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
time 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, distrib-
uted 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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