Introducing FogLAMP

The Open Source Platform for the Internet of Things

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Who Are We?

We are Dianomic Systems - *Our mission: Simplify IoT Data*

DIANOMIC

Dianomí *greek* = Distribution *english*

The distribution of IoT data networking, processing, security and storage makes managing it complicated. Simplifying IoT application and system development with an ubiquitous open source platform, standards and community is Dianomic's mission.

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Conference Theme & Keywords

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Welcome! (and Agenda)

- IoT, IIoT and Fog Computing
- What Is FogLAMP?
- Use Cases
- FogLAMP Architecture
- Demo
- Next Steps (FogLAMP Roadmap)

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Industrial IoT Challenges

Combined Surveys:
- Morgan Stanley
- HP
- Gartner

- Security concerns
- Lack of standardization
- Lack of skills
- Upfront investiments
- Legacy-installed base
- Data integrity
- Internal system barriers
- Liability of current technologies
- Social/political concerns
- Lack of solutions/technologies

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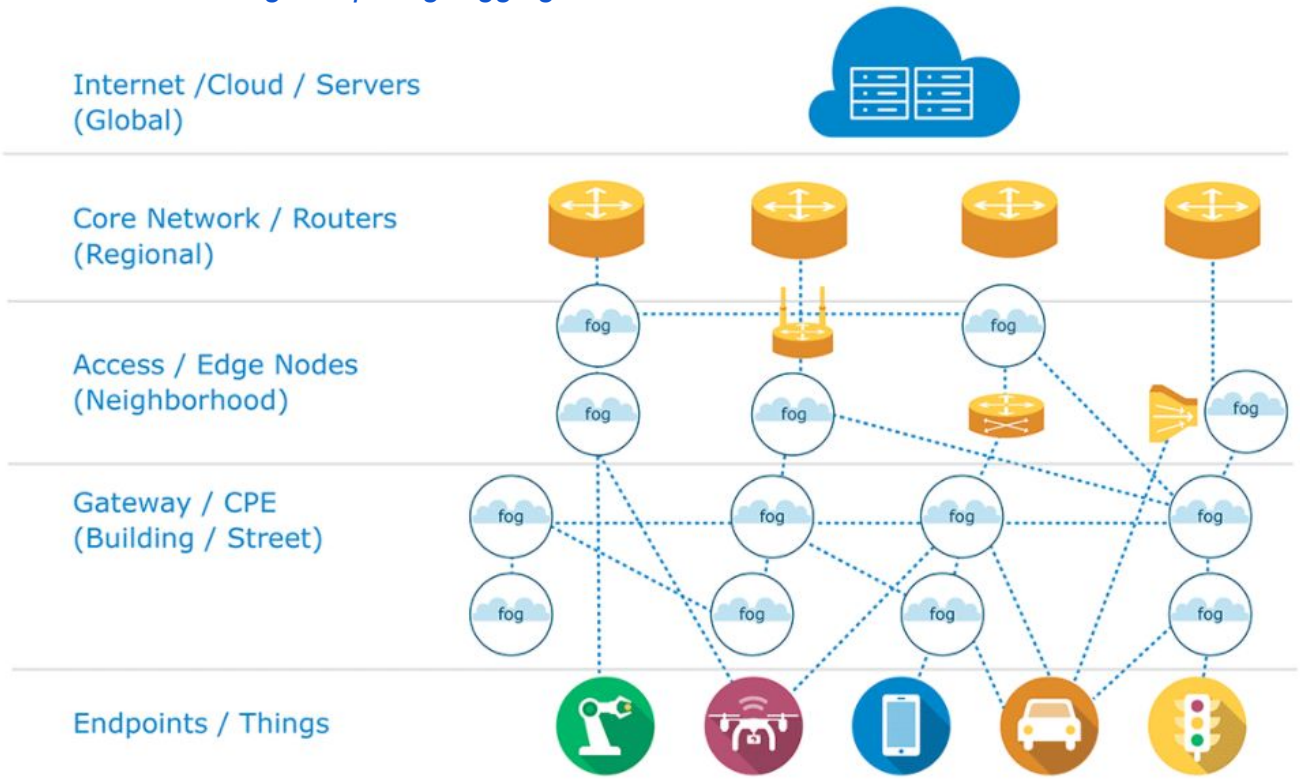
Introducing Fog Computing

http://internetofthingsagenda.techtarget.com/definition/fog-computing-fogging

"A decentralized computing infrastructure in which data, compute, storage and applications are distributed in the most logical, efficient place between the data source and the cloud."



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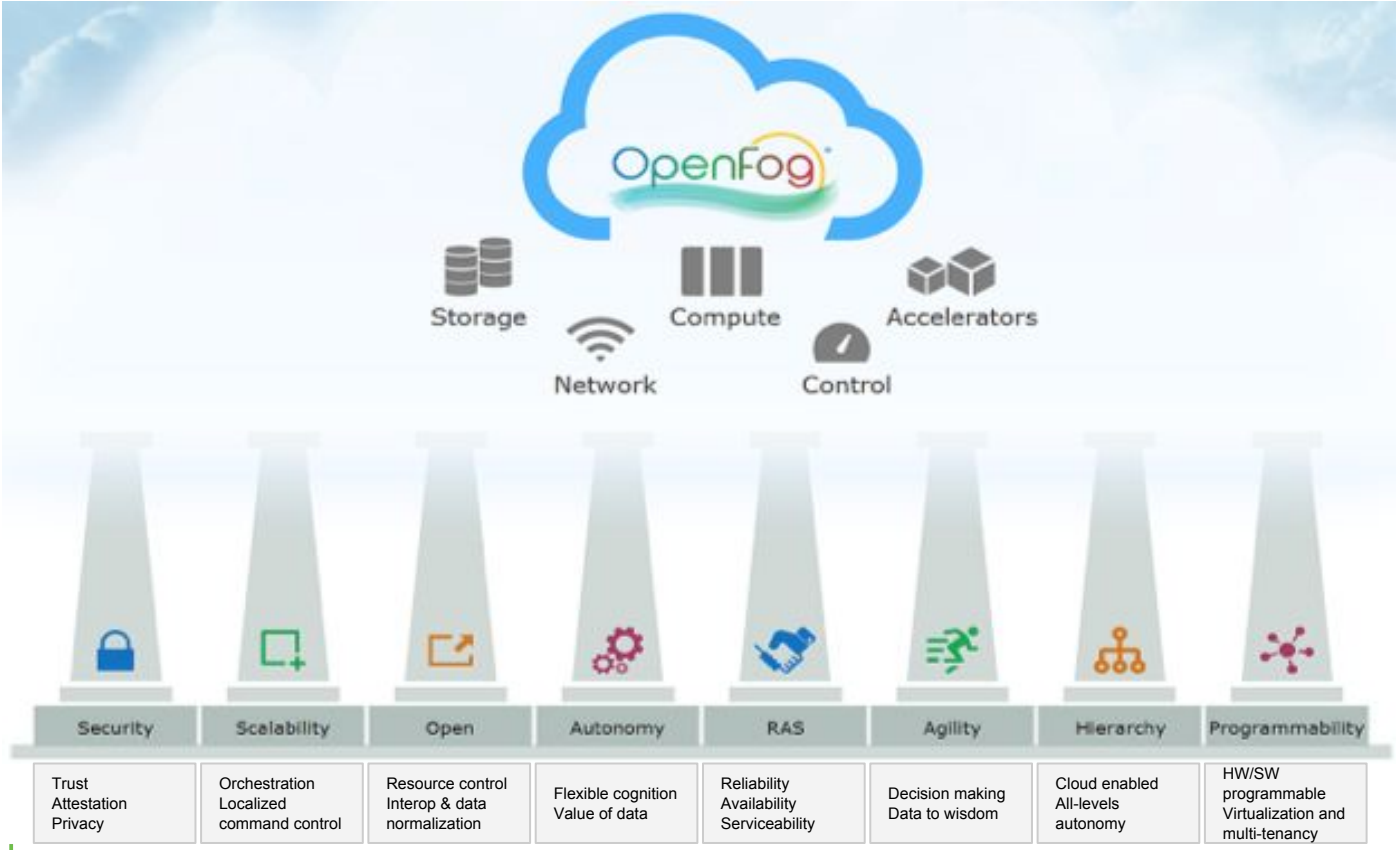
Eight Pillars of an OpenFog Reference Architecture



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Introducing FogLAMP

*FogLAMP is a platform for the **Internet of Things** and an essential component in **Fog Computing**.*

*It uses a modular **microservices architecture** including sensor data collection, storage, processing and forwarding to historians, Enterprise systems and Cloud-based services.*

FogLAMP can run in highly available, standalone, unattended environments that assume unreliable network connectivity.

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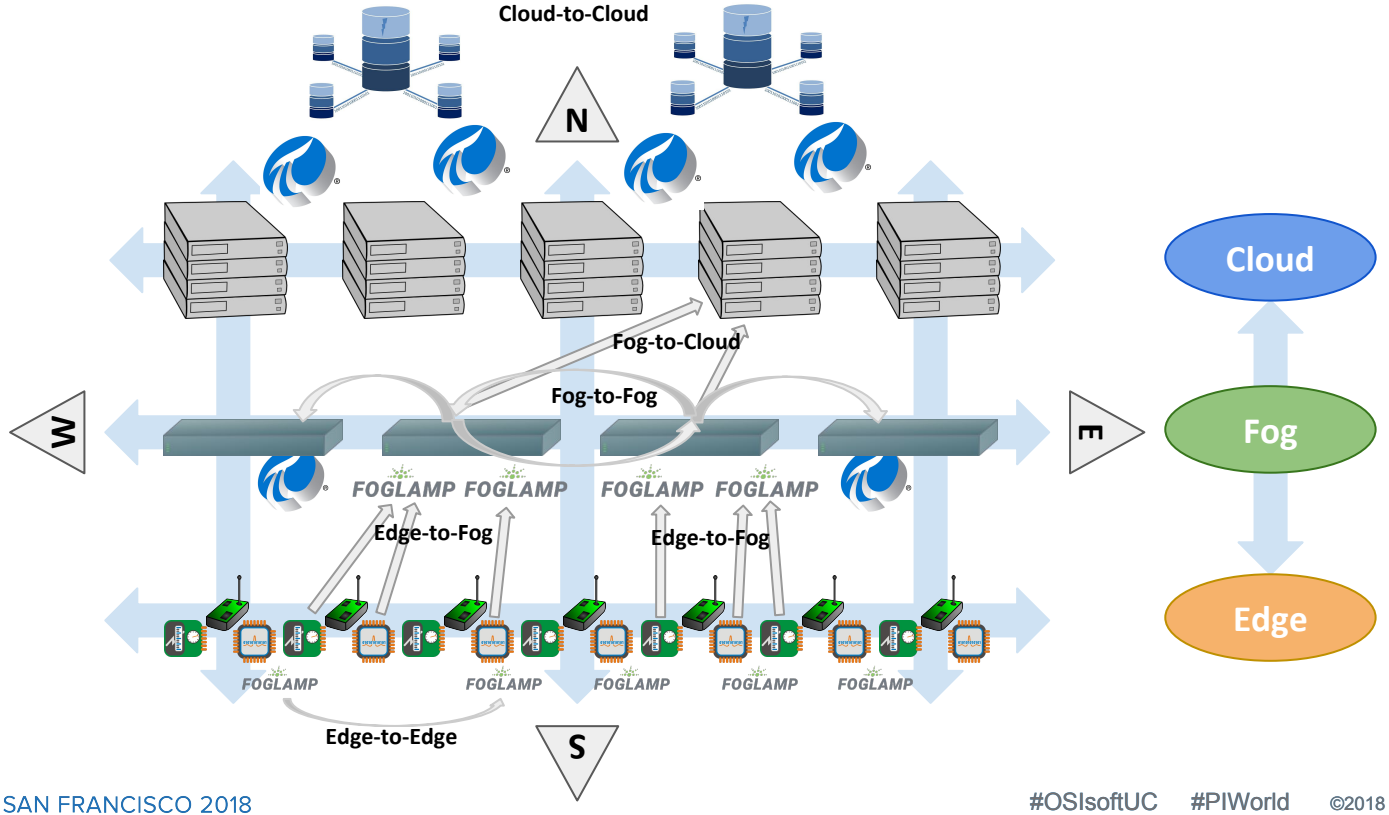
Introducing FogLAMP



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FogLAMP is...

- Open Source
- Written in C/C++ and Python
- Available on a large number of platforms and environments
- Available on GitHub and in our apt repository

Available under a permissive Apache 2.0 license

Applications and Microservices plugins can be written in any language

We develop in Ubuntu/Debian platforms on Intel and we deploy on Intel, Cortex-A, but also Cortex-M or even on 32-bit microcontrollers as little as 80KB of RAM.

https://github.com/foglamp/FogLAMP

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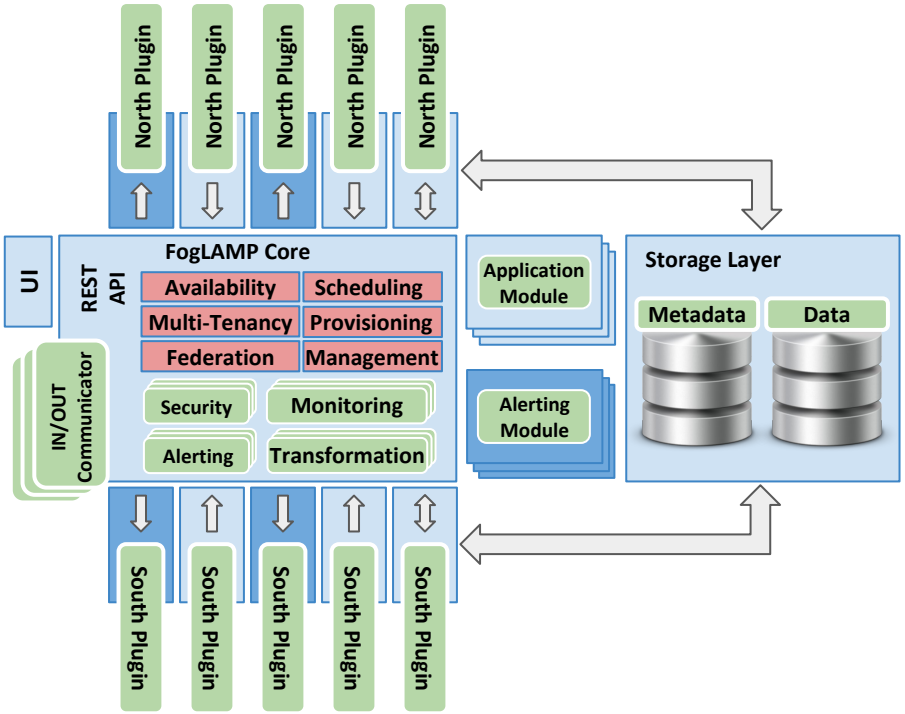
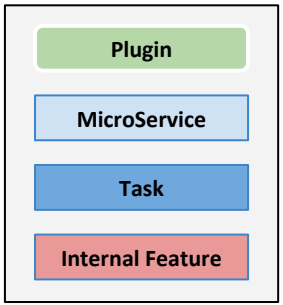
FogLAMP Architecture





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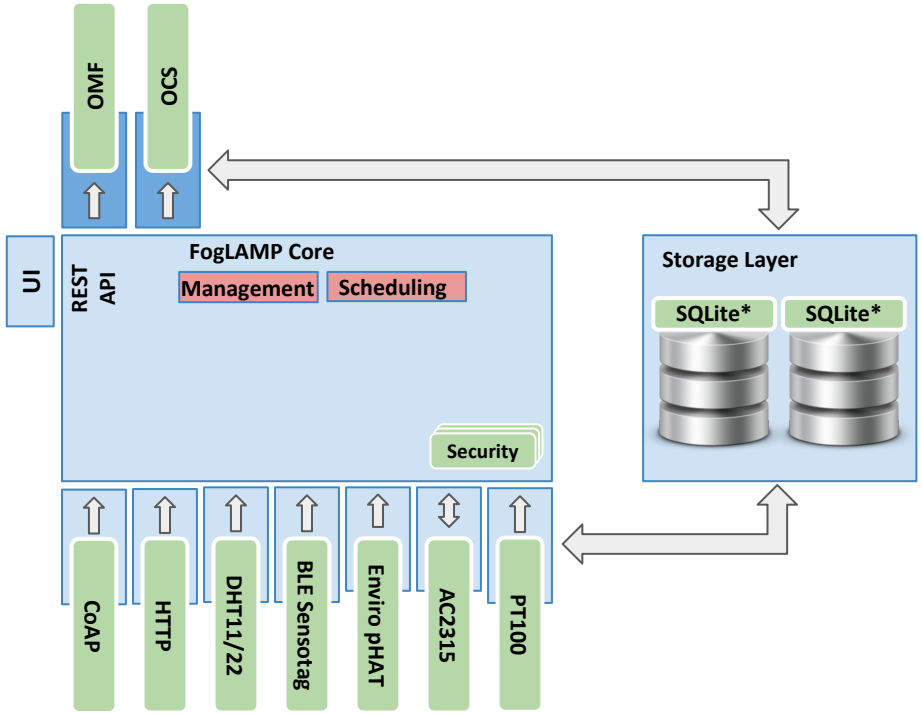
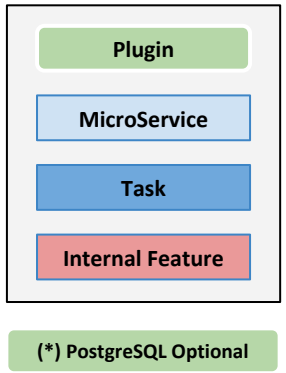
FogLAMP 1.2 - Implementation





(*) PostgreSQL Optional

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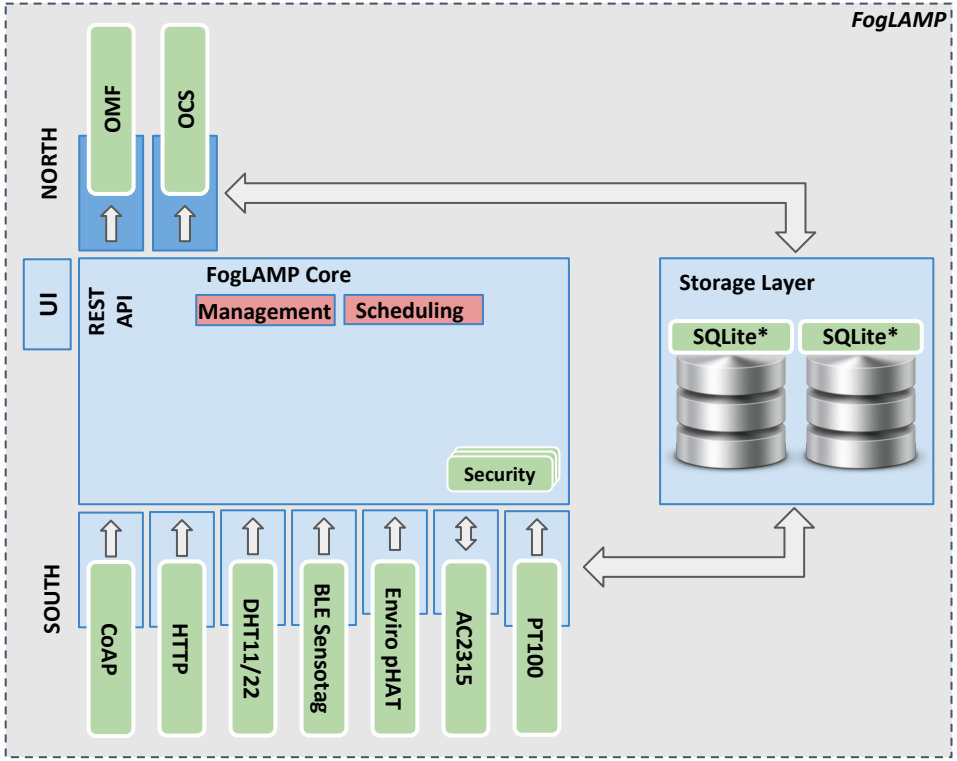

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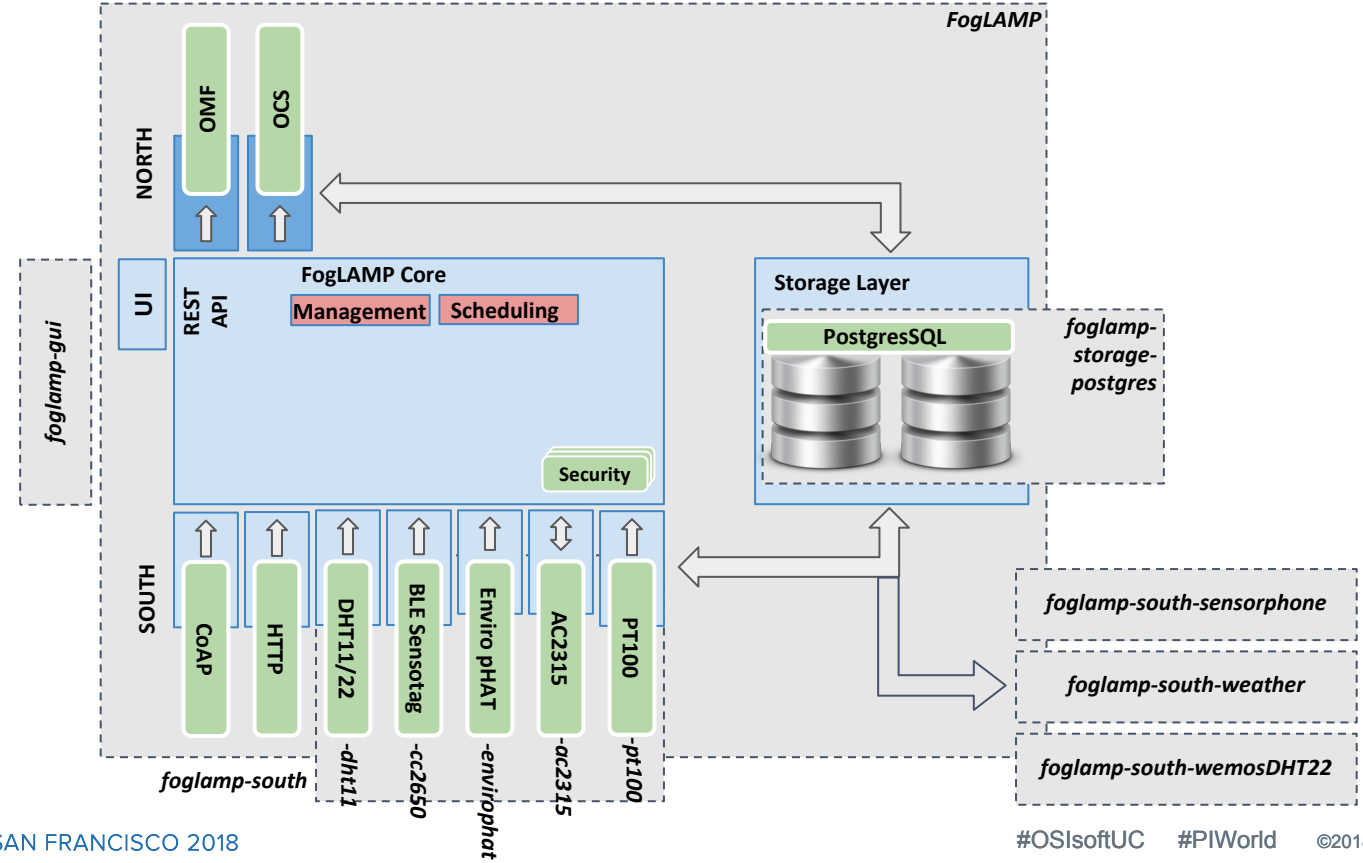

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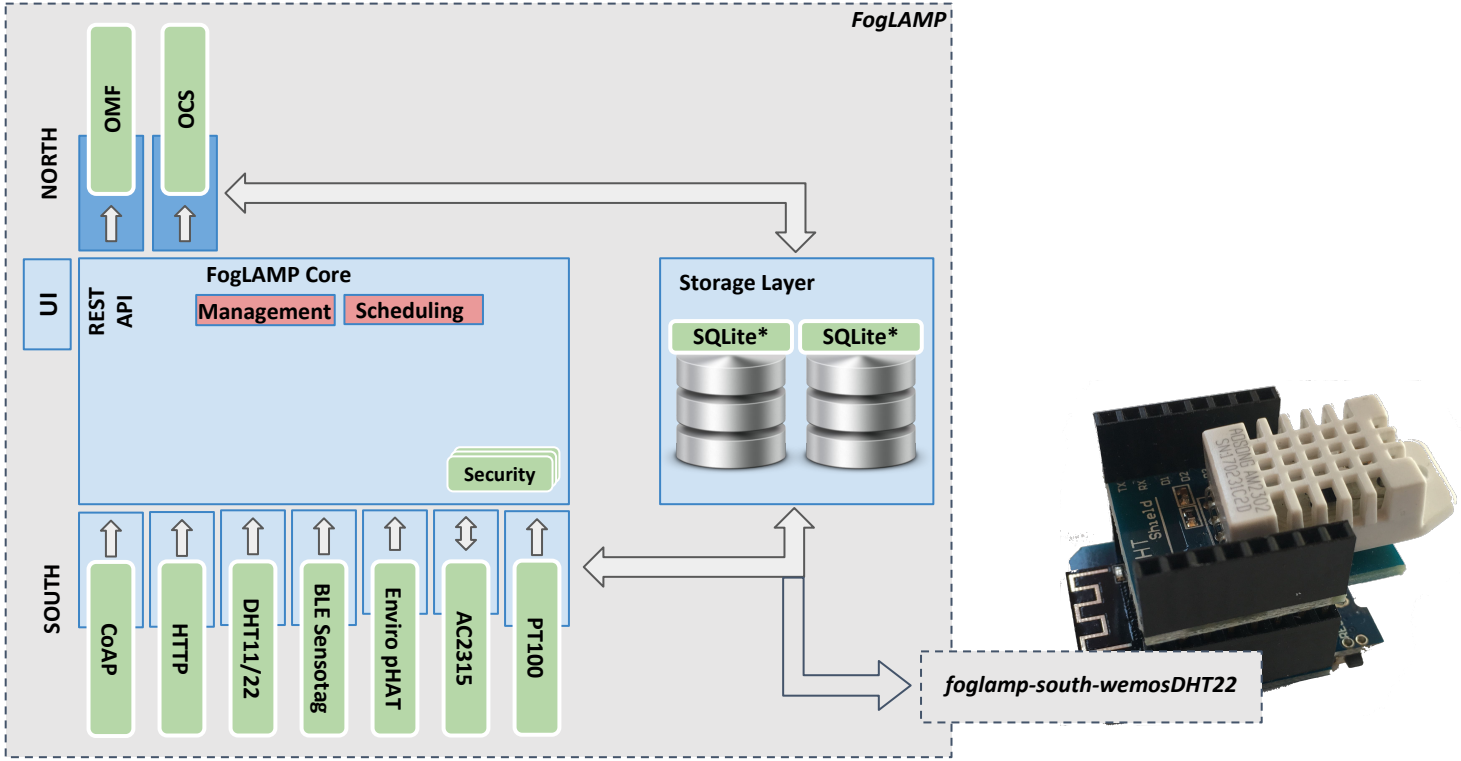

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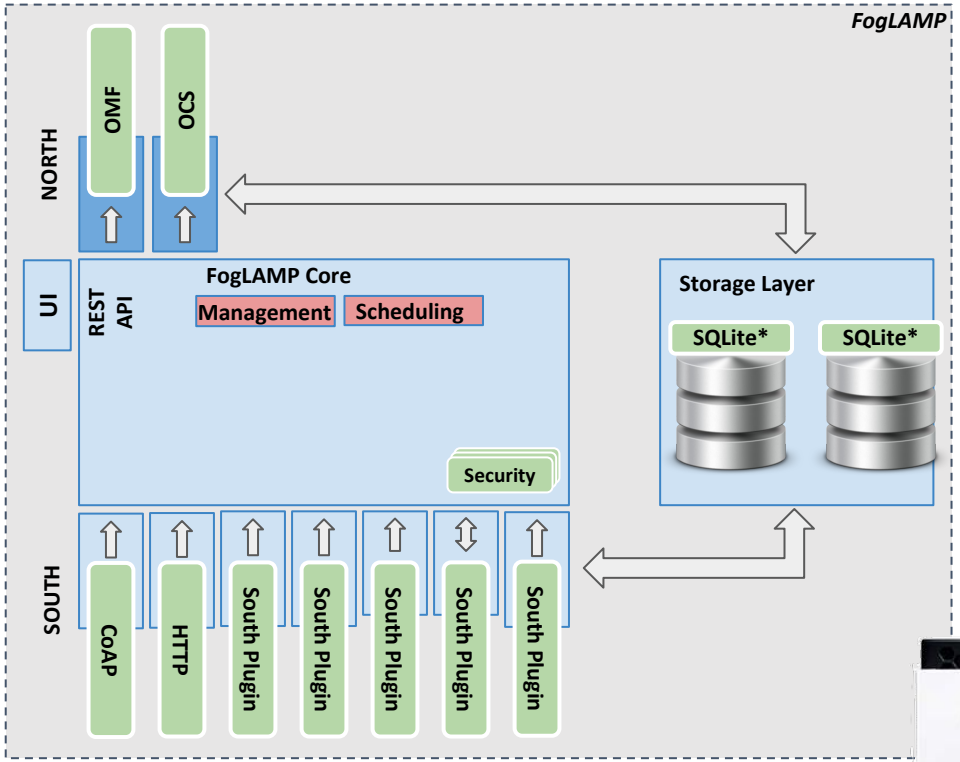

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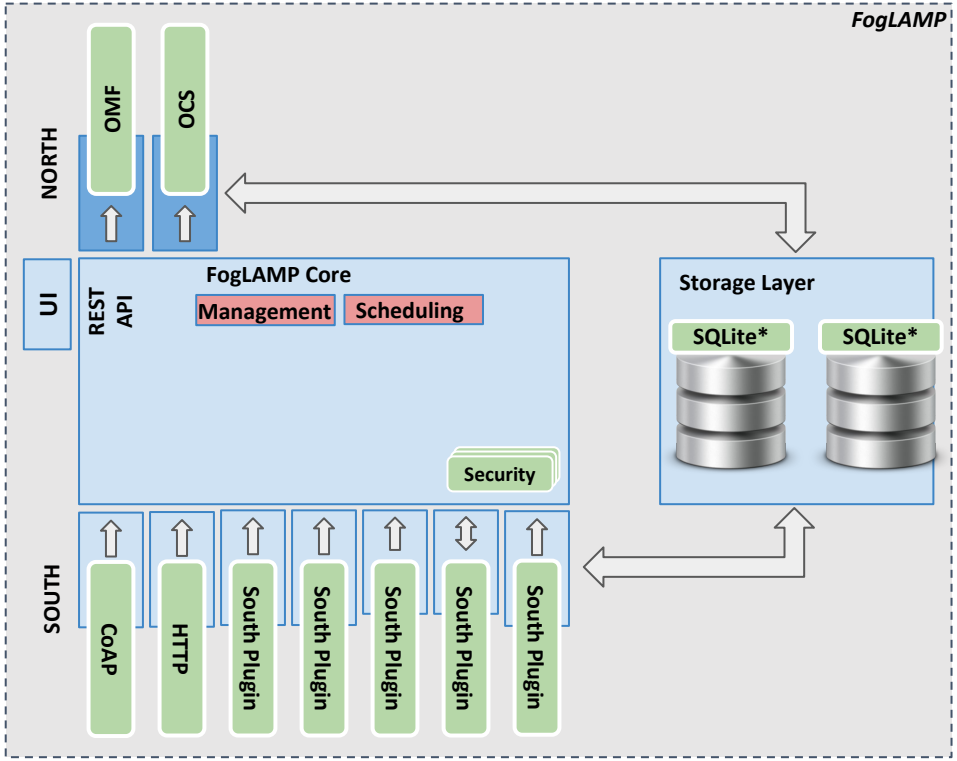

- On *Debian*
  - *Ubuntu, Ubuntu Core, Raspbian, OpenWrt*
- *Red Hat*
  - *CentOS*
- We are working on:
  - *Yocto*
  - *mbed OS*

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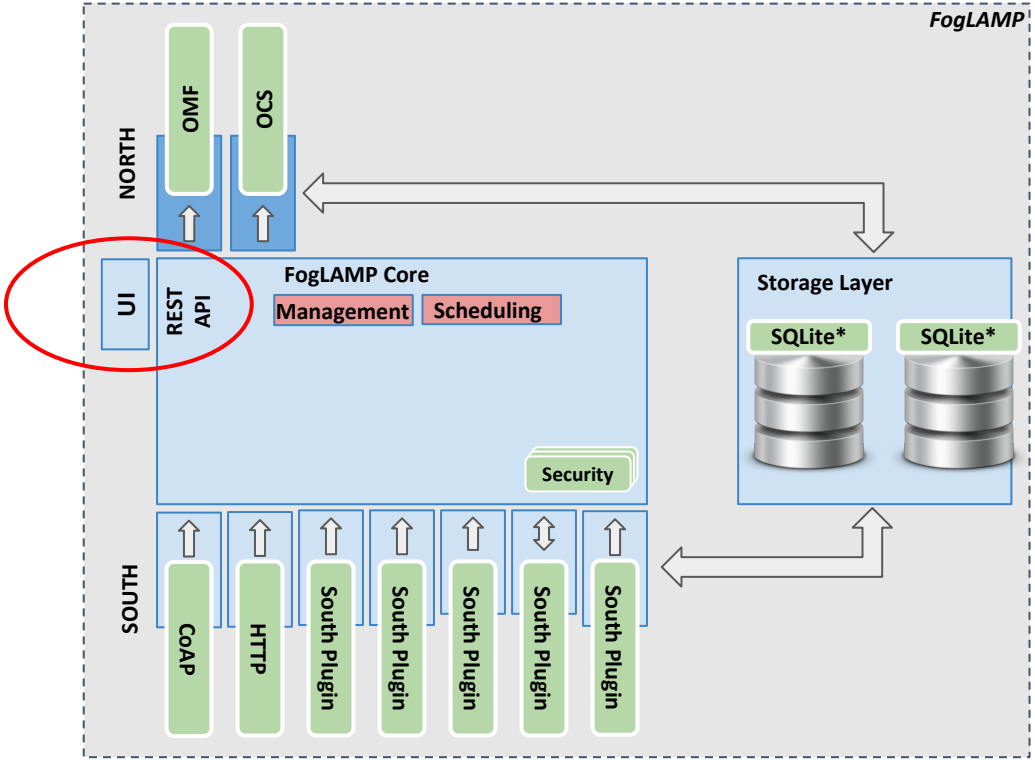
FogLAMP 1.2 - The REST API

- Essential interface used to:
  - Manage and administer FogLAMP, FogLAMP microservices, plugins, users etc.
  - Provide a realtime status of the sensors and devices connected to FogLAMP
  - Send/manage the configuration of sensors and devices
- Available via HTTP/HTTPS



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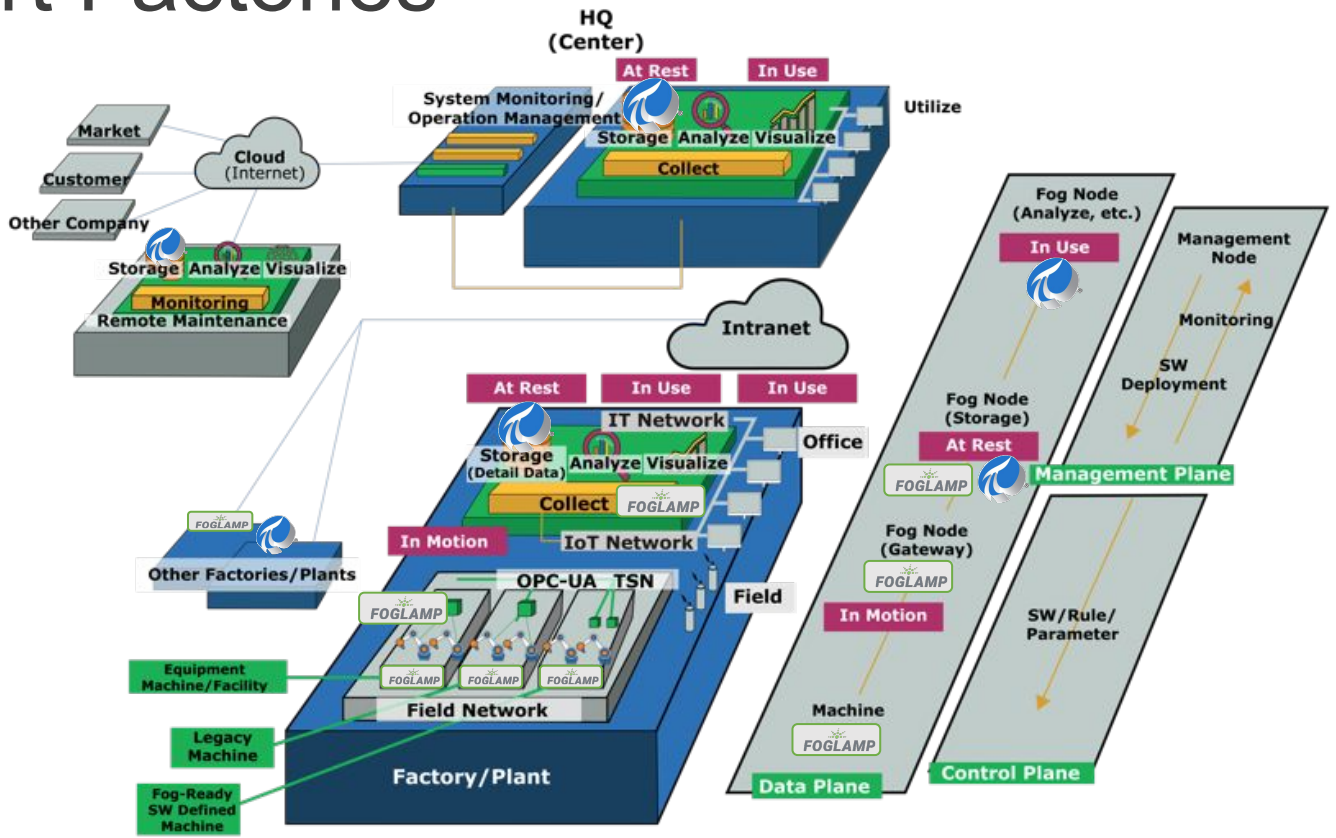
Smart Factories



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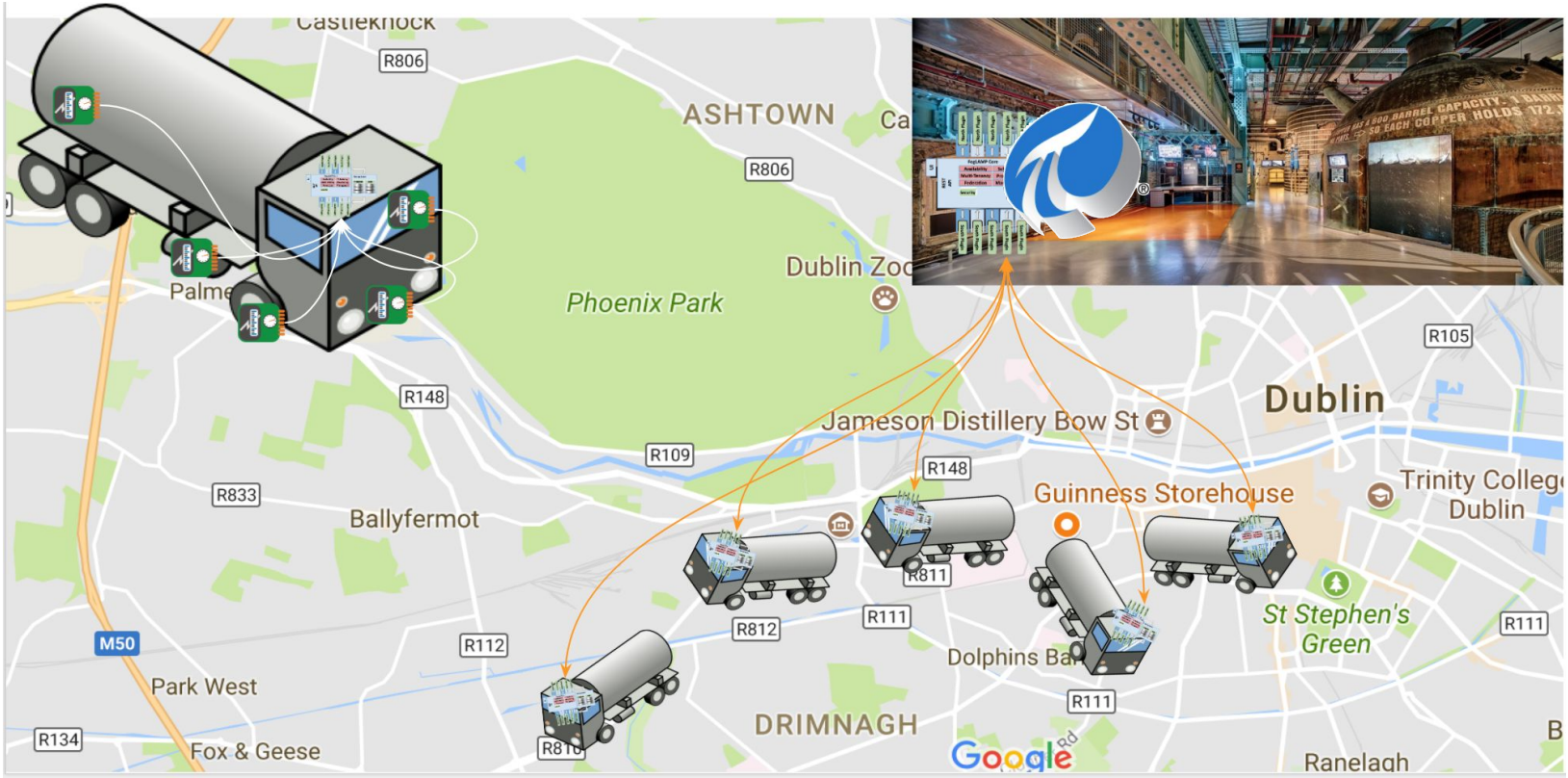
Smart Fleets



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Mining Plants

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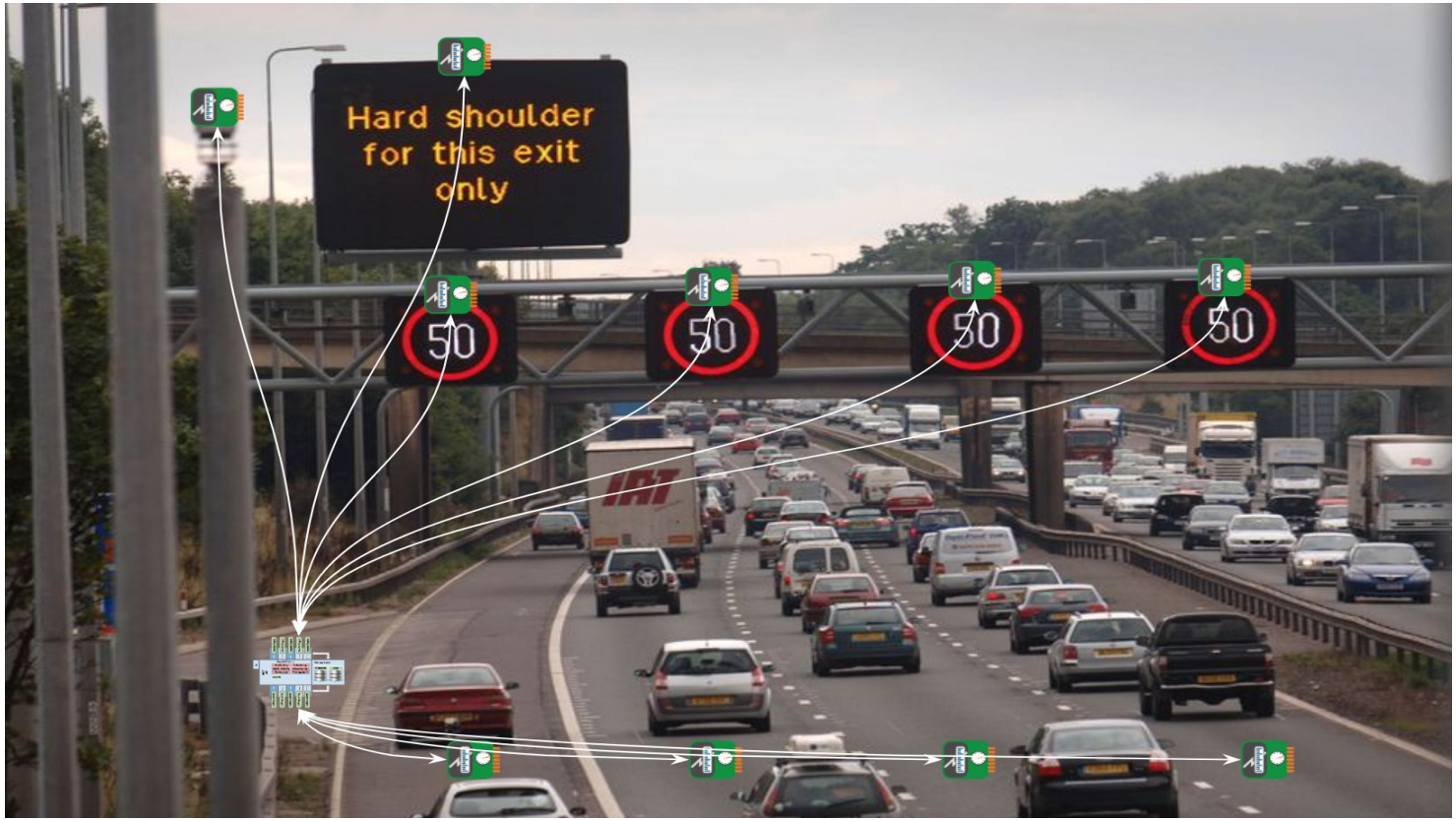
Smart Roads



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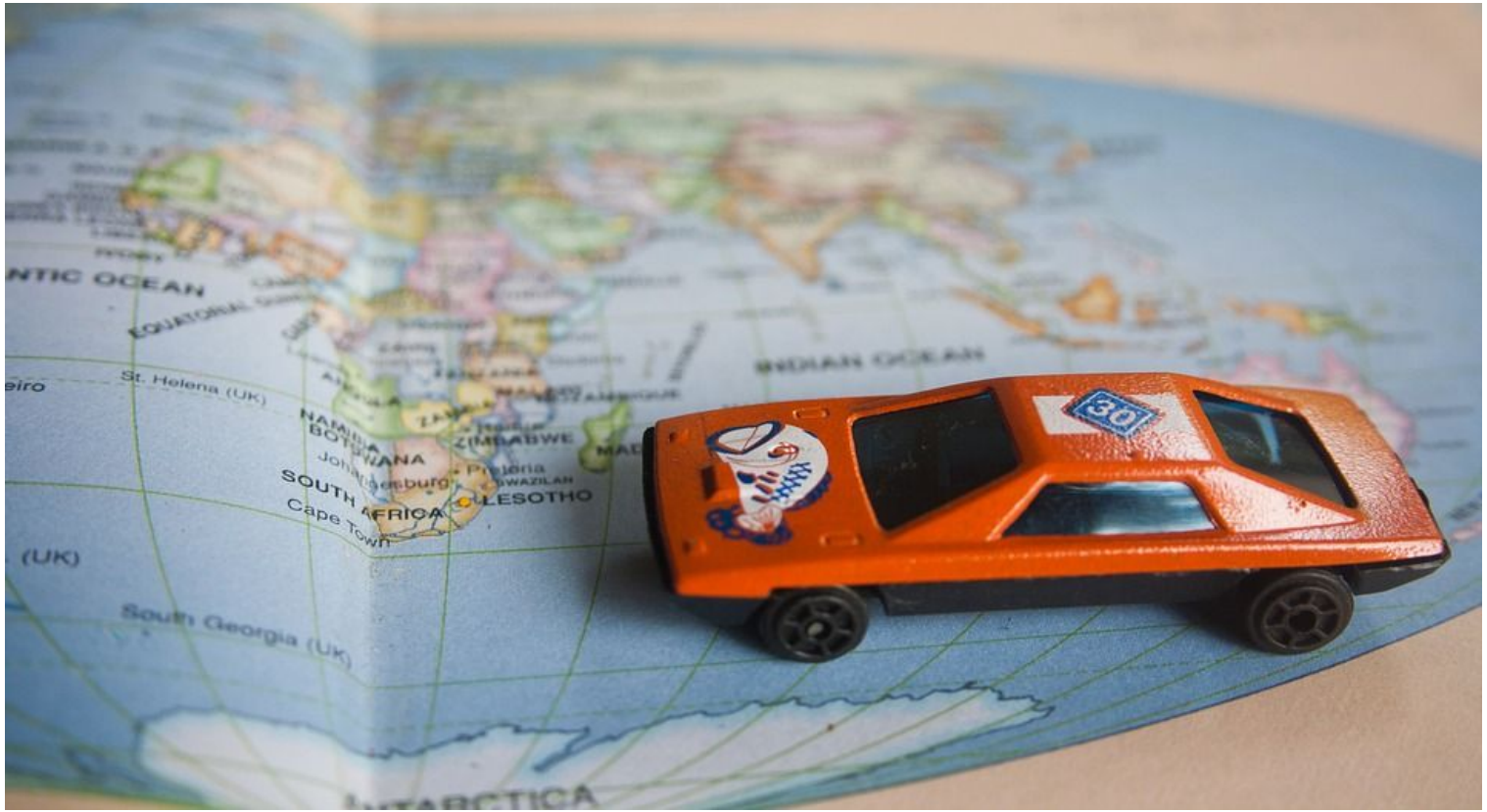
Roadmap and Next Steps



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Reducing Storage and Memory Footprint

- Moving Python-based microservices to C/C++
  - Developers can still create their plugins in Python or other languages, if they wish
  - Initial memory footprint will be about 1/3 of the current footprint
- Removing 3/4 of the current dependencies by moving plugins out of the main repository / package
  - This will massively reduce the storage footprint
  - The repositories will be more “clean”, i.e. easier to use/study/improve
  - Dependencies will be clear and they will be the starting point for a marketplace

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Service Distribution and Port

- Implementing a real, Fog-based distributed architecture
  - We will implement *South* microservices on small devices, leaving *Core*, *Storage* and *North* microservices in FogLAMP instances used as “concentrators”
  - FogLAMP relays: in large environments (i.e. thousands of smart sensors and devices) small FogLAMP instances transfer data to larger FogLAMP instances and to PI Server(s)

- Completing the port of FogLAMP on other environments
  - Support for the Yocto project
  - Full support to OpenWrt
  - FogLAMP in mbed OS (as a whole or by micro/nano service)

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Plugins

- Accepting plugin contributions or implementing them on request
  - There are thousands of libraries/devices/drivers. We hope developers will contribute and provide plugins to increase the offer

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Management

- Fully functional interface
  Now that we have the REST API, we need:
  - A command-Line interface to orchestrate installation and management
  - A control GUI to manage a large number of FogLAMP instances
- Enhance FogLAMP security at all layers and components
  - We have security plugins that can be used to work with North/South services and devices, East/West users and applications
- FogLAMP Control Center
  - Used to deploy, configure and control FogLAMP and the smart sensors and devices accessible via microservices and plugins

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FogLAMP on GitHub: *https://github.com/foglamp/FogLAMP*
FogLAMP Discussion Group: *https://groups.google.com/forum/#!forum/foglamp*

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Questions

Please wait for the **microphone** before asking your questions

State your **name & company**

Please remember to…

Complete the Online Survey for this session

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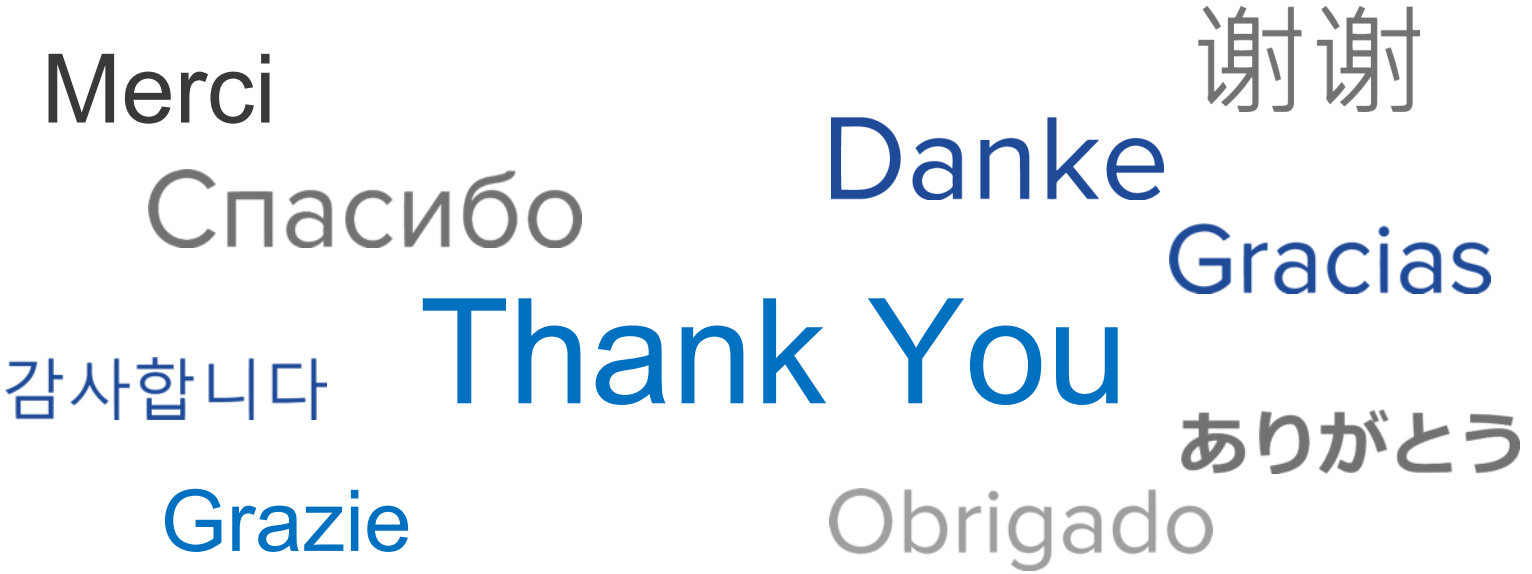

Visit us at the FogLAMP Community Booth!

More content and presentations you might be interested in:

Tue 24 3:15PM	Managing and Accelerating Innovation with Open Source at the Edge
Thu 26 10:30AM	Introduction to FogLAMP
Thu 26 1:30PM	LAB: IoT and Fog Computing - Develop Data Ingress Applications from Edge to Cloud
Thu 26 2:30PM	Fog Computing on the Plant Floor

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FogLAMP on GitHub: *https://github.com/foglamp/FogLAMP*
FogLAMP Discussion Group: *https://groups.google.com/forum/#!forum/foglamp*

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