The Essential Project: Harnessing Conceptual Structures to Expose Organizational Dynamics

Alex Mayall, Enterprise Architecture Solutions Ltd., London, UK
Jonathan Carter, Enterprise Architecture Solutions Ltd., London, UK

ABSTRACT

Conceptual Structures (CS) have the ambitious aim of integrating the creativity of individuals and organizations with the productivity of computers to address business problems more effectively. Unfortunately, in terms of the progress and impact of CS, the practice appears to lag far behind the theory. A major reason is the inadequacy of the enterprise architecture tools that might be used to support CS. This paper introduces the Essential Project, a ten-year development program that has produced an open source enterprise architecture support toolkit with a comprehensive metamodel. In common with other enterprise architecture management suites, Essential enables users to define and describe their enterprise in terms of its current and future states. A new version, the Essential Intelligence Platform, supports inference-based analysis of the stored information and other capabilities that offer realistic support for the conceptual structures of an enterprise. This platform also serves as the launch pad for a range of business services designed to address common business problems.

Keywords: Conceptual Structures, Enterprise Architecture, Knowledge Base, Metamodel, Open Source, Rule-Based Inferences, Semantic Modeling

INTRODUCTION

According to Sheffield Hallam University Conceptual Structures Research Group (CSRG), “Conceptual Structures (CS) recognise that organizations work with concepts; machines like structures. CS advances the theory and practice in connecting the user’s conceptual approach to problem solving with the formal structures that computer applications need to bring their productivity to bear in solving these problems.” (Sheffield Hallam University CSRG, 2015) In other words, CS aims to combine the traditional, mechanistic problem-solving approaches of the computer scientist with the behavioral approaches of the industrial psychologist. The CSRG states that CS builds on a wide range of theories and practices such as Formal Concept Analysis, Description Logics, the Semantic Web, the Pragmatic Web, Ontologies, Multi-agent Systems, and Concept Mapping, as well as modern technology developments in such fields as artificial intelligence, business intelligence, computational linguistics, conceptual modelling, information...
and web technologies, user modelling, and knowledge management. The CSRG’s claim is that “CS allows enterprises to share meaning with its interconnected computing resources, and realise transactions that would otherwise remain as lost business opportunities.”

Again, according to the CRSG, “Conceptual Structures as smart applications integrate the creativity of individuals and organizations with the productivity of computers for a meaningful digital future.” The theory underpinning this ambitious assertion appears to be both convincing and well developed; unfortunately, in terms of its progress and impact, the practice lags far behind the theory. If this were not the case, CS would surely be widely recognized as a standard way of addressing major business problems.

If CS is indeed such a powerful set of capabilities, what is impeding its widespread practical application? Two fundamental requirements are first, the need to capture and integrate the different strands of information that define and describe the various structural elements of a business enterprise, as well as their complex interrelationships, and second, ways of presenting the results for analysis and decision support purposes.

These basic requirements should already be addressed by the concepts and practices of enterprise architecture (EA). The Open Group, which is the preeminent international body in the field of EA, defines an “enterprise” as being “any collection of organizations that has a common set of goals and/or a single bottom line. In that sense, an enterprise can be a government agency, a whole corporation, a division of a corporation, a single department, or a chain of geographically distant organizations linked together by common ownership.” (The Open Group, 2006). That same body provides a definition of an enterprise architecture as being “The structure of components, their inter-relationships, and the principles and guidelines governing their design and evolution over time.” Supporting this, are the wide range of EA frameworks and software suites that are available on the market today. In practice, however, these fall short of meeting the demanding requirements of CS.

One of the best-established and most comprehensive EA frameworks was developed many years ago by John Zachman, a world-renowned authority in the field. Zachman has described the EA discipline as “the cornerstone for containing enterprise frustration and leveraging technology innovations to fulfill the expectations of a viable and dynamic Information Age Enterprise”. (Zachman, 1996). He claims that this ‘enterprise frustration’ often manifests itself at times of organizational change; yet, as he correctly points out, “there is no way to change Boeing 747s quickly (or safely) without starting with the product description”. Using a range of similar analogies, including buildings, automobiles, computers and battleships, he argues for the need for ‘engineering descriptions’ of the architectural components of an enterprise in order to provide a sound basis for launching change initiatives. The problem with such mechanistic views of the enterprise, however, is that they underplay the human factors. In contrast, conceptual structures also acknowledge and embrace the influence of cultural norms, social dynamics and personal agendas on the shape and direction of an enterprise, and it is this wider context that any solution needs to address.

Allied with this issue are the observations over many years by the authors, both during their careers in industry and in their management consulting work, that EA has always been predominantly IT-focused. This view is endorsed by James Lapalme of the University of Montreal in an article that summarizes some of his research into EA positioning. (Lapalme, 2012). Lapalme has identified three schools of thought in respect of enterprise architecture: EA as the “glue” between business and IT; EA as the link between strategy and execution; and EA as the means for organizational innovation and sustainability. He believes that the first school, which focuses on enabling the enterprise strategy by supporting IT planning and reducing costs, essentially applies a reductionist or mechanistic stance. He further observes that current EA practices,
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