Lesson 6: Digital Identity and Authentication

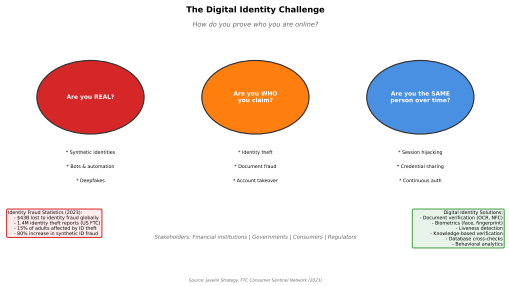
Module 1: FinTech Fundamentals

Digital Finance

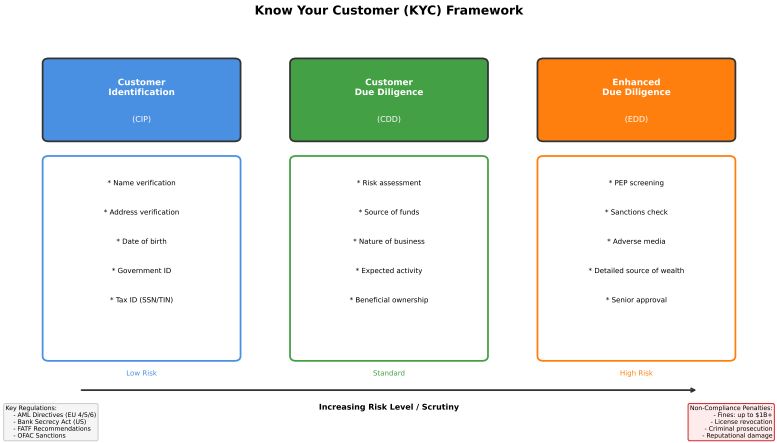
Digital Identity Challenge

Identity Verification Problem

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



KYC Regulatory Requirements

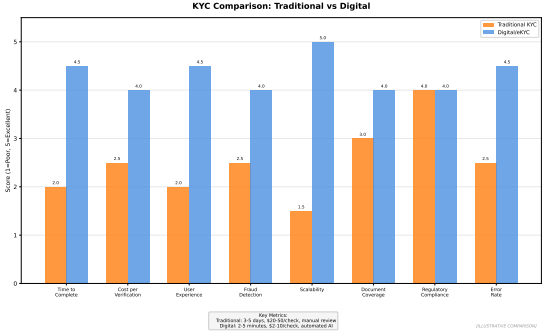


Source: FATF Guidelines, AML regulatory frameworks

Traditional vs Digital KYC

Process Comparison

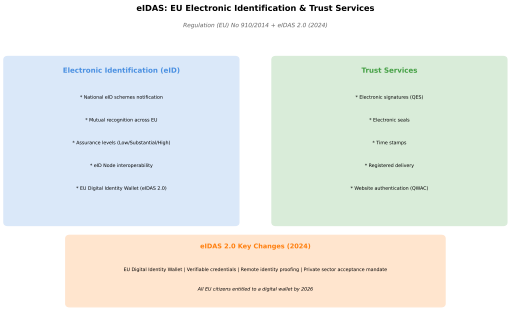
- Traditional: 7-14 days
- Digital: 5-10 minutes
- Cost: $60 vs $5
- Drop-off: 40% vs 15%



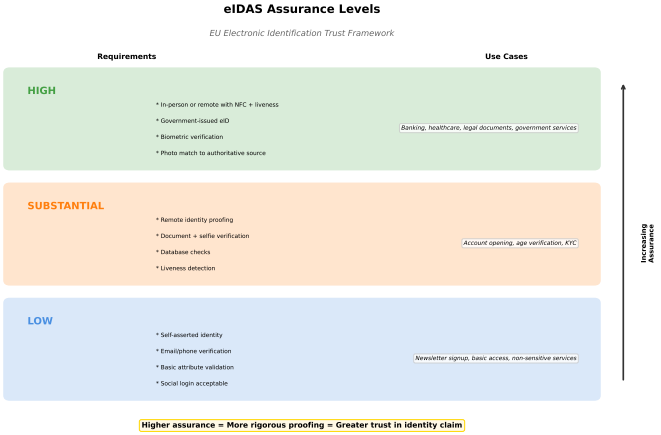
eIDAS Framework

EU Digital Identity

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



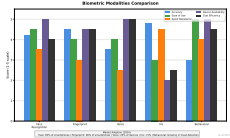
eIDAS Assurance Levels



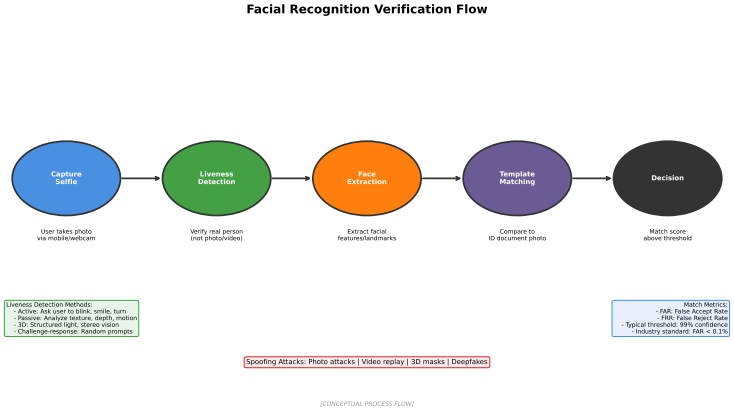
Biometric Authentication

Modalities

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



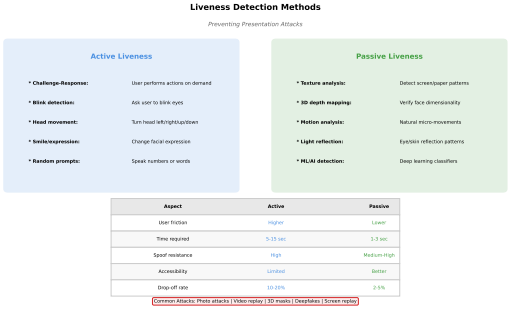
Facial Recognition Flow



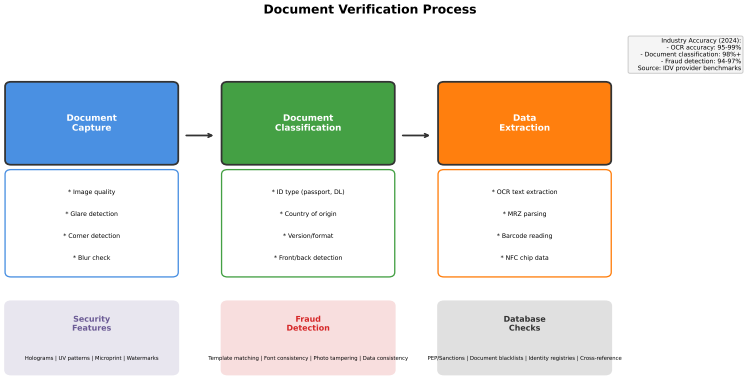
Liveness Detection

Anti-Spoofing

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



Document Verification Technology



OCR and NFC Chip Reading

Automated Extraction

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

Document Data Extraction: OCR vs NFC

OCR (Optical Character Recognition)

1. Image Capture	Camera captures document
2. Pre-processing	Deskew, noise reduction
3. Text Detection	Locate text regions
4. Character Recognition	ML-based text extraction
5. MRZ Parsing	Machine Readable Zone decode
6. Validation	Check digit verification

NFC (Near Field Communication)

1. Chip Detection	Phone detects NFC chip
2. BAC/PACE Auth	Authenticate with MRZ data
3. Data Read	Extract chip data groups
4. Active Auth	Verify chip authenticity
5. Passive Auth	Validate digital signatures
6. Clone Detection	Verify chip is original

Metric	OCR	NFC
Accuracy	95-99%	100%
Security	Medium	Very High
User effort	Take photo	Tap phone
Device req.	Camera	NFC-enabled
Tampering detect	Limited	Cryptographic

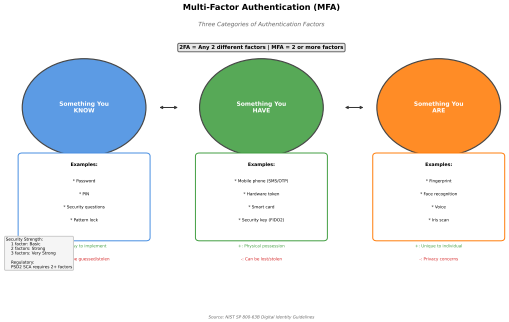
Best Practice: Combine OCR + NFC for maximum security and accuracy

Source: ICAO 9303 (Machine Readable Travel Documents), ePassport specifications

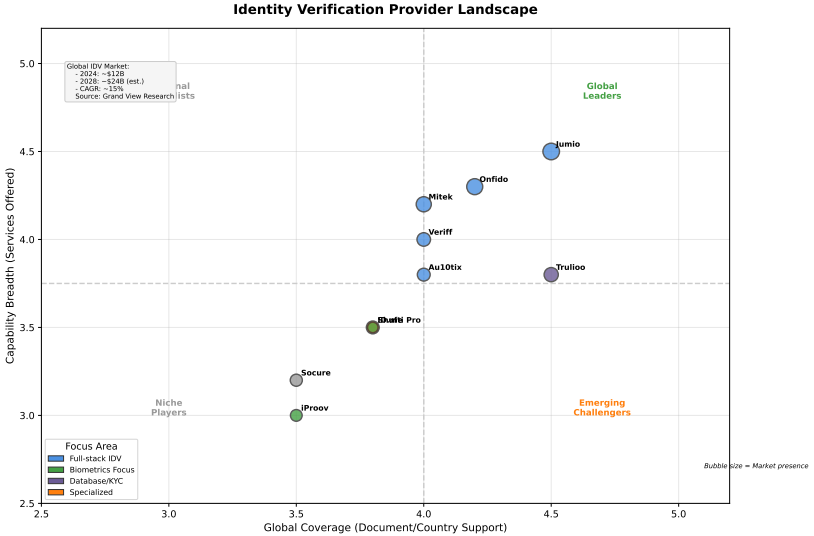
Multi-Factor Authentication (MFA)

Authentication Factors

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



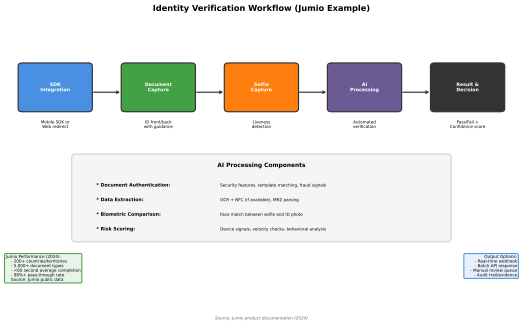
Identity Verification Providers



Jumio Case Study

AI-Powered KYC

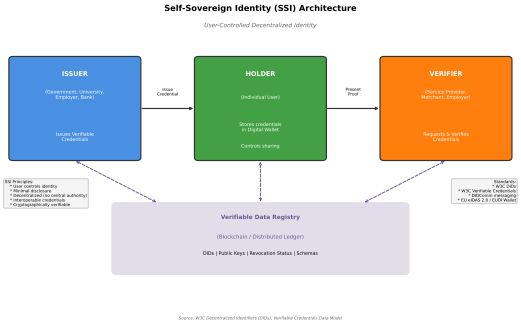
- 1B+ verifications
- 5 minute verification
- 95% automation rate
- 200+ countries



Self-Sovereign Identity (SSI)

Decentralized Model

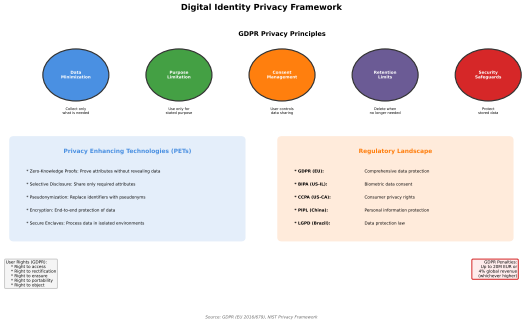
- User controls credentials
- Blockchain-based
- Verifiable credentials
- Privacy-preserving



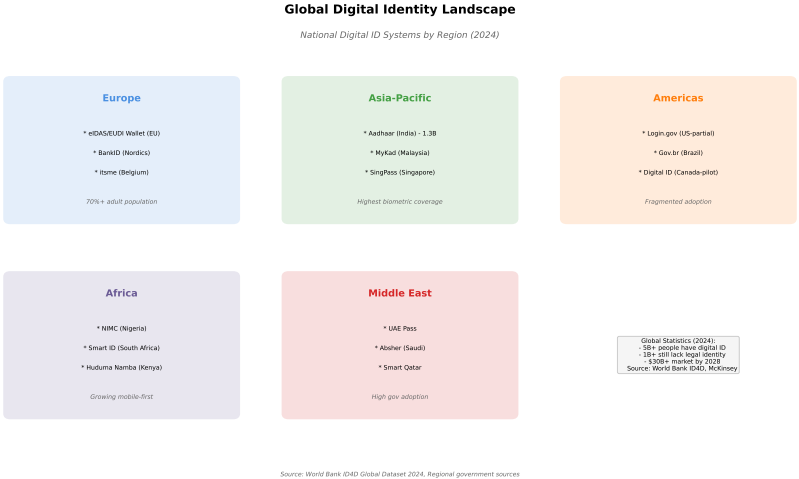
Privacy Concerns

Data Protection

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



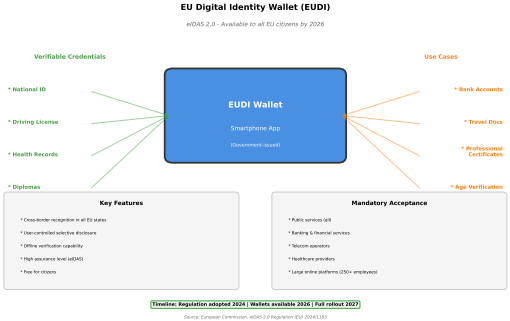
Global Identity Programs



Future: Digital Wallets

EU Digital Identity Wallet

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



Key Takeaways

- **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