UNIVERSITÄT PADERBORN
Die Universität der Informationsgesellschaft

Master's Thesis
Quality Assurance in Software Ecosystems using Reference Architectures

Motivation
In recent years, software ecosystems have become an outstanding way to provide millions of users with different kinds of IT services. Software ecosystems comprise open platforms that are extendable by third-party developers and online marketplaces to market the third-party services. An example is the ecosystem around Google Android (as the open platform) and Google Play (as its marketplace). The literature [1] shows that the range of software ecosystems in practice is far beyond mobile applications. Nowadays, software ecosystems are built for service provision in a variety of application domains such as enterprise application, internet of things (IoT), safety and security, etc.

Problem
Although software ecosystems have already been studied by the literature, there is still a lack of architectural support that can be used by architects to develop their own software ecosystem and assure its quality by performing architectural analysis. Reference architectures are well-known to capture the essential elements of the architecture of similar systems and later be used to check system quality. However, until now no architectural guidance facilitates the creation of reference architectures for software ecosystems, so that, the architects can use it to ensure quality of their ecosystems.

Tasks
The thesis should solve the problem by covering the following tasks:

- Mapping the Archimate [2] language (as a modeling language that can be used to design software ecosystems) to the domain model of software ecosystem provided in [3]
- Developing **three reference architectures** using Archimate by referring to the three architectural patterns in [1]
- Providing tool-support that enables **automated generation** of the reference architectures and tailoring the architectures
- Enabling **architectural analysis** in the tool according to the analysis technique in [3]
- Providing a **case study** to show the concepts mentioned above

References

1.B. Jazayeri, O. Zimmermann, J. Küster, G. Engels, D. Szopinski, and D. Kundisch, "Patterns of Store-oriented Software Ecosystems: Detection, Classification, and Analysis of Design Options" presented at the Lathin American PLOP., 2018.

2.The Open Group, "ArchiMate® 3.0.1 Specification," 2017. http://pubs.opengroup.org/architecture/archimate3-doc/ (accessed Apr. 28, 2020).

3.B. Jazayeri, S. Schwichtenberg, J. Küster, O. Zimmermann, G. Engels, D. Szopinski, and D. Kundisch, "Modeling and Analyzing Architectural Diversity of Open Platforms" to appear at the CAiSE, 2020.

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