Evaluating Databases for the Internet of Things in the Distributed Smart Space Operating System

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, Philipps Hue lamps, shutter controls etc. The backend of the VSL is a database that is distributed on all participating Peer-to-Peer computing nodes. It stores all Smart Space data. There are different requirements on the used database including security, low latency, and scalability. Existing databases fulfill these properties to a different extend and quality.

In this work you will identify suitable candidate databases, implement an interface to DS2OS and compare the resulting performance. You will also create suitable test data sets and metrics for the comparison. A goal of the work is making the VSL middleware that is the base of DS2OS faster and more resilient.

Your results will be integrated into our operating system, 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:
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Distributed Smart 2pace Orchestration System

ds2os.org/