

Capturing Smart Service Systems - Development of a Domain-specific Modeling Language

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Abstract

Over the last years, the nature of service has changed owing to conceptual advances and developments in information technology. These developments have given rise to novel types of service and smart service systems (SSS), i.e. resource configurations capable of learning, dynamic adaptation, and decision-making. Currently, the Internet of Things (IoT) is turning physical objects into active smart things, bridging the gap between the physical and the digital world. Smart things advance SSS as they observe the physical environment, access local data, immerse into individuals' everyday lives and organizational routines. In line with the emergent nature of both phenomena, the impact of the IoT on SSS yet needs to be explored. Building the basis for explanatory and design-led research and for the analysis and design of SSS, a means for the conceptual modeling of SSS that accounts for novel IoT-enabled concepts is in high need. Hence, we designed, demonstrated, and evaluated a domain-specific modeling language (DSML) for SSS. We evaluated the DSML by using it in the modeling of real-world scenarios from all functional IoT domains, by submitting it to the scrutiny of industry experts, by discussing it against generic DSML requirements, and by analyzing to what extent it meets domain-specific design objectives compared to competing artifacts. To demonstrate the DSML, we included a complex real-world scenario centered around the Nest Learning Thermostat.

Keywords: Service Science; Smart Service Systems; Internet of Things;
Domain-specific Modeling Language; Design Science Research