

# Chapter 3.9

## Information Systems Architecture for Business Process Modeling

**Michel Spadoni**

*Ecole Nationale d'Ingénieurs de Metz and Laboratory for Industrial and Mechanical Engineering,  
France*

**Anis Abdmouleh**

*Metz University & Laboratory for Industrial and Mechanical Engineering, France*

### ABSTRACT

The purpose of this chapter is to present our contribution in business process modeling within the CAS (CIMOSA Application Server) project. In this project, a referential, which helps enterprises to model their internal or collaborative activities within an enterprise chain (i.e., extended enterprise) is proposed. The referential is supported by a meta-model, which consists of a process modeling concept and a methodology as a user modeling guide. Enterprise activities modeling is based on a business process approach CIMOSA-based and that we define into an enterprise system. In this manuscript, the implementation of the referential is detailed within an information system by a component approach and a framework, which integrates the modeling methodology. The referential components are developed with .NET Microsoft technology.

### INTRODUCTION

The enterprise concept refers to a set of activities implemented by some resources to reach a purpose through one or more objectives. Manufacture, contractor, training, or research enterprises can be mentioned.

Nowadays, many enterprises realize that it is not enough to be efficient to stay in business. Indeed, due to fierce competition, customer demands are so diverse and the actors involved in the production supply chains are so numerous that any enterprise is facing a highly interdependent situation with its partners. This is the reason why the challenge is no more productivity of the enterprise itself but productivity of the entire supply chain. Consequently, enterprise modeling, a key step in enterprise engineering, should no more be limited to the scope of a single enterprise but must encompass the entire enterprise network

(be it a supply chain, an extended enterprise or a virtual enterprise) to cope with the entire system implications.

A major outcome of enterprise modeling is to provide some form of knowledge capitalization about a single or networked enterprise as a result of producing descriptive and behavioral models. Indeed, these models can represent essential aspects of an enterprise (especially concerning its objectives, structure, functionality, and behavior) in a form that can be understood by many business users and can be shared and exploited by various tools (as numeric models).

The enterprise knowledge core is materialized by the representation of business processes, which have a direct impact on enterprise results, long-term sustainability, and customer satisfaction. It is therefore essential to precisely model business processes and related entities, which have an impact in their design (engineering phase) and their execution (operational phase).

Following an analysis of the major enterprise modeling approaches such as IDEF, GRAI, CIMOSA, PERA, GERAM, ARIS, Olympios, or ACNOS (Bernus, Nems, & Williams, 1996; Vernadat, 1996), prime attention was given to business process centric methods. Among these, CIMOSA (Esprit, 1993) was the very first to propose the concept of system modeling and control based on business processes and not only on activities as it was previously the case in, for instance, GRAI (Doumeingts, Vallespir, & Chen, 1993) and IDEF (Menzel & Mayer, 1999).

The chapter focuses on CAS (CIMOSA Applications Server) project (Abdmouleh, 2004b). In fact, the CIMOSA aspects, which interest the project are presented. In addition, the referential meta-model and components are detailed.

## **PROBLEM**

To be more competitive, enterprises improve their productivity by integrating different technologies

in their information system, such as ERP (enterprise resource planning).

However, large enterprises suffer from their important existing applicative park, which is costly to evolve. On the other hand, small enterprises could not provide the required resources to implement an information system.

In this context, it is necessary to move the database application toward client/server architectures or Web services (Tomas, 1999). This approach is particularly based on information, reuse (Ezran, Moriso, & Tully, 1999), integration, and interoperability (Dogac, Kalinichenko, Ozsu, & Sheth, 1998; Vckouski, 1998), which are crucial to externalize processes. Many projects are released, especially, on interoperability. Among them, ATHENA (<http://www.athena-ip.org>), UEMML (<http://www.ueml.org>), and INTEROP-NoE project (interoperability research for networked enterprises applications and software).

Consequently, two essential issues are studied:

- Managing enterprise information, which is related to processes. So, implementing an opportunist information system is necessary.
- Externalizing the process modeling into extended enterprises and defining activities within individual enterprise.

Before going further, let us define the process concept. Indeed, several definitions (Afnor, 1992; Bernus et al., 1996; Esprit, 1993; Mathieu, 2000) exist, but they remain general. The definition used in CAS project is as follows: “a process is a sequence of correlated activities. A process transforms input objects into ones output by means of required resources to achieve objectives.”

## **THE CAS PROJECT**

The principal motivation of the CAS project is to implement an information system useful for

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