

Thesis Proposal (MA)

A Global Self-Managing Repository for Data Models for Smart Spaces

Outline

Smart Spaces are spaces with computing hardware that interfaces between the Cyber and the Physical World. Examples for such devices are remote controllable building control entities such as shutters, lighting, air conditioning, heating, ventilation, multimedia equipment, etc.

For the past years we developed the Distributed Smart Space Orchestration System (DS2OS). It is a middleware framework that manages service Apps within Smart Spaces. The core of DS2OS is the Virtual State Layer (VSL) middleware.

The VSL offers virtual representations of Smart Devices such as the NEST thermometer shown in the figure. A central problem with virtual representations is that they have to be converged. Having multiple models for similar functionality prevents portability of Apps. To mitigate from this problem, a global repository that offers automated crowdsourced convergence mechanisms is envisioned¹. Your task in this master thesis will be designing and implementing the model repository for real world use by real developers. Concrete tasks include verification of checked in models according to our existing algorithms, tagging of models for retrieval and convergence, developer support in creating models, and securing the models.

Your results will be deployed to our public website, and you will immediately get input from the diverse currently running projects.



Possible Structure

- Analysis
 - o Analyze the problem domain.
 - o Identify relevant research questions that you will work on.
 - o Present relevant technology.
- Related work
 - o What do other projects do that answer your questions?
- Design
 - o Which components do you need?
 - o Which are options for the design? Why are your choices good?
- Implementation
 - o Relevant details such as frameworks used.
- Evaluation
 - o How well does it work?

Requirements

Curiosity, Joy to work in a team, Knowledge in Java.

Ability to write good code (including unit tests and documentation).

Contact

If interested, please send an email briefly explaining why you think to be the right person for this thesis to:

Marc-Oliver Pahl (pahl@net.in.tum.de)

Stefan Liebald (liebald@net.in.tum.de)

<http://s2o.net.in.tum.de/>

Nest Thermostat Image by Nest, <https://www.flickr.com/photos/nest/6286566200>

¹ M.-O. Pahl and G. Carle, "Crowdsourced Context-Modeling as Key to Future Smart Spaces," Network Operations and Management Symposium 2014 (NOMS 2014), 2014.

