Open source oneM2M Platforms

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AGENDA

- What we need?
- Introduce oneM2M Standard
- oneM2M based Implementations
- Introduce Mobius and &Cube platforms
- Interworking demo & projects
What we need for IoT Era?

Common Platforms

- Platforms is typically dedicated to a single application/service
- Slow development of the IoT market

Standards

- High fragmentation of existing platforms
- Missing interoperability

ETSi M2M workshop
oneM2M
– A Global Initiative for M2M Standardization

In July 2012, seven of the world’s leading ICT Standards Development Organizations launched the global oneM2M partnership to:

• Cooperate in the production of globally applicable, access-independent M2M Service Layer specifications, including Technical Specifications and Technical Reports
• Ensure the most efficient deployment of M2M communications systems

www.oneM2M.org
Partners and members

Partner SDOs:
- ARIB (Japan)
- ATIS (N-America)
- CCSA (China)
- ETSI (Europe)
- TIA (N-America)
- TTA (Korea)
- TTC (Japan)
- TSDSI (India)

Industry consortia:
- Broadband Forum
- Continua
- GlobalPlatform
- Home Gateway Initiative (HGI)
- Open Mobile Alliance (OMA)
- New Generation M2M Consortium - Japan

2014 oenM2M webinar
Partners and members

+ over 200 service providers, industry, government, university, research, ... members

Some of the 200+ active members of oneM2M

- T-Mobile
- Sierra Wireless
- Georgia Tech
- Giesecke & Devrient
- Itron
- Sony
- Eurecom
- Alcatel-Lucent
- Qualcomm
- Telecom Italia
- Oracle
- KETI
- KDDI
- Telefonica
- AT&T
- OnStar
- NIST
- Haier
- Fraunhofer FOKUS
- BOSCH
- Fujitsu
- Inmarsat
- Ericsson
- LG
- Huawei
- Intel
- ZTE
- NEC
- InterDigital

2014 oneM2M webinar
oneM2M provides ...

- A common set of Service Layer capabilities
- Access independent view of end-to-end services
- Open/standard interfaces, APIs and protocols
- Security, privacy, and charging aspects
- Reachability and discovery of applications
- Interoperability, test and conformance specs
- Identification & naming of devices and applications
- Management aspects (including remote management of entities)

oneM2M Release 1 specifications delivered in February 4, 2014
oneM2M based Implementations

Open source implementations

LAAS-CNRS  
Fraunhofer FOKUS  
KETI  
CISCO

OM2M  
open mtc  
OCEAN  
OPEN DAYLIGHT

Commercial implementations and demos

LG  
SIERRA WIRELESS  
InterDigital  
IIS

ERICSSON  
QUALCOMM  
HP

First interoperability event (Sept 14-16)

With 30 participating organizations and 75 people

goloTForum (Global Open source IoT Forum) – OCEAN, OM2M, IoTDM
Open allianceCE for IoT standards

http://www.iotocean.org
What is OCEAN
– OCEAN (Open allianCE for iot stANdard) established in Dec. 16th, 2014 by KETI and Korea Government
– The objective of OCEAN is to share open sources based on IoT standards and to encourage co-working between its members
– The OCEAN supports early commercialize and vitalized ecosystem for IoT

License policy
– 3-Clause BSD license policy
– OCEAN adapts IPR policy of the standards referred by open sources

Current Members
– 214 members (Oct. 1st, 2015)

Open source
– The OCEAN is now providing open sources of oneM2M-based IoT platform called “Mobius“ and “&Cube“, and relevant documents.
– For download of the open source, users should join to OCEAN web site (http://www.iotocean.org).
OCEAN open source directions

Open source directions

- Focus on oneM2M standard
- Interworking functions
OCEAN roadmap

- The latest oneM2M open sources
  - Mobius: Blue Octopus v1.1 for Spring Framework (Sep. 2015)
  - Mobius: Yellow Turtle v1.1 for Node.js (Sep. 2015)
  - &Cube: Lavender for Java v1.0 (Aug. 2015)

- Release plan
  - &Cube: Rosemary for Node.js v1.0 (Oct. 2015)
  - &Cube: Rosemary for Java (Nov. 2015 expected)
  - &Cube: Thyme for Java (Nov. 2015 expected)
  - &Cube: Thyme for Node.js (Dec. 2015 expected)
  - oneM2M - AllJoyn Interworking IPE (Feb. 2016 expected)
  - oneM2M - OIC Interworking IPE (Feb. 2016 expected)
Eclipse OM2M
Open source standard-based IoT platform

eclipse.org/om2m
om2m-dev@eclipse.org
Eclipse OM2M

- Open source project developed at the Eclipse Foundation.
- Horizontal service platform for M2M interoperability
- Compliant with SmartM2M (April 2014)
- Compliant with oneM2M (September 2015)
- Restful API with generic set of service capabilities
- Facilitate deployment of vertical applications
- OSGI-based architecture extensible via plugins
- Developed by research labs and companies
Eclipse OM2M Building Blocks

OM2M main building blocks

- CORE
- HTTP
- COAP
- MQTT
- ZIGBEE
- KNX
- 6LowPAN
- OMA-DM
- LWM2M
- TLS
- TLS-PSK
- Semantic
- QoS
- Your plugin!

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Eclipse OM2M roadmap

- **Eclipse OM2M Release 0.8.0 (April 2015)**
  - SmartM2M-based platform.

- **Eclipse OM2M Release 1.0.0 (September 2015)**
  - oneM2M-based platform.
  - IN, MN, ASN, and MN nodes support.
  - Protocol-independent CORE module.
  - HTTP and CoAP communication bindings.
  - XML and JSON resource formats.
  - Interworking driver for simulated devices.
  - Web interface for resource browsing and debugging.
  - DAO persistence layer for SQL and NOSQL databases.
  - Semantic capabilities.
  - Android support.
IoTDM
OpenDaylight
Open Source Project

https://wiki.opendaylight.org/view/IoTDM:Main
IoTDM Overview

- The IoTDM project is about developing a data-centric middleware
- oneM2M compliant IoT Data Broker (IOTDM)
- Enable authorized applications to retrieve IoT data uploaded by any device.
IoTDM Overview

- Implement IoTDM as closely to the oneM2M specifications as possible.
- Keep in mind that the specifications are still evolving.
- Detailed information about what is supported from the oneM2M R1 is available here (https://wiki.opendaylight.org/images/5/55/IoTDM_oneM2M_Features_Lithium.pdf)
- RESTconf is also supported but it is a non-oneM2M standard method for accessing the tree. Bundles providing the API: odl-iotdm-onem2m
- REST API commands include: onem2m-request-primitive for CRUDN
- Examples of CRUDN calls and JSON formats are available here (https://wiki.opendaylight.org/images/9/93/API_Calls_Examples.pdf)
Introduce Mobius and &Cube platforms

Horizontal IoT Platform Model

KETI’s IoT Platform Model (Mobius and &Cube)

IoT Application Domains
oneM2M Reference Architecture and 
Mobius/&Cube platforms

IoT/M2M Device | IoT/M2M Gateway | IoT/M2M Server | Admin/User

&Cube: Thyme
&Cube: Rosemary
&Cube: Lavender

Mobius: Blue Octopus
Mobius: Yellow Turtle

Korea Electronics Technology Institute
Open AllianCE for IoT StANdards
Configuration of Mobius and &Cube

- **Sensors**
  - &Cube: Lavender

- **Actuators**
  - &Cube: Lavender
  - &Cube: Rosemary
  - &Cube: Thyme
# Mobius and &Cube open sources

<table>
<thead>
<tr>
<th>SW name</th>
<th>oneM2M Nodes</th>
<th>AE</th>
<th>CSE</th>
<th>Framework</th>
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<td>ASN</td>
<td>MN</td>
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<td>Yellow Turtle</td>
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<tr>
<td>&amp;Cube</td>
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Not yet opened

Opened
## Released open sources

<table>
<thead>
<tr>
<th>Software name</th>
<th>Framework</th>
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<th>Release date</th>
<th>Corresponding standards</th>
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<tr>
<td>Mobius : Blue Octopus</td>
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<td>TS-0001 Functional Architecture v1.6.1</td>
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<td>TS-0004 Service Layer Core Protocol v1.0.1</td>
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<td>TS-0009 HTTP Protocol Binding v1.0.1</td>
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<td>TS-0010 MQTT Protocol Binding v1.0.1</td>
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<td>Mobius : Yellow Turtle</td>
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<td>Java</td>
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Interworking demo & project

- ETSI oneM2M Showcase in Dec. 2014 - oneM2M Platform Interworking

https://youtu.be/mRy5IvYfvHw
https://youtu.be/VtfP7VSTGHA
Interworking demo & project

- TIA oneM2M Showcase in Jun. 2015 – Legacy and AllJoyn Interworking
Interworking demo & project

Program: Horizon 2020
Project: FIESTA (Federated Interoperable Semantic IoT/cloud Testbeds and Applications)
Members: 13 partners from 7 EU countries + KETI (S. Korea)
Conclusion

- We need standards and common platforms.
- Open source platforms can help IoT ecosystem.
- Interworking is one of the key features of Internet of Things.
THANK YOU

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