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Smart Cards Anno 2020

Stand der Technik und worauf zu achten ist
About & Beyond PKI 2020

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About CRYPTAS

SPECIALIST FOR PKI, STRONG AUTHENTICATION, ENCRYPTION, LAWFUL SIGNATURES AND DIGITAL IDENTITIES

Own solutions around Digital Signatures, Virtual Smart Card, clientless Smart Card access, Self-Service Processes, PKI, OCSP++…

CONSULTING, DEVELOPMENT, INTEGRATION, SERVICES

Topics: eSignature, Smart Cards, PKI, FIM, Key Management, HSM, Encryption…

WIEN, GRAZ, DÜSSELDORF AND STOCKHOLM

Successful in crypto-business since 2003; main markets D/A/CH, Typical Project Size: 1.000 to 300.000 Users

> 40.000 CUSTOMERS / ~100 COUNTRIES /

Verticals: banking, insurance, energy provider, health, industry, government…

Trust Center: Millions Transactions per Day / Thousands Enrollments per Day

eIDAS TRUST CENTER

Qualified Trust Center with focus on Qualified Onboarding, eIDAS Online Contracting, Video-Legitimation, eIDAS Remote Services

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What is a Smart Card

- In an abstract mean
- From a technological view
- Based on the security model
- Practically

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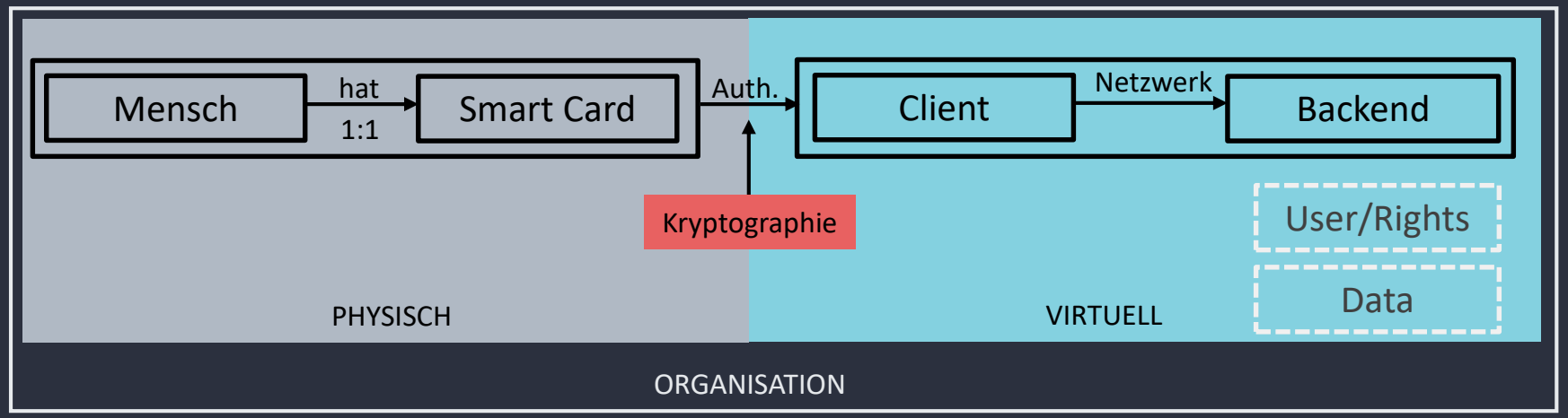
Smart Cards from an abstract perspective



Digital Transformation as main driver

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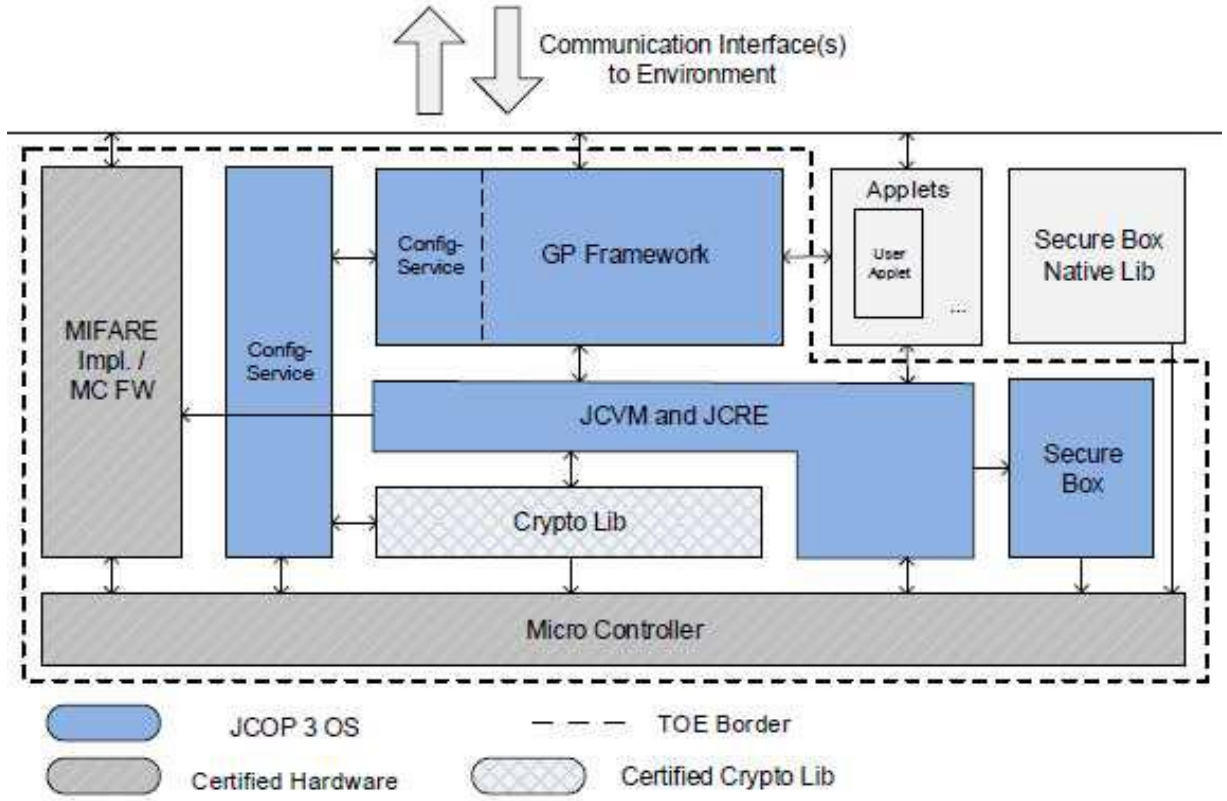
Technological view

- Computer system (Micro Controller) with CPU, RAM, ROM, EEPROM/FLASH, Crypto-Coprozessor, UART/IO, MMU, Security Sensors
- HW abstraction by virtualization
- Card applications delivered by applets



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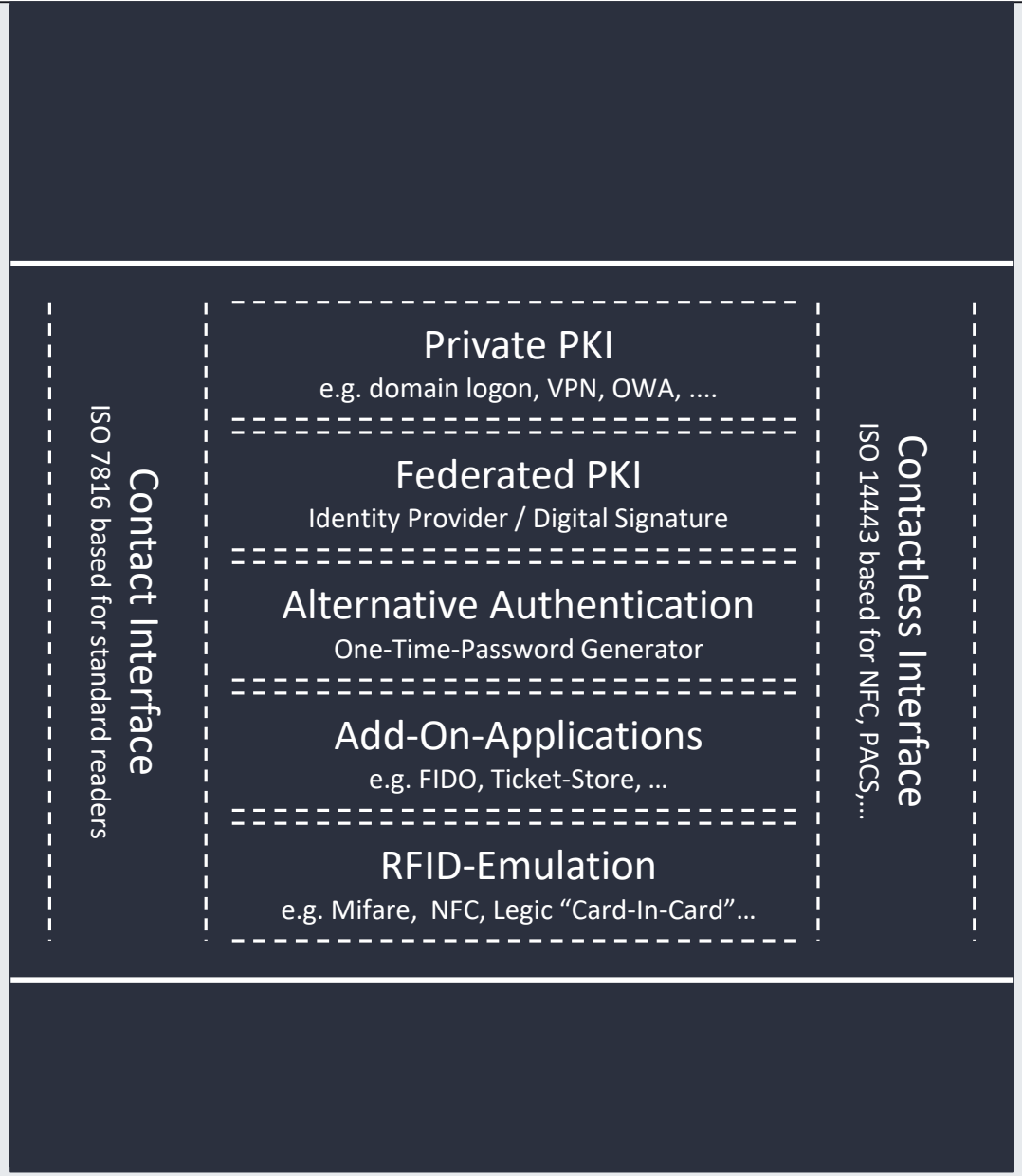
Functional (typically)

- Dual-Interface (contact/contactless)
- PKI often main application
- Physical access control
- Alternative authentication by OTP / FIDO
- Proprietary applications



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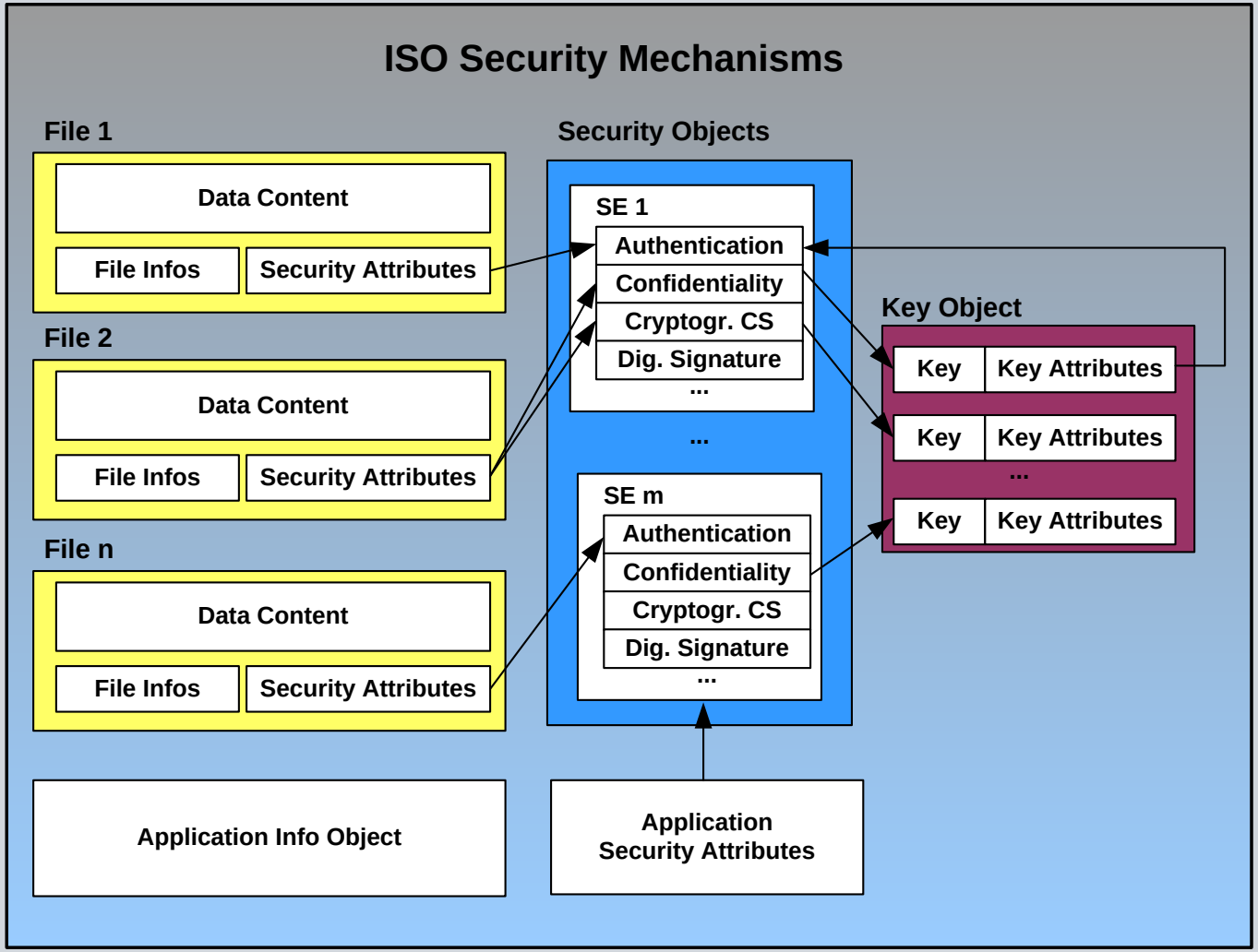
ISO 7816 Security

- Data container with security attributes
- Reference to SE with mechanisms
- Reference to keys with security attr.

→ Separation of data, mechanisms and keys



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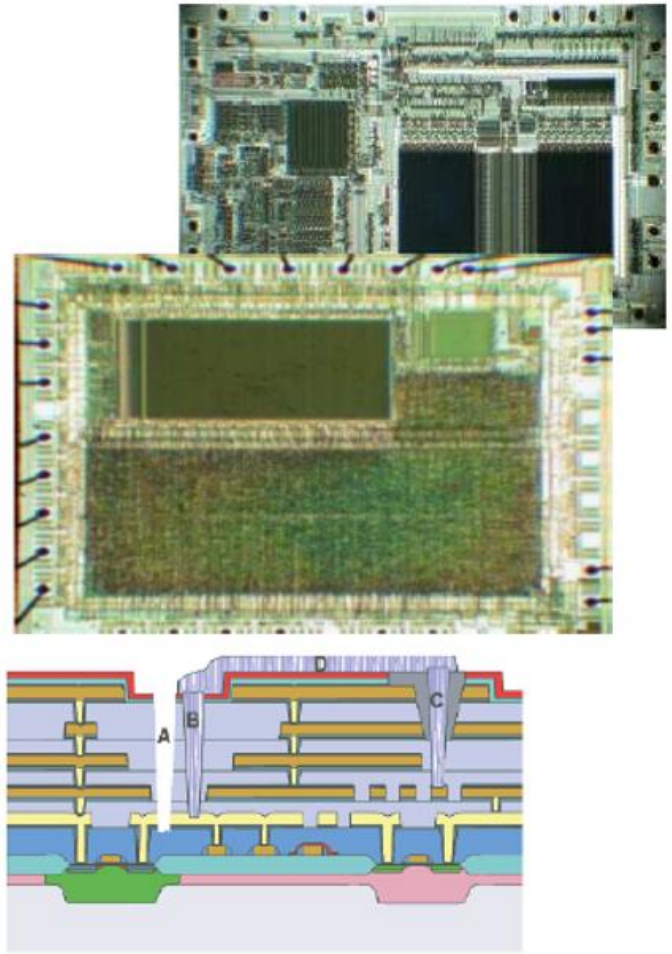
On-Chip Security

- Sensors
  (voltage, clock, temperature, light)
- Filters (Spikes / Glitches)
- Decoupled clock
- Single Fault Injection detection
- Passive and active Shielding
- Bus and memory encryption
- Dense Multi-Layer Technology
- HW error detection
- True-RNG
- Noise-Generation (against Side Channel)
- …



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Practical Flavors

- Different form factors for different application areas
- Main aspects of choice:
  - mass capabilities
  - costs
  - Individualization
  - robustness
  - delivery options
  - speed
  - size
  - …

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Smart Card

SW-Architecture

- End-to-end security
- Software Stack
- Integration into the application

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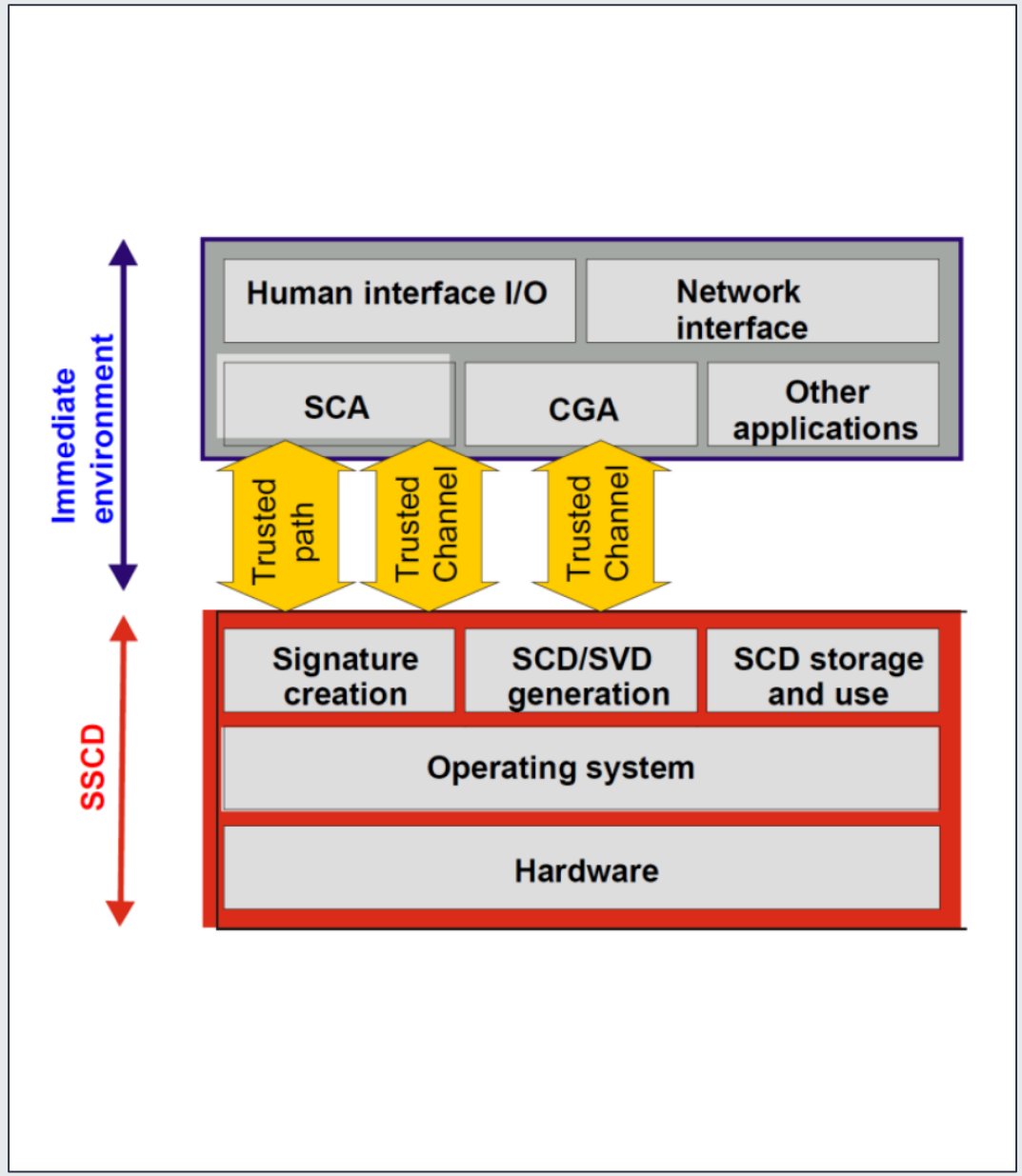
End to End Security?

- SSCD: Secure Signature Creation Device
- SCA: Signature Creation Application
- SCD/SVD: Signature Creation/Validation Data
- CGA: Certification Generating Authority



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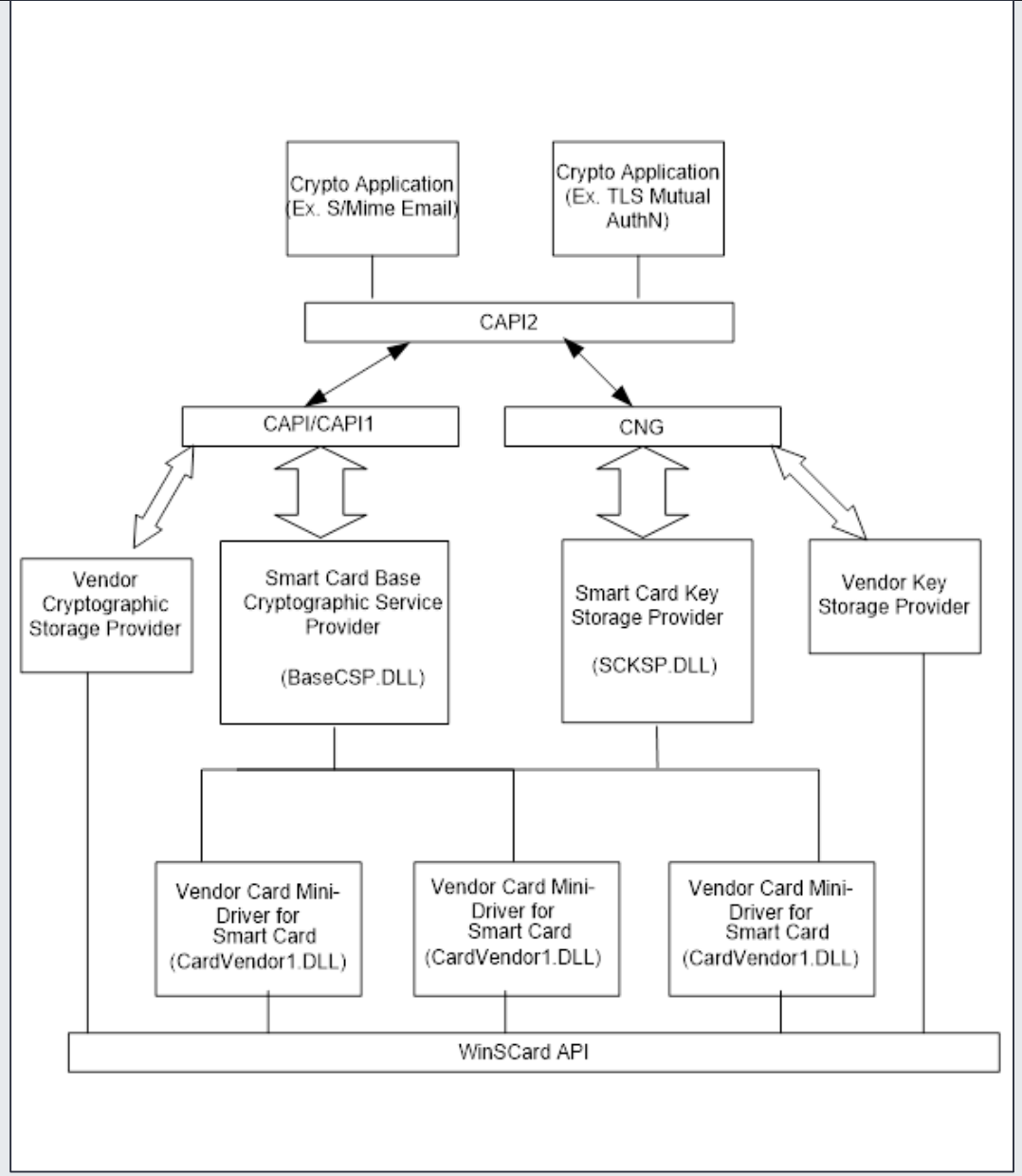
Software Stack Windows

- Modular, well documented components
- Configured by Windows registry
- Dependent on System integrity / driver integrity
- Smart Card driver Plug and Play
- Responsible for overall performance



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Modern Alternatives?

Mobile, TPM, VSC, FIDO, WH4B…?

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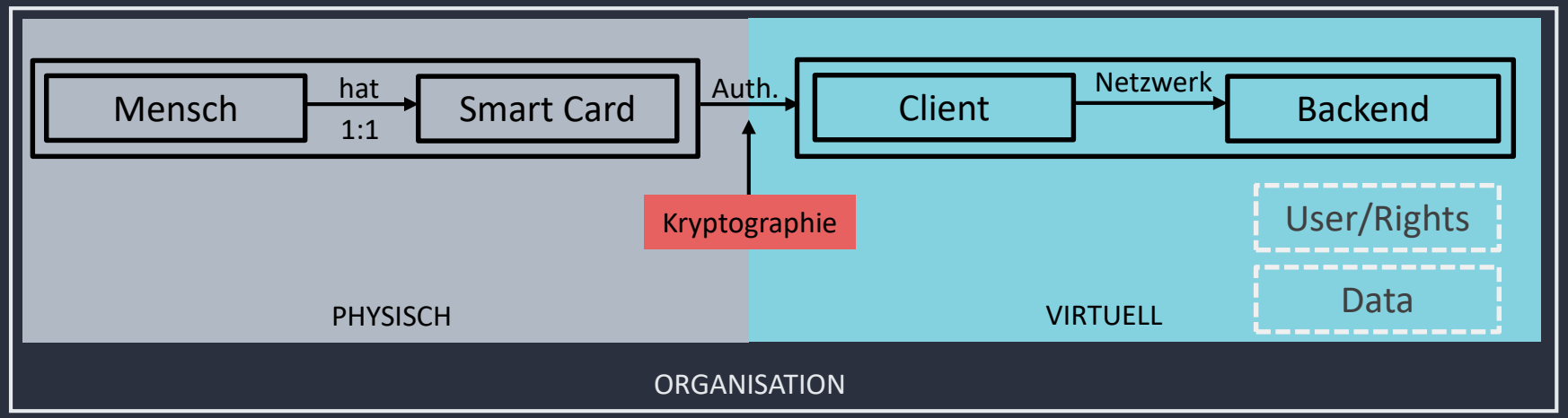
Why Smart Cards – Traditional View



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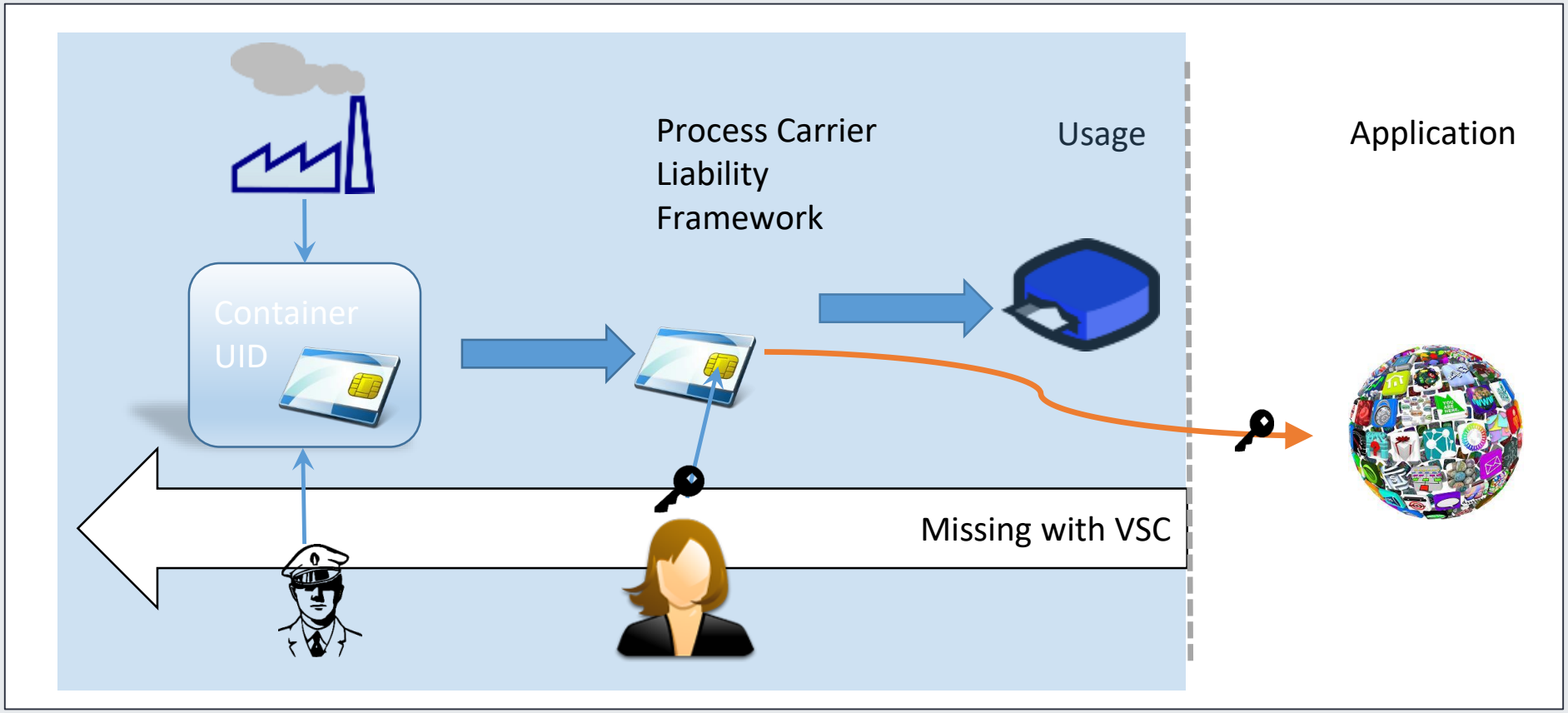
Physical Smart Card compared to virtual ones



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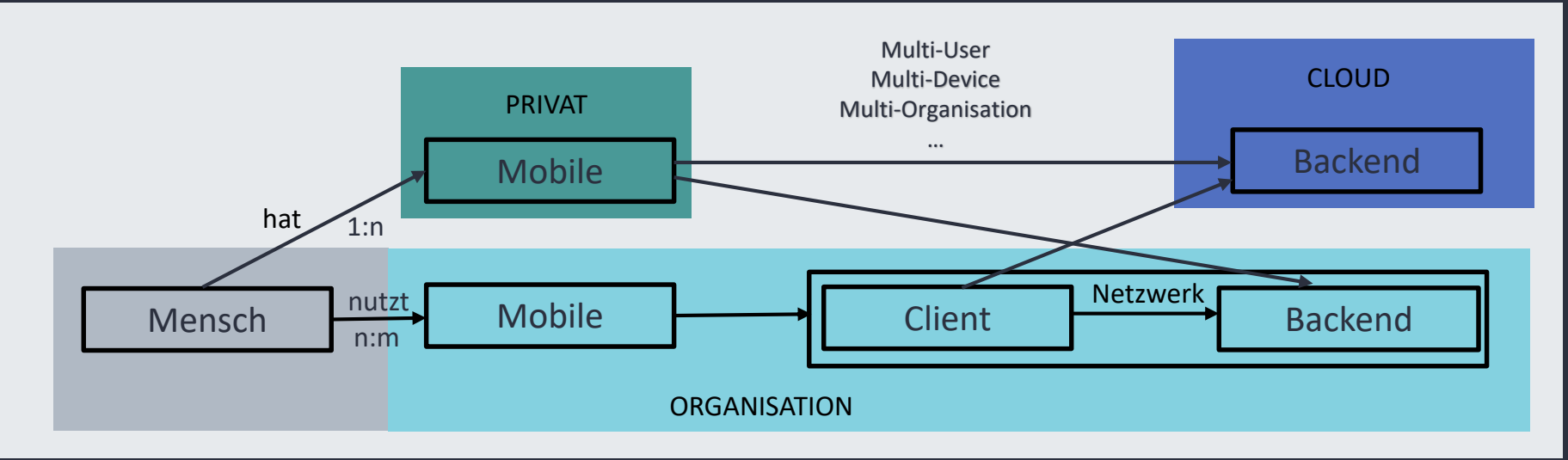
New Goal - Mobile Authentication/Virtual Card?



Transformation des Zugangsschlüssels

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Virtual Smart Card on Mobile as replacement?

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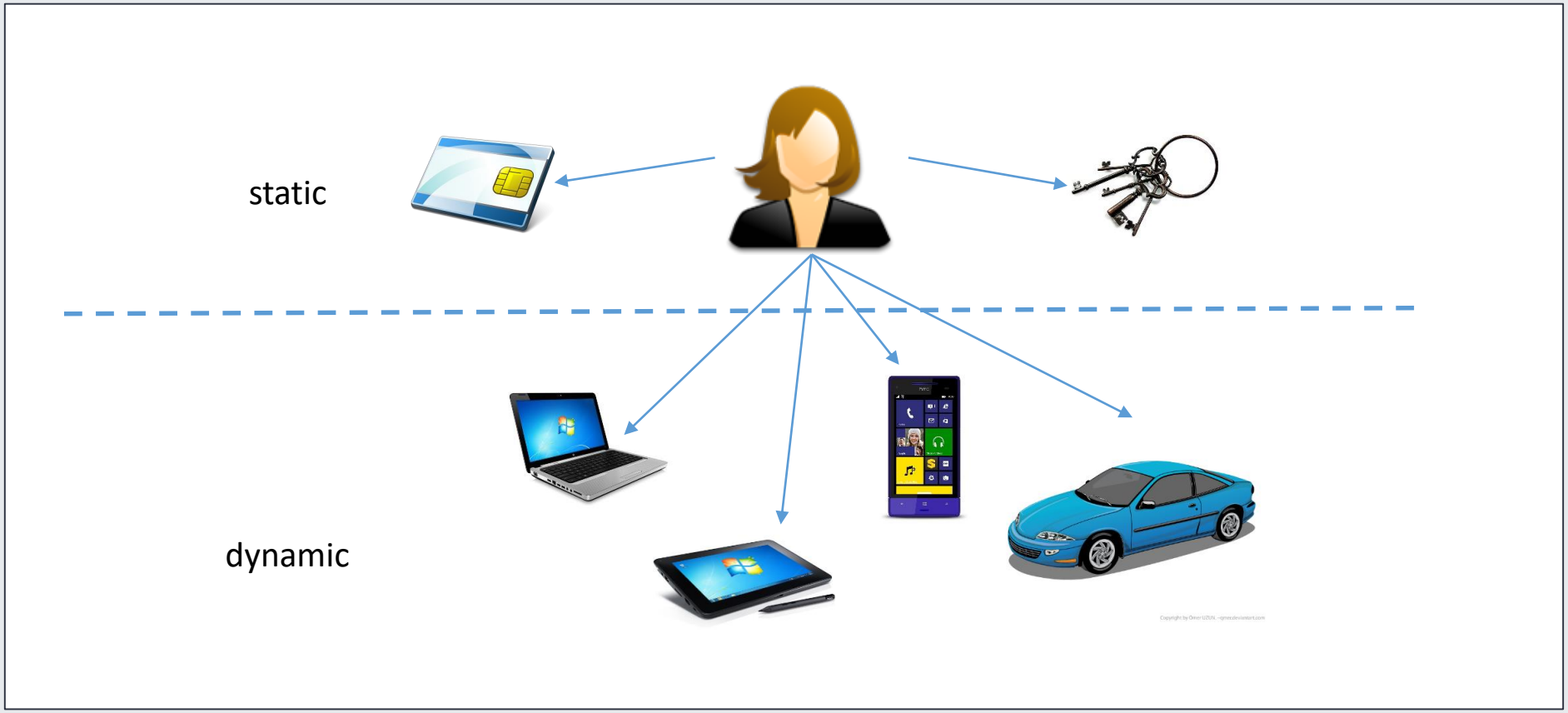
Challenge: Multi-Device.



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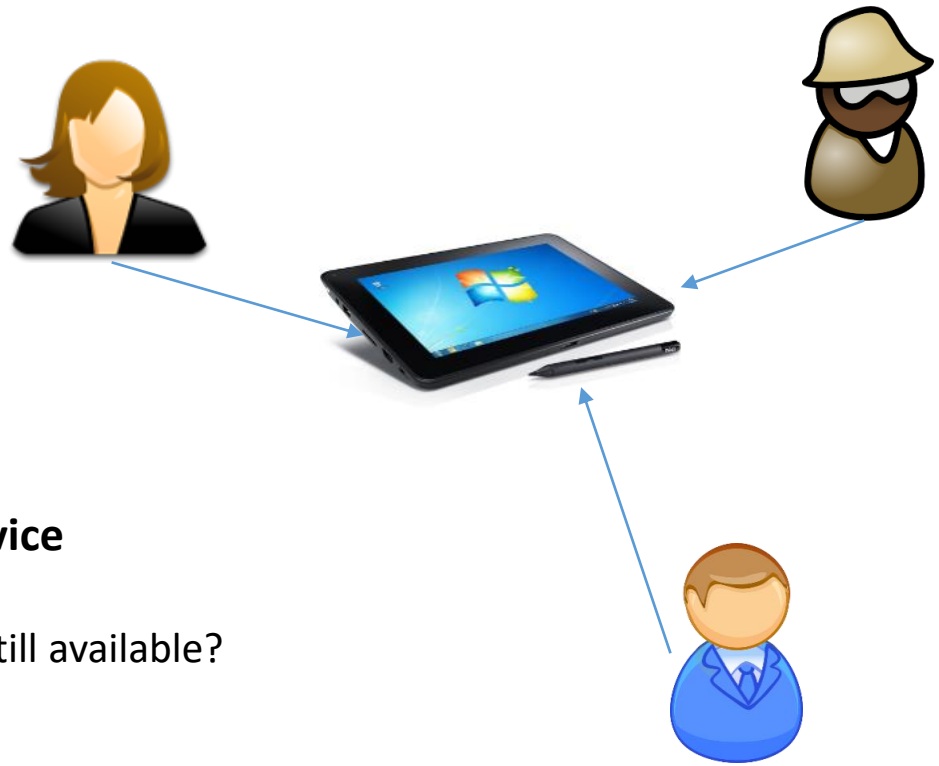
Challenge: Multi-User.



n to 1 relation : User / Device

- Additional factor for VSC still available?
- Smart Card / NFC ?
- Smart Card / OTP Reader

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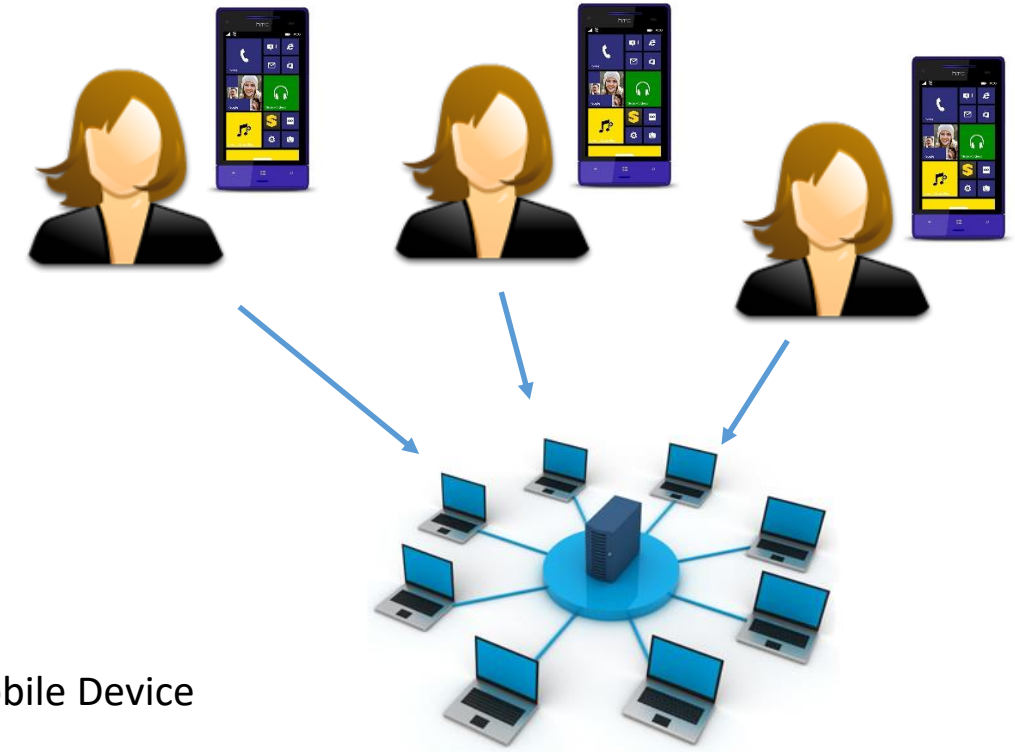
Challenge: Multi-User & Multi-Device.



Virtual Smart Cards in VDI Environments

- Identification / Authentification?
- Smart Card /Mobile Reader
- Smart Card OTP to registered Mobile Device

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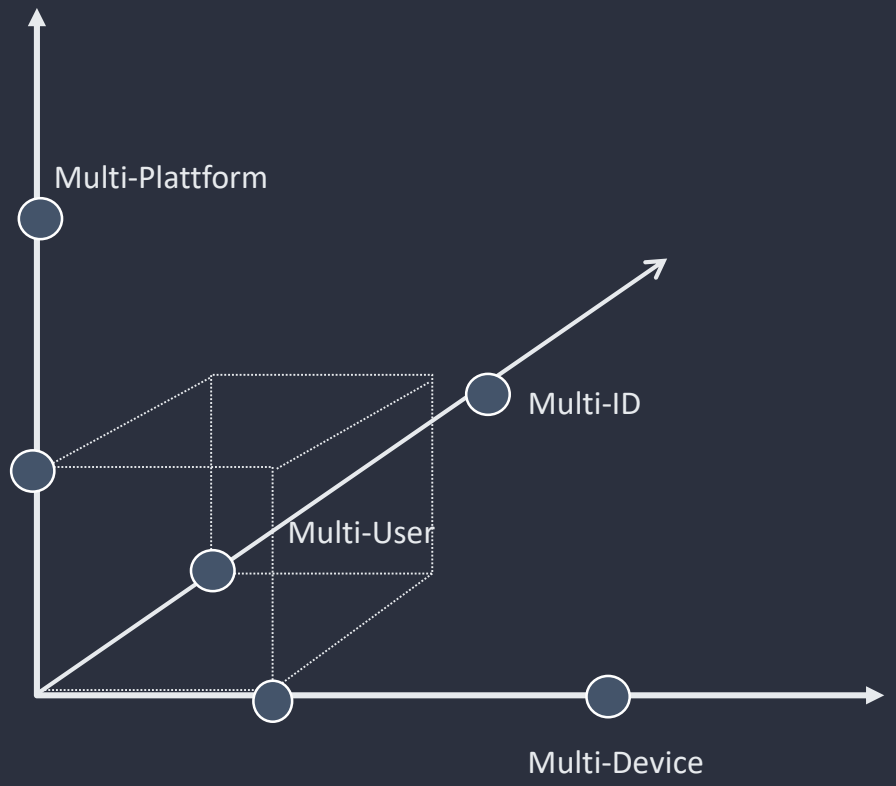
System complexity dramatically increased!



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Conclusio – Practical Security of the Cryptosystem

+ Mathematical Security

+ Quality of Implementation

+ Quality of Enrollment

+ Quality of Key Storage

+ Quality of the application of the keys

+ Quality of Life-Cycle-Management

→ The weakest Link determines the result

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