



Building an Open M2M community

... one step at a time

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Who I am



- Benjamin Cabé
- Open Source guy at Sierra Wireless
- Long-time Eclipse lover



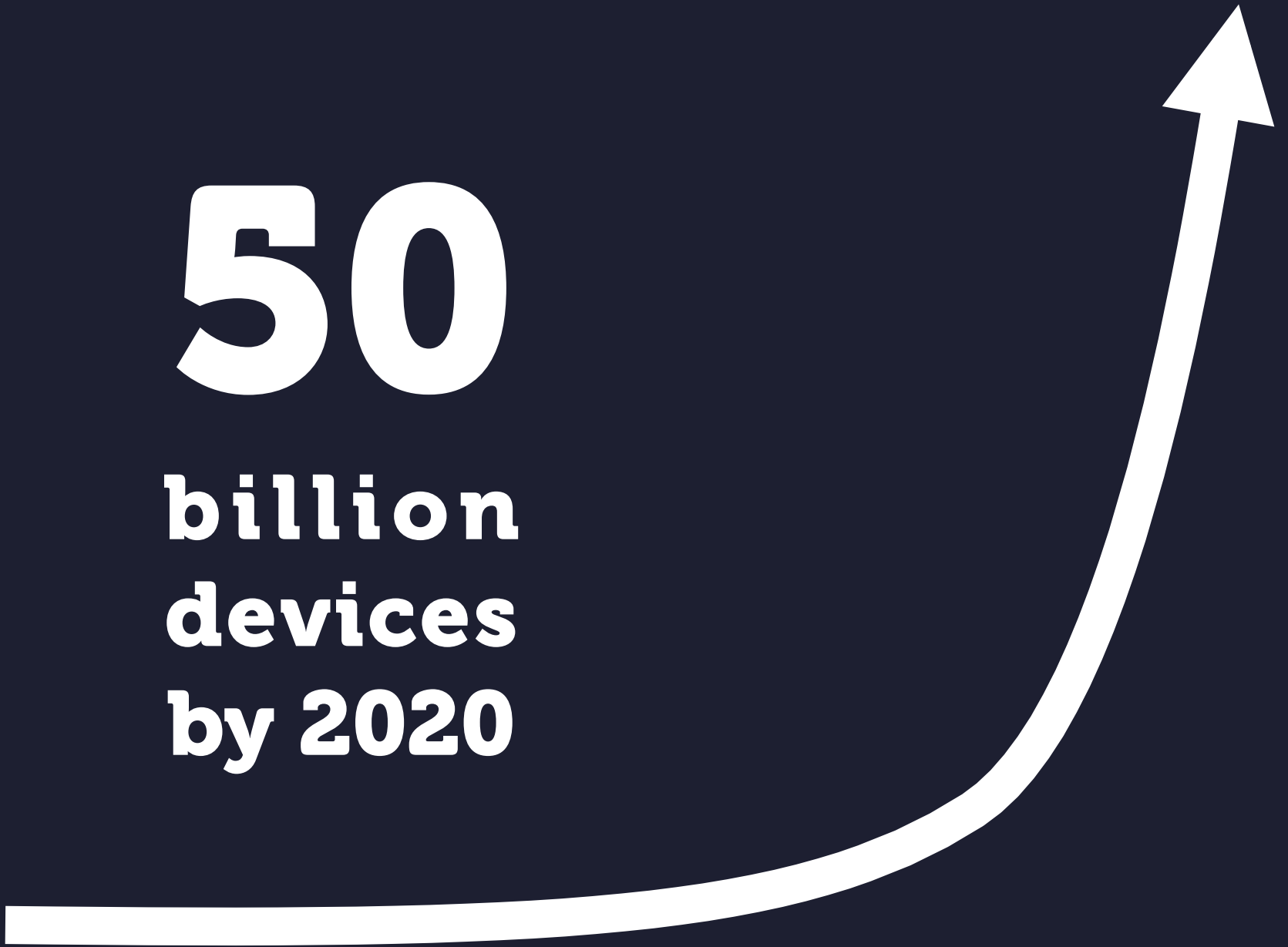
What is M2M?



Technology that supports
wired or wireless
communication
between devices

50

**billion
devices
by 2020**



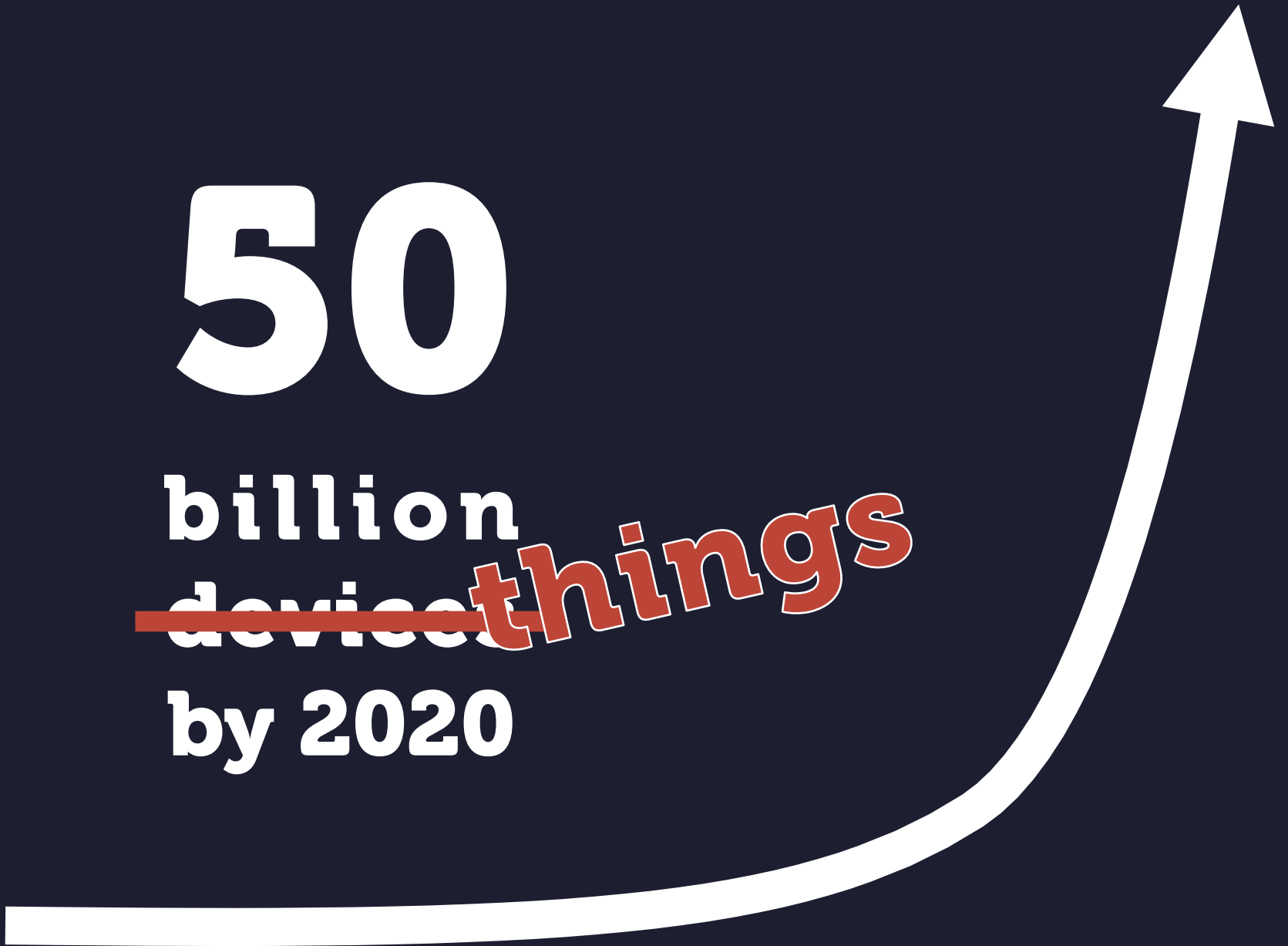
50

billion

~~devices~~

by 2020

things



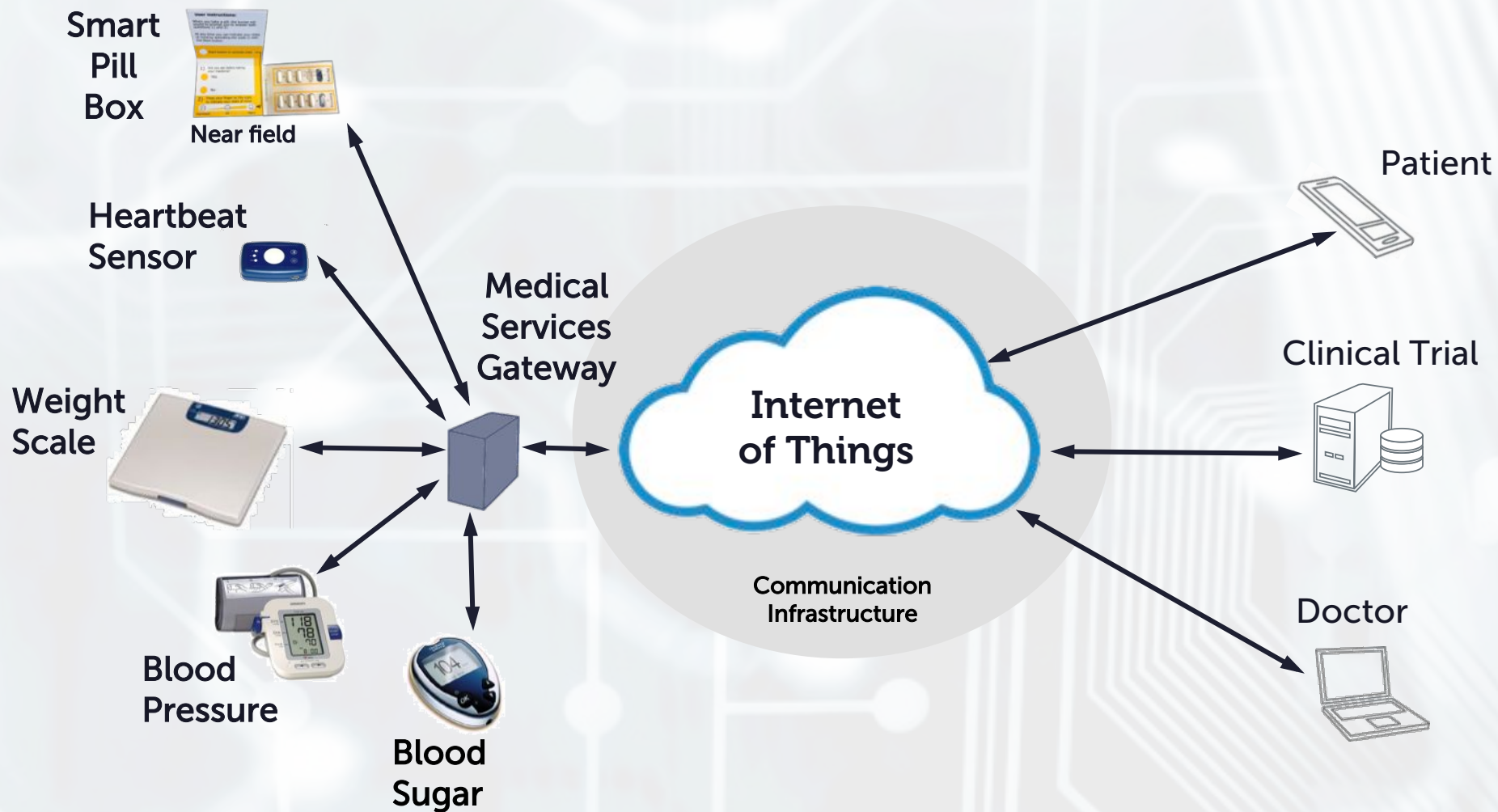












An aerial photograph of a vast, green, grassy field. A line of wooden fence posts runs diagonally across the lower-left portion of the image. The terrain is uneven with varying shades of green and brown, suggesting different types of vegetation or soil. In the upper right, there are some small, dark, irregular shapes that could be trees or shrubs. The text "Ready then?" is superimposed in the center of the image in a bold, black, sans-serif font.

Ready then?

A photograph of a grassy hillside with a fence line. The text "...Not quite!" is overlaid in the center. The hillside is covered in green grass with some brown patches. A fence line runs diagonally across the frame, with a wooden post visible on the left. In the background, there are some trees and a small building.

...Not quite!



**M2M market
= fragmented**



**M2M development
= complex**



**M2M vendors
= lock-in**



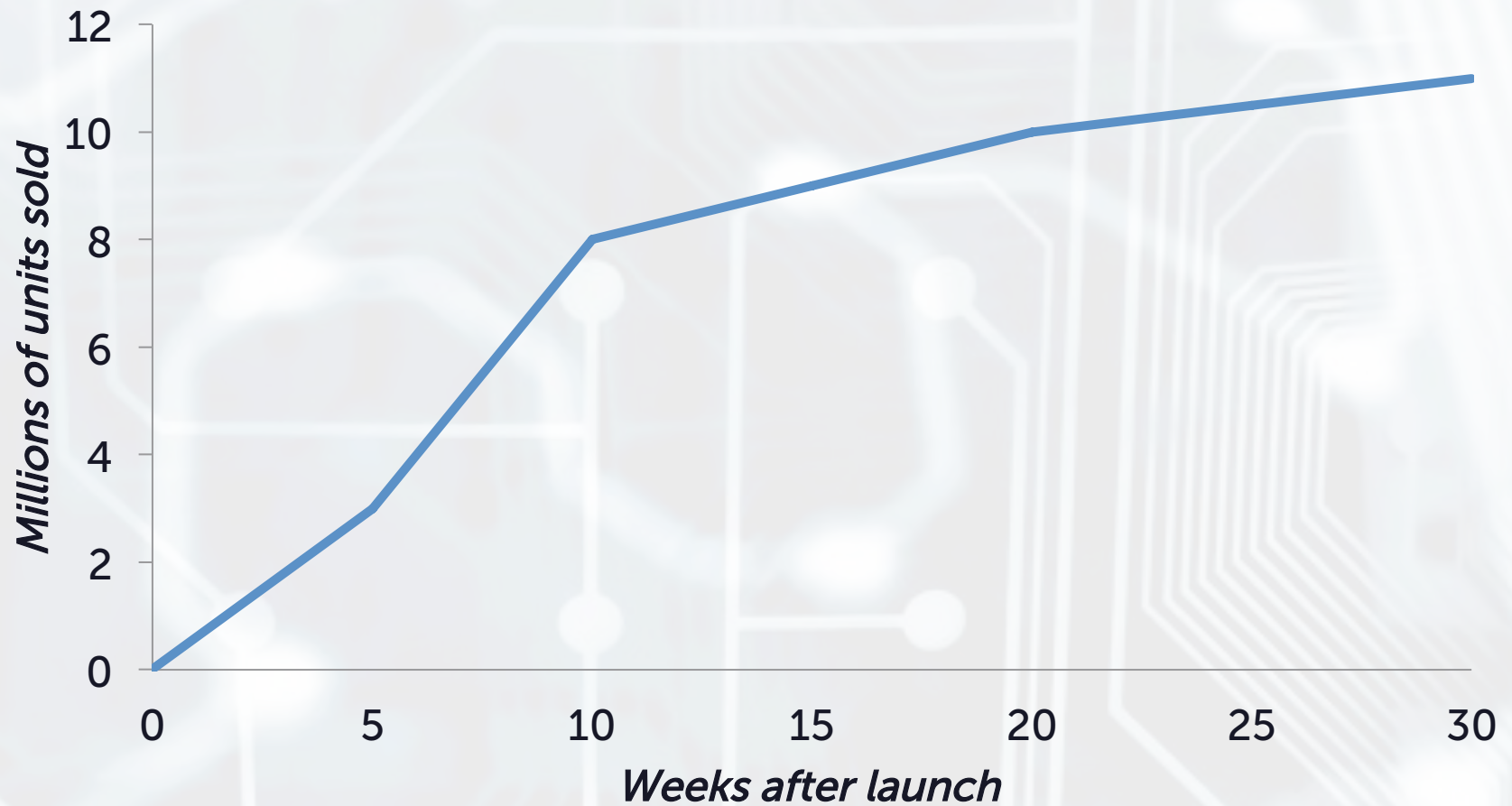
open source ?





- \$3000 bounty
- Open Source driver
- 1 week

Kinect sales







m2m

eclipse.org

Axeda[®]

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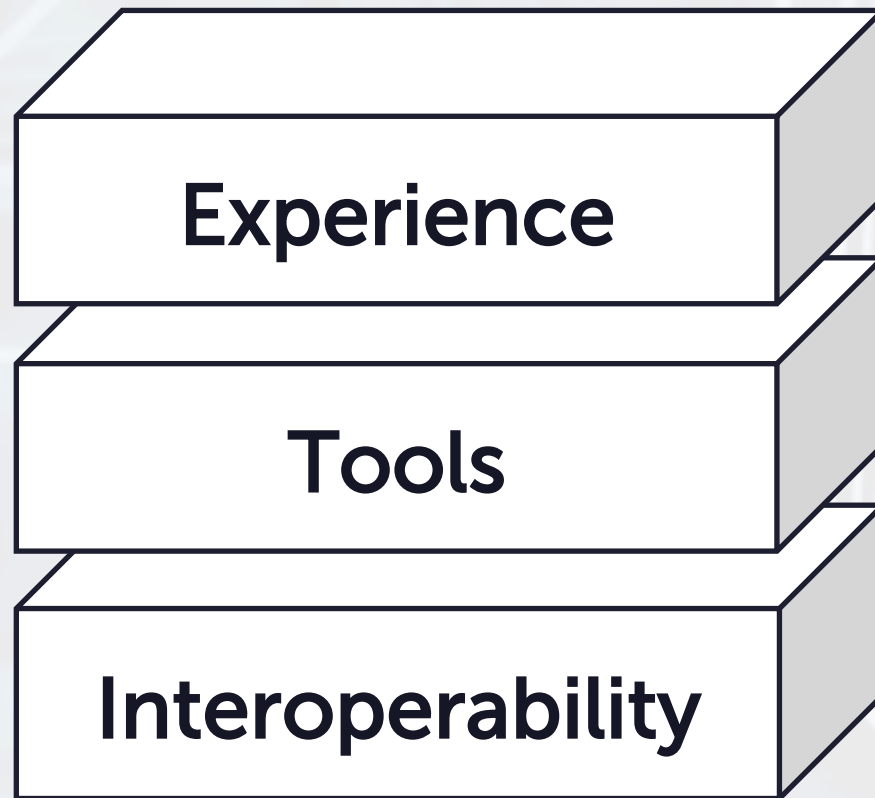
 **Cirrus Link**
SOLUTIONS

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3 pillars



3 projects

Framework

mihini

Protocols

paho

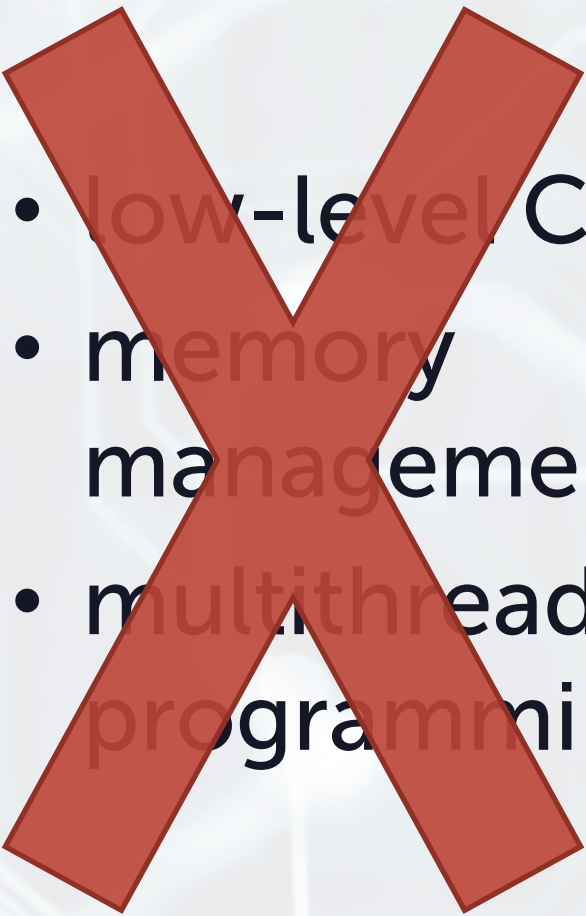
Tools

koneki

mihini = framework

I/O manipulation
data consolidation
application management
dev-friendly API

M2M programming

- 
- low-level C
 - memory management
 - multithreaded programming

- read sensor values
- control actuators
- consolidate data
- communicate

Example: Sending an SMS

```
int main()
{
    unsigned char char1[10];
    unsigned char char_buf[8]="AT+CSQ\n";
    // unsigned char sms_buf[20] = "AT+CMGS="xxxxxxxxxx";

    int wc_fd;
    /****** Init of serial port *****/
    wc_fd = init_wc(wc_fd);
    sleep(3);
    //writing to serial port
    write(wc_fd,char_buf,sizeof(char_buf));
    usleep(40000);
    //reading from serial port
    read(wc_fd,char1,sizeof(char1));

    sleep(2);
    close(wc_fd);

    return 0;
} // end of main

// initialization of serial port

struct termios options;

ttys5_fd = open("/dev/ttyS5", O_RDWR );
if (ttys5_fd < 0)
{
    printf("\nFail to open serial port 2\n");
    return 0;
}
```

```
sms.send(
    '+33612345678',
    'My SMS',
)
```

Simplify M2M programming



- powerful
- fast
- lightweight
- embeddable
- scripting
- C integration

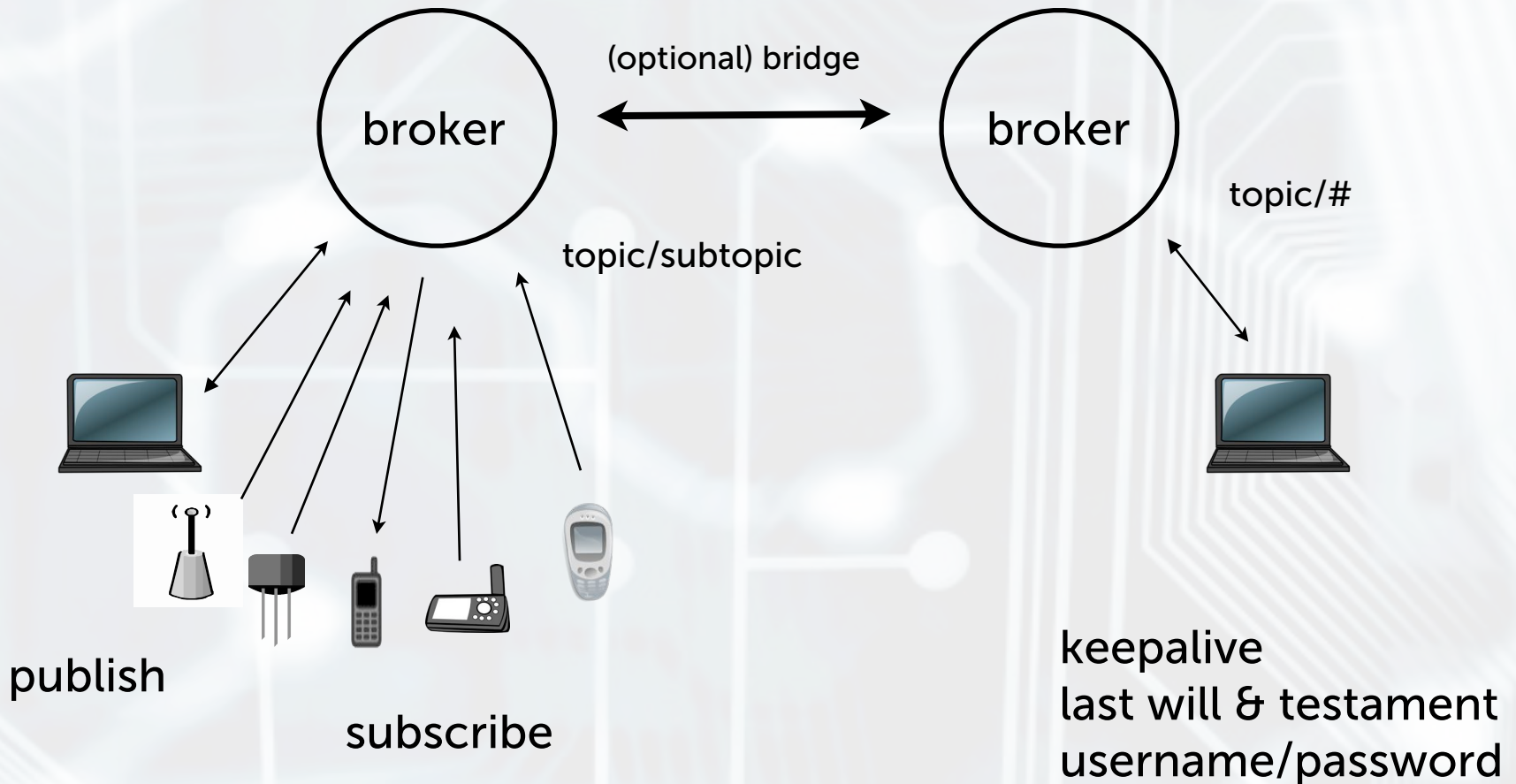
paho = protocols

open
multi-language
clients and servers
MQTT



- Low-bandwidth
- Low-power
- Payload agnostic
- Adjustable QoS
- Large ecosystem

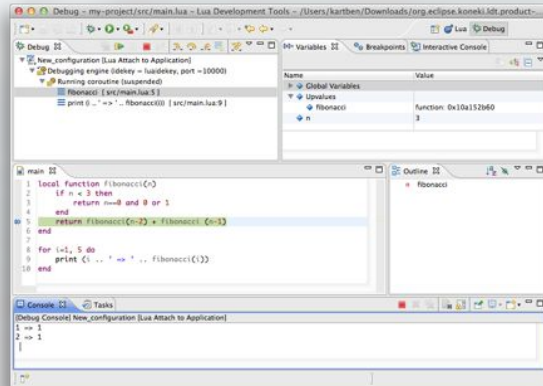
MQTT



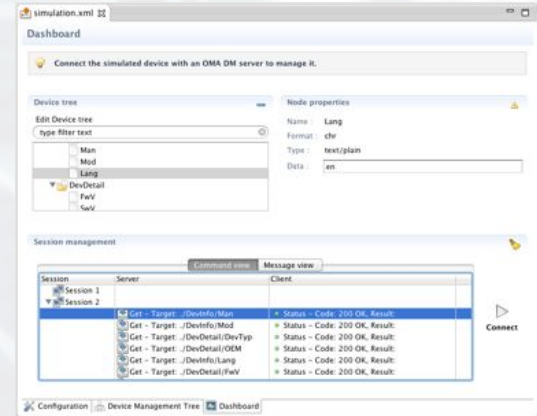
koneki = tools

develop
simulate
debug
deploy

koneki



Lua Development
Tools

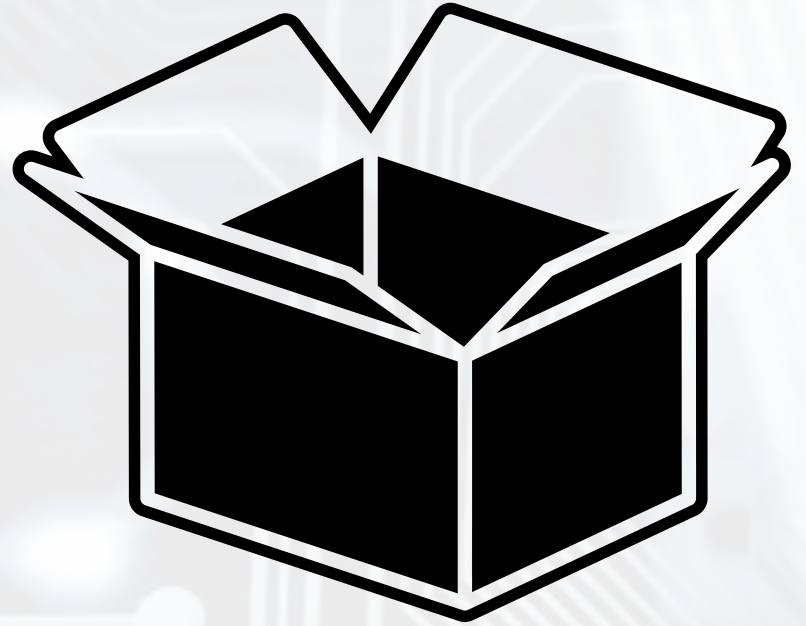


OMA-DM
Simulator

Next: Mihini tooling, M2M modeling

M2M IDE

- June 2013
- Ready-to-use
- Market Place



M2M Developer Kit



Affordable

DIY
Arduino

Simple

CAN bus
Modbus

Industrial

Standardization?

- Actively collaborate with standards organizations
 - OneM2M, Continua, ...
- Combine both bottom-up and top-down approaches
 - Leverage existing, open, software stacks
 - Foster compatibility with emerging standards

M2M Developer Portal

m2m.eclipse.org

m2m.eclipse.org is where you can learn about the technologies developed at [Eclipse](#) to make Machine-to-Machine (M2M) development simpler.

These technologies aim at establishing an open, end-to-end, M2M stack.

< **mihini** >

[Mihini](#)

Mihini will deliver an embedded runtime running on top of Linux, exposing high-level Lua API for building M2M applications.

Frameworks



Deliver an embedded extensible runtime enabling M2M vertical applications.

In order to enable the creation of M2M apps on communicating embedded devices, we provide a complete framework enabling device management, software updates, ...

[More »](#)

Protocols



Provide Open Source implementations of standard 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 M2M developers.

We believe that Lua is a language very well-tailored for M2M, therefore the first component we deliver is an IDE for Lua development, called [Lua Development Tools](#).

[More »](#)

New business models

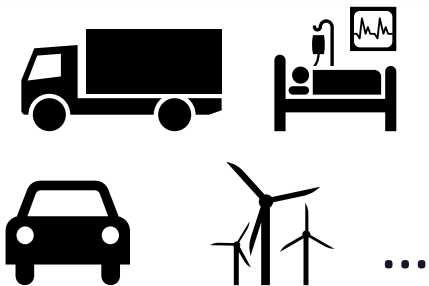
Third Party Ecosystem

Open M2M
communication protocols

Open M2M application
framework and runtimes

Open M2M
development tools

Internet of
Things



H/W differentiation



- ruggedness
- radio certification
- add-ins
- services

S/W differentiation

embedded	server
industrial protocols power optimization development tools vertical applications real-time professional services ...	24/7 3 rd party services security billing carrier integration professional services ...

Wrap-up

- **A complete M2M stack**
 - embedded framework
 - comm. protocols (client and server)
 - tools
- **An open collaboration model**
- **A de-facto standard M2M platform for enabling new businesses**

Join us!



m2m

eclipse.org