Conflicts, Compromises, and Political Decisions:
Methodological Challenges of Enterprise-Wide E-Business Architecture Creation

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ABSTRACT

This article describes the architecture development process in an international ICT company, which is building a comprehensive e-business system for its customers. The implementation includes the integration of data and legacy systems from independent business units and the construction of a uniform Web-based customer interface. We followed the early process of architecture analysis and definition over a year. The research focuses on the creation of e-business architecture and observes that instead of guided by a pre-scribed method, the architecture emerges through somewhat non-deliberate actions obliged by the situation and its constraints, conflicts, compromises, and political decisions. The interview-based qualitative data is analyzed using grounded theory and a coherent story explaining the situation and its forces is extracted. Conclusions are drawn from the observations and possibilities and weaknesses of the support that UML and RUP provide for the process are pointed out.

Keywords: architecture; e-business; enterprise; IS architecture; IS development methodologies; IS integration; RUP; UML

INTRODUCTION

Robust technical architecture is considered one of the key issues when building successful e-business systems. The design of technical architecture is usually seen as a set of trade-offs between available resources (such as available personnel and money) and operational requirements related to technical architecture, such as scalability, capacity, response times, security, and availability. The software architecture research provides design tools for technical architecture design, including, for instance, architecture description languages (Dashofy, Van der Hoek, & Taylor, 2005; Medvidovic & Taylor, 2000), common architectural patterns and styles (Monroe, Kompanek, Melton, & Garlan, 1997), architectural trade-off methods (Kazman, Klein, & Clements, 2000), architectural frameworks (Leist & Zellner, 2006), and technologies for e-business implementation (Bichler, Segev,

& Zhao, 1998). In an ideal world, the work of an architect would be to find the explicit requirements for architecture, and select the best possible design tools and technologies to implement the architecture. Furthermore, the architecture development team would make rational trade-offs concerning the requirements, and produce the best realistic solution for the architecture with the selected design tools and implementation technologies.

However, the literature contains many examples of cases where technical rationality has not been sufficient for the success in IS projects (e.g. Sauer, Southon, & Dampney, 1997). Architecture researchers have found that the work of an architect and the usage of architecture are bound by more diverse organizational issues and limitations that the classical technical software architecture research ignores. These include for example the diverse role of an architect in an organization observed by Grinter (1999) and varying uses and meanings of architecture in practice (Smolander & Päivärinta, 2002a). The main message of these studies is that an architect has a social, and even political, role in an organization and that different stakeholders relate different meanings to architecture to fulfill their informational requirements in the development process. This phenomenon has remarkable similarities to information systems development in general. As pointed out by Klein & Hirscheim, the implicit assumption of rationality of the development processes hides the legitimating of the goals and differing political agendas of various stakeholders (Hirschheim & Klein, 1989).

To understand the issues involved in architecture development, we observed a project that was developing e-business architecture in an international ICT company. We interviewed various stakeholders to gain a deep insight into the process. The company already had several e-commerce systems in individual business units, but it needed a more uniform customer interface for its various systems. The e-business project included the integration of data and legacy systems from these units and the construction of a uniform Web-based customer interface hiding the differences of the business units. Our goal was to find ways for supporting architecture development by means of methods and description languages, such as UML. We were aware of efforts of supporting architecture design with UML (e.g., Conallen, 1999; Garlan & Kompanek, 2000; Hofmeister, Nord, & Soni, 1999b; Object Management Group, 1999, 2006), but these efforts were mostly targeted to technical software design and we did not know how well these would support a large socio-technical or organizational project, such as enterprise or e-business architecture development. Therefore we decided to observe a real world project and concentrate on the requirements that e-business architecture development in its complex organizational context state on description languages and development methods. Next, we decided to compare the observed requirements to the support that UML and RUP offer, because they, together, form the current methodological basis for many systems development organizations. UML is the de-facto standard language in software and systems development and RUP (Jacobson, Booch, & Rumbaugh, 1999) is a widely known process model that claims to improve development process maturity (Kuntzmann & Kruchten, 2003). We believed that this kind of knowledge would benefit both practitioners in process improvement and developers of UML extensions.

Another interest was to find out what factors influenced the creation of e-business architecture: was it designed purposefully by software architects through rational decisions and trade-offs, or did it emerge through somewhat non-deliberate actions obliged by the situation and its constraints, conflicts, compromises, and political decisions? This is a very important issue, as unlike software architecture, e-business architecture is very tightly coupled with the business models of the company and thus the architecture has a far more direct impact on business than for example low-level system architecture. Furthermore, if the business models are not supported by the e-business architecture,

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