Chapter 9

Modelling, Simulation, and Analysis for Enterprise Architecture

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ABSTRACT

Modern organizations need to address increasingly complex challenges including how to represent and maintain their business goals using technologies and IT platforms that change on a regular basis. This has led to the development of modelling notations for expressing various aspects of an organization with a view to reducing complexity, increasing technology independence, and supporting analysis. Many of these Enterprise Architecture (EA) modelling notations provide a large number of concepts that support the business analysis but lack precise definitions necessary to perform computer-supported organizational analysis. This chapter reviews the current EA modelling landscape and proposes a simple language for the practical support of EA simulation including business alignment in terms of executing a collection of goals against prototype execution.

INTRODUCTION

Business and IT alignment has remained an ongoing concern for organizations since the 1980s (Luftman, 2000). Throughout this period, researchers have addressed the importance of alignment and in particular the need for congruence between business strategy and IT strategy (Chan & Reich, 2007). While there are multiple definitions for business and IT alignment (BIA) including integration, linkage, bridge, fusion or even fit, most are consistent with the definition derived from the Strategic Alignment Model (SAM) (Henderson & Venkatraman, 1993). They state...
that alignment is the degree of fit and integration among business strategy, IT strategy, business infrastructure, and IT infrastructure.

Enterprise Architecture (EA) aims to capture the essentials of a business, its IT and its evolution, and to support analysis of this information: it is a coherent whole of principles, methods, and models that are used in the design and realization of an enterprise’s organizational structure, business processes, information systems and infrastructure. (Lankhorst, 2009). In addition to presenting a coherent explanation of the what, why and how of a business, EA aims to support specific types of business analysis including: alignment between business functions and IT systems, and business change describing the current state of a business (as-is) and a desired state of a business (to-be). Thus EA has the potential to serve as the basis of machinery that can be used to address BIA (Wang, Zhou & Jiang, 2008; Pereira & Sousa, 2005).

Alignment occurs in the context of an organization and it is relevant to explore the notion of an organization to better understand this context. Ours is an organizational society such that organizations are the dominant characteristic of modern societies. One rationale for the existence of organizations posited by Carley and Gasser is that they exist to overcome the cognitive, physical, temporal and institutional limitations of individual (Carley and Gasser, 1999). While there are many ways in which these limitations can be overcome and the structure, form or architecture of an organization contributes to such efforts, decades of research indicate that there is no optimal organizational design. Instead, the challenge morphs into one of adaptability and response to change. First we present here a necessarily brief overview of some of the key definitions and perspectives on organizations that underpin how we intend to articulate the concept of an organization in the context of the model driven enterprise. We first begin with a definition of the term organization recognizing that there are multiple definitions depending upon the perspective taken. The definition is reported from (Parsons, 1960).

**Organizations are social units (or human groupings) deliberately constructed and reconstructed to seek specific goals.**

We explore this definition further by considering how the study of organizations has generally investigated the constituent elements of an organization and three dominant theoretical perspectives informing research. Leavitt identifies some core features of organizations (Leavitt, 1964):

- **Social**: Structure: regularized aspects of relationships among participants in an organization that may be both normative (embodying what ought to be) or factual order (actual structures).
- **Participants**: Individuals who in return for a variety of inducements make contributions to the organization. Participants may belong to more than one organization.
- **Goals**: An organizational goal is a desired state of affairs that the organization attempts to realize. Goals are central to how an organization functions and are often vague or very specific.
- **Technology**: This is the means by which work is performed in an organization. Technology can be interpreted as a manufacturing plant, the software systems enabling workers to perform work or even technical knowledge and skills of participants.
- **Environment**: Organizations exist in a specific physical, socio-technical and cultural environment to which they must respond and adapt. All aspects of an organization is influenced and contextualized by the environment. For example, software