

*Yubikey, a physical key that  
provides 2-factor authentication*

CS 88S

# Protecting yourself: apps, methods, practices

## Week 6

# Agenda

- *WireShark Demo, Final Project*
- *Review last week's material*
- *HTTPS, Safe Practices Online*
- *2 Factor Authentication*
- *Back up everything*
- *Use a Password Manager*

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# YouTube Phish



**DJKhaledVEVO** ✓

Published on Apr 28, 2017



**DJKhaledVEVO** 1 hour ago

Thanks for let us reach 2,1M family of subs we have gifts for our viewers:

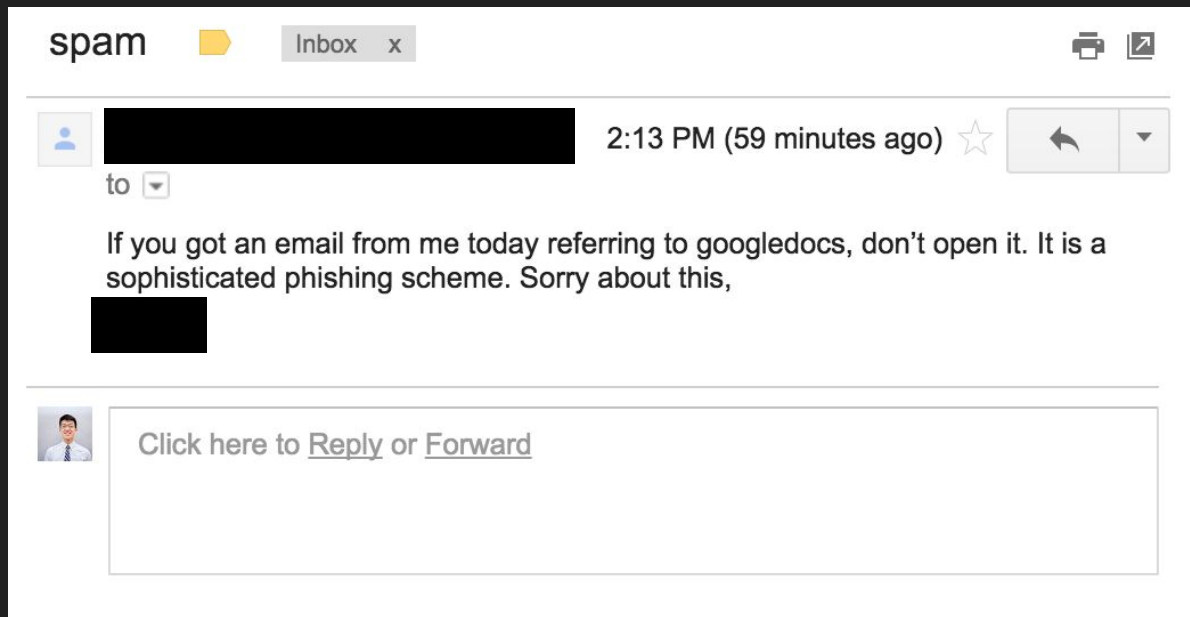
<https://docs.google.com/document/d/1XDiWHmMLC9QMzoqkaqG4hy1TyRX67OLCZ4kgikh-Eas/edit?usp=sharing>

Thanks you all!

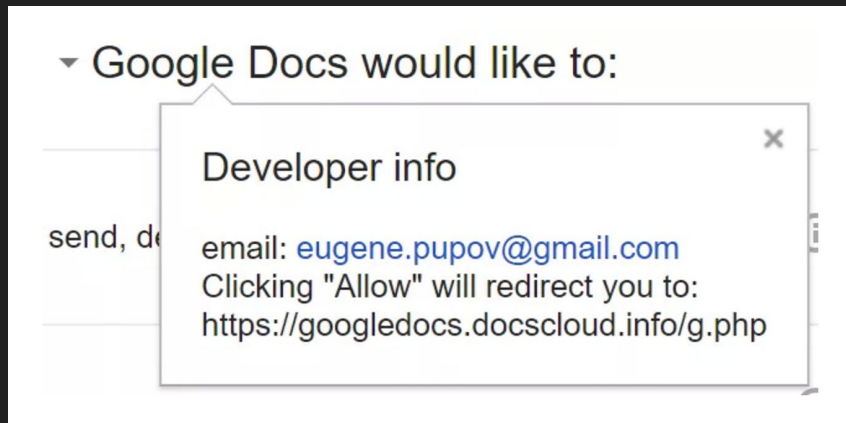
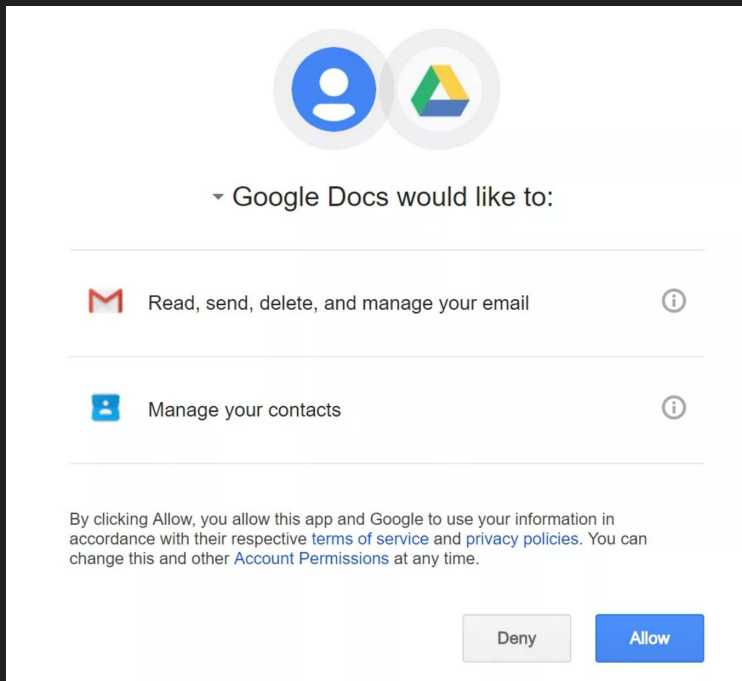
REPLY 73



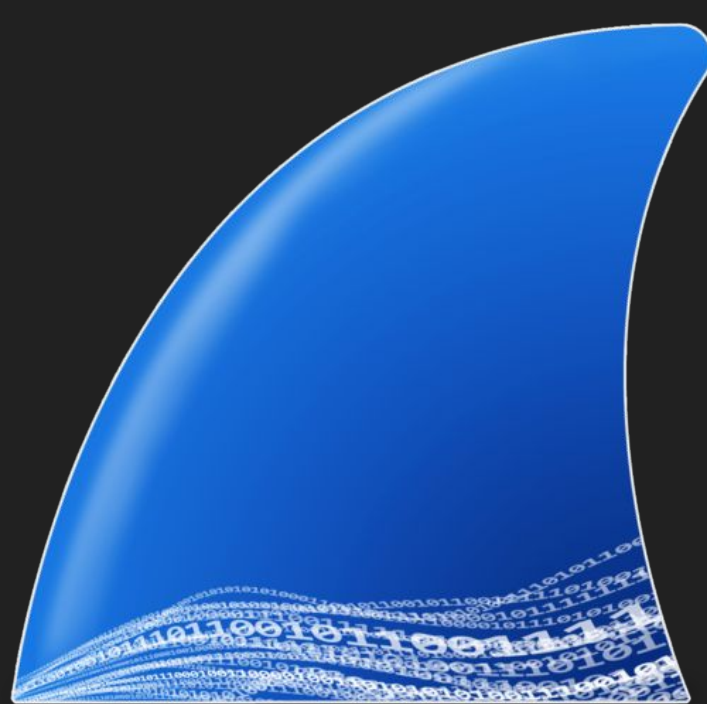
# Google Docs Phish



# Google Docs Phish



# Wireshark Demo



# Final Project

A stylized illustration of a desk setup. In the center is a computer monitor displaying a video lecture of a man in a blue suit pointing at a blackboard with the equation  $3 \times 3 = 9$ . To the left of the monitor is a desk lamp with a grey base and a white adjustable arm. To the right are two large grey speakers. On the far right, there is a stack of books and a brown mug. Above the monitor, a shelf holds several books and a yellow sticky note.

[kfrankc.me/cs88s/final\\_project.pdf](http://kfrankc.me/cs88s/final_project.pdf)



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1

2

3

4

5

6

7

# What happens when you type `www.google.com`?

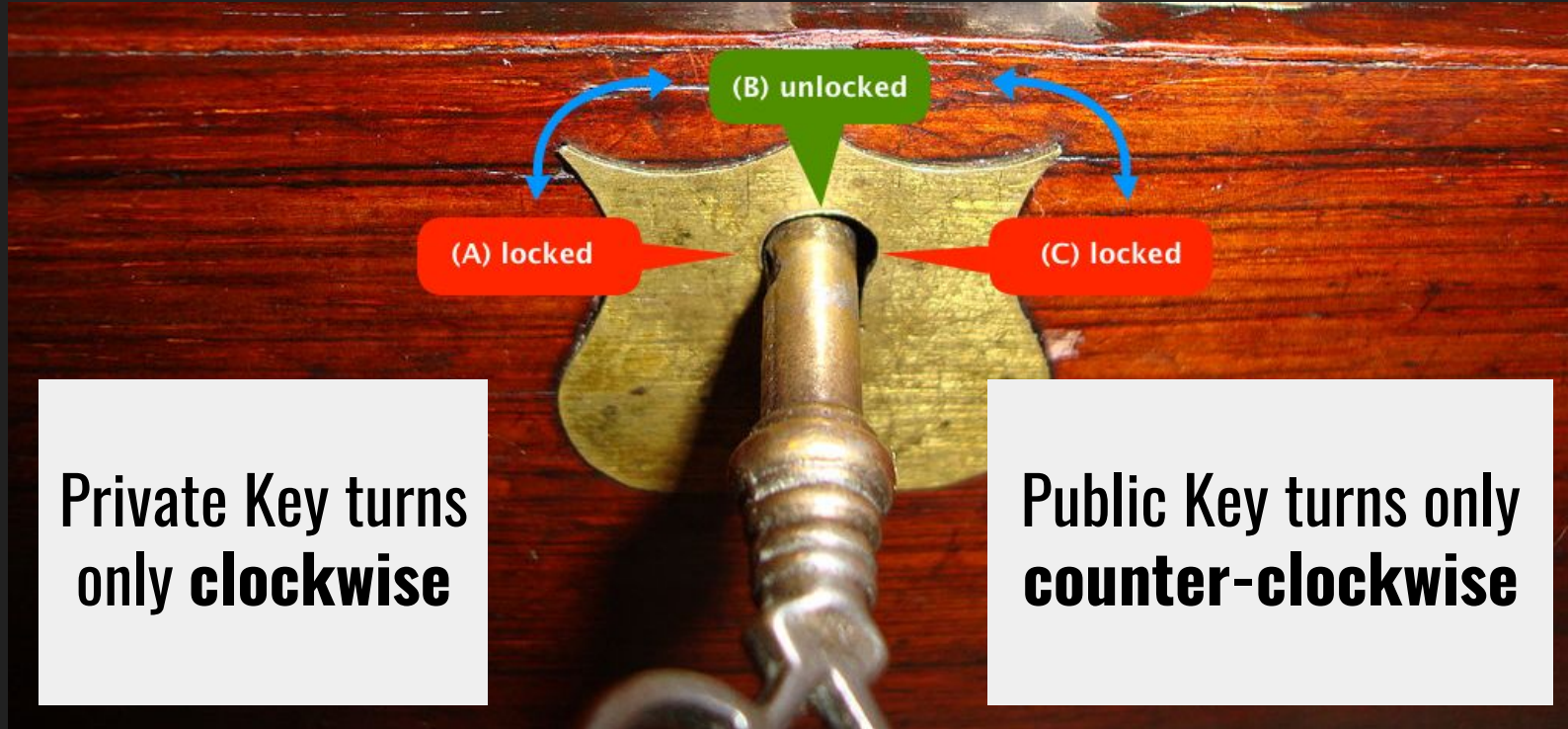


# Symmetric Key

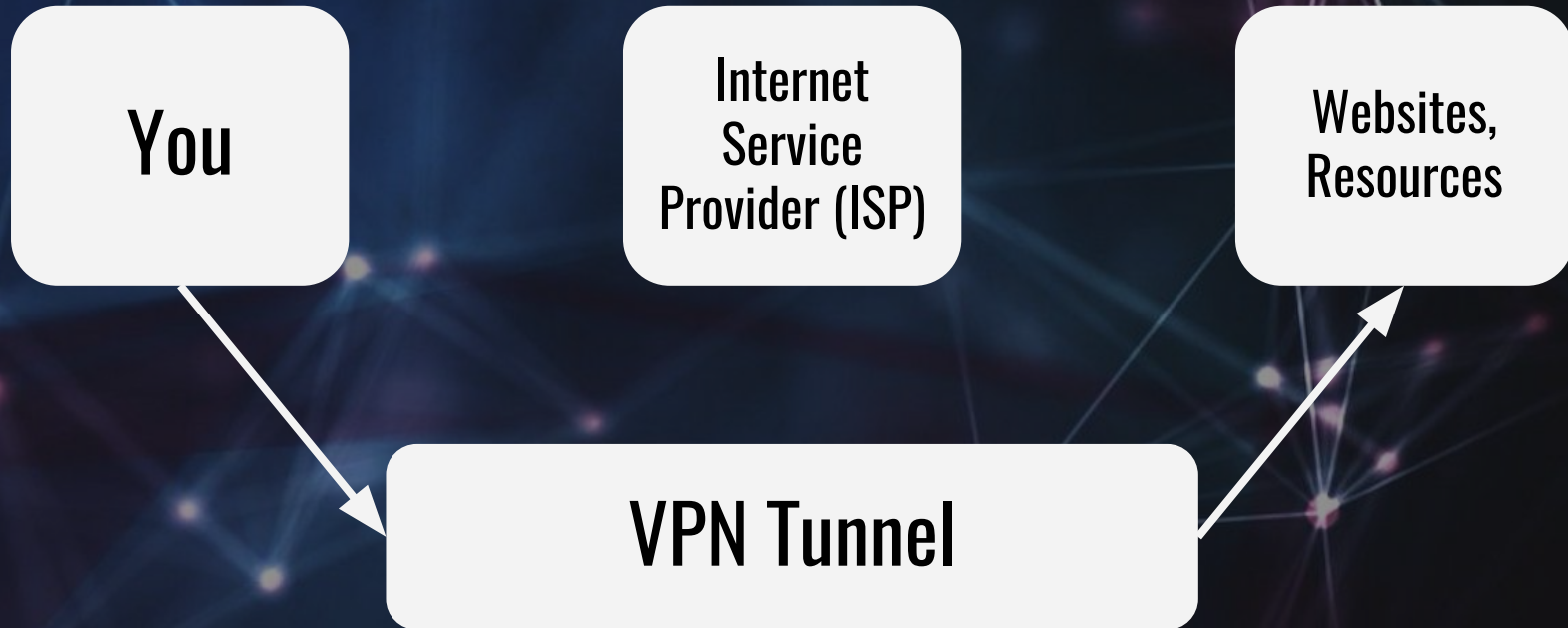


Key used to  
**unlock** and  
**lock** the drawer

# Public/Private Key



# Virtual Private Network (VPN)



# So Far...

cybersecurity	✓
protect myself	✗
hack	✓
privacy	✗
money, personal contact, identification	✓
extra (security in IoT devices)	✗

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# HTTP

*Def: HTTP (Hypertext Transfer Protocol) is the procedure for exchanging information on the Internet*

*It is easy to intercept*



# How secure is HTTP?

**Authentication**



**Integrity**



**Privacy**



# HTTPS, abridged

 Secure | <https://www.facebook.com>



kfrankc.me/cs88s/

Qu

Your connection to this site is not secure

You should not enter any sensitive information on this site (for example, passwords or credit cards), because it could be stolen by attackers.

[Learn more](#)

# HTTPS, abridged

*Def: HTTPS is HTTP over Secure Socket Layer.*

*HTTPS encrypts an HTTP message prior to transmission and decrypts a message upon arrival via SSL Transaction.*

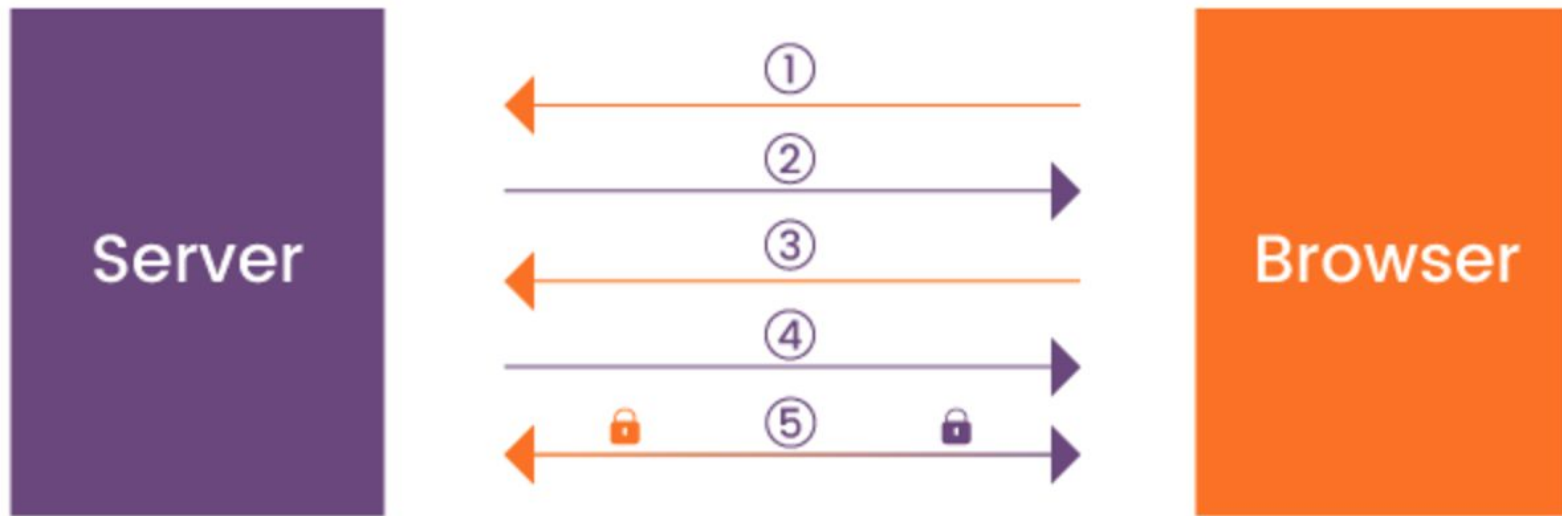
# SSL Transaction



Source: <http://bit.ly/2pTzoTY>

**\*\*\*Note:** To further understand the relationship between SSL and HTTP, you'll first need to understand the OSI model of Computer Networks, which is out of the scope of this class.

# SSL Transaction



# How secure is HTTPS?

**Authentication**



**Integrity**



**Privacy**



# HTTPS Everywhere

- *Browser Extension*
- *Automatically redirect HTTP webpage into HTTPS webpage if possible*
- *Open Source*

Source: <http://bit.ly/2qcu3df>





A photograph of a cafe interior. In the foreground, there's a wooden counter and a display case filled with various pastries. Behind the counter, two white stools are visible. The background features a large window with a grid pattern, through which some outdoor seating and a sign with the word 'PUBLIC' can be seen. The lighting is warm and ambient, with several pendant lights hanging from the ceiling.

# Be Wary of Public Wi-Fi



# Be Wary of Email Links



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# Authentication

What you **know**



What you **own**



Who you **are**



# Authentication

What you **know**



What you **own**



Who you **are**



# Which Password is more secure?

*monkey-ocean-superior-pillow*

3058472038475

They are about the same

# Which Password is more secure?

*monkey-ocean-superior-pillow*

*4 common words:  $2000^4 \sim 2^{43.9}$  combinations*

*3058472038475*

*13 random digits:  $10^{13} \sim 2^{43.2}$  combinations*

# Authentication

What you **know**

\*\*\*

What you **own**



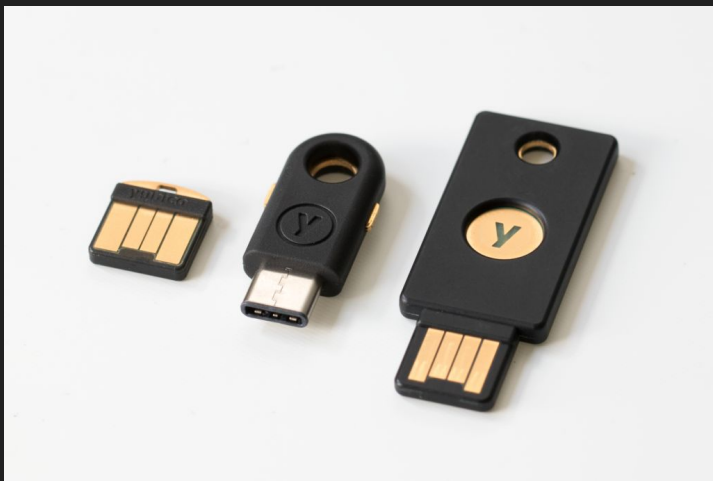
Who you **are**





# Yubikey

- *Physical 2-Factor Authentication Device*
- *Generates One-Time-Passwords (OTPs)*

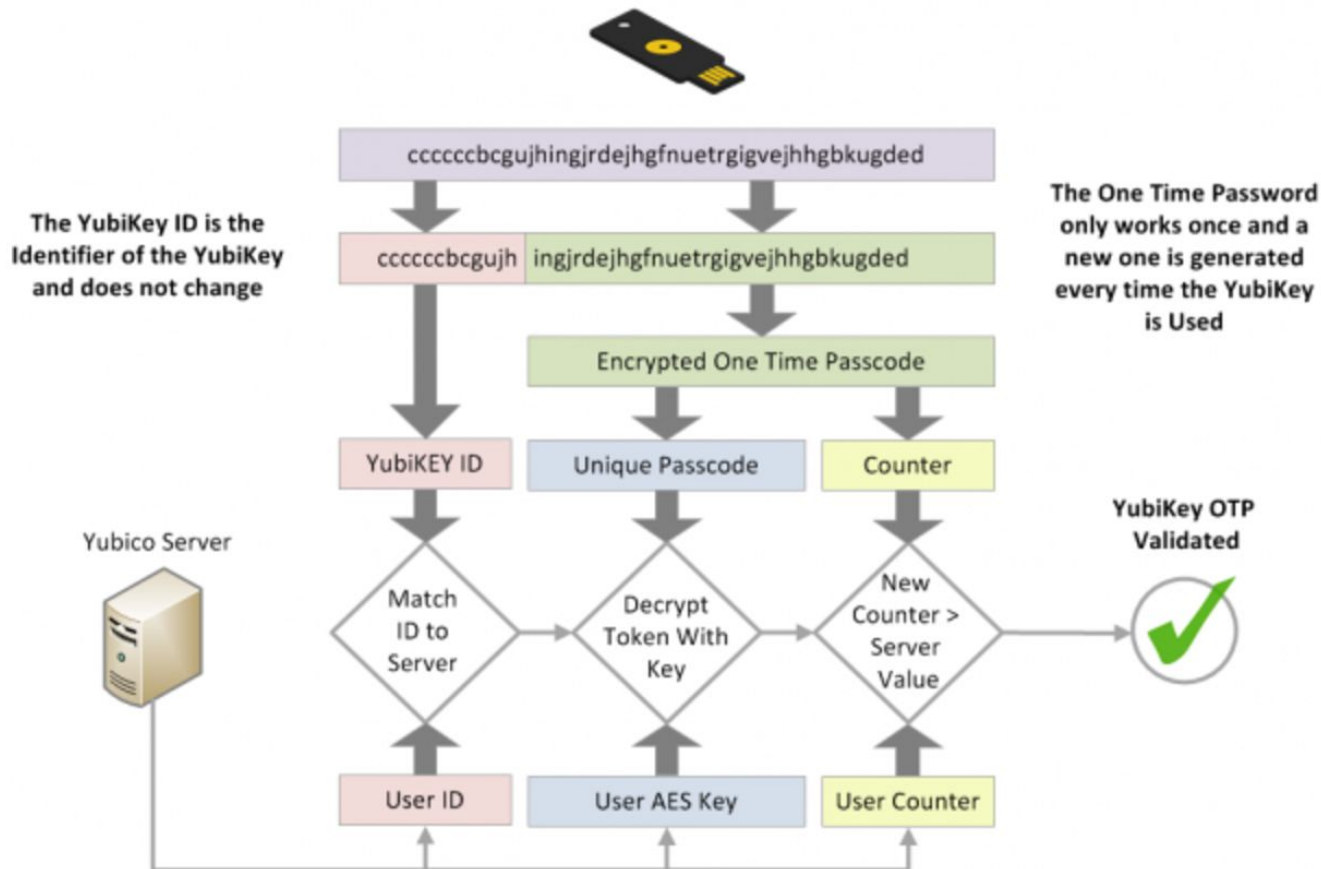


# Yubikey's OTP

cccjgjkhcbb irdrfdnlngghfgrtnnlgedjlftrbdeut

cccjgjkhcbb gefdkbbditfjrlniggevfhenublfnrev

cccjgjkhcbb cvchfkfhiuunbntnvgihdfiktncvlnhck



A close-up photograph of a hand holding a black Yubikey USB security key. The key is positioned over a laptop keyboard, with a finger hovering just above it. The background is a blurred laptop keyboard and the side of the device. The text 'Yubikey Demonstration' is overlaid in a large, white, sans-serif font.

# Yubikey Demonstration

# 2-Factor OTP Generators



# Authentication

What you **know**



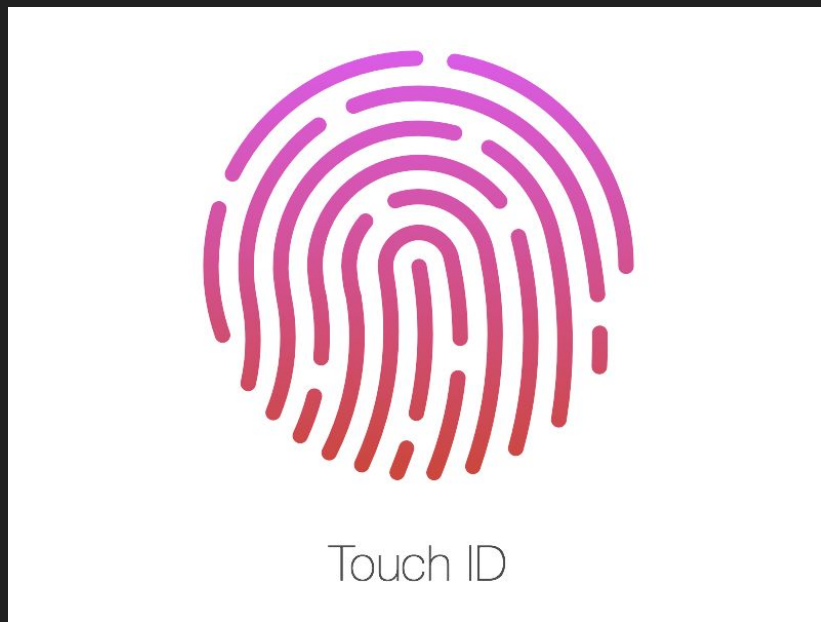
What you **own**



Who you **are**

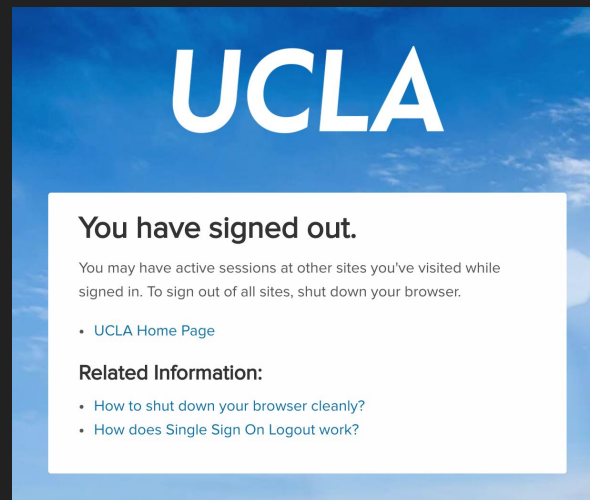


# Fingerprint Scanner



Source: <http://apple.co/1En9Tz7>

# Single Sign-On





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# Cloud Storage



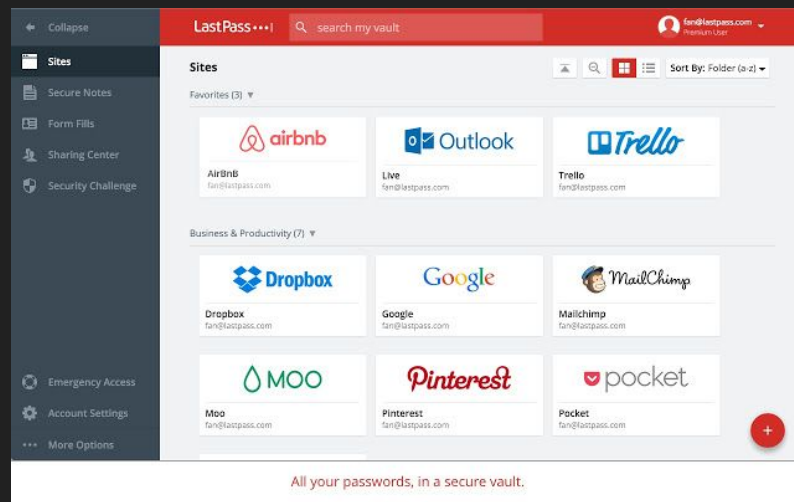
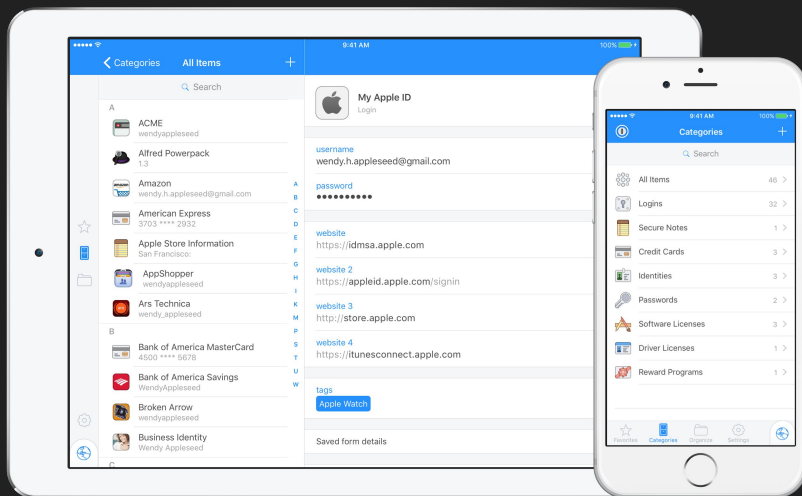
# External Hard Drive



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# Password Managers





# *Safety in the Cloud Tip*

Follow at  
**least one** of  
the Practices  
listed today!

*Facebook's massive data center in Luleå*

# Next Week...

Frank Chen | Spring 2017