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Constrained Semantic Web of Things

Intelligent and decentralized Applications on constrained objects using Semantic Web technologies for Sustainable Agriculture and Smart Buildings

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Problems

- Internet of Things (IoT) connects physical devices
- Heterogeneous devices with various capabilities
- How to build collaboration between devices to propose new services ?
- How to break down manufacturers' silos?

Goal

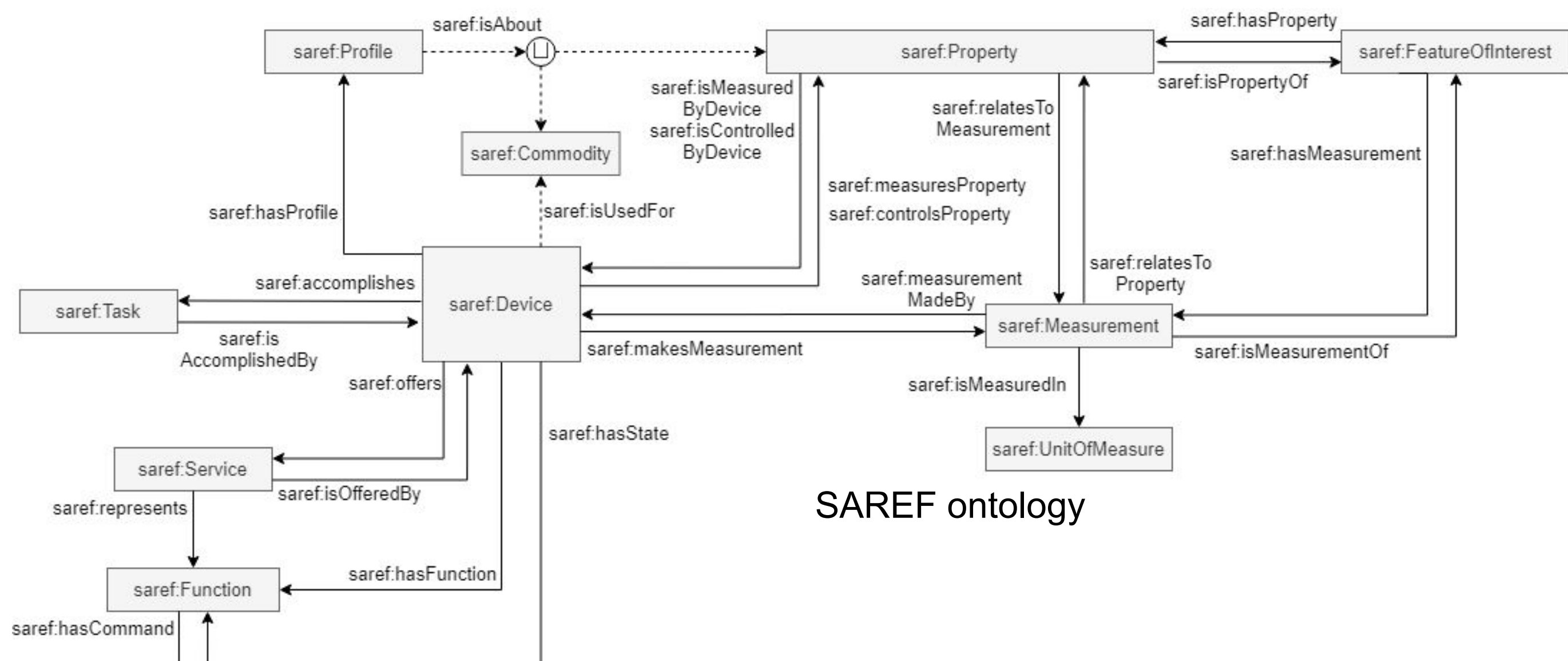
- The Web of Things (WoT) integrates Web standards with physical devices
- Build a **WoT platform to enable the development and execution of intelligent and decentralised smart applications** despite the heterogeneity of devices.

Constrained Objects

- Embedded reasoning
- Limited CPU, Memory, Network, resources...

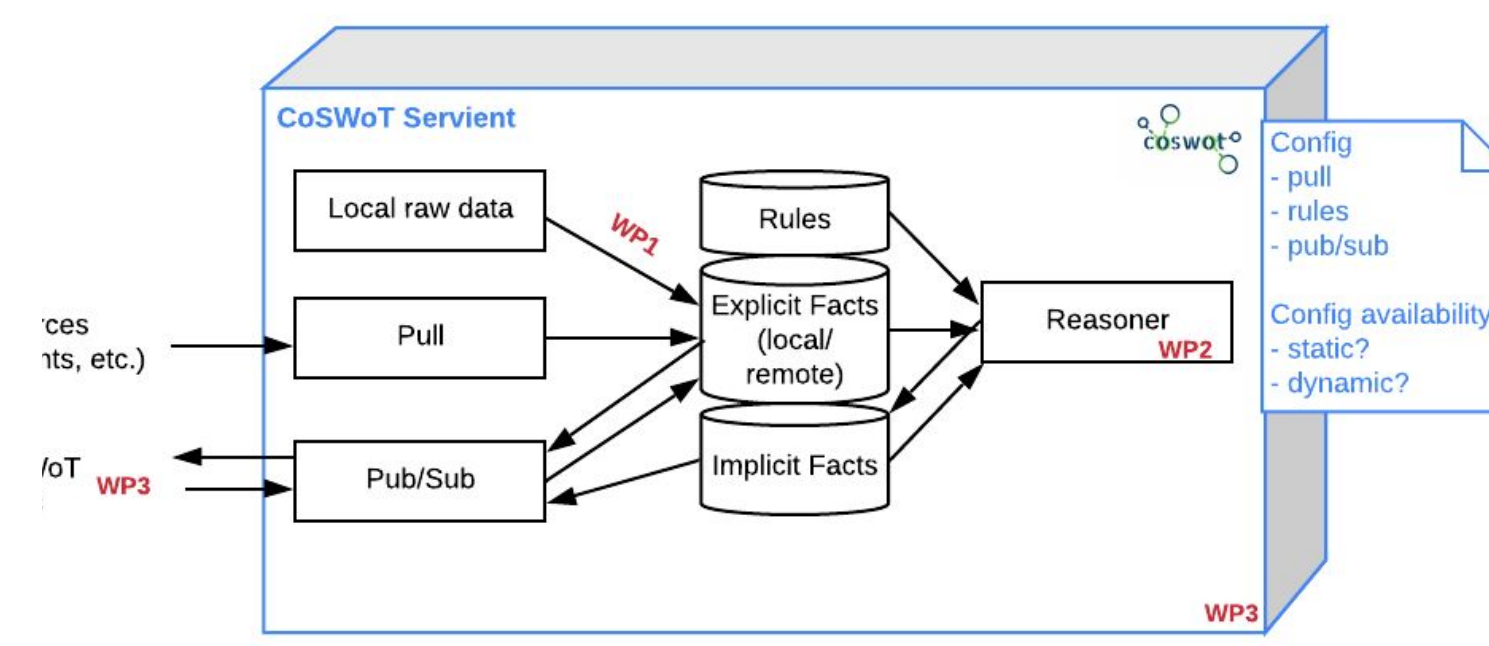


Semantic Web technologies for Interoperability



Network of ontologies:

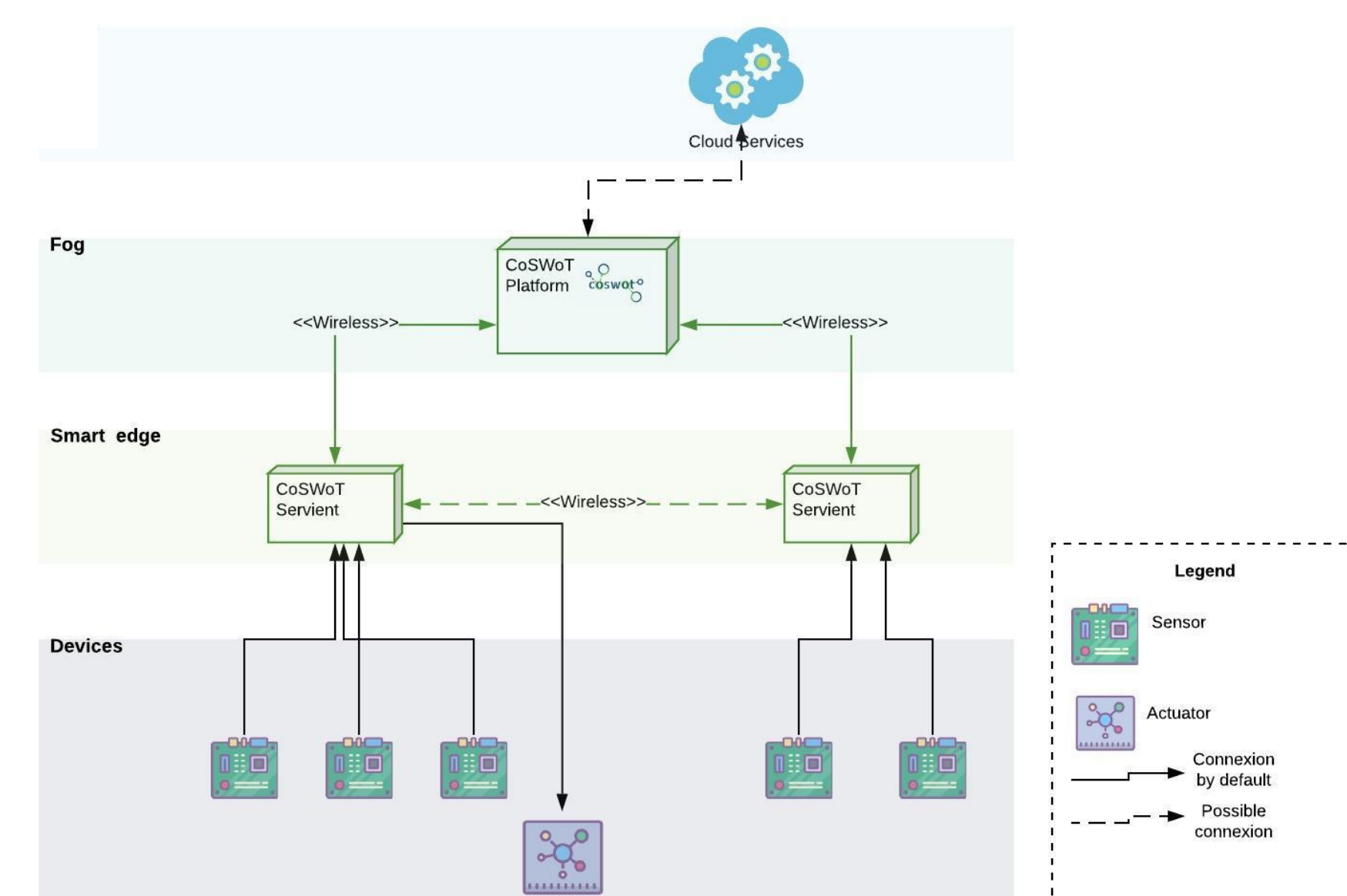
- Sensor Ontologies: SSN/SOSA, SAREF, CASO...
- Web of Thing ontologies: Thing Description, oneM2M...
- Domain ontologies: SAREF4BLDG, SAREF4AGRI, IRRIG...



WoT servient functionalities

Decentralized architecture

- Distributed reasoning
- Processing data close to source (Fog/Edge Computing)
- WoT Servient: first class citizen of our architecture



Coswot deployment architecture

CoSWoT Project Facts

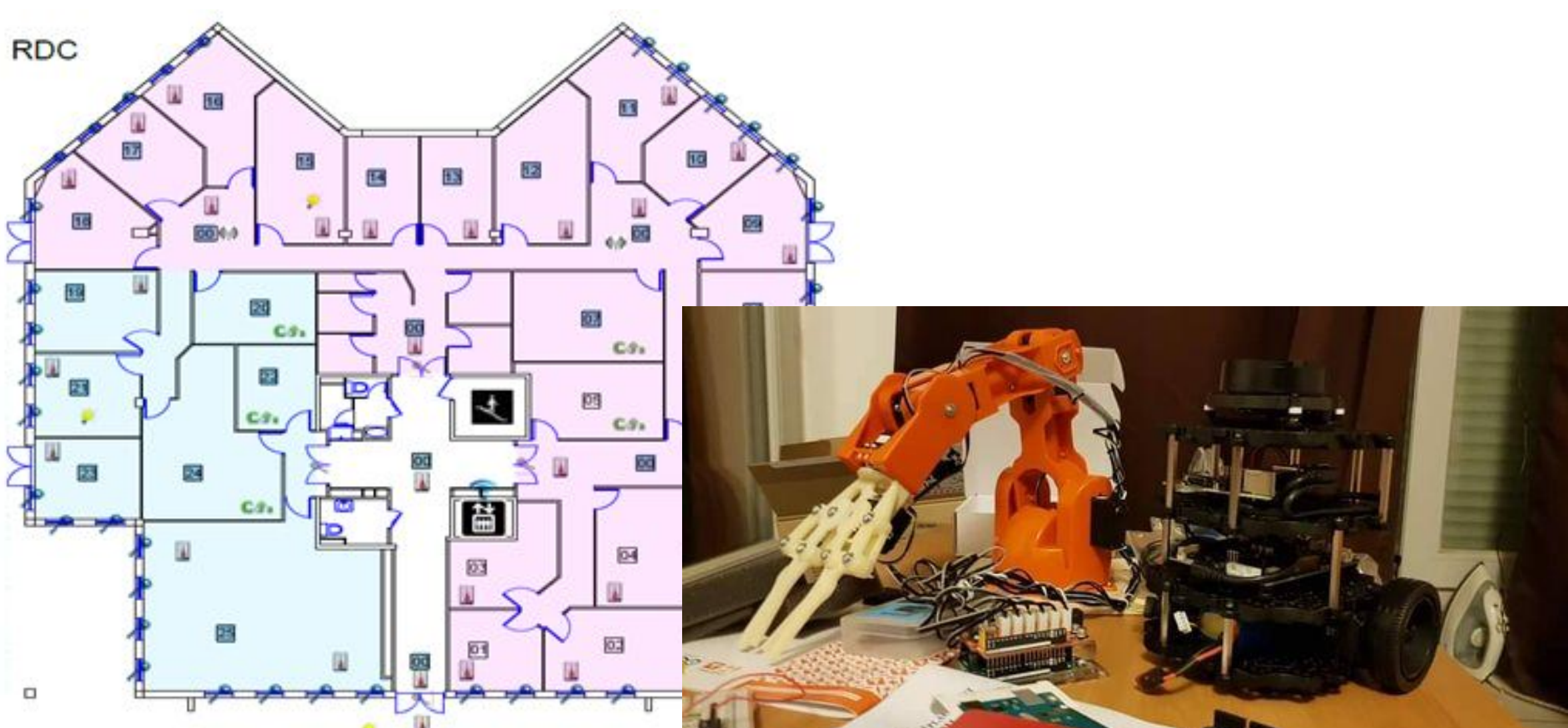
- Dates: Feb. 2020 - Jan. 2024
- Budget: 1.05M€
- HR: 306 person*month
- Website: <https://coswot.gitlab.io/>

Smart Building Use Case

- User comfort and safety
- Personal data reports
- Management of room ventilation (COVID)

Smart Agriculture Use Case

- Automatic irrigation based on weather station
- Field access management for robots
- Crop phenological stage detection



Turtlebot with robotic arm



Experimental farm of the INRAE Agrotechnopole (Montoldre, Auvergne, France)



Weather station



Tractor followed by an autonomous robot (effibot)

Acknowledgements

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