



Eclipse AGAIL project



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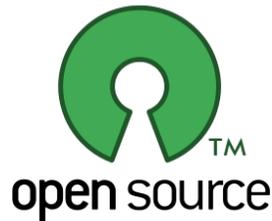
Horizon 2020
European Union funding
for Research & Innovation

Main AGILE/AGAIL Technical Objective:

Adaptive Gateways for diverse multiple Environments



Build a modular, reconfigurable and adaptive gateway for the IoT by going beyond the state of the art technology currently used to build IoT gateways and by leveraging on open source solutions and communities.



IoT Gateways

State of the Art and Beyond

State of The Art:

Focus on existing implementations driven by the open source community or by research community:

Open Source Implementations:

- Eclipse Kura
- Eclipse **Smart Home** Framework
- **OpenHab** Project
- AllSeen/AllJoyn Gateway Agent

Research Projects:

- Butler Project Gateway (sensiNact platform)
- FIWARE Cepheus Gateway Enabler
- ...

Beyond:

a) Need for **strong modularity:**

To support most common IoT/M2M protocols: we need to allow developers to easily plug in new modules implementing additional/ proprietary protocols for device/cloud communication. Same for plugging additional features (different database support, security, etc.)



b) **Support for more than one runtimes and programming environments:**

AGILE components identified for integration (protocol libraries, user interfaces, etc.) use different runtimes (Java, Python, Node.JS).



We don't want to lock external developers into using a specific runtime environment or programming language for developing their application on top of the AGILE software components.



c) **Support for user interfaces that interact with the core AGILE modules**

Device management, data management, protocol support, application design and execution, etc.



Consortium





Makers gateway

Oriented to the “makers” community.

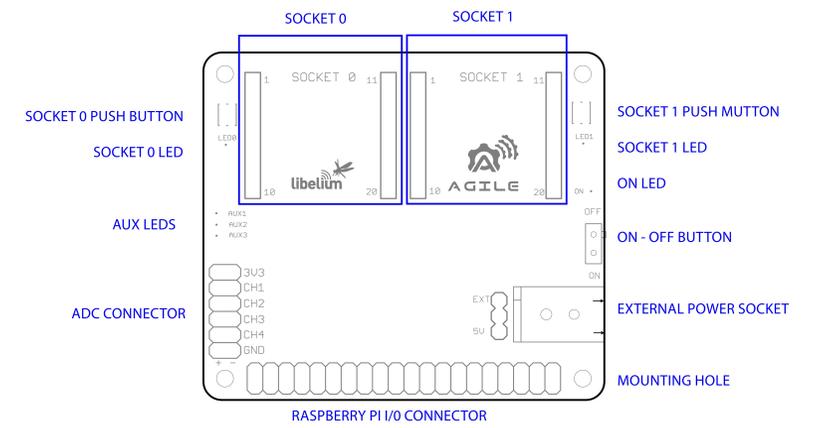
Based on the **Raspberry Pi** ver. 2 and ver. 3

Modularity obtained through the adoption of **shield expansions**:

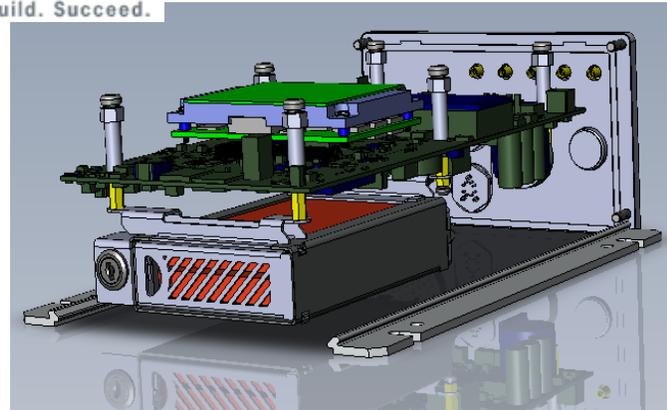
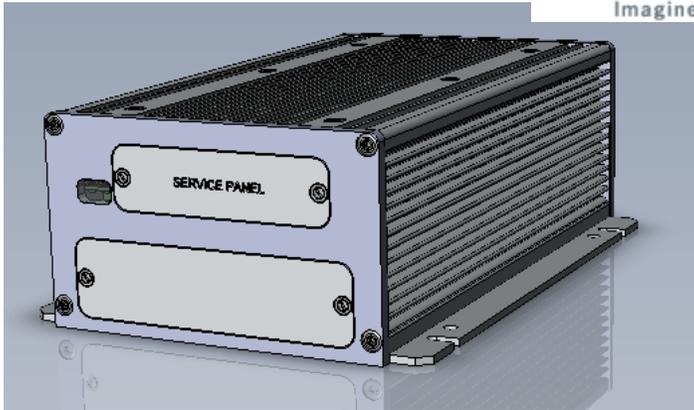
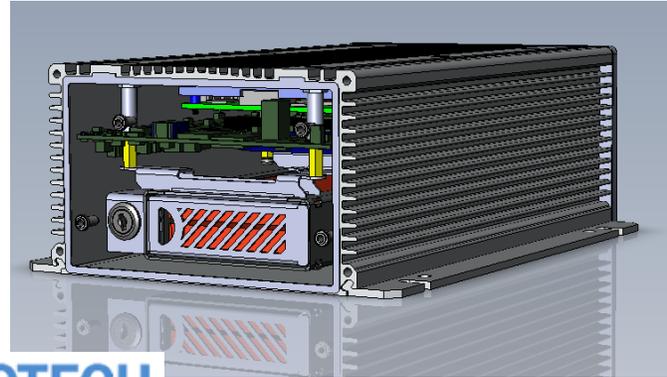
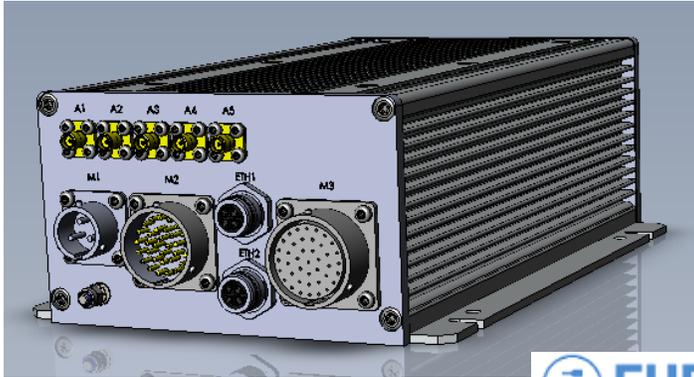
- **2 modules** to be plugged on top of Rasp Pi;
- Modules **hot swap**, with automatic module recognition;
- Raspberry Pi GPIOs accessible for sensors.

Rich connectivity options:

- Raspberry Pi 2
 - 2 modules to be plugged
 - Wifi & 3G/4G ☾ USB Dongle
- Raspberry Pi 3
 - 2 modules to be plugged
 - Wifi & Bluetooth Low Energy, included in Raspberry
 - 3G/4G, USB Dongle



Industrial gateway



CPU Module:

- Intel Atom BayTrail or Apollo Lake families
- 10W TDP Class CPU
- COM Express Type 10



Carrier:

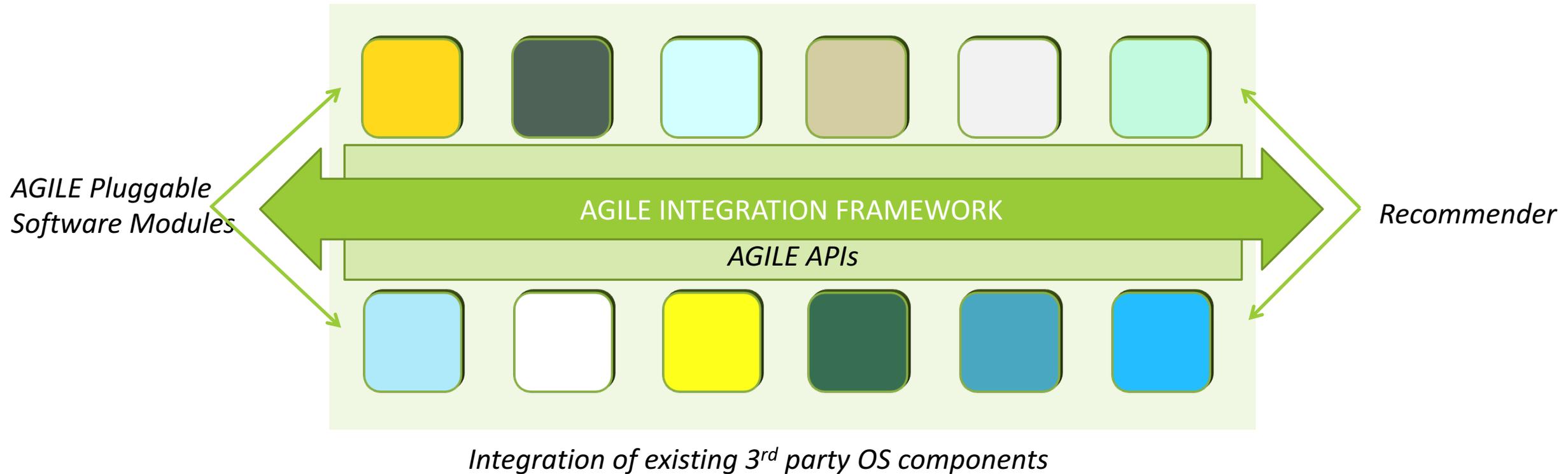


Software Architecture

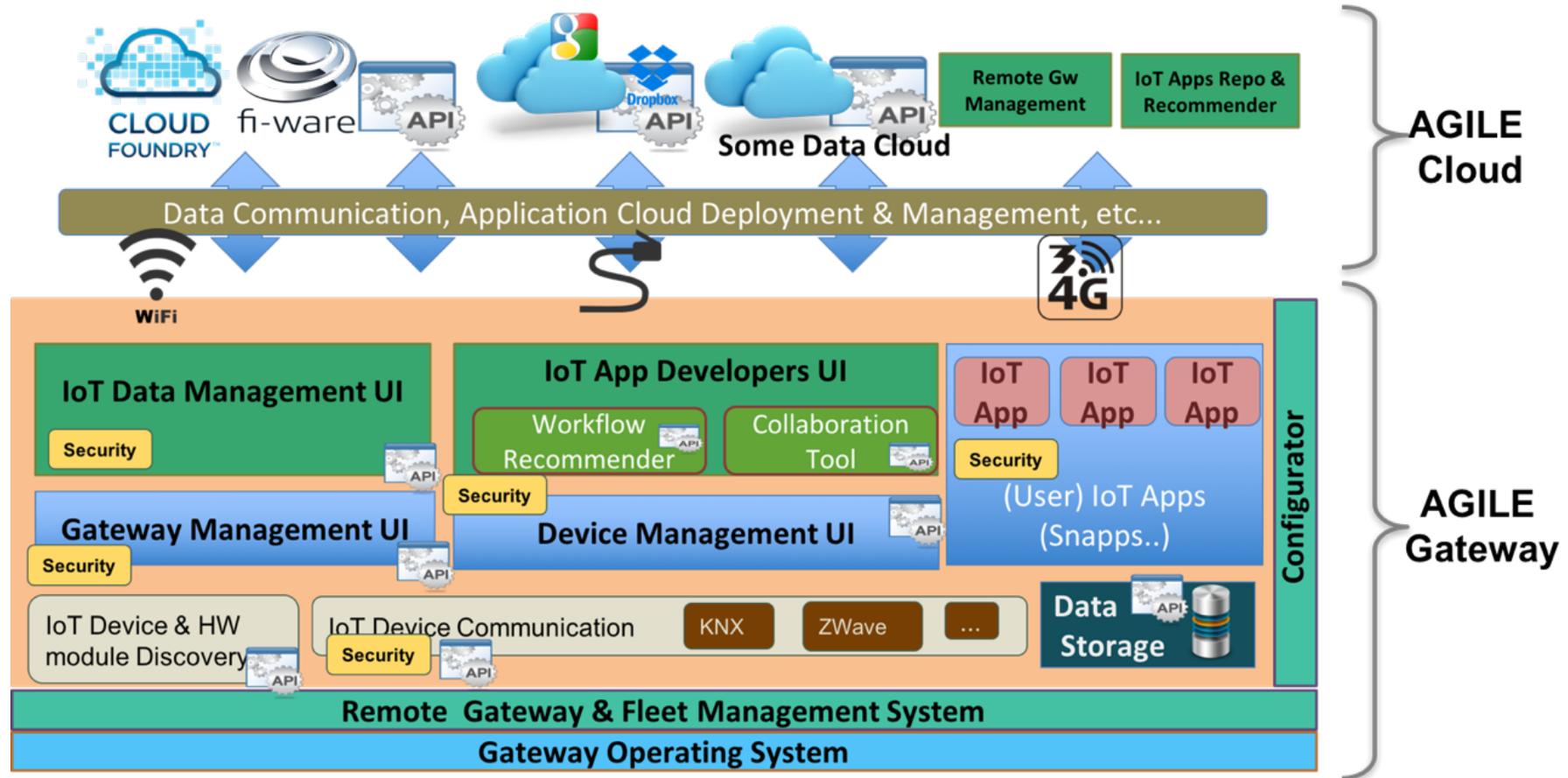
The Modular Approach



Core AGILE Services (developed by AGILE Consortium)



Software Architecture Logical View

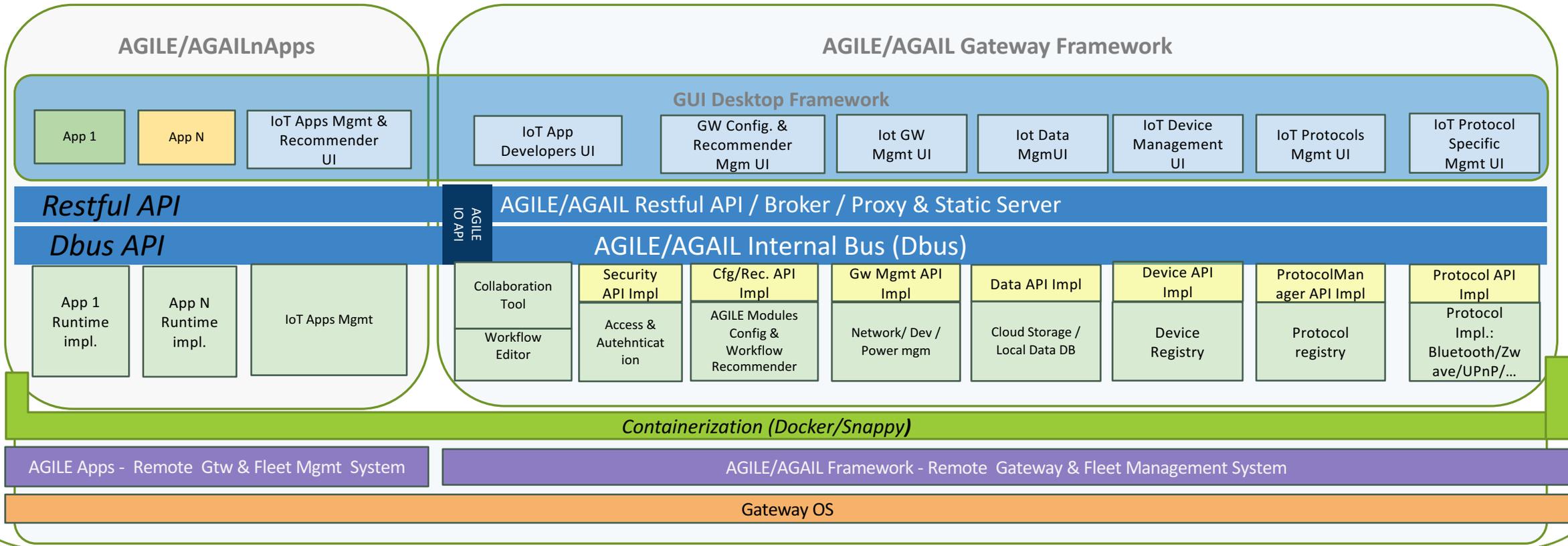


Software Architecture

Development View – The Gateway

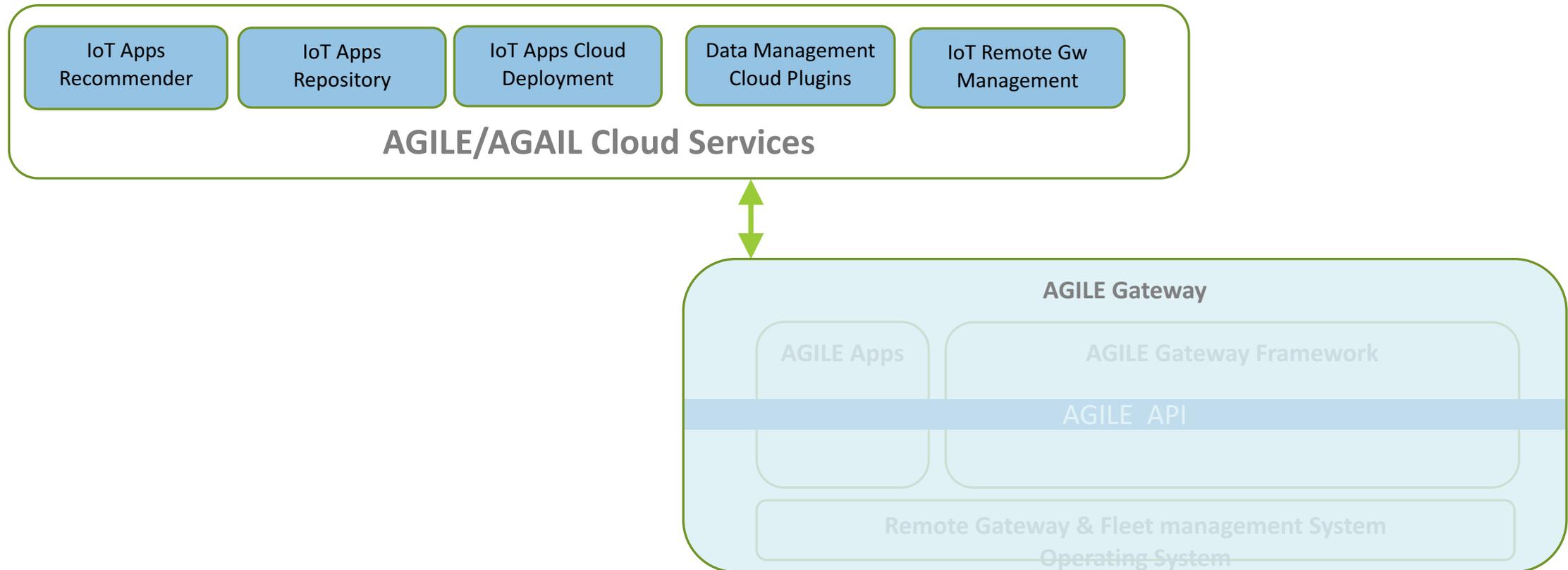


AGILE/AGAIL Gateway



Software Architecture

Development View – The Cloud



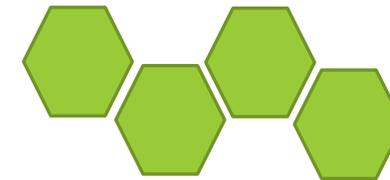
AGILE/AGAIL Software Architecture

Microservices, Containerization and Runtime



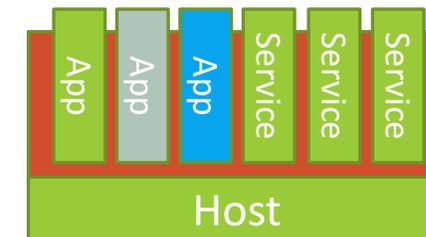
➤ IoT Microservices at the Gateway level:

- modularity and contextualization through service composition



➤ Containerization of Services & Apps:

- Security (isolation) and dynamic deployment



➤ Multiple Runtime Options:

Snappy apps
with packages in
the marketplace



Containerized
apps
& Docker Hub

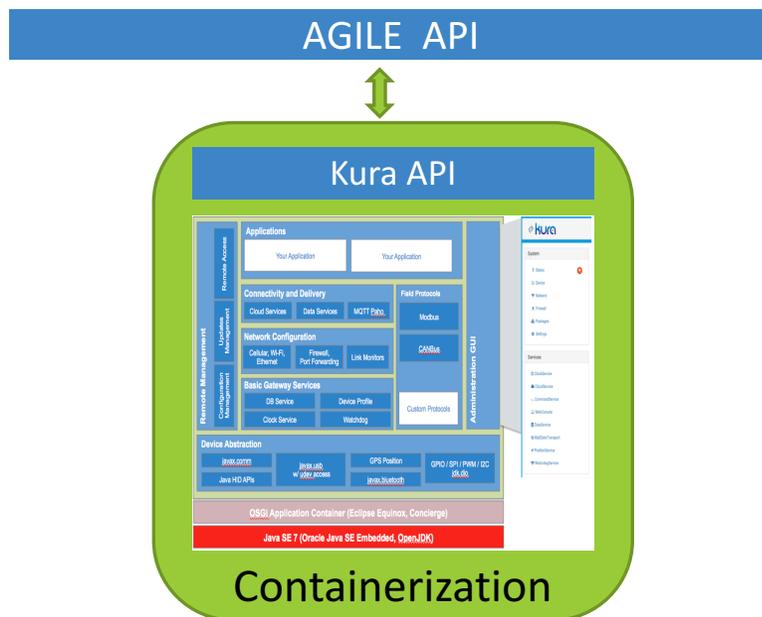
Ubuntu Core



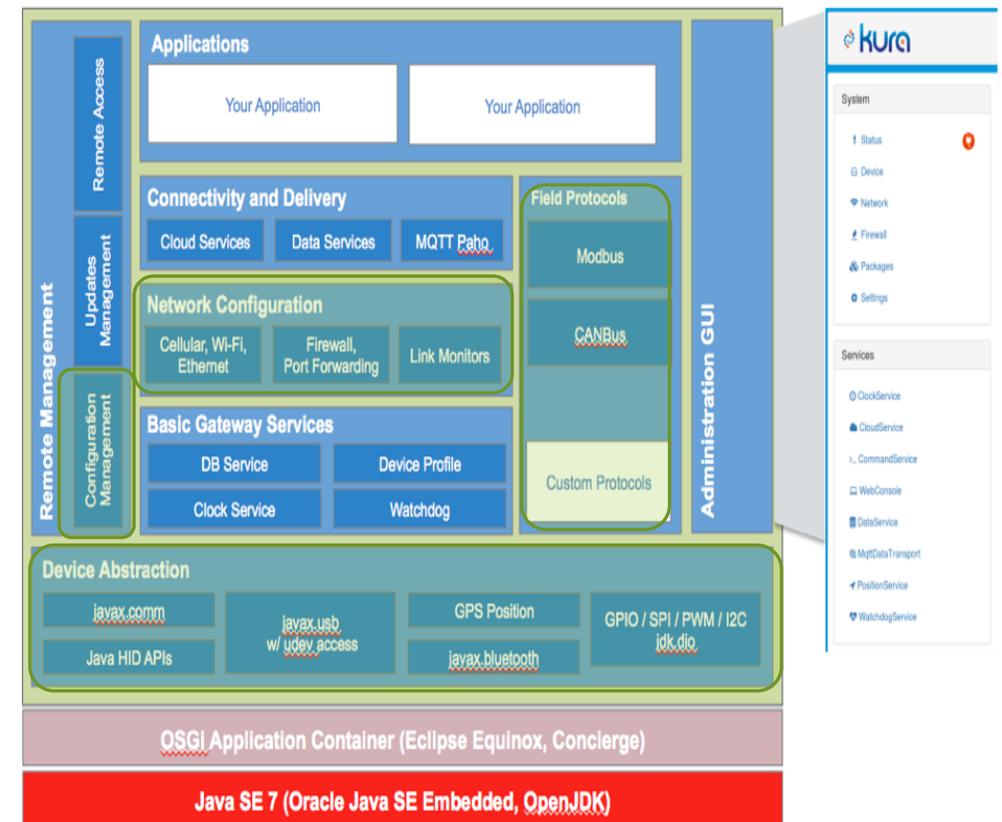
Any linux distro

FAQ: how AGILE will extend/adapt to the architecture of the Kura framework ?

- Kura will be **containerized** and capabilities exposed through the AGILE API
- Kura plans already foresee the development of an open API to expose capabilities and integrate with external components



- Capabilities candidate for integration:

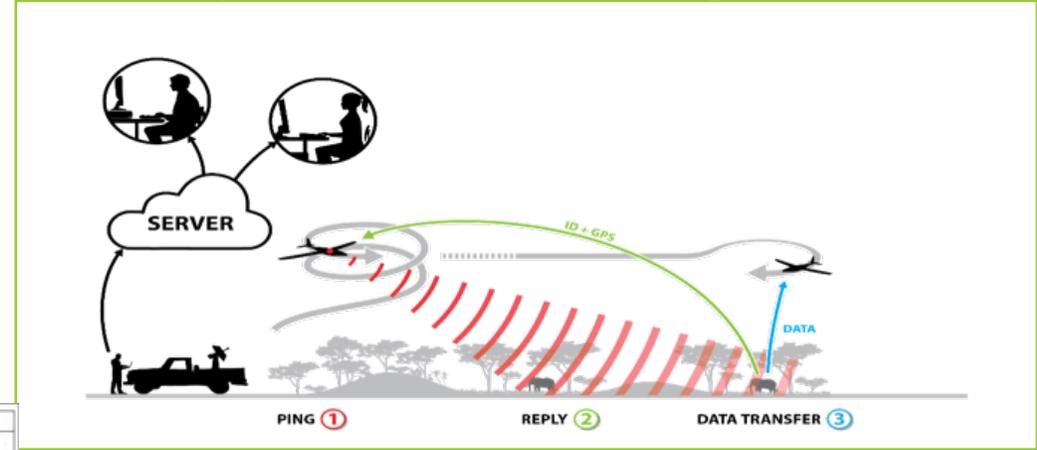


AGILE/AGAIL IoT Pilots

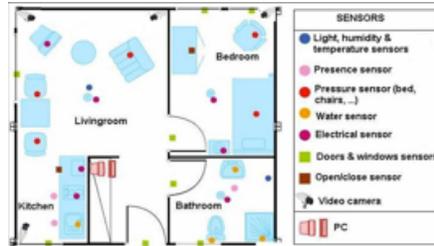
Pilot #1: Quantified Self



Pilot #2: Open Field & Cattle monitoring



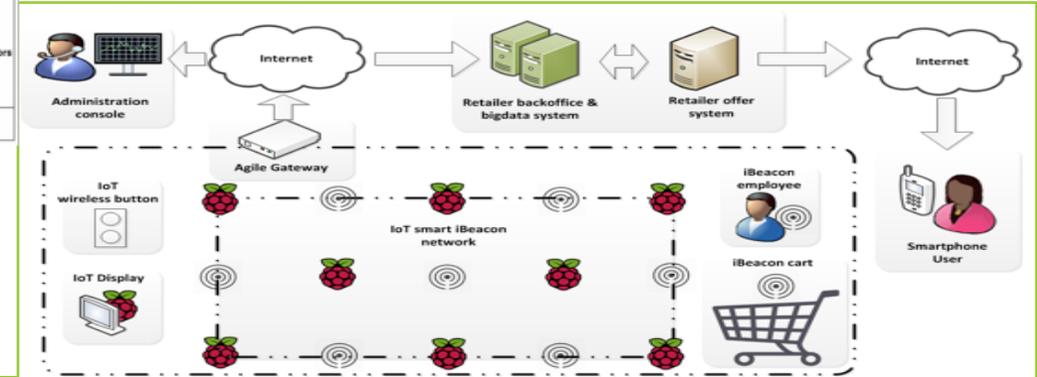
AGILE IoT Testbed
2500+ sensor nodes



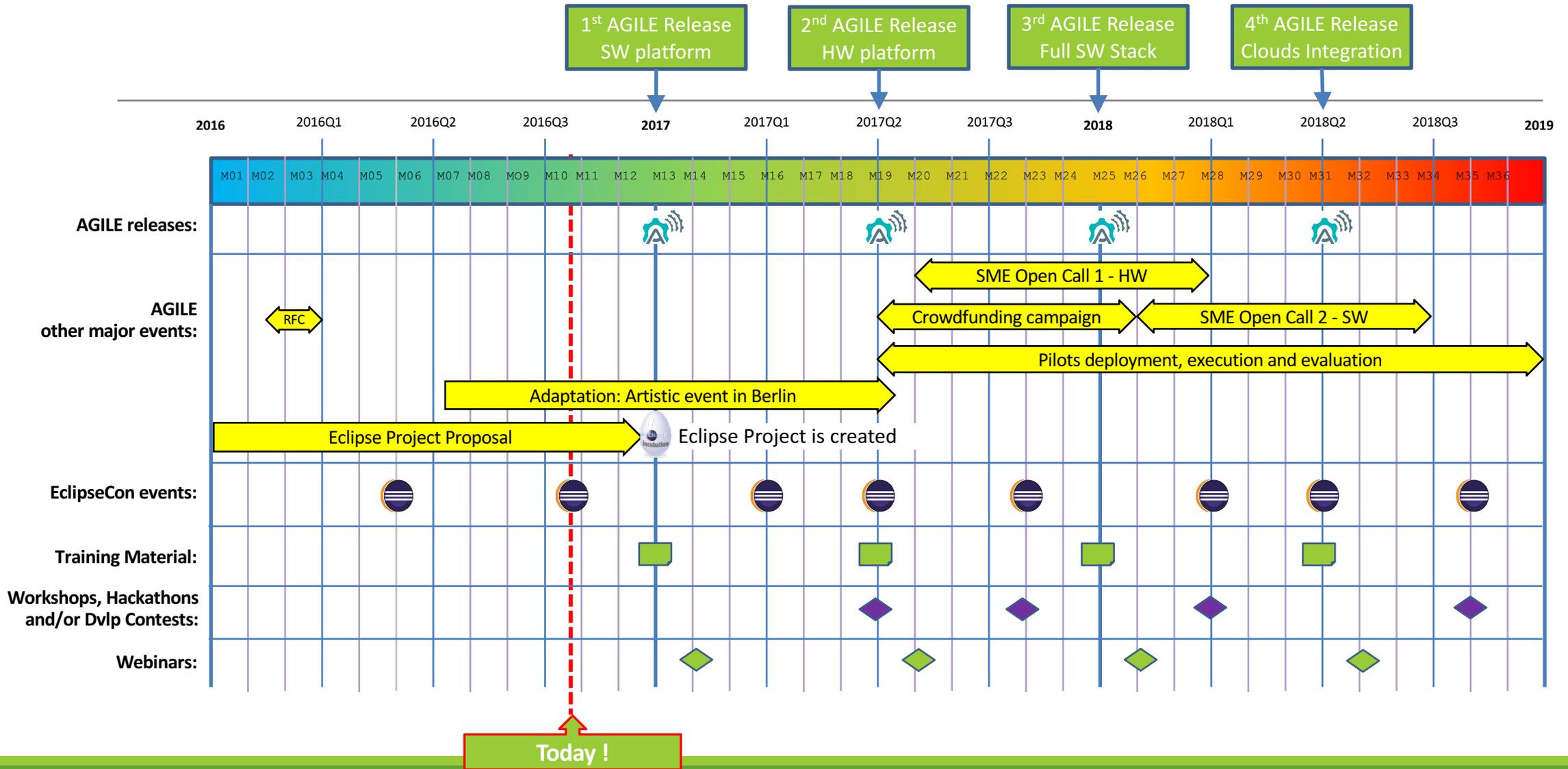
Pilot #3: Air quality & Pollution monitoring



Pilot #4: Smart Retail



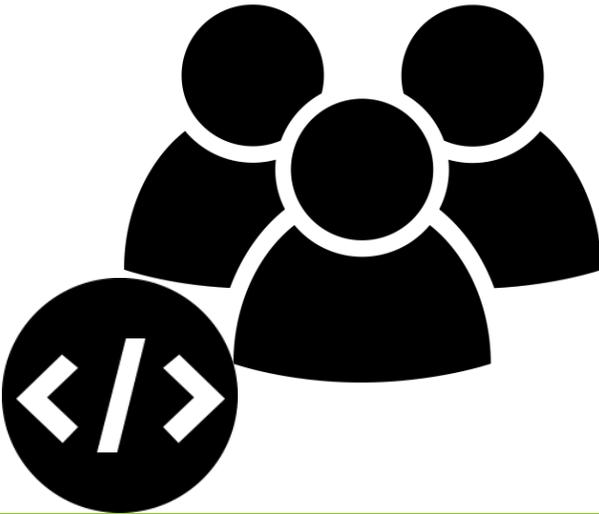
Development Plan



Open Calls SW a HW



- Jul 2017 – Mar 2018: Open Call 1 - HARDWARE
 - **Feb 2018 – Oct 2018: Open Call 2 – SOFTWARE**
- Total budget: **EUR 800K**
 - Participants: minimum 8 selected HW + 8 selected SW
 - Participant budget: maximum EUR 50k per participant (no fixed amounts)

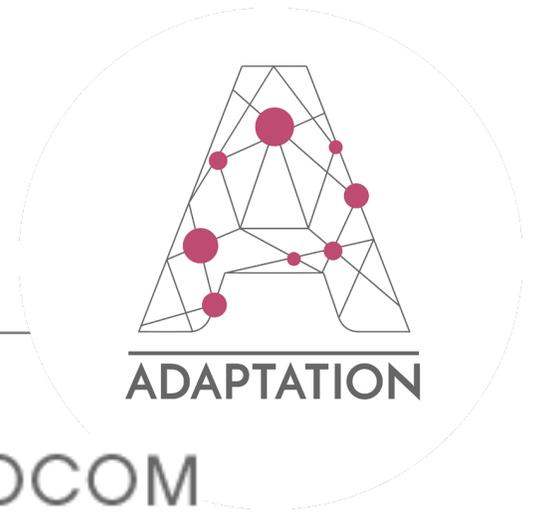


16 x 50K€



startupbootcamp
IoT & Data Tech

Adaptation: IoT is Art



1. Quantified Self



2. Interactive Spaces



3. Smart Cities



4. Environment + Data



November '16	Pairing up Artists & Partners
July '17	Exhibition





Meet us at the IoT Playground !



HOME / PROJECTS / ECLIPSE IOT / ECLIPSE AGAIL IOT GATEWAY

A creation review has been created for this proposal. ✕

Eclipse Agail IoT Gateway

BASICS

This proposal is in the Project Proposal Phase (as defined in the **Eclipse Development Process**) and is written to declare its intent and scope. We solicit additional participation and input from the community. Please login and add your feedback in the comments section.

Parent Project:
Eclipse IoT

Background:
Currently the majority of IoT solutions involve the communication of devices with some cloud service for data management and application execution. In many cases a gateway is involved for providing Internet connectivity to non-IP wireless or wired networks, but mainly it forwards data to the Internet.

The Agail IoT Gateway takes gateways one step further and brings Cloud functionality locally, enabling data storage, processing and visualization. Users can have better control of their devices and the data generated. Agail is language agnostic and through a modular support of various wireless and wired IoT protocols (BLE, ZWave, ZigBee, KNX, etc.) and standards (IoTivity, Thread, etc.) it delivers support for many existing commercial devices.

The Eclipse Agail IoT Gateway framework comes from the collective work of an existing community, in the context of a european H2020 funded IoT project (**AGAIL**). More than 16 entities (research, industrial, startups and nonprofits) in Europe have come together to build and deliver a fully open source modular gateway framework.

Scope:
The goals of the Eclipse Agail IoT Gateway project can be summarised as follows:

- Provide a modular architecture for implementing IoT Gateways through building blocks that feature communication with IoT devices, data collection, local storage and processing, with focus on data ownership and device interoperability;
- Provide IoT application developers with the Agail API, a generic API offering services for device discovery, communication, data management (local and cloud storage), data processing and remote gateway management, accessible as a RESTful interface;
- Provide a language-agnostic framework based on containers to implement IoT Gateway services around Agail API (based on DBus), allowing to reuse and integration of existing best-in-class IoT open source packages for device communication using standard IoT protocols (BLE, ZigBee, LoRa, TCP/IP, etc.), user interfaces for device and data management;
- Provide gateway management components (for managing connected IoT devices and enabled IoT/M2M protocols, installed applications and components, resource management, etc.);
- Deliver reference implementations of the building blocks in a containerized form to simplify deployment and delivery of services and applications on the gateway that implement the core features of the Agail IoT Gateway: communication with commercial wireless and wired IoT devices, protocol support (Thread, IoTivity, etc.), local data management and visualization, local and remote gateway management, application workflow design and execution, data exchange and application deployment on external clouds.

<http://agile-iot.eu>

<https://github.com/Agile-IoT>



<http://www.agile-iot.eu/adaptation>

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