

range Bytes

Volume 46 No 8

August 2022

\$1.50

NOCCC meetings for Sunday August 7, 2022

MAIN MEETING -

Eli the computer guy has generated a video on “What is a Firewall”

If you have ever wondered what a Firewall is and how it works, he tells you. .

Special Interest Groups (SIGs) & Main Meeting Schedule

9:00 AM – 10:30 AM

Beginners Digital PhotographyScience 129

Questions and Answers about Digital Photography

Linux for Desktop Users.....Science 131

Beginners’ Questions about Linux

10:30 AM – 12:00 PM Noon

3D Printing Irvine Auditorium

Questions and Answers about 3D printing

Advanced Digital Photography... ..Science 129

Questions and Answers about Digital Photography

Linux AdministrationScience 131

More topics about the Linux operating system

Mobile ComputingScience 109

We discuss smartphones, tablets, laptops, operating systems and computer related news.

VBA and Microsoft Access/ExcelScience 127

Using VBA code to enhance the capabilities of Access and Excel

12:00 PM Noon – 1:00 PM

3D Printing..... Irvine Auditorium

Questions and Answers about 3D printing

PIG SIG Irvine Courtyard

Bring your lunch. Consume it in the open-air benches in front of the Irvine Hall. Talk about your computer and life experiences.

1:00 PM – 3:00 PM Main Meeting

The workings of a Firewall

..... Irvine Auditorium

3:00 PM – 4:00 PM

Board Meeting.....
Science 129

Verify your membership renewal information by checking your address label on the last page

Mark your calendars for these meeting dates

2022: Aug 7, Sep 4, Oct 2, Nov 6, Dec 4,

2023: Jan ?, Feb ?, Mar ?, Apr ?, May ?,

Coffee, cookies and donuts are available during the day in the Irvine Hall lobby.
Food and drinks need to remain outside the Irvine Auditorium.

“Friends Helping Friends”
since April 1976

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Special email addresses
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Our Website
WWW.NOCCC.ORG

Reminder: Membership expiration dates have been advanced by two years. So if your membership expired in July, 2020 it was now July, 2022. Or to put it another way, your membership renewal is now past due. The same concept holds true for August, so pay your renewal at the meeting.

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July Main Meeting Report

By Jim Sanders

The presentation pointed out that from the perspective of a club member there are two types of Virtual Private Networks. (VPN)

Private

A truly Private network is essentially hard wired. There is no way, other than skulduggery, that a bad guy can gain access to your network. Really large private networks may have a few links that are not hard wired, such as microwave links. But even there, protocols are implemented to make hacking difficult.

Virtual

What do we mean by virtual?

Network Virtualization (NV) refers to abstracting network resources that were traditionally delivered in hardware (hard wired) to software. NV can combine multiple physical networks to one virtual, software-based network, or it can divide one physical network into separate, independent virtual networks.

What do we mean by Virtual Private Network?

A virtual private network extends a private network across a public network and enables users to send and receive data across shared or public networks as if their computing devices were directly connected to the private network.

What is VPN software?

VPN software is **a tool that allows users to create a secure, encrypted connection over a computer network such as the Internet.** The platform was developed to allow for secure access to business applications, provide a pretty good level of privacy, make malware hacking by bad guys pretty difficult, and access to other resources.

What other resources?

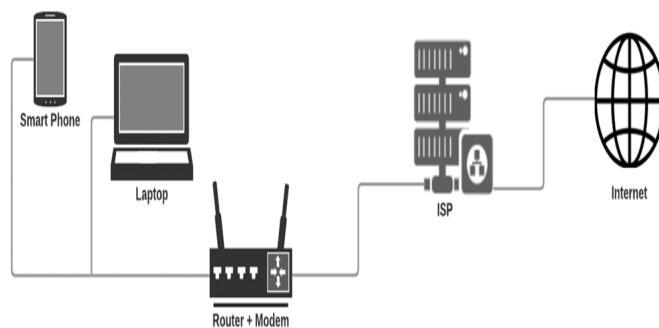
That depends a great deal on how badly **you** are OK with bending if not breaking the rules. Maybe that should read sometimes be breaking the law. You can do all of that without a VPN. But the odds of getting busted, or hacked and infected with malware of all kinds is much more likely.

There are a lot of things one can do with a VPN with relative safety. Downloading of pirated software. Downloading pirated copies of the latest movies. Joining any one of an immense number of *****.xxx** web-

sites. BTW, XXX is the a sponsored Top-Level Domain (sTLD) specifically designed for the benefit of the global online adult entertainment industry to reach their audience using easy to remember, directly relevant domain names. It was first introduced in 2011. Most are straight forward membership for money, viewing/downloading sites, some are free. **The free ones are most likely to cause problems if you don't make use of good protection.**

How does a VPN work

To explain fully what a VPN is and what it does, let's first look at how you connect to the internet normally. When you connect to the internet, your device, such



as a laptop or mobile, connects to a router via WiFi or an Ethernet cable. The router is connected to a modem that, in turn, connects to the internet via your internet service provider (ISP).

Your device sends small clusters of information, called data packets, through these connections that contain instructions on what you want the internet to "do," i.e., which website to visit, log-in details, etc.

The website then responds by sending data packets back to you that show the website and any content or details required.

It is a question of who do you trust. Without a VPN you are trusting your ISP. With a VPN your ISP can no longer see your data, but your VPN provider can. So the question becomes do you trust your VPN provider isn't snooping on your data.

Remember, as shown in the previous slide, once your data leaves the VPN proxy computer it is no longer encrypted. Most of the Web is protected now with HTTPS which is also a form of encryption. However, the packets still reveal domain names and IP addresses.

INTERNET ACCESS SPEED AND TECHNOLOGY

By Member Larry McDavid

There has been much discussion here recently about Internet access speeds. Some of us have seen unexpected increases in access speeds but sometimes only in download speed, not also upload speed. Some of these changes are driven by sales/marketing issues and competition among Internet Service Providers (ISP) but some are actually controlled by technology and even basic physics. The type of Internet access you have is a key factor; most of us have progressed from analog modems on through DSL, AT&T U-verse, cable and fiber optic connections.

AT&T was one of the original suppliers of telephone service and thereby already had twisted-pair wires into our homes. Telephone is an analog technology so Internet analog modems were first used and progressed through several types with increasing speed capability, but with a speed limitation imposed by the frequency response of the standard telephone wire lines. Digital Subscriber Line (DSL) service then offered higher speed and many of us changed to DSL for Internet. Most DSL systems used ADSL ("A" for asymmetrical upload/download speeds). But, DSL has its own speed limits due to the length of the wires between the telephone central office and the home. Soon, optical fiber became available from some companies but required a whole new infrastructure of overhead and buried cabling. Everyone wanted faster Internet access so there was a marketing challenge to provide it despite the cost of new cabling and equipment.

AT&T was a dominant player and already had vast twisted-pair wiring infrastructure in place for telephone use. The corporate mentality at AT&T was to use this existing copper wiring and find a way to minimize the cost of equipment for higher speed data service. Thus evolved AT&T U-verse, a hybrid between fiber and twisted-pair cabling; AT&T pushed U-verse digital service for telephone, TV and Internet and refused to invest in fiber optic cable to the home. It was a strategic corporate decision made over 15 years ago but it was wrong!

AT&T corporate finally realized their choice to implement hybrid U-verse with old, original telephone twisted-pair cable to the home was wrong. Now, they are promoting fiber to the home and are busily playing catch-up to Verizon and Frontier; AT&T no longer offers U-verse to new customers. AT&T is now advertising high-speed fiber to the home where I live in Anaheim, California but I can't find any location in Anaheim that actually has it yet. AT&T even has sales reps in Costco offering high-speed, symmetrical fiber Internet to the home for \$50/month but when I check with them, they discover AT&T fiber is not installed where I live in Anaheim. Running new fiber optic cable to each home is a lot of work and is expensive!

AT&T U-verse is proprietary to AT&T, an American company, but other similar hybrid fiber-to-twisted-pair systems exist and are available in other countries. I have a friend in The Netherlands who has VDSL (Very high-speed DSL), which is similar to U-Verse. His VDSL system provides 26 Mbps download and 3 Mbps upload to his rural location where there is no cable TV service.

Concurrent with all this telephone technology evolution, a vast Cable TV network evolved nationwide, with a new infrastructure of coaxial cable to the home. Coaxial cable inherently has much higher frequency capability than twisted-pair telephone cabling. Originally this service was just for TV but as demand increased for high-speed Internet access it was realized that the coaxial cable infrastructure already in-place could also handle digital TV and digital data for Internet. However, the network of those coaxial cables needed electronic amplifiers in many places along the coax cables to correct for signal strength loss in the coax cabling. Cable TV was developed to provide TV service to the home, not communication from the home back to the cable TV company. Hence, the many amplifiers placed throughout the cable network did not need to pass high-frequency signals back from the home to the cable company; doing this would have increased the cost of this equipment without benefit at that time.

Internet access, though, is inherently bi-directional. The cable TV system already provided high-speed download (or, downstream) through the use of high frequencies, often 860 MHz for TV signals and even higher in some cable systems. There is a fundamental electronic frequency limitation for cable TV upload

(or, upstream) Internet data speed, due to the amplifiers and other hardware cable providers, such as Spectrum, have widely installed throughout their network. It will be very expensive to upgrade to new cable hardware that allows faster upload speed.

Fundamental physics, codified as the Nyquist Criterion, limits digital communication bandwidth based on the frequency used for the communication. Cable TV needed high-frequency capability to downstream TV to the home but had little need for upstream communication; hardware with limited upstream frequency capability was less expensive and was therefore implemented widely. Now, that old hardware is widely distributed across the cable TV network and will have to be replaced to get faster upload speeds. Dr. Harry Nyquist, a Bell Laboratories PhD physicist, showed in 1928 that the sampling speed (read, frequency) must be a minimum of 2X the data rate. Basically, it is a law of physics and can't be circumvented. It is this fundamental-physics that limits cable Internet speed, particularly upload speed.

The old cable TV hardware throughout the USA that limits upstream frequency to approximately 50 MHz (this relatively low frequency may be slightly higher for some cable systems) also limits the upstream digital data rate to about 25 (MegaBitsPerSecond) Mbps. Note this parameter is for digital bits, not digital 8-bit bytes. This is why cable TV Internet upload speed is currently always far slower than the download speed. Fiber optic systems do not suffer this frequency limitation in either direction (upstream or downstream) so fiber optic Internet access speeds can be symmetrical in both directions. Changing this upstream speed limitation for cable will require **vast** expense for new hardware.

I changed from AT&T DSL service to Spectrum cable Internet access to get faster speed. Initially, the cable download speed was 100 (typically 117) Mbps and the upload speed was about 11 Mbps. Competition from mainly Verizon and Frontier fiber optic systems led Spectrum to unilaterally increase the cable download speed to 200 (typically 235) Mbps at no additional cost. Spectrum is again feeling that competitive pressure (especially as AT&T promotes fiber to the home) and has just again increased my download speed to 300 (often 350) Mbps at no additional cost. However, my upload speed remains at about 11 Mbps. The upload speed still suffers the technical limitation I described above. Achieving significantly faster upload speed will

require vast hardware changes to the cable network at great expense. The alternative, of course, is fiber to the home, which AT&T is now promoting. Maybe someday AT&T will finally catch up and be able to offer fiber to us all. The AT&T corporate folks who made the U-verse decision clearly got it wrong! AT&T is now paying a much higher price to install fiber to the home than they would have paid starting 15+ years ago.

AT&T U-verse is essentially dead. AT&T will support existing U-verse users (for now) but is not offering U-verse to any new customers. AT&T is now busy installing fiber optic cabling to the home but at great expense and at limited installation rate. They could have been installing fiber the past 15 years!

Spectrum does offer 400 and 1000 Mbps download speed in some markets, but at additional monthly cost. However, the upload speed still is limited; I've not seen any upload speed above 35 Mbps for cable Internet service. It would be nice to brag that I have 1000 Mbps download and upload speed but I'll have to wait for fiber optics to the home to get that. And, politics get involved as well! Cities contract for utilities and those contracts typically limit competition for similar services. So, if you have AT&T as your city telephone utility, you may not be offered Verizon or Frontier fiber optic Internet service! Generally, telephone and TV suppliers are not competitive so AT&T can install fiber optic cabling and Spectrum can operate coaxial cable with Internet service concurrently. These constraints are really political and can be negotiated in city utility contracts; who knows what goes on with your city government!

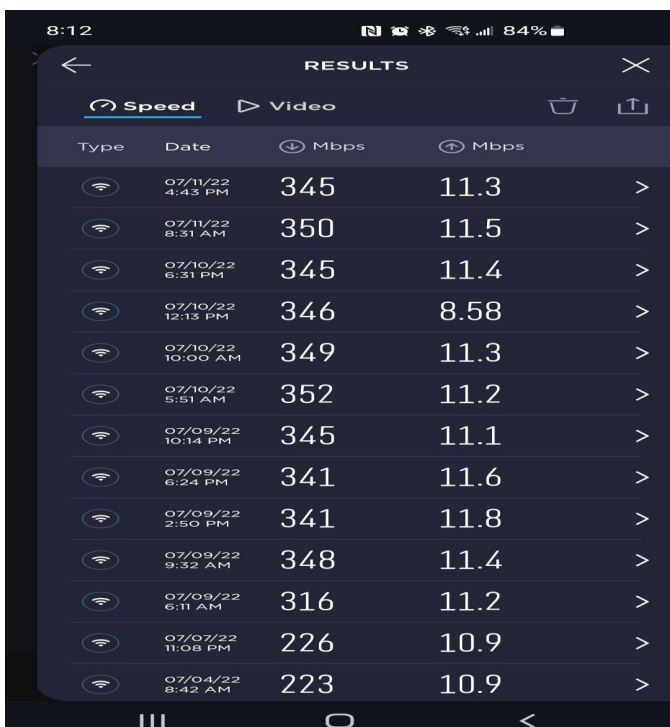
Some cities are proactively promoting fast fiber optic for Internet. Nearby, the City of Fullerton has contracted with SiFi Networks FiberCity to install fiber to every city residence and business, with an announced completion date of fall of 2022. SiFi will install the fiber but is not itself an ISP. The city so far has agreed that GigabitNow and Ting will use the SiFi fiber to offer Internet service as ISP. GigabitNow has announced their standard offering will provide symmetrical 2 Gbps (that is, 2000 Mbps) service, with an option for symmetrical 5 Gbps service. Now, that is impressive Internet access speed!

Yet another future Internet service is possible with the growing 5G(Fifth Generation) cell phone service. This is a new RF wireless service made possible by the use

of ever-higher RF frequency spectrum. Problem is, the frequencies used for the full-bandwidth 5G service are so high that the distance range from cell phones to cell tower sites is very small and new tower sites atop city street light poles as close together as 400 feet will be needed. Obviously, build-out of a nation-wide 5G cell network will take some time.

Fortunately, for most of us, it is the download speed that most affects our use of the Internet. Unless you often send large presentations, pictures or video from your home, an upload speed of 10-30 Mbps is not a problem. Want something faster? Look into fiber. Even the Low-Earth-Orbit (LEO) satellite Internet services cannot match the speed of fiber. Fiber cabling is more fragile than copper wire cabling and is usually installed in plastic conduit. Trucks with big spools of orange tubing being fed underground are installing conduit for fiber optics.

A screen shot showing how my Spectrum Internet access speed recently changed is seen below. Some say they received an email announcing this free speed increase but I did not. I occasionally check my Internet access speeds using Speedtest by Ookla and found the download speed increase. Checking with Spectrum, I found this increase is being implemented only in some markets, likely where there is increasing competition from fiber optic systems.



Type	Date	Time	Download Speed (Mbps)	Upload Speed (Mbps)
WiFi	07/11/22	4:43 PM	345	11.3
WiFi	07/11/22	8:31 AM	350	11.5
WiFi	07/10/22	6:31 PM	345	11.4
WiFi	07/10/22	12:13 PM	346	8.58
WiFi	07/10/22	10:00 AM	349	11.3
WiFi	07/10/22	5:51 AM	352	11.2
WiFi	07/09/22	10:14 PM	345	11.1
WiFi	07/09/22	6:24 PM	341	11.6
WiFi	07/09/22	2:50 PM	341	11.8
WiFi	07/09/22	9:32 AM	348	11.4
WiFi	07/09/22	6:11 AM	316	11.2
WiFi	07/07/22	11:08 PM	226	10.9
WiFi	07/04/22	8:42 AM	223	10.9

Yet another way of getting access to the internet

By Jim Sanders

Verizon is advertising 5G Home a lot on television. That could give you the impression that it is as widely available as the company's 4G LTE network. For instance, Verizon claims its 5G Ultra Wideband offering reaches over 100 million people. Verizon says 5G home internet is available to 30 million people. But just like T-Mobile's 5G Home Internet option, determining if you are eligible isn't easy. You can't look at an online map that clearly shows you are in a service area. Instead, you have to go on Verizon's website, plug in your address and find out if you qualify. That \$25 per month pricing you see on the television ads, that is only if you *also* have the right Verizon Wireless plan. If Verizon is your wireless carrier and you have one of the required Verizon wireless plans, you can get 5G Home for the advertised \$25.00. But if you are not a Verizon wireless customer and you just want the 5G internet service, it starts at \$50 per month with automatic payments enabled. If you don't set up autopay, it is \$10 more at \$60 per month and that is for the first of two plans, the Verizon 5G Home. Then there is the Verizon 5G Home Plus. This starts off at \$70 dollars per month without the same discounts. It is the exact same speed as Verizon 5G Home according to some reviews, but it includes some perks. like a 3 year price guarantee, \$300 off of a sound bar, and discounted security service.

How fast is it? Well, that depends on a number of factors. The current real life speed varies a lot. Under ideal conditions, nearly 1000 Mbps download. One chart lists Verizon 5G Home as 85-300Mbps download, 10Mbps upload. The same chart lists Verizon 5G Home Plus as 300-1000Mbps download, 50Mbps upload. But again, the Verizon website does not say. Then there is the hype about what the speeds will be in the near future. If they actually achieve those speeds it will be impressive. The installation of the system is touted as dead easy. Plug the little white box into power, sit it by a window, wait for the white light to come on. If a red light comes on, move it to a different window, then connect to the WiFi. **Continued on**

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More on 5G WiFi

PLANO, TX – Verizon, Samsung Electronics Co., Ltd., and Qualcomm Technologies, Inc., continue to push the limits of 5G technology, using innovation to continuously drive greater performance from this transformational technology. Recently, the companies reached upload speeds of 711 Mbps in a lab trial using aggregated bands of mmWave spectrum.

“Our mmWave build is a critical differentiator, even as we drive towards massive and rapid expansion of our 5G service using our newly acquired mid-band spectrum, we are doubling down on our commitment to mmWave spectrum usage,” said Adam Koeppe, Senior Vice President of Technology Planning for Verizon. “You will see us continue to expand our mmWave footprint to deliver game changing experiences for the densest parts of our network and for unique enterprise solutions. We had over 17k mmWave cell sites at the end of last year and are on track to add 14k more in 2021, with over 30k sites on air by the end of this year, and we’ll keep building after that,” said Koeppe.

Previous multi-gigabit speeds have been recorded on downloads before, but this is the fastest speed the companies have been able to reach while uploading data to the network. Speeds approaching those seen in this recent trial (for comparison, 700+ Mbps is the equivalent of a one GB movie uploaded in about 10 seconds) will pave the way for uploading videos, pictures and data to the cloud, social media accounts, or sharing directly with others in densely populated venues like downtown streets, concerts and football stadiums. Whether using a traditional mobile link or fixed wireless access, these speeds will also allow students working from home or employees in distributed workforces the ability to upload and synchronize massive files, complete simultaneous editing of documents in the cloud, and collaborate with colleagues effortlessly.

These breakthrough uplink speeds will also drive new private network use cases for enterprises. Faster uplink speeds can enable quality control solutions for manufacturers using artificial intelligence to identify tiny product defects in products visible only through ultra HD video feeds. Other upload-intensive solutions such as multi-location, massive security video capabilities and augmented **reality centered customer experiences will also get a boost with these increased speeds.**

The demonstration surpassed current peak upload

speeds by combining 400 MHz of Verizon’s 5G mmWave frequency and 20 MHz of 4G frequency using the latest 5G technologies, including mmWave carrier aggregation and Single-User MIMO (SU-MIMO). Network technology used in the demo included Samsung’s 28 GHz 5G Compact Macro and virtualized RAN (vRAN) and Core (vCore) along with a smartphone form-factor test device powered by the flagship Snapdragon® X65 5G Modem-RF System.

Snapdragon X65 is Qualcomm Technologies’ 4th generation 5G mmWave Modem-RF System for phones, mobile broadband, compute, XR, industrial IoT, 5G private networks and fixed wireless access. Commercial mobile devices based on these Modem-RF solutions are expected to launch by late 2021.

Samsung’s Compact Macro delivers 5G mmWave by bringing together a baseband, radio and antenna in a single form factor. This compact and lightweight solution can be easily installed on the sides of buildings, as well as on utility poles, for the swift build-out of 5G networks. The Compact Macro achieved first Common Criteria (CC) certification against Network Device collaborative Protection Profile (NDcPP), an internationally recognized IT security standard.

“Enhancing uplink speeds opens the door to new possibilities with 5G mmWave, in transit hubs, downtown areas, shopping malls and crowded venues, while also powering robust 5G fixed wireless access services in homes and small businesses,” said Durga Malladi, Senior Vice President and General Manager, 5G, Mobile Broadband and Infrastructure, Qualcomm Technologies, Inc. “Our collaboration with Samsung and Verizon exemplifies how we are collectively driving 5G mmWave commercialization and enabling new and exciting user experiences – everyday.”

A LITTLE HUMOR

Home computers are being called upon to perform many new functions, including the consumption of homework formerly eaten by the dog.

A computer once beat me at chess, but it was no match for me at kick boxing.

To err is human, but to really foul things up requires a computer. Treat your password like your toothbrush. Don't let anybody else use it, and get a new one every six months.

Don't explain computers to laymen. Simpler to explain sex to a virgin.

Yesterday it was working, Today it is not working, Windows is like that.

**North Orange County Computer ClubDr.
 Donald Armstrong
 709 Rosarita Drive
 Fullerton, CA 92653**

To All Members:

The line above your mailing address now shows your joindate. Please use your join **month** to choose when to renew your membership.

Dated Material – Please deliver before August 7, 2022

Membership Level (\$)	1 Year	3 Years
Individual Member	35	90
Each Additional Family Member	15	40
Full-Time* Enrolled College Student	20	
Enrolled High School Student	15	
*Minimum 12 Semester Hours		
Business Member + Ad (Business Card)	180	
Business Member + Ad (¼ Page, ½ Page)	465,	800
Business Member + Ad (Full Page)	1,475	
Contributing Member	75	
Supporting Member	100	
Advocate Member	250	
Patron Member	500	

Directions to the NOCCC meeting location



Enter CA-55 N (Costa Mesa Freeway) crossing Interstate 5 toward Anaheim/Riverside for 9 miles. *Notice freeway and street signs stating "Chapman University."* Exit toward E Chapman Ave. Turn right onto N Tustin St. Turn left onto E Walnut Ave.

1) Turn left past N. Center St. for the **best place to park** in the underground parking structure (Lastinger under the sports field). Pay the small fee (\$2) to park Ask members or help@noccc.org about parking details, restrictions, and our price break!

2) Turn left onto N Center St. On the right is the Hashinger Science Center, 346 N Center St. Orange California. Parking on the University side is free. Parking on the residential side is a city violation that may cost you a tow away and a ticket!