Is Consumer-Oriented Strong Authentication Finally Here to Stay?

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Professional Strategies – S22

Historical Perspective

- Password-based authentication invented at least 4-5 decades ago
  - Primarily for charge-back accounting
- Over the years
  - “Yellow Pages” (NIS), NIS+, Kerberos, LDAP, OTP, Biometrics, Liberty Alliance, SAML, Higgins, CardSpace, Smartcards, SSL with ClientAuth, OAUTH, ……..

Historical Perspective

- Single-Factor Authentication
  - "What you know"
  - "What you are"
  - "What you have"
- Identity Protection Factor (IPF)*

  ".. a measure of the ability of a technology to resist attack from unauthorized entities"

* http://middleware.internet2.edu/idtrust/2008/papers/01-noor-ipf.pdf

StrongAuth
Securing the Core

IPF Scale

IPF	Description
0	No identification or authentication
1	**Shared-secret** based authentication on a local system, or a network **without** any network encryption
2	**Shared-secret** based authentication **with** network encryption
3	**Multiple shared-secret** based authentication **without** an external token, but with network encryption
4	**Asymmetric-key** based authentication with **Private Key in a file**
5	**Multiple shared-secret** based authentication with **external token** and network encryption
6	Asymmetric-key based authentication with **Private Key** generated and stored **on cryptographic hardware token** and using **keyboard** for authentication to token
7	Asymmetric-key based authentication with Private Key generated and stored on cryptographic hardware token and using an **external PIN-pad** for authentication to token
8	Asymmetric-key based authentication with Private Key generated and stored on cryptographic hardware token using an external PIN-pad and **being physically present at the machine** where the resource exists and where authentication is performed
9	Asymmetric-key based authentication with Private Key generated and stored on hardware cryptographic token, using an external PIN-pad, being physically present at the machine where authentication is performed and using **M of N control** for authentication to token
10	Non-existent/Unknown

Strong Authentication

- Existed for nearly 2 decades
- Asymmetric key-pair based
- **NO** secrets on server-side
- Dynamic challenge
- Hardware-based key-gen and storage
- Smartcard-based SSL ClientAuth
- Difficult and expensive

What is FIDO?

- **F**ast **ID**entity **O**nline
- An alliance of more than 125 companies
  - Alibaba, Google, PayPal, Netflix, Visa, MC, AMEX, WF, BofA, LG, Samsung, Microsoft, Lenovo, RSA, eTrade, SFDC, StrongAuth, ...
- Goal:
  - To make *strong-authentication* simple for consumers
  - Freedom to use choice of *Authenticators* (tokens)
  - Freedom to use choice of local-authentication mechanism to unlock key on token: physical presence, iris scan, fingerprint, voice, facial-recognition, PINs, etc.
  - Freedom to use one Authenticator for many websites
  - Freedom to use *many* Authenticators for *one* website

What is FIDO?

- Two strong-authentication protocols *
  - **Universal 2nd Factor (U2F)**
  - **Universal Authentication Framework (UAF)**
- Why two protocols?

* StrongAuth has implemented the U2F as the open-source StrongKey CryptoEngine; UAF is a work-in-progress

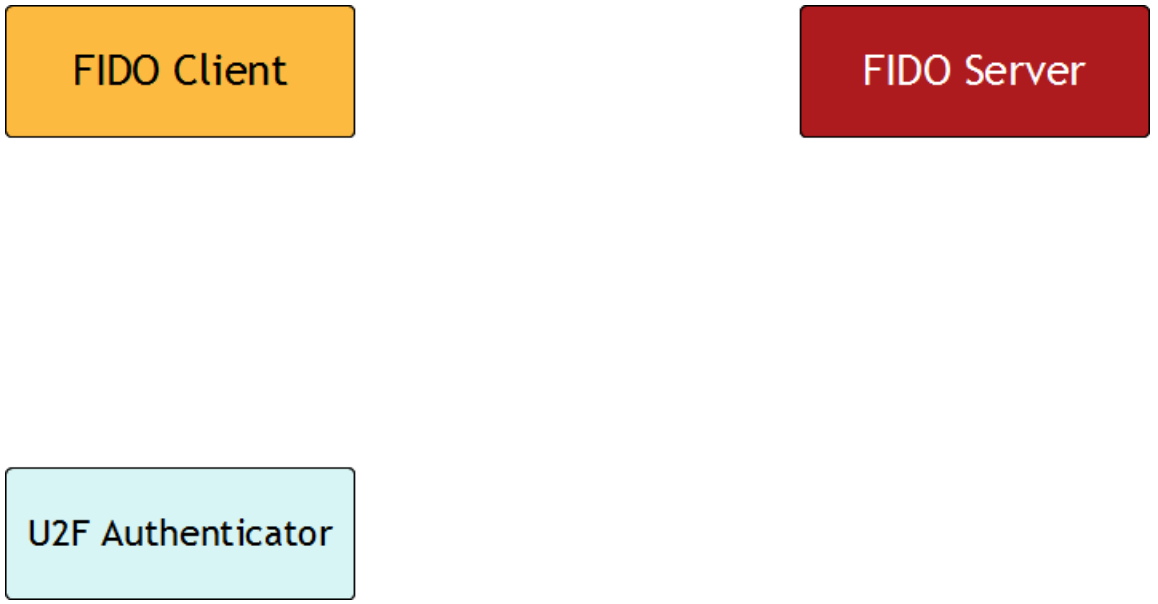
Universal 2nd Factor (U2F)

- Adds second-factor strong-authentication (2FA)
  - Can eliminate password to userid, if desired
- Each cryptographic key-pair is unique per web-site
  - Privacy is built into the FIDO protocol
- No secure display, policy assertions or “business transaction confirmation”
- Allows sharing a single Authenticator
  - User-separation is maintained by username
- Allows use of many Authenticators for single website
  - Separation is maintained in Authenticator

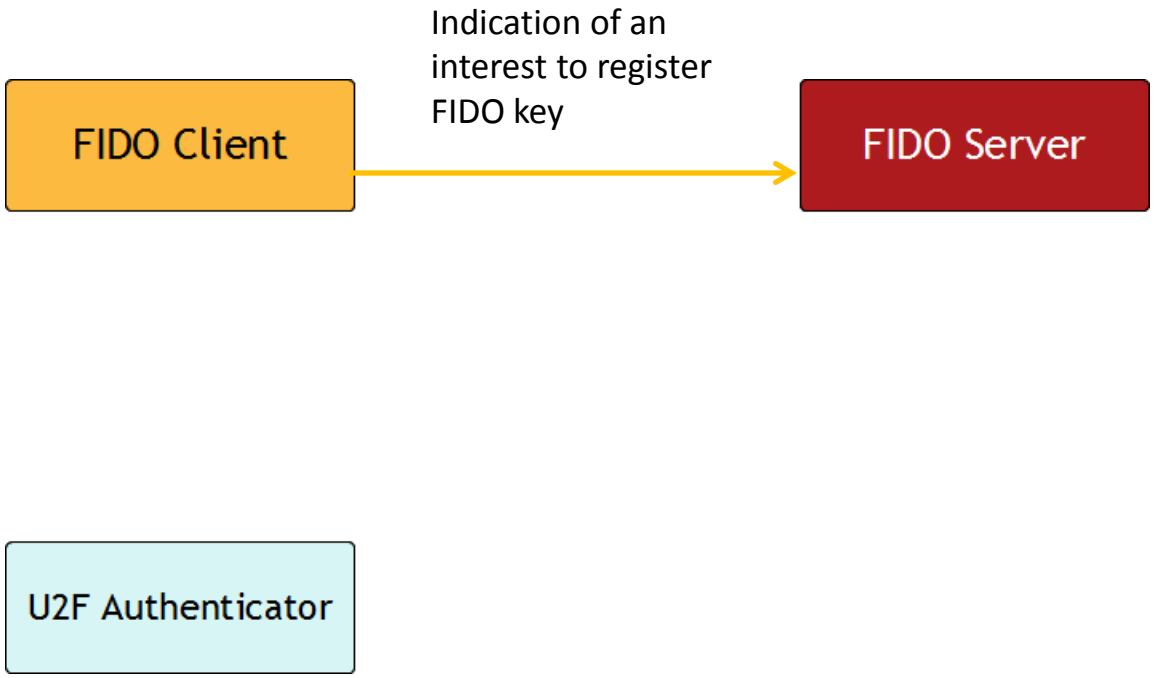
Universal Authentication Framework (UAF)

- Eliminates Password (1FA) authentication
  - Must create unique userid during registration, though
- Adds second-factor strong-authentication (2FA)
- Each cryptographic key-pair is unique per web-site
  - Privacy is built into the FIDO protocol
- Business transaction confirmation + Secure display
- Cannot share Authenticators
- Allows use of many Authenticators for single website

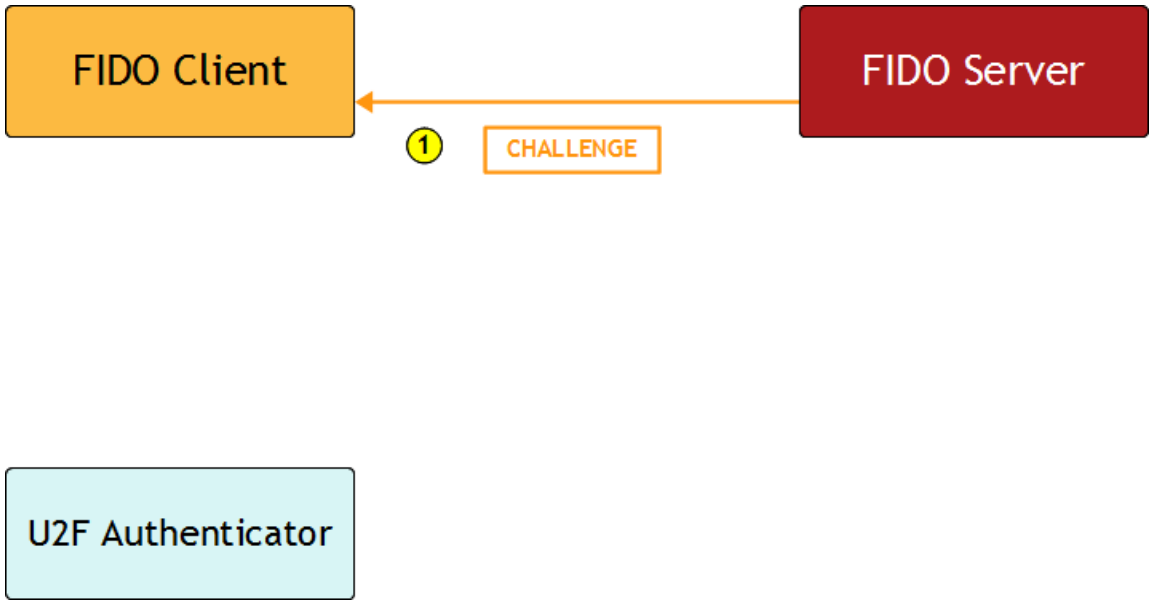
U2F Actors



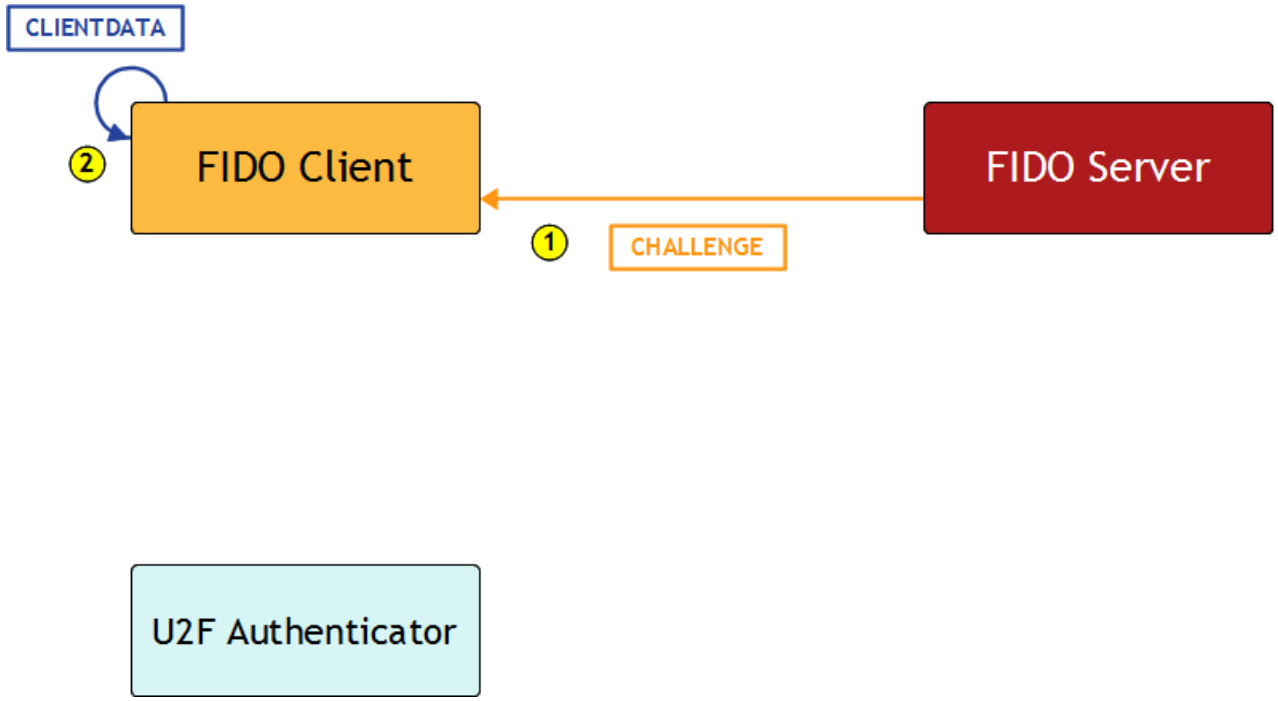
U2F Protocol Initiation



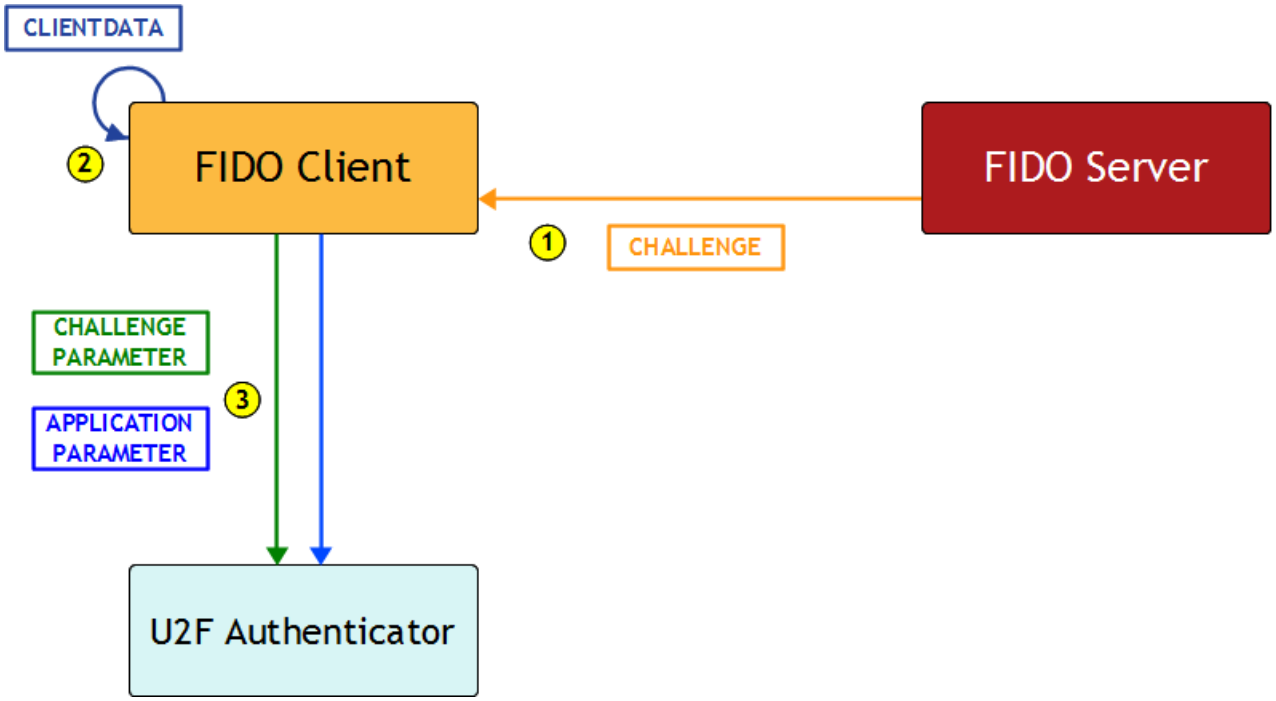
U2F Protocol Detail



U2F Protocol Detail



U2F Protocol Detail



StrongAuth
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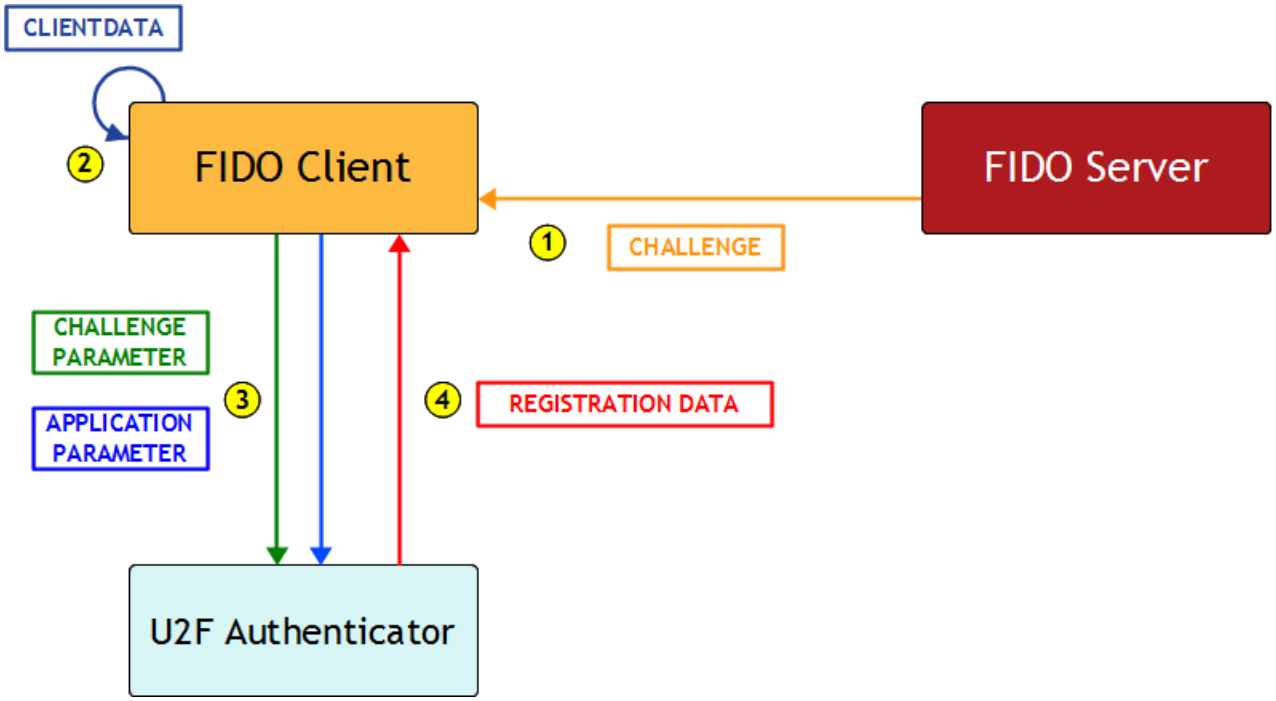
U2F Protocol Detail



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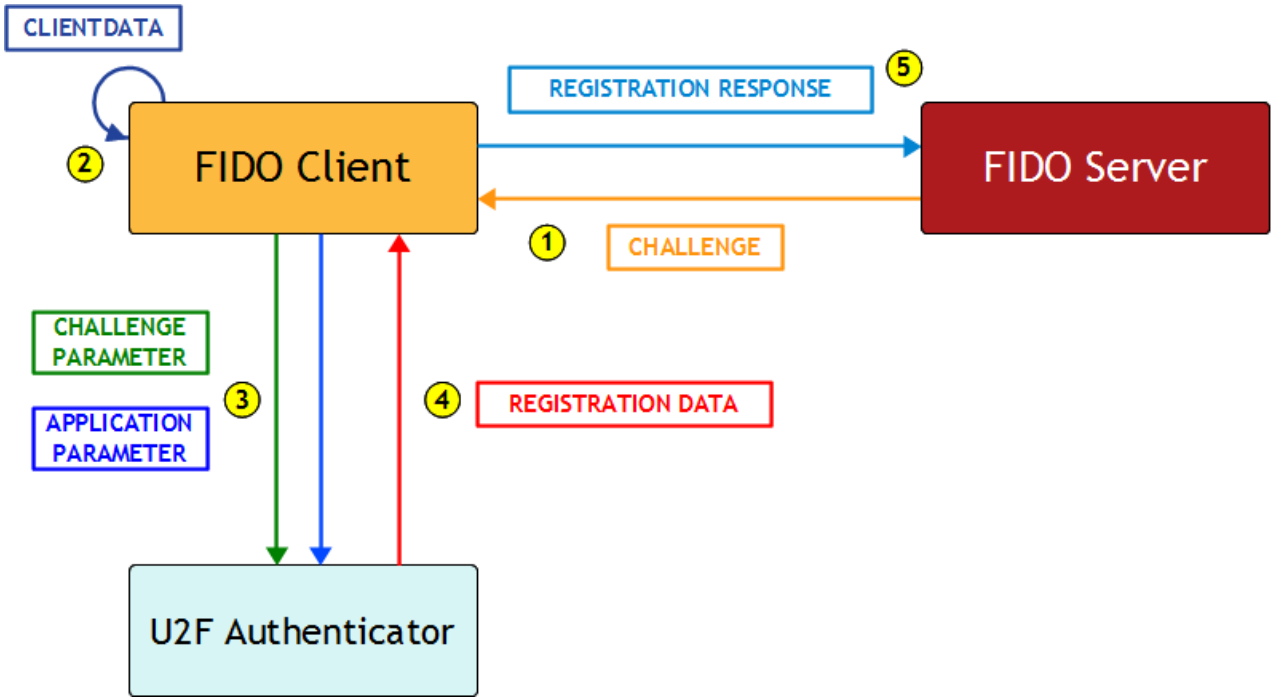
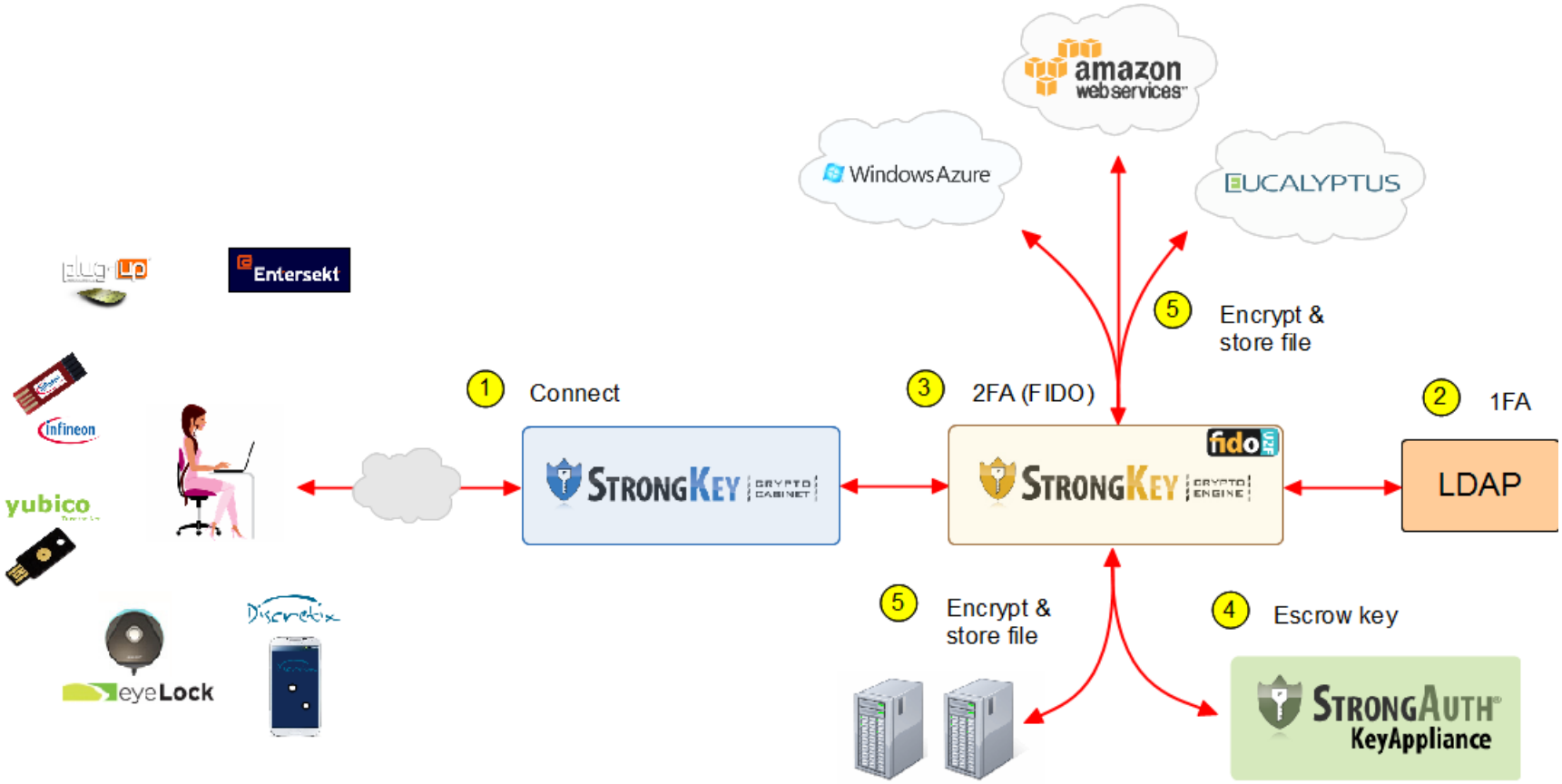


U2F Demonstration



Questions for Auditors

- Is it an “internal-customer” or “external-customer” focused deployment?
- Are the Authenticators FIDO-certified?
- Are the Authenticators hardware- or software-based?
- Are the Authenticators security-tested?
- What controls does the Authenticator manufacturer have around the “Attestation” key(s)?
- How will the Relying Party (RP) Operations staff learn of “revoked” Authenticators and/or manufacturers?

Questions for Auditors

- What controls exist for protecting “Key Handles” on the FIDO Server?
  - Pay special attention if the FIDO Server is hosted in a public cloud like AWS, Azure, etc.
    - *ISACA Fall Conference 2012 - RC3 presentation*
- What account-recovery process exists for customers who have lost their Authenticators, or forgotten them at home?
- Does that account-recovery process address the company's security policy for identification and authentication?

Questions?

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