



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 Progress

The **FCINT project**, co-sponsored by the European Fund for Regional Development and Romania's Government (ID551, cod SMIS-CSNR 12038), is hosted by the University Politehnica of Bucharest.



University Politehnica of Bucharest

During this quarter of its funded activity, the FCINT project focused on: tool design (partial), scenario demonstrations and system validation in industrial

environments (partial), publication on portal and maintenance of language for ontology description (partial), publication on portal of services and interface protocols (partial), further development of wiki portal (partial), and testing and quality control.

So far, the FCINT team has successfully delivered solutions that include multiple components such as service composition and optimization, scenario implementation and demonstration, system evaluation through simulation, scenario implementation and demonstration, system evaluation in lab, ontology modeling language, service portal, and wiki portal. Future activities are geared toward completing and enhancing those features to provide customers with services for smart building management.

Demonstrations and system validation in industrial environment

The endeavors focused on demonstrating and validating the FCINT system in industrial environment have continued during the last six months by improving the HVAC system in the 'East Passive House' building (also entitled 'Laboratory House') on the campus located within University Politehnica of Bucharest.

The East Passive House has been built on the University campus as part of another R&D project. The building has an usable surface of 140 sq. m and is equipped with 13 photovoltaic panels, as well as with a thermal solar panel.



East Passive House – Front view South / East

In addition, it has a ground-air heat exchanger (Awaduckt Thermo system) and a mechanical ventilation system. Moreover, the Laboratory House was designed for supporting research activities.

In order to prepare the FCINT system's validation in 'East Passive House' industrial (real-life) environment, there were installed a couple of devices, as well as the related software services.



They are designed to allow creation, run, demonstration and validation of different operating scenarios.

This way, the temperature, the humidity and the luminosity in various rooms are monitored by special designed wireless sensors, which are periodically sending the measured data to the FCINT building management application through a Wi-Fi software service.

Another group of sensors are connected to the Keithley measurement concentrator, which provides real time measurement data to the buiding management system through a specialized software service. These data can be subsequently used for various performance analysis, building environment behavior studies and predictions. 'JCService' is the software service used for monitoring and control of the devices connected to the FX16 programmable logic controller (PLC). So, the CO₂ concentration, the temperature and the humidity within the technical room are monitored. Furthermore, the FX16 PLC and its associated software service control the flow rate of the PAUL Heat Recovery and Ventilation System (Focus F200) engines, of the Casals centrifugal engine and of the France-Air engine, as well as the dampers for the fresh air and exhausted air in the HVAC system. A software 'WatchDog' service was designed for continuously monitoring of the FCINT SW components' operating status.

Various operating scenarios have been successfully tested. Complete FCINT system demonstration and validation in this industrial environment will be performed before the last project milestone.

FCINT Publications

Cătălin Chera, Șerban Petrescu, *Saving Energy in Intelligent Buildings with a SOA Framework*, Proceedings of the 2nd International Conference on Systems and Computer Science, pp.133-138, ISBN 978-1-4799-2021-1, 2013, Villeneuve d'Ascq, France.

This paper presents an architectural model that can be used in an intelligent building to reduce the operating and maintenance costs and to ensure a higher comfort for the residents. The SOA framework was built during the FCINT project (Ontology-based Service Composition Framework for Syndicating Building Intelligence). In this framework the most important component is the SBC (Smart Building Controller) which interact with physical devices through software services and allows users to define schedules and policies.

FCINT Info

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

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