Reasoning Engine for Smart Contract Deployment

Philippe Collet
Philippe.Collet@unice.fr

25 janvier 2018

Nombre d'étudiants souhaités : 3-4

Description du sujet

SmartIoT for Mobility is a project recently funded by the RISE academy of the Université Côte d'Azur. An additional funding for 3 years is under evaluation by the french agency for research (ANR). The aim of the project is to explore a trans-disciplinary approach for enabling the new economy based on smart contracts, for the rising generation of the Internet of Things. The focus is to be able to have a clearer, more formal definitions of these smart contracts, compatible with a legal viewpoint while being mechanizable, i.e. checked for their consistency, deployed with appropriate agents on variable platforms.

In this context, the aim of the proposed TER project is to provide a reasoning engine that enables to :

— take as inputs i) a description of a smart contract to be deployed and ii) a representation of the diversity of the possible deployment platforms through a variability model
— reason on the functional matching between a high-level contract and the probes or agents that would be deployed on potential platforms

The engine will rely on an abstract model of contract, taken from a standard existing platform in smart contract and blockchains. Previous work in the research team on code deployment on heterogeneous infrastructures will also help in tackling the problem, while classic variability modeling and checking techniques (e.g. SAT solving) are likely to be used for the reasoning part.

Lieu

Laboratoire I3S, Équipe SPARKS, Batiment Templiers (Polytech)

Prérequis

— Object-oriented progamming, software design

Informations complémentaires

This TER is co-supervised with Sébastien Mosser. This project may be followed by a summer internship for 1 or 2 team members.

References

— Clack, Christopher D., Vikram A. Bakshi, and Lee Braine. "Smart contract templates : foundations, design landscape and research directions." arXiv preprint arXiv :1608.00771 (2016).

— Cyril Cecchinel, Sébastien Mosser, Philippe Collet : Automated Deployment of Data Collection Policies over Heterogeneous Shared Sensing Infrastructures. APSEC 2016 : 329-336

— Cyril Cecchinel, Sébastien Mosser, Philippe Collet : Software Development Support for Shared Sensing Infrastructures : A Generative and Dynamic Approach. ICSR 2015 : 221-236

— I. Ayala, M. Amor, L. Fuentes and J. M. Troya, A Software Product Line Process to Develop Agents for the IoT, In International Journal of Sensors, pp 15640-15660, 15 (2015)

— Eretheum White Paper : Buterin, Vitalik. "A next-generation smart contract and decentralized application platform." (2014).

— Mathieu Acher, Philippe Collet, Alban Gaignard, Philippe Lahire, Johan Montagnat, Robert B. France : Composing multiple variability artifacts to assemble coherent workflows. Software Quality Journal 20(3-4) : 689-734 (2012)