

Heterogeneous Device Management with Eclipse OM2M based on oneM2M abstraction layer

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**Towards a Unified IoT Device Management
Federative Platform**

Eclipse IoT Day Grenoble 2020

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Orange

IoT Research Domain



Device Management matters!

Economical

Maintenance of device costs: a call to Customer Care Call center costs 20 € - Sending a technician costs 100 €

Environmental

In the past, devices were considered as disposable - IoT becomes more environment respectful

Business

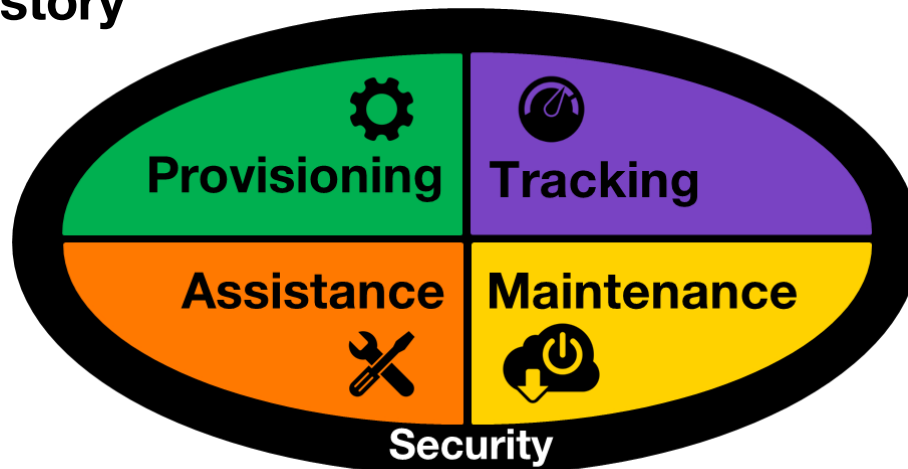
Openness to Third parties / partnership

Devices with advanced configuration capabilities

Not dedicated to a single usage, to fit technical configuration to functional requirements

What is Device Management?

A little piece of history



Gateways, STB
firmware
management

Assistance
(Customer Care)

More stories to
tell with IoT



Service
configuration (e.g.
VoIP)

QoS and QoE
Tracking

What is Device Management?

Device Management in industry

Very few research academic work on Device Management

Even if the issues are complex in IoT context

Some standardisation initiatives:

- Broadband Forum: success of TR-069 – new USP proposal
- CableLabs: DOCSIS
- OMA: OMA-DM and OMA-LWM2M
- oneM2M
- IETF: COMI, SUIT



CableLabs®



one
M2M



A trend towards a fusion of Device and Service Management

And, obviously, many, many, many dedicated specific solutions...

“One Service – One Platform” syndrom

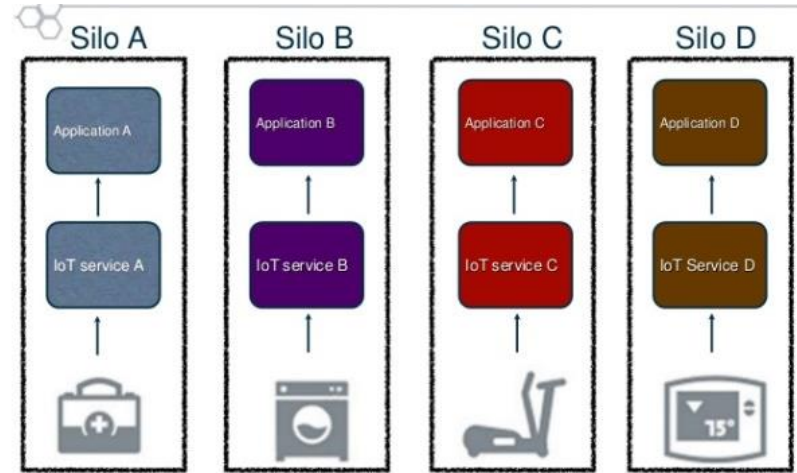
The reality with IoT?

Silos and dedicated solutions

With already well known issues

**Heterogeneity
(protocols,
datamodels,
lifecycles)**

**Scaling (e.g.
number of
devices)**



New challenges and issues brought by IoT Device Management

**Static
Dependencies
(firmware or
configuration)**

**Dynamic
Dependencies
between devices**

**Provisioning of
services on
multi-devices**

Our convictions

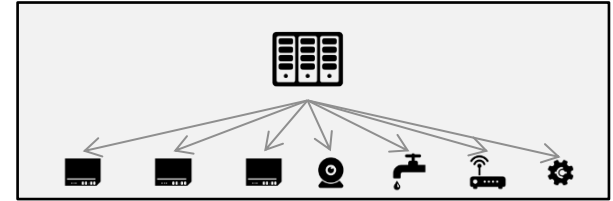
Federative and dynamicity

Facts

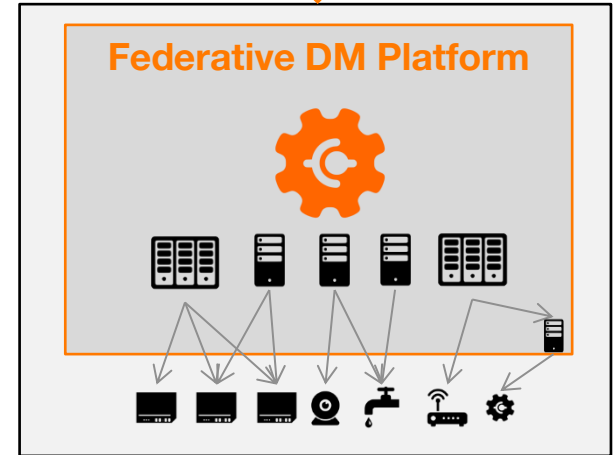
- Billions of device
- Multiplicity and heterogeneity of protocols
- Multiplicity and heterogeneity of DM platforms

Target

- **Federative platform** to integrate multiple and heterogeneous Device Management Platform
- **Dynamic integration** of new management systems
- **Context-aware** management
- Advanced **smarter** (e.g. IA based) coordination features



From a **centralized** paradigm

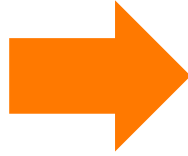


To a **federated** one

Ongoing work

A Generic API for Device Management

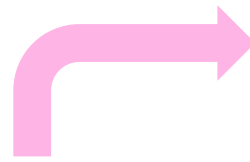
Managing heterogeneous systems of devices



Protocol-agnostic Device Management API



Make it a standard API



Abstracting DM with oneM2M and SDT



Internal DM Server API

Single device focused



Open External Federative DM Server API

Wider scope including massive operations

oneM2M Smart Device Template

Brings an uniform description (abstraction) of connected objects, independently of underlying IoT technologies

Simplify developer work: one API for N technologies

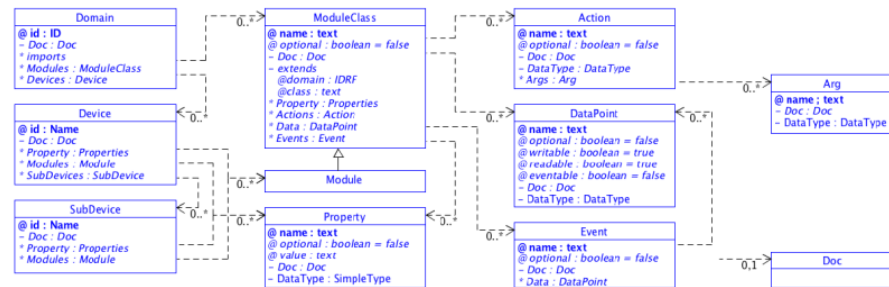
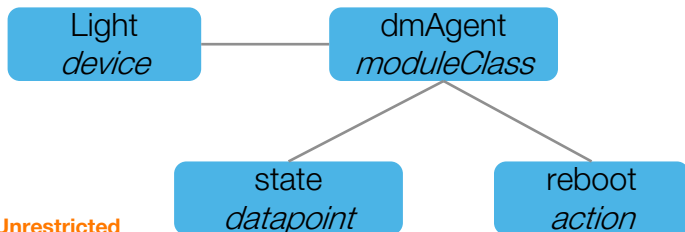
Example: oneM2M 'deviceLight' device, its services, datapoints, and actions

Connect numerous light bulbs from distinct providers and technologies

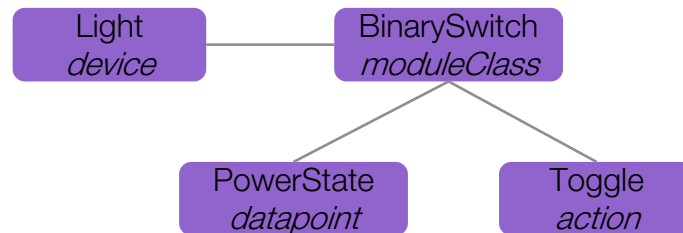
Play with lights: switch light on/off, tune brightness & colour saturation, ...

Application to Device Management

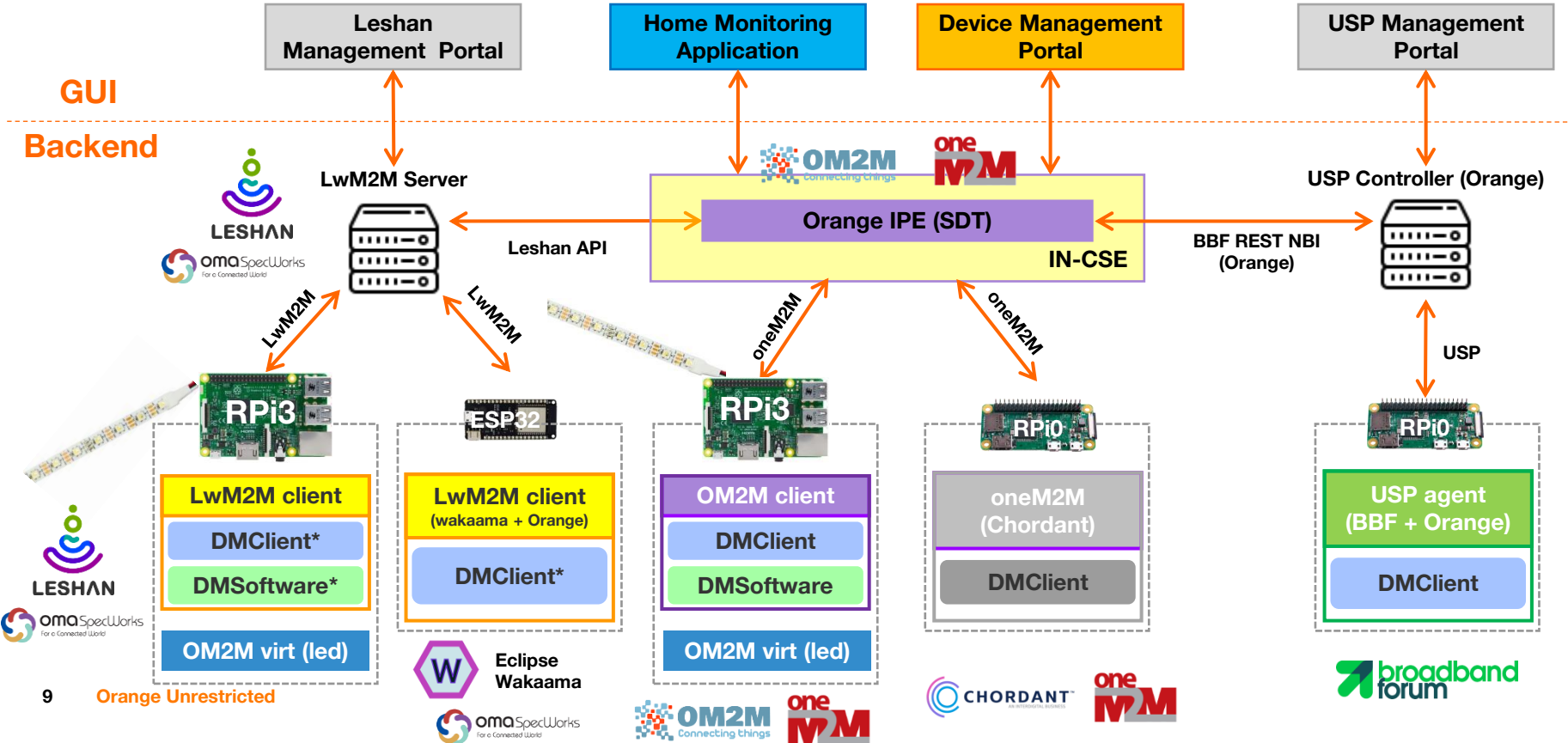
Manage the lights: reboot, read management status, update software, ...



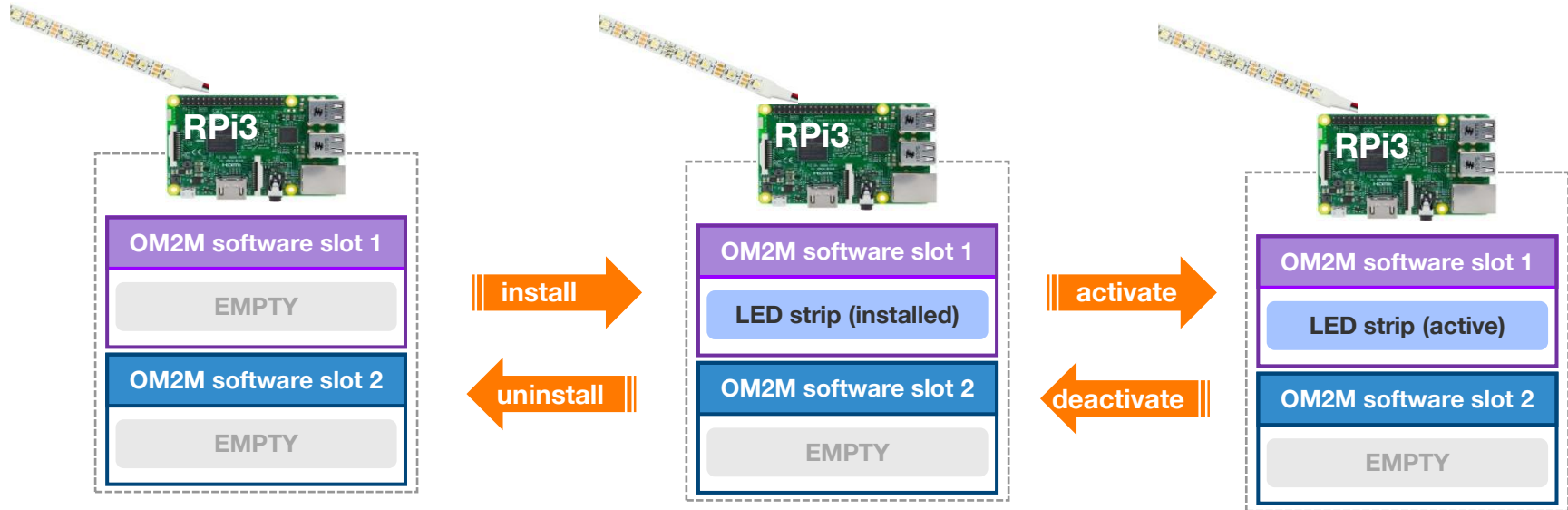
Light device modelling using SDT



Demo Architecture

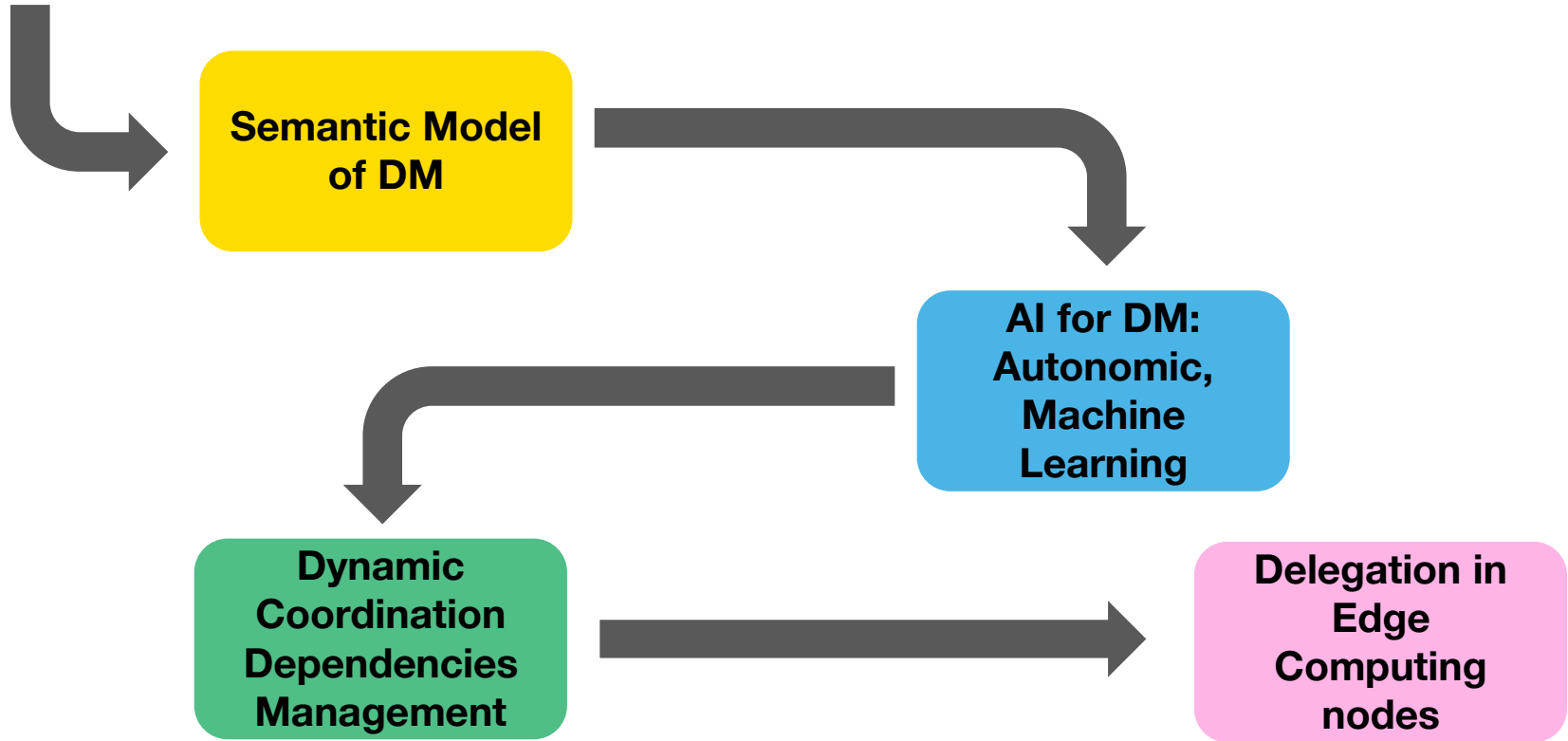


Remote software management through oneM2M



Conclusion - Ongoing work

The Road to a Smarter Device Management



Thank you

