Poster: Evaluating Project Compliance during EA Planning

A model-based semi automatic method for Enterprise Architecture Planning

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ABSTRACT

New business and technology demands as well as Merger & Acquisitions force organizations to adapt their business models and IT infrastructure in order to stay competitive. Ensuring the compliance of new projects with the current goals and principles is an essential task. The discipline of Enterprise Architecture Planning provides methods for the structured development of the business and IT of an organization. The established models of the current and target architecture are used to provide the respective information for decision making at a sufficient aggregation level. We propose a model-based and tool-supported method for EA planning and in specific for the evaluation of project compliance. We utilize gap and impact analysis to ensure change consistency as well as view generation and metric calculation for evaluation purposes. The analyses are executed within a generic analysis architecture execution environment (A2E), that supports the customization of the analyses as well as different EA meta models. The method and the proposed analyses are evaluated within a case study from a medium-sized software product company.

CCS CONCEPTS

• **Applied computing → Enterprise architecture management**; **Business-IT alignment**; *Enterprise modeling*;

KEYWORDS

Architecture Analysis, Architecture Evaluation, Enterprise Architecture, Enterprise Architecture Planning

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1 INTRODUCTION

Digital transformation and cloud computing are recent innovations that force organizations to adapt their business models and restructure their IT infrastructure in order to stay competitive. Enterprise Architecture Management (EAM) has been proposed as a way to manage organizational changes and to reduce the risk of enterprise transformations [10]. It provides a documentation of the relationships between the business and IT as well as structured procedures for transformation planning. Thereby the phenomena of a moving target is a known challenge [3, 9]. Upcoming demands have to be evaluated and integrated into the current strategy, i.e. to plan and execute them in an EA compliant way [1, 5, 9].

In current practice the proposed methods for EA planning (EAP) from literature are not widely adapted. Often because of insufficient data quality but also because practical approaches, especially for comparisons, are missing [10]. We analyze current EAP processes and derive common steps and method blocks. Based on these results we identify automation potential within the method blocks and develop a semi-automated method for project proposal evaluation with respect to EA compliance.

2 SEMI-AUTOMATED PROJECT PROPOSAL EVALUATION METHOD

We identified seven common method blocks in current EAP literature. Nearly all mention the evaluation of cost, risk, metric and performance (e.g. [3, 7, 9, 10]). The development of different scenarios or alternatives (e.g. [3, 9, 10]) is commonly used as well as the concept of domain architectures (e.g. [5, 10]). Further steps in current EAP processes are the evaluation of compliance according to principles and goals (e.g. [1, 6, 9]), the evaluation of gaps (e.g. [7, 9, 10]), the evaluation using different views or abstractions [7, 9, 10] and the evaluation of the impact [7].

Based on these method blocks we developed tool-supported analyses and combine them to our method for project proposal evaluation. To ensure the practicability of the evaluation method, it should be adaptable to individual needs as well as combinable with existing processes and EA models. The data foundation for the analyses is provided through utilizing established architecture models. The employed Architecture Analysis Execution Environment (A2E) provides support for generic analysis definitions as well as customization of the analyses to the specific needs of the stakeholders. Analyses are defined within the A2E using a domain specific language. To enhance the applicability in different EAs the model is stored utilizing a generic meta model that represents the architecture as a stereotyped graph. The A2E and the utilized analyses are results of previous work [4, 8]. For analysis execution A2E converts the analysis definitions into executable constructs. Structural requests are converted into SPARQL queries, a graph-based query language for RDF data. Behavioral requests and recursive definitions are evaluated using Data-flow Analysis (DFA). DFA is a method to compute context-sensitive information based on declarative specifications [11]. The combination of those techniques provides us an analysis execution environment that supports different meta models, incomplete EA models as well as covers most of the analysis types applied in the EA context [8].

Preliminary for our method, the goals and principles for the enterprise architecture have to be defined and the current architecture is documented and up-to-date. For each project proposal or alternative the proposed evaluation process will be executed and finally the results can be compared to each other. If the evaluation results are not promising, the proposal(s) can be rejected or improved based on the evaluation results. Our compliance evaluation process consists of the following three steps:

Determination of the relevant domain architecture: In a first step, the dependencies between the current EA and the project proposal are determined with the gap analysis [4]. This analysis identifies three sets: elements only in the current, elements only in the target and elements that are in both architectures. Based on the result, the relevant domain architecture can be calculated with a scope analysis [8]. Thereby an element of the current architecture is included in the domain architecture, if it is affected or deleted in the proposal or if it has a relationship to an affected, newly introduced or deleted element. The domain architecture narrows the scope [10], so that the architect must only handle the relevant part of the architecture.

Integrate proposal into the domain architecture: In this step the changes made by the project are integrated and validated. Therefore, the to-be domain architecture is generated using the as-is domain architecture, the proposal itself and the gap analysis result. The change consistency, i.e. if all direct and indirect effects of the proposed changes are considered, can be verified afterwards through an approximation of the change effects using an impact analysis [8]. This step ensures the creation of a consistent to-be domain architecture that is used for evaluation in the next step.

Evaluate the to-be architecture: Finally, the to-be architecture is evaluated to ensure the EA compliance of the project and to evaluate its fitness with the architecture strategy. We propose viewpoint generation and metric calculation to support the architect in this task. Viewpoints can be used to either concentrate on the details of an aspect or the coherence between elements. A specialist uses specific views to assess the quality of the design and provide feedback and improvements. Custom viewpoints can be defined within the A2F by the architect and are generated using the scope analysis [8]. Metrics are used to quantify goals and determine their achievement as well as to quantify benefits, risks and costs. Within the A2E we provide the possibility to define individual ones as well as propose predefined templates. For metric definition, the common mathematical arithmetic operations are provided [8].

3 EVALUATION AND CONCLUSION

We applied our approach within a case study in a medium-sized software product company. The company wants to shift its product provisioning model to a Software-as-a-Service (SaaS) model. This transformation is divided into three main activities, which result in three different project proposals. The generated domain architectures covered the relevant part of the architecture, although it was not identical with the manual created model. The generation of the relevant domain architecture and of specific views eases the quality assessment of the proposal compared to the manual proceeding beforehand.

Comparing our method with the requirements for EAP in [2, 10], we cover most of them including an analysis and comparison of the current and target architecture, support for different scenarios, considering successor relationships between current and target as well as considering specific requirements from stakeholders. Weaknesses of our approach are a missing support for life-cycles, for the derivation of project activities, and for transformation paths. Additionally, our approach is dependent from the data quality and the completeness of the EA model.

Since current EAP methods lack the acceptance in practice [10] we focused on the applicability of our method. Therefore, we developed tool-supported analyses for the single evaluation steps. The utilized analysis execution environment A2E provides a single point of access for all the different analysis types. The definition of generic analysis templates eases the execution of the proposed method. The universality of A2E enables an easy adaption to different EA models as well as provides the functionality to extend the analyses according to specific needs from stakeholders. All required analyses for our method are defined as generic templates within the A2F. When applying the method, these templates can be re-used as well as it is possible to further refine or extend them according to specific needs. The A2E and the single analyses are evaluated itself in previous work.

Currently we are applying the method in another use case. In future work, we want to address the current weaknesses and e.g. include support for life cycles. We also consider the integration of subsequent steps like deriving project activities.

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