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# Choosing Your Ontologies for Sensor Data Applications

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**Abstract.** Semantics is increasingly seen as key enabler for integration of sensor data and the broader Web ecosystem. Analytical and reasoning capabilities afforded by Semantic Web standards and technologies are considered important for developing advanced applications that go from capturing observations to recognition of events, deeper insights and actions. The goal of this tutorial is to cover the fundamentals and best practices of Semantic Web technologies in a concise way, and show how can they be used to model ontologies for Intelligent Environments, including notions of ontology modelling and presenting two of the most relevant ontologies for Intelligent Environments:

**Keywords.** Semantic Web, Ontology

## 1. Outline

- The new W3C Semantic Sensor Network (SSN) ontology [1] jointly standardized by the W3C and the Open Geospatial Consortium enables to describe observations, samplings, and actuations activities, their result, the system that made it, the features of interest and its property that is observed or acted upon.
- The ETSI Smart Appliances Reference (SAREF) ontology [2] focuses on the concept of device, which is defined in the context of the Smart Appliances study as "a tangible object designed to accomplish a particular task in households, common public buildings or offices. In order to accomplish this task, the device performs one or more functions". Extensions for different verticals are under development for the Energy-, Building-, Environment-, and Industry- domains.
- The SEAS ontology [3] is a modular and versioned ontology with all the terms it define having the same namespace. It is built on top of SSN, and contains as a core four simple ontology patterns to describe physical systems and their connections, value association for their properties, and the activities by which such value association is done. These ontology patterns are then instantiated for different engineering-related verticals.

## References

- [1] Armin Haller, Krzysztof Janowicz, Simon Cox, Danh Le Phuoc, Kerry Taylor, and Maxime Lefrançois, Semantic Sensor Network Ontology , W3C Recommendation, W3C, 19 October 2017

- [2] Laura Daniele, Frank den Hartog, and Jasper Roes, Created in close interaction with the industry: the smart appliances reference (SAREF) ontology. International Workshop Formal Ontologies Meet Industries. Springer, Cham, 2015
- [3] Maxime Lefrançois, Planned ETSI SAREF Extensions based on the W3C&OGC SOSA/SSN-compatible SEAS Ontology Patterns, Workshop on Semantic Interoperability and Standardization in the IoT, 2017.