Program 2
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TCP Ping:
For webserver in US:

Webserver:	www.cnn.com	www.bing.com	www.google.com	www.wpi.edu	www.microsoft.com/en-us/
1	19.7251	21.7239	20.477	9.71411	22.032
2	40.2019	20.03	20.468	9.73389	21.303
3	20.8552	21.8569	20.3831	21.6011	24.3792
4	20.4438	23.7131	20.198	9.14185	24.5549
5	26.575	20.688	21.126	10.2871	21.7568
6	20.235	20.27	21.408	9.5061	22.058
7	20.6589	37.7798	20.7781	16.428	23.5071
8	48.6301	21.083	27.5291	14.98	22.282
9	21.4619	20.0941	20.844	12.9441	21.3071
10	40.553	21.1841	20.7161	10.0659	21.843
11	19.2249	20.0339	26.957	9.83887	21.3782
12	21.155	20.5281	20.8201	10.0981	23.8889
13	39.752	20.7571	20.095	12.6721	21.665
14	20.145	21.1279	20.196	10.262	21.489
15	40.6931	20.4839	20.689	11.169	23.4189
16	41.7202	20.3718	23.8	9.88599	24.074
17	40.7891	20.873	22.834	10.926	23.127
18	22.1489	20.1311	22.8521	10.2539	22.1331
19	40.5679	21.123	21.876	10.4031	22.0342
20	20.0229	23.156	21.2322	9.93018	21.2298
Min ping	19.2249	20.03	20.095	9.14185	21.2298
Max ping	48.6301	37.7798	27.5291	21.6011	24.5549
Median ping	21.4619	20.0941	20.844	12.9441	21.3071
Mean ping	29.277945	21.854035	21.76394	11.4920695	22.47306

For webserver around the world:

Webserver:	www.baidu.com	www.renren.com	www.youku.com	www.bilibili.com	www.sina.com.cn
1	273.681	21.5132	273.69	93.3669	22.3979
2	239.758	23.9541	261.854	97.6821	22.2771
3	282.085	20.8772	268.634	93.2261	24.3071
4	273.862	22.2092	269.748	97.1009	22.7988
5	288.36	21.1719	256.44	95.8281	22.104
6	275.585	22.217	265.63	93.8792	20.894
7	283.632	19.811	277.195	96.9971	21.9119
8	269.058	25.7249	271.422	93.9612	24.218
9	267.239	28.04	269.172	103.445	21.4832
10	244.039	25.0532	260.153	95.9868	22.1179
11	234.197	22.28	256.793	93.988	22.885
12	237.664	19.457	257.215	93.041	22.323
13	257.966	21.7549	274.434	93.4202	19.281
14	269.626	22.5242	260.408	96.4929	20.511

15	248.155	23.322	262.334	99.2561	19.927
16	285.857	22.583	257.6	96.46	21.688
17	273.322	24.1182	296.73	109.834	22.5029
18	274.816	19.7688	271.964	97.3311	22.229
19	272.288	24.031	271.626	96.739	23.458
20	234.146	21.9221	272.189	103.713	20.9858
Min ping	234.146	19.457	256.44	93.041	19.281
Max ping	288.36	28.04	296.73	109.834	24.3071
Median ping	269.626	22.217	268.634	96.46	22.1179
Mean ping	264.2668	22.616645	267.76155	97.087435	22.01503

TCP Packet Patterns

Server	Max number of bytes received
www.cnn.com	1396
www.bing.com	1440
www.google.com	1430
www.wpi.edu	1440
www.microsoft.com/en-us/	1440
www.baidu.com	1420
www.renren.com	1440
www.youku.com	1440
www.bilibili.com	1440
www.sina.com.cn	1440

The size is not the same for all the servers, but the value is not different from each other a lot.

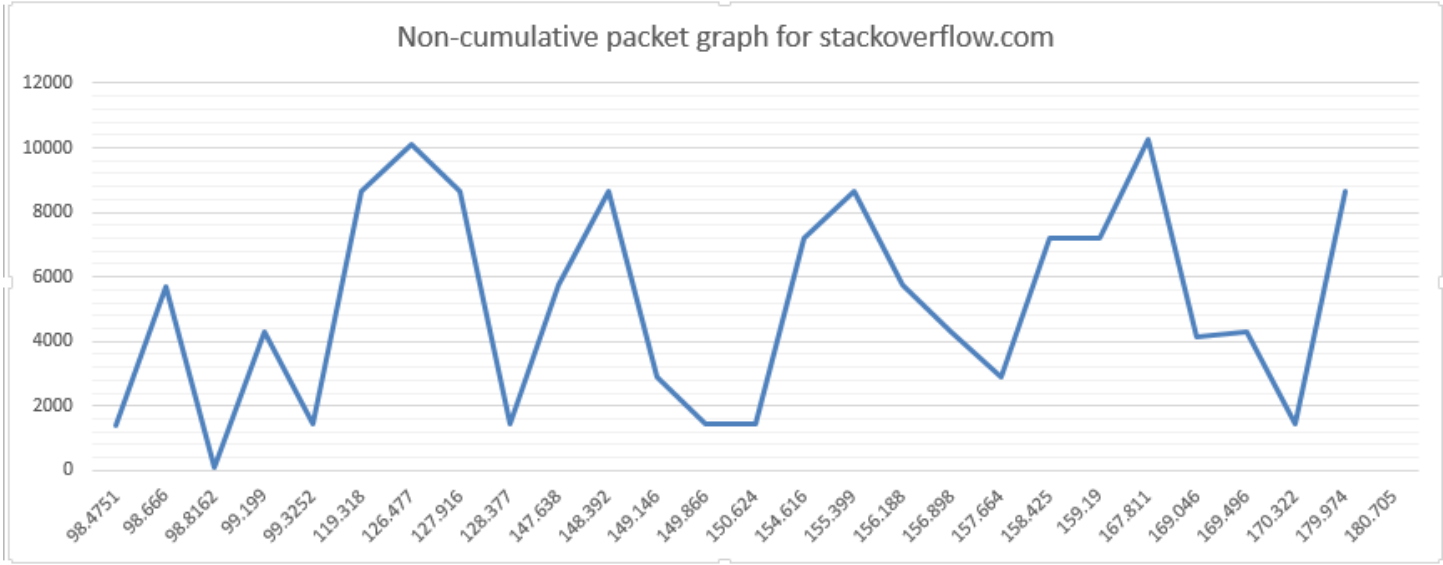
For the plot:

1st website: stackoverflow.com

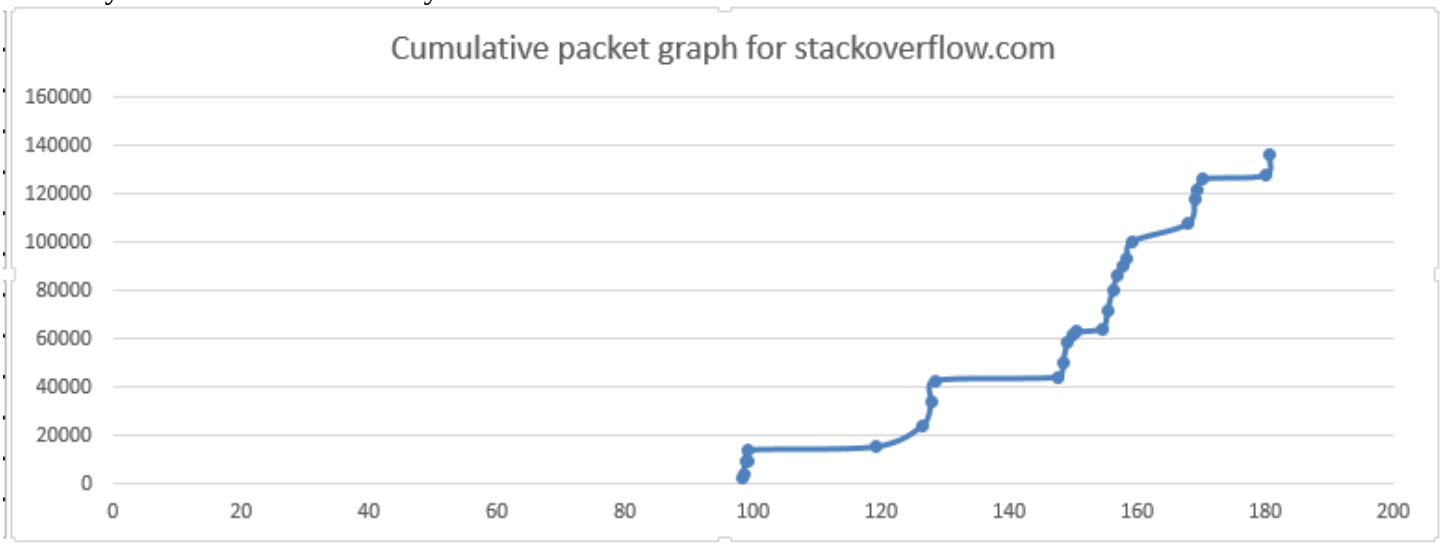
The number of bytes received and the time is shown in the following table:

Number of bytes received	Time(ms)
2468	98.4751
1420	98.666
5680	98.8162
100	99.199
4320	99.3252
1440	119.318
8640	126.477
10080	127.916
8640	128.377
1440	147.638
5760	148.392
8640	149.146
2880	149.866
1440	150.624
1440	154.616
7200	155.399
8640	156.188
5760	156.898

4320	157.664
2880	158.425
7200	159.19
7200	167.811
10240	169.046
4160	169.496
4320	170.322
1440	179.974
8640	180.705



The plot above is the non-cumulative packet graph for stackoverflow.com, the x-axis is the time in millisecond and the y-axis is the number of bytes received.



The plot above shows the cumulative packet graph for stackoverflow.com. The x-axis is the time in millisecond and the y-axis is the running sum of the number of bytes received.

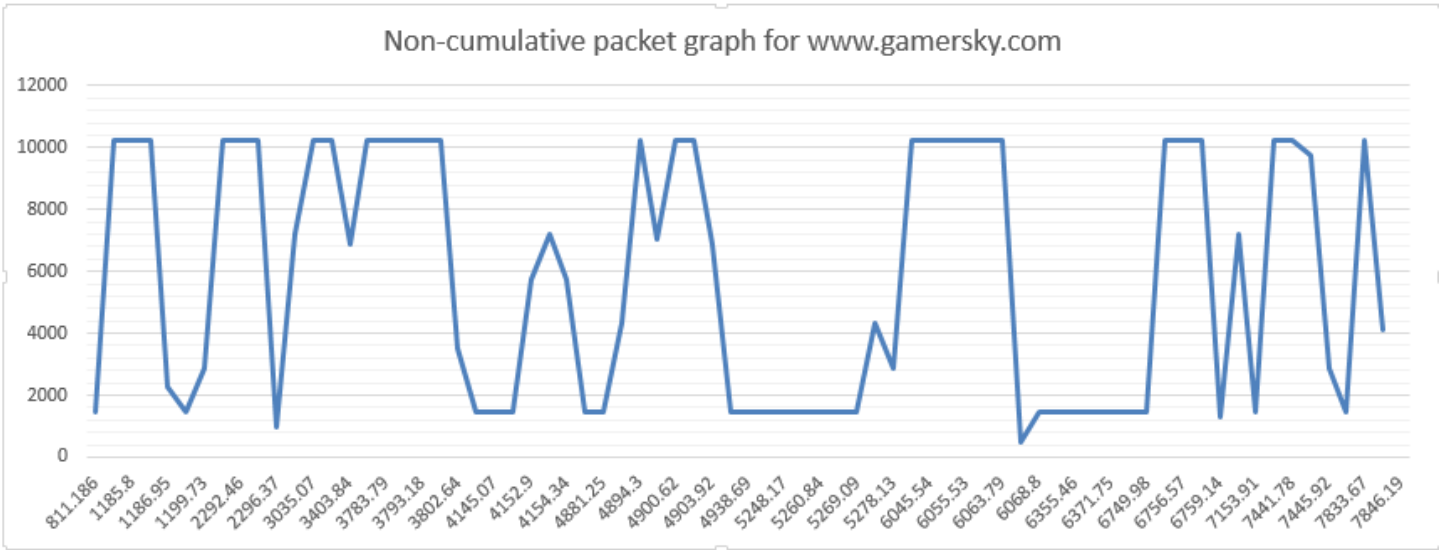
According to the plot above, there are 6 flights. According to the packet size received between 99ms and 119ms, the max packet size should be 1440 bytes. As a result, the number of packets contained in a flight can be calculate by (the sum of bytes per flight)/1440. Following this method, the first flight has 11 packets, the second flight has 20 packets, and the third flight has 14 packets, the fourth flight has 20 packets, the fifth flight has 24 packets and the last flight has 6 packets.

2nd website: www.gamersky.com

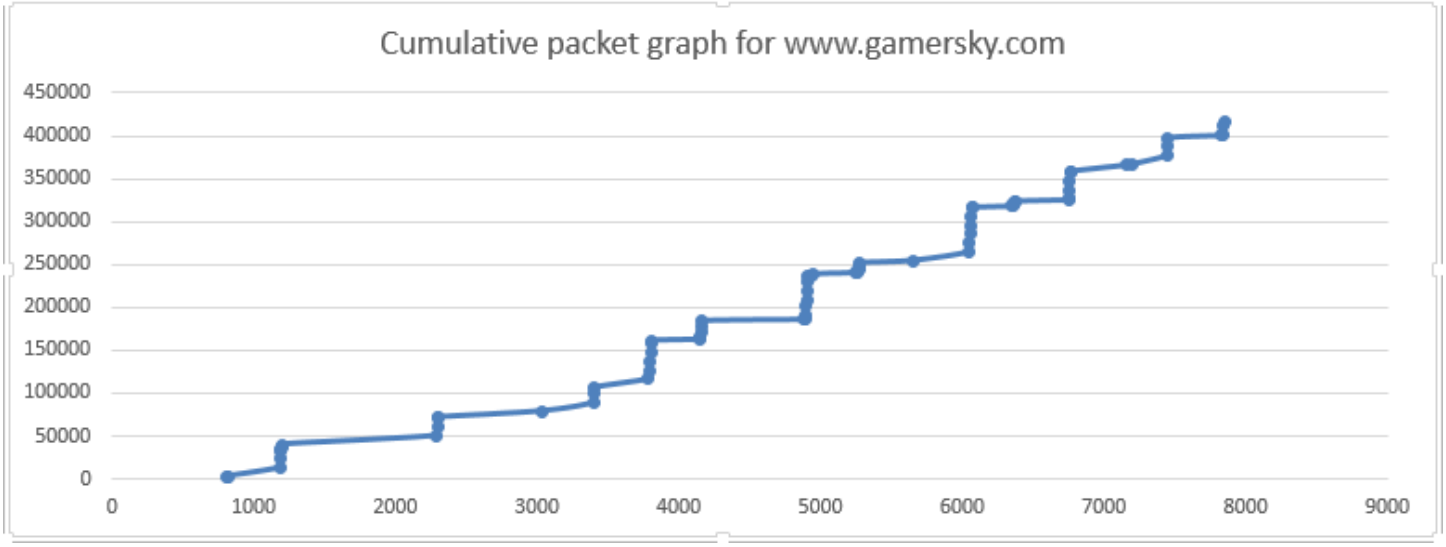
The number of bytes received and the time is shown in the following table:

Number of bytes received	Time(ms)
1440	811.186
1440	815.283
10240	1185.8
10240	1186.22
10240	1186.95
2261	1187.16
1440	1199.73
2880	1200.39
10240	2292.46
10240	2294.51
10240	2296.37
960	2298.01
7200	3035.07
10240	3402.71
10240	3403.84
6880	3405.58
10240	3783.79
10240	3790.3
10240	3793.18
10240	3801.16
10240	3802.64
3520	3803.74
1440	4145.07
1440	4145.92
1440	4152.9
5760	4153.56
7200	4154.34
5760	4155.13
1440	4881.25
1440	4887.03
4320	4894.3
10240	4896.24
7040	4900.62
10240	4902.45
10240	4903.92
6880	4905.28
1440	4938.69
1440	4945
1440	5248.17
1440	5254.1
1440	5260.84
1440	5268.24
1440	5269.09

1440	5270.06
4320	5278.13
2880	5652.85
10240	6045.54
10240	6048.48
10240	6055.53
10240	6061.81
10240	6063.79
10240	6065.6
480	6068.8
1440	6349.35
1440	6355.46
1440	6362.17
1440	6371.75
1440	6374.4
1440	6749.98
1440	6755.47
10240	6756.57
10240	6757.74
10240	6759.14
1312	6760.55
7200	7153.91
1440	7203.54
10240	7441.78
10240	7444.25
9760	7445.92
2880	7826.29
1440	7833.67
10240	7840.77
4111	7846.19



The plot above is the non-cumulative packet graph for www.gamersky.com, the x-axis is the time in millisecond and the y-axis is the number of bytes received.



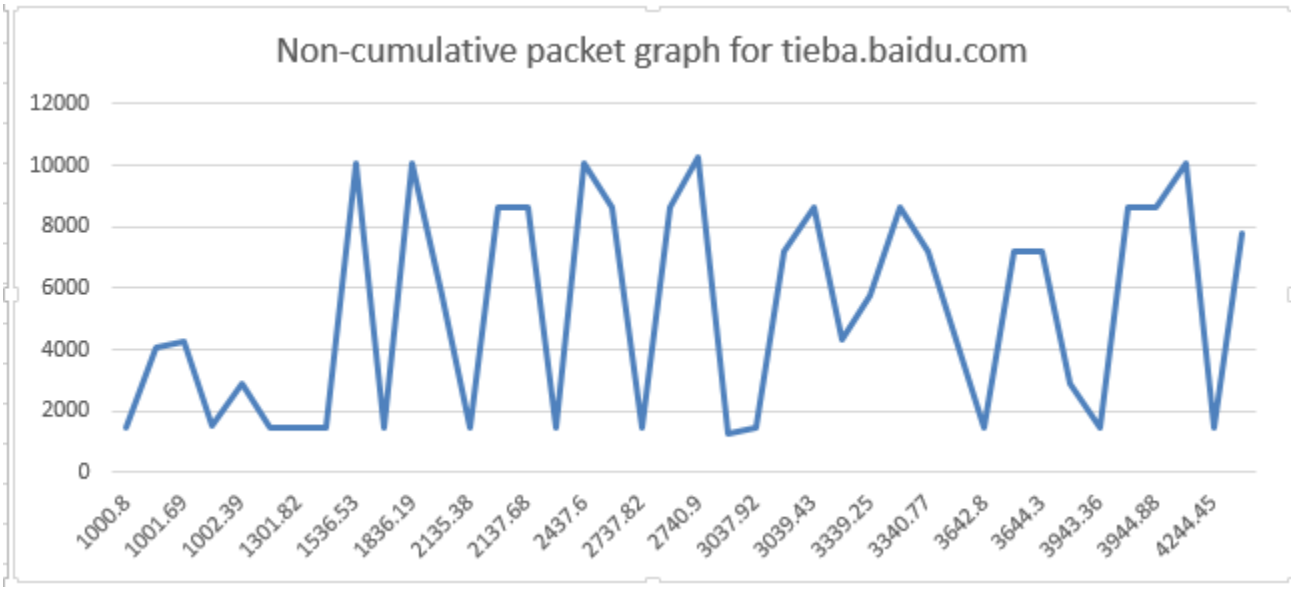
The plot above shows the cumulative packet graph for www.gamersky.com. The x-axis is the time in millisecond and the y-axis is the running sum of the number of bytes received.
According to the plot above, there are 10 flights. According to the packet size received between 811ms and 815ms, the max packet size should be 1440 bytes. As a result, the number of packets contained in a flight can be calculate by (the sum of bytes per flight)/1440. Following this method, the first flight has 18 packets, the second flight has 25 packets, and the third flight has 24 packets, the fourth flight has 38 packets, the fifth flight has 16 packets, the sixth flight has 38 packets, the seventh flight has 11 packets, the eighth flight has 72 packets, the ninth flight has 27 packets and the last flight has 13 packets.

3rd website: news.baidu.com

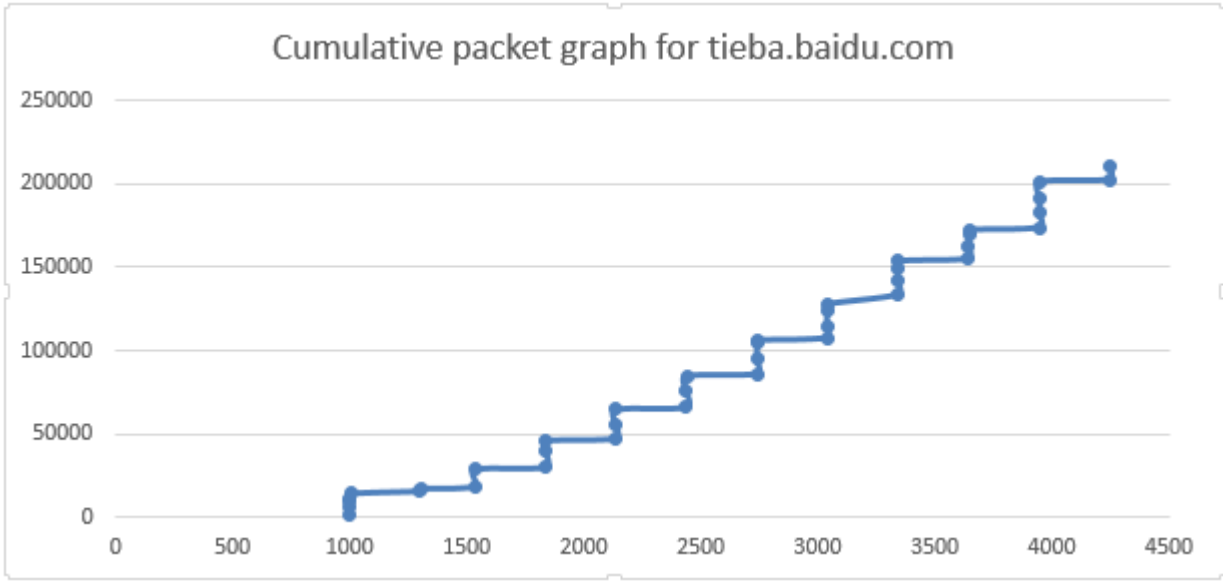
The number of bytes received and the time is shown in the following table:

Number of bytes received	Time(ms)
1440	1000.8
4096	1001.54
4260	1001.69
1500	1001.84
2880	1002.39
1440	1301.09
1440	1301.82
1440	1534.19
10080	1536.53
1440	1835.46
10080	1836.19
5760	1837.22
1440	2135.38
8640	2136.28
8640	2137.68
1440	2436.73
10080	2437.6
8640	2438.46
1440	2737.82
8640	2739
10240	2740.9
1280	2741.03

1440	3037.92
7200	3038.6
8640	3039.43
4320	3040.2
5760	3339.25
8640	3339.98
7200	3340.77
4320	3342.3
1440	3642.8
7200	3643.53
7200	3644.3
2880	3645.11
1440	3943.36
8640	3944.13
8640	3944.88
10080	3948.41
1440	4244.45
7780	4245.17



The plot above is the non-cumulative packet graph for news.baidu.com, the x-axis is the time in millisecond and the y-axis is the number of bytes received.



The plot above shows the cumulative packet graph for tieba.baidu.com. The x-axis is the time in millisecond and the y-axis is the running sum of the number of bytes received.
According to the plot above, there are 11 flights. According to the packet size received between 1301.09ms and 1301.82ms, the max packet size should be 1440 bytes. As a result, the number of packets contained in a flight can be calculate by (the sum of bytes per flight)/1440. Following this method, the first flight has 12 packets, the second flight has 8 packets, and the third flight has 12 packets, the fourth flight has 13 packets, the fifth flight has 14 packets, the sixth flight has 15 packets, the seventh flight has 15 packets, the eighth flight has 18 packets, the ninth flight has 13 packets, the tenth flight has 20 packets and the last flight has 6 packets.

For all the three servers, these flights seem to be uniformly distributed. There are not very often when two flights are very far apart or very close to each other than the other flights. The flights can be clearly observed in the cumulative packet graph for all the three servers and the boundary of each flight can also be determined easily.

TCP Information:
All the time units are in milliseconds.

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5	26.575	20.688	21.126	10.2871	21.7568
6	20.235	20.27	21.408	9.5061	22.058
7	20.6589	37.7798	20.7781	16.428	23.5071
8	48.6301	21.083	27.5291	14.98	22.282
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11	19.2249	20.0339	26.957	9.83887	21.3782
12	21.155	20.5281	20.8201	10.0981	23.8889
13	39.752	20.7571	20.095	12.6721	21.665
14	20.145	21.1279	20.196	10.262	21.489
15	40.6931	20.4839	20.689	11.169	23.4189
16	41.7202	20.3718	23.8	9.88599	24.074
17	40.7891	20.873	22.834	10.926	23.127

18	22.1489	20.1311	22.8521	10.2539	22.1331
19	40.5679	21.123	21.876	10.4031	22.0342
20	20.0229	23.156	21.2322	9.93018	21.2298
Mean ping	29.277945	21.854035	21.76394	11.4920695	22.47306
RTT measured	31.402	17.233	31.5	12.148	19.115
RTT variance measured	12	6	19.12	7.07	11.221

Webserver:	www.baidu.com	www.renren.com	www.youku.com	www.bilibili.com	www.sina.com.cn
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3	282.085	20.8772	268.634	93.2261	24.3071
4	273.862	22.2092	269.748	97.1009	22.7988
5	288.36	21.1719	256.44	95.8281	22.104
6	275.585	22.217	265.63	93.8792	20.894
7	283.632	19.811	277.195	96.9971	21.9119
8	269.058	25.7249	271.422	93.9612	24.218
9	267.239	28.04	269.172	103.445	21.4832
10	244.039	25.0532	260.153	95.9868	22.1179
11	234.197	22.28	256.793	93.988	22.885
12	237.664	19.457	257.215	93.041	22.323
13	257.966	21.7549	274.434	93.4202	19.281
14	269.626	22.5242	260.408	96.4929	20.511
15	248.155	23.322	262.334	99.2561	19.927
16	285.857	22.583	257.6	96.46	21.688
17	273.322	24.1182	296.73	109.834	22.5029
18	274.816	19.7688	271.964	97.3311	22.229
19	272.288	24.031	271.626	96.739	23.458
20	234.146	21.9221	272.189	103.713	20.9858
Mean ping	264.2668	22.616645	267.76155	97.087435	22.01503
RTT measured	236.657	19.648	237.748	89.115	20.51
RTT variance measured	146.742	10.862	145.062	45.289	14.763

The RTT value got from the tcp_info structure is almost the same with the measured ping value.