A NEW MODEL FOR AUTHENTICATION
ENABLING MORE EFFICIENT DIGITAL SERVICE DELIVERY

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The world has a **PASSWORD PROBLEM**
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**Data breaches expected to reach 1,000 in 2016 up 22% from 2015**
- Identity Theft Resource Center

**63% of data breaches in 2015 involved weak, default, or stolen passwords**
- Verizon 2016 Data Breach Report

**Each data breach costs $3.8 million on average up 23% from 2013**
- Ponemon Institute
ONE-TIME PASSCODES

Improve security but aren’t easy enough to use

- SMS Reliability
- Token Necklace
- User Confusion
- Still Phishable
The world has a “SHARED SECRETS” PROBLEM
WE NEED A NEW MODEL
THE NEW MODEL

Fast IDentity Online

online authentication using public key cryptography
THE OLD PARADIGM

SECURITY

USABILITY
THE FIDO PARADIGM

SECURITY

Strong

Weak

USABILITY

Poor

Easy

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HOW “Shared Secrets” WORK

The user authenticates themselves online by presenting a human-readable “shared secret”
The user authenticates “locally” to their device (by various means)

The device authenticates the user online using public key cryptography
Support for Two Authentication Experiences

Passwordless Experience

FIDO UAF (Universal Authentication Framework)

Second Factor Experience

FIDO U2F (Universal Second Factor)

ENABLES MANY AUTHENTICATION OPTIONS | EACH SERVICE PROVIDER HAS ITS OWN UNIQUE SECURITY KEYS
FIDO Registration

1. User is in a Session
   Or
   New Account Flow

2. Invitation Sent
   User Approval

3. New Keys Created

4. Pubic Key Registered
   With Online Server

Registration Complete
FIDO Authentication

1. User needs to login or authorize a transaction

2. FIDO Challenge

3. User Approval

4. Login Complete

Signed Response verified using Public Key Cryptography

Key Selected & Signs
USABILITY, SECURITY, R.O.I. and PRIVACY
No 3rd Party in the Protocol

No Secrets on the Server Side

Biometric Data (if used) Never Leaves Device

No Link-ability Between Services

No Link-ability Between Accounts
FIDO was designed from the start to support the Privacy Principles of the European Data Protection Directive

<table>
<thead>
<tr>
<th>EU Privacy Principle</th>
<th>FIDO Implementation of EU Privacy Principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal data must be processed fairly and lawfully</td>
<td>For a User to access a Relying Party’s services through FIDO Authentication, the User must first agree to register with that Relying Party. When the User wishes to access the online service, they must execute the User Verification step, e.g. touching a sensor, entering a passcode, or providing their fingerprint, in order to execute the cryptographic computation. This ensures that malware installed on the User’s device is unable to autonomously perform FIDO operations.</td>
</tr>
<tr>
<td>Personal data can only be processed for one or more specified lawful purpose(s)</td>
<td>The Personal Data required to access an online service, such as a fingerprint, can only be accessed by the FIDO Authenticator which is part of the User’s device. The FIDO Authenticator can only access such data when it is required to perform an Authentication. The FIDO protocol requires a minimum amount of data stored by the Relying Party, for which the user is required to provide consent.</td>
</tr>
<tr>
<td>Personal data must be adequate, relevant, and not excessive in relation to the purposes for which it is being used</td>
<td>The data needed to perform an Authentication is collected by the Relying Party when the User registers with it. This data is: • A public key: This allows the Relying Party to verify that the FIDO Authenticator being used is the one previously registered by the User. • Authenticator Attestation ID (AAID): This is a reference that allows the Relying Party to look-up the characteristics of the used FIDO Authenticator. • Key Handle: An identifier created by a FIDO Authenticator, potentially containing an encrypted private key, to refer to a specific key maintained the FIDO Authenticator.</td>
</tr>
<tr>
<td>Personal data must be accurate and up to date</td>
<td>The data used for FIDO Authentication, such as the registered public key, must be accurate since cryptographic verification fails otherwise. If the data becomes corrupted for any reason, the User needs to re-register with the Relying Party. Re-registration changes the registered public key.</td>
</tr>
<tr>
<td>Personal data must not be kept for longer than necessary to fulfill the purposes for which it was collected</td>
<td>The User may de-register from a Relying Party at any time. Once de-registration has taken place the Public key held by the Relying Party is of no further use.</td>
</tr>
<tr>
<td>Personal data must be kept secure</td>
<td>Allowing users to authenticate using FIDO Authentication provides a greater level of security around accessing personal data than passwords alone. Data required for local User Verification is stored locally on the FIDO Authenticator. FIDO-related data stored at the Relying Party is not confidential by itself. The FIDO Authenticator is required to protect data required for User Verification and FIDO-related data, such as cryptographic keys, against unauthorized access by third parties.</td>
</tr>
<tr>
<td>Personal data must be processed in accordance with rights of data subjects</td>
<td>Personal data used to authenticate a User can only be accessed by that User when the User wishes to be authenticated.</td>
</tr>
<tr>
<td>Personal data cannot be transferred outside a given geographical area, such as the EEA, without specific circumstances being in place.</td>
<td>Personal data held in a FIDO Authenticator will be protected by the same mechanisms irrespective of the device’s location and the device can only leave the EEA if the owner wishes it to do so. The FIDO Server used by the Relying Party does not contain personal data.</td>
</tr>
</tbody>
</table>
The FIDO Alliance is an open industry association of over 250 organizations with a focused mission: **Authentication Standards**
FIDO Alliance Mission

1. Develop Specifications
2. Operate Adoption Programs
3. Pursue Formal Standardization
Sponsor Members
Government Members

Cabinet Office
National Institute of Standards and Technology
U.S. Department of Commerce

Australian Government
Digital Transformation Office

China Electronics Standardization Institute

Bundesamt für Sicherheit in der Informationstechnik

CAICT 中国信通院

Note: if you are not listed here, we’d like you to be.
Deployments are enabled by over 250 FIDO® Certified products available today
Certification Growth

- 250+ FIDO® Certified products available today
- An open competitive market
- Ensures interoperability
- Sign of mature FIDO ecosystem

Graph showing the growth of FIDO® Certified products from April 2015 to August 2016 with totals reaching 253.
FIDO in the Android Ecosystem

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FIDO in the Apple Ecosystem

Supported iOS Fingerprint Devices

- iPhone SE
- iPhone & iPhone+
- iPad Air, Mini
- iPad Pro

Bank of America
NTT Docomo
eBay
FIDO in the Windows and Web Ecosystems

**Windows Platforms**
- Microsoft
- Hello Windows 10
- Intel
- Lenovo Yoga 910

**Web**
- W3C
- Chrome
- Mozilla
- Microsoft Edge
HOW FIDO CAN HELP GOVERNMENTS
How FIDO Can Help Governments

• Support for “BYOC” (Bring Your Own Credential)
  • Take advantage of the growing ecosystem of FIDO solutions and standards
  • No need to create passwords for digital government services
  • No requirement to issue a separate token or app for MFA

• Better Security, Privacy + Interoperability

• Better Customer Experiences - simpler and safer

• Reduced Cost for the Government Enterprise
FIDO Impact on Policy

FIDO specifications offer governments newer, better options for strong authentication - but governments may need to update some policies to support the ways in which FIDO is different.

As technology evolves, policy needs to evolve with it.
1. Recognize that two-factor authentication no longer brings higher burdens or costs

“another commenter pointed out that current approaches to multi-factor authentication are costly and burdensome to implement”


• While this statement was true of most “old” MFA technology, FIDO specifically addresses these cost and usability issues.

• FIDO enables simpler, stronger authentication capabilities that governments, businesses and consumers can easily adopt at scale.
2. Recognize technology is now mature enough to enable two secure, distinct AuthN factors in a single device

- Recognized by the US government (NIST) in 2014...

- "OMB (White House) to update guidance on remote electronic authentication" to remove requirements that one factor be separate from the device accessing the resource

- The evolution of mobile devices - in particular, hardware architectures that offer highly robust and isolated execution environments (such as TEE, SE and TPM) - has allowed these devices to achieve high-grade security without the need for a physically distinct token
2. Recognize technology is now mature enough to enable two secure, distinct AuthN factors in a single device.

European Banking Authority (EBA)

*Draft Regulatory Technical Standards on PSD2 Strong Authentication*

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**Article 6**

Requirements related to the independence of the elements

1. The use of the elements of strong customer authentication referred to in Article 3, 4 and 5 shall be subject to procedures in terms of the technology, algorithms and parameters, ensuring that the breach of one of the elements does not compromise the reliability of the other elements.

2. Where any of the elements of strong customer authentication or the authentication code, is used through a multi-purpose device including, but not limited to, mobile phones and tablets, the authentication procedure shall provide measures to mitigate the risk of the multi-purpose device being compromised.

3. For the purposes of paragraph 2, the mitigating measures shall include, but not be limited to:
   a. the implementation of separated trusted execution environments inside the multi-purpose device;
   b. mechanisms to ensure that the software or device have not been altered by the payer or by a third party or mechanisms to mitigate the risks related to such alteration where this has taken place.
3. As governments promote or require strong AuthN, make sure it is the “right” strong AuthN

The market is in the midst of a burst of innovation around authentication technology - some solutions are better than others. Don’t build rules and systems focused on old authentication technology.

- Old authentication technologies impose significant costs and burdens on the user - which decreases adoption

- Old authentication technologies have security (i.e., phishable) and privacy issues - putting both users and online service providers at risk
FIDO Delivers on Key Policy Priorities

**Security**
- Authentication using strong asymmetric Public Key cryptography
- Superior to old “shared secrets” model – there is nothing to steal on the server
- Biometrics as second factor

**Privacy**
- Privacy architected in up front; No linkability or tracking
- Designed to support Privacy Principles of the European Data Protection Directive
- Biometric data never leaves device
- Consumer control and consent

**Interoperability**
- Open standards: FIDO 2.0 specs are in W3C standardization process
- FIDO compliance/conformance testing to ensure interoperability of “FIDO certified” products

**Usability**
- Designed with the user experience (UX) first – with a goal of making authentication as easy as possible.
- Security built to support the user’s needs, not the other way around

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Come learn more: FIDO in Vancouver!

• FIDO Seminar - Monday, January 23
• FIDO Plenary - January 24-26
THANK YOU!

QUESTIONS?

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