

@Mittenz,

Personal opinion, (TLDR discard the rest) you don't have a packet loss problem.

Personal opinion, you do have a Pingplotter problem. Carry on with the following paragraphs.

Pingplotter can and will give you false packet loss indications. I've seen this with a Hitron 4582 (Intel Puma 7) modem, seen a complaint with an XBX6 modem and can reproduce this at will with a GT-AX6000 router a Bell Gigahub (Sagemcon Fast 5687E) fibre modem in its default (and permanent) gateway mode.

What you need to do at this point is convince yourself that you don't have any packet loss from the router, modem or CMTS. That's a matter of running ping tests without using Pingplotter.

Its been a while since I've looked at this but my advice is to run these tests with the modem in both Gateway modem and Bridge mode, and using IPV4 and IPV6.

If you run a trace to anywhere, such as www.google.com:

With the modem in Gateway mode, you should see, in order:

Hop 1: the router;

Hop 2: the modem;

Hop 3: the CMTS;

Hop 4: ??

What you want to do is to ping hops 1 to 3 individually. The whole purpose of doing that is to determine once and for all if you do in fact have any packet loss to each one, and as you progress to the CMTS, whether or not you have any packet loss showing up due to the router or modem. I suspect that you will find that you don't have a packet loss issue.

If you want to run a high speed IPv4 test to anywhere, you can use HrPing, which is available here:

<https://www.cfos.de/en/ping/ping.htm>

This is a command line program, so, park it somewhere where its easy to access its location.

Here are the options that you can use with HRPing:

D:\Pingtools\hrping>hrping

This is hrPING v5.07.1148 by cFos Software GmbH -- <http://www.cfos.de>

usage: hrPING [options] host

data options:

- f Set Don't Fragment bit in IP header
- i TTL Time To Live (default 255 for ping, 30 for traceroute)
- v TOS Type Of Service (default 0, deprecated)
- l size Send buffer size (payload size, default 32)
- l s1[:s2[:i[:c]]] Size sweep: send buffer size from <s1> to <s2> step <i>, each size <c> times
- L [s1[:s2[:i[:c]]]] IP datagram size (payload size + 28, default 60) [with sweep]
- M Send ICMP timestamp requests
- u [port] Send UDP packets (port 7 by default)

operational options:

- t Ping the specified host until stopped (Ctrl-C to stop)
- n count Number of packets to send (default 4)
- w timeout Timeout in msec to wait for a reply (default 2000)
- s time Sending interval between packets in msec (default 500)
- c [num] Concurrent sending of up to <num> pings at a time (default 1)
- r [count] Be a traceroute (do <count> pings each hop, default 3)
- a [hop] Resolve addresses to names for traceroute (start at <hop>)
- p Trace path to destination, then ping all hops on path

output options:

- lic Show public license and warranty
- fwhelp Print firewall help text
- F file Log output into <file> as well, even if -q is set
- T Print timestamp in front of each line
- q[r|e|t] Be quiet (-qr=no replies, -qe=no errors, -qt=no timeouts)

-y [sec] Print summary of the last <sec> secs (default 10)
-g -G Show graph (-gg=close graph on exit, -G use running grping.exe)
-? -h This help (-??=more help)

hrPING is Freeware, please share it! See www.cfos.de for our other solutions:

- Internet Acceleration via Traffic Shaping : cFosSpeed
- Webserver for Home Users and Professionals : cFos Personal Net
- IPv6 Connectivity for XP, Vista and Win 7 & 8 : cFos IPv6 Link

From what I remember, when you run HrPing for the first time, there is a license acknowledgement that you have to answer. Run HrPing in admin mode for the first run so that you can do that. When that is done, you can run HrPing in a normal user mode.

When you run HrPing using a command line with normal user privileges, you will probably see the following warning:

```
setsockopt IP_HDRINCL failed: Error 10013: An attempt was made to access a socket in a way forbidden by its access permissions.
```

Ok, so, HrPing will complain, but it will simply get on with the test. If you use a command line with Admin Privileges, you probably won't see the warning

So, for a router test, assuming that you had 192.168.0.1 as the router LAN IP address, you could use:

```
hrping -n 1000 -s 10 192.168.0.1
```

That runs a 1000 packet test, with 10 milli-second spacing to 192.168.0.1

You can drop that down as low as 1 or 2 milli-seconds, just depends on how fast the router is in its response. Don't be afraid to use a fast ping test and don't be afraid to run these for several hours. I usually run a ping test for 24 hours to see the response times during the day. I might not drop the interval down to 1 or 2 ms for long tests, but, it will probably be at or below 500 ms. You won't break the router.

If you ran a ping test for 24 hours, at a default 500 ms interval, the command would be:

```
hrping -n 172800 192.168.0.1
```

24 hours later, you will have your results.

Then move onto the modem, same routine. Say for example you have 10.0.0.1 as the modem's LAN IP:

```
hrping -n 172800 10.0.0.1
```

Another 24 hours rolls by.... I don't have any problems running a faster test to the modem. I probably wouldn't drop the interval down to 1 or 2 milli-seconds, but, hey, if you're curious, why not. You won't break it, and interestingly, running a high speed test, down to say 25 milli-second intervals, maybe even lower might reveal interesting results. That's how the issues with the Intel Puma 6 modems were initially detected.

Then move onto the CMTS, same routine. Fwiw, I don't expect any issues with a 500 ms interval ping test although I've seen plenty of differing opinions. I've run faster ping tests without any issue or response from my ISP.

```
Hrping -n 172800 xxx.xxx.xxx.xxx
```

 where xxx.xxx.xxx.xxx is the third hop IP address in the trace (the CMTS).

That runs a 24 hour test, using 500 milli-second intervals to the CMTS.

If you're interested, you could run the same test out to the ISP DNS. At a 500 ms interval, I wouldn't expect the ISP to see that as an attack on the DNS. The DNS might be set to ignore ICMP ping tests, so don't be surprised to see packet loss from the DNS. You would need to run a UDP test to the DNS to determine if there is a packet loss issue within the ISP network.

That initial series should give you a pretty good idea as to whether or not you have a packet loss problem out to the CMTS.

So, do this one step at a time and record your results. The problem at this point is that HRPing is an IPv4 application. To run the same with IPv6 you can use Microsoft's PSping, which is part of Microsoft's Sysinternals. That is located at <https://learn.microsoft.com/en-us/sysinternals/downloads/psping>

Download PsTools, unzip the tools to a directory somewhere, and then copy and paste PsPing to a directory of your choice. This is also a command line program, so, you'll probably want to park it somewhere that is easy to access via command line.

Here's the ICMP commands:

```
D:\Pingtools\psping>psping -? t
```

```
PsPing v2.01 - PsPing - ping, latency, bandwidth measurement utility
```

```
Copyright (C) 2012-2014 Mark Russinovich
```

```
Sysinternals - www.sysinternals.com
```

```
TCP ping usage: psping [[-6] | [-4]] [-h [buckets | <val1>, <val2>, ...]] [-i <interval>] [-l <requestsize>[k|m]] [-q] [-t] [-n <count>] [-w <count>] <destination:destport>
```

- h Print histogram (default bucket count is 20).
If you specify a single argument, it's interpreted as a bucket count and the histogram will contain that number of buckets covering the entire time range of values.
Specify a comma-separated list of times to create a custom histogram (e.g. "0.01,0.05,1,5,10").
- l Interval in seconds. Specify 0 for fast ping.
- l Request size. Append 'k' for kilobytes and 'm' for megabytes.
- n Number of pings or append 's' to specify seconds e.g. '10s'.
- q Don't output during pings.
- t Ping until stopped with Ctrl+C and type Ctrl+Break for statistics.
- w Warmup with the specified number of iterations (default is 1).
- 4 Force using IPv4.
- 6 Force using IPv6.

To run an extended PSping test, running IPv4 to the router using 192.168.0.1, for example, use;

```
psping -n 10 192.168.0.1
```

That runs a 10 ping test with 1 warm up ping. PSping runs its pings with 1 second intervals, but, it can run a high speed test by setting the interval switch to zero:

```
psping -l 0 -n 10 192.168.0.1
```

That runs a fast ping test using only 10 pings. To extend the test, simply use a larger -n xx number.

To run the same tests using IPv6, run a trace to somewhere, forcing the use of IPv6.

```
tracert -6 www.google.com
```

So, same as before, with the modem in its default gateway mode you should see:

```
Hop 1: the router  
Hop 2: the modem  
Hop 3: the CMTS  
Hop 4: ??
```

Run individual ping tests to the router, modem and CMTS. You could probably run the IPv6 ping test to the router and modem at high speed without any issues.

I'd run the test to the CMTS and beyond using the default 1 second interval for as many hours as you prefer.

When that is all complete, kick the modem into Bridge mode and run an IPv4 and IPv6 trace to determine the CMTS IP address. Don't assume they will be the same as the previous CMTS IP address when the modem was running in Gateway mode. They might be, but each ISP is probably different in how it assigns CMTS upstream addresses, depending on what mode the modem is operating in.

What you should see is:

```
Hop 1: the router  
Hop 2: the CMTS (the modem should be invisible to the trace)  
Hop 3: ??
```

As before:

1. ping the router with a fast, extended test using an IPv4 address with HRPing;
2. ping the CMTS with an extended test using an IPv4 address with HRPing;
3. ping the router with a fast extended test using an IPv6 address with PsPing;
4. ping the CMTS with an extended test using an IPv6 address with PsPing

At the end of all of this, which I would expect to take a few days, you should have a very good idea of the amount of packet loss that you see throughout the day.

Now, just for giggles, start Pingplotter with the modem running in Bridge mode.

1. Run a ping test to the router using a faster rate. To do that type in the interval that you want into the interval window, overwriting the default choices. So, for example, use 0.010 for the interval. Run that as long as you prefer. When you're convinced that there is no packet loss to the router, move onto the modem
2. Run a ping test to the modem using the same fast rate. My bet is that you will see packet loss to the router where you've just proved to yourself that there is no packet loss to the router. Let that run for as long as you prefer.
3. When you're convinced that there is no packet loss to the CMTS (hop #2), move on to the DNS.
4. Run a ping test to the DNS using a slower rate but be prepared to drop that interval time. I'd start with 0.5 as the interval time and then drop that my 0.1 seconds until you start to see packet loss from the CMTS (hop #2) and the modem (hop #1).

If you started those tests using an IPv4 IP address, rerun the tests using IPv6.

My guess is that you will see packet loss from the modem and CMTS as indicated above where you have already shown that there is no packet loss. Ergo, the issue is with Pingplotter. I think that if you read thru the Pingplotter FAQs, the response will be that you have an issue with the router, modem or both. Sorry, but that isn't a believable response. Pingplotter generates a considerable amount of traffic on its own, and for some reason, there's a timing issue between some modems and routers that causes Pingplotter to report false packet loss

Another way to run a test is to use pathping. Pathping is built into Windows and to run it, simply select an end target, router, modem (in Gateway mode), CMTS, or further target. It appears to run at 1 ping per second, so to run that for an extended time you need to include the number of pings for the test:

At a command prompt, enter: pathping

To see the options. Use the -q switch to extend the test to something useful:

```
pathping -q 100 192.168.0.1
```

You can force pathping to use IPv4 or IPv6. I don't know if you have to do that for IPv6 or if pathping is smart enough to know that its using an IPv6 address and switch on its own. Try either one to see what it requires.

To run an extended test, like an all day test you would have to use: pathping -q 172800 xxx.xxx.xxx.xxx

It appears that pathping uses 500 ms intervals (2 pings per second). From what I've seen, if you select a far off target like www.google.com, pathping will run to the last available server. If that happens to be www.google.com, you will end up with the entire path in the final stats. If there is a server, or servers that don't respond, then pathping will only go to the first server that doesn't respond and report results to that server. That will probably be ok for what you're trying to prove at this point in time.

Ok, hope this helps. Please post your results. I'll be interested to see what you find.

Note that HrPing, PsPing and Pathping have numerous switches which allow them to be used in numerous ways, especially HrPing and PsPing. So, you can use them for TCP/IP testing as well.

Are you using the latest version of Pingplotter??