

# Assessing IT Architecture Evolution using Enriched Enterprise Architecture Models

Christophe Ponsard  
CETIC Research Centre  
Gosselies, Belgium  
christophe.ponsard@cetic.be

Software evolvability is its ability to cope with future changes in a cost effective way, especially considering changes in environment, requirements and implementation technologies [1], [2]. Organisations are also evolving in terms of goals, structure and processes, triggering the need to change their supporting software infrastructure. Conversely, the adoption of new software tools enable the organisation to further evolve. In order to keep the IT and organisation aligned, the notion of Enterprise Architecture (EA) is defined as the discipline for proactively and holistically leading enterprise responses to disruptive forces by identifying and analysing the execution of change toward desired business vision and outcomes [3].

Enterprise Architecture Framework (EAF) refers to any framework, process, or methodology which informs how to create and use an EA [4]. A wide variety of EAF has developed with particular advantages and disadvantages, some historical like Zachman [5], other still evolving like TOGAF [6]. They are also complemented and supported by a variety of standard modelling notations such as UML [7] and BPMN [8] as well as business specific way to capture, analyse or visualise enterprise data (e.g. PESTEL, Business Canvas, scorecards). Such approaches and the underlying tooling is increasingly relying on efficient modelling platforms enabling deeper analysis to find the best road to drive the change inside the organisation.

In the scope of our work, we are interested by the evolution of the software part of the system in connection with EA models. Current EA process only consider software related quality attribute quite late, at the project implementation level, rather than at strategic roadmap definition. Our goal is to make sure relevant/high quality architecture information can be taken into account at this earlier step. For this we consider the following enablers:

- EA models are becoming more and more semantically rich and detailed
- frameworks are providing increasingly powerful analysis capabilities
- DEVOPS tools are enabling a high level of automation of the software lifecycle and runtime monitoring making easy to harvest data about component qualities

Considering state of the art techniques in service oriented and Cloud architecture, we propose to enrich and improve the quality of the information about the applications and software components on various qualities (e.g. performance, scalability,

security, technical debt) in order to include them in the assessment process already at the Enterprise Architecture level rather than discovering them later in the change implementation phase. In order to drive our work, we identified the following research questions:

- RQ1 - What kind of analysis can be carried out from the EA model to better drive the co-evolution of the business and IT dimensions ?
- RQ2 - What useful information should be gathered about software component and services in connection with the elaboration of business level strategies ?
- RQ3 - What are the key issues (risks/costs) for a successful model-based approach ?

We discuss about our current progress to answer the above questions using the LabNaf EA framework [9] and some partial industrial cases and a simple data gathering architecture. Our next steps are to record data from a more complex and long term project case study combining an EA model and a development/monitoring infrastructure. Based on this, we will assess how well the evolution roadmap is aligned and how to improve it, especially related to the management of legacy and mission critical components. We also plan to investigate more powerful data analysis tools (e.g. process mining).

## ACKNOWLEDGMENT

This work was partly funded by IDEES FEDER project (grant nr. 113850-112291). We thanks Alain De Preter for giving early access to the LabNaf EA tooling.

## REFERENCES

- [1] S. Cook, H. Ji, and R. Harrison, "Software evolution and software evolvability," 12 2000.
- [2] S. Ciraci and P. van den Broek, "Evolvability as a quality attribute of software architectures," *Journal of Physics: Conference Series*, 01 2006.
- [3] Gartner, "IT Glossary - Enterprise Architecture," <https://www.gartner.com>, 2014.
- [4] S. Watts, "Enterprise Architecture Frameworks (EAF): The Complete Beginner's Guide," *The Business of IT Blog*, 2018.
- [5] J. A. Zachman, *The Zachman Framework for Enterprise Architecture: Primer for Enterprise Engineering and Manufacturing*. Zachman International, 2003.
- [6] The Open Group, "TOGAF - The Open Group Architecture Framework V9," The Open Group, USA, 2009.
- [7] OMG, "Unified modeling language," <http://www.omg.org/spec/UML>, 1997.
- [8] OMG, "BPMN: Business Process Model And Notation V2.0," <https://www.omg.org/spec/BPMN/2.0>, 2011.
- [9] A. D. Preter, "Labnaf, all-in-one strategy & architecture framework," <http://www.labnaf.one>, 2018.