

Understanding

WHAT CAUSES THE INTERNET TO SLOW DOWN?

The internet is much like the crowded freeways of Moscow during rush hour. Traffic, traffic, and more traffic. And the traffic is trying to merge and exit much in the same manner as a freeway system as well.

It's understandable then, that whenever there's a large amount of people trying to use the internet at a particular time (say, Saturday Night movie time) the internet-freeways get congested and slow down. What used to take less than a second to load, could take several seconds or longer now.

It sounds like a first-world problem, and maybe it is, but we've all been there. And Internet speed is generally determined by your ISP. Your router's signal is going to bounce around to other routers (one highway to the next) until it finally reaches its destination. Then the destination router sends it back through to your

router where the web page is loaded onto your screen. These routers that your signal bounce around on are some of the most crucial aspects of your Internet speed and they are called **hops**.

WHAT ARE INTERNET HOPS?

Each time your packet of information is sent to another source, or router, and pushed forward to the next it's referred to as a hop.

At each hop there are **latencies**, so that's why the more hops your data packet has to pass through, the slower it will take to reach its destination. Let's look at an example:

To test the amount of hops it takes for your packet of data to reach its destination you can run a command line IP traceroute (Windows: start menu → run → cmd). This will send a packet of data to the destination, but also request that the hops it reaches send back some information. Each hop is placed on a different line.

We ran an IP **traceroute** to try and get to the always reliable veesp.com

WHAT IS TRACEROUTE?

As touched upon above, a **traceroute** is simply a utility that takes note of the route (or router-to-router-to-router highway transportation, following our analogy) between your computer and the destination on the Internet you're trying to reach.

An IP **traceroute** is typically used to diagnose where the problem is when one is trying to connect to the webpage and /or their internet is running slowly.

traceroute vesp.com

Tracing route to vesp.com [104.22.74.140]
over a maximum of 30 hops:

1	<1 ms	<1 ms	<1 ms	192.168.88.1
2	7 ms	2 ms	1 ms	10.198.177.129
3	1 ms	<1 ms	<1 ms	10.255.255.10
4	1 ms	1 ms	<1 ms	172.30.98.185
5	1 ms	1 ms	<1 ms	172.30.98.186
6	1 ms	1 ms	1 ms	SPB-MET36-C7606-IXR02.spb.sumtel.ru [89.221.199.225]
7	3 ms	2 ms	1 ms	94.25.11.89
8	2 ms	2 ms	2 ms	217.107.73.182
9	1 ms	1 ms	1 ms	104.22.74.140

Trace complete



Vesp website is behind Cloudflare so actually we are pinging Cloudflare server but this is not important in this case.

Thusly, performing a **traceroute** will give you a detailed look of the route a packet will take as it travel from one network system to another.

One could reasonably gather, then, that trying to connect to a United States bound IP (like the Vesp example above) would take much longer than trying to connect to an IP abroad, like [vu ltr.com](#)

traceroute vultr.com

Tracing route to vultr.com [108.61.13.174]
over a maximum of 30 hops:

1	<1 ms	<1 ms	<1 ms	192.168.88.1
2	6 ms	<1 ms	1 ms	10.198.177.129
3	1 ms	<1 ms	<1 ms	10.255.255.10
4	1 ms	<1 ms	<1 ms	172.30.98.185
5	1 ms	1 ms	<1 ms	172.30.98.186
6	1 ms	1 ms	<1 ms	SPB-MET36-C7606-IXR02.spb.sumtel.ru [89.221.199.225]
7	2 ms	2 ms	2 ms	94.25.11.89
8	26 ms	25 ms	29 ms	87.226.133.136
9	52 ms	52 ms	51 ms	ae1-500.cri-stk3.ip4.gtt.net [77.67.90.96]
10	139 ms	126 ms	127 ms	ae0.cr2-nyc4.ip4.gtt.net [213.200.112.166]
11	110 ms	121 ms	110 ms	ip4.gtt.net [173.205.45.234]
12	*	*	*	Request timed out.
13	*	*	*	Request timed out.
14	115 ms	115 ms	115 ms	108-61-13-174.choopa.net [108.61.13.174]

Trace complete.

Notice that while to connect to Veesp it took 9 **hops** with no longer than 7 ms of latency. Connecting overseas, however, took 14 **hops** and upwards of 140 ms of latency. Notice also, **hop #12** and **hop #13** sent back no information. That could be a result of many things, but the most common being that that particular **hop** has a large amount of traffic and simply can't respond to the tracert command. That's mostly likely what happened in the above scenario as we were still able to reach our destination. Had the tracert continued to get those errors, then we would know that **hop #13** is where our connection issue lies.

Tracerouting is a great way to determine the strength of, say, a virtual or dedicated server provider much like us!