

Chapter 4

Ontology Construction: Representing Dietz “Process” and “State” Models Using BPMN Diagrams

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ABSTRACT

Capturing knowledge has always been an objective although known to be costly and time consuming. ontologies, being “an explicit specification of a conceptualization,” have tried to capture knowledge within the aspects of concepts (used to represent a domain entity), relations (representing a interaction between the domain concepts), functions (a special case of relations), axioms (which represent true statements) and instances (used to represent domain elements). The Enterprise Ontology, which represents the work on ontologies applied to the enterprise, as proposed initially by Gruber, can be seen as a collection of terms and definitions relevant to business enterprises that can be used as a basis for decision making. A new concept of Enterprise Ontology proposed by Dietz is defined as the realization and implementation essence of an enterprise proposing a distinction world ontology and system ontology. The sequence of actions, according to Dietz can be classified as “datalogical”, “infological” and “ontological” and all become under a Transaction Pattern which consists of four basic states: “request”, “promise”, “state” and “accept”. Further more the author defines four models that can be used to verify the consistency of the actions: “Process”, “Action”, “State” and “Construction” models. The traditional way to model processes, like the BPMN, draw events, activities and data in a sequence of symbols that may not represent completely all the actions in presence and, above all, does not detect and identify consistency between actors and actions. However, BPMN diagrams can also be used to represent various actions and models proposed by Dietz as the transaction, “Process” and “State” diagrams. Both ways of representing have advantages and disadvantages and can be used, either isolated or together to give a deep representation of reality.

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INTRODUCTION

Ontologies have been used to capture knowledge and representing domains of interest. Since the first works, around 1990, ontologies have evolved significantly and they are used, in the present time, within a broader scope.

As the first ontologies consisted of practical examples defining syntax and semantics about a domain, today they have many formal definitions, each having advantages and disadvantages, and can define concepts, relations, functions, axioms or instances of the domain elements.

The Enterprise Ontology is a collection of terms and definitions relevant to business enterprises modeling and provides a formal way to define a particular domain: the enterprise trying to scope together some of the key organizational elements like goals, work processes, authority, positions and communication. More recently, some authors proposed a framework for modeling organizations.

Thus, the Enterprise Ontology presents several sections: Meta Ontology and Time, Activity, Plan, Capability, and Resource, Organization, Strategy and Marketing and associated concepts and relations between them. The TOVE model considers an organization to be a set of constraints on the activities performed by agents and has the objectives to produce and develop the organizational object taxonomy.

Although ontologies serve several purposes they do not identify lack of coherence between actions of a domain.

Dietz Enterprise Ontology, objectively proposes a methodology and a set of models to represent and analyze consistency of actions in a given process, while identifying three types of human abilities: “performa” (performer acts), “informa” (expressing acts) and “forma” (datalogical acts).

Dietz Transaction Pattern defines four states: “request”, “promise”, “state” and “accept”. The existence of the four states should be considered as a universal need for every transaction. Further more, to detail exhaustively the several actions

a set of four models, with their exclusive way of representation, “Process”, “Action”, “State” and “Construction” are defined by the author, who then demonstrates using the Volley example.

Although it seems that the Transaction Pattern is a convenient and universal method to state identifying the four models could be represented in an existing language, like the BPMN.

Using the Portuguese Air Force Mission Request Process, more complex than the Volley, the authors intend to assert that Dietz’s Transaction Pattern also applies and demonstrate that two models, “Process” and “State”, can be represented using BPMN.

Speaking of the Enterprise Ontology implies revisiting the concept of ontologies, in paragraph “ONTOLOGIES”, and the particular case of the Enterprise Ontology (paragraph “ENTERPRISE ONTOLOGY”). Paragraph “DIETZ ENTERPRISE ONTOLOGY” introduces Dietz Enterprise Ontology and presents the concepts behind: the Transaction Pattern and the “Process”, “Action”, “State” and “Construction” models applied to the *Volley* case study. Paragraph “THE PORTUGUESE AIR FORCE MISSION REQUEST PROCESS” discusses the Mission Request Process and the application of the Transaction Pattern in its analysis and its “Process” and “State” representation using BPMN.

BACKGROUND

Capturing knowledge has always been an objective although known to be costly and time consuming (Neches et al., 1991). Additionally, acquiring and representing the knowledge in a successful way, for a particular domain, does not mean that the captured knowledge can be reused in a new system (Swartout et al., 1994).

The work on the ontologies field goes back to the beginning of 1990. From those early years, ontology-building methodologies have evolved, and several have been proposed in order to achieve

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