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Instrumente Structurale
2007-2013

Framework for Service Composition Based on Ontologies for the Aggregation of Knowledge and Information for Intelligent Buildings (FCINT)

Sponsored by the European Fund for Regional Development and the Government of Romania

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Project Highlights

The **FCINT project**, co-sponsored by the European Fund for Regional Development and Romania's Government (ID551, cod SMIS-CSNR 12038), has reached the midpoint of its 3-year timetable.

During the sixth quarter of funded activity, the project made progress in the following directions: tool design, service composition and optimization, publication on portal and maintenance of language for ontology description, publication on portal of services and interface protocols, wiki portal, testing and quality control, scenario implementation and demonstration and system evaluation through simulation.

One of the major achievements of the project during the sixth quarter the launching of the Smart Building Simulator v.1.0. (see details in the following section of the newsletter).

Dr. Catalin Chera from the Polytechnic University of Bucharest, which is hosting the project, spent one month in residence at the Arizona State University in the United States, where he worked with the project Director, Dr. Wei-Tek Tsai. Dr. Chera visited relevant programs at Arizona State University in the Global Institute of Sustainability, School of Sustainability Engineering and the Built Environment, Del E. Web School of Construction, and School of Computing, Informatics, Decision Systems Engineering. Discussions with American experts who conduct research in subject areas that are related to the FCINT project gave Dr. Chera the opportunity to experience and learn new

approaches that may be used during the implementation stages of FCINT. During his visit to the United States, Dr. Chera collaborated with the American members of the FCINT team on the development of new components of the system that will start being implemented in the seventh quarter of the FCINT project.



ASU Computer Science Department

The FCINT activities scheduled for the seventh quarter are expected to further tool design, advance service composition and optimization, start scenario implementation and demonstration and system evaluation through simulation, continue publication on portal and maintenance of language for ontology description, as well as publication of services and interface protocols (partial), enhance wiki portal and publication mechanisms, and complete work on service matching and discovery.



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FCINT research results

FCINT Launched Smart Building Simulator v.1.0

By Laurentiu Bucur and Monica Dragoicea

In the sixth quarter, the FCINT project launched the first online version of its Smart Building Simulator, at <http://www.fcint.ro/portal/Simulator/Simulator.html>.

Open and free to use by anyone, the Smart Building Simulator uses the latest web technologies and the HLA Simulation standard developed by the U.S. Department of Defense (which is the most widespread standard in simulation). The FCINT Smart Building Simulator was designed to:

- Estimate the energy and billing in a smart building, including:
 - Electricity
 - Cold and hot water
 - Petrol, wood, and other fossil fuels
- Estimate the CO₂ emissions of the devices in a building during their operation. CO₂ emissions simulation can help reduce the carbon footprint of a building environment.
- Simulate the behavior of an intelligent building operated by the Smart Building Controller during normal operation and in case of emergency situations (fire, flooding, burglary, etc.). **Thus the FCINT Smart Building Simulator makes it possible to estimate energy savings that would result from the utilization of the Smart Building Controller**, which is the main goal of the FCINT project.

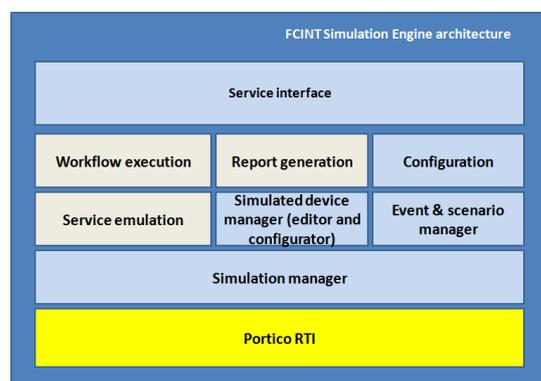
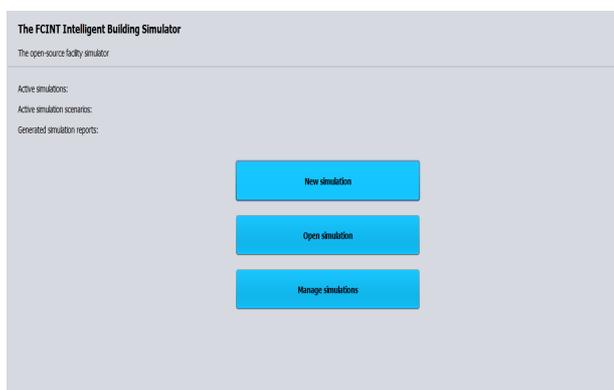


Fig. 1. Main Window of the FCINT Smart Building Simulator Fig. 2. Architecture of FCINT Simulation Engine

Users can create and manage their smart building simulations online. Simulation is based on a set of scenarios, where users can define the behavior of their smart building devices on a time line.

Further work under FCINT will focus on execution and simulation reporting (billing, utility consumption, and CO₂ emissions).



Updates from FCINT Project Director

Dr. Wei-Tel Tsai, the Director of the FCINT project, gave two talks about the project at Tsinghua University in China and one talk at the Peking University in Beijing. He presented to scholars and students ontology techniques used in the FCINT project. In addition, Dr. Tsai was invited to serve on the Expert Panel of China National 973 Project held at Tsinghua University in Beijing (October, 2011).

In November, 2011, Dr. Tsai gave talks on service-oriented computing and SaaS (used in the FCINT project) at BeiHang University in Beijing and at Harbin Institute of Technology in China. Also in November, Dr. Tsai was invited to attend the Science China Editorial Board meeting at MaCau.

In December, 2011, Dr. Tsai served on two panels at IEEE International Symposium on Service-Oriented System Engineering in Irvine, California. One panel addressed "Cloud Testing," and the other focused on "The Role of Service Engineering on Cloud Engineering."

While visiting the Architecture University in Xian, China, Dr. Tsai presented the FCINT project and had discussions with Professor Ren, who leads a similar project.

FCINT Publication

Wu Li, Yann-Hang Lee, **Wei-Tek Tsai**, Jingjing Xu, Young-Sung Son, Jun-Hee Park, and Kyung-Duk Moon (2011). *Service-Oriented Smart Home Applications: Composition, Code Generation, Deployment, and Execution*. Article accepted by Service-Oriented Computing and Applications Journal (Springer).

FCINT Info

FCINT project website: <http://www.fcint.ro>

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