

Master Thesis: Smart City Architecture Principles

Introduction

Recent global and societal changes with increasing urbanization, ubiquitous environmental problems and new expectations for public services and efficiency present modern cities with different challenges. At the same time, digital technologies and current trends such as Big Data, Industry 4.0 and the Internet of Things (IoT) are paving the way for intelligent cities.

Considering the above, some city governments aim to make their city more efficient, sustainable and social (or participatory). Additionally, the quality of life of citizens should be increased. Consequently, the concept of *Smart City* (SC) has received increasing attention in both research and practice, eventually providing a new dimension to ICT's role in urban environments (Hollands, 2008, p. 303; Nam and Pardo, 2011a, p. 283; Alawadhi et al., 2012, p. 40). Developing SC solutions often requires complex collaboration between diverse organizations and systems. Given that SC initiatives face certain challenges comparable to those of traditional enterprises, existing SC architectures are often to some extent based on generic enterprise architecture (EA) frameworks which could direct and guide a city's digital transformation (Mamkaitis et al., 2016a, p. 1; Bastidas, Bezbradica and Helfert, 2017, p. 1). *Architecture Principles* can be seen as the cornerstones of Enterprise Architecture, as they fill the gap between high-level strategic intent and concrete design (Greefhorst and Proper, 2011).

Contribution and Tasks

The Chair of Information Systems and Strategic IT Management (SITM) offers an IS project about architecture principles for smart cities. The aim of this IS project should be the evaluation and comparison of architecture principles in different smart city initiatives.

The architecture principles developed for and used by the Smart City Duisburg initiative will serve as a starting point. In cooperation with the supervisor, around ten smart cities in Germany will be

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selected. Through semi-structured interviews with SC representatives of the respective cities and document analyses, an overview of the current state of the art of Smart Cities in terms of architecture principles will be established. The responders will also be asked to give their opinion on the proposed principles in Duisburg and to what extent these would apply and benefit their own SC initiative. Thus, the thesis will not only provide a profound analysis of the current architecture as well as their requirements but also findings about how the principles of Duisburg compare to the needs and context of different cities. Based on these insights, managerial recommendations and potentially a standardized approach for the development and establishment of architecture principles in smart cities could be proposed.

Application

If you are interested in applying for or discussing this master thesis topic, please send an informal email to Peder Bergan (peder.bergan@uni-due.de) and attach your grade transcript.