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Application of Kroki Mockup Tool to Implementation of Executable CERIF Specification

Milorad Filipović*, Renata Vaderna, Željko Ivković, Sebastijan Kaplar, Željko Vuković, Igor Dejanović, Gordana Milosavljević, Dragan Ivanović

University of Novi Sad, Faculty of Technical Sciences, Trg Dositeja Obradovića 6, Novi Sad, 21000, Serbia

Abstract

The paper presents application of Kroki tool to creation of executable specification of CERIF standard. Kroki (fr. *croquis* – sketch) is an open-source tool that is being developed in order to foster development agility and better communication among team members with different specialties. It can be used for creating of specification of data-driven applications using two different notations (UML based and mockup based) and for generating application over the specification. This paper presents usage of Kroki tool for visualization and further development of CERIF data model, as well as using of Kroki for generating a prototype of CRIS system over CERIF data model. CERIF 1.5 specification was taken from euroCRIS web site and entered into Kroki tool. More than 280 CERIF classes are divided into 31 packages, in order to make CERIF model easier to read and comprehend. Thanks to its mockup and lightweight UML editor, Kroki enables each user, with or without background in information technologies, to understand and change CERIF specification.

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Keywords: CERIF, model-driven development, CRIS applications

* Corresponding author. Tel.: 381-21-485-2422; *E-mail address:* mfili@uns.ac.rs

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1. Introduction

Research management systems take significant role in the development of science (Zimmerman, 2002). Those systems collect, preserve and disseminate data about scientific institutions, scientists and researchers, research projects, published scientific research outputs other relevant data for scientific-research domain. The European Union encourages the development of national research management systems in accordance with the CERIF standard (the Common European Research Information Format - http://www.eurocris.org/cerif/introduction/) because the European Union wants to achieve maximum competitiveness of Europe at all levels of research activity. Research management systems compliant with CERIF standard are called CRIS (Current Research Information System). CERIF standard provides a standardized data model. Standardization of those systems data is very important, because it could enable data exchange between those systems and researchers could search research data in various research management systems.

The first version of CERIF was produced in 1991 by European Commission (EC). It had a single-entry focus and a simple record format: the project was an entity with persons, organizations and other information represented as attributes. In 2000 the EC handed over the custodianship of CERIF to euroCRIS non-profit organization (www.eurocris.org) dedicated to the development of research management systems and their interoperability. Since then, CERIF has gone through various development stages and expanded a lot. Eight version of CERIF has been published by euroCRIS organization in the period 2000-2013. CERIF version 1.5 was published in 2013 and this model contains over 280 entities related to scientific-research domain.

By 2015, there are more than 200 euroCRIS institutional, personal and affiliated members from all over the Europe. Those members belong to various scientific fields and have different specialties including different level of technical skills.

Kroki[11,12] (fr. *croquis* – sketch) is an open-source tool that is being developed in order to foster development agility and better communication among team members with different specialties. It can be used for creating of specification of data-driven applications using two different notations (mockup based and UML based) and for generating application over the specification.

This paper presents usage of Kroki tool for visualization and further development of big CERIF data model which has had very fast expansion in last 15 years, as well as using of Kroki for generating a prototype of CRIS system over CERIF data model.

The paper is structured as follows. Section 2 gives a brief overview of Kroki tool. Section 3 explains creation of CERIF specification and CRIS system prototype using Kroki tool. Section 4 presents related work. Section 5 concludes the paper.

2. Kroki tool

Kroki enables requirements elicitation based on executable prototypes, using the means familiar to the end users - drawing user interface (UI) mockups (see Figure 2). Contrary to the approaches where mockups are created by general-purpose drawing tools and then manually or semi-automatically transformed to formal models[14], mockups created by Kroki are already elements of the UI model. Kroki's mockup editor actually implements the concrete syntax of our EUIS[6] (Enterprise User Interface Specification) DSL (Domain Specific Language) for specifying UIs of enterprise applications at a high-level of abstraction. Drawing is based on several types of forms and its elements, whose layout and functionality have been defined by our user interface guidelines[2, 3]. Its architecture is presented in Figure 1.

EUIS DSL also has concrete syntax designed to look like a simplified UML (Unified Modeling Language) class diagram notation with stereotypes, which enables modeling in the "classical" way (see Figure 3). Changes made in Kroki's class diagram editor are immediately visible in the mockup editor and vice versa, with automatic layouting performed for newly created elements[5]. This enables each participant (with or without background in information technologies) to use preferred way of development, with changes immediately communicated to all concerned parties.