FillP	3	1.62	0.34	0.03	4100.77	3898.51	3566.86	89.18	55.94	93.58
FillP-Sheep	3	1.34	1.00	0.01	3911.98	4097.56	3965.34	27.81	63.55	98.83
Indigo	3	1.07	0.59	0.70	244.40	413.34	290.27	0.04	0.53	0.62
LEDBAT	3	1.30	0.56	0.41	293.11	309.59	309.45	0.16	0.78	5.14
Indigo-Muses	3	0.85	1.07	1.19	3734.11	2688.03	3661.65	87.96	59.46	78.32
PCC-Allegro	3	1.78	0.43	0.43	3376.40	3032.87	3190.78	54.52	35.08	37.39
PCC-Expr	3	1.87	0.00	0.00	3324.59	2789.06	3165.02	67.30	60.65	60.28
QUIC Cubic	3	1.60	0.64	0.21	1961.57	2061.59	2086.01	4.46	9.91	30.18
SCReAM	3	0.08	0.15	0.21	117.54	124.17	128.22	0.00	0.06	0.31
Sprout	3	0.15	0.17	0.18	198.16	165.27	184.34	0.09	0.12	0.22
TaoVA-100x	3	0.01	1.24	0.85	232.36	629.81	669.72	85.93	7.82	23.32
TCP Vegas	3	1.21	0.85	0.82	401.79	440.99	407.17	0.25	0.54	1.94
Verus	3	2.17	0.01	0.02	1663.22	1745.49	1887.86	4.72	4.76	9.14
PCC-Vivace	3	0.98	1.06	0.00	4345.96	4412.62	4429.93	25.87	31.82	20.21
WebRTC media	3	0.44	0.34	0.08	369.53	530.18	482.23	0.10	0.59	12.62

```
Run 1: Statistics of TCP BBR

Start at: 2018-09-06 07:40:00
End at: 2018-09-06 07:40:31
Local clock offset: 8.213 ms
Remote clock offset: 2.618 ms


# Below is generated by plot.py at 2018-09-06 08:39:39
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.70 Mbit/s
95th percentile per-packet one-way delay: 2443.596 ms
Loss rate: 3.75%
-- Flow 1:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 2416.714 ms
Loss rate: 2.13%
-- Flow 2:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 2496.409 ms
Loss rate: 5.55%
-- Flow 3:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 1980.806 ms
Loss rate: 21.63%
```
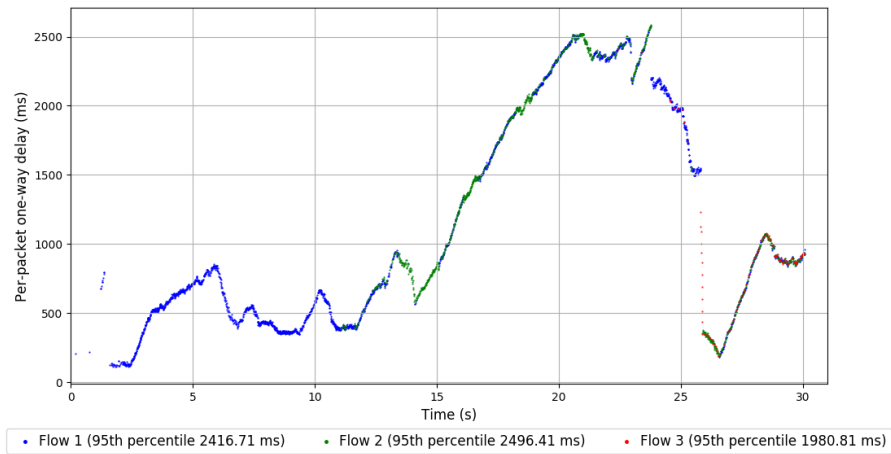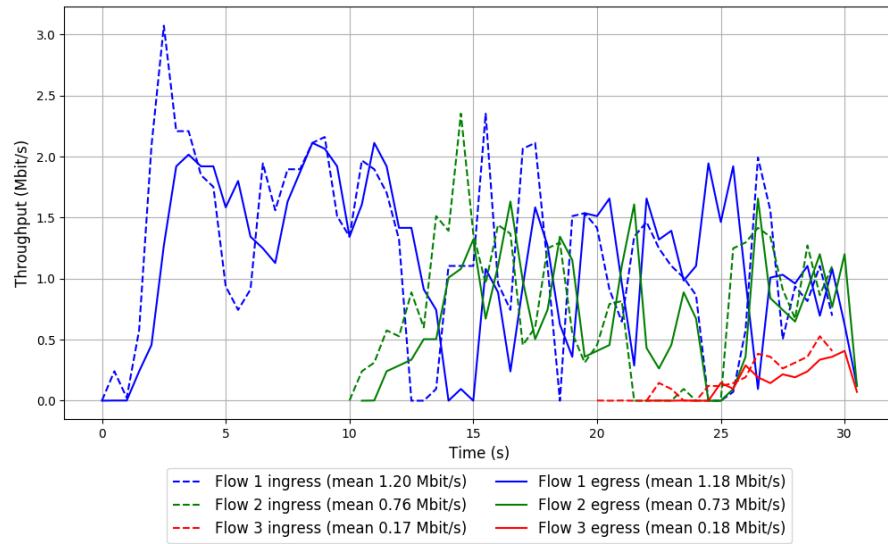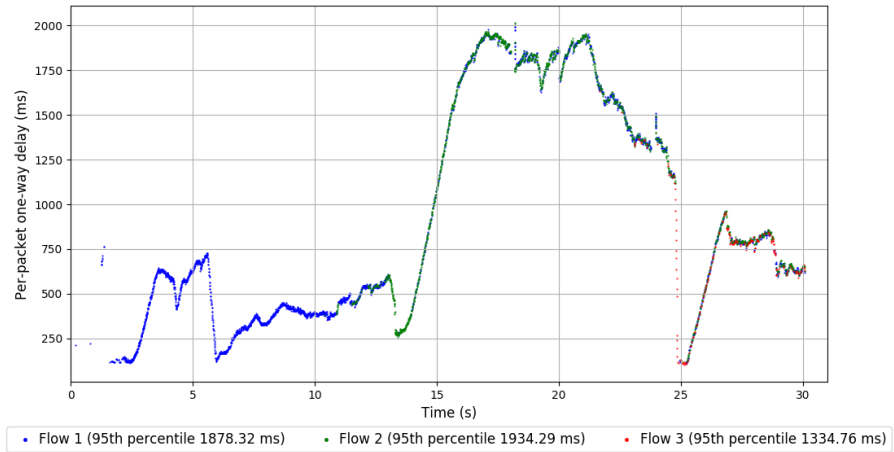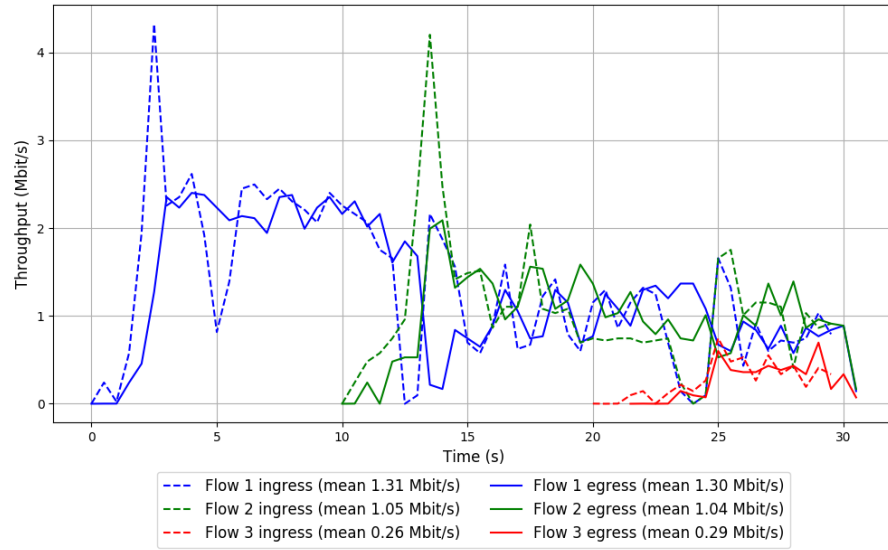
Run 1: Report of TCP BBR — Data Link

Flow 1 ingress (mean 1.20 Mbit/s) Flow 1 egress (mean 1.18 Mbit/s)
Flow 2 ingress (mean 0.76 Mbit/s) Flow 2 egress (mean 0.73 Mbit/s)
Flow 3 ingress (mean 0.17 Mbit/s) Flow 3 egress (mean 0.18 Mbit/s)

Flow 1 (95th percentile 2416.71 ms)   Flow 2 (95th percentile 2496.41 ms)   Flow 3 (95th percentile 1980.81 ms)

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```
Run 2: Statistics of TCP BBR

Start at: 2018-09-06 08:02:06
End at: 2018-09-06 08:02:36
Local clock offset: 5.515 ms
Remote clock offset: 1.547 ms


# Below is generated by plot.py at 2018-09-06 08:39:40
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.07 Mbit/s
95th percentile per-packet one-way delay: 1904.357 ms
Loss rate: 1.93%
-- Flow 1:
Average throughput: 1.30 Mbit/s
95th percentile per-packet one-way delay: 1878.315 ms
Loss rate: 1.22%
-- Flow 2:
Average throughput: 1.04 Mbit/s
95th percentile per-packet one-way delay: 1934.287 ms
Loss rate: 2.57%
-- Flow 3:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 1334.762 ms
Loss rate: 7.30%
```
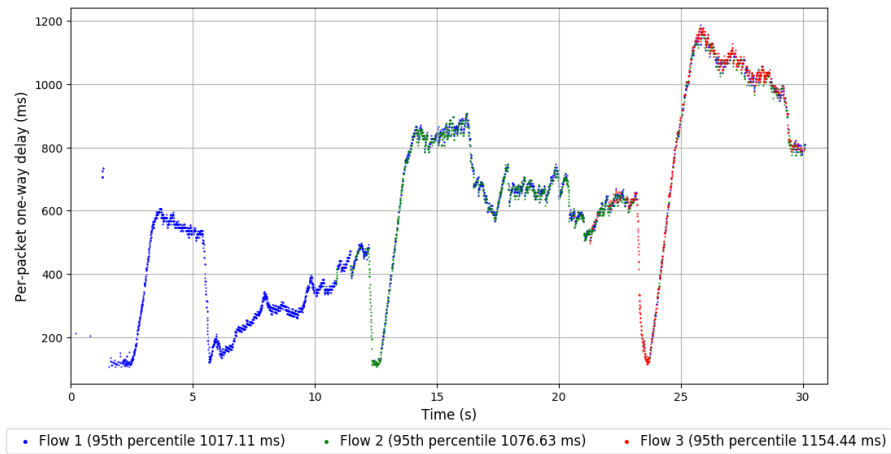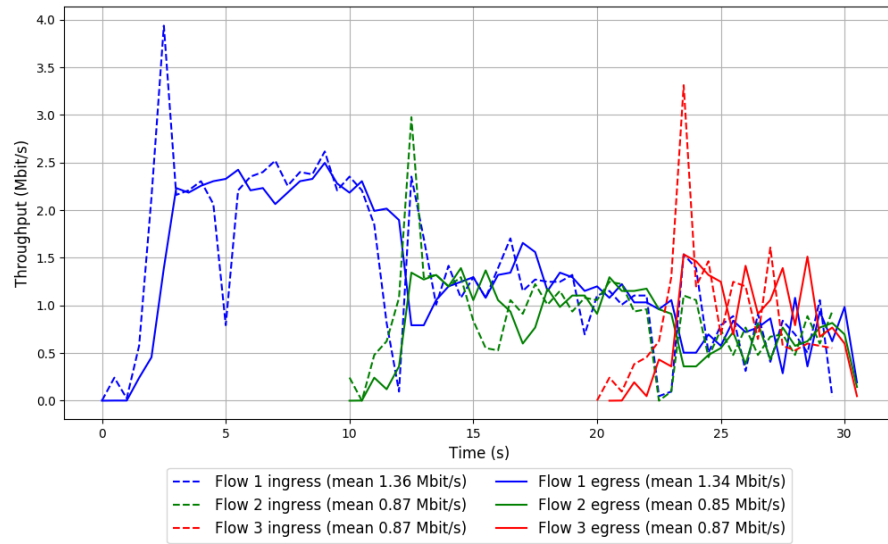
Run 2: Report of TCP BBR — Data Link

```
Run 3: Statistics of TCP BBR

Start at: 2018-09-06 08:24:10
End at: 2018-09-06 08:24:40
Local clock offset: 1.735 ms
Remote clock offset: 2.376 ms


# Below is generated by plot.py at 2018-09-06 08:39:40
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.18 Mbit/s
95th percentile per-packet one-way delay: 1081.429 ms
Loss rate: 1.90%
-- Flow 1:
Average throughput: 1.34 Mbit/s
95th percentile per-packet one-way delay: 1017.108 ms
Loss rate: 0.57%
-- Flow 2:
Average throughput: 0.85 Mbit/s
95th percentile per-packet one-way delay: 1076.629 ms
Loss rate: 3.53%
-- Flow 3:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 1154.442 ms
Loss rate: 4.85%
```
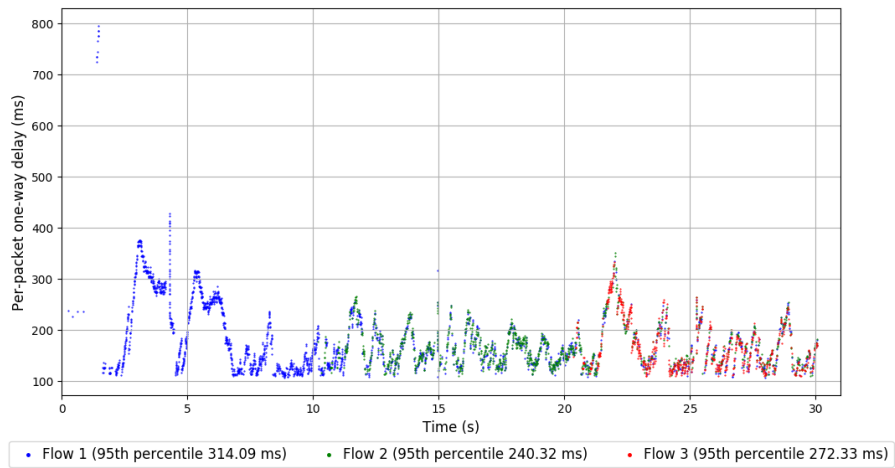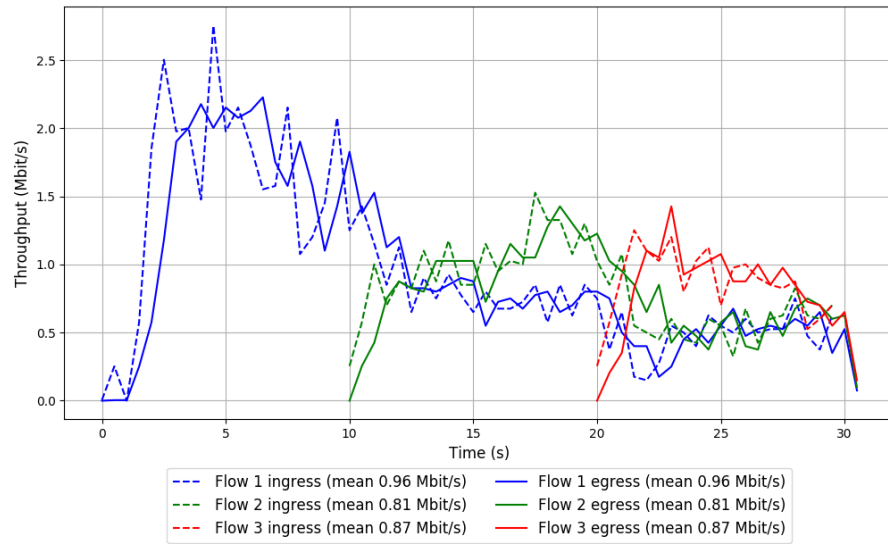
Run 3: Report of TCP BBR — Data Link

- Flow 1 ingress (mean 1.36 Mbit/s)
- Flow 1 egress (mean 1.34 Mbit/s)
- Flow 2 ingress (mean 0.87 Mbit/s)
- Flow 2 egress (mean 0.85 Mbit/s)
- Flow 3 ingress (mean 0.87 Mbit/s)
- Flow 3 egress (mean 0.87 Mbit/s)

- Flow 1 (95th percentile 1017.11 ms)
- Flow 2 (95th percentile 1076.63 ms)
- Flow 3 (95th percentile 1154.44 ms)

```
Run 1: Statistics of Copa

Start at: 2018-09-06 07:41:14
End at: 2018-09-06 07:41:44
Local clock offset: 9.031 ms
Remote clock offset: 0.46 ms


# Below is generated by plot.py at 2018-09-06 08:39:40
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.79 Mbit/s
95th percentile per-packet one-way delay: 295.419 ms
Loss rate: 0.35%
-- Flow 1:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 314.086 ms
Loss rate: 0.26%
-- Flow 2:
Average throughput: 0.81 Mbit/s
95th percentile per-packet one-way delay: 240.318 ms
Loss rate: 0.47%
-- Flow 3:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 272.328 ms
Loss rate: 0.44%
```
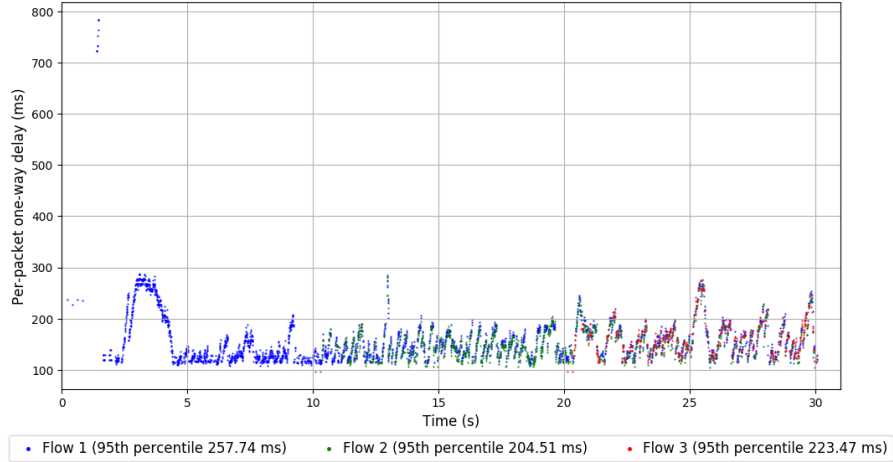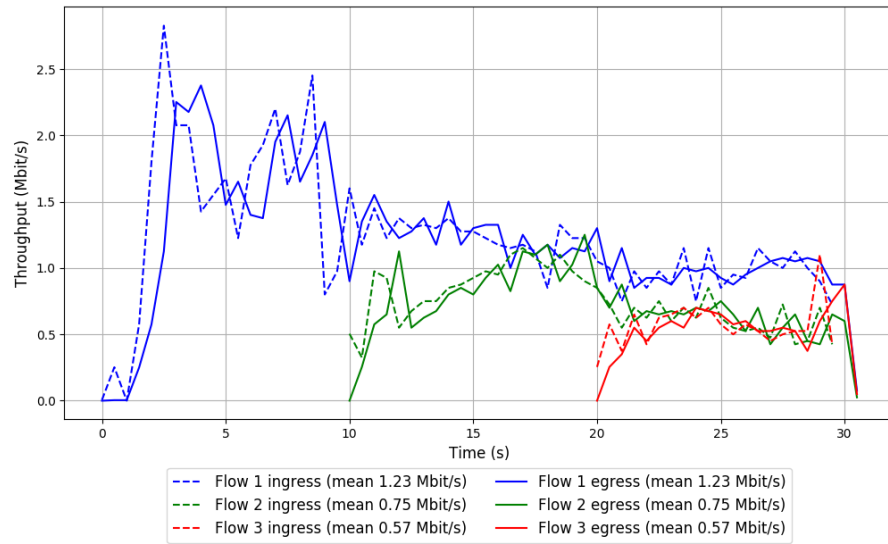
Run 1: Report of Copa — Data Link

```
Run 2: Statistics of Copa

Start at: 2018-09-06 08:03:20
End at: 2018-09-06 08:03:50
Local clock offset: 5.419 ms
Remote clock offset: 0.133 ms


# Below is generated by plot.py at 2018-09-06 08:39:40
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.92 Mbit/s
95th percentile per-packet one-way delay: 244.374 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 257.744 ms
Loss rate: 0.10%
-- Flow 2:
Average throughput: 0.75 Mbit/s
95th percentile per-packet one-way delay: 204.508 ms
Loss rate: 0.17%
-- Flow 3:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 223.470 ms
Loss rate: 0.00%
```
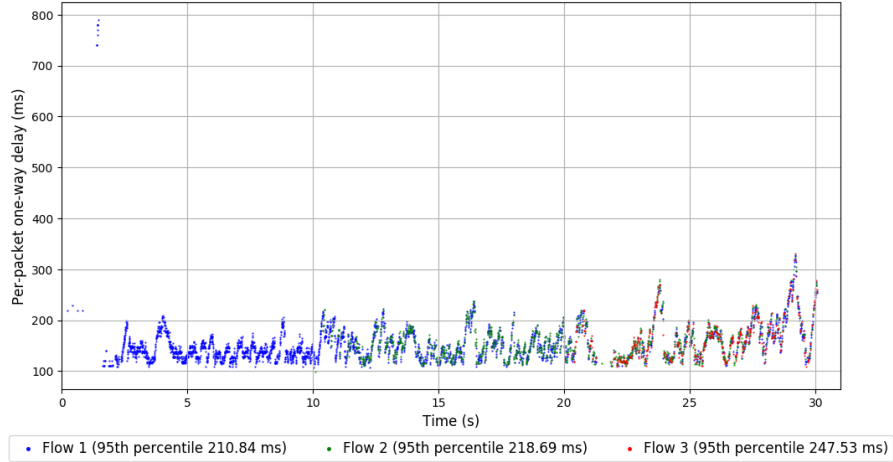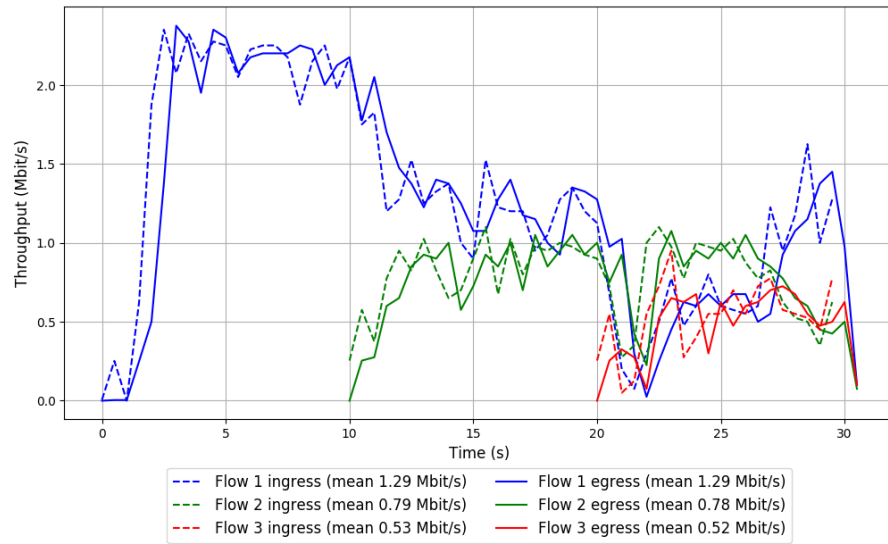
Run 2: Report of Copa — Data Link

Flow 1 ingress (mean 1.23 Mbit/s) --- Flow 1 egress (mean 1.23 Mbit/s)
Flow 2 ingress (mean 0.75 Mbit/s) --- Flow 2 egress (mean 0.75 Mbit/s)
Flow 3 ingress (mean 0.57 Mbit/s) --- Flow 3 egress (mean 0.57 Mbit/s)

Flow 1 (95th percentile 257.74 ms) · Flow 2 (95th percentile 204.51 ms) · Flow 3 (95th percentile 223.47 ms)

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```
Run 3: Statistics of Copa

Start at: 2018-09-06 08:25:24
End at: 2018-09-06 08:25:54
Local clock offset: 1.573 ms
Remote clock offset: 1.234 ms


# Below is generated by plot.py at 2018-09-06 08:39:40
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 217.595 ms
Loss rate: 0.71%
-- Flow 1:
Average throughput: 1.29 Mbit/s
95th percentile per-packet one-way delay: 210.843 ms
Loss rate: 0.55%
-- Flow 2:
Average throughput: 0.78 Mbit/s
95th percentile per-packet one-way delay: 218.690 ms
Loss rate: 0.64%
-- Flow 3:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 247.528 ms
Loss rate: 2.12%
```
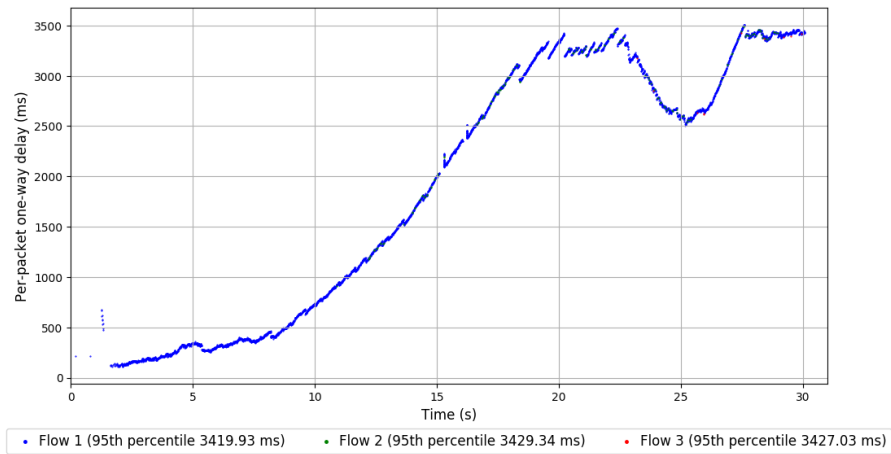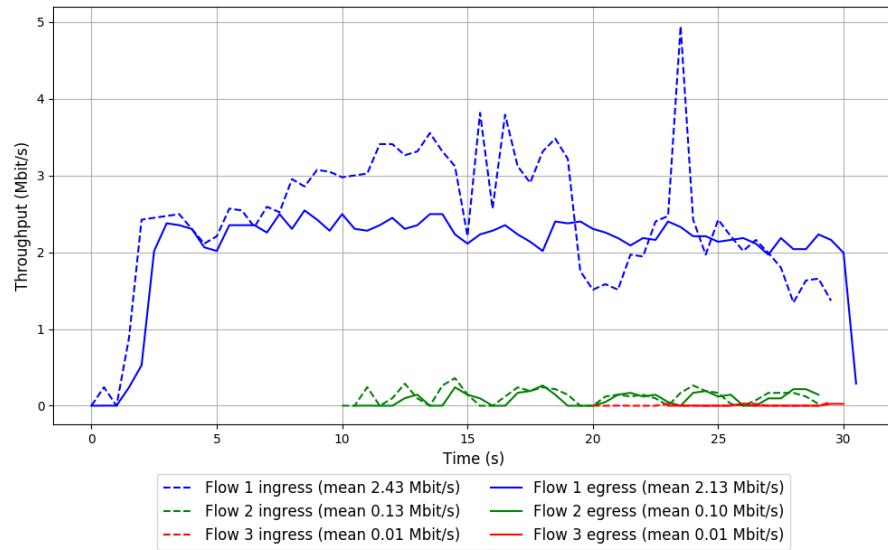
Run 3: Report of Copa — Data Link

```
Run 1: Statistics of TCP Cubic

Start at: 2018-09-06 07:37:30
End at: 2018-09-06 07:38:00
Local clock offset: 8.867 ms
Remote clock offset: 2.835 ms


# Below is generated by plot.py at 2018-09-06 08:39:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.19 Mbit/s
95th percentile per-packet one-way delay: 3420.967 ms
Loss rate: 13.17%
-- Flow 1:
Average throughput: 2.13 Mbit/s
95th percentile per-packet one-way delay: 3419.935 ms
Loss rate: 12.73%
-- Flow 2:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 3429.341 ms
Loss rate: 25.97%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 3427.028 ms
Loss rate: 36.86%
```
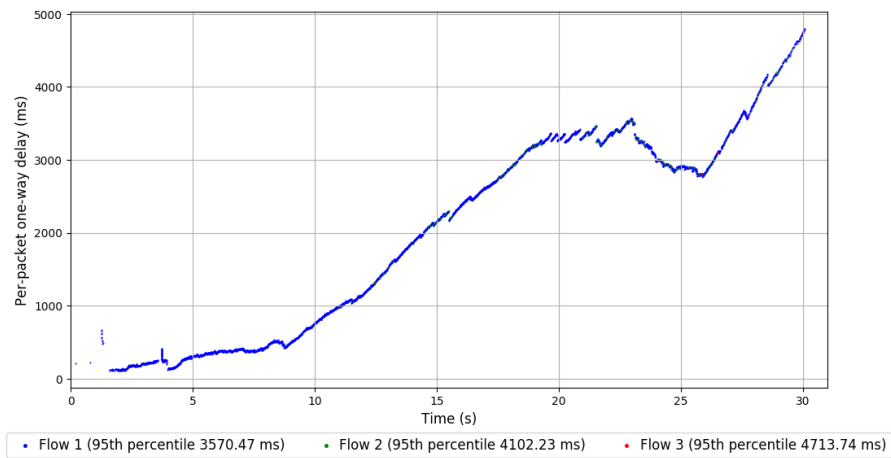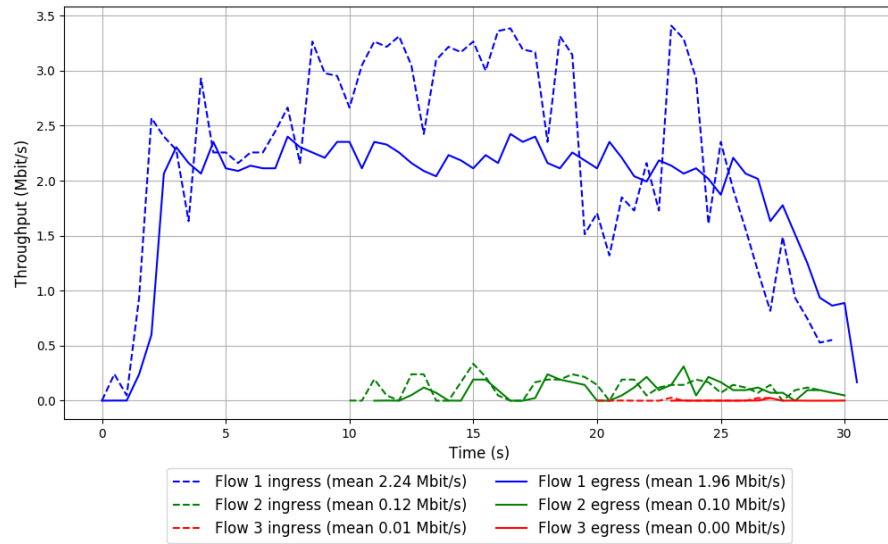
Run 1: Report of TCP Cubic — Data Link

- Flow 1 ingress (mean 2.43 Mbit/s)
- Flow 1 egress (mean 2.13 Mbit/s)
- Flow 2 ingress (mean 0.13 Mbit/s)
- Flow 2 egress (mean 0.10 Mbit/s)
- Flow 3 ingress (mean 0.01 Mbit/s)
- Flow 3 egress (mean 0.01 Mbit/s)

- Flow 1 (95th percentile 3419.93 ms)
- Flow 2 (95th percentile 3429.34 ms)
- Flow 3 (95th percentile 3427.03 ms)

```
Run 2: Statistics of TCP Cubic

Start at: 2018-09-06 07:59:32
End at: 2018-09-06 08:00:02
Local clock offset: 5.771 ms
Remote clock offset: 1.247 ms


# Below is generated by plot.py at 2018-09-06 08:39:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.02 Mbit/s
95th percentile per-packet one-way delay: 3583.729 ms
Loss rate: 13.62%
-- Flow 1:
Average throughput: 1.96 Mbit/s
95th percentile per-packet one-way delay: 3570.472 ms
Loss rate: 13.26%
-- Flow 2:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 4102.230 ms
Loss rate: 22.93%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 4713.737 ms
Loss rate: 60.08%
```
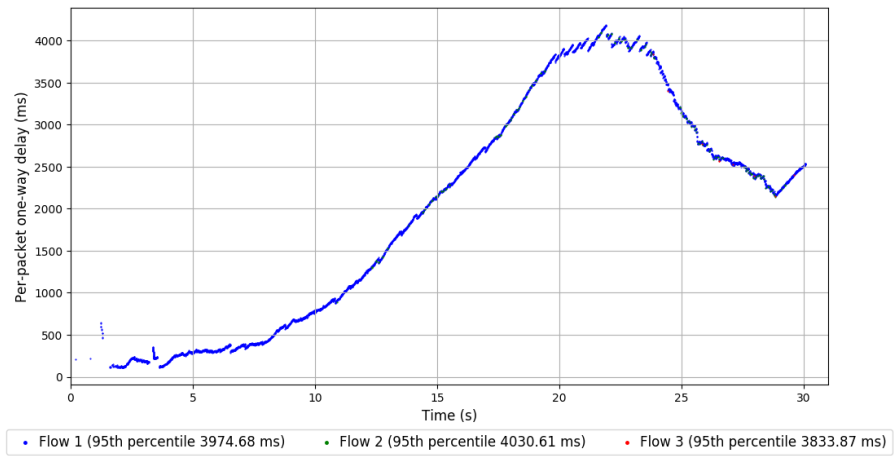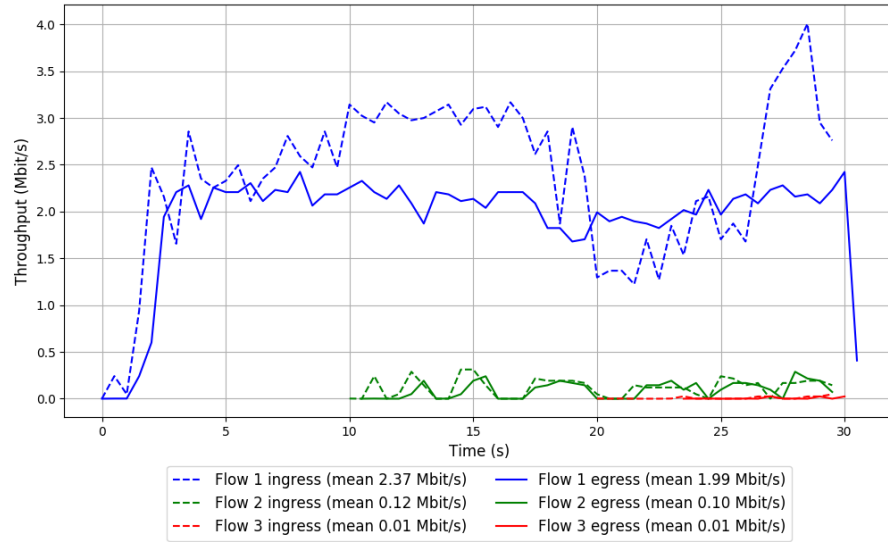
Run 2: Report of TCP Cubic — Data Link

```
Run 3: Statistics of TCP Cubic

Start at: 2018-09-06 08:21:43
End at: 2018-09-06 08:22:13
Local clock offset: 2.166 ms
Remote clock offset: 1.25 ms


# Below is generated by plot.py at 2018-09-06 08:39:43
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.06 Mbit/s
95th percentile per-packet one-way delay: 3977.580 ms
Loss rate: 16.53%
-- Flow 1:
Average throughput: 1.99 Mbit/s
95th percentile per-packet one-way delay: 3974.685 ms
Loss rate: 16.25%
-- Flow 2:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 4030.607 ms
Loss rate: 23.48%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 3833.870 ms
Loss rate: 54.29%
```

Run 3: Report of TCP Cubic — Data Link

```
Run 1: Statistics of FillP

Start at: 2018-09-06 07:35:02
End at: 2018-09-06 07:35:32
Local clock offset: 8.737 ms
Remote clock offset: 1.503 ms


# Below is generated by plot.py at 2018-09-06 08:39:56
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.65 Mbit/s
95th percentile per-packet one-way delay: 4612.557 ms
Loss rate: 93.39%
-- Flow 1:
Average throughput: 1.63 Mbit/s
95th percentile per-packet one-way delay: 4614.475 ms
Loss rate: 93.44%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 4225.448 ms
Loss rate: 15.97%
-- Flow 3:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 3267.152 ms
Loss rate: 83.99%
```
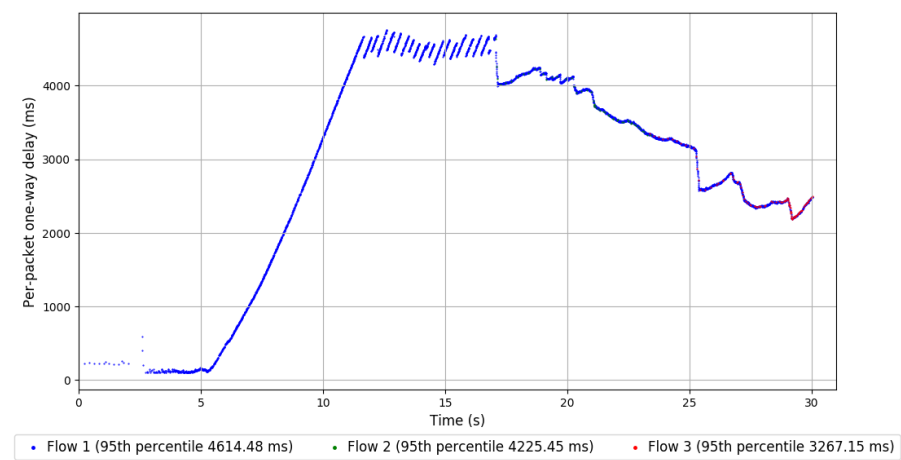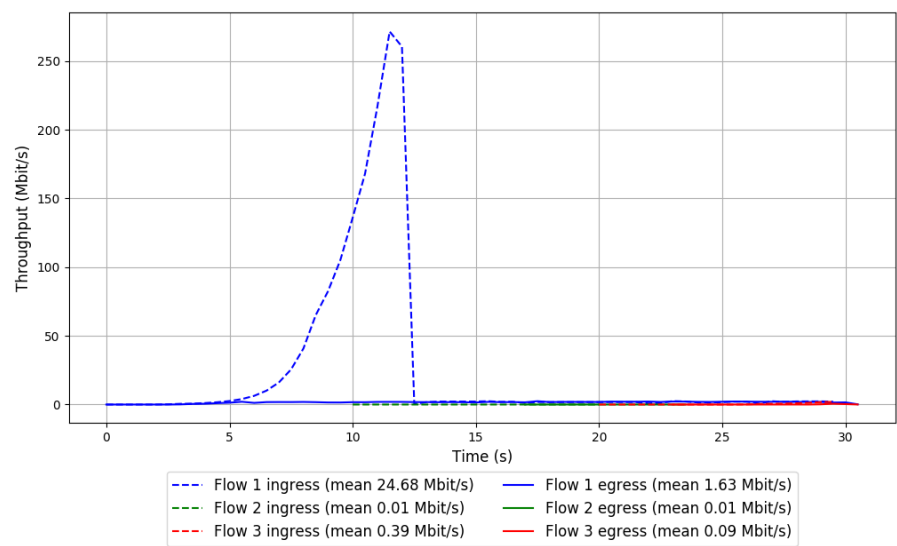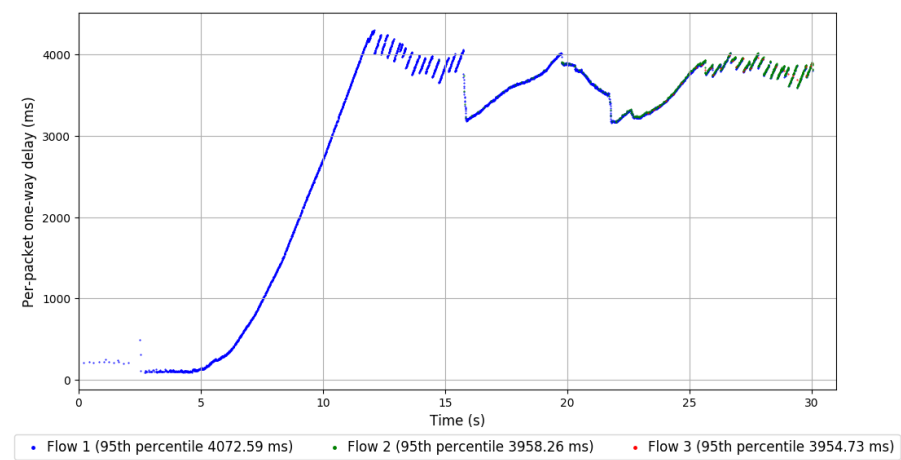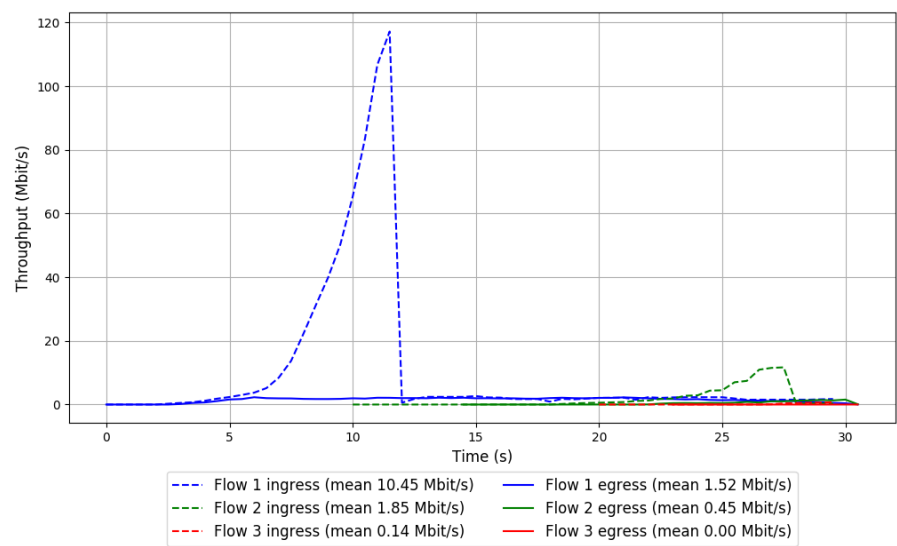
Run 1: Report of FillP — Data Link

Flow 1 ingress (mean 24.68 Mbit/s)   Flow 1 egress (mean 1.63 Mbit/s)
Flow 2 ingress (mean 0.01 Mbit/s)   Flow 2 egress (mean 0.01 Mbit/s)
Flow 3 ingress (mean 0.39 Mbit/s)   Flow 3 egress (mean 0.09 Mbit/s)

• Flow 1 (95th percentile 4614.48 ms)   • Flow 2 (95th percentile 4225.45 ms)   • Flow 3 (95th percentile 3267.15 ms)

```
Run 2: Statistics of FillP

Start at: 2018-09-06 07:57:05
End at: 2018-09-06 07:57:35
Local clock offset: 5.274 ms
Remote clock offset: 1.533 ms


# Below is generated by plot.py at 2018-09-06 08:39:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.76 Mbit/s
95th percentile per-packet one-way delay: 4051.196 ms
Loss rate: 85.09%
-- Flow 1:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 4072.589 ms
Loss rate: 85.47%
-- Flow 2:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 3958.264 ms
Loss rate: 81.34%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 3954.731 ms
Loss rate: 98.05%
```
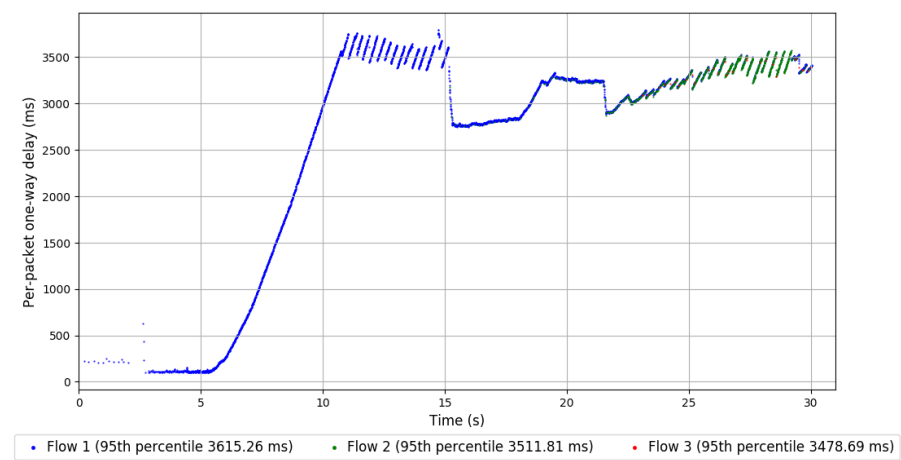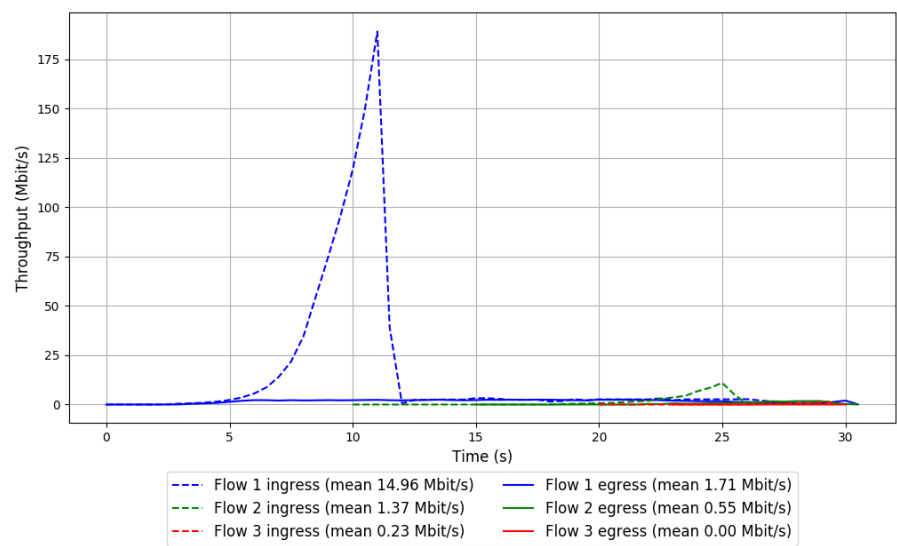
Run 2: Report of FillP — Data Link

Flow 1 ingress (mean 10.45 Mbit/s) --- Flow 1 egress (mean 1.52 Mbit/s)
Flow 2 ingress (mean 1.85 Mbit/s) --- Flow 2 egress (mean 0.45 Mbit/s)
Flow 3 ingress (mean 0.14 Mbit/s) --- Flow 3 egress (mean 0.00 Mbit/s)

• Flow 1 (95th percentile 4072.59 ms) • Flow 2 (95th percentile 3958.26 ms) • Flow 3 (95th percentile 3954.73 ms)

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```
Run 3: Statistics of FillP

Start at: 2018-09-06 08:19:14
End at: 2018-09-06 08:19:44
Local clock offset: 2.867 ms
Remote clock offset: 1.375 ms


# Below is generated by plot.py at 2018-09-06 08:39:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 3605.069 ms
Loss rate: 87.63%
-- Flow 1:
Average throughput: 1.71 Mbit/s
95th percentile per-packet one-way delay: 3615.256 ms
Loss rate: 88.62%
-- Flow 2:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 3511.812 ms
Loss rate: 70.50%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 3478.690 ms
Loss rate: 98.69%
```
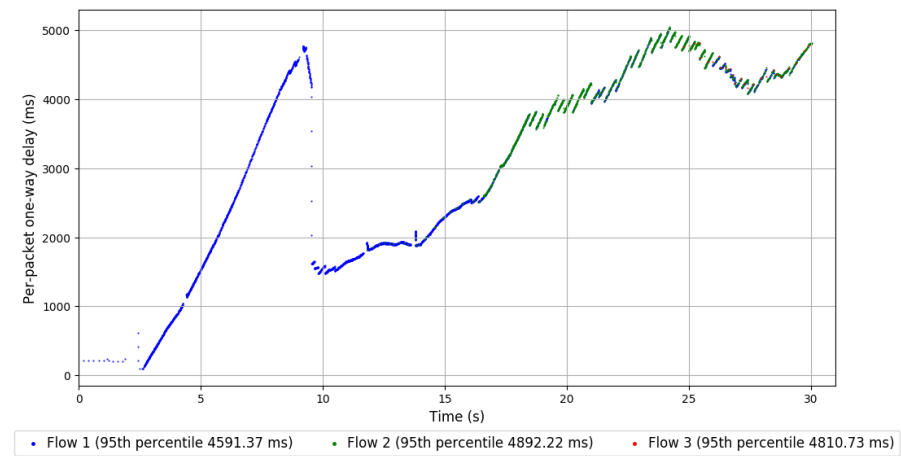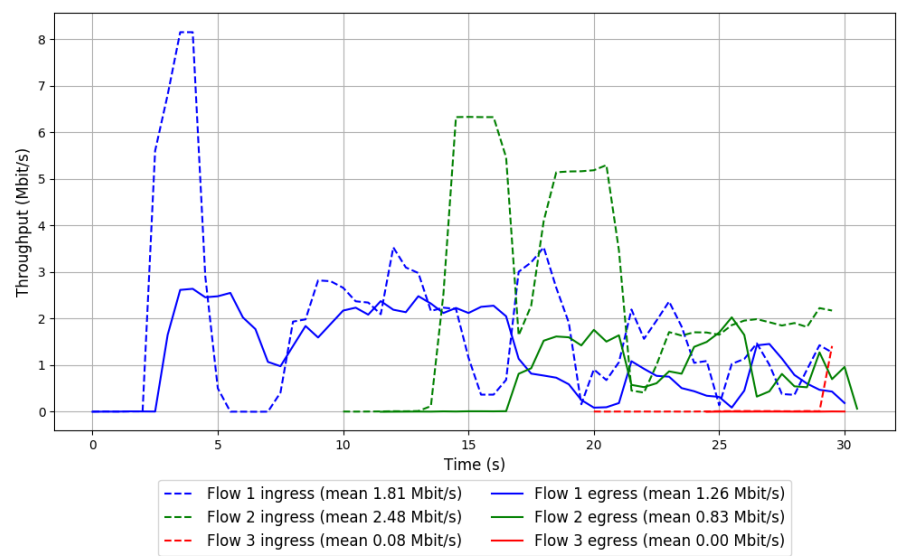
Run 3: Report of FillP — Data Link

Flow 1 ingress (mean 14.96 Mbit/s)   Flow 1 egress (mean 1.71 Mbit/s)
Flow 2 ingress (mean 1.37 Mbit/s)   Flow 2 egress (mean 0.55 Mbit/s)
Flow 3 ingress (mean 0.23 Mbit/s)   Flow 3 egress (mean 0.00 Mbit/s)

Flow 1 (95th percentile 3615.26 ms)   Flow 2 (95th percentile 3511.81 ms)   Flow 3 (95th percentile 3478.69 ms)

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```
Run 1: Statistics of FillP-Sheep

Start at: 2018-09-06 07:44:54
End at: 2018-09-06 07:45:24
Local clock offset: 9.125 ms
Remote clock offset: 2.829 ms


# Below is generated by plot.py at 2018-09-06 08:39:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.76 Mbit/s
95th percentile per-packet one-way delay: 4805.645 ms
Loss rate: 49.71%
-- Flow 1:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 4591.373 ms
Loss rate: 31.07%
-- Flow 2:
Average throughput: 0.83 Mbit/s
95th percentile per-packet one-way delay: 4892.223 ms
Loss rate: 69.45%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 4810.729 ms
Loss rate: 97.08%
```
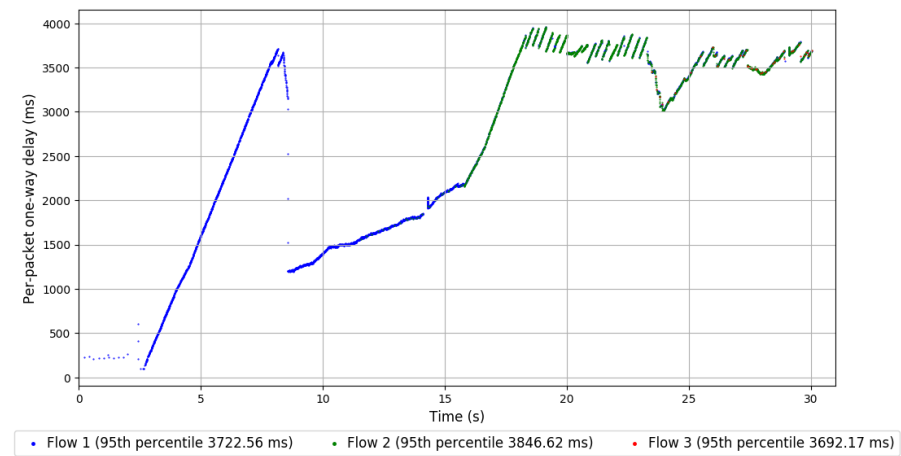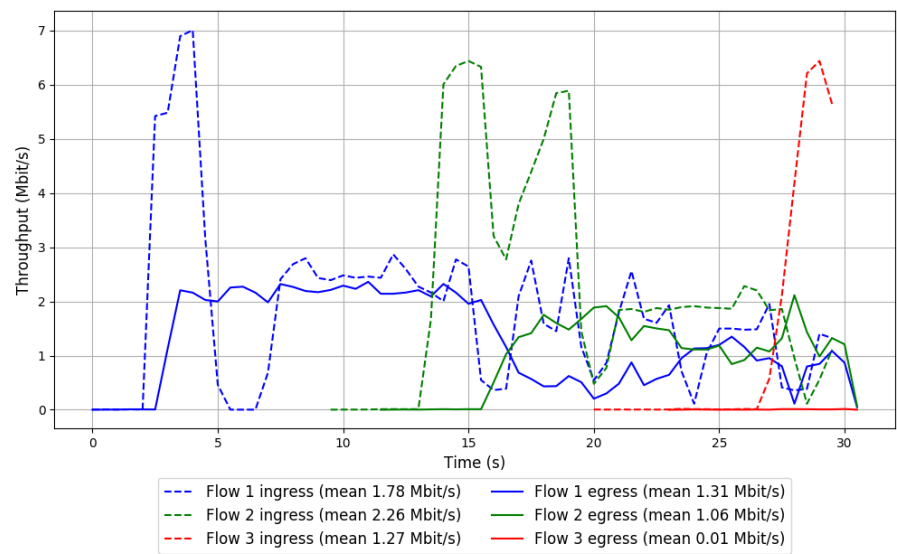
Run 1: Report of FillP-Sheep — Data Link

```
Run 2: Statistics of FillP-Sheep

Start at: 2018-09-06 08:07:01
End at: 2018-09-06 08:07:31
Local clock offset: 4.406 ms
Remote clock offset: 1.49 ms

# Below is generated by plot.py at 2018-09-06 08:39:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.97 Mbit/s
95th percentile per-packet one-way delay: 3796.930 ms
Loss rate: 47.07%
-- Flow 1:
Average throughput: 1.31 Mbit/s
95th percentile per-packet one-way delay: 3722.560 ms
Loss rate: 26.63%
-- Flow 2:
Average throughput: 1.06 Mbit/s
95th percentile per-packet one-way delay: 3846.621 ms
Loss rate: 56.54%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 3692.166 ms
Loss rate: 99.66%
```
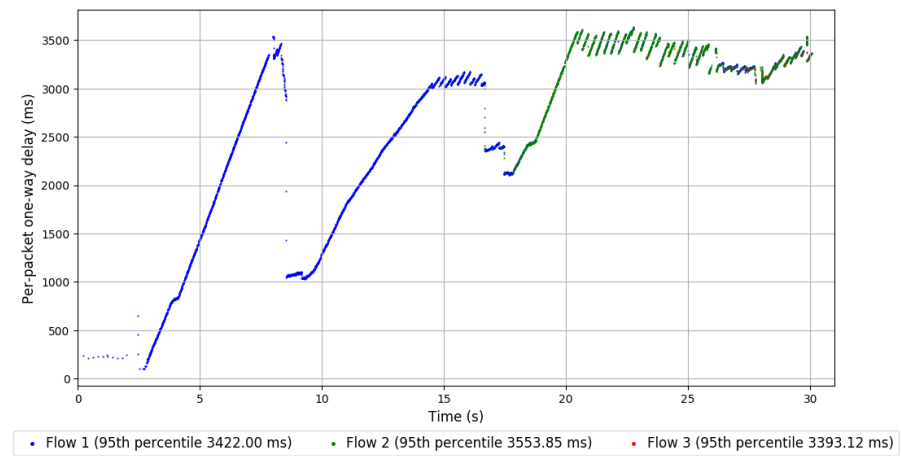
Run 2: Report of FillP-Sheep — Data Link

```
Run 3: Statistics of FillP-Sheep

Start at: 2018-09-06 08:29:04
End at: 2018-09-06 08:29:34
Local clock offset: 1.088 ms
Remote clock offset: 1.063 ms


# Below is generated by plot.py at 2018-09-06 08:39:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.11 Mbit/s
95th percentile per-packet one-way delay: 3516.456 ms
Loss rate: 51.57%
-- Flow 1:
Average throughput: 1.46 Mbit/s
95th percentile per-packet one-way delay: 3422.003 ms
Loss rate: 25.73%
-- Flow 2:
Average throughput: 1.10 Mbit/s
95th percentile per-packet one-way delay: 3553.846 ms
Loss rate: 64.67%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 3393.125 ms
Loss rate: 99.74%
```
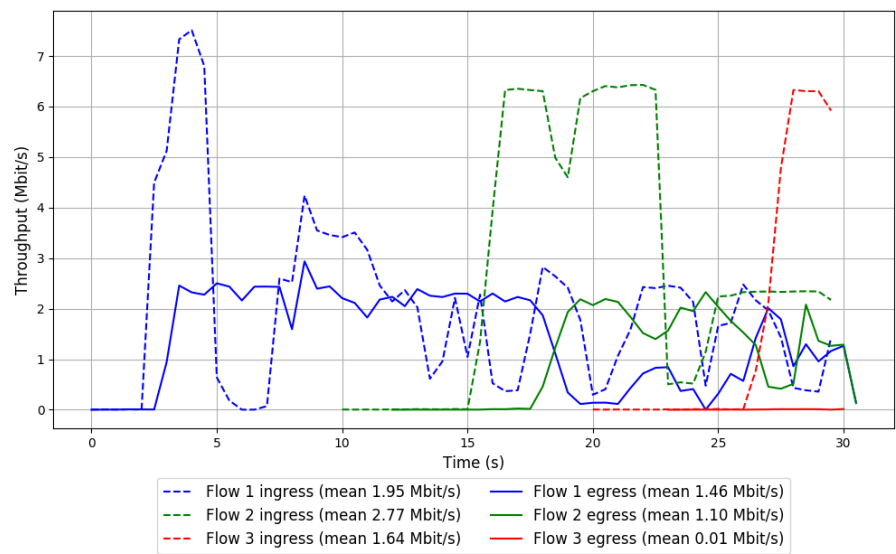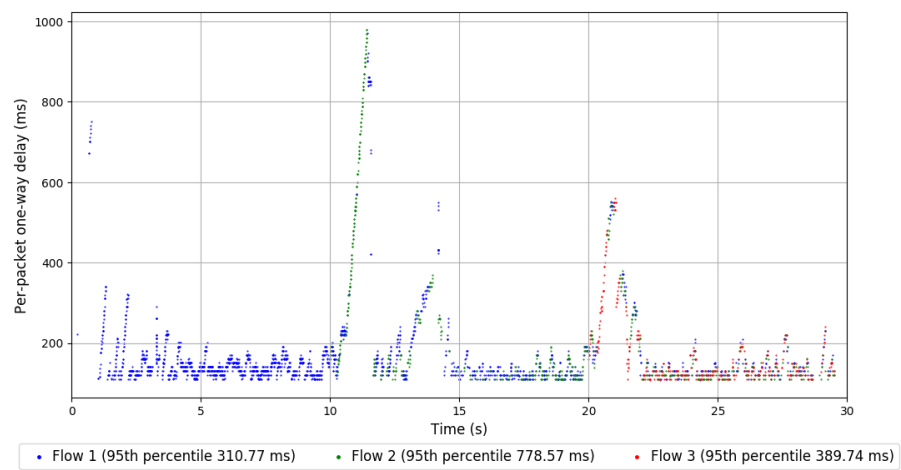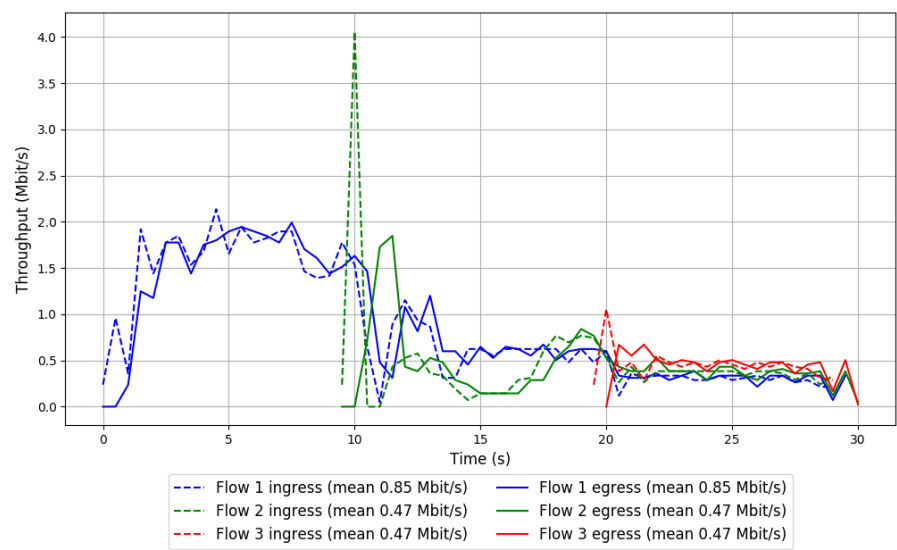
Run 3: Report of FillP-Sheep — Data Link

Flow 1 ingress (mean 1.95 Mbit/s)
Flow 1 egress (mean 1.46 Mbit/s)
Flow 2 ingress (mean 2.77 Mbit/s)
Flow 2 egress (mean 1.10 Mbit/s)
Flow 3 ingress (mean 1.64 Mbit/s)
Flow 3 egress (mean 0.01 Mbit/s)

Flow 1 (95th percentile 3422.00 ms)
Flow 2 (95th percentile 3553.85 ms)
Flow 3 (95th percentile 3393.12 ms)

```
Run 1: Statistics of Indigo

Start at: 2018-09-06 07:49:46
End at: 2018-09-06 07:50:16
Local clock offset: 7.58 ms
Remote clock offset: 0.325 ms


# Below is generated by plot.py at 2018-09-06 08:39:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 508.775 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 0.85 Mbit/s
95th percentile per-packet one-way delay: 310.770 ms
Loss rate: 0.10%
-- Flow 2:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 778.570 ms
Loss rate: 0.26%
-- Flow 3:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 389.739 ms
Loss rate: 0.00%
```
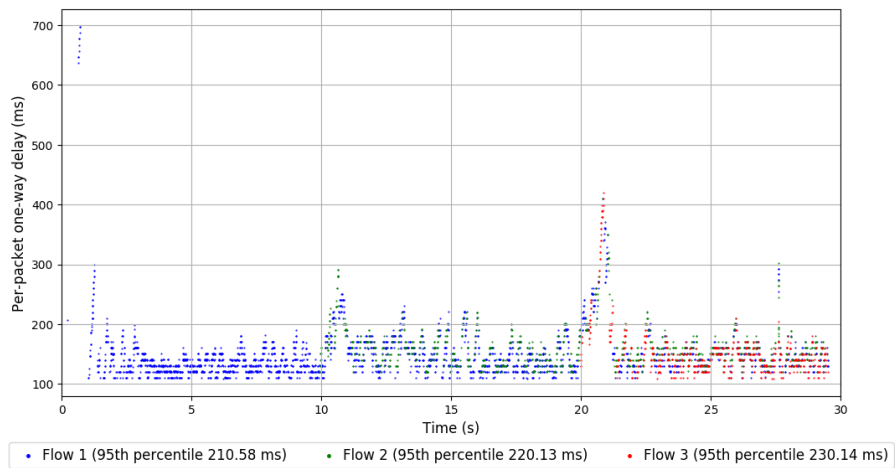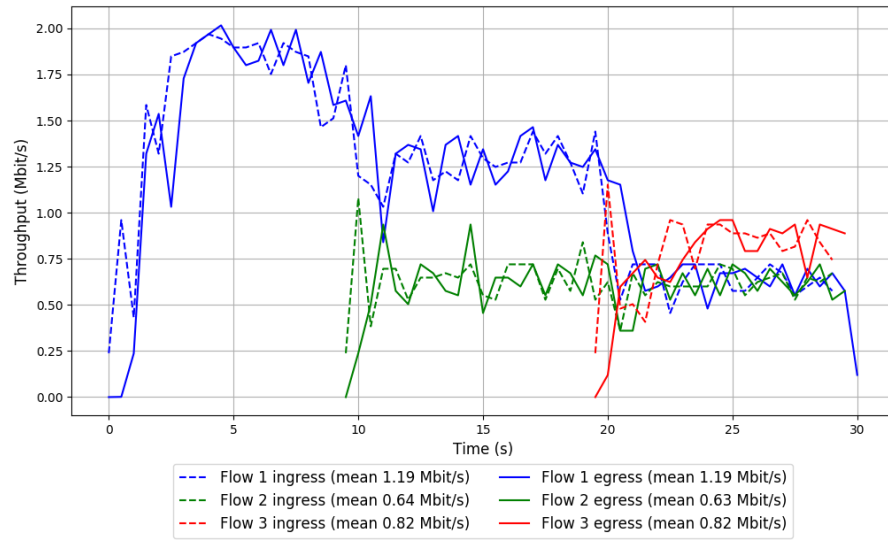
Run 1: Report of Indigo — Data Link

- Flow 1 ingress (mean 0.85 Mbit/s)
- Flow 1 egress (mean 0.85 Mbit/s)
- Flow 2 ingress (mean 0.47 Mbit/s)
- Flow 2 egress (mean 0.47 Mbit/s)
- Flow 3 ingress (mean 0.47 Mbit/s)
- Flow 3 egress (mean 0.47 Mbit/s)

- Flow 1 (95th percentile 310.77 ms)
- Flow 2 (95th percentile 778.57 ms)
- Flow 3 (95th percentile 389.74 ms)

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```
Run 2: Statistics of Indigo

Start at: 2018-09-06 08:11:53
End at: 2018-09-06 08:12:23
Local clock offset: 4.146 ms
Remote clock offset: 0.12 ms

# Below is generated by plot.py at 2018-09-06 08:39:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.88 Mbit/s
95th percentile per-packet one-way delay: 211.300 ms
Loss rate: 0.39%
-- Flow 1:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 210.583 ms
Loss rate: 0.03%
-- Flow 2:
Average throughput: 0.63 Mbit/s
95th percentile per-packet one-way delay: 220.130 ms
Loss rate: 1.15%
-- Flow 3:
Average throughput: 0.82 Mbit/s
95th percentile per-packet one-way delay: 230.140 ms
Loss rate: 0.77%
```
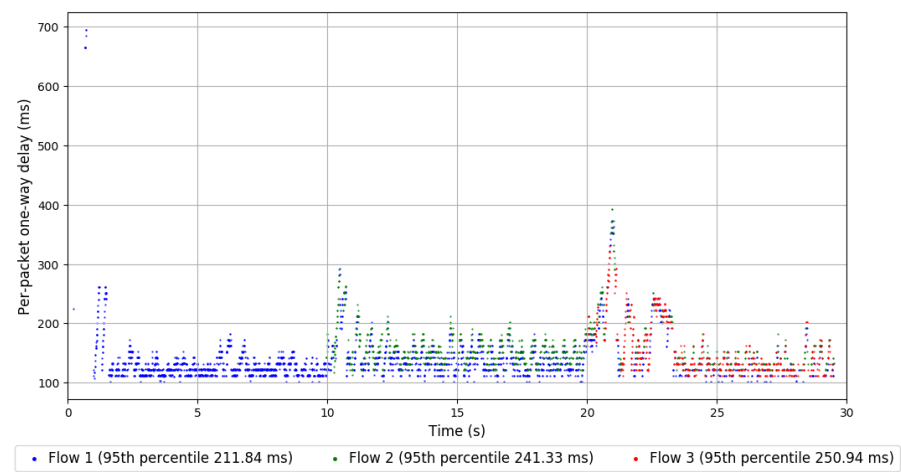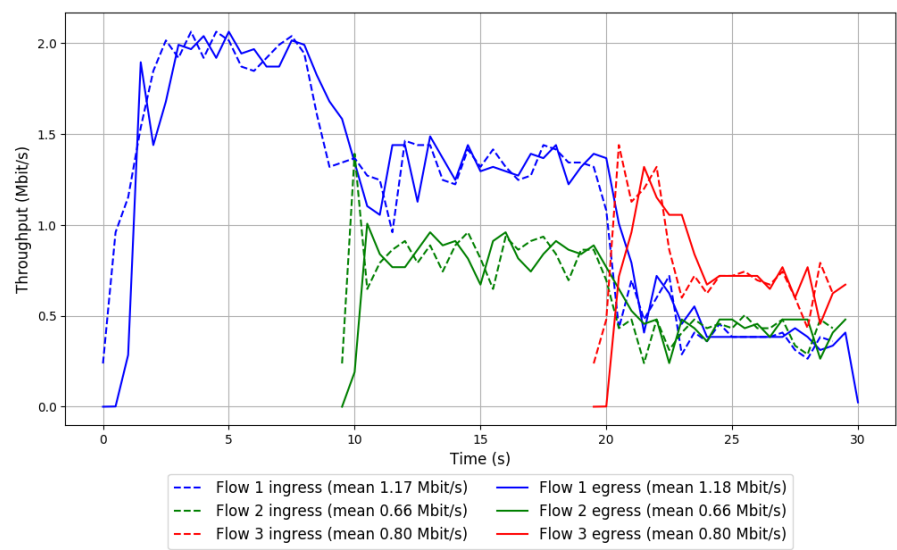
Run 2: Report of Indigo — Data Link

```
Run 3: Statistics of Indigo

Start at: 2018-09-06 08:33:57
End at: 2018-09-06 08:34:27
Local clock offset: 0.457 ms
Remote clock offset: 1.045 ms


# Below is generated by plot.py at 2018-09-06 08:39:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.87 Mbit/s
95th percentile per-packet one-way delay: 231.852 ms
Loss rate: 0.20%
-- Flow 1:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 211.842 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 241.332 ms
Loss rate: 0.19%
-- Flow 3:
Average throughput: 0.80 Mbit/s
95th percentile per-packet one-way delay: 250.942 ms
Loss rate: 1.09%
```
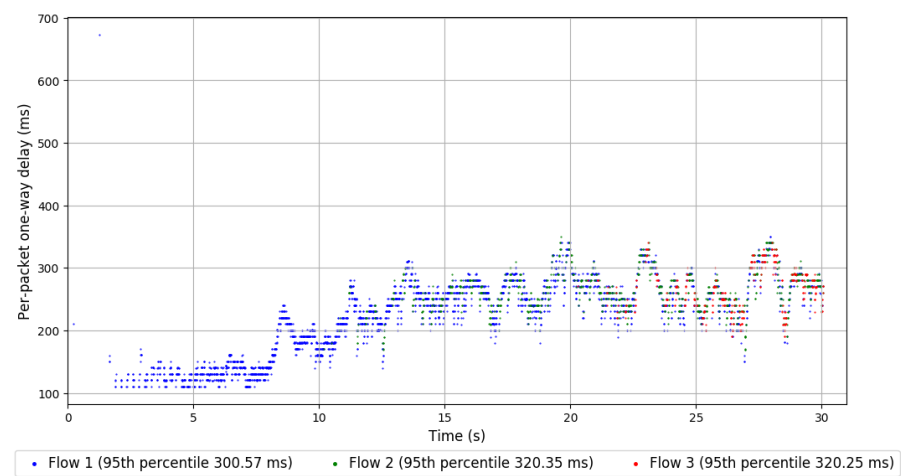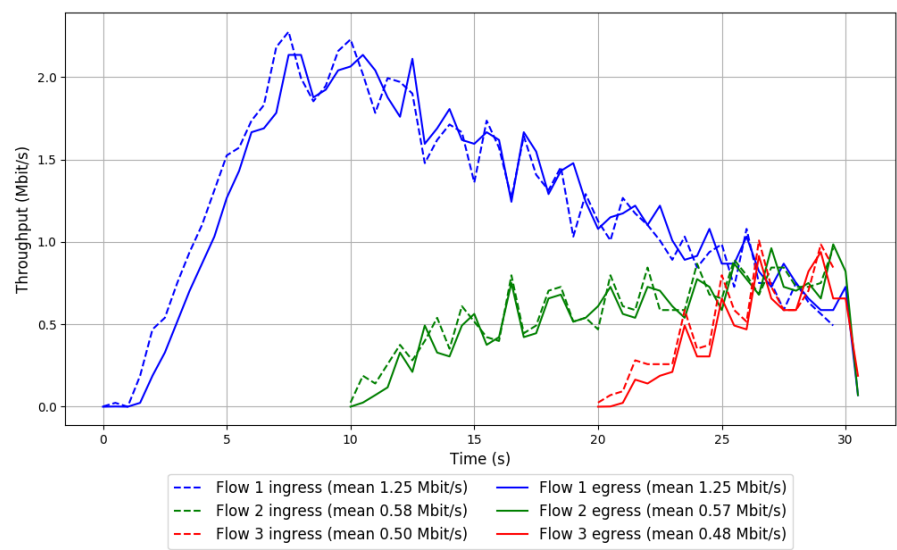
Run 3: Report of Indigo — Data Link

```
Run 1: Statistics of LEDBAT

Start at: 2018-09-06 07:43:41
End at: 2018-09-06 07:44:11
Local clock offset: 9.117 ms
Remote clock offset: 1.459 ms

# Below is generated by plot.py at 2018-09-06 08:39:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.79 Mbit/s
95th percentile per-packet one-way delay: 310.540 ms
Loss rate: 0.83%
-- Flow 1:
Average throughput: 1.25 Mbit/s
95th percentile per-packet one-way delay: 300.571 ms
Loss rate: 0.09%
-- Flow 2:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 320.347 ms
Loss rate: 1.62%
-- Flow 3:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 320.245 ms
Loss rate: 4.50%
```

Run 1: Report of LEDBAT — Data Link

```
Run 2: Statistics of LEDBAT

Start at: 2018-09-06 08:05:48
End at: 2018-09-06 08:06:18
Local clock offset: 5.242 ms
Remote clock offset: 1.393 ms


# Below is generated by plot.py at 2018-09-06 08:39:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.74 Mbit/s
95th percentile per-packet one-way delay: 299.037 ms
Loss rate: 0.67%
-- Flow 1:
Average throughput: 1.33 Mbit/s
95th percentile per-packet one-way delay: 289.698 ms
Loss rate: 0.35%
-- Flow 2:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 299.150 ms
Loss rate: 0.26%
-- Flow 3:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 288.936 ms
Loss rate: 5.50%
```
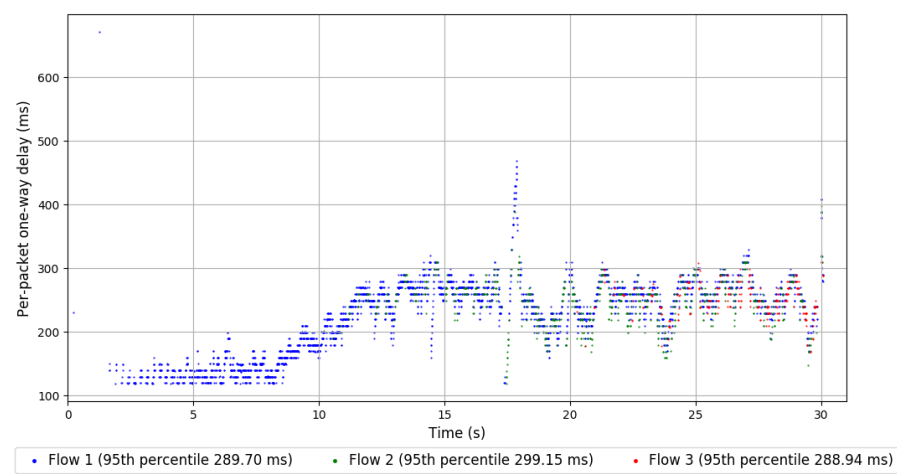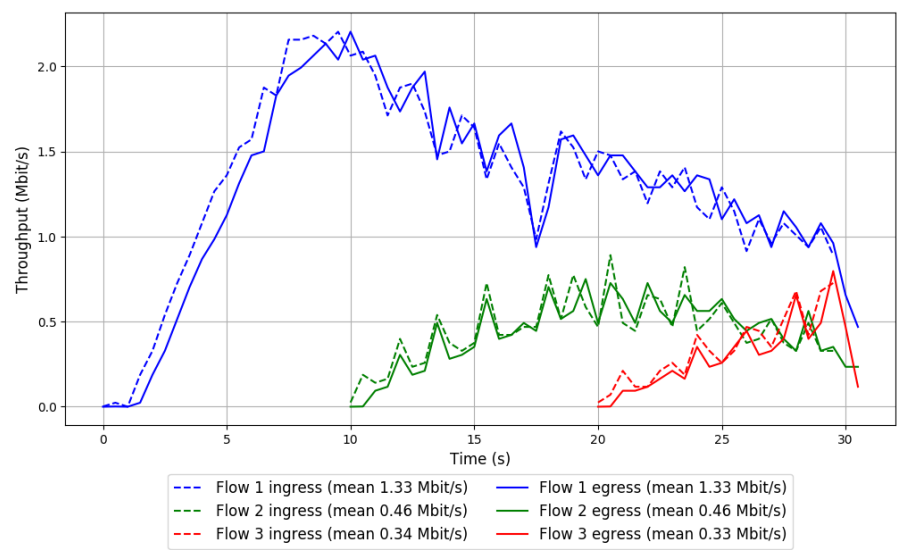
Run 2: Report of LEDBAT — Data Link

```
Run 3: Statistics of LEDBAT

Start at: 2018-09-06 08:27:51
End at: 2018-09-06 08:28:21
Local clock offset: 1.243 ms
Remote clock offset: 1.199 ms


# Below is generated by plot.py at 2018-09-06 08:39:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.90 Mbit/s
95th percentile per-packet one-way delay: 299.172 ms
Loss rate: 0.54%
-- Flow 1:
Average throughput: 1.33 Mbit/s
95th percentile per-packet one-way delay: 289.060 ms
Loss rate: 0.03%
-- Flow 2:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 309.270 ms
Loss rate: 0.45%
-- Flow 3:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 319.178 ms
Loss rate: 5.42%
```
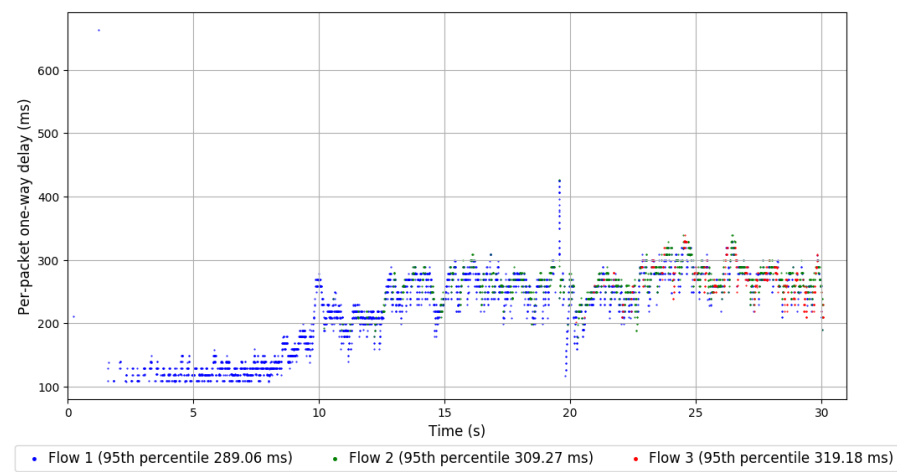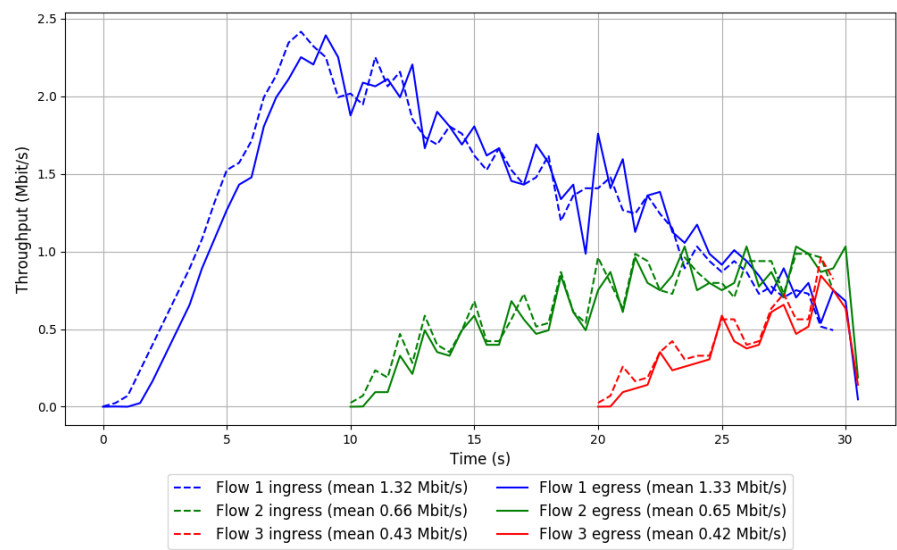
Run 3: Report of LEDBAT — Data Link

```
Run 1: Statistics of Indigo-Muses

Start at: 2018-09-06 07:36:16
End at: 2018-09-06 07:36:46
Local clock offset: 7.959 ms
Remote clock offset: 1.854 ms

# Below is generated by plot.py at 2018-09-06 08:39:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.89 Mbit/s
95th percentile per-packet one-way delay: 3785.677 ms
Loss rate: 86.59%
-- Flow 1:
Average throughput: 0.81 Mbit/s
95th percentile per-packet one-way delay: 3785.790 ms
Loss rate: 86.45%
-- Flow 2:
Average throughput: 1.13 Mbit/s
95th percentile per-packet one-way delay: 3466.041 ms
Loss rate: 80.94%
-- Flow 3:
Average throughput: 1.54 Mbit/s
95th percentile per-packet one-way delay: 3945.693 ms
Loss rate: 92.08%
```
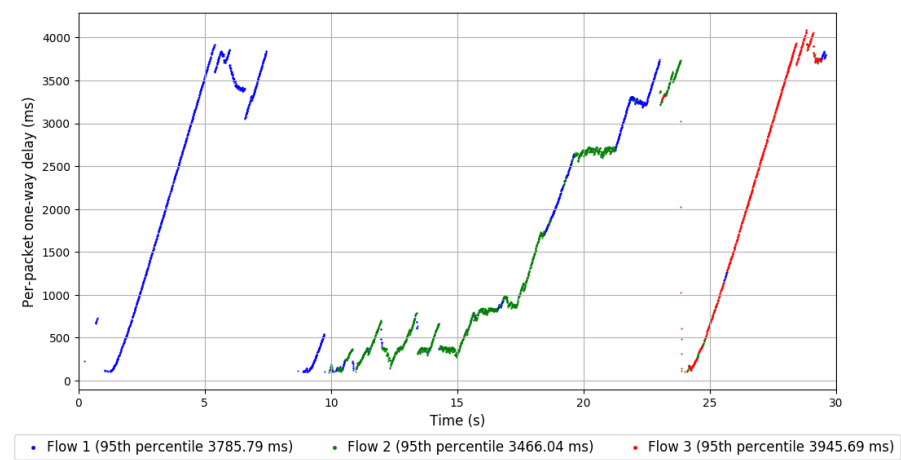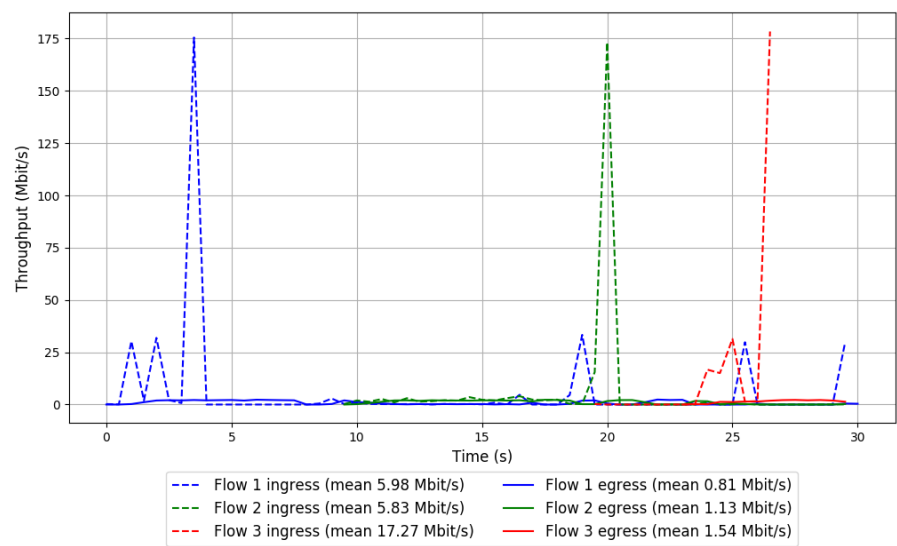
Run 1: Report of Indigo-Muses — Data Link

```
Run 2: Statistics of Indigo-Muses

Start at: 2018-09-06 07:58:18
End at: 2018-09-06 07:58:48
Local clock offset: 5.055 ms
Remote clock offset: 2.448 ms


# Below is generated by plot.py at 2018-09-06 08:39:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.74 Mbit/s
95th percentile per-packet one-way delay: 3543.806 ms
Loss rate: 70.71%
-- Flow 1:
Average throughput: 0.78 Mbit/s
95th percentile per-packet one-way delay: 3623.818 ms
Loss rate: 82.70%
-- Flow 2:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 813.772 ms
Loss rate: 0.35%
-- Flow 3:
Average throughput: 1.95 Mbit/s
95th percentile per-packet one-way delay: 3454.766 ms
Loss rate: 44.71%
```
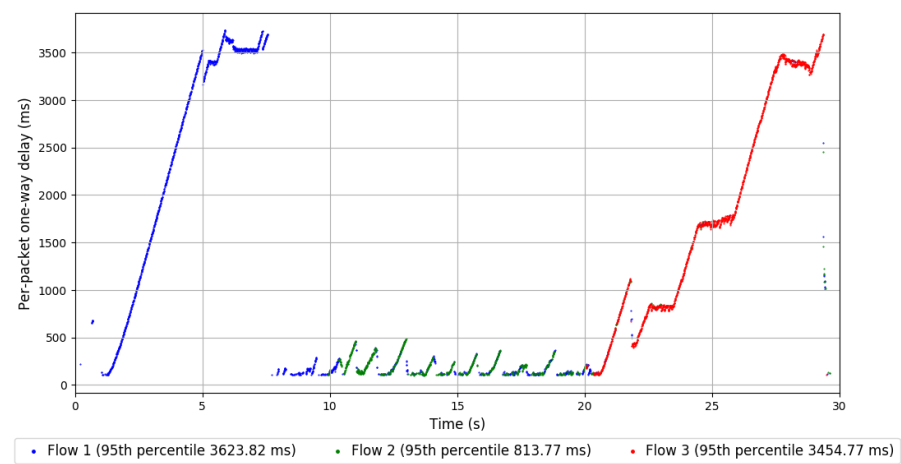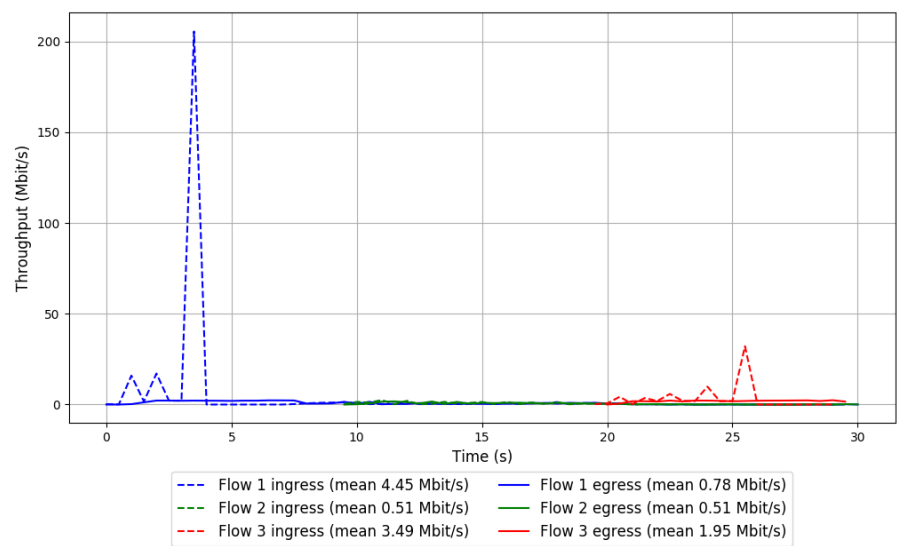
Run 2: Report of Indigo-Muses — Data Link

```
Run 3: Statistics of Indigo-Muses

Start at: 2018-09-06 08:20:29
End at: 2018-09-06 08:20:59
Local clock offset: 3.304 ms
Remote clock offset: 0.097 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.93 Mbit/s
95th percentile per-packet one-way delay: 3785.366 ms
Loss rate: 96.28%
-- Flow 1:
Average throughput: 0.95 Mbit/s
95th percentile per-packet one-way delay: 3792.713 ms
Loss rate: 94.74%
-- Flow 2:
Average throughput: 1.56 Mbit/s
95th percentile per-packet one-way delay: 3784.280 ms
Loss rate: 97.08%
-- Flow 3:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 3584.485 ms
Loss rate: 98.18%
```
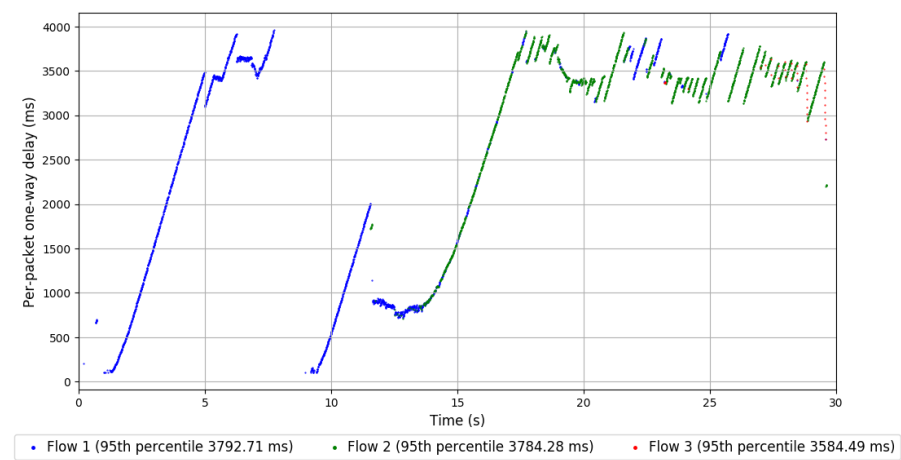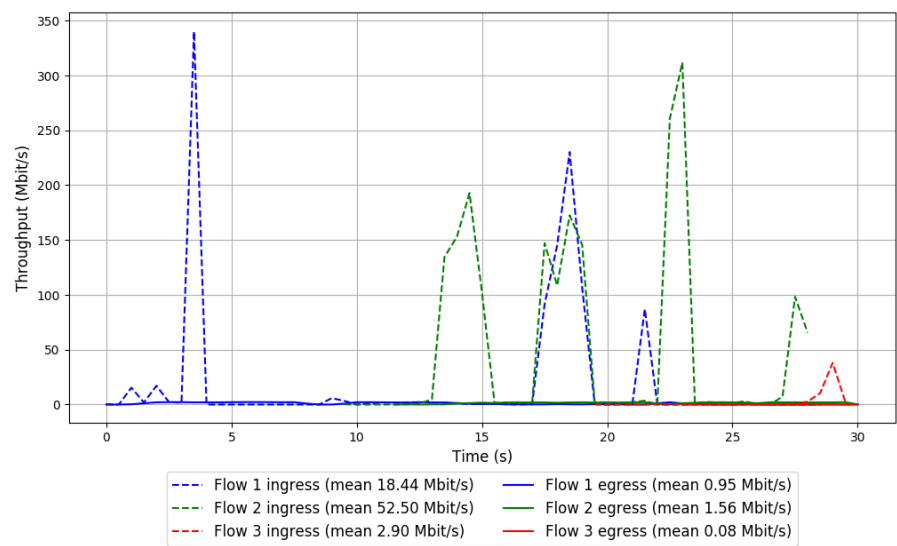
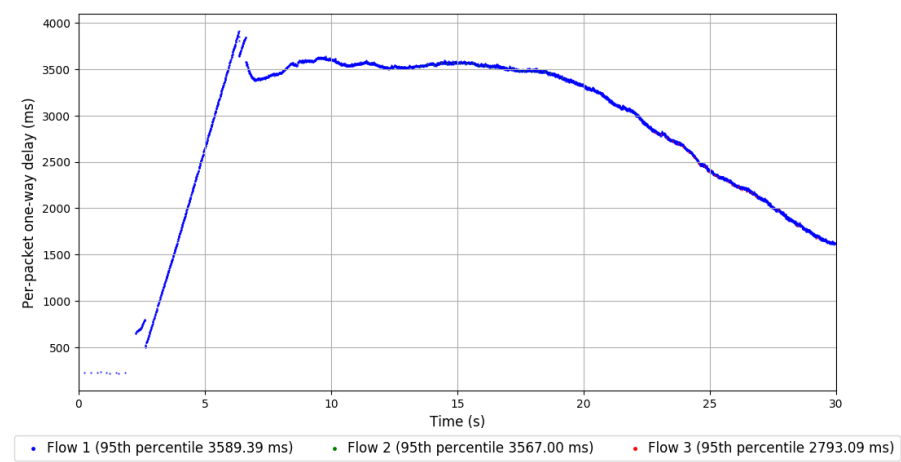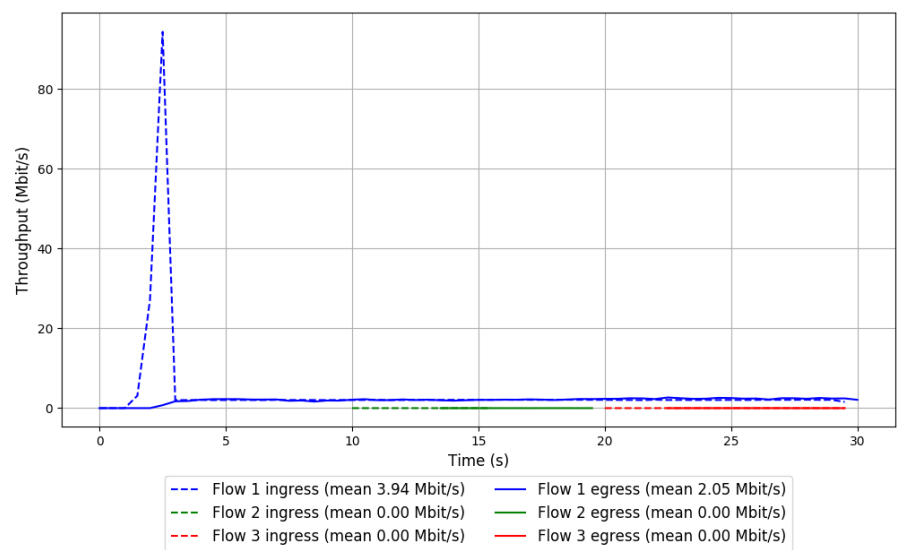Run 3: Report of Indigo-Muses — Data Link

```
Run 1: Statistics of PCC-Allegro

Start at: 2018-09-06 07:52:12
End at: 2018-09-06 07:52:42
Local clock offset: 6.193 ms
Remote clock offset: 1.679 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 3589.213 ms
Loss rate: 48.35%
-- Flow 1:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 3589.389 ms
Loss rate: 48.36%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 3567.001 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 2793.089 ms
Loss rate: 7.73%
```

Run 1: Report of PCC-Allegro — Data Link

Flow 1 ingress (mean 3.94 Mbit/s) --- Flow 1 egress (mean 2.05 Mbit/s)
Flow 2 ingress (mean 0.00 Mbit/s) --- Flow 2 egress (mean 0.00 Mbit/s)
Flow 3 ingress (mean 0.00 Mbit/s) --- Flow 3 egress (mean 0.00 Mbit/s)

Flow 1 (95th percentile 3589.39 ms) • Flow 2 (95th percentile 3567.00 ms) • Flow 3 (95th percentile 2793.09 ms)

```
Run 2: Statistics of PCC-Allegro

Start at: 2018-09-06 08:14:20
End at: 2018-09-06 08:14:50
Local clock offset: 4.052 ms
Remote clock offset: 1.216 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.33 Mbit/s
95th percentile per-packet one-way delay: 3323.134 ms
Loss rate: 81.89%
-- Flow 1:
Average throughput: 1.53 Mbit/s
95th percentile per-packet one-way delay: 3303.237 ms
Loss rate: 52.45%
-- Flow 2:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 3345.755 ms
Loss rate: 91.67%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 3375.813 ms
Loss rate: 5.60%
```
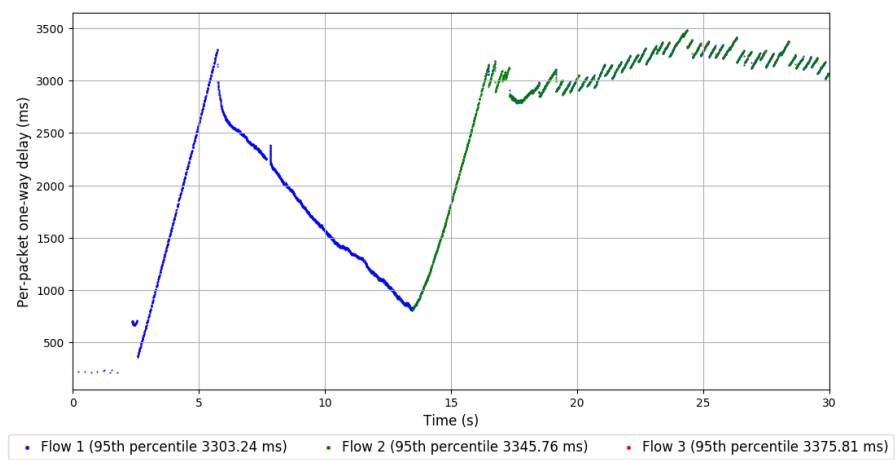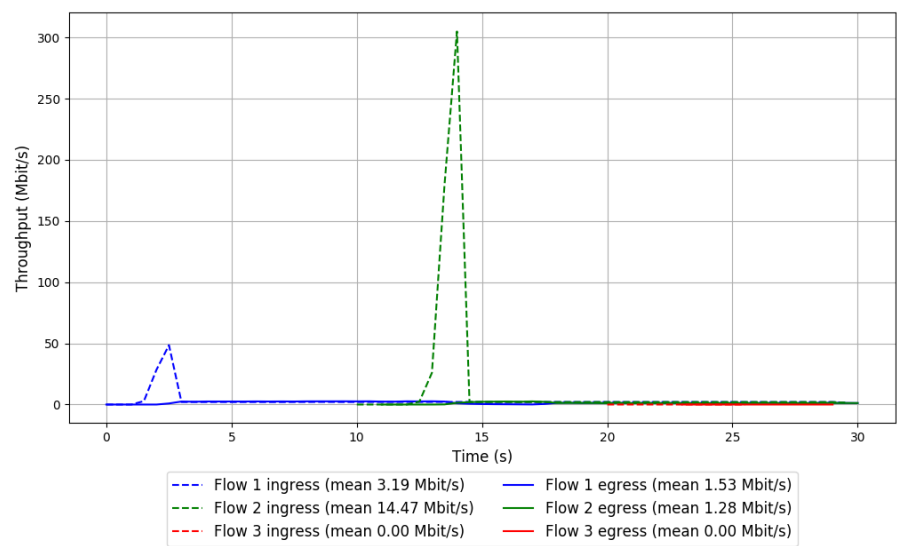
Run 2: Report of PCC-Allegro — Data Link

Flow 1 ingress (mean 3.19 Mbit/s)   Flow 1 egress (mean 1.53 Mbit/s)
Flow 2 ingress (mean 14.47 Mbit/s)   Flow 2 egress (mean 1.28 Mbit/s)
Flow 3 ingress (mean 0.00 Mbit/s)   Flow 3 egress (mean 0.00 Mbit/s)

Flow 1 (95th percentile 3303.24 ms)   Flow 2 (95th percentile 3345.76 ms)   Flow 3 (95th percentile 3375.81 ms)

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```
Run 3: Statistics of PCC-Allegro

Start at: 2018-09-06 08:36:24
End at: 2018-09-06 08:36:54
Local clock offset: 0.241 ms
Remote clock offset: 1.047 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.15 Mbit/s
95th percentile per-packet one-way delay: 3345.460 ms
Loss rate: 94.23%
-- Flow 1:
Average throughput: 1.77 Mbit/s
95th percentile per-packet one-way delay: 3236.577 ms
Loss rate: 62.74%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 2185.867 ms
Loss rate: 13.57%
-- Flow 3:
Average throughput: 1.29 Mbit/s
95th percentile per-packet one-way delay: 3403.440 ms
Loss rate: 98.85%
```
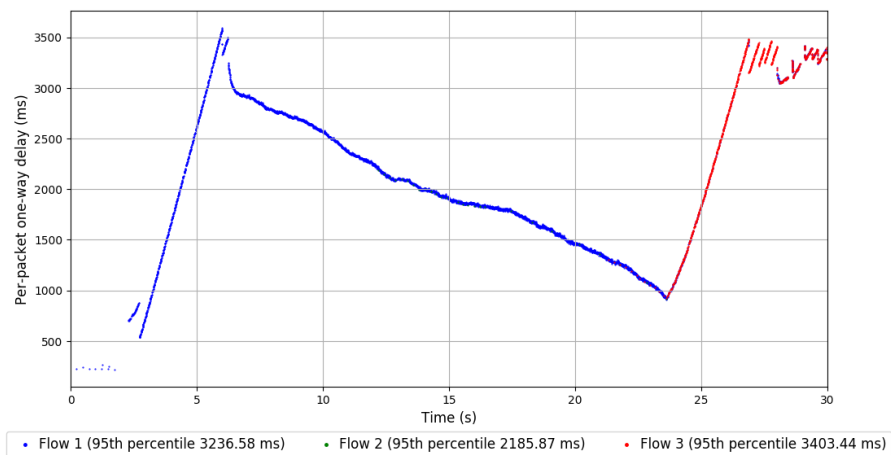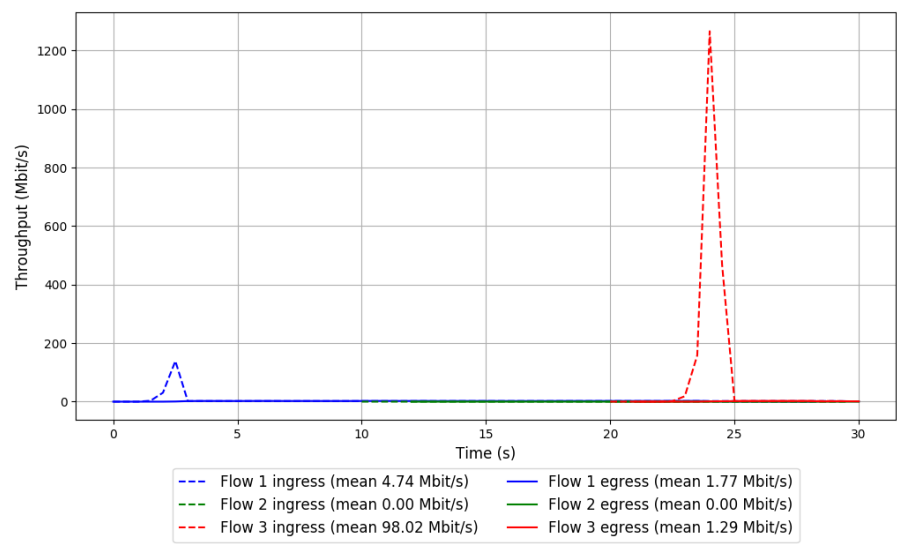
Run 3: Report of PCC-Allegro — Data Link

Flow 1 ingress (mean 4.74 Mbit/s)   Flow 1 egress (mean 1.77 Mbit/s)
Flow 2 ingress (mean 0.00 Mbit/s)   Flow 2 egress (mean 0.00 Mbit/s)
Flow 3 ingress (mean 98.02 Mbit/s)   Flow 3 egress (mean 1.29 Mbit/s)

Flow 1 (95th percentile 3236.58 ms) Flow 2 (95th percentile 2185.87 ms) Flow 3 (95th percentile 3403.44 ms)
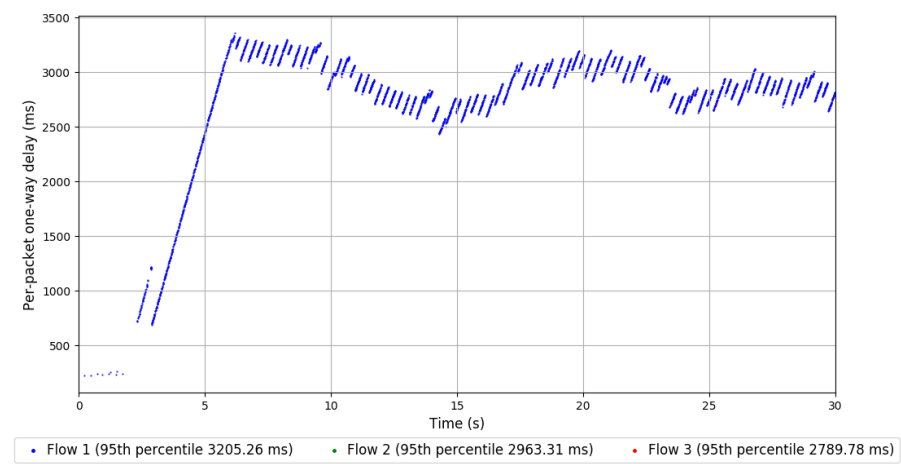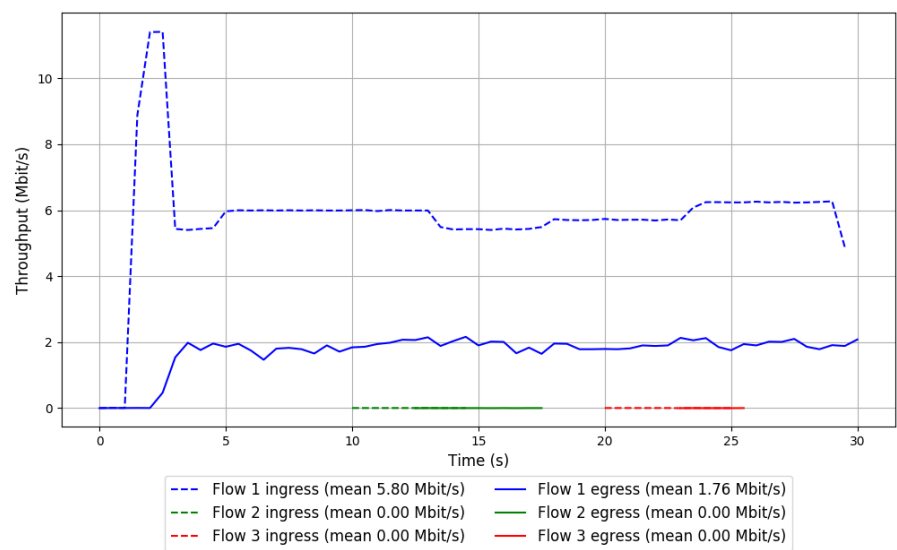
```
Run 1: Statistics of PCC-Expr

Start at: 2018-09-06 07:42:27
End at: 2018-09-06 07:42:57
Local clock offset: 8.303 ms
Remote clock offset: 1.516 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.76 Mbit/s
95th percentile per-packet one-way delay: 3205.263 ms
Loss rate: 69.86%
-- Flow 1:
Average throughput: 1.76 Mbit/s
95th percentile per-packet one-way delay: 3205.263 ms
Loss rate: 69.87%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 2963.312 ms
Loss rate: 52.16%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 2789.779 ms
Loss rate: 80.84%
```

Run 1: Report of PCC-Expr — Data Link

Flow 1 ingress (mean 5.80 Mbit/s)   Flow 1 egress (mean 1.76 Mbit/s)
Flow 2 ingress (mean 0.00 Mbit/s)   Flow 2 egress (mean 0.00 Mbit/s)
Flow 3 ingress (mean 0.00 Mbit/s)   Flow 3 egress (mean 0.00 Mbit/s)

• Flow 1 (95th percentile 3205.26 ms)   • Flow 2 (95th percentile 2963.31 ms)   • Flow 3 (95th percentile 2789.78 ms)
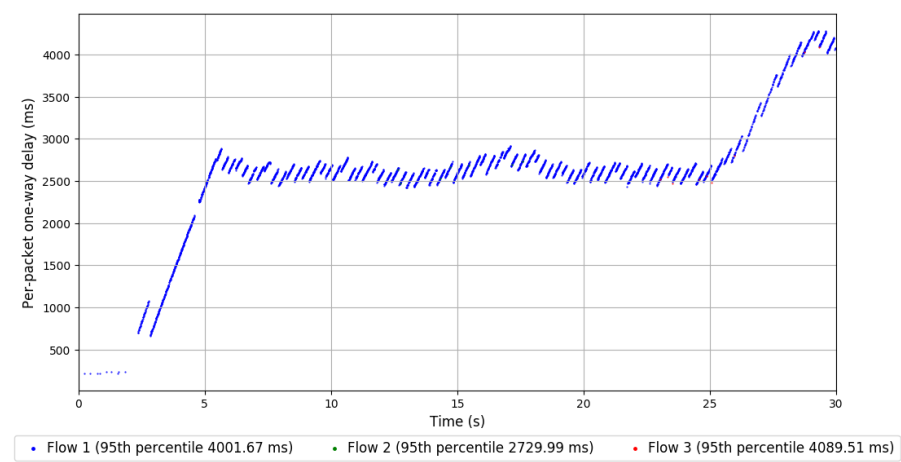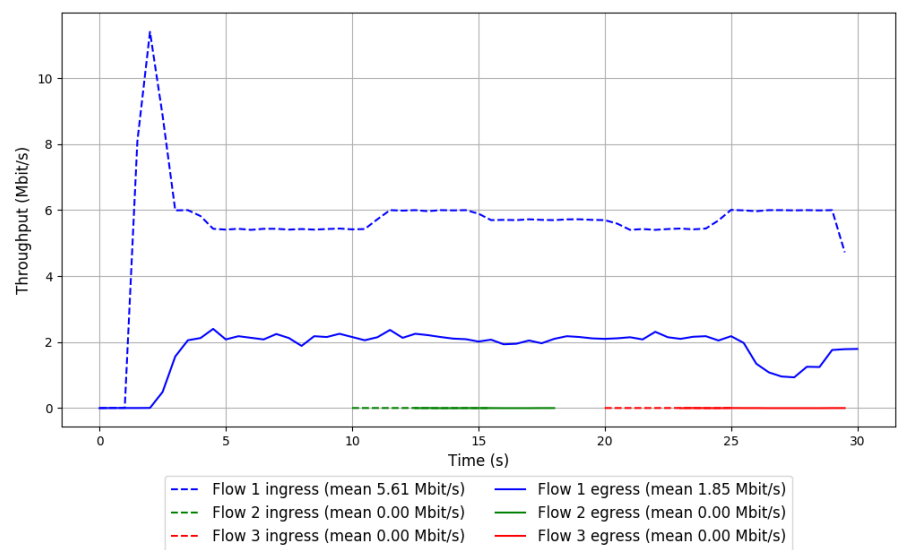
```
Run 2: Statistics of PCC-Expr

Start at: 2018-09-06 08:04:34
End at: 2018-09-06 08:05:04
Local clock offset: 4.549 ms
Remote clock offset: 1.338 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.85 Mbit/s
95th percentile per-packet one-way delay: 4002.076 ms
Loss rate: 67.21%
-- Flow 1:
Average throughput: 1.85 Mbit/s
95th percentile per-packet one-way delay: 4001.671 ms
Loss rate: 67.21%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 2729.985 ms
Loss rate: 55.35%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 4089.510 ms
Loss rate: 50.00%
```

Run 2: Report of PCC-Expr — Data Link

Flow 1 ingress (mean 5.61 Mbit/s)   Flow 1 egress (mean 1.85 Mbit/s)
Flow 2 ingress (mean 0.00 Mbit/s)   Flow 2 egress (mean 0.00 Mbit/s)
Flow 3 ingress (mean 0.00 Mbit/s)   Flow 3 egress (mean 0.00 Mbit/s)

• Flow 1 (95th percentile 4001.67 ms)   • Flow 2 (95th percentile 2729.99 ms)   • Flow 3 (95th percentile 4089.51 ms)

```
Run 3: Statistics of PCC-Expr

Start at: 2018-09-06 08:26:37
End at: 2018-09-06 08:27:07
Local clock offset: 2.114 ms
Remote clock offset: 1.199 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.99 Mbit/s
95th percentile per-packet one-way delay: 2766.787 ms
Loss rate: 64.82%
-- Flow 1:
Average throughput: 1.99 Mbit/s
95th percentile per-packet one-way delay: 2766.828 ms
Loss rate: 64.83%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 2673.871 ms
Loss rate: 74.45%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 2615.779 ms
Loss rate: 50.00%
```
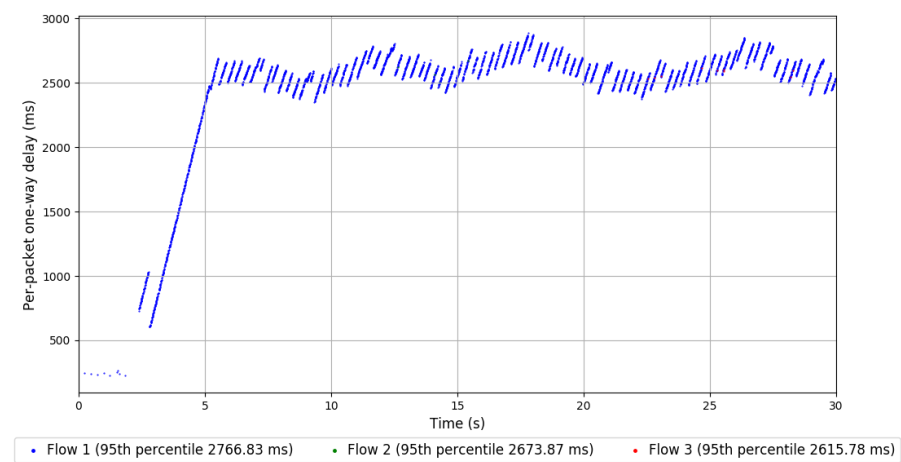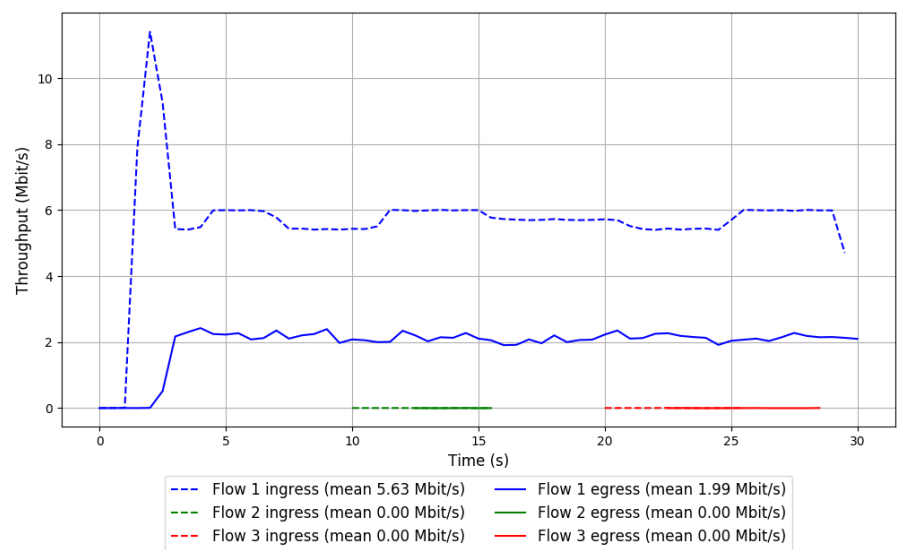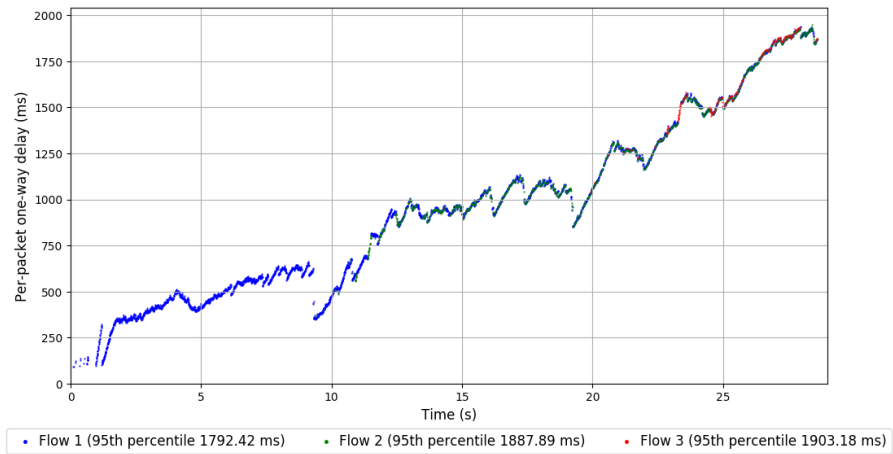
Run 3: Report of PCC-Expr — Data Link

Flow 1 ingress (mean 5.63 Mbit/s) — — — Flow 1 egress (mean 1.99 Mbit/s)
Flow 2 ingress (mean 0.00 Mbit/s) — — — Flow 2 egress (mean 0.00 Mbit/s)
Flow 3 ingress (mean 0.00 Mbit/s) — — — Flow 3 egress (mean 0.00 Mbit/s)

Flow 1 (95th percentile 2766.83 ms)   Flow 2 (95th percentile 2673.87 ms)   Flow 3 (95th percentile 2615.78 ms)

```
Run 1: Statistics of QUIC Cubic

Start at: 2018-09-06 07:53:25
End at: 2018-09-06 07:53:55
Local clock offset: 5.889 ms
Remote clock offset: 1.467 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.18 Mbit/s
95th percentile per-packet one-way delay: 1858.053 ms
Loss rate: 6.55%
-- Flow 1:
Average throughput: 1.76 Mbit/s
95th percentile per-packet one-way delay: 1792.418 ms
Loss rate: 4.71%
-- Flow 2:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 1887.887 ms
Loss rate: 10.56%
-- Flow 3:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 1903.179 ms
Loss rate: 27.49%
```
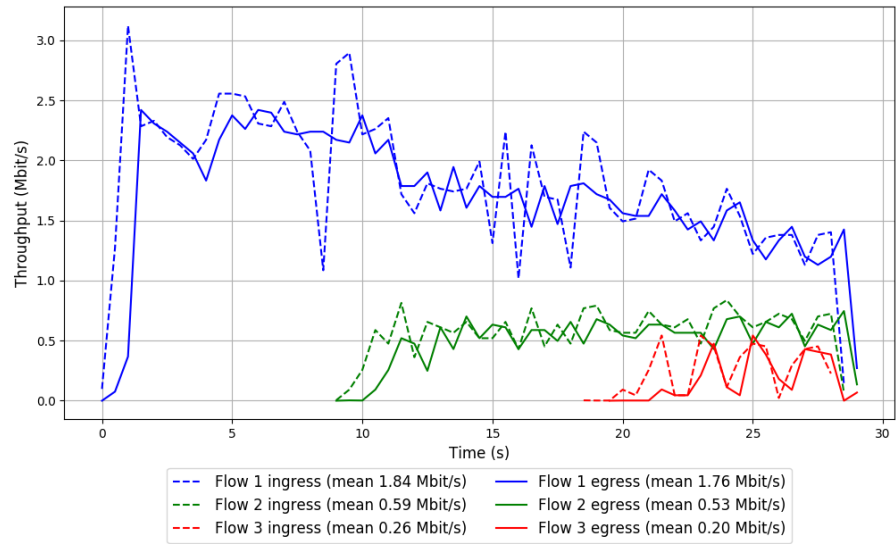
Run 1: Report of QUIC Cubic — Data Link

```
Run 2: Statistics of QUIC Cubic

Start at: 2018-09-06 08:15:34
End at: 2018-09-06 08:16:04
Local clock offset: 4.73 ms
Remote clock offset: 0.175 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.70 Mbit/s
95th percentile per-packet one-way delay: 2449.636 ms
Loss rate: 7.24%
-- Flow 1:
Average throughput: 1.33 Mbit/s
95th percentile per-packet one-way delay: 2345.568 ms
Loss rate: 4.84%
-- Flow 2:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 2510.555 ms
Loss rate: 11.60%
-- Flow 3:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 2507.614 ms
Loss rate: 35.93%
```
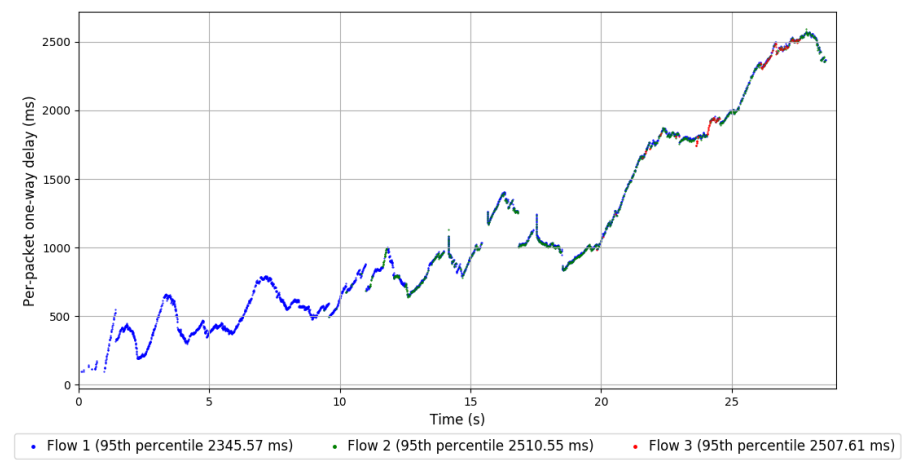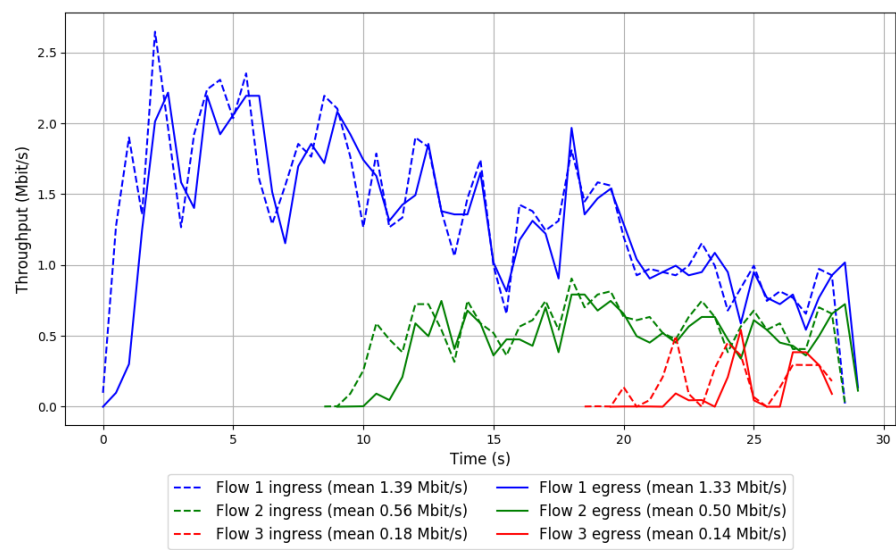
Run 2: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 1.39 Mbit/s) --- Flow 1 egress (mean 1.33 Mbit/s)
Flow 2 ingress (mean 0.56 Mbit/s) --- Flow 2 egress (mean 0.50 Mbit/s)
Flow 3 ingress (mean 0.18 Mbit/s) --- Flow 3 egress (mean 0.14 Mbit/s)

Flow 1 (95th percentile 2345.57 ms)   Flow 2 (95th percentile 2510.55 ms)   Flow 3 (95th percentile 2507.61 ms)

```
Run 3: Statistics of QUIC Cubic

Start at: 2018-09-06 08:37:38
End at: 2018-09-06 08:38:08
Local clock offset: 0.19 ms
Remote clock offset: 0.021 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.40 Mbit/s
95th percentile per-packet one-way delay: 1768.656 ms
Loss rate: 5.88%
-- Flow 1:
Average throughput: 1.70 Mbit/s
95th percentile per-packet one-way delay: 1746.725 ms
Loss rate: 3.83%
-- Flow 2:
Average throughput: 0.89 Mbit/s
95th percentile per-packet one-way delay: 1786.328 ms
Loss rate: 7.58%
-- Flow 3:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 1847.241 ms
Loss rate: 27.12%
```
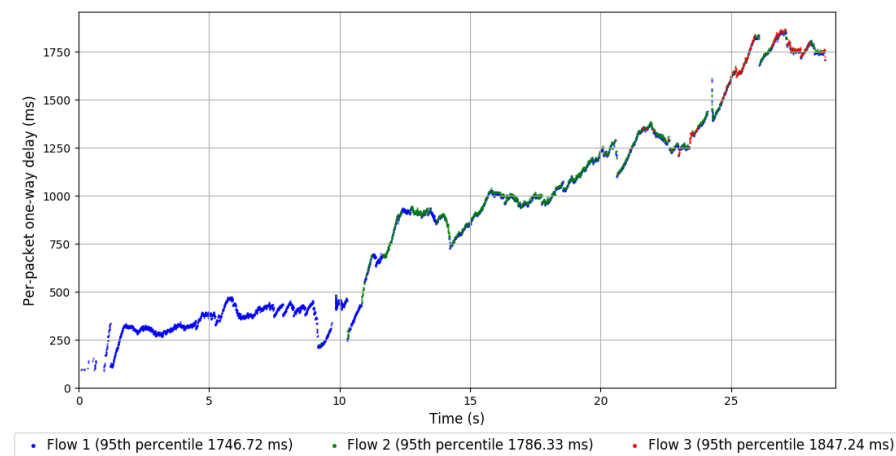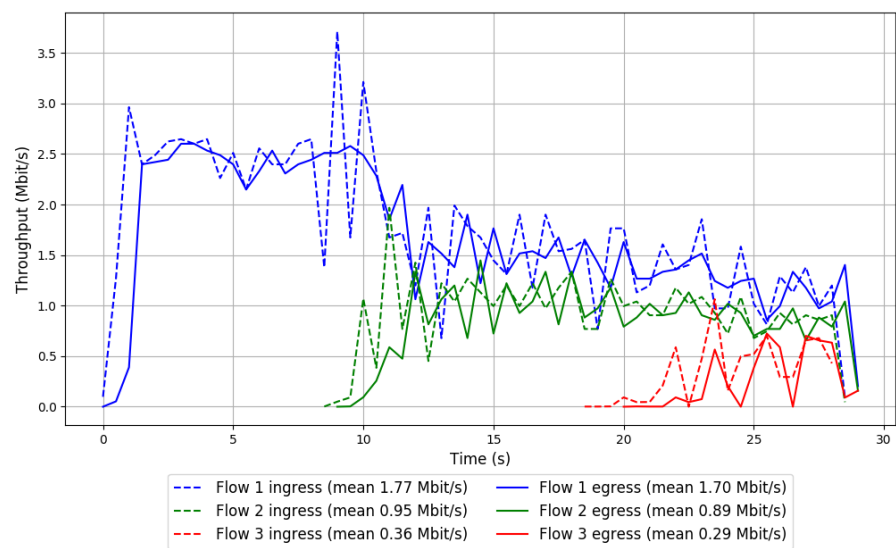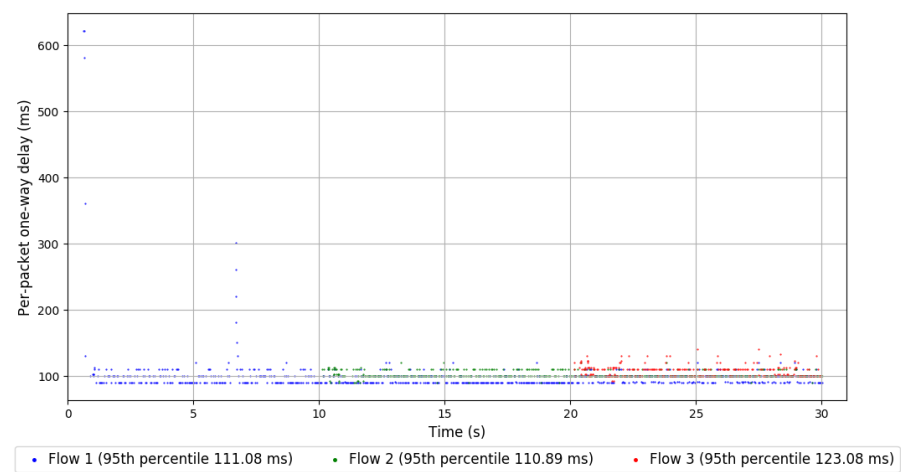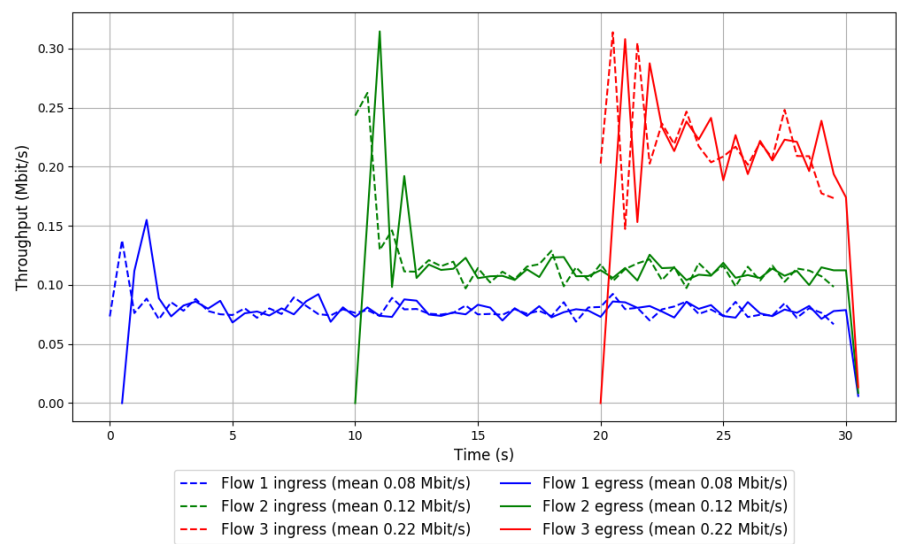
Run 3: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 1.77 Mbit/s) --- Flow 1 egress (mean 1.70 Mbit/s)
Flow 2 ingress (mean 0.95 Mbit/s) --- Flow 2 egress (mean 0.89 Mbit/s)
Flow 3 ingress (mean 0.36 Mbit/s) --- Flow 3 egress (mean 0.29 Mbit/s)

Flow 1 (95th percentile 1746.72 ms) Flow 2 (95th percentile 1786.33 ms) Flow 3 (95th percentile 1847.24 ms)

```
Run 1: Statistics of SCReAM

Start at: 2018-09-06 07:46:07
End at: 2018-09-06 07:46:37
Local clock offset: 8.247 ms
Remote clock offset: 1.48 ms

# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 112.951 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 111.078 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 110.885 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 123.084 ms
Loss rate: 0.31%
```
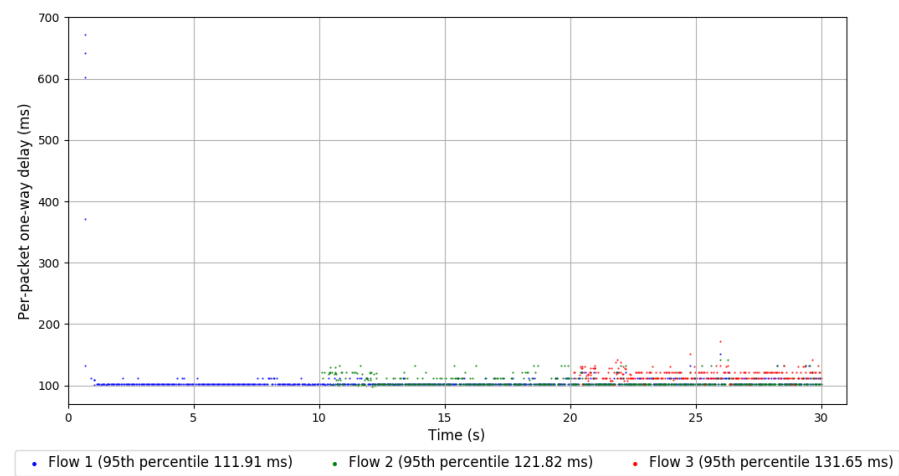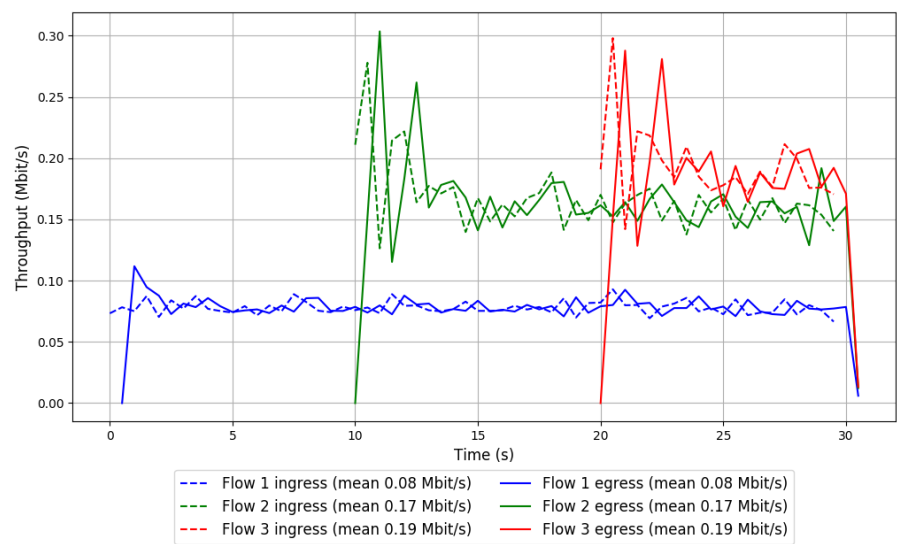
Run 1: Report of SCReAM — Data Link

```
Run 2: Statistics of SCReAM

Start at: 2018-09-06 08:08:14
End at: 2018-09-06 08:08:44
Local clock offset: 5.099 ms
Remote clock offset: 2.549 ms

# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 121.871 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 111.907 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 121.819 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 131.653 ms
Loss rate: 0.35%
```

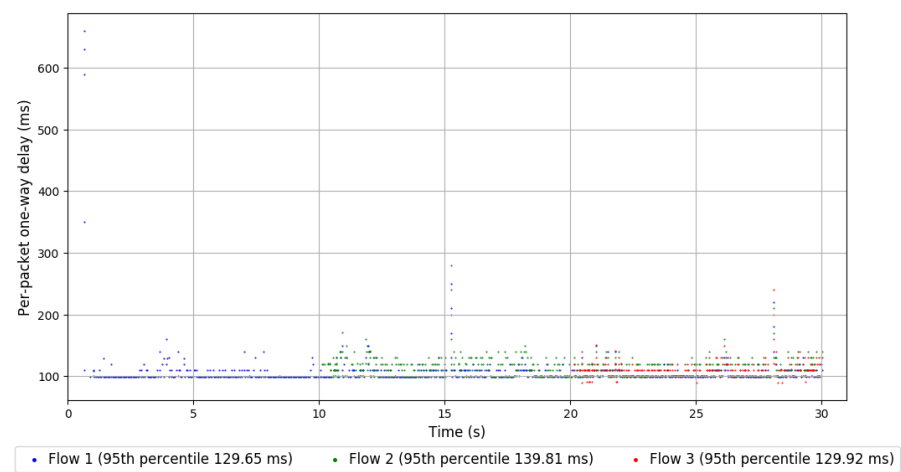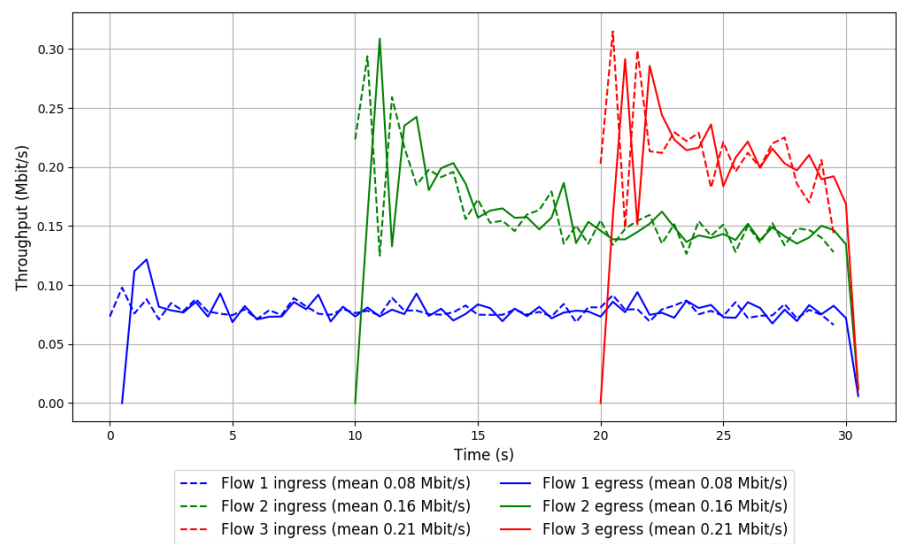Run 2: Report of SCReAM — Data Link

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```
Run 3: Statistics of SCReAM

Start at: 2018-09-06 08:30:17
End at: 2018-09-06 08:30:47
Local clock offset: 0.939 ms
Remote clock offset: -0.074 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 129.989 ms
Loss rate: 0.15%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 129.649 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 139.806 ms
Loss rate: 0.17%
-- Flow 3:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 129.918 ms
Loss rate: 0.27%
```

Run 3: Report of SCReAM — Data Link

```
Run 1: Statistics of Sprout

Start at: 2018-09-06 07:48:33
End at: 2018-09-06 07:49:03
Local clock offset: 7.114 ms
Remote clock offset: 1.415 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 185.192 ms
Loss rate: 0.24%
-- Flow 1:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 205.693 ms
Loss rate: 0.26%
-- Flow 2:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 165.117 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 185.216 ms
Loss rate: 0.66%
```
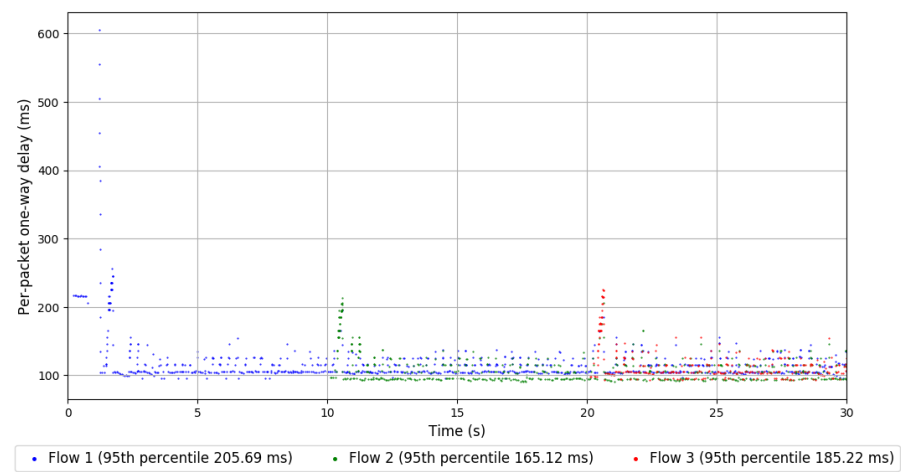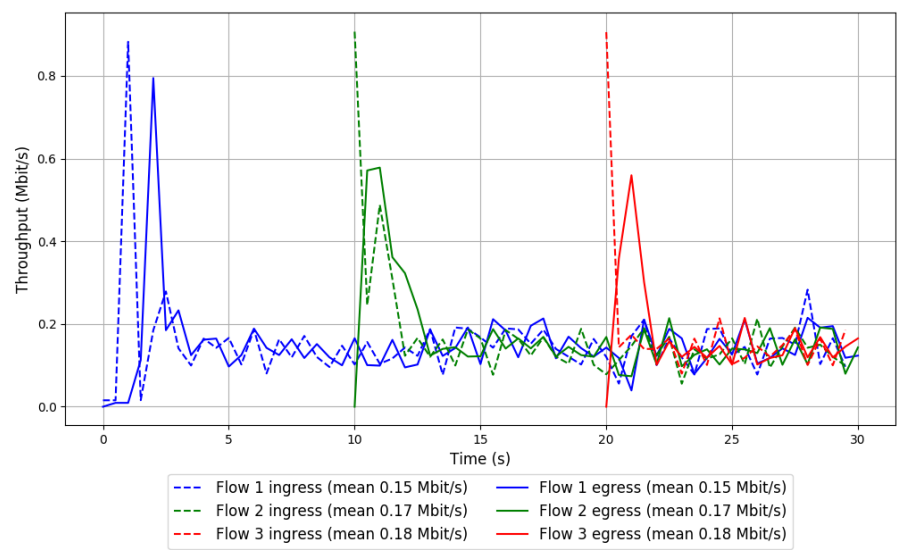
Run 1: Report of Sprout — Data Link

```
Run 2: Statistics of Sprout

Start at: 2018-09-06 08:10:40
End at: 2018-09-06 08:11:10
Local clock offset: 4.206 ms
Remote clock offset: 2.586 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 179.974 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 198.306 ms
Loss rate: 0.02%
-- Flow 2:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 160.610 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 198.411 ms
Loss rate: 0.00%
```
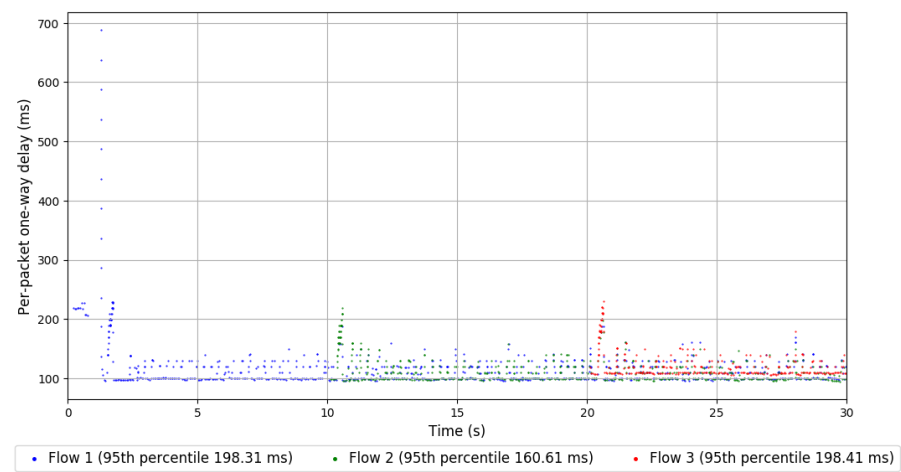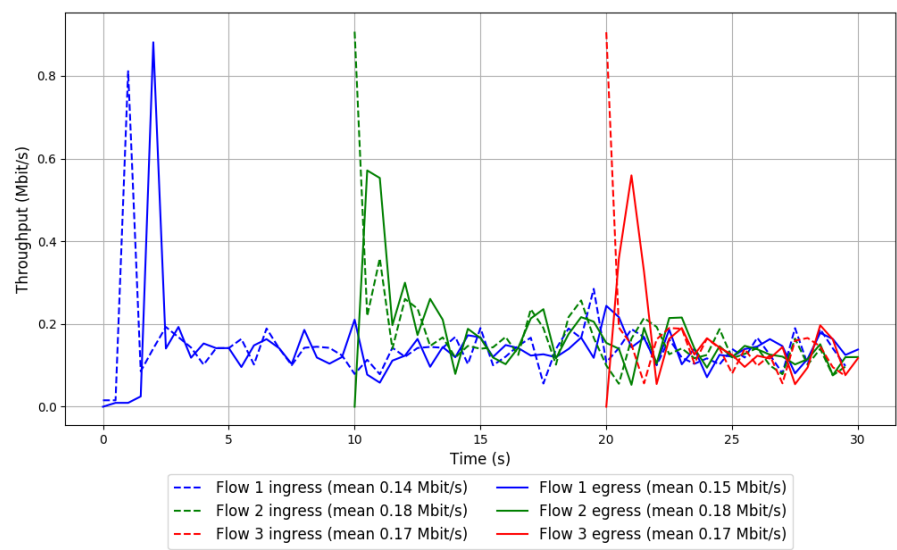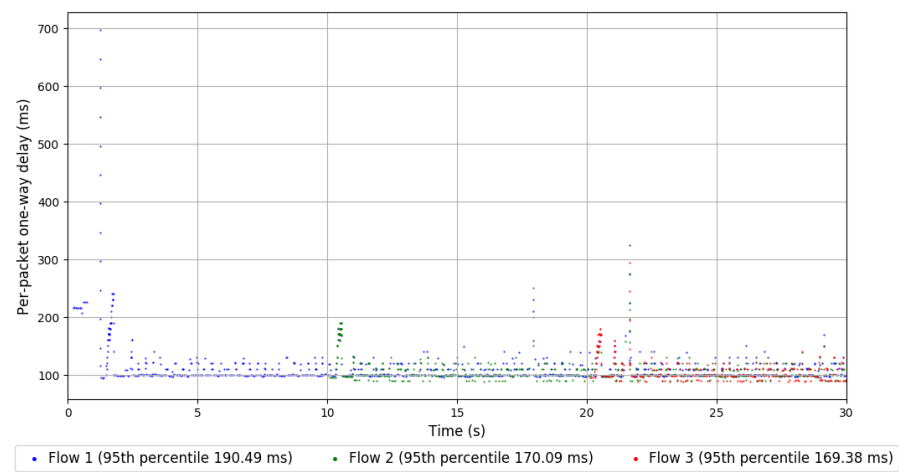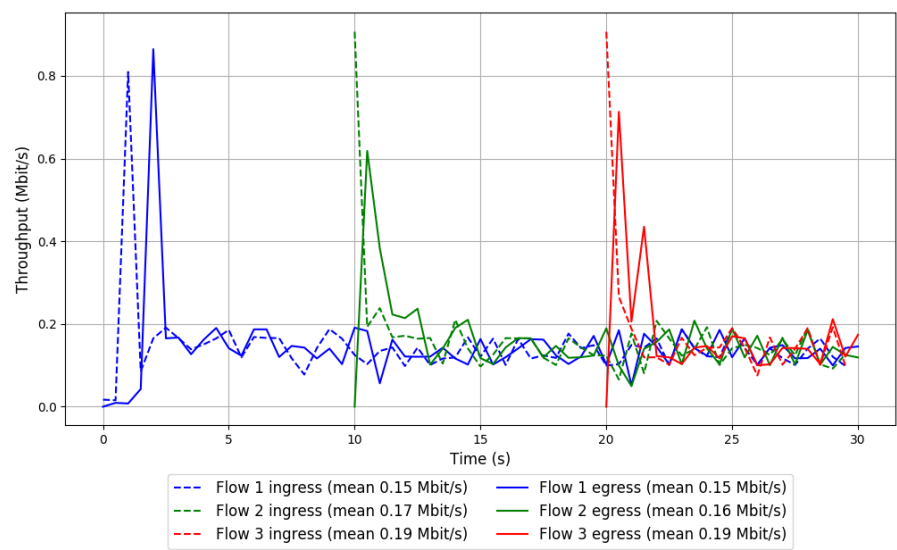
Run 2: Report of Sprout — Data Link

```
Run 3: Statistics of Sprout

Start at: 2018-09-06 08:32:44
End at: 2018-09-06 08:33:14
Local clock offset: 1.412 ms
Remote clock offset: 1.067 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 170.679 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 190.493 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 170.094 ms
Loss rate: 0.36%
-- Flow 3:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 169.384 ms
Loss rate: 0.00%
```
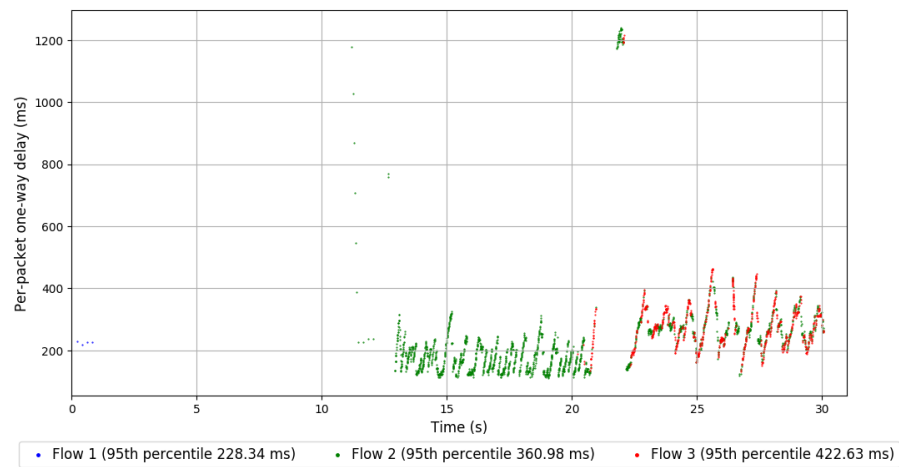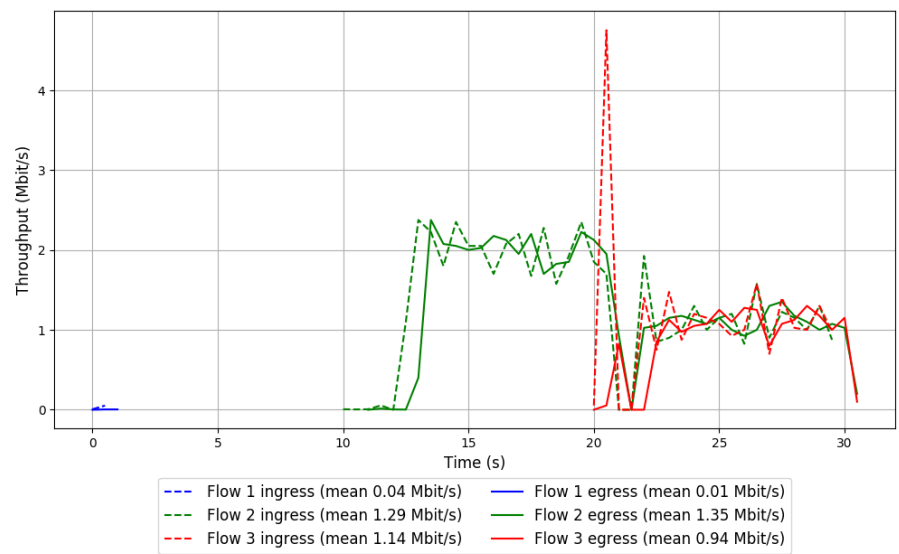
Run 3: Report of Sprout — Data Link

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

Start at: 2018-09-06 07:33:49
End at: 2018-09-06 07:34:19
Local clock offset: 8.668 ms
Remote clock offset: 1.756 ms

# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.16 Mbit/s
95th percentile per-packet one-way delay: 390.454 ms
Loss rate: 6.40%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 228.342 ms
Loss rate: 85.93%
-- Flow 2:
Average throughput: 1.35 Mbit/s
95th percentile per-packet one-way delay: 360.984 ms
Loss rate: 1.21%
-- Flow 3:
Average throughput: 0.94 Mbit/s
95th percentile per-packet one-way delay: 422.631 ms
Loss rate: 18.01%
```

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

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

Start at: 2018-09-06 07:55:52
End at: 2018-09-06 07:56:22
Local clock offset: 6.147 ms
Remote clock offset: 2.437 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.90 Mbit/s
95th percentile per-packet one-way delay: 484.472 ms
Loss rate: 24.14%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 239.311 ms
Loss rate: 85.93%
-- Flow 2:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 1122.480 ms
Loss rate: 13.42%
-- Flow 3:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 460.638 ms
Loss rate: 48.65%
```
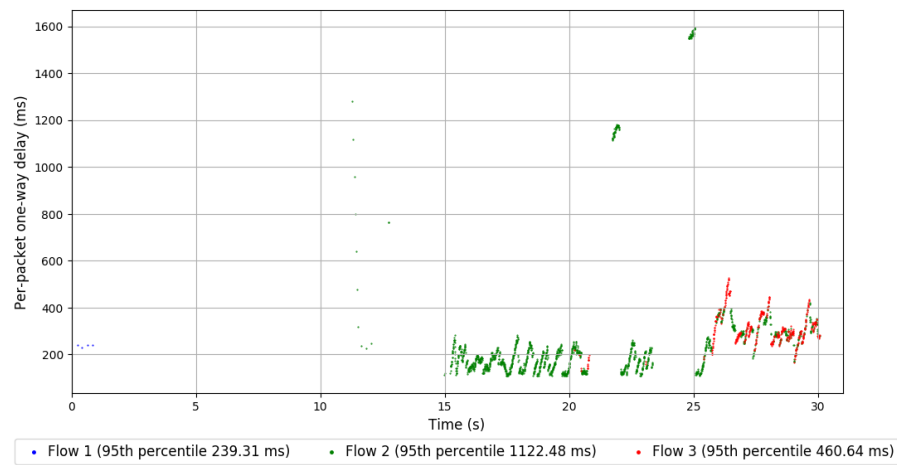
Run 2: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 0.04 Mbit/s)   Flow 1 egress (mean 0.01 Mbit/s)
Flow 2 ingress (mean 1.23 Mbit/s)   Flow 2 egress (mean 1.14 Mbit/s)
Flow 3 ingress (mean 1.07 Mbit/s)   Flow 3 egress (mean 0.56 Mbit/s)

Flow 1 (95th percentile 239.31 ms)   Flow 2 (95th percentile 1122.48 ms)   Flow 3 (95th percentile 460.64 ms)

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

Start at: 2018-09-06 08:18:01
End at: 2018-09-06 08:18:31
Local clock offset: 3.107 ms
Remote clock offset: 2.423 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 721.252 ms
Loss rate: 7.28%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 229.438 ms
Loss rate: 85.93%
-- Flow 2:
Average throughput: 1.24 Mbit/s
95th percentile per-packet one-way delay: 405.981 ms
Loss rate: 8.82%
-- Flow 3:
Average throughput: 1.04 Mbit/s
95th percentile per-packet one-way delay: 1125.879 ms
Loss rate: 3.31%
```
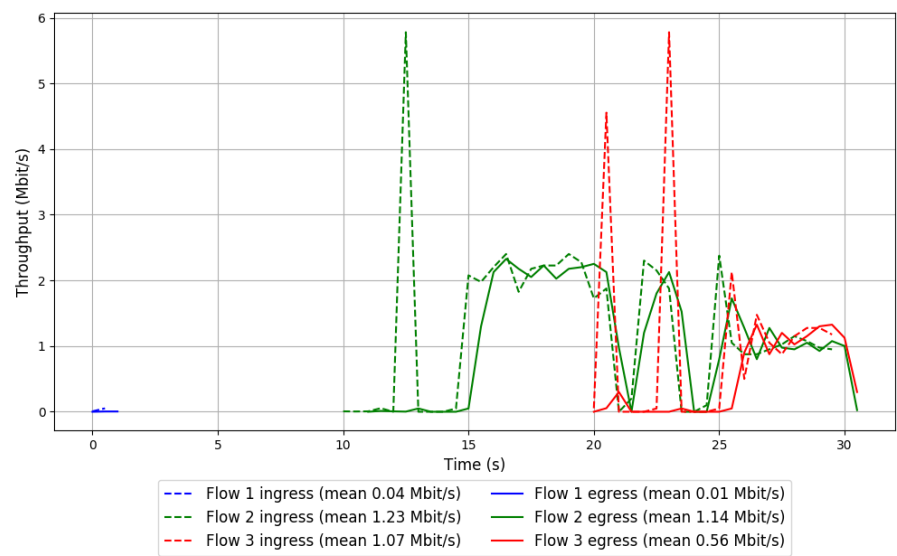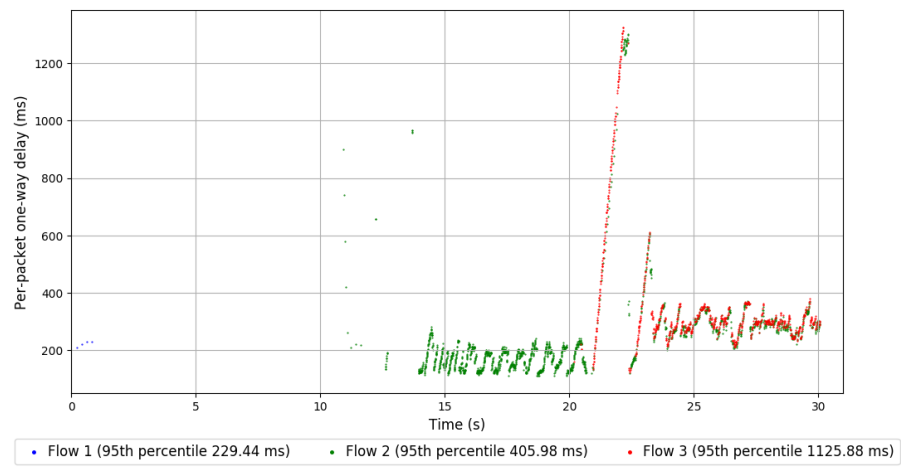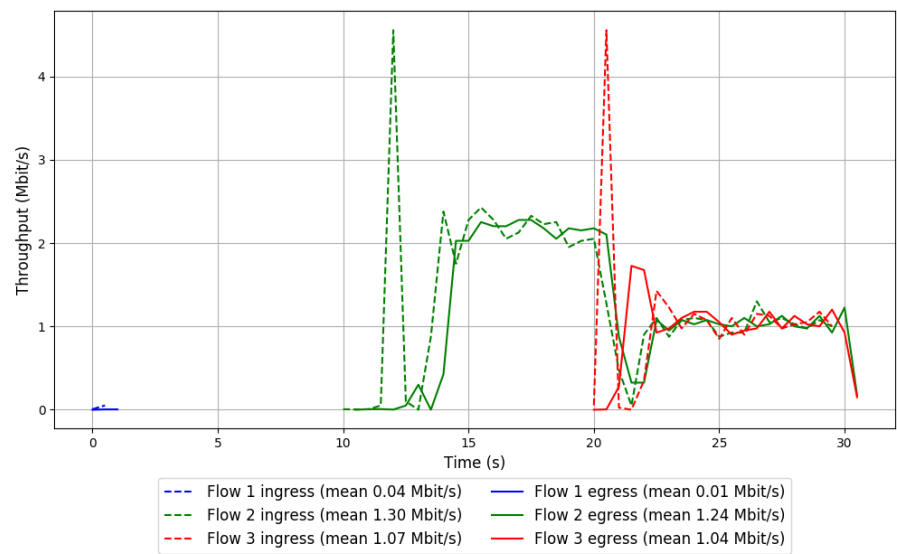
Run 3: Report of TaoVA-100x — Data Link

- - - - Flow 1 ingress (mean 0.04 Mbit/s) ——— Flow 1 egress (mean 0.01 Mbit/s)
- - - - Flow 2 ingress (mean 1.30 Mbit/s) ——— Flow 2 egress (mean 1.24 Mbit/s)
- - - - Flow 3 ingress (mean 1.07 Mbit/s) ——— Flow 3 egress (mean 1.04 Mbit/s)

• Flow 1 (95th percentile 229.44 ms)   • Flow 2 (95th percentile 405.98 ms)   • Flow 3 (95th percentile 1125.88 ms)

```
Run 1: Statistics of TCP Vegas

Start at: 2018-09-06 07:47:20
End at: 2018-09-06 07:47:50
Local clock offset: 7.688 ms
Remote clock offset: 1.684 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.02 Mbit/s
95th percentile per-packet one-way delay: 504.238 ms
Loss rate: 0.63%
-- Flow 1:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 448.554 ms
Loss rate: 0.23%
-- Flow 2:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 498.286 ms
Loss rate: 0.31%
-- Flow 3:
Average throughput: 1.21 Mbit/s
95th percentile per-packet one-way delay: 530.852 ms
Loss rate: 2.17%
```
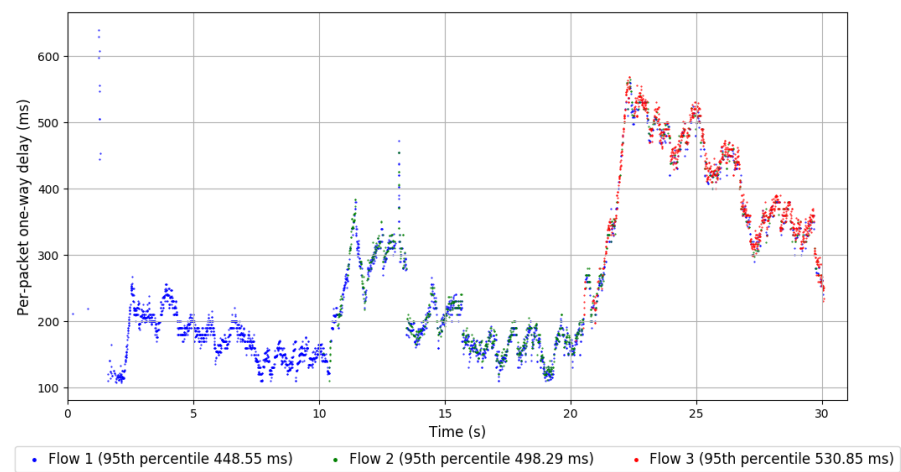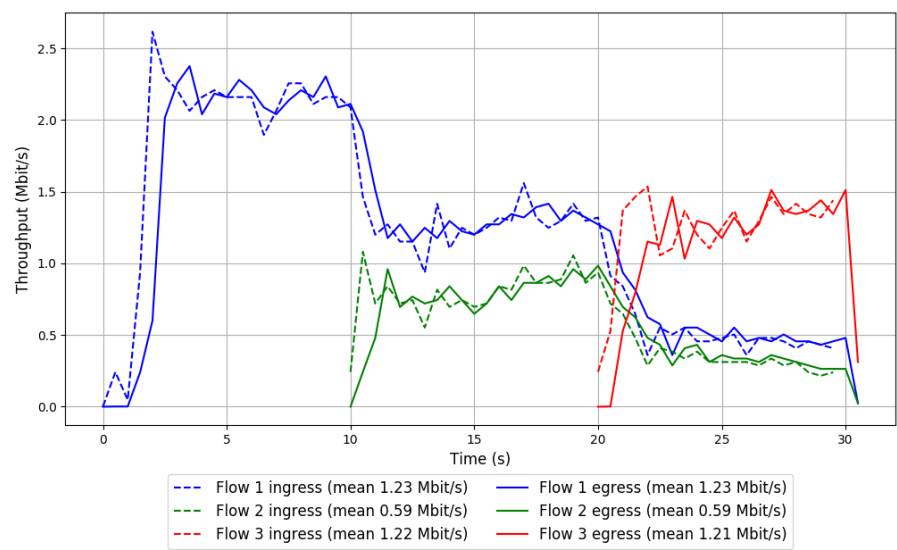
Run 1: Report of TCP Vegas — Data Link

```
Run 2: Statistics of TCP Vegas

Start at: 2018-09-06 08:09:27
End at: 2018-09-06 08:09:57
Local clock offset: 4.241 ms
Remote clock offset: 1.294 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.07 Mbit/s
95th percentile per-packet one-way delay: 270.513 ms
Loss rate: 0.79%
-- Flow 1:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 270.694 ms
Loss rate: 0.43%
-- Flow 2:
Average throughput: 0.83 Mbit/s
95th percentile per-packet one-way delay: 280.100 ms
Loss rate: 0.87%
-- Flow 3:
Average throughput: 0.61 Mbit/s
95th percentile per-packet one-way delay: 243.534 ms
Loss rate: 2.90%
```
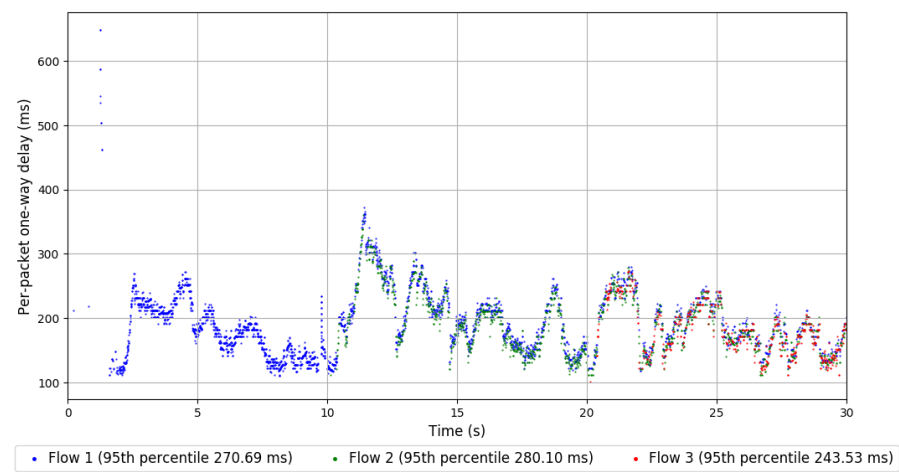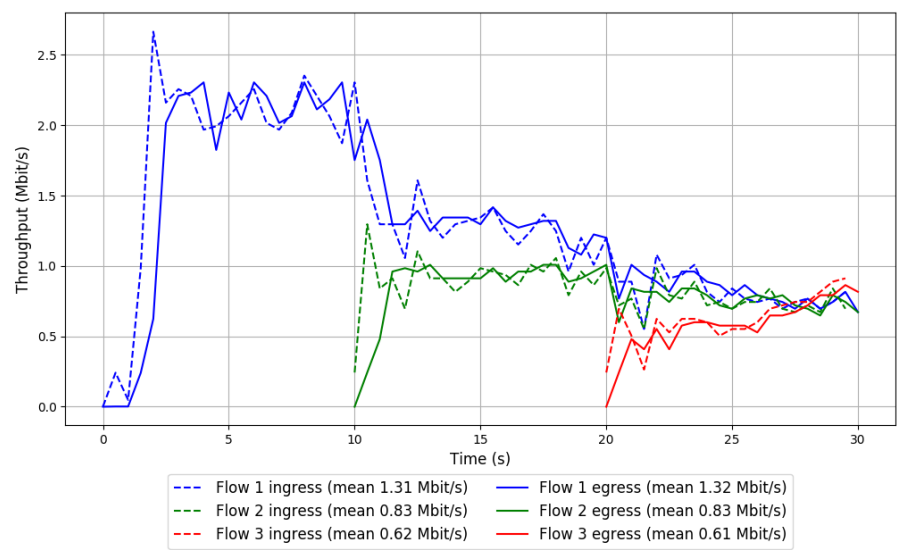
Run 2: Report of TCP Vegas — Data Link

```
Run 3: Statistics of TCP Vegas

Start at: 2018-09-06 08:31:30
End at: 2018-09-06 08:32:00
Local clock offset: 1.566 ms
Remote clock offset: 2.321 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.03 Mbit/s
95th percentile per-packet one-way delay: 506.268 ms
Loss rate: 0.28%
-- Flow 1:
Average throughput: 1.07 Mbit/s
95th percentile per-packet one-way delay: 486.120 ms
Loss rate: 0.08%
-- Flow 2:
Average throughput: 1.12 Mbit/s
95th percentile per-packet one-way delay: 544.594 ms
Loss rate: 0.43%
-- Flow 3:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 447.135 ms
Loss rate: 0.74%
```
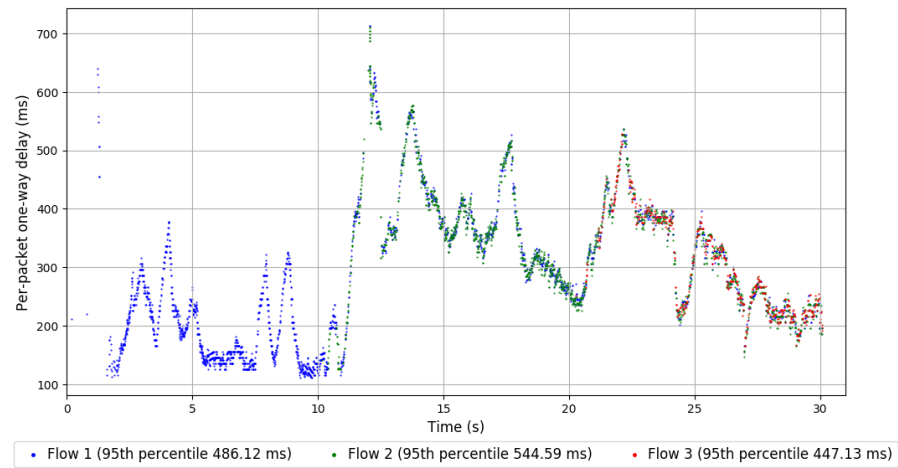
Run 3: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 1.07 Mbit/s) —— Flow 1 egress (mean 1.07 Mbit/s)
Flow 2 ingress (mean 1.12 Mbit/s) —— Flow 2 egress (mean 1.12 Mbit/s)
Flow 3 ingress (mean 0.65 Mbit/s) —— Flow 3 egress (mean 0.65 Mbit/s)

• Flow 1 (95th percentile 486.12 ms)   • Flow 2 (95th percentile 544.59 ms)   • Flow 3 (95th percentile 447.13 ms)

```
Run 1: Statistics of Verus

Start at: 2018-09-06 07:54:38
End at: 2018-09-06 07:55:08
Local clock offset: 6.43 ms
Remote clock offset: 1.541 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.00 Mbit/s
95th percentile per-packet one-way delay: 1811.149 ms
Loss rate: 6.20%
-- Flow 1:
Average throughput: 1.99 Mbit/s
95th percentile per-packet one-way delay: 1810.982 ms
Loss rate: 6.20%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 2201.602 ms
Loss rate: 4.76%
-- Flow 3:
Average throughput: 0.02 Mbit/s
95th percentile per-packet one-way delay: 2360.905 ms
Loss rate: 8.33%
```
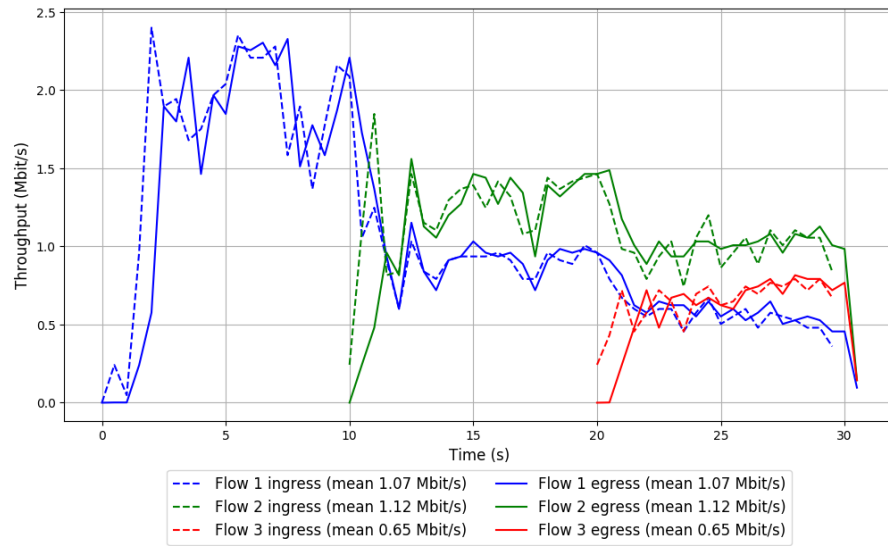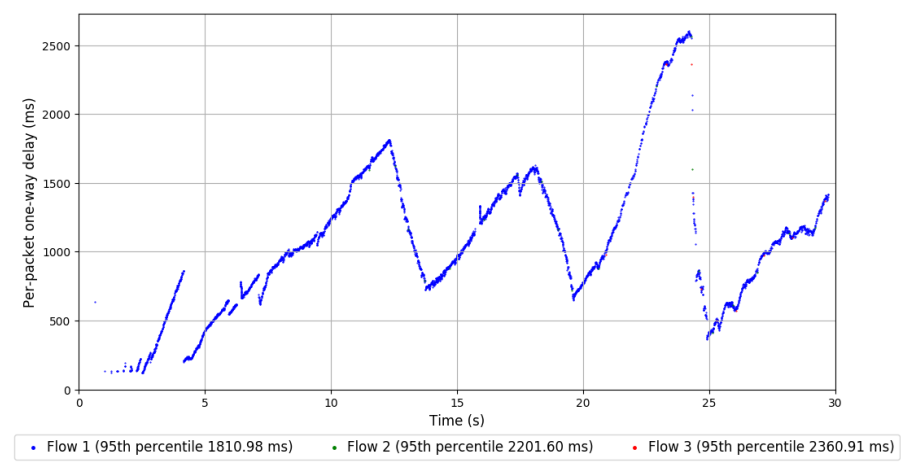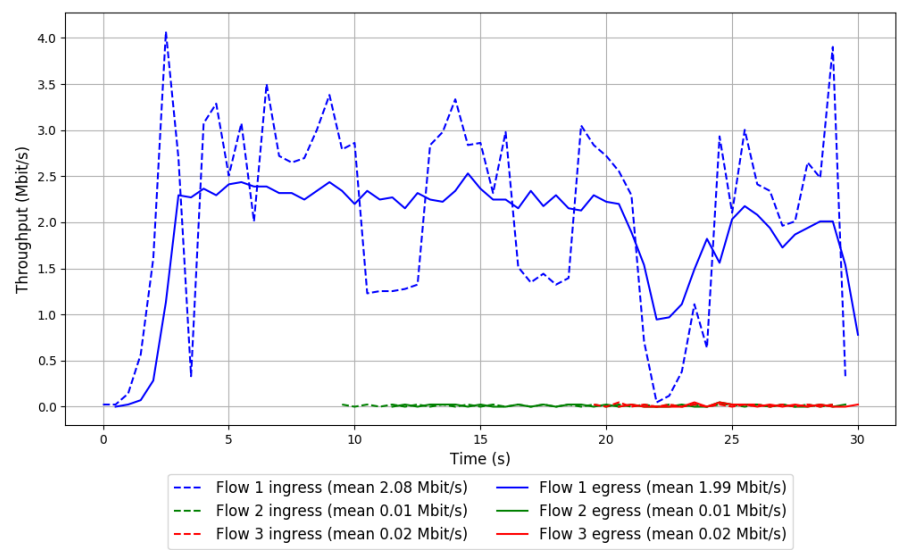
Run 1: Report of Verus — Data Link

- Flow 1 ingress (mean 2.08 Mbit/s)
- Flow 1 egress (mean 1.99 Mbit/s)
- Flow 2 ingress (mean 0.01 Mbit/s)
- Flow 2 egress (mean 0.01 Mbit/s)
- Flow 3 ingress (mean 0.02 Mbit/s)
- Flow 3 egress (mean 0.02 Mbit/s)

- Flow 1 (95th percentile 1810.98 ms)
- Flow 2 (95th percentile 2201.60 ms)
- Flow 3 (95th percentile 2360.91 ms)

```
Run 2: Statistics of Verus

Start at: 2018-09-06 08:16:47
End at: 2018-09-06 08:17:17
Local clock offset: 4.377 ms
Remote clock offset: 1.314 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.26 Mbit/s
95th percentile per-packet one-way delay: 1643.690 ms
Loss rate: 3.04%
-- Flow 1:
Average throughput: 2.25 Mbit/s
95th percentile per-packet one-way delay: 1643.690 ms
Loss rate: 3.02%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1575.638 ms
Loss rate: 4.76%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1754.353 ms
Loss rate: 10.00%
```
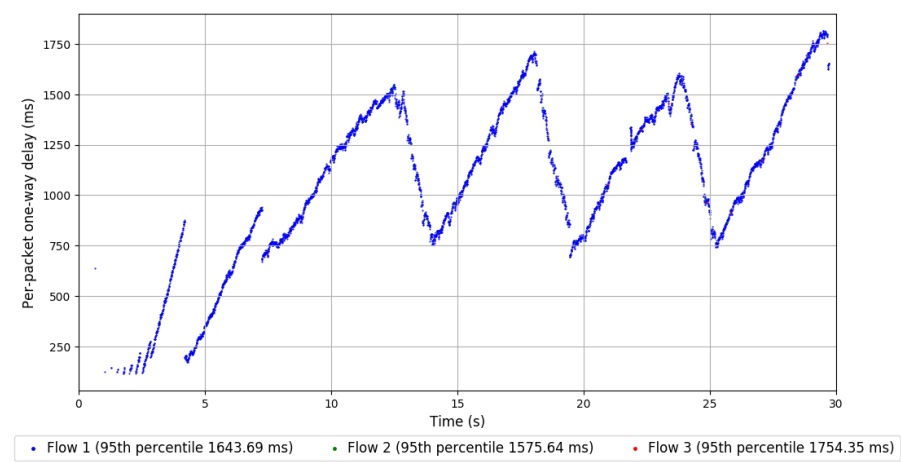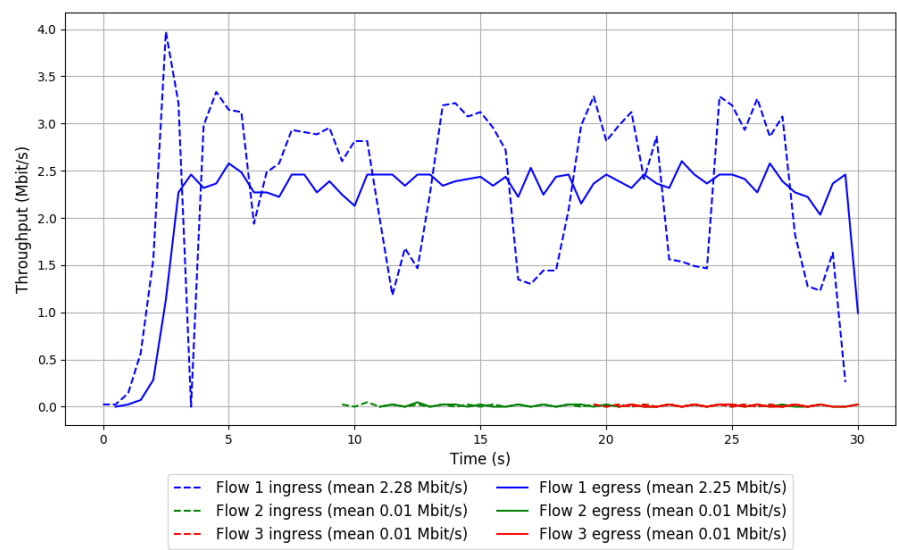
Run 2: Report of Verus — Data Link

Flow 1 ingress (mean 2.28 Mbit/s) -- Flow 1 egress (mean 2.25 Mbit/s)
Flow 2 ingress (mean 0.01 Mbit/s) -- Flow 2 egress (mean 0.01 Mbit/s)
Flow 3 ingress (mean 0.01 Mbit/s) -- Flow 3 egress (mean 0.01 Mbit/s)

Flow 1 (95th percentile 1643.69 ms) · Flow 2 (95th percentile 1575.64 ms) · Flow 3 (95th percentile 1754.35 ms)
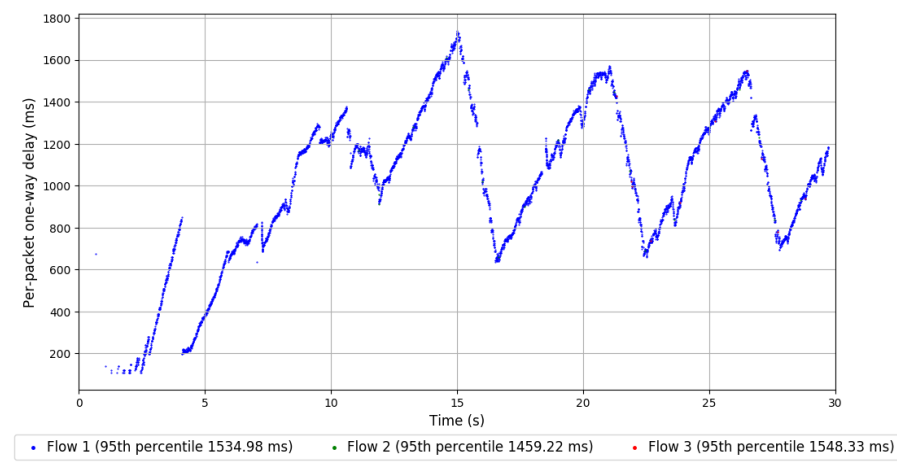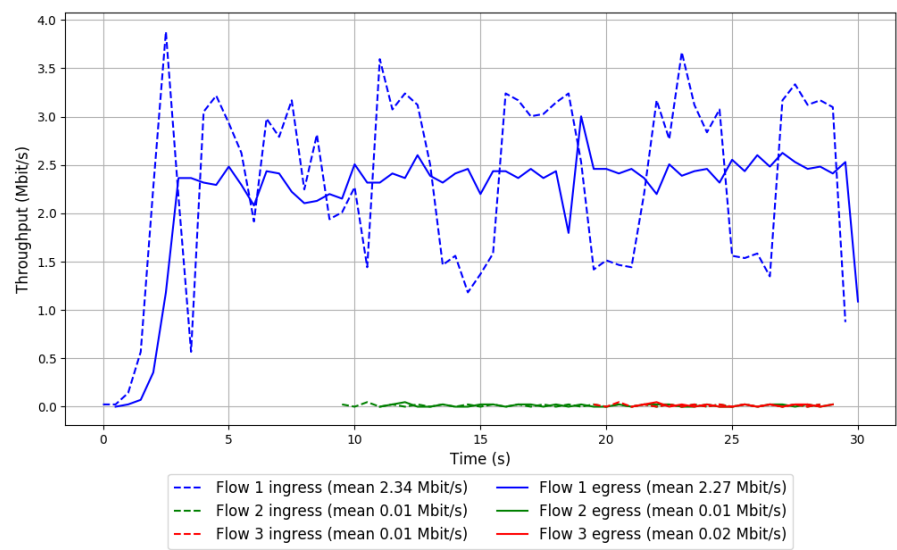
```
Run 3: Statistics of Verus

Start at: 2018-09-06 08:38:52
End at: 2018-09-06 08:39:22
Local clock offset: 0.087 ms
Remote clock offset: -0.061 ms

# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 1534.977 ms
Loss rate: 4.94%
-- Flow 1:
Average throughput: 2.27 Mbit/s
95th percentile per-packet one-way delay: 1534.977 ms
Loss rate: 4.93%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1459.225 ms
Loss rate: 4.76%
-- Flow 3:
Average throughput: 0.02 Mbit/s
95th percentile per-packet one-way delay: 1548.326 ms
Loss rate: 9.09%
```

Run 3: Report of Verus — Data Link

Flow 1 ingress (mean 2.34 Mbit/s) — — — Flow 1 egress (mean 2.27 Mbit/s)
Flow 2 ingress (mean 0.01 Mbit/s) — — — Flow 2 egress (mean 0.01 Mbit/s)
Flow 3 ingress (mean 0.01 Mbit/s) — — — Flow 3 egress (mean 0.02 Mbit/s)

• Flow 1 (95th percentile 1534.98 ms)   • Flow 2 (95th percentile 1459.22 ms)   • Flow 3 (95th percentile 1548.33 ms)

```
Run 1: Statistics of PCC-Vivace

Start at: 2018-09-06 07:38:46
End at: 2018-09-06 07:39:16
Local clock offset: 8.925 ms
Remote clock offset: 1.555 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.72 Mbit/s
95th percentile per-packet one-way delay: 3948.883 ms
Loss rate: 25.64%
-- Flow 1:
Average throughput: 0.98 Mbit/s
95th percentile per-packet one-way delay: 3930.184 ms
Loss rate: 23.84%
-- Flow 2:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 3971.010 ms
Loss rate: 27.92%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 3847.776 ms
Loss rate: 15.80%
```
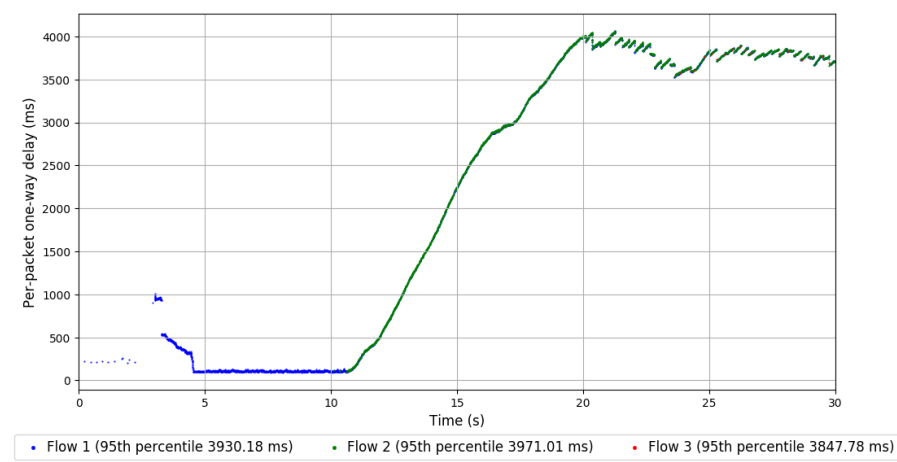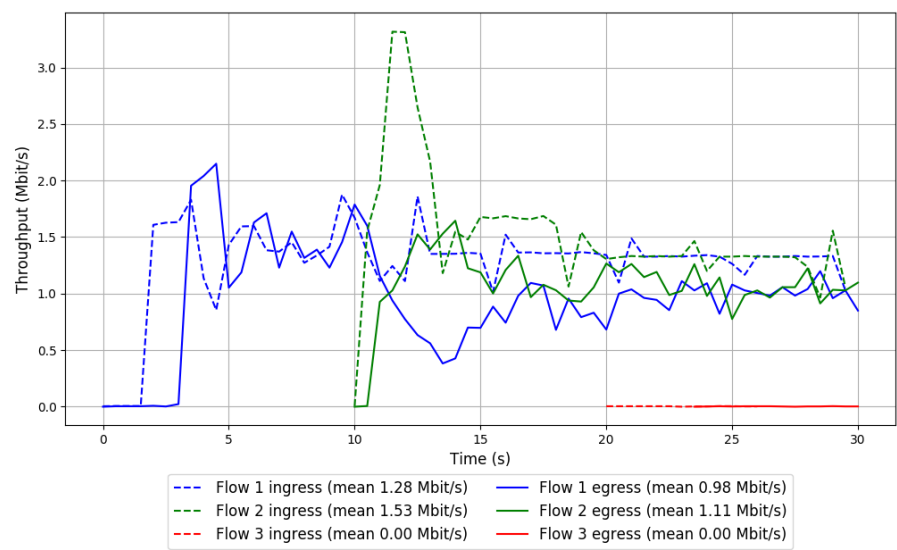
Run 1: Report of PCC-Vivace — Data Link

```
Run 2: Statistics of PCC-Vivace

Start at: 2018-09-06 08:00:46
End at: 2018-09-06 08:01:16
Local clock offset: 4.834 ms
Remote clock offset: 1.401 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.35 Mbit/s
95th percentile per-packet one-way delay: 5923.053 ms
Loss rate: 43.36%
-- Flow 1:
Average throughput: 0.80 Mbit/s
95th percentile per-packet one-way delay: 5848.604 ms
Loss rate: 38.97%
-- Flow 2:
Average throughput: 0.83 Mbit/s
95th percentile per-packet one-way delay: 5993.535 ms
Loss rate: 48.72%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 6142.812 ms
Loss rate: 44.83%
```
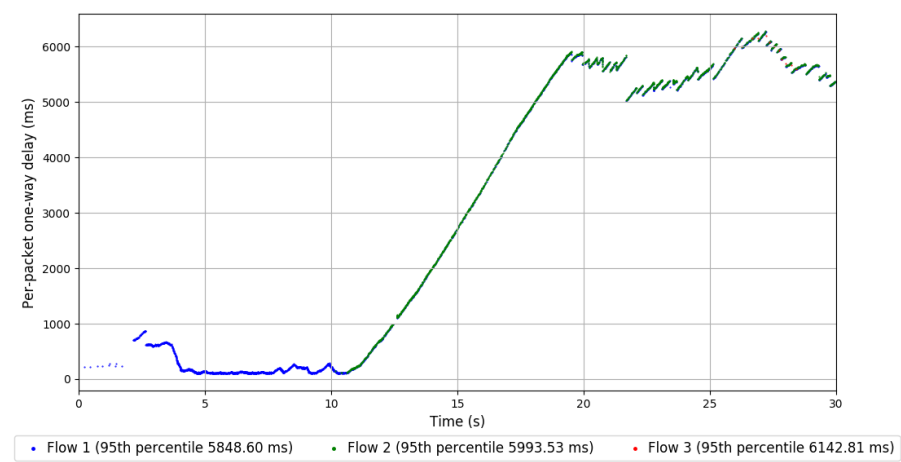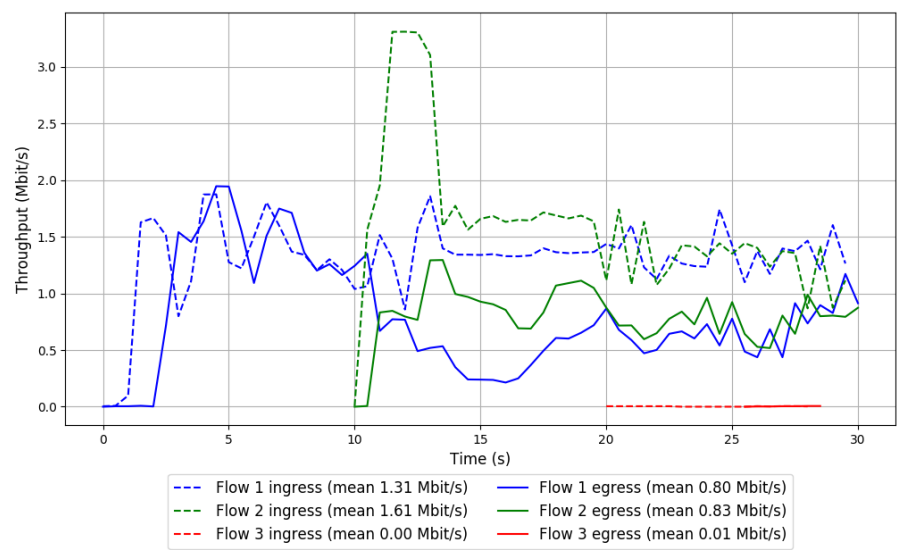
Run 2: Report of PCC-Vivace — Data Link

- - - - Flow 1 ingress (mean 1.31 Mbit/s)   ——— Flow 1 egress (mean 0.80 Mbit/s)
- - - - Flow 2 ingress (mean 1.61 Mbit/s)   ——— Flow 2 egress (mean 0.83 Mbit/s)
- - - - Flow 3 ingress (mean 0.00 Mbit/s)   ——— Flow 3 egress (mean 0.01 Mbit/s)

- Flow 1 (95th percentile 5848.60 ms)   • Flow 2 (95th percentile 5993.53 ms)   • Flow 3 (95th percentile 6142.81 ms)

```
Run 3: Statistics of PCC-Vivace

Start at: 2018-09-06 08:22:56
End at: 2018-09-06 08:23:26
Local clock offset: 2.715 ms
Remote clock offset: 0.106 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.99 Mbit/s
95th percentile per-packet one-way delay: 3266.068 ms
Loss rate: 16.53%
-- Flow 1:
Average throughput: 1.15 Mbit/s
95th percentile per-packet one-way delay: 3259.102 ms
Loss rate: 14.81%
-- Flow 2:
Average throughput: 1.24 Mbit/s
95th percentile per-packet one-way delay: 3273.308 ms
Loss rate: 18.82%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 3299.195 ms
Loss rate: 0.00%
```
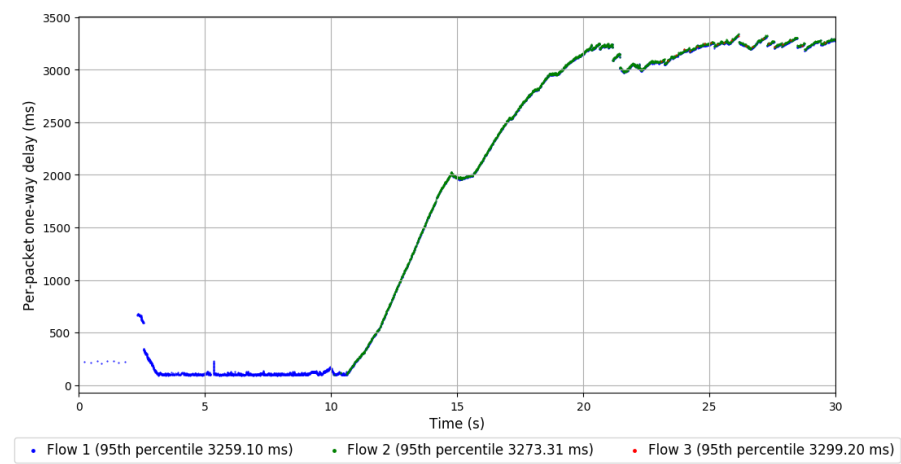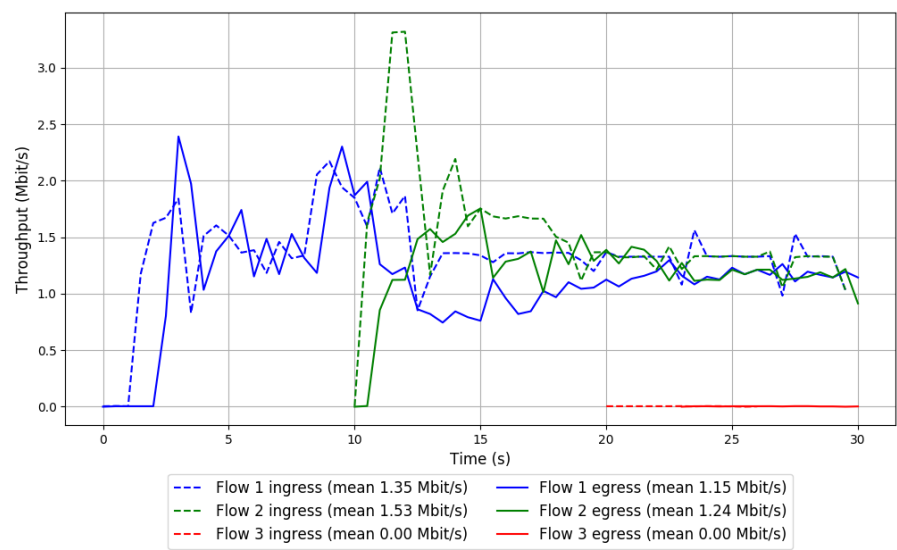
Run 3: Report of PCC-Vivace — Data Link

```
Run 1: Statistics of WebRTC media

Start at: 2018-09-06 07:50:59
End at: 2018-09-06 07:51:29
Local clock offset: 7.231 ms
Remote clock offset: 2.751 ms

# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.78 Mbit/s
95th percentile per-packet one-way delay: 386.325 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 344.449 ms
Loss rate: 0.05%
-- Flow 2:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 430.200 ms
Loss rate: 0.12%
-- Flow 3:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 435.584 ms
Loss rate: 0.00%
```
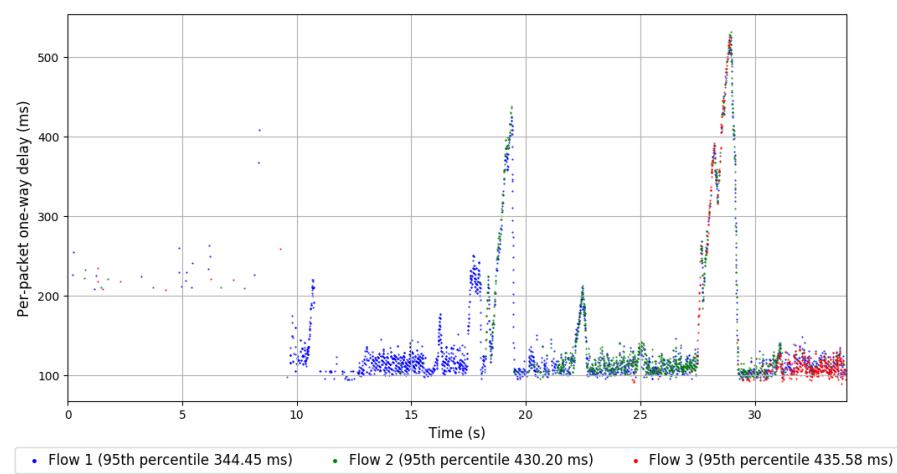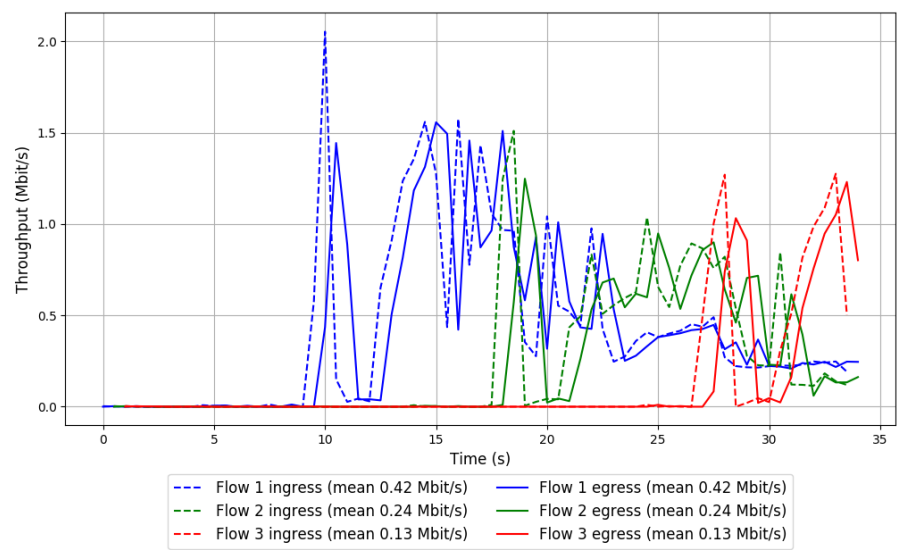
Run 1: Report of WebRTC media — Data Link

```
Run 2: Statistics of WebRTC media

Start at: 2018-09-06 08:13:06
End at: 2018-09-06 08:13:36
Local clock offset: 4.029 ms
Remote clock offset: 2.407 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 623.034 ms
Loss rate: 0.87%
-- Flow 1:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 433.696 ms
Loss rate: 0.14%
-- Flow 2:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 756.181 ms
Loss rate: 0.94%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 492.440 ms
Loss rate: 35.38%
```
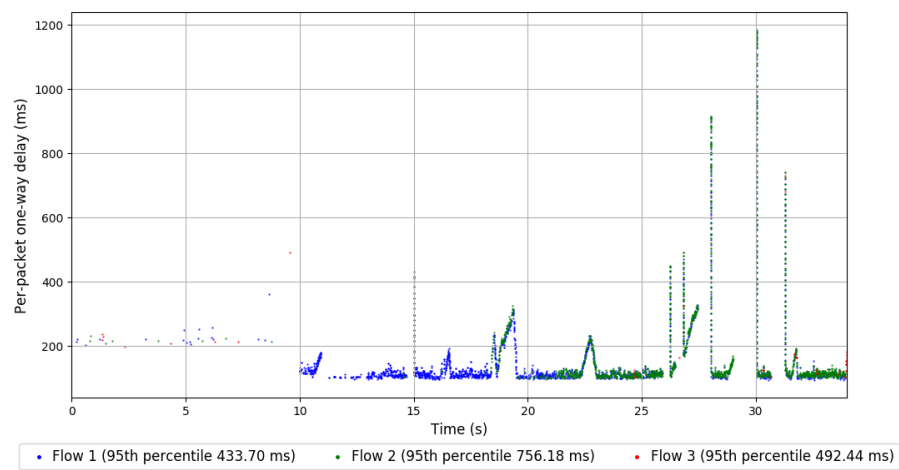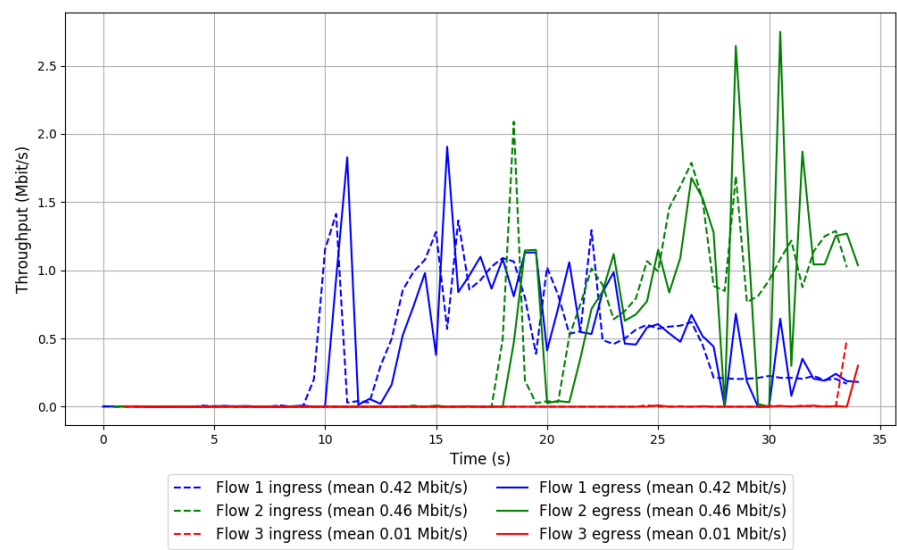
Run 2: Report of WebRTC media — Data Link

```
Run 3: Statistics of WebRTC media

Start at: 2018-09-06 08:35:10
End at: 2018-09-06 08:35:40
Local clock offset: 1.168 ms
Remote clock offset: 1.015 ms


# Below is generated by plot.py at 2018-09-06 08:40:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 393.845 ms
Loss rate: 0.60%
-- Flow 1:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 330.436 ms
Loss rate: 0.11%
-- Flow 2:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 404.149 ms
Loss rate: 0.72%
-- Flow 3:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 518.654 ms
Loss rate: 2.49%
```

Run 3: Report of WebRTC media — Data Link

Flow 1 ingress (mean 0.47 Mbit/s)   Flow 1 egress (mean 0.47 Mbit/s)
Flow 2 ingress (mean 0.32 Mbit/s)   Flow 2 egress (mean 0.32 Mbit/s)
Flow 3 ingress (mean 0.10 Mbit/s)   Flow 3 egress (mean 0.10 Mbit/s)

Flow 1 (95th percentile 330.44 ms)   Flow 2 (95th percentile 404.15 ms)   Flow 3 (95th percentile 518.65 ms)