The Aspern Smart City Project

Josiane Xavier Parreira

Siemens AG Oesterreich, Vienna, Austria
josiane.parreira@siemens.com

Abstract. This extended abstract briefly describes the Aspern Smart City Research project – one of the largest smart city projects in Vienna, Austria – which aims at overcoming silos in smart grid and smart building domains. The project's testbed will provide the opportunity to explore and advance RDF stream processing technologies for urban data analytics, in order to provide an optimal interaction between power supply, building systems, intelligent power grids, and information and communication technologies. In addition, this document also provides a description of the author's expertise and relation to the RSP community and ESWC in general.

1 ASCR Project Description

The Aspern Smart City Research (ASCR), is a joint initiative between Siemens AG Oesterreich, a Power Grid operator (Wiener Netze) and one large energy provider (Wien Energie) and multiple energy providers in Vienna. Started in October 2013, with an expected duration of 5 years and a budget of almost 40 million Euros, the project will have as testbed a "living laboratory" which is being created in the urban-lakeside district of Aspern, one of the largest urban development projects in Europe[1]. This area will include apartments and offices, a business, science, research, and education quarter. Altogether, it will cover around 240 hectares. Fifty percent of the space is reserved for public areas - plazas, parks, and recreation areas. Step by step, between now and 2030, the district will evolve into an intelligent city of the future, with 20,000 residents and 20,000 additional jobs.

The ASCR project represents an opportunity to develop a long-term integrated concept for an energy-optimized city district, using appropriate technologies, products, and solutions in a real-world infrastructure. The overall goal is to make the whole system "smarter", by having power supply, building systems, intelligent power grids, and information and communication technologies interacting in an optimal manner. For example, part of the project involves connecting buildings that have different functions, i.e. offices and apartments, to the low-voltage distribution network. This will allow efficient management of the energy exchange between buildings and optimization of the local energy consumption. This offers building operators the possibility to participate actively on the energy markets.

[1] http://www.aspern-seestadt.at/en

Efficient and scalable data integration and analytics solutions in heterogeneous domains are paramount for the success of the project. We plan to explore Semantic Web technologies – specially RDF stream technologies – to enable urban data analytics in heterogenous domains. We will look into automatic semantic annotation of data streams from the smart grid and building domains, as well as reasoning methods over semantic streams, and how semantic representation and processing can aid data analytics tasks. The benefits of using semantic technologies go beyond the ASCR project and can further facilitate the integration of other city data providers. Furthermore, it can easily be extended to other applications where heterogeneous devices must cooperate, for example, in the Industry 4.0 vision.

2 Author's expertise, relation to RDF Stream Processing and ESWC

Josiane Xavier Parreira is a Senior Research Scientist at Siemens AG Oesterreich. She is involved in a number of projects in the area of Smart Cities, Smart Grids and Building Technologies.
Before joining Siemens last year Josiane was a Postdoctoral Researcher / Adjunct Lecturer and Project Leader at The INSIGHT Center for Data Analytics formerly Digital Enterprise Research Institute (DERI) National University of Ireland, Galway. There she was involved on a number of research projects in the areas of Semantic Web applied to stream data management, graph-based stores, and federated query processing. In particular, she worked in the Continuous Query Evaluation over Linked Streams (CQELS), an approach that provides a scalable query processing model for unified stream data in RDF format and Linked Open Data [1]. Scalability in CQELS is achieved by state-of-the-art techniques for efficient data storage and query processing, combined with a novel and adaptive cost-based query optimization algorithm for dynamic data sources, such as sensor streams. The CQELS algorithm has been applied in different projects and also integrated into a middleware for developing semantic sensor applications [2].
Josiane Xavier Parreira is an active member of the W3C Community Group on RDF Stream processing. In addition she is co-chairing the "Mobile Web, Internet of Things and Semantic Streams" Track at ESWC 2015, which is highly related to the topics addressed in the RDF Stream Processing Workshop.

References

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