

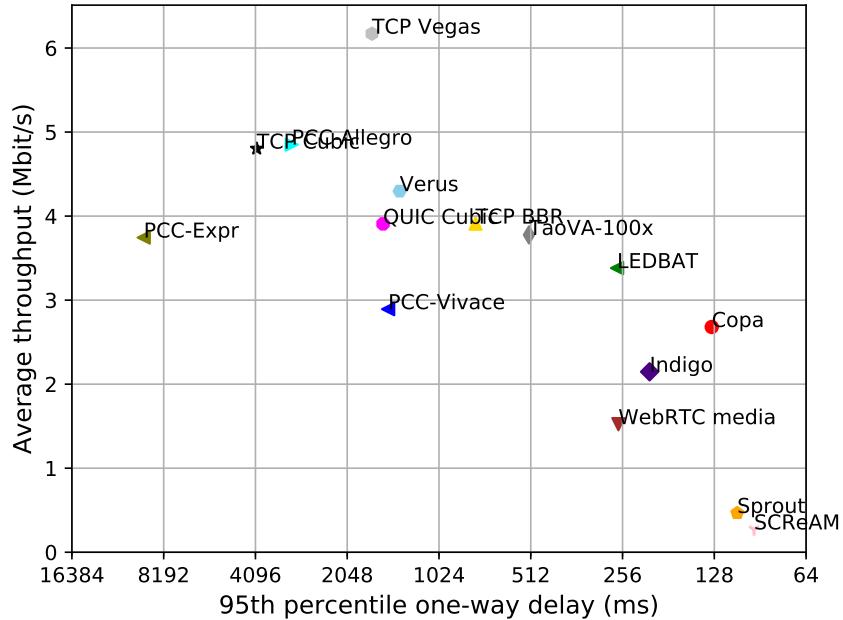
Pantheon Report

Generated at 2018-06-18 16:04:05 (UTC).
Data path: AWS Korea Ethernet (*local*) → China ppp0 ppp0 (*remote*).
Repeated the test of 16 congestion control schemes 3 times.
Each test lasted for 30 seconds running 3 flows with 10-second interval between two flows.

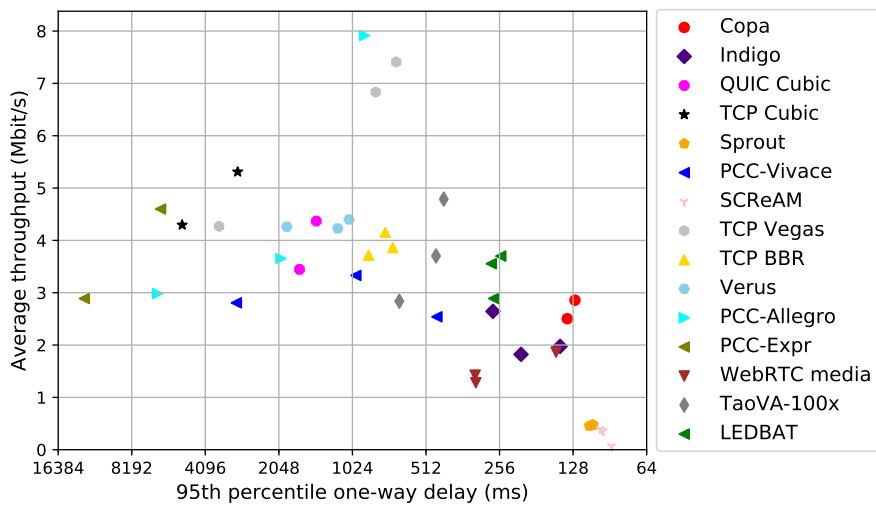
Increased UDP receive buffer to 16 MB (default) and 32 MB (max).
NTP offsets were measured against `ntp.nict.jp` and have been applied to correct the timestamps in logs.

```
Git summary:  
branch: master @ 9141c5f9450c85ea5ea2ea755a8e946998d3abf3  
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834  
third_party/genericCC @ c7966e494a929986eaa5a9c169a7f381fe1bbbe5  
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d  
third_party/libutp @ b3465b942e2826f2b179eab4a906ce6bb7cf3cf  
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 Korea to China ppp0, 3 runs of 30s each per scheme
 3 flows with 10s interval between flows (mean of all runs by scheme)



test from AWS Korea to China ppp0, 3 runs of 30s each per scheme
 3 flows with 10s interval between flows



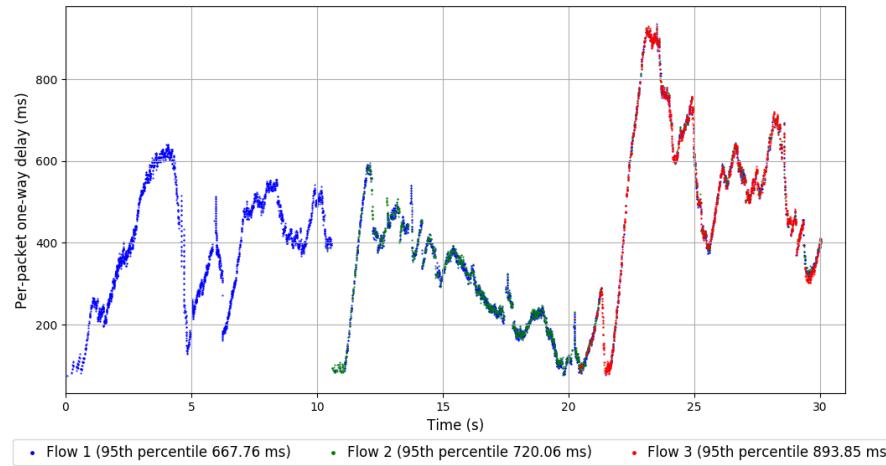
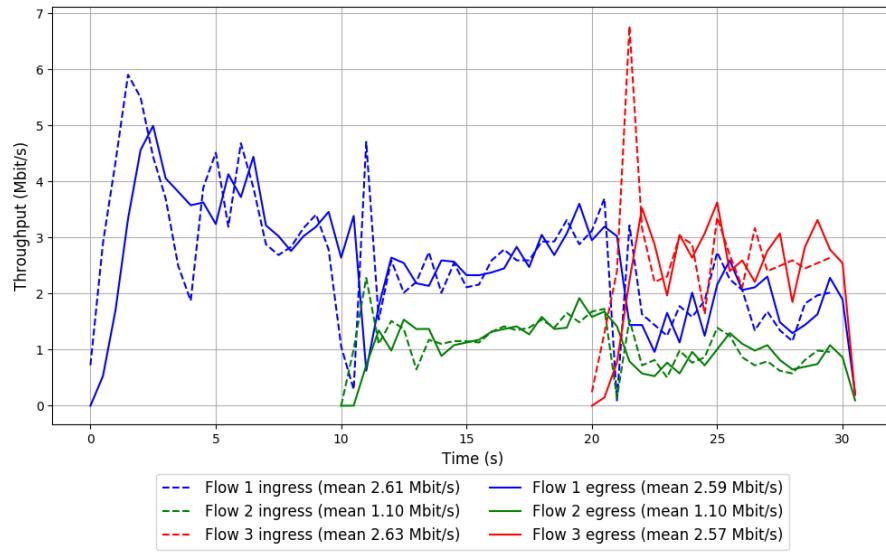
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	2.55	1.35	1.46	737.40	786.54	911.22	1.09	1.99	5.92
Copa		1.33	1.35	1.36	121.67	131.53	147.09	0.10	0.24	0.29
TCP Cubic		4.53	0.44	0.04	4007.40	4046.58	3964.71	11.49	32.05	56.60
FillP		0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Indigo		0.83	1.28	1.46	334.95	190.19	180.14	0.16	0.19	0.29
LEDBAT		2.63	0.85	0.56	262.08	269.78	278.61	0.32	0.95	2.25
PCC-Allegro		3.70	1.57	0.39	3051.96	3241.02	3259.51	36.67	41.34	49.22
PCC-Expr		3.75	0.01	0.00	9526.16	8928.24	7222.75	35.72	40.42	62.84
QUIC Cubic		3.25	0.83	0.40	1541.92	1578.91	1633.28	3.93	6.89	22.23
SCReAM		0.16	0.11	0.12	99.02	92.21	95.41	0.00	0.00	0.64
Sprout		0.22	0.25	0.25	108.54	104.81	108.74	0.06	0.16	0.00
TaoVA-100x		2.08	1.71	1.68	380.06	544.11	722.81	0.85	1.20	0.73
TCP Vegas		4.56	1.56	2.16	540.87	675.11	1925.83	3.43	2.47	11.81
Verus		4.08	0.32	0.04	1126.76	1625.18	1072.40	2.19	3.20	9.72
PCC-Vivace		1.48	1.88	0.50	1482.34	1513.50	1422.77	4.04	4.61	6.51
WebRTC media		0.75	0.54	0.24	245.73	281.67	233.03	0.04	0.16	0.62

Run 1: Statistics of TCP BBR

```
Start at: 2018-06-18 15:09:49
End at: 2018-06-18 15:10:19
Local clock offset: -1.651 ms
Remote clock offset: -1.117 ms

# Below is generated by plot.py at 2018-06-18 16:03:25
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.15 Mbit/s
95th percentile per-packet one-way delay: 751.743 ms
Loss rate: 1.50%
-- Flow 1:
Average throughput: 2.59 Mbit/s
95th percentile per-packet one-way delay: 667.760 ms
Loss rate: 0.78%
-- Flow 2:
Average throughput: 1.10 Mbit/s
95th percentile per-packet one-way delay: 720.063 ms
Loss rate: 1.48%
-- Flow 3:
Average throughput: 2.57 Mbit/s
95th percentile per-packet one-way delay: 893.850 ms
Loss rate: 3.67%
```

Run 1: Report of TCP BBR — Data Link

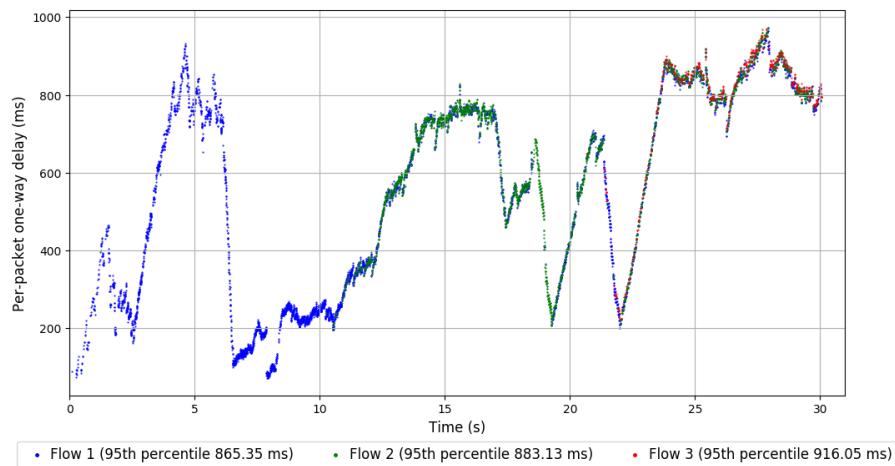
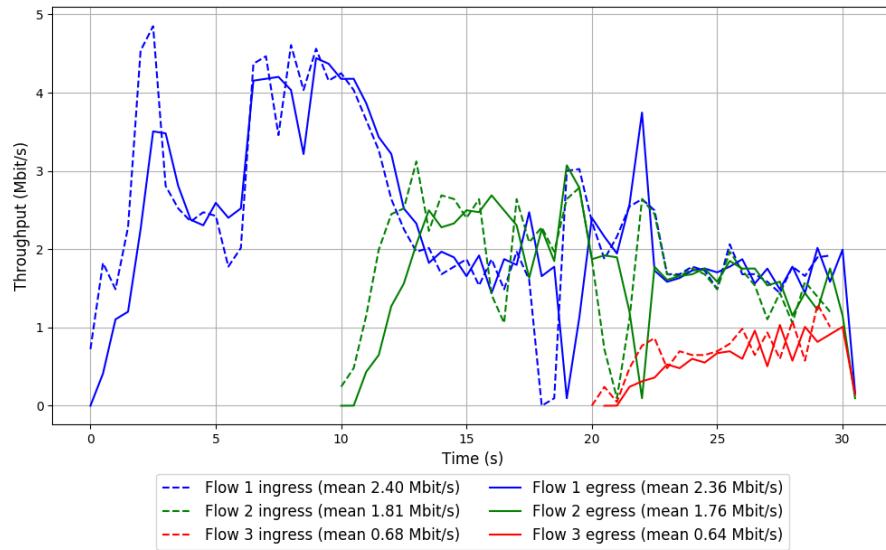


Run 2: Statistics of TCP BBR

```
Start at: 2018-06-18 15:33:32
End at: 2018-06-18 15:34:02
Local clock offset: -1.094 ms
Remote clock offset: -0.869 ms

# Below is generated by plot.py at 2018-06-18 16:03:25
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.72 Mbit/s
95th percentile per-packet one-way delay: 879.663 ms
Loss rate: 2.75%
-- Flow 1:
Average throughput: 2.36 Mbit/s
95th percentile per-packet one-way delay: 865.346 ms
Loss rate: 1.87%
-- Flow 2:
Average throughput: 1.76 Mbit/s
95th percentile per-packet one-way delay: 883.133 ms
Loss rate: 2.95%
-- Flow 3:
Average throughput: 0.64 Mbit/s
95th percentile per-packet one-way delay: 916.053 ms
Loss rate: 11.03%
```

Run 2: Report of TCP BBR — Data Link

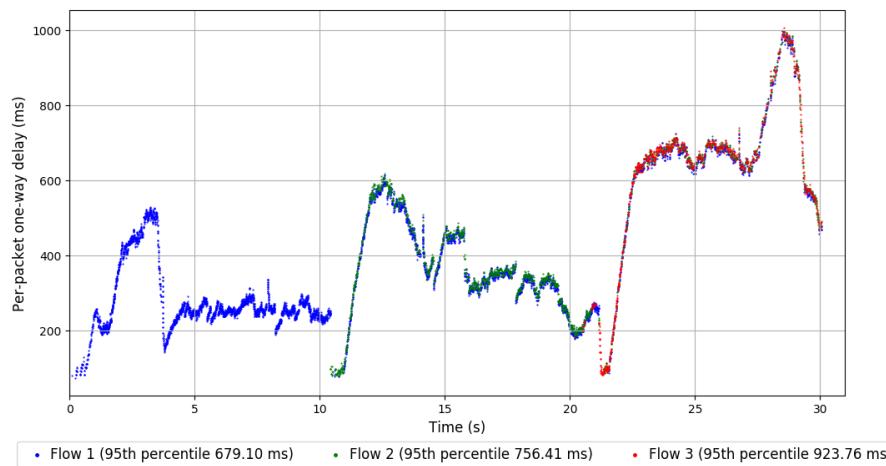
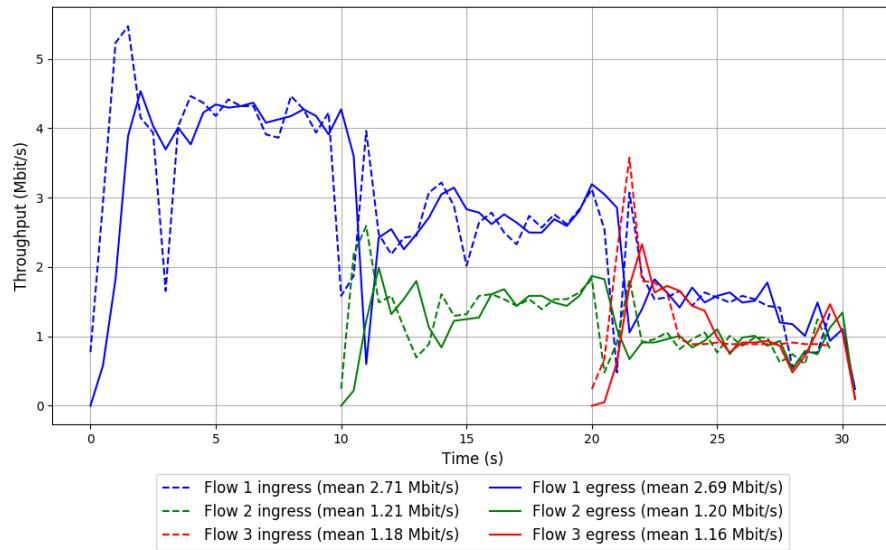


Run 3: Statistics of TCP BBR

```
Start at: 2018-06-18 15:56:27
End at: 2018-06-18 15:56:57
Local clock offset: -4.641 ms
Remote clock offset: -0.51 ms

# Below is generated by plot.py at 2018-06-18 16:03:25
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.86 Mbit/s
95th percentile per-packet one-way delay: 699.882 ms
Loss rate: 1.06%
-- Flow 1:
Average throughput: 2.69 Mbit/s
95th percentile per-packet one-way delay: 679.103 ms
Loss rate: 0.62%
-- Flow 2:
Average throughput: 1.20 Mbit/s
95th percentile per-packet one-way delay: 756.413 ms
Loss rate: 1.54%
-- Flow 3:
Average throughput: 1.16 Mbit/s
95th percentile per-packet one-way delay: 923.764 ms
Loss rate: 3.06%
```

Run 3: Report of TCP BBR — Data Link

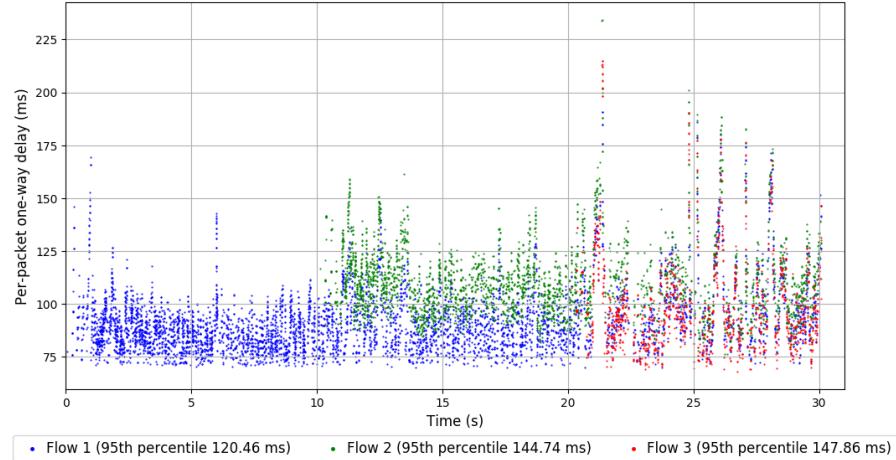
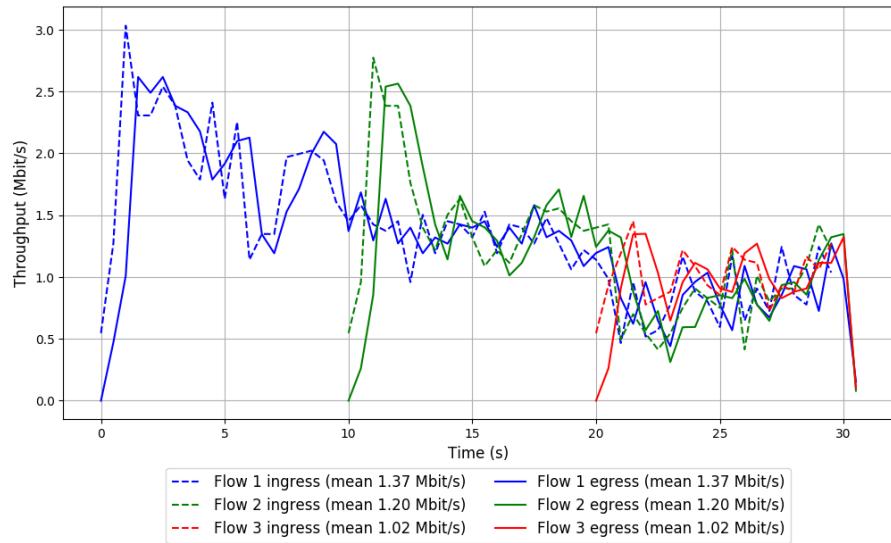


Run 1: Statistics of Copa

```
Start at: 2018-06-18 15:15:41
End at: 2018-06-18 15:16:11
Local clock offset: -0.838 ms
Remote clock offset: -1.15 ms

# Below is generated by plot.py at 2018-06-18 16:03:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.50 Mbit/s
95th percentile per-packet one-way delay: 135.247 ms
Loss rate: 0.17%
-- Flow 1:
Average throughput: 1.37 Mbit/s
95th percentile per-packet one-way delay: 120.458 ms
Loss rate: 0.09%
-- Flow 2:
Average throughput: 1.20 Mbit/s
95th percentile per-packet one-way delay: 144.743 ms
Loss rate: 0.27%
-- Flow 3:
Average throughput: 1.02 Mbit/s
95th percentile per-packet one-way delay: 147.860 ms
Loss rate: 0.26%
```

Run 1: Report of Copa — Data Link

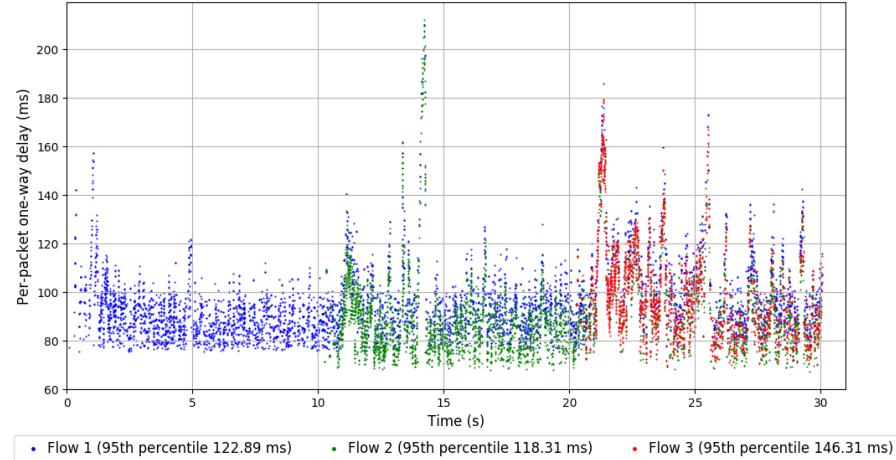
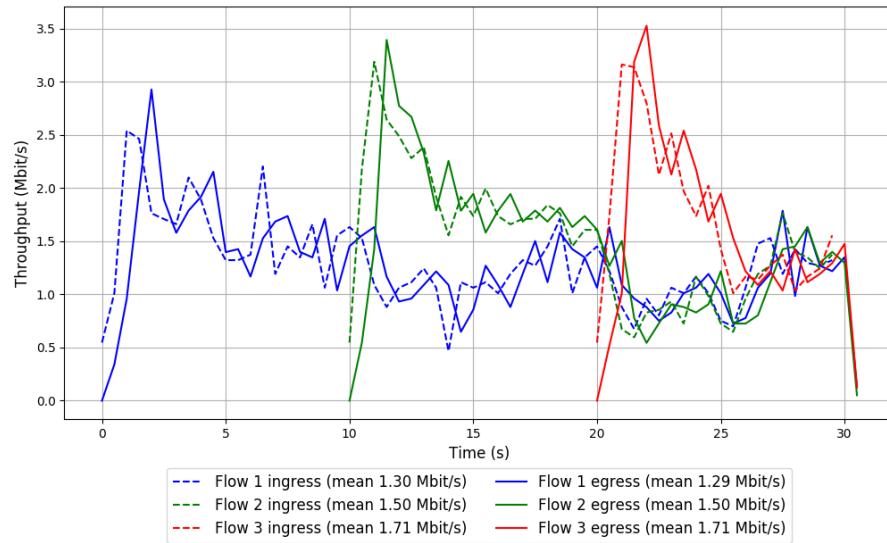


Run 2: Statistics of Copa

```
Start at: 2018-06-18 15:39:13
End at: 2018-06-18 15:39:43
Local clock offset: -2.586 ms
Remote clock offset: -0.817 ms

# Below is generated by plot.py at 2018-06-18 16:03:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.86 Mbit/s
95th percentile per-packet one-way delay: 125.789 ms
Loss rate: 0.19%
-- Flow 1:
Average throughput: 1.29 Mbit/s
95th percentile per-packet one-way delay: 122.885 ms
Loss rate: 0.10%
-- Flow 2:
Average throughput: 1.50 Mbit/s
95th percentile per-packet one-way delay: 118.313 ms
Loss rate: 0.22%
-- Flow 3:
Average throughput: 1.71 Mbit/s
95th percentile per-packet one-way delay: 146.312 ms
Loss rate: 0.32%
```

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

/home/ubuntu/pantheon/data/2018-06-18T14-53-AWS-Korea-to-China-ppp0-3-runs-3-flows/copa_stat

Run 3: Report of Copa — Data Link

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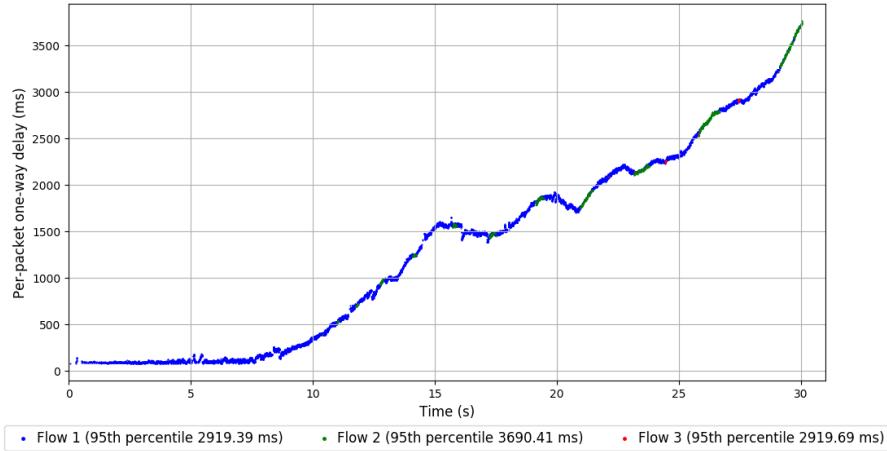
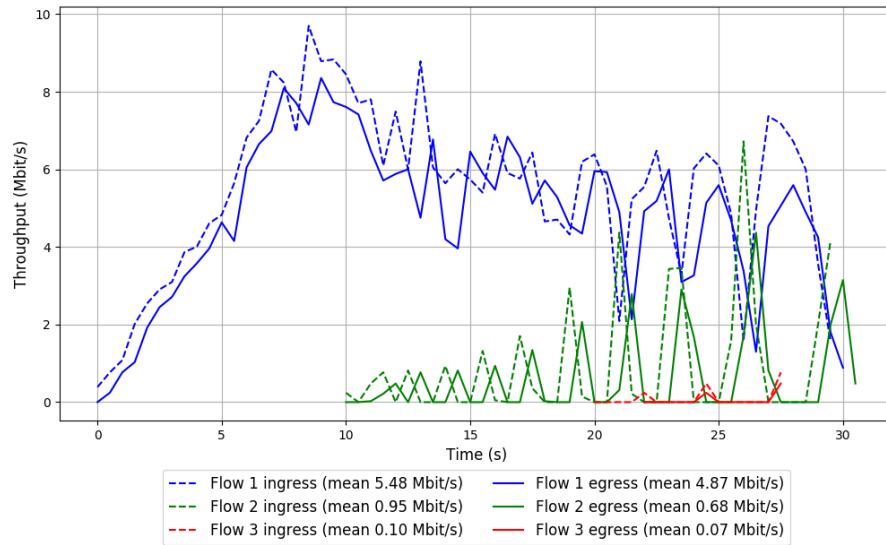
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```
Run 1: Statistics of TCP Cubic
```

```
Start at: 2018-06-18 15:11:16
End at: 2018-06-18 15:11:46
Local clock offset: -1.45 ms
Remote clock offset: -1.09 ms

# Below is generated by plot.py at 2018-06-18 16:03:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.31 Mbit/s
95th percentile per-packet one-way delay: 3019.384 ms
Loss rate: 13.46%
-- Flow 1:
Average throughput: 4.87 Mbit/s
95th percentile per-packet one-way delay: 2919.388 ms
Loss rate: 11.52%
-- Flow 2:
Average throughput: 0.68 Mbit/s
95th percentile per-packet one-way delay: 3690.413 ms
Loss rate: 28.81%
-- Flow 3:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 2919.694 ms
Loss rate: 51.41%
```

Run 1: Report of TCP Cubic — Data Link

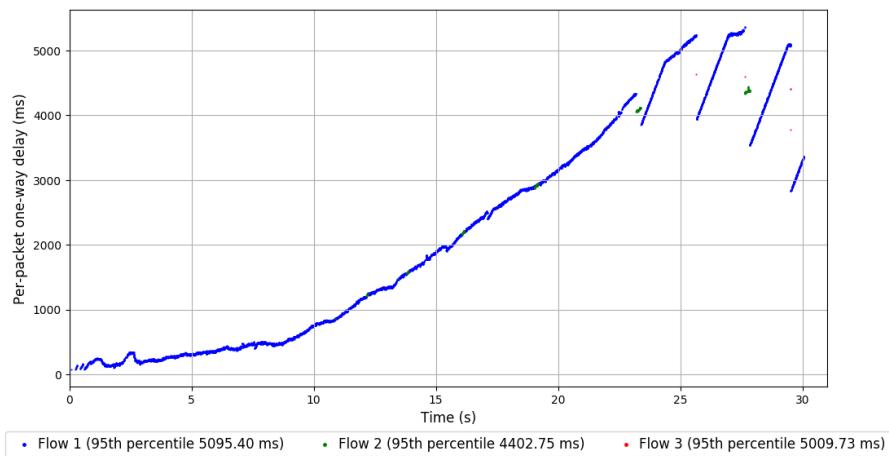
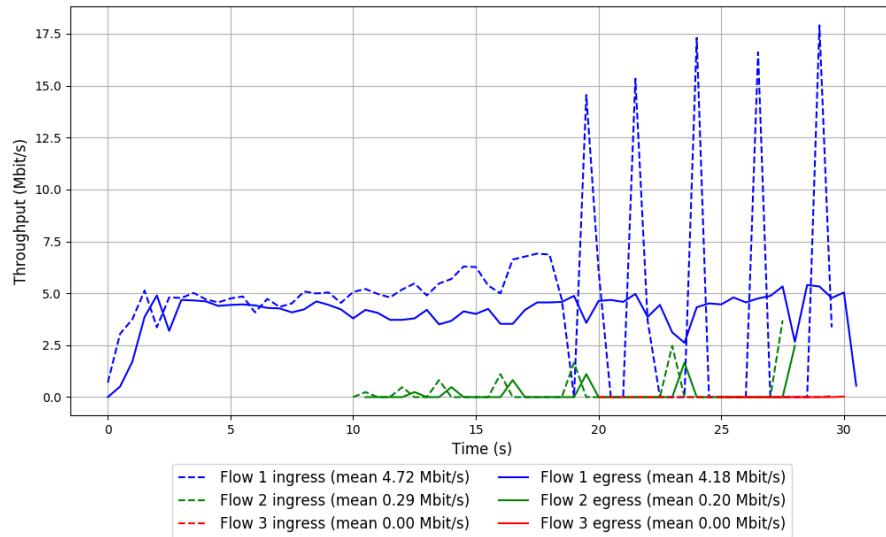


Run 2: Statistics of TCP Cubic

```
Start at: 2018-06-18 15:34:57
End at: 2018-06-18 15:35:27
Local clock offset: -1.721 ms
Remote clock offset: -0.874 ms

# Below is generated by plot.py at 2018-06-18 16:03:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.30 Mbit/s
95th percentile per-packet one-way delay: 5094.649 ms
Loss rate: 12.32%
-- Flow 1:
Average throughput: 4.18 Mbit/s
95th percentile per-packet one-way delay: 5095.404 ms
Loss rate: 11.46%
-- Flow 2:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 4402.746 ms
Loss rate: 35.30%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 5009.735 ms
Loss rate: 61.79%
```

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

/home/ubuntu/pantheon/data/2018-06-18T14-53-AWS-Korea-to-China-ppp0-3-runs-3-flows/cubic_sta

Run 3: Report of TCP Cubic — Data Link

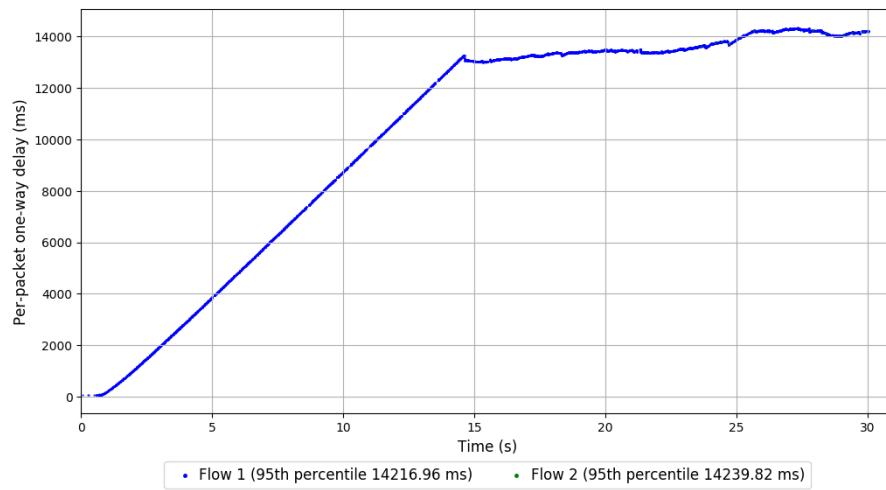
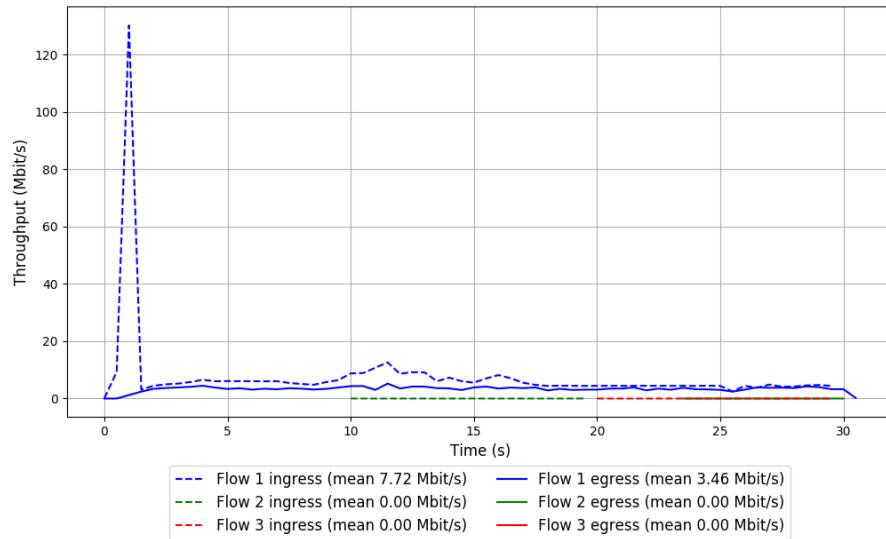
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Run 1: Statistics of FillP

Start at: 2018-06-18 15:08:23
End at: 2018-06-18 15:08:53
Local clock offset: -1.759 ms
Remote clock offset: -1.03 ms

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

/home/ubuntu/pantheon/data/2018-06-18T14-53-AWS-Korea-to-China-ppp0-3-runs-3-flows/fillp_st

Run 2: Report of FillP — Data Link

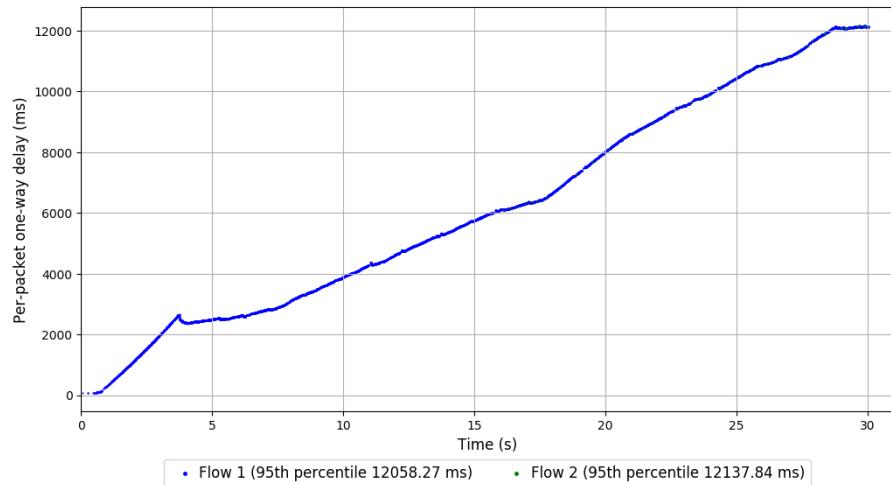
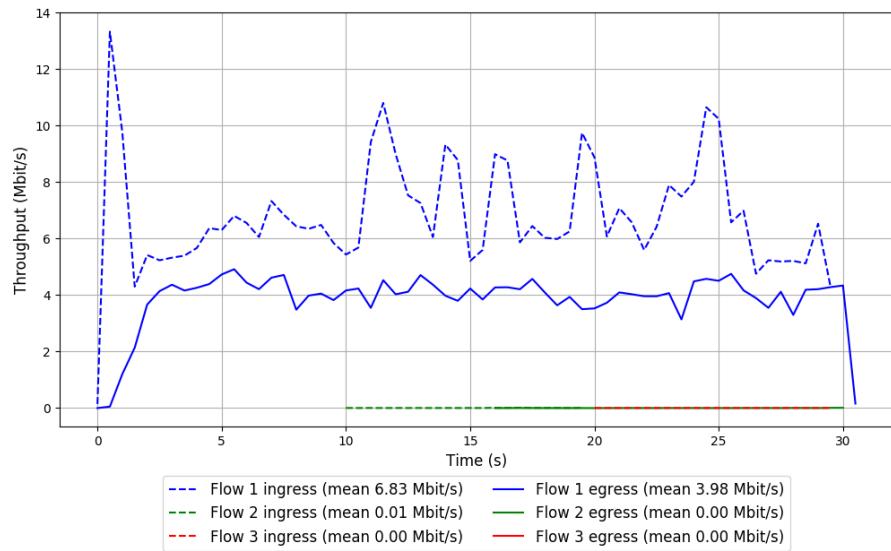
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Run 3: Statistics of FillP

Start at: 2018-06-18 15:55:01
End at: 2018-06-18 15:55:31
Local clock offset: -4.346 ms
Remote clock offset: -0.578 ms

Run 3: Report of FillP — Data Link

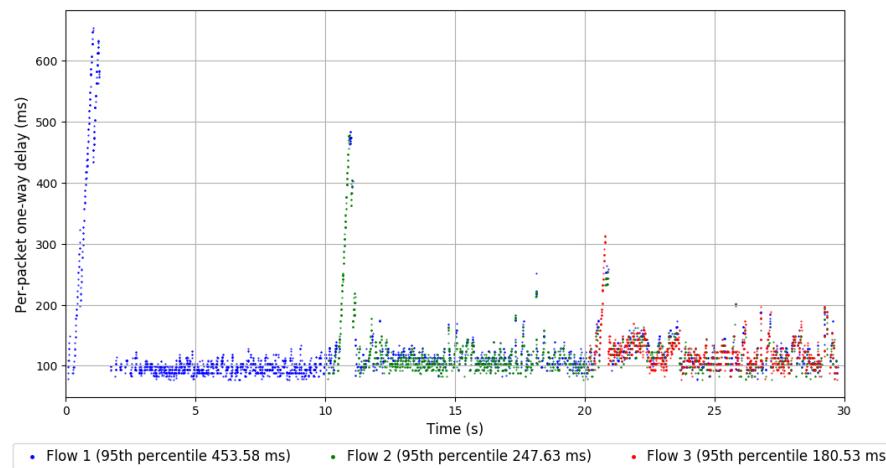
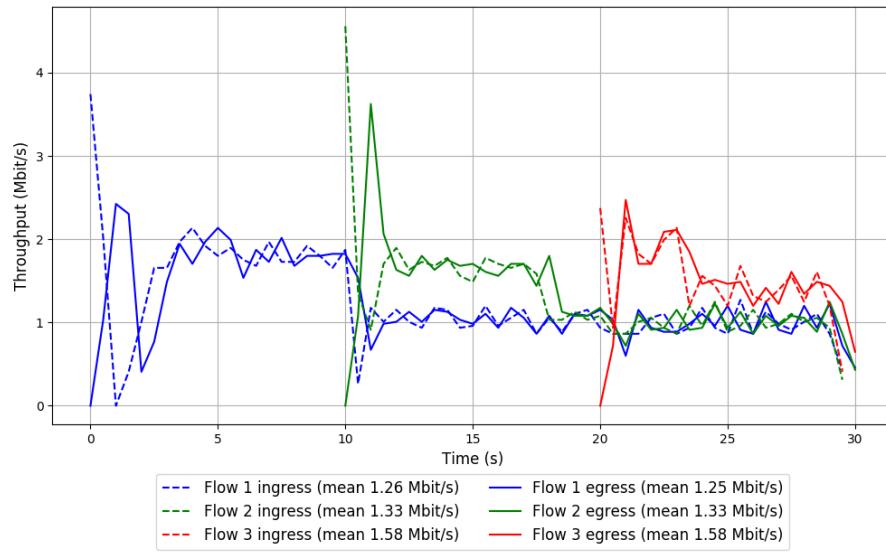


Run 1: Statistics of Indigo

```
Start at: 2018-06-18 15:14:16
End at: 2018-06-18 15:14:46
Local clock offset: -1.065 ms
Remote clock offset: -1.178 ms

# Below is generated by plot.py at 2018-06-18 16:03:35
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.64 Mbit/s
95th percentile per-packet one-way delay: 272.372 ms
Loss rate: 0.24%
-- Flow 1:
Average throughput: 1.25 Mbit/s
95th percentile per-packet one-way delay: 453.579 ms
Loss rate: 0.23%
-- Flow 2:
Average throughput: 1.33 Mbit/s
95th percentile per-packet one-way delay: 247.629 ms
Loss rate: 0.23%
-- Flow 3:
Average throughput: 1.58 Mbit/s
95th percentile per-packet one-way delay: 180.528 ms
Loss rate: 0.32%
```

Run 1: Report of Indigo — Data Link

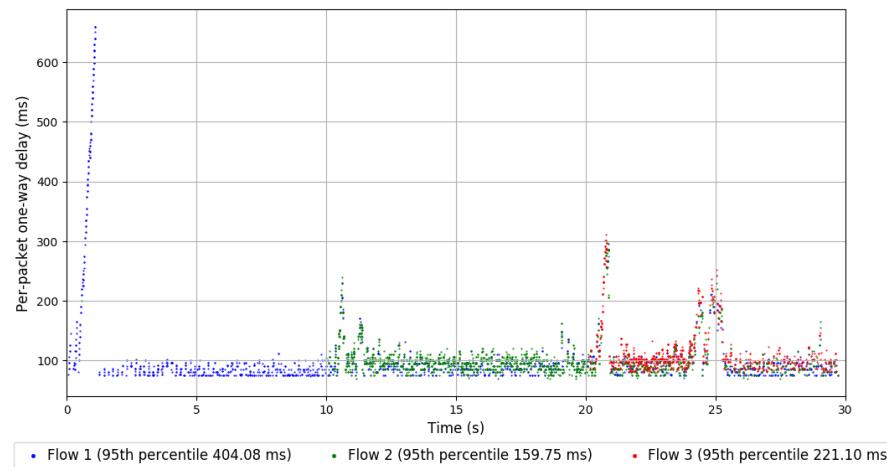
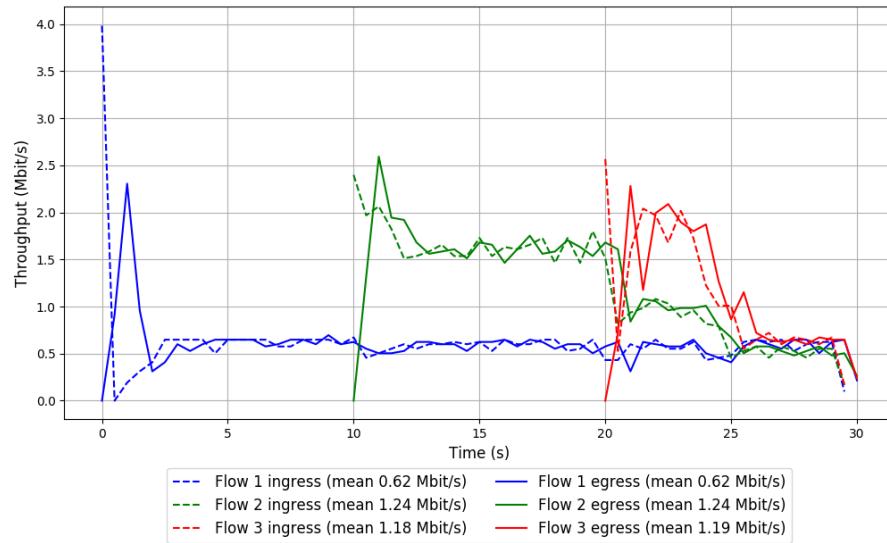


Run 2: Statistics of Indigo

```
Start at: 2018-06-18 15:37:51
End at: 2018-06-18 15:38:21
Local clock offset: -2.313 ms
Remote clock offset: -0.742 ms

# Below is generated by plot.py at 2018-06-18 16:03:35
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.82 Mbit/s
95th percentile per-packet one-way delay: 209.031 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 0.62 Mbit/s
95th percentile per-packet one-way delay: 404.081 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 1.24 Mbit/s
95th percentile per-packet one-way delay: 159.746 ms
Loss rate: 0.10%
-- Flow 3:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 221.096 ms
Loss rate: 0.32%
```

Run 2: Report of Indigo — Data Link

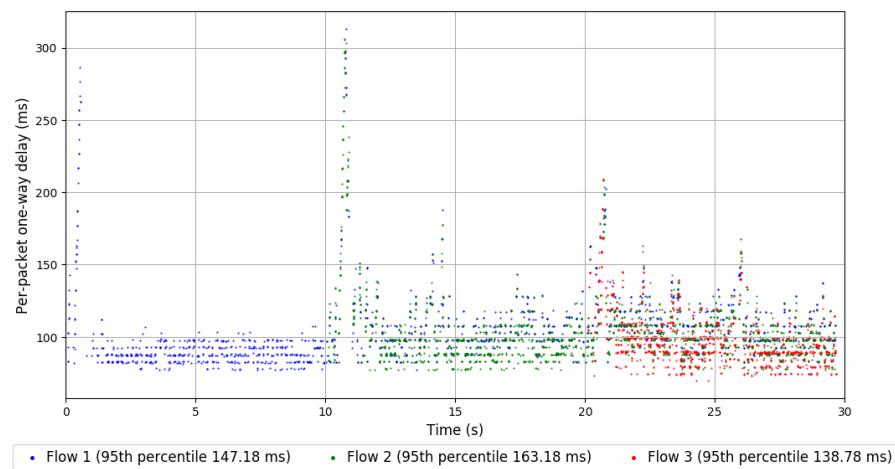
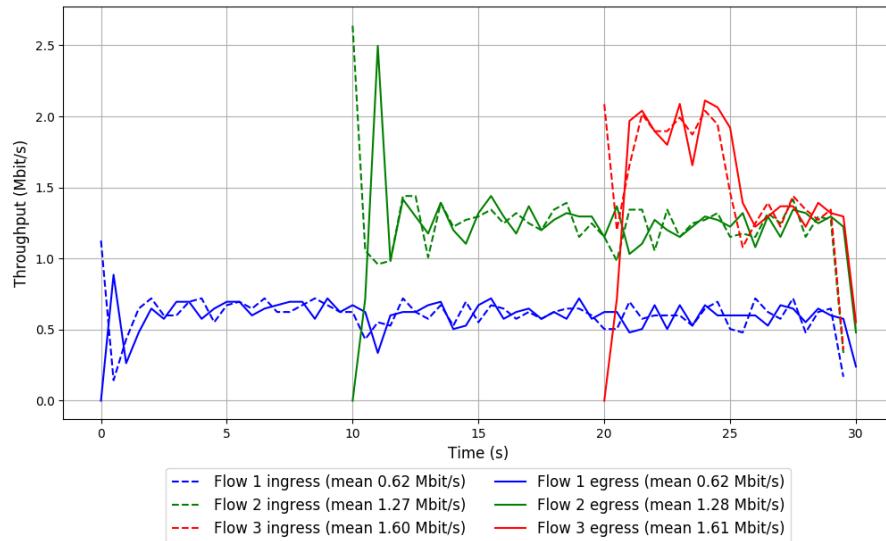


Run 3: Statistics of Indigo

```
Start at: 2018-06-18 16:00:56
End at: 2018-06-18 16:01:26
Local clock offset: -5.078 ms
Remote clock offset: -0.681 ms

# Below is generated by plot.py at 2018-06-18 16:03:35
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 144.669 ms
Loss rate: 0.25%
-- Flow 1:
Average throughput: 0.62 Mbit/s
95th percentile per-packet one-way delay: 147.181 ms
Loss rate: 0.26%
-- Flow 2:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 163.181 ms
Loss rate: 0.24%
-- Flow 3:
Average throughput: 1.61 Mbit/s
95th percentile per-packet one-way delay: 138.784 ms
Loss rate: 0.23%
```

Run 3: Report of Indigo — Data Link

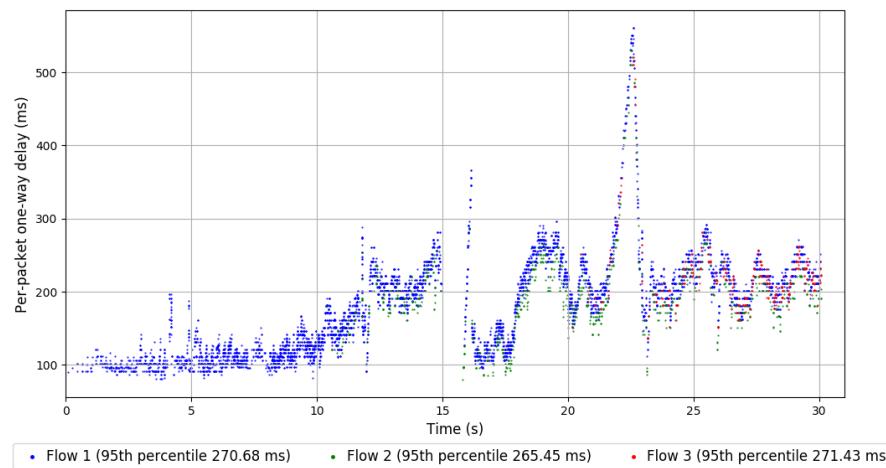
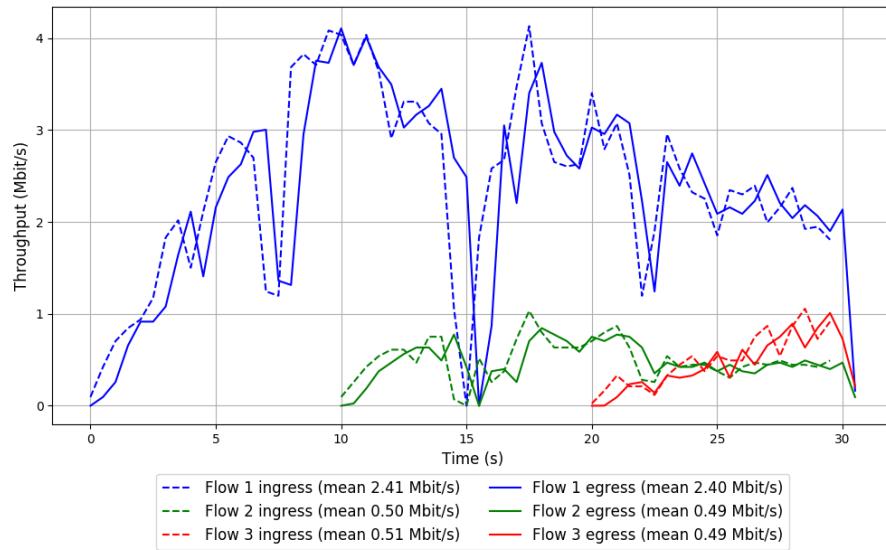


```
Run 1: Statistics of LEDBAT

Start at: 2018-06-18 15:01:26
End at: 2018-06-18 15:01:56
Local clock offset: -3.291 ms
Remote clock offset: -0.792 ms

# Below is generated by plot.py at 2018-06-18 16:03:35
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.89 Mbit/s
95th percentile per-packet one-way delay: 270.563 ms
Loss rate: 0.51%
-- Flow 1:
Average throughput: 2.40 Mbit/s
95th percentile per-packet one-way delay: 270.679 ms
Loss rate: 0.36%
-- Flow 2:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 265.447 ms
Loss rate: 0.71%
-- Flow 3:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 271.429 ms
Loss rate: 2.35%
```

Run 1: Report of LEDBAT — Data Link

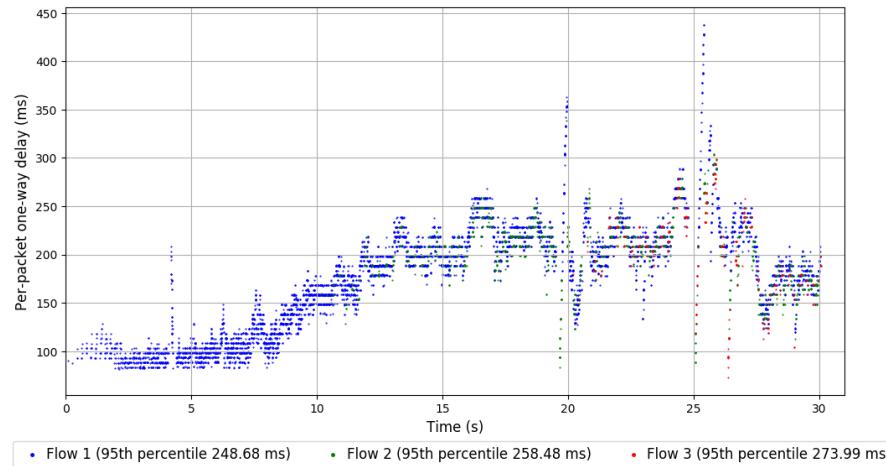
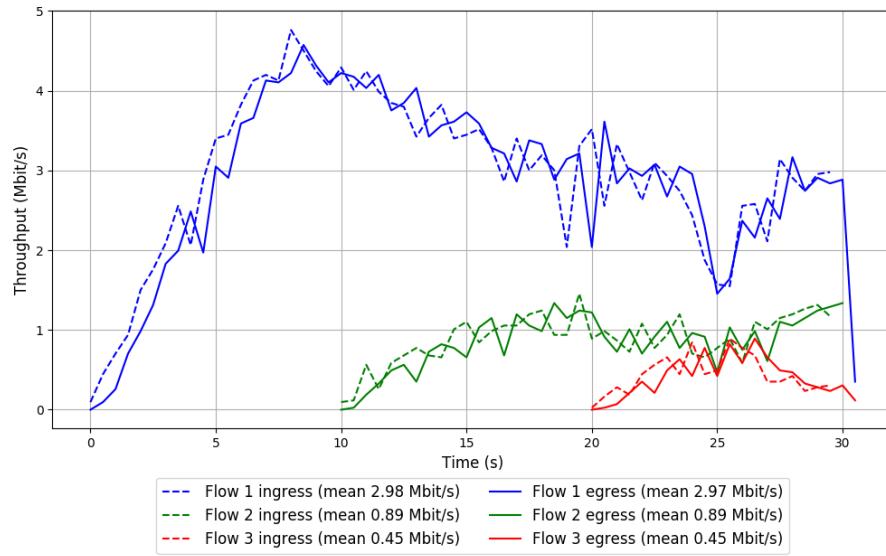


Run 2: Statistics of LEDBAT

```
Start at: 2018-06-18 15:24:42
End at: 2018-06-18 15:25:12
Local clock offset: -0.83 ms
Remote clock offset: -1.093 ms

# Below is generated by plot.py at 2018-06-18 16:03:35
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.70 Mbit/s
95th percentile per-packet one-way delay: 253.089 ms
Loss rate: 0.53%
-- Flow 1:
Average throughput: 2.97 Mbit/s
95th percentile per-packet one-way delay: 248.677 ms
Loss rate: 0.35%
-- Flow 2:
Average throughput: 0.89 Mbit/s
95th percentile per-packet one-way delay: 258.484 ms
Loss rate: 1.39%
-- Flow 3:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 273.991 ms
Loss rate: 0.53%
```

Run 2: Report of LEDBAT — Data Link

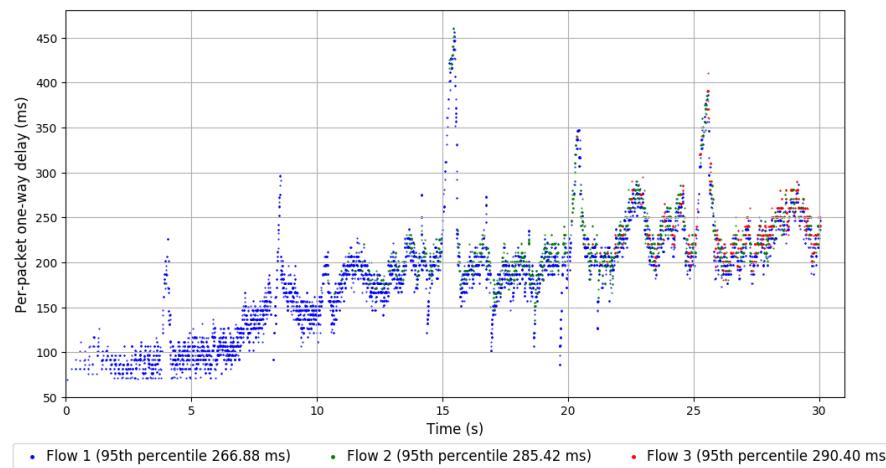
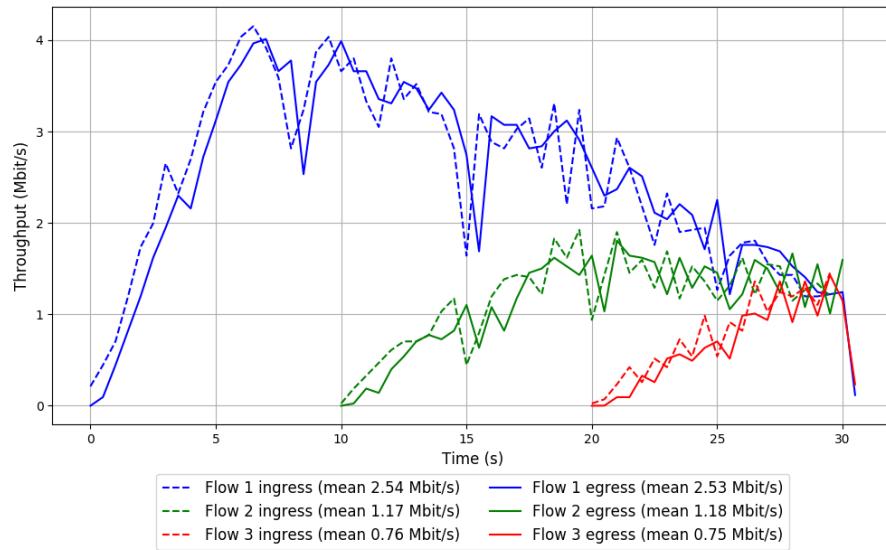


Run 3: Statistics of LEDBAT

```
Start at: 2018-06-18 15:48:05
End at: 2018-06-18 15:48:35
Local clock offset: -3.865 ms
Remote clock offset: -0.69 ms

# Below is generated by plot.py at 2018-06-18 16:03:35
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.55 Mbit/s
95th percentile per-packet one-way delay: 276.779 ms
Loss rate: 0.62%
-- Flow 1:
Average throughput: 2.53 Mbit/s
95th percentile per-packet one-way delay: 266.875 ms
Loss rate: 0.26%
-- Flow 2:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 285.418 ms
Loss rate: 0.75%
-- Flow 3:
Average throughput: 0.75 Mbit/s
95th percentile per-packet one-way delay: 290.404 ms
Loss rate: 3.87%
```

Run 3: Report of LEDBAT — Data Link

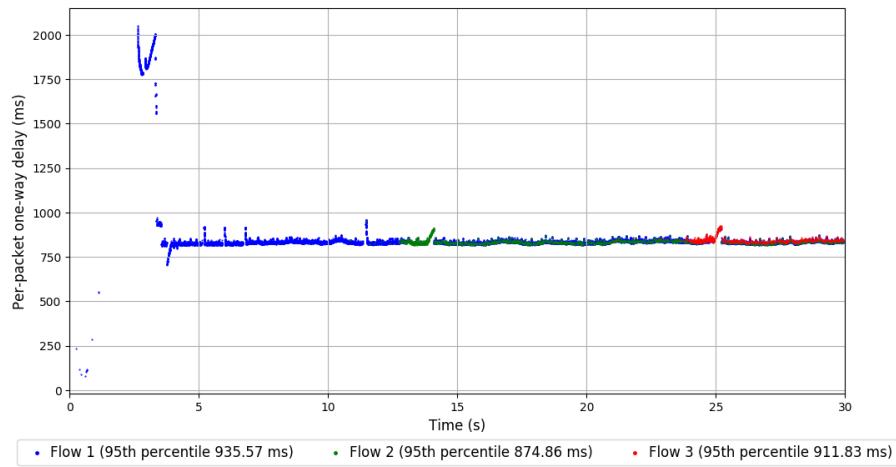
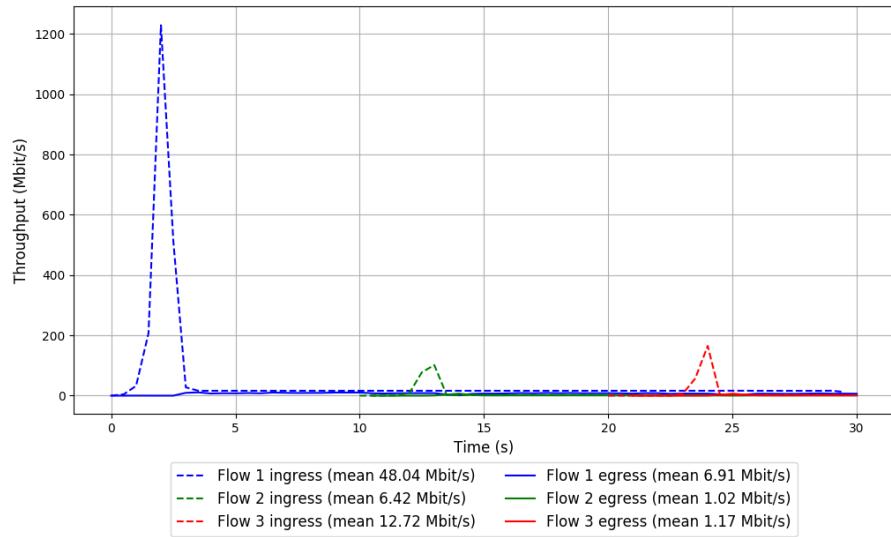


```
Run 1: Statistics of PCC-Allegro
```

```
Start at: 2018-06-18 15:12:46
End at: 2018-06-18 15:13:16
Local clock offset: -1.181 ms
Remote clock offset: -1.115 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.91 Mbit/s
95th percentile per-packet one-way delay: 913.339 ms
Loss rate: 86.07%
-- Flow 1:
Average throughput: 6.91 Mbit/s
95th percentile per-packet one-way delay: 935.573 ms
Loss rate: 85.70%
-- Flow 2:
Average throughput: 1.02 Mbit/s
95th percentile per-packet one-way delay: 874.855 ms
Loss rate: 84.67%
-- Flow 3:
Average throughput: 1.17 Mbit/s
95th percentile per-packet one-way delay: 911.826 ms
Loss rate: 91.74%
```

Run 1: Report of PCC-Allegro — Data Link

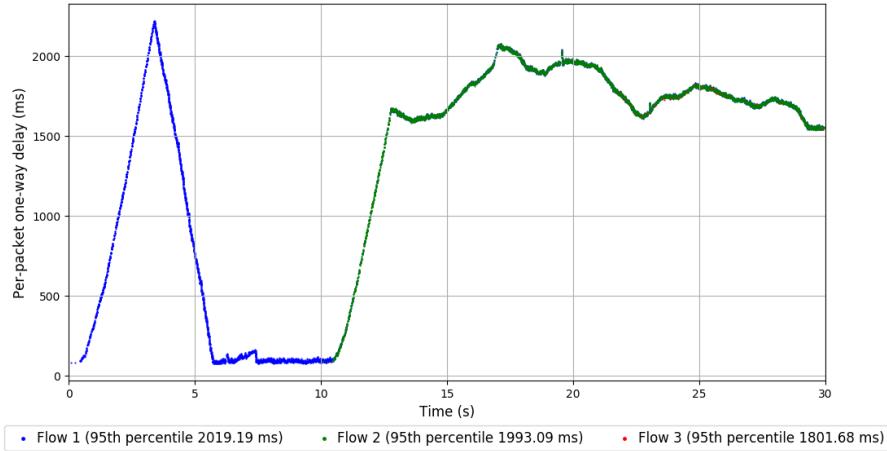
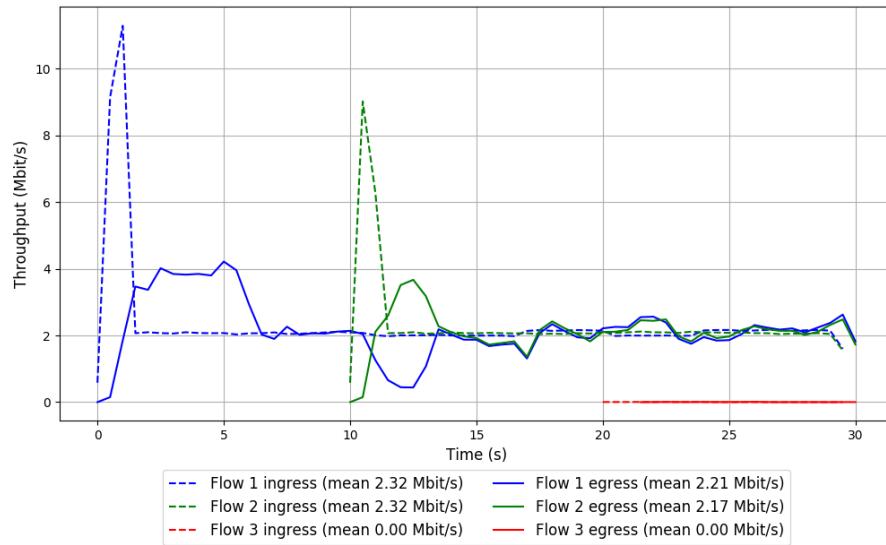


Run 2: Statistics of PCC-Allegro

```
Start at: 2018-06-18 15:36:26
End at: 2018-06-18 15:36:56
Local clock offset: -2.025 ms
Remote clock offset: -0.81 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.65 Mbit/s
95th percentile per-packet one-way delay: 2008.795 ms
Loss rate: 5.47%
-- Flow 1:
Average throughput: 2.21 Mbit/s
95th percentile per-packet one-way delay: 2019.190 ms
Loss rate: 4.64%
-- Flow 2:
Average throughput: 2.17 Mbit/s
95th percentile per-packet one-way delay: 1993.085 ms
Loss rate: 6.70%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 1801.684 ms
Loss rate: 3.80%
```

Run 2: Report of PCC-Allegro — Data Link

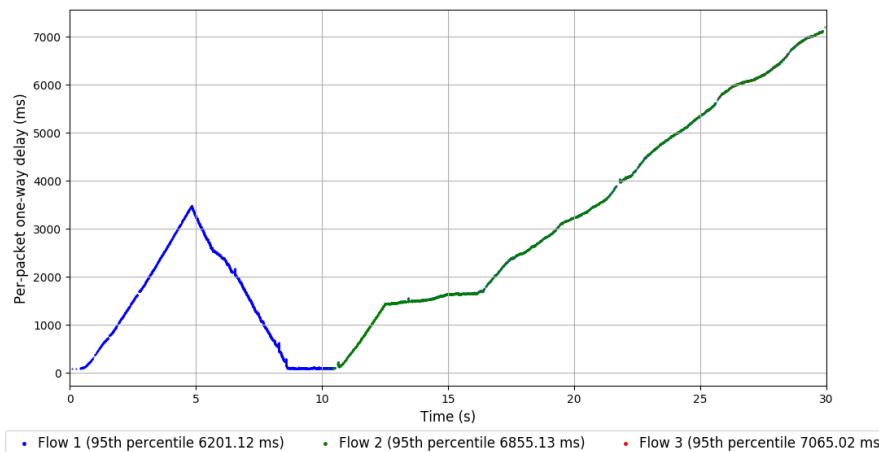
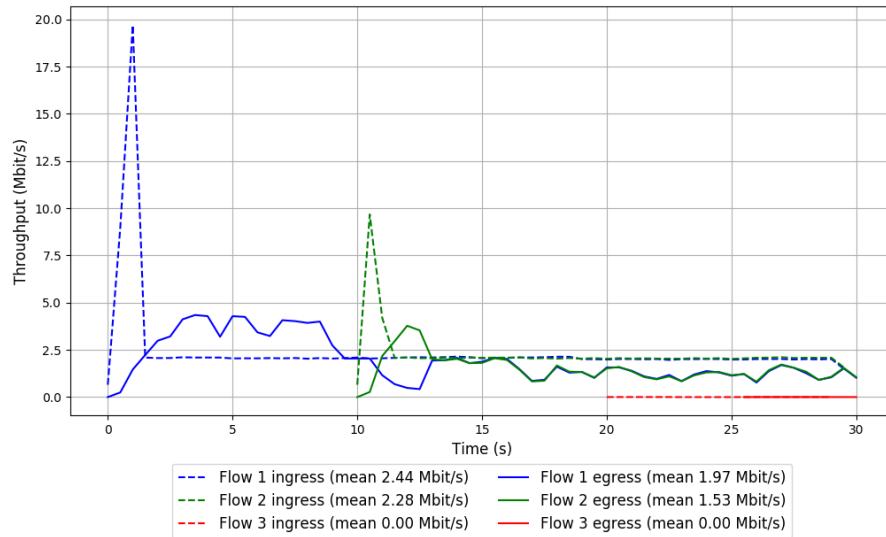


Run 3: Statistics of PCC-Allegro

```
Start at: 2018-06-18 15:59:33
End at: 2018-06-18 16:00:03
Local clock offset: -4.814 ms
Remote clock offset: -0.59 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.98 Mbit/s
95th percentile per-packet one-way delay: 6422.156 ms
Loss rate: 24.64%
-- Flow 1:
Average throughput: 1.97 Mbit/s
95th percentile per-packet one-way delay: 6201.119 ms
Loss rate: 19.66%
-- Flow 2:
Average throughput: 1.53 Mbit/s
95th percentile per-packet one-way delay: 6855.132 ms
Loss rate: 32.66%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 7065.016 ms
Loss rate: 52.11%
```

Run 3: Report of PCC-Allegro — Data Link



Run 1: Statistics of PCC-Expr

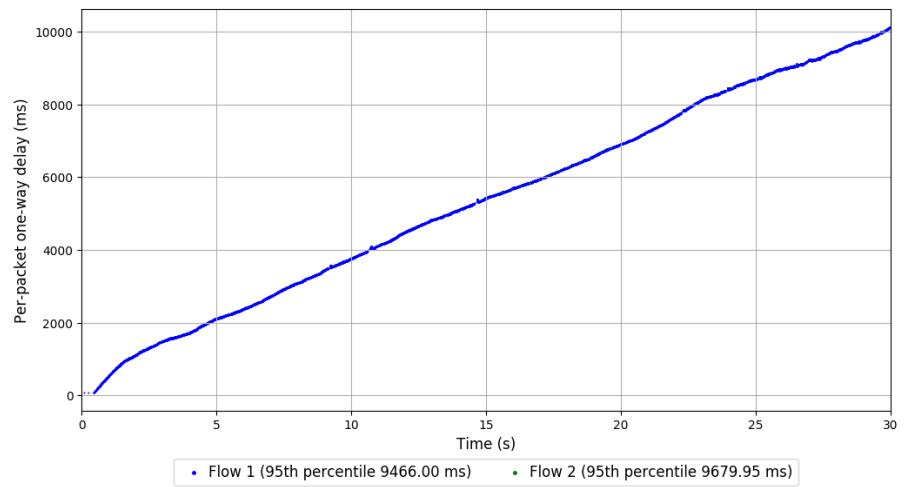
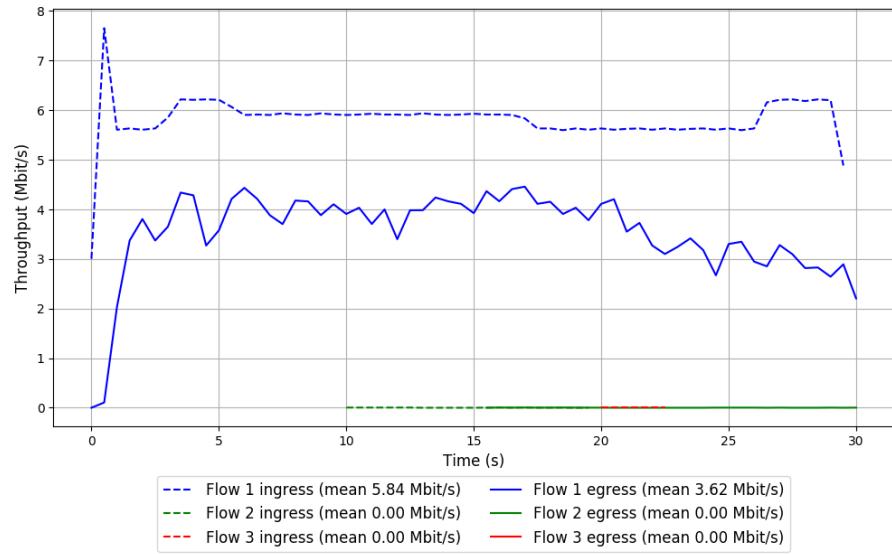
Start at: 2018-06-18 14:58:32

End at: 2018-06-18 14:59:02

Local clock offset: -3.084 ms

Remote clock offset: -0.549 ms

Run 1: Report of PCC-Expr — Data Link

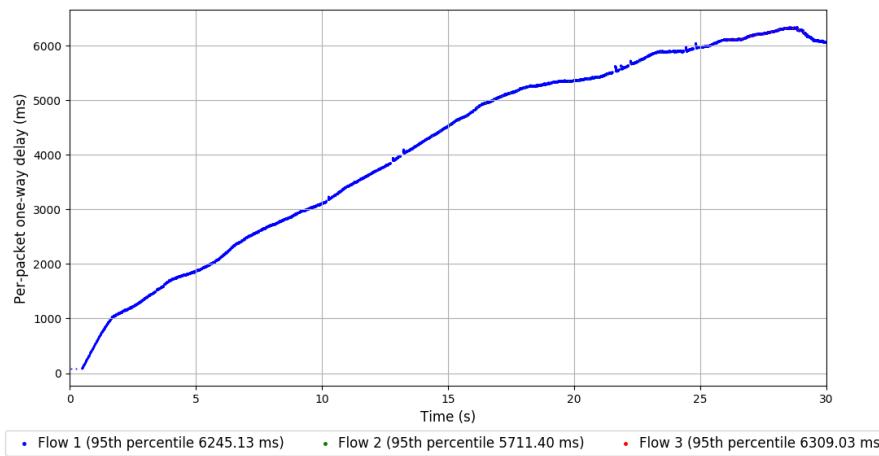
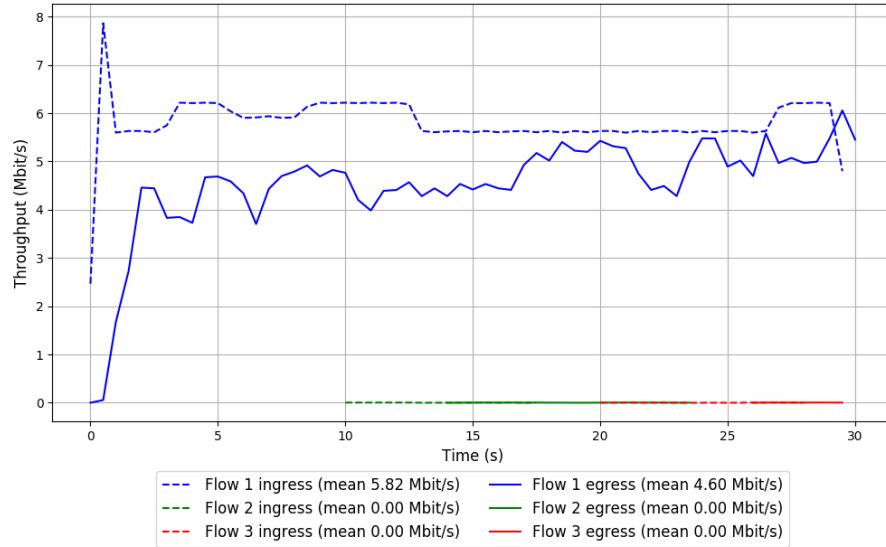


Run 2: Statistics of PCC-Expr

```
Start at: 2018-06-18 15:21:38
End at: 2018-06-18 15:22:08
Local clock offset: -0.787 ms
Remote clock offset: -1.154 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.60 Mbit/s
95th percentile per-packet one-way delay: 6245.649 ms
Loss rate: 21.01%
-- Flow 1:
Average throughput: 4.60 Mbit/s
95th percentile per-packet one-way delay: 6245.132 ms
Loss rate: 21.01%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 5711.400 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 6309.029 ms
Loss rate: 44.83%
```

Run 2: Report of PCC-Expr — Data Link

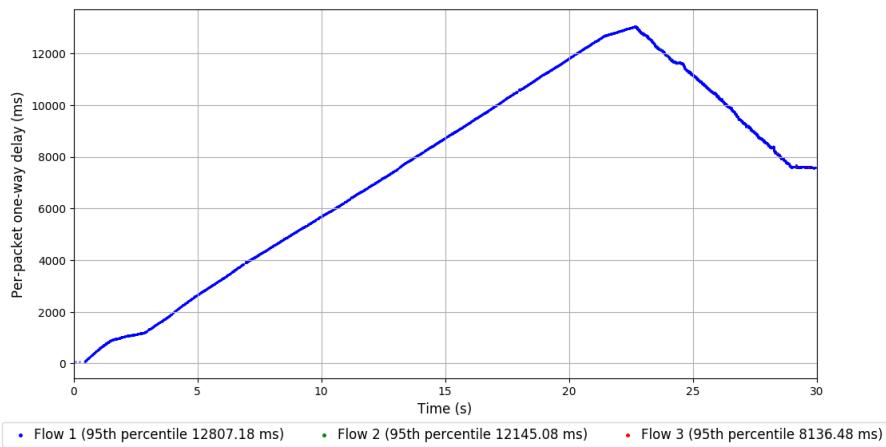
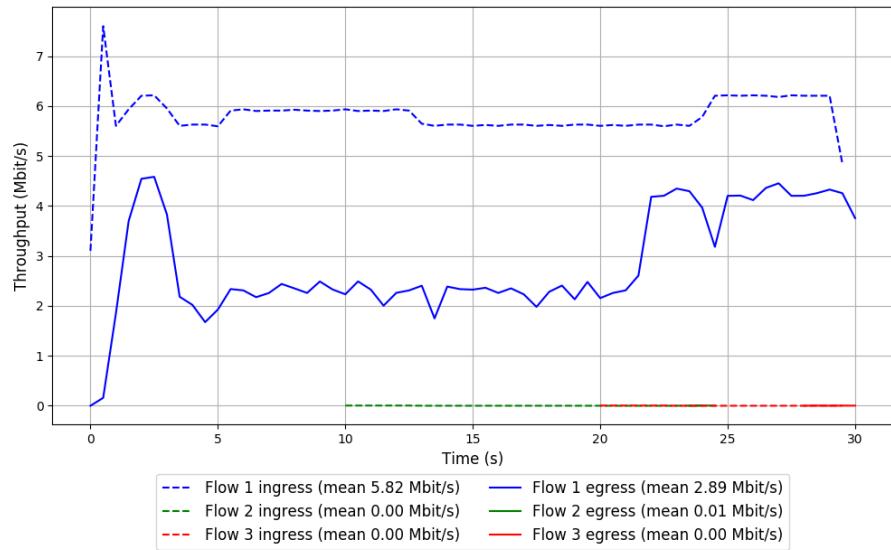


Run 3: Statistics of PCC-Expr

```
Start at: 2018-06-18 15:45:17
End at: 2018-06-18 15:45:47
Local clock offset: -3.438 ms
Remote clock offset: -0.744 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.89 Mbit/s
95th percentile per-packet one-way delay: 12807.181 ms
Loss rate: 50.43%
-- Flow 1:
Average throughput: 2.89 Mbit/s
95th percentile per-packet one-way delay: 12807.181 ms
Loss rate: 50.42%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 12145.075 ms
Loss rate: 80.84%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 8136.478 ms
Loss rate: 80.84%
```

Run 3: Report of PCC-Expr — Data Link

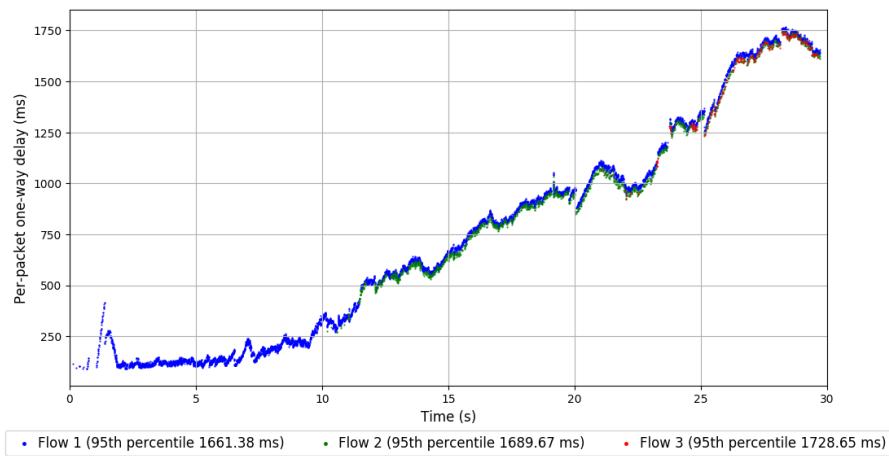
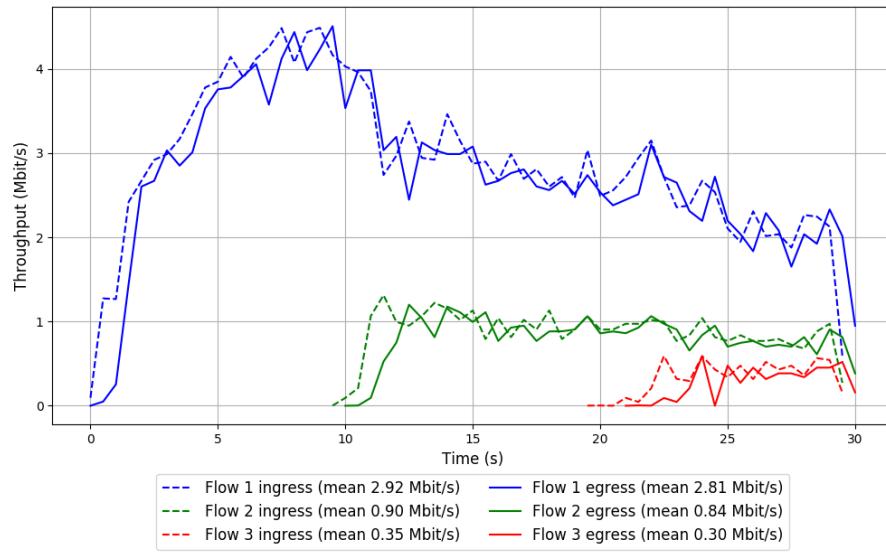


```
Run 1: Statistics of QUIC Cubic
```

```
Start at: 2018-06-18 15:00:02
End at: 2018-06-18 15:00:32
Local clock offset: -3.169 ms
Remote clock offset: -0.676 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.45 Mbit/s
95th percentile per-packet one-way delay: 1685.869 ms
Loss rate: 5.20%
-- Flow 1:
Average throughput: 2.81 Mbit/s
95th percentile per-packet one-way delay: 1661.381 ms
Loss rate: 4.02%
-- Flow 2:
Average throughput: 0.84 Mbit/s
95th percentile per-packet one-way delay: 1689.668 ms
Loss rate: 7.42%
-- Flow 3:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 1728.655 ms
Loss rate: 23.77%
```

Run 1: Report of QUIC Cubic — Data Link

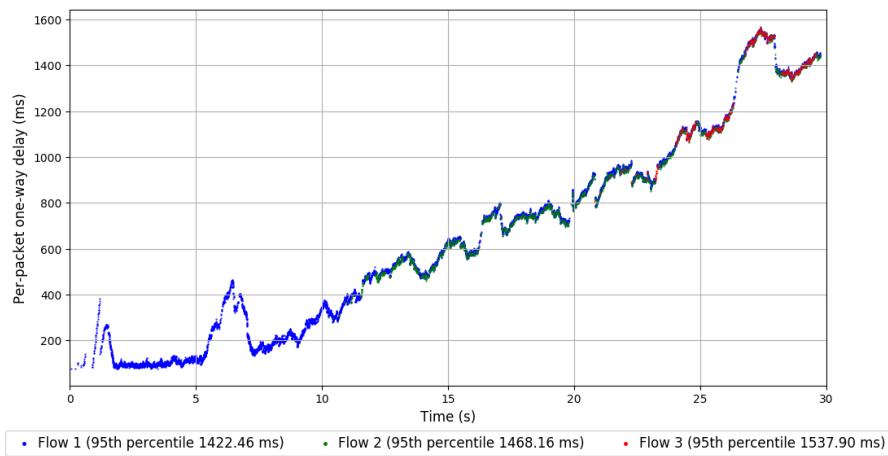
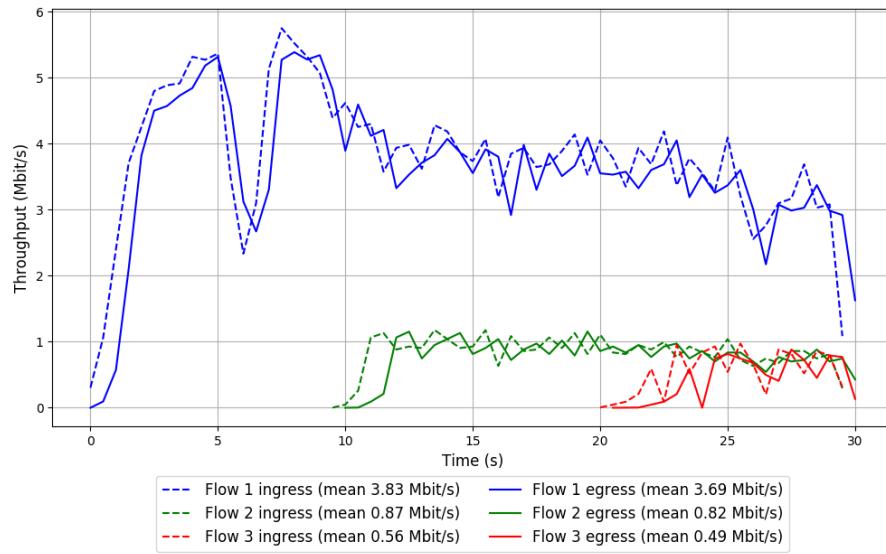


Run 2: Statistics of QUIC Cubic

```
Start at: 2018-06-18 15:23:15
End at: 2018-06-18 15:23:45
Local clock offset: -0.812 ms
Remote clock offset: -1.198 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.37 Mbit/s
95th percentile per-packet one-way delay: 1438.979 ms
Loss rate: 4.83%
-- Flow 1:
Average throughput: 3.69 Mbit/s
95th percentile per-packet one-way delay: 1422.465 ms
Loss rate: 3.84%
-- Flow 2:
Average throughput: 0.82 Mbit/s
95th percentile per-packet one-way delay: 1468.161 ms
Loss rate: 6.37%
-- Flow 3:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 1537.905 ms
Loss rate: 20.68%
```

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2018-06-18 15:46:42

End at: 2018-06-18 15:47:12

Local clock offset: -3.713 ms

Remote clock offset: -0.702 ms

Run 3: Report of QUIC Cubic — Data Link

Figure is missing

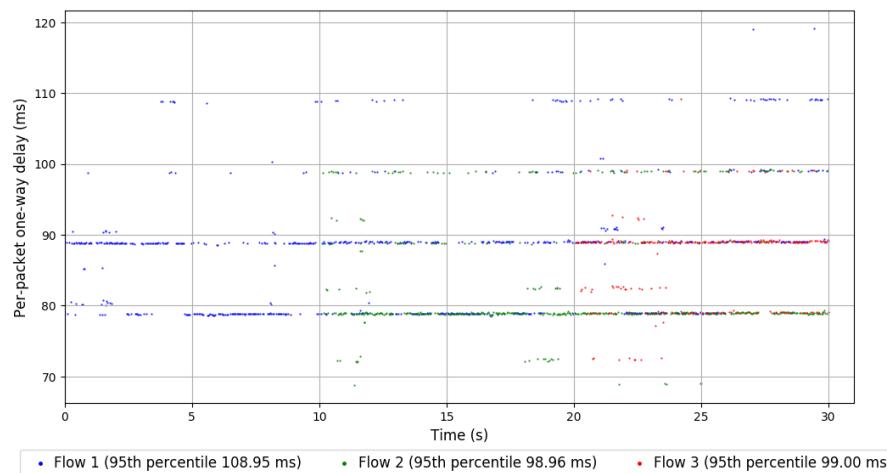
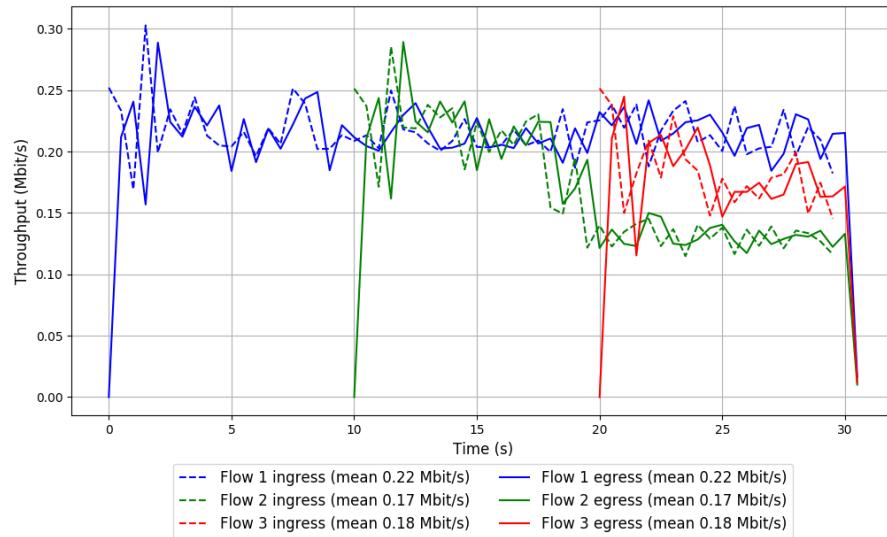
Figure is missing

```
Run 1: Statistics of SCReAM

Start at: 2018-06-18 15:07:04
End at: 2018-06-18 15:07:34
Local clock offset: -1.837 ms
Remote clock offset: -0.946 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 99.138 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 108.951 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 98.961 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 98.996 ms
Loss rate: 0.00%
```

Run 1: Report of SCReAM — Data Link

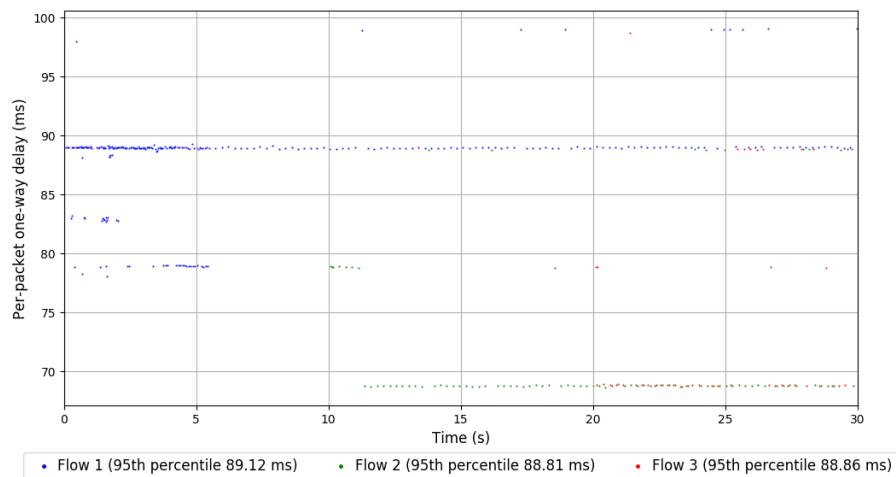
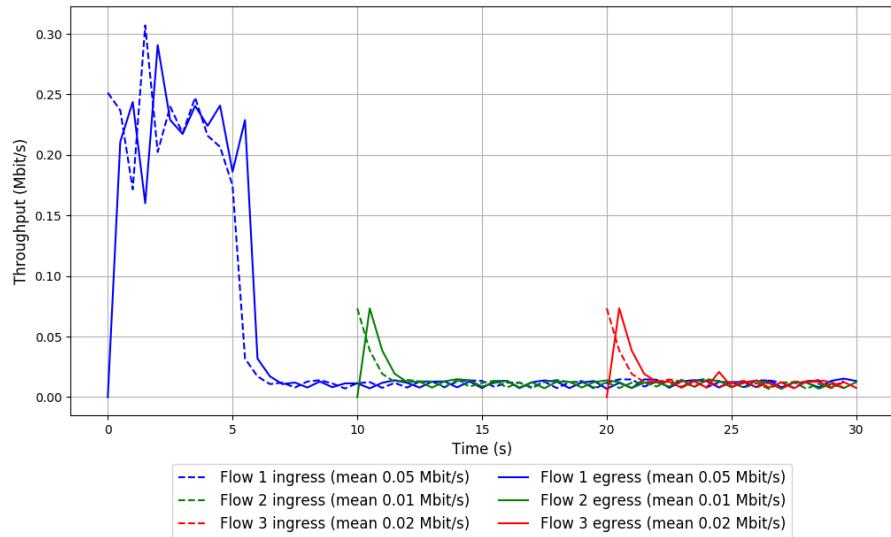


Run 2: Statistics of SCReAM

```
Start at: 2018-06-18 15:30:23
End at: 2018-06-18 15:30:53
Local clock offset: -0.457 ms
Remote clock offset: -0.93 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 89.072 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 89.120 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 88.809 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.02 Mbit/s
95th percentile per-packet one-way delay: 88.863 ms
Loss rate: 1.91%
```

Run 2: Report of SCReAM — Data Link

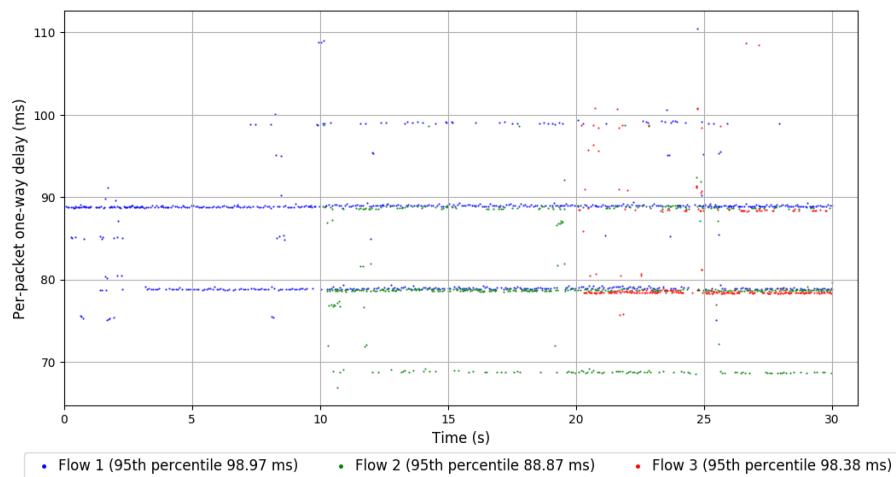
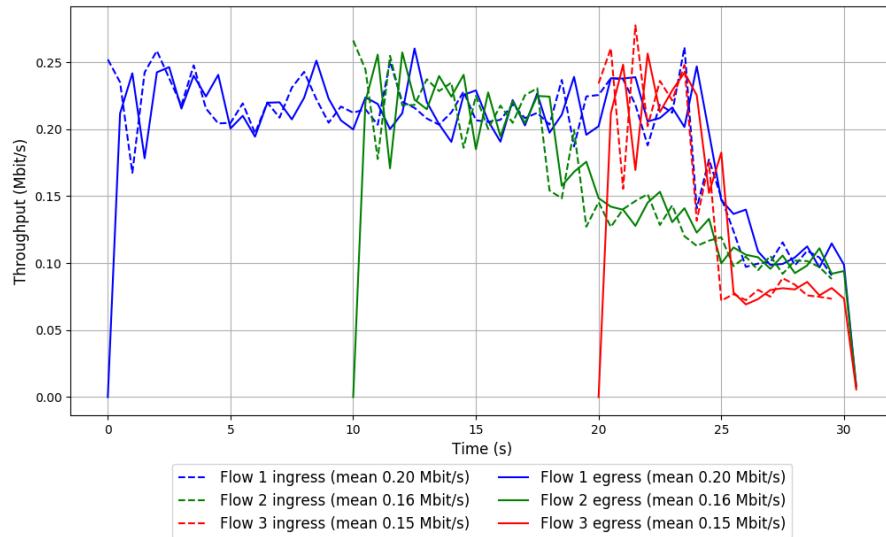


Run 3: Statistics of SCReAM

```
Start at: 2018-06-18 15:53:42
End at: 2018-06-18 15:54:12
Local clock offset: -4.255 ms
Remote clock offset: -0.475 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 96.318 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 98.974 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 88.873 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 98.384 ms
Loss rate: 0.00%
```

Run 3: Report of SCReAM — Data Link

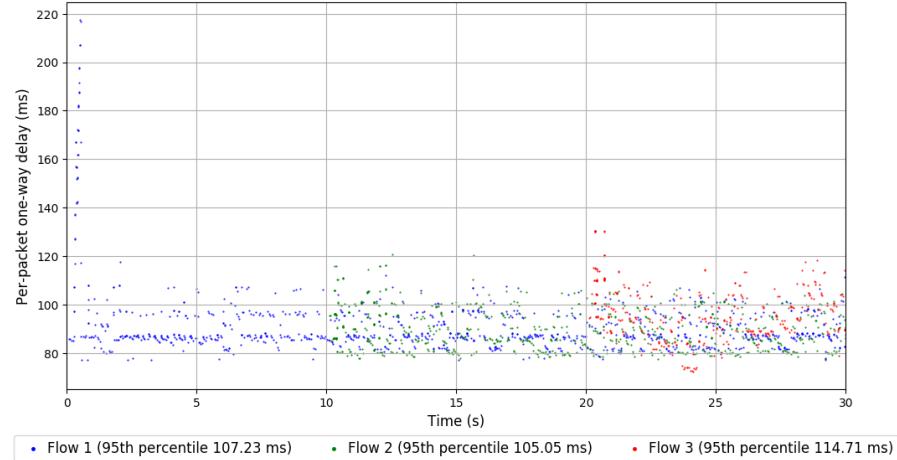
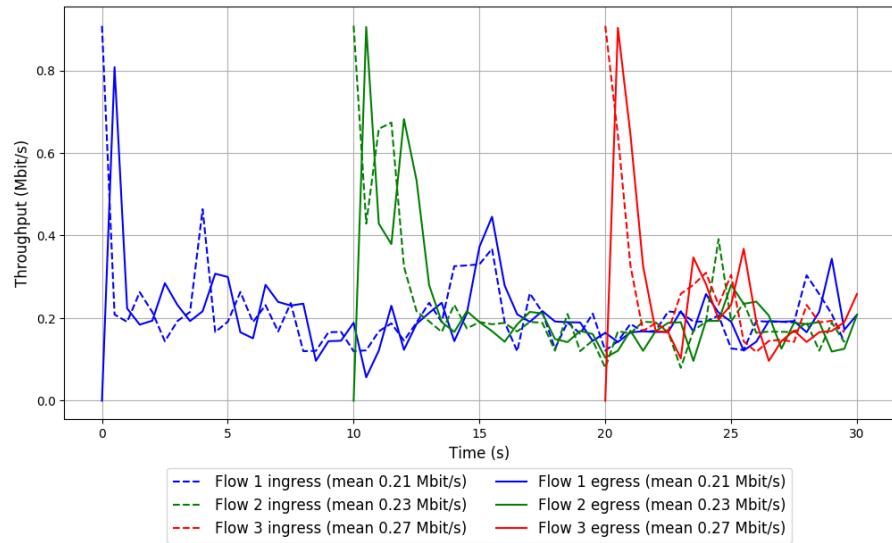


Run 1: Statistics of Sprout

```
Start at: 2018-06-18 15:04:15
End at: 2018-06-18 15:04:45
Local clock offset: -2.615 ms
Remote clock offset: -0.909 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 109.891 ms
Loss rate: 0.15%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 107.233 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 105.048 ms
Loss rate: 0.46%
-- Flow 3:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 114.708 ms
Loss rate: 0.00%
```

Run 1: Report of Sprout — Data Link

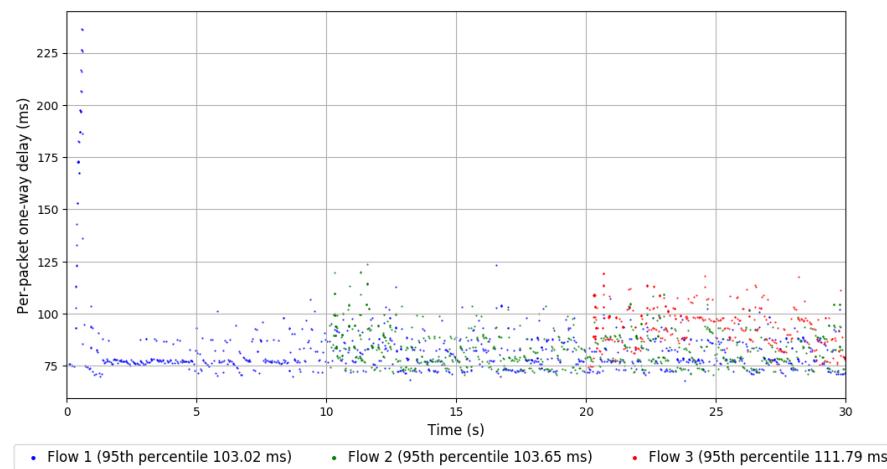
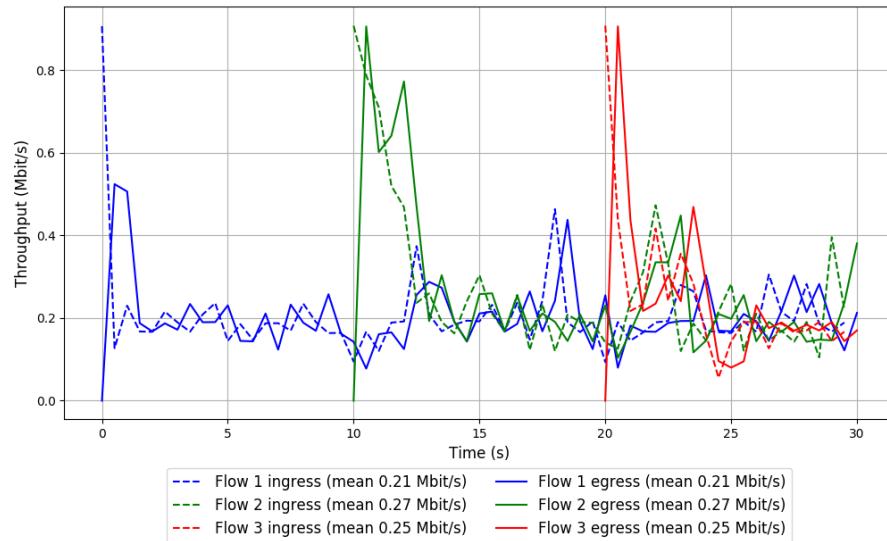


Run 2: Statistics of Sprout

```
Start at: 2018-06-18 15:27:35
End at: 2018-06-18 15:28:05
Local clock offset: -0.488 ms
Remote clock offset: -1.042 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 107.204 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 103.022 ms
Loss rate: 0.19%
-- Flow 2:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 103.646 ms
Loss rate: 0.01%
-- Flow 3:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 111.794 ms
Loss rate: 0.00%
```

Run 2: Report of Sprout — Data Link

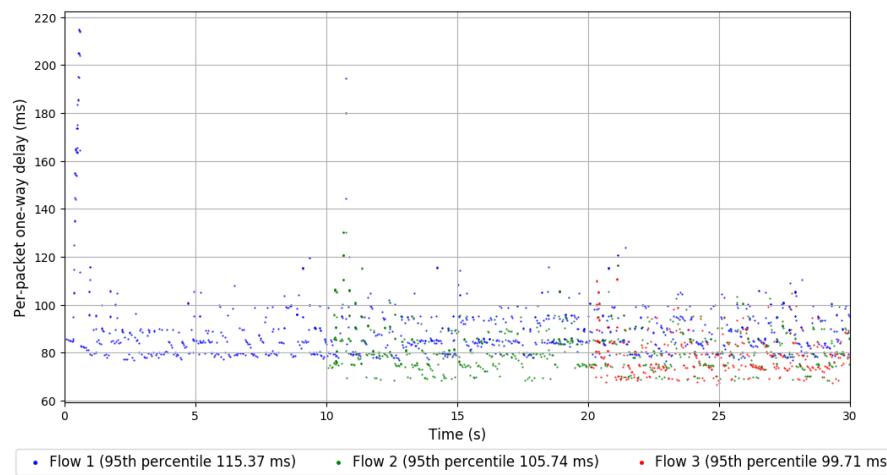
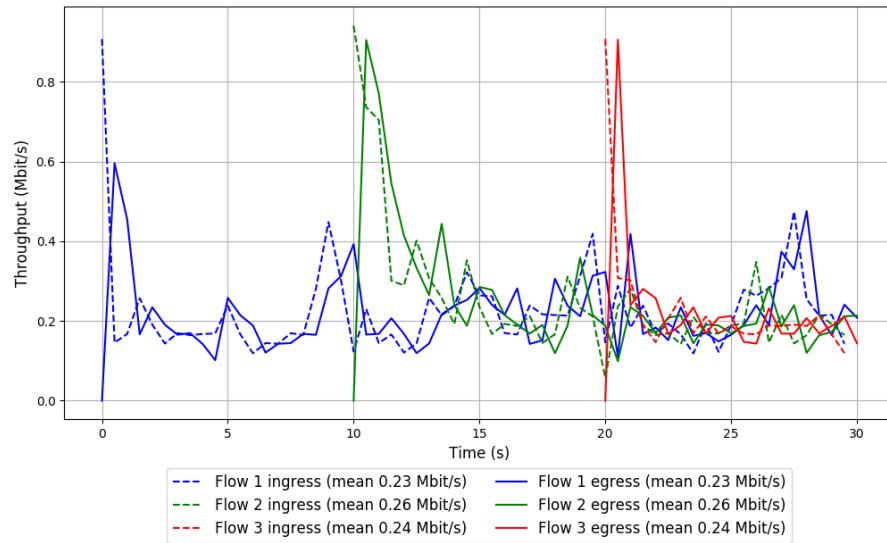


Run 3: Statistics of Sprout

```
Start at: 2018-06-18 15:50:52
End at: 2018-06-18 15:51:22
Local clock offset: -4.046 ms
Remote clock offset: -0.604 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 105.914 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 115.367 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 105.739 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 99.713 ms
Loss rate: 0.00%
```

Run 3: Report of Sprout — Data Link

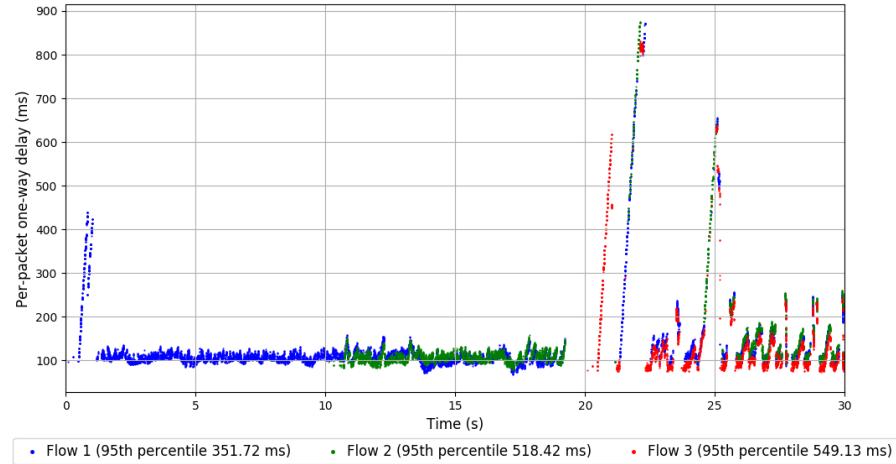
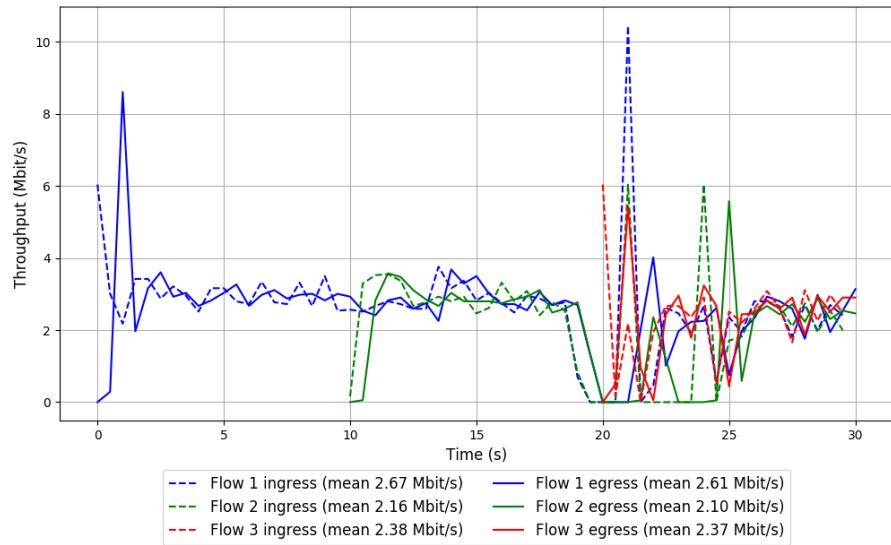


Run 1: Statistics of TaoVA-100x

```
Start at: 2018-06-18 14:53:52
End at: 2018-06-18 14:54:22
Local clock offset: -2.635 ms
Remote clock offset: 0.107 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.79 Mbit/s
95th percentile per-packet one-way delay: 433.148 ms
Loss rate: 2.05%
-- Flow 1:
Average throughput: 2.61 Mbit/s
95th percentile per-packet one-way delay: 351.722 ms
Loss rate: 2.17%
-- Flow 2:
Average throughput: 2.10 Mbit/s
95th percentile per-packet one-way delay: 518.422 ms
Loss rate: 2.84%
-- Flow 3:
Average throughput: 2.37 Mbit/s
95th percentile per-packet one-way delay: 549.127 ms
Loss rate: 0.22%
```

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

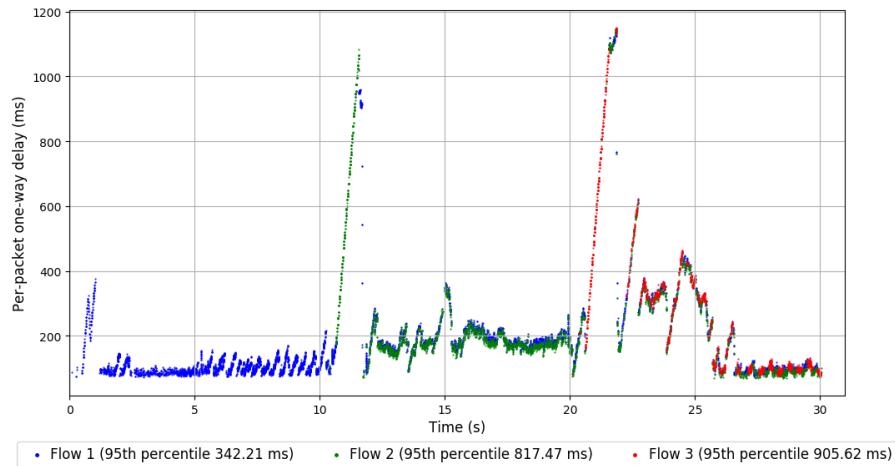
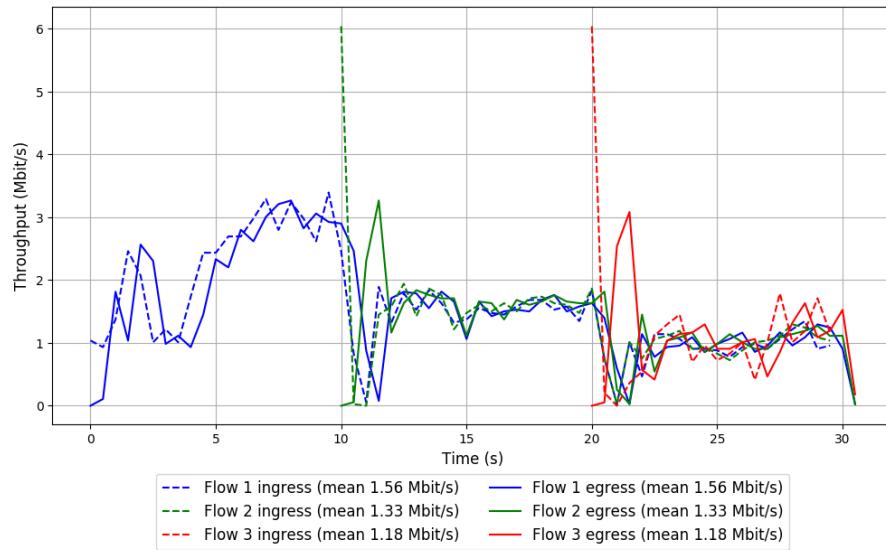


Run 2: Statistics of TaoVA-100x

```
Start at: 2018-06-18 15:17:09
End at: 2018-06-18 15:17:39
Local clock offset: -0.91 ms
Remote clock offset: -1.229 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.84 Mbit/s
95th percentile per-packet one-way delay: 658.139 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 1.56 Mbit/s
95th percentile per-packet one-way delay: 342.212 ms
Loss rate: 0.03%
-- Flow 2:
Average throughput: 1.33 Mbit/s
95th percentile per-packet one-way delay: 817.472 ms
Loss rate: 0.15%
-- Flow 3:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 905.620 ms
Loss rate: 0.33%
```

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

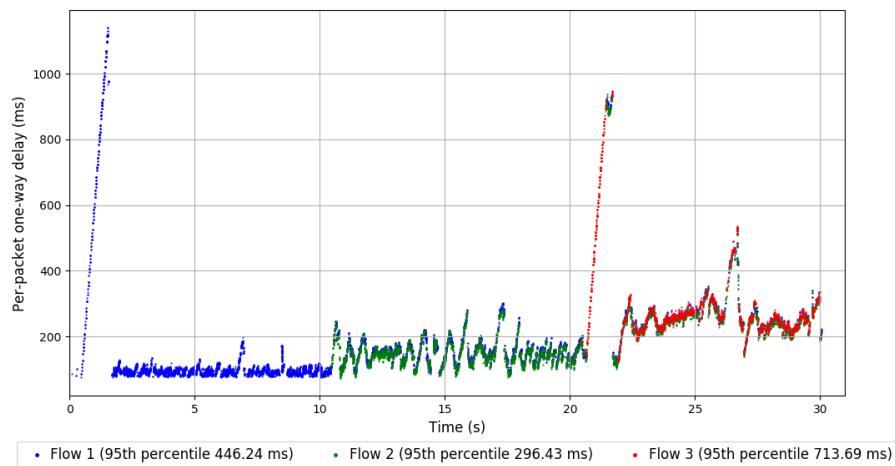
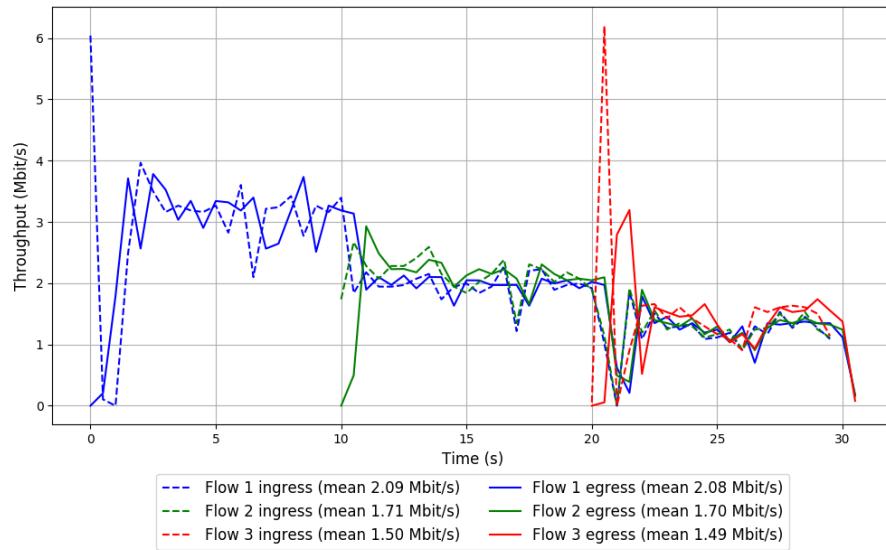


Run 3: Statistics of TaoVA-100x

```
Start at: 2018-06-18 15:40:43
End at: 2018-06-18 15:41:13
Local clock offset: -2.897 ms
Remote clock offset: -0.773 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.70 Mbit/s
95th percentile per-packet one-way delay: 465.700 ms
Loss rate: 0.60%
-- Flow 1:
Average throughput: 2.08 Mbit/s
95th percentile per-packet one-way delay: 446.237 ms
Loss rate: 0.35%
-- Flow 2:
Average throughput: 1.70 Mbit/s
95th percentile per-packet one-way delay: 296.427 ms
Loss rate: 0.61%
-- Flow 3:
Average throughput: 1.49 Mbit/s
95th percentile per-packet one-way delay: 713.691 ms
Loss rate: 1.64%
```

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

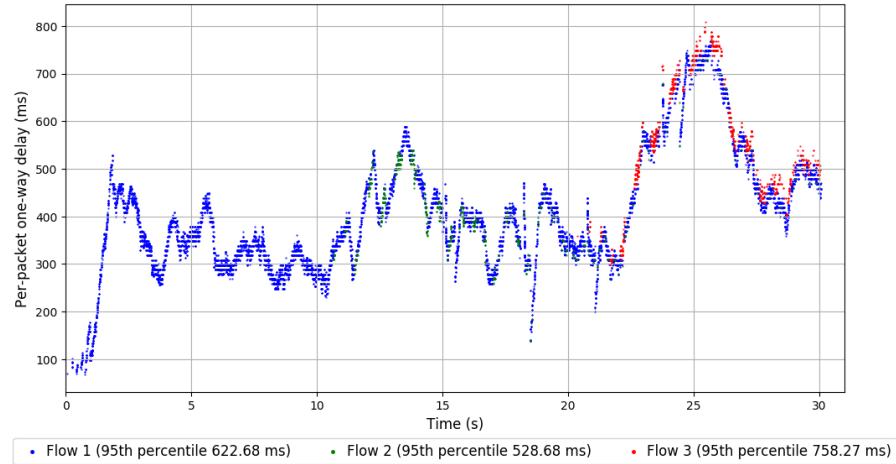
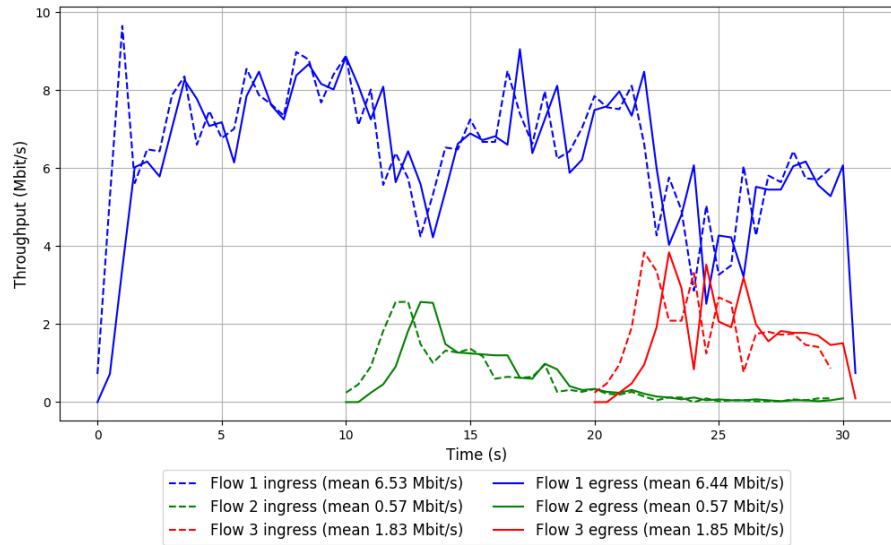


Run 1: Statistics of TCP Vegas

```
Start at: 2018-06-18 14:55:29
End at: 2018-06-18 14:55:59
Local clock offset: -2.757 ms
Remote clock offset: -0.158 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.41 Mbit/s
95th percentile per-packet one-way delay: 677.707 ms
Loss rate: 1.31%
-- Flow 1:
Average throughput: 6.44 Mbit/s
95th percentile per-packet one-way delay: 622.677 ms
Loss rate: 1.28%
-- Flow 2:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 528.681 ms
Loss rate: 0.74%
-- Flow 3:
Average throughput: 1.85 Mbit/s
95th percentile per-packet one-way delay: 758.266 ms
Loss rate: 1.92%
```

Run 1: Report of TCP Vegas — Data Link

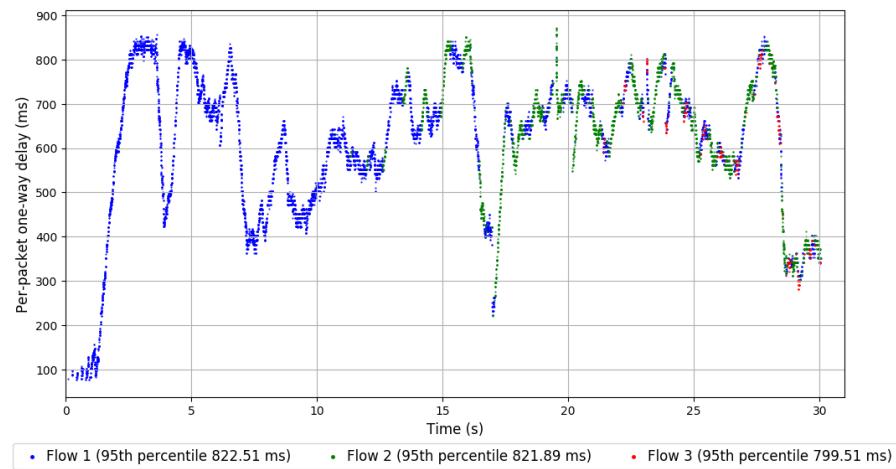
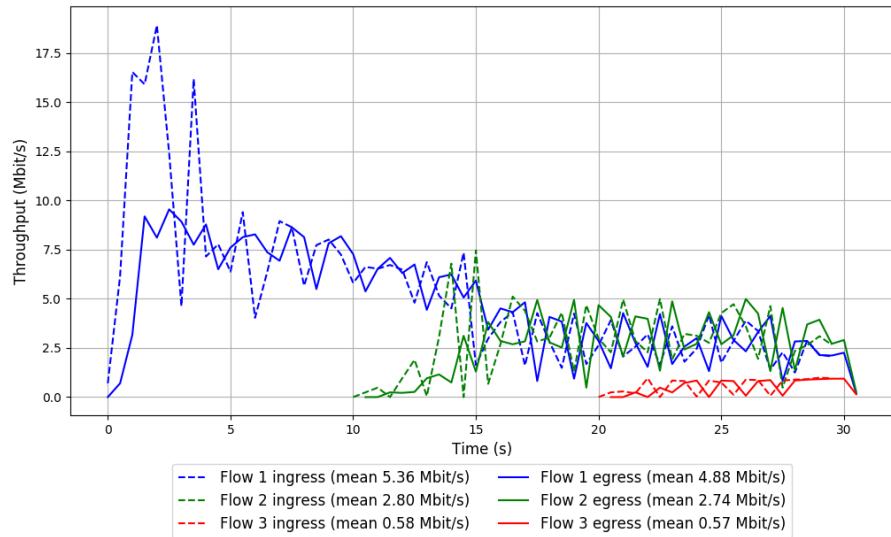


Run 2: Statistics of TCP Vegas

```
Start at: 2018-06-18 15:18:37
End at: 2018-06-18 15:19:07
Local clock offset: -0.801 ms
Remote clock offset: -1.189 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.83 Mbit/s
95th percentile per-packet one-way delay: 822.298 ms
Loss rate: 7.69%
-- Flow 1:
Average throughput: 4.88 Mbit/s
95th percentile per-packet one-way delay: 822.510 ms
Loss rate: 8.69%
-- Flow 2:
Average throughput: 2.74 Mbit/s
95th percentile per-packet one-way delay: 821.888 ms
Loss rate: 4.90%
-- Flow 3:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 799.511 ms
Loss rate: 7.11%
```

Run 2: Report of TCP Vegas — Data Link

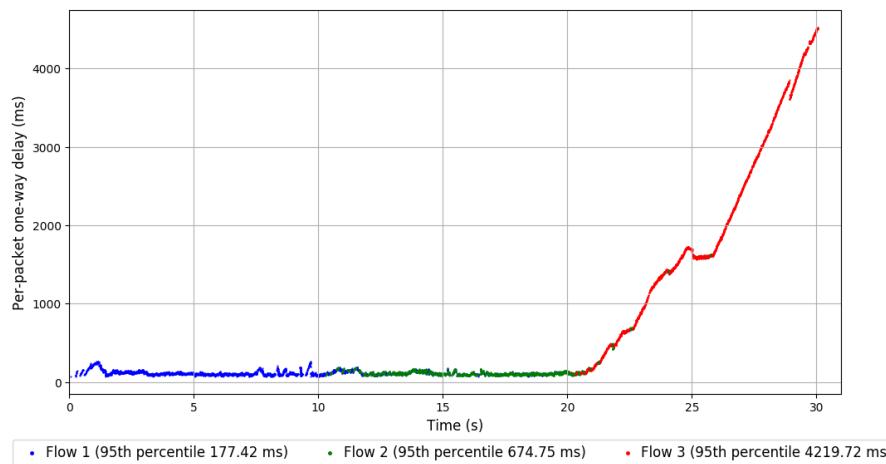
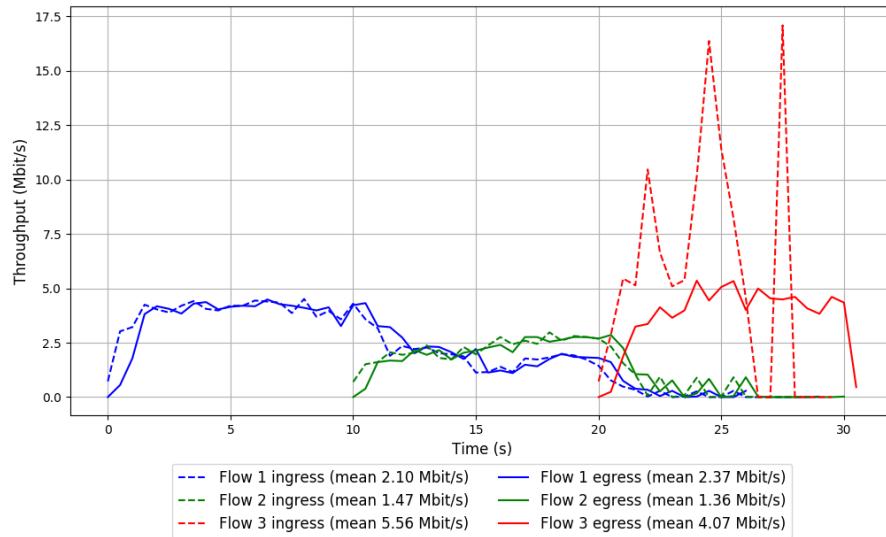


Run 3: Statistics of TCP Vegas

```
Start at: 2018-06-18 15:42:14
End at: 2018-06-18 15:42:44
Local clock offset: -3.023 ms
Remote clock offset: -0.728 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.27 Mbit/s
95th percentile per-packet one-way delay: 3597.909 ms
Loss rate: 10.58%
-- Flow 1:
Average throughput: 2.37 Mbit/s
95th percentile per-packet one-way delay: 177.418 ms
Loss rate: 0.33%
-- Flow 2:
Average throughput: 1.36 Mbit/s
95th percentile per-packet one-way delay: 674.746 ms
Loss rate: 1.77%
-- Flow 3:
Average throughput: 4.07 Mbit/s
95th percentile per-packet one-way delay: 4219.715 ms
Loss rate: 26.39%
```

Run 3: Report of TCP Vegas — Data Link

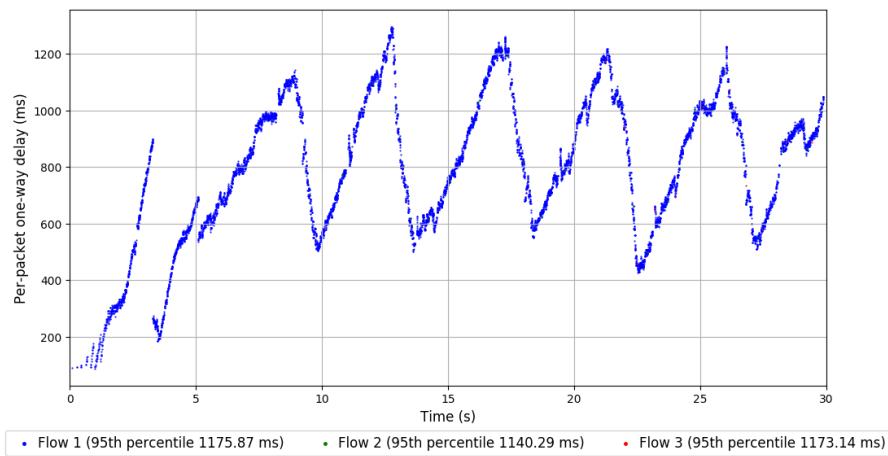
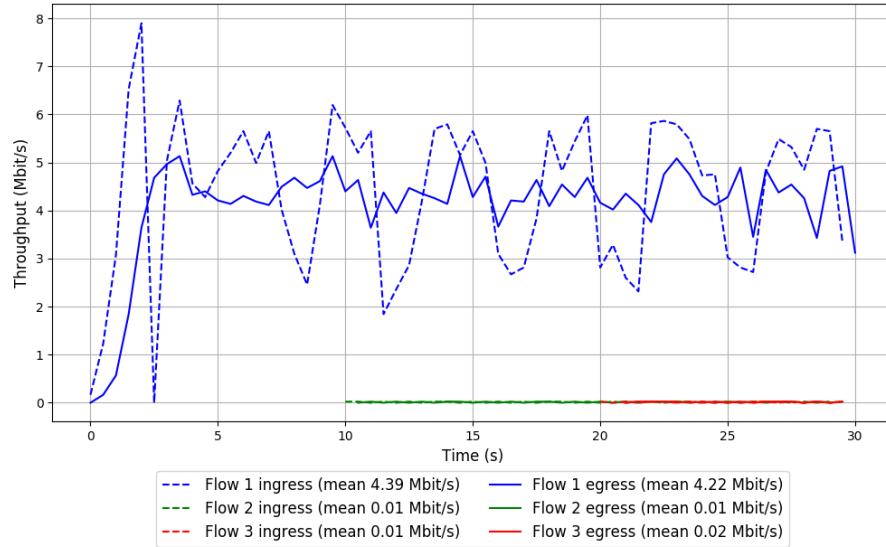


Run 1: Statistics of Verus

```
Start at: 2018-06-18 15:05:35
End at: 2018-06-18 15:06:05
Local clock offset: -2.289 ms
Remote clock offset: -0.971 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.23 Mbit/s
95th percentile per-packet one-way delay: 1175.869 ms
Loss rate: 4.15%
-- Flow 1:
Average throughput: 4.22 Mbit/s
95th percentile per-packet one-way delay: 1175.869 ms
Loss rate: 4.14%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1140.294 ms
Loss rate: 4.35%
-- Flow 3:
Average throughput: 0.02 Mbit/s
95th percentile per-packet one-way delay: 1173.138 ms
Loss rate: 8.33%
```

Run 1: Report of Verus — Data Link

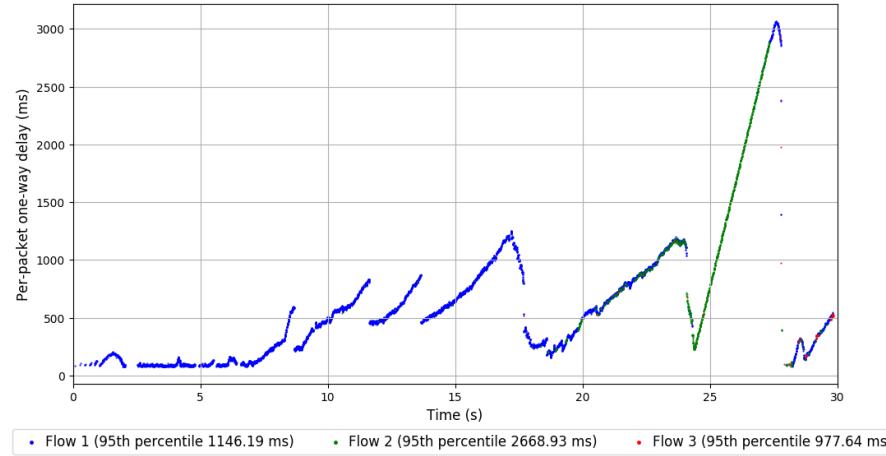
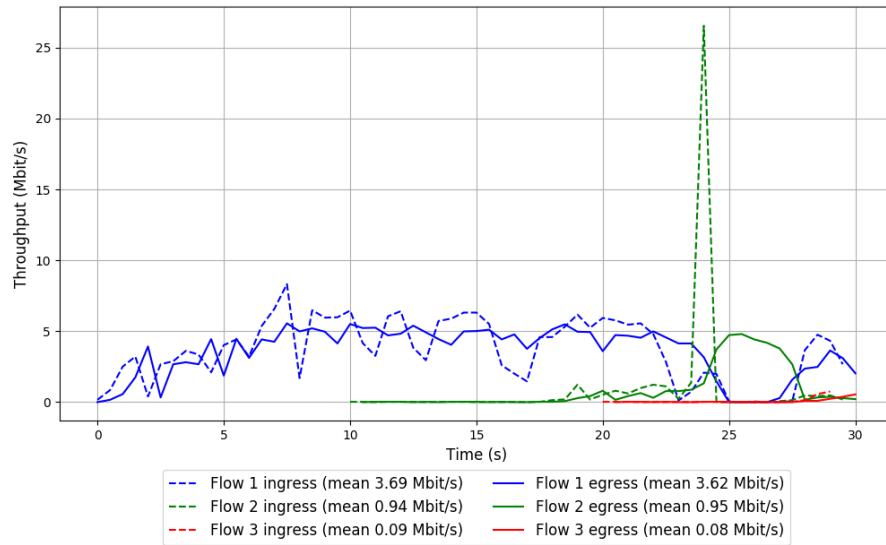


Run 2: Statistics of Verus

```
Start at: 2018-06-18 15:28:55
End at: 2018-06-18 15:29:25
Local clock offset: -0.488 ms
Remote clock offset: -0.937 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.26 Mbit/s
95th percentile per-packet one-way delay: 1900.330 ms
Loss rate: 1.90%
-- Flow 1:
Average throughput: 3.62 Mbit/s
95th percentile per-packet one-way delay: 1146.195 ms
Loss rate: 1.96%
-- Flow 2:
Average throughput: 0.95 Mbit/s
95th percentile per-packet one-way delay: 2668.934 ms
Loss rate: 1.08%
-- Flow 3:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 977.640 ms
Loss rate: 12.50%
```

Run 2: Report of Verus — Data Link

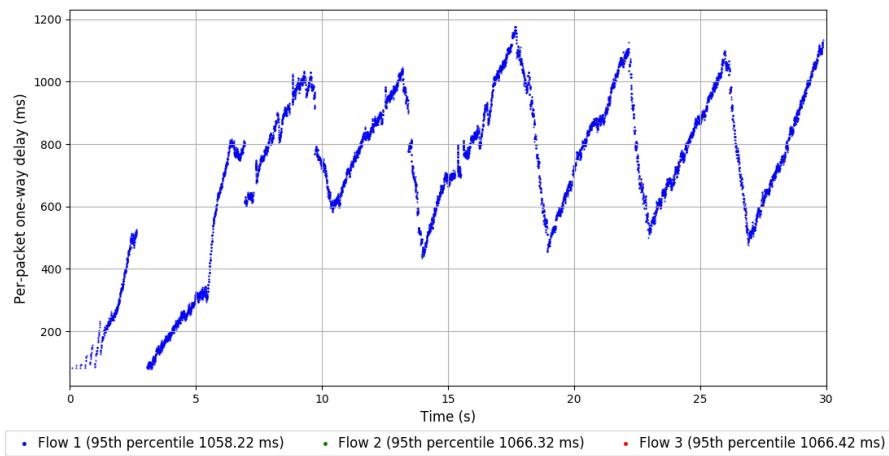
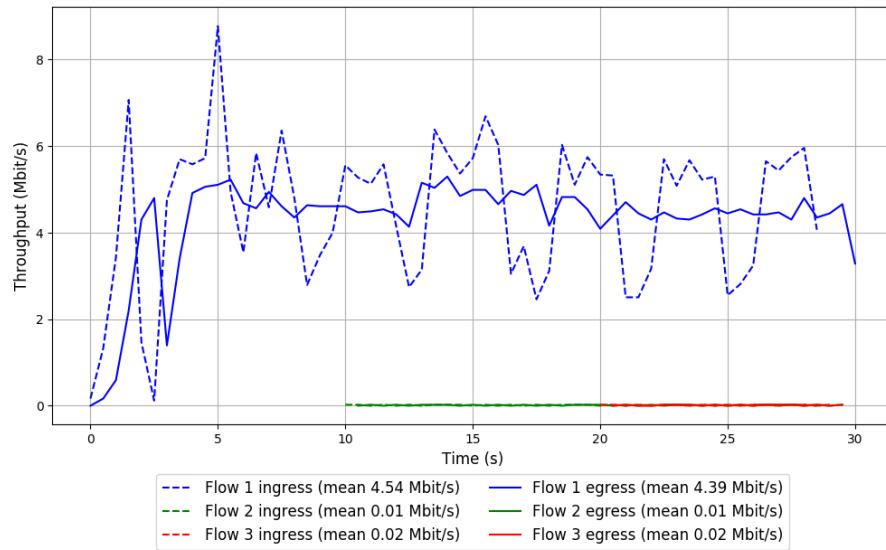


Run 3: Statistics of Verus

```
Start at: 2018-06-18 15:52:12
End at: 2018-06-18 15:52:42
Local clock offset: -4.267 ms
Remote clock offset: -0.519 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.40 Mbit/s
95th percentile per-packet one-way delay: 1058.379 ms
Loss rate: 0.49%
-- Flow 1:
Average throughput: 4.39 Mbit/s
95th percentile per-packet one-way delay: 1058.220 ms
Loss rate: 0.48%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1066.320 ms
Loss rate: 4.17%
-- Flow 3:
Average throughput: 0.02 Mbit/s
95th percentile per-packet one-way delay: 1066.425 ms
Loss rate: 8.33%
```

Run 3: Report of Verus — Data Link

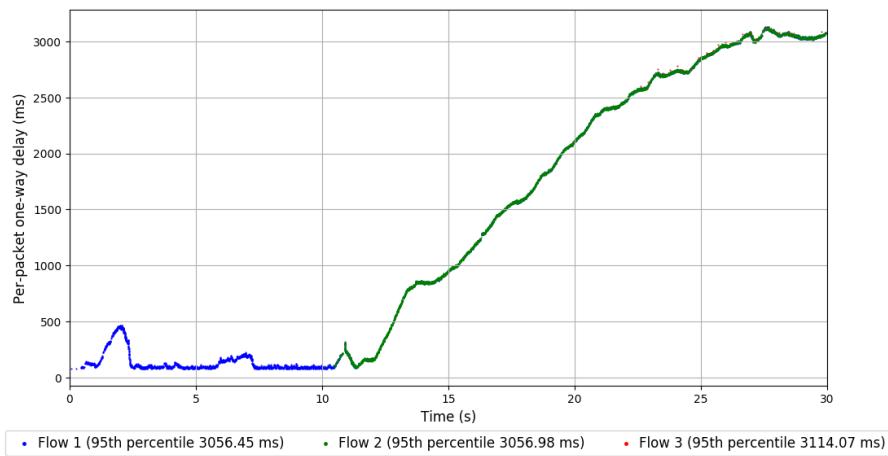
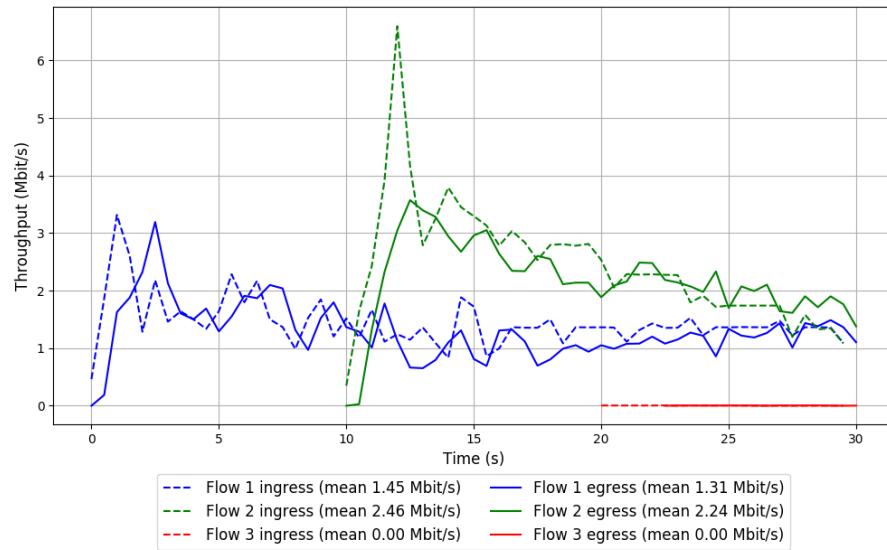


```
Run 1: Statistics of PCC-Vivace
```

```
Start at: 2018-06-18 14:57:05
End at: 2018-06-18 14:57:35
Local clock offset: -2.883 ms
Remote clock offset: -0.398 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.81 Mbit/s
95th percentile per-packet one-way delay: 3057.370 ms
Loss rate: 9.20%
-- Flow 1:
Average throughput: 1.31 Mbit/s
95th percentile per-packet one-way delay: 3056.453 ms
Loss rate: 9.46%
-- Flow 2:
Average throughput: 2.24 Mbit/s
95th percentile per-packet one-way delay: 3056.982 ms
Loss rate: 8.97%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 3114.065 ms
Loss rate: 10.53%
```

Run 1: Report of PCC-Vivace — Data Link

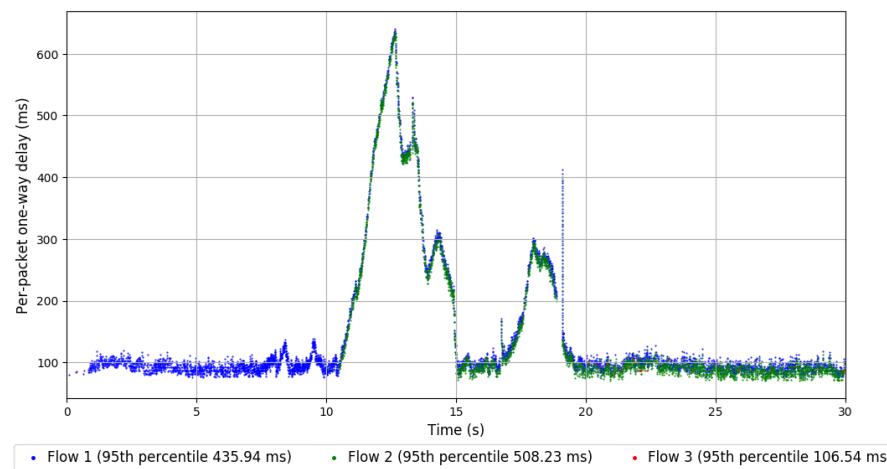
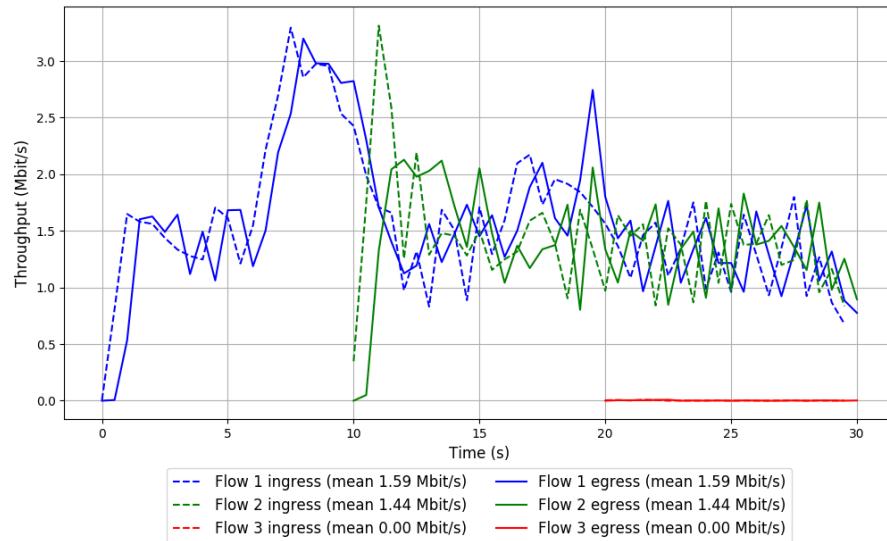


Run 2: Statistics of PCC-Vivace

```
Start at: 2018-06-18 15:20:11
End at: 2018-06-18 15:20:41
Local clock offset: -0.766 ms
Remote clock offset: -1.207 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.54 Mbit/s
95th percentile per-packet one-way delay: 461.942 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 1.59 Mbit/s
95th percentile per-packet one-way delay: 435.942 ms
Loss rate: 0.05%
-- Flow 2:
Average throughput: 1.44 Mbit/s
95th percentile per-packet one-way delay: 508.233 ms
Loss rate: 0.15%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 106.539 ms
Loss rate: 0.00%
```

Run 2: Report of PCC-Vivace — Data Link

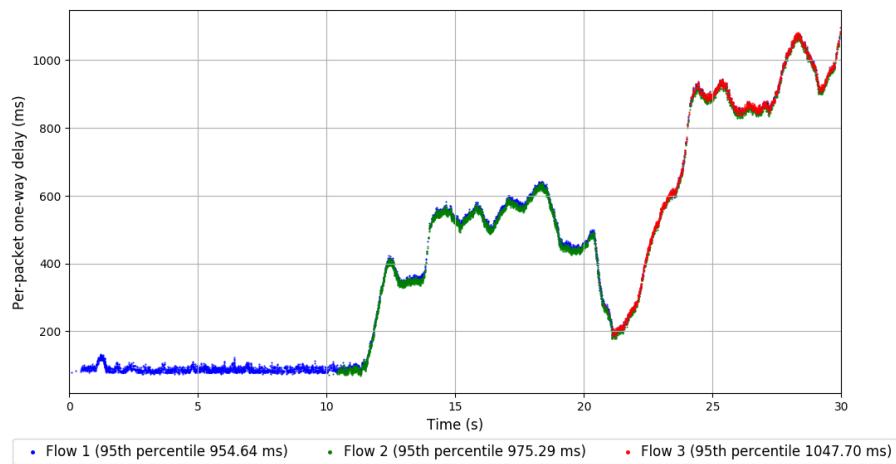
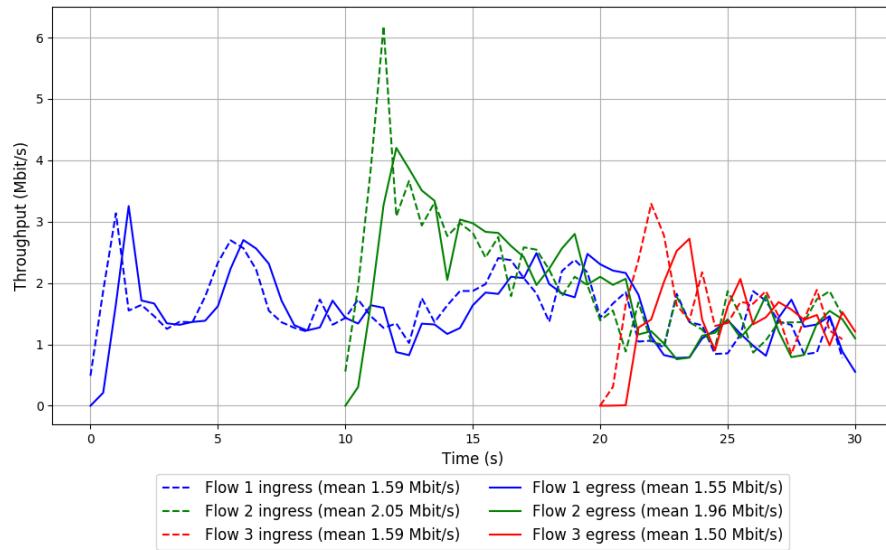


Run 3: Statistics of PCC-Vivace

```
Start at: 2018-06-18 15:43:45
End at: 2018-06-18 15:44:15
Local clock offset: -3.275 ms
Remote clock offset: -0.769 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.33 Mbit/s
95th percentile per-packet one-way delay: 991.557 ms
Loss rate: 4.39%
-- Flow 1:
Average throughput: 1.55 Mbit/s
95th percentile per-packet one-way delay: 954.636 ms
Loss rate: 2.60%
-- Flow 2:
Average throughput: 1.96 Mbit/s
95th percentile per-packet one-way delay: 975.294 ms
Loss rate: 4.70%
-- Flow 3:
Average throughput: 1.50 Mbit/s
95th percentile per-packet one-way delay: 1047.702 ms
Loss rate: 8.99%
```

Run 3: Report of PCC-Vivace — Data Link

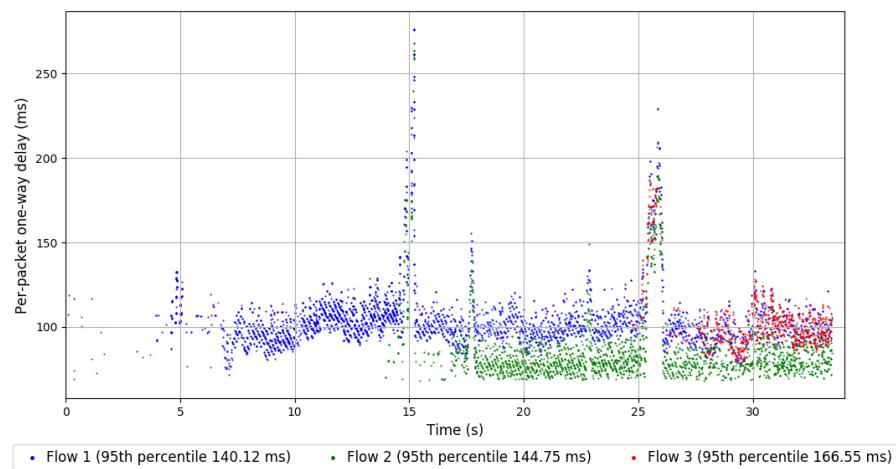
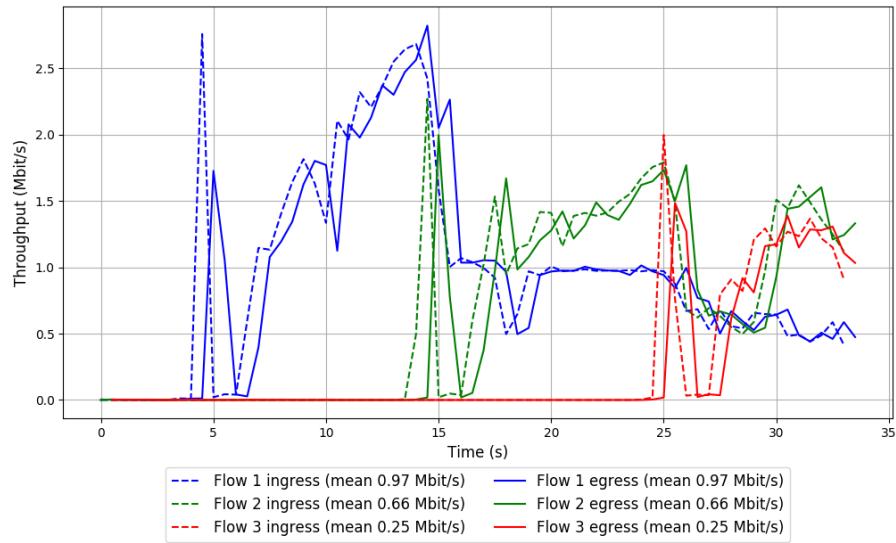


```
Run 1: Statistics of WebRTC media

Start at: 2018-06-18 15:02:53
End at: 2018-06-18 15:03:23
Local clock offset: -2.935 ms
Remote clock offset: -0.845 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.86 Mbit/s
95th percentile per-packet one-way delay: 150.252 ms
Loss rate: 0.23%
-- Flow 1:
Average throughput: 0.97 Mbit/s
95th percentile per-packet one-way delay: 140.120 ms
Loss rate: 0.06%
-- Flow 2:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 144.753 ms
Loss rate: 0.31%
-- Flow 3:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 166.552 ms
Loss rate: 0.70%
```

Run 1: Report of WebRTC media — Data Link

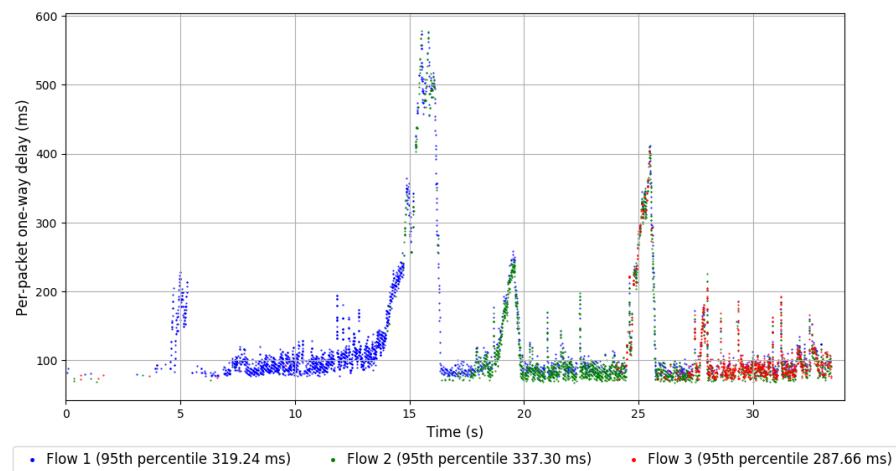
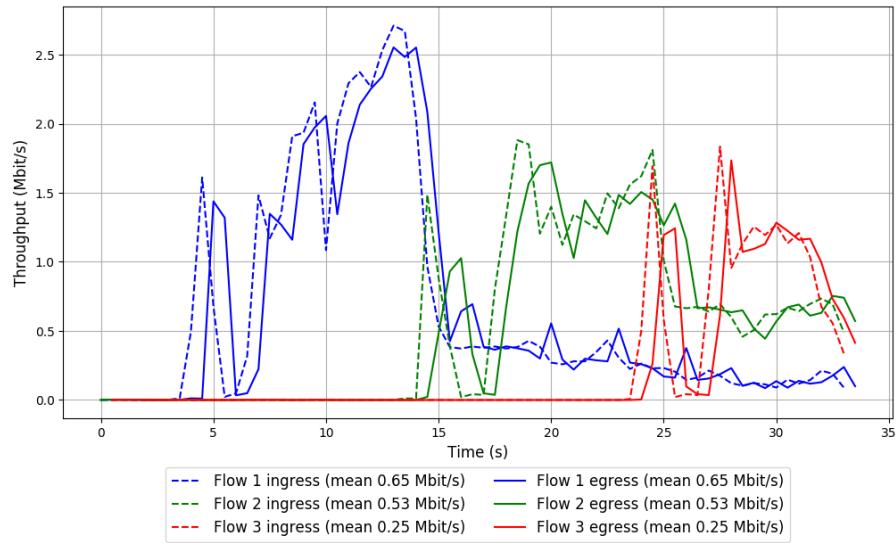


Run 2: Statistics of WebRTC media

```
Start at: 2018-06-18 15:26:10
End at: 2018-06-18 15:26:40
Local clock offset: -0.775 ms
Remote clock offset: -1.091 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.43 Mbit/s
95th percentile per-packet one-way delay: 322.148 ms
Loss rate: 0.23%
-- Flow 1:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 319.243 ms
Loss rate: 0.04%
-- Flow 2:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 337.299 ms
Loss rate: 0.10%
-- Flow 3:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 287.661 ms
Loss rate: 1.04%
```

Run 2: Report of WebRTC media — Data Link



```
Run 3: Statistics of WebRTC media

Start at: 2018-06-18 15:49:31
End at: 2018-06-18 15:50:01
Local clock offset: -3.897 ms
Remote clock offset: -0.692 ms

# Below is generated by plot.py at 2018-06-18 16:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 320.187 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 0.62 Mbit/s
95th percentile per-packet one-way delay: 277.836 ms
Loss rate: 0.02%
-- Flow 2:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 362.972 ms
Loss rate: 0.06%
-- Flow 3:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 244.875 ms
Loss rate: 0.11%
```

Run 3: Report of WebRTC media — Data Link

