

# e-Signature Deep Dive

Day 2 | 14:15 – 15:00



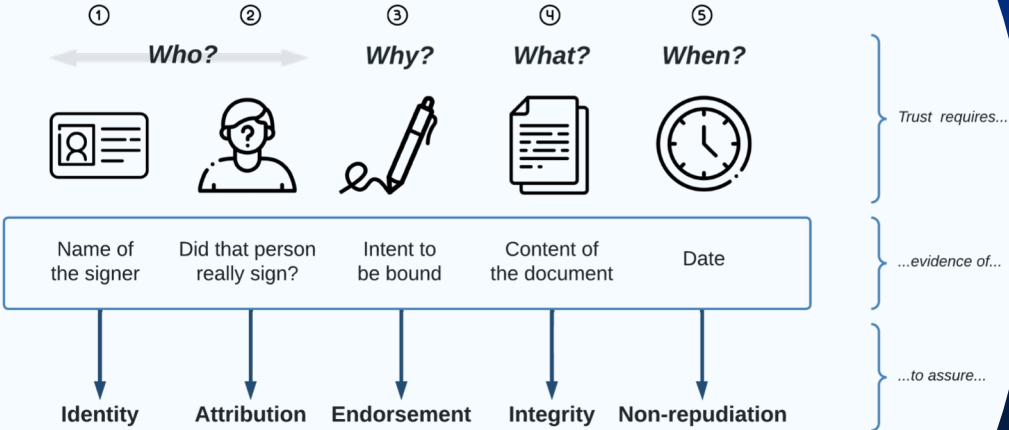
## e-Signatures are all around us



1. Typing a name at the end of an email.
2. Clicking on an "I accept" button on a website.
3. Using a scanned image of a handwritten signature.
4. Using a finger or stylus to hand write a signature on screen.
5. Digital authentication (PIN, biometric).

# What is a signature anyway?

This functional view is equally valid for paper and electronic signatures.





### Electronic Signature

*"Data in electronic form which is attached to or logically associated with other data in electronic form and which is used by the signatory to sign."*

*(eIDAS Art. 3(10))*



### Digital Signature

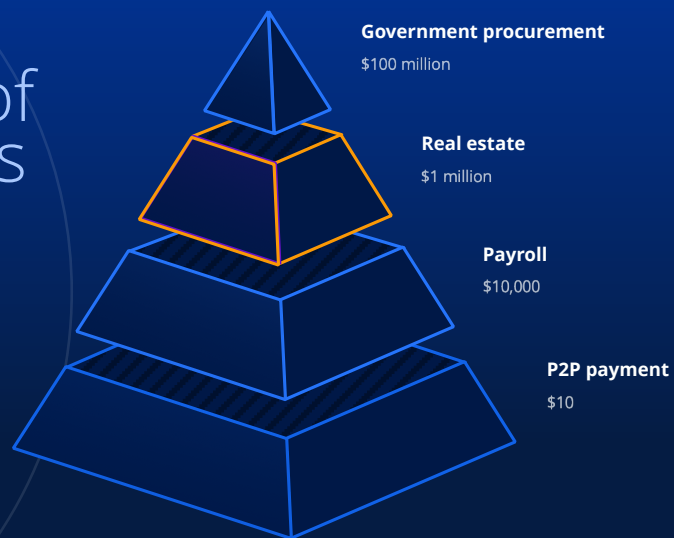
*"A value computed with a cryptographic algorithm and associated with a data object in such a way that any recipient of the data can use the public key to verify the data has not been altered since it was signed by the private key."*

*(NIST SP 800-63B)*

What is an  
**electronic**  
signature?

# Use cases of e-signatures

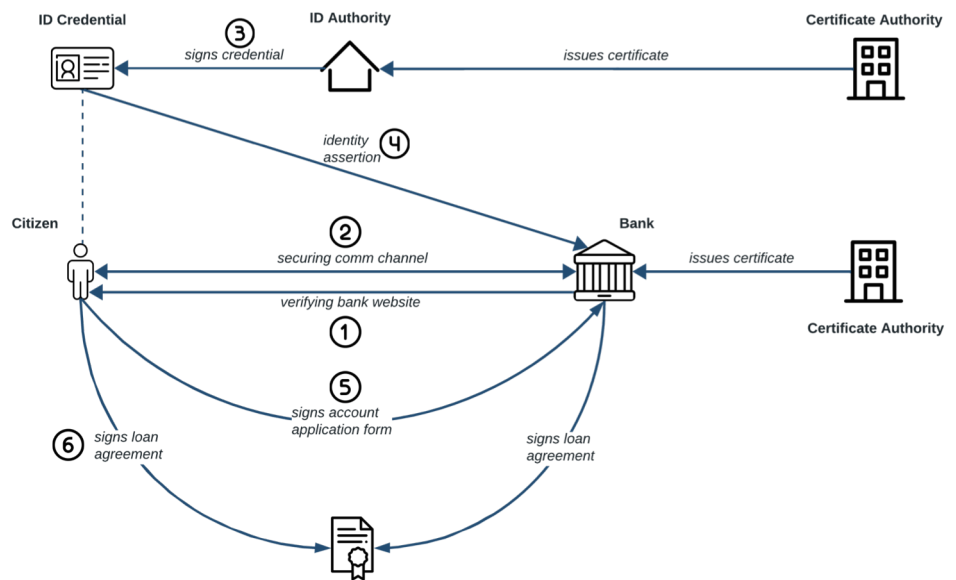
The majority of e-signature use cases are relatively low risk. However, very high value transactions can also be signed electronically if there is enough trust.



Increasing transaction risk

# Signatures are all around us

Sample use case:  
**Online loan application**



# Sources of trust

## Pre-existing trust



- Do I know you offline?
- Have we interacted successfully online before?
- Do we have a pre-existing contractual relationship?
- Are we members of the same professional body?
- Are we transacting on a secure communication channel?

## Extension of trust



### People

Providers of e-signature services are trusted and vetted.



### Process

Identity checks carried out when onboarding a signer.



### Technology

Technical measures to protect the integrity of the signed document

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# Trust framework

- Set **standards**
- Balance security and **usability**
- Clarify **roles** and responsibilities
- Promote **adoption**
- Risk-based **levels of assurance**
- **Flexible** to allow innovation
- Technology **neutral**



# Levels of assurance in practice

The example of the European eIDAS regulation.

Requirement	Level of Assurance		
	Low	Medium	High
<b>Signer identity</b>	<i>none</i>	Signer can be identified	Signer can be identified
<b>Data integrity</b>	<i>none</i>	Modifications after signing detectable	Modifications after signing detectable
<b>User onboarding</b>	<i>none</i>	<i>none</i>	Identity verification done face to face
<b>Technology</b>	<i>none</i>	<i>none</i>	Digital certificate (PKI)
<b>Certificate issuer</b>	<i>none</i>	<i>none</i>	Audited for compliance with rigorous standards
<b>Signing device</b>	<i>none</i>	<i>none</i>	High security device from approved list

## Legal Framework



### Trust Framework



Laws

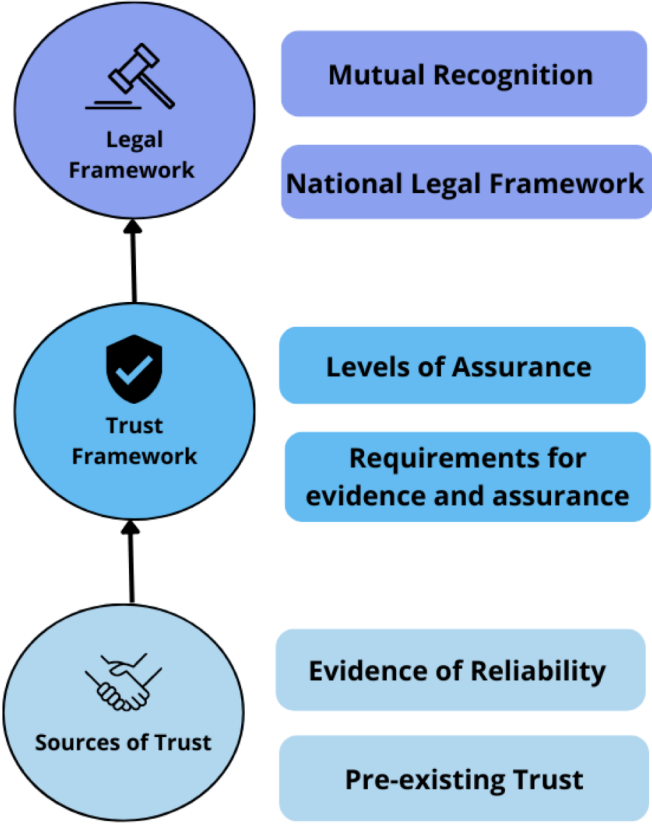
Regulations

### Legal effect

- Enforceability
- Admissibility as evidence
- Presumption of validity

### Mutual recognition

- Scaling trust across borders



Legal Framework

Mutual Recognition

National Legal Framework

Trust Framework

Levels of Assurance

Requirements for evidence and assurance

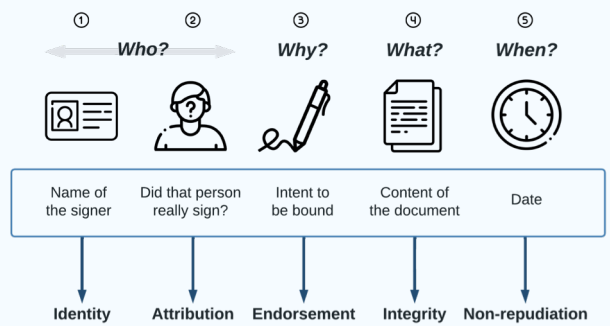
Sources of Trust

Evidence of Reliability

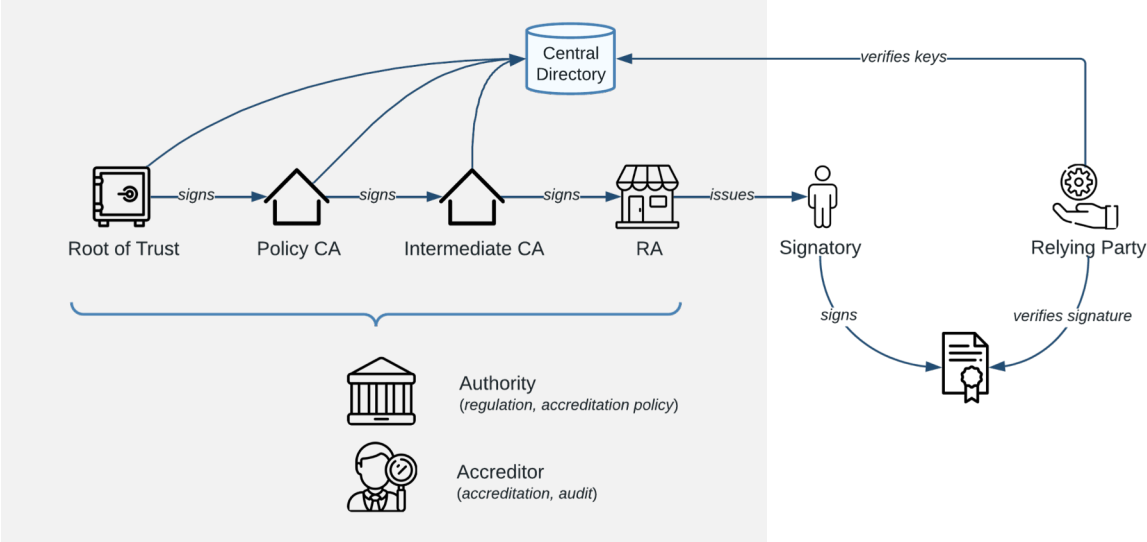
Pre-existing Trust

# The role of PKI

Functionality	Role PKI
<b>Identity</b>	<i>none</i>
<b>Attribution</b>	<i>none</i>
<b>Endorsement</b>	<i>none</i>
<b>Integrity</b>	<b>Hashing</b> ensures that the content of a document has not been modified after signing.
<b>Nonrepudiation</b>	Verifiable <b>timestamps</b> ensure that the signer cannot deny having previously signed a document.

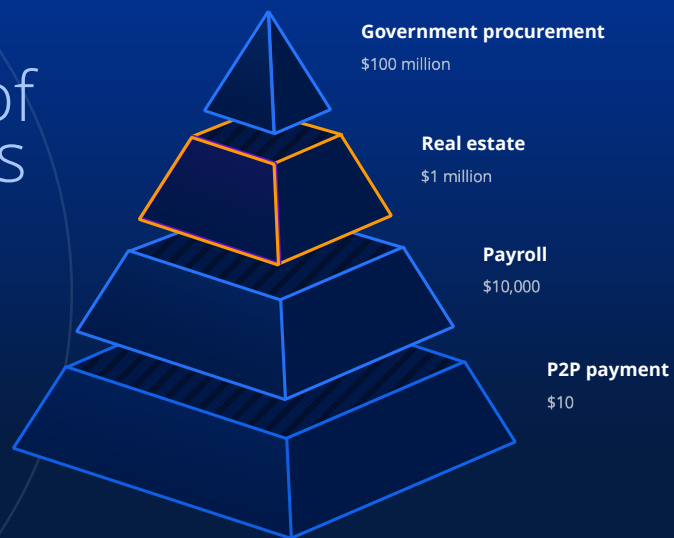


# What is a PKI?



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