

## Pantheon Report

Generated at 2018-01-31 12:29:14 (UTC).

Data path: China ppp0 (*remote*) → AWS Korea Ethernet (*local*).

Repeated the test of 17 congestion control schemes 3 times.

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

Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

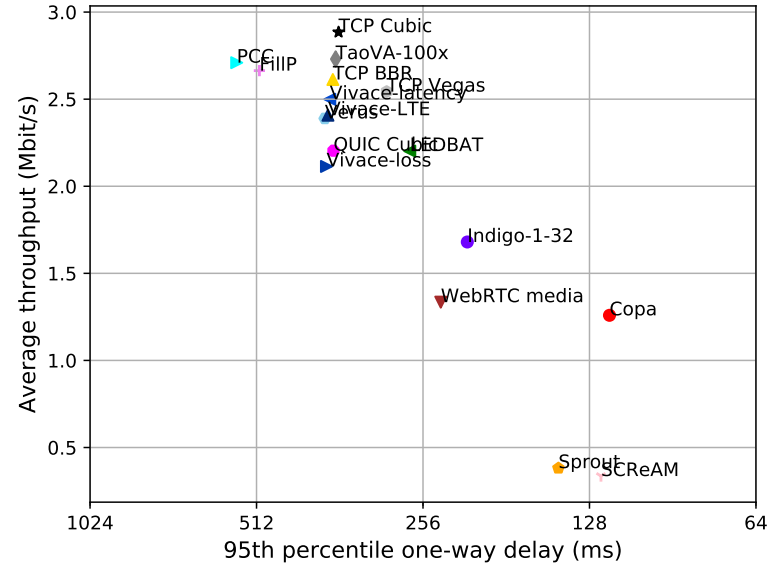
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo\_fast**).

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

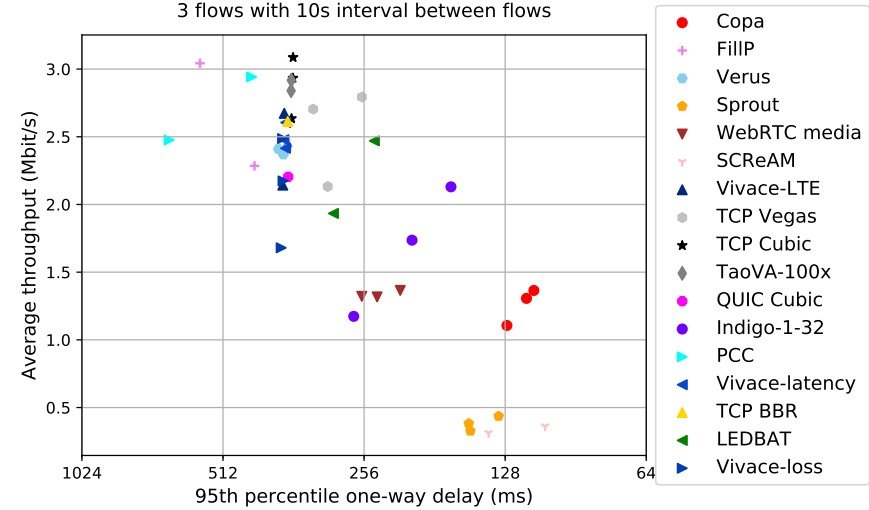
Git summary:

```
branch: master @ 70217998b3c9a7166a95460a70c0854d1326e100
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/fillp @ fb9c9ab842e5614ad52911a76fb9bd1c1b0dca86
third_party/genericCC @ 80b516c448f795fd6e9675f7177b69c622f07da8
third_party/indigo @ a9b2060d39e4da2e8987e893e3eca2a6c7cd0ab9
third_party/indigo-1-layer-128-unit @ 3ae9e4ef4230db7484501f82ce8b377695f2f66d
third_party/indigo-1-layer-32-unit @ 2601c92e4aa9d58d38dc4dfe0ecd9c077e64d
third_party/indigo-1-layer-32-unit-no-calib @ 1f3a7f75b41135ed5b540c0fd3505939528e2a5f
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
  M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ fb1053193c2861da659ba9013db26744ccfcf993
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
  M receiver/src/buffer.h
  M receiver/src/core.cpp
  M sender/src/buffer.h
  M sender/src/core.cpp
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885
third_party/sourdough @ f1a14bffe749737437f61b1eae30b267cde681
third_party/sprout @ 6f2efe6e088d91066a9f023df375eee2665089ce
  M src/examples/cellsim.cc
  M src/examples/sproutbt2.cc
  M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
  M src/verus.hpp
  M tools/plot.py
third_party/vivace @ 7a4ba531e75b4a6f66f5c4580192120401784ce3
third_party/webrtc @ a488197ddd041ace68a42849b2540ad834825f42
```

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



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



scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	1	1.85	0.81	0.72	371.64	372.66	376.82	7.18	11.31	21.33
TCP Cubic	3	2.02	1.00	0.66	363.08	364.30	359.88	2.30	4.51	7.45
LEDBAT	2	1.36	0.93	0.71	267.59	271.17	279.46	0.44	1.67	4.38
PCC	2	1.48	1.31	1.18	385.34	556.63	740.00	45.61	54.55	85.55
QUIC Cubic	1	1.48	0.75	0.74	371.39	367.19	377.24	4.53	8.19	12.94
SCReAM	2	0.16	0.17	0.18	127.58	117.06	113.65	0.31	0.72	1.39
WebRTC media	3	0.61	0.44	0.30	233.05	214.52	255.52	0.57	0.97	4.03
Sprout	3	0.19	0.19	0.20	145.82	147.40	145.18	0.71	1.55	2.38
TaoVA-100x	3	1.60	1.25	0.94	363.12	368.67	374.51	4.30	6.85	22.49
TCP Vegas	3	1.22	1.22	1.58	272.86	292.35	281.93	0.92	1.53	3.97
Verus	2	2.23	0.20	0.14	385.69	370.26	364.32	65.13	38.14	46.44
Copa	3	0.69	0.57	0.58	115.87	120.58	119.61	0.82	1.65	4.67
FillP	2	1.37	1.14	1.77	379.97	509.54	591.65	30.55	46.53	53.44
Indigo-1-32	3	0.83	0.80	1.03	201.54	194.87	248.65	1.00	2.64	6.31
Vivace-latency	3	1.37	1.13	1.18	374.90	377.59	382.68	14.04	19.91	36.44
Vivace-loss	3	1.30	0.88	0.75	381.71	383.79	384.15	28.24	35.74	43.19
Vivace-LTE	2	1.42	1.02	1.01	378.40	383.38	381.13	18.61	27.48	32.53

Run 1: Statistics of TCP BBR

/home/ubuntu/pantheon\_data/2018-01-31T09-34-China-ppp0-to-AWS-Korea-3-runs-3-flows/bbr\_stats

Run 1: Report of TCP BBR — Data Link

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Run 2: Statistics of TCP BBR

Start at: 2018-01-31 10:18:37

End at: 2018-01-31 10:19:07

Local clock offset: -1.21 ms

Remote clock offset: 3.821 ms

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

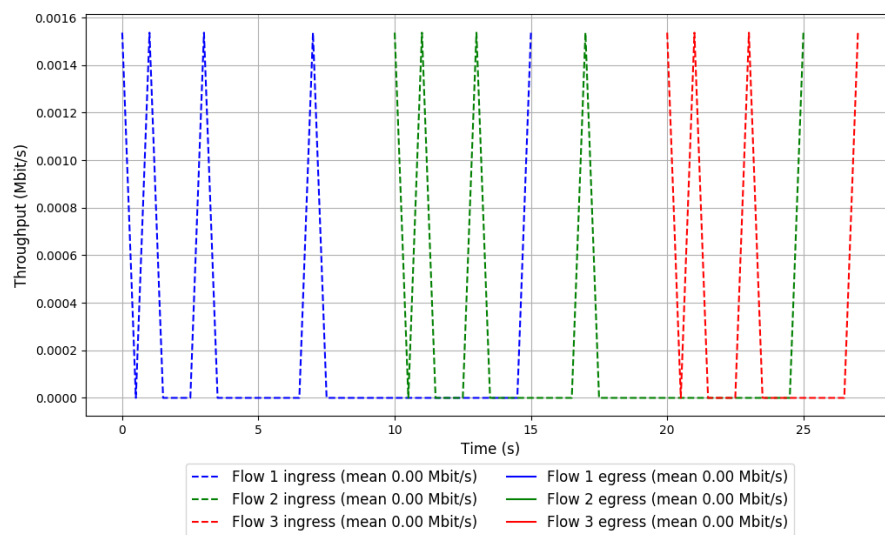


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Run 3: Statistics of TCP BBR

Start at: 2018-01-31 10:45:51

End at: 2018-01-31 10:46:21

Local clock offset: -1.305 ms

Remote clock offset: 4.432 ms

# Below is generated by plot.py at 2018-01-31 12:28:38

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.61 Mbit/s

95th percentile per-packet one-way delay: 372.594 ms

Loss rate: 9.49%

-- Flow 1:

Average throughput: 1.85 Mbit/s

95th percentile per-packet one-way delay: 371.644 ms

Loss rate: 7.18%

-- Flow 2:

Average throughput: 0.81 Mbit/s

95th percentile per-packet one-way delay: 372.661 ms

Loss rate: 11.31%

-- Flow 3:

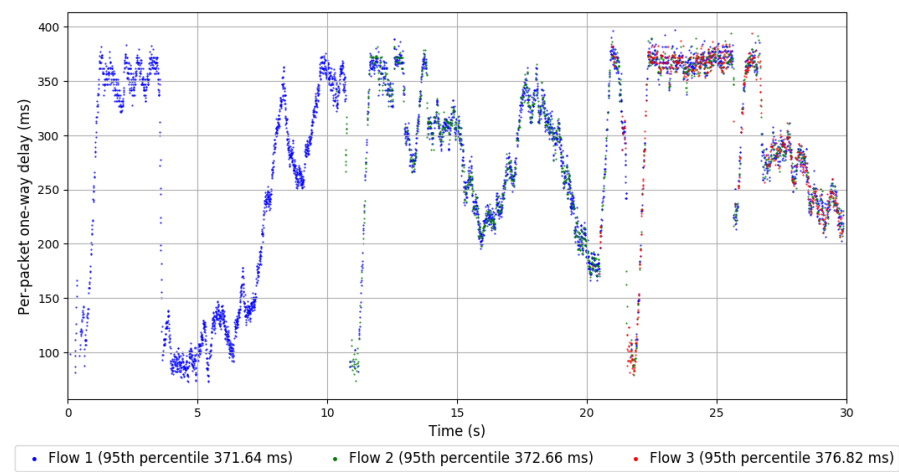
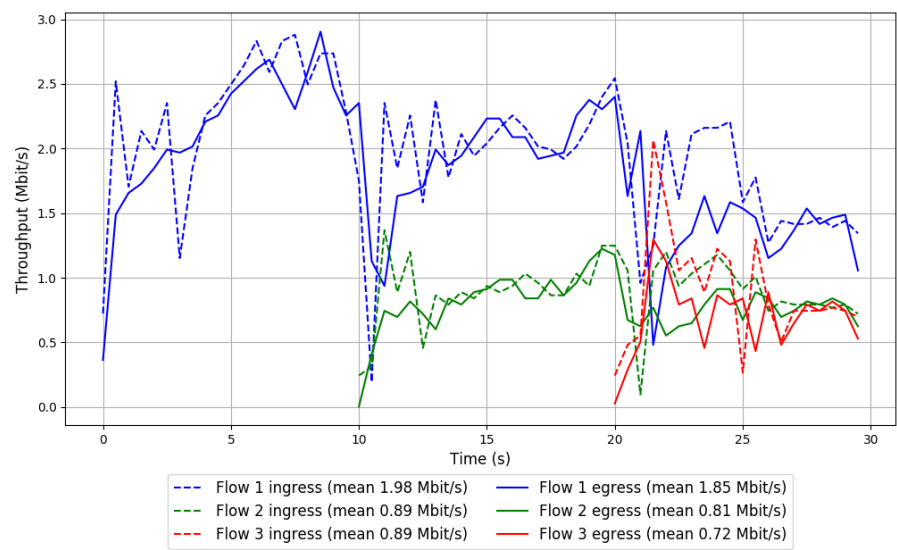
Average throughput: 0.72 Mbit/s

95th percentile per-packet one-way delay: 376.825 ms

Loss rate: 21.33%



Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-01-31 09:57:04

End at: 2018-01-31 09:57:34

Local clock offset: -1.459 ms

Remote clock offset: 4.368 ms

# Below is generated by plot.py at 2018-01-31 12:28:38

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.93 Mbit/s

95th percentile per-packet one-way delay: 363.110 ms

Loss rate: 2.88%

-- Flow 1:

Average throughput: 2.22 Mbit/s

95th percentile per-packet one-way delay: 359.322 ms

Loss rate: 1.73%

-- Flow 2:

Average throughput: 0.67 Mbit/s

95th percentile per-packet one-way delay: 367.303 ms

Loss rate: 5.70%

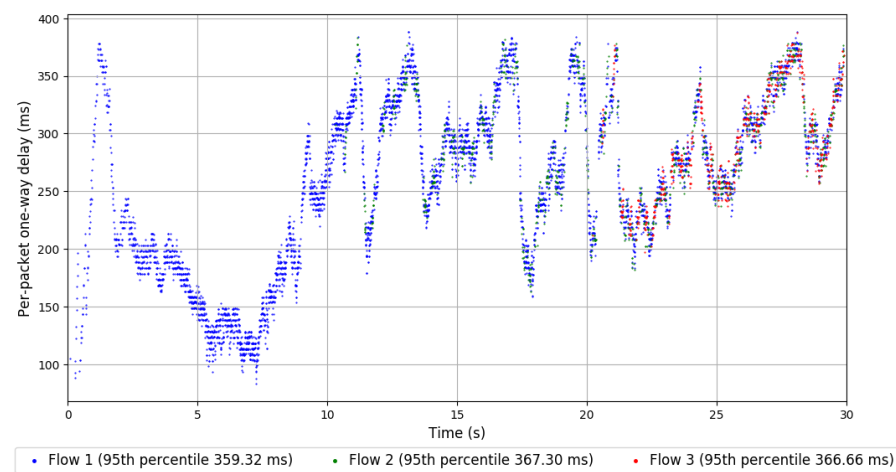
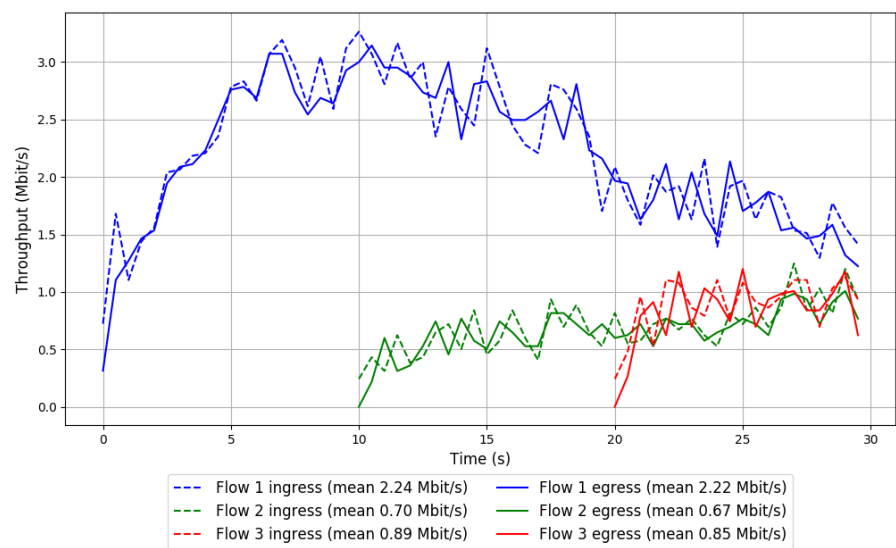
-- Flow 3:

Average throughput: 0.85 Mbit/s

95th percentile per-packet one-way delay: 366.662 ms

Loss rate: 7.17%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-01-31 10:25:15

End at: 2018-01-31 10:25:45

Local clock offset: -1.237 ms

Remote clock offset: 3.782 ms

# Below is generated by plot.py at 2018-01-31 12:28:39

# Datalink statistics

-- Total of 3 flows:

Average throughput: 3.09 Mbit/s

95th percentile per-packet one-way delay: 362.871 ms

Loss rate: 3.43%

-- Flow 1:

Average throughput: 1.81 Mbit/s

95th percentile per-packet one-way delay: 364.511 ms

Loss rate: 3.06%

-- Flow 2:

Average throughput: 1.61 Mbit/s

95th percentile per-packet one-way delay: 358.267 ms

Loss rate: 3.36%

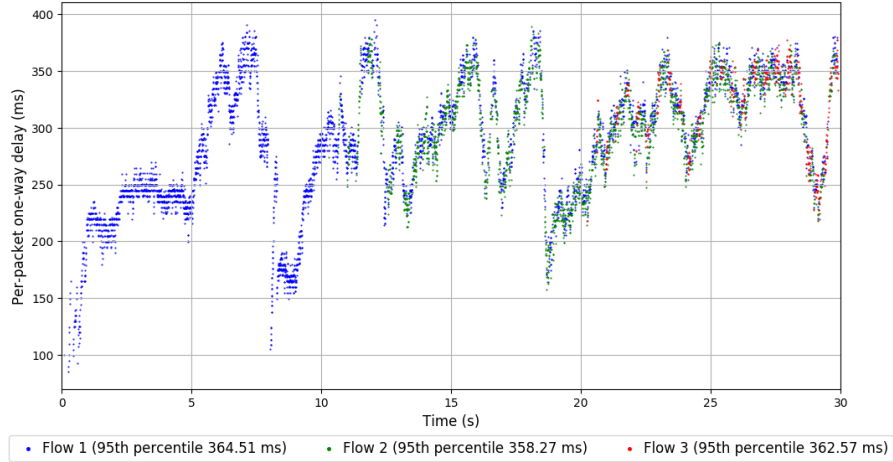
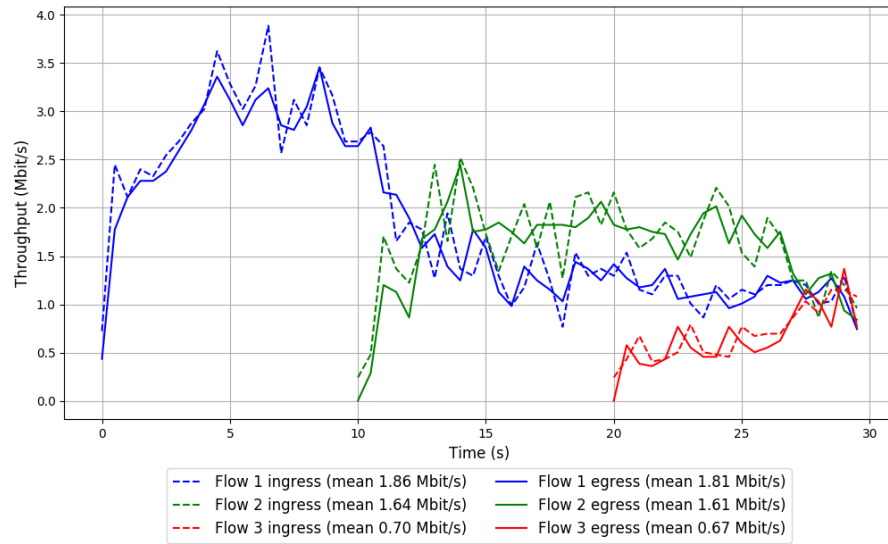
-- Flow 3:

Average throughput: 0.67 Mbit/s

95th percentile per-packet one-way delay: 362.571 ms

Loss rate: 6.71%

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



Run 3: Statistics of TCP Cubic

Start at: 2018-01-31 10:51:43

End at: 2018-01-31 10:52:13

Local clock offset: -1.37 ms

Remote clock offset: 4.532 ms

# Below is generated by plot.py at 2018-01-31 12:28:39

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.63 Mbit/s

95th percentile per-packet one-way delay: 365.651 ms

Loss rate: 2.91%

-- Flow 1:

Average throughput: 2.02 Mbit/s

95th percentile per-packet one-way delay: 365.405 ms

Loss rate: 2.11%

-- Flow 2:

Average throughput: 0.71 Mbit/s

95th percentile per-packet one-way delay: 367.315 ms

Loss rate: 4.48%

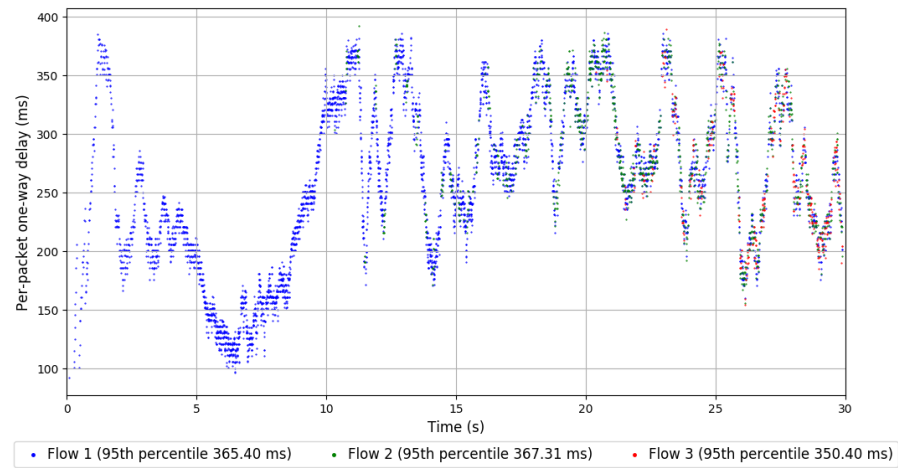
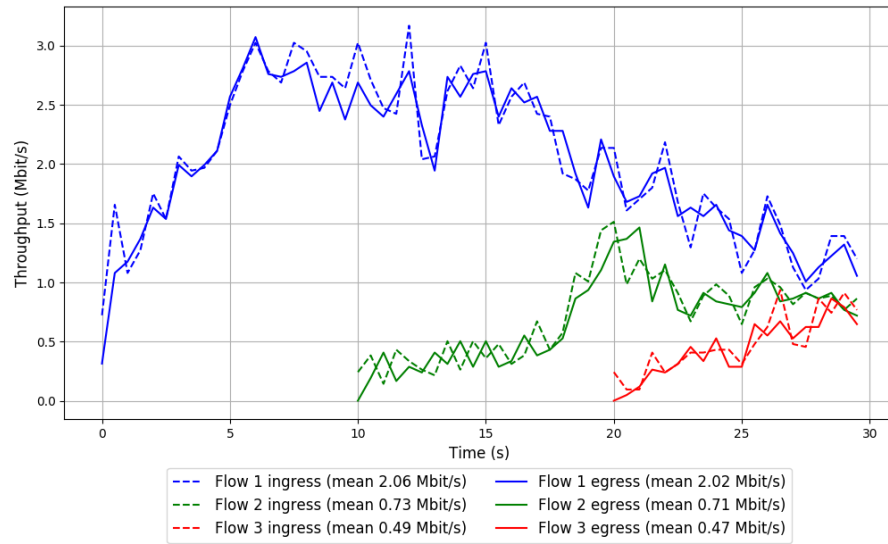
-- Flow 3:

Average throughput: 0.47 Mbit/s

95th percentile per-packet one-way delay: 350.401 ms

Loss rate: 8.46%

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



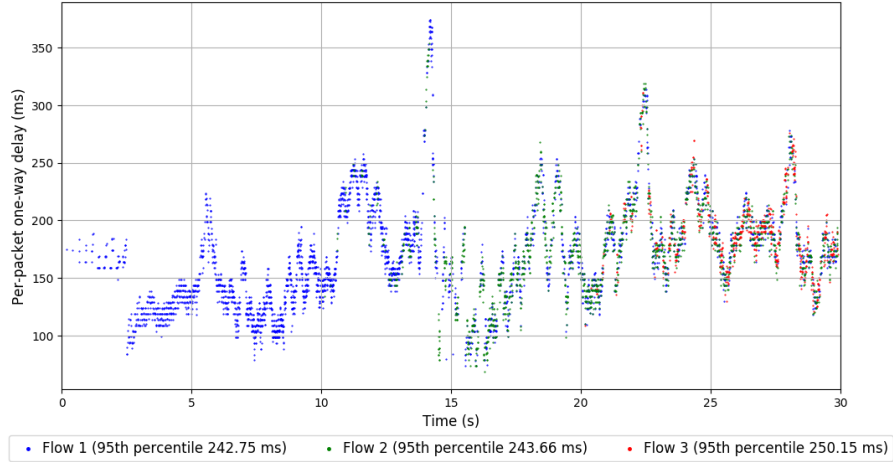
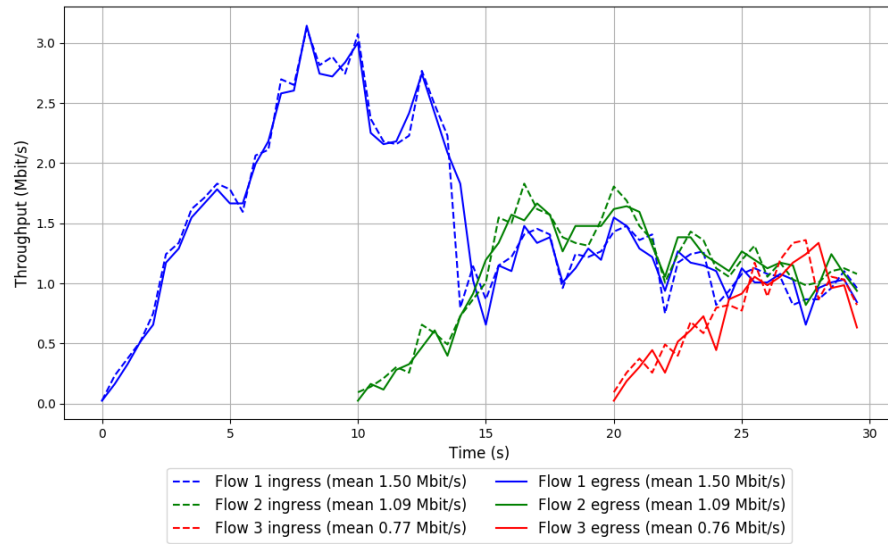
```
Run 1: Statistics of LEDBAT

Start at: 2018-01-31 09:52:35
End at: 2018-01-31 09:53:05
Local clock offset: -1.276 ms
Remote clock offset: 4.239 ms

# Below is generated by plot.py at 2018-01-31 12:28:39
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.47 Mbit/s
95th percentile per-packet one-way delay: 243.425 ms
Loss rate: 1.12%
-- Flow 1:
Average throughput: 1.50 Mbit/s
95th percentile per-packet one-way delay: 242.747 ms
Loss rate: 0.68%
-- Flow 2:
Average throughput: 1.09 Mbit/s
95th percentile per-packet one-way delay: 243.661 ms
Loss rate: 1.18%
-- Flow 3:
Average throughput: 0.76 Mbit/s
95th percentile per-packet one-way delay: 250.145 ms
Loss rate: 3.53%
```



# Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

/home/ubuntu/pantheon\_data/2018-01-31T09-34-China-ppp0-to-AWS-Korea-3-runs-3-flows/ledbat\_st

Run 2: Report of LEDBAT — Data Link

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Run 3: Statistics of LEDBAT

Start at: 2018-01-31 10:47:19

End at: 2018-01-31 10:47:49

Local clock offset: -0.934 ms

Remote clock offset: 4.512 ms

# Below is generated by plot.py at 2018-01-31 12:28:39

# Datalink statistics

-- Total of 3 flows:

Average throughput: 1.93 Mbit/s

95th percentile per-packet one-way delay: 297.665 ms

Loss rate: 1.29%

-- Flow 1:

Average throughput: 1.22 Mbit/s

95th percentile per-packet one-way delay: 292.428 ms

Loss rate: 0.19%

-- Flow 2:

Average throughput: 0.76 Mbit/s

95th percentile per-packet one-way delay: 298.674 ms

Loss rate: 2.15%

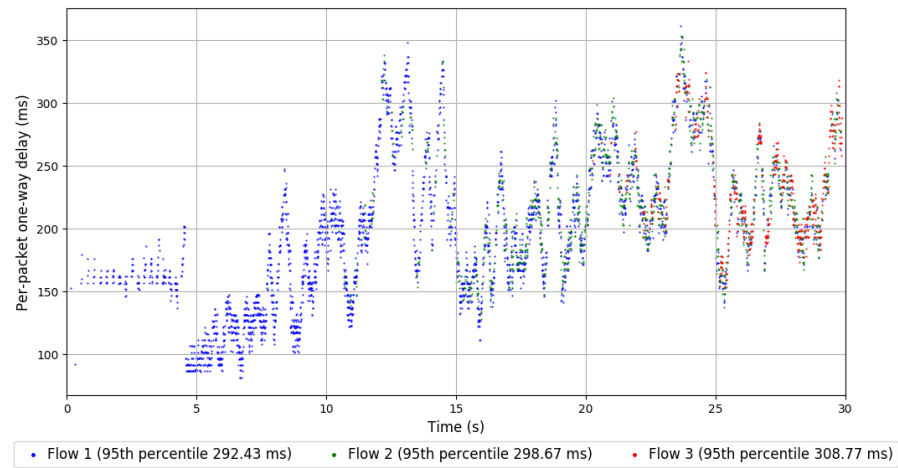
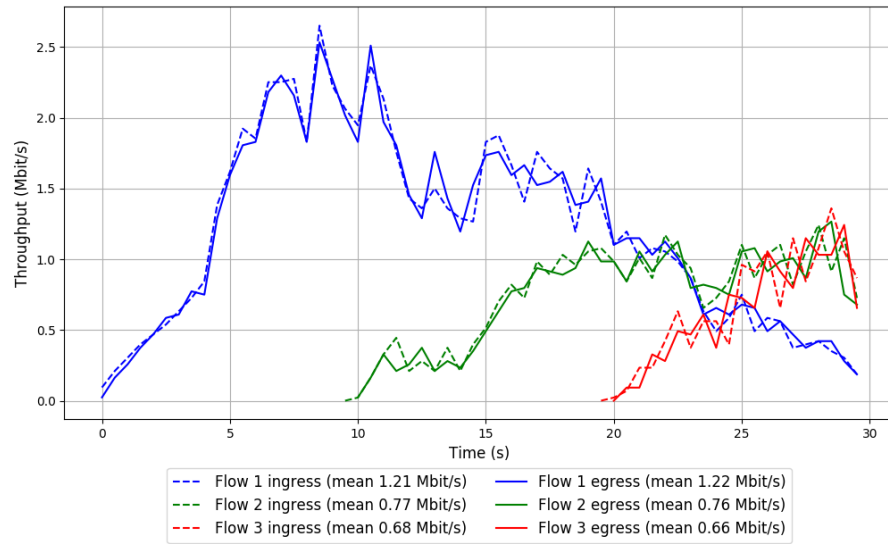
-- Flow 3:

Average throughput: 0.66 Mbit/s

95th percentile per-packet one-way delay: 308.773 ms

Loss rate: 5.23%

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



Run 1: Statistics of PCC

/home/ubuntu/pantheon\_data/2018-01-31T09-34-China-ppp0-to-AWS-Korea-3-runs-3-flows/pcc\_stats

Run 1: Report of PCC — Data Link

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Run 2: Statistics of PCC

Start at: 2018-01-31 10:15:39

End at: 2018-01-31 10:16:09

Local clock offset: -1.629 ms

Remote clock offset: 3.782 ms

# Below is generated by plot.py at 2018-01-31 12:28:40

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.94 Mbit/s

95th percentile per-packet one-way delay: 444.835 ms

Loss rate: 57.81%

-- Flow 1:

Average throughput: 1.57 Mbit/s

95th percentile per-packet one-way delay: 377.679 ms

Loss rate: 37.45%

-- Flow 2:

Average throughput: 1.42 Mbit/s

95th percentile per-packet one-way delay: 384.953 ms

Loss rate: 39.59%

-- Flow 3:

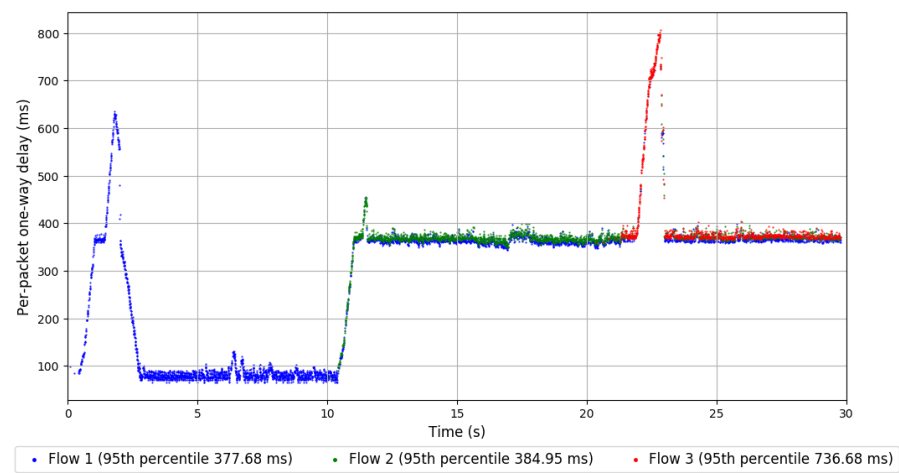
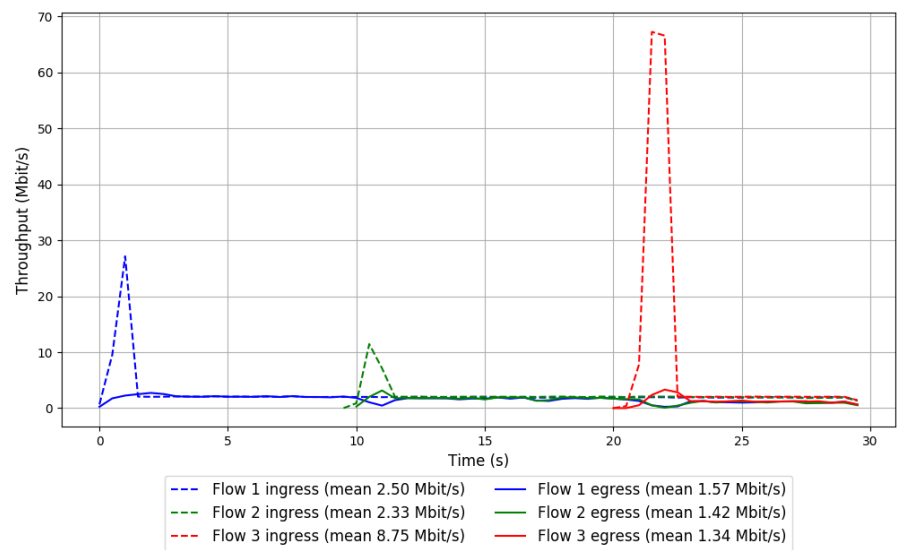
Average throughput: 1.34 Mbit/s

95th percentile per-packet one-way delay: 736.682 ms

Loss rate: 85.32%



Run 2: Report of PCC — Data Link



Run 3: Statistics of PCC

Start at: 2018-01-31 10:42:51

End at: 2018-01-31 10:43:21

Local clock offset: -1.132 ms

Remote clock offset: 4.288 ms

# Below is generated by plot.py at 2018-01-31 12:28:42

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.48 Mbit/s

95th percentile per-packet one-way delay: 667.092 ms

Loss rate: 67.91%

-- Flow 1:

Average throughput: 1.38 Mbit/s

95th percentile per-packet one-way delay: 392.997 ms

Loss rate: 53.77%

-- Flow 2:

Average throughput: 1.21 Mbit/s

95th percentile per-packet one-way delay: 728.303 ms

Loss rate: 69.52%

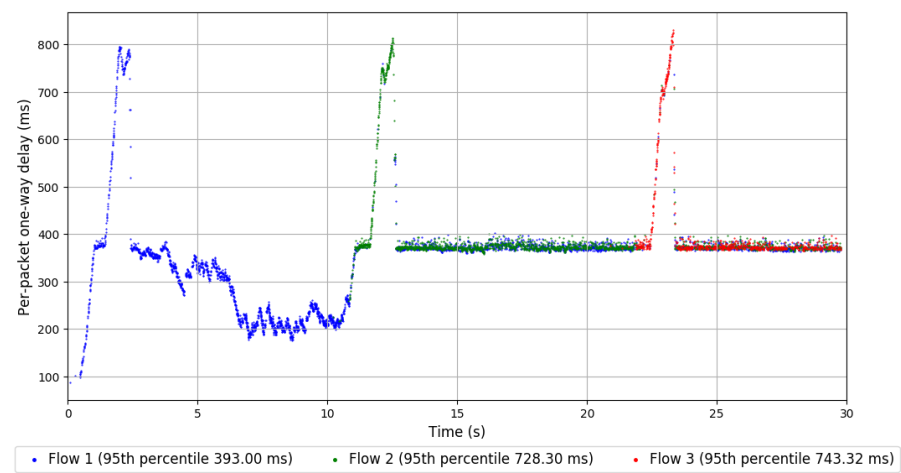
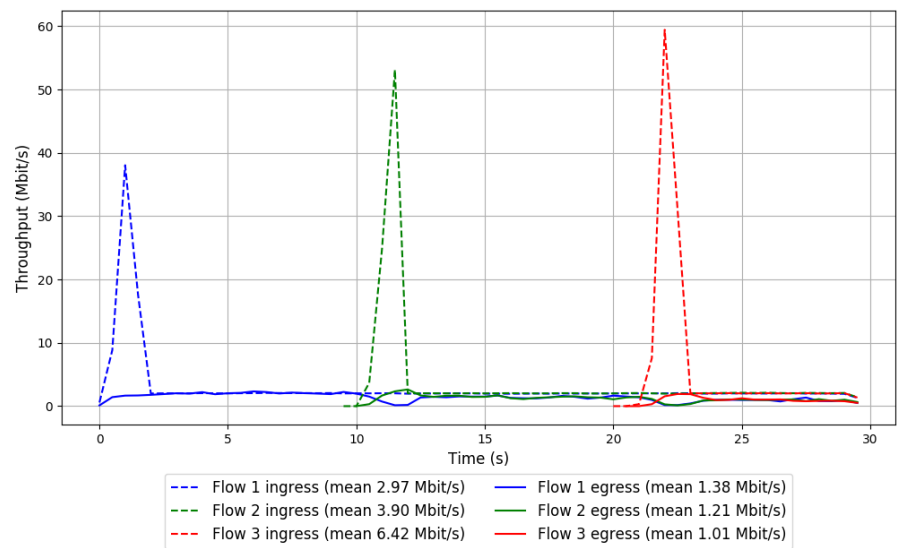
-- Flow 3:

Average throughput: 1.01 Mbit/s

95th percentile per-packet one-way delay: 743.315 ms

Loss rate: 85.78%

Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2018-01-31 09:46:14

End at: 2018-01-31 09:46:44

Local clock offset: -1.214 ms

Remote clock offset: 4.249 ms

Run 1: Report of QUIC Cubic — Data Link

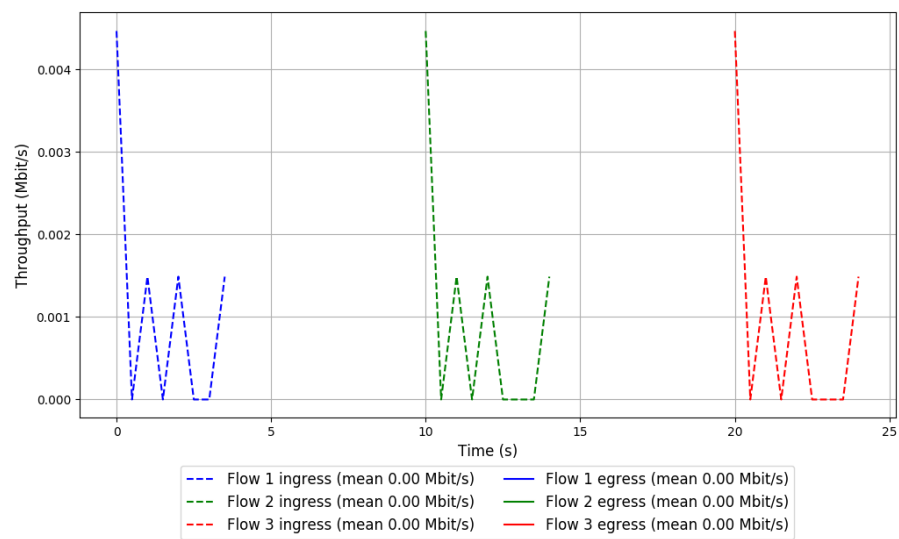


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Run 2: Statistics of QUIC Cubic

/home/ubuntu/pantheon\_data/2018-01-31T09-34-China-ppp0-to-AWS-Korea-3-runs-3-flows/quic\_stat

Run 2: Report of QUIC Cubic — Data Link

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Run 3: Statistics of QUIC Cubic

Start at: 2018-01-31 10:41:24

End at: 2018-01-31 10:41:54

Local clock offset: -1.325 ms

Remote clock offset: 4.258 ms

# Below is generated by plot.py at 2018-01-31 12:28:45

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.20 Mbit/s

95th percentile per-packet one-way delay: 371.703 ms

Loss rate: 6.33%

-- Flow 1:

Average throughput: 1.48 Mbit/s

95th percentile per-packet one-way delay: 371.387 ms

Loss rate: 4.53%

-- Flow 2:

Average throughput: 0.75 Mbit/s

95th percentile per-packet one-way delay: 367.185 ms

Loss rate: 8.19%

-- Flow 3:

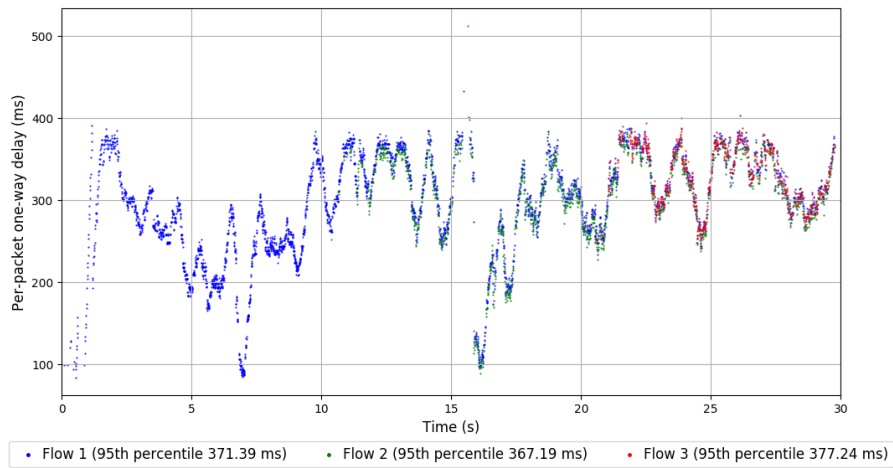
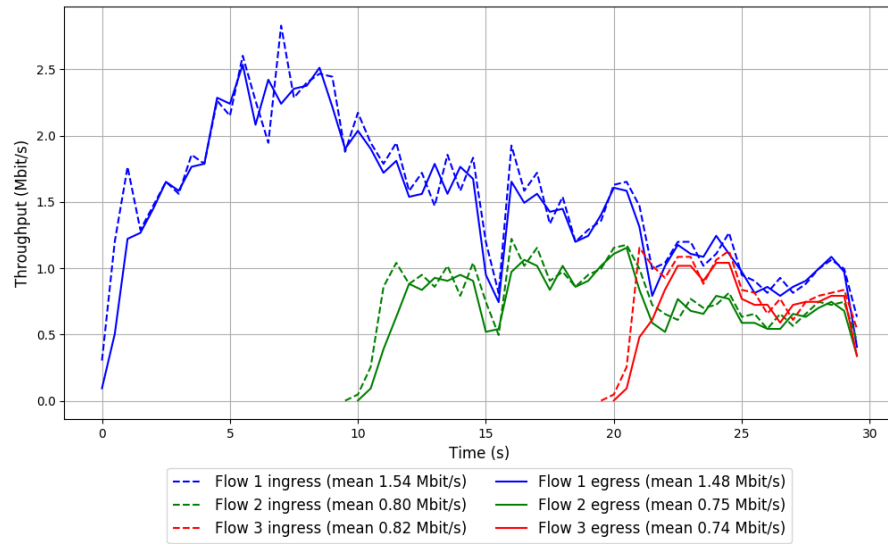
Average throughput: 0.74 Mbit/s

95th percentile per-packet one-way delay: 377.238 ms

Loss rate: 12.94%



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

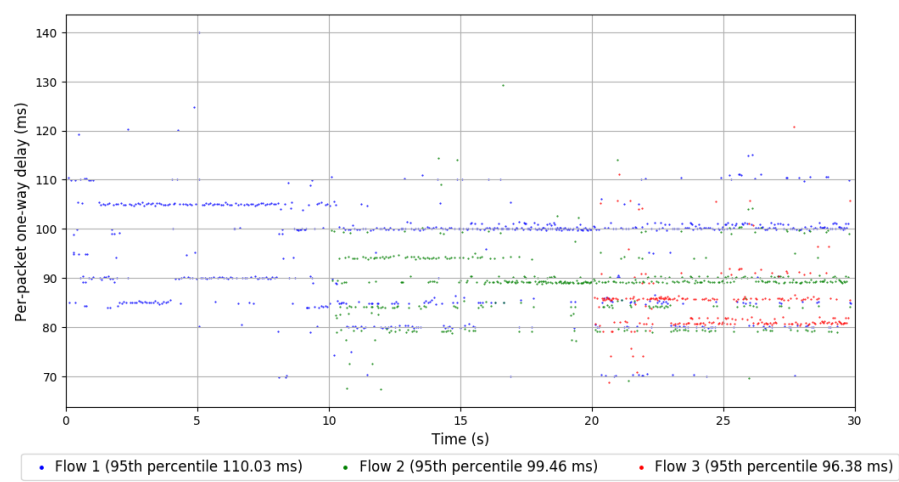
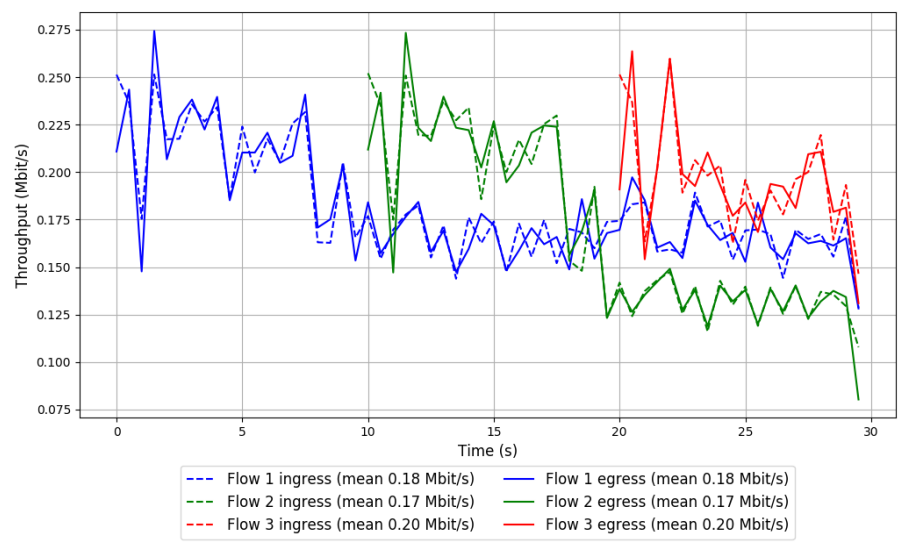


```
Run 1: Statistics of SReAM

Start at: 2018-01-31 09:54:03
End at: 2018-01-31 09:54:33
Local clock offset: -1.282 ms
Remote clock offset: 4.275 ms

# Below is generated by plot.py at 2018-01-31 12:28:45
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 105.231 ms
Loss rate: 0.65%
-- Flow 1:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 110.027 ms
Loss rate: 0.35%
-- Flow 2:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 99.461 ms
Loss rate: 0.67%
-- Flow 3:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 96.383 ms
Loss rate: 1.46%
```

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SCReAM

/home/ubuntu/pantheon\_data/2018-01-31T09-34-China-ppp0-to-AWS-Korea-3-runs-3-flows/scream\_st

Run 2: Report of SReAM — Data Link

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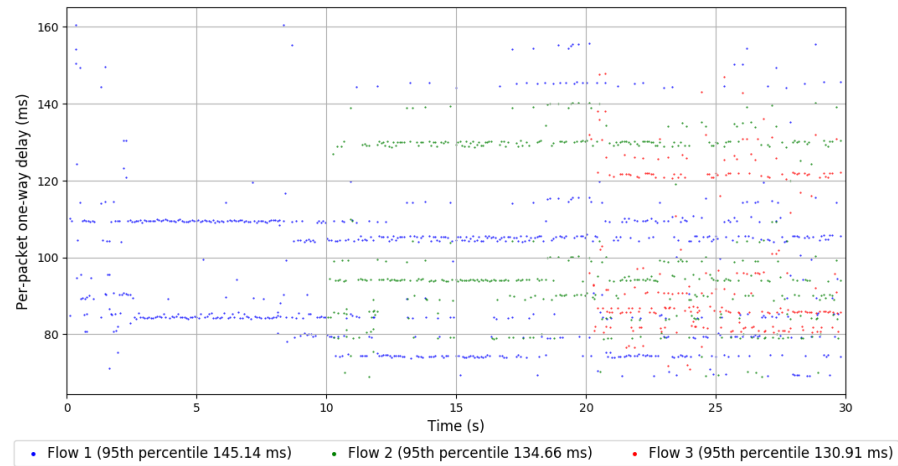
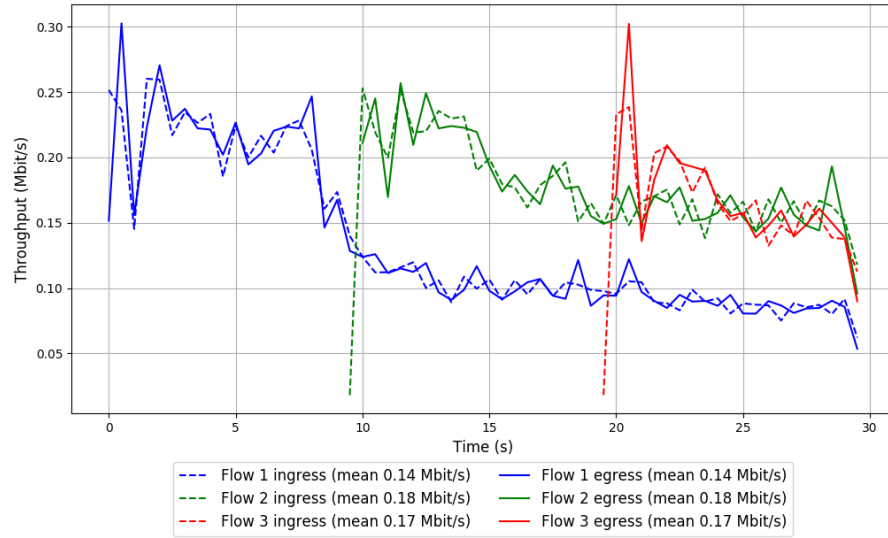
Figure is missing

Run 3: Statistics of SCReAM

Start at: 2018-01-31 10:48:47  
End at: 2018-01-31 10:49:17  
Local clock offset: -1.162 ms  
Remote clock offset: 4.548 ms

# Below is generated by plot.py at 2018-01-31 12:28:45  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.31 Mbit/s  
95th percentile per-packet one-way delay: 138.820 ms  
Loss rate: 0.65%  
-- Flow 1:  
Average throughput: 0.14 Mbit/s  
95th percentile per-packet one-way delay: 145.142 ms  
Loss rate: 0.27%  
-- Flow 2:  
Average throughput: 0.18 Mbit/s  
95th percentile per-packet one-way delay: 134.655 ms  
Loss rate: 0.77%  
-- Flow 3:  
Average throughput: 0.17 Mbit/s  
95th percentile per-packet one-way delay: 130.911 ms  
Loss rate: 1.31%

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



Run 1: Statistics of WebRTC media

Start at: 2018-01-31 09:38:00

End at: 2018-01-31 09:38:30

Local clock offset: -1.163 ms

Remote clock offset: 4.452 ms

# Below is generated by plot.py at 2018-01-31 12:28:46

# Datalink statistics

-- Total of 3 flows:

Average throughput: 1.32 Mbit/s

95th percentile per-packet one-way delay: 240.102 ms

Loss rate: 2.83%

-- Flow 1:

Average throughput: 0.54 Mbit/s

95th percentile per-packet one-way delay: 217.731 ms

Loss rate: 1.07%

-- Flow 2:

Average throughput: 0.49 Mbit/s

95th percentile per-packet one-way delay: 191.848 ms

Loss rate: 1.86%

-- Flow 3:

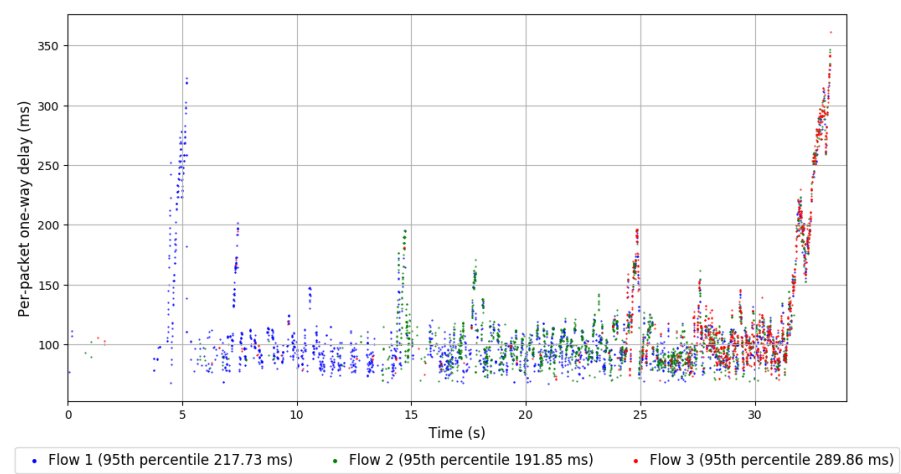
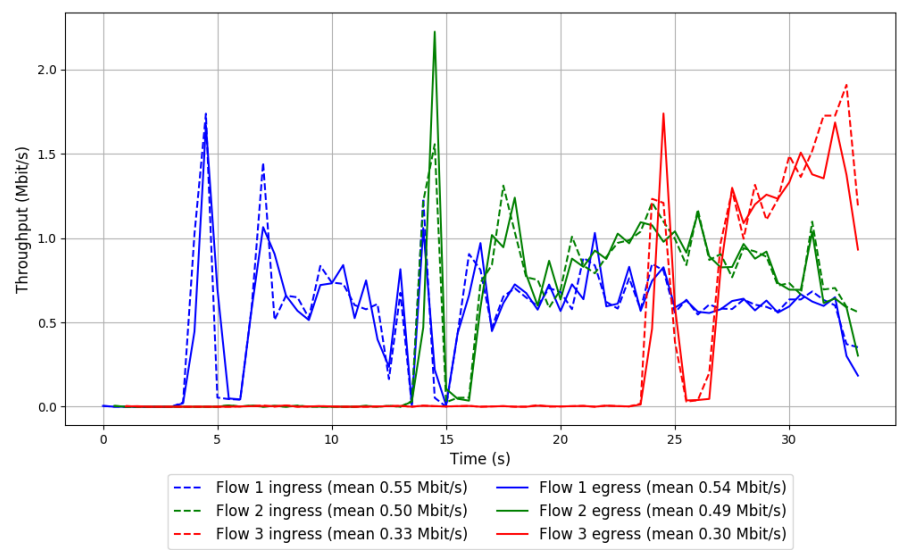
Average throughput: 0.30 Mbit/s

95th percentile per-packet one-way delay: 289.860 ms

Loss rate: 7.36%



Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2018-01-31 10:05:52

End at: 2018-01-31 10:06:22

Local clock offset: -1.175 ms

Remote clock offset: 4.083 ms

# Below is generated by plot.py at 2018-01-31 12:28:46

# Datalink statistics

-- Total of 3 flows:

Average throughput: 1.37 Mbit/s

95th percentile per-packet one-way delay: 214.306 ms

Loss rate: 0.73%

-- Flow 1:

Average throughput: 0.56 Mbit/s

95th percentile per-packet one-way delay: 224.241 ms

Loss rate: 0.22%

-- Flow 2:

Average throughput: 0.46 Mbit/s

95th percentile per-packet one-way delay: 196.744 ms

Loss rate: 0.18%

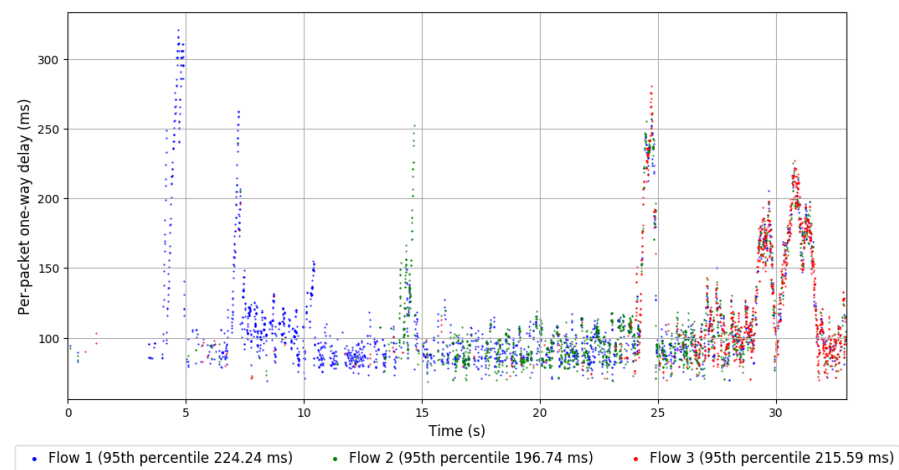
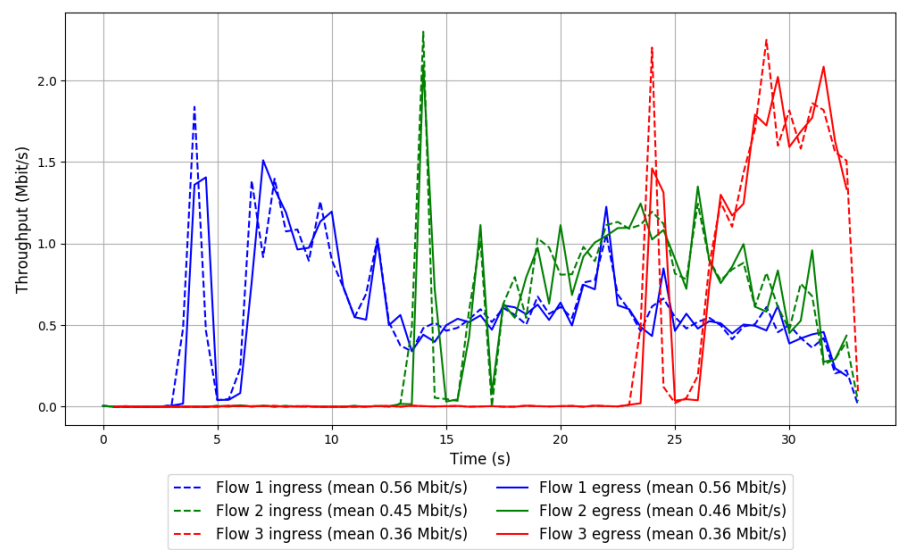
-- Flow 3:

Average throughput: 0.36 Mbit/s

95th percentile per-packet one-way delay: 215.587 ms

Loss rate: 2.23%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2018-01-31 10:34:03

End at: 2018-01-31 10:34:33

Local clock offset: -0.946 ms

Remote clock offset: 3.954 ms

# Below is generated by plot.py at 2018-01-31 12:28:47

# Datalink statistics

-- Total of 3 flows:

Average throughput: 1.32 Mbit/s

95th percentile per-packet one-way delay: 258.872 ms

Loss rate: 0.91%

-- Flow 1:

Average throughput: 0.73 Mbit/s

95th percentile per-packet one-way delay: 257.173 ms

Loss rate: 0.41%

-- Flow 2:

Average throughput: 0.37 Mbit/s

95th percentile per-packet one-way delay: 254.964 ms

Loss rate: 0.88%

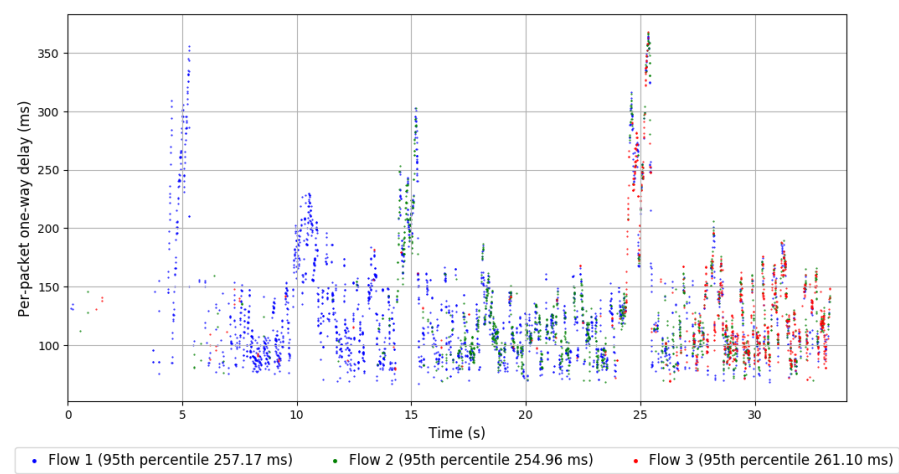
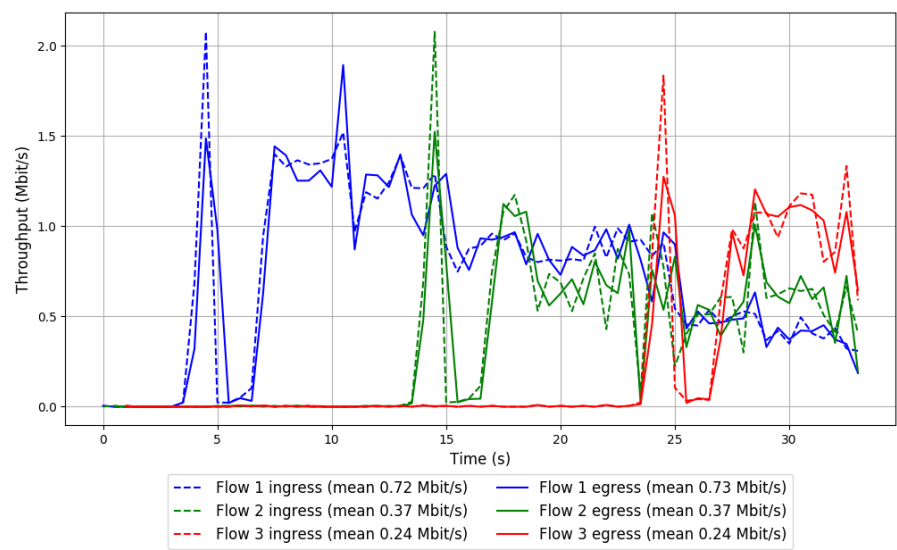
-- Flow 3:

Average throughput: 0.24 Mbit/s

95th percentile per-packet one-way delay: 261.098 ms

Loss rate: 2.51%

Run 3: Report of WebRTC media — Data Link

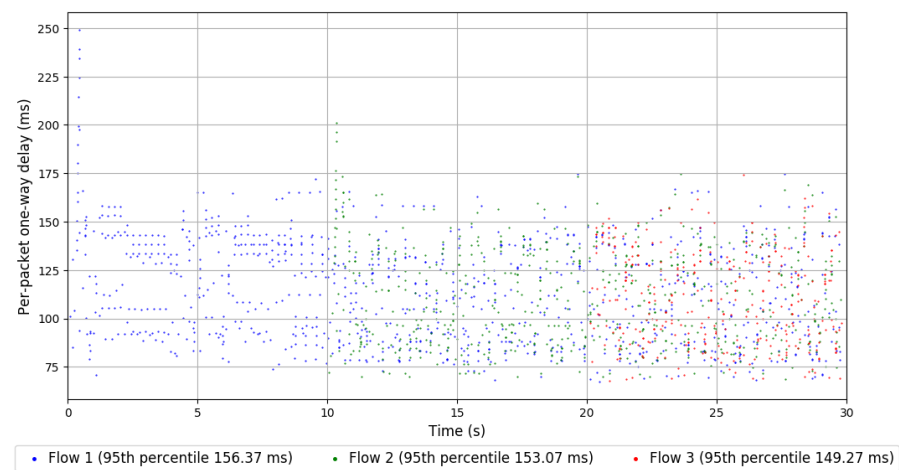
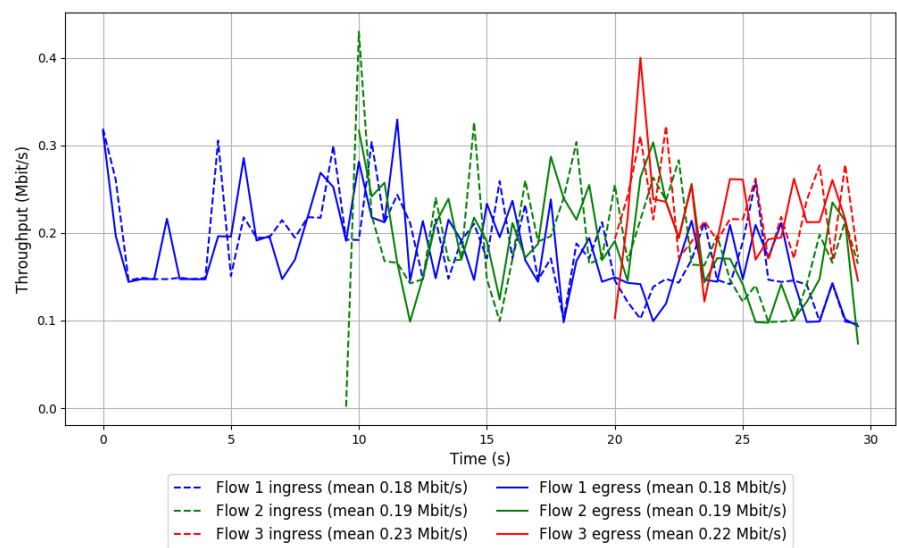


Run 1: Statistics of Sprout

Start at: 2018-01-31 09:58:31  
End at: 2018-01-31 09:59:01  
Local clock offset: -1.819 ms  
Remote clock offset: 4.392 ms

# Below is generated by plot.py at 2018-01-31 12:28:47  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.38 Mbit/s  
95th percentile per-packet one-way delay: 153.067 ms  
Loss rate: 1.02%  
-- Flow 1:  
Average throughput: 0.18 Mbit/s  
95th percentile per-packet one-way delay: 156.372 ms  
Loss rate: 0.44%  
-- Flow 2:  
Average throughput: 0.19 Mbit/s  
95th percentile per-packet one-way delay: 153.067 ms  
Loss rate: 1.23%  
-- Flow 3:  
Average throughput: 0.22 Mbit/s  
95th percentile per-packet one-way delay: 149.267 ms  
Loss rate: 2.08%

Run 1: Report of Sprout — Data Link



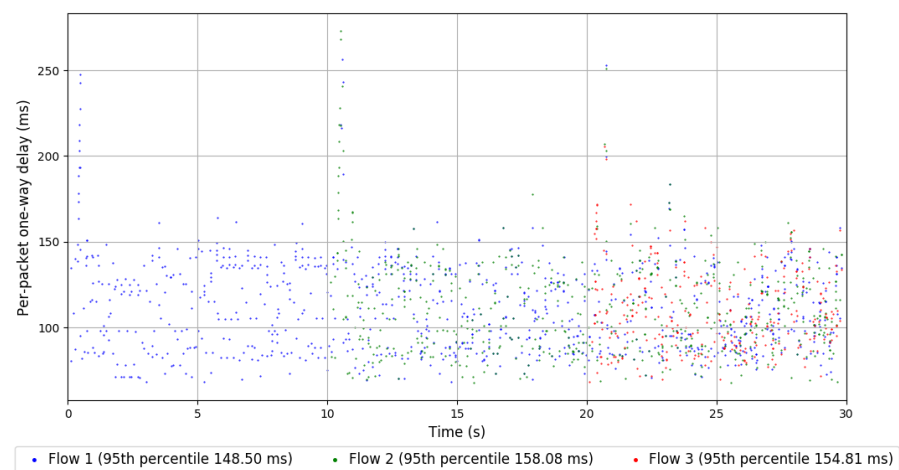
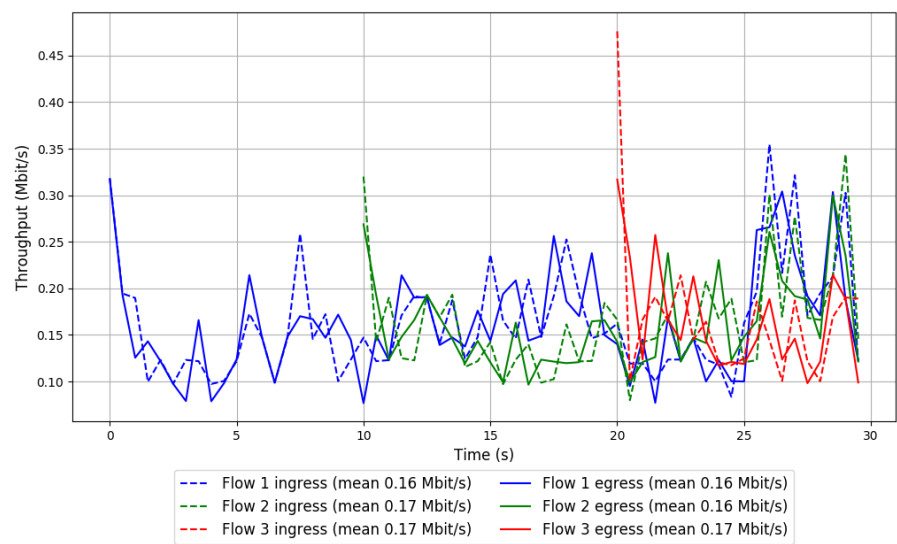
## Run 2: Statistics of Sprout

Start at: 2018-01-31 10:26:46  
End at: 2018-01-31 10:27:16  
Local clock offset: -1.346 ms  
Remote clock offset: 3.812 ms

```
# Below is generated by plot.py at 2018-01-31 12:28:47
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 151.840 ms
Loss rate: 1.75%
-- Flow 1:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 148.499 ms
Loss rate: 1.17%
-- Flow 2:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 158.081 ms
Loss rate: 2.08%
-- Flow 3:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 154.812 ms
Loss rate: 2.77%
```



Run 2: Report of Sprout — Data Link

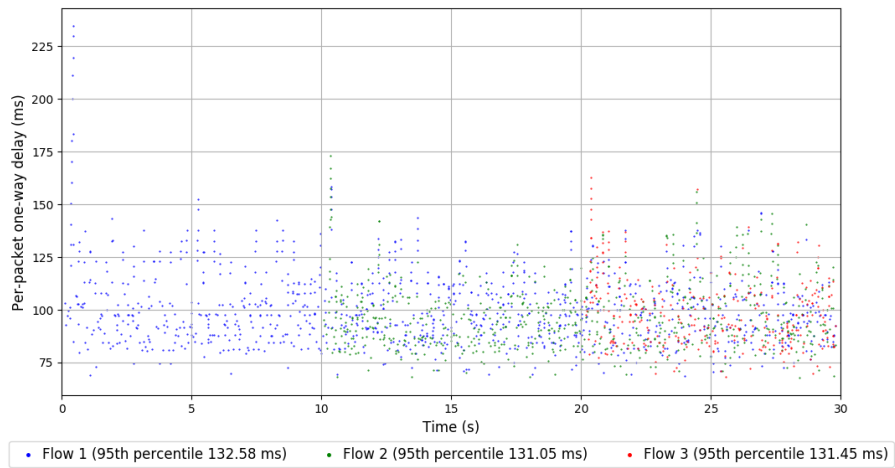
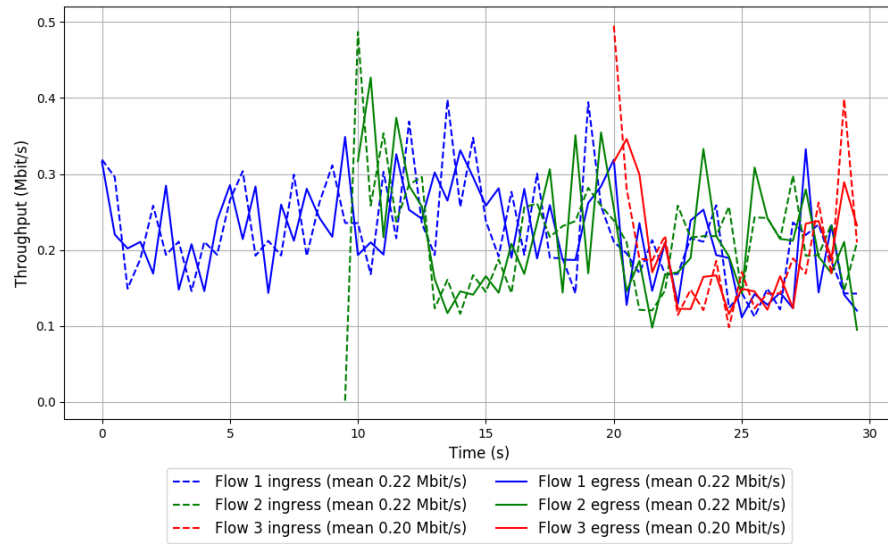


### Run 3: Statistics of Sprout

Start at: 2018-01-31 10:53:09  
End at: 2018-01-31 10:53:39  
Local clock offset: -1.374 ms  
Remote clock offset: 4.526 ms

```
# Below is generated by plot.py at 2018-01-31 12:28:47
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 132.148 ms
Loss rate: 1.06%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 132.579 ms
Loss rate: 0.52%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 131.054 ms
Loss rate: 1.34%
-- Flow 3:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 131.454 ms
Loss rate: 2.29%
```

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



Run 1: Statistics of TaoVA-100x

Start at: 2018-01-31 09:39:26

End at: 2018-01-31 09:39:56

Local clock offset: -1.672 ms

Remote clock offset: 4.348 ms

# Below is generated by plot.py at 2018-01-31 12:28:54

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.92 Mbit/s

95th percentile per-packet one-way delay: 365.975 ms

Loss rate: 3.65%

-- Flow 1:

Average throughput: 1.71 Mbit/s

95th percentile per-packet one-way delay: 358.132 ms

Loss rate: 2.48%

-- Flow 2:

Average throughput: 1.33 Mbit/s

95th percentile per-packet one-way delay: 366.866 ms

Loss rate: 3.43%

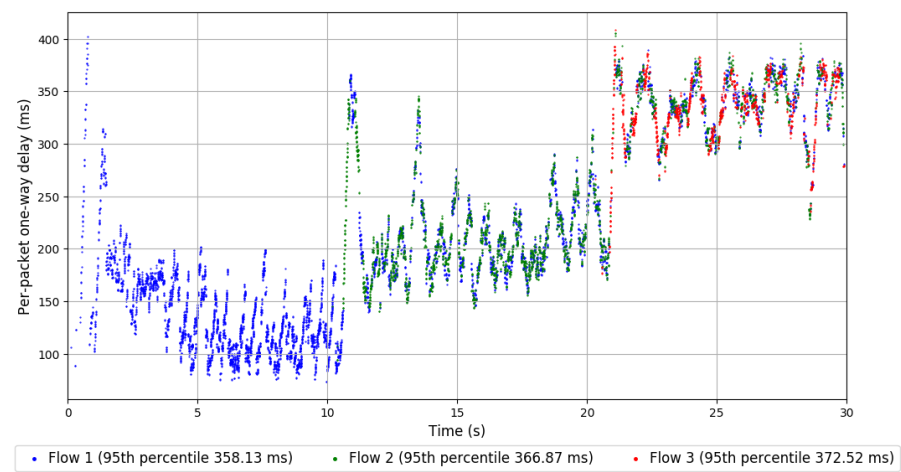
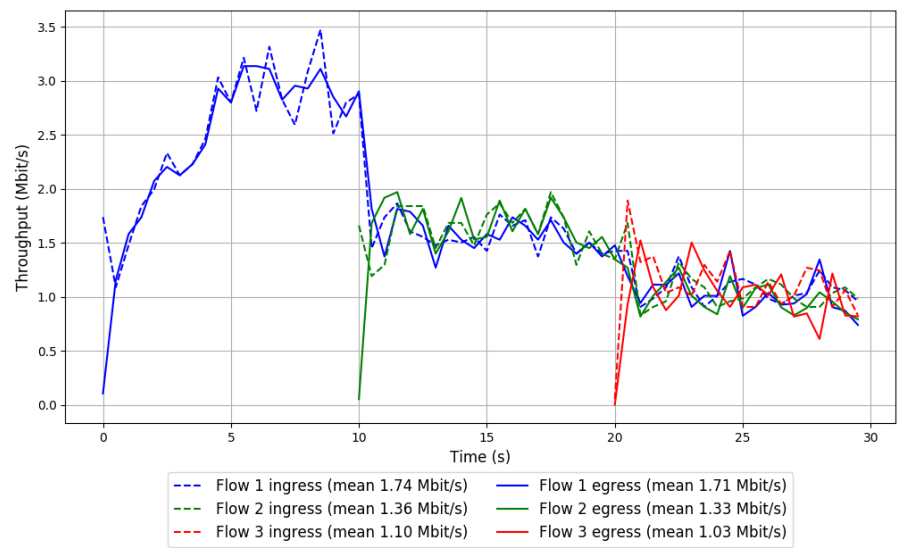
-- Flow 3:

Average throughput: 1.03 Mbit/s

95th percentile per-packet one-way delay: 372.516 ms

Loss rate: 9.81%

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



Run 2: Statistics of TaoVA-100x

Start at: 2018-01-31 10:07:19

End at: 2018-01-31 10:07:49

Local clock offset: -1.647 ms

Remote clock offset: 3.978 ms

# Below is generated by plot.py at 2018-01-31 12:28:54

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.43 Mbit/s

95th percentile per-packet one-way delay: 372.721 ms

Loss rate: 11.06%

-- Flow 1:

Average throughput: 1.41 Mbit/s

95th percentile per-packet one-way delay: 368.317 ms

Loss rate: 6.95%

-- Flow 2:

Average throughput: 1.07 Mbit/s

95th percentile per-packet one-way delay: 374.276 ms

Loss rate: 12.13%

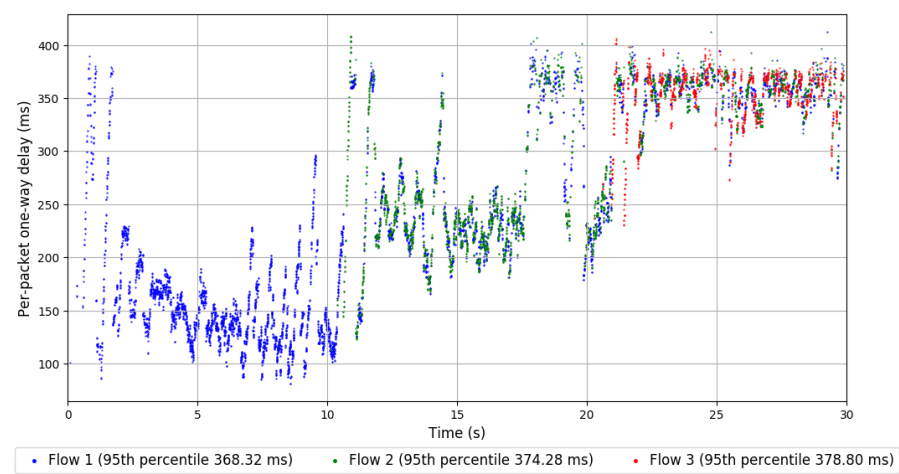
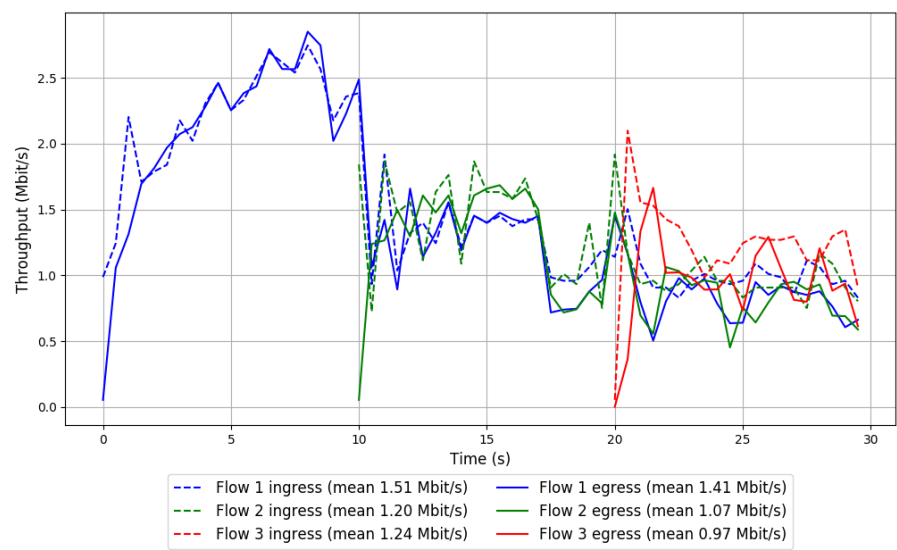
-- Flow 3:

Average throughput: 0.97 Mbit/s

95th percentile per-packet one-way delay: 378.803 ms

Loss rate: 24.07%

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



Run 3: Statistics of TaoVA-100x

Start at: 2018-01-31 10:35:30

End at: 2018-01-31 10:36:00

Local clock offset: -1.747 ms

Remote clock offset: 4.064 ms

# Below is generated by plot.py at 2018-01-31 12:28:57

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.84 Mbit/s

95th percentile per-packet one-way delay: 366.347 ms

Loss rate: 7.85%

-- Flow 1:

Average throughput: 1.68 Mbit/s

95th percentile per-packet one-way delay: 362.913 ms

Loss rate: 3.48%

-- Flow 2:

Average throughput: 1.36 Mbit/s

95th percentile per-packet one-way delay: 364.857 ms

Loss rate: 4.99%

-- Flow 3:

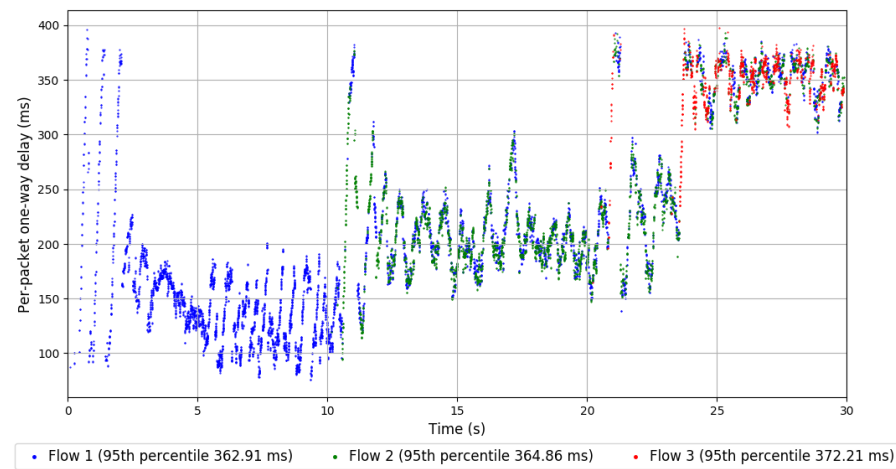
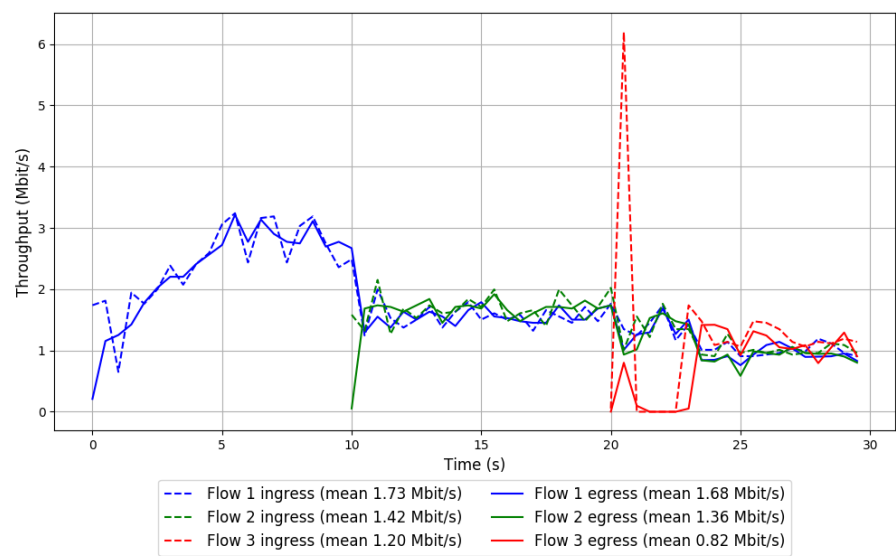
Average throughput: 0.82 Mbit/s

95th percentile per-packet one-way delay: 372.207 ms

Loss rate: 33.59%



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



Run 1: Statistics of TCP Vegas

Start at: 2018-01-31 09:40:58

End at: 2018-01-31 09:41:28

Local clock offset: -1.39 ms

Remote clock offset: 4.324 ms

# Below is generated by plot.py at 2018-01-31 12:28:57

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.70 Mbit/s

95th percentile per-packet one-way delay: 328.700 ms

Loss rate: 1.99%

-- Flow 1:

Average throughput: 1.43 Mbit/s

95th percentile per-packet one-way delay: 273.117 ms

Loss rate: 0.87%

-- Flow 2:

Average throughput: 1.05 Mbit/s

95th percentile per-packet one-way delay: 283.960 ms

Loss rate: 0.69%

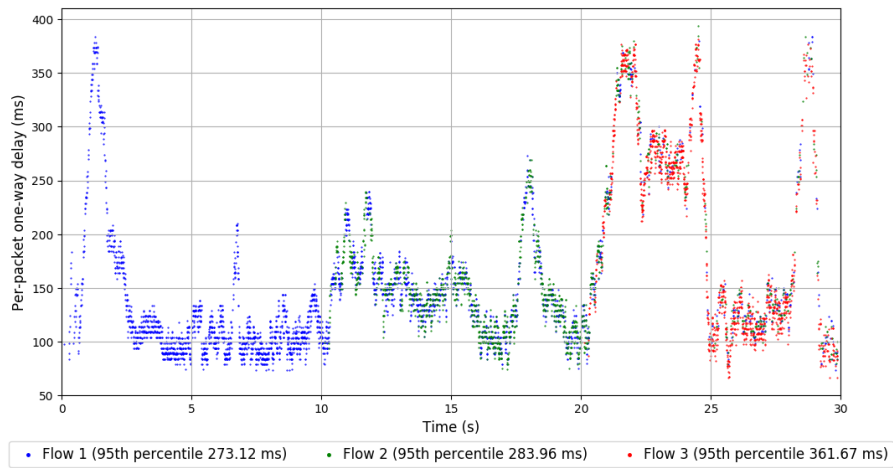
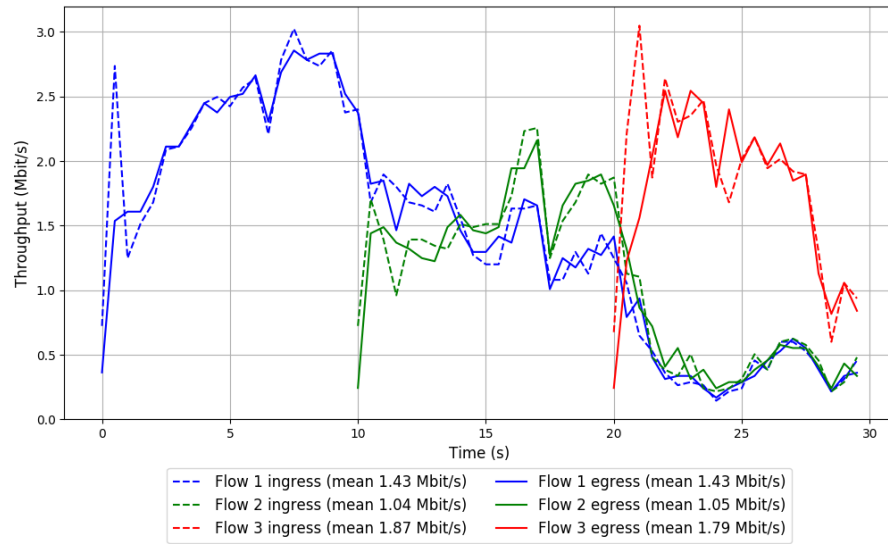
-- Flow 3:

Average throughput: 1.79 Mbit/s

95th percentile per-packet one-way delay: 361.670 ms

Loss rate: 6.02%

# Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2018-01-31 10:08:48

End at: 2018-01-31 10:09:18

Local clock offset: -1.182 ms

Remote clock offset: 4.023 ms

# Below is generated by plot.py at 2018-01-31 12:28:57

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.79 Mbit/s

95th percentile per-packet one-way delay: 258.746 ms

Loss rate: 1.10%

-- Flow 1:

Average throughput: 1.27 Mbit/s

95th percentile per-packet one-way delay: 294.377 ms

Loss rate: 1.01%

-- Flow 2:

Average throughput: 1.67 Mbit/s

95th percentile per-packet one-way delay: 248.217 ms

Loss rate: 0.72%

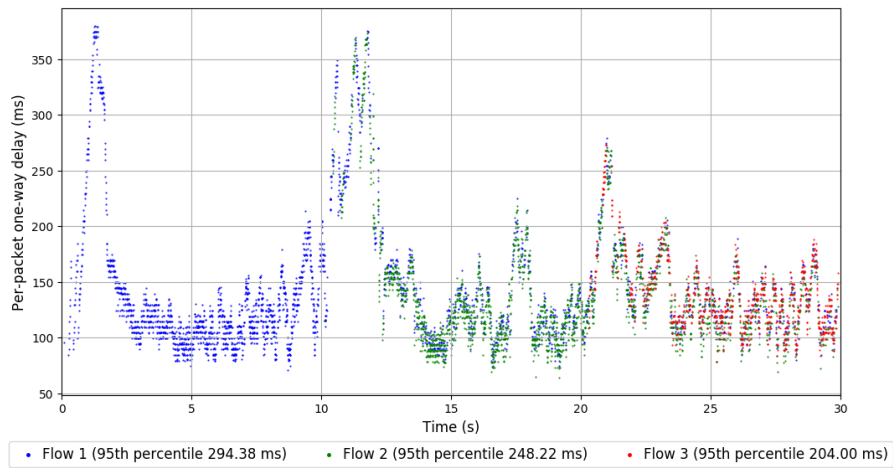
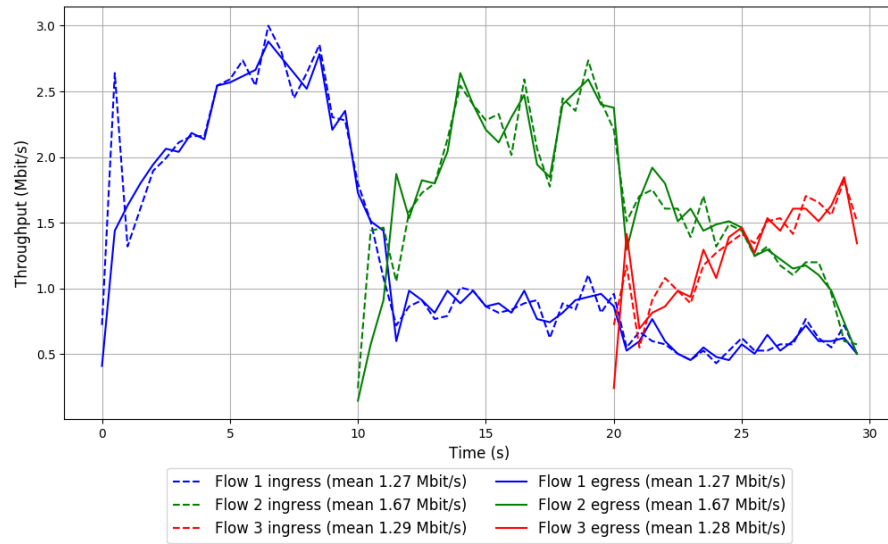
-- Flow 3:

Average throughput: 1.28 Mbit/s

95th percentile per-packet one-way delay: 204.000 ms

Loss rate: 2.34%

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



Run 3: Statistics of TCP Vegas

Start at: 2018-01-31 10:37:00

End at: 2018-01-31 10:37:30

Local clock offset: -1.337 ms

Remote clock offset: 4.131 ms

# Below is generated by plot.py at 2018-01-31 12:28:57

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.13 Mbit/s

95th percentile per-packet one-way delay: 306.055 ms

Loss rate: 2.25%

-- Flow 1:

Average throughput: 0.96 Mbit/s

95th percentile per-packet one-way delay: 251.082 ms

Loss rate: 0.87%

-- Flow 2:

Average throughput: 0.95 Mbit/s

95th percentile per-packet one-way delay: 344.867 ms

Loss rate: 3.18%

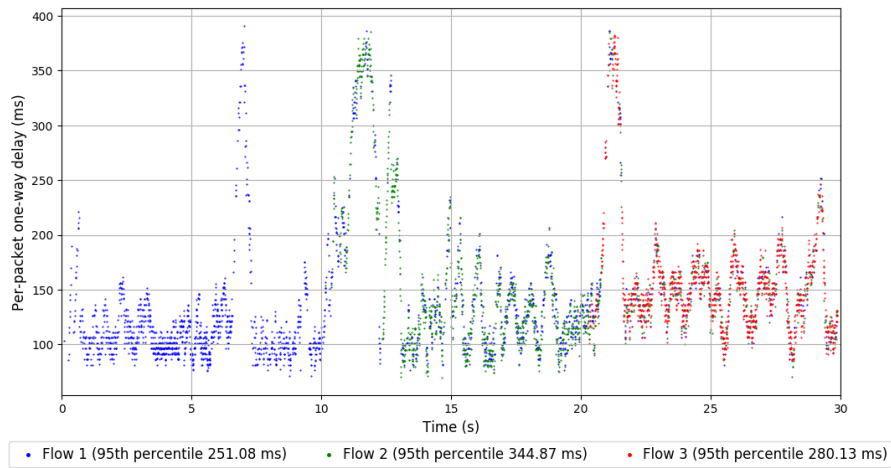
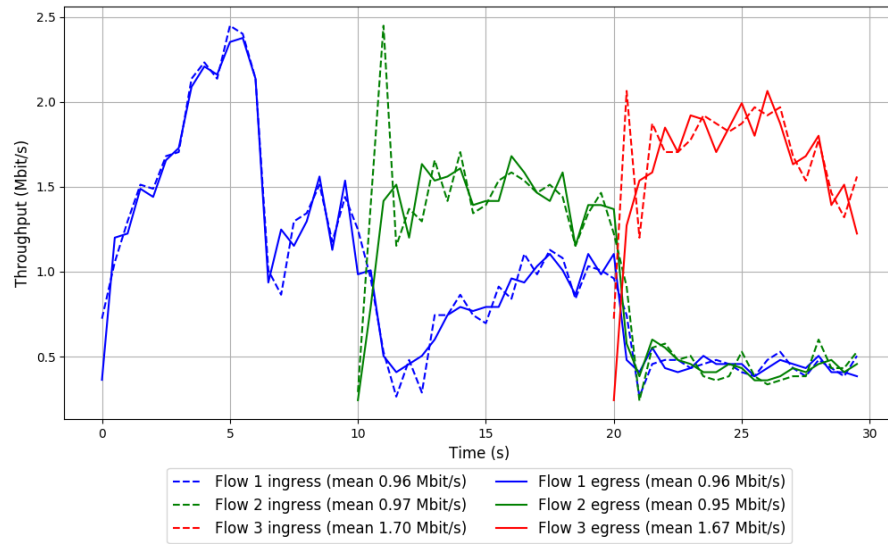
-- Flow 3:

Average throughput: 1.67 Mbit/s

95th percentile per-packet one-way delay: 280.131 ms

Loss rate: 3.56%

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



Run 1: Statistics of Verus

Start at: 2018-01-31 09:55:29

End at: 2018-01-31 09:55:59

Local clock offset: -1.277 ms

Remote clock offset: 4.294 ms

# Below is generated by plot.py at 2018-01-31 12:29:02

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.41 Mbit/s

95th percentile per-packet one-way delay: 389.960 ms

Loss rate: 86.27%

-- Flow 1:

Average throughput: 2.35 Mbit/s

95th percentile per-packet one-way delay: 390.200 ms

Loss rate: 86.54%

-- Flow 2:

Average throughput: 0.06 Mbit/s

95th percentile per-packet one-way delay: 368.192 ms

Loss rate: 52.13%

-- Flow 3:

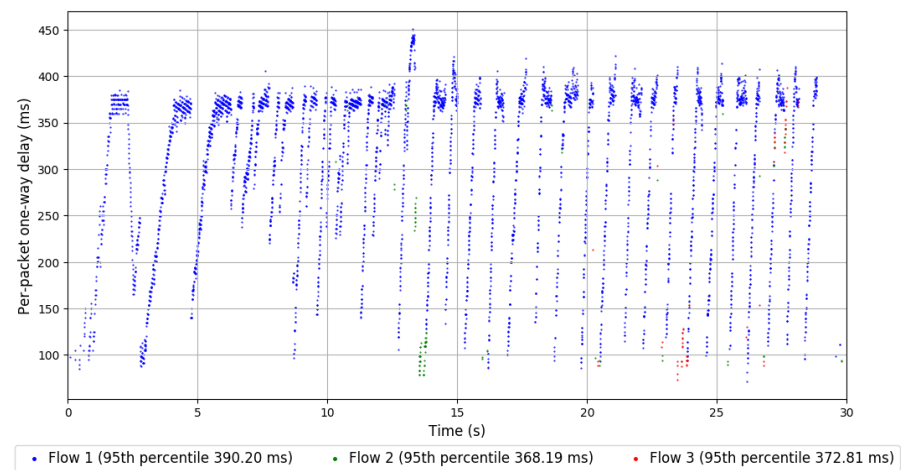
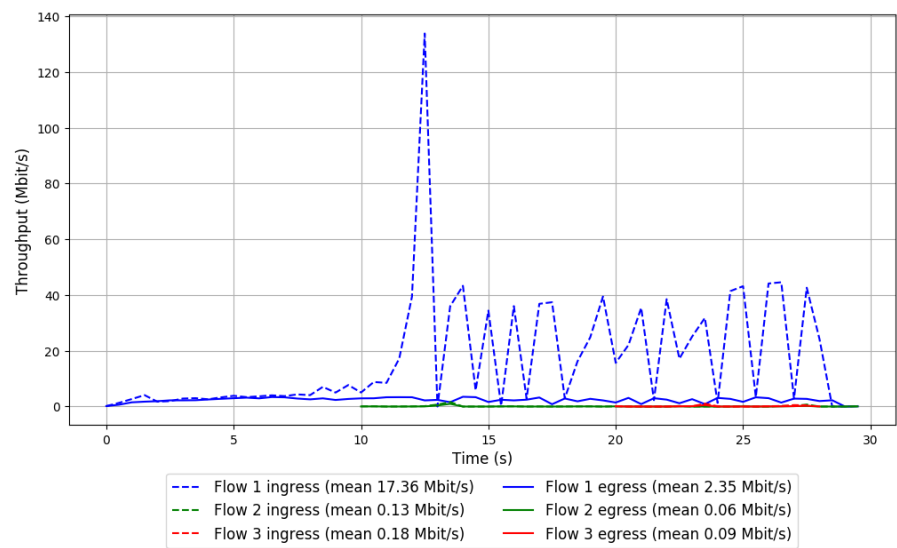
Average throughput: 0.09 Mbit/s

95th percentile per-packet one-way delay: 372.814 ms

Loss rate: 50.42%



Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

/home/ubuntu/pantheon\_data/2018-01-31T09-34-China-ppp0-to-AWS-Korea-3-runs-3-flows/verus\_sta

Run 2: Report of Verus — Data Link

Figure is missing

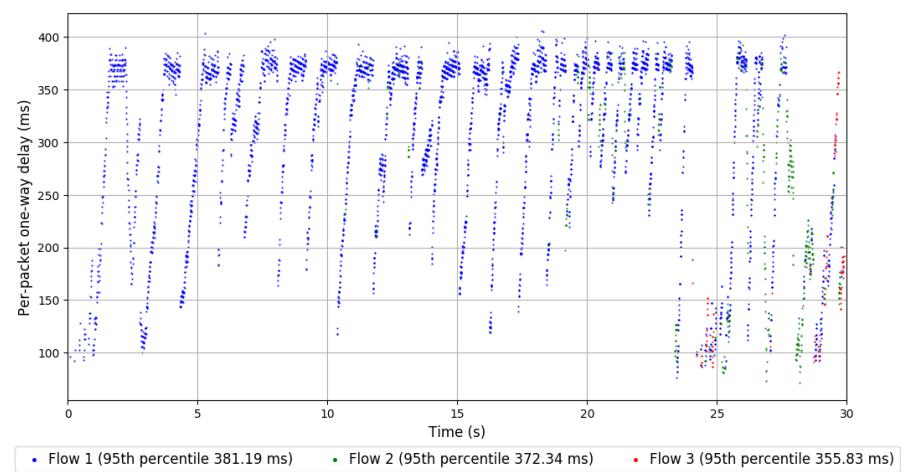
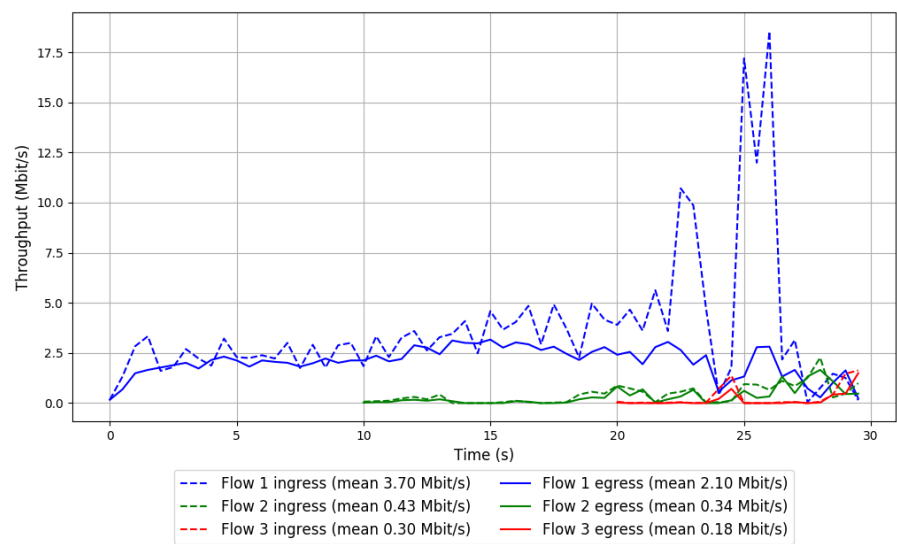
Figure is missing

Run 3: Statistics of Verus

Start at: 2018-01-31 10:50:13  
End at: 2018-01-31 10:50:43  
Local clock offset: -0.958 ms  
Remote clock offset: 4.539 ms

# Below is generated by plot.py at 2018-01-31 12:29:02  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 2.37 Mbit/s  
95th percentile per-packet one-way delay: 380.560 ms  
Loss rate: 42.31%  
-- Flow 1:  
Average throughput: 2.10 Mbit/s  
95th percentile per-packet one-way delay: 381.188 ms  
Loss rate: 43.72%  
-- Flow 2:  
Average throughput: 0.34 Mbit/s  
95th percentile per-packet one-way delay: 372.337 ms  
Loss rate: 24.14%  
-- Flow 3:  
Average throughput: 0.18 Mbit/s  
95th percentile per-packet one-way delay: 355.833 ms  
Loss rate: 42.46%

Run 3: Report of Verus — Data Link



Run 1: Statistics of Copa

Start at: 2018-01-31 09:42:26

End at: 2018-01-31 09:42:56

Local clock offset: -1.444 ms

Remote clock offset: 4.289 ms

# Below is generated by plot.py at 2018-01-31 12:29:02

# Datalink statistics

-- Total of 3 flows:

Average throughput: 1.11 Mbit/s

95th percentile per-packet one-way delay: 126.895 ms

Loss rate: 1.87%

-- Flow 1:

Average throughput: 0.60 Mbit/s

95th percentile per-packet one-way delay: 123.934 ms

Loss rate: 0.93%

-- Flow 2:

Average throughput: 0.49 Mbit/s

95th percentile per-packet one-way delay: 135.601 ms

Loss rate: 2.23%

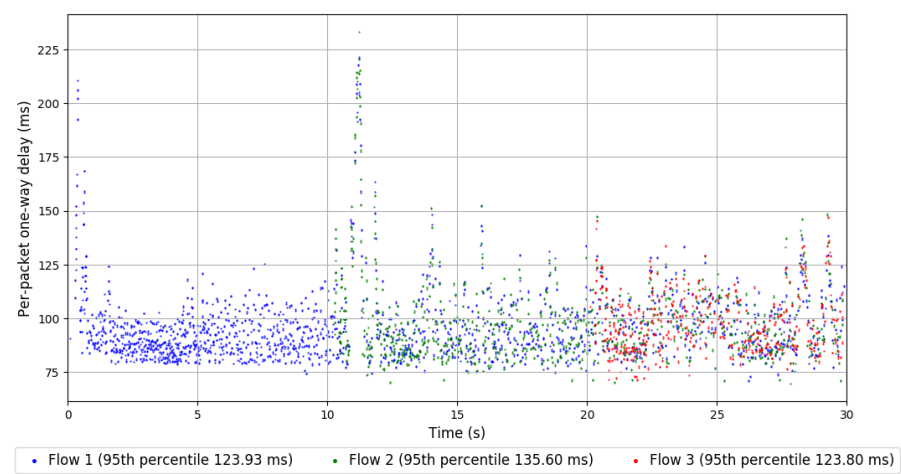
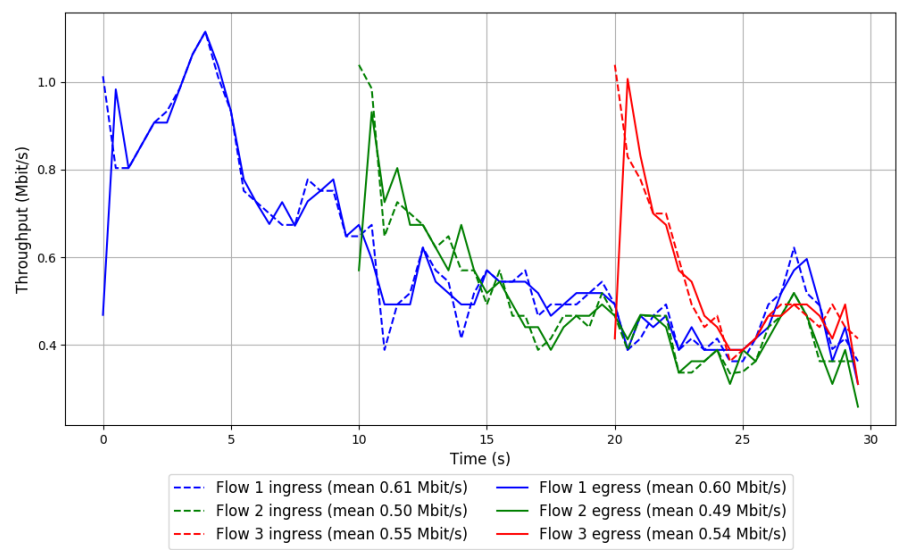
-- Flow 3:

Average throughput: 0.54 Mbit/s

95th percentile per-packet one-way delay: 123.796 ms

Loss rate: 4.31%

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

Start at: 2018-01-31 10:10:16

End at: 2018-01-31 10:10:46

Local clock offset: -1.211 ms

Remote clock offset: 3.924 ms

# Below is generated by plot.py at 2018-01-31 12:29:02

# Datalink statistics

-- Total of 3 flows:

Average throughput: 1.36 Mbit/s

95th percentile per-packet one-way delay: 111.152 ms

Loss rate: 1.74%

-- Flow 1:

Average throughput: 0.77 Mbit/s

95th percentile per-packet one-way delay: 109.157 ms

Loss rate: 0.85%

-- Flow 2:

Average throughput: 0.59 Mbit/s

95th percentile per-packet one-way delay: 110.957 ms

Loss rate: 1.44%

-- Flow 3:

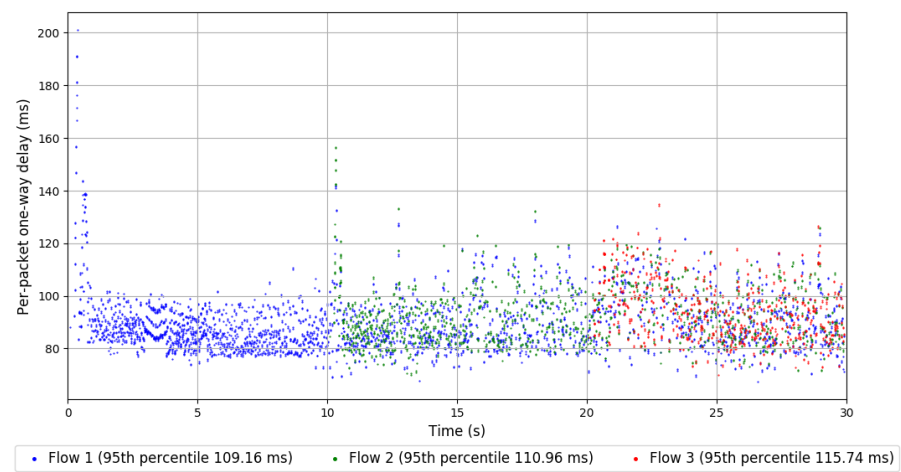
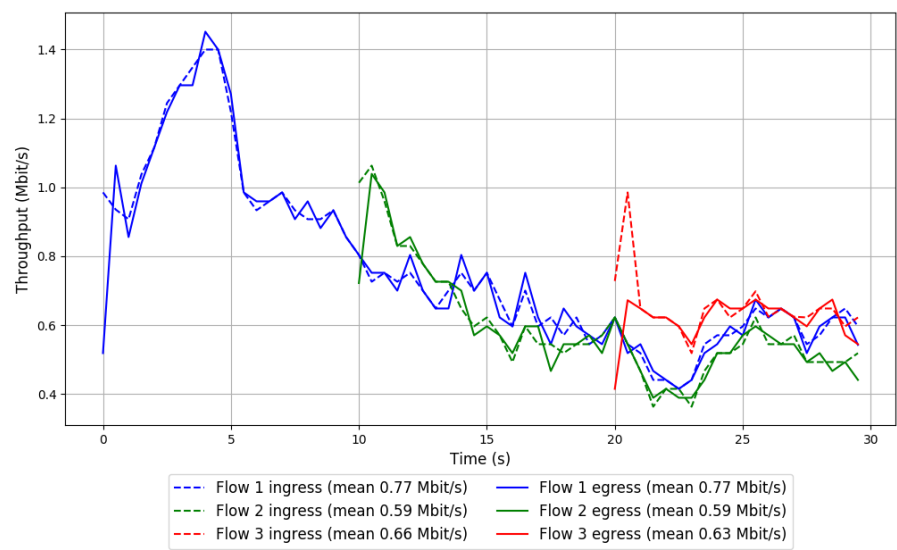
Average throughput: 0.63 Mbit/s

95th percentile per-packet one-way delay: 115.740 ms

Loss rate: 5.40%



Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

Start at: 2018-01-31 10:38:28

End at: 2018-01-31 10:38:58

Local clock offset: -1.725 ms

Remote clock offset: 4.156 ms

# Below is generated by plot.py at 2018-01-31 12:29:02

# Datalink statistics

-- Total of 3 flows:

Average throughput: 1.31 Mbit/s

95th percentile per-packet one-way delay: 115.272 ms

Loss rate: 1.39%

-- Flow 1:

Average throughput: 0.71 Mbit/s

95th percentile per-packet one-way delay: 114.520 ms

Loss rate: 0.67%

-- Flow 2:

Average throughput: 0.62 Mbit/s

95th percentile per-packet one-way delay: 115.183 ms

Loss rate: 1.28%

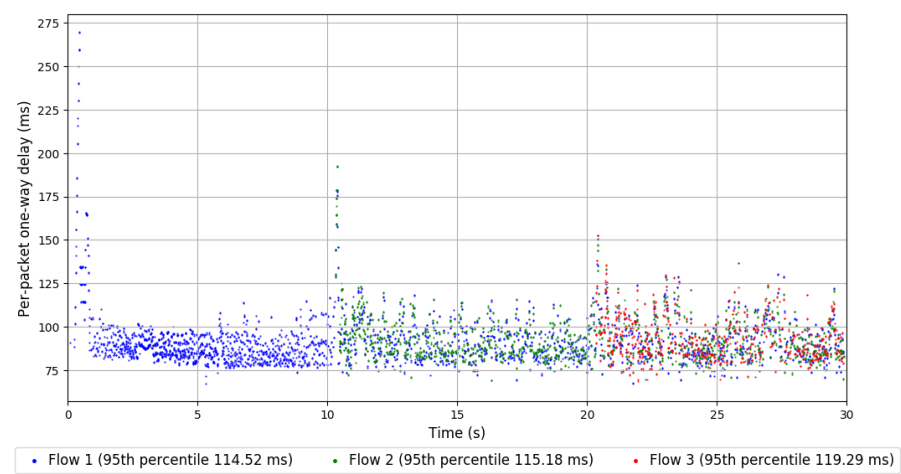
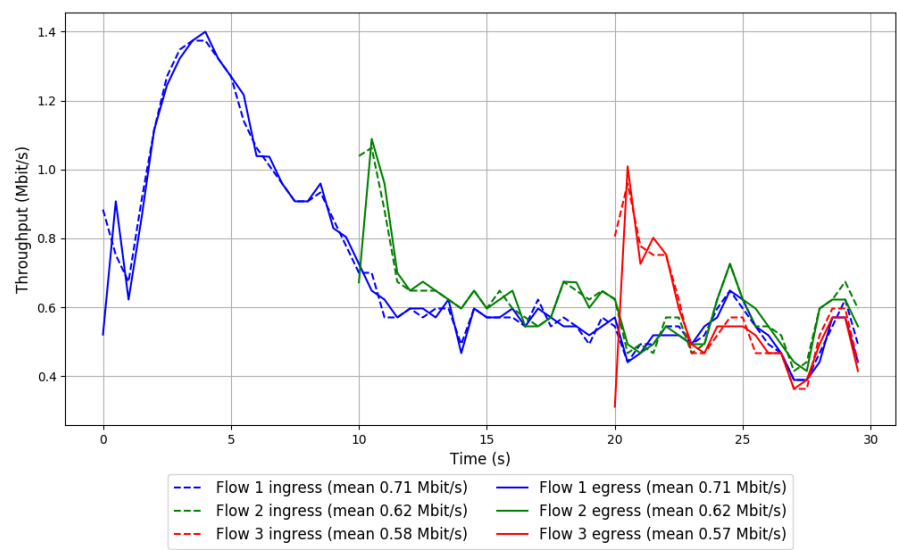
-- Flow 3:

Average throughput: 0.57 Mbit/s

95th percentile per-packet one-way delay: 119.293 ms

Loss rate: 4.30%

Run 3: Report of Copa — Data Link



Run 1: Statistics of FillP

/home/ubuntu/pantheon\_data/2018-01-31T09-34-China-ppp0-to-AWS-Korea-3-runs-3-flows/fillp\_sta

Run 1: Report of FillP — Data Link

Figure is missing

Figure is missing

Run 2: Statistics of FillP

Start at: 2018-01-31 10:11:43

End at: 2018-01-31 10:12:13

Local clock offset: -1.228 ms

Remote clock offset: 3.91 ms

# Below is generated by plot.py at 2018-01-31 12:29:10

# Datalink statistics

-- Total of 3 flows:

Average throughput: 3.04 Mbit/s

95th percentile per-packet one-way delay: 573.264 ms

Loss rate: 40.27%

-- Flow 1:

Average throughput: 1.62 Mbit/s

95th percentile per-packet one-way delay: 379.069 ms

Loss rate: 26.11%

-- Flow 2:

Average throughput: 1.32 Mbit/s

95th percentile per-packet one-way delay: 574.488 ms

Loss rate: 47.23%

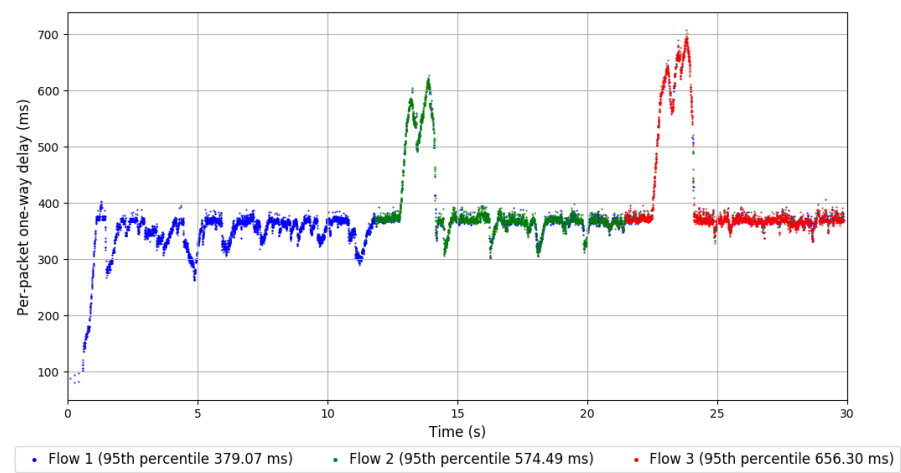
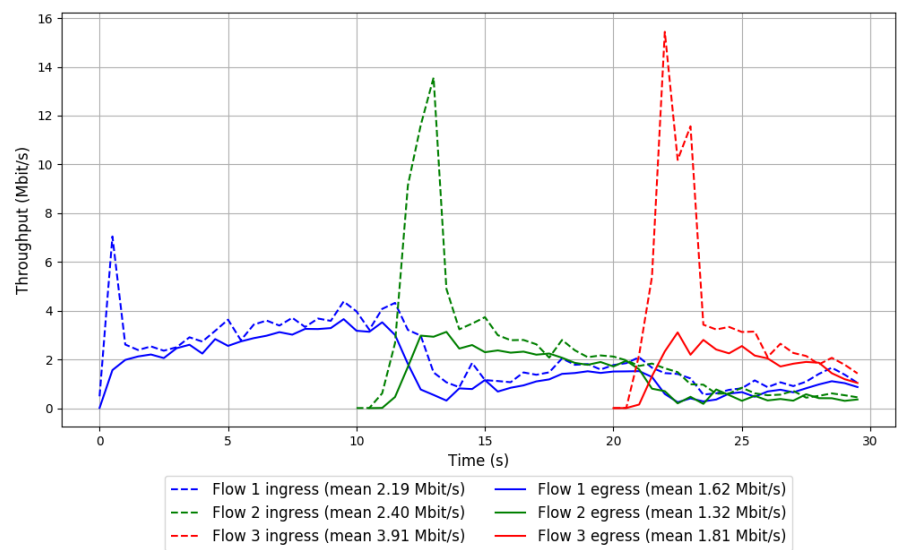
-- Flow 3:

Average throughput: 1.81 Mbit/s

95th percentile per-packet one-way delay: 656.301 ms

Loss rate: 55.65%

Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

Start at: 2018-01-31 10:39:55

End at: 2018-01-31 10:40:25

Local clock offset: -1.341 ms

Remote clock offset: 4.205 ms

# Below is generated by plot.py at 2018-01-31 12:29:10

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.28 Mbit/s

95th percentile per-packet one-way delay: 438.566 ms

Loss rate: 42.68%

-- Flow 1:

Average throughput: 1.12 Mbit/s

95th percentile per-packet one-way delay: 380.865 ms

Loss rate: 35.00%

-- Flow 2:

Average throughput: 0.96 Mbit/s

95th percentile per-packet one-way delay: 444.591 ms

Loss rate: 45.83%

-- Flow 3:

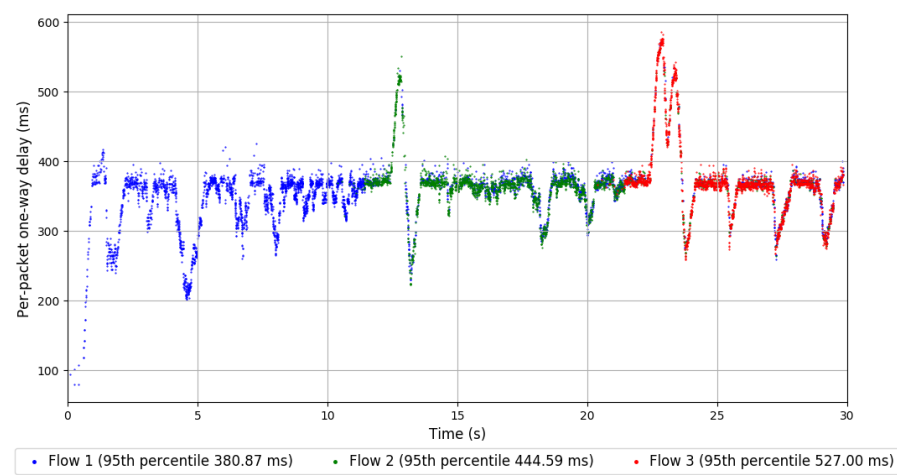
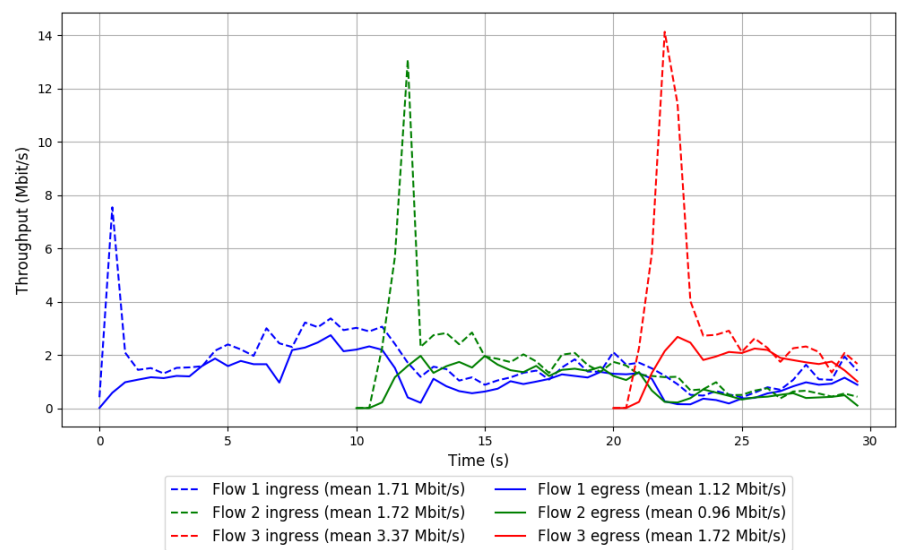
Average throughput: 1.72 Mbit/s

95th percentile per-packet one-way delay: 527.000 ms

Loss rate: 51.23%



Run 3: Report of FillP — Data Link



Run 1: Statistics of Indigo-1-32

Start at: 2018-01-31 09:59:56

End at: 2018-01-31 10:00:26

Local clock offset: -1.448 ms

Remote clock offset: 4.41 ms

# Below is generated by plot.py at 2018-01-31 12:29:10

# Datalink statistics

-- Total of 3 flows:

Average throughput: 1.17 Mbit/s

95th percentile per-packet one-way delay: 269.335 ms

Loss rate: 5.58%

-- Flow 1:

Average throughput: 0.42 Mbit/s

95th percentile per-packet one-way delay: 256.285 ms

Loss rate: 0.68%

-- Flow 2:

Average throughput: 0.83 Mbit/s

95th percentile per-packet one-way delay: 224.329 ms

Loss rate: 6.02%

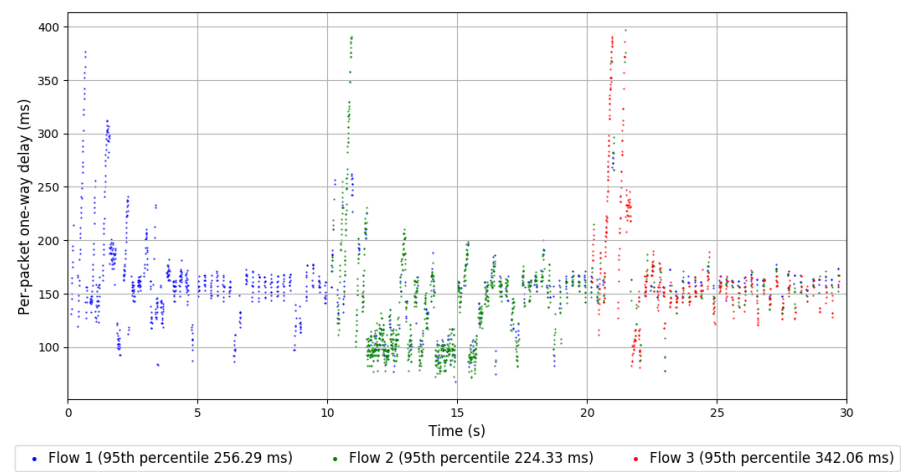
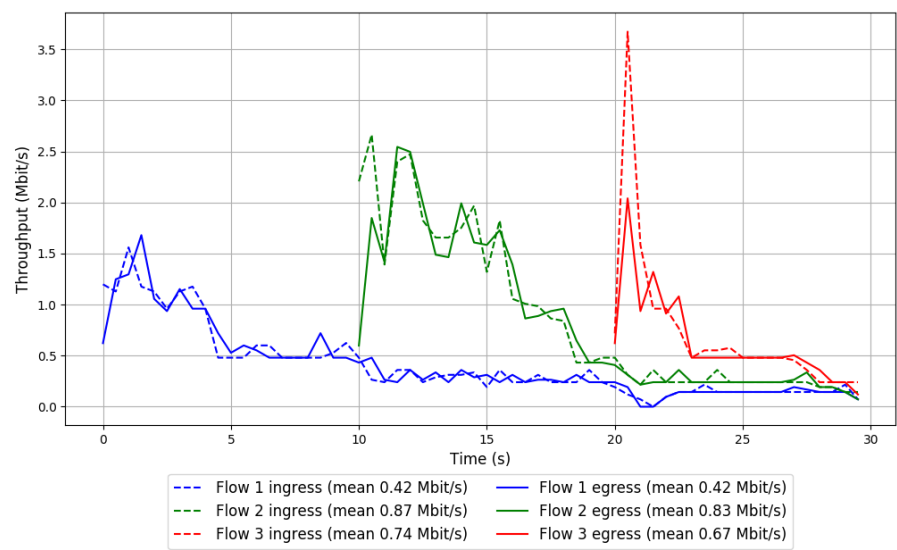
-- Flow 3:

Average throughput: 0.67 Mbit/s

95th percentile per-packet one-way delay: 342.064 ms

Loss rate: 12.89%

Run 1: Report of Indigo-1-32 — Data Link



Run 2: Statistics of Indigo-1-32

Start at: 2018-01-31 10:28:12

End at: 2018-01-31 10:28:42

Local clock offset: -1.118 ms

Remote clock offset: 3.79 ms

# Below is generated by plot.py at 2018-01-31 12:29:10

# Datalink statistics

-- Total of 3 flows:

Average throughput: 1.74 Mbit/s

95th percentile per-packet one-way delay: 202.242 ms

Loss rate: 1.13%

-- Flow 1:

Average throughput: 0.99 Mbit/s

95th percentile per-packet one-way delay: 186.549 ms

Loss rate: 0.97%

-- Flow 2:

Average throughput: 0.73 Mbit/s

95th percentile per-packet one-way delay: 169.985 ms

Loss rate: 0.75%

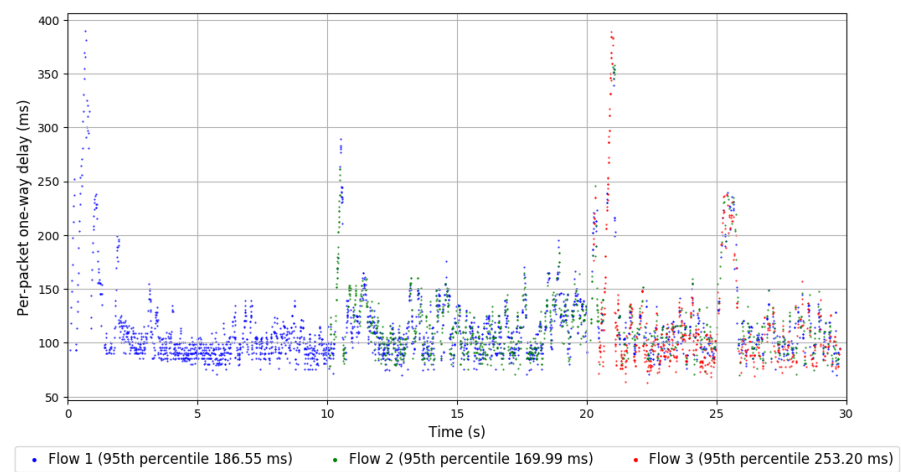
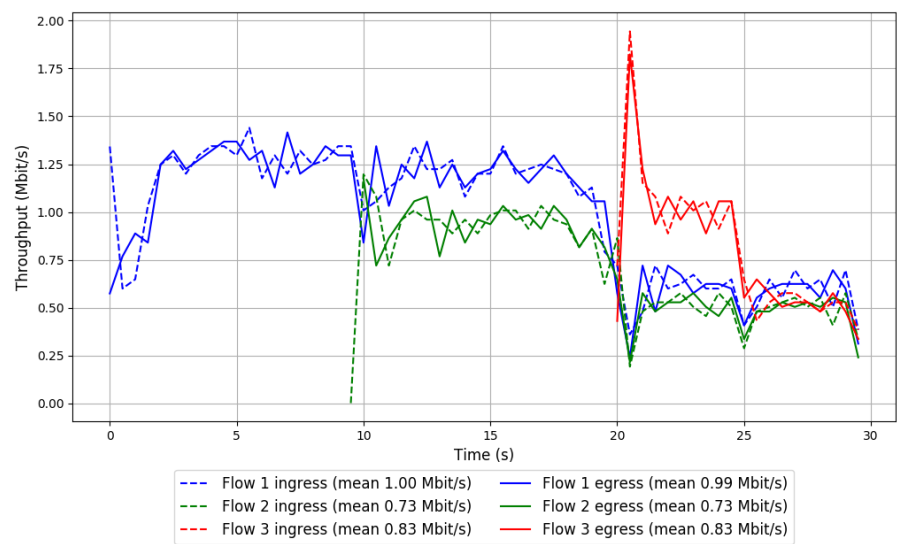
-- Flow 3:

Average throughput: 0.83 Mbit/s

95th percentile per-packet one-way delay: 253.198 ms

Loss rate: 2.38%

Run 2: Report of Indigo-1-32 — Data Link



Run 3: Statistics of Indigo-1-32

Start at: 2018-01-31 10:54:36

End at: 2018-01-31 10:55:06

Local clock offset: -1.297 ms

Remote clock offset: 4.472 ms

# Below is generated by plot.py at 2018-01-31 12:29:10

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.13 Mbit/s

95th percentile per-packet one-way delay: 167.056 ms

Loss rate: 1.85%

-- Flow 1:

Average throughput: 1.08 Mbit/s

95th percentile per-packet one-way delay: 161.778 ms

Loss rate: 1.34%

-- Flow 2:

Average throughput: 0.84 Mbit/s

95th percentile per-packet one-way delay: 190.303 ms

Loss rate: 1.15%

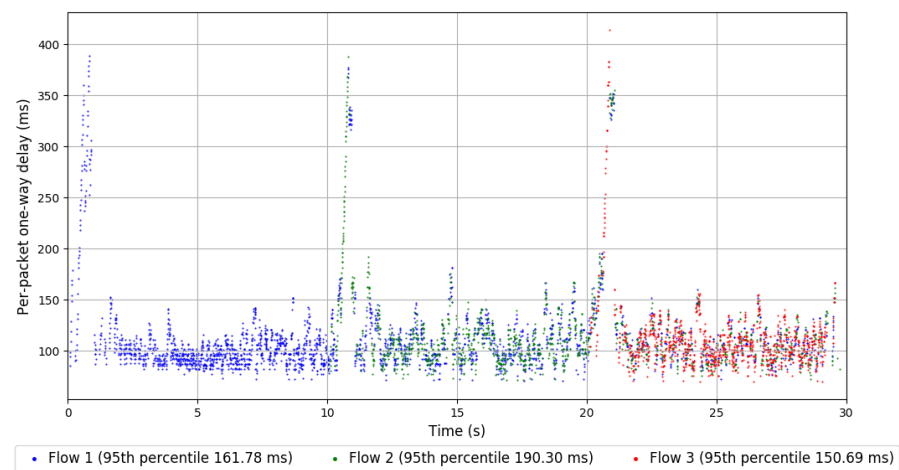
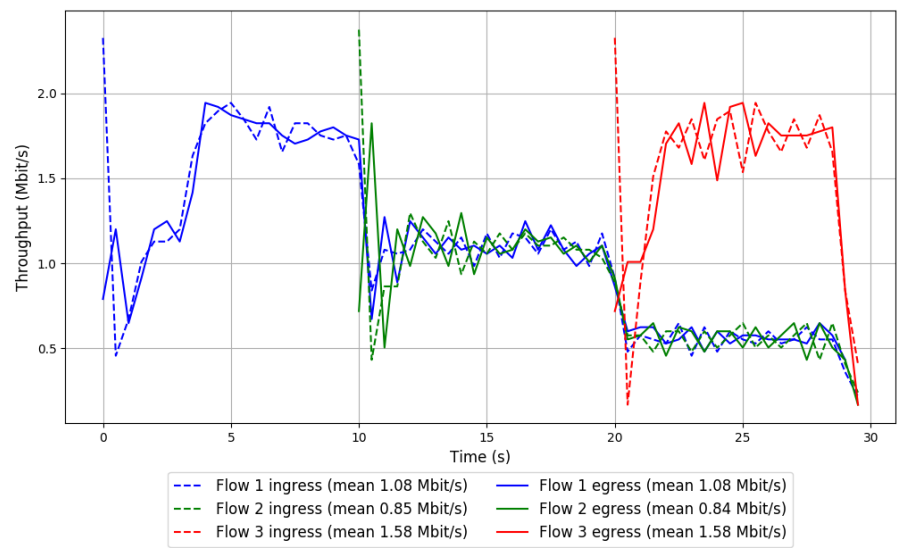
-- Flow 3:

Average throughput: 1.58 Mbit/s

95th percentile per-packet one-way delay: 150.685 ms

Loss rate: 3.67%

Run 3: Report of Indigo-1-32 — Data Link



Run 1: Statistics of Vivace-latency

Start at: 2018-01-31 09:36:31

End at: 2018-01-31 09:37:01

Local clock offset: -1.05 ms

Remote clock offset: 4.511 ms

# Below is generated by plot.py at 2018-01-31 12:29:10

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.41 Mbit/s

95th percentile per-packet one-way delay: 376.603 ms

Loss rate: 20.52%

-- Flow 1:

Average throughput: 1.27 Mbit/s

95th percentile per-packet one-way delay: 375.517 ms

Loss rate: 15.81%

-- Flow 2:

Average throughput: 1.15 Mbit/s

95th percentile per-packet one-way delay: 375.027 ms

Loss rate: 19.22%

-- Flow 3:

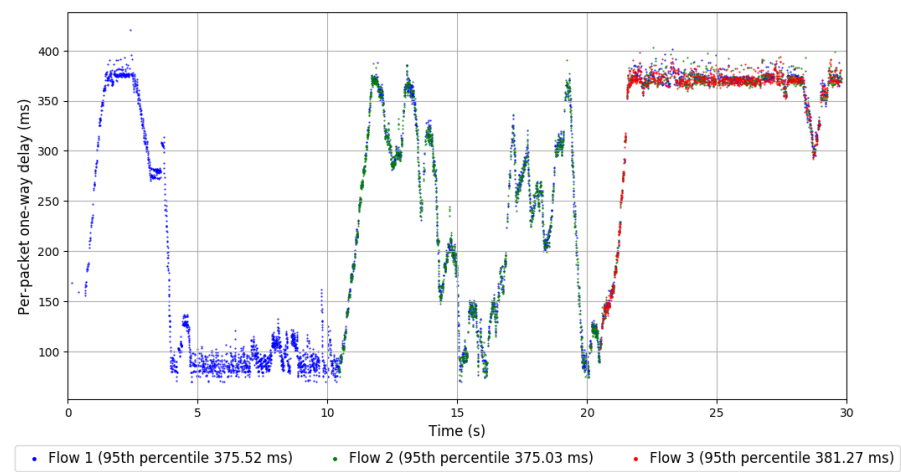
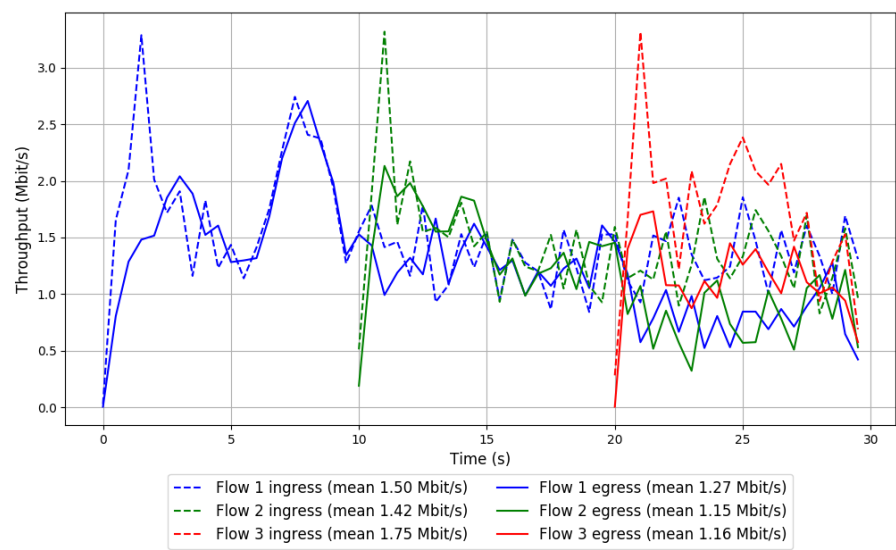
Average throughput: 1.16 Mbit/s

95th percentile per-packet one-way delay: 381.272 ms

Loss rate: 34.89%



Run 1: Report of Vivace-latency — Data Link



Run 2: Statistics of Vivace-latency

Start at: 2018-01-31 10:04:20

End at: 2018-01-31 10:04:50

Local clock offset: -1.395 ms

Remote clock offset: 4.156 ms

# Below is generated by plot.py at 2018-01-31 12:29:10

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.61 Mbit/s

95th percentile per-packet one-way delay: 376.321 ms

Loss rate: 18.47%

-- Flow 1:

Average throughput: 1.43 Mbit/s

95th percentile per-packet one-way delay: 372.911 ms

Loss rate: 11.27%

-- Flow 2:

Average throughput: 1.17 Mbit/s

95th percentile per-packet one-way delay: 376.580 ms

Loss rate: 15.76%

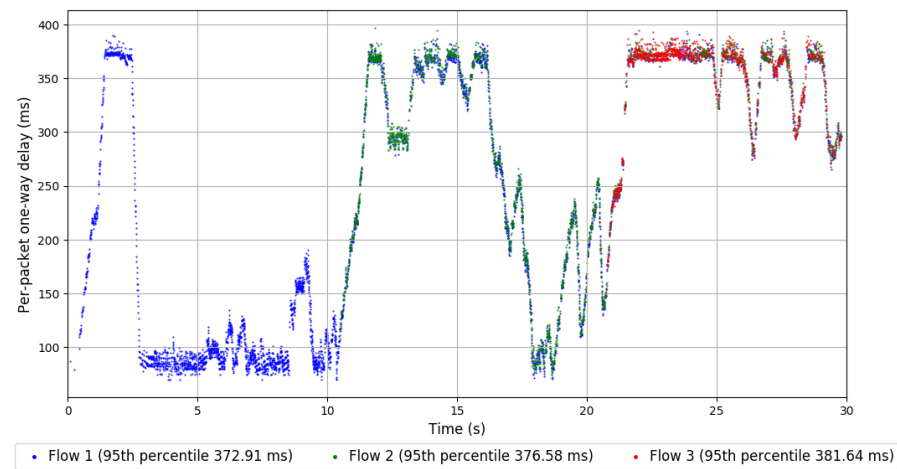
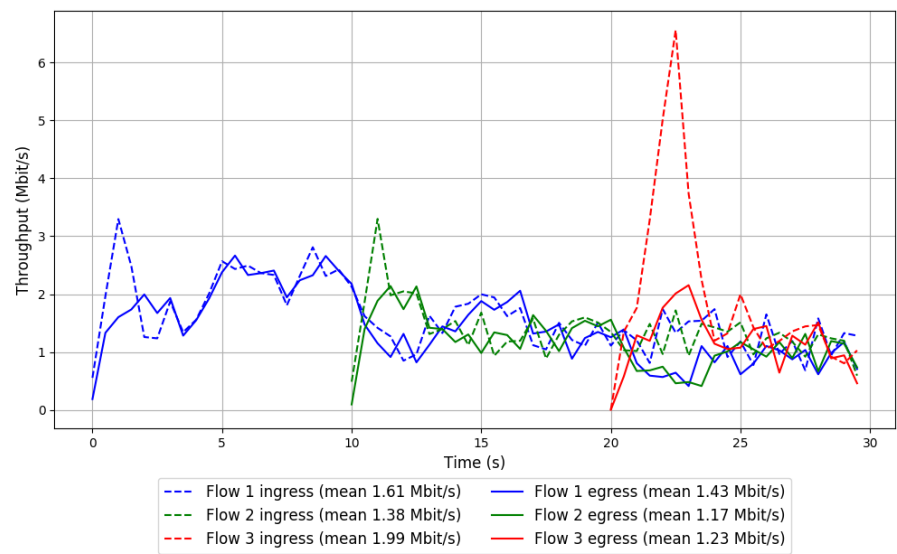
-- Flow 3:

Average throughput: 1.23 Mbit/s

95th percentile per-packet one-way delay: 381.639 ms

Loss rate: 39.92%

Run 2: Report of Vivace-latency — Data Link



Run 3: Statistics of Vivace-latency

Start at: 2018-01-31 10:32:34

End at: 2018-01-31 10:33:04

Local clock offset: -1.206 ms

Remote clock offset: 3.892 ms

# Below is generated by plot.py at 2018-01-31 12:29:10

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.48 Mbit/s

95th percentile per-packet one-way delay: 379.543 ms

Loss rate: 21.45%

-- Flow 1:

Average throughput: 1.40 Mbit/s

95th percentile per-packet one-way delay: 376.260 ms

Loss rate: 15.03%

-- Flow 2:

Average throughput: 1.06 Mbit/s

95th percentile per-packet one-way delay: 381.163 ms

Loss rate: 24.74%

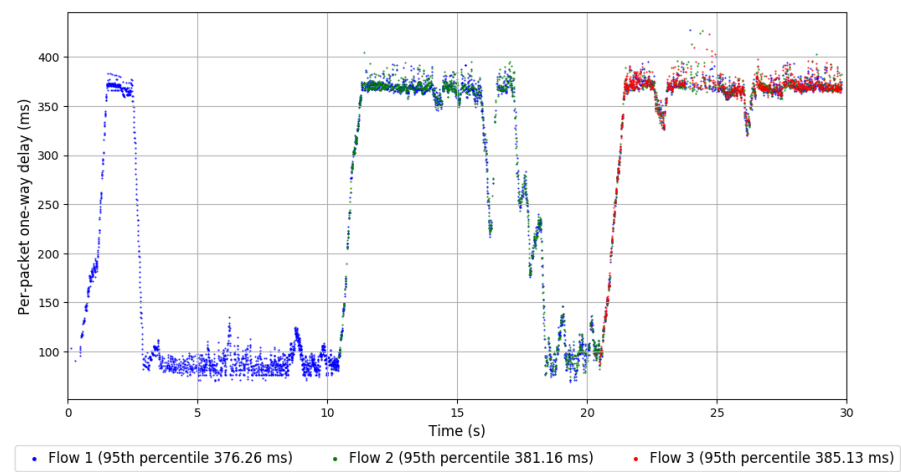
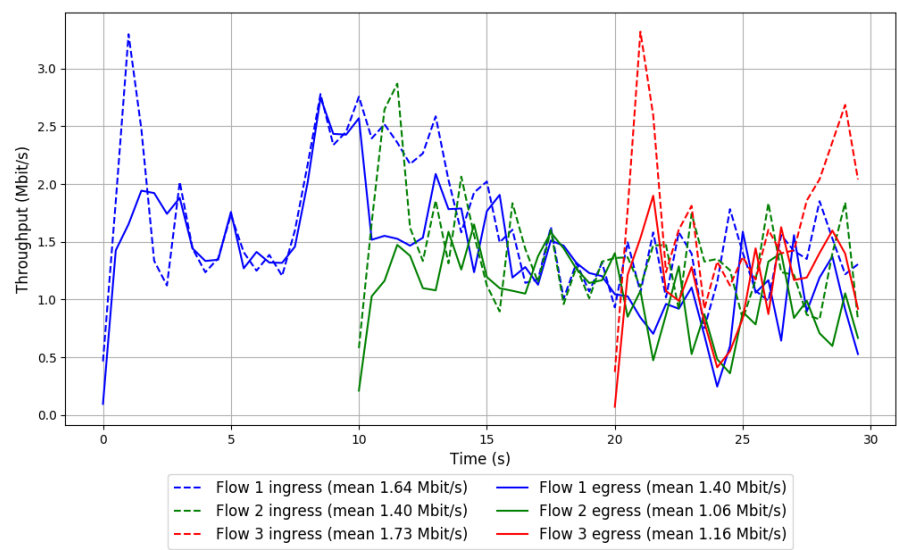
-- Flow 3:

Average throughput: 1.16 Mbit/s

95th percentile per-packet one-way delay: 385.135 ms

Loss rate: 34.50%

Run 3: Report of Vivace-latency — Data Link



Run 1: Statistics of Vivace-loss

Start at: 2018-01-31 09:35:03

End at: 2018-01-31 09:35:33

Local clock offset: -1.708 ms

Remote clock offset: 4.621 ms

# Below is generated by plot.py at 2018-01-31 12:29:10

# Datalink statistics

-- Total of 3 flows:

Average throughput: 1.68 Mbit/s

95th percentile per-packet one-way delay: 384.669 ms

Loss rate: 40.68%

-- Flow 1:

Average throughput: 1.05 Mbit/s

95th percentile per-packet one-way delay: 383.069 ms

Loss rate: 35.48%

-- Flow 2:

Average throughput: 0.68 Mbit/s

95th percentile per-packet one-way delay: 389.083 ms

Loss rate: 46.39%

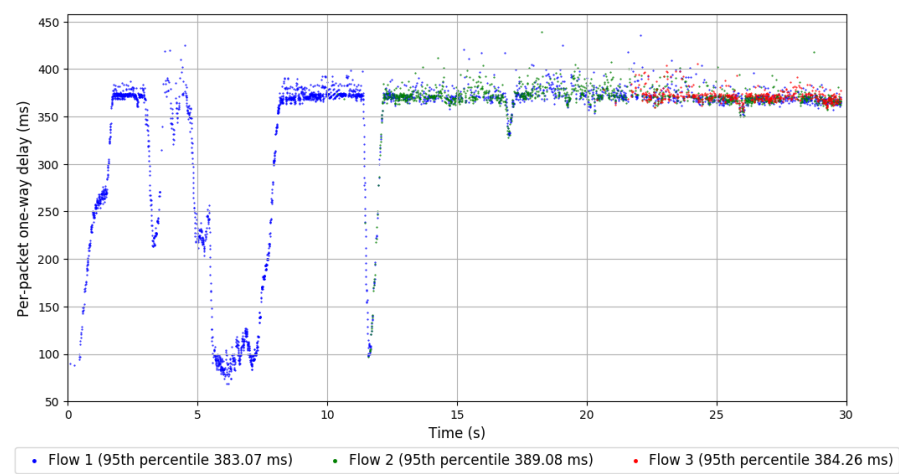
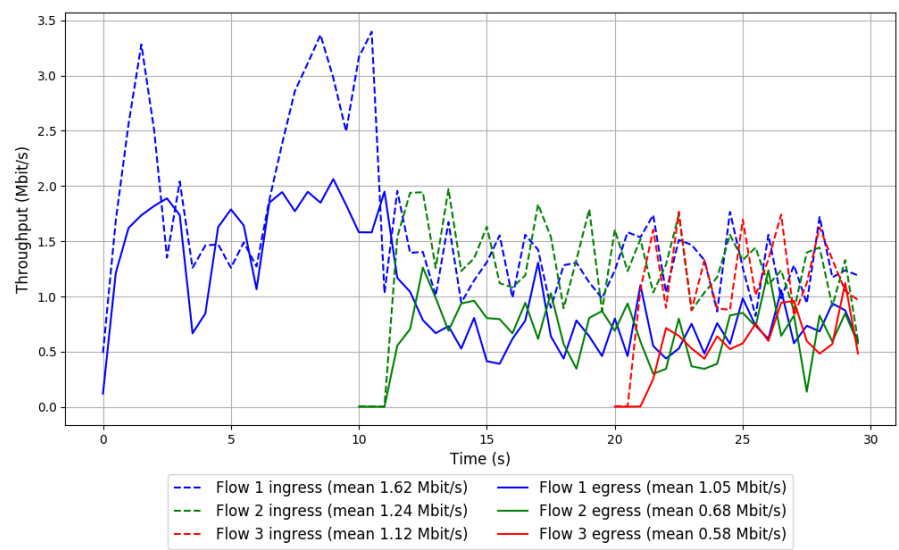
-- Flow 3:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 384.256 ms

Loss rate: 50.84%

Run 1: Report of Vivace-loss — Data Link



Run 2: Statistics of Vivace-loss

Start at: 2018-01-31 10:02:49

End at: 2018-01-31 10:03:19

Local clock offset: -1.461 ms

Remote clock offset: 4.266 ms

# Below is generated by plot.py at 2018-01-31 12:29:11

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.17 Mbit/s

95th percentile per-packet one-way delay: 381.155 ms

Loss rate: 31.12%

-- Flow 1:

Average throughput: 1.27 Mbit/s

95th percentile per-packet one-way delay: 380.060 ms

Loss rate: 27.20%

-- Flow 2:

Average throughput: 0.95 Mbit/s

95th percentile per-packet one-way delay: 380.994 ms

Loss rate: 31.98%

-- Flow 3:

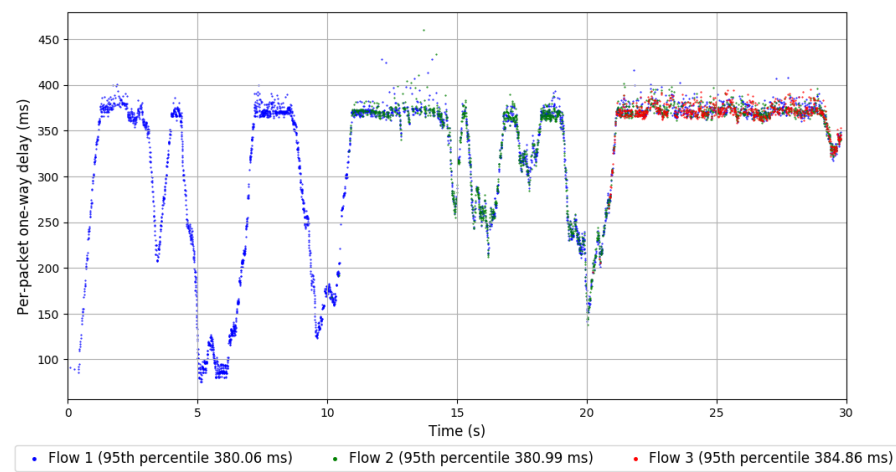
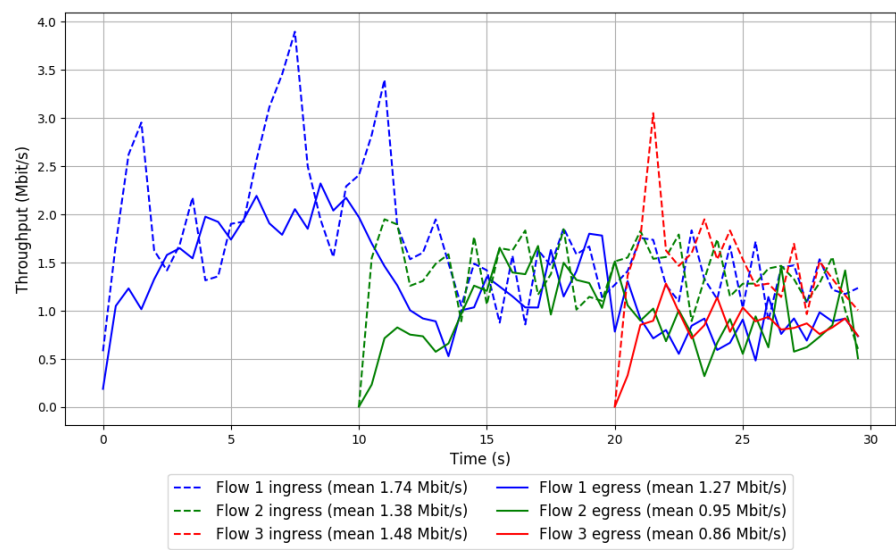
Average throughput: 0.86 Mbit/s

95th percentile per-packet one-way delay: 384.855 ms

Loss rate: 43.47%



Run 2: Report of Vivace-loss — Data Link



Run 3: Statistics of Vivace-loss

Start at: 2018-01-31 10:31:05

End at: 2018-01-31 10:31:35

Local clock offset: -1.217 ms

Remote clock offset: 3.843 ms

# Below is generated by plot.py at 2018-01-31 12:29:11

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.49 Mbit/s

95th percentile per-packet one-way delay: 382.020 ms

Loss rate: 25.50%

-- Flow 1:

Average throughput: 1.57 Mbit/s

95th percentile per-packet one-way delay: 382.015 ms

Loss rate: 22.04%

-- Flow 2:

Average throughput: 1.01 Mbit/s

95th percentile per-packet one-way delay: 381.284 ms

Loss rate: 28.84%

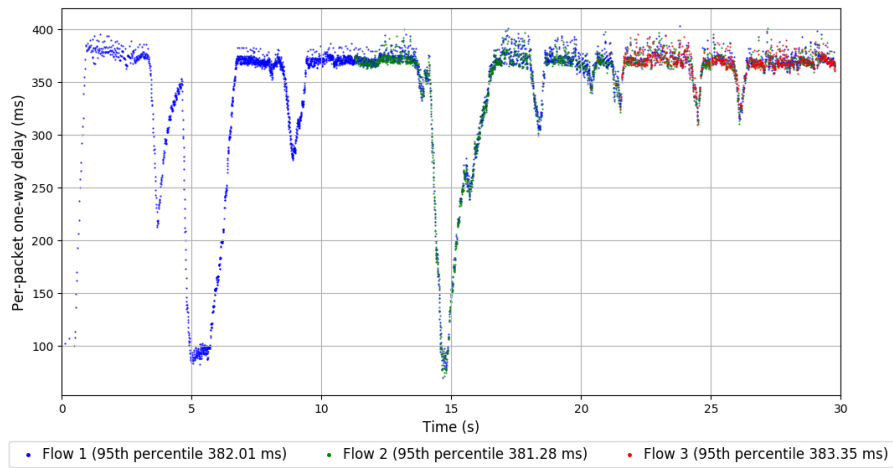
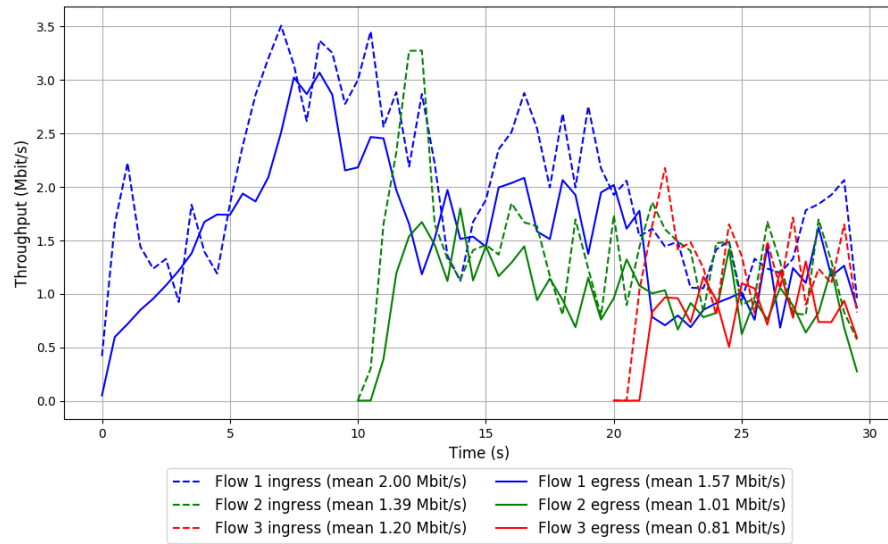
-- Flow 3:

Average throughput: 0.81 Mbit/s

95th percentile per-packet one-way delay: 383.353 ms

Loss rate: 35.25%

### Run 3: Report of Vivace-loss — Data Link



Run 1: Statistics of Vivace-LTE

Start at: 2018-01-31 09:49:25

End at: 2018-01-31 09:49:55

Local clock offset: -1.865 ms

Remote clock offset: 4.251 ms

# Run 1: Report of Vivace-LTE — Data Link

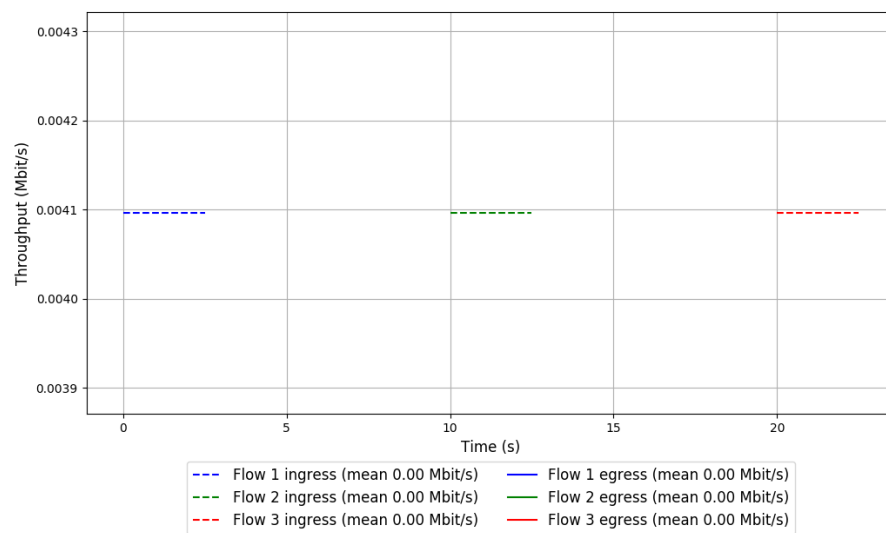


Figure is missing

Run 2: Statistics of Vivace-LTE

Start at: 2018-01-31 10:17:09

End at: 2018-01-31 10:17:39

Local clock offset: -1.272 ms

Remote clock offset: 3.788 ms

# Below is generated by plot.py at 2018-01-31 12:29:12

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.67 Mbit/s

95th percentile per-packet one-way delay: 378.971 ms

Loss rate: 20.74%

-- Flow 1:

Average throughput: 1.63 Mbit/s

95th percentile per-packet one-way delay: 377.128 ms

Loss rate: 15.62%

-- Flow 2:

Average throughput: 1.11 Mbit/s

95th percentile per-packet one-way delay: 380.081 ms

Loss rate: 23.91%

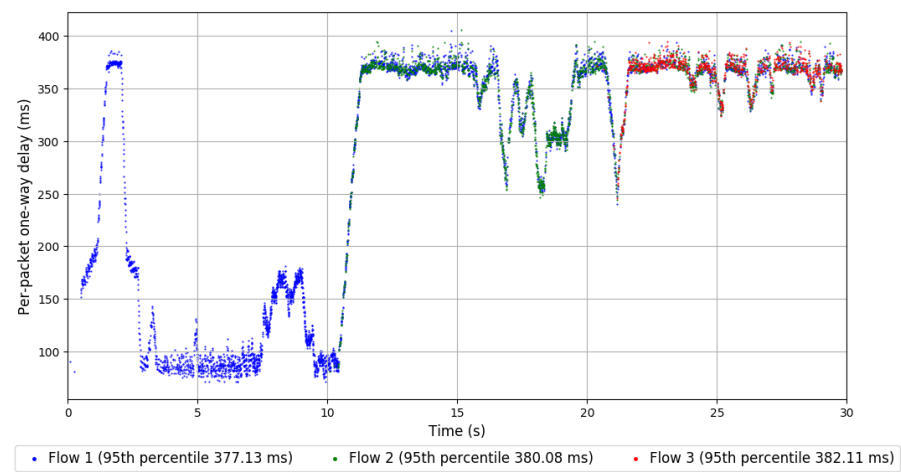
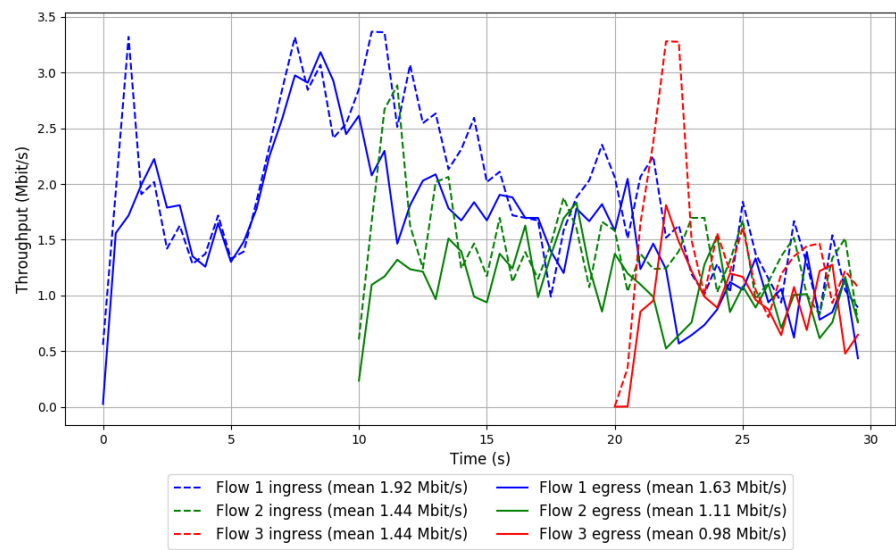
-- Flow 3:

Average throughput: 0.98 Mbit/s

95th percentile per-packet one-way delay: 382.114 ms

Loss rate: 34.97%

Run 2: Report of Vivace-LTE — Data Link



Run 3: Statistics of Vivace-LTE

Start at: 2018-01-31 10:44:21

End at: 2018-01-31 10:44:51

Local clock offset: -1.123 ms

Remote clock offset: 4.343 ms

# Below is generated by plot.py at 2018-01-31 12:29:12

# Datalink statistics

-- Total of 3 flows:

Average throughput: 2.14 Mbit/s

95th percentile per-packet one-way delay: 381.641 ms

Loss rate: 25.89%

-- Flow 1:

Average throughput: 1.20 Mbit/s

95th percentile per-packet one-way delay: 379.665 ms

Loss rate: 21.59%

-- Flow 2:

Average throughput: 0.93 Mbit/s

95th percentile per-packet one-way delay: 386.688 ms

Loss rate: 31.05%

-- Flow 3:

Average throughput: 1.04 Mbit/s

95th percentile per-packet one-way delay: 380.137 ms

Loss rate: 30.10%



Run 3: Report of Vivace-LTE — Data Link

