# Internship offer

**Topic of the internship (title)**  
Web of Things Servient implementation for constrained devices

**Proposed dates of the internship**  
Start: 01/09/2022  
End: 28/02/2023

**Scientific and academic objectives of the internship:**

**Keywords:** Internet of Things, Web of Things, Semantic Web, Embedded Software, C Language

**Context:** The Web of Things (WoT) is a layer built on top of the Internet of Things (IoT) that aims at providing interoperability among physical devices, hence decoupling hardware and applications, by fostering the use of Web standards. WoT can be applied to many domains such as smart cities, smart building, e-agriculture, health, etc. [Raw14]. The Semantic Web provides a theoretical basis to leverage interoperability in WoT through knowledge graphs emerging from exchanging, interlinking, processing and reasoning about application data.

The central component of the WoT software architecture is the “WoT Servient”, which is a functional virtual device. A Servient extends the IoT physical devices by providing standard access and control capabilities to the devices.

The CoSWoT ([https://coswot.gitlab.io/](https://coswot.gitlab.io/)) project aims to design and implement the core functionalities of a WoT Servient in constrained devices with low memory and computation capabilities, for example ESP32 or Arduino Due. We focus on embedding the semantic stack (Knowledge graphs, reasoning capabilities) in constrained objects, according to the main use cases of the project: smart building and e-agriculture. To this end, we leverage the software architecture defined in the WoT standards - and in particular the notion of servient [WoT20] - into these devices.

The goal of the internship is to provide an implementation of the W3C Web of Things (WoT) architecture written in the C language. The implementation will first target primary parts of the WoT architecture necessary for the CoSWoT project [CWT19]. In particular, it aims to cope with other components already developed in CoSWoT such as reasoning capabilities [Ben22]. The implementation can be inspired by the WoT scripting API [WAPI20] and the reference open source implementation Eclipse ThingWeb [NodeWoT].

**Expected work:** The tasks to be carried out are as follows:

- Study of the RDF libraries and frameworks in the literature for C language
- Review and identification of the core functionalities required for the CoSWoT project
- Design, development and test of a servient in C language
- Integration with other modules developed in the CoSWoT project

We will evaluate the effectiveness of the implementation through experiments on various materials and in various scenarios corresponding to use cases belonging to the CoSWoT project.

**Location:** The internship will take place at LIRIS/INSA Lyon in the TWEAK team ([https://liris.cnrs.fr/en/team/tweak](https://liris.cnrs.fr/en/team/tweak)) and will be co-supervised with MONDECA, a software company located in Paris.

Please read [https://www.insa-lyon.fr/en/international-student-1](https://www.insa-lyon.fr/en/international-student-1) to know the advantages to come and study at INSA Lyon (student services, campus life and city).

**Supervisors:** Lionel Médini (LIRIS), Frédérique Laforest (LIRIS), Ghislain Atemezing (MONDECA)
Bibliography


[CWT19] https://coswot.gitlab.io/

[NodeWoT] https://github.com/eclipse/thingweb.node-wot


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