Interface

Thursday
January 11, 2024
11AM

T HOME INTERNET   Verizon 5G Home.   AT&T 5G

5G Home Internet Services.
Presented
By

Micky Knickman
LCCUG Treasurer

Happy New Year

2024
Inside This Issue

Our links can be found at:

LCCUG.com/links, There you will find many interesting places to visit. Check them out and see what you can find interesting

All Meetings will be Virtual and Zoom

LCCC Community Learning Center
201 W Erie Ave, Lorain, OH 44052

Please Email: info@lccug.com
if you have any questions or
concerns!

A Word From Our President

Welcome to the new year with LCCUG!

Please note that we will be meeting on the 2ⁿᵈ THURSDAY of the first 4 months of the year at 11 a.m.

We did this last year to accommodate Micky's tax schedule and this is our plan for this year as well.

We will also try meeting at 11 am instead of 10 am as we have been. We hope this might appeal to some members so we will be trying it for these first 4 months. Let us know what you think.

We will continue to meet at one of the LCCC classrooms on W. Erie **AND** on **ZOOM**. Whatever works best for you.

We are also eager to hear what you would like to learn more about. We are planning sessions on learning more about AI (artificial intelligence).

I expect that other than our upcoming annual program by Glenn Pubal of Royal Business, we will continue to show select shorts about interesting technology from some of our favorite online you tubers who specialize in topics for Seniors like us.

2nd Thursday of the month at 11 am

So that would be:

January 11

February 8

March 14

April 11

Our December meeting was a lunch at the Golden Corral. About 20 of us met and socialized while eating our fill. We had a 50 – 50 raffle to benefit the Second Harvest food bank. The club matched the collected share from the raffle and is sending the Food bank $200. Bobbi White had the winning raffle ticket.

Our January 11 meeting (11a.m.) will be on less expensive 5G Home Internet services with companies like T-Mobile, Verizon or ATT.

We're looking forward to when Glenn Pubal of Royal Business will return to talk with us soon. His annual visit is always a fan favorite.

Sandra Ruth

LCCUG President

LCCUG Officers For 2023

Position	Officer
President	Sandee Ruth president@lccug.com
Vice President	**Vacant** vp-programs@lccug.com
Secretary	Don Hall secretary@lccug.com
Treasurer	Micky Knickman treasurer@lccug.com
Newsletter Editor	Pam Rihel newsletter@lccug.com
Web Page Editor	Richard Barnett webpage@lccug.com
Statutory Agent	Sandra Ruth statutory_agent@lccug.com
Director of Membership	**Vacant** membership@lccug.com
Director of Advertising	Richard Barnett advertising@lccug.com
Director of Education	Neil Higgins education@lccug.com

Funny New Year's Eve Jokes
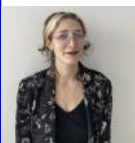
BY MICAELA BAHN

♦ Where can you find the comedians on New Year's Eve? Waiting for the punchline.

♦ What's a New Year's resolution? It's something that goes in one year and out the other.

♦ Why should you have your left foot in the air on New Year's Eve? To make sure you start 2024 on the right one!

♦ What's the one type of pain that you'll enjoy on New Year's? Cham-pain!

5G Home Internet Services.

Verizon 5G Home.

T HOME INTERNET

AT&T 5G

Presented By

Micky Knickman
LCCUG Treasurer

Micky will talk about Wireless Home Internet so you can judge for yourselves which is better for you.

AT&T, Verizon and T-Mobile offer 5G Home Internet broadband service with download speeds rivaling Cable Internet services. Micky will have a discussion concerning his experience converting from Spectrum Internet to AT&T 5G service and also discuss the Verizon & T-Mobile alternatives.

LCCUG

To Wish you a Happy New Year

Woohoo!

Membership Dues

Your renewal dues have been changed from $15.00, To 3 years for $15.00. When everyone else is raising their prices our Computer Club is lowering their dues, so tell your friends to come and Join in the fun and learn computer information.

Tell your family and friends about this great deal. Once in a lifetime opportunity.

LCCUG
Director of Membership,
membership@lccug.com.

Executive Board Meeting Minutes

DECEMBER 5, 2022

The December board Zoom meeting was attended by Sandee Ruth, Don Hall, Micky Knickman, Pam Rihel and Neil Higgins.

Sandee will check on the availability of Glenn Pubal.

She will also check with Richard Barnett on his willingness to serve on board.

The board discussed the final plans for the Christmas meeting.

Pam moved, Neil seconded the meeting be adjourned.

The Lorain County Chapter of OGS

is having its next meeting online:

Check our webpage for the next program.

http://loraincoogs.org/events.html

We are having our meetings virtually only, using Zoom

https://zoom.us/j/6681479672?pwd=amh0NmtmalZWa0lmRWVBWEwySkxmZz09&omn=92912561207

Lorain County Chapter is inviting you to a scheduled Zoom meeting.

Topic: LCC-OGS January 2024 Presentation: "Wells Waite Miller: Forgotten Civil War Hero".

Time: Jan 8, 2024 06:45 PM Eastern Time (US and Canada)

Meetings are free and the program begins at 7:00 PM.

John Kolb
secretary@loraincoogs.org

General Meeting Minutes

DECEMBER 12, 2022

President Sandee Ruth called the meeting to order. A motion to accept the minutes as shown in the December issue of the *INTERFACE* was made by Micky Knickman, seconded by Doug Smith, Motion passed by voice vote.

Sandee brought up election of officers. There were no nominations from the floor including the empty Vice President and Director of Membership. Pam Rihel moved the existing slate be approved by unanimous ballet, Nancy Smith seconded. Motion approved by voice vote.

Sandee announced the meeting day for January thru April 2024 will be the second Thursday of the month at 11 AM in place of Tuesday.

Bobbi White won the 50/50 raffle prize of $85.

MEMBERSHIP WITH LCCUG:

Yearly dues are now $15.00 For 3 years. For more information contact:
LCCUG
Director of Membership,
membership@lccug.com.

Meeting Location:
At a new time: from 10 am. - noon
in a new location: LCCC facility at
201 W. Erie, Lorain

Our meeting space is on the first floor – easily accessible – larger – refreshments available!
Please email
info@lccug.com if you have any questions.

Lorain County Computer Users Group
2024 Calendar of Events

http://lccug.com
email: info@lccug.com

Using Zoom & In Person
Meeting & program starts at 11:00 am

2nd Thursday of each month until May. Changes are announced on the webpage and the newsletter.

All meetings are open to the public

If you have anything you would like to know about, PLEASE let up know. We would really like your input.

January 11, Thursday Wireless 5G Home Internet

February 8, Thursday

March 14, Thursday

April 11, Thursday

May 14, Tuesday

June 11, Tuesday

July 9, Tuesday

Genealogy Tip of the Day

More than One Connection
michaeljohnneill, 03 Jan 09:26 AM

Never assume that once you've figured out one relationship between two individuals that there could not be another.

A man named Rolf married the sister of my ancestor and that was the first relationship I learned about. Later I discovered that years before he married the ancestor's sister, he had been married to that same ancestor's aunt.

So he was originally my ancestor's uncle by marriage and then his brother-in-law.

Sometimes there is more than one connection.

25 March Started the Year
michaeljohnneill, 01 Jan 03:53 PM

Until 1752 England and their colonies started the "new year" on 25 March. That can create confusion because during the time when the year started on 25 March, the year number would not "roll over" to the next year until 25 March.
This article on the State of Massachusetts website goes into more detail.

This post on our sister site shows a will dated 17 June 1743 and admitted to probate on 9 March 1743.

To view these pages with your pointer on the blue ,hit ctrl & enter

NEED HELP?

Here's Who to Contact:

Neil Higgins
 440-985-8507 - **higgins.neil@gmail.com**
 Evenings 6 p.m. -10 p.m. + Weekends
 Hardware, Linux & Windows Operating Systems,
 Chromebooks, Tweaking your system

Micky Knickman
 440-967-3118 - **micky@knickman.com**
 Daily 5:00 am to 3:00 pm. Leave message if no answer.
 General Software Configuration, Hardware Installation, Basic to Advanced Windows

Richard Barnett
 440-365-9442 - **Richard216@aol.com**
 Evenings & Weekends
 General Software Configuration, Hardware Installation, Basic to Advanced Windows & Web Page Design

Sandee Ruth
 440-984-2692 - **sandee29@gmail.com**
 Basic Word Processing, Windows, & Web Design
 Advanced Internet

Pam Casper Rihel
 440-277-6076 or 440-308-8196
 6:00 p.m. to 9:00 pm Monday thru Thursday
 Genealogy help
  prihel1947@gmail.com

Denny Smith Unavailable at this time
 440-355-6218 - **dennis.smith@windstream.net**
 Microsoft EXCEL
 Leave message on machine if no answer

If any of our members are interested in helping other users with what programs you are adept at, please contact any of our officers with you name, what program or programs you would be willing to give help with, you email address and or phone number and when you would like to have them call you. Thanks

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Problem Solving Workshop

 Date:Thursday– January 11, 2024
 Time: 12PM –Please show up by 12:30
 Instructor: Micky Knickman
 Place: LCCC @ 201 W. Erie Ave., Lorain, OH

Learn how to repair or update your computer by changing hard drives, memory, CD ROMs, etc.

This workshop is limited to LCCUG members in good standing.

The Problem Solving Workshop is being held at our new building, LCCC, 201 W. Erie Ave. Lorain, Ohio

You are asked to bring in your computer, laptop and other electronics that you need help with unless the problem/question can be replicated on any device.

Learning About Electronics

 Date:Thursday– January 11, 2024
 Time: 12PM –Please show up by 12:30
 Instructor: Sandee Ruth
 Place: LCCC @ 201 W. Erie Ave., Lorain, OH
  Learn how use you electronic devices.

Members are encouraged to bring their tablets, iPod, kindles, etc. for assistance from Sandee and any other knowledgeable members. The public is welcome to sit in on these sessions.

Member of Association of Personal Computer Users Groups

Officers Nominations

Elections of Officers 2024

Elections were held at the December Meeting

These are the results

President Sandee Ruth president@lccug.com

Secretary Don Hall
Secretary@lccug.com

Treasurer Micky Knickman
treasurer@lccug.com

Newsletter Editor Pam Rihel
newsletter@lccug.com

Webpage Editor Richard Barnett
webpage@lccug.com

Statutory Agent Sandra Ruth
statutory_agent@lccug.com

Director of Advertising Richard Barnett
advertising@lccug.com

Director of Education Neil Higgins
education@lccug.com

These are the Vacant spots:

Vice President and Membership.

Please think about becoming a board member. It isn't hard and doesn't take up much time.

There will be lots of help to explain what you need to perform these open spots.

We need new ideas, so feel free to send us any suggestions you might have.

Thank you

From the Board

→ BIG NEWS ←

New time and new day until the May meeting.

Day: 2nd Thursday of the month

Time: 11:00 am

Place: LCCC Community Learning Center 201 W Erie Ave, Lorain, OH 44052

LCCUG Meetings will be happening on ZOOM & in Person

Workshop will be held after the meeting, approximately 12:30pm

Please Email: info@lccug.com if you have any questions or concerns!

Please mark your calendars of these changes.

We are counting on you all to attend our monthly meetings, either in person or on ZOOM.

The reason for the change is that Micky will only be available on Thursdays until May.

Thank You

Tip of the Day:

Turn Off Windows 11 Widgets

One of Windows 11's annoying features is the so-called "widgets" area, which displays random things including (poorly) curated news stories from MSN news. If you happen to pass your mouse pointer over the icon in the taskbar, up pops the mess that is widgets.

OK, clearly I'm not a fan. And if you are, then this tip's not for you.

However, if you're ready to make the Widgets disappear:

Right-click on the Taskbar

Click on Taskbar settings

Turn Widgets off

Simple as that.

Visit Tip of the Day: Turn Off Windows 11 Widgets for moderated comments, related links, and updates.

Have a question? An idea or request for a future Tip of the Day? Use Ask Leo! for Patrons to drop me a line.

Tip of the Day: Dust Is Your Enemy

The Basics
Fundamentals & Refreshers for All

I have three dogs. (Corgis, for the curious.)
In our home, we fight a constant battle against dust and pet fur. In some areas, it's a lost cause. For example, a meal without a little dog hair just isn't complete.

When it comes to your computer, the battle is a little more important. Dust and fur and who-

knows-what accumulate on and inside of your computer over time, restricting airflow and eventually leading to overheating. The result can range from benign (clean it out and all's well), to expensive (the part that overheated is broken and needs replacing).

Needless to say, avoiding the problem is the best defense.

Place your computer where air can flow freely. Unfortunately, air contains dust, and sometimes more than a little pet hair, so that detritus will probably also flow freely on the outside of your computer, where the air flows in, and thus all over the inside of the computer as well.

The outside is easy: brush it off every so often. How often will depend on exactly how quickly dust accumulates in your location.

Inside is a little more difficult. In some cases, you won't be able to open your computer to clean it out, but with larger desktop machines, that's something worth doing every so often. Again, exactly how often depends on how bad the problem turns out to be.

Be sure to turn off your machine before attempting either of these approaches.

There are differing opinions on whether to suck or blow.

Suction, as with a brush attached to a vacuum cleaner, is one approach some people use *carefully*. The risk is that using such a device will cause another enemy to appear: static electricity. One spark in the wrong place at the wrong time can do even more damage.

The generally preferred approach is to use a can of compressed air. While this doesn't remove the dust from the environment like vacuuming might, it gets it off of and out of the computer, which is the real goal here, and somewhere you can vacuum it up safely.

Pet the dogs, embrace the fur, but do what you can to keep your computer from feeling the

same way.

Footnotes & References

Just for fun, the image below was created using AI, of course, with the following sequence of prompts:

- 16:9 photorealistic image of the back side of a very dusty desktop computer.

- More dust. include pet hair. show the backside of the computer

- Dustier. dustier still. the dustiest computer ever seen.

The tool generated the following instructions for itself:

"Create a photorealistic image showing the back side of a desktop computer with an extreme amount of dust and pet hair, making it appear as the dustiest computer ever seen. The dust should be extremely thick, forming a dense, almost solid layer that covers every part of the computer's back. It should be difficult to even distinguish the ports and cables due to the heavy accumulation of dust and pet hair. The image should convey an extreme level of neglect and lack of cleaning, with the dust and hair almost transforming the appearance of the computer. The image should be in a 16:9 aspect ratio."

Hopefully nothing we'd ever see in real life.
Visit Tip of the Day: Dust Is Your Enemy for moderated comments, related links, and updates.

ScamBusters.org

HOW TO SPOT A HOME WARRANTY SCAM AND BEAT THE FRAUDSTERS

DON'T LET HOME WARRANTY FRAUDSTERS PILE ON THE PAIN AFTER AN APPLIANCE BREAKDOWN: INTERNET SCAMBUSTERS #1,098

With appliance and home system repairs that can run into many thousands of dollars, taking out "insurance" via a home warranty seems like a no-brainer.

But this $3.6 billion business sector is a favorite hunting ground for scammers, and victims often don't realize they've been defrauded until the last minute.

But in this week's issue, you can learn about the most common types of home warranty fraud, the warning signs, and the protective action you can take.
Let's get started…

HOW TO SPOT A HOME WARRANTY SCAM AND BEAT THE FRAUDSTERS

If, like most of us, you find yourself asking "What's next?" after an appliance breakdown, you may be kicking yourself for not taking out that home warranty you read about in a flyer, mailer, or online.
And if you do have a warranty, this will be a test of your faith in the warranty provider's promise they'll put things right quickly and at minimal cost.

Although that's what happens in the majority of cases, a quick Google search will show you the Internet is littered with woeful tales of home warranty scams.

By knowing how to spot them and protect yourself, you could not only save yourself a lot of money but also avoid the pain of chasing the fraudsters and burning up days, weeks, or even

---

months of frustration when you just want the thing, whatever it is, fixed ASAP.

WHY YOU'RE AT RISK

In simple terms, a home warranty is a lot like an insurance policy. You pay a premium and if things go wrong with major appliances or utility systems, the "insurer" covers all or most of the cost of repairing or replacing them. It's a $3.6 billion market.

But warranties vary from company to company in terms of what they cover and how much they'll pay. For example, are pre-existing issues covered (probably not), can you choose the contractor/supplier, is there an age limit on replaceable/repairable systems and devices?
If you don't know the answers to these questions, you may not have the protection you think you have.

And if you don't know how trustworthy the provider is, you may discover too late that your warranty is actually worthless.

THE MOST COMMON HOME WARRANTY SCAMS

If you've never received a message saying your home warranty expired - whether you have coverage or not - you're a lucky exception. These emails and letters, usually sent out at random, complete with payment slip, are by far the most common form of this type of scam. Sometimes they're genuine solicitations, but any company that promotes its wares this way should be regarded with suspicion, at best. We say: Trash them.

Other warning signs to look out for include:

- There's no written contract.
- There is a contract but it's confusing, with lots of fine print and all manner of get-out clauses. Short and over-simplified contracts are just as bad, leaving holes through which a crooked provider can slip.
- Hidden/unlisted fees, such as call-out charges, copies of deeds, and unrea-

sonable coverage limits. They're often tagged onto low-ball premiums.
- High pressure and aggressive sales tactics. "Act now" means you're being pressured. Same goes for repeated phone calls and messaging. And if a reminder is tagged "Final Notice," it's probably a scam.
- No guarantees of workmanship or quality of products.
- Fake warranty companies. The provider isn't real and you have no protection, but you won't find out until you try to contact them or make a claim.
- Discount vouchers and refunds. Scam reminders sometimes have fake coupons or vouchers supposedly worth a couple hundred dollars. Often, they look like checks, but they're not.
- Difficult cancellation process and long waits for attention to your problem.
- Denying or delaying legitimate claims by referring to fine print exclusions or vague reasons, like your lack of maintenance. Sometimes customer records are altered to make a fault look like a pre-existing condition.
- Bait and switch. Like extra fees (see above) or sending out poor technicians then charging again for a second visit.

HOW TO SAFEGUARD YOURSELF AGAINST HOME WARRANTY FRAUD

As with most scam-avoidance tactics, the most important thing you can do to protect yourself is to thoroughly research the provider you're thinking of using. The basics of this are to check what other users say about them, their rating with trust organizations like the Better Business Bureau, and their state insurance department registration.

Pricing is crucial too. Annual premiums usually cost between $500 and $700, but remember that the cheapest is rarely the best, especially if they're a lot lower than others.

Other steps you can take to protect yourself against home warranty scams include:

How to Stop Home Warranty Scams...

- If you don't already have a warranty and you get a "reminder," it's a scam.
- If there's no contract, don't buy.
- If there's a contract, read every line of this and any other terms and conditions documents. Ask questions about anything you're not clear about. You need to know exactly what's covered. And keep records of all communications.
- Establish exactly what extra fees and deductions you'll have to pay.
- Understand the call-out times and claims process and compare with others. It should be quick and easy.
- Check the source of any reminder or notification. If it seems to come from an organization you already do business with, contact them directly. If it comes out of the blue, beware.
- Get recommendations from friends, family, neighbors, and realtors.
- Be wary about providing confidential personal information until you're at the right stage of the research and decision process
- Check if you might be duplicating existing coverage such as manufacturers and retailer warranties, especially on newer appliances. Unscrupulous warranty providers will use this as a get-out.
- Know the scope of coverage - just wear and tear, manufacturing defects, or accidental damage, for example.
- Try to speak to a human and know how and when you can contact them - 24/7 for instance. If everything seems computer driven, beware.
- Find out what the usual call-out time is. The best firms send a tech out within 48 hours.
- If you just bought a home and it doesn't come with a warranty, have systems checked as part of a home inspection so you'll have an idea of likely risks.

Finally, if you discover you've fallen victim to a home warranty scam, report it to your state in-surance department, the Federal Trade Commission, and the Better Business Bureau.

THIS WEEK'S ALERT
2024 outlook:

Hot on the heels of our review last week of scam prospects in 2024, the non-profit Identity Theft Resource Center (ITRC) has issued a warning, echoing our own, about the fraudulent use of artificial intelligence (AI). Record levels of data breaches during 2023 will also feed a big increase in ID theft. Read the full report: Identity Theft Resource Center 2024 Predictions (PDF).

A Cautionary Tale

David Kretchmar,
Computer Hardware Specialist
Sun City Summerlin Computer Club
https://www.scscc.club
dkretch ** gmail.com
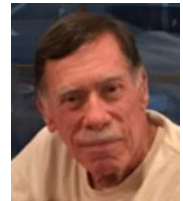
Recently I helped a club member regain control of their Yahoo Mail account after they had been hacked by possibly one of the most sophisticated computer intrusions I have seen to date. The user became aware they had been compromised when people whose names were in the Yahoo Mail personal contact list reported receiving suspicious emails purportedly from the hacked individual's Yahoo account. No doubt those emails contained a link to malware that would have planted itself on any computer on which the infected link was opened.

The user immediately did the correct thing; they changed their Yahoo password.

Subsequently, the user could not log into their Yahoo mail account, instead getting a mes-

sage that their account was locked and they would have to wait a period of time (the countdown "clock" appeared to start at one hour) before attempting to unlock it. The user encountered this lock and countdown when trying to access their account. The timer was an interesting clue since Yahoo's advertised lockout period for a user's repeated incorrect password attempts is either 12 or 24 hours, not one hour. There is a countdown clock available for Yahoo and Google advertisers that could be set to run for one hour or any preselected time.

A Google Chrome issue?

 This user was attempting to access their Yahoo Mail via their favorite browser, Google Chrome. On a hunch, I tried to access the Yahoo account using Microsoft's native internet browser, Microsoft Edge. The user manually entered their Yahoo username and the new password, and they got into their account with no problem! Yet the Yahoo account contained virtually no recent email. I then downloaded and installed the Mozilla Firefox web browser with the same results.

My suspicions turned to the Google Chrome internet browser installed on their computer. I checked the area in Chrome where browser infections are known to attack and reside: Extensions (Settings, More tools, Extensions). I turned off or deleted all potentially problematic Extensions, yet the problem persisted. I then reviewed each application installed on the system and saw nothing suspicious.

Chrome seemed to be operating fine except for the Yahoo Mail issue. This begged the question, "Why does Chrome present problems with Yahoo while two other browsers work?" The problem HAD to be with Chrome. I reset the Chrome browser and deleted cached data, but the problem persisted.

I deleted the Chrome browser, restarted the computer, then downloaded and reinstalled Chrome. The same problem persisted. That pesky timer seemed to continue its countdown, and since I had been working on the issue for almost an hour, the lockout appeared to be about to expire. When the countdown clock dropped to less than a minute, I continued to attempt to log in continuously, finally getting Yahoo to accept the user's login and the new password, and the problem was solved. I had hit the program precisely when the lockout ended before the hacker or hacking program could kick in.

Even after accessing the Yahoo Mail account, the inbox was empty. I sent an email from that Yahoo account to that same account, and it seemed to send OK but never appeared in the inbox. Yet it appeared as sent mail. I checked to filter settings on Yahoo Mail and saw that any mail containing the Yahoo email address of the affected account, including every email going into that account, was being diverted to Trash. Removing that filter was an easy fix for the rest of the problem.

Conclusions and Recommendations

The malware that caused the problem was probably accessed via a link in an email from a trusted friend. This is how most malware is spread. Remember, friends of the club member received an email from the club member that no doubt contained the same malicious link.

To prevent email account lockouts, a user should limit the number of times they try to enter a password. If an account holder gets a "bad username or password" message 2 or 3 times, they should use the "Forgot Password" feature to reset the password. The password is virtually always the problem with email ac-

counts since we keep the same username (email address) all our lives.

Consider using a password manager like the good one built into Google Chrome. This will make it easier to use strong passwords that are almost impossible to hack, as well as make your life easier when you log in to sites. Also, a "keyboard logger" that records keystrokes cannot capture passwords.

Don't count on antivirus software to protect you from hacks. The hacked user discussed in this article was running Malwarebytes Pro and Windows Security, two of the best PC defenses available today.

Internet Security – Once over easy, with Hash

By Phil Sorrentino, Secretary, and APCUG Rep
Sun City Center Computer Club, FL
https://www.scccomputerclub.org/
philsorr ** yahoo.com

The Internet is essential to so many things we do, like shopping, investing, and banking, that you may have wondered how secure the Internet is. And additionally, how secure is my private information during an Internet transaction? And now that we're thinking about it, how is the Internet made secure? If knowing a little about how the Internet is kept secure is interesting, read on; if not, jump to the next article.

The Internet provides essential communications between tens of millions of people and has become an essential tool for commerce; therefore, security has become a tremendously important issue. Internet security has many facets, ranging from keeping communications private to protecting passwords and guaranteeing secure commerce transactions and payments.

Computers are an integral part of the Internet, and when it comes to computers, security is a concern on many different levels. There is

physical security that keeps your computer hardware from being stolen. There is software security that keeps people out of our private files. There is "malware" security that keeps your computer software from being infected with viruses, spyware, worms, and the like. And finally, there is "network" security that keeps private data protected as it goes from one computer (or client) to another computer (or server) on the Internet. These security concerns are important, but the subject here is network security. Network Security is implemented by applying cryptography to messages sent on the Internet.

Remember the "s" in "https://" and the little lock icon on the browser when you go to a "secure" website? Well, cryptography is behind all that security. Cryptography is used to secure telephone, Internet, and email communications (as well as to protect software and other digital property). Cryptography is nearly as old as written language itself. It was invented to address the age-old question: How can I communicate with my friend so that no one else listening will know what was shared? Cryptography becomes necessary when communicating private information over a public or "un-trusted" medium, such as the Internet. Typically, you can be sure that the message you send over the Internet will get to the destination you expect, but you cannot guarantee that intermediaries (computers along the way) will not be able to see and/or read your message if it is not protected. With a collection of not-so-expensive equipment and a good deal of knowledge, a message on the Internet can be intercepted (sniffed), and if it is "plain text," it can be read. For mundane email messages, this is not much of a concern; for messages that contain private information, such as personal information such as bank account or social security numbers, this could be an invitation for Identity Theft.

To get a bit technical here (here's the once over, with hash), we need to address the following four security concerns to guarantee messages are secure on the Internet. 1) *Priva-*

cy: Ensuring that no one can read the message except the intended receiver. 2) *Integrity:* Assuring the receiving party that the received message has not been altered from the original. 3) *Authentication:* The process of proving one's identity. 4) *Non-repudiation:* A mechanism to prove that the expected sender sent this message.

There are, in general, three types of cryptographic schemes typically used to accomplish these goals: Secret-key cryptography, Public-key cryptography, and Hash functions, each of which can be researched in great detail by doing a Google search on the subject and settling in for some rigorous mathematics and explanations.
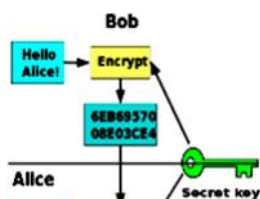
Secret-key Cryptography

However, here is a brief summary. Secret-key cryptography, sometimes called symmetric cryptography because the sender and receiver use the same key, is the more traditional form of cryptography where the (same) key is used to encrypt and decrypt a message.

Public-key cryptography

On the other hand, public-key cryptography uses algorithms to create two asymmetric keys, a public, and a private key. (Unlike secret-key cryptography, it does not require a secure initial exchange of secret keys to both sender and receiver.) The asymmetric keys are a mathematically related key pair: a secret private key and a published public key. These keys protect a message by creating an encrypted message using the public key, which can be decrypted only by using the private key, providing "privacy," the first security concern.

Hash functions are mathematical transformations used to irreversibly encrypt data, meaning that the Hash results cannot be reversed to recover the original message. Hash functions are well-suited for ensuring data "integrity," the second security concern, because any change made to the contents of a message will result in the receiver calculating a different hash value than the one sent by the sender. Since it is doubtful that two different messages will yield the same hash value, data *integrity* is ensured to a high degree of confidence.

"Authentication," the third security concern, is accomplished in nearly all modern computer systems using passwords that authenticate users attempting to access computer resources. For security reasons, passwords are not typically kept on a server in plaintext. Hash functions are commonly used to convert passwords to an irreversible data pattern. When you type in your password, a Hash function converts it to a data pattern and compares it to the data pattern previously stored for your password. Your password is never stored on your machine or your server's machine; only the hash function results are stored. There is no way of going backward from the Hash function data pattern to the password (remember, the Hash function is irreversible). So now you know how the passwords are protected and why when you forget a password, the server can't tell you what it was; they can only reset it to a new password.

Digital Signature

The fourth security concern, "non-repudiation, " ensures the message was sent from the expected sender. This is accomplished by a digital signature which ensures that the sender cannot deny the authenticity of its signature or later deny sending the message. A digital signature is created using the private key of an asymmetric key pair. The signature can be verified by the corresponding public key of the asymmetric key pair, thus proving that the document was "electronically signed" by the private key owner, thus guaranteeing the message's source. So with all of these four concerns met my take, it looks like the Internet is pretty secure.