Chapter 20
Generic Object Oriented Enterprise Modeling Approach Utilizing a Strategic Abstraction Mechanism

Islam Choudhury
Kingston University, Kingston-upon-Thames, UK.

Sergio de Cesare
Brunel University, Middlesex, U.K.

Emily Di Florido
Brunel University, Middlesex, U.K.

ABSTRACT

A Generic Object-Oriented Enterprise Modeling Process (GOOEMP) is a set of partially ordered steps intended to reach the objective of building a fully integrated, dynamic, object-oriented model of the enterprise. An abstraction mechanism is proposed to enable this process. The process is generic because it applies to most types of enterprises. Enterprise models are the products developed from the process and these can be used by various stakeholders in an organization to: a) give them an understanding of the enterprise; b) design integrated information systems; c) respond to business changes by evolving their enterprise models and information systems in a coordinated and coherent manner; and d) enable the enterprise models built within a particular industry to be reused and applied to many other industries.

INTRODUCTION

High level competition in a global market requires organizations to deliver high quality customized and short life span products and services at a low cost, low lead time, and provide full customer satisfaction at all times. This involves products and services being developed at a higher rate and in reduced time. Enterprises need to be agile, respond rapidly to changes and new ideas. This requires the enterprise to adopt an effective information systems strategy that maps the business needs accurately. The business processes, functions, data and systems must be fully understood, stored, made accessible,

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integrated and supported by a well designed information infrastructure. At present most of the information within an enterprise has been developed in a piecemeal manner. Information is stored in disorganized, disintegrated, incomplete company wide databases. Also the information models that were developed separated out the processes, functions, data, and systems. It is very difficult to access accurate and useful information as and when required quickly and efficiently. Computer-aided modeling of the enterprise is a powerful tool for analyzing business structures and the associated information infrastructures. Enterprise wide computer models represent the business structure, process, functions, classes, resources, strategy, token, flow and information of an enterprise and can be used to develop a suitable information systems infrastructure (Graefe & Chan, 1993; Hu, Harding, & Popplewell, 2000).

Enterprise models can be developed using object-orientation; a powerful concept that can be applied to almost all aspects of the lifecycle of a product from analysis, design, implementation and maintenance. The main benefit gained from using one paradigm throughout the lifecycle is that the difficulties of conceptual transformation from one level to other levels of the lifecycle are reduced. Object-orientation modeling constructs help in understanding, abstracting and representing different levels of knowledge within the enterprise and encapsulating that knowledge within object components. Componentizing the enterprise helps to: a) reduce and mange the complexity within an enterprise; b), provides better understanding of the enterprise; c) helps to develop and represent an enterprise in a model; and d) help in integration, reuse and evolution of the enterprise model. The authors have developed an object-oriented enterprise modeling process by synthesizing, adapting and enhancing previous work in enterprise modeling.

There have been a variety of research approaches, methodologies, and frameworks and modeling approaches in enterprise and business modeling including the following:

- The Information Engineering (IE) approach developed by Martin (1989);
- The Enterprise Integration methodologies and Enterprise Architectures and Reference Models, developed by various researchers such as 'PERA' (Barber, Dewhurst, Burns, & Rogers, 2003; Hu et al., 2000; Vallespir, Chen, Zanettin.M., & Doumeingts, 1991), 'GRAI integrated methodologies' (Williams, 1993 and Chen et al 1997), 'CIM-OSA' (Barber et al., 2003; Dewhurst, Barber, & Pritchard, 2002; Kim, Weston, & Woo, 2001; Vernadat, 1992), 'TOVE' (Fox, 1992), and 'Component-oriented methodologies' (Dogru, 2005; Stojanovic, Dahanayake, & Sol, 2005); A summary of various enterprise integration reference architectures can be found in Chalmeta et al. (2001) and Bernus et al (2003);
- Generic enterprise architectures, frameworks, methodologies and modeling approaches, such as the 'Generic Reusable Business Object Modelling' (Choudhury, Sun, & Patel, 1997; Choudhury 1999; Papazoglou & Van den Heuvel, 2000; Versteeg & Bouwman, 2006), the 'Generic Enterprise Reference Architecture and Methodology' (Bernus & Nemes, 1996) and 'Information Systems Architecture' (Zachman, 1987); Enterprise architecture at work: modelling, communication, and analysis (Lankhorst 2005)
- Object-oriented business engineering and enterprise modeling such as 'Reengineering with Object Technology' (Jacobson, Ericson, & Jacobson, 1995), 'Business Engineering with Object Technology' (Taylor, 1995), 'Object Oriented Business Engineering' (Shelton, 1994), Object Oriented Enterprise Modeling' (Gale & Eldred, 1996), Object Oriented Principles