Slow.

Handling SLOW in a WORLD that demands FAST.

Working Remote

COVID-19 has forced us all to shine a light on our capacity to work from afar… remote (as they say). For some, this is a piece of cake. Yet, for others, the experience has been a tad frustrating. There can be a myriad of reasons that combine together to just make it seem an impractical task, so I thought that I would try to compile a list of the common suspects with some overview to perhaps help in measuring probable causes if you are finding yourself stuck in slow-ville.

The most common cause of slow remote computing are (in no particular order):

- The internet service at your home (Point A)
- The internet service at your office (Point Z)
- The internet in between Point A and Point Z (Hops)
- The asset of computer equipment/software at Point Z and the configuration of same (the Server)
- The connection protocol (the Method)
- The design of the application that you are attempting to run (i.e. the "Database")

The Internet

As you might have noticed from the list above, the internet plays a pretty significant role in determining just how fast (or slow) your remote computing experience could be. So, let's take a few minutes and break this down. I'm a big fan of analogies and it would be reticent of me if I passed up the opportunity to inject one here.

A Road

Think of the internet as the road that leads from your home to your office. Is that road in good shape? Is it paved? When the weather turns bad, is it well maintained, or is it the last on the list to get tended to? The internet is your road to a having a good connection. If your road is in bad repair, single lane, strewn with potholes then you are starting off at a disadvantage. Simply put, you are constrained against your will to drive at the speed limit to which that road will bear.

Now imagine that that road is a perfectly straight road directly from your house to the office. It is nicely paved, kept clear of debris and like the Autobahn in Germany, there is literally no speed limit. You likely wouldn't even break a sweat getting to the office.

(Finger snap). Wake up. That doesn't exist. No. More than likely you have to take several roads on the way to work. Sometimes there are busy intersections that you have to deal with and road detours and construction that you may have to navigate… all of which place a "cost" on the time it takes to make that connection from your home to your office. The same is true with computers. The internet world calls these "hops" and the "cost" is measured in "milliseconds". The internet (which is kind of like a self evolving monster child) monitors the cost at each hop and is able to decide when a specific route (or "hop") is simply too costly, and will attempt to find a different route as it tries to get you from Point A to Point B (and back again).

If you want to try something fun, you can see kind of how hops would work:

1. *Hold the Windows key down and press the letter "R"*
2. *In the popup "Run" window, type* ***"CMD"*** *and press Enter*
3. *In the black Command Window, type*

TRACERT WWW.GOOGLE.COM

This will show you in "Hops" the trip from your computer to the Google server

If you do have the inquisitiveness to try the steps above, try it at different times of the day to see how that your ability to travel on the internet road changes. Also try it on different days (weekends for example) and with different sites. Instead of the Google site, try "amazon.ca", or another internet site of your choice.

So along with this analogy of "the road" = "the internet", what a lot of people are now seeing is a sudden rise in demand in their home environment. Pre COVID, how many homes in your community had people working 100% of the time from home? How many homes also had multiple family members at home vying for internet bandwidth?

Today we find your daughter Sally doing homework and research on the internet, while also chatting to her friends through Instagram and Facebook, while streaming music from God-knows where. John-John should be doing homework but instead he's playing some video game with 12 other people that has something to do with submarines… Oh yeah, and he's streaming music too. Your partner is working from home connecting to his office via internet, researching some product details on the web, and also streaming some YouTube videos on boats. And what are you trying to do? Just trying to connect to your office across town while on a Zoom meeting with colleagues. Cindy (the dog) is just wondering when you will all get out of her hair so she can get some peace. Now consider this… That's just your house. What about all of the others in your community? All driving up and down the internet "road" back and forth all day long result by the people in your immediate neighbourhood – Are they a cause of your slow connection?

Consider all of the additional traffic at each hop and then let's examine what this means to your office internet "commute".

All Down, no Up

Most internet connections are designed for home users. By that I mean they expect you to download more content than you upload, so you will often see internet that delivers a certain speed for you to download from the internet and a much slower speed for uploading data to the internet. For a visual on this, in your browser, go to the following website: www.speedtest.net and run through the test to measure the speed of your internet. My internet is pretty good both ways (89.80 Mbps down, 90.68 Mbps up), but that is something that I pay for because I've had a home office for about 30 years. (Yes, I suppose I have been practising for a COVID-like scenario for 30 years).

Considering how the demands on the internet at the office plays into it are also part of the discussion. For example, if before COVID, only a few people connected remotely to the server, you must now consider the quality and viability of the internet service at your office to handle this sudden influx of new remote computer connections.

Buckets and buckets of data

While the internet is a major player in the determination of how fast your remote computing will fare, so is the "protocol" of how the remote service is delivered to you. In a standard office environment, it is common for computers to connect to a database server through a "L.A.N." (Local Area Network). The workstation (where you generally sit) has the program (aka W.I.S.H.) installed on it, and it makes requests to the server for data from the server. So for example, in this scenario, if you click on the lookup to find a Client's name, your workstation will say to the server, "Hey give me the database containing the Client Names" and the server will respond by sending the entire contents of the Client database (names, addresses, physical description) et cetera for ALL OF THE CLIENTS to the workstation, and then the workstation searches through that and just picks the Client record that you want to work on. So imagine your CLIENT database is 100 MB, then every single time you want to read or write to the Client file, the server sends you 100 MB of data to the server which you then promptly send back when you are finished. 200 MB round trip of data, just to look up a Client name! Generally, in a L.A.N. environment this is sustainable because most L.A.N.s are very fast and at any one time not everybody is going to request that file at the same time.

Push this model to a W.A.N. (Wide Area Network), where your workstation is at home and you are connecting through the internet (aka W.A.N.) to the database server, suddenly (actually immediately) attempting to push 100MB through the internet is a deal breaker… Think of trying to push a golf ball through a garden hose.

In summary, the "buckets and buckets of data" model is fine for L.A.N.s BUT never intended to be used for W.A.N.S.. Enter "Thin Client Computing"

The Skinny on Thin

If you are trying to push that proverbial golf ball through the garden hose, you just ain't in for any joy. Fortunately, others have gone before you and solved this challenge very early on. As the business world embraced the internet, "thin" computing was born from need. The concept of "thin" computing is simple: Let the server do all the work… just pass the result back to the client.

You see this everyday. When you go on eBay and search for "**right rear taillight 1979 Camaro**", eBay doesn't send you their entire product inventory for you sort through. No. They send you a filtered out inventory listing of matching choices, and, even then, only a page of about 30 choices at a time. They do this so that you get a fast response. Thin computing.

Another common example that many of you are familiar with is "Remote Desktop". This too is an example of "Thin Computing". Remember the example posed above where you wanted to lookup a Client, and the workstation was sent the entire Client list to be sorted through. In Remote Desktop, the thin computer is achieved because literally no database data is sent from the server to your remote workstation. Instead, the server paints a picture of what it wants to show on your screen. And in return, your computer simple sends its keystrokes and mouse movements back to the "Remote Desktop Server". This is one of the thinnest (and therefore fastest) examples of Thin Computing today…. Screen update goes one way, keyboard and mouse go the other.

So, if this is one of the fastest thin computing protocols, why can it seem so slow at times?

Really, the major components in obtaining good performance for RDP (Remote Desktop Protocol) are:

- Internet (we raked that topic over the coals earlier)
- The RDS (Remote Desktop Server) itself.

Here are some ideas on spec-ing out your RDS server.

- The server that you choose to be your RDS should be a workhorse. It should have sufficient RAM memory to be able to juggle lots of remote client sessions (think about juggling balls). The more clients connecting to it, the more memory it is going to need. If you have 10 or more people connecting to a RDS, really I would want at least 32 GB of RAM. In the scheme of things RAM memory isn't terribly expensive, so don't scrimp on this.
- Multiple CPUs. Many servers today are equipped with the ability to have multiple CPUs installed (think "brains"). This is an expensive option but worth exploring as your user count increases.

- If the RDS Server CAN be the WISH Database Server as well, this would be the absolute fastest configuration, but if it isn't consider making it on the same Virtual Server or distant second choice, in the same room and on the same L.A.N.. If you don't know what I mean by Virtual Server (VS), don't worry your tech department will. Just feel free to throw that acronym around like this: "Is that going to be a VS, John?". If the response is jargon to you, just nod and respond with "Yeah, that's what I thought". Under no circumstance try to connect an RDS server to a database running outside your office. (See previous section entitled "Buckets and buckets of data".

- W.I.S.H. is a pretty intensive application, so try to reserve the database server (which may be your RDS server) for mostly the W.I.S.H. application. If you try to run another service (such as Microsoft Exchange Server) on the same server, both W.I.S.H. and Microsoft Exchange will starve most server resources as both application are "high needs".

- If you are not already running the SQL version of W.I.S.H., you should be. SQL changes the optic of workload on a database server. As the number of database connections go up, the SQL version of W.I.S.H. suffers less of a speed performance hit than the non-SQL version of W.I.S.H.

- For the "Database Server" upgrade to use SSD (Solid State Drives) which can run up to 20 times faster on some tasks than a standard non-SSD drive.

There are other ways of achieving a "Thin Computing" experience, but generally I would expect them to be less able to perform as a properly equipped RDS. Most commonly, you can install a remote access software on your computer that remains in the office and connect to it rather than an RDS server to achieve a Thin Computing solution for less cost[1]. Products such as "LogMeIn", Teamviewer and "SplashTop" come to mind, but there are literally 100's. I have never seen one that can perform as well as a properly outfitted RDS computer, though.

VPN and Security

In all cases, making a system secure needs to be a vital part of your configuration. VPN (Virtual Private Networking) is a term that, thanks to COVID, many of you have started to become familiar with. Essentially VPN is another layer of security. Think of it as an additional locked door to your building. If before you had to pass through two locked and checked doors to get to your office, add VPN and now, PRESTO, you have three. The more the merrier.

Of course, as with everything, VPN adds a "cost" to the performance, but definitely well worth it. What you want to do, however, is to NEVER try to run a database like W.I.S.H. through a VPN without also using Remote Desktop. Remember the section

[1] Except that you now need 2 computers for each person rather than 1 computer for each person and 1 RDS server for the group.

above entitled “Buckets and buckets of data”? VPN will not solve that problem. You still must use a “thin computing” solution like RDP but simply use it through VPN for security.

There are some other great products for security as well, www.rdpguard.com comes to mine, but generally you should look to your IT team for their expertise.

Finding Speed

When my wife, Linda and I used to sail, we become aware of the adage “Sail Fast… Live Slow”. We enjoyed the way life slowed down while we were on the boat, but at the same time we were always aware of minute signs of more wind found by watching both the sky and the water.

If you are saddled with poor internet at your office and there is no way to upgrade the service, then consider placing your server in the “cloud” as this may be the only realistic choice that you have. There are pros and cons to cloud based servers and that topic can be exhaustive. If the internet at the office is great, but the internet at your home is the problem, then selling your house (try realtor.ca) may be your only resolve for that one as not even a cloud server will save you then. But let’s hope it doesn’t come to that! Isolating the bottleneck and then checking with your internet provider for an upgrade of service may be a very simple and viable fix.

There is no magic cure for some of the ailments of poor internet, so try “looking for the wind”. If the internet at home or at the shelter is marginal, then you need to find ways to reduce the demand until you can upgrade that service, or move to a cloud server. Be aware of other internet related tasks that can possibly scheduled for a time when internet demand is lower. Culprits such as streaming movies or downloading files can often make a long task much longer when internet use is at a peak.

The good news is that if lack of speed continues to be a problem and if you determine that the internet isn’t the bottleneck, then everything else is fixable.

Good luck in finding your speed.