

OPEN SOURCE & INTERNET OF THINGS



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 @kartben



M2M?

IoT?



Technology that supports
wired or wireless
communication
between devices

50
billion
devices
by 2020



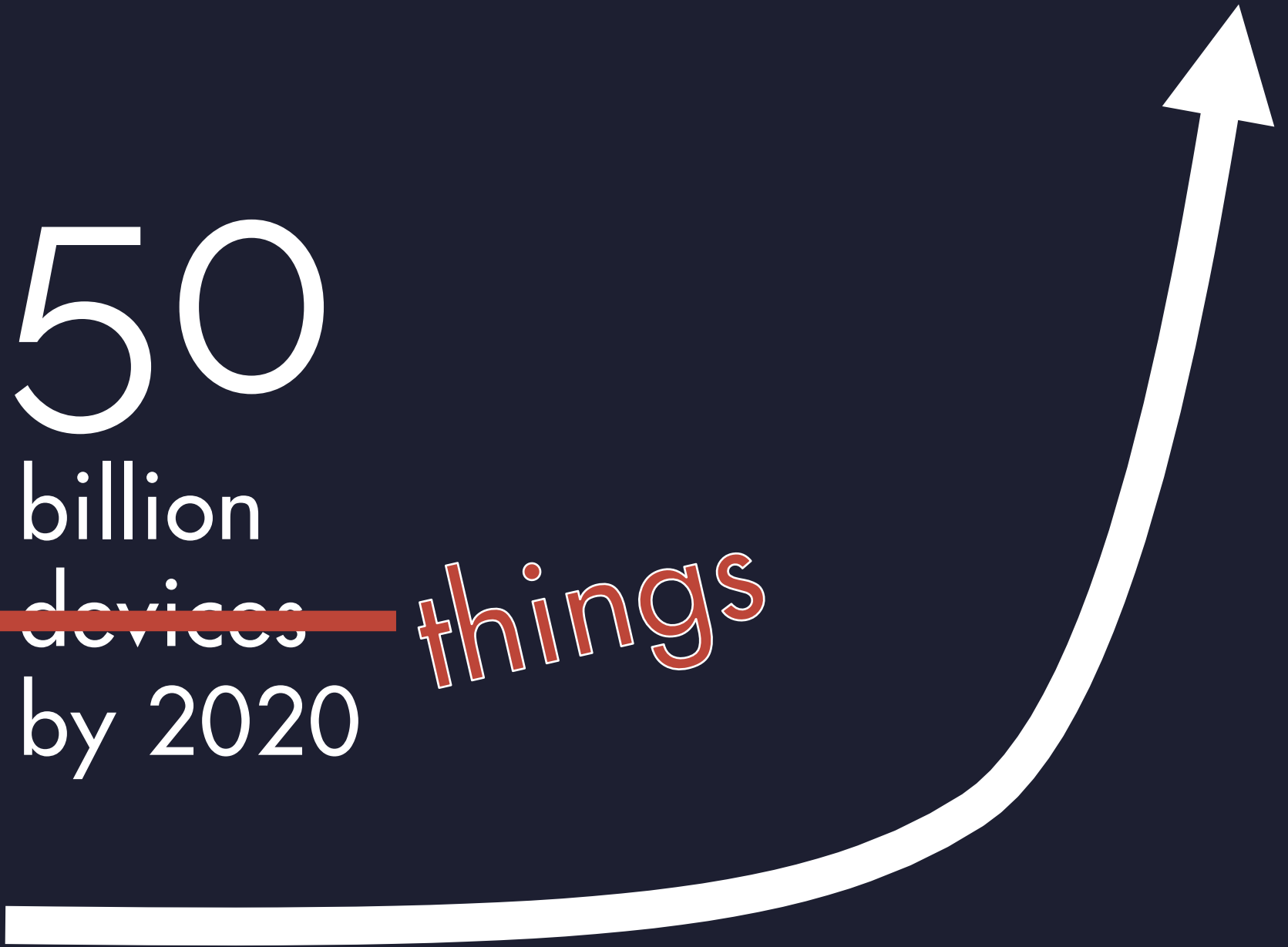
50

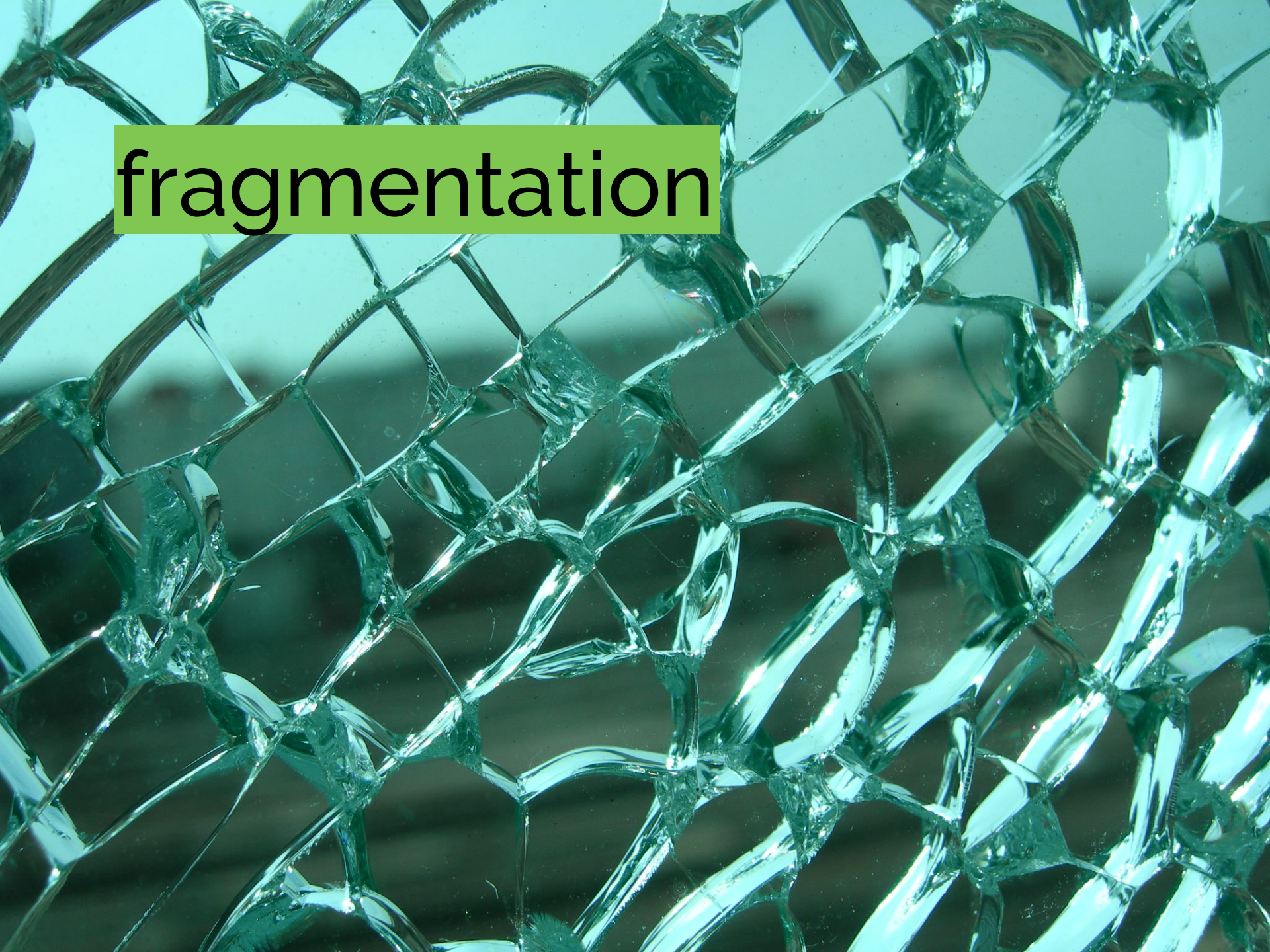
billion

~~devices~~

by 2020

things





fragmentation

A close-up photograph of shattered glass, showing sharp, jagged edges and a complex, web-like pattern of cracks and fragments. The background is a solid light blue color.

fragmentation

A photograph of a large, intricate maze made of green hedges. The maze is composed of many interconnected paths and dead ends, creating a complex, winding pattern. The hedges are well-maintained and have a vibrant green color. The background is a solid light blue color.

complexity

A close-up photograph of shattered glass, with sharp, jagged fragments reflecting light in a chaotic pattern. The background is a solid light blue color.

fragmentation

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

A photograph of a lush green hedge maze, with the hedges forming a complex, winding path. The sun is shining, creating strong shadows and highlights on the foliage.

complexity

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

A close-up photograph of a rusty metal padlock attached to a wooden door. The padlock is heavily corroded, and the wood shows signs of age and wear. The brand name 'Viro' is visible on the padlock.

lock-in

<http://www.flickr.com/photos/photoslightfaces/815279172/>



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



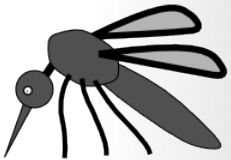
Paho provides client implementations of the MQTT protocol.

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

(code pending)

Wakaama is an implementation of LWM2M written in C.

Krikkit

(code pending)

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

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*

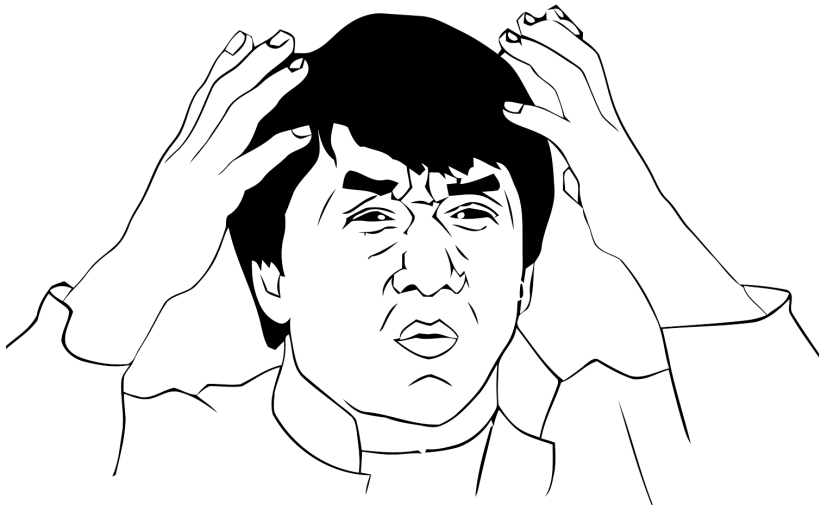


* and many participating companies and individual IoT enthusiasts

I often get asked...

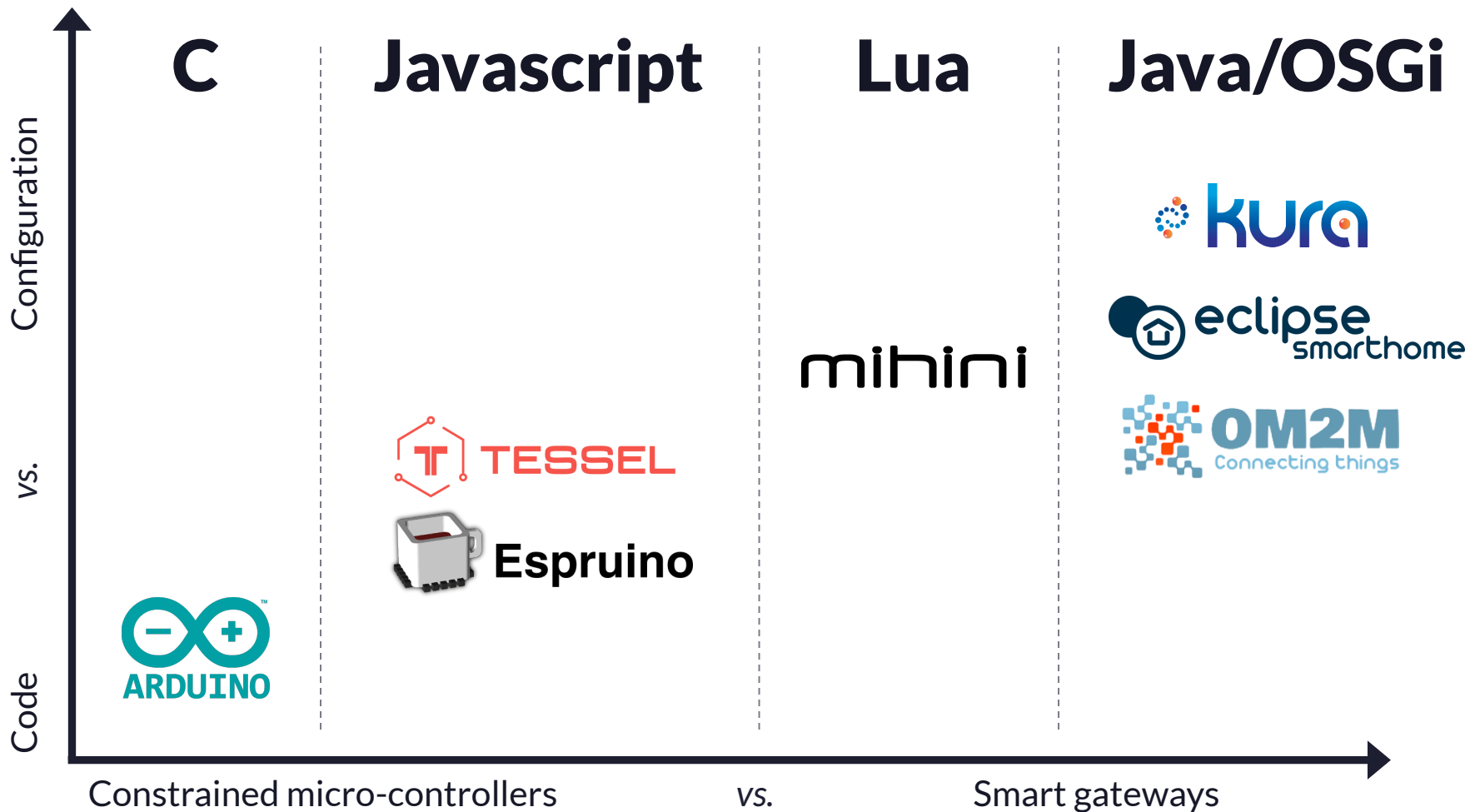
I often get asked...

WHAT IS ZE BEST
LANGUAGE FOR
IOT?!?



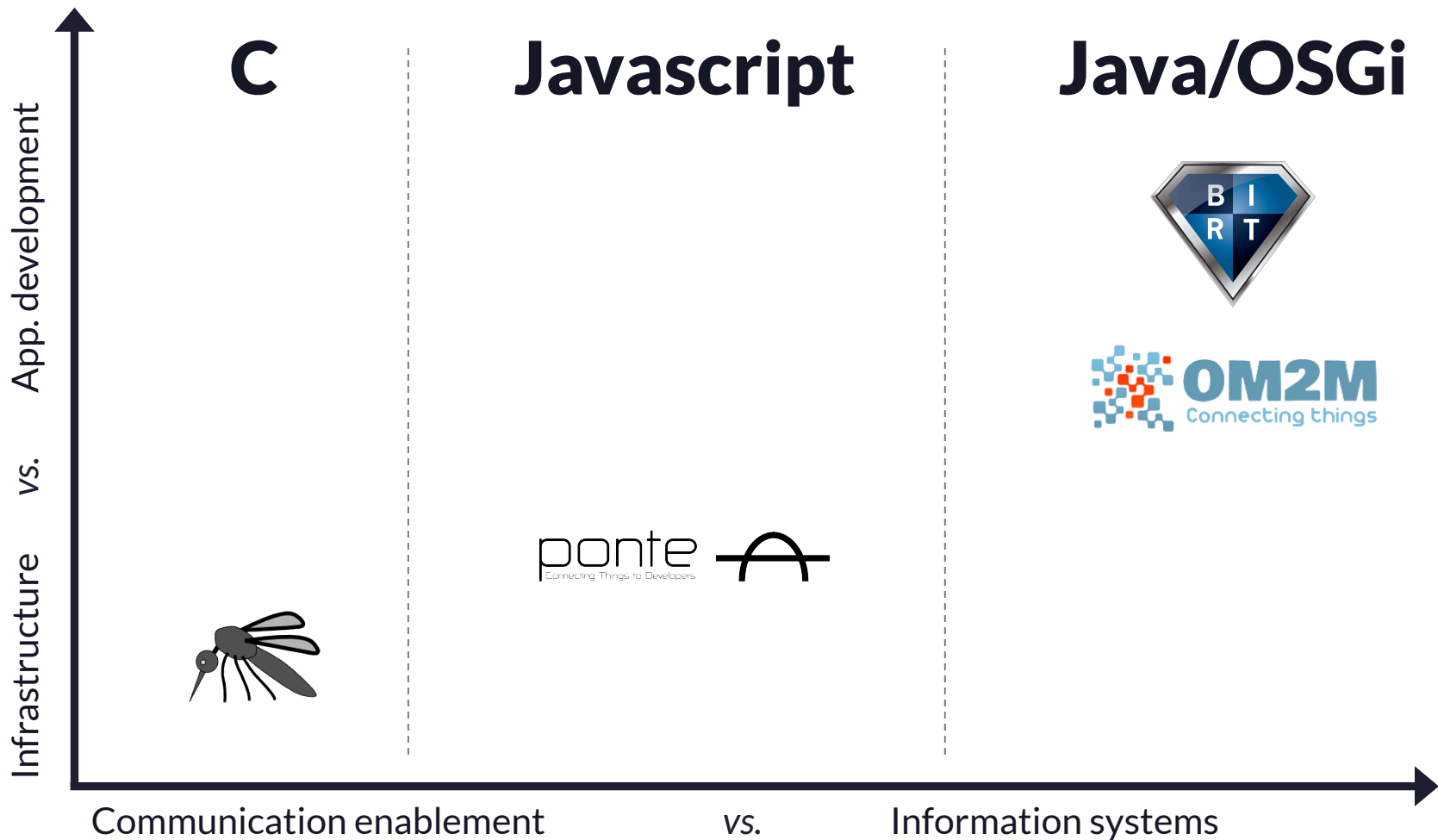
ANSWER: It depends! 😊

For embedded systems...

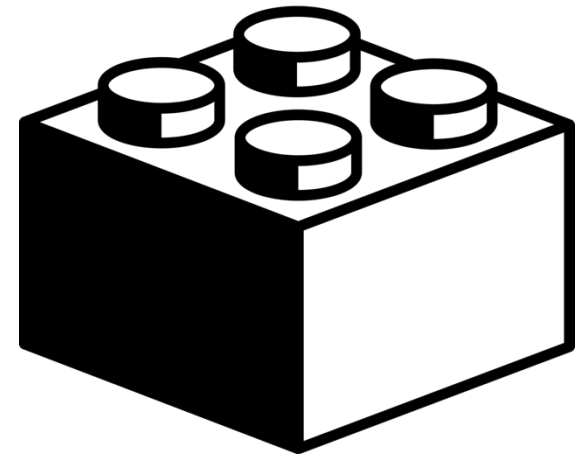


ANSWER: It depends! 😊

On the server side...

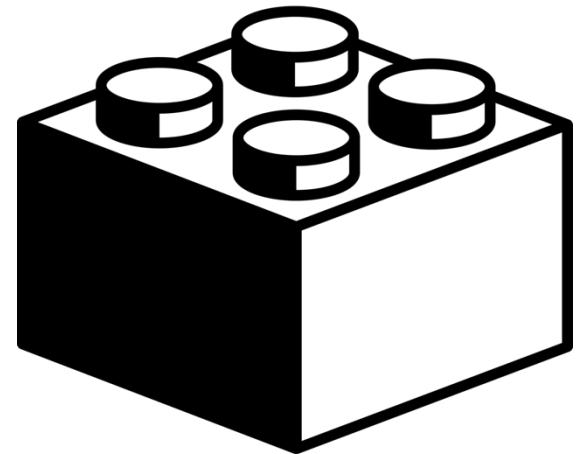


Building blocks for IoT

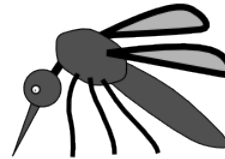


Building blocks for IoT

... for building what?

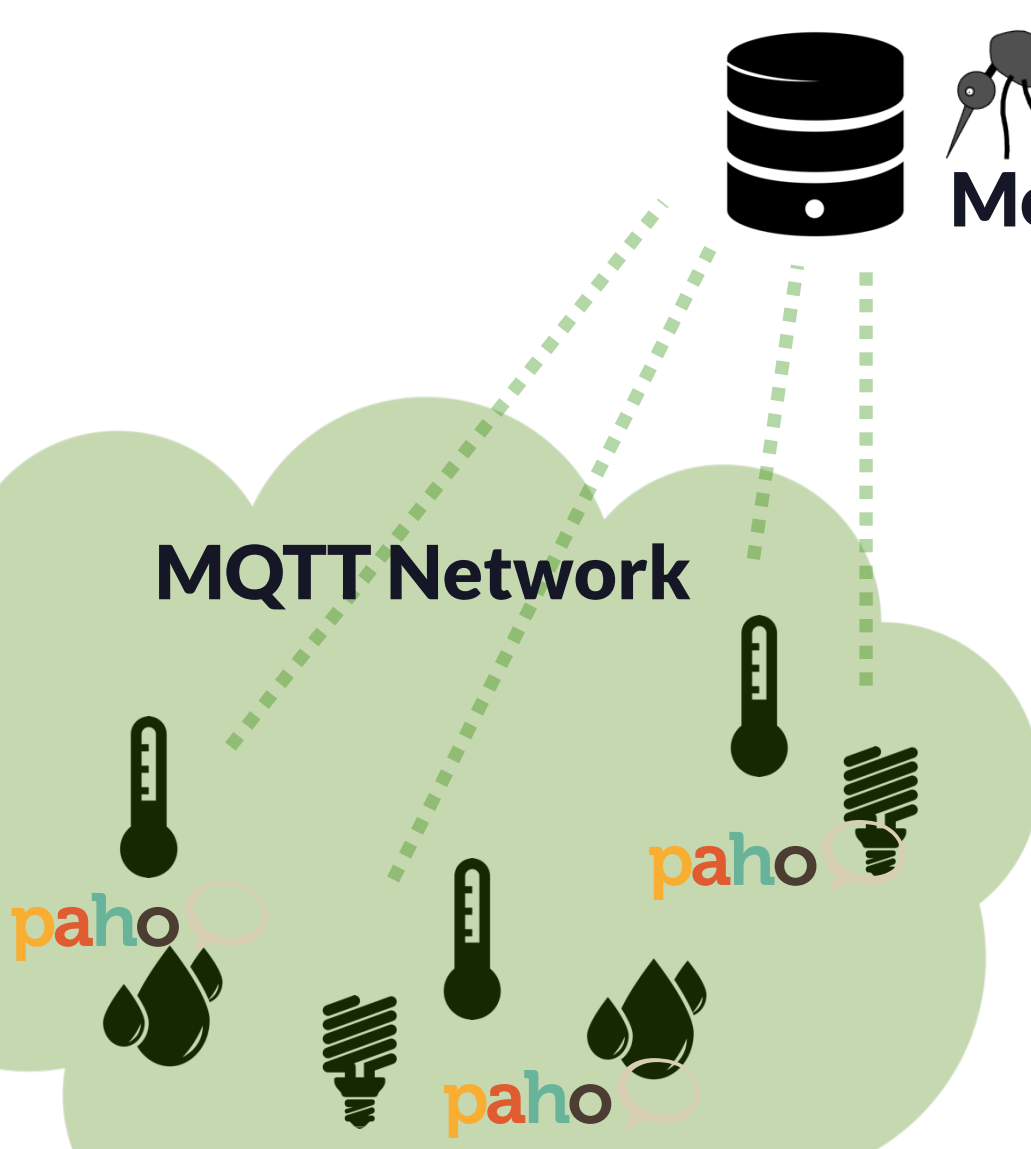


Building... SENSOR NETWORKS



Mosquitto broker

MQTT Network



Building... **SENSOR NETWORKS**

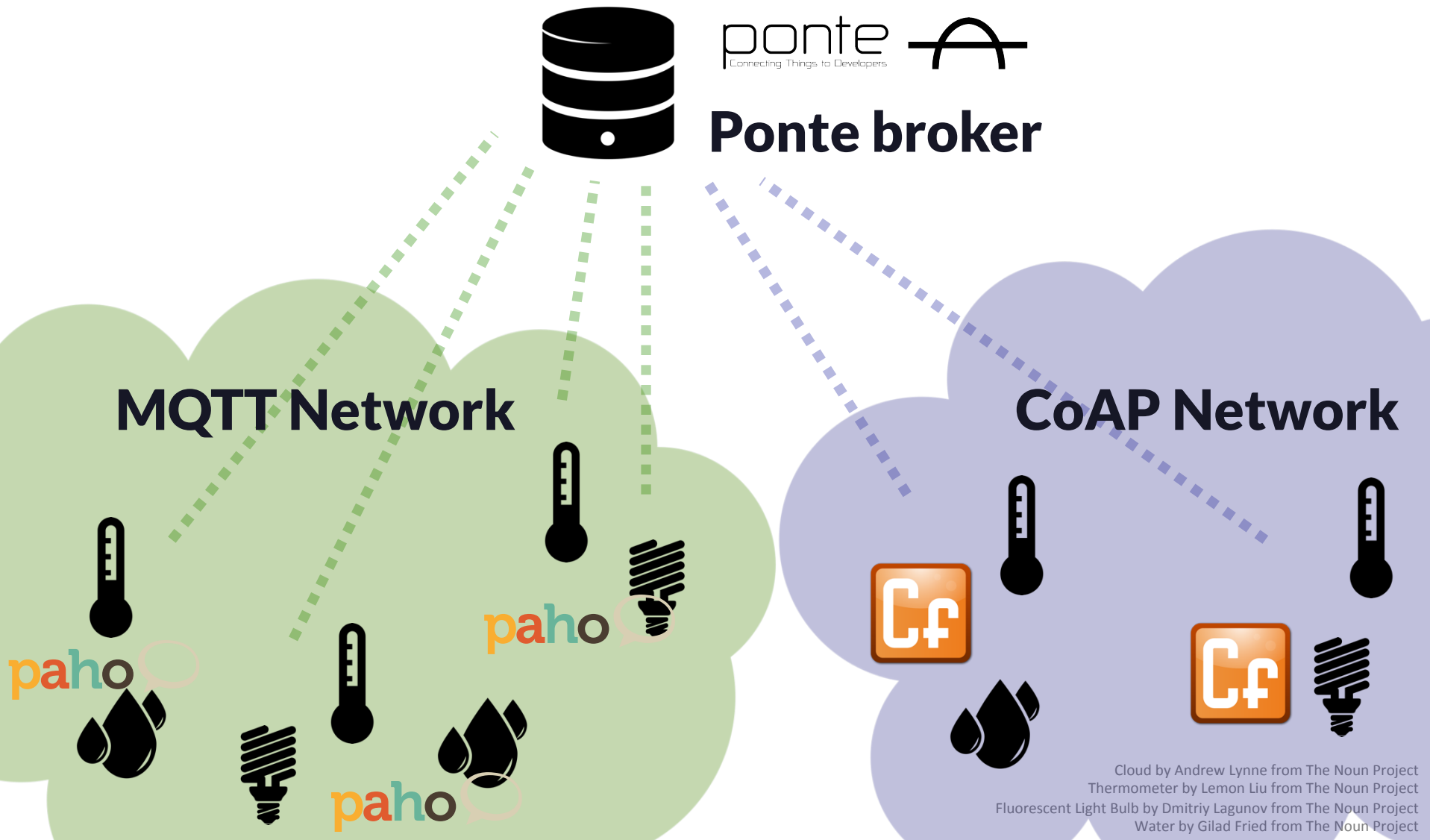
1. Get a Paho client from:
<http://eclipse.org/paho>

2. Use Eclipse MQTT sandbox* to
test your app



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

Building... SENSOR NETWORKS

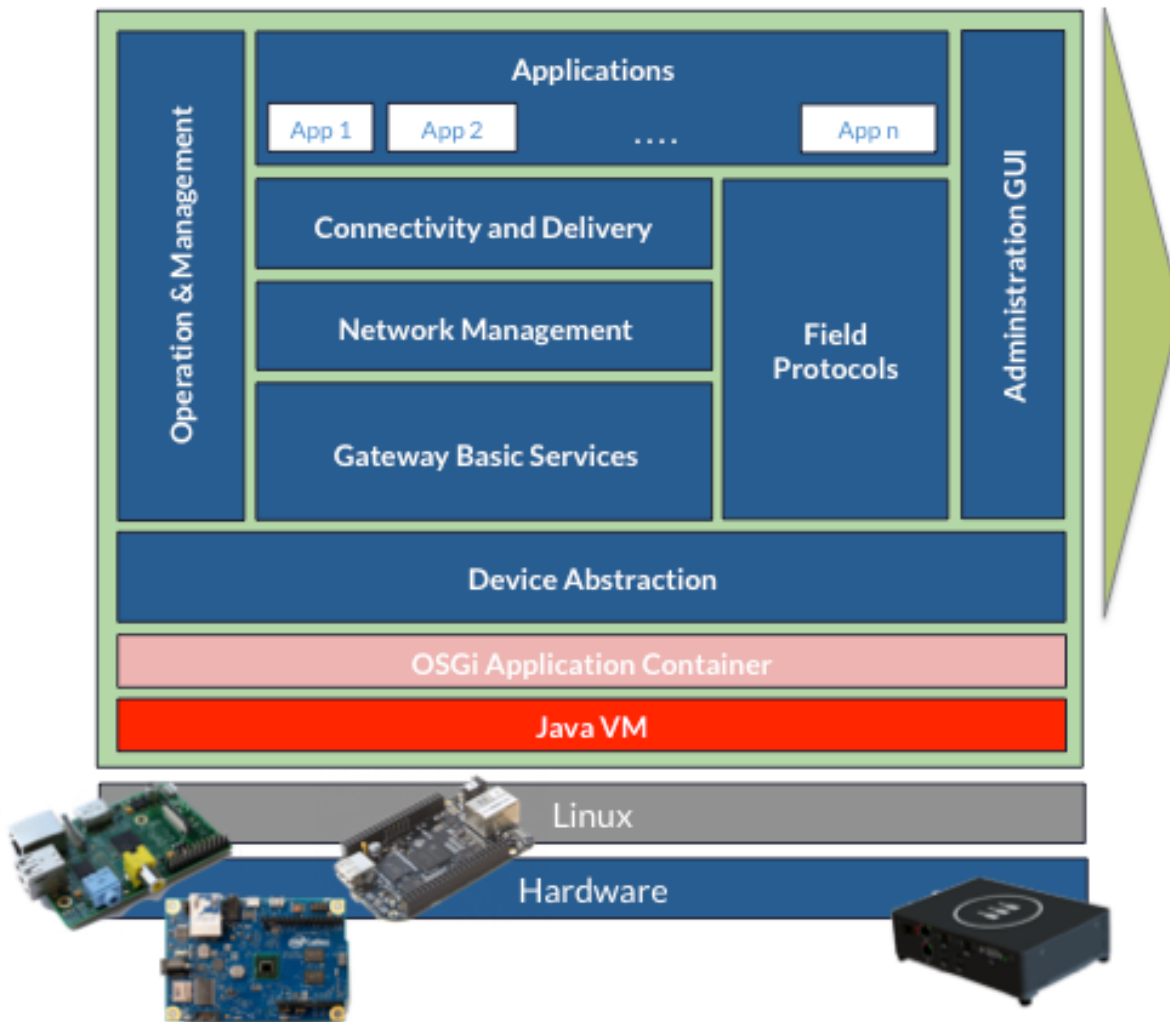


Building... **SENSOR NETWORKS**

```
$ npm install ponte
```



Building... M2M/IOT GATEWAYS



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

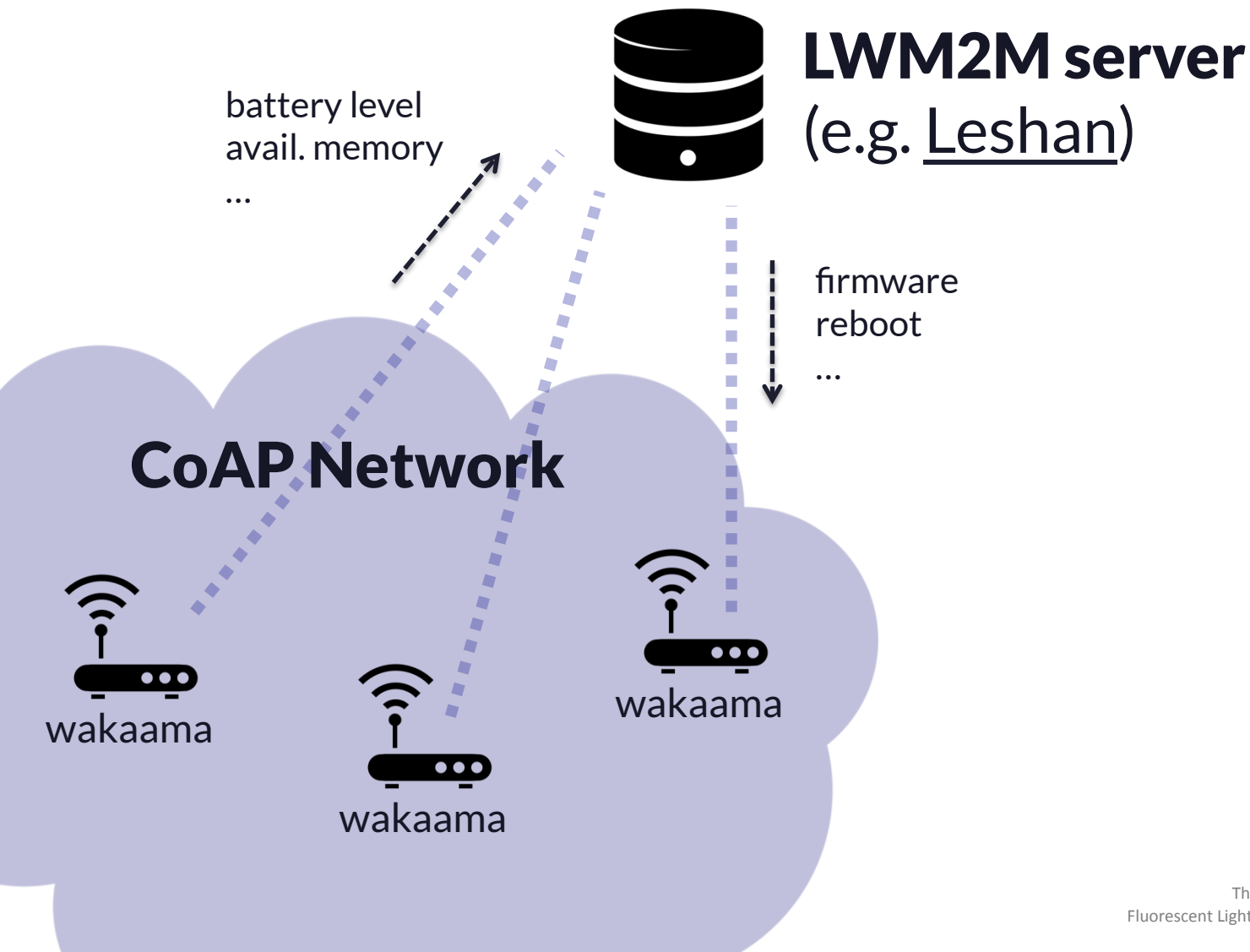
1/ Download Kura code:
<https://github.com/eclipse/kura>

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.**

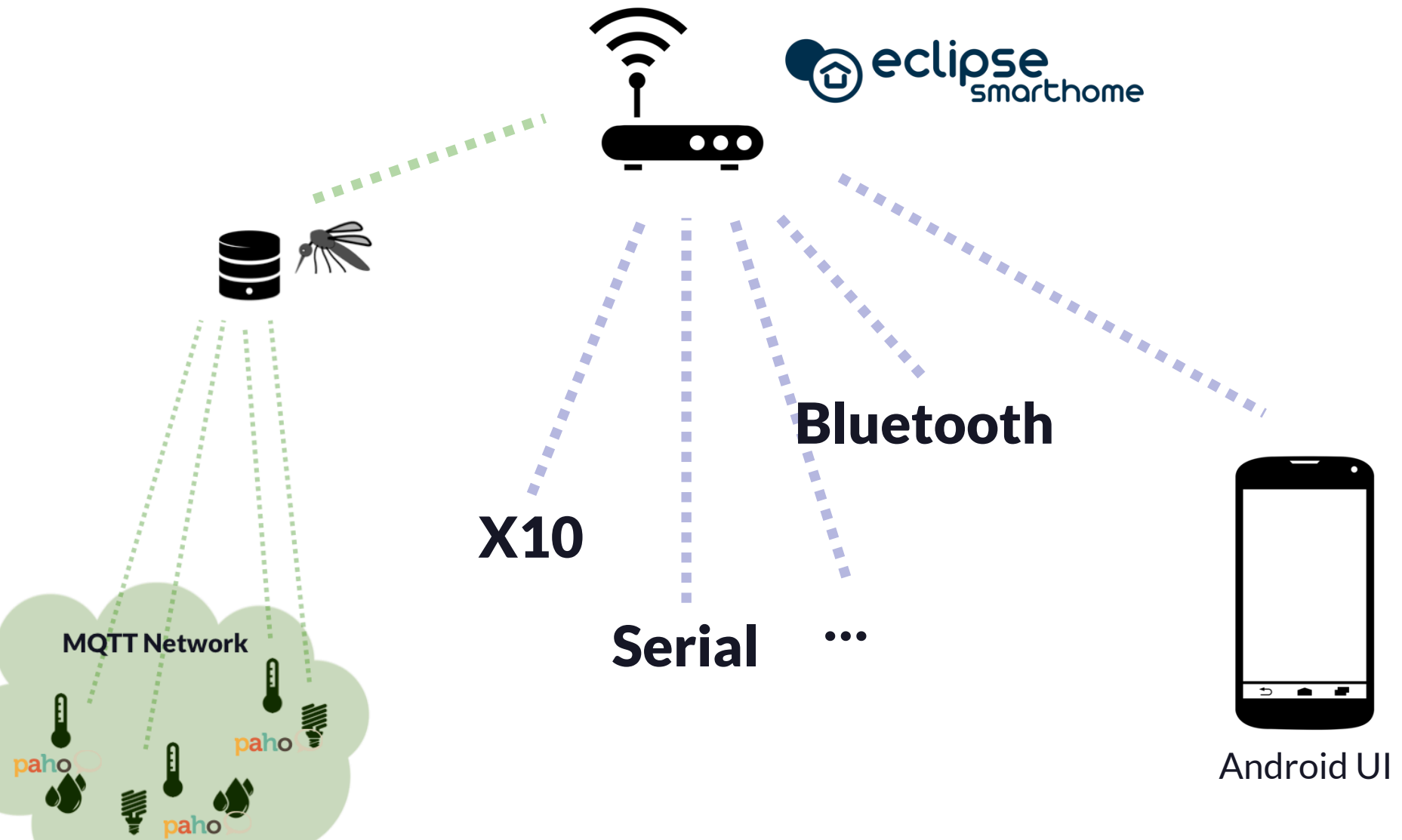
1/ Port Wakaama's LWM2M callbacks to your device
e.g. "reboot()"



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

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Orion will enable IoT development in the cloud

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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?



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