Writing Smart Contracts
14 Security

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Supported by the Algorand Foundation

Elements of security

1. Mindset
2. Organizational
3. Physical

Your passphrase (2)

Irreversible transactions (!)

You may loose . . .
- Assets (tokens, NFTs)
- Voting rights / control over organization
- Identity, home . . .

Dangers
1. Loss (loose, forget, become incapacitated)
2. Theft (physical, cyber)
3. Robbery
4. Destruction (fire, water, . . .)

Considerations
- Cost vs. maximal damage
- Useful: mindset of data backup

Your passphrase (2)

Don't

- Digital cop<u>ies</u> (backups, hacks, . . .)
- Especially in the cloud (no google docs, dropbox)
- Store credentials in code (Github)
- Leave credentials on old hardware (phone, SSD, laptop)
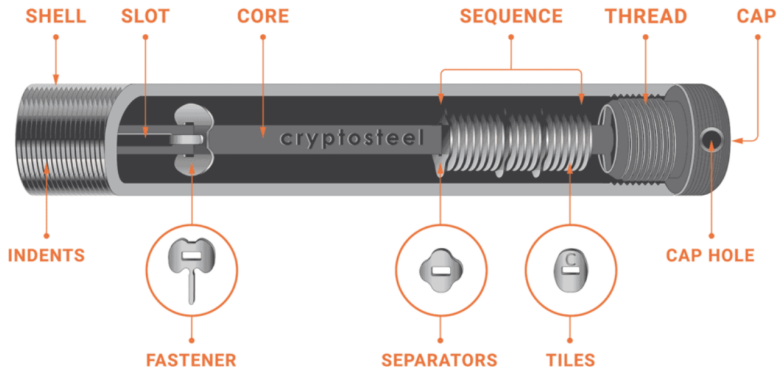
Do

- Store passphrase, not private key
- Keep small wallet online and large wallet offline ("cold")
- Physical storage of passphrase
  - ▶ Limited durability of paper storage (paper, ink, lamination)
  - ▶ Alternative materials (stone, metal), e.g. Cryptosteel
- Split passphrase in two
- Consider multisig
- Consider including passphrase in your will
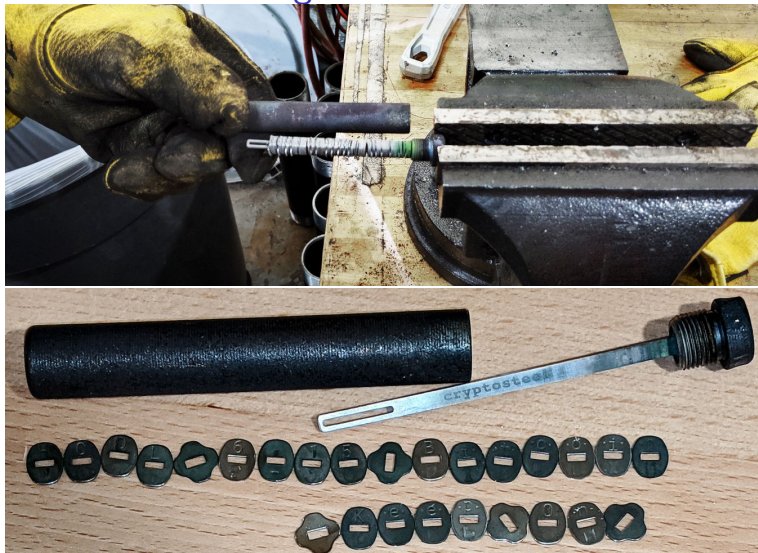- Regularly verify cold storage

Use Gitguardian
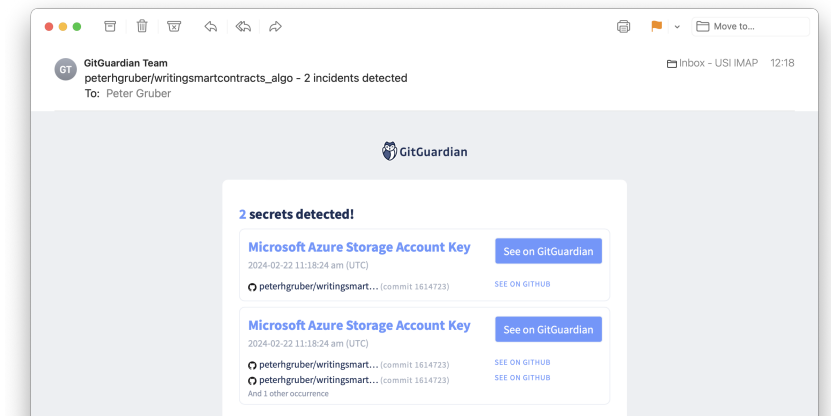
- Private keys are recognised as "Azure Storage Account Key"
- Passphrases are **not** recognised

Cryptosteel

Cryptosteel after burning

Source:

https://medium.com/@cryptosteel/independent-heat-test-of-the-cryptosteel-capsule-e9de0c3ea534

Home-made cryptosteel

Source: https://blockmit.com/english/guides/diy/make-cold-wallet-washers/

Credentials in the code

Don't

- Store credentials in main code
  - ▶ Problem 1: loss/theft (Github etc)
  - ▶ Problem 2: (multiple) copies of the code
  - ▶ Problem 3: updates

Do (depending on security requirements)

- Store in *few* places
- Store in separate .key file, use gitignore
- Use system variable (in the RAM)
- Connect to wallet app in browser
- Connect to phone wallet via QR code

  https://algorand.github.io/walletconnect-example-dapp/

- Separate code from credentials $\leftrightarrow$ do not print in Juyputer Notebook

Further reading

`https://hackernoon.com/485-stories-to-learn-about-security`