



Connect and Manage Devices

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Creating the Open Source Building Blocks for IoT

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Open Wins

Open Wins

W3C[®]

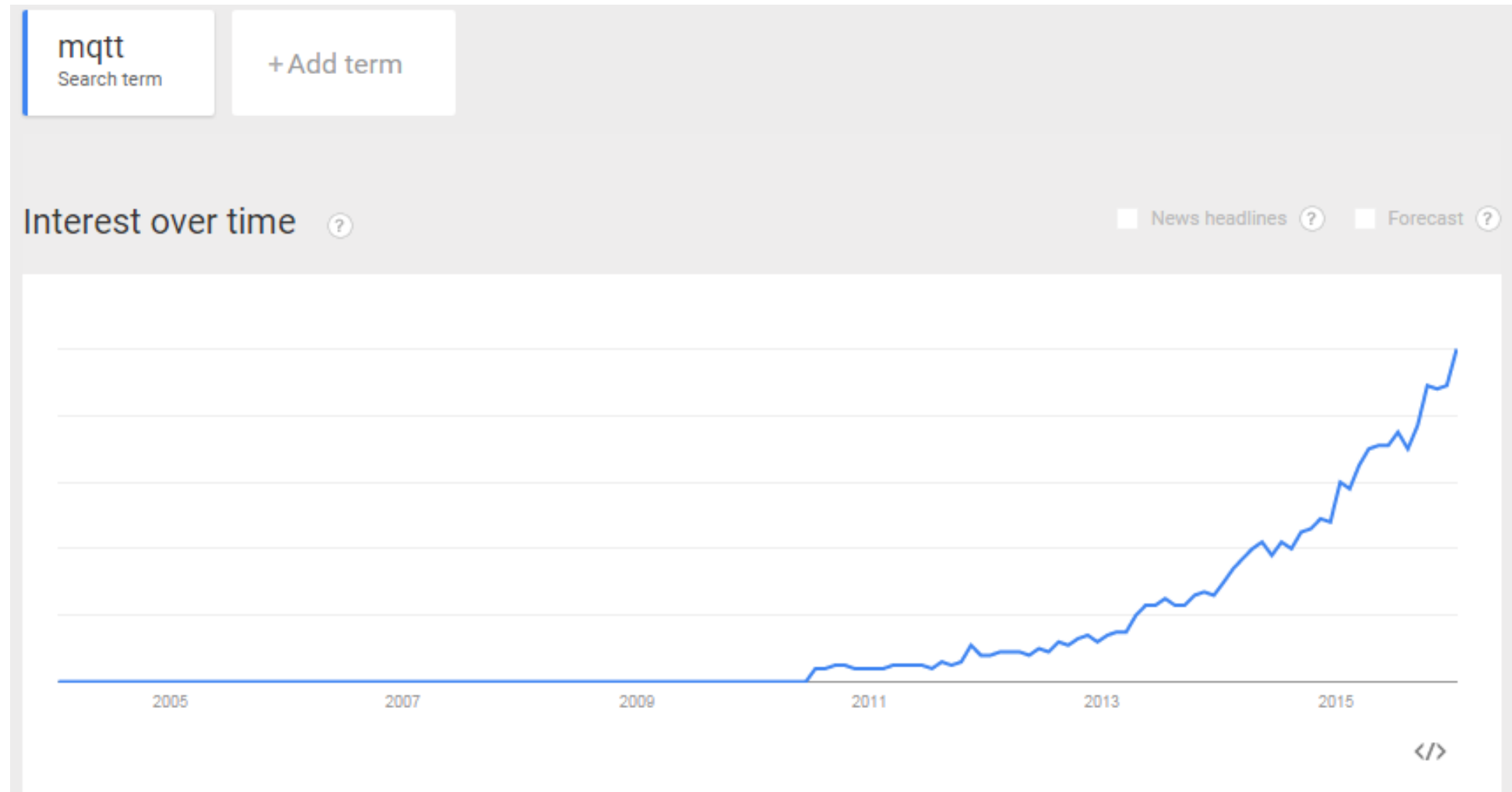
APACHE
HTTP SERVER



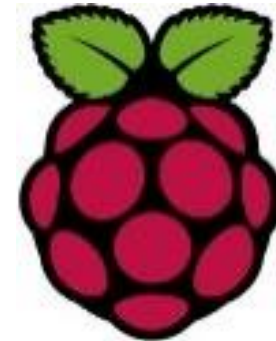
Linux[™]



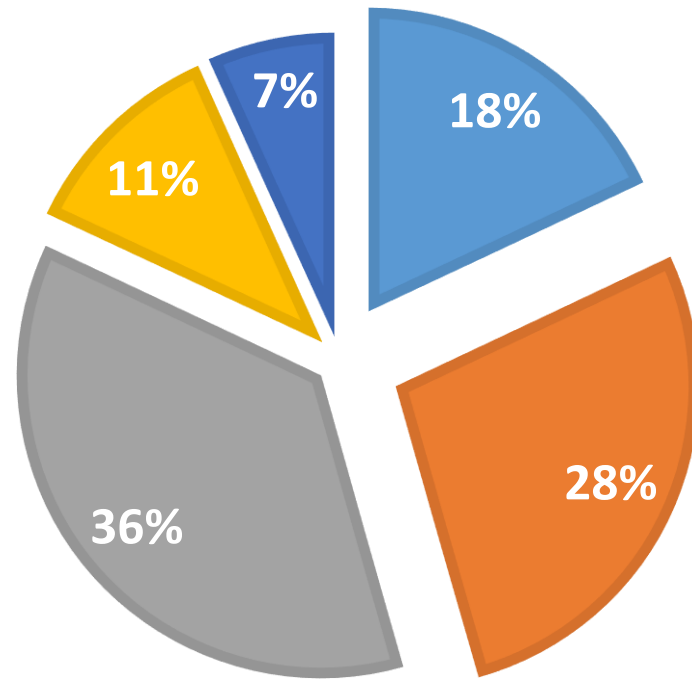
MQTT – Open Wins



Open Hardware Is a Key Enabler



HAVE YOU EVER USED ANY ACCESSIBLE HARDWARE PLATFORMS LIKE RASPBERRY PI, ARDUINO, BEAGLEBONE, ETC. ?



- Yes, my company deploys IoT solution using an accessible hardware platform.
- Yes, my company prototypes IoT solutions using an accessible hardware platform.
- Yes, I have experimented with accessible hardware in my spare time
- No, but I intent to experiment with accessible hardware in the next 6 months.
- Never used open hardware.

Open Source Software Will Be a Key Enabler

Innovation

Open Source enables:

- Permissionless innovation
- Innovation through integration
- Far higher levels of experimentation





Connect and Manage Devices

OS at Eclipse IoT



Mosquitto

An Open Source MQTT v3.1 Broker

4diac

paho 

 **eclipse**
Wakaama



 **kura**

 **eclipse**
smarthome

Vorto

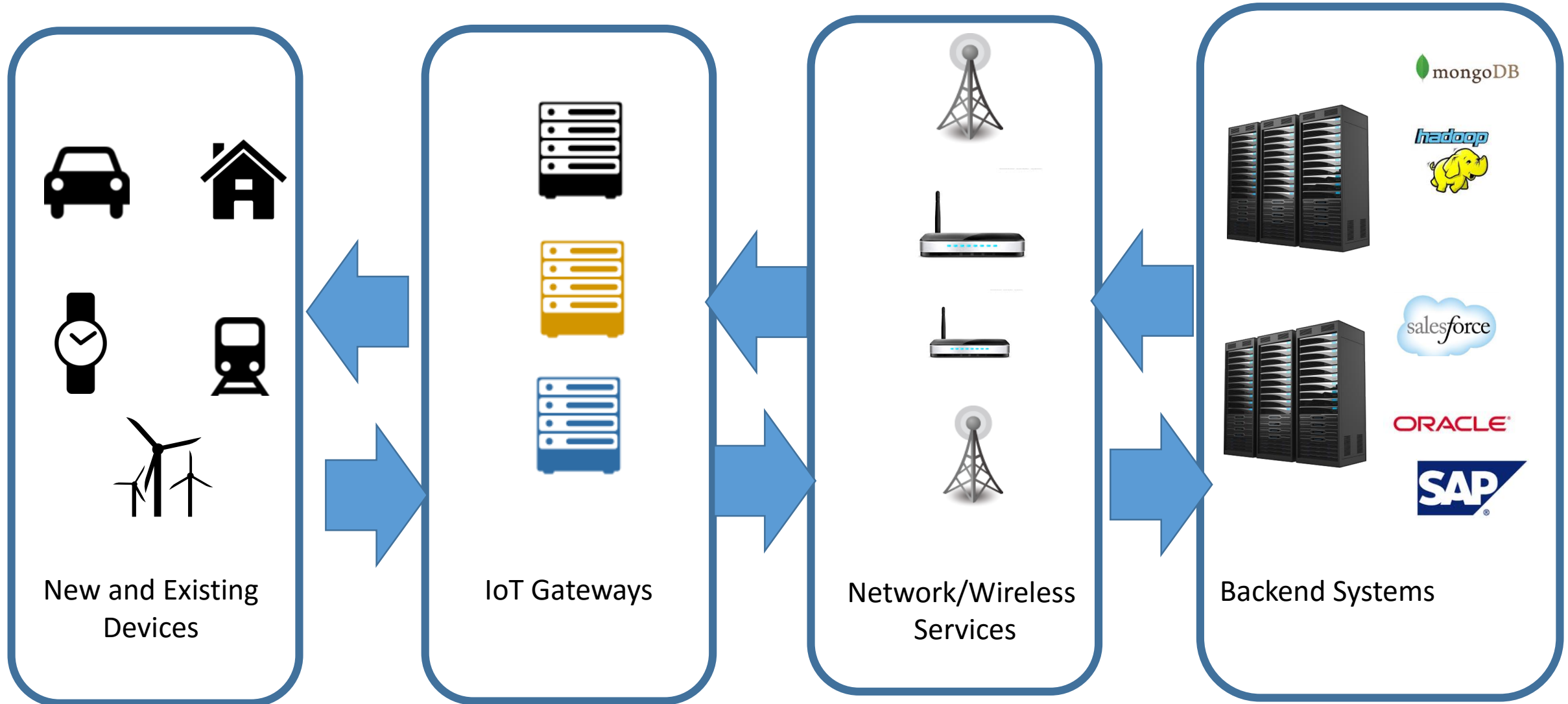
Krikkit



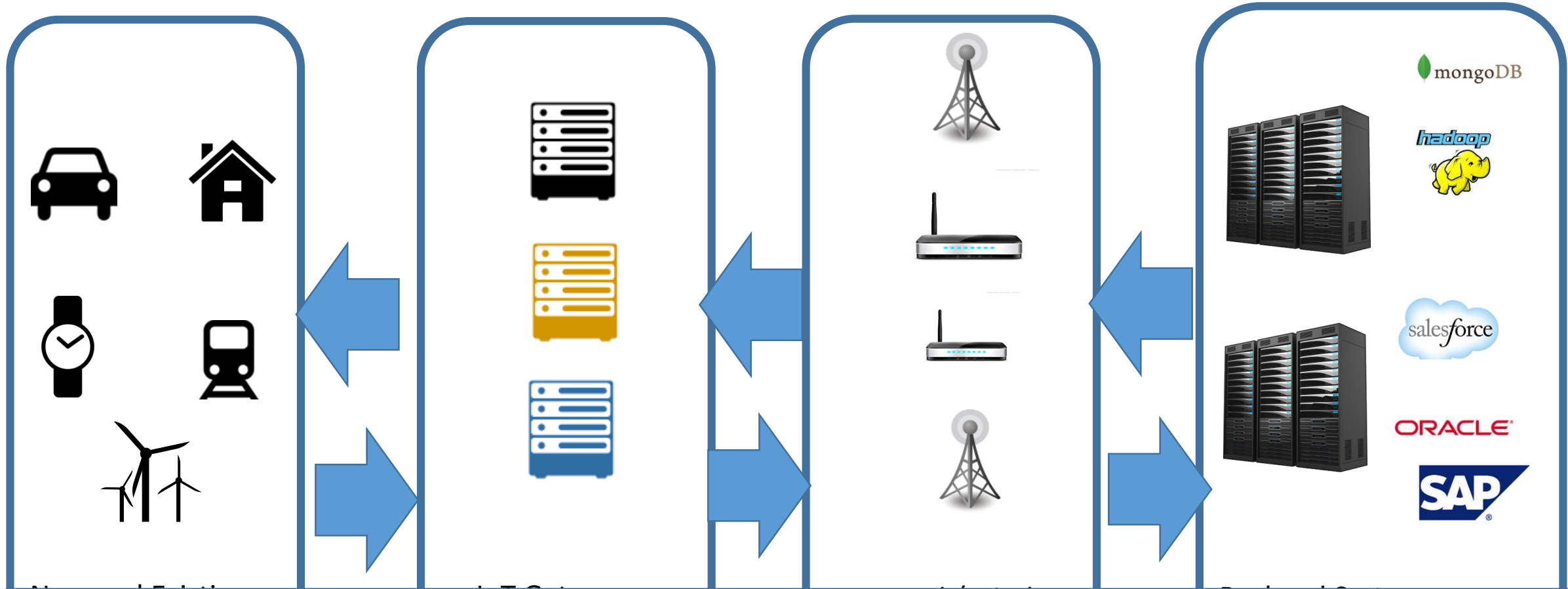
 neoSCADA

 **OM2M**
Connecting things

IoT Architectures

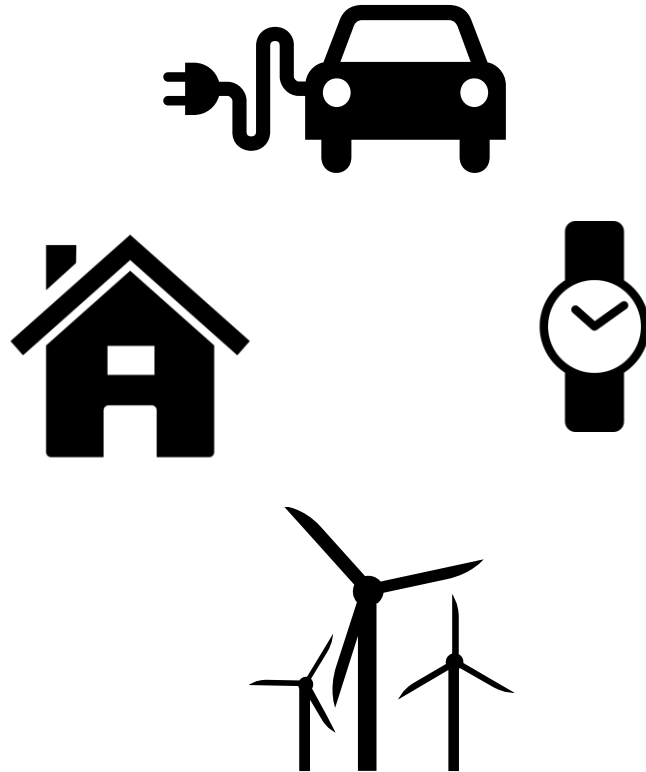


Open Solutions

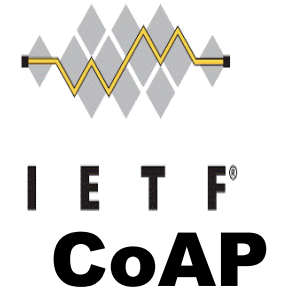


Open Standards and Open Source to Connect and Manage

Connect and Manage with Open Standards



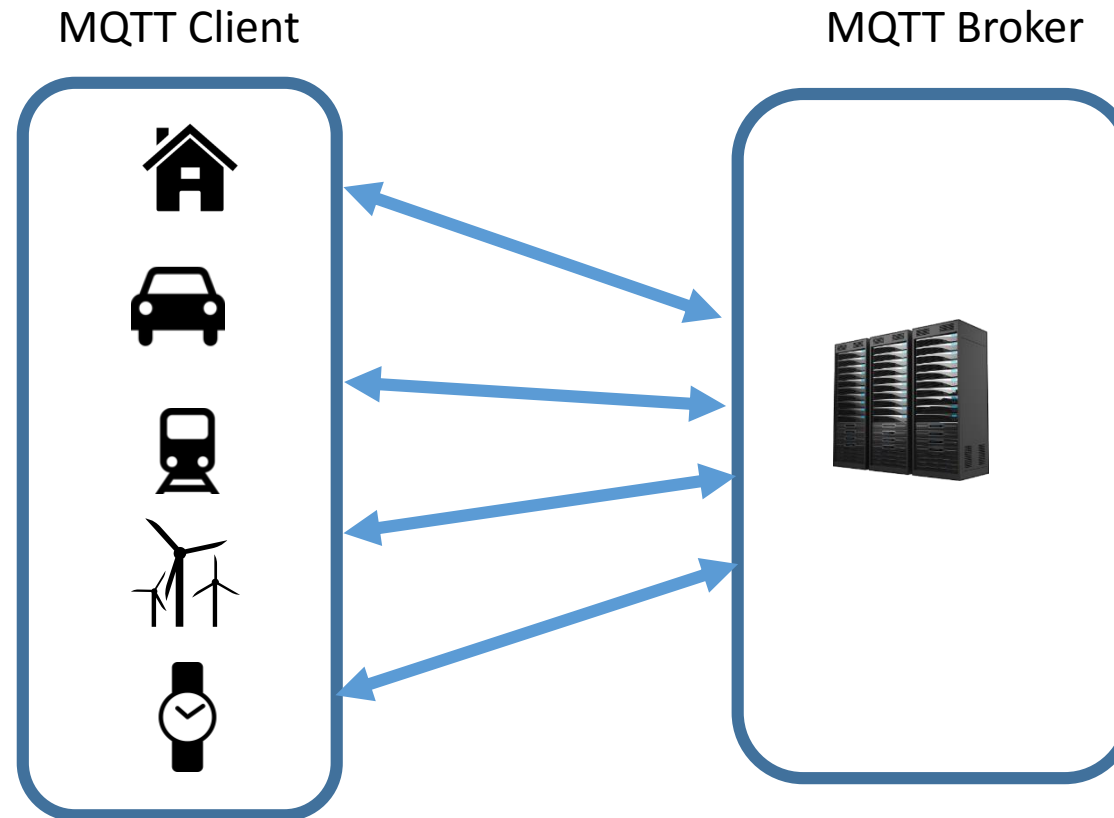
New and Existing Devices



Many Open Standards

MQTT

- Simple Publish/Subscribe protocol
- Small footprint
- Minimal on-the-wire formal and payload




MQTT Client
(Java, JS, C, C++, Python, etc.)

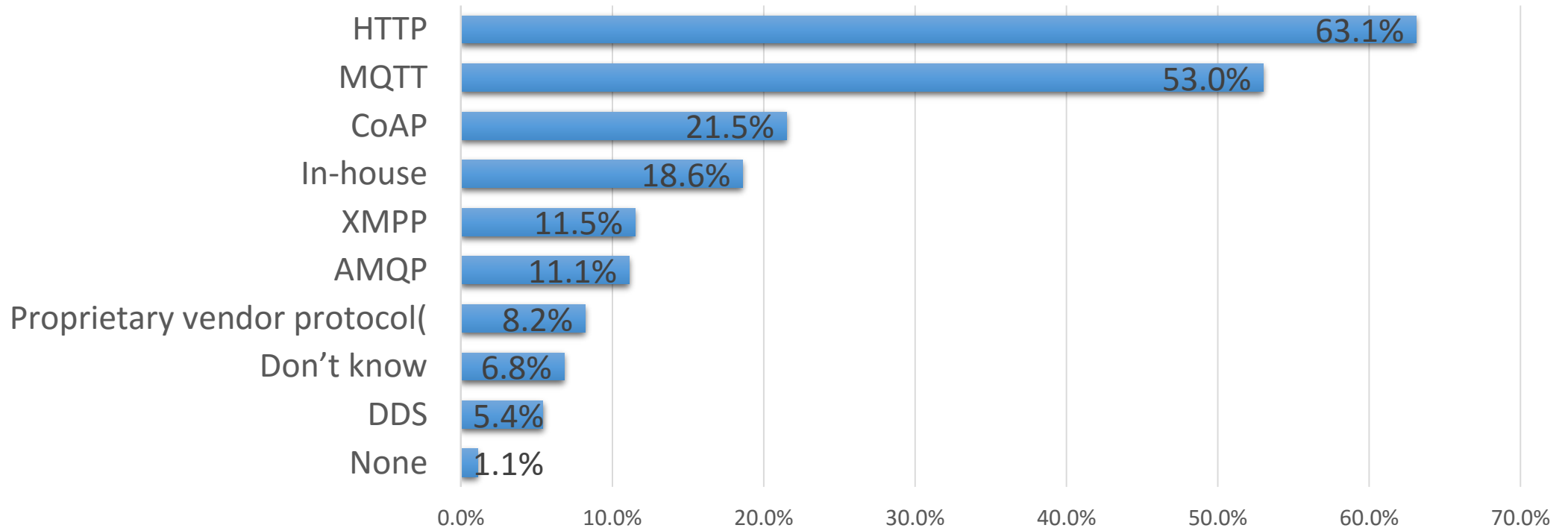

Mosquitto
MQTT Broker
(C Code)

MQTT Adoption



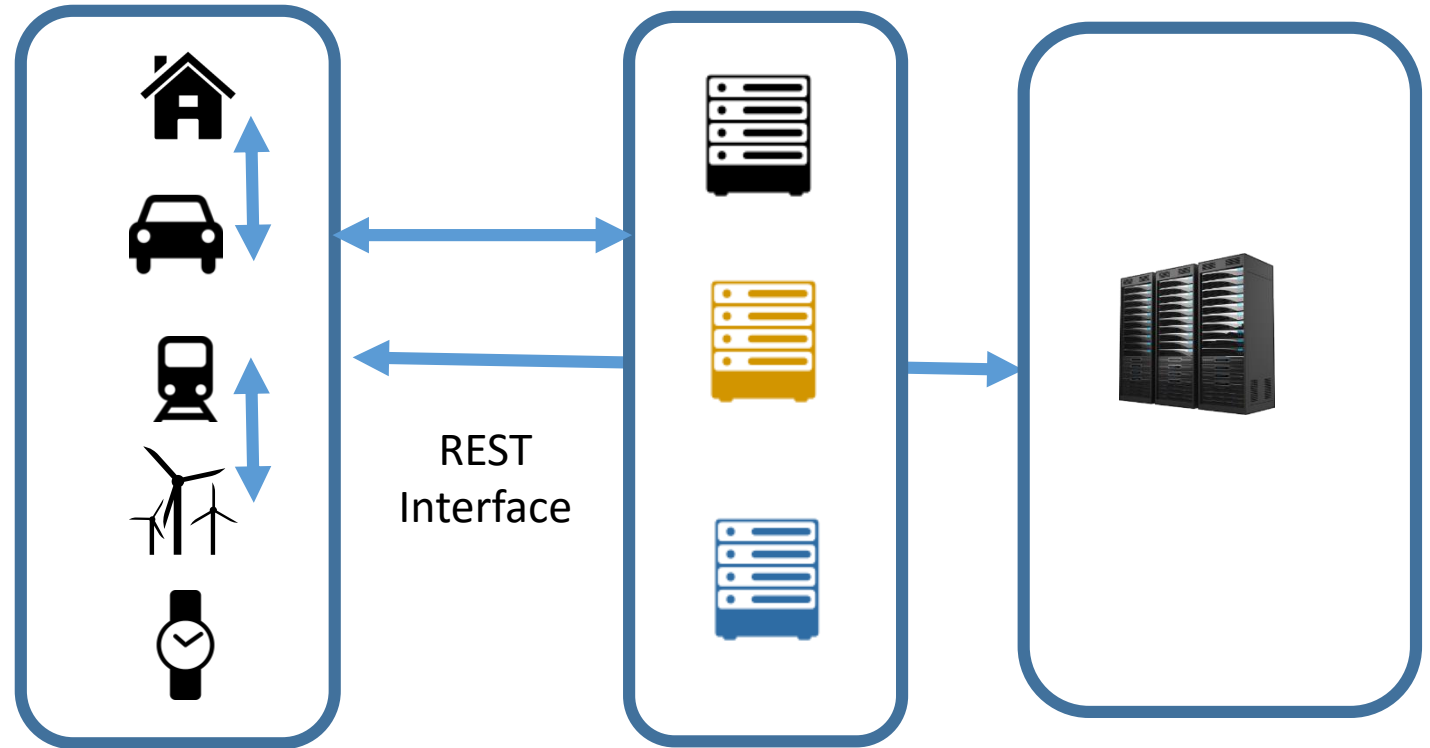
Messaging Protocol

What general messaging protocols do you use in your IoT solution?



Constrained Application Protocol (CoAP)

- RESTful protocol designed from scratch
- Transparent mapping to HTTP
- Works over UDP
- DTLS Security



Californium

- CoAP Core
- DTLS
- CoAP Tools
- Java implementations

Lightweight M2M

- Standard for device management
- Based on CoAP



LWM2M Adoption



ARM[®]mbed[™]

IoT Gateway Services



IoT Gateways



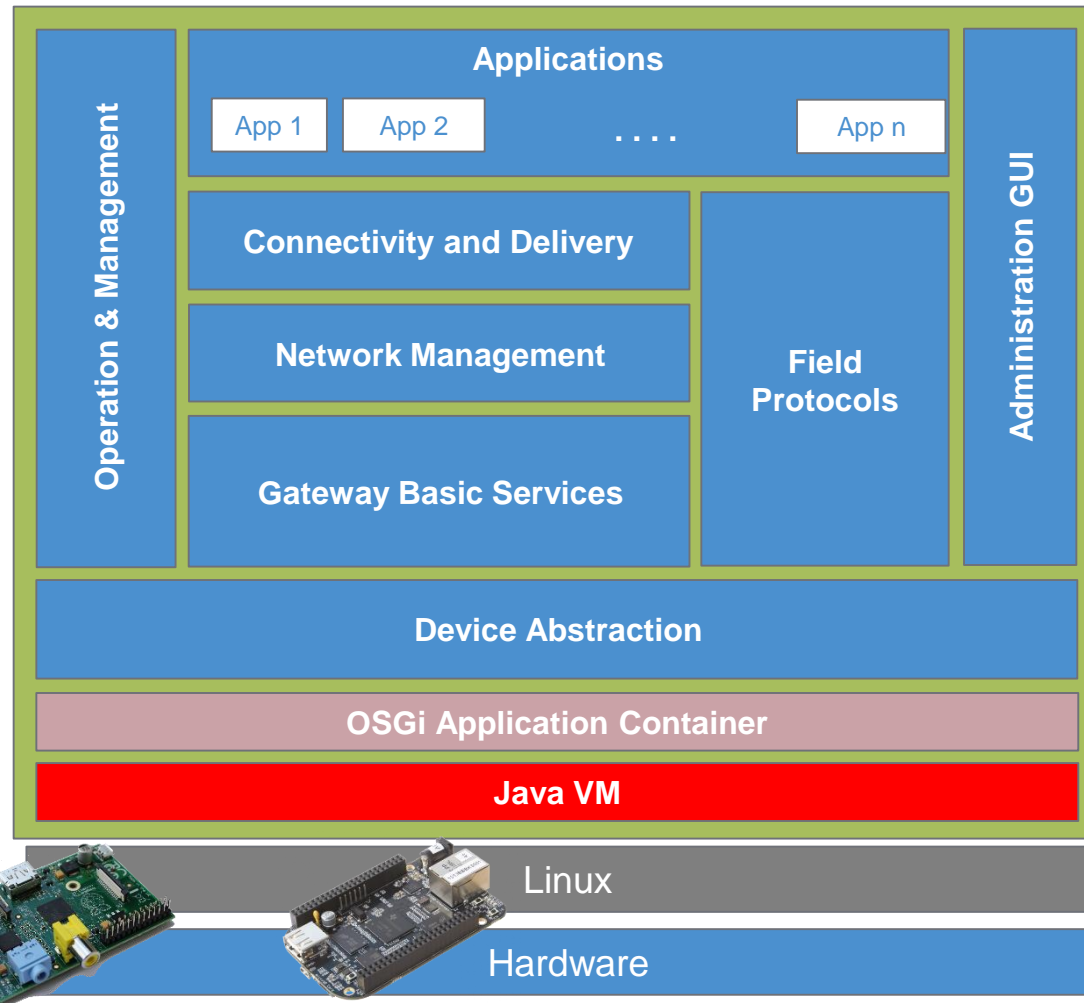
Java and OSGi

Gateways

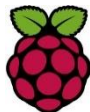
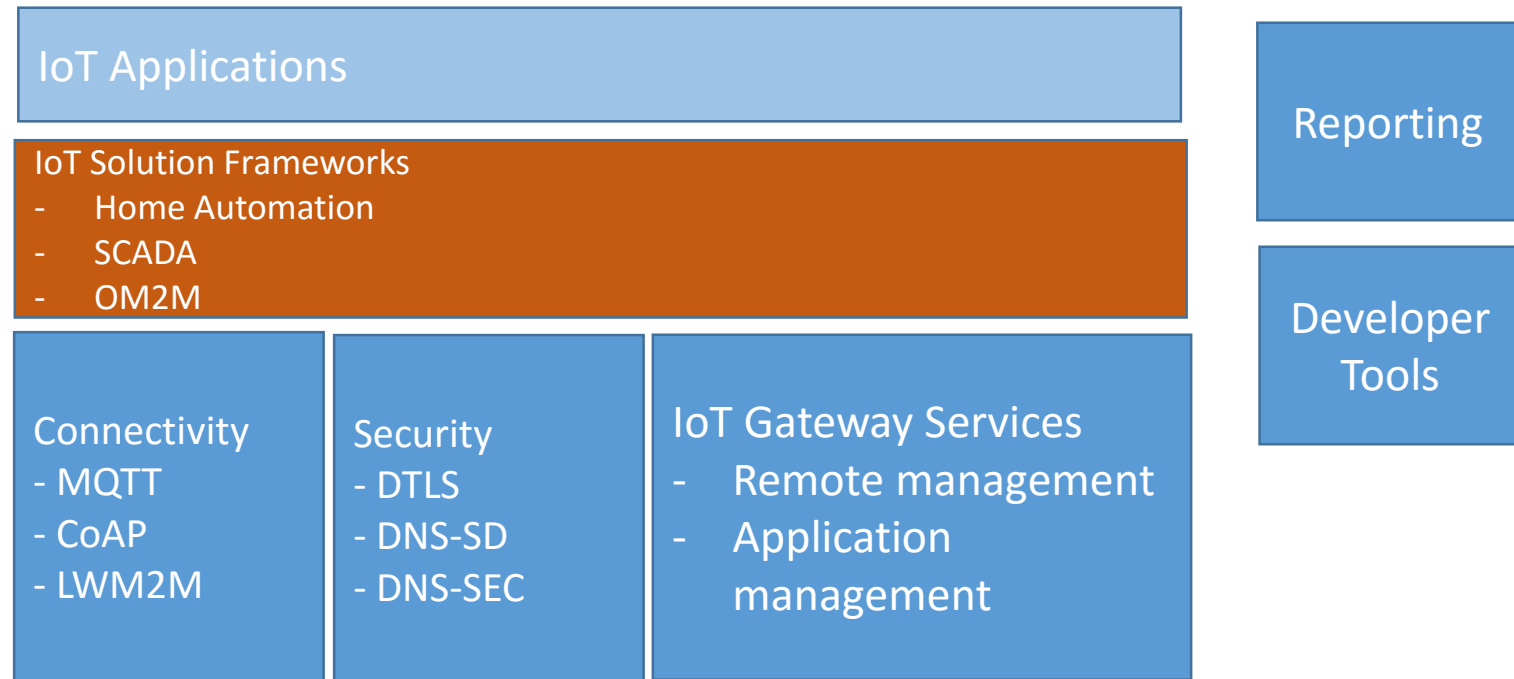


IoT Gateways

- Gateway management
 - How to manage remote gateways and keep them up to date
 - How to manage connectivity
- Manage deployed applications
 - Gateways become an application container
 - Remote configuration
 - Remote update



Where we are heading: Open IoT Stack

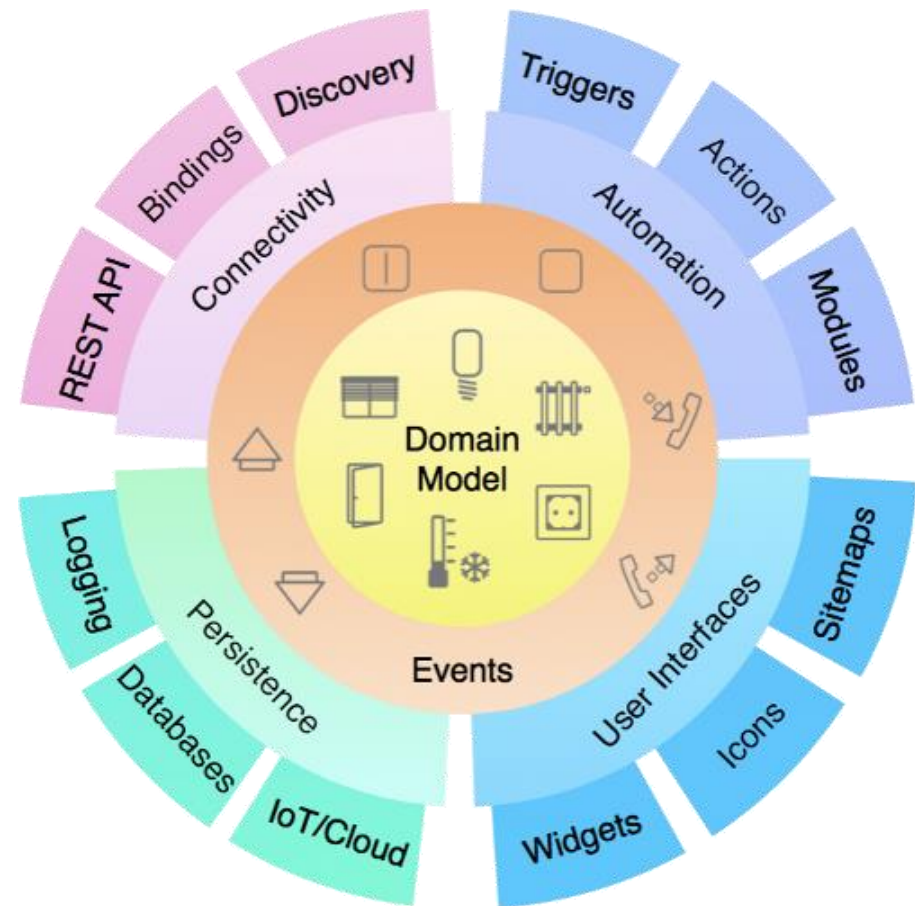


Open & Commercial Hardware

Home Automation



- Flexible Framework
- Based on **Java** and **OSGi**
- Huge number of “bindings”:
KNX, Nest, Philips HUE, ...





openHAB

Free and open source solution based on Eclipse SmartHome



QIVICON

Smart Home platform by Deutsche Telekom AG



aleon

Innovation management for your project



YETU

Run your entire home with one simple online platform



ProSyst

Middleware for the Internet of Things



Zoo Automation

One Home, One Control, One Life

Solutions

- Telco Service Providers
 - Implementation of oneM2M: **OM2M**
- Industrial IoT:
 - Eclipse neoSCADA
 - Support Siemens S7 PLC, IEC 60870-4-105
 - 4DIAC - IEC 61499
 - Rise V2G - IEC 15118
 - OPC-UA
- IoT network management: **Krikkit**
 - Rules engine for IoT devices
 - Powering Cisco's Data in Motion.



Eclipse IoT is also...

IoT Server Platform

Software provisioning

<https://projects.eclipse.org/projects/iot.hawkbit>

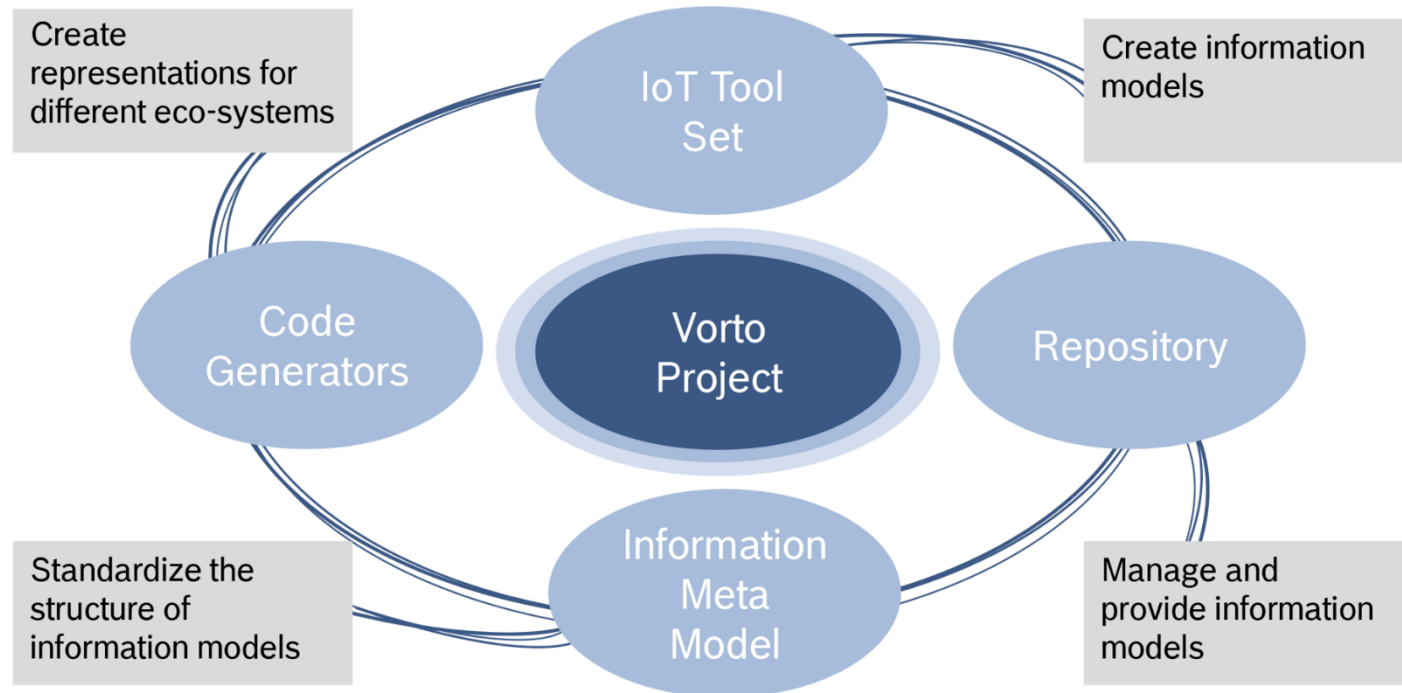
Uniform service interface for Telemetry and Command & Control

<https://projects.eclipse.org/projects/iot.hono>

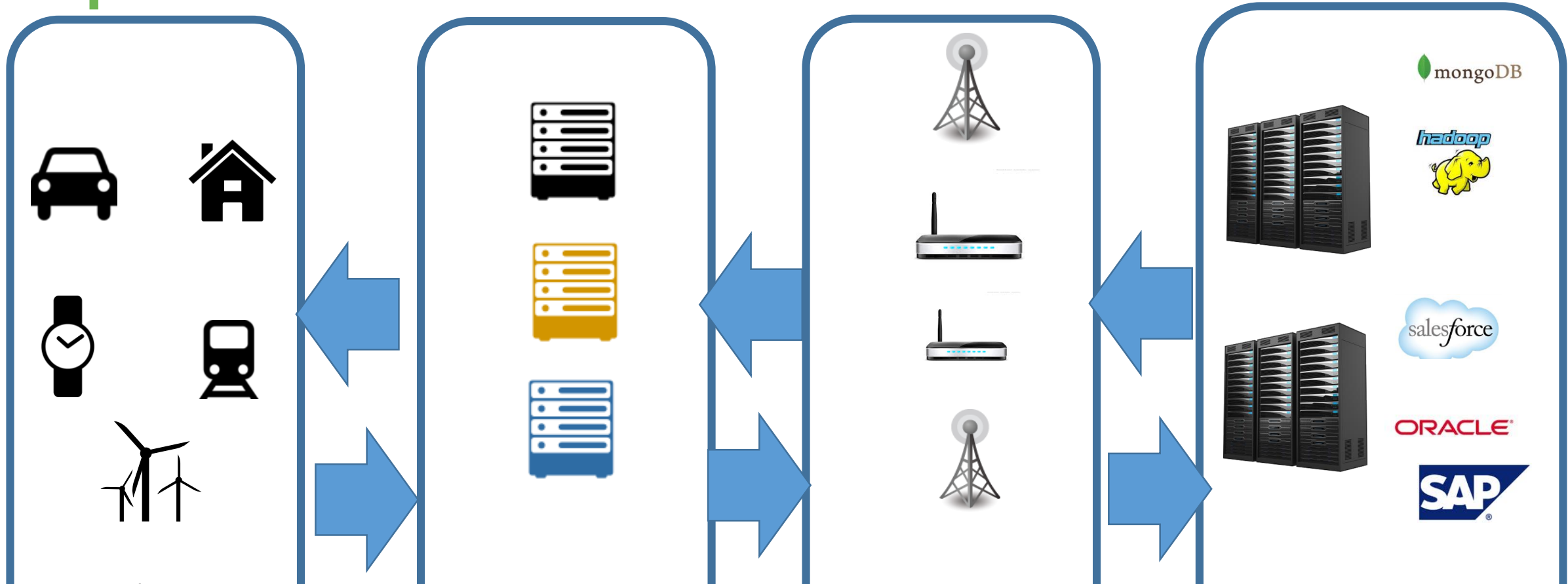


Vorto: IoT device modeling tools

The goal of the Vorto project is to enable a global standardization

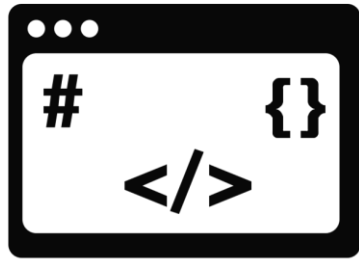


Open IoT Stack



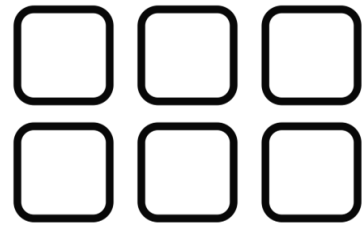
Eclipse IoT Community

Eclipse IoT today



2

MLOC



21

projects



150+

developers

Commercial Ecosystem



bitreactive



CANONICAL

itemis



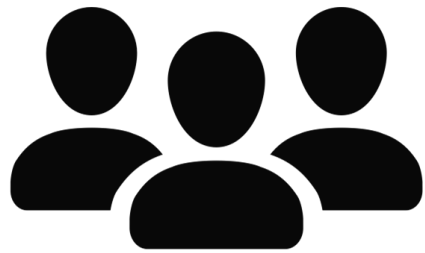
zolertia



Open IoT Stack for Java



OPEN IOT CHALLENGE 2.0



80 teams



\$20K+ in prizes

<http://iot.eclipse.org/open-iot-challenge>

More Info: iot.eclipse.org

The screenshot shows the iot.eclipse.org website in a browser window. The browser's address bar displays 'iot.eclipse.org'. The website's navigation bar includes the logo, 'Services & Frameworks', 'Protocols', 'Tools', 'Community', 'Ecosystem', and 'See it live'. A notification badge shows '8+1' and '294'. The main banner features the text 'iot.eclipse.org' and a description: '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.' To the right is a graphic with a rocket icon and the text 'LEARN MORE ABOUT THE OPEN IOT STACK FOR JAVA'. Below the banner are three columns: 'Services & Frameworks' with a gear icon, 'Protocols' with a speech bubble icon, and 'Tools' with a briefcase icon. Each column contains a brief description and a 'More »' button. The footer shows the URL 'eclipse.org/index.html'.

iot.eclipse.org — IoT x

iot.eclipse.org

Apps Ottawa (Kanata... Weather Foreca... Ottawa Citizen ... Tweet Activity a... CBCNews.ca - B... Global Flight St... 24 Google Calendar TweetDeck Ad Report Home » SugarC...

Services & Frameworks Protocols Tools Community Ecosystem See it live 8+1 294

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.

LEARN MORE ABOUT THE OPEN IOT STACK FOR JAVA

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 and CoAP, as well as OMA-DM and OMA LWM2M Device Management protocols

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 »

eclipse.org/index.html

Sandbox Servers

MQTT

You can make use of this MQTT server with client code from the [Paho project](#), the Eclipse MQTT view from Paho, or from one of the other client APIs listed on the [MQTT.org downloads page](#).

Access the server using the hostname `iot.eclipse.org` and port `1883` .

Some livestatistics are available via [Xively](#) and an HTTP bridge with a list of topics is deployed at <http://eclipse.mqttbridge.com>. This server is running the Open Source [Mosquitto](#) broker in its version 1.3.1.

Lightweight M2M (LWM2M)

In order to test LWM2M communication scenarios, we host a LWM2M server.

You can make use of this server with the [Wakaama project](#)

The LWM2M server is available at: `coap://iot.eclipse.org:5684/`

A web interface allows to interact with registered LWM2M clients:

`http://iot.eclipse.org/lwm2m/` .

This server is running the Open Source [Leshan](#) server.

CoAP

A CoAP server exposing test resources is available at: `coap://iot.eclipse.org:5683/` .

It should be used by anyone interested in testing a CoAP client implementation against another endpoint, and more generally by anyone interested in understanding the key concepts of the CoAP protocol.

This server is running [Eclipse Californium](#).

Get Involved!



- Open (or fix!) bugs
- Request new features
- Write articles, tutorials
- Participate on the mailing lists
- Share your success stories
- Propose your project!

Questions

@ianskerrett

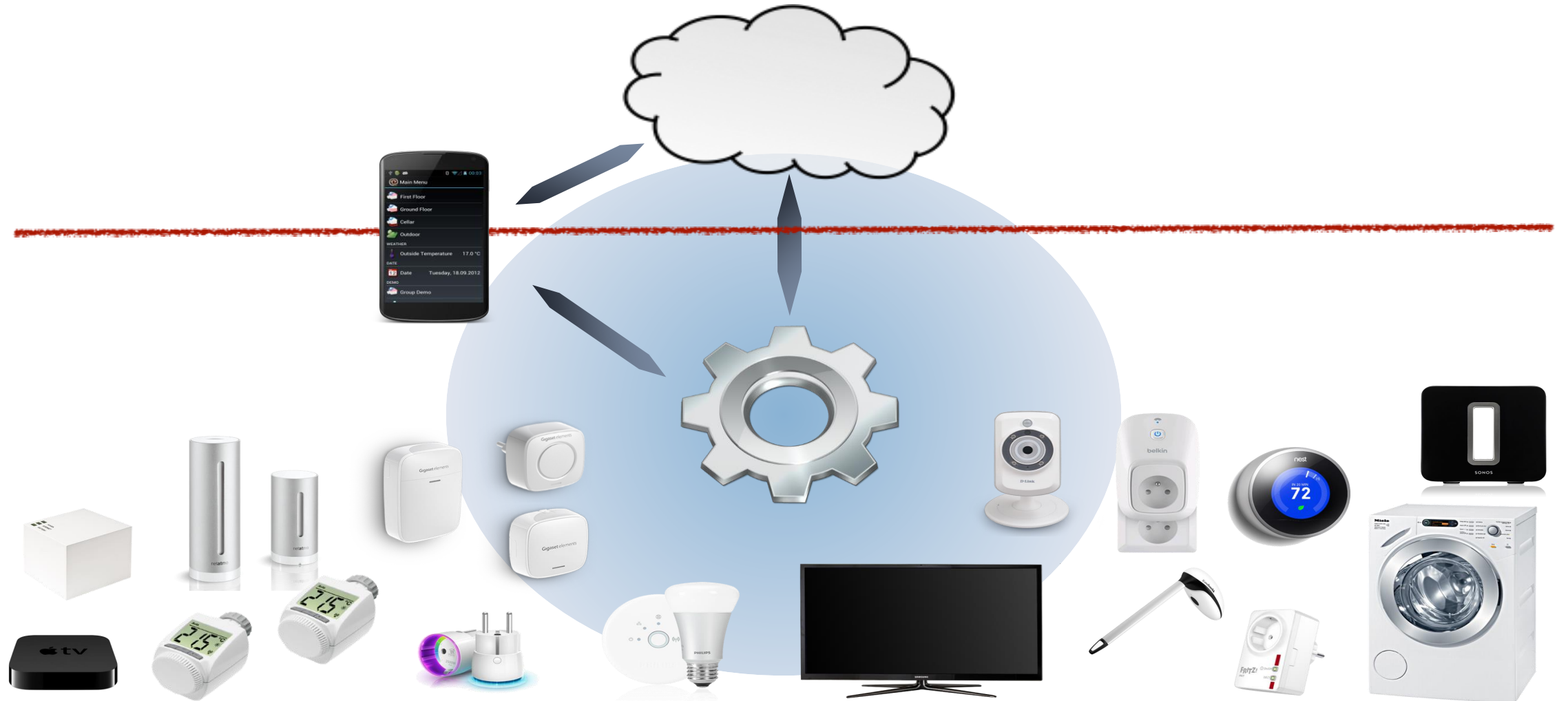
lan.Skerrett@eclipse.org

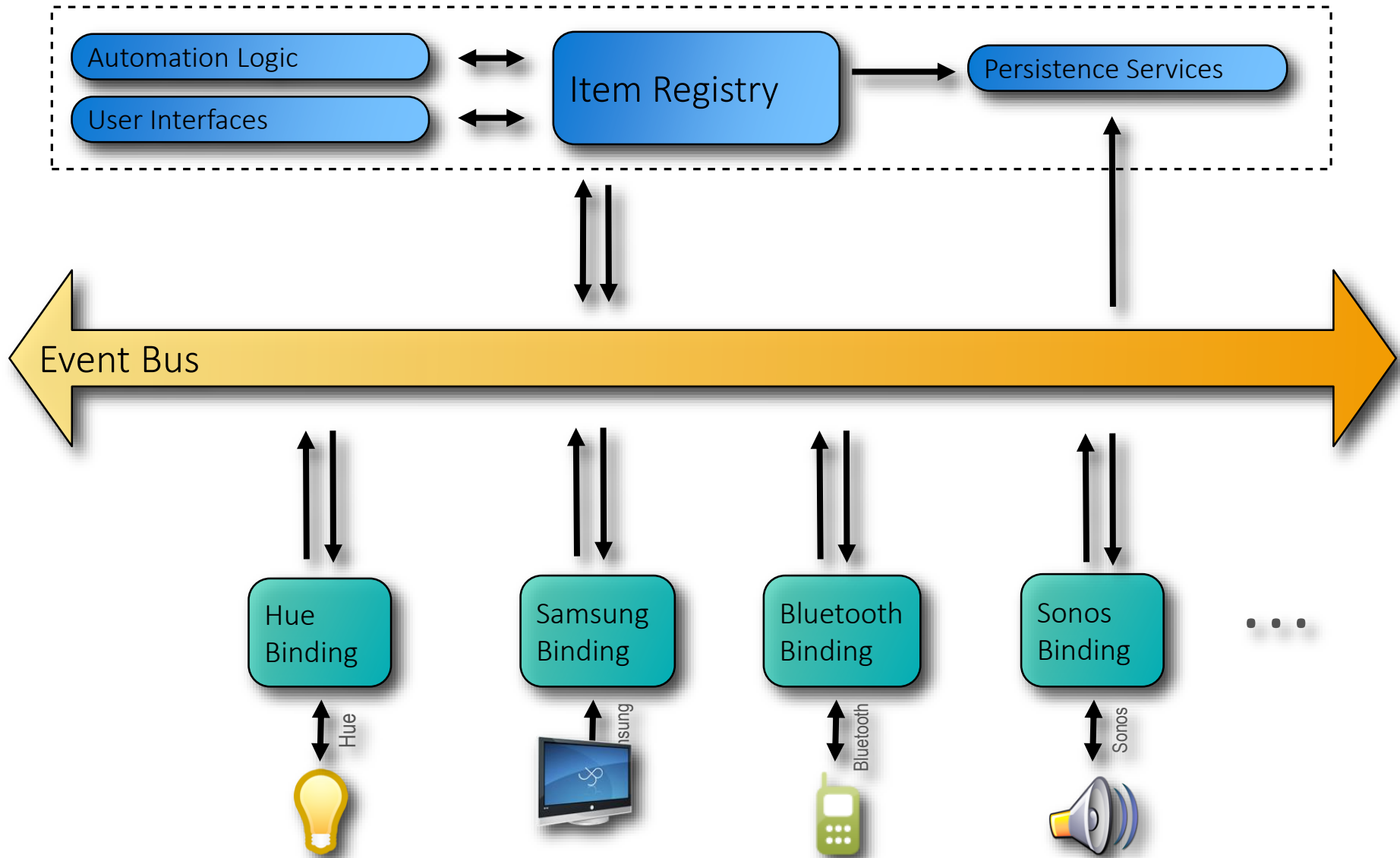
Backup

IoT Solutions – Home Automation



Intranet of Things for Home Automation

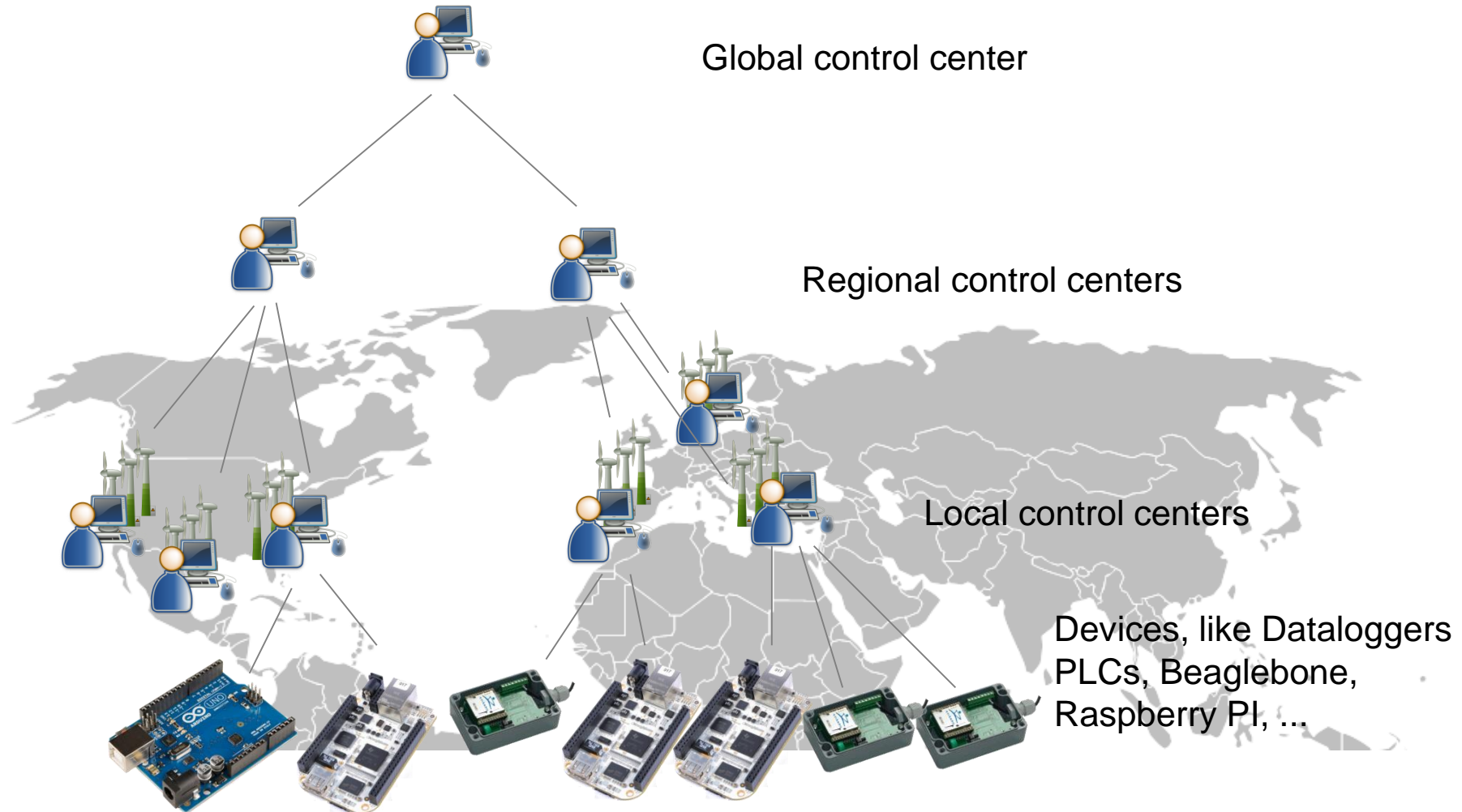




IoT Solutions: SCADA

- SCADA (Supervisory Control and Data Acquisition) is defined as the monitoring and control of technical processes by means of a computer system

Hierarchical Architecture



Protocols & Interoperability

- Drivers

- Modbus (master & slave)
- Siemens S7 PLC
- IEC 60870-4-105 (master & slave) *
- OPC DA 2 (client) †
- OPC UA (client & server) **
- SNMP †, JDBC, Shell
- Building blocks for more

Eclipse SCADA

Client and server for Java

Client for .NET using IKVM

Partially: JSON, Webservice

† SNMP and OPC from openSCADA

* included in next release 0.2.0

** planned for 0.3.0