



# Tools and Rules

*Innovative Tools and Technologies to Prevent and Fight Fraud and Corruption in EU Funding:  
Can Blockchain Technology Be the Key to Locking Out Fraud in Agriculture?*

CSD, Standing Up To State Capture:  
Innovative Methods to Investigate Fraud and Corruption in EU Funding for Agriculture,  
13-14 September 2018, Sofia, Bulgaria

**p r o v e t** }

Projektgruppe verfassungsverträgliche Technikgestaltung

## Challenges to State Capture prevention

### Fraud Detection

- Verification of prices and payments
- Verifications of market prices
- Verification of ownership structures
- Checks of price estimations

### Fraud Prevention

- Transparency
- Strict Procurement Procedures
- Tamperproof Documents
- Secure Communications

## Tools for fraud detection and tools for fraud prevention

Analysing tools, e.g.

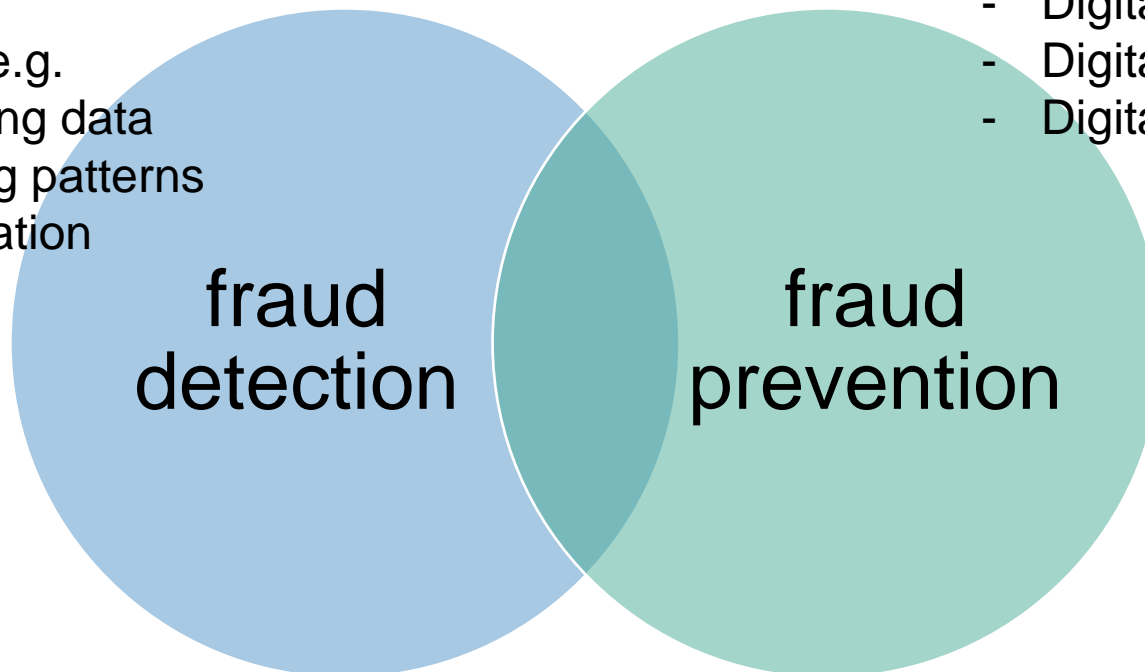
- INSPECT
- LiDaKrA

Functions e.g.

- correlating data
- detecting patterns
- Visualization

Securing Integrity of data and data trails, e.g.

- Cryptography
- Digital Timestamps
- Digital Seals
- Digital Signatures



## Problem that LiDaKrA - Addresses

→ Accessible Data Online – Finding the needle in the haystack



Cumbersome search



Based on FuhSen: A  
Semantic Federated  
Search Engine

## Problem that LidaKrA Addresses

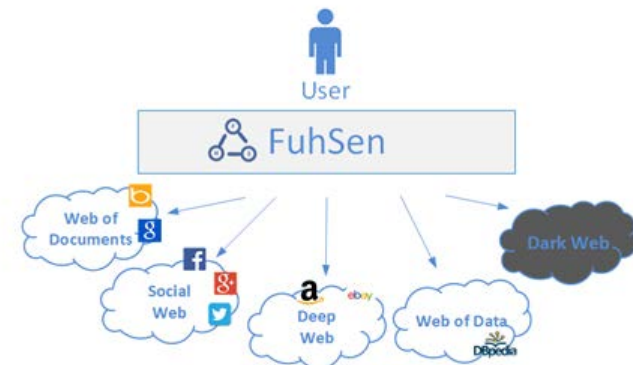
→ Making sense of diversified data,



Cumbersome search



## Structured & simplified search



## Federated Search Approach



**A Semantic Federated Search Engine  
to search and integrate pieces of  
knowledge from heterogeneous Web  
sources**

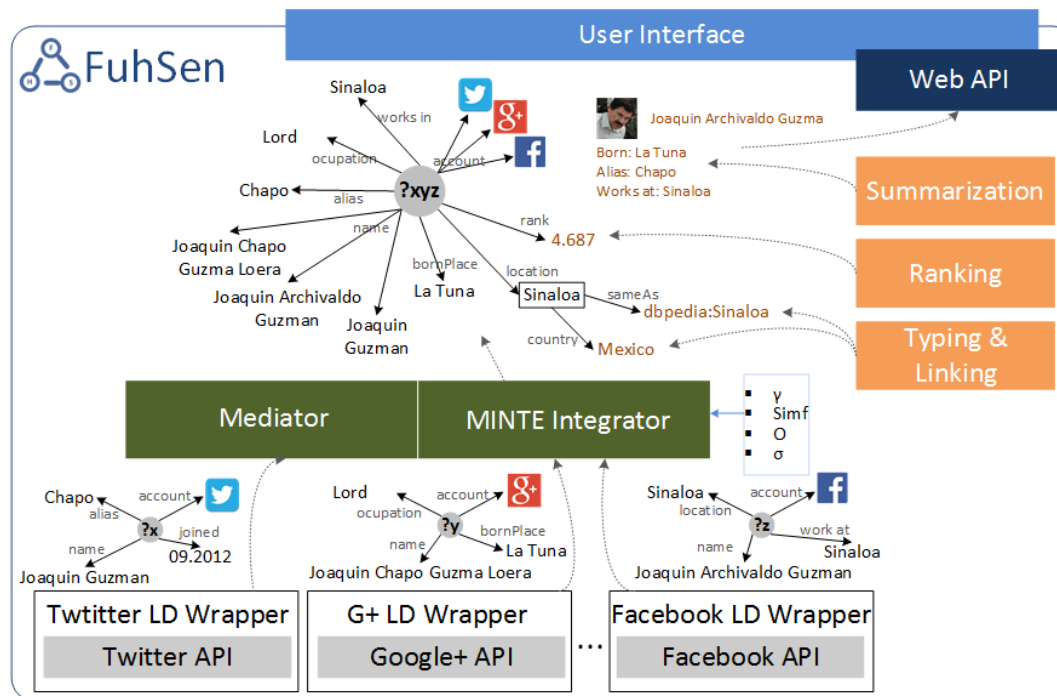
## Federated Search Approach



**A Semantic Federated Search  
to search and integrate  
knowledge from heterogeneous  
sources**

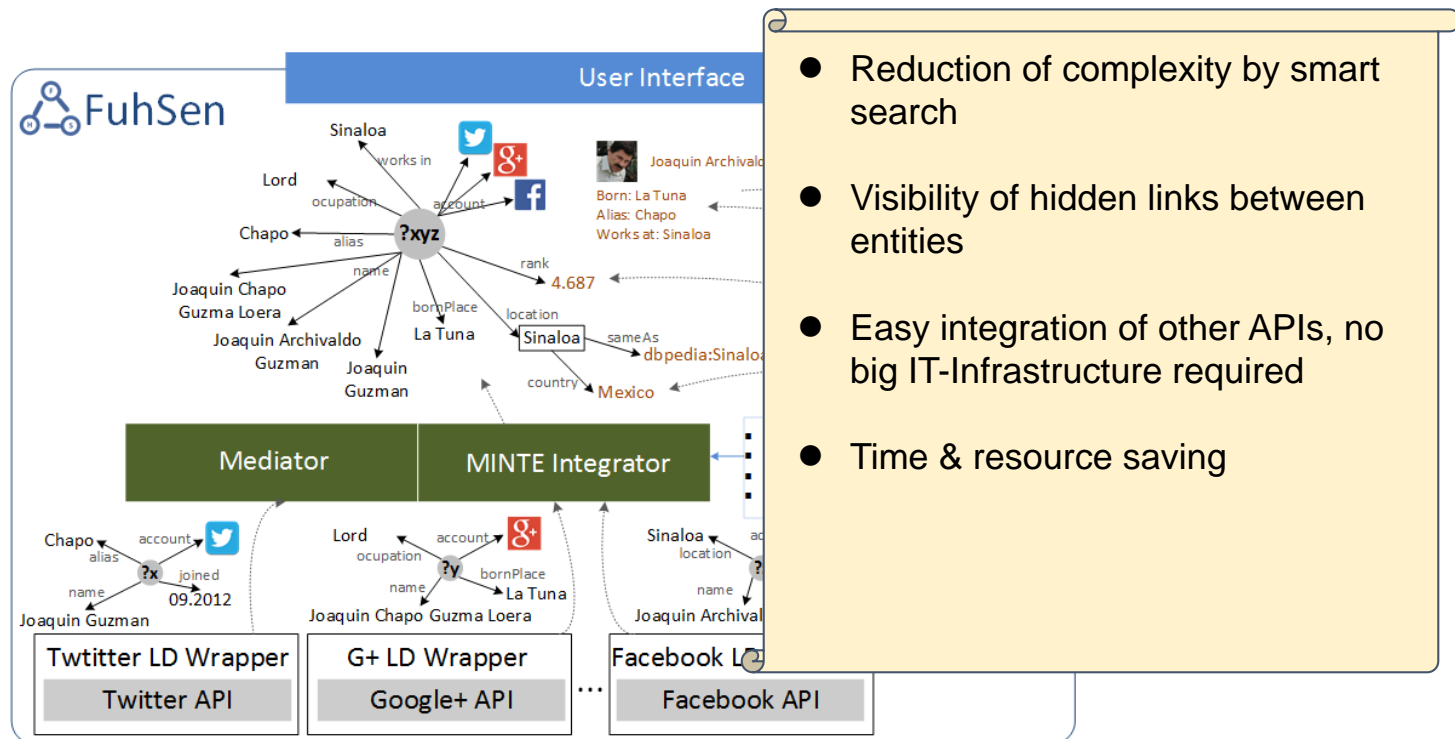
- FuhSen relies on semantics encoded in vocabularies to integrate data collected from a federation of heterogeneous sources.
- It utilizes semantic similarity measures to determine relatedness between two entities.
- Highly similar data molecules are aggregated into an integrated molecule that corresponds to the answer of a keyword based query.
- Finally, molecules of information are enriched with semantics and displayed to the user

# FuhSen DEMO





## FuhSen Benefits & Value Proposition



- Reduction of complexity by smart search
- Visibility of hidden links between entities
- Easy integration of other APIs, no big IT-Infrastructure required
- Time & resource saving

Wie sieht das dann aus?

Deutsch | English

## FuhSen

### Federated Hybrid Search

Donald Trump

Data sources: all. Types: all.

Data sources:	Entity types:
<input checked="" type="checkbox"/> Darknet Market Products	<input checked="" type="checkbox"/> Product
<input checked="" type="checkbox"/> Crawled Onion websites	<input checked="" type="checkbox"/> Document
<input checked="" type="checkbox"/> Facebook	<input checked="" type="checkbox"/> Website
<input checked="" type="checkbox"/> Google Custom Search	<input checked="" type="checkbox"/> Organization
<input checked="" type="checkbox"/> Google Knowledge Graph	<input checked="" type="checkbox"/> Person
<input checked="" type="checkbox"/> Google+	
<input checked="" type="checkbox"/> ICIJ Offshore Leaks	
<input checked="" type="checkbox"/> OCCRP	
<input checked="" type="checkbox"/> pipl	
<input checked="" type="checkbox"/> Social Media Posts	
<input checked="" type="checkbox"/> Onion websites	
<input checked="" type="checkbox"/> Twitter	
<input checked="" type="checkbox"/> Vk	
<input checked="" type="checkbox"/> Xing	
<input checked="" type="checkbox"/> eBay	

No valid Facebook token found, please: [Retrieve a new access token](#)

No valid Xing token found, please: [Retrieve a new access token](#)

Need Help. Send us an e-mail

LiDaKrA  
gefördert im Rahmen des  
Sicherheitsforschungsprogrammes  
der Bundesregierung

Nur für den internen Gebrauch!

# Linked Data Kriminal Analyse

Wie sieht das dann aus?

The screenshot shows the FuhSen search interface. At the top left is the FuhSen logo. On the right, there is a search bar containing 'fentanyl', with options for 'Favourites(2)', 'Deutsch | English', 'Data sources: (Google Custom Search)', and 'Types: (Website)'. Below the search bar, the results are filtered to 'Onion / Web sites(10)'. On the left side, there are 'Results filters' for 'Title' and 'Source', and a 'Merge Results' section with 'First Result' and 'Second Result' boxes and a 'Merge Results' button. The main content area displays three search results, each with a Google logo icon, a title, a web title, a comment, and a link. The first result is 'Fentora (fentanyl) dose, indications, adverse effects, interactions ...'. The second result is 'Acetyl Fentanyl Temporarily Scheduled as Schedule I Drug ...'. The third result is 'CDC Issues Fentanyl Health Advisory | NDEWS | National Drug ...'. A red circle highlights the 'Onion / Web sites(10)' filter. A red arrow points to the first result title. A red box highlights the 'Merge Results' section.

**FuhSen**

Favourites(2) Deutsch | English

fentanyl

Data sources: (Google Custom Search).

Types: (Website).

Results filters [Export](#)

Onion / Web sites(10)

Title

Source

Display exact matches only

Merge Results

First Result

Second Result

Merge Results

**Fentora (fentanyl) dose, indications, adverse effects, interactions ...**

Web title: Fentora (fentanyl) dose, indications, adverse effects, interactions ...

Comment: Fentanyl is an opioid agonist and therefore has abuse potential and risk of fatal overdose from respiratory failure. Addiction may occur in patients who obtain fentanyl illicitly or in those appropriately prescribed the drug. The risk of addiction in any individual is unknown. However, patients with mental illness (e.g., major ...

Link: <http://www.pdr.net/drug-summary/Fentora-fentanyl-2330>

**Acetyl Fentanyl Temporarily Scheduled as Schedule I Drug ...**

Web title: Acetyl Fentanyl Temporarily Scheduled as Schedule I Drug ...

Comment: On July 17, the U.S. Drug Enforcement Administration (DEA) issued a rule to temporarily schedule the synthetic opioid acetyl fentanyl (N-(1-phenethylpiperidin-4-yl)-N-phenylacetamide) into Schedule I of the Controlled Substances Act. According to the notice: "The DEA is currently aware of at least 39 fatalities associated ...

Link: <https://ndews.umd.edu/feature/acetyl-fentanyl-temporarily-scheduled-schedule-i-drug>

**CDC Issues Fentanyl Health Advisory | NDEWS | National Drug ...**

Web title: CDC Issues Fentanyl Health Advisory | NDEWS | National Drug ...

Sicherheit

Nur für den internen Gebrauch!

Wie sieht das dann aus?

The screenshot shows the FuhSen search interface. At the top left is the FuhSen logo. On the right, there are search filters: 'Favourites(2)', 'Deutsch | English', and a search box containing 'fentanyl'. Below the search box, it says 'Data sources: (Google Custom Search)' and 'Types: (Website)'. The main content area is titled 'Onion / Web sites(10)'. On the left, there are 'Results filters (Export)' and a 'Merge Results' section with two boxes labeled 'First Result' and 'Second Result' and a 'Merge Results' button. A dropdown menu is open, showing a list of search results sorted by frequency. The results include:

- New NDEWS HotSpot Report Looks (1) at Fentanyl Overdoses in New ...
- Fentanyl - Drugs.com (1)
- Acetyl Fentanyl Temporarily Scheduled as Schedule I Drug ... (1)
- CDC Issues Fentanyl Health Advisory | NDEWS | National Drug ... (1)
- Scientists Create Fentanyl Vaccine | (1) NDEWS | National Drug Early ...
- NDEWS Releases New Report on (1) Fentanyl and Fentanyl Analogs ...
- Fentora (fentanyl) dose, indications,(1) adverse effects, interactions ...
- Fentanyl | NDEWS | National Drug (1) Early Warning System I, ...
- Safety Alert: Health Risks (1) Associated with Exposure to Clandestinely ...
- DEA Warning to Police and Public: (1) Fentanyl Exposure Kills

The main search results list includes:

- Fentora (fentanyl) dose, indications, adverse effects, interactions ...**  
Web title: Fentora (fentanyl) dose, indications, adverse effects, interactions ...  
Description: Fentora (fentanyl) dose, indications, adverse effects, interactions ...  
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Description: On July 17, the U.S. Drug Enforcement Administration (DEA) issued a rule temporarily schedule the synthetic opioid acetyl fentanyl (N-(1-phenethylpiperidin-4-yl)phenylacetamide) into Schedule I of the Controlled Substances Act. According to the notice: "The DEA is currently aware of at least 39 fatalities associated with the use of acetyl fentanyl."  
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- CDC Issues Fentanyl Health Advisory | NDEWS | National Drug ...**  
Web title: CDC Issues Fentanyl Health Advisory | NDEWS | National Drug ...

Nur für den internen Gebrauch!

## Leveraging technology



Internet



(Offline)  
Databases +  
Documents



Seized  
Materials



## Regulatory EU framework for fraud prevention - Direct

- Article 325 of the Treaty on the Functioning of the European Union (replacing Article 280 of the EC Treaty).
- Establishment of OLAF (Decision 1999/352/EC) and regulations and agreements defining OLAFs role (e.g. EU/883/2013).
- Horizontal EU legislation concerning on-the-spot checks/inspections in the Member States
- Sectoral EU legislation concerning provisions on the prevention and detection of irregularities
- Sectoral EU legislation concerning the notification of irregularities and recovery of misused funds
- Conventions on the harmonisation of EU criminal law



## **Regulatory EU framework for fraud prevention - Indirect**

### **General Data Protection Regulation – GDPR (2016/679)**

### **Directive regarding the processing of personal data by competent authorities for the purposes of the prevention, investigation, detection or prosecution of criminal offences – Police-Directive (2016/680)**

- Regulation applies directly in all member states, directive has to be transposed.
- Personal data is information concerning the personal or material circumstances of identified or identifiable individuals.
- Protection of fundamental rights to privacy (Art. 7, 8 Charter Fundamental Rights EU).
- Data Protection Acts usually address the security of systems with personal data.
- Rules detail examples for specific security measures.
-

# Co-Regulation of Privacy



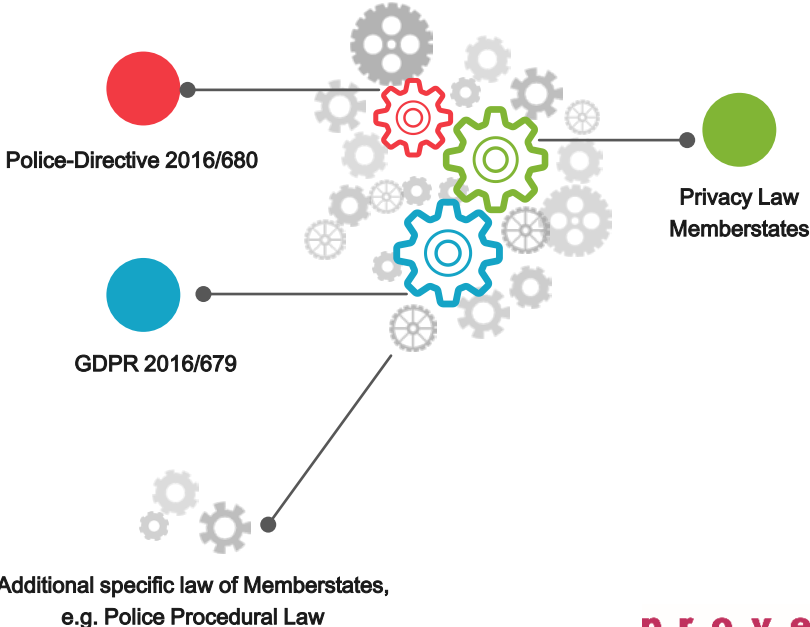
**Police-Directive 2016/680**  
Has to be transposed into law of Memberstates



**Privacy Laws of Memberstates**  
Transposition of Police-Directive and necessary adjustments to GDPR

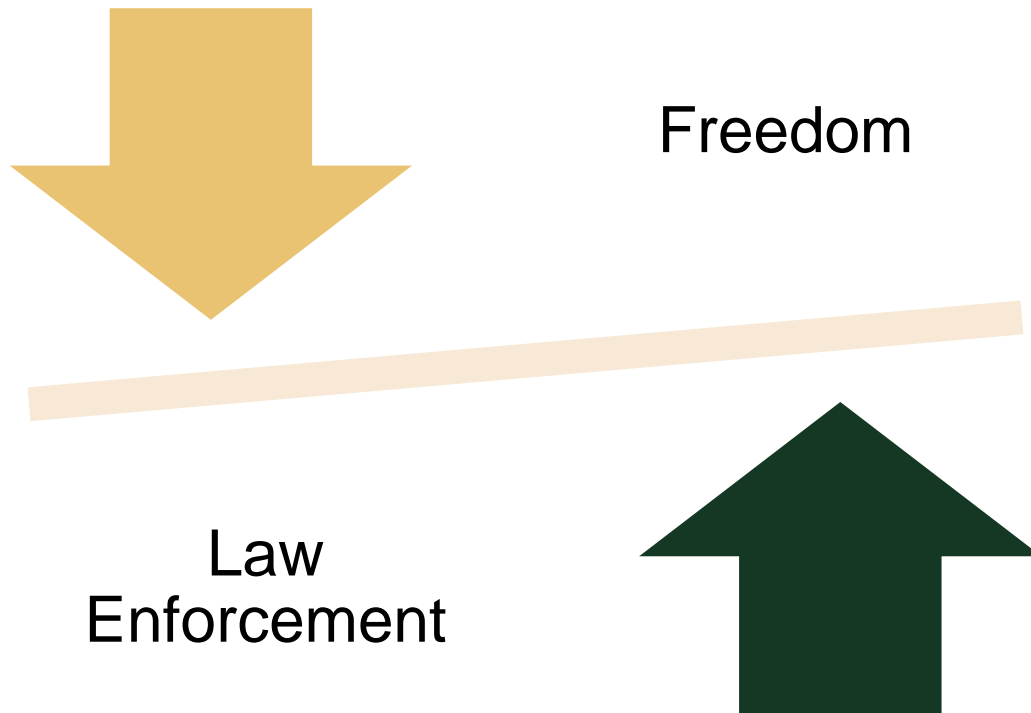


**GDPR**  
Applies directly. Usually does not apply to the work of law enforcement agencies..





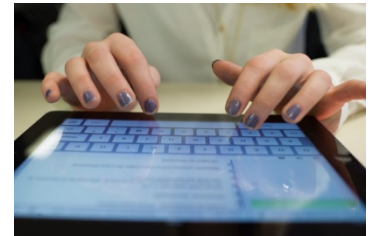
## Challenge – Striking the Balance



## Regulatory framework for fraud prevention

What is an appropriate measure?

- Evaluation of the risks inherent in the processing,
- Implementation of measures to mitigate those risks.
- To assess data processing risk, consider e.g. risk of
  - accidental or unlawful destruction,
  - loss,
  - alteration,
  - unauthorized disclosure or access to data and
  - possible physical, material or non-material damage.
- Security measures should ensure an appropriate level of security, including
  - confidentiality,
  - taking into account the state of the art,
  - taking into account the costs of implementation in relation to the risks,
  - taking into account the nature of the personal data to be protected.



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## Trust Services and legal framework

Goals of cybersecurity for data protection must be



Integrity



Confidentiality

## Trust Services and legal framework

Legal framework for of electronic transactions and electronic market.

Goals are to ensure Integrity and Authenticity of data.



Integrity



Authenticity

## Trust Services and legal framework

### Regulation on electronic identification and trust services for electronic transactions– eIDAS (2014/910)

Trust Services are electronic services normally provided for remuneration which consists in the creation, verification, and validation of

- electronic signatures,
- electronic seals,
- electronic time stamps,
- electronic registered delivery services,
- certificates related to above mentioned services,
- creation, verification and validation of certificates for website authentication,
- preservation of electronic signatures, seals or certificates related to these services.

Difference between “trust services” and “qualified trust services”.

Later are in accordance with Art. 2 Nr. 17 eIDAS, trust services, that comply with the relevant requirements of the Regulation.

## Trust Services and legal framework

- All trust services use encryption to facilitate security.
- Assessment of the technical security depends in particular on the *security compatibility of the algorithms and parameters used*.
- Detectability of forgery depends largely on the suitability of the hash method used.
- Over time the compatibility of cryptographic algorithms for security may be compromised.
- Threats come from advances in computer and software technology as well as from advances in mathematics and cryptography.
- These advancements are monitored by the supervisory authority and evaluated with respect to their impact on the security of the algorithms and associated parameters used.

## Rules of Evidence in eIDAS

### Non-discrimination clauses

Art. 46:

An electronic document shall not be denied legal effect and admissibility as evidence in legal proceedings solely on the grounds that it is in electronic form.

Art. 25 (1), 35 (1), 41 (1), 43 (1):

... shall not be denied legal effect and admissibility as evidence in legal proceedings solely on the grounds that it is in an electronic form or that it does not meet the requirements for qualified [trustservice].



electronic documents



electronic signatures



electronic seals



electronic time stamps



electronic registered delivery services

## General rules of evidence

- Evaluation of evidence in general pursuant to Codes of Civil Procedure.
- Principle of free evaluation of evidence, Weighing of evidence lies within the discretion of the court.
- Few statutory exceptions to principle exist.
- Burden of proof (onus probandi) for facts, usually lies with the person who brings them up in their favour (semper necessitas probandi incumbit ei qui agit).
- The burden of proof may shift according to specific laws.
- Legal presumptions usually shift the burden of proof.
- Legal presumptions are usually rebuttable.
- Prima facie evidence in case law exist as way to lower the standard of proof for one party; burden of proof does not shift.



## Rules of Evidence in eIDAS



qualified electronic signatures

Art. 25 (2):

A qualified electronic signature shall have the equivalent legal effect of a handwritten signature.

Recital 22:

It is for the national law to define the legal effect of trust services, except if otherwise provided in this Regulation.

Recital 49:

... a qualified electronic signature should have the equivalent legal effect of a handwritten signature.

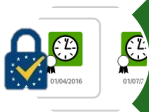


## Rules of Evidence in eIDAS



qualified electronic seals

Art. 35 (2): A qualified electronic seal shall enjoy the **presumption of integrity** of the data and of **correctness of the origin** of that data to which the qualified electronic seal is linked.



qualified electronic time stamps

Art. 41 (2): A qualified electronic time stamp shall enjoy the **presumption** of the **accuracy of the date and the time** it indicates and the **integrity** of the data to which the date and time are bound.



qualified electronic registered delivery services

Art. 43 (2): Data sent and received using a qualified electronic registered delivery service shall enjoy the **presumption** of the **integrity** of the data, the **sending** of that data **by** the identified **sender**, its **receipt** by the identified addressee and the **accuracy of the date and time** of sending and **receipt** indicated by the qualified electronic registered delivery service.



## Rules of evidence in eIDAS

- Member states must adhere to non-discrimination-principle of electronic documents and trust services.
- Member states are free to regulate evidence value of qualified electronic signatures.
- They at least have to be equivalent legal effect to handwritten signature.
- Presumptions in eIDAS for Qseal, Qtstmp und Qdelivery apply directly.
- Apply to all legal avenues and judicial branches, with the exceptions of criminal procedures. The latter lies without the scope and reach of regulation.
- Presumptions in eIDAS are rebuttable.
- They are rebutted by evidence which shows that in the particular case it is unsafe to arrive at a particular conclusion.
- Presumption do not change burden of proof.



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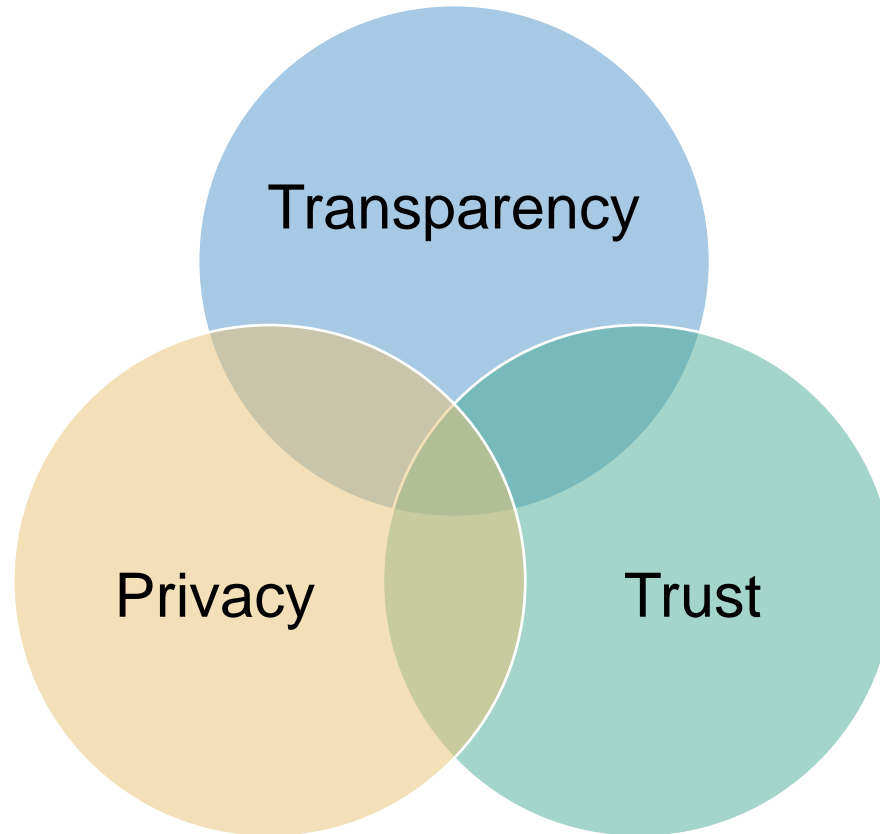
## eIDAS and Blockchain

- Blockchain provides trail or chain of evidence by default.
- series of timestamped data records that link together, forming the chain.
- each transaction proves that consent was given by the senders of a transaction by providing digital signatures.
- Blockchain falls under non-discrimination clause(s) of eIDAS.
- Blockchain in general does not fall under evidence rules of eIDAS.
- Acceptance of electronic signatures not uniform.
- eIDAS leaves member states free to set their own signature requirements for a transaction.
- only type of signatures universally recognized by all EU states are qualified signatures → equivalent legal effect of a handwritten signature.

## eIDAS and Blockchain

- Signatures used on most blockchains meet the criteria laid out for advanced electronic signatures, Art. 3 No. 11 eIDAS
- Public blockchains provide a way for anyone to approve a transaction regardless of by whom, where or how the signature is created.
- User of qualified signature needs approval from a TSP (Identification by approved method).
- Can blockchain signatures be qualified signatures? Yes if every signatory undergoes process required for obtaining a certificate.
- But qualified signatures defeat the purpose of a decentralized public ledger.
- Local legislation on electronic signatures can be leveraged to get legal effect from any electronic signature.
- In case of a conflict, the circumstances of the signing then determine whether the agreement is legally binding.

## Conclusion





Wagner, Das elektronische Dokument im Zivilprozess, JuS 2016, 29.

Roßnagel, Das Recht der Vertrauensdienste, Nomos, Baden Baden 2016.

Bacher, Der elektronische Rechtsverkehr im Zivilprozess, NJW 2015, 2753.

Jandt, Beweissicherheit im elektronischen Rechtsverkehr, NJW 2015, 1205.

Johannes/Weinhold, Das neue Datenschutzrecht bei Polizei und Justiz, Nomos, 2018.

Roßnagel, Das neue Datenschutzrecht, Nomos, 2018.

**Thank You!**

**Questions?**

**Feel free to contact me.**

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