

## Lesson 6: Digital Identity and Authentication

### Module 1: FinTech Fundamentals

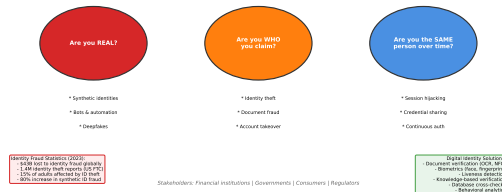
Digital Finance

## Identity Verification Problem

- 1.7B unbanked adults
- Lack of identity documents
- Fraud losses: **\$5.8B** (2023)
- Remote onboarding need

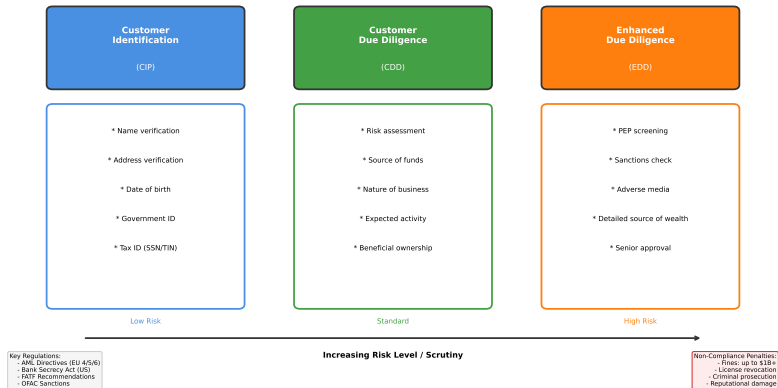
## The Digital Identity Challenge

How do you prove who you are online?



Source: Javelin Strategy, FTC Consumer Sentinel Network (2023)

## Know Your Customer (KYC) Framework

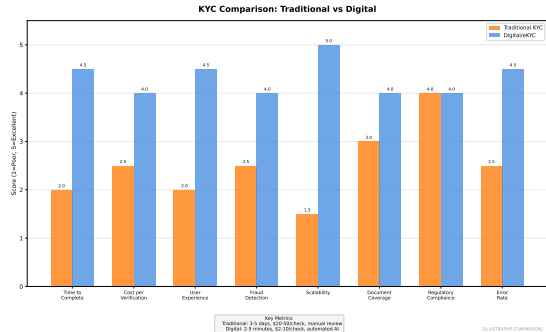


Source: FATF Guidelines, AML regulatory frameworks

# Traditional vs Digital KYC

## Process Comparison

- Traditional: 7-14 days
- Digital: 5-10 minutes
- Cost: **\$60 vs \$5**
- Drop-off: 40% vs 15%



## EU Digital Identity

- Electronic ID recognition
- Trust services regulation
- Cross-border validity
- Three assurance levels

### eIDAS: EU Electronic Identification & Trust Services

Regulation (EU) No 910/2014 + eIDAS 2.0 (2024)

#### Electronic Identification (eID)

- \* National eID schemes notification
- \* Mutual recognition across EU
- \* Assurance levels (Low/Substantial/High)
- \* eID Node interoperability
- \* EU Digital Identity Wallet (eIDAS 2.0)

#### Trust Services

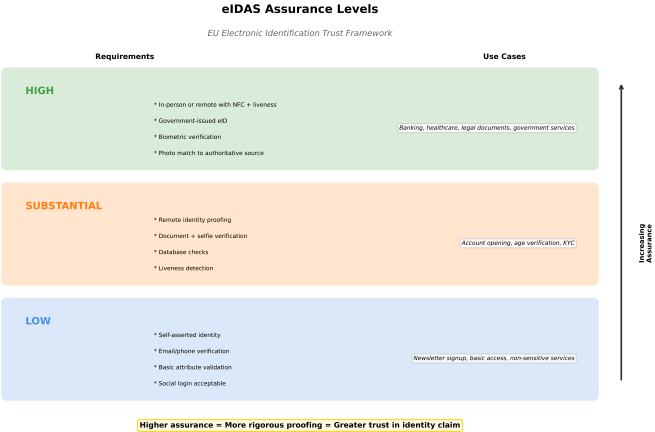
- \* Electronic signatures (QES)
- \* Electronic seals
- \* Time stamps
- \* Registered delivery
- \* Website authentication (QRNC)

#### eIDAS 2.0 Key Changes (2024)

EU Digital Identity Wallet | Verifiable credentials | Remote identity proofing | Private sector acceptance mandate

All EU citizens enrolled to a digital wallet by 2026

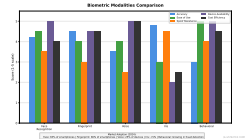
Source: EU Regulation 910/2014, eIDAS 2.0 (2024)



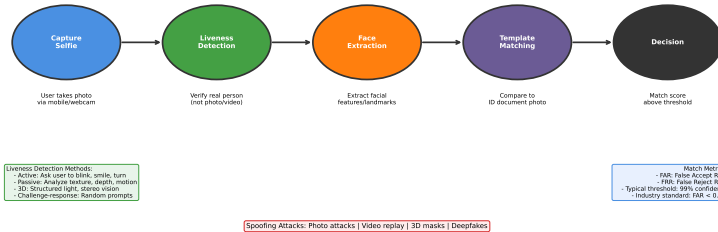
Source: EU Regulation 910/2014, Implementing Regulation 2015/2502

## Modalities

- Fingerprint: 99.8% accuracy
- Face recognition: 99.5%
- Iris scan: 99.99%
- Voice: 95% accuracy



## Facial Recognition Verification Flow



[CONCEPTUAL PROCESS FLOW]



## Anti-Spoofing

- Active: User actions
- Passive: Texture analysis
- 3D depth sensing
- Challenge-response

### Liveness Detection Methods

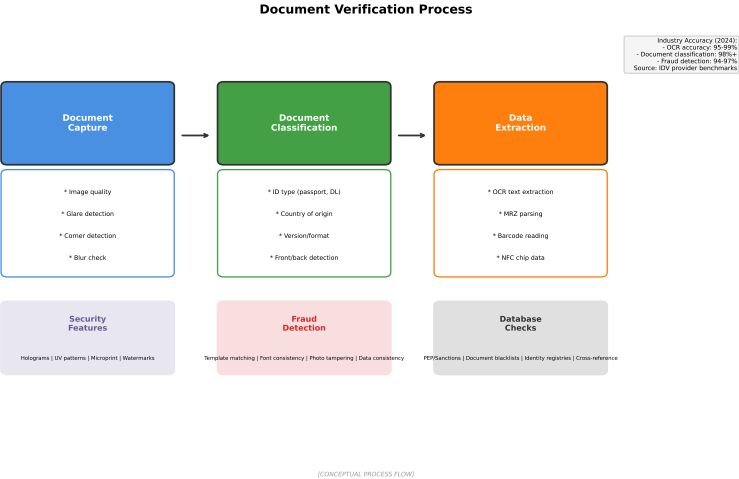
Preventing Presentation Attacks



Aspect	Active	Passive
User friction	Higher	Lower
Time required	5-15 sec	1-3 sec
Spoof resistance	High	Medium-High
Accessibility	Limited	Better
Drop-off rate	10-20%	2-5%

Common Attacks: Photo attacks | Video replay | 3D masks | Displays | Screen replay

Source: Industry liveness detection standards (ISO/IEC 30107)



## Automated Extraction

- Optical character recognition
- Machine-readable zone (MRZ)
- NFC chip data (ePassports)
- Security features check

## Document Data Extraction: OCR vs NFC



Metric	OCR	NFC
Accuracy	85-90%	100%
Security	Medium	Very High
User effort	Take photo	Tap phone
Device req.	Camera	NFC-enabled
Storing data	Unlimited	Cryptographic

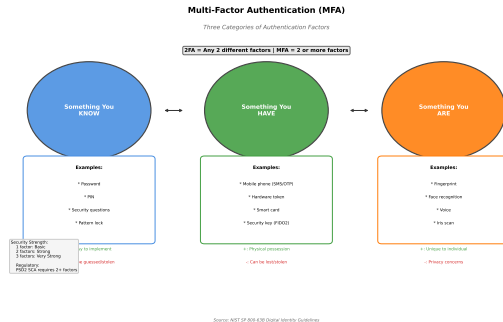
**Best Practice: Combine OCR + NFC for maximum security and accuracy**

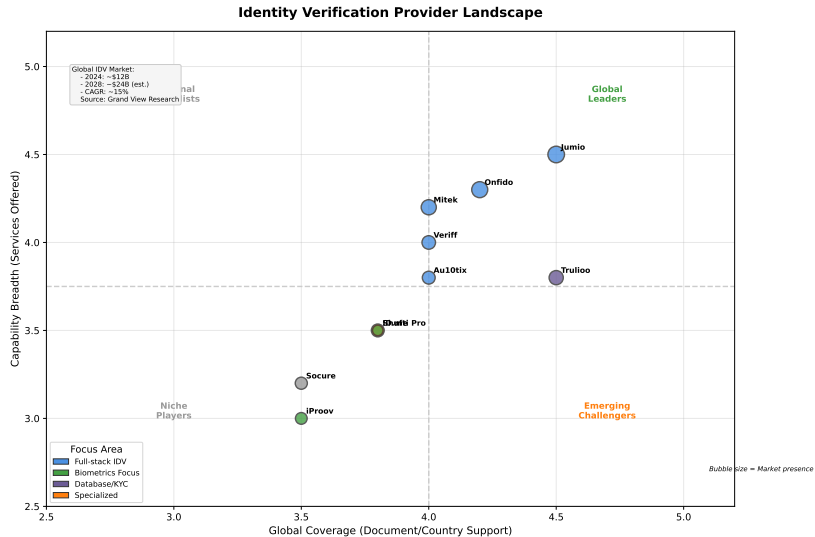
Source: ICAO 9303 Machine Readable Travel Documents, ePassport specifications

# Multi-Factor Authentication (MFA)

## Authentication Factors

- Knowledge: Password/PIN
- Possession: OTP token
- Inherence: Biometric
- Reduces fraud 99.9%

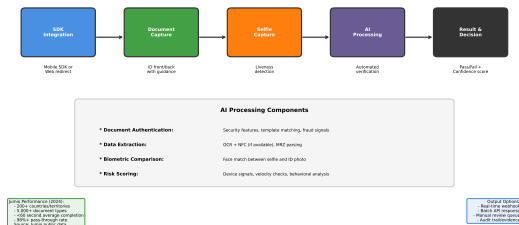




## AI-Powered KYC

- 1B+ verifications
- 5 minute verification
- 95% automation rate
- 200+ countries

Identity Verification Workflow (Jumio Example)

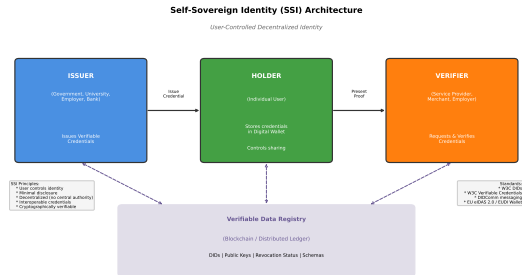


Source: Jumio product documentation (2024)

# Self-Sovereign Identity (SSI)

## Decentralized Model

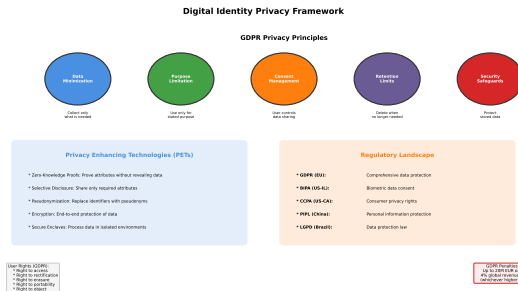
- User controls credentials
- Blockchain-based
- Verifiable credentials
- Privacy-preserving



Source: W3C Decentralized Identifiers (DIDs), Verifiable Credentials Data Model

## Data Protection

- GDPR compliance
- Biometric template storage
- Data minimization
- Right to erasure



Source: GDPR (EU) 2016/679, NIST Privacy Framework



## Global Digital Identity Landscape

National Digital ID Systems by Region (2024)

### Europe

- \* eIDAS/EUDI Wallet (EU)
- \* BankID (Nordics)
- \* Itsme (Belgium)

70%+ adult population

### Asia-Pacific

- \* Aadhaar (India) - 1.3B
- \* MyKad (Malaysia)
- \* SingPass (Singapore)

Highest biometric coverage

### Americas

- \* Login.gov (US-partial)
- \* Gov.br (Brazil)
- \* Digital ID (Canada-pilot)

Fragmented adoption

### Africa

- \* NIMC (Nigeria)
- \* Smart ID (South Africa)
- \* Huduma Namba (Kenya)

Growing mobile-first

### Middle East

- \* UAE Pass
- \* Absher (Saudi)
- \* Smart Qatar

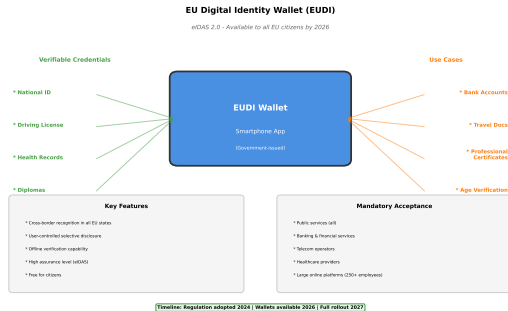
High gov adoption

Global Statistics (2024):  
- 5B+ people have digital ID  
- 1B+ still lack legal identity  
- \$30B+ market by 2028  
Source: World Bank ID4D, McKinsey

Source: World Bank ID4D Global Dataset 2024, Regional government sources

## EU Digital Identity Wallet

- eIDAS 2.0 mandate
- 2026 rollout target
- Universal EU acceptance
- Private sector integration



Source: European Commission, eIDAS 2.0 Regulation (EU) 2024/1183

- **KYC:** Digital verification reduces cost 90% and time 95%
- **eIDAS:** EU framework for cross-border identity
- **Biometrics:** Face + liveness detection standard approach
- **MFA:** Multi-factor prevents 99.9% of fraud
- **Future:** Self-sovereign identity and digital wallets