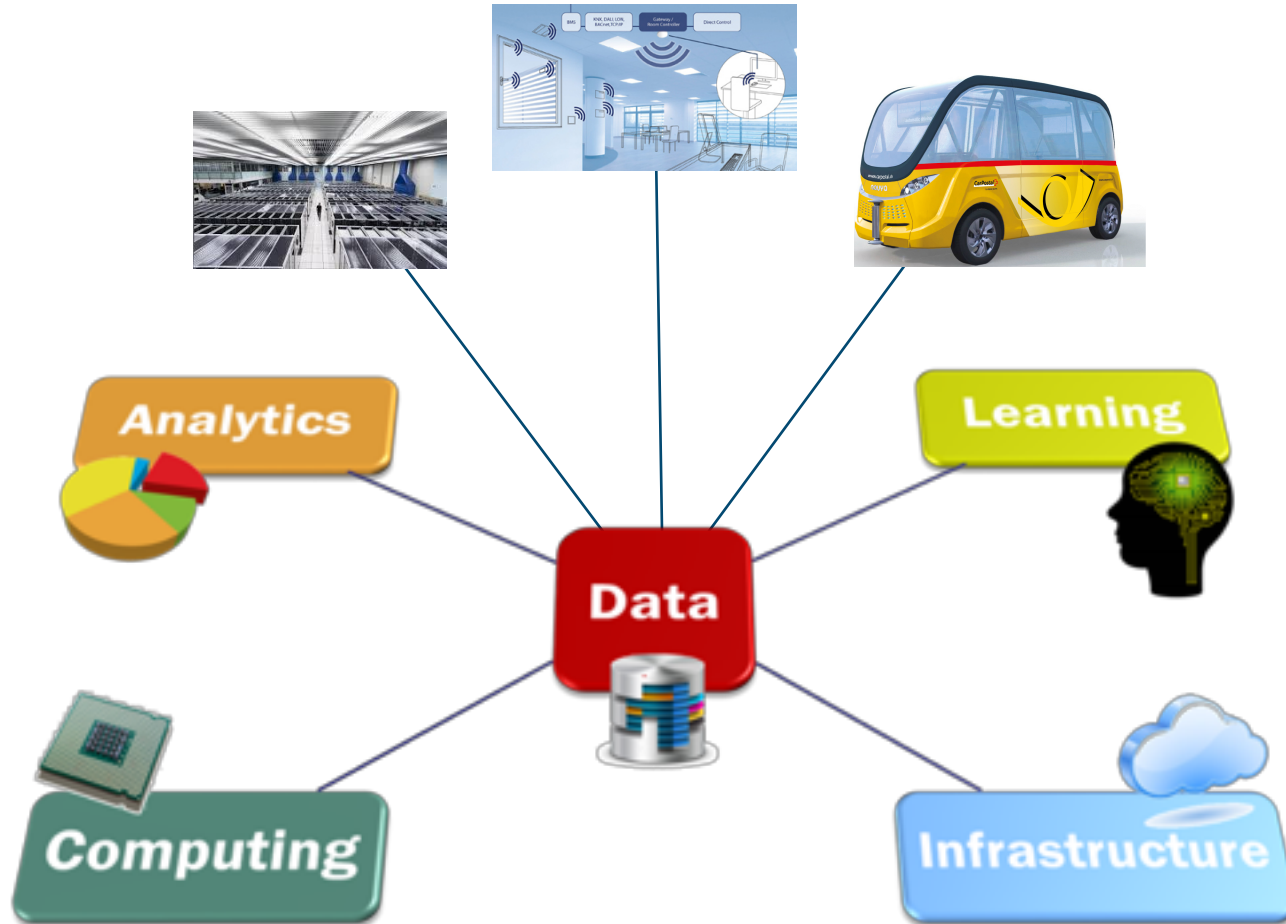# Smart Things and IoT

Fons Rademakers

CERN openlab Chief Research Officer

"Smart Things" and IoT

Understand the potential and impact of technologies such as Internet of Things, fast wireless/mobile communication (5G), and large-scale DA/ML

Raise awareness among the community by collecting and aggregating interests and setting up PoC projects

Currently investigating applications for **mobility** and **smart environments**

Possible applications in **control systems** and **environmental control**

Motivation

Learn About Smart Technologies and the Internet of Things

- Lot of opportunity at CERN for Smart developments and deployments
- There are initiatives in many different corners and areas
- Not yet coordinated and mostly not aware of each other
- Try to create mutual awareness
- Try to create collaborations between CERN, industry and academics
- We have a beautiful campus that can benefit from many of these developments

State of the Art

Profit from Global Initiatives and Developments

- Smart cities
- Smart campus
- Smart mobility
- Smart destination
- 5G fast wireless
- LoRaWan low power wireless

CERN Smart Initiatives

- Distributed network of sensors for monitoring radioactive waste

- Smart mobility, managing the CERN car pool and car parks

- Smart buildings, managing temperature and light based on occupancy

- Smart monitoring of LHC machine parameters

- Smart destinations, buildings advertising themselves

- Smart networking using LoRa
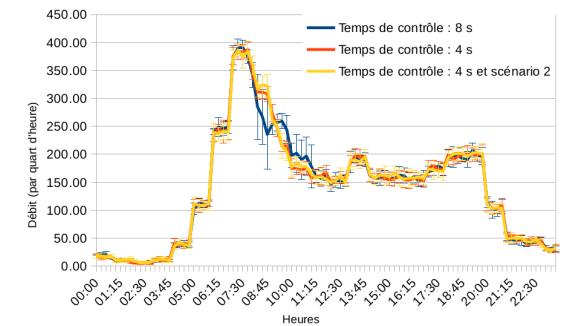
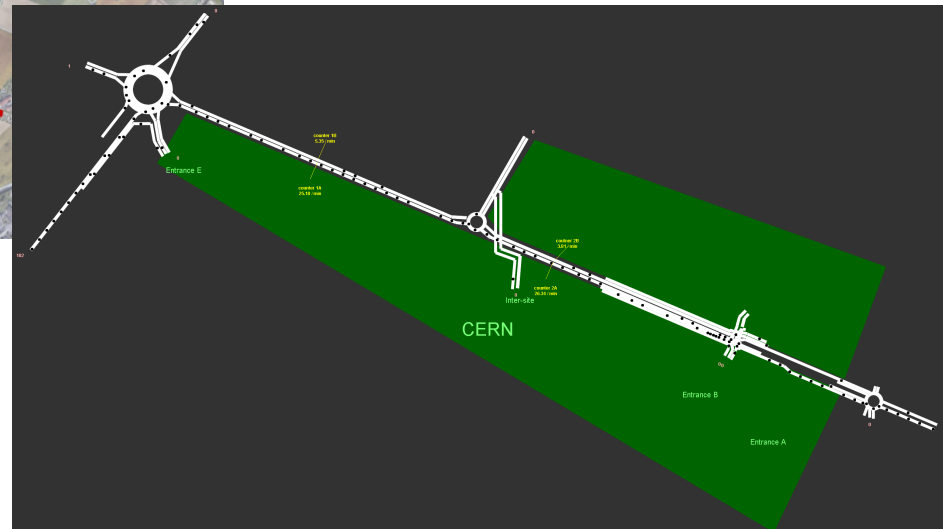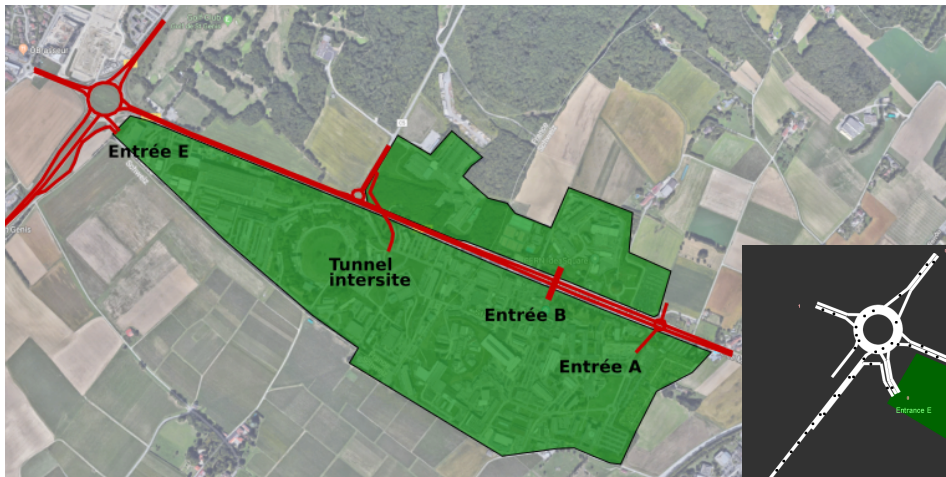- IoT security considerations

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CERN's Mobility Master Plan

The Mobility Master Plan will be presented this summer and cover:

- CERN car fleet optimisation
- CERN bike fleet management
- CERN shuttle service optimisation
- Develop a CERN Mobility As A Service platform
- Optimisation of the CERN access gates
- Develop a CERN car pooling scheme
- Increase visibility and safety for soft mobility
- Increase communication on Mobility matters

CERN Site Traffic Optimisations

Joint project with the UNIGE. Students study the traffic patterns around the different CERN access gates and try to optimise the access.

Opportunities

- There is a great interest in these developments
- There are many industry solutions we can benefit from
    - Smart id cards, presence, mobility, destinations, buildings, network, etc.
- To benefit fully we need to combine the solutions, aim for vertical solutions to unleash the real power of Smart technologies
- Ongoing standardisation allows for interoperability of IoT technologies

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Plans

- Try to set up a number of pilot projects with direct benefit for the user community

    - Smart management of the CERN car pool

    - Smart destinations to make visiting CERN more attractive

    - …

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