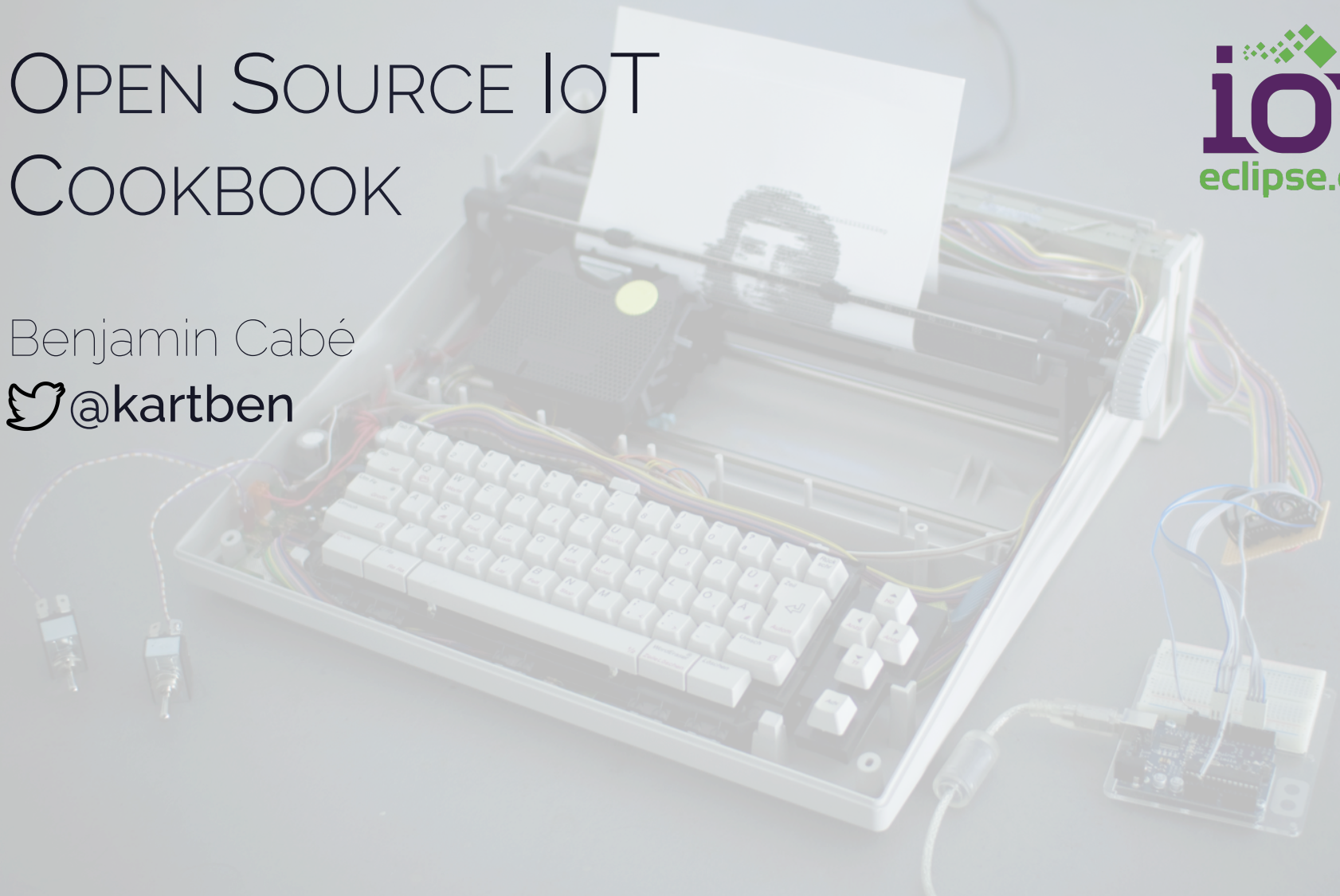


# OPEN SOURCE IoT COOKBOOK



Benjamin Cabé

 @kartben



**SophiaConf**   
2014 du 30 juin au 3 juillet

Open Source Web Sémantique Google  
Web Informatique Cloud Sécurité  
Internet of things DIY BI Big Data  
No SQL Développement Frameworks

5<sup>ème</sup> édition

50  
billion  
devices  
by 2020



50

billion

~~devices~~

by 2020

*things*







fragmentation





fragmentation



complexity





fragmentation

<http://www.flickr.com/photos/chiperoni/239435850/>



complexity

<http://www.flickr.com/photos/cyberslayer/952953634/>



lock-in

<http://www.flickr.com/photos/photosightfaces/81527917/>





protocols

tools

frameworks

services

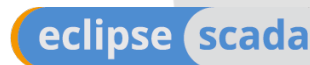
In less than 3 years...

From 0 to 13+ open-source projects

We call them **building blocks** for IoT



mihini



Wakaama

Krikkit

Concierge





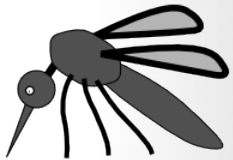
**Paho** provides client implementations of the MQTT protocol.

mihini

**Mihini** is an embedded Lua runtime providing HW abstraction and other services.



**Koneki** provides tools for embedded Lua developers.



**Eclipse SCADA** is a complete Java/OSGi-based SCADA system (communication, monitoring, GUI, ...)

**Kura** is a Java/OSGi-based M2M container for gateways. Has support for Modbus, CANbus, MQTT, ...

**Mosquitto** is a lightweight server implementation of the MQTT and MQTT-SN protocols, written in C.





**Ponte** bridges M2M/IoT (MQTT, CoAP) protocols to the Web.



**SmartHome** provides a complete set of services for home automation gateways.



**OM2M** implements the ETSI M2M standard.



**Californium** is an implementation of the CoAP protocol written in Java. Includes DTLS for security.

**Wakaama** is an implementation of LWM2M written in C.

**Wakaama**

(code pending)

**Krikkit** is a rules system for programming edge devices just like you'd configure a router

**Krikkit**

(code pending)

**Concierge**

**Concierge** is a lightweight implementation  
of OSGi Core R5.

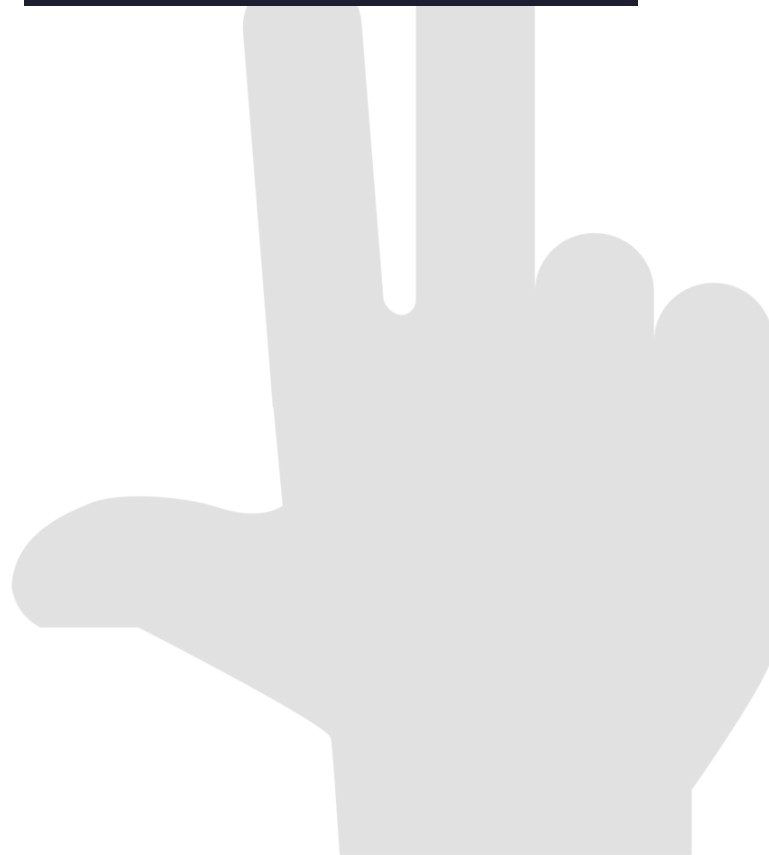
***Your project?***



**We need to talk! ;-)**

In less than 3 years...

From 0 to **one million lines** of code





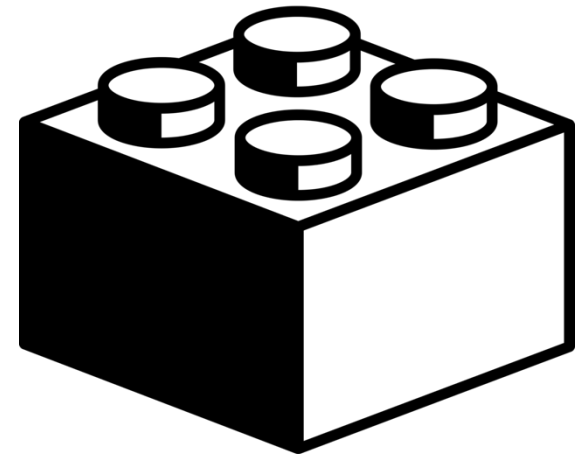
# In less than 3 years...

- From 0 to 11 member companies\*



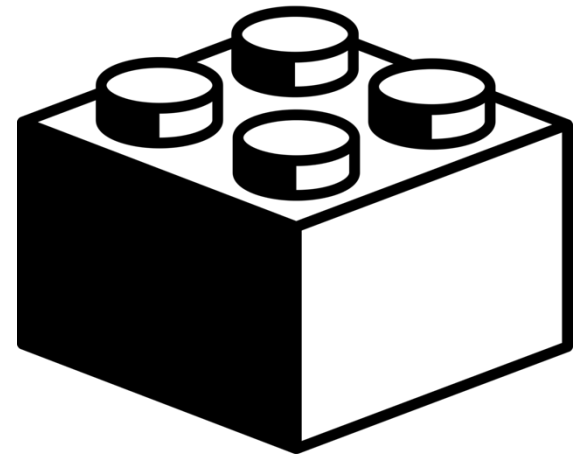
\* and many participating companies and individual IoT enthusiasts

# Building blocks for IoT

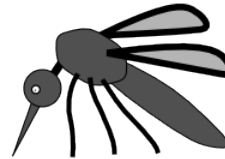


# Building blocks for IoT

*... for building what?*

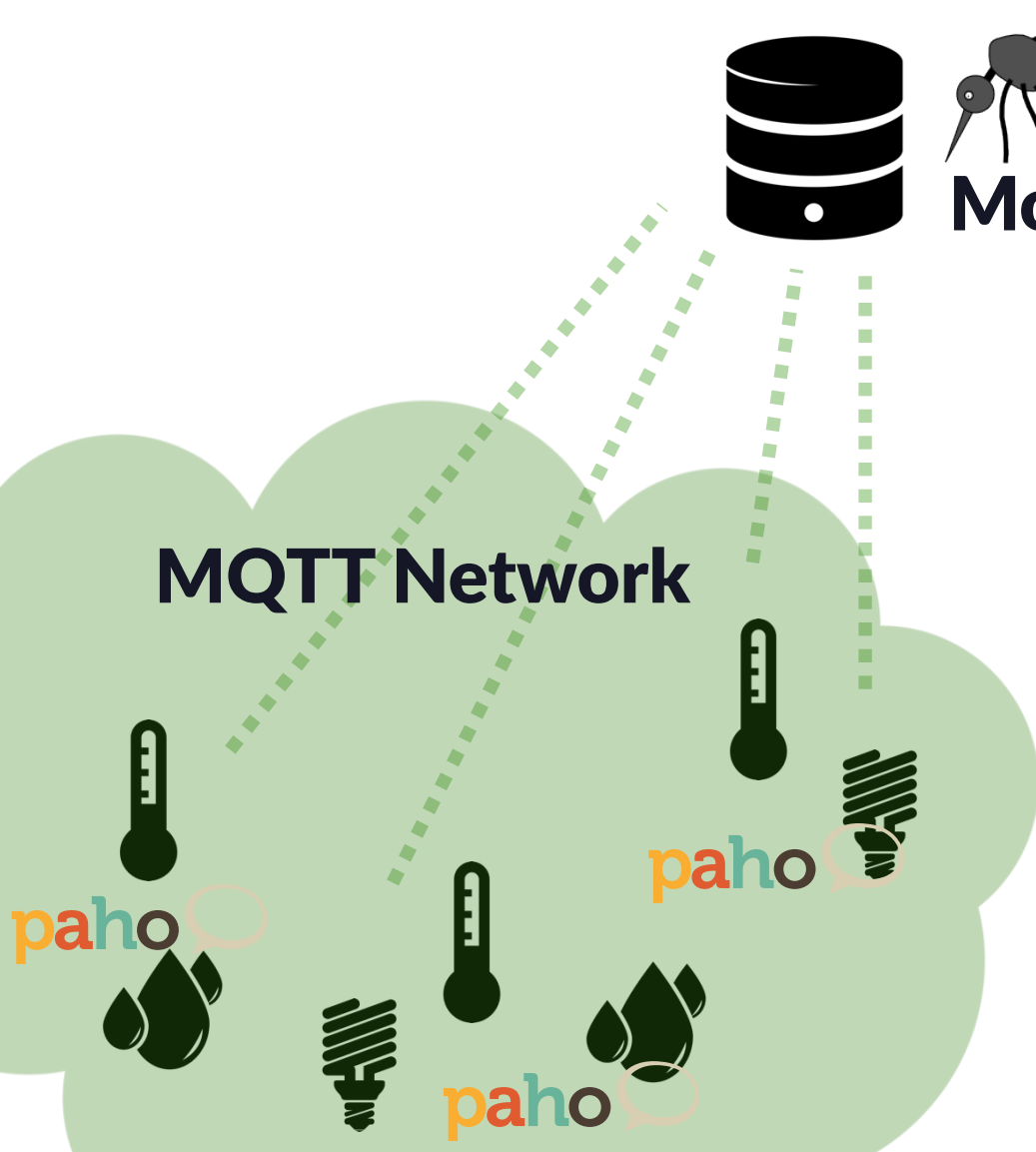


# Building... SENSOR NETWORKS



**Mosquitto broker**

**MQTT Network**





# Building... **SENSOR NETWORKS**

1. Get a Paho client from:  
<http://eclipse.org/paho>

2. Use Eclipse MQTT sandbox\* to  
test your app

\* <http://iot.eclipse.org/sandbox.html>



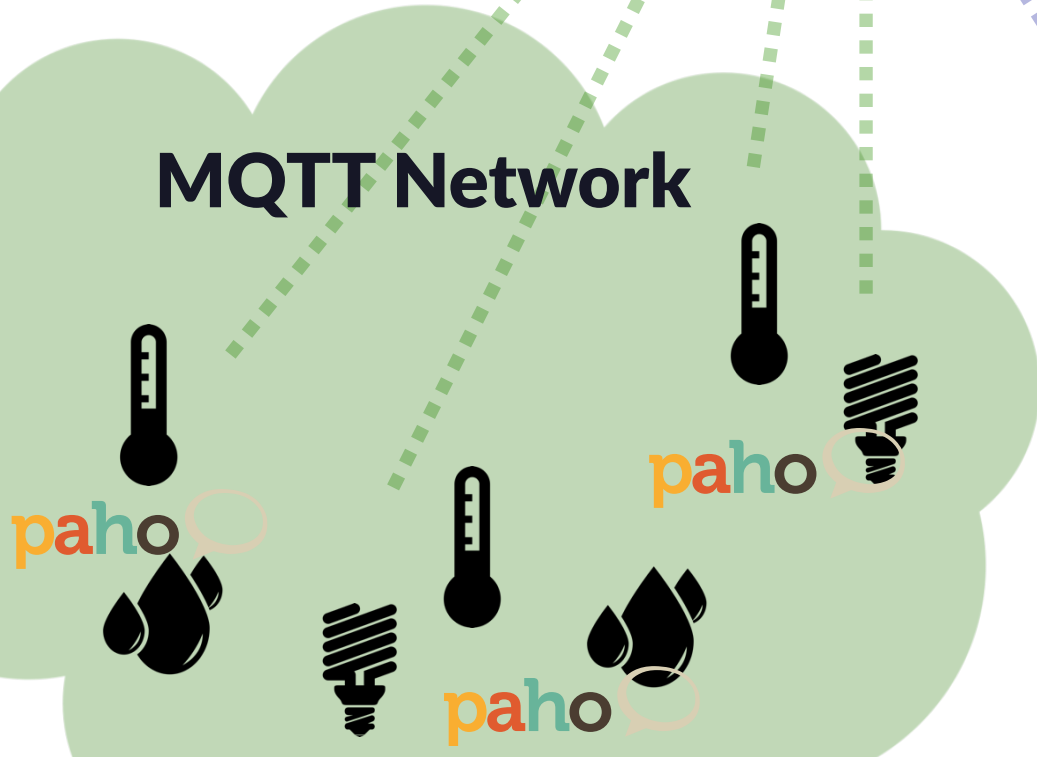
# Building... SENSOR NETWORKS



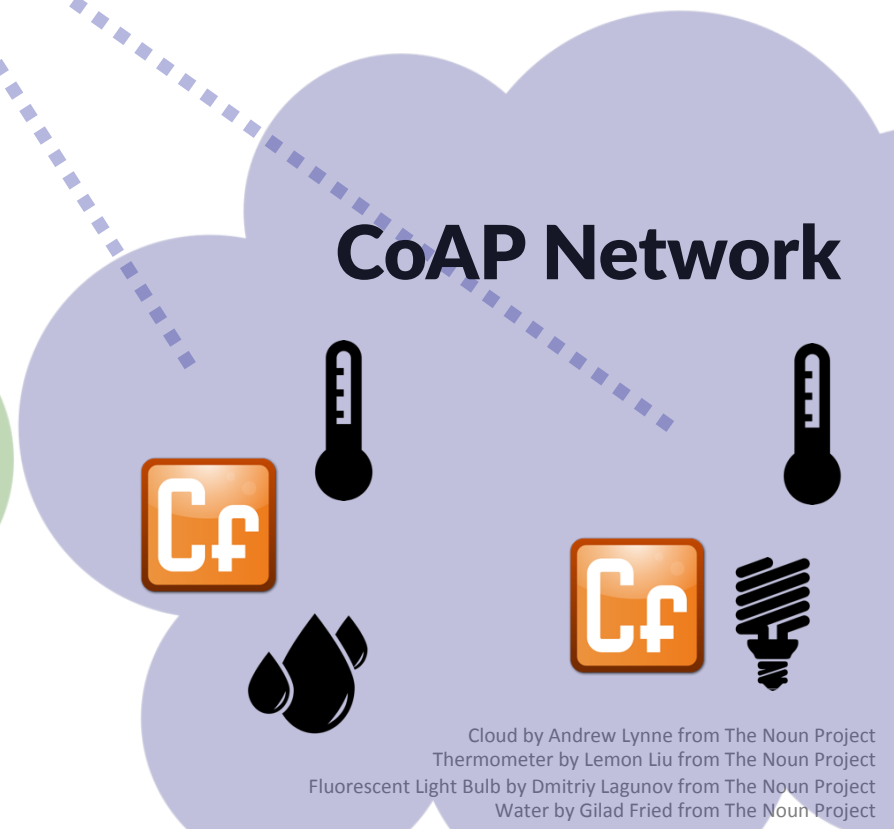
ponte   
Connecting Things to Developers

**Ponte broker**

**MQTT Network**



**CoAP Network**



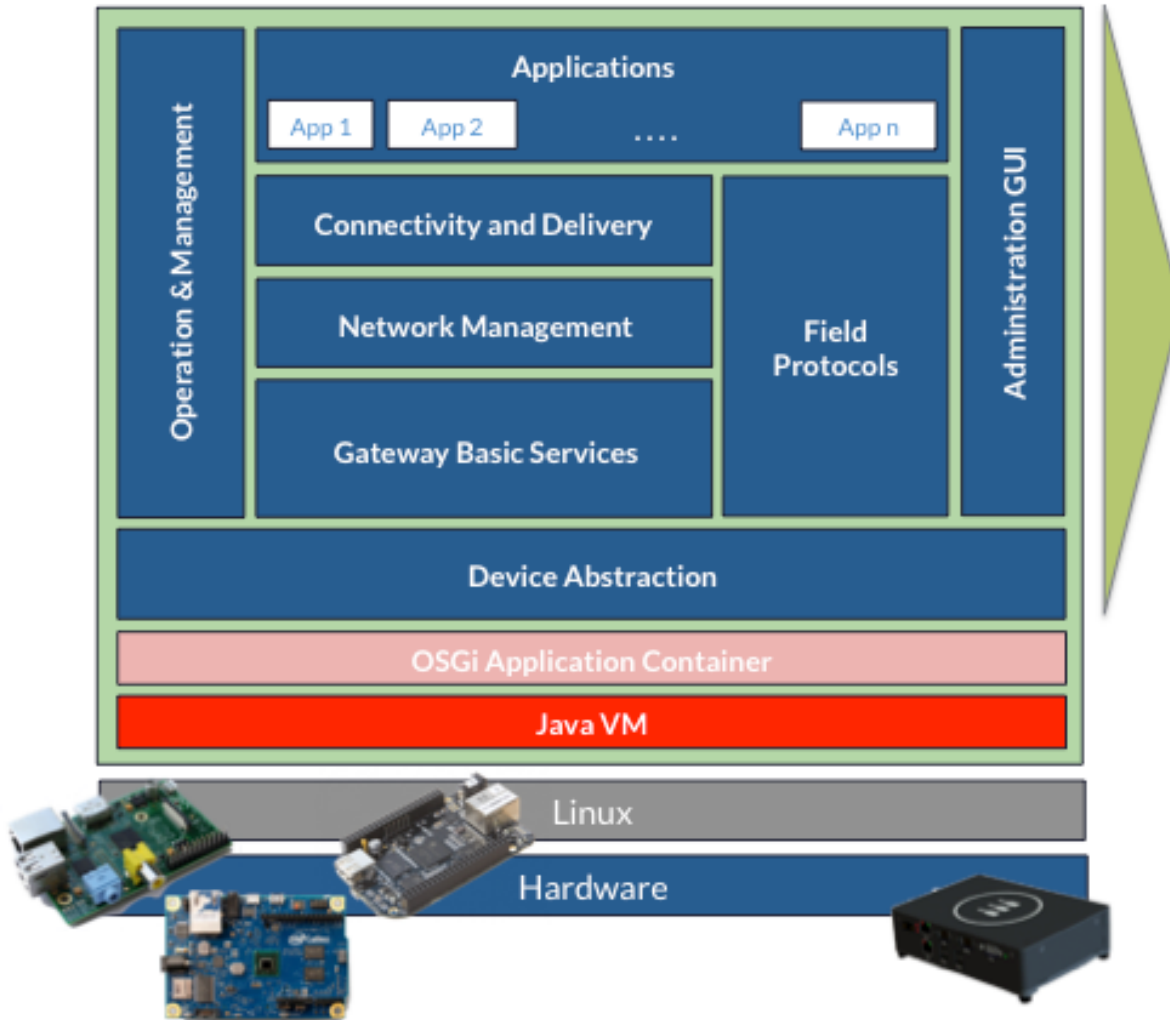
Cloud by Andrew Lynne from The Noun Project  
Thermometer by Lemon Liu from The Noun Project  
Fluorescent Light Bulb by Dmitriy Lagunov from The Noun Project  
Water by Gilad Fried from The Noun Project

# Building... **SENSOR NETWORKS**

```
$ npm install ponte
```



# Building... M2M/IOT GATEWAYS



kura

# Building... **M2M/IOT GATEWAYS**

1/ Download Kura code:  
<https://github.com/eclipse/kura>

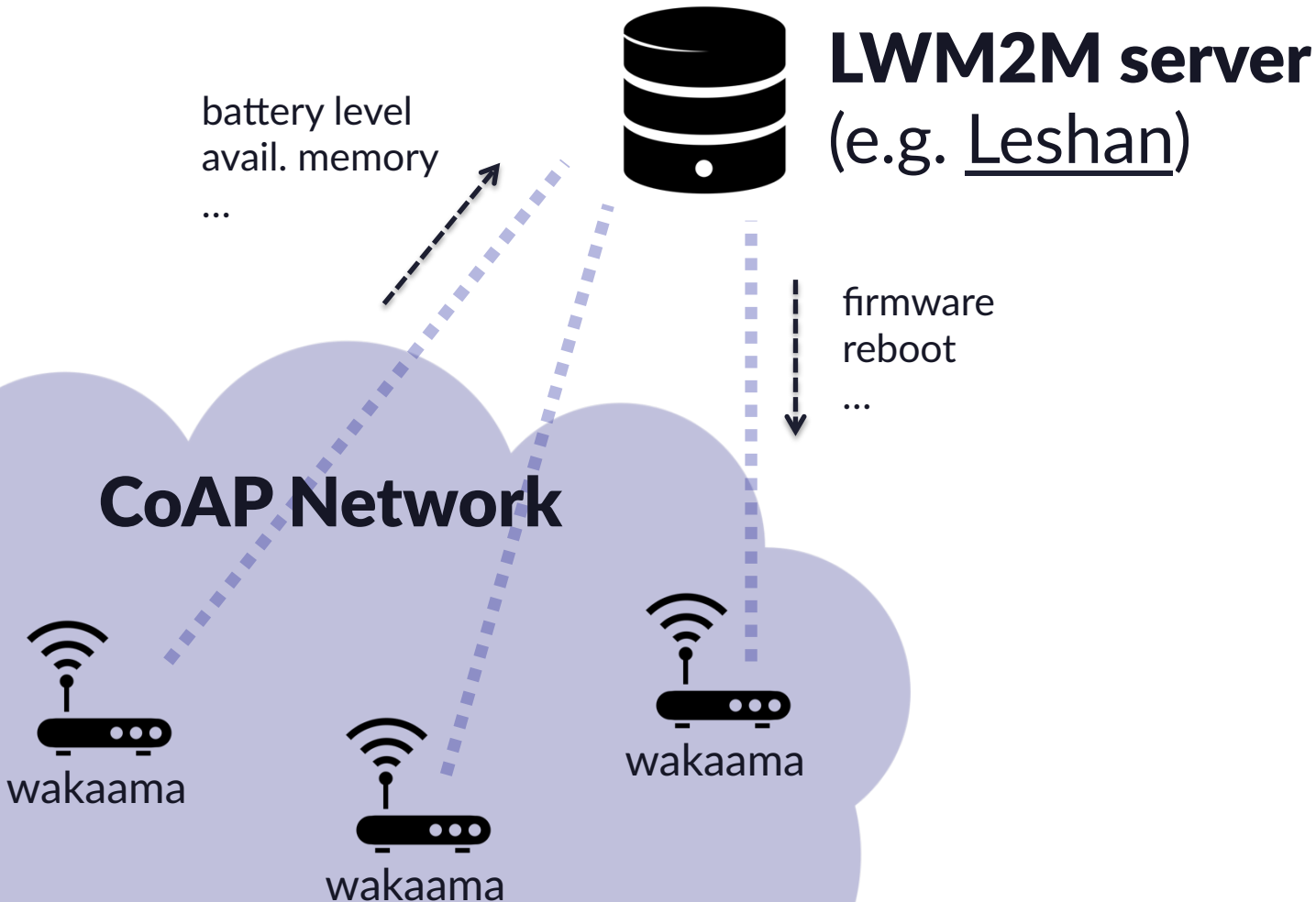
2/ Follow compilation instructions in  
the README

3/ Install on your favorite gateway  
(e.g. Raspberry Pi thanks to .deb package)





# Building... DEVICE MGMT.



# Building... **DEVICE MGMT.**

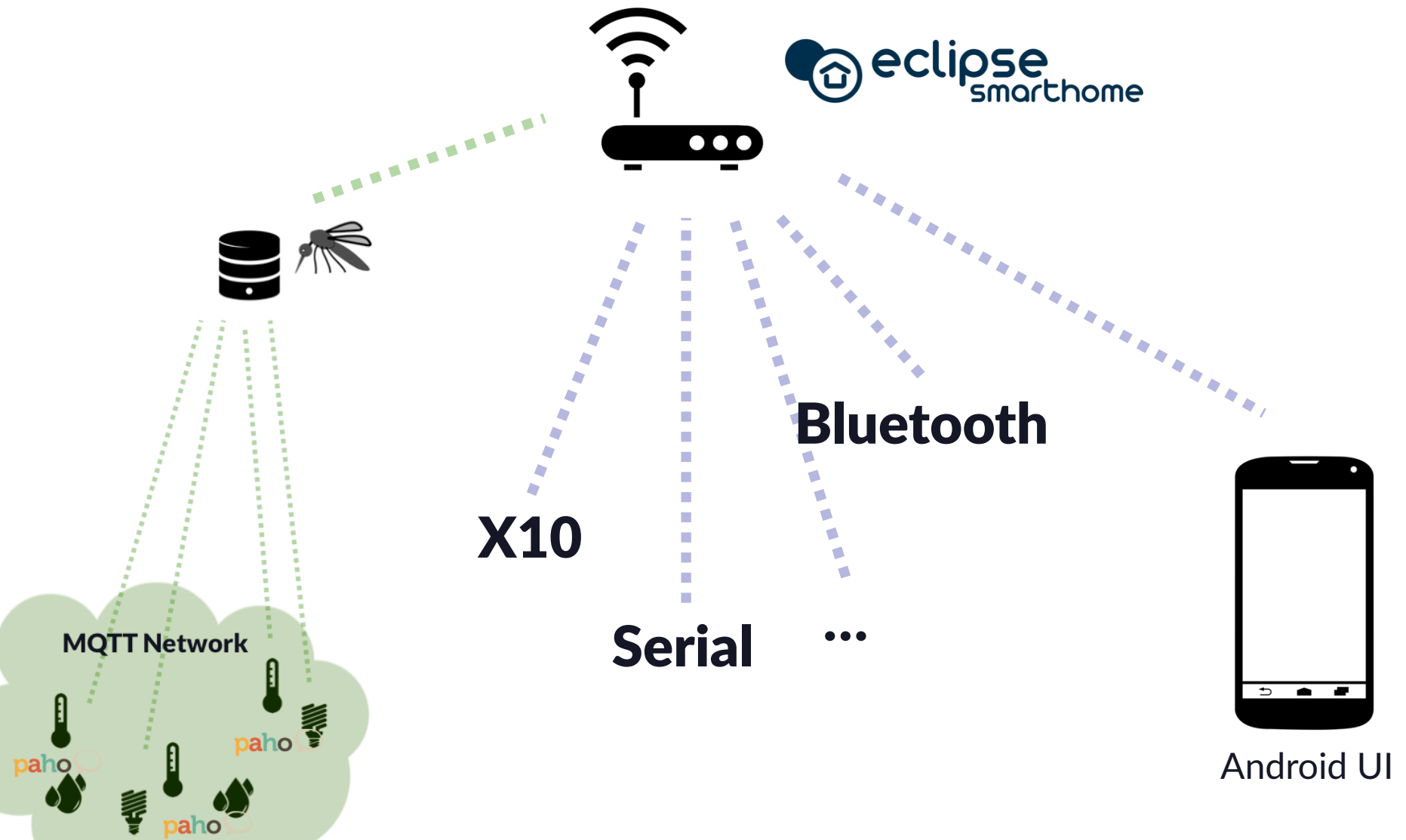
1/ Port Wakaama's LWM2M callbacks to your device  
e.g. "reboot()"



2/ Use Eclipse LWM2M sandbox\* or deploy Leshan on your own server infrastructure

\* <http://iot.eclipse.org/sandbox.html>

# Building... HOME AUTOMATION



# Future of (Eclipse) IoT





# Future of (Eclipse) IoT

IoT devices ARE the Cloud (or Fog?)

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IoT devices **ARE** the Cloud (or Fog?)

Technologies like **Krikkit** will help make the network smarter

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**Orion** will enable IoT development in the cloud

# Future of (Eclipse) IoT

IoT devices **ARE** the Cloud (or Fog?)

Technologies like **Krikkit** will help make the network smarter

**Orion** will enable IoT development in the cloud

More **open protocols** implementations will ensure interoperability



# <http://iot.eclipse.org>



Services & Frameworks

Protocols

Tools

Community

Live demo

8+1 161

## iot.eclipse.org

This portal is where you can learn about the technologies developed at [Eclipse](#) to make Internet of Things (IoT) development simpler.

Our technologies aim at establishing an open IoT/M2M platform to be used by anyone.



### Paho

The Paho project provides scalable Open Source implementations of the MQTT messaging protocol.

### Services & Frameworks



Deliver extensible runtimes and services enabling IoT/M2M applications.

We provide a set of services and frameworks enabling features such as device management, software update, vertical solutions, ...

[More »](#)

### Protocols



Provide Open Source implementations of standard IoT/M2M protocols.

Currently, we provide tools and libraries for:

- MQTT messaging protocol
- OMA-DM Device Management protocol

[More »](#)

### Tools



Package a "one-stop shop" IDE for IoT/M2M developers.

We believe that Lua is a language very well-tailored for the Internet of Things, therefore an IDE for Lua development is available.

[More »](#)



# Thanks! Questions?



<http://iot.eclipse.org>

[<benjamin@eclipse.org>](mailto:benjamin@eclipse.org)

[@kartben](#)