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Results That Drive Mission Success!

Digital Authentication – Mobile Platforms to the Rescue!

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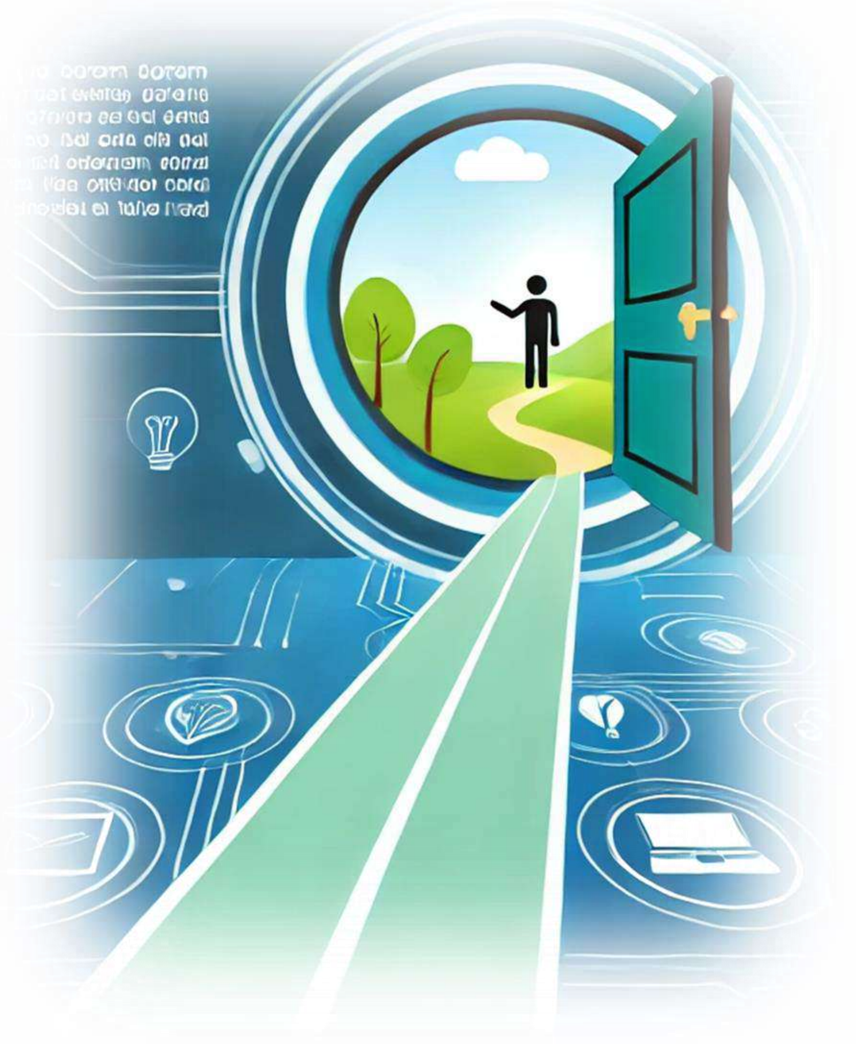
Agenda

- Introduction
- Capabilities of Mobile Devices
- Digital Authentication Support through Mobile Devices
- NIST SP 800-63-4 Connection
- Wrap-Up

Introduction

Basics



- What is Digital Authentication?
  - Verifying the identity of users attempting to access online services
- Traditional Authentication Factors
  - Something You Know (SYK)
    - Password, PIN, Passphrase
  - Something You Have (SYH)
    - Key Fob, Device, Smartcard
  - Something You Are (SYA)
    - Facial Image, Fingerprint, Voiceprint

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Current Challenges in Digital Authentication

- **Weak Passwords and Credential Reuse**
  - 80% of breaches involve compromised or weak credentials
- **Phishing and Social Engineering Attacks**
  - Users are often tricked into divulging credentials
- **Balancing Security and Usability:**
  - Need for robust security measures without impacting user experience

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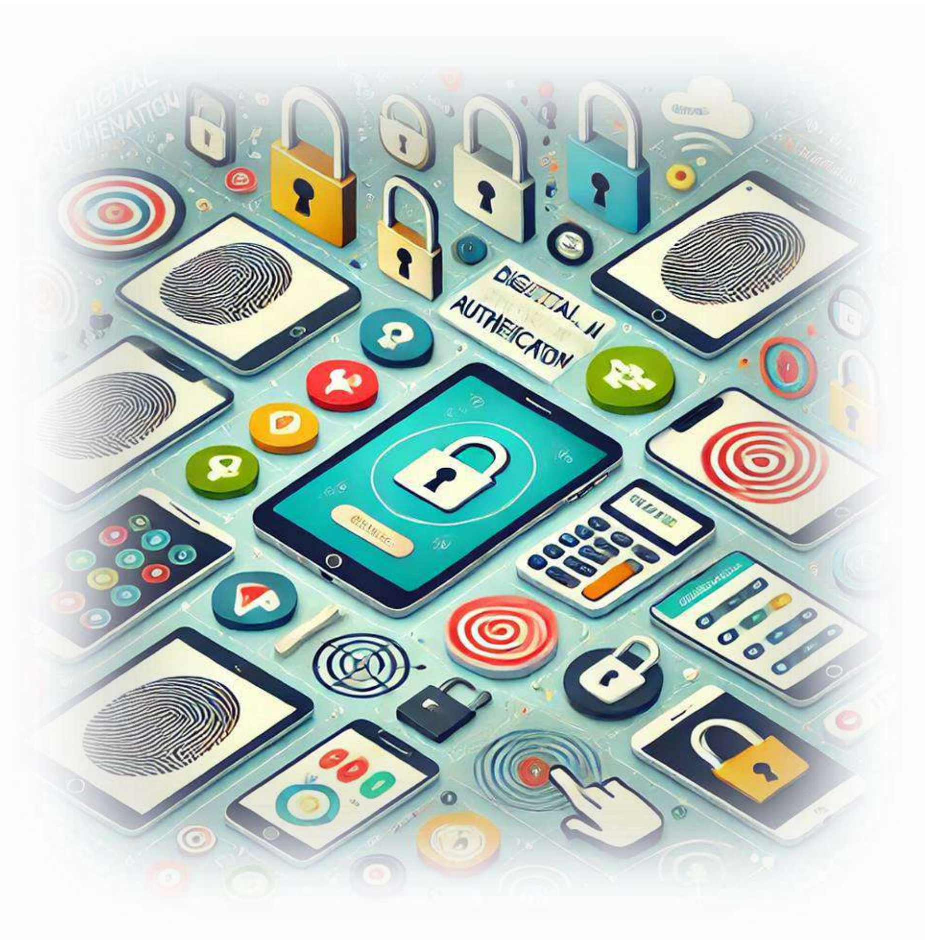
Capabilities of Mobile Devices

Mobile Device as an Authentication Tool



- **Mobile Devices as Authentication Enablers**
  - Built-in Biometrics: Fingerprint sensors, facial recognition
  - Cryptographic Chips: Secure elements for storing secrets
  - Connectivity: Continuous access to the internet for real-time authentication
- **Advantages of Mobile Devices**
  - Ubiquitous
  - Personal and unique to each user
  - Always with the user, reducing dependency on external tokens
  - Offer built-in sensors and advanced hardware/software features

Capabilities - Smart Mobile Platforms (I)

- **Multiple Biometric Sensors**
  - Camera – Facial Image and Iris Scan
  - Fingerprint Scanner – Fingerprint
  - Voice – Voiceprint
- **Multiple Wireless Connectivity Mechanisms**
  - Cellular
  - Wi-Fi
  - Bluetooth
  - Near Field Communications (NFC)

Capabilities - Smart Mobile Platforms (II)

- **Multiple Contextual Sensors**
  - Accelerometer – senses axis-based motion, orientation, motion
  - Gyroscope – senses orientation and movement
  - Magnetometer – senses geographical direction (North, South, etc.)
  - GPS – determines location based on connection with GPS satellites
  - Barometer – measures air pressure
  - Proximity Sensor – determines distance from body

Capabilities - Smart Mobile Platforms (III)

- **Application Sandboxing**
  - Each App (or App Group) runs in its own sandbox
- **Reliable Network Time**
  - Important for secure transactions between parties
- **Cryptographic Capabilities**
  - Cryptographic key generation (symmetric / asymmetric)
  - Encryption / Decryption
  - Digital signature generation / verification
- **Secure Storage**
  - Cryptographic keys

Digital Authentication Support through Mobile Devices

Authentication Apps on Mobile Devices

- **Password Managers**
  - Secure storage for complex passwords, autofill capabilities
  - Example: Integration with device biometrics (Face ID, Fingerprint)
- **OTP (One-Time Password) Generators**
  - TOTP (Time-based OTP) and HOTP (HMAC-based OTP) for 2FA
  - Examples: Google Authenticator, Microsoft Authenticator
  - Benefits: Offline operation, low cost, no reliance on SMS

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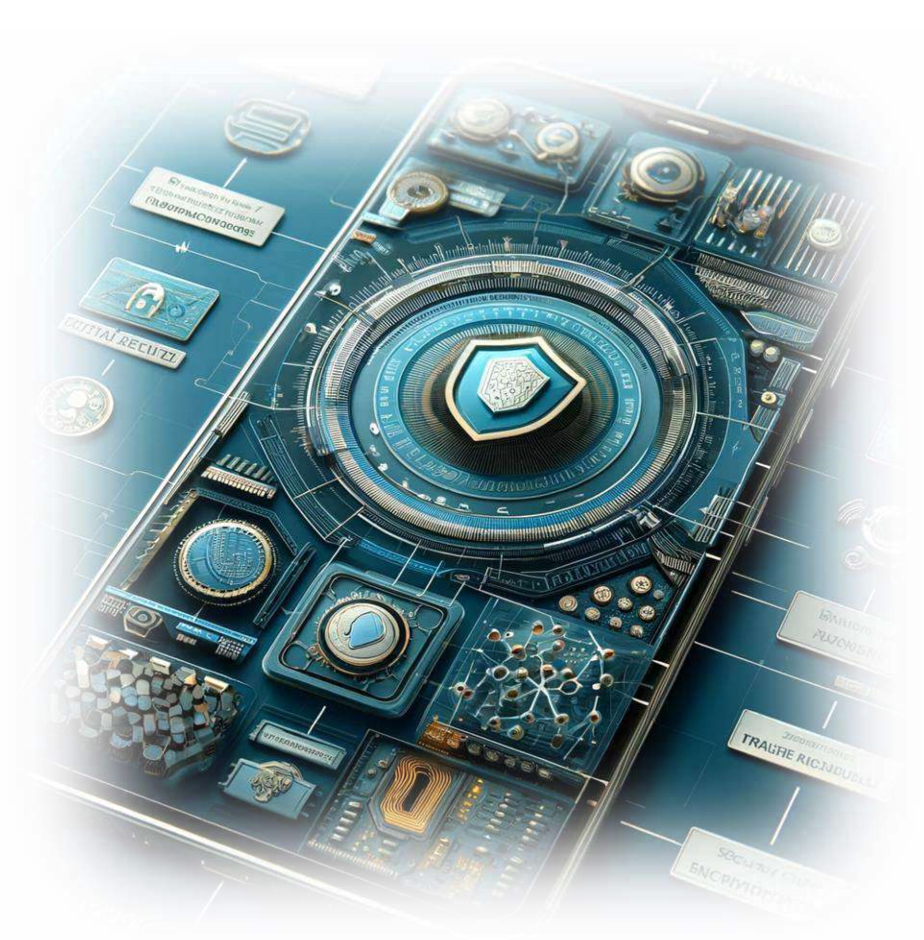
Leveraging Cryptographic Capabilities



- **Hardware Security Modules (HSMs)**
  - Secure Enclave (iOS) and TrustZone (Android) for key management
  - Protect cryptographic operations from the main OS
- **Public Key Infrastructure (PKI)**
  - Use of digital certificates for secure client authentication
  - Mobile apps using certificates for seamless, secure user access
- **Example Use Cases**
  - Banking apps using device-based certificates for transactions
  - Derived PIV Credentials

Biometric Authentication

- Mobile Biometric Sensors
  - Fingerprint, facial recognition, iris scanning
- Local Authentication
  - Unlocking devices or apps
- Using a Biometric as an Activation Factor
  - Enabling use of Multifactor Authentication (MFA) credentials

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Out-of-Band (OOB) Authentication

- **What is it?**
  - **Utilizing a separate communication channel (SMS, push notifications)**
- **Examples**
  - **Bank sends one time code via SMS for transactions**
  - **Mobile push notifications for approving logins**
- **Security Considerations**
  - **Risks: SIM swap attacks, malware interception**

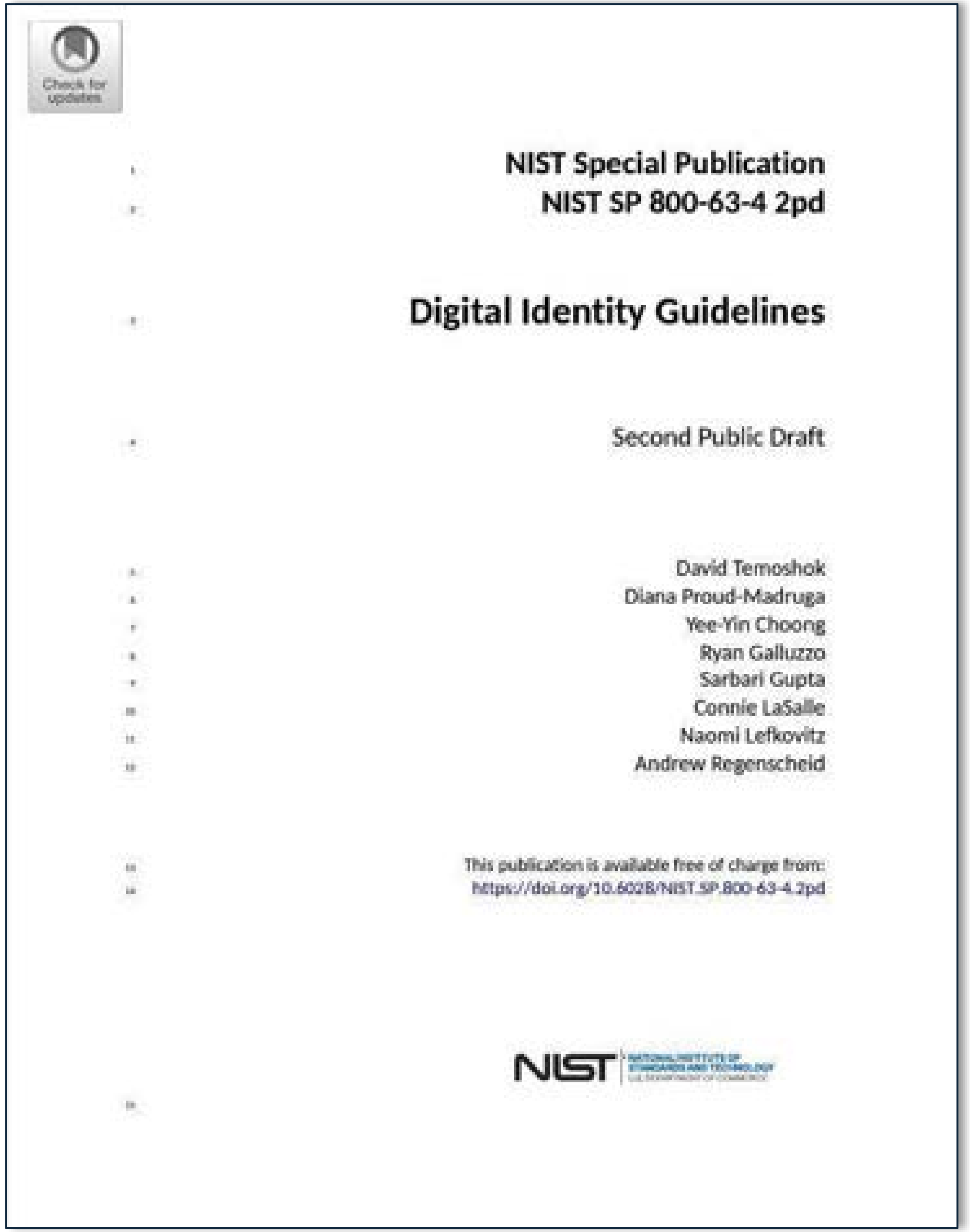
Emerging Trends and Future Capabilities

- FIDO2 and WebAuthn
  - Passwordless authentication using mobile devices
  - Use of mobile hardware for secure cryptographic credential storage (public/private keys)
  - Widely supported on mobile and traditional OS and Browser platforms
- Mobile Drivers License (mDL)
  - Digital version of traditional driver's license stored on mobile device (based on ISO 18013-5)
  - Can be used for identity verification both online and offline
  - Leverages Near Field Communication (NFC), QR codes
  - Incorporates data encryption and ability to control which information is shared
- Continuous and Adaptive Authentication
  - Continuous monitoring using mobile device sensors (location, behavior)
  - Adjust security dynamically based on detected risks

NIST Special Publication 800-63-4 Connection

NIST SP 800-63-4 2pd

- **Second Public Draft**
  - Released Aug 21, 2024
- **Public Comment Period**
  - 8/21/24 to 10/7/24
- **Four (4) Volumes**
  - SP 800-63-4: Digital Identity Risk Management and Model
  - SP 800-63A-4: Identity Proofing and Enrollment
  - SP 800-63B-4: Authentication and Authenticator Management
  - SP 800-63C-4: Federation and Assertions



Check for updates

NIST Special Publication
NIST SP 800-63-4 2pd

Digital Identity Guidelines

Second Public Draft

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This publication is available free of charge from:
https://doi.org/10.6028/NIST.SP.800-63-4.2pd

NIST

NIST SP 800-63B-4 2pd Authenticator Types

- Password (SYK)
  - Secret value chosen by and either memorized or recorded by the subscriber
- Look-Up Secret (SYH)
  - Physical or electronic record that stores a set of shared secrets
- Single-factor OOB Device (SYH)
  - Physical device that is uniquely addressable
  - Can communicate securely over distinct communications channel
- Multi-factor OOB Device (SYH)
  - Out-of-Band Device that can be used only after successful input of an activation factor
- Single Factor OTP (SYH)
  - Hardware or Software-based tool with an embedded secret used for generating one-time passwords
- Multi-factor OTP (SYH and (SYK or SYA))
  - An OTP generator that can be used only after successful input of an activation factor
- Single-Factor Cryptographic Authenticator (STH)
  - Hardware or Software-based cryptographic module used to prove possession of encapsulated cryptographic keys via an authentication protocol
- Multi-factor Cryptographic Authenticator (SYH and (SYK or SYA))
  - Cryptographic authenticator that can be used only after successful input of an activation factor

Support for SP 800-63B-4 Authenticators

SP 800-63B-4 Authenticator Type	Support on Mobile Devices
Password	Password Managers
Look-up-Secret	List of Pre-Generated Secrets stored on Mobile Device
Single-factor Out-of-Band Device	One time use code sent via SMS
Multi-factor Out-of-Band Device	Same as above but enabled by Face/PIN/Fingerprint
Single-Factor OTP	Authenticator Apps that generate OTPs
Multi-factor OTP	Same as above but enabled by Face/PIN/Fingerprint
Single-Factor Cryptographic Authenticator	Single-factor FIDO2
Multi-Factor Cryptographic Authenticator	Multi-factor FID02, mDL

Wrap-Up

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Security Considerations and Best Practices

- **Risks of Mobile-Based Authentication**
  - Device theft or loss, malware, phishing
- **Mitigation Strategies**
  - Regular software updates
  - Using encrypted storage
  - Strong PINs/passwords
  - Enabling remote wipe
  - App-based MFA
- **User Education**
  - Training users to recognize threats like phishing and social engineering

Conclusion

- **Key Points**
  - Mobile devices offer multiple layers of authentication apps, biometrics, cryptographic capabilities
  - They provide robust security while enhancing usability
- **Recommendations**
  - Encourage adoption of mobile-based authentication strategies
  - Continuous improvement and adaptation to emerging threats
- **Final Thoughts**
  - Mobile devices are not just a convenience but a key enabler of secure, user-friendly digital authentication

Discussion and Contact Information

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