

# Model-Based Construction of Enterprise Architecture Knowledge Graphs (Extended Abstract)

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## Abstract

In this extended abstract, we report on a method for the model-based construction of Enterprise Architecture Knowledge Graphs (EAKG) and its tool support by means of a Archi toolkit plugin. We briefly elaborate on the need for such an approach and tooling, and show, how an EAKG can be constructed by initially transforming an EA model into a graph structure that is subsequently enriched by EA-specific, graph characteristics-specific, and EA Smell-specific knowledge.

## Keywords

Enterprise Architecture, Knowledge Graph, Modeling Tool, ArchiMate, Archi

## Model-based EA Knowledge Graph Construction

The transformation of information systems triggered enterprises to adopt enterprise architecture (EA) as a means to manage the complexity and evolution of the enterprise. EA enables comprehensive management and decision-making based on the models of the organization and therefore, EA models need to be analyzed efficiently. Such EA analysis involves querying models to evaluate various properties. However, holistic EA models grow in size and complexity, thereby hampering manual human analysis, while advanced and automated analysis of EA models is so far underrepresented in EA research and tooling [1].

EA modeling tools offer different features based on the supported EA approach and the analytical capabilities provided and thus restrict the kind of analysis they support [2]. The need for proper tool support was pointed out in the past [3]. EA modeling tools do not take full advantage of the several structural properties of EA models represented as graphs, such as the differentiation of relations between elements, the discovery of paths, clusters, or graph metrics. Current approaches are often tied to a concrete EA approach, offering a limited set of visualization techniques. Moreover, current works that apply graph-based formalism merely constrain the explicit knowledge encoded by the EA model (i.e., no further knowledge enrichment) and basic model analysis (i.e., no KG reasoning). Knowledge Graphs (KG) represent interlinked descriptions of entities – objects, events, and concepts that can

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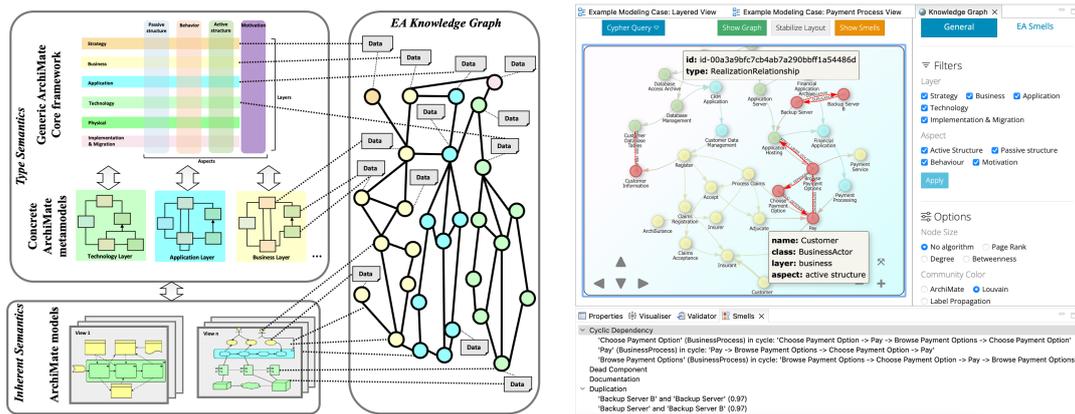
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**Figure 1:** Model-based EAKG Creation, enrichment and deployment

organize and represent knowledge to ease advanced reasoning (e.g., rule-based and machine learning-based) and provide question-answering, recommendation, and information retrieval solutions. Therefore, we provide a knowledge graph-based generic EA analysis tool to utilize the full potential of graph-based representation of EA models.

In the full paper [4], we propose the model-based construction and enrichment of EAKGs to exploit the benefits of KG-based representation and reasoning in EA. The model-based construction involves three phases. Initially, knowledge is extracted and created from the EA models in the KG Creation phase. Then the knowledge is enriched, and additional inferences are made using that knowledge in the KG Enrichment phase. Fig. 1 visualizes the knowledge creation phase (left) and the Archi plugin we developed (right) (cf.[5]) where the EAKG is used to identify and visualize EA Smells [6].

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