A Tool Suite to Enable Web Designers, Web Application Developers and End-Users to Handle Semantic Data

Mariano Rico, Universidad Autónoma de Madrid, Spain
Oscar Corcho, Universidad Politécnica de Madrid, Spain
José Antonio Macías, Universidad Autónoma de Madrid, Spain
David Camacho, Universidad Autónoma de Madrid, Spain

ABSTRACT

Current web application development requires highly qualified staff, dealing with an extensive number of architectures and technologies. When these applications incorporate semantic data, the list of skill requirements becomes even larger, leading to a high adoption barrier for the development of semantically enabled Web applications. This paper describes VPOET, a tool focused mainly on two types of users: web designers and web application developers. By using this tool, web designers do not need specific skills in semantic web technologies to create web templates to handle semantic data. Web application developers incorporate those templates into their web applications, by means of a simple mechanism based in HTTP messages. End-users can use these templates through a Google Gadget. As web designers play a key role in the system, an experimental evaluation has been conducted, showing that VPOET provides good usability features for a representative group of web designers in a wide range of competencies in client-side technologies, ranging from amateur HTML developers to professional web designers.

Keywords: Semantic Data, Semantically Enabled Web Applications, VPOET, Web Application Development, Web Applications

INTRODUCTION

Web application development is becoming increasingly difficult, especially when focusing on designing attractive and reusable web applications. Web application developers need to be skilled in a wide set of client-side technologies (e.g., HTML, Javascript, CSS, DHTML, Flash, AJAX) and server-side ones (e.g., JSP, ASP, .NET), addressing an extensive number of programming languages (e.g., Java, Python, Ruby, PHP). The fast and divergent development of client-side technologies, which have formed
the basis for the emergence of the Web 2.0 concept (O’Reilly, 2005) and attitude (Davis, 2005), has increased the importance of having experts in this type of technologies. In this paper, we refer to these client-side experts as web designers. This heterogeneity and complexity converts web designers in skilled programmers, as pointed out by Rochen, Rosson, and Pérez (2006), and increases the development cost of such applications.

The situation becomes even more complex when Web application developers want to incorporate Semantic Web data in their applications. Although many domains have a lack of ontologies, semantic technologies are mature enough and there is an increasing number of ontologies publicly available. According to d’Aquin et al, in 2007 there were around 23,000 ontologies available on the Internet (d’Aquin et al., 2007), and this number is growing quickly, especially due to the Linked Open Data initiative (Bizer, Heath, & Berners-Lee, 2009).

Therefore, this wealth of information still remains hidden to most Web application developers and end-users. On the one hand, semantic web technology experts are not usually focused on producing attractive and reusable web applications what makes it difficult for end-users to access this information (Macías & Castells, 2007). For example, early work on Semantic Web portals showed that usability aspects were not well considered in general in semantic web portal technologies (Lausen et al., 2005). From our experience with semantic web portals (Corcho, López-Cima, & Gómez-Pérez, 2006), we did conclude that such portals required very skilled people to maintain them, and demanded more flexible frameworks in order to create complex applications combining traditional web development and semantic data management. On the other hand, Web application developers need to improve their skills with those for the understanding and management of ontologies and semantic data, in order to produce semantically-enabled web applications (Oren, Heitmann, & Decker, 2008; d’Aquin et al., 2008).

Our approach aims at hiding much of the complexity of semantic web technologies to the parties responsible for bringing the Semantic Web to end-users. In our previous work (Rico, Camacho, & Corcho, 2008) we divided the skills required to create a semantically-enabled web application into different groups of competencies, identifying the roles (profiles) involved. Two of these roles were identified as developers. The first of them had competencies in semantic web technologies and was low-skilled in web application development. The second developer profile had minimal skills in semantic web technologies but high competencies in web application development. For the first developer profile we built a wiki-based framework named Fortunata (Rico, Camacho, & Corcho, 2010), which allows semantic web application developers to create, configure and activate pieces of code that run on top of the framework, in a collaborative way. The experimental evaluation of this framework showed that the development cost and the required competencies for handling this framework were lower when compared to traditional technologies. We measured the usability of Fortunata from the developer’s perspective by means of early-prototypes of Fortunata-based application, and that information was useful to identify usability pitfalls and successfully solve most of them, as well as to create a “Fortunata-based-application developers guide”.

For the second developer profile, the most common currently available, we provide them with a programming-language independent mechanism (based in HTTP messages) to use ‘semantic templates’. These templates are created by web designers by using a Fortunata-based application named VPOET (Rico et al., 2008), which plays a key role between the two developer profiles described.

The novelty of this paper is the description of the final version of VPOET, and the analysis of VPOET from the perspective of its users. VPOET lets web designers create semantic templates to present and edit semantic data, even if they are low skilled in semantic web technologies. VPOET may have been implemented with
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