

An Electronic-signature Based Circular Resolution Database System

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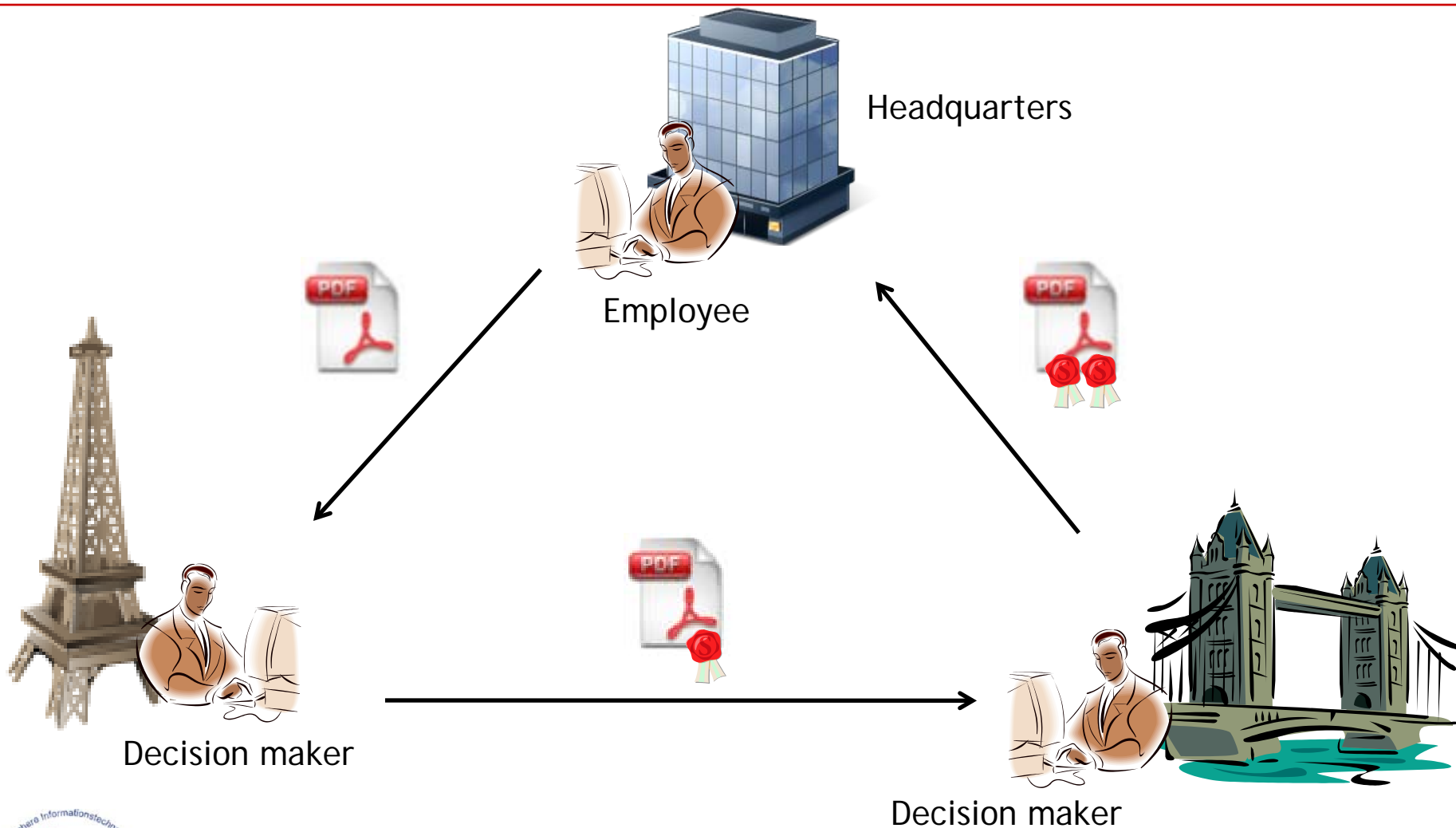
Outline

- Introduction
- Core concepts
- Architectural design
- Practical experiences
- Conclusions

Motivation

- Secure and efficient decision making processes are important for companies
- Locally dispersed activity areas of decision makers can be challenging when written consent is required
- Circular resolutions provide means to carry out decision making processes in such scenarios

Circular Resolutions - Example



Drawbacks of Circular Resolutions

- Provision of written consent can be cumbersome
 - How to sign an electronically transmitted document and forward it again electronically?
 - How to determine signing order?
- Satisfying security requirements can be difficult
 - How to protect documents during processing?

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Core concepts

- Centralized approach
 - No need to manually exchange documents
- Electronic signing of digital documents
 - Avoids media breaks
 - Resolution is processed electronically
- Secure User Authentication
 - Based on two-factor authentication

Austrian Citizen-Card Concept

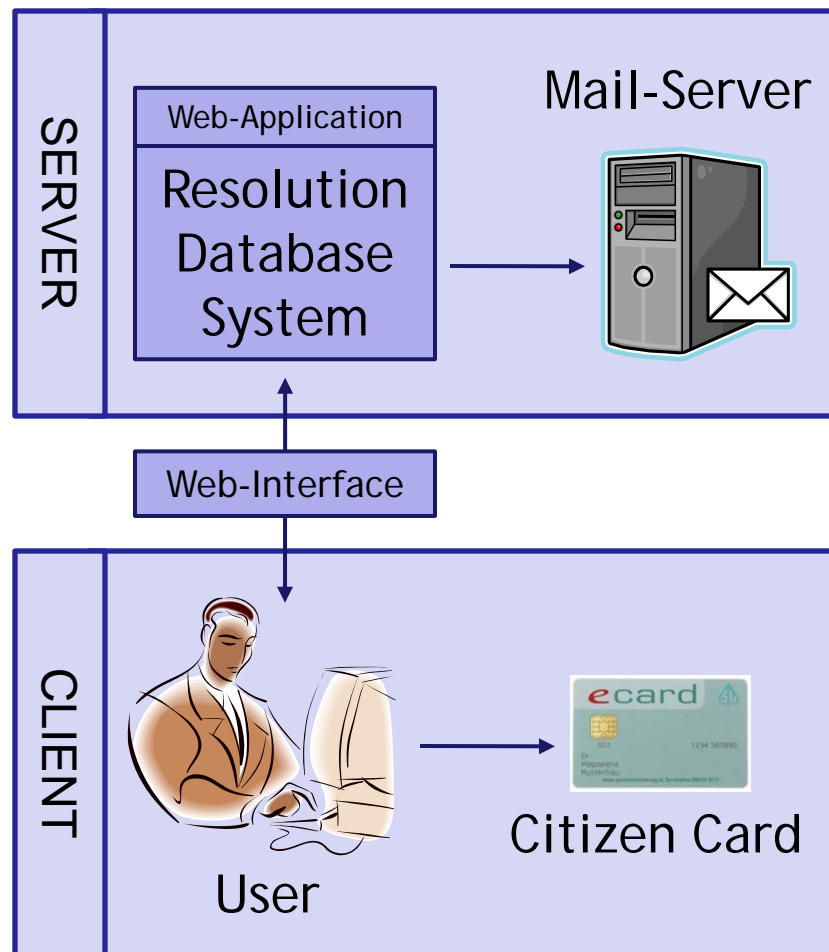


- Citizen-card is used in Austria to authenticate citizens over the Internet, e.g. in e-government processes
- Citizen-card concept is based on qualified electronic signatures
- Citizen-card concept is used to improve the processing of circular resolutions
 - Electronic signing of resolutions
 - Secure user authentication

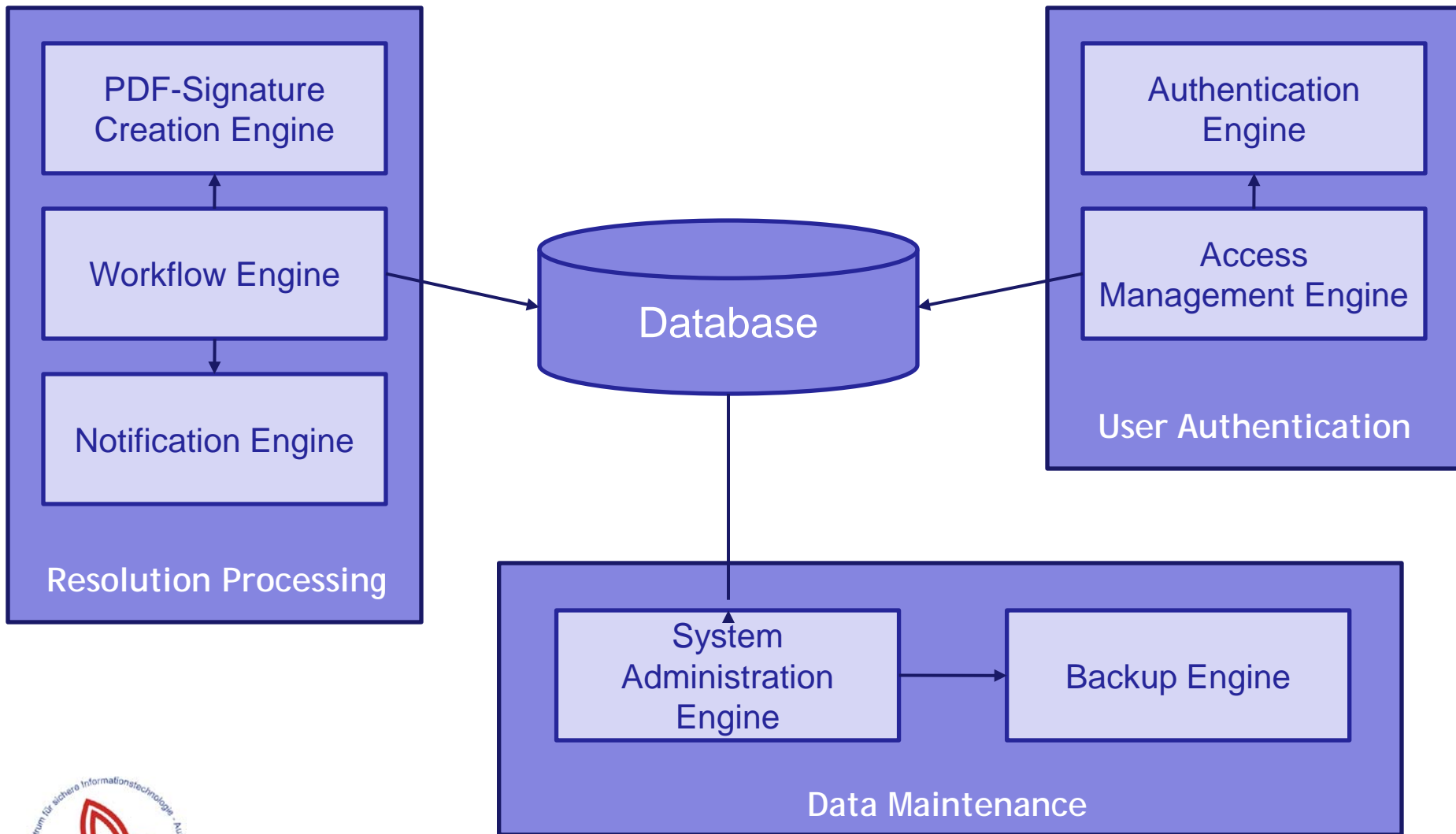
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System Overview

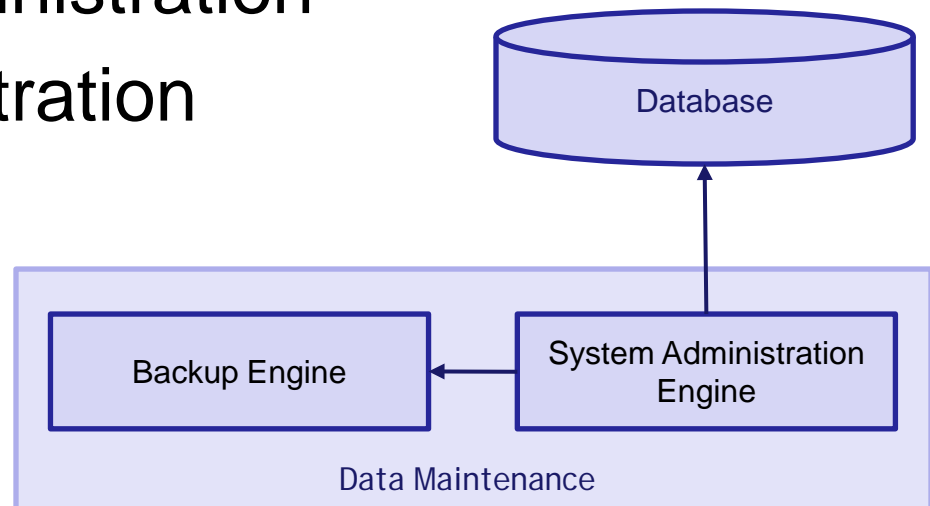


Resolution Database System - Overview



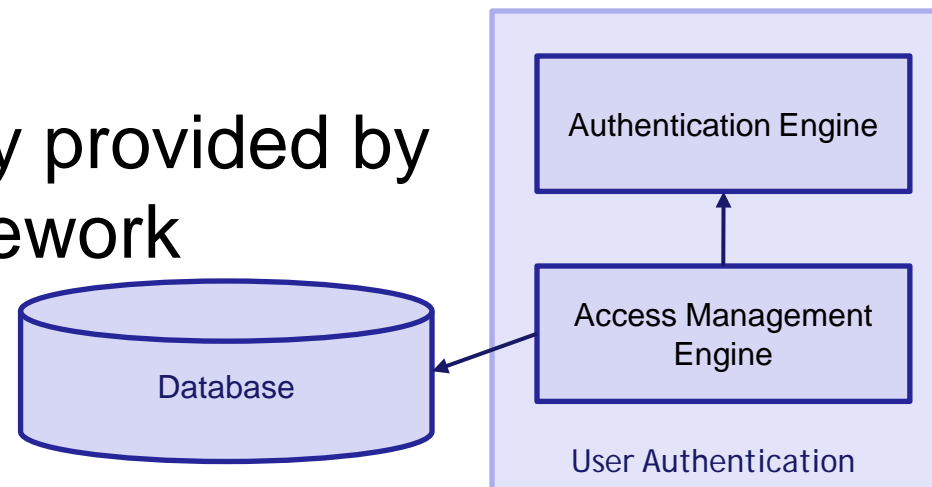
Data Maintenance

- System Administration Engine
 - User profile administration
 - User privilege administration
 - Document administration
- Backup Engine



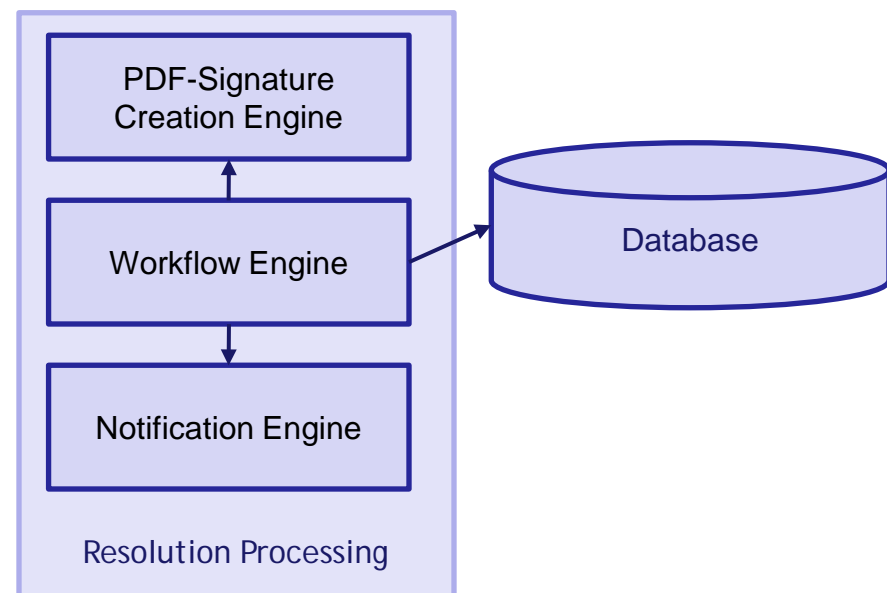
User Authentication

- Access Management Engine
 - Controls access to resources and functionality
- Authentication Engine
 - Authenticates users using the Citizen Card
 - Based on functionality provided by an open-source framework



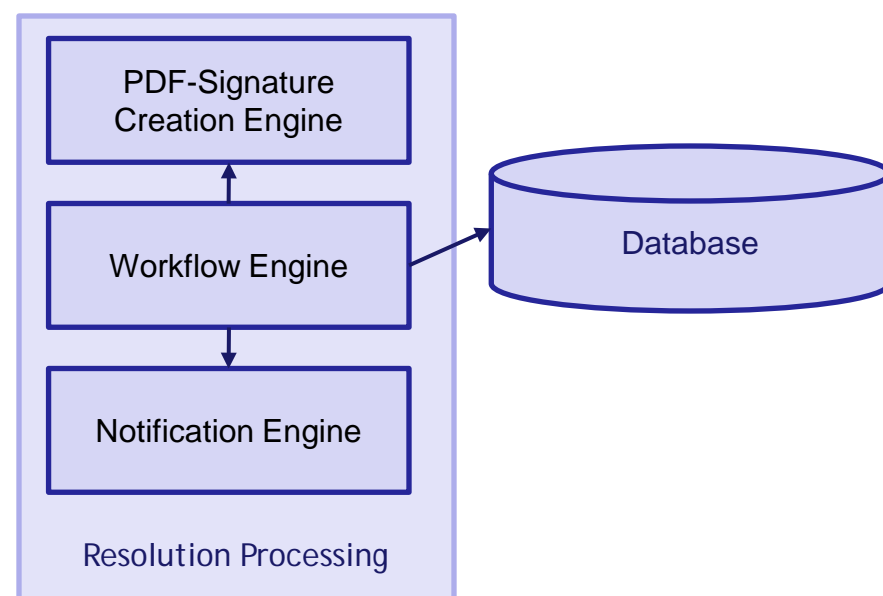
Resolution Processing (1)

- **Workflow Engine**
 - Create resolutions
 - Sign resolutions
 - Publish resolutions
- **PDF-Signature Creation Engine**
 - Performs PDF signature creation
 - Relies on an established publicly available tool



Resolution Processing (2)

- Notification Engine
 - All relevant events trigger automatic email notifications
 - Emails are sent through a connected mail server



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Productive Operation at A-SIT

- Developed system has been in productive operation at A-SIT for almost two years
- A-SIT has been predestined for adopting the developed resolution database system
 - Association is locally distributed over two cities (Vienna, Graz)
 - Decisions require written consent of two executive board members

Lessons Learned (1)

- Processing time of circular resolutions has been reduced
 - Resolutions can be processed within minutes independent of the current whereabouts of executive board members
- Usability has been increased
 - All resolutions are available any time
 - Users get notified automatically about relevant events

Lessons Learned (2)

- Overall decision making process has been increased in terms of continuity and security
 - Continuity of all stored resolutions is guaranteed due to central approach
 - Security of processed resolutions is assured due to central approach and the application of qualified signatures

Outlook

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Conclusions (1)

- Accomplishment of decision making processes based on circular resolutions can be challenging
- Our solution follows a centralized approach
 - Allows central maintenance of resolutions
 - Enhances decision making processes by avoiding the manual exchange of documents

Conclusions (2)

- Incorporation of qualified electronic signatures
 - Secure user authentication
 - Electronic signing of resolutions
- The developed system has already proven its capability to enhance decision making processes in practice

Selected References

- [1] Leitold, H., Hollosi, A., and Posch, R. 2002. Security Architecture of the Austrian Citizen Card Concept, Proceedings of the 18th Annual Computer Security Applications Conference, p.391
- [2] Digital Austria – Modules for Online Applications,
<http://www.digitales.oesterreich.gv.at/site/6528/default.aspx>
- [3] Herbert Leitold, Reinhard Posch, Thomas Rössler 2009. Media-break resistant eSignatures in eGovernment – an Austrian experience. Emerging Challenges for Security, Privacy, and Trust - 24th IFIP SEC
- [4] EGovLabs: PDF-AS: Projektinfo, <http://egovlabs.gv.at/projects/pdf-as/>
- [5] EGovLabs: MOA-ID/SP/SS: Projektinfo, <http://egovlabs.gv.at/projects/moa-idspss/>
- [6] Republic of Austria: Austrian Federal Act on Electronic Signatures, Federal Law Gazette, part I, Nr. 137/2000, last amended by Nr. 59/2008, 2000
- [7] European Union: Directive 1999/93/EC of the European Parliament and the Council of 13. December 1999 on a community framework for electronic signatures

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Thank you for your attention!