



Chapter XIII

Towards Construction of Business Components: An Approach to Development of Web-Based Application Systems

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ABSTRACT

Global competition among today's enterprises forces their business processes to evolve constantly, leading to changes in corresponding Web-based application systems. Most existing approaches that extend the traditional software engineering to develop Web-based application systems are based on object-oriented methods. Such methods emphasize modeling individual object behaviors instead of system behavior. This chapter proposes the Business Process-Based Methodology (BPBM) for developing such systems. It uses a business process as a unified conceptual framework for analyzing relationships

between a business process and associated business objects and for identifying business activities and designing object-oriented components called business components. We propose measures for coupling and cohesion measurement in order to ensure that these business components enable the potential reusability. These business components can more clearly represent semantic system behaviors than linkages of individual object behaviors. A change made to one business process impacts some encapsulated atomic components within the respective business component without affecting other parts of the system. A business component is divided into parts suitable for implementation of multitier Web-based application systems.

INTRODUCTION

The increasing competition caused by worldwide businesses forces the enterprise's strategies to evolve frequently. Whenever a strategy has been changed, the associated business processes must also be remodeled which in turn requires that the corresponding Web-based application systems also be re-implemented and installed quickly.

Web applications are software-intensive systems based on the typical three-tier Web application architecture, which should be centered on not only presentation modeling, but also business logic and business-state modeling (Conallen, 1999). Further, Frolund and Guerraoui (2002) described that "a typical application, distributed or not, usually includes elements that handle presentation, logic, and data" (p. 378). With this knowledge, a typical application can be modeled based on the well-known Model-View-Controller (MVC) architecture (Grasner & Pope, 1988). That is, centralized systems, client/server systems and multitier distributed systems including Web-based application systems can be modeled with respect to the MVC architecture, which make the presentation (i.e., View) component independent of the other components. Based on this aspect, a Web-based application system can be modeled into three component types corresponding to the Model, View and Controller components. Such components are modeling regardless of presentation components (e.g., browsers for Web-based systems or Windows for client/server or distributed systems), communication protocol (e.g., stateless (HTTP) for Web-based systems or stateful for the other) and data source types (e.g., relational/object-oriented database or XML document). In software-intensive Web-computing environment, the most important issue is how to model the primary element (i.e., Model) of a Web-based application system to be a rigorous and flexible enough in order to be adaptable according to such dynamic and global businesses. Moreover, the elements of the Model component should also be a seamless transformation to other components. Based on the notion of a Web-based system is a software-intensive system.

The expanding traditional software engineering is an alternative solution in modeling Web-based application systems.

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