First International Workshop on Semantic Web on Constrained Things (SWoCoT2023)⋆

Ghislain Atemezing*¹,*,†*, Lionel Médini*²,†* and Frédérique Laforest*³,†*

¹Mondeca, 18 rue de Londres, 75009 Paris, France

²Univ Lyon, UCBL, CNRS, INSA Lyon, LIRIS, UMR5205, F-69622 Villeurbanne, France

³Univ Lyon, INSA Lyon, CNRS, UCBL, LIRIS, UMR5205, F-69621 Villeurbanne, France

Abstract

In recent years, the Internet of Things (IoT) and the Semantics and Web of Things (SWoT) have been more and more often combined to collect sensing data conforming to the semantic web stack, expose kg-based services and build smart applications. At the same time, the need for decentralized infrastructure to capture and transform data on the edge has gained attraction due to the real necessity to reduce the global carbon emission of centralized architectures. A step towards the so-called Green Web.

Keywords
Web of Things, Constrained Device, Low Code, Semantic Web,

Introduction

The SWoCoT2023 workshop (https://mondecalabs.github.io/SWoCoT23/), organized in the framework of the CoSWoT project (https://coswot.gitlab.io/), was held in the frame of the Extended Semantic Web Conference ESWC'23.

In recent years, the combination of Internet of Things (IoT), Semantics and Web of Things (SWoT) has been more and more popular to collect sensing data according to the semantic web stack and build smart services and applications. One momentum is the release of a W3C recommendation for WoT architecture along with a formal specification of Thing Descriptions https://www.w3.org/TR/wot-thing-description11/. The Web of Things (WoT) allows to describe device semantics, bridging the gap between device and service descriptions. Developers can use WoT standards and tools to collect sensing data and control devices for the applications in agriculture, energy, enterprise, finance, healthcare, industry, etc.

At the same time, decentralized infrastructures able to capture and transform data at the edge have gained attraction over centralized ones, due to both the constant attempts to reduce industrial costs and the real necessity to reduce global carbon emissions. Decentralized

infrastructures hence represent a step towards the so-called Green Web, especially as they are usually built on small and low-energy consuming devices. However, fulfilling the SWoT promises using such infrastructures poses new challenges as these small devices are constrained in terms of computing capabilities and memory, and since wireless network communications are also energy-consuming and can hinder battery life of autonomous devices. Deploying SWoT standards on such devices require to control and monitor the consumption of these resources, whereas semantic technologies are known to be verbose and computation intensive.

This first SWoCoT international workshop aims at bridging together research and industry communities working on the different aspects of embedding data semantics and standards-based solutions into edge and/or constrained Internet and Web of Things setups, as well as reducing the carbon footprint of semantic technologies.

SWoCoT2023 has included selected contributions, a keynote presentation, and break-out discussions.

Accepted contributions

SWoCoT'23 has received a total of 8 contributions, out of which 6 were selected to be included in the proceedings. These are 5 full papers and 1 short paper:

- Pieter Bonte and Femke Ongenae. Towards Cascading Reasoning for Generic Edge Processing
- Jihoon Chung, Gabriel Jacoby-Cooper, Kelsey Rook, Henrique Santos, Dennis Shelden, Elisa F. Kendall and Deborah L. McGuinness. Towards an Indoor Environmental Quality Management Ontology
- Michael Freund, Justus Fries, Thomas Wehr and Andreas Harth. Generating Visual Programming Blocks based on Semantics in W3C Thing Descriptions
- Justus Fries, Michael Freund and Andreas Harth. A Solid Architecture for Machine Data Exchange with Access Control
- Jan Romann. Bridging the Gap to the Web of Things. On the Conversion between WoT Data Models and the Semantic Definition Format
- Roderick van der Weerdt, Victor de Boer, Laura Daniele, Ronald Siebes and Frank van Harmelen. Evaluating the Effect of Semantic Enrichment on Entity Embeddings of IoT Knowledge Graphs

Keynote talk by Sebastian Käbisch

SWoCoT'23 has invited *Dr. Sebastian Käbisch* https://scholar.google.com/citations?user=5bIiZBcAAAAJ&hl=en, to give a keynote talk during the event about *The Web of Things 2.0*. Sebastian Käbisch is a Senior Key Expert at Siemens Technology in Munich, Germany. His work focuses on the efficient realization and usage of standardized Internet and Web technologies for the Industrial Internet of Things domain. He drives strategic initiatives, research and development for Siemens' business units such as industrial and building automation. Sebastian Käbisch is an active member of and contributor to standardization groups such as Industrial

Digital Twin Association and W3C Thing Description. In that context, Sebastian Käbisch is one of the initiators and authors of the reference implementation for Web of Things called Eclipse node-wot and the Thing Description authoring tool called Eclipse ediTDor.

Program Committee

- Jean-Paul Calbimonte (HES-SO Valais-Wallis, Switzerland)
- Victor Charpenay (Mines Saint-Etienne, France)
- Maxime Lefrançois (Mines Saint-Etienne, France)
- Catherine Roussey (MISTEA Montpellier, France)
- Nicolas Seydoux (INRUPT, France)
- Kamal Singh (University of Saint-Etienne, France)
- Antoine Zimmermann (Mines Saint-Etienne, France)
- Michael Mrissa (University of Primorska - InnoRenew CoE, Slovenia)
- Pieter Bonte (Ghent University)
- Raúl García-Castro (Universidad Politécnica Madrid)
- Alba Fernandez-Izquierdo (BASF Digital Solutions)
- Andreas Harth (University of Erlangen-Nuremberg, Fraunhofer IIS-SCS)
- Laura Daniele (TNO, Netherlands)

Acknowledgments

---

[1]https://coswot.gitlab.io/