3 - Eclipse OM2M, Open Source oneM2M-based Platform

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Eclipse: open source ~~IDE~~ ?
A community of open source projects

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Eclipse Working Groups

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Eclipse IoT open source projects

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iot eclipse.org

https://iot.eclipse.org/projects

27 open source projects addressing:

- Constraineed devices,
- Gateways and Smart devices,
- IoT cloud platforms and backends

Advanced Infrastructure for open source development

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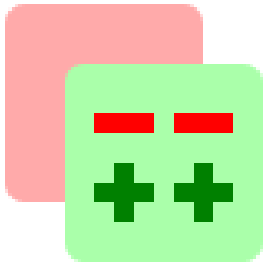

Gerrit

Eclipse OM2M Community

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Code Contributors

LAAS CNRS
INSTITUT CARNOT LAAS CNRS

orange

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Global IoT Platform

Partners

SIERRA WIRELESS

de remi facemmo ali
POLITECNICO DI BARI
1990

VTT

ITALTEL

Carleton UNIVERSITY

e⋄device
Connectivity That Cares

國立交通大學
National Chiao Tung University

Western

KICS

eRDCAD

UPEC | LISSI

HANA
Heterogeneous Advanced Networking & Applications

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III 財團法人資訊工業策進會
INSTITUTE FOR INFORMATION INDUSTRY

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Heterogeneous Advanced Networking & Applications

Eclipse OM2M example architecture

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IBM Watson Analytics

Non oneM2M

oneM2M applications

oneM2M

IoT Cloud/server

oneM2M

IoT gateway

oneM2M

Non oneM2M

Non oneM2M

SAP HANA Analytics

Non oneM2M

Cloud domain

Gateway and Device domain

Eclipse OM2M Building Blocks

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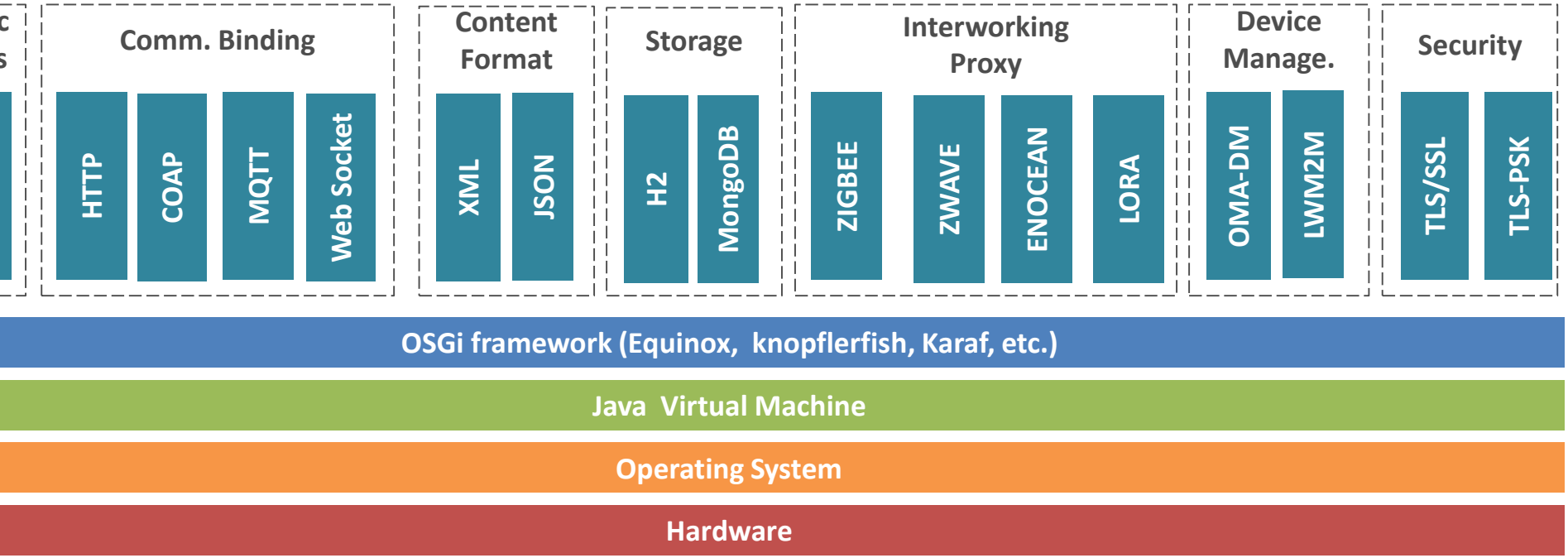
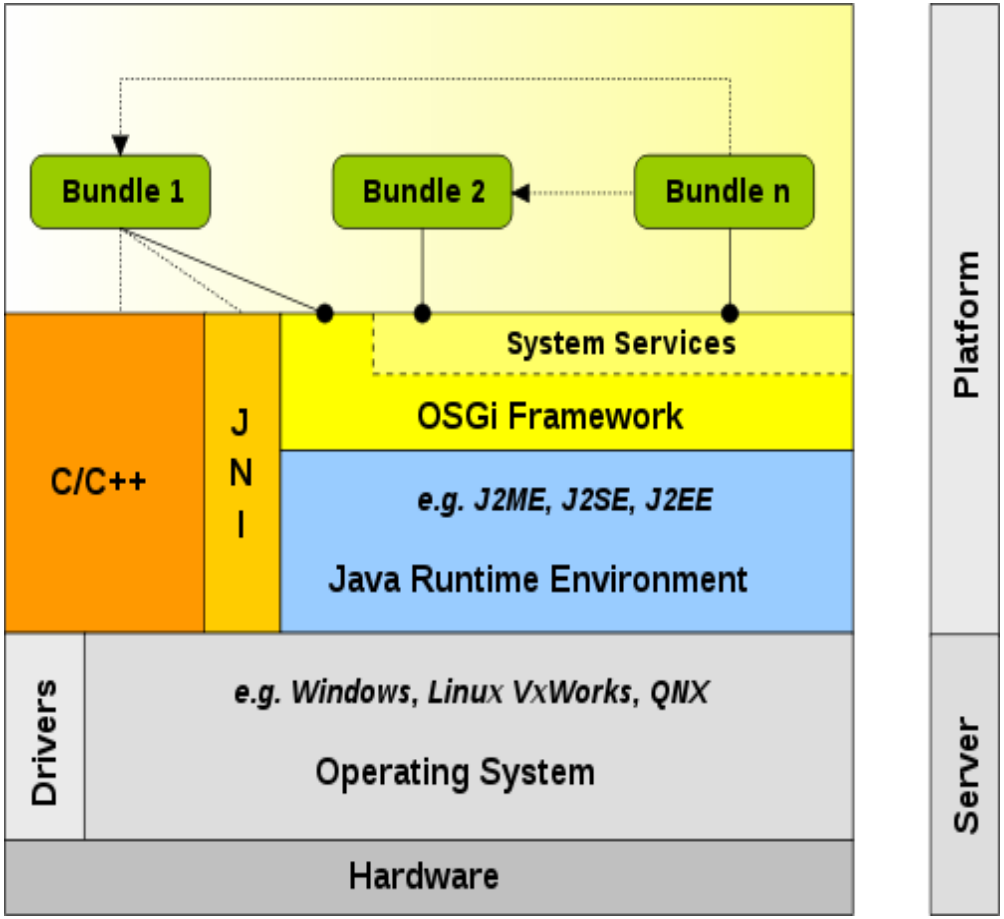
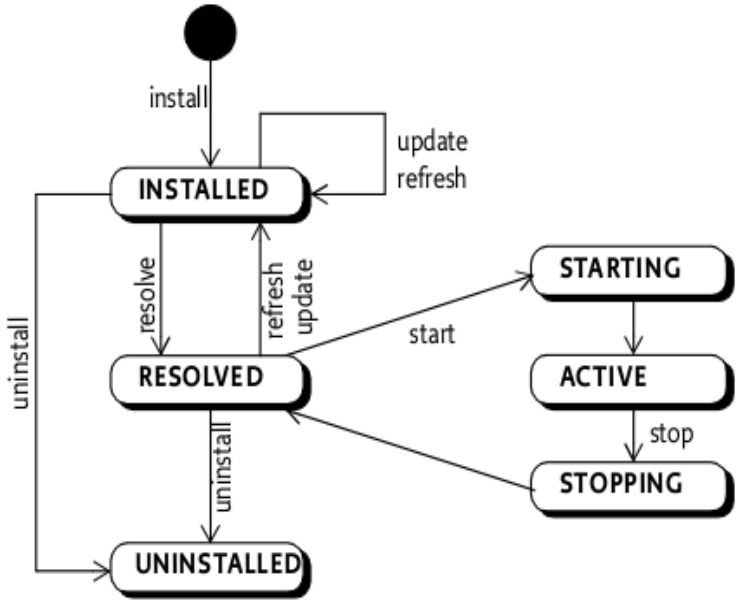
- OM2M is a java platform running on top of an OSGi runtime
  - Highly extensible via plugins.
  - Flexible OSGi container: Equinox, Knopflerfish, or others.
  - Flexible database: SQL or NoSQL.
- Each CSE includes required plugins and is build as an Eclipse product using maven and Tycho.



OM2M OSGi-based platform



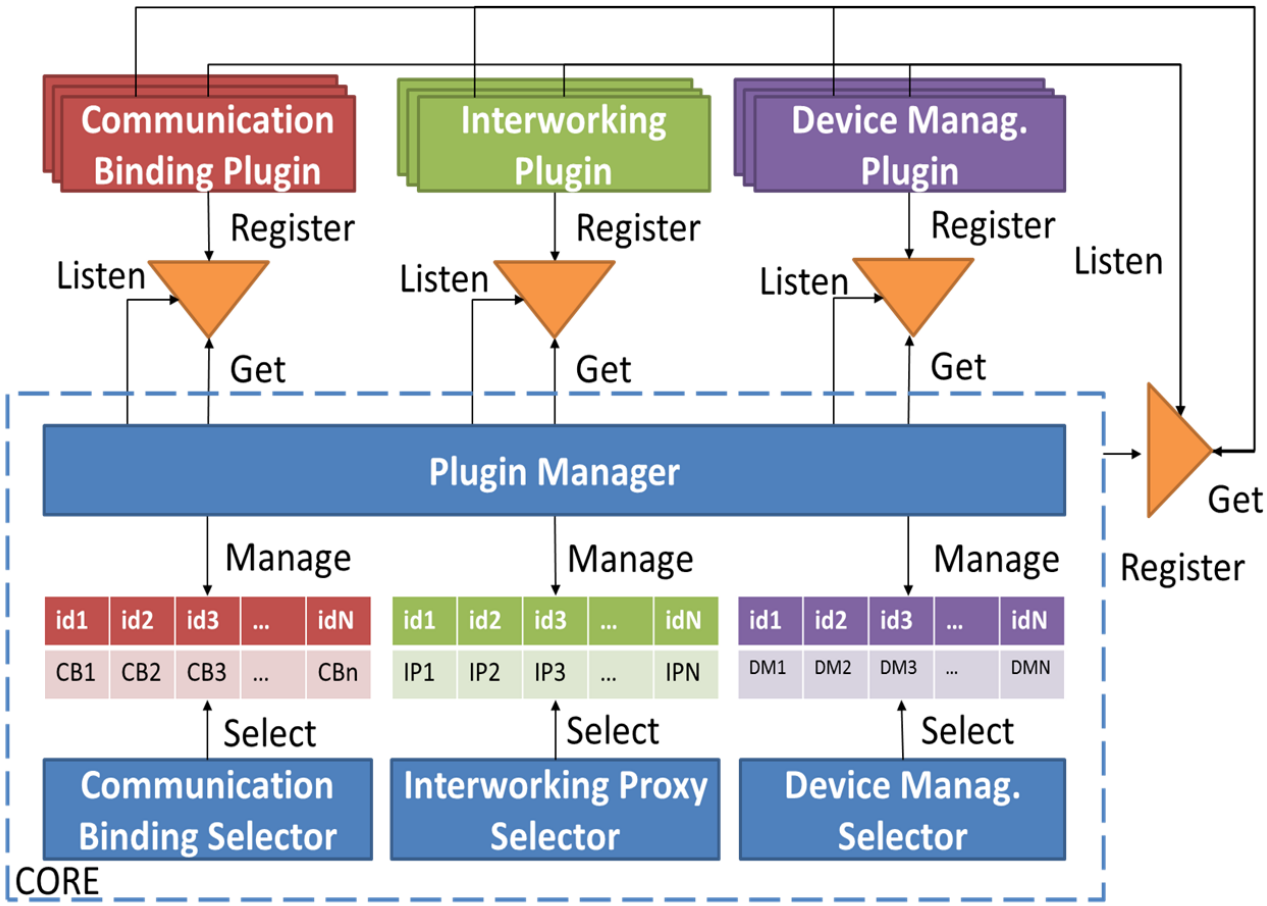
OSGi Architecture



bundle life cycle

OM2M Service discovery

- Extension through three axes
  - Communication binding,
  - Interworking,
  - Device management



OM2M service discovery and management

OM2M components diagram overview

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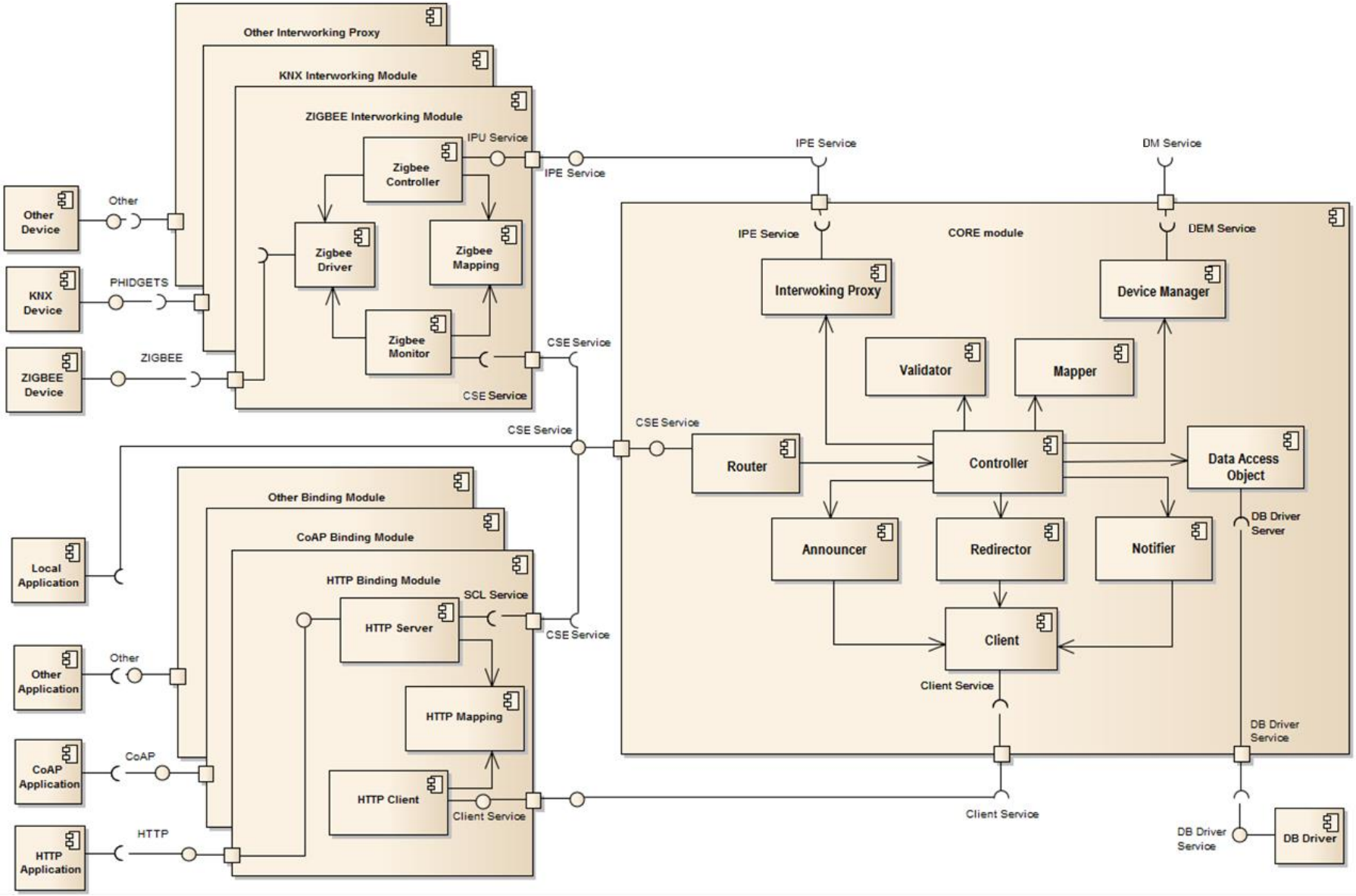
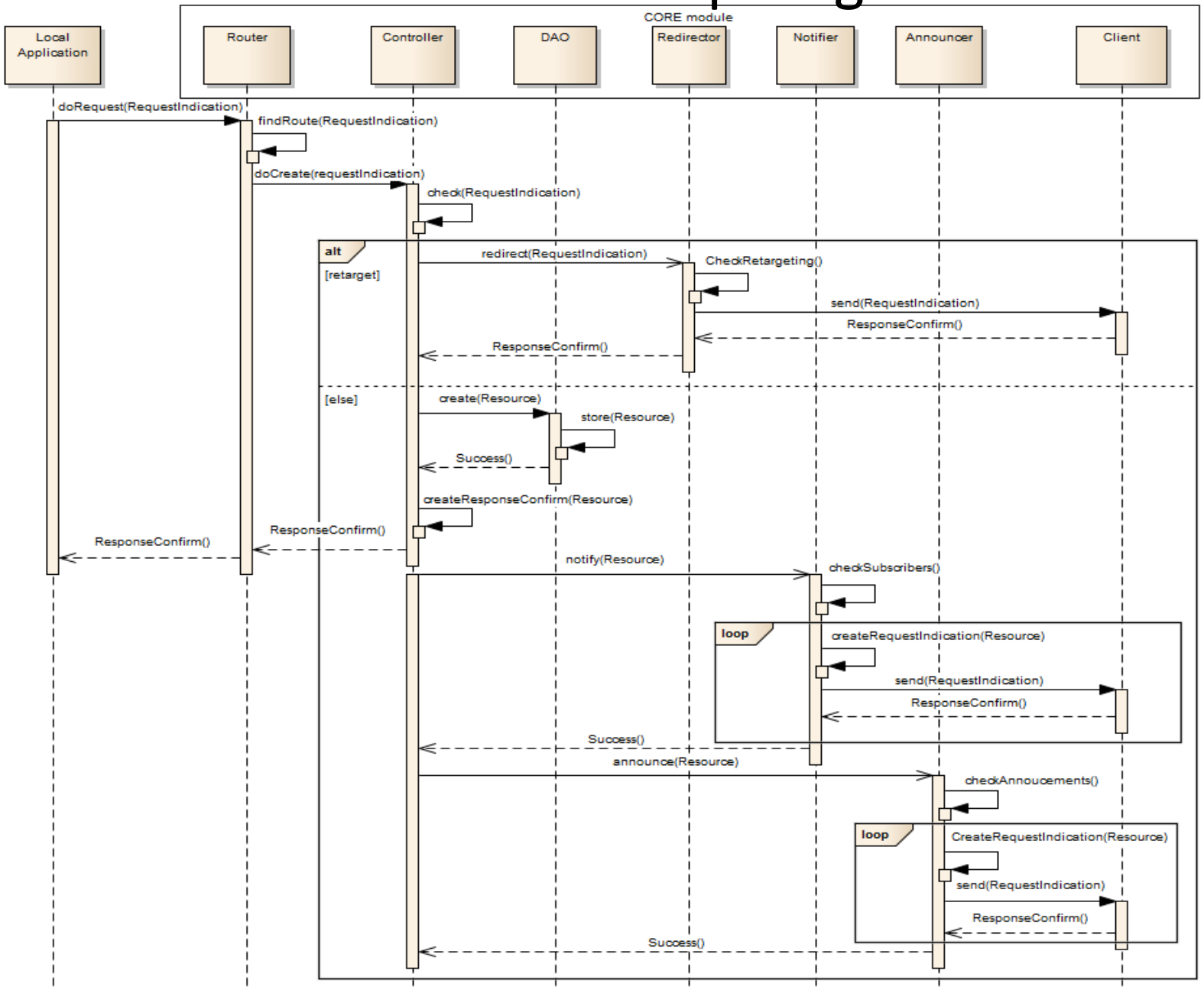
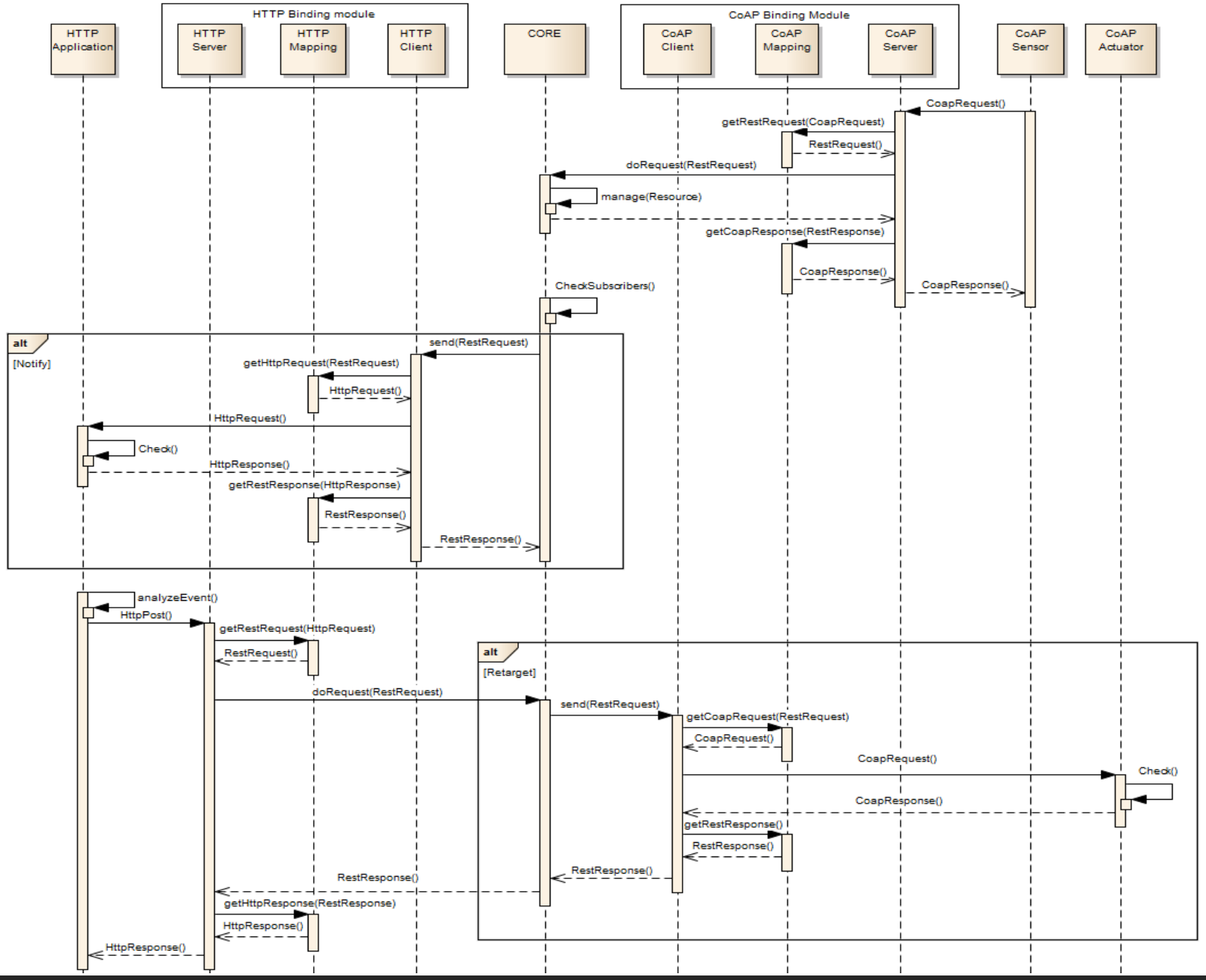


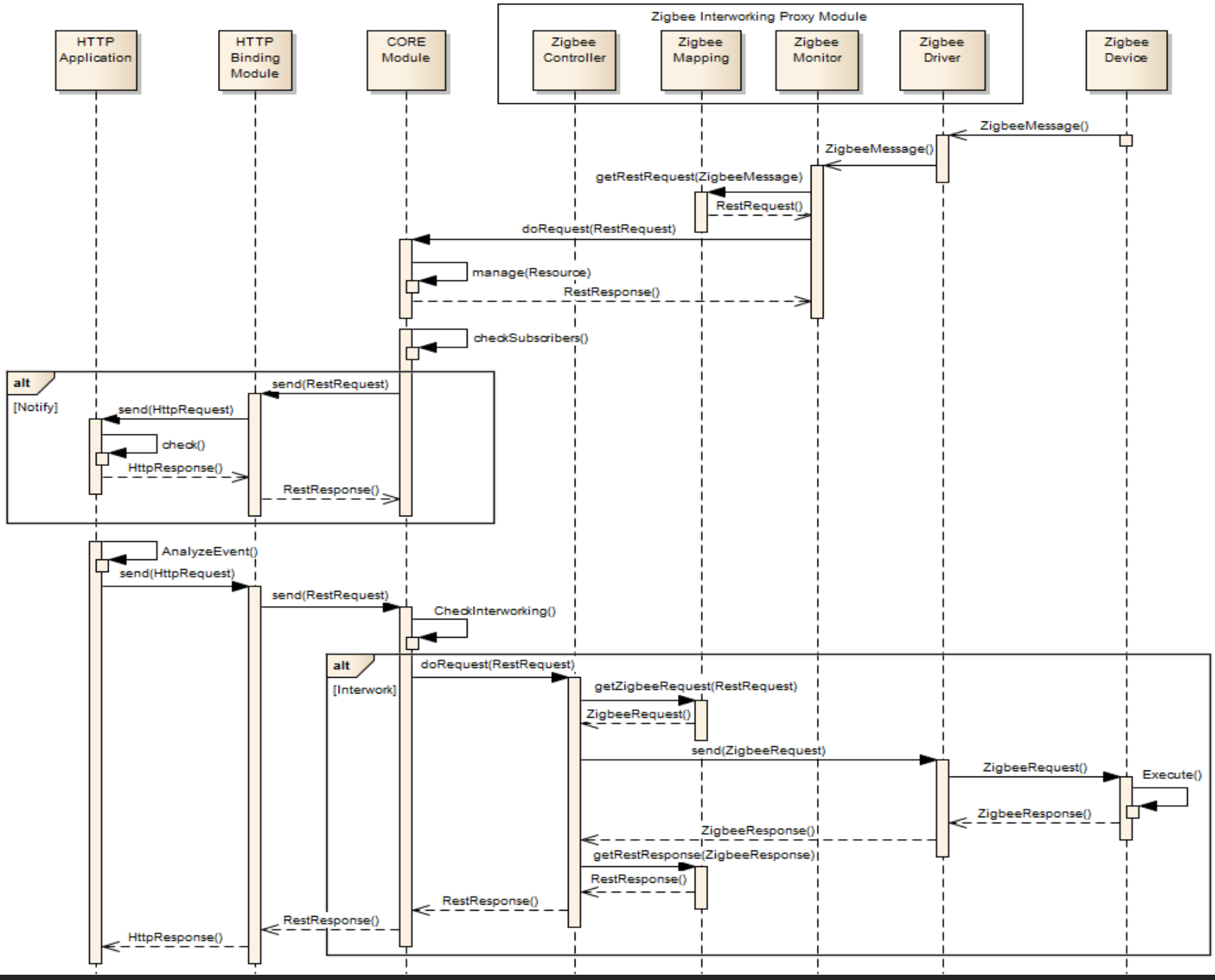
OM2M CORE seq. diagram



OM2M communication binding seq. diagram



OM2M Interworking Proxy Seq. Diagram



oBIX: Open Building Information Exchange

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"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

oBIX™ Open Building Information Xchange

OASIS Advancing open standards for the information society

oBIX Object Model

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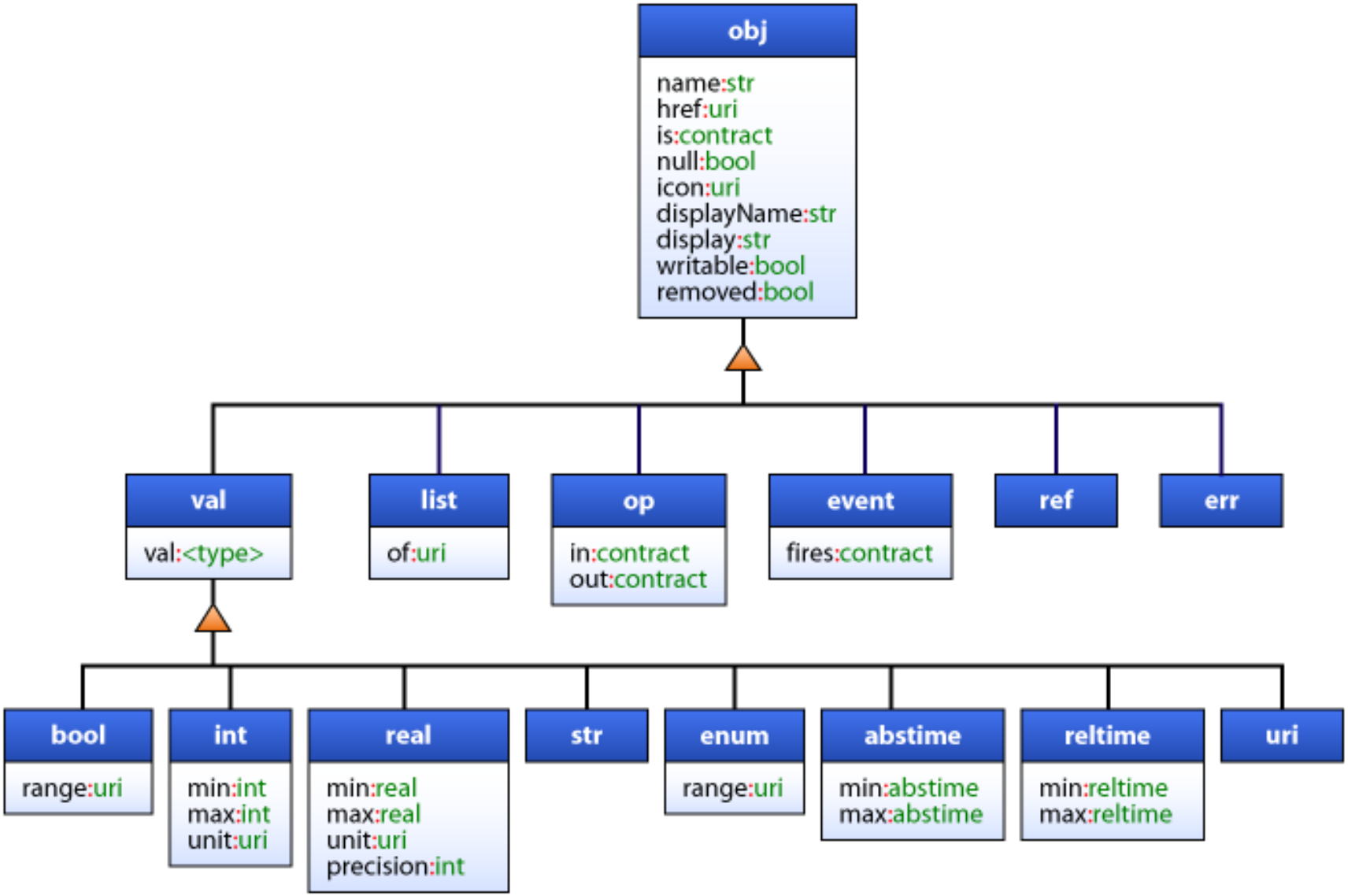

Eclipse OM2M web interfaces

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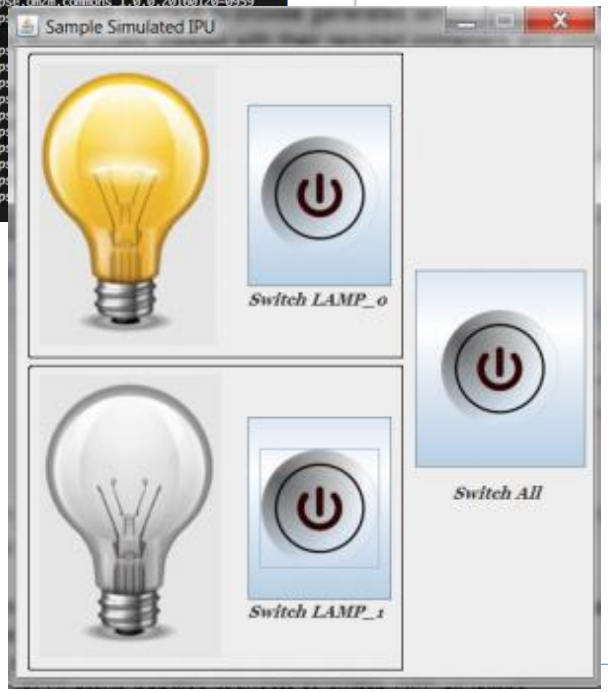
```
ss
"Framework is launched."

id      State       Bundle
0       ACTIVE      org.eclipse.osgi_3.10.2.v20150203-1939
1       RESOLVED    javax.servlet_3.1.0.v20140303-1611
2       RESOLVED    javax.xml_1.3.4.v201005080400
3       RESOLVED    org.apache.commons.codec_1.6.0.v201305230611
4       RESOLVED    org.apache.commons.logging_1.1.1.v20110211721
                    Fragments=24
5       ACTIVE      org.apache.felix.gogo.command_0.10.0.v20120930121
6       ACTIVE      org.apache.felix.gogo.runtime_0.10.0.v20120930103
7       ACTIVE      org.apache.felix.gogo.shell_0.10.0.v201212101605
8       RESOLVED    org.apache.httpcomponents.httpclient_4.3.6.v20141
9       RESOLVED    org.apache.httpcomponents.httpcore_4.3.3.v2014112
10      ACTIVE      org.eclipse.equinox.console_1.1.0.v20140131-1639
11      ACTIVE      org.eclipse.equinox.http.jetty_3.0.200.v20131021-
12      ACTIVE      org.eclipse.equinox.http.servlet_1.1.500.v2014031
13      RESOLVED    org.eclipse.equinox.launcher_1.3.0.v20140415-2008
14      RESOLVED    org.eclipse.jetty.continuation_8.1.16.v20140903
15      RESOLVED    org.eclipse.jetty.http_8.1.16.v20140903
16      RESOLVED    org.eclipse.jetty.io_8.1.16.v20140903
17      RESOLVED    org.eclipse.jetty.security_8.1.16.v20140903
18      RESOLVED    org.eclipse.jetty.server_8.1.16.v20140903
19      RESOLVED    org.eclipse.jetty.servlet_8.1.16.v20140903
20      RESOLVED    org.eclipse.jetty.util_8.1.16.v20140903
21      ACTIVE      org.eclipse.om2m.binding.http_1.0.0.20160120-0959
22      RESOLVED    org.eclipse.om2m.binding.service_1.0.0.20160120-0
23      RESOLVED    org.eclipse.om2m.commons_1.0.0.20160120-0959
24      RESOLVED    org.eclips
                    Master=4
25      ACTIVE      org.eclips
26      RESOLVED    org.eclips
27      ACTIVE      org.eclips
28      RESOLVED    org.eclips
29      RESOLVED    org.eclips
30      RESOLVED    org.eclips
31      ACTIVE      org.eclips
32      RESOLVED    org.eclips
33      ACTIVE      org.eclips
34      RESOLVED    org.eclips
osgi> start 30
```

- mn-name
  - acp_admin
  - acpae-924510951
  - acpae-987420501
  - acpae-268930119
  - LAMP_0
    - DESCRIPTOR
      - cin_586540630
    - DATA
  - LAMP_1
  - LAMP_ALL



Attribute	Value
ty	4
ri	cin-586540630
pi	/mn-cse/cnt-766321079
ct	20160120T121007
lt	20160120T121007
st	0
cnf	application/obix
cs	658
con	

Attribute	Value
type	LAMP
location	Home
appId	LAMP_0
getState	/mn-cse/mn-name/LAMP_0/DATA/la
getState(Direct)	/mn-cse/mn-name/LAMP_0?op=getStateDirect&lampid=LAMP_0
switchON	/mn-cse/mn-name/LAMP_0?op=setOn&lampid=LAMP_0
switchOFF	/mn-cse/mn-name/LAMP_0?op=setOff&lampid=LAMP_0
toggle	/mn-cse/mn-name/LAMP_0?op=toggle&lampid=LAMP_0

Smart Building Use Case
ADREAM by LAAS-CNRS, France

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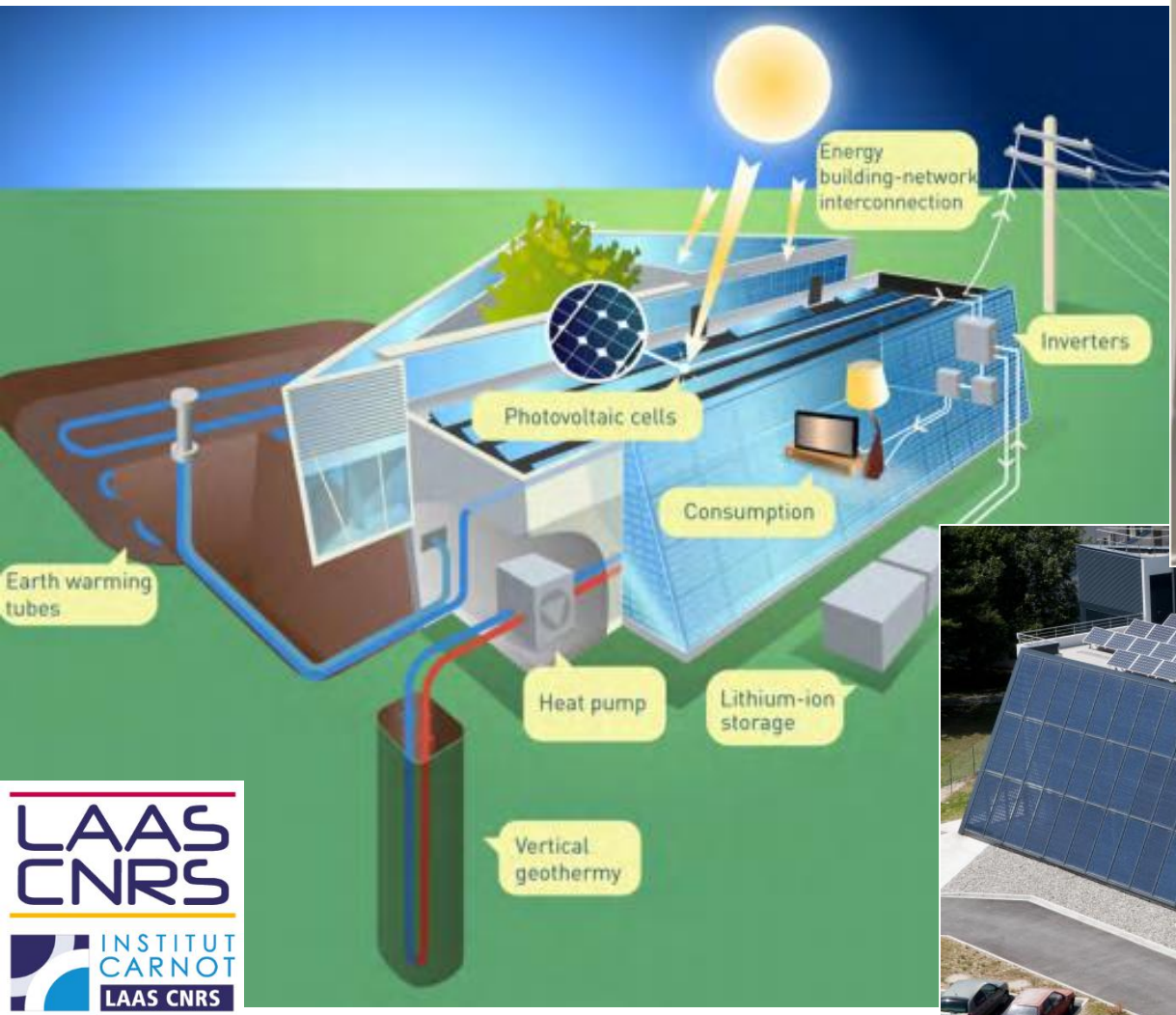

LAAS CNRS

INSTITUT CARNOT LAAS CNRS

https://www.laas.fr/public/en/adream

Smart Home Use Case
Open The Box by Orange, France

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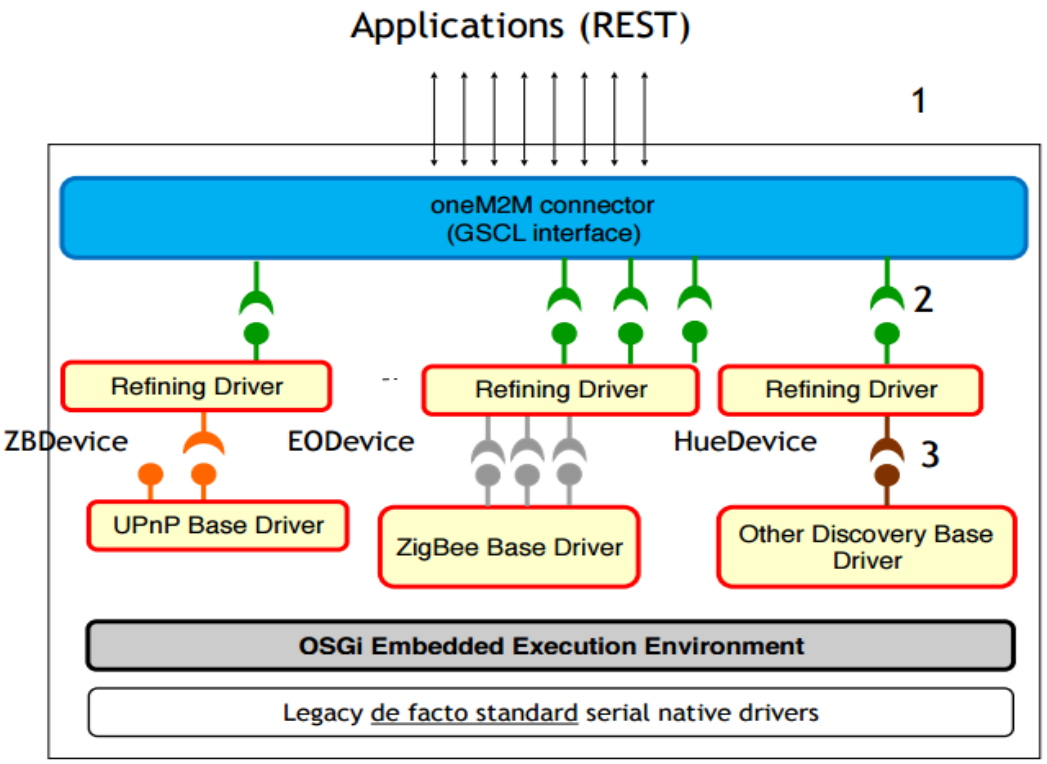

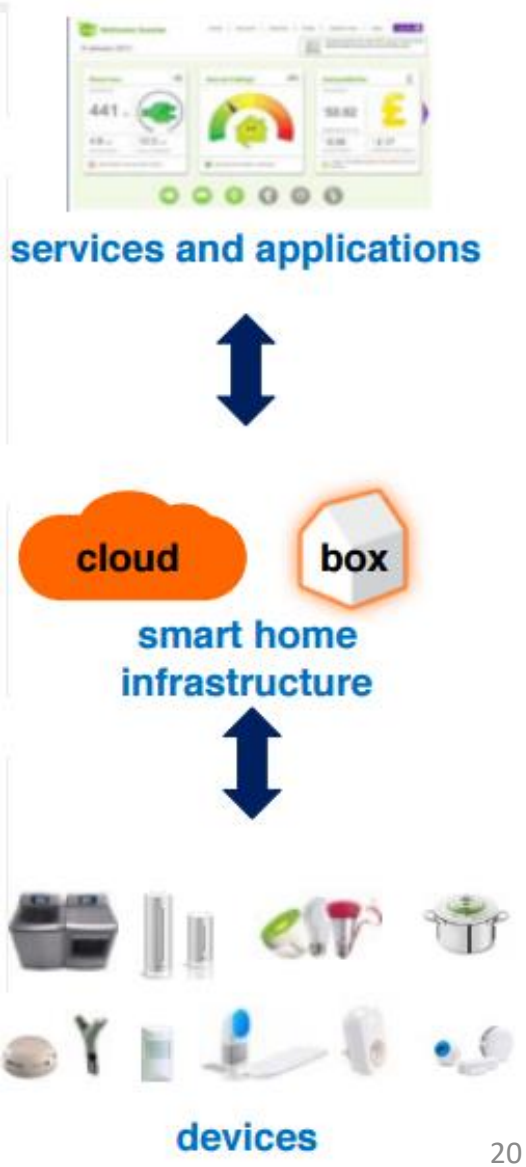

OPEN THE BOX

http://openthebox.org

Healthcare Use Case
OHP-M2M by KNU, Korea

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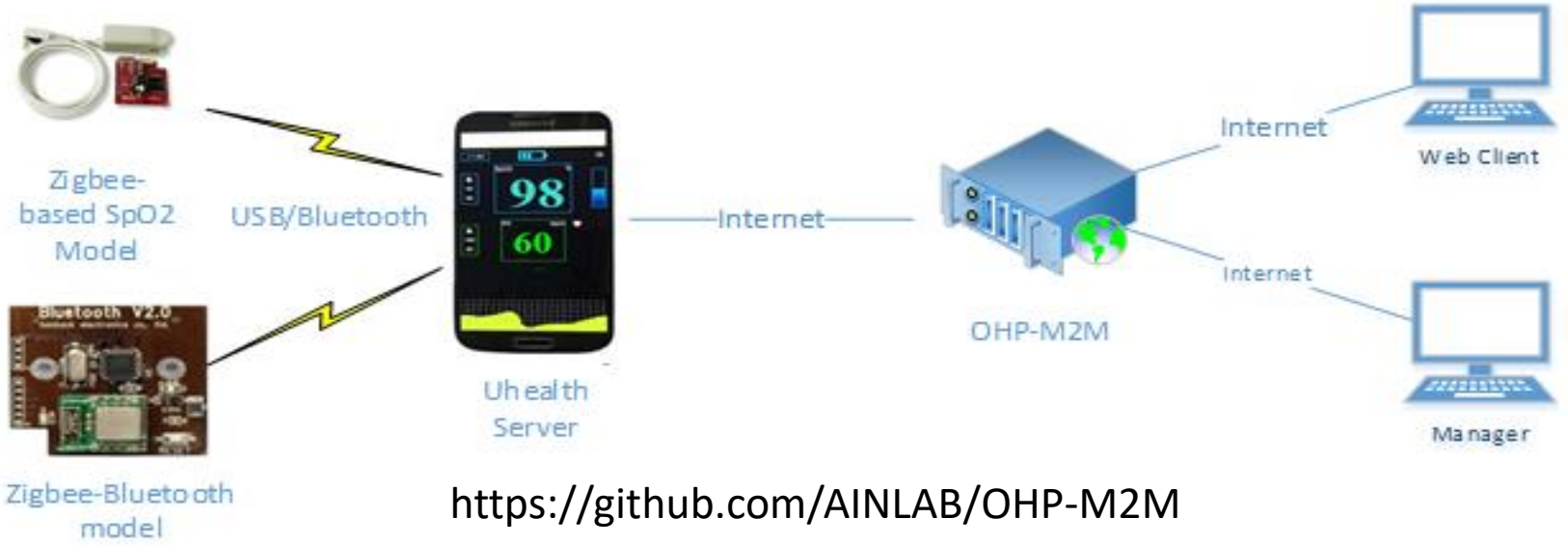
OHP-M2M

KYUNGPOOK NATIONAL UNIVERSITY 경북대학교



https://github.com/AINLAB/OHP-M2M

Autonomous Vehicle Use Case
AUTOPILOTE, EU H2020-LSP5 (2017-2020)

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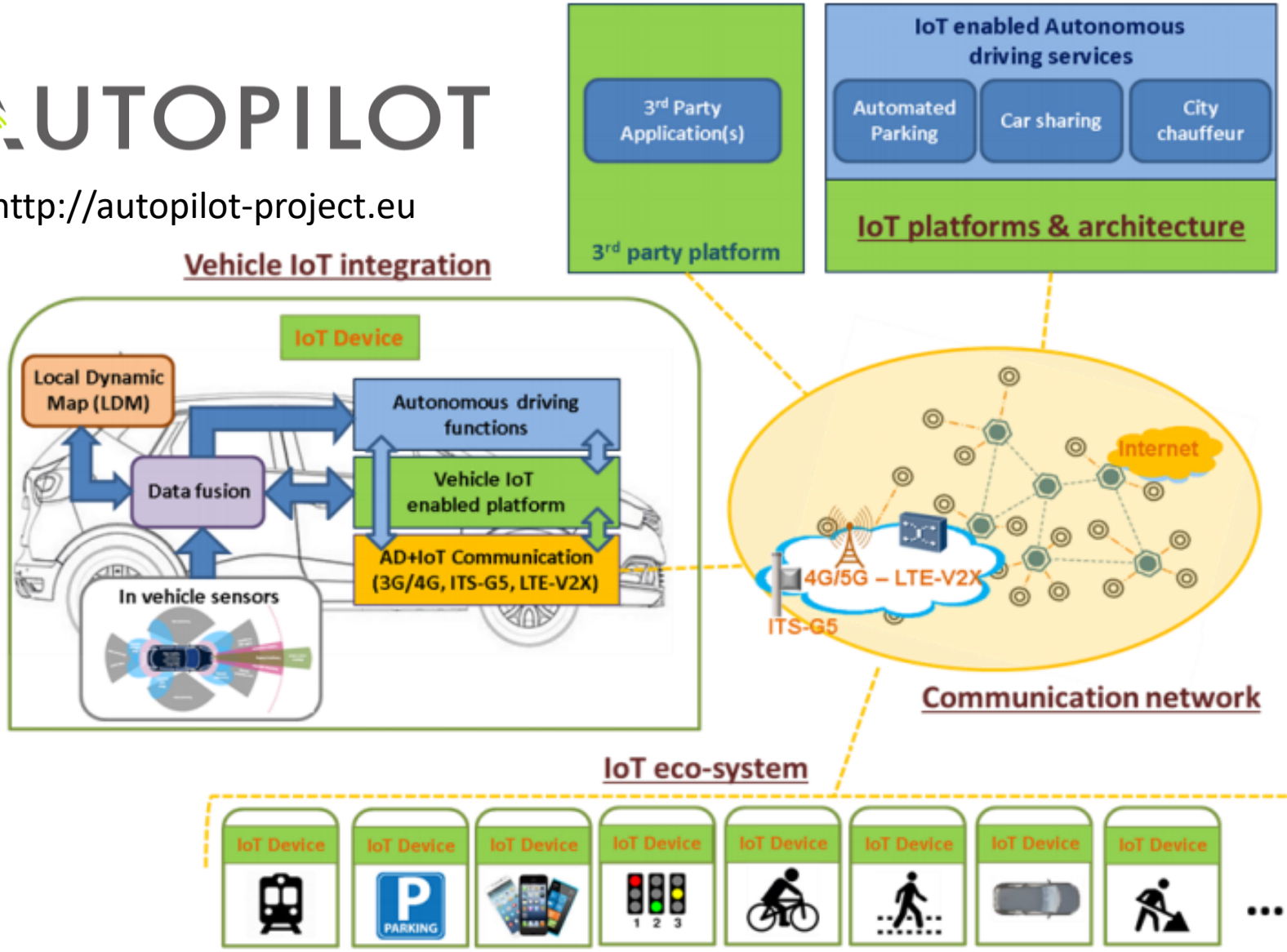
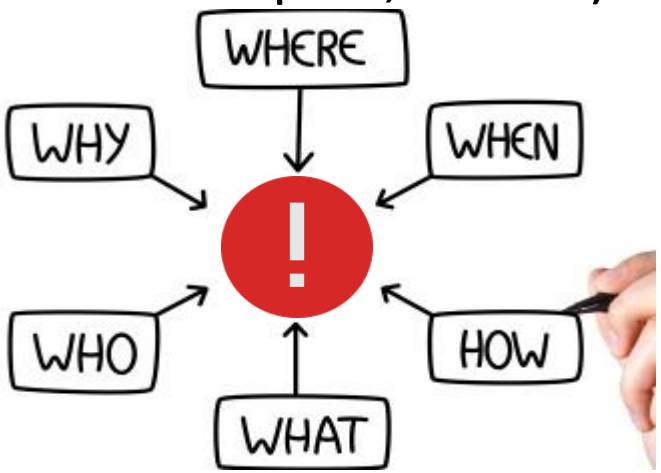
AUTOPILOT

http://autopilot-project.eu

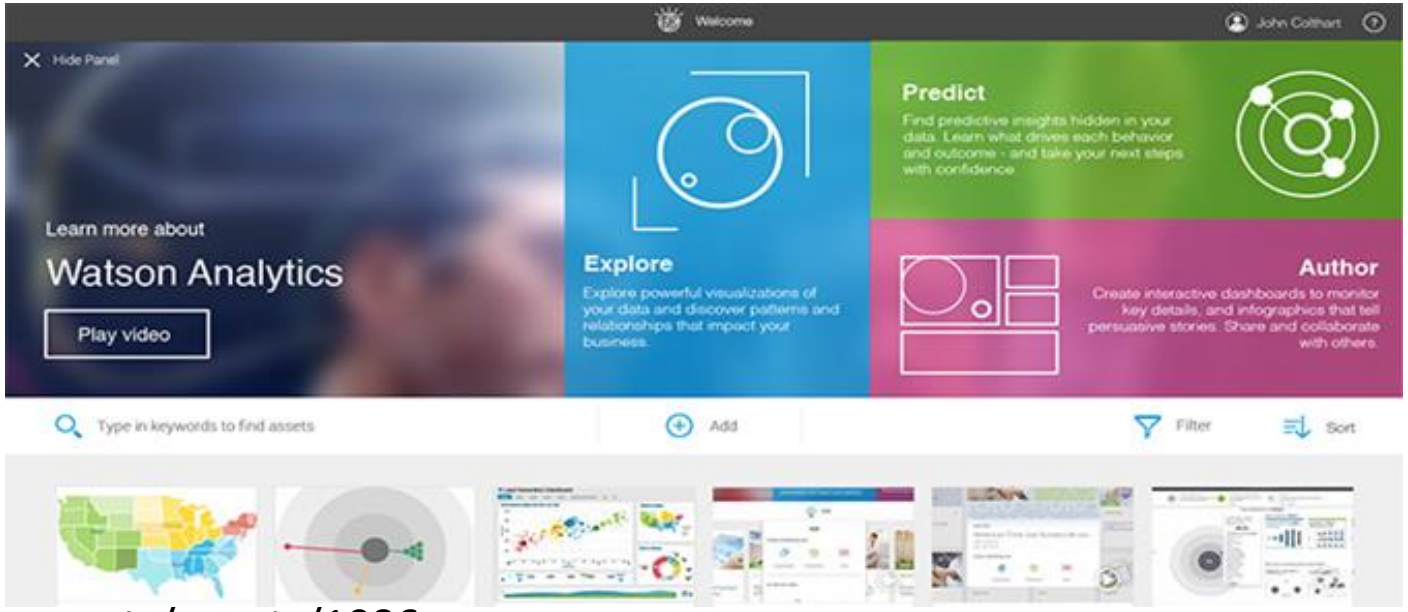


Smart Appliances Use Case
oneM2M IBM Watson by IBM & Sensinov

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



IBM Watson



IBM

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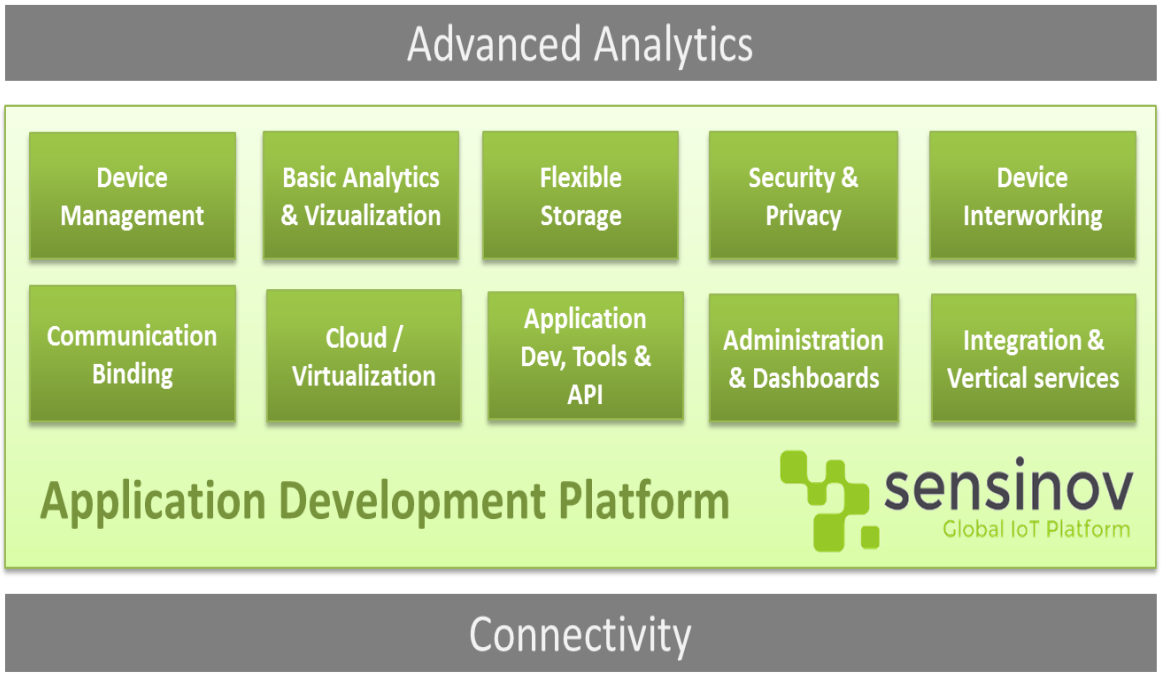
Global IoT Platform

http://www.etsi.org/news-events/events/1086

Horizontal Platform Use Case
Sensinov IoT Platform

- Cloud-native IoT platform based on microservices for horizontal scalability, low latency, high throughput, massive data, fault tolerance, and multitenancy.
- Integration with existing backends, connectivity and device technologies.
- A focus on Standards, Open API and Open Source.



Sensinov Partnerships

- We are aiming to have solid partnerships worldwide and win-win engagements that make mutual business sense, while remaining focused on our vision.
- Our goal is to work in regional and strategic partnerships with industry leaders who share a similar vision and believe in the value of IoT.

Thank you for your Attention

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