

COMP90007 Internet Technologies

Project 1 – Network Analysis

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Section 2

Ans 2.1

TRACERT is a Windows command tool that uses routing tracing to determine the path (routing hops) taken by the IP packet access target. It can show the transmission time from the sender to the destination as well as the transmission time from sender to each passed routers(hops).

The command -n (-d in my Windows laptop) means that the program does not resolve the hostname and hops, so only the IP addresses of the target server and hops are displayed. This command is usually used to speed up the process because resolving the hostname during a run takes up time. If we do not add -d (-n in MacOS), the program will take a long time to resolve the hops' name and display them, it can be prolonged.

The command -w1 means program set the waiting time to 1s where 1 is the timeout threshold. It can increase the working efficiency as it does not wait for the response for a long time.

Ans 2.2 Looking at Fig.1 and table.1 and the result achieved in section 2 of the appendix

<i>Id</i>	<i>Host</i>	<i>Location</i>	<i>Destination</i>	<i>Hop #</i>	<i>Physical_distance(km)</i>
1	iperf.he.net	San Jose, California, United States	Hunan,China	17	10758.752
2	bouygues.testdebit.info	Clichy-sous-Bois, France	Hunan,China	21	9030.259
3	iperf.comneonext.de	Cologne (Neustadt/Nord), Germany	Hunan,China	17	8641.545
4	ikoula.testdebit.info	Paris, France	Hunan,China	19	9045.501
5	st2.nn.ertelecom.ru	Nizhny Novgorod, Russia	Hunan,China	17	6161.709
6	iperf.biznetnetworks.com	Jakarta, Indonesia	Hunan,China	19	3870.902
7	iperf.scottlinux.com	San Jose, California, United States	Hunan,China	17	10758.752
8	speedtest.serverius.net	Dronten, Netherlands	Hunan,China	16	8628.701
9	iperf.volia.net	Lviv, Ukraine	Hunan,China	17	7591.362
10	iperf.eenet.ee	Tallinn, Estonia	Hunan,China	20	7248.421

Table.1 (Refer to Location of IP[1] and Distance[2])

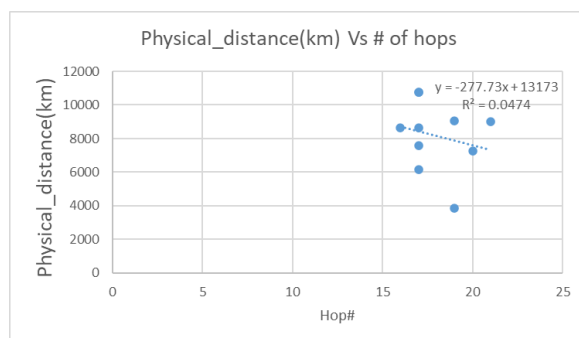


Fig.1

Fig.1 and Table.1 is my testing result of the relationship between approximate geographical distance for those hosts and the number of hops. The actual result does not show an apparent positive relationship between them. This is probably due to the complex Chinese network distribution. A more common situation is, a longer geo distance leads to more hops to be used on the way.

Generally, there are many factors to determine the number of hops; geographical is not the only one factor. In my testing, most of the cases show that my packet travels from Hunan to GongZhou through about ten hops, then it travels to HONGKONG than be sent to the destination country directly.[1] That means Hongkong is one of the stations that hold many servers that connect Chinese Network with Networks in other countries. The Chinese government have set a firewall, and a few main points connect to the servers outside the country. So there will be many routing points when packet travelling inside Chinese network but a few points connect Chinese network and other networks. Based on that, because servers HONGKONG can connect to many servers directly by submarine cables[3], the geographical distance becomes less significant here; also the latency by this way will be dramatically increased due to the firewall. But if we look at networks inside China, we can find that geographical distance can be significant because there are lots of routers and complex network structure in China.

On the other hand, location in the same region can have a similar number of hops. Two servers in San Jose, USA have 17 hops, while two servers in France also have a similar number of hops. However, Jakarta, Indonesia has the shortest distance but not a low number of hops. One reason could be that, based on the world submarine map, there are many submarine cable directly connected in HONGKONG with other countries. Still, there is no direct submarine cable connect HONGKONG with Indonesia, so the packet need travel to other routers in a third country in order to travel to Indonesia. Another reason is that, there are many islands in Indonesia, to construct the network, it needs more submarine cable between island and island, so it can also affect the number of hops. So the region and submarine cables can also be factors that influence the number of hops. [3]

Section 3

Ans 3.1 Looking at the Table.2, Fig.2, Table.3, Fig.3 and result achieved in section 3 of the appendix

<i>I</i>	<i>Host</i>	<i>Location</i>	<i>round-trip</i> <i>delay1(ms)</i>	<i>round-trip</i> <i>delay2(ms)</i>	<i>round-trip</i> <i>delay3(ms)</i>	<i>avera</i> <i>ge</i>	<i>Physical_dist</i> <i>ance(km)</i>
1	iperf.he.net	San Jose, California, United States	194.413	202.173	195.436	197.3 407	10758.752
2	bouygues.testd ebit.info	Clichy-sous-Bois, France	308.986	285.834	282.427	292.4 157	9030.259
3	iperf.comneone xt.de	Cologne (Neustadt/Nord), Germany	302.118	298.612	303.181	301.3 037	8641.545
4	ikoula.testdebit .info	Paris, France	354.371	347.888	349.175	350.4 78	9045.501
5	st2.nn.erteleco m.ru	Nizhny Novgorod, Russia	317.459	310.095	307.822	311.7 92	6161.709

6	iperf.biznetnet works.com	Jakarta, Indonesia	232.665	231.533	233.686	232.6	3870.902
7	iperf.scottlinux. com	San Jose, California, United States	203.212	204.322	213.185	206.9	10758.752
8	speedtest.server ius.net	Dronten, Netherlands	282.822	278.862	286.734	282.8	8628.701
9	iperf.volia.net	Lviv, Ukraine	275.869	273.942	269.653	273.1	7591.362
10	iperf.eenet.ee	Tallinn, Estonia	300.915	304.756	305.418	303.6	7248.421

Table.2

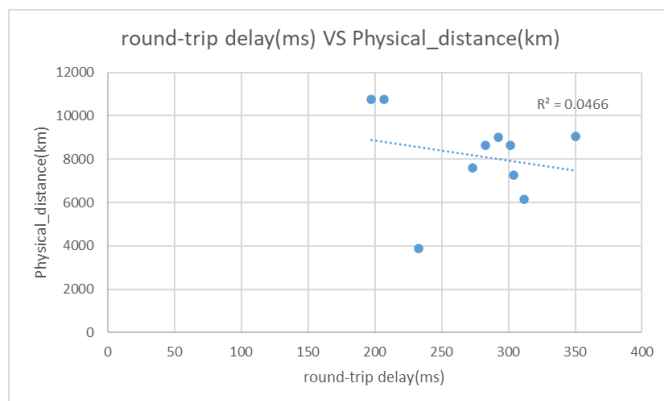


Figure.2

<i>Id</i>	<i>Host</i>	<i>jitter1(std)</i>	<i>jitter2(std)</i>	<i>jitter3(std)</i>	<i>average</i>	<i>Physical_distance(km)</i>
1	iperf.he.net	2.126	9.246	2.598	4.66	10758.75
2	bouygues.testdebit.info	27.313	3.799	11.808	14.31	9030.259
3	iperf.comneonext.de	5.907	7.84	2.266	5.34	8641.545
4	ikoula.testdebit.info	3.922	3.173	4.336	3.81	9045.501
5	st2.nn.ertelecom.ru	2.916	3.6	5.611	4.04	6161.709
6	iperf.biznetnetworks.com	3.234	1.492	4.638	3.12	3870.902
7	iperf.scottlinux.com	12.517	11.111	10.082	11.24	10758.75
8	speedtest.serverius.net	9.971	4.066	13.02	9.02	8628.701
9	iperf.volia.net	11.755	14.074	15.922	13.92	7591.362
10	iperf.eenet.ee	2.95	1.744	5.069	3.25	7248.421

Table.3

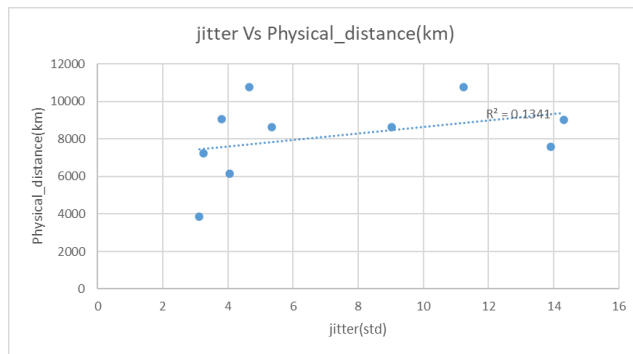


Fig.3

Ans 3.2 Looking at Fig.2 and Fig.3, Table.2 and Table.3 and the result achieved in section 3 of the appendix

Based on Fig.2 and Table.2, The round-trip delay have a slightly positive correlation with geographical distance, except for the two outliers (the two points of USA), while Fig.3 and Table.3 demonstrate a great positive correlation between jitter and geographical distance. The trend is that jitter and round-trip delay is reduced as geographic distances are reduced. Indonesia, for example, has the smallest geographical distance and relatively low jitter (3.12) and round-trip delay (232.628), while France and Germany, which are relatively far away, show higher round trip delay (292.4157 and 301.3037 respectively) and jitter (14.31 and 5.34 respectively). Servers in the United States performed better than those in Europe, Russia, Ukraine and the Netherlands in terms of round-trip delay, but the jitter is not better than others. It indicates that the transmission between the source and USA server is faster (better bandwidth) than others but not very stable. Overall, the basic trend between geographical distance with round-trip delay and jitter is positive – larger distance may have more significant round-trip delay and higher jitter.

There are two reasons for this, the round-trip delay and jitter can be affected by the geo distance, while the real-time network environment can also be a factor. On the one hand, as mentioned in section 2, the number of hops commonly increased by the geo distance, which means that it takes more time on the routing process – router received data, processing the data than send it to the next router or device. Also, the round-trip is basically the double side transmission latency in definition, which equals the combination of transmission delay and propagation delay. Transmission delay is the time to transmit the message to the channel(the first bit to last bit) while the Propagation delay is the time it takes for a signal to travel a certain distance in a transmission medium, such as the submarine cable. In this case, the propagation delay can be significantly affected by the length of the transmission medium, so the geo distance has a great impact on that.

On the other hand, the real-time network environment. When I was testing the network environment, I closed any program on my laptop to avoid background traffic, which can affect my testing result. To make a comparison, I tried to make a busy network and test the result again. Because I am using a family network at home, the network condition is relatively stable and fast; also, there are a few other family members is using the network. In order to make the traffic, I ran over a dozen online movies at the same time with 1080P +(the highest Picture quality). Fig.4 and Fig.5, as well as Table.4, shows the results of new tested and the comparison of the old results. As a result, when there is more background network traffic, the jitter has been affected

significantly, while it has a slight impact on the round-trip delay. It makes sense that the round-trip delay can be affected more by the propagation delay; the channel bandwidth is still not full at this moment. Meanwhile, the better network environment, more stable network it could be.

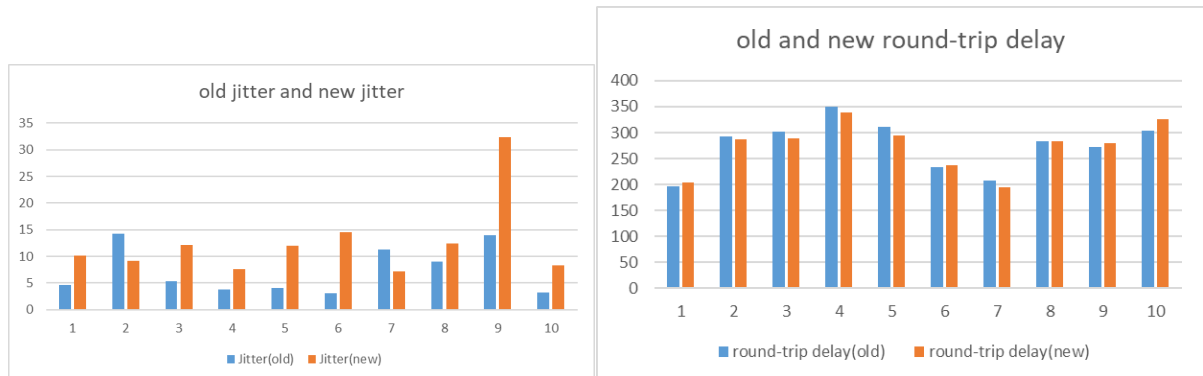


Fig.4 and Fig.5

<i>Id</i>	<i>Jitter(old)</i>	<i>Jitter(new)</i>	<i>round-trip delay(old)</i>	<i>round-trip delay(new)</i>
1	4.66	10.205	197.3406667	204.376
2	14.31	9.199	292.4156667	286.384
3	5.34	12.178	301.3036667	289.487
4	3.81	7.547	350.478	339.053
5	4.04	11.975	311.792	294.385
6	3.12	14.574	232.628	238.093
7	11.24	7.215	206.9063333	195.17
8	9.019	12.445	282.806	283.862
9	13.917	32.314	273.1546667	280.37
10	3.25	8	303.696	326.17

Table 4

Section 4

Ans 4.1 Looking at Table.5 and the result achieved in section 4 of the appendix

<i>l</i>	<i>Host</i>	<i>Location</i>	<i>Physical_dist ance(km)</i>	<i>BW1(Mb its/sec)</i>	<i>BW2(Mb its/sec)</i>	<i>BW3(Mb its/sec)</i>	<i>avgBW(M bits/sec)</i>
1	iperf.he.net	San Jose, California, United States	10758.752	null	null	null	null
2	bouygues.testd ebit.info	Clichy-sous-Bois, France	9030.259	4.8	4.6	4.82	4.74
3	iperf.comneon ext.de	Cologne (Neustadt/Nord), Germany	8641.545	3.74	3.81	3.83	3.79
4	ikoula.testdebi t.info	Paris, France	9045.501	3.63	4,19	3,87	3.63

5	st2.nn.erteleco m.ru	Nizhny Novgorod, Russia	6161.709	4.57	4.48	4.4	4.48
6	iperf.biznetnet works.com	Jakarta, Indonesia	3870.902	5.43	5.55	5.39	5.46
7	iperf.scottlinu x.com	San Jose, California, United States	10758.752	6.36	2.16	5.94	4.82
8	speedtest.serve rius.net	Dronten, Netherlands	8628.701	0.0393	0.0405	0.0386	0.039
9	iperf.volia.net	Lviv, Ukraine	7591.362	4.98	5.21	4.81	5
10	iperf.eenet.ee	Tallinn, Estonia	7248.421	4.48	4.45	4.3	4.41

Table.5

	Hop #	jitter1(s td)	jitter2(s td)	jitter3(s td)	average	round- trip delay1(m s)	round- trip delay2(ms)	round- trip delay3(m s)	averag e
<i>iperf.eene t.ee</i>	20	2.95	1.744	5.069	3.254333	300.915	304.756	305.418	303.69
					333				63

Table.6

The server *iperf.he.net* is not able to reach(always time out, tried changing ports, using iperf2 and iperf3), so I add *iperf.eenet.ee* to the testing and did the same testing in section 2 and section 3(in appendix section 4 under *iperf.eenet.ee*) Table.6 is the testing result for *iperf.eenet.ee*, table 5 above indicates the the bandwidth measurement of each host.

The bandwidth-delay product can be calculated by bandwidth * Propagation Delay; it means that the maximum number of bits that can be accommodated on a channel at a given time. If we send data at the maximum bandwidth, and then the first bit gets to its destination, the bandwidth-delay product describes the number of bits that are sent, and those bits are transmitted over the channel. The bandwidth-delay have a significant impact on network speed, for example, If we think of a channel(a network data link) as a pipe, when the amount of data entering the pipe is greater than the amount of unacknowledged data, or when the data enters a small pipe from a large pipe, that is when data enters the router faster than the router can send out data, and the pipe becomes clogged.

Ans 4.2 Looking at Fig.6 and the result achieved in section 4 of the appendix

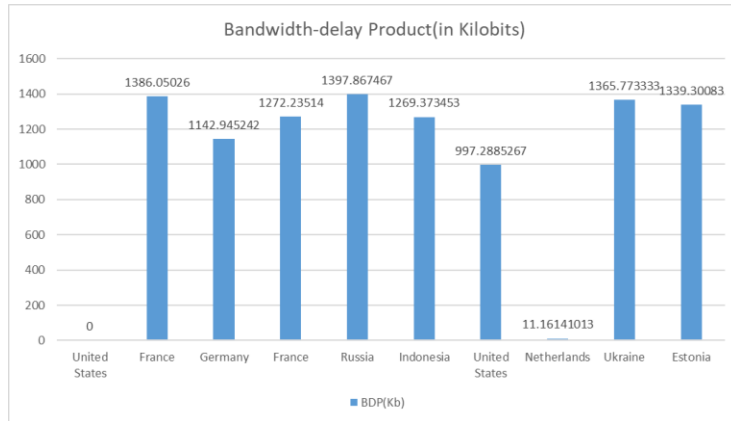


Fig.6

To begin with, I am using a family network in China, and it has a stable network and about 100 MB bandwidth. The downloading/uploading speed is generally 10MB/s to 20 MB/s. There are no more than ten devices are sharing network, and when I do the testing, about three devices are sharing the network bandwidth. But however, this doesn't take much bandwidth which could not fill the bandwidth. It is actually very hard to do so. So the result of testing each time is relatively stable. Based on Fig.6, The Bandwidth-delay product is around 1200 kilobits which are 1.2MB, except for the Netherlands one(very low bandwidth) and the First United States one(not reachable). The results are significantly slower than the general speed of download and upload in my network.

There are a few reasons that could explain the difference. Firstly, my network is located in China, while the servers are located in a different area (Other countries). The general experience of using my network is connecting those servers in China. When transmitting data to the servers in other area, data pass through many routers, which may result in a decline on bandwidth. On the other hand, The entire network of China, as mentioned before, the government set a firewall to make the network safe and independent from other networks. The firewall may decrease the network bandwidth when visiting the network outside China. There is testing when visiting some general servers inside China in Table.7(also screenshot in section 4 of the appendix), we could see that the bandwidth is much greater than the previous testing.

Website	Location	BW(Mbits/sec)
www.163.com	China	9.33
www.qq.com	China	9.52
www.canyun.com	China	9.54
www.taobao.com	China	9.58
www.baidu.com	China	9.94
www.bilibili.com	China	21.9

Table.7

Secondly, network congestion could significantly affect bandwidth. The bandwidth can be decreased if a load of network increase or the transmission is on a very long way. As mentioned, the network that I am using is a family network; just a few people are using it. it is very hard to make the network congestion in my network. I basically tried to increase the load of my network by downloading things on different devices and run

many online videos at the same time. The new testing result is varied significantly for some servers. The result is shown on Fig.7 and Table.8, most of the bandwidth were decreased, compared with the previous test result.

Lastly, there is an outlier in my test result: The bandwidth-delay product of Netherland is only 11.16 kilobits, where others are over 1000 kilobits. This sample is not within a normal distance of the mean or other samples; therefore, it is marked as an outlier. The reason that outlier happens might be the limitation of routers and links on the way, as well as the port numbers in the transport layer.

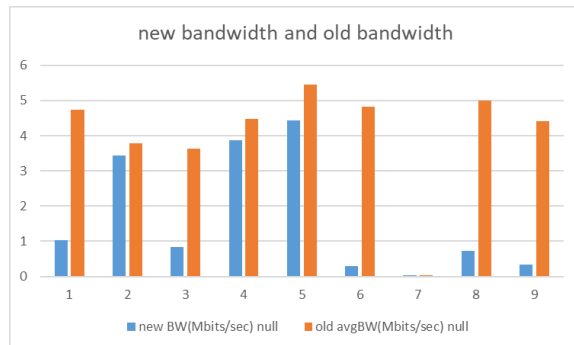


Fig.7

Table.8

Ans 4.3 Looking at Fig.8 and the result achieved in section 4 of the appendix

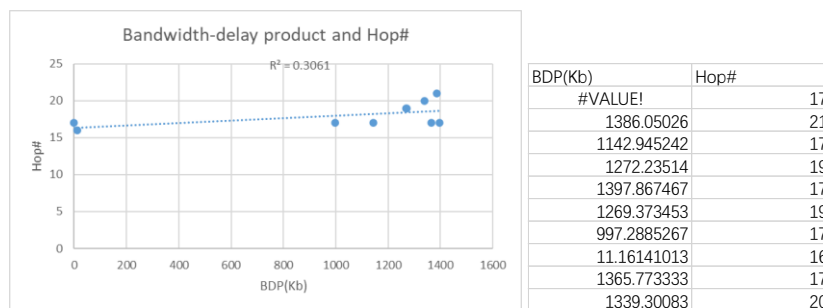


Fig.8

The Fig.8 above shows the plot of the number of hops vs the Bandwidth-delay product. It is hard to say that they have an obvious correlation. As we can see in the Fig.8, the trend line does show a slightly positive relation, but those points are separated without a pattern. Also, because we discussed in section 2, The number of hops can be determined by many factors, and the hops' number is very close in this test. Due to the non-pattern distribution and a small number of samples, we cannot say that there is a correlation between hop number and bandwidth-delay.

On the other hand, theoretically, the bandwidth-delay product is determined by the bandwidth times the round-trip delay. As the number of hops increases, the RTT will also be increased, Because the number of routers increases, the transmission time will be increased. Hence, when the number of hops increases, there will be a higher bandwidth-delay product, they should have a positive correlation if we only consider the RTT. However, bandwidth can also be a factor. As the number of hops increases, the bandwidth can also be affected negatively. The hops may limit the bandwidth, make the bandwidth unpredictable and unstable. As data

transmitted through hops, the performance of a router, the number of routers, or the congestion of a channel, can reduce bandwidth, therefore, there is not a correlation between the number of hops and BDP.

Ans 4.4

In this experiment, there are many variables that affect the results and the accuracy of the data. Firstly, network data transmission is unpredictable. In my test, whether using iperf, hrping or tracer, will produce unstable data, because network data transmission can be impacted by other networks, the network is not stable. To avoid inaccurate results, testing should be done in a way that minimizes the impact of external environments and backend networks, such as shutting down other software, websites, and devices that can make background traffic.

Secondly, when using iperf, the choice of the port can affect the bandwidth result, different ports may result in different bandwidth. The port is generally choosing 80, but some servers require other port such as 5001 or 5002; otherwise, the connection would be refused, or connection would time out.

Finally, the number of experimental samples needs to be increased. This means that we need to send more packets in one run and run more at the same sample. For example, in the Ping experiment, we get more than ten results, and then we average them to reduce the uncertainty of the result because the RTT and jitter can be significantly varied each time.

References

- [1]“IP Geolocation API & Free Address Database | DB-IP.” <https://db-ip.com/> (accessed Sep. 15, 2020).
- [2]“How Far Is It Between.” <https://www.freemaptools.com/how-far-is-it-between.htm> (accessed Sep. 15, 2020).
- [3]“Submarine Cable Map,” <https://www.submarinecablemap.com/>. <https://www.submarinecablemap.com/> (accessed Sep. 15, 2020).

Appendix

Section 2

(1) iperf.he.net

```
C:\Windows\system32>tracert -dwl iperf.he.net
Tracing route to 1500.mtu.he.net [216.218.207.42]
over a maximum of 30 hops:
  0  2 ms    4 ms    1 ms   192.168.0.1
  1  2 ms    1 ms    1 ms   192.168.1.1
  2  8 ms    6 ms    3 ms   10.148.0.1
  3  5 ms    *        *     111.8.31.205
  4  9 ms    8 ms    7 ms   111.8.30.37
  5  11 ms   11 ms   26 ms   221.183.26.213
  6  52 ms   97 ms   35 ms   221.176.17.182
  7  26 ms   74 ms   50 ms   221.183.68.141
  8  *       28 ms   *       221.183.52.86
  9  31 ms   36 ms   46 ms   221.183.68.126
 10 195 ms   193 ms  196 ms  223.120.12.29
 11 195 ms   192 ms  189 ms  223.120.6.70
 12 197 ms   *       197 ms  216.218.132.101
 13 *       *       *       Request timed out.
 14 *       198 ms  195 ms  184.105.65.210
 15 *       199 ms  *       216.218.207.42
 16 197 ms   193 ms  199 ms  216.218.207.42
Trace complete.
```

(2) bouygues.testdebit.info

```
C:\Windows\system32>tracert -dwl bouygues.testdebit.info

Tracing route to bouygues.testdebit.info [89.84.1.222]
over a maximum of 30 hops:

  1    6 ms      4 ms      2 ms     192.168.0.1
  2    5 ms      5 ms      3 ms     192.168.1.1
  3    7 ms      7 ms      4 ms     10.148.0.1
  4    *         *         10 ms    111.8.31.201
  5   25 ms     28 ms     28 ms    111.8.30.77
  6   10 ms     16 ms     10 ms    221.183.19.201
  7   23 ms     25 ms     22 ms    221.176.17.190
  8   25 ms     27 ms     26 ms    221.176.22.158
  9   27 ms     *         29 ms    221.176.19.242
 10   26 ms     38 ms     24 ms    221.183.55.53
 11  219 ms     220 ms    253 ms    223.120.15.49
 12  267 ms     263 ms    268 ms    223.120.10.186
 13   *         243 ms    242 ms    149.14.81.185
 14   *         *         244 ms    130.117.51.73
 15  261 ms     253 ms    259 ms    154.54.56.130
 16  313 ms     310 ms    351 ms    130.117.0.166
 17   *         *         *         Request timed out.
 18  301 ms     303 ms    320 ms    62.34.2.57
 19   *         272 ms    272 ms    212.194.171.68
 20   *         300 ms    270 ms    89.89.101.141
 21   *         *         313 ms    89.84.1.222

Trace complete.
```

(3) iperf.comneonext.de

```
C:\Windows\system32>tracert -dwl iperf.comneonext.de

Tracing route to iperf.comneonext.de [91.195.241.136]
over a maximum of 30 hops:

  1    8 ms      2 ms      2 ms     192.168.0.1
  2   22 ms      2 ms      2 ms     192.168.1.1
  3    4 ms      3 ms      4 ms     10.148.0.1
  4   12 ms     12 ms      *         111.8.31.201
  5   13 ms     28 ms     13 ms    111.8.30.77
  6   15 ms     11 ms     11 ms    221.183.19.197
  7   24 ms     21 ms     22 ms    221.176.17.190
  8   24 ms     33 ms     26 ms    221.176.22.158
  9   34 ms     30 ms      *         221.176.20.6
 10   25 ms     25 ms     25 ms    221.183.55.57
 11  240 ms     238 ms    256 ms    223.120.15.161
 12   *         278 ms    258 ms    223.120.10.122
 13   *         *         *         Request timed out.
 14  281 ms     *         *         62.115.114.88
 15   *         *         *         Request timed out.
 16   *         283 ms    301 ms    62.115.160.179
 17  296 ms     312 ms    290 ms    91.195.241.102
 18  292 ms     *         *         91.195.241.110
 19  302 ms     307 ms    291 ms    91.195.241.136

Trace complete.
```

(4) ikoula.testdebit.info

```
C:\Windows\system32>tracert -dwl ikoula.testdebit.info

Tracing route to ikoula.testdebit.info [213.246.63.45]
over a maximum of 30 hops:

  1    8 ms      2 ms      4 ms     192.168.0.1
  2    2 ms      2 ms      4 ms     192.168.1.1
  3    5 ms     13 ms      5 ms     10.148.0.1
  4    8 ms      *         5 ms     111.8.31.205
  5   10 ms      7 ms     98 ms    111.8.30.37
  6    7 ms      6 ms      7 ms     221.183.19.185
  7   24 ms     24 ms     22 ms    221.176.27.226
  8   35 ms     36 ms     36 ms    221.183.22.217
  9   38 ms     39 ms     40 ms    221.176.21.150
 10   39 ms     39 ms     51 ms    221.183.52.1
 11   *         *         142 ms    221.183.21.182
 12   98 ms     97 ms    102 ms    203.190.230.40
 13  127 ms    124 ms    126 ms    184.105.64.253
 14  363 ms    320 ms    342 ms    184.105.65.14
 15  361 ms    374 ms    329 ms    184.105.222.21
 16  343 ms    342 ms    345 ms    184.104.205.18
 17  319 ms    322 ms    320 ms    213.246.50.193
 18  343 ms    346 ms    320 ms    213.246.50.182
 19  357 ms     *         349 ms    213.246.63.45

Trace complete.
```

(5) st2.nn.ertelecom.ru

```
C:\Windows\system32>tracert -dwl st2.nn.ertelecom.ru

Tracing route to st2.nn.ertelecom.ru [91.144.184.232]
over a maximum of 30 hops:

  1     3 ms     4 ms     5 ms  192.168.0.1
  2     3 ms     2 ms     2 ms  192.168.1.1
  3     9 ms    12 ms     6 ms  10.148.0.1
  4    10 ms     6 ms     *    111.8.31.205
  5    13 ms    10 ms     9 ms  111.8.30.37
  6    40 ms    67 ms    10 ms  221.183.19.189
  7    27 ms    29 ms    30 ms  221.176.17.138
  8    31 ms    32 ms    26 ms  221.176.22.14
  9    33 ms    30 ms    32 ms  221.176.22.206
 10   264 ms   266 ms   263 ms  221.183.21.202
 11   263 ms   260 ms   261 ms  223.118.18.138
 12   262 ms   262 ms   268 ms  87.245.240.68
 13   321 ms   314 ms   318 ms  87.245.232.188
 14   306 ms    *    306 ms  87.245.254.154
 15   299 ms   298 ms   299 ms  109.194.232.26
 16   264 ms   264 ms   264 ms  109.194.232.25
 17   308 ms   305 ms   305 ms  91.144.184.232
```

(6) iperf.biznetnetworks.com

```
C:\Windows\system32>tracert -dwl iperf.biznetnetworks.com

Tracing route to iperf.biznetnetworks.com [117.102.109.186]
over a maximum of 30 hops:

  1     4 ms     2 ms    39 ms  192.168.0.1
  2     3 ms     3 ms     3 ms  192.168.1.1
  3     6 ms     5 ms     7 ms  10.148.0.1
  4    16 ms    11 ms     8 ms  111.8.31.201
  5    10 ms    18 ms     9 ms  111.8.30.77
  6    11 ms     9 ms     8 ms  221.183.19.201
  7    22 ms    19 ms    19 ms  221.176.17.190
  8    27 ms    26 ms    48 ms  221.176.22.158
  9    21 ms    25 ms    *    221.176.19.190
 10    24 ms    29 ms    27 ms  221.183.68.126
 11   181 ms   178 ms   181 ms  223.120.13.149
 12   194 ms   194 ms   184 ms  223.120.6.70
 13   193 ms   211 ms   194 ms  216.218.132.101
 14   219 ms   213 ms   223 ms  184.104.194.38
 15   184 ms   197 ms   193 ms  184.105.64.129
 16   222 ms   216 ms   250 ms  184.105.222.102
 17    *    423 ms   414 ms  27.50.33.110
 18   252 ms   268 ms   286 ms  182.253.99.106
 19   232 ms   246 ms   242 ms  117.102.109.186

Trace complete.
```

(7) iperf.scottlinux.com

```
C:\Windows\system32>tracert -dwl iperf.scottlinux.com

Tracing route to iperf.scottlinux.com [45.33.39.39]
over a maximum of 30 hops:

  1     3 ms     7 ms     6 ms  192.168.0.1
  2     6 ms     2 ms     9 ms  192.168.1.1
  3    12 ms     4 ms    23 ms  10.148.0.1
  4    *    *    *    Request timed out.
  5    15 ms    54 ms    11 ms  111.8.30.77
  6    53 ms     8 ms    21 ms  221.183.19.197
  7    20 ms    20 ms    57 ms  221.176.17.190
  8    24 ms    24 ms    24 ms  221.176.22.158
  9    34 ms    29 ms    28 ms  221.176.19.190
 10    35 ms    22 ms    25 ms  221.183.55.53
 11   189 ms   198 ms   186 ms  223.120.13.149
 12   186 ms   187 ms   186 ms  223.120.6.70
 13    *    229 ms   215 ms  38.88.224.161
 14   184 ms   180 ms    *    154.54.1.193
 15   206 ms   209 ms   187 ms  154.54.1.162
 16   189 ms   197 ms   206 ms  38.142.11.154
 17   212 ms    *    212 ms  173.230.159.67
 18   208 ms   200 ms   196 ms  45.33.39.39

Trace complete.
```

(8) speedtest.serverius.net

```
C:\Windows\system32>tracert -dwl speedtest.serverius.net

Tracing route to speedtest.serverius.net [178.21.16.76]
over a maximum of 30 hops:

  1     4 ms     2 ms     6 ms  192.168.0.1
  2     3 ms    14 ms     4 ms  192.168.1.1
  3     6 ms     8 ms     5 ms  10.148.0.1
  4    *    *    7 ms  111.8.31.205
  5     9 ms    28 ms    15 ms  111.8.30.37
  6    10 ms     9 ms    12 ms  221.183.26.213
  7    31 ms    31 ms    28 ms  221.176.17.138
  8    30 ms    30 ms    29 ms  221.176.22.14
  9    30 ms    36 ms    32 ms  221.176.22.206
 10   267 ms   266 ms   267 ms  221.183.21.202
 11   272 ms   261 ms   263 ms  223.118.18.138
 12   291 ms   266 ms   269 ms  87.245.240.68
 13   290 ms    *    287 ms  87.245.232.44
 14   294 ms   279 ms   277 ms  87.245.246.61
 15   281 ms   280 ms   276 ms  185.8.179.33
 16   282 ms   275 ms   274 ms  178.21.16.76

Trace complete.
```

(9) iperf.volia.net

```
C:\Windows\system32>tracert -dwl iperf.volia.net

Tracing route to speedtest.volia.net [77.120.3.236]
over a maximum of 30 hops:

  1    8 ms    7 ms    4 ms  192.168.0.1
  2    8 ms    2 ms    3 ms  192.168.1.1
  3    4 ms    7 ms   121 ms  10.148.0.1
  4    *      *      9 ms   111.8.31.205
  5   20 ms   13 ms    9 ms   111.8.30.37
  6   11 ms    9 ms    9 ms  221.183.19.189
  7   30 ms   59 ms   29 ms  221.176.17.138
  8   32 ms   29 ms   30 ms  221.176.22.14
  9   33 ms   31 ms   32 ms  221.176.22.206
 10  263 ms  266 ms  267 ms  221.183.21.202
 11  262 ms  261 ms  261 ms  223.118.18.138
 12  263 ms  266 ms  264 ms  87.245.240.68
 13  294 ms  329 ms  300 ms  87.245.232.216
 14  295 ms  292 ms  298 ms  87.245.237.57
 15  293 ms  293 ms  293 ms  77.120.1.125
 16  291 ms  290 ms  290 ms  77.120.1.49
 17  258 ms  259 ms  271 ms  77.120.3.236

Trace complete.
```

(10) iperf.eenet.ee

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>tracert -dwl iperf.eenet.ee

Tracing route to iperf.eenet.ee [193.40.55.7]
over a maximum of 30 hops:

  1     3 ms    2 ms    5 ms  192.168.0.1
  2     3 ms    4 ms    2 ms  192.168.1.1
  3    13 ms    6 ms   17 ms  10.148.0.1
  4     9 ms    6 ms    5 ms  111.8.31.205
  5   104 ms    7 ms    6 ms  111.8.30.37
  6   122 ms    8 ms    7 ms  221.183.26.213
  7    35 ms   30 ms  145 ms  221.176.17.182
  8    27 ms  135 ms   33 ms  221.176.22.106
  9    34 ms   29 ms   35 ms  221.176.19.242
 10    30 ms   31 ms    *    221.183.55.53
 11   227 ms  247 ms  228 ms  223.120.15.229
 12   224 ms  229 ms  224 ms  223.120.10.154
 13   280 ms  287 ms  277 ms  62.115.47.44
 14   304 ms    *    300 ms  62.115.114.90
 15   304 ms  306 ms  301 ms  62.115.138.104
 16   300 ms  310 ms  295 ms  62.115.134.241
 17   301 ms    *    306 ms  62.115.151.17
 18   291 ms    *    297 ms  193.40.133.6
 19     *      *    309 ms  193.40.132.162
 20   305 ms    *    304 ms  193.40.55.7

Trace complete.
```

Section 3

Section 3.1 and Section 3.2

1 iperf.he.net

```
C:\Users\49323\Desktop\hrping>hrping iperf.he.net
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=4859
Pinging iperf.he.net [216.218.207.42]
with 32 bytes data (60 bytes IP):

From 216.218.207.42: bytes=60 seq=0001 TTL=48 ID=bc44 time=193.106ms
From 216.218.207.42: bytes=60 seq=0002 TTL=48 ID=bc76 time=192.722ms
From 216.218.207.42: bytes=60 seq=0003 TTL=48 ID=bc9e time=197.412ms
Timeout waiting for seq=0004

Packets: sent=4, rcvd=3, error=0, lost=1 (25.0% loss) in 1.500644 sec
RTTs in ms: min/avg/max/dev: 192.722 / 194.413 / 197.412 / 2.126
Bandwidth in kbytes/sec: sent=0.159, rcvd=0.119

C:\Users\49323\Desktop\hrping>hrping iperf.he.net
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=1863
Pinging iperf.he.net [216.218.207.42]
with 32 bytes data (60 bytes IP):

From 216.218.207.42: bytes=60 seq=0001 TTL=48 ID=c05a time=194.473ms
From 216.218.207.42: bytes=60 seq=0002 TTL=48 ID=c0d2 time=196.870ms
From 216.218.207.42: bytes=60 seq=0004 TTL=48 ID=c109 time=215.176ms
Timeout waiting for seq=0003

Packets: sent=4, rcvd=3, error=0, lost=1 (25.0% loss) in 1.716293 sec
RTTs in ms: min/avg/max/dev: 194.473 / 202.173 / 215.176 / 9.246
Bandwidth in kbytes/sec: sent=0.139, rcvd=0.104

C:\Users\49323\Desktop\hrping>hrping iperf.he.net
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=2059
Pinging iperf.he.net [216.218.207.42]
with 32 bytes data (60 bytes IP):

From 216.218.207.42: bytes=60 seq=0002 TTL=48 ID=c3c8 time=192.838ms
From 216.218.207.42: bytes=60 seq=0003 TTL=48 ID=c42c time=198.035ms
Timeout waiting for seq=0001
Timeout waiting for seq=0004

Packets: sent=4, rcvd=2, error=0, lost=2 (50.0% loss) in 1.500925 sec
RTTs in ms: min/avg/max/dev: 192.838 / 195.436 / 198.035 / 2.598
Bandwidth in kbytes/sec: sent=0.159, rcvd=0.079
```

2 bouygues.testdebit.info

```
C:\Users\49323\Desktop\hrping>hrping bouygues.testdebit.info
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=cc58
Pinging bouygues.testdebit.info [89.84.1.222]
with 32 bytes data (60 bytes IP):

From 89.84.1.222: bytes=60 seq=0001 TTL=41 ID=ec95 time=279.589ms
From 89.84.1.222: bytes=60 seq=0002 TTL=41 ID=ecf8 time=348.583ms
From 89.84.1.222: bytes=60 seq=0003 TTL=41 ID=ed2d time=288.076ms
From 89.84.1.222: bytes=60 seq=0004 TTL=41 ID=eda7 time=319.699ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.820946 sec
RTTs in ms: min/avg/max/dev: 279.589 / 308.986 / 348.583 / 27.313
Bandwidth in kbytes/sec: sent=0.131, rcvd=0.131

C:\Users\49323\Desktop\hrping>hrping bouygues.testdebit.info
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=dc61
Pinging bouygues.testdebit.info [89.84.1.222]
with 32 bytes data (60 bytes IP):

From 89.84.1.222: bytes=60 seq=0001 TTL=41 ID=edd1 time=288.045ms
From 89.84.1.222: bytes=60 seq=0002 TTL=41 ID=ee05 time=280.487ms
From 89.84.1.222: bytes=60 seq=0004 TTL=41 ID=ee77 time=288.970ms
Timeout waiting for seq=0003

Packets: sent=4, rcvd=3, error=0, lost=1 (25.0% loss) in 1.790126 sec
RTTs in ms: min/avg/max/dev: 280.487 / 285.834 / 288.970 / 3.799
Bandwidth in kbytes/sec: sent=0.134, rcvd=0.100

C:\Users\49323\Desktop\hrping>hrping bouygues.testdebit.info
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=cc45
Pinging bouygues.testdebit.info [89.84.1.222]
with 32 bytes data (60 bytes IP):

From 89.84.1.222: bytes=60 seq=0001 TTL=41 ID=ef45 time=287.378ms
From 89.84.1.222: bytes=60 seq=0002 TTL=41 ID=efaf time=269.968ms
From 89.84.1.222: bytes=60 seq=0003 TTL=41 ID=efdf time=272.956ms
From 89.84.1.222: bytes=60 seq=0004 TTL=41 ID=f033 time=299.406ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.800810 sec
RTTs in ms: min/avg/max/dev: 269.968 / 282.427 / 299.406 / 11.808
Bandwidth in kbytes/sec: sent=0.133, rcvd=0.133
```

3 iperf.comneonext.de

```

C:\Users\49323\Desktop\hrping>hrping iperf.comneonext.de
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=085a
Pinging iperf.comneonext.de [91.195.241.136]
with 32 bytes data (60 bytes IP):

From 91.195.241.136: bytes=60 seq=0002 TTL=43 ID=0097 time=296.211ms
From 91.195.241.136: bytes=60 seq=0004 TTL=43 ID=dcf0 time=308.026ms
Timeout waiting for seq=0001
Timeout waiting for seq=0003

Packets: sent=4, rcvd=2, error=0, lost=2 (50.0% loss) in 1.809069 sec
RTTs in ms: min/avg/max/dev: 296.211 / 302.118 / 308.026 / 5.907
Bandwidth in kbytes/sec: sent=0.132, rcvd=0.066

C:\Users\49323\Desktop\hrping>hrping iperf.comneonext.de
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=d052
Pinging iperf.comneonext.de [91.195.241.136]
with 32 bytes data (60 bytes IP):

From 91.195.241.136: bytes=60 seq=0001 TTL=43 ID=45d3 time=290.744ms
From 91.195.241.136: bytes=60 seq=0002 TTL=43 ID=5eb0 time=309.313ms
From 91.195.241.136: bytes=60 seq=0003 TTL=43 ID=2770 time=295.781ms
Timeout waiting for seq=0004

Packets: sent=4, rcvd=3, error=0, lost=1 (25.0% loss) in 1.500762 sec
RTTs in ms: min/avg/max/dev: 290.744 / 298.612 / 309.313 / 7.840
Bandwidth in kbytes/sec: sent=0.159, rcvd=0.119

C:\Users\49323\Desktop\hrping>hrping iperf.comneonext.de
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=045f
Pinging iperf.comneonext.de [91.195.241.136]
with 32 bytes data (60 bytes IP):

From 91.195.241.136: bytes=60 seq=0001 TTL=43 ID=64b5 time=300.288ms
From 91.195.241.136: bytes=60 seq=0002 TTL=43 ID=7a25 time=303.434ms
From 91.195.241.136: bytes=60 seq=0003 TTL=43 ID=33be time=305.823ms
Timeout waiting for seq=0004

Packets: sent=4, rcvd=3, error=0, lost=1 (25.0% loss) in 1.500677 sec
RTTs in ms: min/avg/max/dev: 300.288 / 303.181 / 305.823 / 2.266
Bandwidth in kbytes/sec: sent=0.159, rcvd=0.119

```

```

C:\Users\49323\Desktop\hrping>hrping ikoula.testdebit.info
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=4458
Pinging ikoula.testdebit.info [213.246.63.45]
with 32 bytes data (60 bytes IP):

From 213.246.63.45: bytes=60 seq=0002 TTL=42 ID=0d58 time=359.328ms
From 213.246.63.45: bytes=60 seq=0003 TTL=42 ID=0dab time=354.050ms
From 213.246.63.45: bytes=60 seq=0004 TTL=42 ID=0e1c time=349.736ms
Timeout waiting for seq=0001

Packets: sent=4, rcvd=3, error=0, lost=1 (25.0% loss) in 1.850691 sec
RTTs in ms: min/avg/max/dev: 349.736 / 354.371 / 359.328 / 3.922
Bandwidth in kbytes/sec: sent=0.129, rcvd=0.097

C:\Users\49323\Desktop\hrping>hrping ikoula.testdebit.info
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=305e
Pinging ikoula.testdebit.info [213.246.63.45]
with 32 bytes data (60 bytes IP):

From 213.246.63.45: bytes=60 seq=0001 TTL=42 ID=0ff4 time=350.680ms
From 213.246.63.45: bytes=60 seq=0002 TTL=42 ID=102e time=349.536ms
From 213.246.63.45: bytes=60 seq=0003 TTL=42 ID=103a time=343.450ms
Timeout waiting for seq=0004

Packets: sent=4, rcvd=3, error=0, lost=1 (25.0% loss) in 1.501086 sec
RTTs in ms: min/avg/max/dev: 343.450 / 347.888 / 350.680 / 3.173
Bandwidth in kbytes/sec: sent=0.159, rcvd=0.119

C:\Users\49323\Desktop\hrping>hrping ikoula.testdebit.info
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=9060
Pinging ikoula.testdebit.info [213.246.63.45]
with 32 bytes data (60 bytes IP):

From 213.246.63.45: bytes=60 seq=0001 TTL=42 ID=125f time=355.402ms
From 213.246.63.45: bytes=60 seq=0002 TTL=42 ID=1277 time=343.161ms
From 213.246.63.45: bytes=60 seq=0003 TTL=42 ID=129b time=348.713ms
From 213.246.63.45: bytes=60 seq=0004 TTL=42 ID=12a1 time=349.426ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.850562 sec
RTTs in ms: min/avg/max/dev: 343.161 / 349.175 / 355.402 / 4.336
Bandwidth in kbytes/sec: sent=0.129, rcvd=0.129

```

5 st2.nn.ertelecom.ru

```

C:\Users\49323\Desktop\hrping>hrping st2.nn.ertelecom.ru
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=c860
Pinging st2.nn.ertelecom.ru [91.144.184.232]
with 32 bytes data (60 bytes IP):

From 91.144.184.232: bytes=60 seq=0001 TTL=47 ID=592e time=320.375ms
From 91.144.184.232: bytes=60 seq=0002 TTL=47 ID=598e time=314.543ms
Timeout waiting for seq=0003
Timeout waiting for seq=0004

Packets: sent=4, rcvd=2, error=0, lost=2 (50.0% loss) in 1.501117 sec
RTTs in ms: min/avg/max/dev: 314.543 / 317.459 / 320.375 / 2.916
Bandwidth in kbytes/sec: sent=0.159, rcvd=0.079

C:\Users\49323\Desktop\hrping>hrping st2.nn.ertelecom.ru
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=b04c
Pinging st2.nn.ertelecom.ru [91.144.184.232]
with 32 bytes data (60 bytes IP):

From 91.144.184.232: bytes=60 seq=0001 TTL=47 ID=5c49 time=309.799ms
From 91.144.184.232: bytes=60 seq=0002 TTL=47 ID=5c6f time=315.616ms
From 91.144.184.232: bytes=60 seq=0003 TTL=47 ID=5c89 time=309.437ms
From 91.144.184.232: bytes=60 seq=0004 TTL=47 ID=5c92 time=305.528ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.806382 sec
RTTs in ms: min/avg/max/dev: 305.528 / 310.095 / 315.616 / 3.600
Bandwidth in kbytes/sec: sent=0.132, rcvd=0.132

C:\Users\49323\Desktop\hrping>hrping st2.nn.ertelecom.ru
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=745f
Pinging st2.nn.ertelecom.ru [91.144.184.232]
with 32 bytes data (60 bytes IP):

From 91.144.184.232: bytes=60 seq=0001 TTL=47 ID=5ddc time=312.351ms
From 91.144.184.232: bytes=60 seq=0003 TTL=47 ID=5e53 time=311.202ms
From 91.144.184.232: bytes=60 seq=0004 TTL=47 ID=5e8e time=299.915ms
Timeout waiting for seq=0002

Packets: sent=4, rcvd=3, error=0, lost=1 (25.0% loss) in 1.800394 sec
RTTs in ms: min/avg/max/dev: 299.915 / 307.822 / 312.351 / 5.611
Bandwidth in kbytes/sec: sent=0.133, rcvd=0.099

```


6 iperf.biznetnetworks.com

```
C:\Users\49323\Desktop\hrping>hrping iperf.biznetnetworks.com
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=0c4f
Pinging iperf.biznetnetworks.com [117.102.109.186]
with 32 bytes data (60 bytes IP):

From 117.102.109.186: bytes=60 seq=0001 TTL=42 ID=05c3 time=231.294ms
From 117.102.109.186: bytes=60 seq=0002 TTL=42 ID=05c4 time=237.805ms
From 117.102.109.186: bytes=60 seq=0003 TTL=42 ID=05c5 time=228.986ms
From 117.102.109.186: bytes=60 seq=0004 TTL=42 ID=05c6 time=232.578ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.733747 sec
RTTs in ms: min/avg/max/dev: 228.986 / 232.665 / 237.805 / 3.234
Bandwidth in kbytes/sec: sent=0.138, rcvd=0.138

C:\Users\49323\Desktop\hrping>hrping iperf.biznetnetworks.com
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=844b
Pinging iperf.biznetnetworks.com [117.102.109.186]
with 32 bytes data (60 bytes IP):

From 117.102.109.186: bytes=60 seq=0001 TTL=42 ID=05c7 time=232.302ms
From 117.102.109.186: bytes=60 seq=0002 TTL=42 ID=05c8 time=233.450ms
From 117.102.109.186: bytes=60 seq=0003 TTL=42 ID=05c9 time=229.467ms
From 117.102.109.186: bytes=60 seq=0004 TTL=42 ID=05ca time=230.916ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.731973 sec
RTTs in ms: min/avg/max/dev: 229.467 / 231.533 / 233.450 / 1.492
Bandwidth in kbytes/sec: sent=0.138, rcvd=0.138

C:\Users\49323\Desktop\hrping>hrping iperf.biznetnetworks.com
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=5c63
Pinging iperf.biznetnetworks.com [117.102.109.186]
with 32 bytes data (60 bytes IP):

From 117.102.109.186: bytes=60 seq=0001 TTL=42 ID=05cb time=241.192ms
From 117.102.109.186: bytes=60 seq=0002 TTL=42 ID=05cc time=233.676ms
From 117.102.109.186: bytes=60 seq=0003 TTL=42 ID=05cd time=230.841ms
From 117.102.109.186: bytes=60 seq=0004 TTL=42 ID=05ce time=229.037ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.729083 sec
RTTs in ms: min/avg/max/dev: 229.037 / 233.686 / 241.192 / 4.638
Bandwidth in kbytes/sec: sent=0.138, rcvd=0.138
```

7 iperf.scottlinux.com


```

C:\Users\49323\Desktop\hrping>hrping iperf.scottlinux.com
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfes.de

Source address is 192.168.0.103; using ICMP echo-request, ID=385e
Pinging iperf.scottlinux.com [45.33.39.39]
with 32 bytes data (60 bytes IP):

From 45.33.39.39: bytes=60 seq=0001 TTL=48 ID=e9aa time=196.523ms
From 45.33.39.39: bytes=60 seq=0002 TTL=48 ID=e9f3 time=220.757ms
From 45.33.39.39: bytes=60 seq=0003 TTL=48 ID=ea59 time=187.409ms
From 45.33.39.39: bytes=60 seq=0004 TTL=48 ID=eae5 time=208.160ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.708640 sec
RTTs in ms: min/avg/max/dev: 187.409 / 203.212 / 220.757 / 12.517
Bandwidth in kbytes/sec: sent=0.140, rcvd=0.140

C:\Users\49323\Desktop\hrping>hrping iperf.scottlinux.com
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfes.de

Source address is 192.168.0.103; using ICMP echo-request, ID=8c57
Pinging iperf.scottlinux.com [45.33.39.39]
with 32 bytes data (60 bytes IP):

From 45.33.39.39: bytes=60 seq=0001 TTL=48 ID=ec03 time=193.211ms
From 45.33.39.39: bytes=60 SEQ=0003 TTL=48 ID=ec72 time=215.434ms
Timeout waiting for seq=0002
Timeout waiting for seq=0004

Packets: sent=4, rcvd=2, error=0, lost=2 (50.0% loss) in 1.500803 sec
RTTs in ms: min/avg/max/dev: 193.211 / 204.322 / 215.434 / 11.111
Bandwidth in kbytes/sec: sent=0.159, rcvd=0.079

C:\Users\49323\Desktop\hrping>hrping iperf.scottlinux.com
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfes.de

Source address is 192.168.0.103; using ICMP echo-request, ID=2846
Pinging iperf.scottlinux.com [45.33.39.39]
with 32 bytes data (60 bytes IP):

From 45.33.39.39: bytes=60 seq=0001 TTL=48 ID=f027 time=198.932ms
From 45.33.39.39: bytes=60 SEQ=0003 TTL=48 ID=f0c6 time=220.638ms
From 45.33.39.39: bytes=60 seq=0004 TTL=48 ID=f15a time=219.986ms
Timeout waiting for seq=0002

Packets: sent=4, rcvd=3, error=0, lost=1 (25.0% loss) in 1.720440 sec
RTTs in ms: min/avg/max/dev: 198.932 / 213.185 / 220.638 / 10.082
Bandwidth in kbytes/sec: sent=0.139, rcvd=0.104

```

```

C:\Users\49323\Desktop\hrping>hrping speedtest.serverius.net
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=e057
Pinging speedtest.serverius.net [178.21.16.76]
with 32 bytes data (60 bytes IP):

From 178.21.16.76: bytes=60 seq=0001 TTL=43 ID=cc62 time=300.058ms
From 178.21.16.76: bytes=60 seq=0002 TTL=43 ID=cccd time=278.065ms
From 178.21.16.76: bytes=60 seq=0003 TTL=43 ID=cd1e time=276.280ms
From 178.21.16.76: bytes=60 seq=0004 TTL=43 ID=cdce time=276.887ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.777558 sec
RTTs in ms: min/avg/max/dev: 276.280 / 282.822 / 300.058 / 9.971
Bandwidth in kbytes/sec: sent=0.135, rcvd=0.135

C:\Users\49323\Desktop\hrping>hrping speedtest.serverius.net
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=2855
Pinging speedtest.serverius.net [178.21.16.76]
with 32 bytes data (60 bytes IP):

From 178.21.16.76: bytes=60 seq=0001 TTL=43 ID=ce25 time=278.004ms
From 178.21.16.76: bytes=60 seq=0002 TTL=43 ID=cfe3 time=276.847ms
From 178.21.16.76: bytes=60 seq=0003 TTL=43 ID=d190 time=285.647ms
From 178.21.16.76: bytes=60 seq=0004 TTL=43 ID=d2ad time=274.950ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.775919 sec
RTTs in ms: min/avg/max/dev: 274.950 / 278.862 / 285.647 / 4.066
Bandwidth in kbytes/sec: sent=0.135, rcvd=0.135

C:\Users\49323\Desktop\hrping>hrping speedtest.serverius.net
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=3455
Pinging speedtest.serverius.net [178.21.16.76]
with 32 bytes data (60 bytes IP):

From 178.21.16.76: bytes=60 seq=0001 TTL=43 ID=d7f4 time=276.294ms
From 178.21.16.76: bytes=60 seq=0002 TTL=43 ID=d9a2 time=307.150ms
From 178.21.16.76: bytes=60 seq=0003 TTL=43 ID=da9d time=274.586ms
From 178.21.16.76: bytes=60 seq=0004 TTL=43 ID=dc49 time=288.906ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.789751 sec
RTTs in ms: min/avg/max/dev: 274.586 / 286.734 / 307.150 / 13.020
Bandwidth in kbytes/sec: sent=0.134, rcvd=0.134

```

9 iperf.volia.net

```

C:\Users\49323\Desktop\hrping>hrping iperf.volia.net
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=b85d
Pinging iperf.volia.net [77.120.3.236]
with 32 bytes data (60 bytes IP):

From 77.120.3.236: bytes=60 seq=0001 TTL=47 ID=ac4e time=279.150ms
From 77.120.3.236: bytes=60 seq=0002 TTL=47 ID=acb4 time=266.517ms
From 77.120.3.236: bytes=60 seq=0003 TTL=47 ID=ad21 time=293.673ms
From 77.120.3.236: bytes=60 seq=0004 TTL=47 ID=ad7b time=264.139ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.764339 sec
RTTs in ms: min/avg/max/dev: 264.139 / 275.869 / 293.673 / 11.755
Bandwidth in kbytes/sec: sent=0.136, rcvd=0.136

C:\Users\49323\Desktop\hrping>hrping iperf.volia.net
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=140f
Pinging iperf.volia.net [77.120.3.236]
with 32 bytes data (60 bytes IP):

From 77.120.3.236: bytes=60 seq=0001 TTL=47 ID=adde time=265.978ms
From 77.120.3.236: bytes=60 seq=0002 TTL=47 ID=ae28 time=283.206ms
From 77.120.3.236: bytes=60 seq=0003 TTL=47 ID=ae6b time=291.213ms
From 77.120.3.236: bytes=60 seq=0004 TTL=47 ID=aea0 time=255.373ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.756208 sec
RTTs in ms: min/avg/max/dev: 255.373 / 273.942 / 291.213 / 14.074
Bandwidth in kbytes/sec: sent=0.136, rcvd=0.136

C:\Users\49323\Desktop\hrping>hrping iperf.volia.net
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=305f
Pinging iperf.volia.net [77.120.3.236]
with 32 bytes data (60 bytes IP):

From 77.120.3.236: bytes=60 seq=0001 TTL=47 ID=aea3 time=295.947ms
From 77.120.3.236: bytes=60 seq=0002 TTL=47 ID=af08 time=268.695ms
From 77.120.3.236: bytes=60 seq=0003 TTL=47 ID=af25 time=257.659ms
From 77.120.3.236: bytes=60 seq=0004 TTL=47 ID=af5f time=256.314ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.757197 sec
RTTs in ms: min/avg/max/dev: 256.314 / 269.653 / 295.947 / 15.922
Bandwidth in kbytes/sec: sent=0.136, rcvd=0.136

```

10.ipperf.eenet.ee

```
C:\Users\49323\Desktop\hrping>hrping ipperf.eenet.ee
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=d438
Pinging ipperf.eenet.ee [193.40.55.7]
with 32 bytes data (60 bytes IP):

From 193.40.55.7: bytes=60 seq=0001 TTL=39 ID=3532 time=297.393ms
From 193.40.55.7: bytes=60 seq=0002 TTL=39 ID=354d time=301.692ms
From 193.40.55.7: bytes=60 seq=0003 TTL=39 ID=3575 time=301.664ms
From 193.40.55.7: bytes=60 seq=0004 TTL=39 ID=3598 time=302.912ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.803227 sec
RTTs in ms: min/avg/max/dev: 297.393 / 300.915 / 302.912 / 2.095
Bandwidth in kbytes/sec: sent=0.133, rcvd=0.133
```

```
C:\Users\49323\Desktop\hrping>hrping ipperf.eenet.ee
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=4889
Pinging ipperf.eenet.ee [193.40.55.7]
with 32 bytes data (60 bytes IP):

From 193.40.55.7: bytes=60 seq=0001 TTL=39 ID=39fa time=306.953ms
From 193.40.55.7: bytes=60 seq=0002 TTL=39 ID=3a04 time=303.087ms
From 193.40.55.7: bytes=60 seq=0003 TTL=39 ID=3a20 time=303.005ms
From 193.40.55.7: bytes=60 seq=0004 TTL=39 ID=3a38 time=305.980ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.807082 sec
RTTs in ms: min/avg/max/dev: 303.005 / 304.756 / 306.953 / 1.744
Bandwidth in kbytes/sec: sent=0.132, rcvd=0.132
```

```
C:\Users\49323\Desktop\hrping>hrping ipperf.eenet.ee
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=3478
Pinging ipperf.eenet.ee [193.40.55.7]
with 32 bytes data (60 bytes IP):

From 193.40.55.7: bytes=60 seq=0001 TTL=39 ID=3e0c time=303.334ms
From 193.40.55.7: bytes=60 seq=0002 TTL=39 ID=3e1c time=314.147ms
From 193.40.55.7: bytes=60 seq=0003 TTL=39 ID=3e45 time=301.781ms
From 193.40.55.7: bytes=60 seq=0004 TTL=39 ID=3e70 time=302.410ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.802486 sec
RTTs in ms: min/avg/max/dev: 301.781 / 305.418 / 314.147 / 5.069
Bandwidth in kbytes/sec: sent=0.133, rcvd=0.133
```

Section 3.2

New Test result

1 ipperf.he.net

```
C:\Users\49323\Desktop\hrping>hrping ipperf.he.net
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=0c64
Pinging ipperf.he.net [216.218.207.42]
with 32 bytes data (60 bytes IP):

From 216.218.207.42: bytes=60 seq=0001 TTL=48 ID=cfc3 time=221.877ms
From 216.218.207.42: bytes=60 seq=0002 TTL=48 ID=d013 time=200.851ms
From 216.218.207.42: bytes=60 seq=0003 TTL=48 ID=d018 time=197.032ms
From 216.218.207.42: bytes=60 seq=0004 TTL=48 ID=d079 time=197.744ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.698852 sec
RTTs in ms: min/avg/max/dev: 197.032 / 204.376 / 221.877 / 10.205
Bandwidth in kbytes/sec: sent=0.141, rcvd=0.141
```

2 bouygues.testdebit.info

```
C:\Users\49323\Desktop\hrping>hrping bouygues.testdebit.info
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=f46d
Pinging bouygues.testdebit.info [89.84.1.222]
with 32 bytes data (60 bytes IP):

From 89.84.1.222: bytes=60 seq=0001 TTL=41 ID=ae0c time=322.636ms
From 89.84.1.222: bytes=60 seq=0002 TTL=41 ID=af3b time=269.327ms
From 89.84.1.222: bytes=60 seq=0003 TTL=41 ID=af9b time=267.191ms
Timeout waiting for seq=0004

Packets: sent=4, rcvd=3, error=0, lost=1 (25.0% loss) in 1.500682 sec
RTTs in ms: min/avg/max/dev: 267.191 / 286.384 / 322.636 / 25.648
Bandwidth in kbytes/sec: sent=0.159, rcvd=0.119
```

3 ipperf.comneonext.de

```
C:\Users\49323\Desktop\hrping>hrping iperf.comneonext.de
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=7467
Pinging iperf.comneonext.de [91.195.241.136]
with 32 bytes data (60 bytes IP):

From 91.195.241.136: bytes=60 seq=0001 TTL=43 ID=fcae time=278.798ms
From 91.195.241.136: bytes=60 seq=0002 TTL=43 ID=97e4 time=285.503ms
From 91.195.241.136: bytes=60 seq=0003 TTL=43 ID=092a time=283.493ms
From 91.195.241.136: bytes=60 seq=0004 TTL=43 ID=4ce7 time=310.155ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.811542 sec
RTTs in ms: min/avg/max/dev: 278.798 / 289.487 / 310.155 / 12.178
Bandwidth in kbytes/sec: sent=0.132, rcvd=0.132
```

4 ikoula.testdebit.info

```
C:\Users\49323\Desktop\hrping>hrping ikoula.testdebit.info
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=e061
Pinging ikoula.testdebit.info [213.246.63.45]
with 32 bytes data (60 bytes IP):

From 213.246.63.45: bytes=60 seq=0001 TTL=42 ID=ea9d time=338.922ms
From 213.246.63.45: bytes=60 seq=0002 TTL=42 ID=ead6 time=331.137ms
From 213.246.63.45: bytes=60 seq=0003 TTL=42 ID=eb14 time=351.225ms
From 213.246.63.45: bytes=60 seq=0004 TTL=42 ID=eb31 time=334.929ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.835779 sec
RTTs in ms: min/avg/max/dev: 331.137 / 339.053 / 351.225 / 7.547
Bandwidth in kbytes/sec: sent=0.130, rcvd=0.130
```

5 st2.nn.ertelecom.ru

```
C:\Users\49323\Desktop\hrping>hrping st2.nn.ertelecom.ru
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=e06e
Pinging st2.nn.ertelecom.ru [91.144.184.232]
with 32 bytes data (60 bytes IP):

From 91.144.184.232: bytes=60 seq=0001 TTL=47 ID=a5f7 time=289.250ms
From 91.144.184.232: bytes=60 seq=0002 TTL=47 ID=a671 time=314.801ms
From 91.144.184.232: bytes=60 seq=0003 TTL=47 ID=a6b2 time=284.123ms
From 91.144.184.232: bytes=60 seq=0004 TTL=47 ID=a6b9 time=289.367ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.790555 sec
RTTs in ms: min/avg/max/dev: 284.123 / 294.385 / 314.801 / 11.975
Bandwidth in kbytes/sec: sent=0.134, rcvd=0.134
```

6 iperf.biznetnetworks.com

```
C:\Users\49323\Desktop\hrping>hrping iperf.biznetnetworks.com
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=3468
Pinging iperf.biznetnetworks.com [117.102.109.186]
with 32 bytes data (60 bytes IP):

From 117.102.109.186: bytes=60 seq=0001 TTL=42 ID=060b time=231.823ms
From 117.102.109.186: bytes=60 seq=0002 TTL=42 ID=060c time=229.084ms
From 117.102.109.186: bytes=60 seq=0003 TTL=42 ID=060d time=263.233ms
From 117.102.109.186: bytes=60 seq=0004 TTL=42 ID=060e time=228.234ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.728897 sec
RTTs in ms: min/avg/max/dev: 228.234 / 238.093 / 263.233 / 14.574
Bandwidth in kbytes/sec: sent=0.138, rcvd=0.138
```

7 iperf.scottlinux.com

```
C:\Users\49323\Desktop\hrping>hrping iperf.scottlinux.com
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=8c77
Pinging iperf.scottlinux.com [45.33.39.39]
with 32 bytes data (60 bytes IP):

From 45.33.39.39: bytes=60 seq=0002 TTL=48 ID=77d3 time=187.964ms
From 45.33.39.39: bytes=60 seq=0003 TTL=48 ID=7869 time=192.516ms
From 45.33.39.39: bytes=60 seq=0004 TTL=48 ID=78fe time=205.030ms
Timeout waiting for seq=0001

Packets: sent=4, rcvd=3, error=0, lost=1 (25.0% loss) in 1.706481 sec
RTTs in ms: min/avg/max/dev: 187.964 / 195.170 / 205.030 / 7.215
Bandwidth in kbytes/sec: sent=0.140, rcvd=0.105
```

8 speedtest.serverius.net

```
C:\Users\49323\Desktop\hrping>hrping speedtest.serverius.net
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=b475
Pinging speedtest.serverius.net [178.21.16.76]
with 32 bytes data (60 bytes IP):

From 178.21.16.76: bytes=60 seq=0001 TTL=43 ID=cf2e time=280.931ms
From 178.21.16.76: bytes=60 seq=0002 TTL=43 ID=cf6c time=304.940ms
From 178.21.16.76: bytes=60 seq=0003 TTL=43 ID=d133 time=275.803ms
From 178.21.16.76: bytes=60 seq=0004 TTL=43 ID=d1fd time=273.774ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.774088 sec
RTTs in ms: min/avg/max/dev: 273.774 / 283.862 / 304.940 / 12.445
Bandwidth in kbytes/sec: sent=0.135, rcvd=0.135
```

9 iperf.volia.net

```
C:\Users\49323\Desktop\hrping>hrping iperf.volia.net
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=6077
Pinging iperf.volia.net [77.120.3.236]
with 32 bytes data (60 bytes IP):

From 77.120.3.236: bytes=60 seq=0001 TTL=47 ID=9817 time=336.265ms
From 77.120.3.236: bytes=60 seq=0002 TTL=47 ID=9875 time=264.036ms
From 77.120.3.236: bytes=60 seq=0003 TTL=47 ID=98df time=259.301ms
From 77.120.3.236: bytes=60 seq=0004 TTL=47 ID=9950 time=261.879ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.762601 sec
RTTs in ms: min/avg/max/dev: 259.301 / 280.370 / 336.265 / 32.314
Bandwidth in kbytes/sec: sent=0.136, rcvd=0.136
```

10 iperf.eenet.ee

```
C:\Users\49323\Desktop\hrping>hrping iperf.eenet.ee
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=64ad
Pinging iperf.eenet.ee [193.40.55.7]
with 32 bytes data (60 bytes IP):

From 193.40.55.7: bytes=60 seq=0001 TTL=43 ID=796e time=320.853ms
From 193.40.55.7: bytes=60 seq=0002 TTL=43 ID=7997 time=324.233ms
From 193.40.55.7: bytes=60 seq=0003 TTL=43 ID=79ae time=340.275ms
From 193.40.55.7: bytes=60 seq=0004 TTL=43 ID=79cf time=319.321ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.820539 sec
RTTs in ms: min/avg/max/dev: 319.321 / 326.170 / 340.275 / 8.334
Bandwidth in kbytes/sec: sent=0.131, rcvd=0.131
```

Section 4

1.iperf.he.net

Connection timeout for all tried ports

2.bouygues.testdebit.info

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c bouygues.testdebit.info -p 80
-----
Client connecting to bouygues.testdebit.info, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61194 connected with 89.84.1.222 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.1 sec  5.75 MBytes  4.80 Mbits/sec
```

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c bouygues.testdebit.info -p 80
-----
Client connecting to bouygues.testdebit.info, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61147 connected with 89.84.1.222 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.3 sec  5.62 MBytes  4.60 Mbits/sec
```

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c bouygues.testdebit.info -p 80
-----
Client connecting to bouygues.testdebit.info, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61157 connected with 89.84.1.222 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.0 sec  5.75 MBytes  4.82 Mbits/sec
```

3.iperf.comneonext.de

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.comneonext.de -p 80
-----
Client connecting to iperf.comneonext.de, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61320 connected with 91.195.241.136 port 80
write failed: Broken pipe
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0- 0.6 sec   256 KBytes  3.74 Mbits/sec
```

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.comneonext.de -p 80
-----
Client connecting to iperf.comneonext.de, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61348 connected with 91.195.241.136 port 80
write failed: Broken pipe
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0- 0.6 sec   256 KBytes  3.81 Mbits/sec
```

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.comneonext.de -p 80
-----
Client connecting to iperf.comneonext.de, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61347 connected with 91.195.241.136 port 80
write failed: Broken pipe
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0- 0.5 sec   256 KBytes  3.83 Mbits/sec
```

4.ikoula.testdebit.info

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c ikoula.testdebit.info -p 80
-----
Client connecting to ikoula.testdebit.info, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61414 connected with 213.246.63.45 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.1 sec   4.38 MBytes  3.63 Mbits/sec
```

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c ikoula.testdebit.info -p 80
-----
Client connecting to ikoula.testdebit.info, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61424 connected with 213.246.63.45 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.2 sec   5.12 MBytes  4.19 Mbits/sec
```

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c ikoula.testdebit.info -p 80
-----
Client connecting to ikoula.testdebit.info, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61425 connected with 213.246.63.45 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.0 sec   4.62 MBytes  3.87 Mbits/sec
```

5.st2.nn.ertelecom.ru


```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c st2.nn.ertelecom.ru
-----
Client connecting to st2.nn.ertelecom.ru, TCP port 5001
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61475 connected with 91.144.184.232 port 5001
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.1 sec  5.50 MBytes  4.57 Mbits/sec
```

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c st2.nn.ertelecom.ru
-----
Client connecting to st2.nn.ertelecom.ru, TCP port 5001
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61483 connected with 91.144.184.232 port 5001
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.1 sec  5.38 MBytes  4.48 Mbits/sec
```

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c st2.nn.ertelecom.ru
-----
Client connecting to st2.nn.ertelecom.ru, TCP port 5001
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61486 connected with 91.144.184.232 port 5001
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.2 sec  5.38 MBytes  4.40 Mbits/sec
```

6.iperf.biznetnetworks.com

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.biznetnetworks.com -p 80
-----
Client connecting to iperf.biznetnetworks.com, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61549 connected with 117.102.109.186 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.0 sec  6.50 MBytes  5.43 Mbits/sec
```

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.biznetnetworks.com -p 80
-----
Client connecting to iperf.biznetnetworks.com, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61561 connected with 117.102.109.186 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.2 sec  6.75 MBytes  5.55 Mbits/sec
```

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.biznetnetworks.com -p 80
-----
Client connecting to iperf.biznetnetworks.com, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61569 connected with 117.102.109.186 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.1 sec  6.50 MBytes  5.39 Mbits/sec
```

7.iperf.scottlinux.com

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.scottlinux.com -p 80
-----
Client connecting to iperf.scottlinux.com, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61642 connected with 45.33.39.39 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.1 sec  7.62 MBytes  6.36 Mbits/sec
```

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.scottlinux.com -p 80
-----
Client connecting to iperf.scottlinux.com, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61661 connected with 45.33.39.39 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.2 sec  2.62 MBytes 2.16 Mbits/sec
```

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.scottlinux.com -p 80
-----
Client connecting to iperf.scottlinux.com, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61662 connected with 45.33.39.39 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.1 sec  7.12 MBytes 5.94 Mbits/sec
```

8.speedtest.serverius.net

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c speedtest.serverius.net -p 5002
-----
Client connecting to speedtest.serverius.net, TCP port 5002
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61755 connected with 178.21.16.76 port 5002
write failed: Connection reset by peer
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-53.4 sec  256 KBytes 39.3 Kbits/sec
```

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c speedtest.serverius.net -p 5002
-----
Client connecting to speedtest.serverius.net, TCP port 5002
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61775 connected with 178.21.16.76 port 5002
write failed: Connection reset by peer
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-51.7 sec  256 KBytes 40.5 Kbits/sec
```

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c speedtest.serverius.net -p 5002
-----
Client connecting to speedtest.serverius.net, TCP port 5002
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61793 connected with 178.21.16.76 port 5002
write failed: Connection reset by peer
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-54.3 sec  256 KBytes 38.6 Kbits/sec
```

9.iperf.volia.net

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.volia.net -p 80
-----
Client connecting to iperf.volia.net, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 61909 connected with 77.120.3.236 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.1 sec  6.00 MBytes 4.98 Mbits/sec
```



```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.volia.net -p 80
```

```
-----  
Client connecting to iperf.volia.net, TCP port 80  
TCP window size: 208 KByte (default)  
-----
```

```
[ 3] local 192.168.0.103 port 61899 connected with 77.120.3.236 port 80  
[ ID] Interval      Transfer    Bandwidth  
[ 3] 0.0-10.1 sec   6.25 MBytes 5.21 Mbits/sec
```

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.volia.net -p 80
```

```
-----  
Client connecting to iperf.volia.net, TCP port 80  
TCP window size: 208 KByte (default)  
-----
```

```
[ 3] local 192.168.0.103 port 61879 connected with 77.120.3.236 port 80  
[ ID] Interval      Transfer    Bandwidth  
[ 3] 0.0-10.3 sec   5.88 MBytes 4.81 Mbits/sec
```

10.iperf.eenet.ee

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>tracert -dwl iperf.eenet.ee
```

```
Tracing route to iperf.eenet.ee [193.40.55.7]  
over a maximum of 30 hops:
```

1	3 ms	2 ms	5 ms	192.168.0.1
2	3 ms	4 ms	2 ms	192.168.1.1
3	13 ms	6 ms	17 ms	10.148.0.1
4	9 ms	6 ms	5 ms	111.8.31.205
5	104 ms	7 ms	6 ms	111.8.30.37
6	122 ms	8 ms	7 ms	221.183.26.213
7	35 ms	30 ms	145 ms	221.176.17.182
8	27 ms	135 ms	33 ms	221.176.22.106
9	34 ms	29 ms	35 ms	221.176.19.242
10	30 ms	31 ms	*	221.183.55.53
11	227 ms	247 ms	228 ms	223.120.15.229
12	224 ms	229 ms	224 ms	223.120.10.154
13	280 ms	287 ms	277 ms	62.115.47.44
14	304 ms	*	300 ms	62.115.114.90
15	304 ms	306 ms	301 ms	62.115.138.104
16	300 ms	310 ms	295 ms	62.115.134.241
17	301 ms	*	306 ms	62.115.151.17
18	291 ms	*	297 ms	193.40.133.6
19	*	*	309 ms	193.40.132.162
20	305 ms	*	304 ms	193.40.55.7

Trace complete.

```
C:\Users\49323\Desktop\hrping>hrping iperf.eenet.ee  
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de
```

```
Source address is 192.168.0.103; using ICMP echo-request, ID=d438  
Pinging iperf.eenet.ee [193.40.55.7]  
with 32 bytes data (60 bytes IP):
```

```
From 193.40.55.7: bytes=60 seq=0001 TTL=39 ID=3532 time=297.393ms  
From 193.40.55.7: bytes=60 seq=0002 TTL=39 ID=354d time=301.692ms  
From 193.40.55.7: bytes=60 seq=0003 TTL=39 ID=3575 time=301.664ms  
From 193.40.55.7: bytes=60 seq=0004 TTL=39 ID=3598 time=302.912ms
```

```
Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.803227 sec  
RTTs in ms: min/avg/max/dev: 297.393 / 300.915 / 302.912 / 2.095  
Bandwidth in kbytes/sec: sent=0.133, rcvd=0.133
```

```
C:\Users\49323\Desktop\hrping>hrping iperf.eenet.ee  
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de
```

```
Source address is 192.168.0.103; using ICMP echo-request, ID=4889  
Pinging iperf.eenet.ee [193.40.55.7]  
with 32 bytes data (60 bytes IP):
```

```
From 193.40.55.7: bytes=60 seq=0001 TTL=39 ID=39fa time=306.953ms  
From 193.40.55.7: bytes=60 seq=0002 TTL=39 ID=3a04 time=303.087ms  
From 193.40.55.7: bytes=60 seq=0003 TTL=39 ID=3a20 time=303.005ms  
From 193.40.55.7: bytes=60 seq=0004 TTL=39 ID=3a38 time=305.980ms
```

```
Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.807082 sec  
RTTs in ms: min/avg/max/dev: 303.005 / 304.756 / 306.953 / 1.744  
Bandwidth in kbytes/sec: sent=0.132, rcvd=0.132
```

```
C:\Users\49323\Desktop\hrping>hrping iperf.eenet.ee
This is hrPING v5.07.1148 by cFos Software GmbH -- http://www.cfos.de

Source address is 192.168.0.103; using ICMP echo-request, ID=3478
Pinging iperf.eenet.ee [193.40.55.7]
with 32 bytes data (60 bytes IP):

From 193.40.55.7: bytes=60 seq=0001 TTL=39 ID=3e0c time=303.334ms
From 193.40.55.7: bytes=60 seq=0002 TTL=39 ID=3e1c time=314.147ms
From 193.40.55.7: bytes=60 seq=0003 TTL=39 ID=3e45 time=301.781ms
From 193.40.55.7: bytes=60 seq=0004 TTL=39 ID=3e70 time=302.410ms

Packets: sent=4, rcvd=4, error=0, lost=0 (0.0% loss) in 1.802486 sec
RTTs in ms: min/avg/max/dev: 301.781 / 305.418 / 314.147 / 5.069
Bandwidth in kbytes/sec: sent=0.133, rcvd=0.133
```

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.eenet.ee -p 80
```

```
-----
Client connecting to iperf.eenet.ee, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 59806 connected with 193.40.55.7 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.3 sec  5.50 MBytes 4.48 Mbits/sec
```

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.eenet.ee -p 80
```

```
-----
Client connecting to iperf.eenet.ee, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 59810 connected with 193.40.55.7 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.1 sec  5.38 MBytes 4.45 Mbits/sec
```

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.eenet.ee -p 80
```

```
-----
Client connecting to iperf.eenet.ee, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 59811 connected with 193.40.55.7 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.0 sec  5.12 MBytes 4.30 Mbits/sec
```

Section 4.2

Testing of Website in China:

1. www.163.com

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c www.163.com -p 80
```

```
-----
Client connecting to www.163.com, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 64997 connected with 120.220.42.86 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.1 sec  11.2 MBytes 9.33 Mbits/sec
```

2. www.qq.com

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c www.qq.com -p 80
```

```
-----
Client connecting to www.qq.com, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 64841 connected with 111.30.144.71 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.0 sec  11.4 MBytes 9.52 Mbits/sec
```

3. www.canyun.com

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c www.caiyun.com -p 80
-----
Client connecting to www.caiyun.com, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 64497 connected with 139.129.18.73 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.0 sec  11.4 MBytes  9.54 Mbits/sec
```

4. www.taobao.com

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c www.taobao.com -p 80
-----
Client connecting to www.taobao.com, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 64492 connected with 183.201.229.108 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.1 sec  11.5 MBytes  9.58 Mbits/sec
```

5. www.baidu.com

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c www.baidu.com -p 80
-----
Client connecting to www.baidu.com, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 64486 connected with 39.156.66.14 port 80
write failed: Broken pipe
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0- 1.5 sec  1.75 MBytes  9.94 Mbits/sec
```

6. www.bilibili.com

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c www.bilibili.com -p 80
-----
Client connecting to www.bilibili.com, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 64480 connected with 119.3.238.64 port 80
write failed: Broken pipe
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0- 0.1 sec   256 KBytes  21.9 Mbits/sec
```

New Bandwidth testing under network congestion

1.iperf.he.net

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.he.net
connect failed: Connection refused

C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.he.net -p 80
connect failed: Connection timed out
```

2.bouygues.testdebit.info

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c bouygues.testdebit.info -p 80
-----
Client connecting to bouygues.testdebit.info, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 49615 connected with 89.84.1.222 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.1 sec  1.25 MBytes  1.04 Mbits/sec
```

3.iperf.comneonext.de

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.comneonext.de -p 80
-----
Client connecting to iperf.comneonext.de, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 49649 connected with 91.195.241.136 port 80
write failed: Broken pipe
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-0.6 sec    256 KBytes  3.43 Mbits/sec
```

4.ikoula.testdebit.info

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c ikoula.testdebit.info -p 80
-----
Client connecting to ikoula.testdebit.info, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 49658 connected with 213.246.63.45 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.1 sec   1.00 MBytes  827 Kbits/sec
```

5.st2.nn.ertelecom.ru

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c st2.nn.ertelecom.ru -p 5001
-----
Client connecting to st2.nn.ertelecom.ru, TCP port 5001
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 49673 connected with 91.144.184.232 port 5001
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.0 sec   4.62 MBytes  3.86 Mbits/sec
```

6.iperf.biznetnetworks.com

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.biznetnetworks.com -p 80
-----
Client connecting to iperf.biznetnetworks.com, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 49686 connected with 117.102.109.186 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.2 sec   5.38 MBytes  4.44 Mbits/sec
```

7.iperf.scottlinux.com

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.scottlinux.com -p 80
-----
Client connecting to iperf.scottlinux.com, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 49694 connected with 45.33.39.39 port 80
write failed: Broken pipe
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-20.8 sec   768 KBytes  302 Kbits/sec
```

8.speedtest.serverius.net

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c speedtest.serverius.net
-----
Client connecting to speedtest.serverius.net, TCP port 5001
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 49710 connected with 178.21.16.76 port 5001
write failed: Connection reset by peer
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-58.9 sec   256 KBytes  35.6 Kbits/sec
```

9.iperf.volia.net

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.volia.net -p 80
-----
Client connecting to iperf.volia.net, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 57741 connected with 77.120.3.236 port 80
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.1 sec   896 KBytes  726 Kbits/sec
```

10.iperf.eenet.ee

```
C:\Users\49323\Desktop\iperf-3.1.3-win64\iperf-2.0.9-win64>iperf -c iperf.eenet.ee -p 80
-----
Client connecting to iperf.eenet.ee, TCP port 80
TCP window size: 208 KByte (default)
-----
[ 3] local 192.168.0.103 port 57746 connected with 193.40.55.7 port 80
write failed: Broken pipe
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-33.7 sec   1.38 MBytes  343 Kbits/sec
```