Connect and Manage Devices

Ian Skerrett

Eclipse Foundation

Creating the Open Source Building Blocks for IoT

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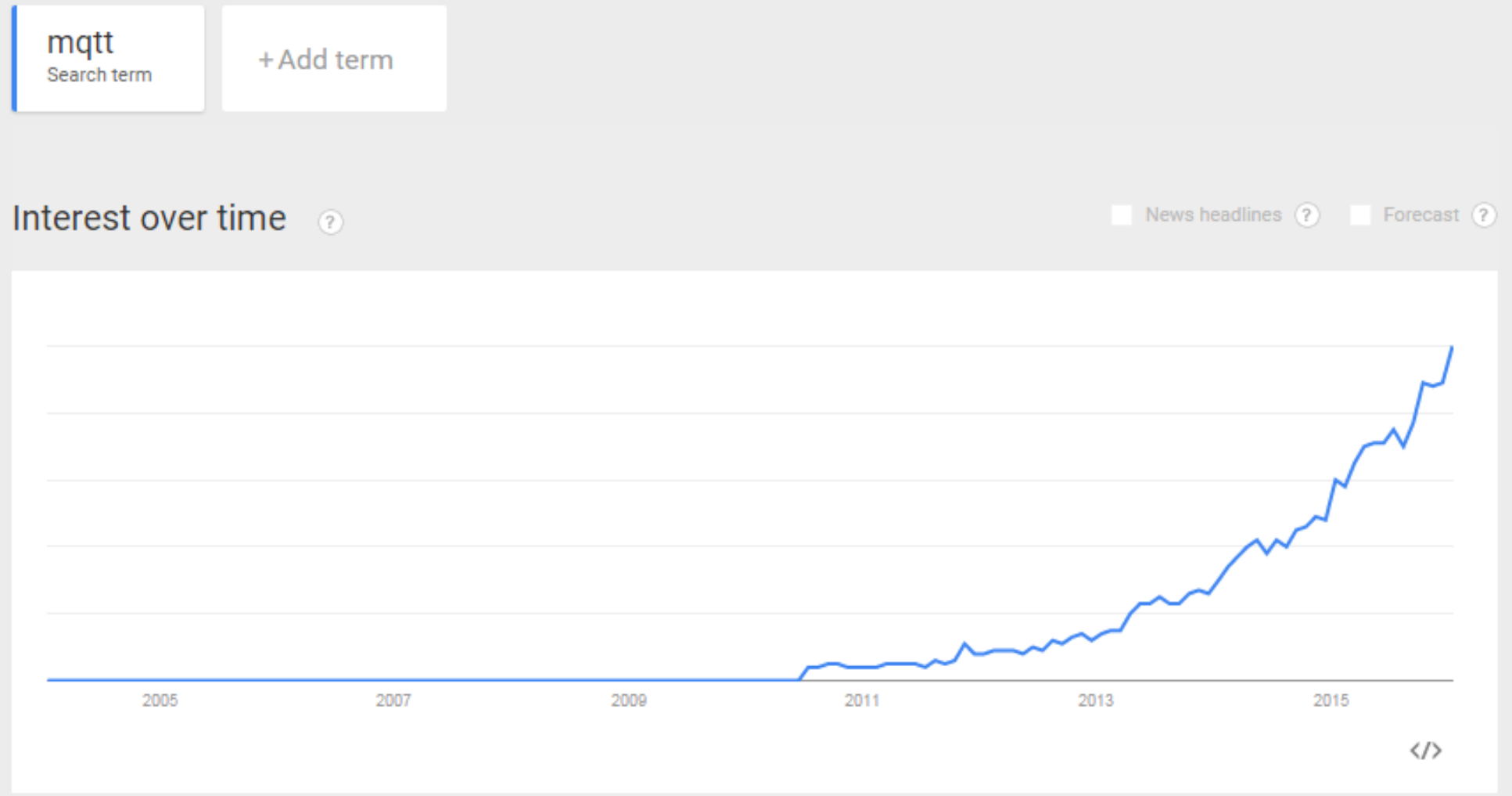
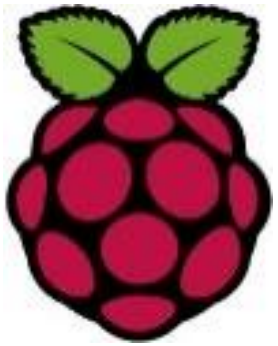
Open Wins

Open Wins

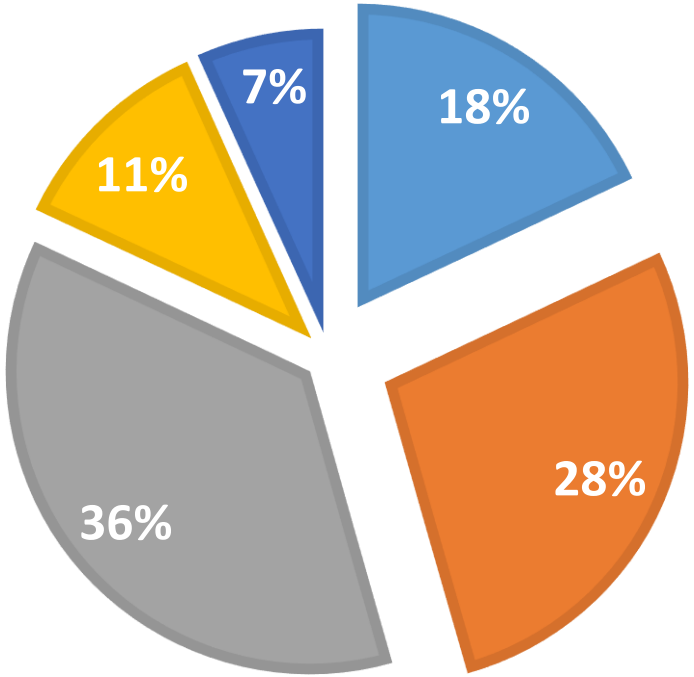
MQTT – Open Wins



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

kura

eclipse smarthome

eclipse Wakaama

Vorto

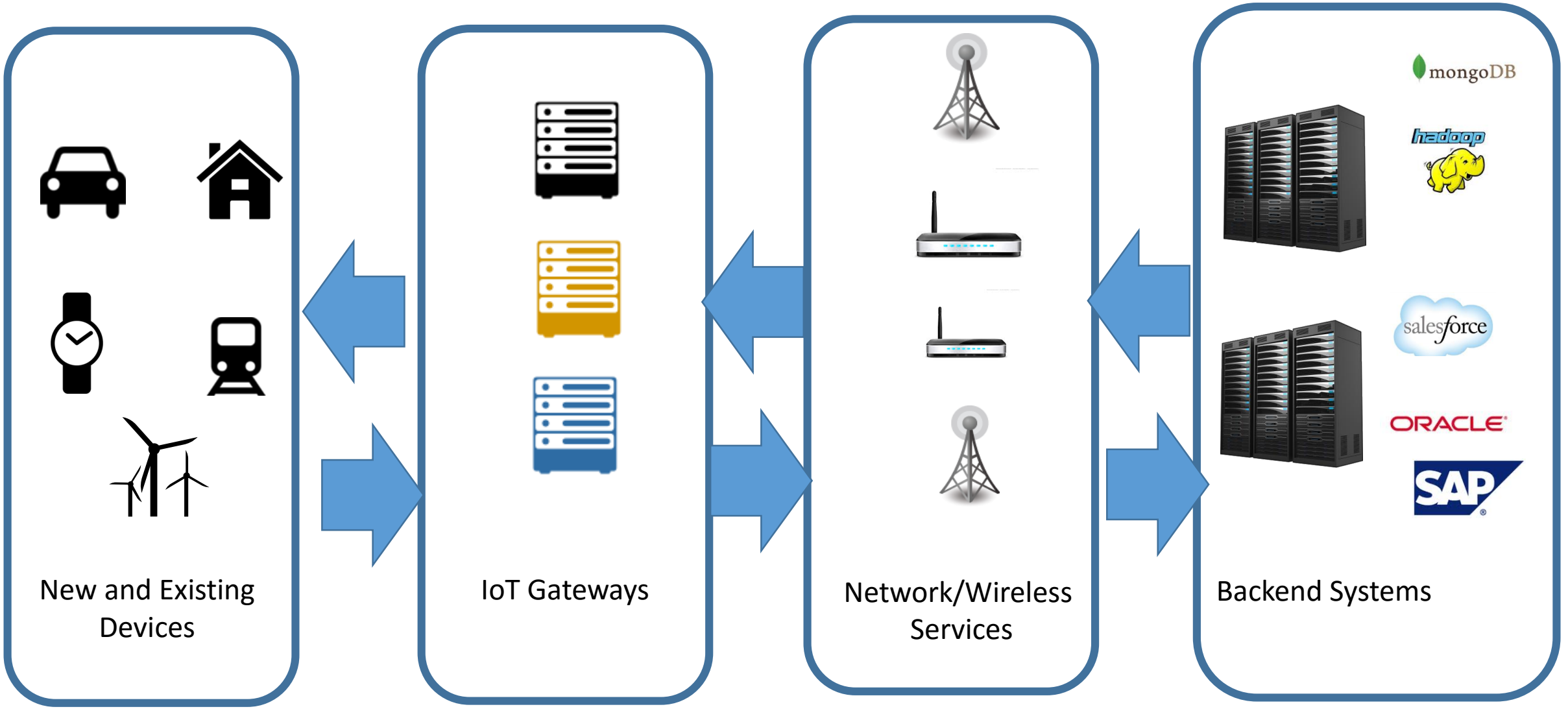
Krikkit

LESHAN

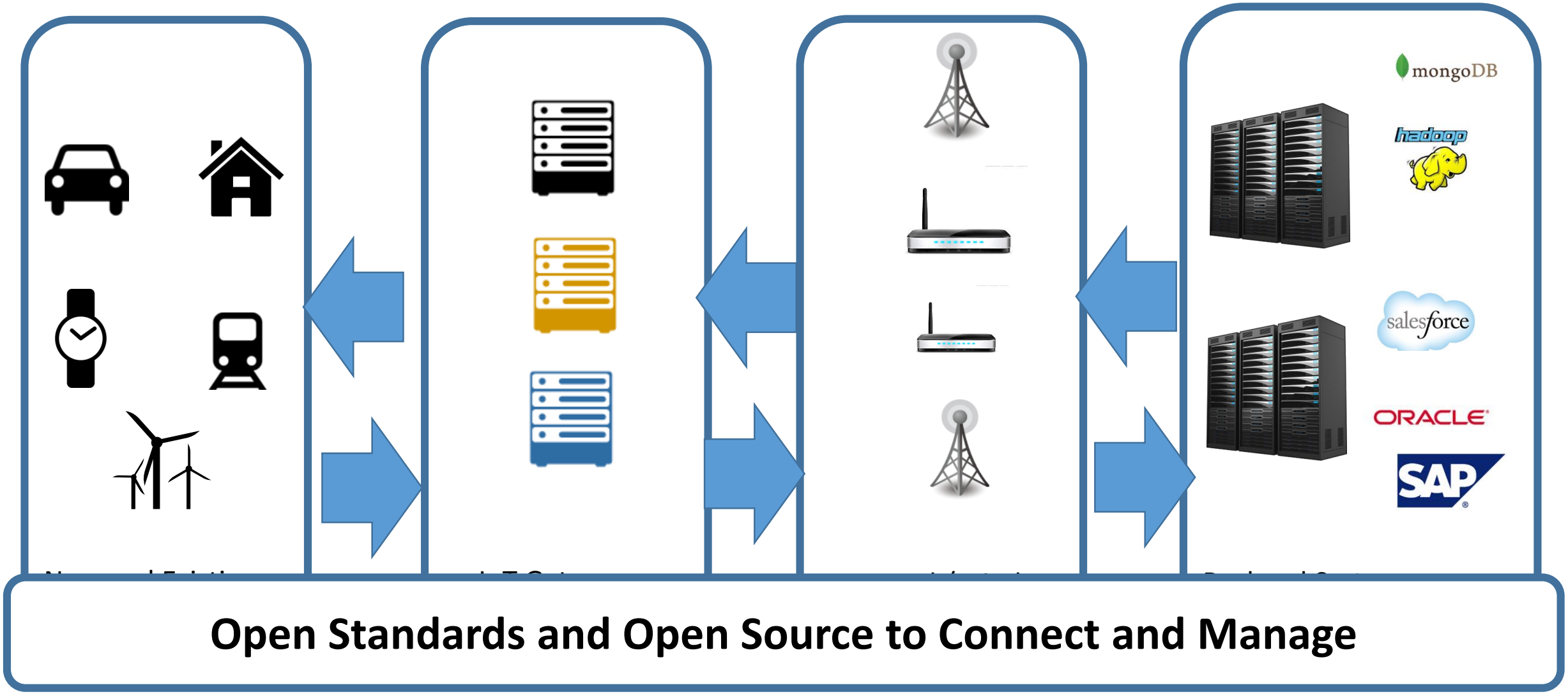
OM2M Connecting things

neoSCADA

IoT Architectures

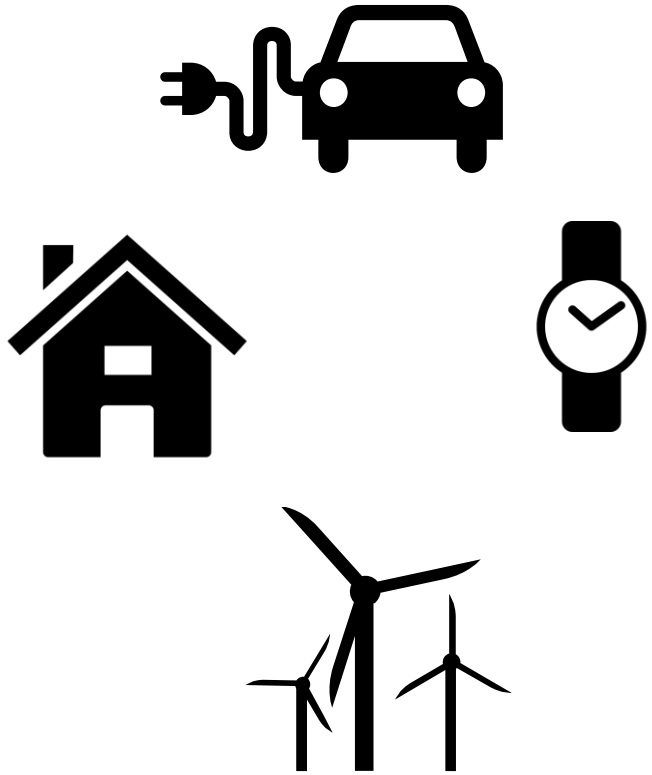


Open Solutions



Open Standards and Open Source to Connect and Manage

Connect and Manage with Open Standards



New and Existing Devices

OASIS
Advancing open standards for the information society

MQTT.ORG

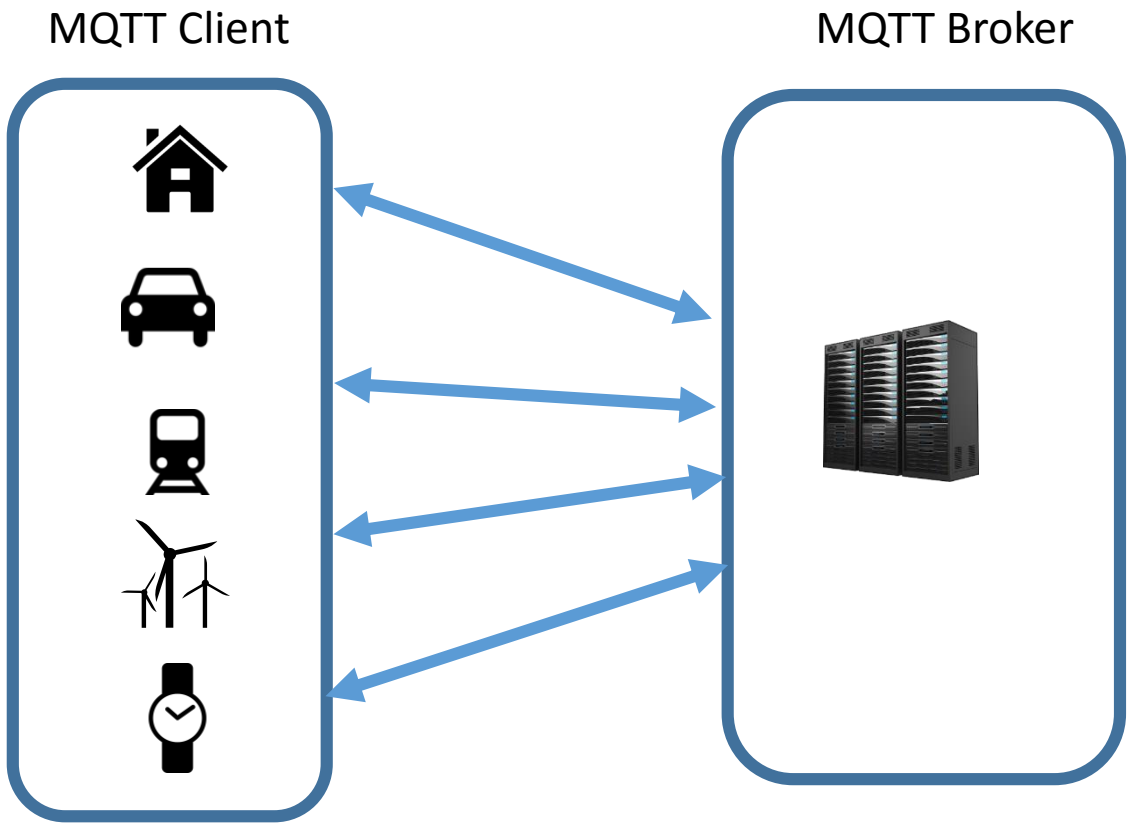
IETF
CoAP

oma
Open Mobile Alliance
LWM2M

Many Open Standards

MQTT

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



iot eclipse.org

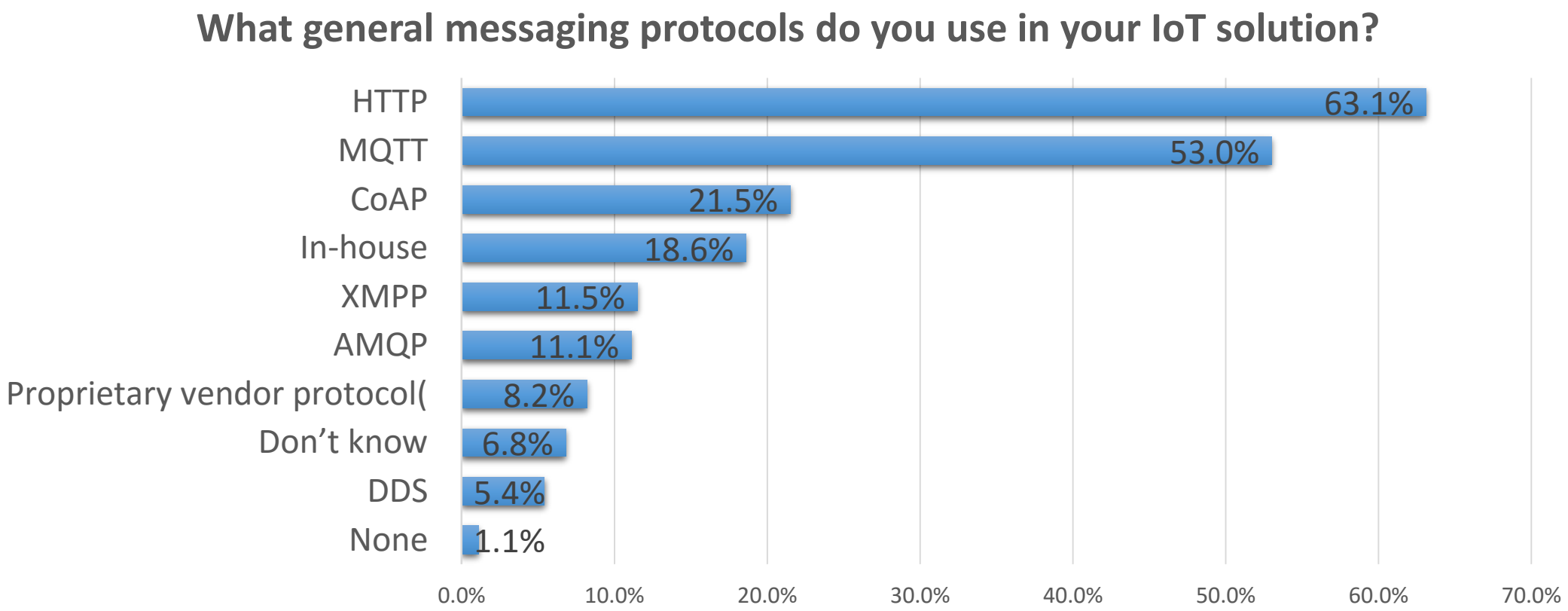
paho

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

Mosquitto
MQTT Broker
(C Code)

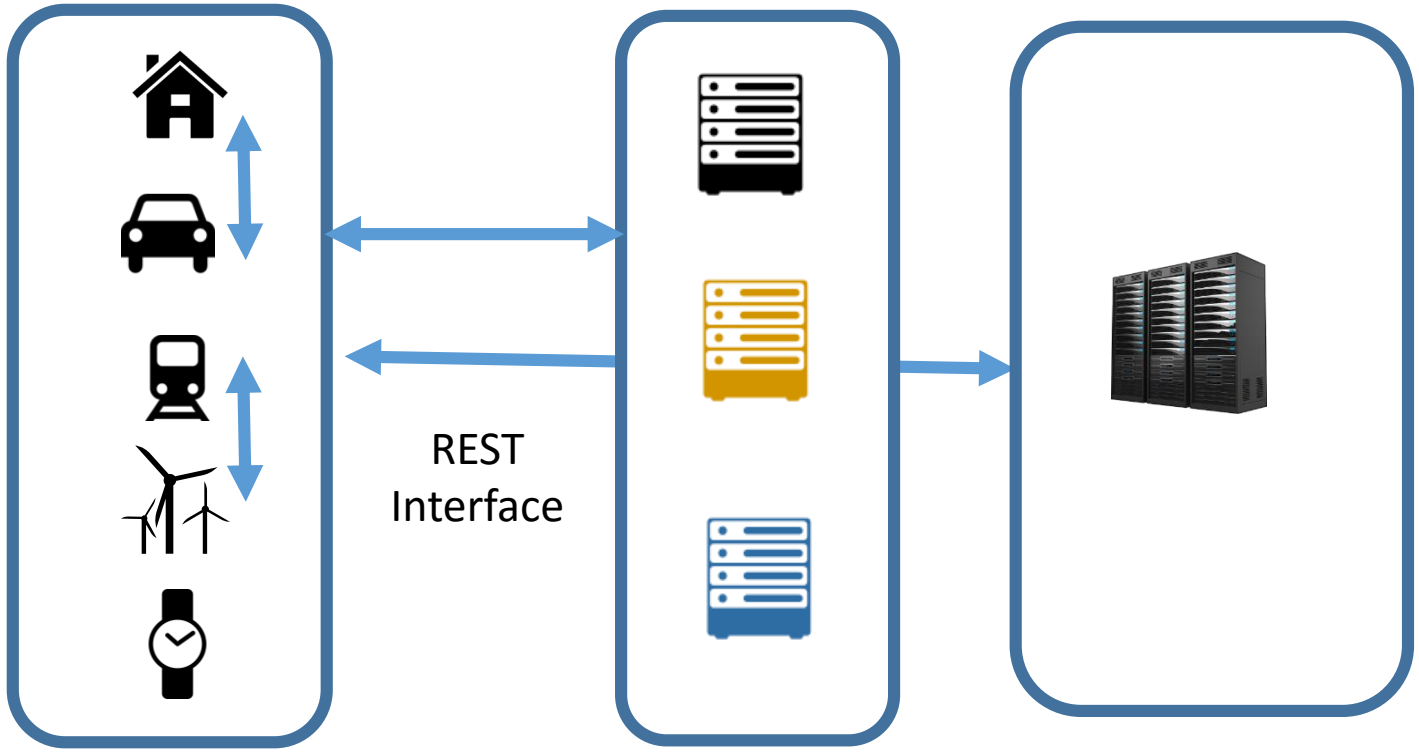
MQTT Adoption

Messaging Protocol



Constrained Application Protocol (CoAP)

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

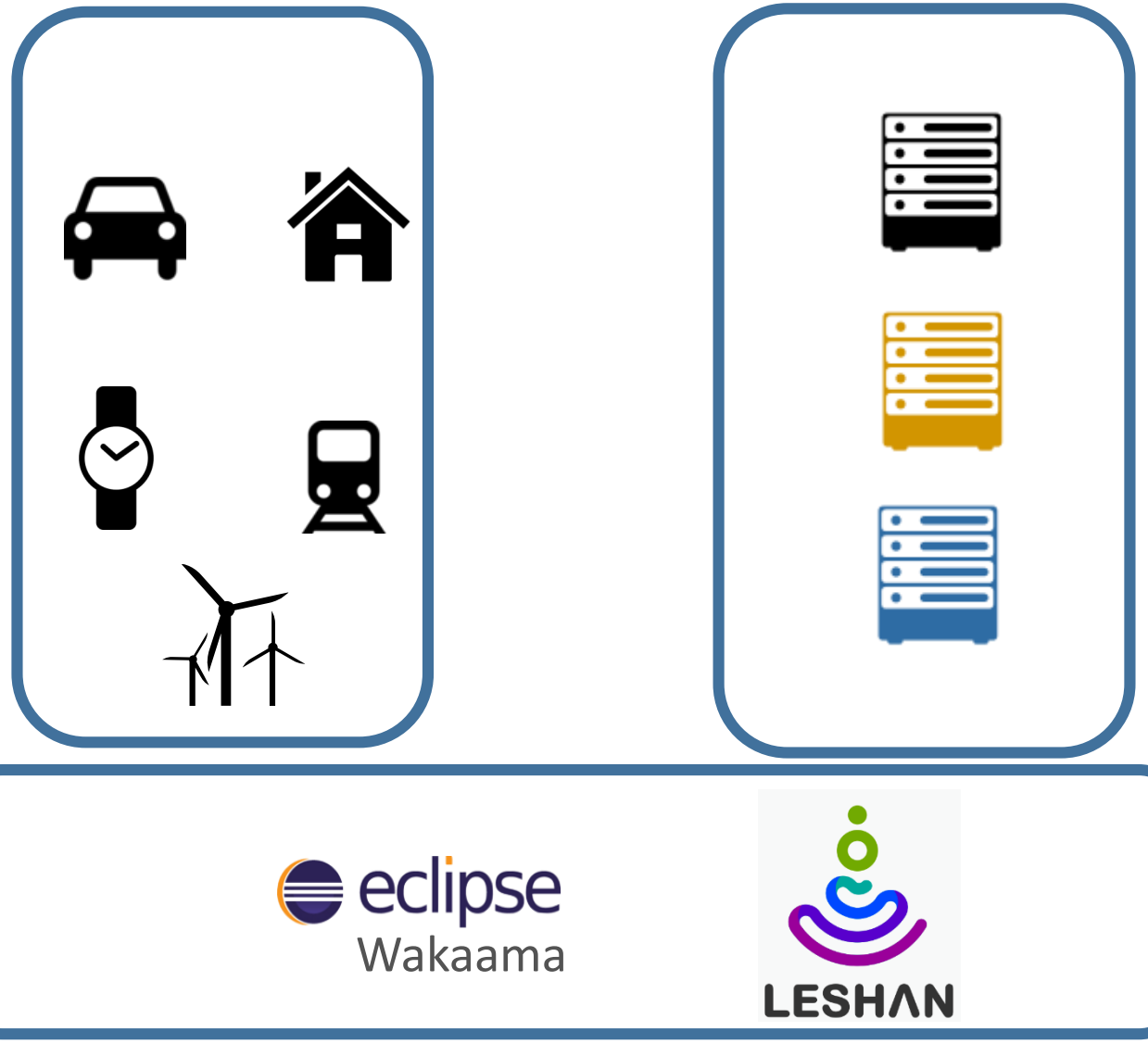


iot
eclipse.org

Californium
- CoAP Core
- DTLS
- CoAP Tools
- Java implementations

Lightweight M2M

- Standard for device management
- Based on CoAP



iot eclipse.org

eclipse Wakaama

LESHAN

LWM2M Adoption

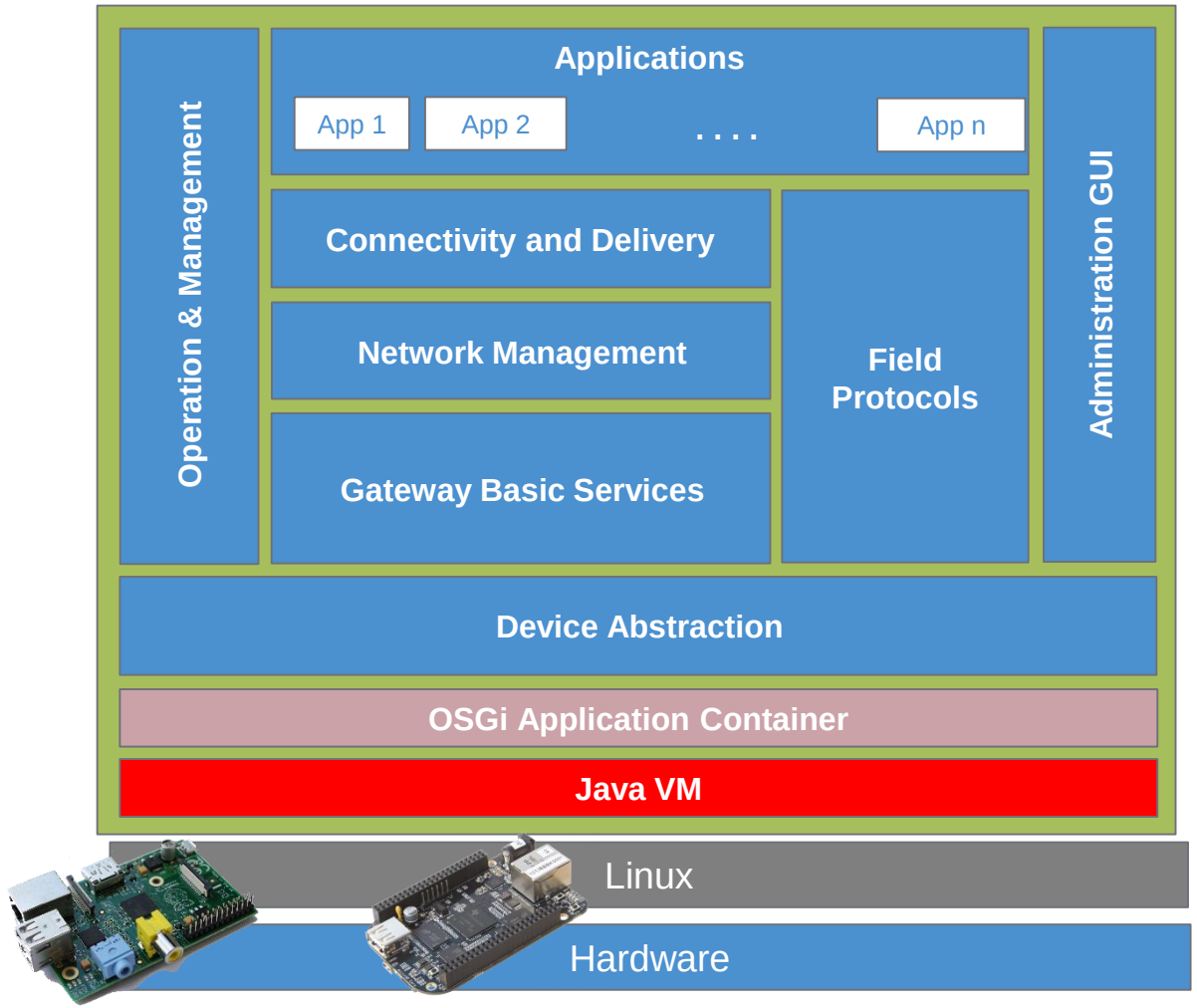
IoT Gateway Services

Java and OSGi

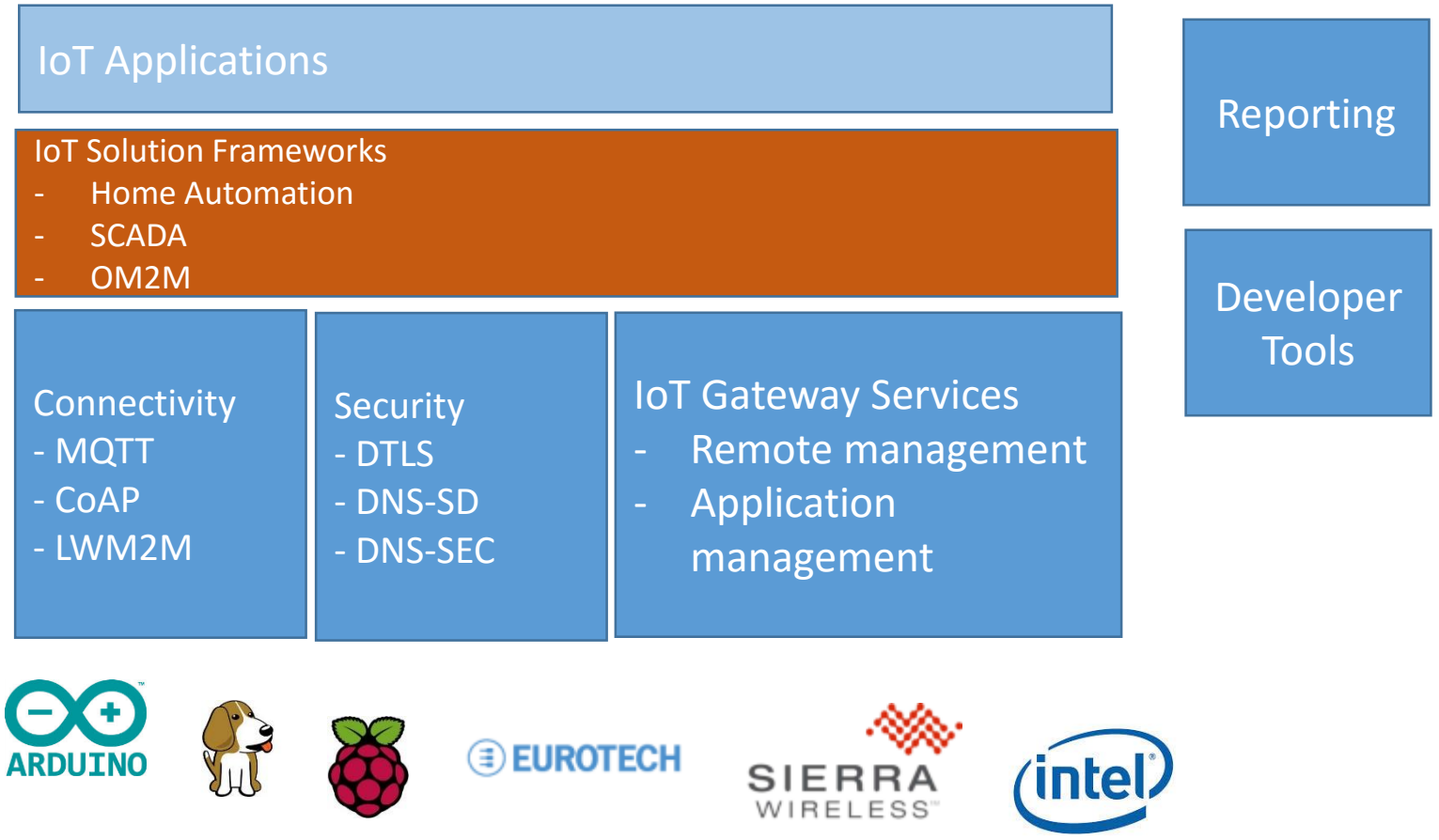
Gateways

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


Applications
App 1
App 2
. . . .
App n
Operation & Management
Administration GUI
Connectivity and Delivery
Network Management
Gateway Basic Services
Field Protocols
Device Abstraction
OSGi Application Container
Java VM
Linux
Hardware

Where we are heading: Open IoT Stack



Open & Commercial Hardware

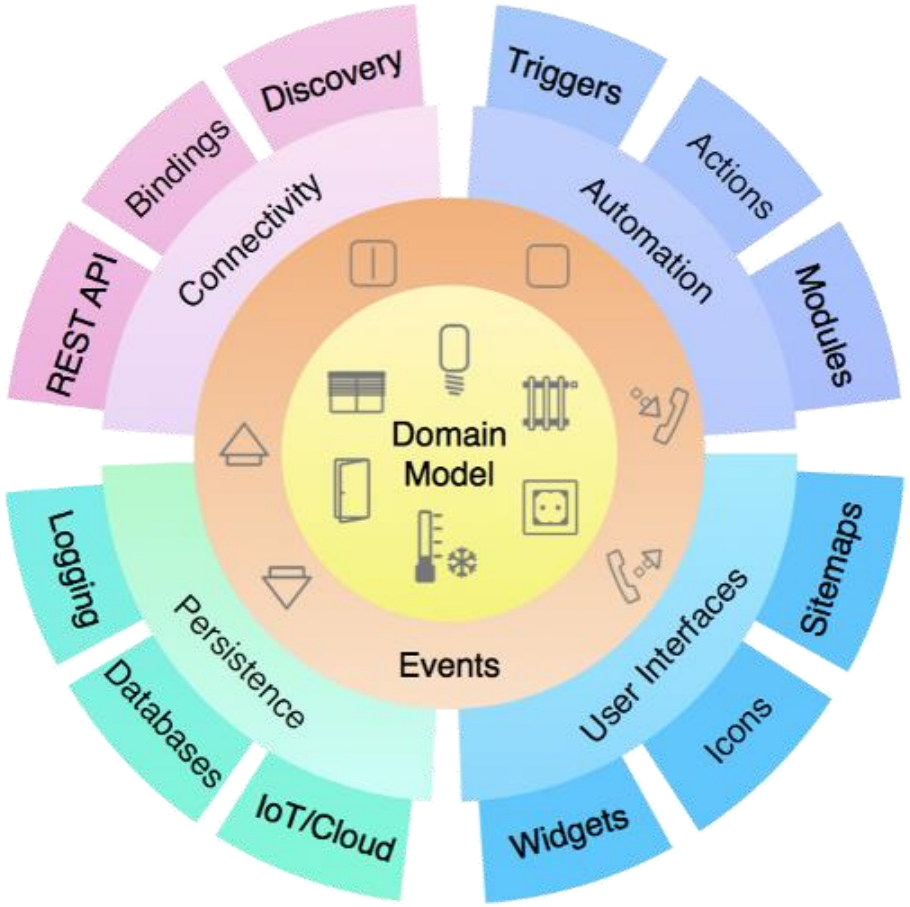
Home Automation

eclipse smarthome

QIVICON powered by T

- Flexible Framework
- Based on **Java** and **OSGi**

- Huge number of “bindings”:
  KNX, Nest, Philips HUE, …



eclipse smarthome

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

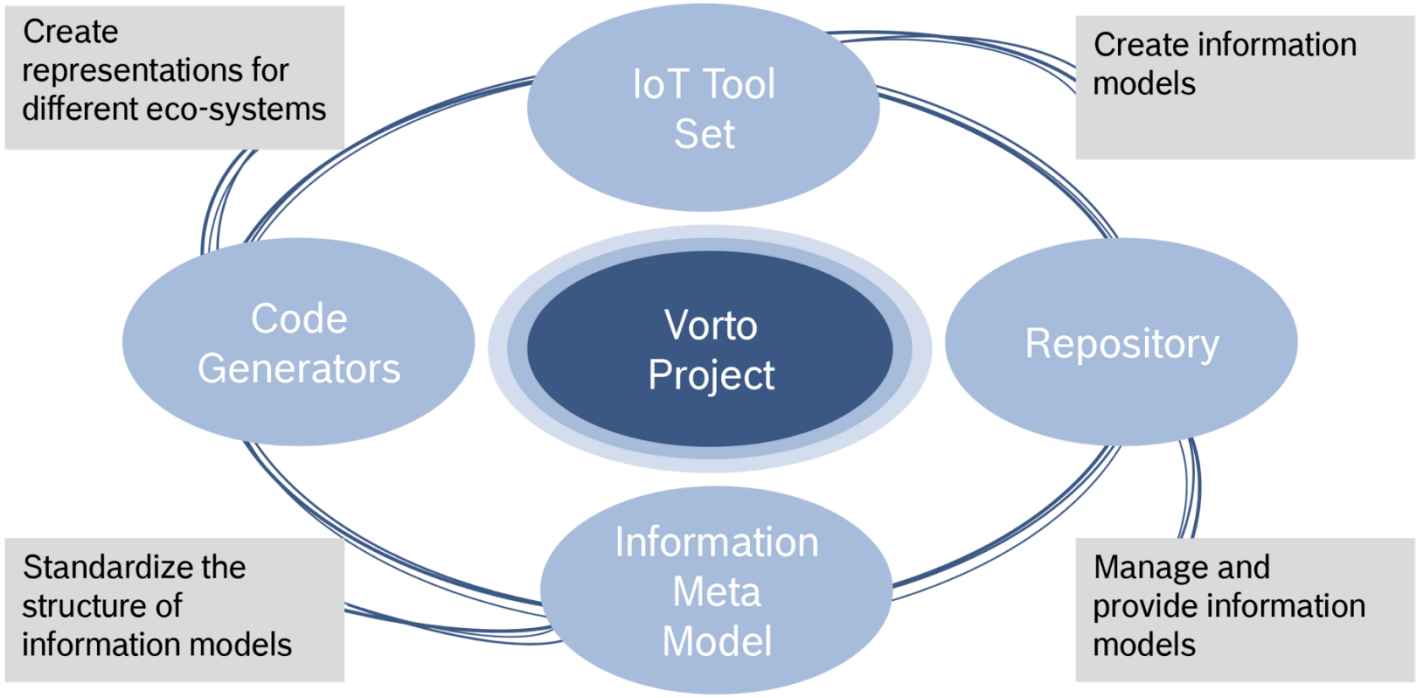
https://projects.eclipse.org/projects/iot.hawkbit

Uniform service interface for Telemetry and Command & Control

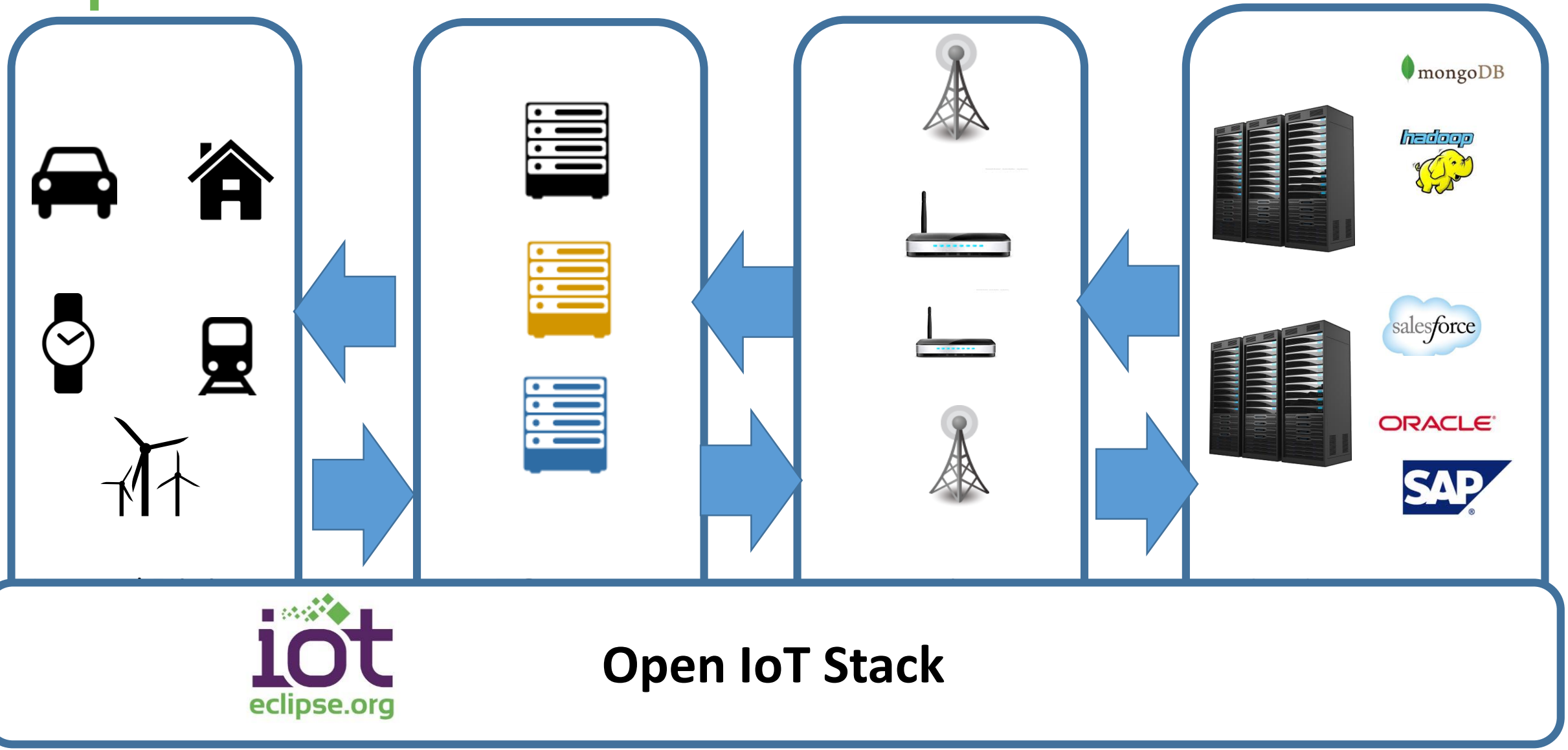
https://projects.eclipse.org/projects/iot.hono

Vorto: IoT device modeling tools

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

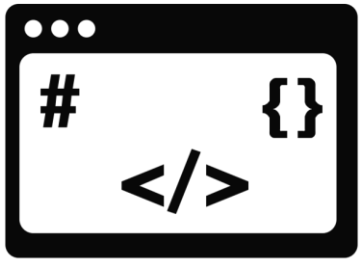


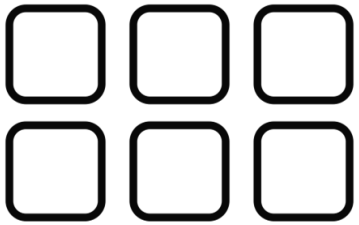
Open IoT Stack



Eclipse IoT Community

Eclipse IoT today





2

MLOC

21

projects

150+

developers

Commercial Ecosystem

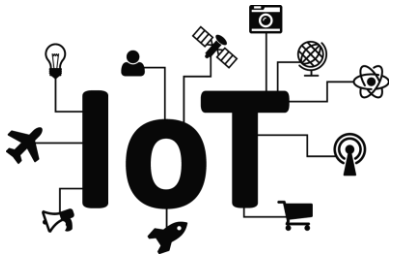
iot eclipse.org

Open IoT Stack for Java

80 teams

$20K+ in prizes

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

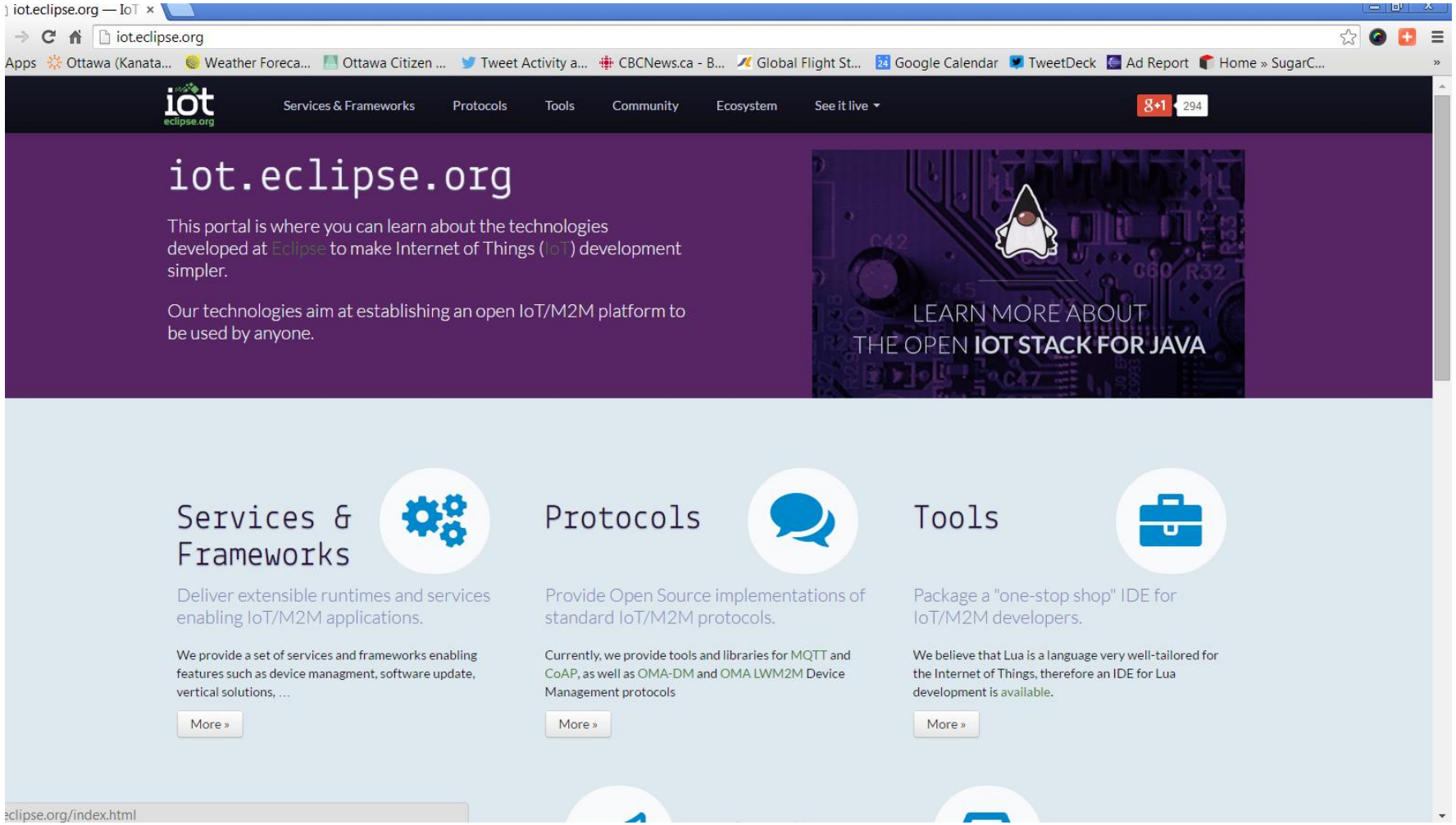


Virtual IoT Meetup

Bi-weekly webinars with IoT experts
800 members

http://www.meetup.com/Virtual-IoT

More Info: iot.eclipse.org



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

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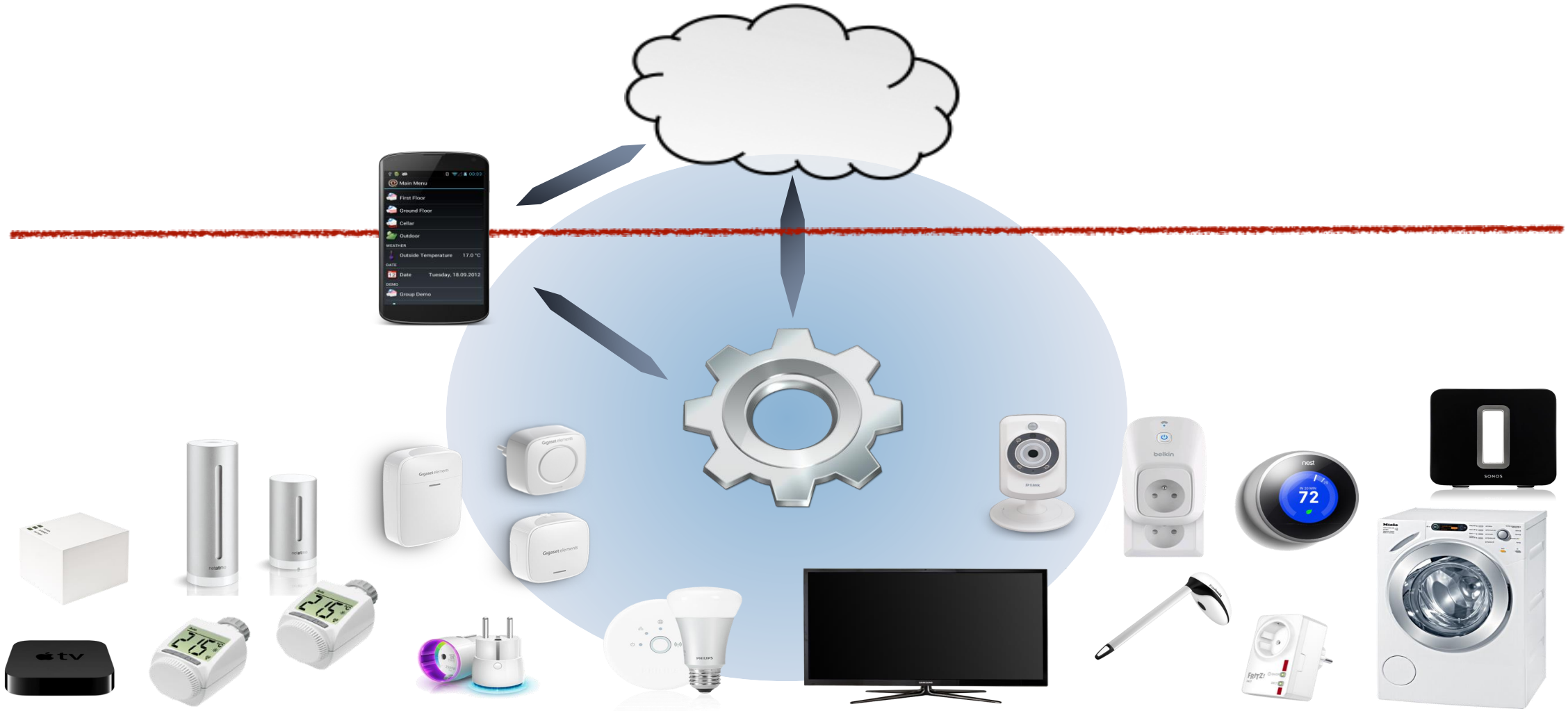
Ian.Skerrett@eclipse.org

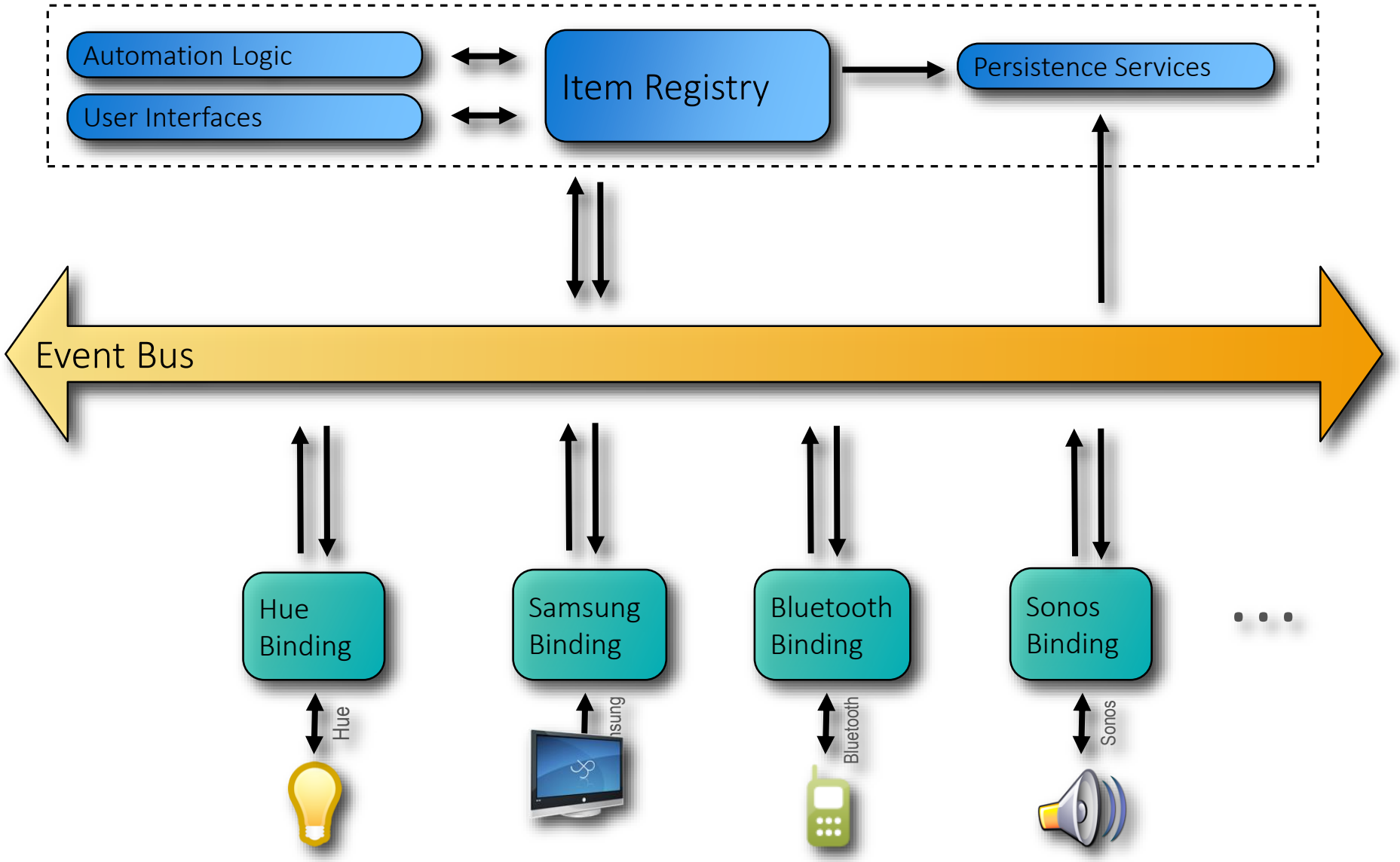
Backup

IoT Solutions – Home Automation

Intranet of Things for Home Automation



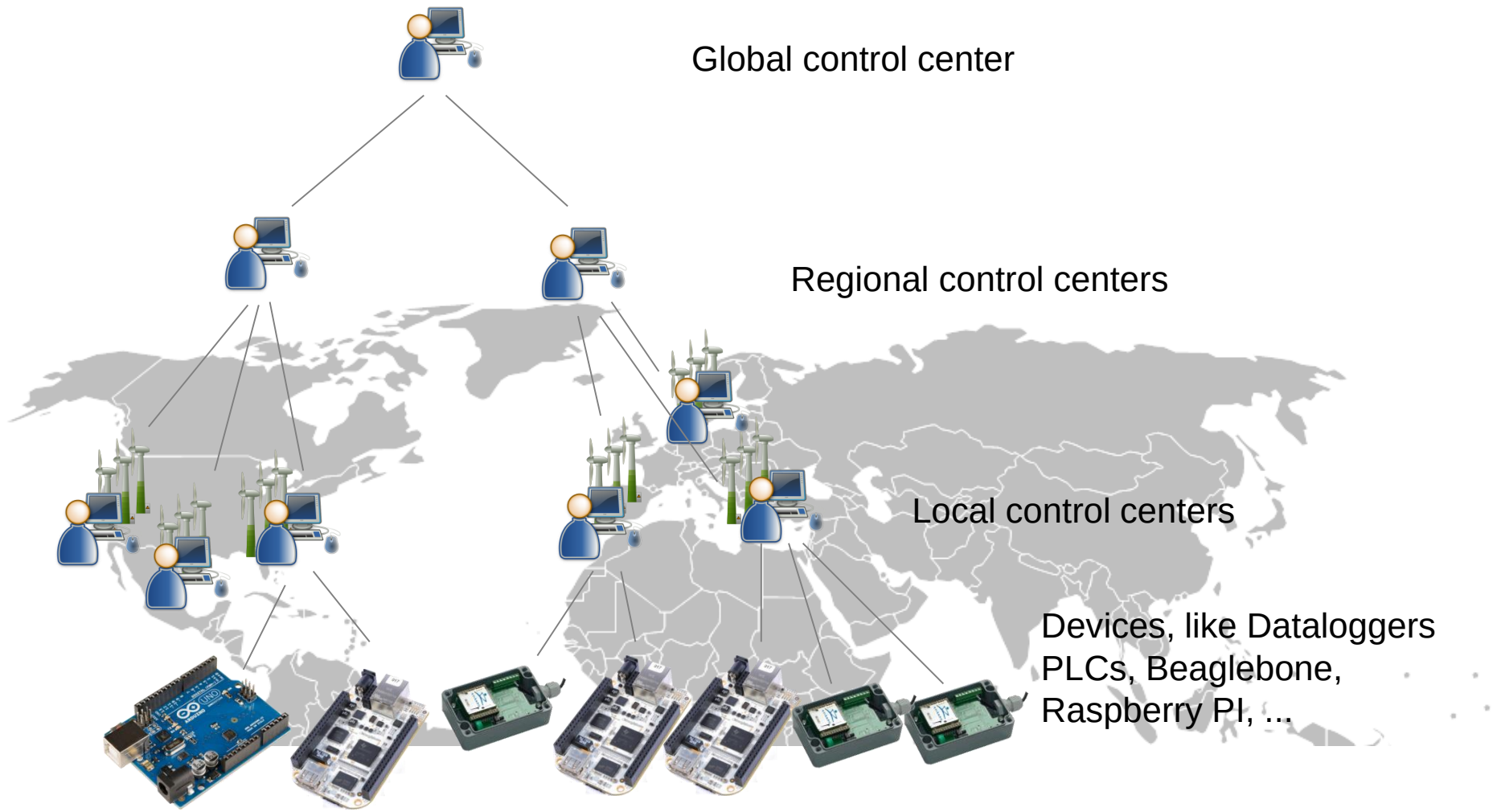
eclipse smarthome



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