



Methodology Evaluation Framework for Component- Based System Development

Ajantha Dahanayake, Delft University of Technology, The Netherlands
Henk Sol, Delft University of Technology, The Netherlands
Zoran Stojanovic, Delft University of Technology, The Netherlands

ABSTRACT

Components are already prominent in the implementation and deployment of advanced distributed information systems. Part and parcel of this development are the effective Component Based Development (CBD) methodology encompassing methods, tools and techniques that effectively target the existing component based technology. Current CBD methodologies lack a comprehensive component-based concept structure. They handle components mainly at the implementation and deployment phases still, which are heavily influenced by UML notations. In this paper a presentation is made of an evaluation framework, which highlights the extent to which a methodology is component oriented. Current CBD methods and approaches do not provide full support for various component concepts. Therefore, a CBD method sample was evaluated using the framework's concepts and requirements. CBD method improvements are proposed based on the evaluation. The improved approach suggests the use of the standard RM-ODP as an underlying framework, to provide consistent, systematic, and integrated CBD methodology engineering support throughout the lifecycle.

Keywords: CBD, method, components, modeling, techniques, tools, method engineering

INTRODUCTION

Today, organizations are intensively looking for a way to make effective use of technology opportunities for conducting their business. They are constantly under pressure from ever-changing demands in business and technology. There are many impact factors responsible for the current state of an enterprise. The Internet is one

of the main factors contributing to the new "digital economy", for crossing the borders of organizations towards virtual enterprises. At the same time the need for tighter integration of various types of information inside an enterprise, such as financial, geographical, and multimedia data, and the need to establish complex enterprise information warehouses is rising. Last, but not least, there is the new technology of wireless

communication, providing unlimited mobility for users, information and applications. Combining this with geographical location-awareness allows e-business to generate a wealth of new opportunities.

The evolving demands in the business environment in turn demand immediate changes in the corresponding information and communication technology (ICT) solutions, and at the same time, new ICT opportunities must be rapidly adapted to the way of conducting business. The effective solutions for managing these complexity-adaptability parameters have been widely recognized as a crucial factor in the modern business world and have become an important differentiator among competing organizations.

These technology, business and organizational requirements have resulted in a growing interest in research communities and industry in component-based development (CBD) (Brown and Wallnau, 1998). CBD provides organizations with an approach to building scalable solutions that are flexible, manageable and able to accommodate ever-changing demands in a cost-effective and a timely manner (Butler Group, 1998). Using a CBD approach, the system development phases are reduced to selection, reconfiguration, adaptation, assembling and deployment of encapsulated system units called components. This eliminates the traditional approach of building a complete system from scratch.

So far CBD has been introduced through new technological solutions and distributed infrastructures such as Microsoft's Component Object Model (COM), Object Management Group's (OMG) Common Object Request Broker Architecture (CORBA) (Siegel, 2000), or Java-based tools (Java Beans). These standards have emerged to enable interoperability to be achieved in the het-

erogeneous world of the Internet. While the technology is a necessary element of any solution, it is not sufficient on its own. Methods, techniques and tools for developing component-oriented applications are of equal importance in targeting the technology at the final phase (Welke, 1994). Such development methods need to incorporate the component concept as an integral part of the whole system life cycle, from business requirements to implementation.

Therefore, the main objective of this paper is to identify the current methodological shortcomings of the CBD methods and to present a first cut of a methodology framework, for designing improved and proper CBD methods. For this reason the paper is organized as follows: first an account of the current state of the CBD methods and approaches is given, by describing and comparing the most prominent and well-documented CBD methods. Based on this analysis a framework for defining necessary characteristics and requirements for an advanced CBD methodology is defined, and the chosen method sample is evaluated accordingly. Finally, suggestions are made regarding how to improve the methodology towards comprehensive component-based systems development support.

THE CURRENT STATE OF CBD METHODS

CBD is not a completely new approach. Rather it has evolved from "divide-and-conquer" modularization ideas and concepts in systems development (Gartner Group, 1997; Szyperski, 1998). During the last few years, due to the rapid development of Internet technology and commercial applications, the CBD paradigm has been seen as the main strategic imperative for time-to-market quality solutions (Gartner

24 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/article/methodology-evaluation-framework-component-based/3288

Related Content

Efficient and Robust Node-Partitioned Data Warehouses

Pedro Furtado (2009). *Database Technologies: Concepts, Methodologies, Tools, and Applications* (pp. 658-677).

www.irma-international.org/chapter/efficient-robust-node-partitioned-data/7937

Fabric Database and Fuzzy Logic Models for Evaluating Fabric Performance

Yan Chen, Graham H. Rong and Jianhua Chen (2009). *Database Technologies: Concepts, Methodologies, Tools, and Applications* (pp. 2166-2191).

www.irma-international.org/chapter/fabric-database-fuzzy-logic-models/8029

The Cultural Foundation of Information Security Behavior: Developing a Cultural Fit Framework for Information Security Behavior Control

Canchu Lin, Anand S. Kunnathur and Long Li (2020). *Journal of Database Management* (pp. 21-41).

www.irma-international.org/article/the-cultural-foundation-of-information-security-behavior/249169

Accuracy in Modeling with Extended Entity Relationship and Object Oriented Data Models

Douglas B. Bock and Terence Ryan (1993). *Journal of Database Management* (pp. 30-39).

www.irma-international.org/article/accuracy-modeling-extended-entity-relationship/51126

Database Administration at the Crossroads: The Era of End-User-Oriented, Decentralized Data Processing

Mark L. Gillenson (1991). *Journal of Database Administration* (pp. 1-11).

www.irma-international.org/article/database-administration-crossroads/51094