

# Chapter IV

## Enterprise Architecture Framework for Agile and Interoperable Virtual Enterprises

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### **ABSTRACT**

*Virtual enterprise (VE) has become a prime candidate to survive under the increasingly turbulent and competitive business environment. In order to quickly respond to the rapidly changing business environment, the agility and interoperability are regarded as the core requirements for the VEs. Unfortunately, there is no previous approach to fully support configurations of the agile and interoperable VE. The systematic modeling framework based on the meta-model driven approach could be used for business domain experts and developers to construct VE models quickly and systematically with insights. It should be noted that this chapter aims to present a systematic modeling framework itself, not to generate only instances of VE models. Based on the proposed framework, business domain experts and developers would configure all of VE models such as VE architectures, modeling languages, model transformations, and deployment models, as well as instances of VE models.*

## INTRODUCTION

Today, enterprises are facing a rapidly changing business environment and can no longer make predictable long-term provisions. Moreover, business competition is no longer enterprise to enterprise, but value chain to value chain (Cadence Design Systems, 2003). In order to respond to these business environments, most competitive enterprises seek to enhance competitive performance by closely integrating internal operations and effectively linking them with the external operations of suppliers, customers, and other business partners. As each enterprise operates as a node in the network composed of suppliers, customers, engineers, and other specialized service providers, collaborations among multiple business partners are becoming important (Barnett, Presley, & Liles, 1994; Camarinha-Matos & Af-sarmanesh, 2003; Jagdev & Thoben, 2001). The virtual enterprise (VE), which is a collaborative network across the value chains, has become a key factor to survive under the competitive business environment. For efficient collaborations among the business partners of the VE, the agility and interoperability among heterogeneous enterprise models in different business domains of interests is required. The agility is the capability to flexibly adapt enterprise models of VE in order to cope with unanticipated business environments. The interoperability means seamless communications among enterprise models, which can be shared and exchanged. To guarantee the agility and the interoperability, participants of the VE must understand each other through EA of participant enterprise. The EA mean business components and their relationships that are required for business activities. Business components are things such as application, data, technology, and business architecture that require enterprise business. Hence, EA of VE describes business components and their relationship that are required by business partners.

In order to establish and manage an agile and interoperable VE, it is keenly necessary to develop a systematic methodology for configuration of a VE based on the collaborative business processes. It should be noted that the configuration of a VE in this chapter means not only the designing instances of VE models, but also the designing VE architecture, modeling languages, and deployed models.

The goal of this chapter is to introduce a new systematic modeling framework that can be used for designing and managing the agile and interoperable VEs. The systematic modeling framework has a hybrid approach that harmonizes the up-to-date technologies such as enterprise architecture (EA), model driven architecture (MDA), meta-modeling approach, domain specific methodology (DSM), model transformation, framework-based development, and so on. It combines the advantages of the heterogeneous technologies so that it can produce integrated synergy effects, as well as it can take individual advantages of each technology. This proposed modeling framework provides modeling concepts that underpin the representation of all of the VE from different viewpoints, at different levels of granularity, generality, and abstraction during different life cycle of a VE. It would be used systematically by business domain experts and developers who want to design and manage a VE quickly and effectively.

*The rest of this chapter is organized as follows. Requirements of VE to Support the Agility and Interoperability Section, describes the requirements of the VE to support the agility and interoperability. Literature Review Section, reviews the related researches. In Systematic Modeling Framework for the Agile and Interoperable VE Section, we introduce our systematic modeling framework for the agile and interoperable VEs. Finally, Discussion and Conclusion Section, provides some conclusions and gives some suggestions for future work.*

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