

Electronic Document Workflow and e-Signature Implementation at Riga Technical University

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Keywords

e-Signature, Electronic Document Workflows, Document Management System.

1. SUMMARY

The paper describes a pilot-project of implementing a custom-developed module for electronic document workflows and e-signature at Riga Technical University, Latvia. The module is developed in-house and uses official e-signature technology in Latvia to provide RTU management and staff with a tool for efficient document workflows in existing Document Management System (DMS). A business need, the project scope and benefits of the developed solution are outlined.

2. EXTENDED ABSTRACT

In 2016 Riga Technical University (RTU) set up a cross-university project to implement electronic document workflow and e-signature module in existing RTU Document Management System (DMS). The project was initiated to meet a business need of solving the problem of inefficient document life-cycle at the university: document creation, approval, dating and signing are performed manually outside of DMS, and then scanned and registered in DMS. The business need was defined from the middle management with a goal to facilitate a broader adoption of e-signature at the university, to improve collaboration between document authors, approvers, and external entities, timeliness of document life-cycle, and to increase document security.

A project group, consisting of members of Document Management Department, IT Department, and Administrative Department, was set up to investigate the options and alternatives for improving administrative staff productivity by implementing electronic document workflows and signing document electronically with the official e-signature technology in Latvia.

A change-driven approach to the project was chosen. The project team was focused on rapid delivery in short iterations. Business analysis effort was based on the best practice described in (IIBA, 2009), and produced an initial list of high-level requirements, this backlog was then updated throughout the project as new requirements have emerged. Throughout the project, these requirements were prioritized and reprioritized based on the business need. The highest-priority requirements were taken from the backlog for detailed requirements analysis, and implementation began as soon as analysis was complete.

The developed solution includes the following steps: (1) a document author prepares MS Word document in DMS using predefined template (templates are available in several languages), (2) WebDav protocol is used for MS Word and DMS integration: the prepared document is saved in DMS, and a user is able to edit the document in MS Word and save changes to the server, (3) the document author starts a workflow by defining a list of internal approvers (sequentially or in parallel) and a person who will sign the document (either with e-signature or by hand), (4) when the workflow is successfully completed, the document can be signed with e-signature or can be printed out and signed by hand, (5) multiple documents can be signed with e-signature at the same time, and (6) e-signed document is then sent out from the DMS to the recipient.

Documents are electronically signed in the client side using Java desktop application developed by RTU Department of Information Technology. The solution uses Java 8 version and is based on JavaFX

software platform (ORACLE, 2016) which provides tools for rich internet application development and could be executed on more than one operating system. In order to provide an opportunity to safely sign documents the application uses the official Java EDOC library developed by SJSC Latvia State Radio and Television Centre (LSRTC, 2016), the only Trusted Certification Services Provider in Latvia. EDOC is a file format that contains an archive with signed/unsigned files. The library contains all the necessary functionality for EDOC integration in custom applications. There are methods for EDOC creation, classes for adding and removing data files, functions for adding and validating digital signatures. The Java application launch is carried out by Java applet or browser extension.

One of the most important issues of e-signature and electronic document workflows is security and confidentiality (Jaju & Chowhan, 2015). In order to limit the number of web resources which can run the application - certificates are used. The data exchange between the web resource and a user desktop application is possible only if the resource certificate has been added to the user's certificate trust store. For security reasons file checksums are calculated before EDOC signing and compared with the Java desktop application initialization parameters.

The potential benefits of the developed approach are as follows: (1) a step towards Green IT, e.g., reduced paper use, (2) cutting costs ("lost time" costs of RTU management by signing document by hand, scanning costs, disposal costs, etc), (3) efficient document management business process, (4) employee satisfaction, and (5) improved collaboration and version control.

3. REFERENCES

- IIBA. (2009). *A Guide to the Business Analysis Body of Knowledge*® (*BABOK*® *Guide*).
- Jaju, S. A., & Chowhan, S. S. (2015). A Modified RSA algorithm to enhance security for digital signature. In *2015 International Conference and Workshop on Computing and Communication (IEMCON)* (pp. 1-5). IEEE. <http://doi.org/10.1109/IEMCON.2015.7344493>
- LSRTC. (2016). Latvia State Radio and Television Centre. Retrieved March 17, 2017, from <http://www.lvrta.lv/company.html?lang=en>
- ORACLE. (2016). Client Technologies: Java Platform, Standard Edition (Java SE) 8 Release 8. Retrieved March 17, 2017, from <http://docs.oracle.com/javase/8/javase-clienttechnologies.htm>

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