Focused Requirements Engineering Method for Web Application Development

Ala M. Abu-Samaha
Amman University, Jordan

Lana S. Al-Salem
SpecTec Ltd & MEP, Greece

INTRODUCTION

The requirements phase of the system/application development process typically involves the activities of requirements elicitation, analysis, validation, and specification. The main goal of such a process is "to develop a requirements specification document which defines the system to be procured and which can act as a basis for the system design" (Sawyer, Sommerville, & Viller, 1996). Hence the underpinning assumption of the requirements engineering (RE) process is to transform the operational needs of an organisation into complete, consistent, and unambiguous system/application specifications through an iterative process of definition and validation (Pohl ,1994).

The Web engineering (WE) literature provides a limited number of methods and techniques that can be used to manage the RE process in a Web development context [*e³-value* framework (Gordijn, Akkermans, & van Vliet, 2000), SOARE approach (Bleistein, Aurum, Cox, & Ray, 2004), e-prototyping (Bleek, Jeenicke, & Klischewski, 2002), AWARE (Bolchini & Paolini, 2004), and SSM/ICDT (Meldrum & Rose, 2004)]. Despite the availability of such a limited number of Web requirements engineering (WRE) methods, many researchers criticised such methods for their failure to address the necessity to align the Web application' requirements to the organisation's business strategy. Hence, the recommendation of many researchers (Al-Salem & Abu-Samaha, 2005a; Bleistein 2005; Bleistein, Cox, & Verner, 2004; Vidgen, Avison, Wood, & Wood-Harper, 2002) is to utilise a general WRE framework for the development of Web applications that can align the application's requirements to the organisation's business needs and its future vision. The objective of such a WRE framework is to incorporate the elicitation/analysis of business strategy as part of the application's RE process.

This chapter presents a WRE method that extends Sommerville and Kotonya's viewpoint-oriented requirements definition (VORD) and Kaplan and Norton's balanced scorecard (BSC) to elicit the Web application' requirements and to plan/analyze the business strategy, respectively. In addition, eWARE (extended Web application requirements engineering) deploys the concept of "requirements alignment" to attain business objectives during the requirements discovery, elicitation, and formalisation process to identify the services of the Web application that will achieve the business objectives in order to improve the organisation's profitability and competitiveness. The chapter is organised into a number of sections. The second section of this chapter provides a background to Web applications in terms of definition and differentiating characteristics. The third section provides a discussion of eWARE method in terms of phases and activities. This section is divided into two subsections to cover the activities of the two prominent phases of the eWARE process in more detail. The fourth and fifth sections provide a discussion of possible future trends in WRE and a number of concluding remarks.

BACKGROUND

Web applications provide organisations an unprecedented chance to stretch their existence beyond the typical boundaries of an organisation to include customers, trading partners, and suppliers.Little attention has been paid to the process of RE for Web application development, in comparison to other areas of the development process [modelling, design, and coding] (Ginige & Murugesan, 2001). Hence, Web applications can be defined as "applications that tend to be used to integrate and streamline an organisation's business processes beyond organisational (customers, agents, suppliers, others) and geographical borders; provide an organisation with competitive products and services that give it a strategic advantage over its competitors in the marketplace; promote business innovation; and/or improve operational efficiency" (Al-Salem & Abu-Samaha, 2005a).

There is a pressing need in the WE discipline for RE approaches and techniques that (a) take into account the multiplicity of user profiles and the various stakeholders involved [a stakeholder is defined as "anyone who can share information about the system, its implementation constraints or the problem domain" (Potts, Takahashi, & Anton, 1994)]; (b) eliciting overall functionality and the business environ-

ment of the Web application; (c) specifying technical and nontechnical requirements of the Web application, and (d) aligning the Web application' requirements to the overall business strategy (Bleistein et al., 2005; Ceri, Fraternali, Bongio, Brambilla, Comai, & Matera, 2003; Ginige & Murugesan, 2001; Kautz & Madsen, 2003; Lowe, 2003; Meldrum & Rose, 2004; Nuseibeh & Easterbrook, 2000; Vidgen et al., 2002). More importantly, a Web application must be developed with an emphasis on how the services of such an application can achieve the business vision and strategy and fulfil the business processes (Haire, Henderson-Sellers, & Lowe, 2001).

eWARE Process

eWARE process can be best perceived as a series of activities grouped into three phases; strategy articulation via BSC, Web application' requirements elicitation via VORD, and prototype building; Figure (1) presents the phases and activities of eWARE. Such a process aims to develop a Web application requirements specification (WRS) document that is aligned with business strategy and detailed enough to be used for contractual purposes.

The strategy articulation phase of eWARE can be best thought of as a structure of many layers. The vision of the organisation is at the top of the structure, while the strategic objectives are presented in the next layer of the structure followed by the Web application services. The next layer of the structure contains the measurements and targets for meeting the strategic objectives. The level of detail tends to increase as we move down the structure of the strategy. This articulation of the organisation's vision, objectives, and measurements aims to translate the future vision of the organisation into detailed and prioritised Web application requirements (this will be fully covered in the coming subsections).

The requirements elicitation phase of the eWARE process is used to produce a WRS document based on requirements collected during the strategy articulation phase. Requirements elicitation relies on the identification of the relevant viewpoints (VPs), their sub-VPs, and requirements for each viewpoint (VP). Kotonya and Sommerivlle (1996) define a VP as anyone who may have some direct or indirect influence on the system/application requirements. Goals and objectives of the different stakeholder groups need to be identified to define success or failure measures for each stakeholder. Moreover, nonfunctional requirements {NFR) need to be

Figure 1. The eWARE process