Implementing PDF-based eIDAS trust services

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eIDAS – electronic Identification and Trust Services

- REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC
- Officially published on 28.08.2014

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The relevant trust services of eIDAS

www.pdfa.org

TIMESTAMPS
Qualified timestamps

SIGNATURES
Qualified signatures
(person-related)
local and remote signatures

SEALS
Qualified seals
(organization-related)

ELECTRONIC DOCS
Non-discrimination

ELECTRONIC DELIVERY
Secure message delivery services

LTP + VALIDATION
Longterm preservation
Validation of signatures, timestamps and seals

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eIDAS and PDF

- Vast majority of all electronically signed documents are PDF documents
  - „electronic paper“ for static representation
  - ISO standard of document format with integrated electronic signature
- ETSI standards for signing PDF („PAdES“)
  - Explicitly referenced within Implementing Acts
- eIDAS aims at „digitally everywhere“
  - PDF as ubiquitous format

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eIDAS - Electronic signature and seals

- Non-discrimination as evidence in legal proceedings (art. 25.1-34.1)
- Legal effect (art.25.2-34.2)
  - e-Signature:
    - Only for natural persons
    - Assimilation to handwritten signature
  - e-Seal:
    - Only for legal entities
    - Integrity of the data and correctness of the origin
- Recognition in all MS of a qualified electronic signature/seal based on a qualified certificate issued in one member state (art.25.3-34.3)

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eIDAS - Electronic time stamp

- Non-discrimination as evidence in legal proceedings (art.39.1)
  - Legal effect (art.39.2)
    - Accuracy of the date and time it indicates
    - Integrity of the data to which the date and time are bound
  - Requirements for qualified e-time stamp (art.40)
    - Binds the date and time to data in such a manner as to reasonably preclude undetectable changes to the data
    - Based on accurate time source linked to UTC
    - Signed with an AES or sealed with an AESeal of the QTSP – or by some equivalent method

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eIDAS - Electronic documents

- Non-discrimination of electronic documents compared to paper documents as evidence in legal proceedings (art.44)
  - Ensures validity and legal certainty of cross-border electronic transactions through the impossibility for Courts to reject a document on the grounds that it is in electronic form

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Implementing Acts

NO.	DOMAIN	TITLE
2015/296	eID	24 February 2015 , IA on procedural arrangements for MS cooperation on eID
2015/1501	eID	8 September 2015, IA on the interoperability framework
2015/1502	eID	8 September 2015, IA on setting out minimum technical specifications and procedures for assurance levels for electronic identification means
2015/1984	eID	3 November 2015, IA on defining the circumstances, formats and procedures of notification
2015/806	Trust Services	22 May 2015, IA on the form of the EU Trust Mark for Qualified Trust Services
2015/1505	Trust Services	8 September 2015, IA on laying down technical specifications and formats relating to trusted lists
2015/1506	Trust Services	8 September 2015, IA on laying down specifications relating to formats of advanced electronic signatures and advanced seals to be recognised by
2016/650	Trust Services	25 April 2016 , IA on laying down standards for the security assessment of qualified signature and seal creation devices

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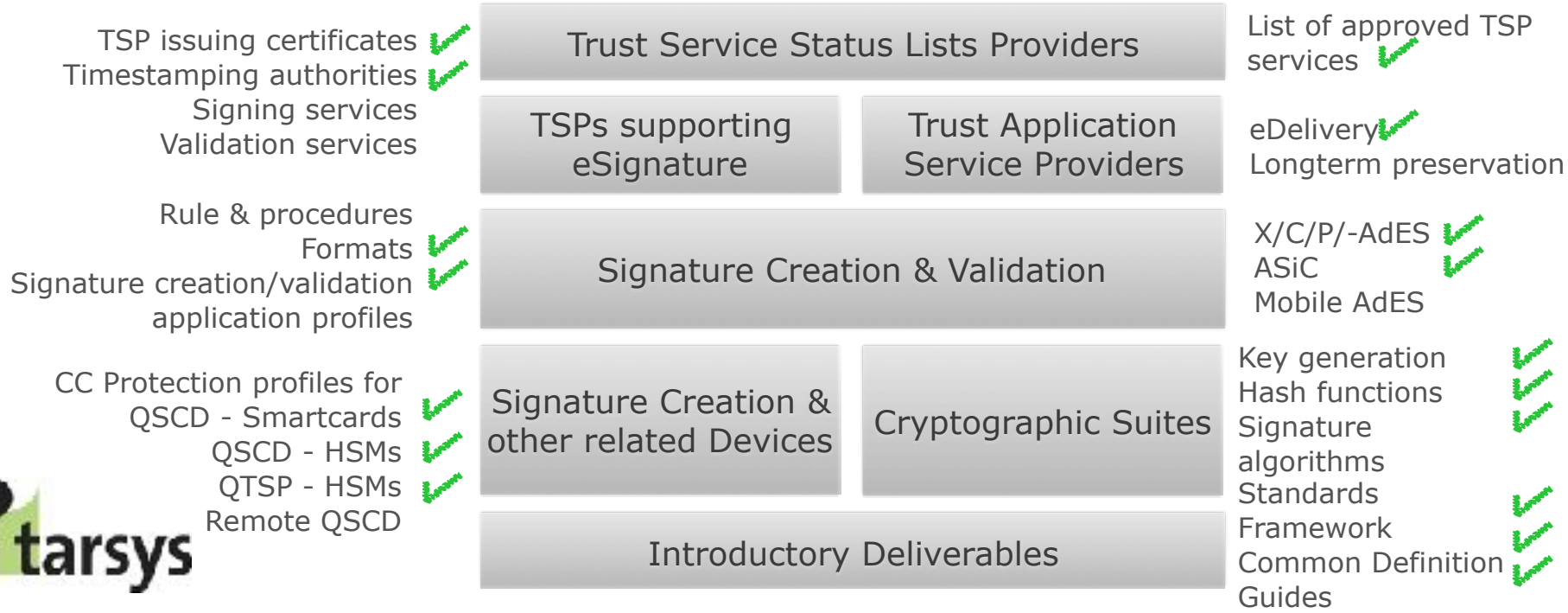
ETSI/CEN Standardization Areas



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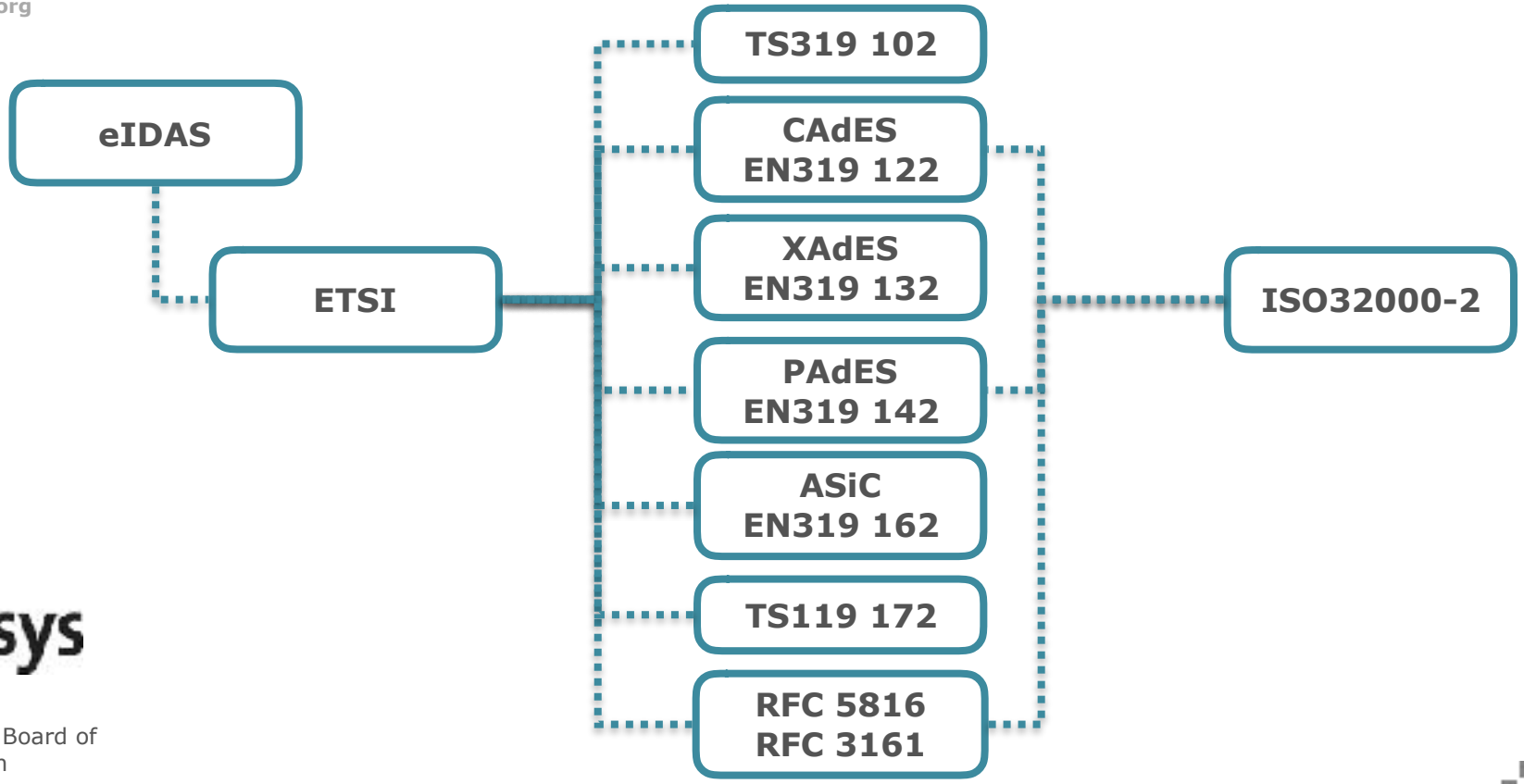
ISO 32000-2 and Signing Standards



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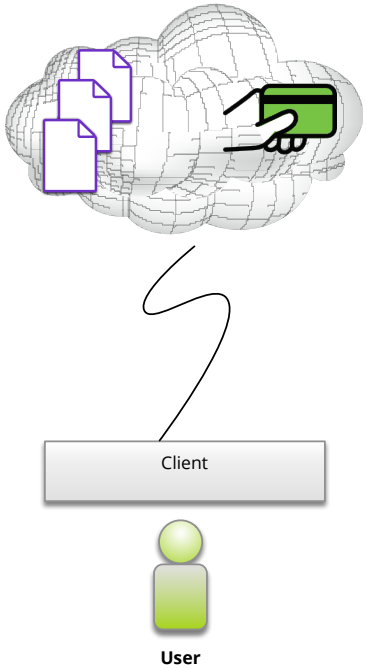
Signature Architecture Cloud



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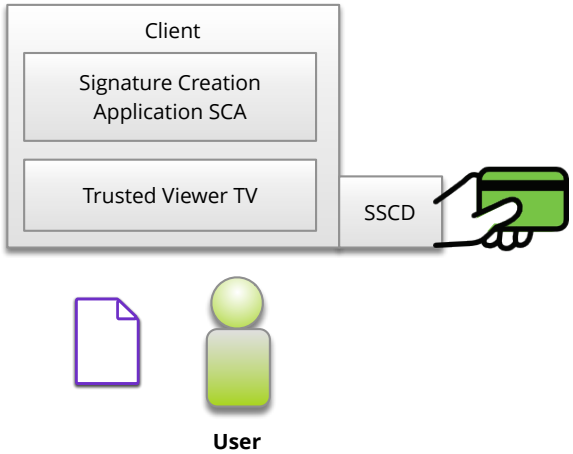
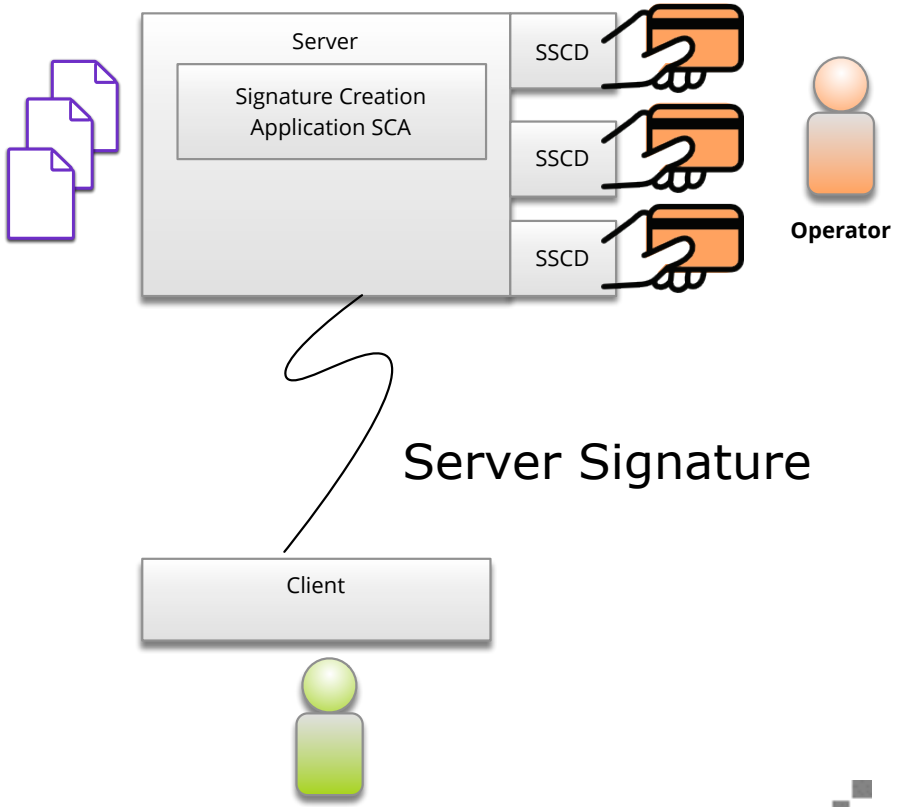
Classical Signature Architectures

Client Signature



Server Signature



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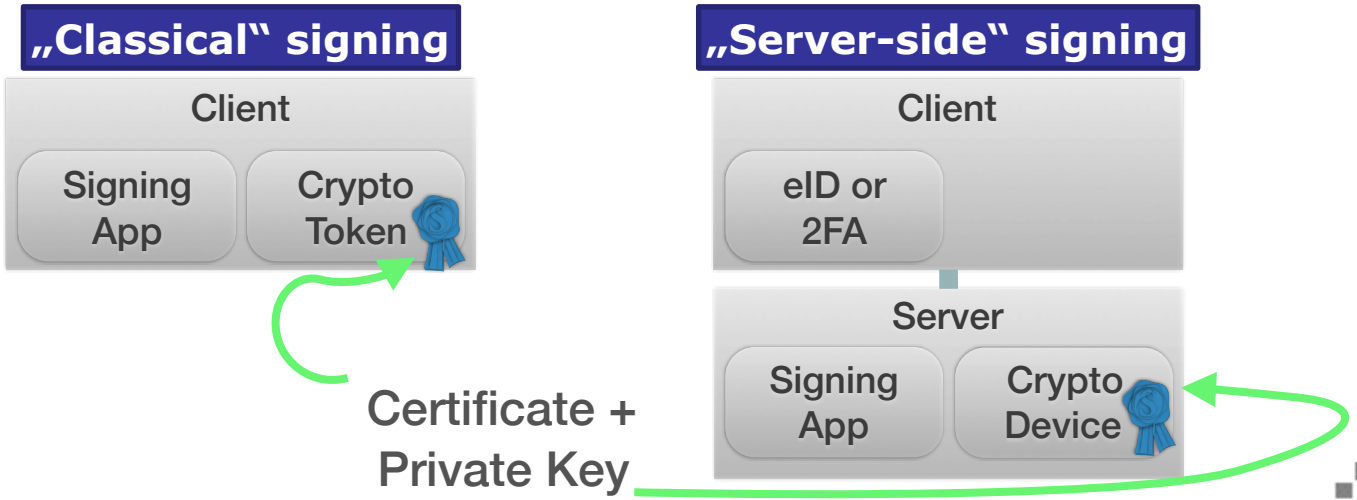
Remote signing or server-side signing

- Article 3.7.c of eIDAS Regulation: *… it is created using e-signature creation data that the signatory can … use under his/her sole control*
- No specific hardware token (e.g. Smartcard) on client side needed
- Secure eID and/or 2FA (Two-Factor-Authorization) become more important
- Better integration in business processes



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Building a standard for cloud signatures

A new industry consortium to pioneer
open digital signatures for mobile and the web

#OpenSignature

CLOUD
SIGNATURE
CONSORTIUM

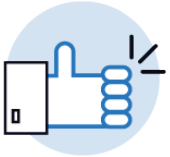
Why Cloud Signatures?

- Simpler certificate handling
  - No complex renewal procedures
  - No loss or theft of token
  - Storing of private key in high-secure environment

- Keeping documents in the Cloud without download
  - Sign documents in the Cloud, no download of large documents
  - Interface to Cloud DMS, Web DMS

- Secure transactions, signing-to-go
  - Web Browser, mobile devices (smartphones), desktop

- Simpler, faster, better!
  - No smartcards or USB tokens, no driver installation, zero dependency of client platform



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The actual State of Cloud Signature

- Cloud-based signatures are available since many years
  - But not on a „qualified" level —> not legally binding
- Market penetration was difficult
  - Conflict between user experience and intransparent national legal regulations
- Technological and regulation evolution
  - eIDAS Regulation mentions «Remote Electronic Signatures» and trust services, who offer the creation of qualified signatures on behalf of the client
- Number of existent solutions
  - Proprietary APIs
  - No interoperability
  - Various APIs, authentification mechanisms, certificate enrollment procedures etc.

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The CSC

- Early 2016 foundation of Cloud Signature Consortium
  - Internationale companies and experts from industry and universities
  - Solution providers, technology companies and trust service providers
  - Some overlapping with ETSI ESI group
- Creation of a common architecture and components for a 3-pillow architecture
- Technical specification of protocols and APIs for interoperable solutions
- Publication of the specifications

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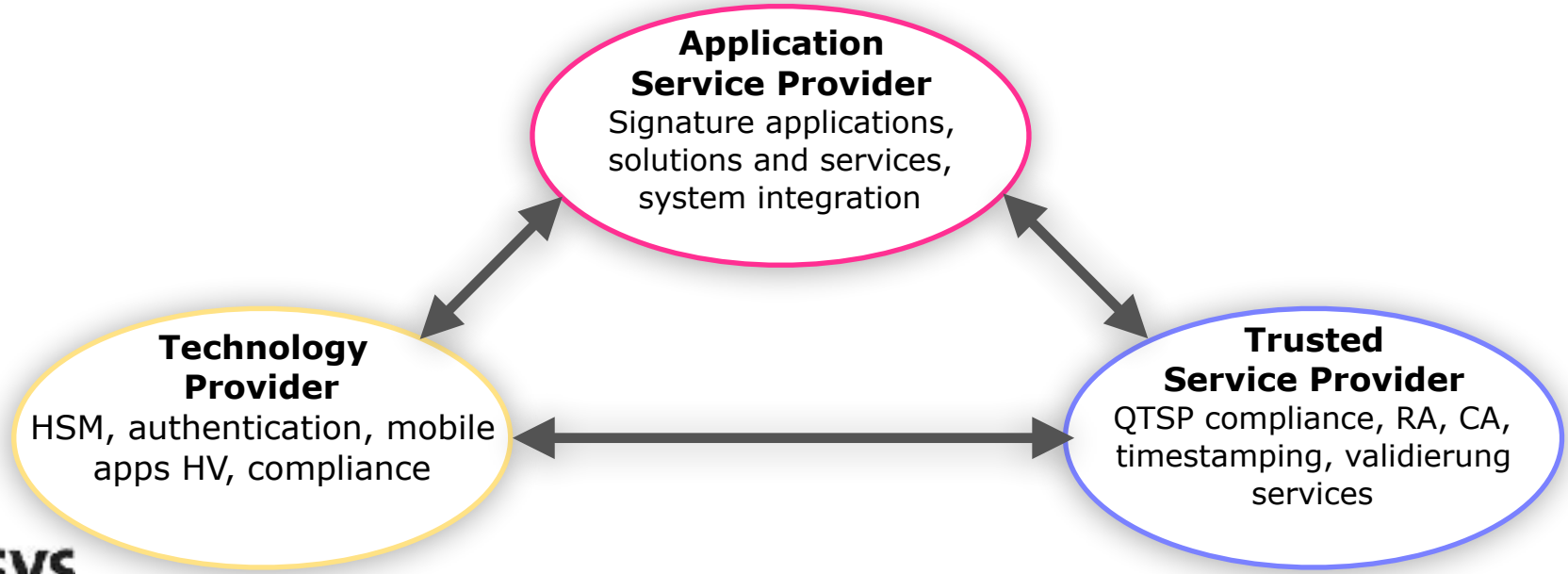
Background CSC



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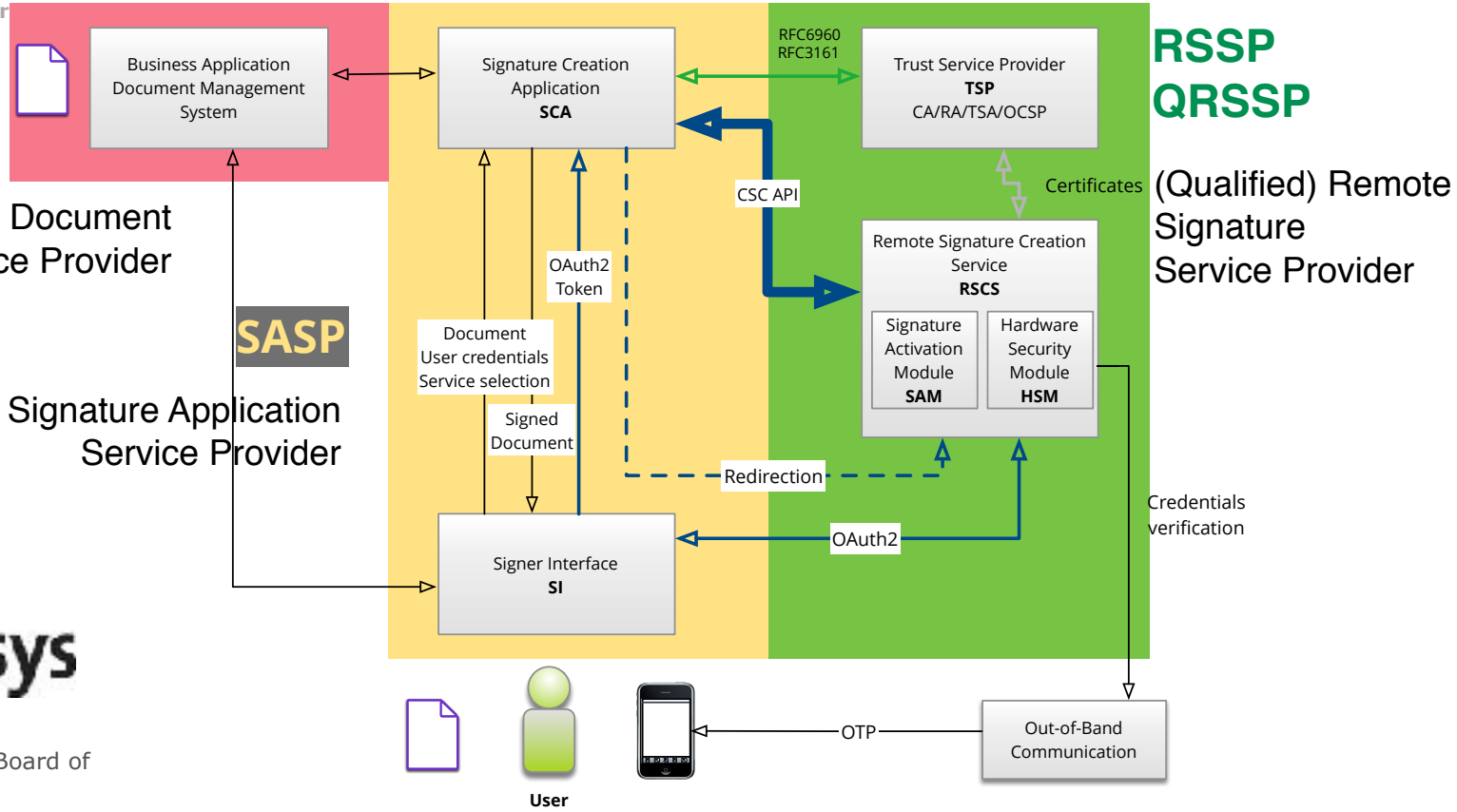
The CSC Architecture – Service Provider



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New eIDAS Trust Service: Longterm Preservation

- Article 34:
  Qualified preservation service for qualified electronic signatures
  1. A qualified preservation service for qualified electronic signatures may only be provided by a qualified trust service provider that uses procedures and technologies capable of extending the trustworthiness of the qualified electronic signature beyond the technological validity period.

- Does this mean longterm preservation of (signed) documents?
- In search for appropriate longterm container formats
  - Signature data
  - Payload data
  - Meta data
  - Verification data

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PDF/A-3 as Cryptographic Longterm Archive Container

- Possible archive container formats
  - XAIP
    - Base of TR-ESOR TR-03125
    - XML format
  - XFDU
    - ISO Standard ISO 13527:2010
    - XML format
  - ASiC
    - CEN Standard EN 319 162
    - ZIP format
  - PDF/A-3
    - ISO Standard ISO 19005-3
    - Signatures compliant with ETSI/EN standards

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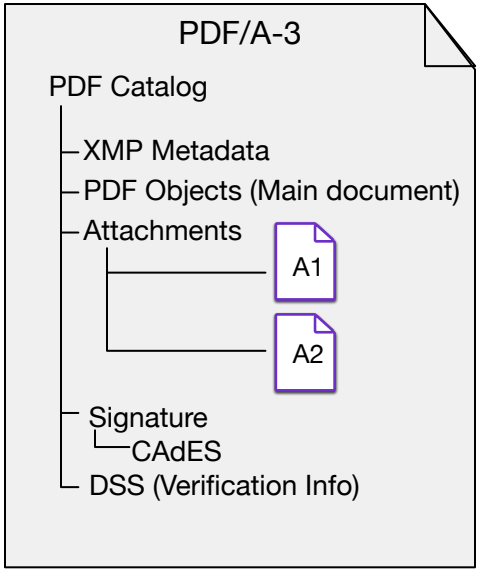
PDF/A-3 as Cryptographic Longterm Archive Container

- PDF/A-3 as data package format for information and evidence preservation



Please refer to „Datenpakete zur Informations- und Beweiswerterhaltung – ein Vergleich", D·A·CH Security 2017,5.-6.9.2017, München

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Reasons for Cryptographic Longterm Archive Container

- Self-contained document format
  - Identical reproduction of the document possible (all necessary resources included)
- Storing of arbitrary meta data
- Storing of multiple documents / data files

- Integrity protection
  - Integrated Integrity protection
  - Container encompasses all necessary informations for verification

Signatures
Evidence Records

- Mechanism for securing cryptographic keys

Hash Trees
Timestamps

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Could PDF/A-3 do the job?

- Self-contained document format
  - Identical reproduction of the document possible (all necessary resources included)
  - YES (unique selling point)
- Storing of arbitrary meta data
  - YES, BUT actually only via XMP; awkward)
- Storing of multiple documents / data files
  - YES, BUT PDF/A-3 requires always a „primary document“, even when dummy
  - NO versioning on attachment level

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Could PDF/A-3 do the job?

- Integrity protection
  - Integrated Integrity protection
  - Container encompasses all necessary informations for verification
  - OK, BUT PAdES signatures are always embedded and related to the whole PDF/A-3 document
- Mechanism for securing cryptographic keys
  - PARTIAL, on a per (embedded) PDF document base via PAdES-LTA profile possible; not practicable for a big number of documents

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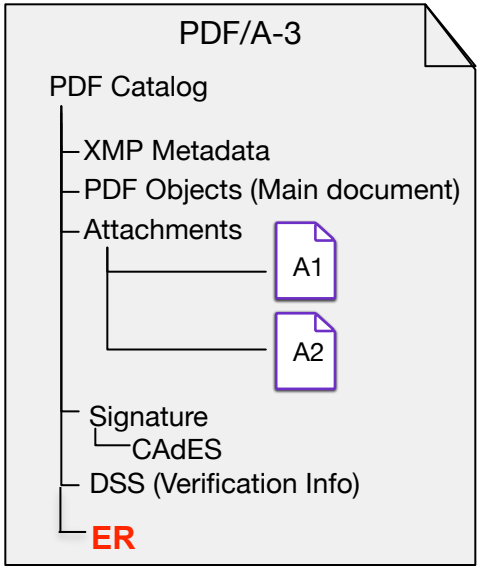
Requirements for a more suitable PDF/A-x

- Native support of Evidence Records (related to file attachments)
- Relationship between PDF(/A) and signature / meta data attachments
- Alternative to XMP for storing meta data
- In summary: a suitable PDF/A-3+ should be like ASiC plus PDF part



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Thank you! Any questions?

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