Federal Office
for Information Security

Augmenting passwords

Lightning talk

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Passwords – Knowledge bound to individual

Does a good password exist?

Everyone uses passwords

- Trivial concept
- Easy to use
- Toolless
- Easy to implement (really?)
- Easy to manage and support (well…)

How secure are passwords?

- Credential stuffing
- **Phishing**
- Malware, key logger
- Social engineering

Your password (complexity, length) does not matter !

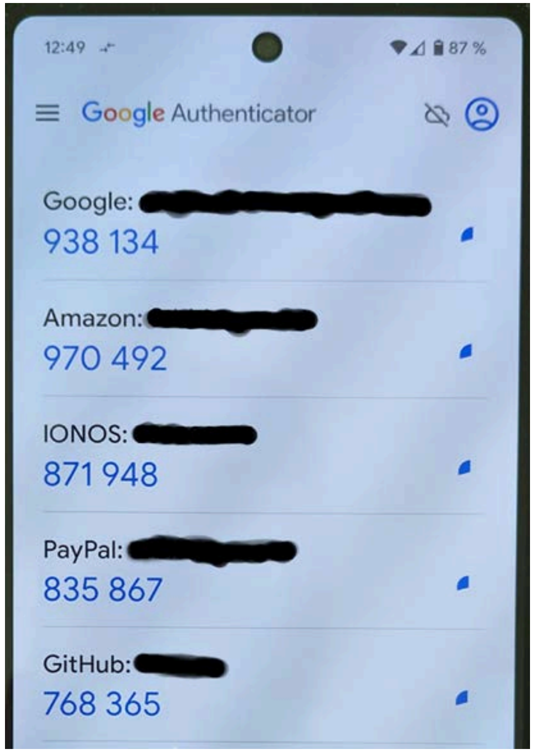
- Password spraying
- Brute force

Your password does matter !
(so please choose a good one)

- …

-> Authentication enforced by (only) presenting a static shared secret is problematic !

Augmenting passwords



12:49 87 %

Google Authenticator

Google: [redacted]
938 134

Amazon: [redacted]
970 492

IONOS: [redacted]
871 948

PayPal: [redacted]
835 867

GitHub: [redacted]
768 365

Adding (sort of) ‘Possession’ as an additional factor:

➢ Typ. ‘Knowledge’ weakly bound to device or similar

  - TAN list (deprecated)
  - mTAN / smsTAN (still widely used)

More advanced (and recommended):

- TAN generator
- Time-based one-time passwords (TOTP)
  (widely adopted; authenticators available as software or hardware)

Still a shared secret susceptible to phishing / MITM

Strong second factor, Strong multi-factor & Strong single factor authentication

FIDO U2F & FIDO 2

Strong 2nd factor utilizing asymmetric cryptography with FIDO U2F

- Authenticator creates private/public key pair
- Mutual registration of authenticator and relying party
- Signed Challenge-Response and Attestation scheme
- Dedicated hardware (Client connected via USB/NFC/BT)

-> Strong mitigation against phishing attacks

‘Passwordless’ authentication with FIDO 2 (WebAuthn & CTAP 2)

- Enhanced protocols and functionality
- Added user authentication for authenticator (PIN, gesture, biometrics)
- Discoverable credentials enable strong single factor

Bundesamt
für Sicherheit in der
Informationstechnik

Deutsches IT-Sicherheitszertifikat
erteilt vom Bundesamt für Sicherheit in der Informationstechnik

BSI-DSZ-CC-1060-2020(*)

de.fac2 - FIDO U2F Authenticator Applet
v1.34

Common Criteria

from	Federal Office for Information Security (BSI)
PP Conformance:	FIDO Universal Second Factor (U2F) Authenticator Version 3, 5 November 2018, BSI-CC-PP-0096-V3-2018
Functionality:	PP conformant plus product specific extensions Common Criteria Part 2 extended
Assurance:	Common Criteria Part 3 conformant EAL 4 augmented by AVA_VAN.5

Hot topics

Acceptance: Usability vs. Security?

- Possibilities for backup or synchronisation of authenticators?
- ‘Passkeys’ to solve all problems?
- Software tools vs. hardware tokens?

Security Assurance, i.e. evaluation and certification of secure authenticators and services

State of adoption

- FIDO 2 on/with mobile devices, i.e. iOS and Android
- FIDO 2 browser integration
- Services offering FIDO 2 authentication

Thank you for your attention!

Contact

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