



PATACS Posts

Newsletter of the Potomac Area Technology and Computer Society

June 2023, Volume 4

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My turn.....

Where has the time gone? Didn't I *just* finish the May issue? Time, I guess, is doing its thing: flying by.



Mea culpa: OH! Boy did I blow it! Apologies to all of you. Believe it or not, I try to keep track of the articles I use and when, but in the May issue, there are some of the same articles I used in April. 😞 Did you notice and were they worth reading twice? I will try to do better.

What's new? My wife and I leave Saturday, the 17th, for a 10-day trip to Poland. She is the co-leader of the trip which will be taking a group of 35-40 North Carolinian secondary-level Holocaust educators on a tour of Holocaust sites. In NC, holocaust education is mandatory. Needless to say, it will be very interesting, and I am excited for it to commence. (Also, we'll be flying on an Airbus A380—that big double-decker plane—very cool.) We were supposed to have gone a year ago, but the invasion of Ukraine by the f-ing Russians delayed the trip. I've been to two major and one minor concentration camps while visiting Europe on other trips (Auschwitz/Birkenau (Poland), Dachau (near Munich), and Theresienstadt (near Prague)), but never with a group like this one. This will be my first trip with the new laptop (an LG Gram) that I described last month.

Changing subjects completely, in case you haven't heard, a couple of weeks ago, Apple came out with a bunch of product updates and their newest item: a MR (mixed reality) headset called the **Vision Pro**. As I see it, there are two problems with it right now: the first is the price: \$3500!—yes, you read that right: thirty-five *hundred* dollars. The 2nd problem is what to do with it? I will say that when other never-before-seen Apple devices appeared, the same problem was associated with them and yet eventually they changed the world. Perhaps the same will happen with the Vision Pro when the price comes down? I've read a couple of reviews of a product that is not yet available and won't be until early 2024. The reviewer(s) got an Apple-scripted demo for about 30 minutes. What does it tell us? Not much. I did read a review that discussed the hardware which was quite fascinating for us hardware nerds. It will be interesting to see how fast the price falls—if it does. I'm no prognosticator so I can't begin to tell you if it'll be successful. Me? I don't much see the point. But time will tell.

What's new with you? Send your info to editor@patacs.com!

Next printed issue: August 2023

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Proofreaders for this issue: Jon Bernstein, Doris Bloch, and Barry DeMaio

Intro to IP Addresses and Port Numbers

The foundation for any app that communicates with other computers is an IP address and port number. Learn how that works.

By John Krout, Potomac Area Technology and Computer Society www.patacs.org

Introduction

Much of what we all do with computers is based on communication with other computers through a digital network. Email, web browsing, and streaming video are three of many examples.

All that communication is based on Internet Protocol (IP) addresses and a related concept called port numbers. This article will explain those concepts and how the device which provides your home Wi-Fi, called a **router**, plays a critical role in digital network communication.

Every computer, smartphone, and tablet has an IP address once connected to a network. The purpose of the IP address is just like your home address, often called a street address. For example, delivery services such as the US Postal Service (USPS), Federal Express (FedEx), United Parcel Service (UPS), and many others can deliver mail and packages because they are labeled with your street address. Likewise, the IP address assigned to your computer, smartphone, or tablet serves the same purpose: digital info for your device is delivered fast and accurately because it is labeled with your device's IP address.

However, your device has to **ask** for digital info. You use an email application or a Web page to request email, and then the new emails are delivered to your device from a computer acting as an email server. This is an example of **client-server computing**, in which your device's software is called a client, and the email receiver-transmitter is called a server. You ask to see the new incoming email, and the server delivers. You use your application or web browser to compose and send an email, and the computer forwards it to the email server, which then sends

it to the destination domain specified in your email. In all client-server computing scenarios, the client application does part of the work, and the server application does another part of the work.

Domain Name Service (DNS)

Behind the scenes, when you receive or send an email, or you ask to see a web page, two things happen. First, your request for digital info includes the IP address of the device you are using.

Another server called a **Domain Name Server** (DNS), helps in a big way: it converts the domain portion of the recipient address, such as @yahoo.com or @gmail.com, or @nasa.gov, to an equivalent IP address. Using that IP address, other computers can relay your request to the destination and send the reply to your device. You need to know only the name, **not the IP address**, of the server you contact. Over time, the destination IP address for a familiar domain name might change, but the DNS stays up to date and allows you to use a familiar domain name instead of a changed IP address.

What does an IP address look like?

Inside your device, all data is numbers. A byte is a number (a group of 8 bits with a collective value from 0 to 255). Combining bytes in creative ways lets us write emails, display web pages, and so forth.

Likewise, an IP address is a number composed of four bytes. An IP address is expressed like this: **192.168.1.42**. Each byte in the address is separated from the next by a period.

How to See your device IP Address:

Android 12: (in **illustration 1**, above right) Open the **Settings app**, choose **About phone**, and then choose **Status Information**. Look under the heading **IP address**.

iOS 15 (Apple): (in **illustration 2** at right, the IP address is circled.) Open the Settings app and choose **Wi-Fi**. Touch the **Wi-Fi address** to which the device is connected and you will see your **Wi-Fi network name** below the **Wi-Fi switch**, with some gadgets to the right. Tap the info button (the letter **i** in a circle) to the right of the name of your **Wi-Fi network**. A new screen appears. Scroll down and find the **IPv4 address heading**. Below that, you will see both your device's IP address and the internal IP address of your router.

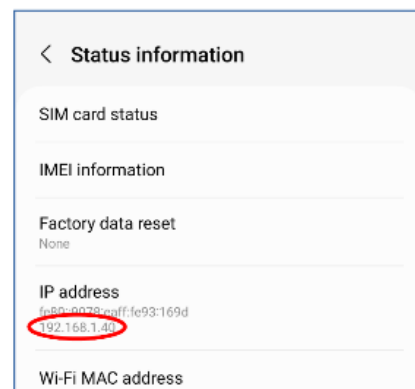


Illustration 1

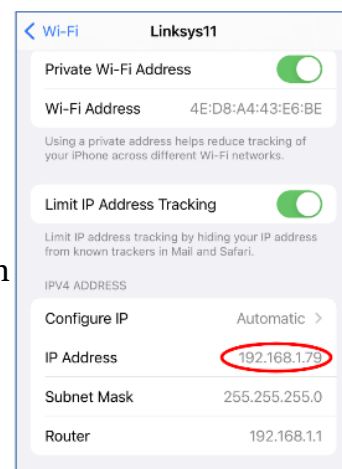


Illustration 2

Windows 10: (illustration 3) Open the Settings application, choose Network & Internet, and click the Properties button in the right-hand pane. A new screen appears; scroll to the bottom and find the **IPv4 address**. The IP address is circled (to the right).

Port Numbers

As you know from experience, your device can communicate with many other computers simultaneously. For instance, your device can run an email client application, a web browser, and a video streaming application simultaneously.

Your device uses a second concept called **port numbers** to properly deliver incoming info to the correct application on your device.

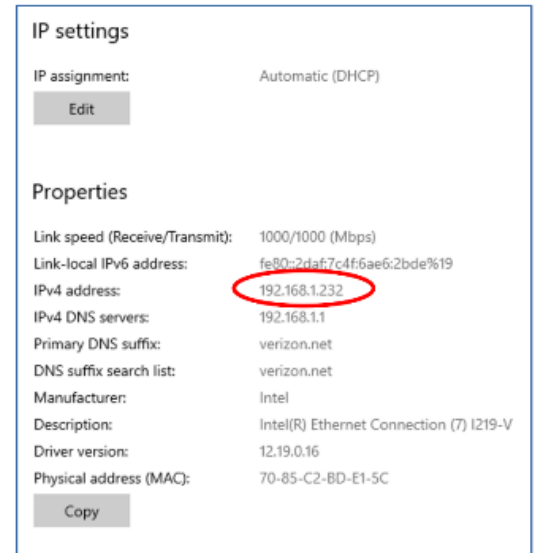


Illustration 3

Ports are analogous to apartments within an apartment house. Each apartment has its apartment number. Physical deliveries are directed to the correct apartment by being labeled with the correct apartment house address and apartment number.

Think of your device's applications as apartments. Each uses a port devoted to the purpose of the application. The ports are numbered 0 through 65,535. There are 65,536 ports.

Some of the port numbers are, by internet convention, devoted to specific purposes. For example, some port numbers are devoted to email, some for web browsing, etc.

The port numbers in the range of 0 to 1023 are called **well-known port numbers** because those are pre-assigned to specific purposes such as email or web browsing. I reviewed a Wikipedia page listing all of the pre-assigned port numbers; there are many devoted to purposes and applications I have never heard of and many I use every day. Port numbers *greater than* 1023 can be used for any purpose and are called **ephemeral ports**.

Some web page addresses include both a name and a port number. For example, you may have accessed a web page like this: <https://www.anyserver.com:8080> (not a real URL).

In this example, the number after the colon character, 8080, is a port number. It is part of the range called ephemeral ports. Using a temporary port number as part of the address allows web servers to host many different home pages, and each home page is assigned a different port number.

Your Router

The device which provides your home Wi-Fi service is called a router. It does a lot more than send and receive Wi-Fi radio signals. Overall, it serves as the city name for various apartment buildings.

The total possible number of IP addresses is close to 4 billion. That sounds like a lot, but in most metro areas, there are more devices than people by a large margin so a solution was developed long ago and built into the router.

The router has two responsibilities. First, it assigns IP addresses to itself and your devices in one of two ranges of **reserved IP addresses**, either 192.168.#.# or 10.#.#.#. The address assigned to itself is called the router's **internal IP address**. Second, the router acts as your connection to the internet. As such, the router is assigned an external IP address by your internet service provider (ISP), such as Cox, Comcast, or FiOS, etc.

Like a central post office, the router forwards every digital info request from your device to the destination. For the return address, the router substitutes the router's external IP address for the internal IP address of your device. From the viewpoint of the outside world, the only destination address for responses to your requests is the external IP address of the router. When the corresponding response arrives at the router, the router forwards it to your device.

In practice, an unlimited number of routers can assign the same range of IP addresses to connected devices. Your neighbor's router can, by chance, assign the same IP address to your neighbor's phone that your router assigns to your phone. The neighbor's router serves a different "city" and has a different external IP address than your router has, so servers on the internet can direct responses to the correct router.

My own router's external address, assigned by my ISP, begins with 96. However, that is not necessarily a **permanent** IP address assignment. Each assignment of an IP address by an ISP to a router has a fixed duration, called a lease. A lease typically expires in 24 hours. Then the lease is renewed by the ISP. However, my router's external IP address has not changed in many months.

The bottom line: routers and reserved IP address ranges make it possible to connect many more than 4 billion devices to the internet at the "cost" of one IP address per router. As a result, my router serves nine or more devices most days.

Your router also has a self-assigned internal IP address in the same range it assigns to your devices. For example, my router, which is about two years old, assigned itself the internal 192.168.1.1. The router's local address enables your devices to send info requests to and through your router because each computer is connected to the router by Wi-Fi or ethernet, and each smartphone or tablet is connected by Wi-Fi.

When your smartphone leaves your home

When your smartphone is out of range of your Wi-Fi or disconnected from your Wi-Fi, it connects to the cell network or another Wi-Fi if you are in range. At that point, the IP address of your phone is assigned by the network to which it has newly connected and is not necessarily the same IP address your device was assigned on your Wi-Fi.

For example, on my Wi-Fi, when I wrote this article, the IP address assigned to my smartphone by my router was 192.168.1.40. When I disconnected my smartphone from my Wi-Fi at home, the IP address assigned to my smartphone by the cell network was 100.87.129.39. Effectively I have moved my smartphone to a different "city."

How can you receive email when your device's IP address changes? Because your device sends your email account name and password to the email server when you use an email application or a Web page to check for email. The current IP address is simply the address to which the email server must send its response.

Some limitations

In reality, most consumer routers limit the number of devices that can connect to the router simultaneously, much lower than the range of IP addresses that the router can assign. For example, my own router's limit is 241. That total includes devices connected by Wi-Fi or ethernet.

###

Where to Get E-Books

By Tom Burt, Vice President, Sun City Summerlin Computer Club

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A perennial challenge is to find suitable gifts for friends and family. Books have always been a popular choice. Now, with the maturing of the electronic book (e-book) format and industry, it should be easier than ever to find just the right title, purchase it, and email a link for your giftee to use to access and read the book. Of course, things aren't so simple in practice, so read on.

This article is based on a seminar I gave in December 2020 titled "E-Books and E-Readers." My seminar slides are at: [https://www.scscclub.com/smnr/E-Books and E-Readers Seminar.pdf](https://www.scscclub.com/smnr/E-Books%20and%20E-Readers%20Seminar.pdf).

E-book formats

There are two main formats: Amazon Kindle and E-Pub. There are hardware and software readers for each. Both formats support digital rights management (copy protection) so that the purchaser of a book can't share it with more than a few others. Amazon mainly uses the Kindle format. E-Pub is used by Barnes and Noble and Kobo and for many self-published books. Adobe PDF and HTML are also often used for e-books. Apple's iBook format is a variation of E-Pub.

When buying an e-book, it's important to know what format it is in so you can be sure your reader device or program can read the book. A common problem for owners of Amazon's Kindle or Fire tablets is that they do not support the E-Pub format. The Amazon app store does not offer an E-Pub reader app. It's possible to "jailbreak" a Kindle or Fire tablet so that it can install Android apps from the Google play store, including Adobe's Digital Editions E-Pub reader. But that's a topic for another day.

E-Book Websites

Here's a list of e-book websites with links to each:

- **Amazon Kindle Store** www.amazon.com
- **Barnes & Noble** <http://www.barnesandnoble.com>
- **Google Play Store Books** <https://play.google.com/store/books>
- **Kobo** www.kobo.com
- **Open Library** <https://openlibrary.org/>
- **Project Gutenberg (60,000 free ebooks)** <https://www.gutenberg.org/>

Let's look at a few of them in more depth.

Amazon Kindle

The screenshot shows the Amazon website search results for "rex stout nero wolfe mysteries". The search results are displayed in a grid format. On the left, there are filters for Department (Books), Customer Reviews (4.5 stars), and Book Series (Nero Wolfe books by Rex Stout). The main results show three books:

Book Title	Series	Format	Price	Availability
Fer-de-Lance	(A Nero Wolfe Mystery Book 1)	Kindle	\$4.99	Available instantly
Triple Jeopardy	(A Nero Wolfe Mystery Book 20)	Kindle	\$8.99 (was \$17.99)	Available instantly
Please Pass The Guilt	(A Nero Wolfe Mystery Book 45)	Kindle	\$8.99 (was \$15.99)	Available instantly

The Amazon bookstore is vast. You can buy books in hardcover, paperback, audio, and e-book format. As with all Amazon shopping, the search is very smart, and you can set filters to narrow

your choices. In addition, you can click on items in the search results to view details and, from there, add them to your shopping cart.

If buying for yourself, E-books are delivered (downloaded) to the reading device you specify. You can also specify you are buying for someone else and enter the giftee's information so they can receive the book.

For hardware you need an Amazon Kindle or Fire tablet to read Kindle books. The Amazon Fire H10 tablet with 32 GB of storage lists for \$100. Alternatively, software readers, such as Amazon's free Kindle reader app, are readily available for download to read Kindle books. Versions exist for Windows, macOS, Linux, Android, and iOS.

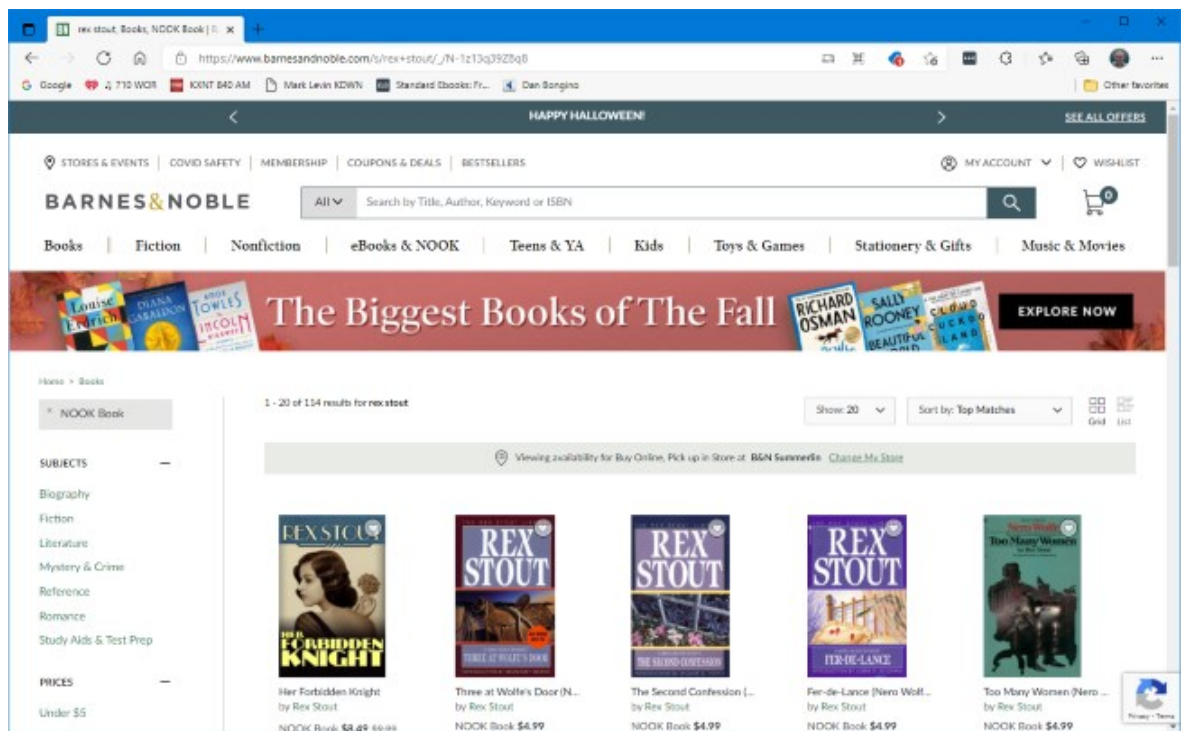
If you subscribe to Amazon Prime, you have access to an extensive collection of e-books at no charge via the Prime Reading service. In addition, you can have free access to up to ten e-books for as long as you wish. Then, return or buy one of the ten you have when you want another.

Barnes and Noble

Barnes and Noble sells books in “Nook book” (E-Pub) format and paperback and hardcover. B&N also sells a family of Nook reader tablets and has a free reader app. In addition, you can set up an account on B&N and enjoy special pricing, free e-books, and other perks.

See the screenshot below to get a sense of their online store. The search window is very smart.

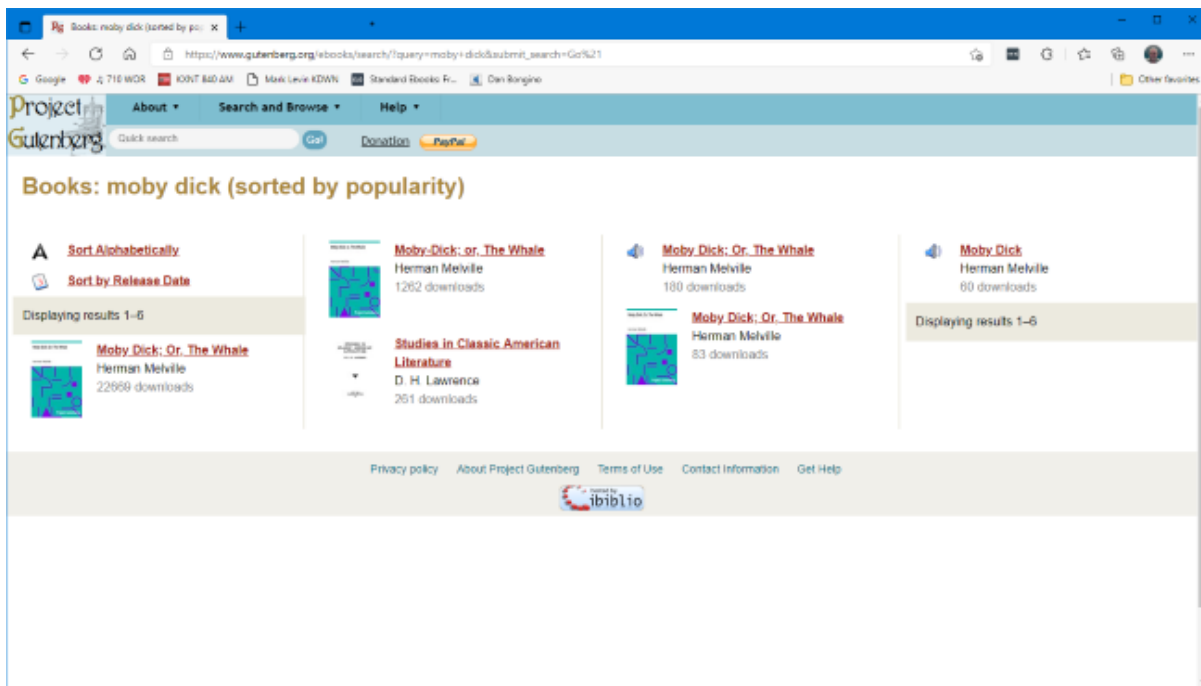
The Nook book reader is a 10-inch Android tablet (made by Lenovo) with 32 GB of storage, listed at \$130 (as of 5/16/23). It has full access to the Google Play Store apps. This would include the free Amazon Kindle Reader app for Android.



So, a Nook reader tablet could double as a Kindle Reader, allowing you to shop for books in either Nook or Kindle format.

Project Gutenberg

Project Gutenberg was founded by Michael Hart, who invented e-books in 1971. Its website claims to have 60,000 titles in its library. All these titles are completely free. Most

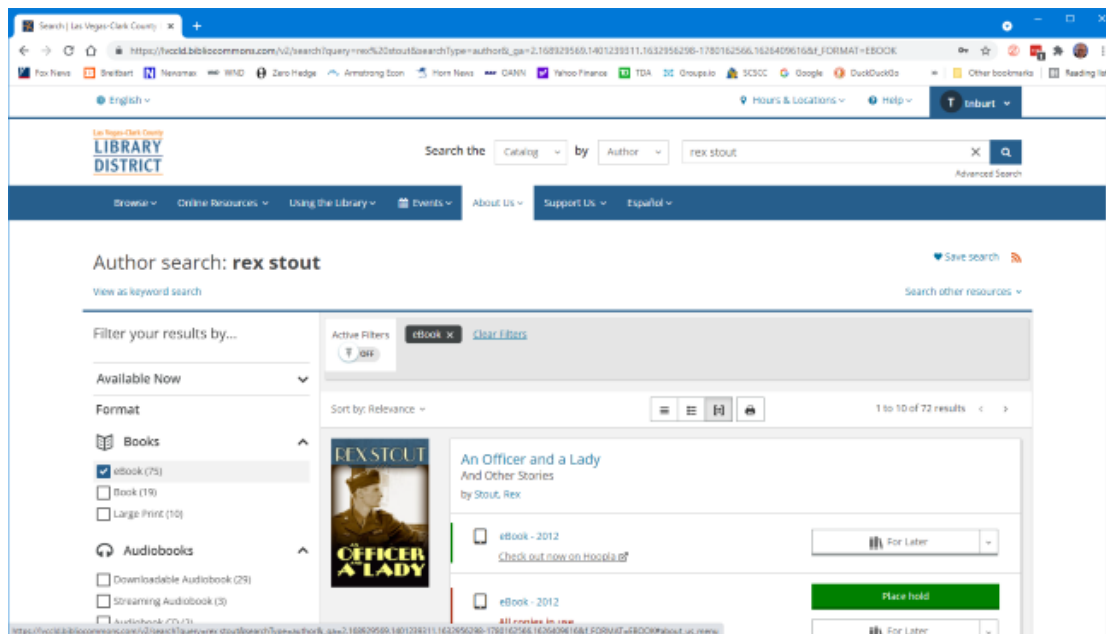


are “classics” that are out of copyright. For example, I searched for Albert Einstein and found an English translation of his Special and General Relativity expositions.

I tried downloading a copy of Herman Melville’s “Moby Dick” in Kindle format and read it using the free Calibre book reader app on my PC. But unfortunately, the Amazon Kindle Reader app wasn’t able to open the book.

Open Library (Editor’s note: Be sure to check with your public library system, it may be different.)

To check out a book, use the search by author, subject, or title to find the desired e-book, click the “Check Out” button, select your format (Kindle, E-Pub, OverDrive Read), and then click the Download button. For Kindle format, you get



redirected to the Amazon bookstore to download the selected e-book. Amazon handles it as a sale for \$0.00 that grants you 21-day reading privileges for that book. After 21 days, the book is automatically “returned,” and you can no longer read it. You get an alert email after 18 days that your “loan” is about to expire. You can also return books early. It’s polite to do that, as others are often waiting to borrow the book. The library has to pay for each lending license, so they often only license a few copies.

Hopefully, that helps you know more about e-books and how to get them. I love them because of the convenience and the ease of reading. And they take up zero space in the house.

###

Flatpaks with Linux Mint

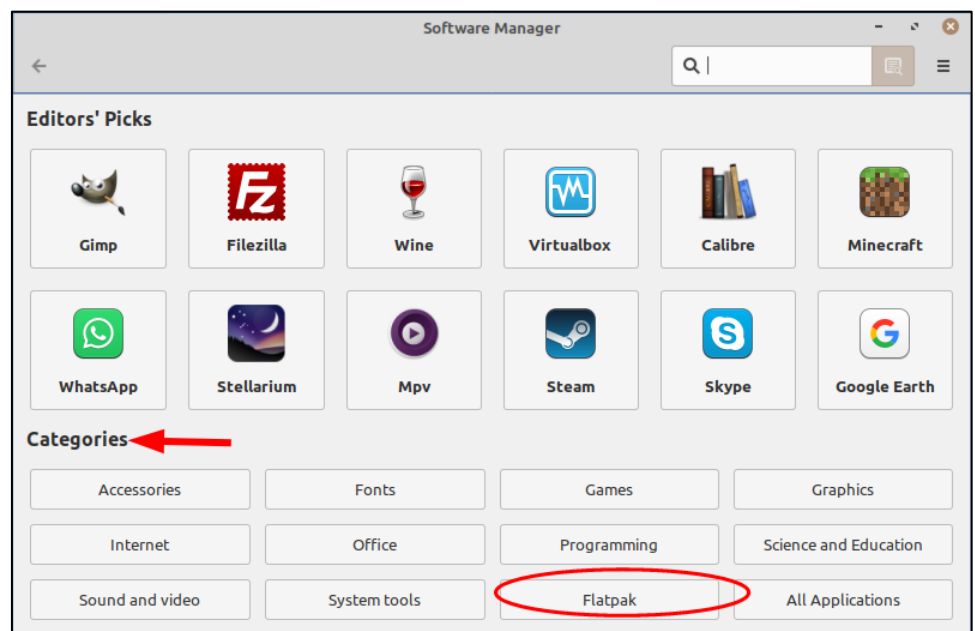
By Cal Esneault, Past President and leader of many Open-Source Workshops & SIGs
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Linux software is installed using pre-compiled “packages.” The traditional method, called dynamic packaging, separately installs the main application and additional supporting sub-components (“dependencies”). Mint uses

the Debian package management system and provides a graphical Software Manager program to help users install new software. To minimize developer efforts, new software versions usually only appear at two-year intervals (security and bug fixes appear as soon as they are available).

Recently, Mint has included the ability to get more recent software using the Flatpak container method. A “container” packages the main program and dependencies as a single unit. Flatpak applications are universally available from flathub.org and are maintained by software developers. The Linux Mint software manager has a special section for Flatpak programs (see below). Installation is analogous to the standard method. About 200 Flatpak applications are available at this time.

When installed in this manner, the application will be “integrated” into the menu system (it appears just like any other app). It can also be removed using the software manager.



While it may be rare that you urgently need a brand new version of standard programs (such as LibreOffice, GIMP, Inkscape, etc.), Flatpaks are very useful in obtaining apps typically unavailable through legacy packaging. A short list of some of these programs is given below.

Discord	Text chat for gamers; phone calls; replaces Skype
Gradio	Browse, search, play radio stations
Bitwarden	Password manager, sync among various devices
Visual Studio	Microsoft proprietary code packaged in a flatpak
Viber	Message or call via PC or mobile
Brackets	Code editor for HTML, CSS, and JavaScript
Shortcut	Video editor for Mac, Windows, Linux
Signal	Voice/Video private calls (PC and Phone)
Slack	Linux version; chat with team members
ElectronMail	Desktop client for ProtonMail
VueScan	Scanner software for Linux, Mac, Windows

Although Flatpak packages come from outside sources and are not compiled by normal reputable groups (Debian, Ubuntu, Mint, etc.), security is enhanced by isolating them from the main OS and from other programs (known as “sandboxing”). Also, developers are helped by writing their interfaces to

comply with Flatpak runtime code versus standard Linux OS methods. Finally, some available programs usually run on Windows or Mac OS.

Flatpak apps are a way to augment your standard Linux Mint packaging system, not replace it. Flatpak and other container systems (Snap, AppImage) are established but still developing protocols to address issues raised by the Linux community. Try one out to see how you like the new way.

###

Who's Watching You?

By Kurt Jefferson, Editor, CKCS Newsletter October 2022 Issue

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More Internet users are relying on VPNs—Virtual Private Networks—that keep your Internet activity from prying eyes than ever before. As more of us pay our credit card bills online, buy tickets from online travel agencies, and read our email, it's clear online privacy is getting much more attention.

Most Americans are unaware that in 2017, Congress passed, and the president signed a bill trashing an FCC rule. That rule would have required Internet providers to get permission from customers before selling their web browsing history and other private information to advertisers, ad agencies, and others.

Instead, Internet providers are free to sell your data, despite your objections. Isn't this backward? Shouldn't you be able to decide who sees your browsing habits, your email, the banks with whom you do business, and your Social Security number?

Personal information such as which illnesses you've searched in a web browser, where you bank, where you shop, and potentially even where your child or grandchild goes to school can now be accessed by the company you pay for Internet service.

To prevent this, more and more of us are paying for VPNs to keep prying eyes away. The COVID-19 pandemic is having a major impact on VPN use.

"When the pandemic hit in 2020, VPN demand skyrocketed, driven by the increased use of internet-based services at home, and the evolution of remote work. During the first two weeks between March 8th and March 22nd alone, VPN usage in the USA increased a massive 124%," reports Findstack.

A blog called The Cornwall Seeker writes, "A decade ago, only a third of Americans and 20% of the people in the UK knew what a VPN was. Now, 68% of all adults in the U.S. use a VPN according to security.org."

A just-released poll by Associated Press-NORC Center for Public Affairs Research and Meritalk reveals that most Americans believe their personal online information is not at all secure.

Most polled believe social media activity such as Facebook, Twitter, or Instagram are not very or not at all secure. Fifty percent say private text conversations lack privacy.

In addition, many are not satisfied with the federal government's total lack of action. Nearly 75% of those polled support establishing national standards for how companies can collect, process, and share personal data.

The Associated Press quotes Sarah Blick, a professor of medieval art history at Kenyon College in Gambier, Ohio, northeast of Columbus as saying, "I feel there is little to no security whatsoever."

Earlier this year, the college's human resources department told Blick that someone fraudulently applied for unemployment insurance benefits in her name. As we spoke about during the September Tech Night Zoom session, VPNs can keep your online activity secure – but only if you use them on all of your Internet devices.

If you missed Tech Night, check out [A Beginner's Guide to Understanding VPNs](#).

If you're ready to choose a VPN, see what [Top10VPN](#) considers its best VPN services. Tom's Guide lists its top choices for the best VPNs.

Because so many Americans (and Internet users all over the world) are currently considering a VPN, it's a very competitive market.

As I mentioned during Tech Night if you can afford it, you can get better pricing if, rather than buying a VPN for six months or one year, you pay for a two- or three-year period.

What To Look For In a VPN

Security & Privacy: As one website says, “A VPN is only as good as its ability to keep you and your data safe.”

Speed: Since a VPN is rerouting your Internet connection through its private servers, if there aren't enough servers your speed can suffer. The best VPNs have vast networks all over the world. If you cannot connect to one server because too many people are connected at the same time, you simply choose another server.

Ease of Use & Customer Support: It should be as simple as moving a slider button on your phone or double-clicking a tab on your Mac or PC to activate a VPN. If you have trouble with a VPN—or questions—the company needs to provide customer support. Period.

Performance & Server Locations: The more servers there are, the better chances you have to connect to your VPN if there's congestion. If you cannot connect to a server closest to you, then there should be one fairly close by. (Connecting to a VPN server in St. Louis or Virginia rather than St. Croix or Germany or Australia will typically give you faster Internet speed from your computer, phone, or iPad in Kentucky.)

Price: Find a VPN that you can afford. Avoid free VPNs. Many of them generate revenue by displaying plenty of ads. So, as you're trying to use the Internet, you're constantly disrupted by ads. Free VPNs often have few servers, and it might be a challenge to find one located near you. What you might not know is that many free VPNs use your computer's processing power when it's not in use. In addition, your activity might be tracked, your browsing details may be sold, and your Internet connection is often slow. Also, it's been discovered that China owns a number of free VPNs. Do you really want your Internet data going to Chinese authorities?

No Logging: The best VPNs will not track your web browser visits, your email, your social media usage, or other Internet activity. VPNs that do track your activity usually have one goal in mind: Making money. They want to sell your data.

“One-quarter of all Internet users have accessed a VPN in the last month,” wrote Rob Mardisalu on the thebestvpn.com website in January 2020.

Here's a breakdown by device:

Desktop: 17% (had used a VPN in the last month as of Jan. 2020.)

Mobile: 15%

Tablet: 7% For some, using a VPN was as common as washing their hands. bestvpn.com reports in early 2020, 35% of desktop computer users and 42% of mobile users (phones, laptops, iPads) had used a VPN every day.

VPN Users by Age (source: thebestvpn.com)

55-64 years old: 4%

45-54: 9%
35-44: 19%
25-34: 33%
16-24: 35%

The Asia–Pacific region has the highest number of VPN users (30%), while North America and Europe lag with far fewer VPN users (17%).

It turns out that retaining anonymity (and keeping personal data private) is the strongest motivator to use a VPN in: the USA, Sweden, Canada, France, Japan, Germany, and South Africa. In other countries, folks use VPNs to stream TV shows and movies that have not yet been released or are off-limits in those regions. In China and Russia, reporters use VPNs to get around repressive, dictatorial internet restrictions.

Need more details? Several websites describe VPNs in simple English so that all of us can decide what's best for us individually.

Here are some links providing details, descriptions, and information about VPNs that are easy to digest:

[How-To-Geek](#) [Tricky Enough](#) [Forbes Advisor](#)

###



What I do after I've put the news-letter to bed. If only from this location!

©Henry S. Winokur. Taken at the Fitapreta Vinhos Winery near Évora, Portugal, May 2022. Canon R5, 1/320ths, f/8, ISO 100, 24mm (RF 24-105 f/4 L IS USM)

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Meeting schedule (Zoom=Online Only, Hybrid=Online/In-person)

1 st Wednesday	7:00 - 9 PM	Arlington General Meeting	Hybrid
3 rd Monday	7:00 - 9 PM	Board of Directors Meeting	Zoom
3 rd Saturday	12:45 - 3:30 PM	Fairfax General Meeting	Hybrid
4 th Wednesday	7:00 - 9 PM	Technology & PC Help Desk	Hybrid
Arlington Meet: 5711 S. 4 th ST., Arl. VA		Fairfax Meet: 4210 Roberts RD., Fairfax, VA	

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