

**Special Issue on**  
**ADAPTATION AND EVOLUTION IN WEB SYSTEMS ENGINEERING**  
**EDITORIAL**

Adaptation and evolution are increasingly becoming first-class concerns in software products in general, and Web Systems in particular. Adaptation and evolution are strongly related: they both concern the *change* of an application. Where *adaptation* constitutes the application's ability to act upon and adapt to external factors, *evolution* denotes the process of change an application goes through over time.

Adaptation has become a crucial factor in the success of modern Web applications. With the explosion of the user base on one hand, and the increasing size of Web applications on the other hand, the ability to tailor, both in content, functionality, and appearance to the different needs of the various users is essential. Users differ in their requirements, characteristics, abilities, knowledge etc., and they all expect a personalized view on their applications. With the rise of the mobile Web, an additional challenge is the adaptation of the Web application to different contexts and devices. A successful application typically copes well with all these issues and is able to effectively anticipate and autonomously adapt to varying circumstances. The application's ability to adapt and tailor itself to user and/or context is called *adaptation*.

Next to exhibiting adaptive behavior, Web applications are typically evolutionary in their nature. Due to a variety of reasons, Web applications change over time: as regular applications, they are often extensible, and/or are adjusted as to correct flaws (e.g. security flaws), migrate to different platforms and technologies, or take into account new application requirements. Furthermore, their content, structure, navigation, and presentation is frequently updated, even while the application is online and in use. The study of these changes and their consequences over time is called *evolution*.

In this special issue we propose four selected articles that all deal with different aspects of adaptation and evolution in Web systems engineering. Through these articles we offer the reader some insight in the two concerns, and a better understanding of the situations that may demand for one or both of the techniques.

The papers were originally presented and discussed at the *Second International Workshop on Adaptation and Evolution in Web Systems Engineering (AEWSE'07)*, held in conjunction with the *Seventh International Conference on Web Engineering (ICWE'07)* in July 2007, in Como, Italy. The success of the workshop in both amount of submissions and on-site participation led to the selection of four high quality articles for this special issue. The articles were adapted according to the workshop's comments and discussions and extended with original new content. Next to the blind peer-review process for the workshop, the

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<sup>a</sup>For more details on the workshop, please visit the official web site of AEWSE'07: <http://wise.vub.ac.be/aewse2007/>

following papers passed the additional blind peer-review process for the special issue:

- "Managing Runtime Adaptivity through Active Rules: the Bellerofonte Framework" by Florian Daniel, Maristella Matera, and Giuseppe Pozzi: in this paper, the authors describe the development of adaptive web applications by means of so-called ECA (Event-Condition-Action) rules. Adaptation rules allow developers to associate hypertext elements (e.g. pages or sets of pages) with adaptive behaviors. The proposed XML-based rule language comes with a detached engine for rule evaluation that also allows for the management of rules during the runtime of the application.
- "Supporting Different Patterns of Interaction through Context-Aware Data Management" by Michael Grossniklaus and Moira C. Norrie: in this article, the authors approach the problem of context-awareness, and hence adaptivity, from a data management point of view. The approach proposes the use of an object-oriented and intrinsically context-aware database management system for the management of context-aware application features at the data level in order to transparently provide such features to Web applications built on top of the context-aware database. The authors also describe a real life example application.
- "A Migration Platform Based on Web Services for Migratory Web Applications" by Fabio Paternò, Carmen Santoro, and Antonio Scordia: in this article, the authors describe a forefront environment supporting the migration of Web user interfaces/applications among a variety of mobile devices. That is, the proposed environment provides users that switch from one device to another with an application that migrates with them, thus providing for task continuity. The environment is based on transformation techniques leveraging logical user interface descriptions and also supports the automatic discovery of client devices.
- "Enriching Model-Based Web Applications Presentation" by Juan Carlos Preciado, Marino Linaje, and Fernando Sanchez-Figueroa: in this article, the authors provide an approach to technology evolution in Web applications. More precisely, using their RUX-Method, they propose an evolution process for traditional Web applications to so-called Web 2.0 applications. Special focus is put on the migration of the user interface, with the aim of enabling the transition to proper RIA (Rich Internet Applications) applications. The process is explained using WebML application models as reference.

The selected articles in this special issue cover a wide range of topics related to adaptation and evolution in Web systems engineering. We strongly believe that they provide an interesting overview of mature works with valuable ideas. In the hope that this acknowledgment is shared by the readers of this issue, we would like to thank the authors for their commitment and contributions and the reviewers for their constructive and professional comments.

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