My Experience with a subscriber VPN
Advantages, costs, pitfalls, workarounds
Part 2 of a 2-part article series
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In part 1, you learned about the need for VPNs and how a VPN secures your internet communications. Also Part 1 identified several VPN services that are highly rated, including the one to which I subscribe, IPvanish.

This part explores some of the complications and workarounds that I have encountered.

REAL LIFE VPN IMPACT
As of late September 2019, I have a VPN installed on my laptop computer, two tablets, and my smart phone. As was the case at work, the VPN at home does not seem to impose any noticeable slowdown on those devices.

I use my second tablet primarily for its Roku app, which is a remote control for my Roku Premiere video streaming box. When I installed and used the IPvanish VPN app on that backup tablet, the Roku app was no longer able to communicate with the Roku box on my home network.

Why did that happen? The tablet could not search the LAN for the IP address of the Roku box. This may be because the tablet communications were encrypted and our home LAN router was not.

This led me to learn about another aspect of subscriber VPNs.

SPLIT TUNNELING
In operation, a VPN connection is sometimes referred to as a *tunnel*. That simply means the communication is hidden by encryption, as if concealed inside a tunnel, and cannot be read or understood by a Man in the Middle.

Split tunneling is a feature of the IPvanish app for Android. Many other VPN services offer split tunneling in their apps.

The idea of split tunneling is that you can configure the VPN client app so that, for example, communications by a particular app on my tablet or phone should *not* be encrypted, not sent through the "tunnel" to the VPN server. Apps exempted in that way are *split* away from the encryption tunnel.

Split tunneling is configured on an app by app basis. Lucky me, the Android VPN app for iPvanish enables split tunneling, so I told the VPN app to exempt the Roku app. That

way, I can use the app to control the Roku box even while the tablet is otherwise connected to the iPvanish VPN.

Later on, I set up split tunneling for the Roku app on my smart phone. At that moment, when I applied the config change to implement the split tunneling, my smart phone VPN app was already connected to the VPN. I learned that for the IPvanish VPN client, it is best to set up split tunneling while the VPN app is *not* yet connected to the VPN. I tried when the VPN client app is connected to the VPN; the VPN client app then told me it had to disconnect and reconnect the VPN in order to implement the config change for split tunneling.

I started thinking about other types of in-home communications on a home Local Area Network. The Internet **of Things (IoT)**, meaning lights and appliances connected to your router, is one example. For a control app to communicate with those devices from a phone or tablet running a VPN client app, the control app would have to be split tunneled.

LAN PRINTERS AND VPNS

There is one very widespread present-day LAN use that will require split tunneling: I have my printer connected to my home router, so that computers around the house can print.

The initial issue I have is that the Windows VPN client application from IPvanish does *not* permit split tunneling as of September 2019. The IPvanish help desk says the company is working on adding that feature. So I have to wait for IPvanish to update their Windows VPN client app.

If you choose a different VPN service, and you have a printer connected to the LAN at home, make absolutely sure that their VPN client app for your personal computer supports split tunneling, whether it is a Windows box, a Mac box, a Linux box, or a ChromeOS box.

The second issue is that there are a *huge* number of personal computer applications that can print. Examples include all Microsoft Office applications, all LibreOffice applications, all web browsers, Adobe Acrobat Reader, Notepad, Wordpad, graphics image editors like Adobe Photoshop, general printing applications like PrintMaster (invitations, birthday cards, banners, et cetera), desktop publishing applications, and so forth. It is fairly difficult to identify valuable desktop applications that do *not* include the ability to print.

Because split tunneling is so useful, I am researching other subscriber VPN services and their VPN clients' abilities to support split tunneling. I will report on that in a later article.

DO NOT SPLIT TUNNEL THAT WEB BROWSER!

Now, of all the myriad of applications that can print, the one that is most often the target of snooping and therefore most in need of a VPN is a Web browser. Don't set the VPN app to split tunnel that browser.

If you habitually print one or more web pages using your Web browser, there are a couple of ways to work around that problem while connected to a VPN.
The easy case is to connect the computer to the printer using a different method. Most, but not all, printers can be connected to computers by a USB cable.

The two following suggestions are provided in case you cannot do that.

For the special case of downloading and printing PDF files, you can download each PDF using your Web browser. In the VPN client application, apply split tunneling to **Adobe Acrobat Reader**, which is far less risky than applying it to your web browser. Then use Acrobat Reader to load and print the PDFs.

For the more general case, when you need to print Web pages, you can print each Web page through a PDF print driver such as Microsoft Print to PDF or PDFCreator or PDF995. Those drivers create a PDF file instead of sending output to a printer. Then you use the same technique: apply split tunneling to Adobe Acrobat Reader, then use Acrobat Reader to load and print the PDFs to your LAN printer.

Sounds too complicated. But wait, all is not lost.

A MORE COMPREHENSIVE SOLUTION
Some VPN services also allow you to install a VPN client on a *home router*. What are the advantages of that approach? First, the router connects all of your devices to the internet via a VPN server, so long as those devices are at home and connected to the home LAN, either by ethernet or by Wi-Fi. Second, the router VPN client will do the work of VPN client encryption and decryption for all of your devices.

Using this approach, your devices at home need not run a VPN client. Effectively, your device count at home, from the viewpoint of your VPN service, is ***one***: the router itself, which handles all VPN encryption and decryption for all your devices. Therefore, the home router must contain a fast CPU and a good amount of RAM and will be expensive.

When all devices use a home router VPN client, your devices at home can communicate with a LAN printer.

When all devices use a home router VPN client, your devices at home can act as the remote control for a Roku box and run an app to control home lights and appliances.
I must say that the installation process for a VPN client on a router is complex and not for newbies. It often involves installing a third-party app called DD-WRT on the router as a prerequisite. I watched a YouTube video of how to do the installation for the NordVPN router client, and the process looked daunting to me.

This strikes me as an opportunity for a **user group lab**: work on the installations together during a user group meeting. It would require you to bring your home router to the lab meeting.

Some VPN services even sell routers with the VPN client pre-installed. I think this is probably the best alternative for most folks who want to use a VPN client on a home router.

IPvanish publishes a list of router makes and models on which their router VPN client is known to be installable and is known to work. The list as of September 2019 includes high-end, expensive Linksys routers, Asus routers, and Netgear routers. I checked out the prices of those routers: the lowest I saw was about $150. With the VPN client pre-installed, the price would increase.

When you are away from your home router, yes, you will still run the VPN client on your phone, tablet or computer. But typically you won't bring your Roku box or printer or your lights and appliances along with you.

ARE THERE WEB SITES THAT ARE NOT ACCESSIBLE WHEN YOU USE A VPN?
At some point in 2019, I read an article published in a user group newsletter which briefly described VPNs. The author made a broad claim, without details, that VPNs *prevent use of video streaming services and financial web sites*. The VPN service was not specified, the streaming service was not specified, the financial sites were not specified, and the browser and operating system used by the author were not specified. Perhaps the author was using a home router running a VPN client. Again, no details were provided.

As I was wrapping up this article series, I went looking for that article. I could not find it. That claim was *questionable*, in my opinion. The traveling public use those sites on the Web all the time while on the go, even overseas. Netflix in particular encourages use by travelers.

More generally, subscriber VPN services address *how* users access the Web, and do not act as content censors. Well, I admit VPNs of some corporations and government agencies block certain types of web content that they deem unrelated to work. And I suspect in some small countries the local banks lobby the government to prohibit access to foreign banks through the Web, a simple protectionism for the local banks. But that is another big reason why VPNs exist: to enable connections to foreign web sites with powerful security so that government snooping does not know what you are accessing on the Web. The only IP addresses the snoops can see are those of your device and the VPN server.

So, as soon as I got my IPvanish account set up and I got the VPN client app installed on my laptop computer, I started testing access to financial web sites for the accounts I

use, my stock brokerage, my credit card banks, and my checking account bank. I also tested watching a video on the Netflix web site.

Here's how I did that test.

First, I connected to an IPvanish VPN server in the Boston Massachusetts area. I accessed all those sites and kept track of what happened.

Second, I connected to an IPvanish VPN server in the London England area. Again, I accessed all those sites and kept track of what happened.

My tests used a Toshiba Satellite laptop running Windows 10, and the Firefox web browser.

The results appear in **Illustration 3**.

In short. I found that Netflix worked, my three-credit card bank web sites worked, my stock brokerage web site worked, and my checking account bank web site worked. That was true even when accessing those through the London England VPN server.
I did learn also that Netflix and my stock brokerage site both require that I enable cookies. I did that. I also have my Firefox browser set so that, when I shut down Firefox, it deletes all cookies that were created by web sites during its current use.

Cookies are one way that snooping is implemented. But there are also good cookies. Cookies are used to "remember" your login ID on various web sites such as email, Amazon.com, and geocaching.com, so that you need not log in again when you revisit the sites.

Cookies are also central to the way retail shopping and bank transactions are handled in your Web browser.

So the lesson is: set up your browser to allow sites to install cookies, so you can shop and use the bank and stock brokerage sites.

To avoid keeping bad cookies, I set the bowers to delete *all* cookies installed during the current Web browser use, when I shut down the browser, after shopping or banking is done. That way I throw out the bad cookies, but I am forced to discard the good cookies too.

And shut down your browser promptly. Don't let it run for days at a time.

The regrettable side effect is that I must log into Yahoo! email, Verizon email, geocaching.com and Amazon.com every time I use the browser to access those sites. I can even checkmark the web site login box saying remember me. The remembrance works until I shut down the web browser and the cookies get purged.
I am willing to live with that side effect.

Is my test a *comprehensive* test? No. I do not have an account for every bank and every stock brokerage in the US. Nor do I have an account with every VPN service. So a comprehensive test is just about impossible.

But I think my test results provide good news. Not every VPN service causes such problems. Not every browser causes such problems. Not every web site experiences such problems.

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Service	Service type	Boston VPN server	London VPN server
Netflix	Video streaming	Success	Success
www.Citicards.com	Credit card issuer	Success	Success
www.Americanexpress.com	Credit card issuer	Success	Success
www.usaa.com	Credit card issuer	Success	Success
www.bankwithunited.com	Checking account bank	Success	Success
www.schwab.com	Stock brokerage	Success	Success