

1. Internet + Phishing = ?

Lose your cash!

Southern Oregon University Phishing Attack Nets Criminals \$1.9 Million
by titanadmin | Jun 20, 2017

Lose your house!

First time homebuyer out more than \$36,000 in spear phishing scam
November 29, 2017

Lose your business!

Ubiquiti Networks victim of \$39 million social engineering attack
By Brian Honan
CSO - AUG 4, 2016 11:58 PM PT

Lose your election!

The phishing email that hacked the account of John Podesta
October 28, 2016

Lose your Instagram?

Hackers Seem to Be Hijacking Instagram Accounts With Increasing Frequency
By DON REISINGER August 14, 2018

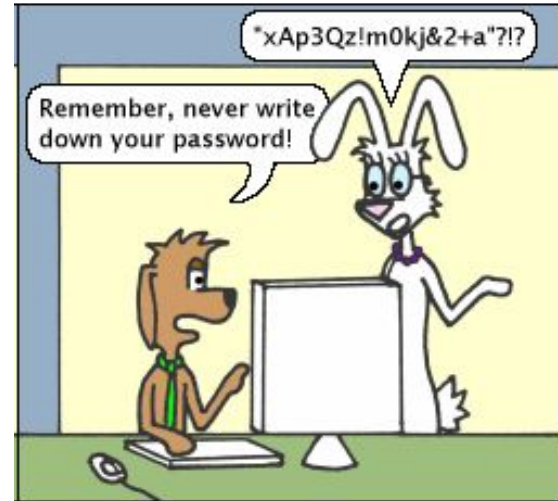
2. Grim Statistics on Phishing

- 76% of businesses victimized (2017), Wombat Security
- 95% of enterprise attacks due to spear phishing (SANS)
- 2018 Verizon Data Breach Investigations Report (DBIR):

"Companies are nearly three times more likely to get breached by social attacks than via actual vulnerabilities, emphasizing the need for ongoing cybersecurity education"

3. One reason? Passwords

Hard to remember, hard to guess VS Easy to remember, easy to guess

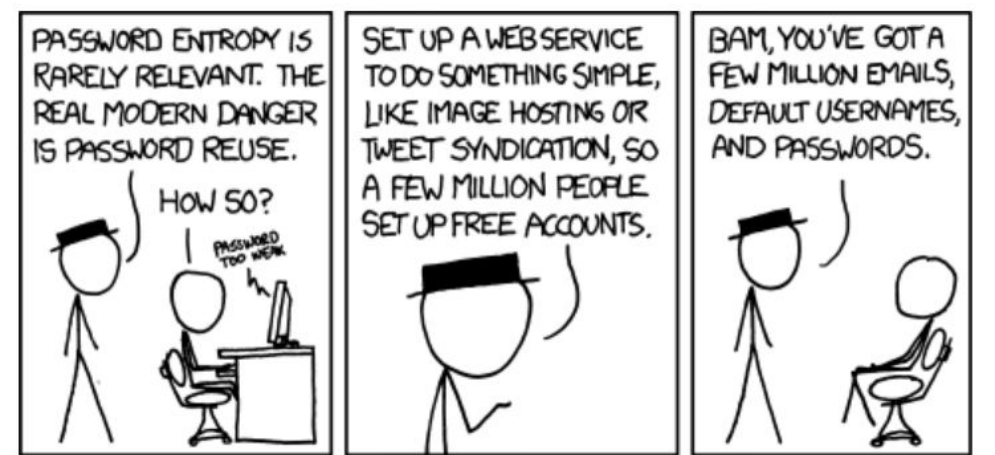


2018 Top 10 passwords

- | | |
|--------------|--------------|
| 1. 123456 | 6. 111111 |
| 2. password | 7. 1234567 |
| 3. 123456789 | 8. sunshine |
| 4. 12345678 | 9. qwerty |
| 5. 12345 | 10. iloveyou |

4. Reuse is Rampant

Password Security Report: 83% of Users Surveyed Use the Same Password for Multiple Sites



5. Broken Passwords Beget Broken Passwords

- 81% of breaches leveraged stolen and/or weak passwords (2017 Verizon DBIR)

OCTOBER 20TH, 2014

Stolen Administrator Credentials Led to Breach of University Systems

December 12, 2017
Mohit Kumar

Dropbox employee's password reuse led to theft of 60M+ user credentials

Kate Conger, Matthew Lynley

8/30/2016

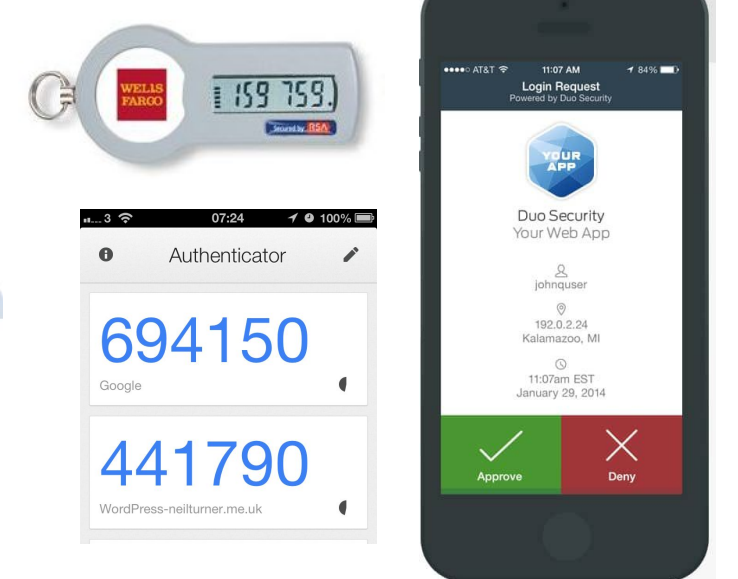
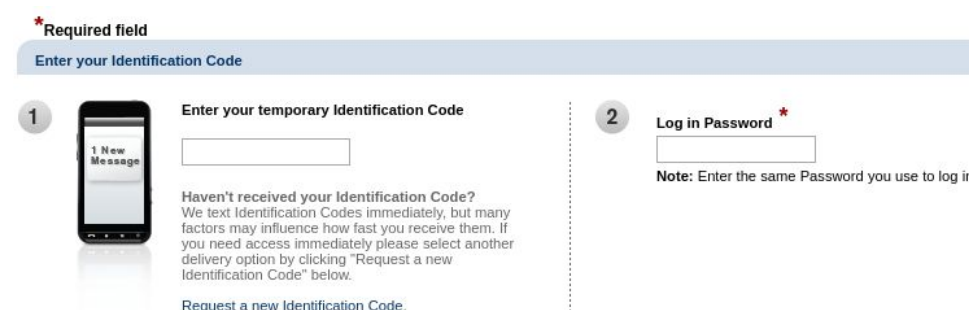
Hackers are passing around a massive collection of 2.2 billion stolen logins

Chris Smith @chris_writes
January 28th, 2019 at 10:33 AM

"The common vein is the ability to use a single password to access thousands if not millions of user data"

6. 2-Factor Authentication (2FA) to the Rescue?

Chase Online <smrfs@emailonline.chase.com> 2:48 PM (0 minutes ago)
to
Note: This is a service message regarding the Identification Code you requested.
Your Identification Code is: 40153014



7. 2FA Issues

- For the privileged:** Users must be able to afford a smart-phone
- Hard to learn:** Each site has its own version of 2FA for users to learn
- Hard to use:** Multiple applications must be accessed to use
- And now..... **vulnerable to attack**

2FA Might Be Secure, But It's Not Usable: A Summative Usability Assessment of Google's Two-factor Authentication (2FA) Methods

Claudia Ziegler Acemayan, Philip Kortum, Jeffrey Xiong, more...
September 27, 2018
<https://doi.org/10.1177/1541931218621262>

Amnesty International reveals how 2FA is being bypassed automatically

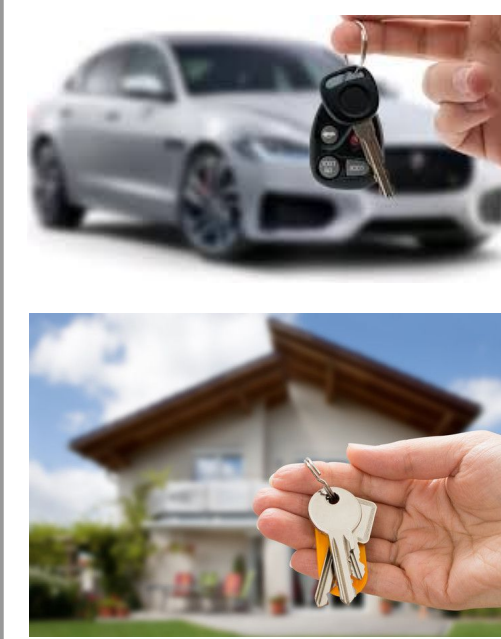
Alan Martin_martin

20 December 2018

UK bank falls victim to SS7 attacks, allowing cybercriminals to drain accounts and reminding us why SMS two-factor authentication sucks

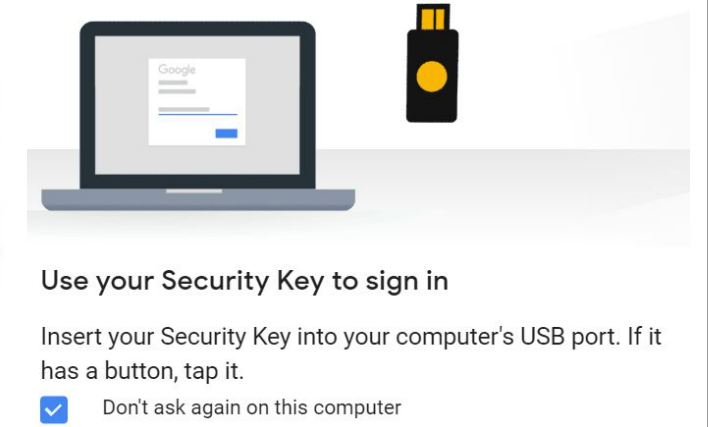
Jason Hahn
Feb 3, 2019

8. Yubikeys, WebAuthn, U2F to the Rescue?



W3C approves WebAuthn as the web standard for password-free logins

EMIL PROTALINSKI @EPRO MARCH 4, 2019 5:00 AM



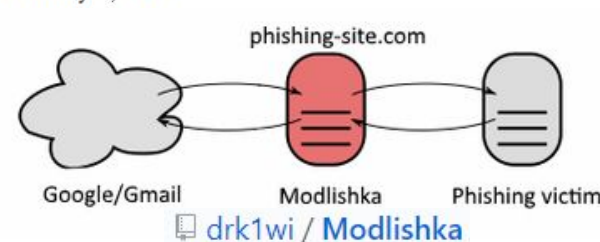
9. Usable security for only \$20!

23 Google: Security Keys Neutralized Employee Phishing

"The beauty of WebAuthn is that it eliminates the need for users to constantly type in their passwords, which negates the threat from common password-stealing methods like phishing and man-in-the-middle attacks."

Phishing NG. Bypassing 2FA with Modlishka.

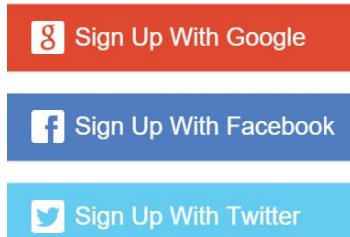
Written on January 2, 2019



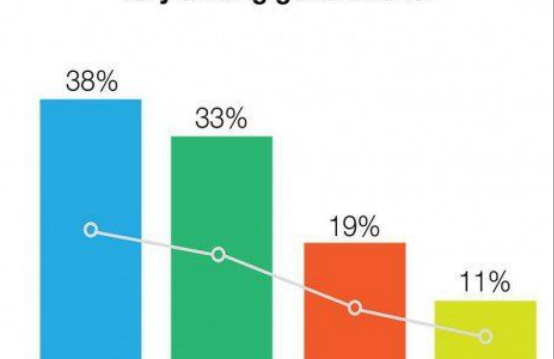
"Currently, the only way to address this issue, from a technical perspective, is to entirely rely on 2FA hardware tokens, that are based on U2F protocol."

10. A Yubikey curriculum

- Motivate the need for Yubikeys/U2F (<https://bit.ly/pdx-yubi>)
- Give participants Yubikeys (Yubikey 4: USB-A)
- Have students use Google's 2FA wizard to register key
- Swap laptops and login using the registered key
- Why Google accounts?
 - 93% of users prefer single sign-on via social login
 - Younger generation adopting social login quickly with 97.9% preferring Facebook and Google for it.
 - Usability of Google's wizard shown to be good



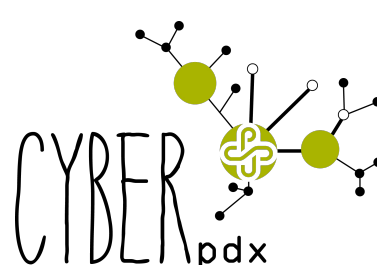
How do social login and sharing activities vary among generations?



11. Deployed at CyberPDX (2019)

"CyberPDX: A Camp for Broadening Participation in Cybersecurity" (USENIX Security ASE 2017)

- Curriculum taught to ~20 high-school teachers
- 2 pilot schools
 - Capital High School (Olympia, WA)
 - ~115 students
 - School of Science and Technology (Beaverton, OR)
 - ~30 students

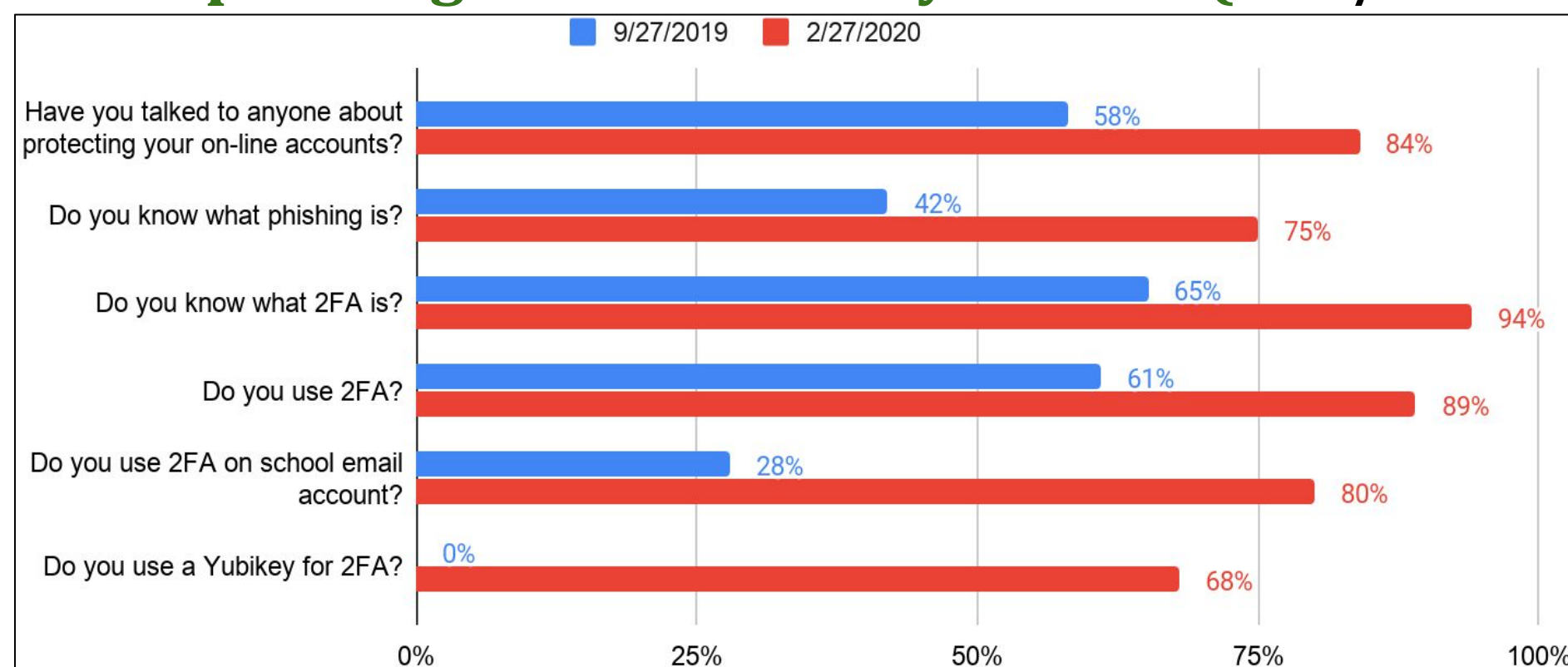


Capital HS students study cybersecurity

Scott Le Duc's Career and Technical Education classes at Capital High School have been a part of a cybersecurity research study sponsored by Portland State University (PSU). The study began in fall 2019 and will be completed six months later, finishing with a survey that examines the students' knowledge and experience using the Yubikey. Le Duc has been teaching students what makes a strong password, as well as what "phishing" is and how to guard against it. Students were also provided with a USB device called a Yubikey from PSU. Yubikeys are a security tool used for hardware authentication. Le Duc describes them as, "like car keys for Google accounts."



12. Capital High-School Survey Results (115/96 students)



2/27/2020 survey

Should all students learn to use a Yubikey?

- Yes: 47%
- Unsure: 39%
- No: 14%

Will you use the Yubikey in the future?

- Yes: 55%
- Unsure: 29%
- No: 16%

Do you want a Yubikey that works on devices without USB?

- Yes: 60%



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