CuteSIB Demo for Raspberry Pi

Sergey A. Marchenkov, Andrey N. Borodulin, Dmitry E. Baganov, Dmitry G. Korzun
Petrozavodsk State University (PetrSU)
Petrozavodsk, Russia
{marchenk, boroduli, baganov, dkorzun}@cs.karelia.ru

***Abstract*—This demo studies the opportunities of CuteSIB—an implementation variant of the Smart-M3 semantic information broker. In our illustrative study, a software agent operates with the public DBpedia service from the Internet. Credit card-sized single-board computers such as Raspberry PI are considered as hosting devices to run both CuteSIB and the DBpedia agent. As a result, a smart space is created locally to share information about the cities which the human participants are from.**

Smart spaces are gaining relevance as promising deployment environments for novel classes of applications stemming from the dynamic discovery and interaction between smart objects and the resources available in their physical localities. In particular, smart spaces seamlessly exploiting smart phones to control surrounding environment and provided services. The Semantic Information Broker (SIB) of Smart-M3 platform supports interoperability of many devices and service/application components in a smart space based on semantic-driven information sharing [1]. The CuteSIB [2] is the latest implementation variant of Smart-M3 SIB (available at https://sourceforge.net/projects/smart-m3/ as open source).

Credit card-sized single-board computers can advance smart spaces deployment in Internet of Things environments. A promising case is Raspberry Pi 2. It has a Broadcom system on a chip (SOC), which include an ARM compatible CPU and chip graphics processing unit GPU (a VideoCore IV). Quad-core ARM CPU has speed range of 900 MHz. Board memory is 1 Gb RAM. The board has an RJ45 Ethernet port, 4 USB slots, HDMI, and composite video output.

The demo scenario is shown in Fig. 1. The idea comes from the SmartRoom system [3], which assists such collaborative work activity as conferences and meetings. From this point of view, the demo illustrates the case of international conferences: many participants come from several countries (and representing various cities) of the world. To create the smart space we deploy CuteSIB on Raspberry Pi 2. Additionally, Raspberry Pi can host a Smart-M3 knowledge processor (KP). Let such a KP be responsible for interaction with the DBpedia service from the Internet. The KP feeds the smart space with information about the cities which the conference participants are from.

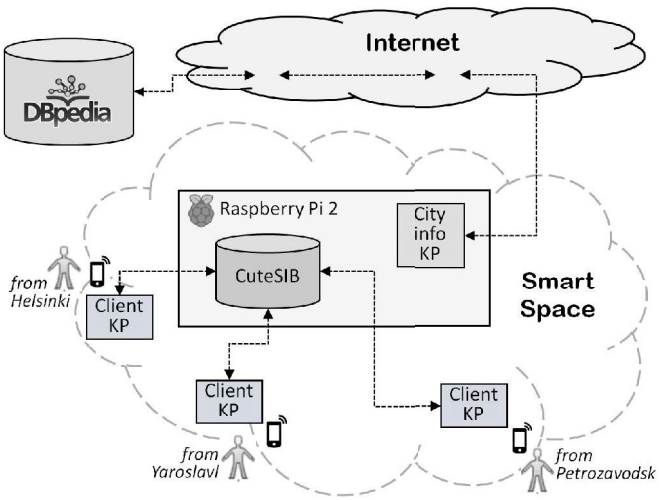

Fig. 1: SmartRoom-oriented scenario with Raspberry Pi

The smart space is local, aimed at surrounding devices of the wireless local network. Any conference participant can access the smart space using her/his personal mobile device such as a smartphone and a tablet. The device runs Smart-Room client [4]. The participants (via the client interface) can view the collected information about the cities: description, image, date of foundation, attractions, etc. Consequently, the participants receive information useful for further face-to-face communication during the conference.

The demo also estimates the performance of the scenario execution. We experiment with a moderate-performance public Wi-Fi network and with the number of participants of several dozen. Our measurements indicate that the Raspberry Pi capacity is enough for the considered class of smart spaces.

ACKNOWLEDGMENT

This work is financially supported by the Ministry of Education and Science of Russia within project # 14.574.21.0060 (RFMEFI57414X0060) of Federal Target Program "Research and development on priority directions of scientific-technological complex of Russia for 2014–2020". The reported study was partially funded by Russian Foundation for Humanities according to project # 16-01-12033.

REFERENCES

[1] J. Honkola, H. Laine, R. Brown, and O. Tyrkkö, "Smart-M3 information sharing platform," in *Proc. IEEE Symp. Computers and Communications (ISCC'10)*. IEEE Computer Society, Jun. 2010, pp. 1041–1046.

[2] I. Galov, A. Lomov, and D. Korzun, "Design of semantic information broker for localized computing environments in the Internet of Things," in *Proc. 17th Conf. of Open Innovations Association FRUCT*. ITMO Univeristy, IEEE, Apr. 2015, pp. 36–43.

[3] D. Korzun, I. Galov, A. Kashevnik, and S. Balandin, "Virtual shared workspace for smart spaces and M3-based case study," in *Proc. 15th Conf. of Open Innovations Association FRUCT*, S. Balandin and U. Trifonova, Eds. ITMO Univeristy, Apr. 2014, pp. 60–68.

[4] A. Vdovenko, S. Marchenkov, and D. Korzun, "Mobile multi-service smart room client: Initial study for multi-platform development," in *Proc. 13th Conf. of Open Innovations Association FRUCT and 2nd Seminar on e-Tourism for Karelia and Oulu Region*, S. Balandin and U. Trifonova, Eds. SUAI, Apr. 2013, pp. 143–152.