Ontology-Driven Re-engineering of Business Systems

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Abstract. The aim of the tutorial is to provide a practical introduction for researchers and practitioners to the BORO methodology, an ontology-based systems re-engineering and modernisation approach. At the core of the methodology is the BORO Foundation. The tutorial will firstly introduce the foundation and then the methodology. It will start with a series of worked examples that explain the philosophical principles underlying the foundation. These will then be developed in further business based worked examples to illustrate how the methodology works and how the philosophical principles drive the methodology and analysis. The examples will showcase how the use of BORO promotes flexibility and reuse of the re-engineered models.

Keywords: Ontology-driven re-engineering, BORO, foundational ontology, perdurantism, extensionalism, business systems.

1 Introduction

The aim of the tutorial is to provide a practical introduction to the BORO methodology for researchers and practitioners, giving them a feel for how the methodology can be applied and the benefits it brings. This will involve exploring the methodology's philosophical foundation; however, looking at alternative foundations, the approaches these lead to and the relative benefits these bring is out of scope.

BORO is a systems and data re-engineering methodology developed by Partridge [1], which has been successfully deployed in various industrial sectors including finance, oil and gas, and defence. BORO comprises of a foundational ontology, bearing the same name, and it is strongly rooted in Philosophical ontology. BORO influenced the ISO 15926 standard [2] and inspired the upper level ontology of the International Defence Enterprise Architecture Specification for exchange Group [3], adopted by the U.S. Department of Defense Architecture Framework (DoDAF).

Philosophically the BORO Foundation adopts the following metaphysical choices: (1) a realist stance towards ontology, that is it takes for granted a mind-independent real world; (2) a revisionary stance – accepting that if we want better models, we need to change the ways we look at the world; (3) completeness categories based upon ex-

tensional criteria of identity and (4) a 4D and possible worlds approach as these fit best with its commitment to extensionalism [4].

Consequently BORO is strongly grounded in physical reality and the models produced map directly to real world objects in a one-to-one manner. This becomes apparent once perdurantism (or 4D) is well understood [5]. From a perdurantist perspective all individual objects (also known as elements or bodies) exist because they have a 4-dimensional spatiotemporal extension (or extent). This extent defines an element's identity. As a consequence an individual object is never fully present at any given instant, but only partially present. In its lifetime an object goes through states (or stages). For example, a person goes through the stages of childhood and adulthood. In perdurantism change is therefore explained via successive temporal parts. The tutorial will demonstrate how perdurantism and extensionalism together allow the ontologist to produce more flexible and reusable models of real world domains.

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