3 - Eclipse OM2M, Open Source oneM2M-based Platform

Dr. Mahdi Ben Alaya
Founder & CEO, Sensinov
benalaya@sensinov.com
www.sensinov.com

November 14, 2016
Eclipse: open source IDE?
A community of open source projects

Over 250 Projects!
Advanced Infrastructure for open source development
# Eclipse IoT projects

![Eclipse IoT logo](https://iot.eclipse.org/projects)

## Mihini
The Mihini project delivers an embedded runtime running on top of Linux, that exposes an high-level Lua API for building Machine-to-Machine...

## Paho
The Paho project has been created to provide scalable open-source implementations of open and standard messaging protocols aimed at new, existing, and emerging applications for Machine-to-Machine...

## Eclipse SCADA
SCADA (supervisory control and data acquisition) is a type of industrial control system (ICS). Industrial control systems are computer controlled systems that monitor and control industrial processes...

## Ponte
The following are the plan items for the Ponte project: Build a reusable solution for bridging several M2M protocols to REST: Formalize a REST API for reading, writing and...

## Concierge
Concierge is a small-footprint implementation of the OSGi Core Specifications R5 standard optimized for mobile and embedded...

## Mosquito
Mosquito provides a lightweight server implementation of the MQTT and MQTT-SN protocols, written in C. The reason for writing it in C is to enable the server to run on machines which do not even have...

## Eclipse SmartHome
The Eclipse SmartHome project is a framework that allows building smart home solutions that have a strong focus on heterogeneous environments, i.e. solutions that deal with the integration of...

## Kura
Kura aims at offering a Java/OSGi-based container for M2M applications running in service gateways. Kura provides or, when available, aggregates open source implementations for the most common...

## Krikkit
The Krikkit architecture is a publish/subscribe mechanism where rules/policies are registered on edge routers/gateways that have visibility into and communicate with...

## OM2M
The OM2M project is an open source implementation of the ETSI M2M standard. It provides a framework for developing services independently of the underlying network and aims to facilitate deployment of...

## Californium (Cf) CoAP Framework
Californium (Cf) is an open source implementation of the Constrained Application Protocol (CoAP). It is written in Java and targets unconstrained environments such as back-end service infrastructures...
Eclipse OM2M Community

Code Contributors

Partners
Eclipse OM2M architecture

- oneM2M based server and gateway for distributed architecture.
- Unique reference points based on a lightweight RESTful API for seamless interaction with platform applications, services, and devices.
Eclipse OM2M Building Blocks

• OM2M is a java platform running on top of an OSGi runtime
  • Highly extensible via plugins.
  • Flexible OSGi container: Equinox, Knopflerfish, or others.
  • Flexible database: SQL or NoSQL.

• Each CSE includes required plugins and is build as an Eclipse product using maven and Tycho.
OM2M OSGi-based platform

OSGi Architecture

bundle life cycle
OM2M Service discovery

- Extension through three axes

Communication binding, Interworking, Device management

OM2M service discovery and management
OM2M components diagram overview
OM2M Interworking Proxy Seq. Diagram
oBIX: Open Building Information Exchange

“oBIX is a standard for RESTful Web Services-based interfaces to building control systems. oBIX is about reading and writing data over a network of device using XML and URIs, within a framework specifically designed for building automation.”

Wikipedia

- open – all technical details freely available
- Building – any and all building systems
- Information – pertinent system data
- eXchange – interoperability

OASIS
Advancing open standards for the information society
oBIX Object Model

```
obj
- name: str
- href: uri
- is: contract
- null: bool
- icon: uri
- displayName: str
- display: str
- writable: bool
- removed: bool

val
- val: <type>

list
- of: uri
  - in: contract
  - out: contract

op

event
- fires: contract

ref

err

bool
- range: uri

int
- min: int
- max: int
- unit: uri

real
- min: real
- max: real
- unit: uri
- precision: int

str
- range: uri

enum

abstime
- min: abstime
- max: abstime

reltime
- min: reltime
- max: reltime

uri
```
Eclipse OM2M web interfaces
Smart Building Use Case
ADREAM by LAAS-CNRS, France

Smart Home Use Case
Open The Box by Orange, France

http://openthebox.org
Healthcare Use Case
OHP-M2M by KNU, Korea

http://openhealth.knu.ac.kr
Autonomous Vehicle Use Case
AUTOPILIOTE, EU H2020-LSP5 (2017-2020)
Smart Appliances Use Case
oneM2M IBM Watson by IBM & Sensinov

(Demo at oneM2M Showcase, 15-17 Nov 2016 at ETSI Sophia, France)

http://www.etsi.org/news-events/events/1086
Horizontal Platform Use Case
Sensinov IoT Platform

- Application development platform for IoT to quickly connect devices and build secure applications.
- Integration with advanced analytics and connectivity solutions.
- A focus on Standards, Open API and Open Source.
Recent Events

- Sensinov Keynote and demonstration at IoT Korea Week 2016
  10-14 Oct 2016 at Seoul, Korea

- Sensinov & IBM joint demonstration at oneM2M Showcase Event. “oneM2M Watson IoT and Smart Appliances”
  15-17 Nov 2016 at Nice, France

- Sensinov participation to the 3rd oneM2M Interop Event.
  29 Nov - 02 Dec 2016 at Kobe, Japan
Thank you for your Attention

benalaya@sensinov.com
www.sensinov.com