

# Practical Cybersecurity

*or . . . The internet is a dumpster fire – what can I do to protect myself from hackers and scams?*

David Raymond, Ph.D.  
Associate Vice President for IT Security and Identity  
Virginia Tech  
raymond@vt.edu



VIRGINIA CYBER RANGE

# Disclaimers

- These are my thoughts and opinions – not those of my employers
- Everything I say will be factual\* – don't shoot the messenger!
- I'm a computer guy - I'm not giving investment advice!

\*Barring any honest mistakes!

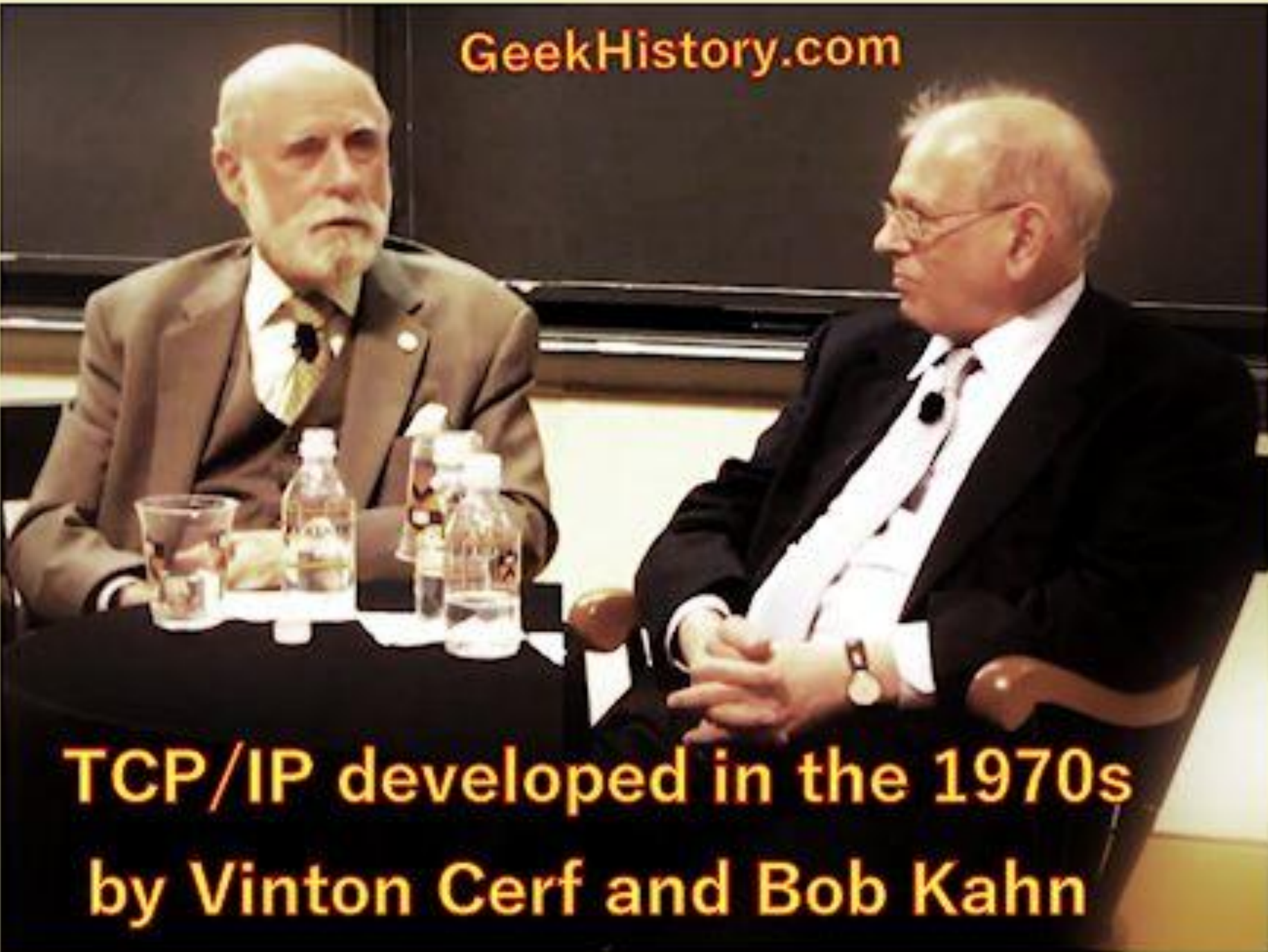


VIRGINIA  
CYBER RANGE



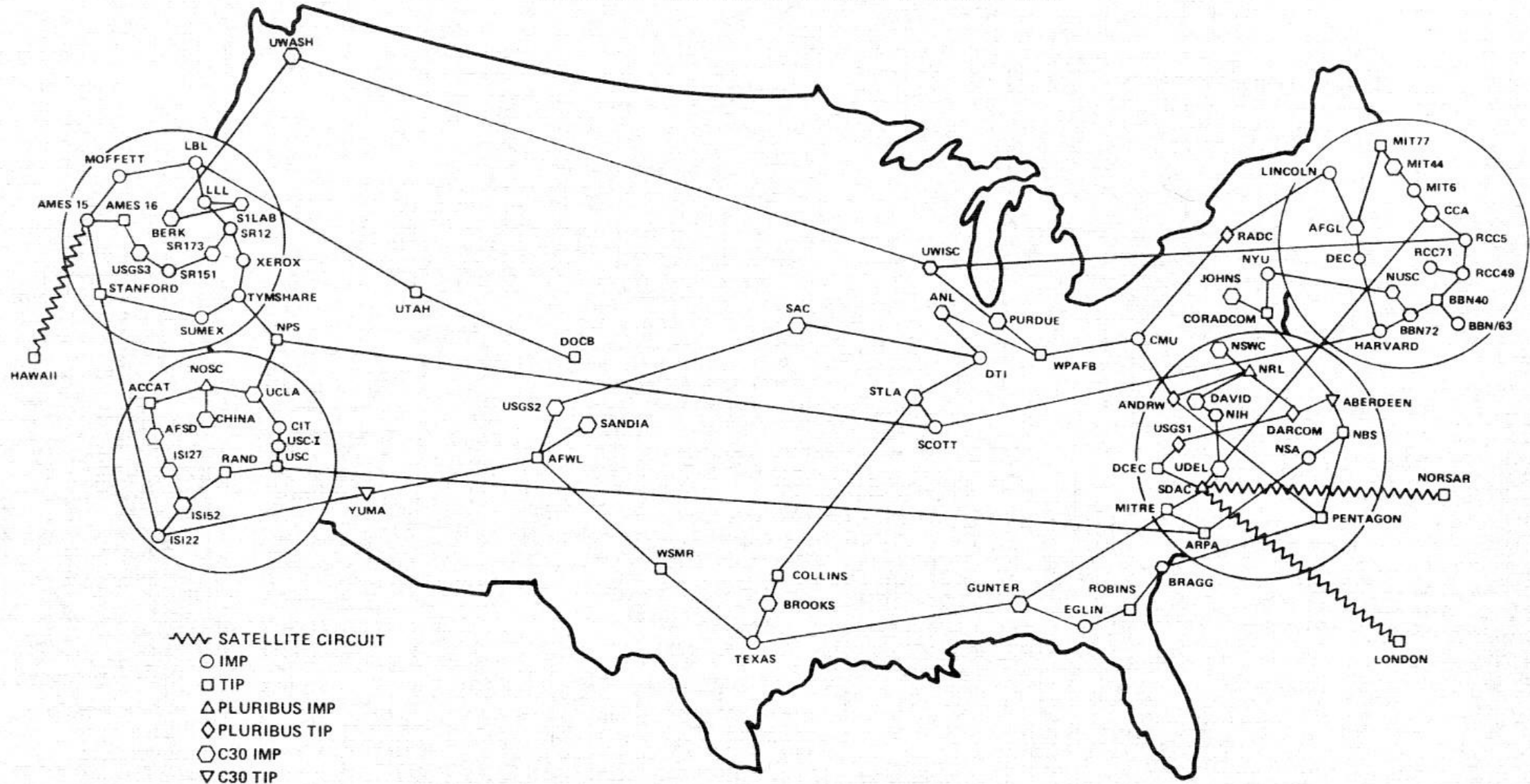
The ARPANET in December 1969

GeekHistory.com

A photograph of Vinton Cerf and Bob Kahn, the co-developers of TCP/IP, seated at a table during a panel discussion. Vinton Cerf is on the left, wearing a brown suit and a patterned tie. Bob Kahn is on the right, wearing a dark suit and glasses. They are both looking towards the right side of the frame. On the table in front of them are several water bottles and a glass. The background is dark and out of focus.

**TCP/IP developed in the 1970s  
by Vinton Cerf and Bob Kahn**

# ARPANET GEOGRAPHIC MAP, FEBRUARY 1982







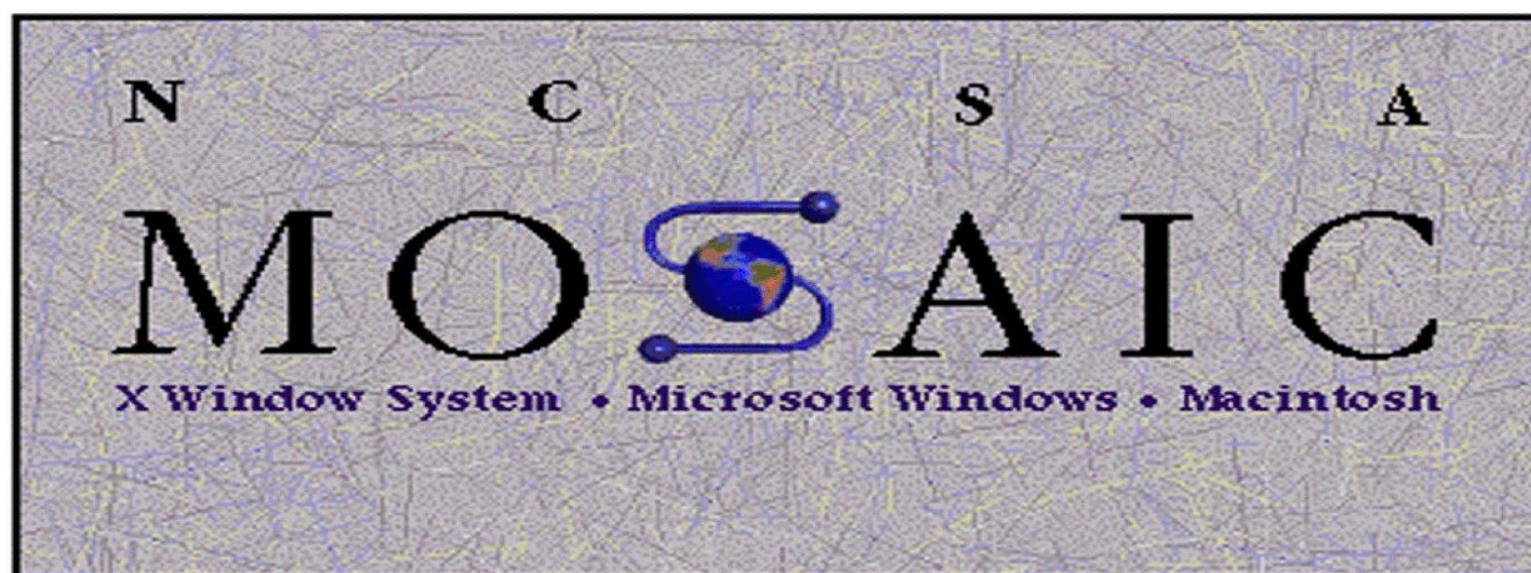
Mailbox is '/var/mail/root' with 2 messages [ELM 2.5 PL6]

1	Sep 17	Patrick J. Volkerd (174)	Welcome to Linux (Slackware 9.1)!
0 2	Sep 17	(45)	Register with the Linux counter pr

You can use any of the following commands by pressing the first character;  
d)delete or u)ndelete mail, m)ail a message, r)eply or f)orward mail, q)uit  
To read a message, press <return>. j = move down, k = move up, ? = help

Command:



☐ ☒ <http://www.ncsa.uiuc.edu/SDG/Software/Mosaic/>

Welcome to NCSA Mosaic, an Internet information browser and [World Wide Web](#) client. NCSA Mosaic was developed at the [National Center for Supercomputing Applications](#) at the [University of Illinois](#) in Urbana-Champaign. NCSA Mosaic software is [copyrighted](#) by The Board of Trustees of the University of Illinois (UI), and ownership remains with the UI.





Back



Forward



Home



Reload



Images



Open



Print



Find



Stop

Location: about:



What's New!

What's Cool!

Handbook

Net Search

Net Directory

Software



NETSCAPE

## Netscape Navigator (TM)

**Version 2.01**

Copyright © 1994-1995 Netscape Communications Corporation, All rights reserved.

This software is subject to the license agreement set forth in the [license](#). Please read and agree to all terms before using this software.

Report any problems through the [feedback page](#).

Netscape Communications, Netscape, Netscape Navigator and the Netscape Communications logo are trademarks of Netscape Communications Corporation.



JAVA COMPATIBLE

Contains Java™ software developed by Sun Microsystems, Inc.  
Copyright © 1992-1995 Sun Microsystems, Inc. All Rights Reserved.



MAKE LOVE  
NOT MONEY





# Online Banking

Login:

\*\*\*\*\*

Password:

\*\*\*\*\*

Security Code:

SU T























# ASHLEY MADISON®

Life is short. Have an affair.®

Get started by telling us your relationship status:

Please Select ▾

See Your Matches »

Over **38,855,000** anonymous members!



**As seen on:** BBC News,  
Reuters, The Sun, The  
Telegraph, The Times

Ashley Madison is the  
world's leading married  
dating service for  
**discreet** encounters



Trusted  
Security  
Award



SSL  
Secure  
Site

[Register on Ashley Madison](#) [Affiliate Program](#) [Press](#) [FAQ](#) [Guarantee](#) [Blog](#) [Infidelity News](#) [Articles](#) [Terms](#) [Privacy](#) [Contact Us](#)

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4 0369

NO  
HAZARDOUS  
MATERIAL  
ALLOWED

**WM**  
WASTE MANAGEMENT  
604-520-7800  
www.wm.com



# The Cost of Cybercrime

## Cybercrime Damages\*

**\$9 Trillion in 2024**

***Could be \$16 Trillion by 2029***

## Ransomware Costs\*\*

**\$1.25 Billion in 2023**

## Cybercrime Statistics\*\*\*

- **Half of all Americans had an account breached in 2021**
- **Data breaches cost US companies an average of \$4.35M in 2023**
- **Romance scams cost Americans \$956M in 2021**

\* "Estimated cost of cybercrime worldwide 2018-2029", Statista, <https://www.statista.com/forecasts/1280009/cost-cybercrime-worldwide>

\*\* Chainalysis, <https://www.chainalysis.com/blog/crypto-crime-ransomware-victim-extortion-2025/>

\*\*\* "The Latest 2025 Cyber Crime Statistics", AAG, <https://aag-it.com/the-latest-cyber-crime-statistics/>















# Case Studies





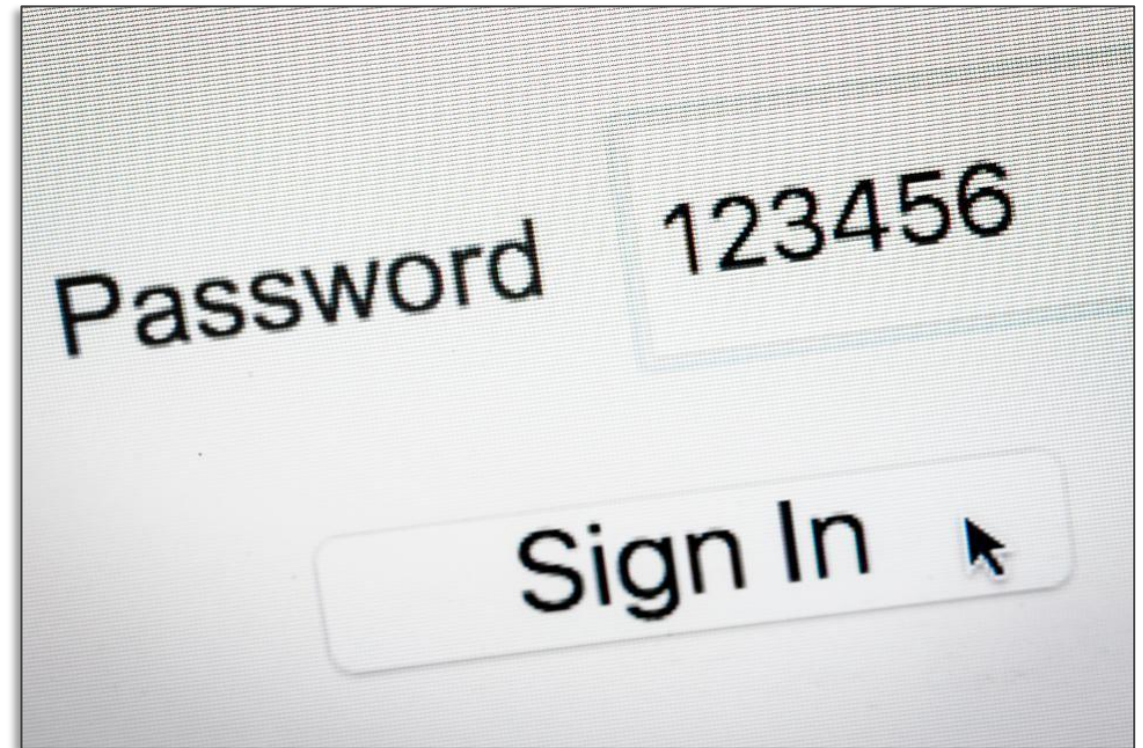


Q: What do  
these people  
have in common?  
A: They reused  
their passwords!




# 24 Most Common Passwords of 2024

- |              |               |
|--------------|---------------|
| 1. 123456    | 13. welcome   |
| 2. password  | 14. monkey    |
| 3. 12345     | 15. login     |
| 4. 12345678  | 16. qwerty123 |
| 5. Qwerty    | 17. dragon    |
| 6. 123456789 | 18. master    |
| 7. 1234      | 19. sunshine  |
| 8. 111111    | 20. ashley    |
| 9. 1234567   | 21. bailey    |
| 10. abc123   | 22. passw0rd  |
| 11. iloveyou | 23. shadow    |
| 12. admin    | 24. 123123    |






https://haveibeenpwned.com/

en pwned Passwords API About Donate 

';--have i been pwned?

Check if you have an account that has been compromised in a data breach

email address pwned?

 Generate secure, unique passwords for every account [Learn more at 1Password.com](#)

[Why 1Password?](#)

312  
pwned websites

5,421,711,825  
pwned accounts

78,950  
pastes

86,251,942  
paste accounts

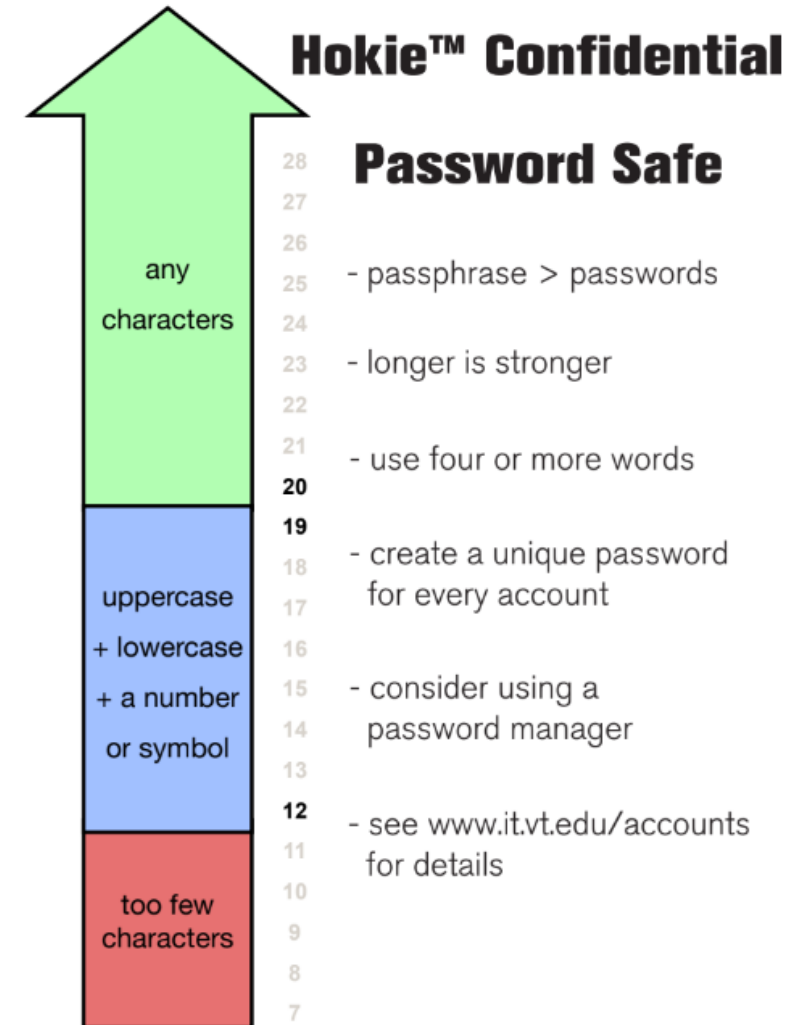
# Use good passwords!

## *What is good?*

- Longer is better! Use a passphrase  
abirdinthehandisworthtwainthebush
- If shorter, add special characters and numbers
- Don't use dictionary words alone
- Don't use predictable passwords
  - Hokies2025!
  - B@ndit
- Can't remember them? Write them down!

Division of Information  
Technology / IT Security Office

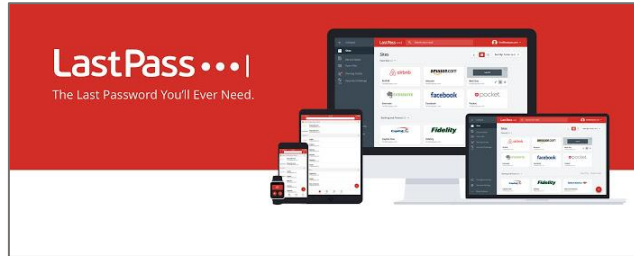
**Hokie™ Confidential**



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# Password Manager



- **LastPass**

- Cloud-based password storage
- Multi-platform
- Free for one platform - \$36/year for premium account

- **1Password**



- Similar features as LastPass
- \$35.88/year



**KeyPass**  
Password Safe

- **KeyPass**

- File-based password storage
- Windows/Mac/Linux
- Free (Open Source)



- **Dashlane**

- Similar features as others
- Free for up to 50 passwords - \$59.99 - \$119.88/year for premium
- Highest tier includes identity theft insurance



**Q: What  
About  
These?**

**Dog's name: Nitro**

**Best friend growing up: Laura Simpson**

**Birthday: August 15, 1990**



VIRGINIA  
CYBER RANGE





NATIONAL  
CYBERSECURITY  
ALLIANCE

RESOURCES

INITIATIVES

ABOUT US



## ONLINE SAFETY BASICS

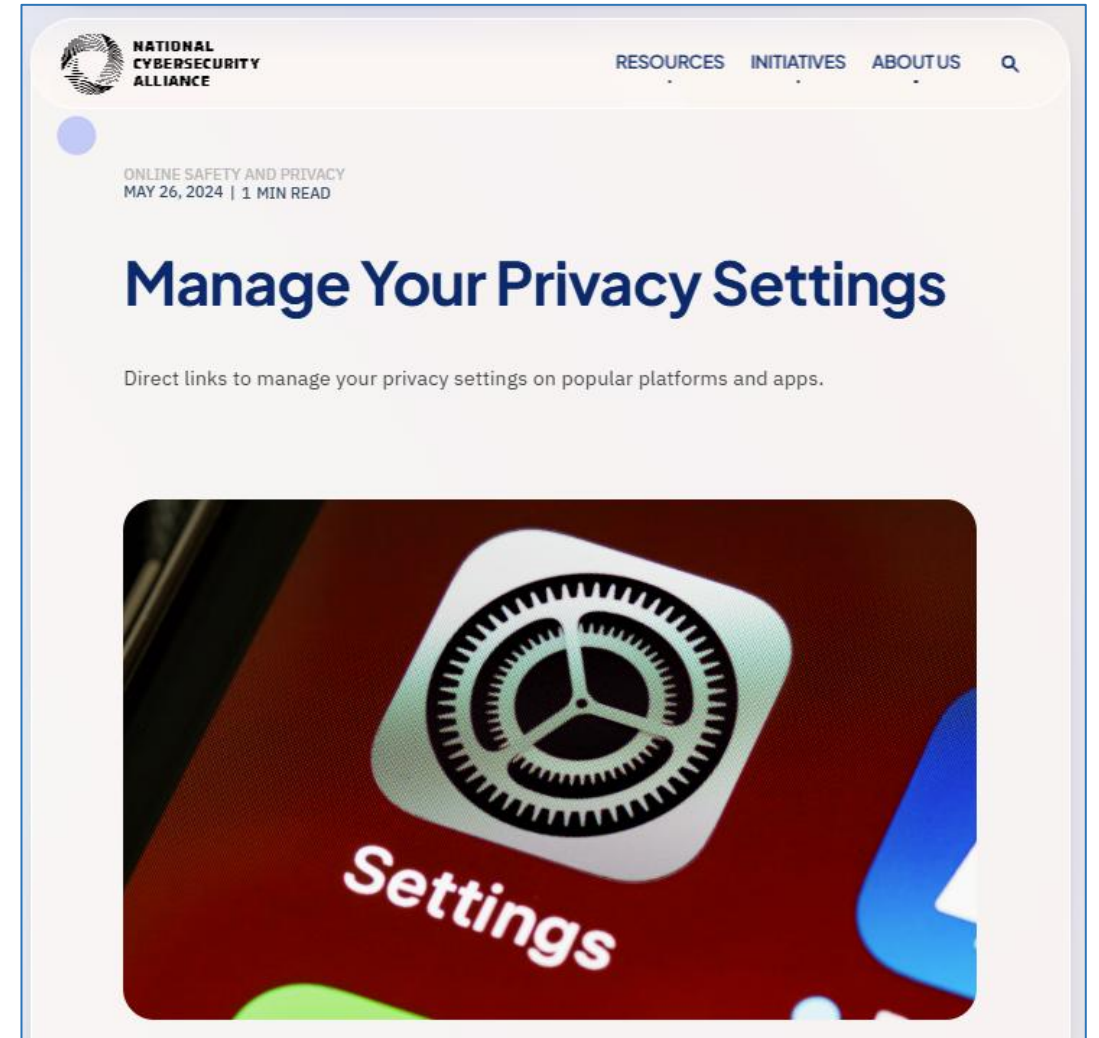
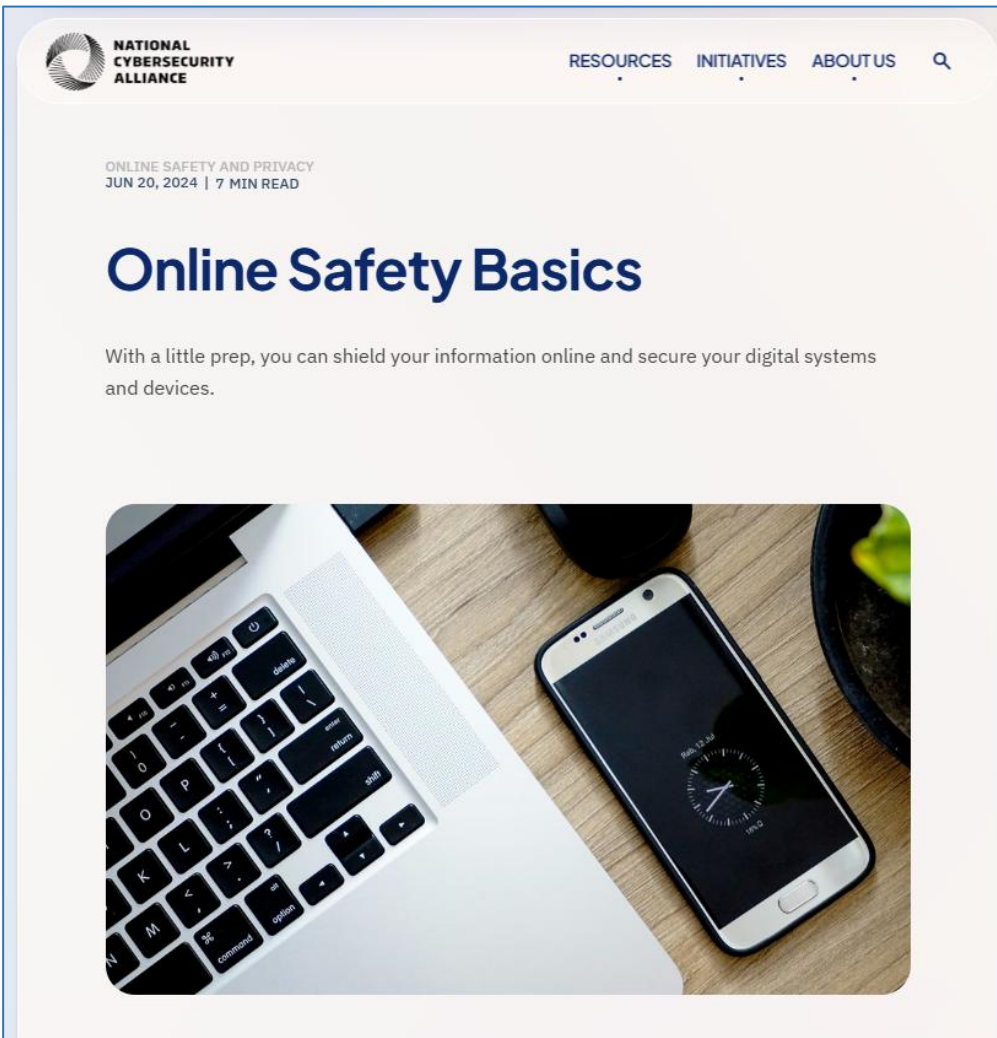
Stay safe online with our simple top ten tips!

Learn More >



SCROLL

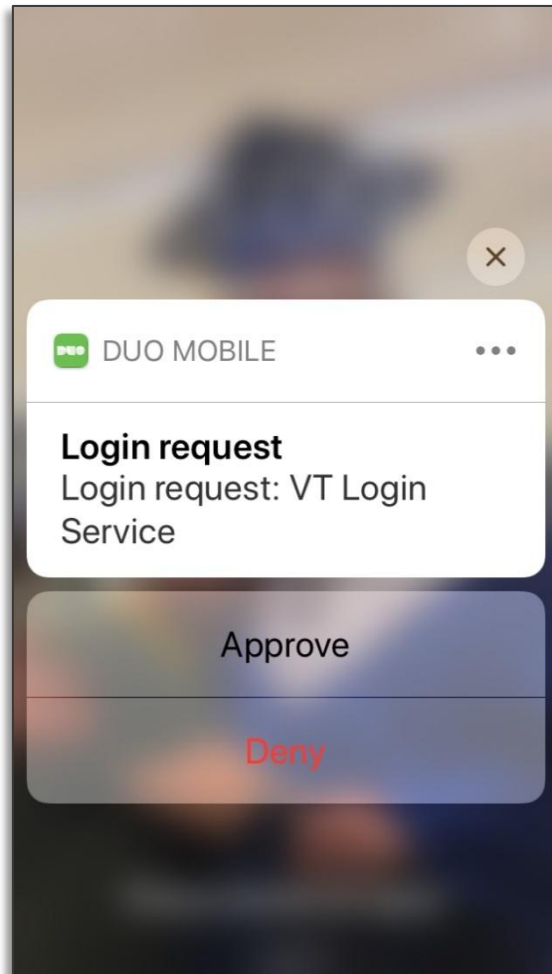
[www.staysafeonline.org](http://www.staysafeonline.org)



[www.staysafeonline.org](http://www.staysafeonline.org)



# Multi-factor Authentication



- Requires a “2<sup>nd</sup> factor” to gain access to accounts
  - Password is “1<sup>st</sup> factor”
- Examples 2<sup>nd</sup> factors
  - Text Message
  - Phone call
  - Authenticator app
- Usually found in account security settings
- Use for “important” accounts
  - Password manager
  - Email accounts
  - Bank/financial
  - Anywhere you have a site saving credit card data

A photograph of John Podesta, an older man with glasses, wearing a dark suit, white shirt, and a red striped tie. He is gesturing with his right hand near his temple. The background is dark and out of focus.

**Q:What about him?**

(John Podesta)

(Hillary Clinton's Campaign Manager)

**A: He got  
phished!**





## Timothy Sands



EXTREMELY IMPORTANT <carlsonbzcoop@gmail.com>

To: ~~XXXXXXXXXX~~, Lana

Lana

It is very important, please reconfirm your cell#.

Thanks.



The physical evidence of the financial transaction HCJ1TFRMVRXL9P#HJ-TA, the bill HCJ1TFRMVRXL9P, serves as a lighthouse of responsibility and transparency, and its attachment signifies the end of the path of trade. The exchange's fine details unfold like a scroll, precisely charting the route from purchase HCJ1TFRMVRXL9P to payment HCJ1TFRMVRXL9P#HJ-TA. Its lines combine descriptions and figures to tell a story of reciprocal duty and economic connection. With its clear representation of the agreement, it becomes a sign of confidence as it becomes attached to the transaction HCJ1TFRMVRXL9P#HJ-TA, bridging the gap between buyer and seller. Its presence causes uncertainty to vanish and is replaced with a sense of closure and affirmation.



DEAR deannakatey@vt.edu,

THANK YOU FOR CHOOSING **NORTON!**

YOUR PAYMENT CARD WILL BE DEBITED AT THE END OF THE DAY FOR THE SUCCESSFULLY RENEWED SUBSCRIPTION TO **NORTON.**

ORDER INFO:

Security Name	Product Amount	Payment Mode	End	Status
NORTON	\$563.53	Auto Debit	12 Months	Active

DATE â€” 2024-May-08

WITH ONLINE SUPPORT, OUR TECHNICAL SUPPORT TEAM IS READY TO ANSWER QUESTIONS AND GUIDE YOU THROUGH THE REPAIR PROCESS.

IF YOU DID NOT AUTHORISE THIS PAYMENT OR RENEWAL OR IT WASN'T MADE BY YOU, PLEASE CONTACT OUR TECHNICAL SUPPORT TEAM AS SOON AS POSSIBLE TO CANCEL OR REQUEST A REFUND.

**+1(830)-(455)-(4719)**

Best Regards

**David**

**Oak Lawn Ave, Charlotte, North Carolina 92863**

REPLY TO THIS EMAIL IS NOT MONITORED KINDLY CALL SUPPORT DESK.

ALL RIGHTS RESERVED COPYRIGHT 2024 **NORTON** - ONLINE COMPUTER REPAIR.



## Order Completed

Dear [samitowsifkhan@vt.edu](mailto:samitowsifkhan@vt.edu),

Thank you for your purchase!

We are pleased to confirm that your order for a Walmart gift card has been successfully processed. Here are the details of your purchase:

### Order Summary:

Gift Card Amount: \$900.00

Recipient's Name: Arslan Khalid

Delivery Method: Email

Order Number: 728965665

Delivery Details: emailed to [arslan.khalid@aol.com](mailto:arslan.khalid@aol.com)

Email Delivery: If you selected email delivery, the gift card will be sent to [Recipient's Email Address] within the next 24 hours.

Physical Delivery: If you selected physical delivery, please allow 5-7 business days for the gift card to arrive at [Recipient's Mailing Address].

If you have any questions or need assistance with your order, please do not hesitate to contact our customer service team at [Customer Service Phone Number] or [Customer Service Email Address].

Thank you for choosing Walmart. We hope the recipient enjoys their gift card!

Best regards,

**The Walmart Team**

**1 (830) 297-0286**

**1 (866) 562-7022**





service@paypal.com

To: order\_status1@klaii.online <order\_status1@klaii.online>



Reply



Reply all



Forward



Tue 2/18/2025 9:48 AM

Hello, order\_status1@klaii.online



## Here's your invoice

F4 Customs sent you an invoice for \$999.99 USD

Due on receipt.

### F4 Customs



You don't have any payments with this seller in the last year.

### Invoice details

#### Amount requested

\$999.99 USD

#### Note from seller

Please review the invoice carefully. If there are any issues with your order, contact PayPal customer service at 1(888) 927-6905 to cancel the order and request a refund.

#### Invoice number

000656

[View and Pay Invoice](#)

Don't recognize this invoice?



[Report this invoice](#)

Before paying, make sure you recognize this invoice. If you don't, report it. [Learn more](#) about common security threats and how to spot them. For example, PayPal would never use an invoice or a money request to ask you for your account credentials.



## This invoice isn't available

We removed this invoice because it may have been a scam. Our fraud detection tools work around the clock to help keep online commerce safe for everyone.

### **What to do next?**

Do not call any numbers or click any links that are in the invoice and consider deleting the email.

If you think this invoice is valid, contact the seller for another way to pay.

Powered by  **PayPal**

Copyright © 1999-2025 PayPal. All rights reserved. [PayPal Privacy](#)



## VITAL NOTICE! READ ASAP



Frederick Nyantakyi <F.Nyantakyi1215@o365.ncu.edu>



Thu 5/16/2024 5:38 AM

### **WORK FROM HOME FOR \$800 - \$1250weeklyPay**

Urgently needed are remote workers who can handle day to day online purchase of Bitcoin. job requires only your mobile phone and computer.

This is a VT internship Job offer for you and every other students who might be interested.

Pay is \$800 weekly

You work just 2hrs daily, weekends excluded.

To Apply, send your NAME and PHONE NUMBER to our recruiting agent at **NUjobrecruiter@outlook.com**

**APPLICANTS MUST BE WILLING TO BEGIN AS SOON AS TODAY!**

## VITAL VT ALERT



michael abt <michaelabt94@outlook.com>



To: michael abt <michaelabt94@outlook.com>

Thu 2/1/2024 10:38 PM

Hello there

We received a request to have your **VT EDU** account terminated and the process has already begun. If this was not authorized by you, please click the link below to undergo a short verification process which automatically puts a stop to the termination process. You are advised to have this done immediately before this account gets terminated.

[CLICK HERE NOW](#) to verify and secure your Edu details from been terminated.



# VirginiaTech



Reply



Forward




# Don't Get Phished

- Don't trust links in emails!
- Hover over links and look for legitimate domains
- Don't open documents that you don't expect
- <https://phishingquiz.withgoogle.com/>

Can you spot when you're being phished?

Identifying phishing can be harder than you think. Phishing is an attempt to trick you into giving up your personal information by pretending to be someone you know. Can you tell what's fake?

TAKE THE QUIZ



Jigsaw | Google

Privacy / Terms / Feedback

# Safe Browsing

- Provides warnings about sites, downloads, and extensions that have been identified as dangerous
- Available for almost all modern browsers
  - Chrome
  - Firefox
  - Safari
  - Edge
- Most let you choose between *standard* or *enhanced*
- Google “[browser name] safe browsing”

## Choose your Safe Browsing protection level in Chrome

When you use Google Safe Browsing in Chrome, you receive warnings that help protect you against malware, abusive sites and extensions, phishing, malicious and intrusive ads, and social engineering attacks.

Safe Browsing crawls and analyzes the web to discover potentially harmful sites and add them to its lists. Each time you visit a website or attempt a download, Chrome checks with Safe Browsing based on the protection level you've selected.

You can choose:

- **Enhanced protection:** Google's most secure browsing experience, Enhanced protection offers security from known and potential new dangers.
- **Standard protection:** By default, Standard protection offers security from known dangers.
- **No protection (not recommended):** You can also turn off Safe Browsing, but you won't be protected against potentially dangerous websites, downloads, and extensions. Your Safe Browsing setting in other Google products won't be affected.

You can choose to visit an unsafe site or download a file after you receive a warning from Chrome.

### About Safe Browsing protection levels

Enhanced protection



Standard protection







+63 969 507 4754 >

iMessage  
Today 6:37 AM

Your package cannot be delivered due to incorrect address information. Please update your address and we will deliver it as soon as possible .

<https://usps.com-trackadlr.top/>

(Please reply Y, then exit the text message, reopen the text message activation link, or copy the link to Safari browser to open it, and get the latest logistics status)

Regards,  
The US Postal Team

The sender is not in your contact list.



askwersk-squitterhm6@ez6xf.u4... >



from: USPS  
Msg: You have a package that needs to be delivered, The package will be returned to the sender soon due to an incorrect delivery address. To deliver your parcel, update your address now. [eqrco.de/a/RTgtsJ?7385](http://eqrco.de/a/RTgtsJ?7385)  
.Courier#AO8W8MQKB3



**USPS\_file-63376.pdf**

PDF Document · 118 bytes



Text Message

The Toll Roads Notice of Toll Evasion:

Our records show that your vehicle has been involved in a toll evasion incident. This is a violation of the toll payment regulations and may result in additional penalties, including fines and suspension of access to toll roads.

To avoid further action, Please settle the toll payment within 12 hours.

Failure to pay within the specified time will result in increased fines and may be reported to the DMV.

We urge you to make the necessary payment promptly to avoid any complications.

<https://txtag.org-txtagstorefrontqqz.xin/us>

VDOT Final Reminder:

You have an outstanding toll. Your toll account balance is outstanding. If you fail to pay by March 6, 2025, you will face penalties or legal action.

Now Payment:

<https://vdot.virginia-ticketee.xin/us>

(Please reply Y, then exit the SMS and open it again to activate the link, or copy the link to your Safari browser and open it)

Please settle your toll immediately after reading this message to avoid penalties for delaying the payment.

Thank you for your cooperation.



11:58   
◀ Signal



+1 (424) 402-7410 >

iMessage  
Today 11:57 AM

Greetings, dear friend! It's been so long since we last connected. Do you remember me?

The sender is not in your contact list.  
[Report Junk](#)



iMessage





+1 (647) 335-9761 >

Text Message • SMS  
Today 2:26 PM

Are you still using this  
number my friend?

The sender is not in your contact list.

[Report Junk](#)



Text Message • SMS





## Romance Scams

**\$9.9 Billion in 2024**

**NEWS** 13 FEB 2025

# Romance Baiting Losses Surge 40% Annually



**Phil Muncaster**

UK / EMEA News Reporter, Infosecurity Magazine

Email Phil Follow @philuncaster



Losses to romance baiting, or pig butchering, scams increased 40% year-on-year (YoY) in 2024 to comprise a third of total crypto fraud revenue, according to Chainalysis.

ADVERTISEMENT

Infosecurity Magazine

**WHAT DOES IT  
TAKE TO BE A**







- Premiere Cryptocurrency exchange
  - Handling **70%** of all bitcoin transactions world-wide
- In 2014, **850,000 bitcoins** went “missing”
  - Would be worth **\$81B** in Mar 2025
- Reasons for disappearance? **“Theft, fraud, and mismanagement”\***

GONE —

# Digital exchange loses \$137 million as founder takes passwords to the grave

QuadrigaCX survivors try to hack encrypted laptop in hopes of accessing cold wallet.

DAN GOODIN - 2/2/2019, 11:40 AM

## February 2019





Home ▶ Bitcoin Exchange ▶ QuadrigaCX Wallets Found Empty, Mystery of \$150 Million Missing Crypto Deepens



Just where is Canadian crypto exchange QuadrigaCX's missing \$150 million in cryptocurrency? | Source: Shutterstock

## QuadrigaCX Wallets Found Empty, Mystery of \$150 Million Missing Crypto Deepens

# March 2019

ANDY GREENBERG

LILY HAY NEWMAN

SECURITY FEB 22, 2025 6:38 AM

# Security News This Week: \$1.4 Billion Stolen From ByBit in Biggest Crypto Theft Ever

Plus: Apple turns off end-to-end encrypted iCloud backups in the UK after pressure to install a backdoor, and two spyware apps expose victim data—and the identities of people who installed the apps.

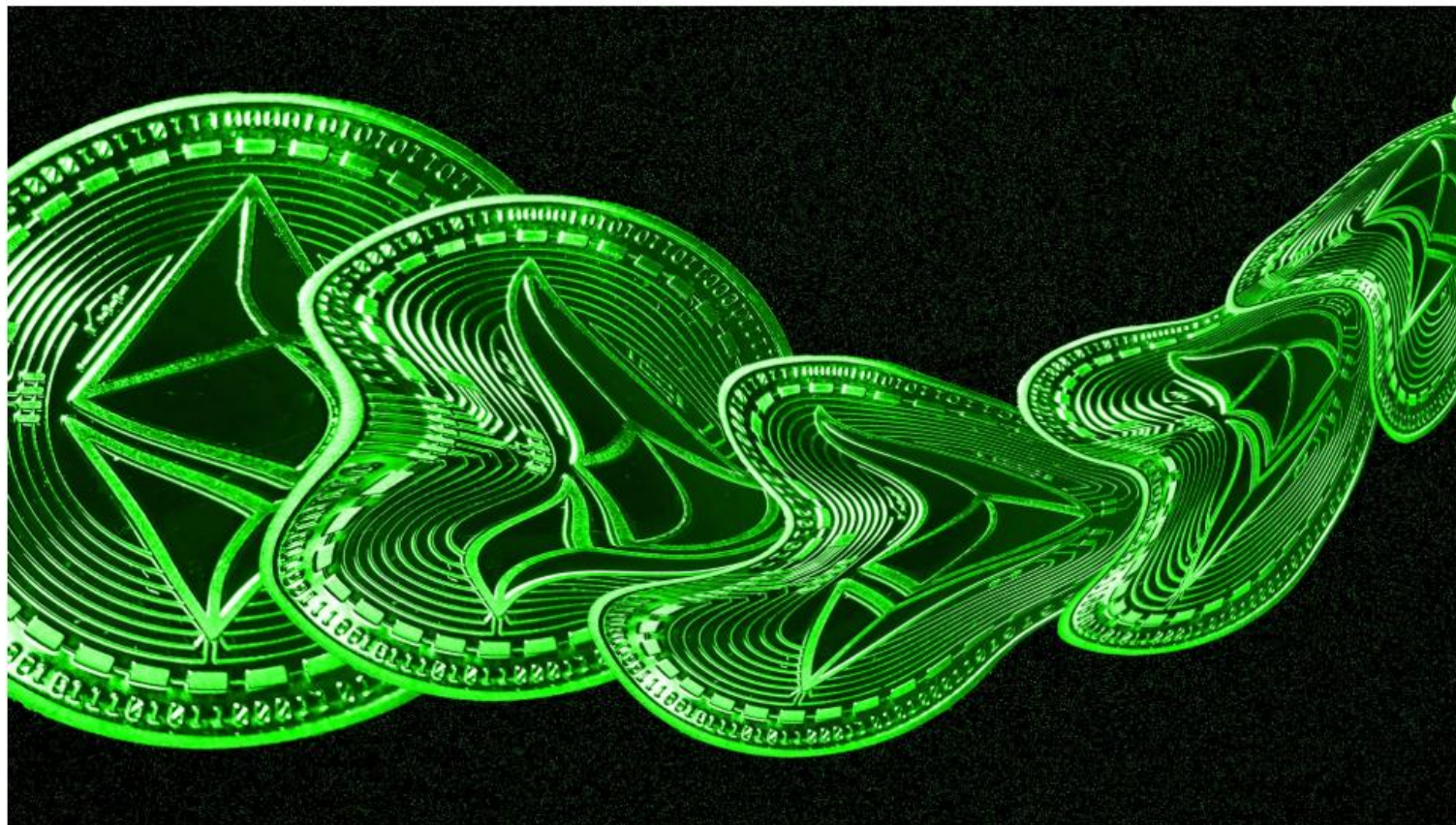


PHOTO-ILLUSTRATION: WIRED STAFF/SHUTTERSTOCK



## Pump Notifier/Trading...

15.9K members

share our channel link to your friends and extend the family!

<https://t.me/PumpNotifier>

Timeanddate

**Captain's Pump!!**

Countdown to 28 Jun 2017

16:00. Showing days, hours, minutes and seconds ticking down to 0

5.4K 5:30

**Pump Notifier/Trading Signals**

The big moment is here! 15 mins to go



Will directly put the coin name in 15 mins with direct link to coin page.  
(BITTREX)

5.1K 5:45 A

**Pump Notifier/Trading Signals**

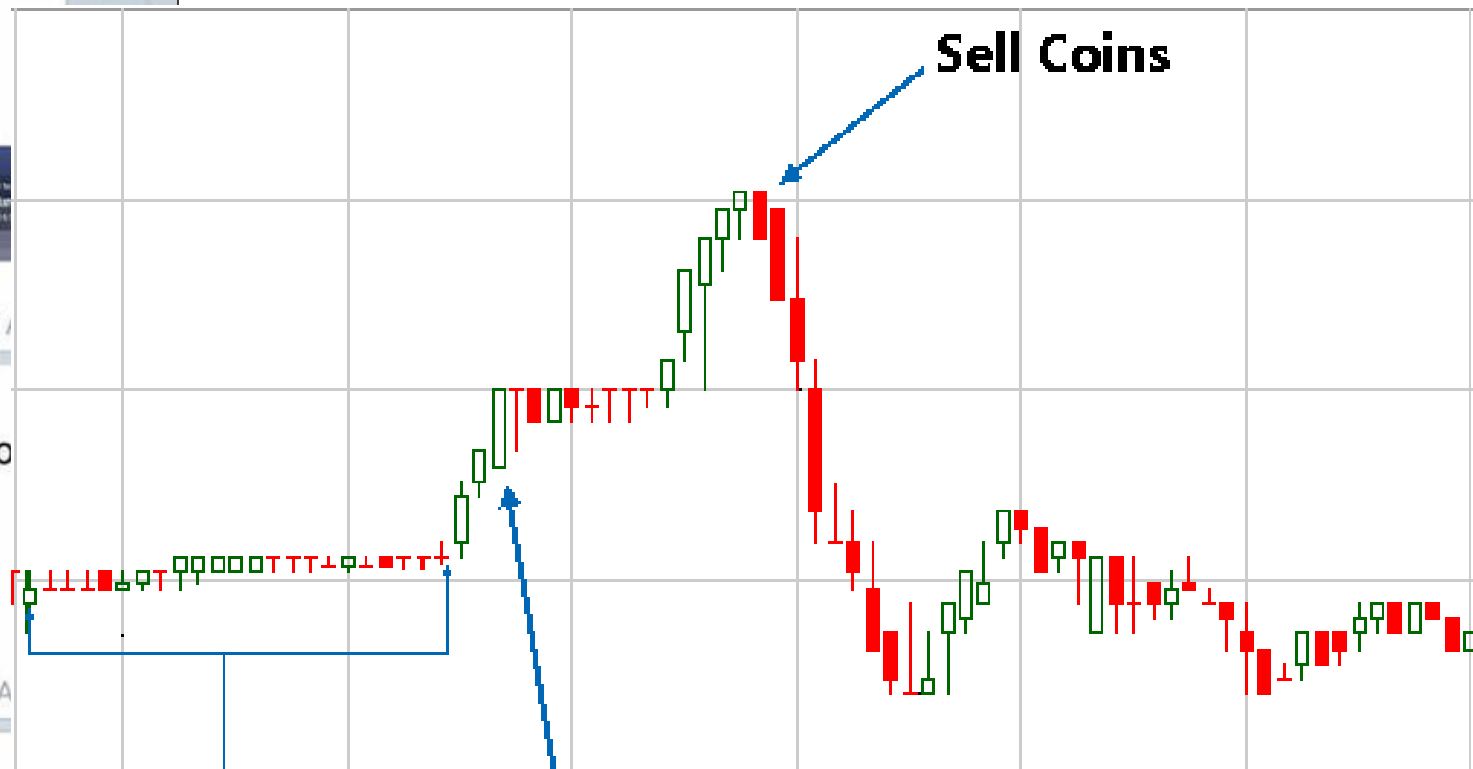
Coin ~ Diamond (DMD)

Excahnge- BITTREX

<https://bittrex.com/Market/Index>

[?MarketName=BTC-DMD](https://bittrex.com/Market/Index?MarketName=BTC-DMD)

4.7K 6:00 AM



**Buy Coins**

**Pump Story**

# Statis Group Finds That Nearly 80% of ICOs in 2017 Were Scams



ICO scams: The ICO advisory firm, Statis Group, just [announced](#) its recent study that showed that nearly 80 percent of initial coin offerings (ICOs) held in 2017 were scams.



# Questions?



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Making Virginia a  
national resource for  
cybersecurity education.

**CONNECT WITH US**



**@VaCyberRange**

**[virginiacyberrange.org](http://virginiacyberrange.org)**