Communicating object model for smart logistic and security issues

Sourour Trab[1], Ahmed Zouinkhi[1], Eddy Bajic[2], Mohamed Naceur Abdelkrim[1], Hassen Chekir[3], Radhouane Belhaj[3]
[1]Research Unit: Modeling, Analysis and Control of Systems (MACS),National engineering school of Gabes, Tunisia.
[2]Université de Lorraine, CRAN, UMR 7039, Vandœuvre-lès-Nancy Cedex, 54516, France.
[3]Tunisian Chemical Group, Industrial Zone, 6000 Gabes,Tunisia.

Sourour.trab@gmail.com
Ahmed.zouinkhi@enig.rnu.tn
Eddy.bajic@univ-lorraine.fr

Abstract— **Communicating object also known as connected object is an object forming part of the Internet of Things (IoT) in order to project the entire real world into a wide digital virtual space known as cyber-physical space. Our work provides a communicating object model for smart logistic and security issue where communicating and reasoning capabilities of objects are used to assure intelligent and reactive logistics features with an uncommon emphasis on security matters covering both object-to-objects and object-to-human dependancies. This approach is particularly convenient for chemical industry application domain and green environment issues. Currently, many IoT Europeans projects have defined various functional communicating object models and architectures somehow coordinated within IERC (Internet of Things Research Cluster). Those models are designed for improvement of various fields of application domains such as Smart Industry (Iot@Work [13], FITMAN [9], and SMART ACTION [18]), Smart City (RERUM, City Pulse [3], Clout [4], ALMANAC [1] and Smartie [19]), Smart Grid (E-PRICE [8], Nobel [16]), e-health (CONFIDENCE [5]) and smart logistic (iCargo [10], EMAR [7])...**
The work presented in this paper has the objective to analyse and extend the current research works with a focus on logistics and security issues concerning the communicating model. At application level the goal is a better management of a chemical product within its warehouse with respect to placement, availability, product life management, and safety issues with relation to ambient conditions and human interactions. This model is based on the IoT Europeans projects concepts and issues such as: IoT-I [15], IoT-A [12], BUTLER [2], iCORE [11], IoT EST [14] and RERUM [17].
In this paper, we firstly present a study of Iot concepts and issues, and then we analyse IoT underway projects methodologies, reference architectures and proposals. Finally we define the communicating object model with extensive integration of logistics decision aid and security in the context of chemical industry, with relation to the main IoT reference model architecture.

Keywords— **IoT, communicating object model, smart logistics.**

REFERENCES

[1] ALMANAC, EU FP7 project, Reliable Smart Secure Internet Of Things For Smart Cities, online at http://www.almanac-project.eu/news.php

[2] BUTLER, EU FP7 project, Smartlife – Secure and Context Awareness in the IoT, http://www.iot-butler.eu/

[3] CityPulse, EU FP7 project, Real-Time IoT Stream Processing and Large-scale Data Analytics for Smart City Applications, online at http://www.ict-citypulse.eu/page/

[4] Clout, EU FP7-Japan project, Cloud of Things for empowering the citizen clout in smart cities, online at http://clout-project.eu/

[5] CONFIDENCE, EU FP7 project, Ubiquitous Care System to Support Independent Living, online at http://www.confidence-eu.org/

[6] E. Borgia, The Internet of Things vision: Key Features, Applications and Open Issues, Computer Communications (2014)

[7] EMAR, EU FP7 project, e-Maritime, online at http://www.emarproject.eu/

[8] E-PRICE, EU FP7 project, Price-based Control of Electrical Power Systems, online at http://www.e-price-project.eu/

[9] FITMAN, EU FP7 project, Future Internet Technologies for MANufacturing industries, online at http://www.fitman-fi.eu/

[10] iCargo, EU FP7, Intelligent Cargo in Efficient and Sustainable Global Logistics Operations, online at http://www.i-cargo.eu/

[11] iCore, EU FP7 project, Empowering IoT through Cognitive Technologies, online at http://www.iot-icore.eu/

[12] IoT-A, EU FP7 project, online at http://www.iot-a.eu

[13] IoT@Work, EU FP7 project, Internet of Things at Work, online at https://www.iot-at-work.eu/

[14] IoT.est, EU FP7 project, Internet of Things Environment for Service Creation and Testing, online at http://ict-iotest.eu/iotest/

[15] IoT-I, FP7 EU project, Internet of Things Initiative, online at http://www.iot-i.eu/public/front-page

[16] Nobel, EU FP7 project, Neighbourhood Oriented Brokerage Electricity and monitoring system, online at http://www.ict-nobel.eu/

[17] RERUM, EU FP7 project, REliable, Resilient and secUre IoT for sMart city applications, online at https://ict-rerum.eu/

[18] SMART ACTION, EU FP7 project, online at http://www.smart-action.eu/home/

[19] Smartie, EU FP7 project, Secure and smarter cities data management, online at http://www.smartie-project.eu/