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RFC 236 - OSGi Interworking Service for oneM2M Networks

Draft

11 Pages

Abstract

Defines the OSGi interworking service for oneM2M networks that enabling OSGi-based devices to interoperate with oneM2M devices.

0 Document Information

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0.3 Feedback

This document can be downloaded from the OSGi Alliance design repository at <https://github.com/osgi/design> The public can provide feedback about this document by opening a bug at <https://www.osgi.org/bugzilla/>.

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0.5 Terminology and Document Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY" and "OPTIONAL" in this document are to be interpreted as described in 10.1.

Source code is shown in this typeface.

0.6 Revision History

The last named individual in this history is currently responsible for this document.

Revision	Date	Comments
Initial	June 21 2017	<i>Initial Document</i> <i>Seven Gan, Huawei, seven.ganlu@huawei.com</i>

1 Introduction

oneM2M is a global organization that specifies requirements, architecture, API specifications, security solutions and interoperability for Machine-to-Machine and IoT technologies. Its specifications provide a framework to support a wide range of applications and services such as smart cities, smart grid, connected car, home automation, public safety, and health. As an increasing number of big players participating in oneM2M standard, it is becoming more and more popular and is likely to become one of the most mainstream IoT standards in the world. Interoperating with oneM2M devices can help build IoT ecosystem, expand the markets of both OSGi and oneM2M.

This RFC provides a solution to enable OSGi-based devices to interoperate with oneM2M devices.

2 Application Domain

When adding a OSGi-based device (such as IoT gateways, enhanced capability devices) into oneM2M network, it requires the oneM2M protocol communication support of these devices. So that these OSGi devices and their connected sensors can be remotely discovered and operated on the oneM2M IoT platform as shown in Fig 1.

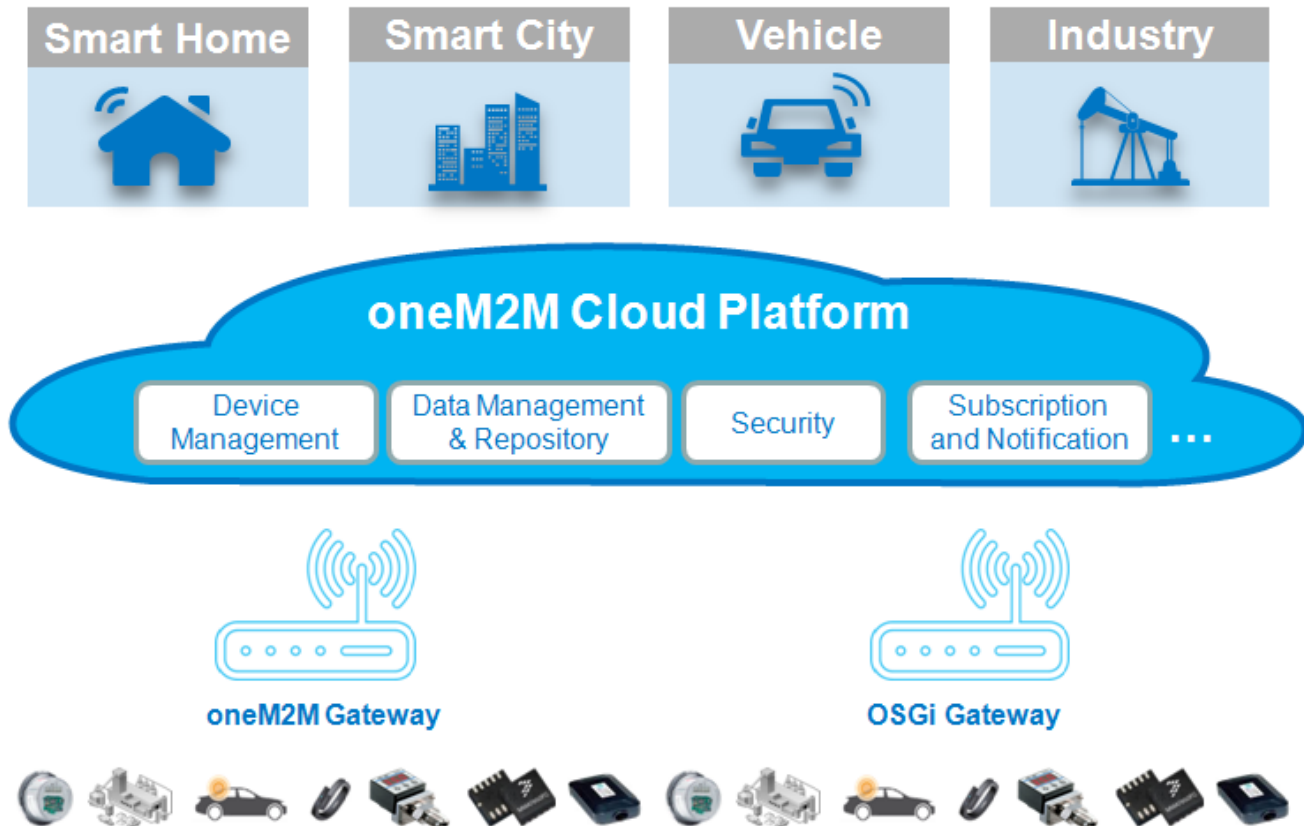


Fig 1

3 Problem Description

OSGi defines Device Abstraction Layer which provides a unified interface for OSGi application developers to interact with sensor, devices, etc. And also defines Configuration Admin service which allows operators to configure deployed bundles. Other OSGi standard device services (e.g. UPnP Device Service, EnOcean Device Service, Zigbee Device Service, SDT Device Service) and OSGi-based open source projects (e.g. Eclipse

SmartHome, Kura) have the similar mechanisms. It is impossible to integrate these devices into oneM2M network by re-developing them as fully oneM2M compliance devices. The better way is to develop an oneM2M protocol interworking service which can interact with these device services and configuration admin service, expose these devices and configurations as oneM2M resources to oneM2M network without affecting the exist implementation of OSGi devices.

There are two interworking scenarios. One is to consider OSGi gateways as an oneM2M AE who communicates with CSE through Mca reference point, as shown in Fig 2. The other one is to consider OSGi gateways as an oneM2M CSE who communicates with other CSE through Mcc reference point and communicates with AE through Mca reference point, as shown in Fig 3.

The interworking service requested in this RFC would give developers a common way of developing such service.

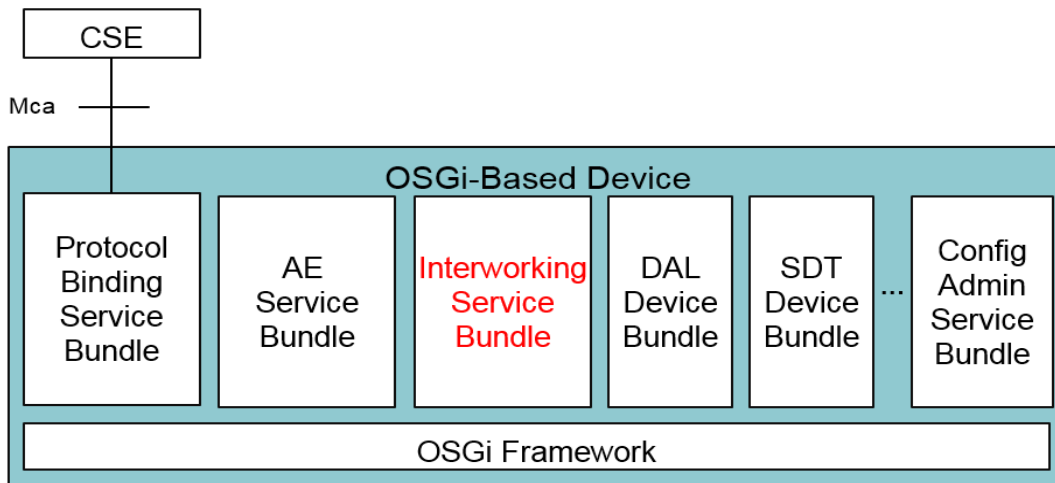


Fig 2

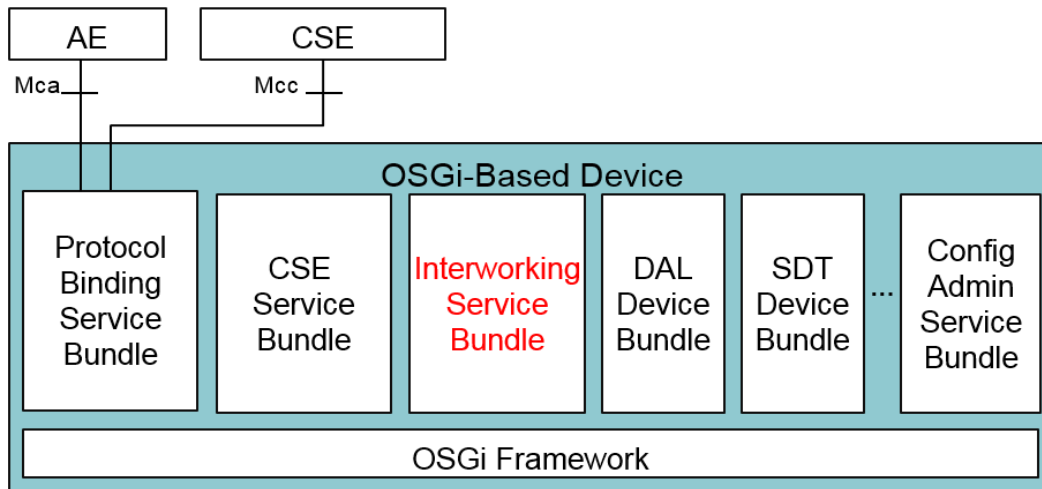


Fig 3

4 Requirements

R1: The solution MUST provide a standard service for exposing Device service and Configuration Admin service as oneM2M resources to oneM2M network without any modification of Device Service and Configuration admin service.

R2: The solution MUST provide a set of rules to map between Device service and oneM2M resource for Interworking service developers.

R3: The solution MUST provide a set of rules to map between Configuration Admin service and oneM2M resource for Interworking service developers.

R4: The solution MUST define API for configuring the Interworking service.

R5: The solution MUST be independent of specific transport protocol between OSGi devices and oneM2M devices.

5 Technical Solution

The Interworking service is responsible for the interoperation between OSGi and oneM2M devices. It listens to the service registry, obtains device service objects, converts java objects to oneM2M resources and calls the oneM2M CSE/AE interface to create/update/delete resources on oneM2M side. Each interworking service has a unique pointOfAccess property, marks the oneM2M resources by specifying this property at creation time. The interworking service also provides interfaces for oneM2M CSE/AE to invoke the service operations.

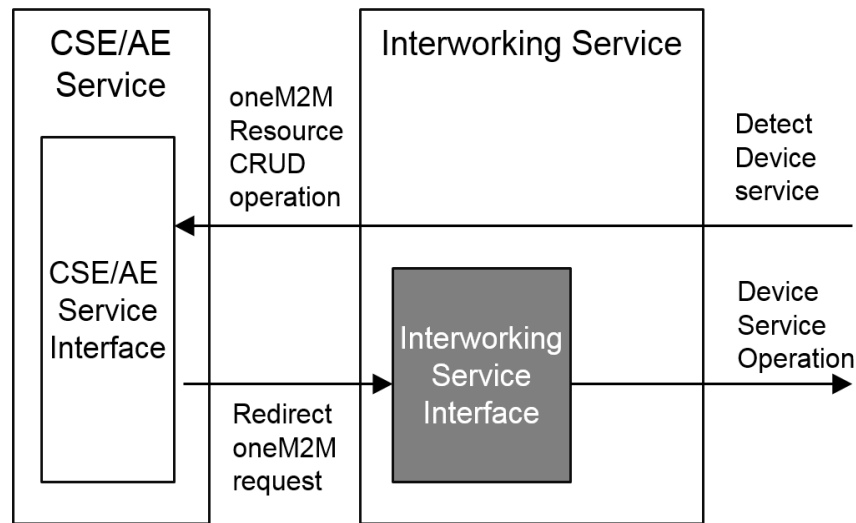


Fig 4

Each OSGi device operation can be mapped to an oneM2M resource CRUDN operation. The mapping is bidirectional as shown in the following table. Registering service and generating device function event create different types of resource on oneM2M side. For the detail mapping rules between structures of OSGi service and oneM2M resource, please refer to the oneM2M specification.

OSGi Device	oneM2M Resource
Register service	Create resource
Unregister service	Delete resource
Modify service property	Update resource
Generate device function event	Create resource

The interworking service is used to be detected by oneM2M CSE/AE, distinguished by the different pointOfAccess property. The operation doExecute is called when oneM2M CSE/AE needs to retarget requests to the address specified in property pointOfAccess.

```

public interface InterworkingService {

    public static final String POINT_OF_ACCESS = "onem2m.resource.poa";

    public ResponsePrimitiveDTO doExecute(RequestPrimitiveDTO request);
}

```


6 Data Transfer Objects

RFC 185 defines Data Transfer Objects as a generic means for management solutions to interact with runtime entities in an OSGi Framework. DTOs provides a common, easily serializable representation of the technology.

For all new functionality added to the OSGi Framework the question should be asked: would this feature benefit from a DTO? The expectation is that in most cases it would.

The DTOs for the design in this RFC should be described here and if there are no DTOs being defined an explanation should be given explaining why this is not applicable in this case.

This section is optional and could also be provided in a separate RFC.

7 Javadoc

Please include Javadoc of any new APIs here, once the design has matured. Instructions on how to export Javadoc for inclusion in the RFC can be found here: <https://www.osgi.org/members/RFC/Javadoc>

8 Considered Alternatives

For posterity, record the design alternatives that were considered but rejected along with the reason for rejection. This is especially important for external/earlier solutions that were deemed not applicable.

9 Security Considerations

Description of all known vulnerabilities this may either introduce or address as well as scenarios of how the weaknesses could be circumvented.

10 Document Support

10.1 References

- [1]. Bradner, S., Key words for use in RFCs to Indicate Requirement Levels, RFC2119, March 1997.
- [2]. Software Requirements & Specifications. Michael Jackson. ISBN 0-201-87712-0
- [3]. oneM2M Release 2 specifications, TS 0001 Functional Architecture v2.10.0

*Add references simply by adding new items. You can then cross-refer to them by choosing <Insert><Cross Reference><Numbered Item> and then selecting the paragraph. **STATIC REFERENCES (I.E. BODGED) ARE NOT ACCEPTABLE, SOMEONE WILL HAVE TO UPDATE THEM LATER, SO DO IT PROPERLY NOW.***

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