



# Two-Factor Authentication: Text Messages and Beyond

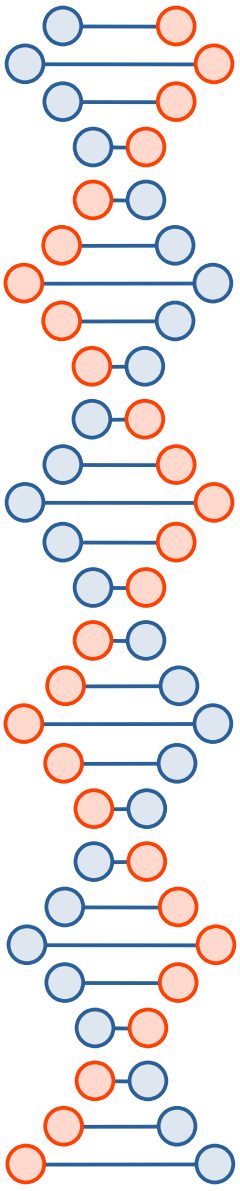


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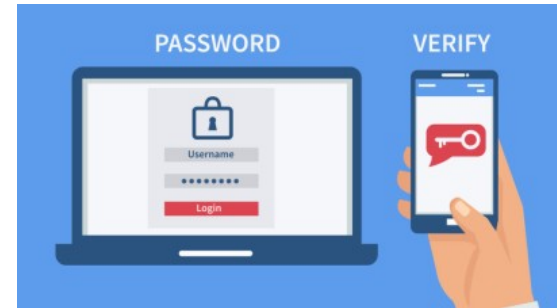
Fraud Watch Network

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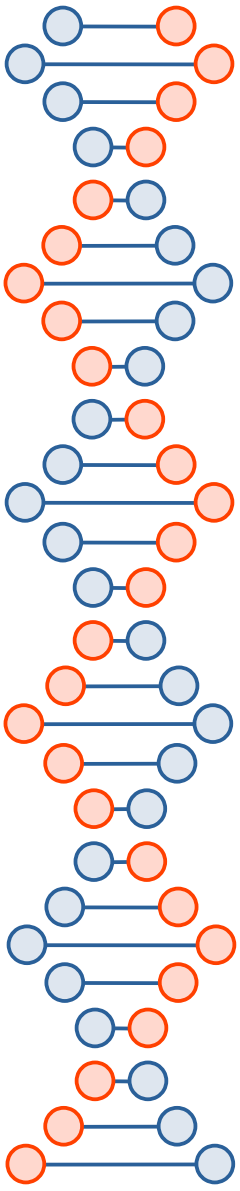
# Agenda

- Two-Factor Authentication (2FA)
- SMS Text Messages
- How Bad Guys Defeat 2FA
- Authenticator Apps
- Hardware Keys



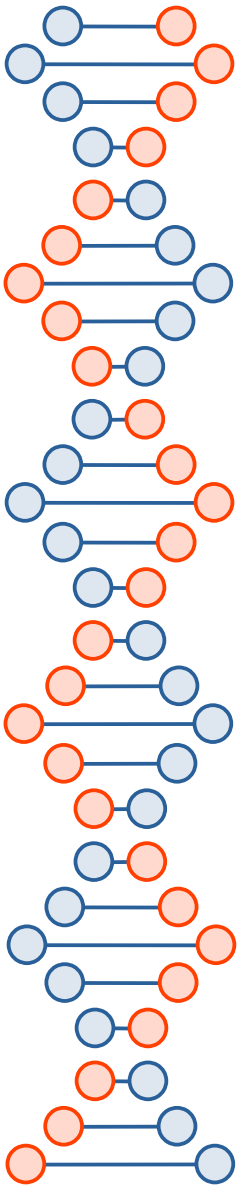
# Two-Factor Authentication (2FA)

- Something you know
- Something you are
- Something you have
- Password/pin
- Biometrics
- Text message code
- Email message code
- Authenticator app code
- Hardware key



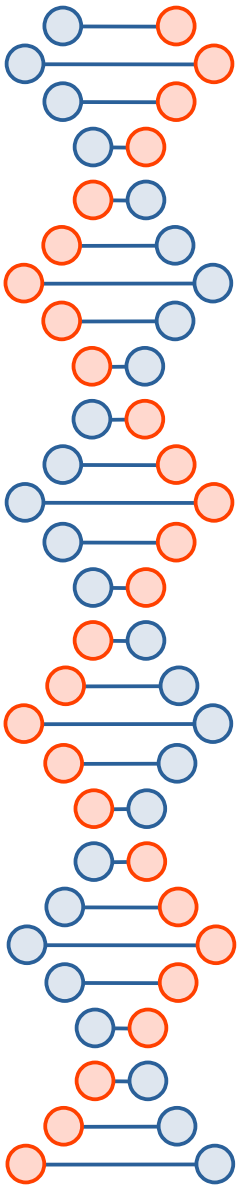
# SMS Text Messages for 2FA

- Technology: Unique 6-digit code good for 10-30 min.
- Far more secure than username and password alone
- The chain is as strong as its weakest link.



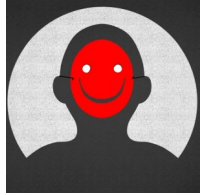
# SIM-Jacking (SIM Swapping)

- 2014 - 2019: Targeting Bitcoin wallets
  - Cell carrier customer support employees
  - Forged Letters of Authorization to transfer
- 2020: Congressional request for FCC action
  - No response from then-chairman Ajit Pai. 20 months later, his replacement proposed a rule that could take effect in 2022.
- 2021: T-Mobile breach
  - Name, phone, birth date, social security no., driver license no.
  - **Account PIN**



# One-Time Password Robot

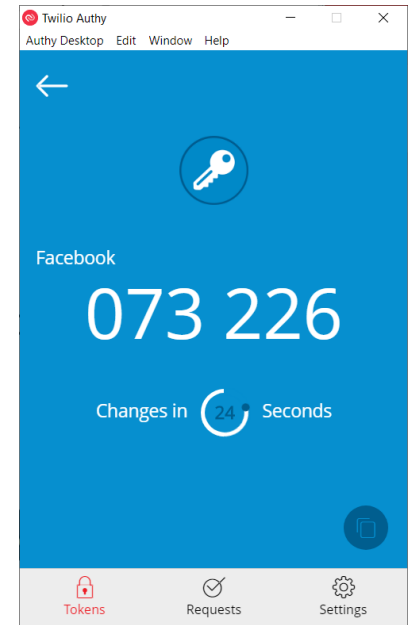
A man-in-the-middle social engineering attack



- My bank sends me a text message with their one-time code
- A bot calls me or initiates a chat about a questionable purchase
- The bot asks me to confirm their one-time code
- The bot reassures me that the situation is taken care of

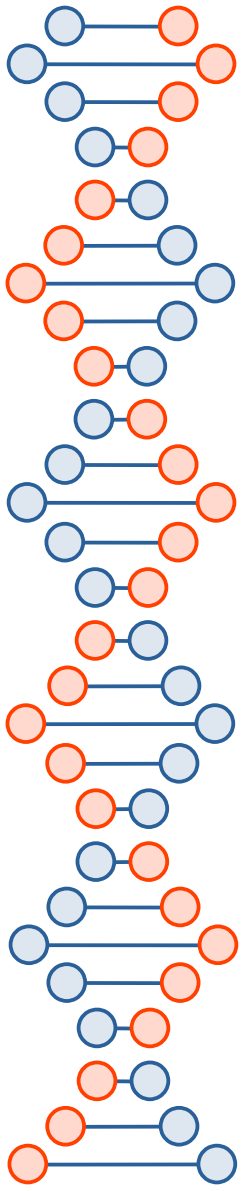
# Authenticator Apps

- Time-based one-time password (TOTP) standard
- Unique code every 30 seconds
- Computer app, phone app, hardware token
- Duo, Google, Microsoft, Toopher, Authy
- Log into an account without a password
- The chain is as strong as its weakest link.

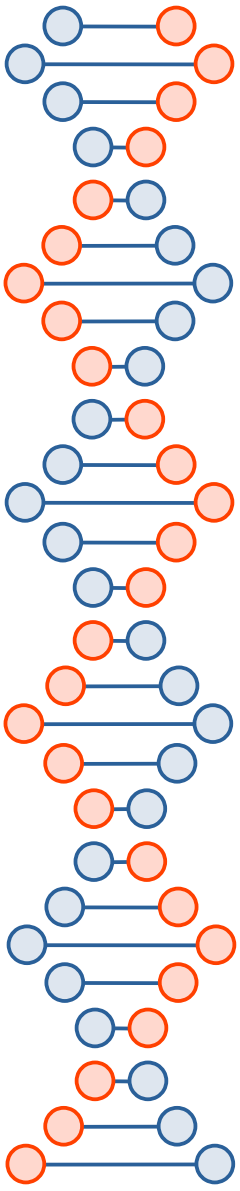


# Hardware Security Keys

- Google's experience: "NO account takeovers since implementing security keys in 2017."
- YubiKey, Thetis, SoloKey, Google Titan
- Connect via USB-A, USB-C, Lightning, NFC
- October 2021: Yubikey Bio Series includes fingerprint reader
- The chain is as strong as its weakest link.
- Demo: Login to LastPass

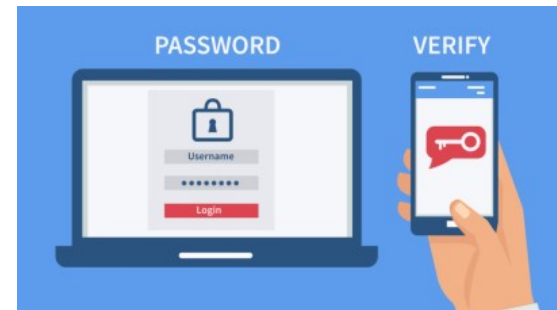






# Review

- Two-Factor Authentication
- SMS Text Messages
- SIM-Jacking
- Authenticator Apps
- Hardware Keys





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## Questions? Comments?



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