Modularising the Complex Meta-Models in Enterprise Systems Using Conceptual Structures

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Abstract

The development of meta-models in Enterprise Modelling, Enterprise Engineering, and Enterprise Architecture enables an enterprise to add value and meet its obligations to its stakeholders. This value is however undermined by the complexity in the meta-models which have become difficult to visualise thus deterring the human-driven process. These experiences have driven the development of layers and levels in the modular meta-model. Conceptual Structures (CS), described as “Information Processing in Mind and Machine”, align the way computers work with how humans think. Using the Enterprise Information Meta-model Architecture (EIMA) as an exemplar, two forms of CS known as Conceptual Graphs (CGs) and Formal Concept Analysis (FCA) are brought together through the CGtoFCA algorithm, thereby mathematically evaluating the effectiveness of the layers and levels in these meta-models. The work reveals the useful contribution that this approach brings in actualising the modularising of complex meta-models in enterprise systems using conceptual structures.

Layers And Levels In Enterprise Meta-Models

To rebalance human creativity with computational execution, meta-models have been broken down into components then coupled together by interfaces analogous to the software engineering principles found in object-oriented design. Like programming-in-the-large, this approach has enabled ‘metamodelling-in-the-large’ (Zivkovic and Karagiannis, 2015). In Enterprise Architecture, the meta-models have been modularised into layers and levels that collectively describe how a business works. A study describes the benefits of this approach (Bork, 2015). The outcome is a matrix structure that is superficially akin to the grid originally pictured by Zachman, the ‘father of enterprise architecture’ (Zachman, 1987; Sow& Zachman, 1992).

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