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

Decision maker

Headquarters

Employee

Decision maker
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

Mail-Server

Resolution
Database System

Server

Web-Application

Web-Interface

User

Citizen Card

Client
Resolution Database System - Overview

PDF-Signature Creation Engine
Workflow Engine
Notification Engine
Resolution Processing

Database

Authentication Engine
Access Management Engine
User Authentication

System Administration Engine
Backup Engine
Data Maintenance
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
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


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Thank you for your attention!