Management Interface for M2M Requirements

Candidate Version 1.0 – 25 Nov 2014

Open Mobile Alliance

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1. Scope (Informative)

This technical report defines requirements for an interface from Device Management (DM) server to the Machine to Machine (M2M) systems on top. This Northbound Interface (NBI) allows M2M service layer to access the DM server functionality. These requirements are derived from device and service management use cases.

2. References

2.1 Normative References

[oneM2MRequirements]	Reference oneM2M-TS-0002-Requirements-V0_6_2 URL:http://www.onem2m.org
[RFC2119]	"Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997, URL:http://www.ietf.org/rfc/rfc2119.txt

2.2 Informative References

[OMADICT]	"Dictionary for OMA Specifications", Version x.y, Open Mobile Alliance™, OMA-ORG-Dictionary-Vx_y, URL:http://www.openmobilealliance.org/
[oneM2M UseCases]	Reference oneM2M-TR-0001-UseCase-V0_0_5 URL:http://member.onem2m.org/Application/documentapp/downloadLatestRevision/?docId=673

3. Terminology and Conventions

3.1 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except “Scope” and “Introduction”, are normative, unless they are explicitly indicated to be informative.

3.2 Definitions

Kindly consult [OMADICT] for more abbreviations used in this document.

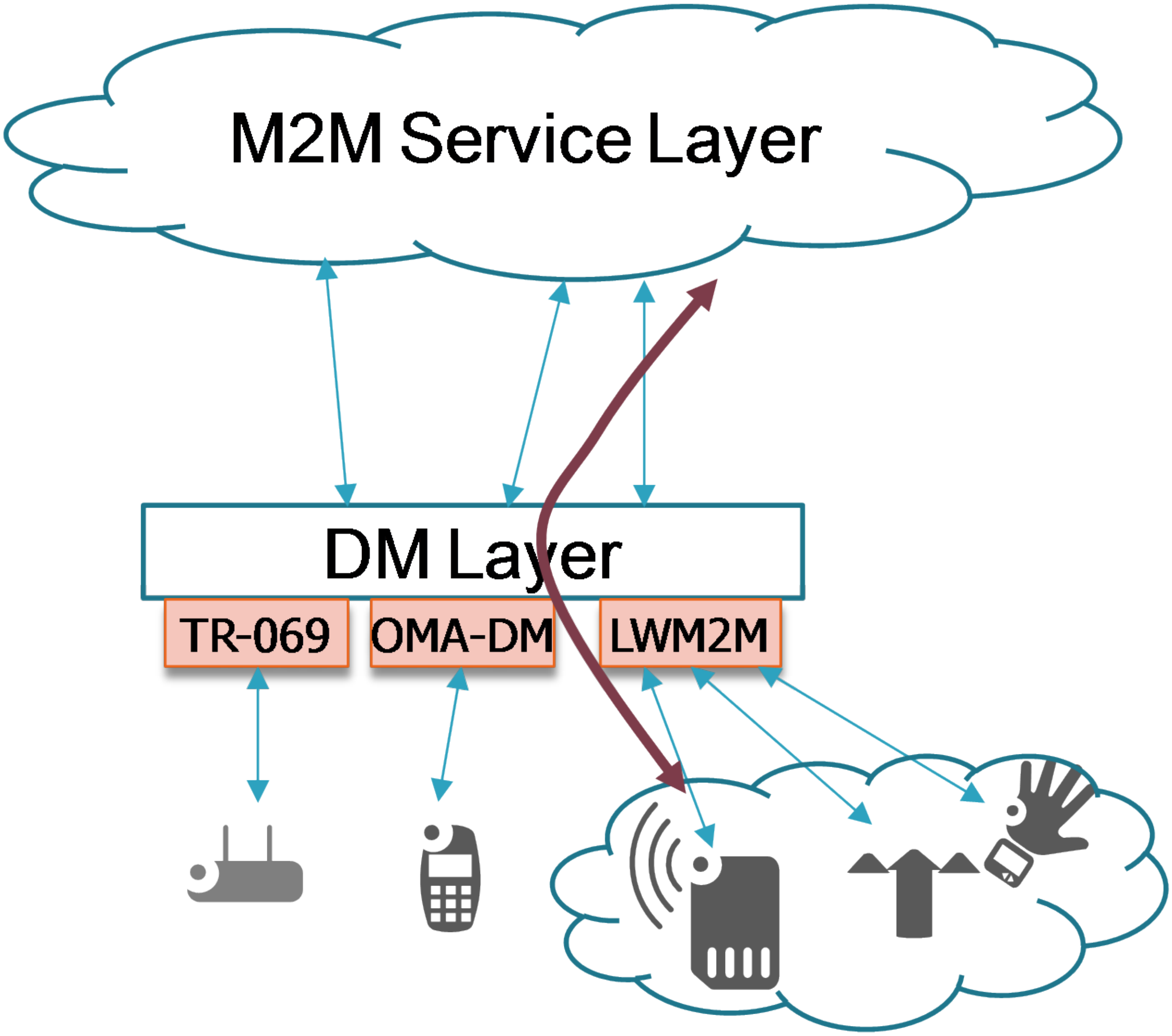
3.3 Abbreviations

LWM2M	Lightweight Machine to Machine (refers to this OMA enabler)
OMA	Open Mobile Alliance

Kindly consult [OMADICT] for more abbreviations used in this document.

4. Introduction (Informative)

M2M Service layer is establishing practices which utilize device management functionality provided by the DM layer. In order to effectively use the device management functionality of the DM layer, an interface between the M2M Service layer and DM layer needs to be specified.



4.1 Version 1.0

Version 1.0 of M2M interface RD provides the requirements basic functionalities interconnecting M2M service layer to Device Management Layer and covers the following

- Security
- Session Establishment
- Session Operations
- Events
- Resource Discovery

5. M2M Interface R1.0

Relationship between oneM2M, OMA DM, OMA LWM2M handling entities

Origin	High Level Entity	Next Sub-level Entity	Next Sub-level Entity
OMA DM	Device	Objects	Attributes
OMA LWM2M	Device	Objects	Resources
oneM2M	Node	Resources	Attributes

Note all references used in the requirements of this document relates to the OMA rows of terminology as per above table.

5.1 End-to-end Service Description

The M2M evolution is bringing multiple use case scenarios into the telecom domain. In terms of the operational actions it provides more challenges with existing as well as new use cases which are being brought in. The following is a use case prescription from oneM2M (Reference [oneM2M UseCases])

Industry Segment	oneM2M Use Cases							
Agriculture								
Energy	Wide area Energy related measurement /control system for advanced transmission and distribution automation	Analytics for oneM2M	Smart Meter Reading	Environmental Monitoring for Hydro-Power Generation using Satellite M2M	Oil and Gas Pipeline Cellular /Satellite Gateway			
Enterprise	Smart building							
Finance								
Healthcare	M2M Healthcare Gateway	Wellness services	Secure remote patient care and monitoring					
Industrial								
Public Services	Street Light Automation	Devices, Virtual devices and Things	Car/Bicycle Sharing Services	Smart parking	Information Delivery service in the devastated area			
Residential	Home Energy Management	Home Energy Management System	Plug-In Electrical Charging Vehicles and power feed in home scenario	Real-time Audio/Video Communication	Event Triggered Task Execution	Semantic Home Control	Semantic Device Plug and Play	
Retail								

Industry Segment	oneM2M Use Cases							
Transportation	Vehicle Diagnostic & Maintenance Report	Remote Maintenance services	Neighbourhood Alerting on Traffic Accident	Fleet management service using Digital Tachograph				
Other	Extending the M2M Access Network using Satellites	M2M data traffic management by underlying network operator	Optimizing connectivity management parameters with mobile networks	Optimizing mobility management parameters with mobile networks	Sleepy nodes	Collection of M2M system data	Leveraging Broadcasting/ Multicasting Capability of Underlying Networks	Service Provisioning for Equipment with Built-in Device

Table 1: Use Cases from oneM2M

In order to ensure the Device Management layer is succeeding in the new environment, it is essential to interface the M2M towards Device Management and vice versa. The M2M Interface enabler would add ability to OMA, in order to establish capabilities for providing a natural path of progression for existing Device Management layer.

6. Requirements (Normative)

6.1 High-Level Functional Requirements

The requirements for this section are derived from [oneM2MRequirements] section 6.1

Label	Description	Release
M2Mi-HLF-001	The M2M Interface Enabler SHALL provide the capability for the M2M Service Layer to establish a session between the M2M Service Layer and the Device Management Server.	
M2Mi-HLF-002	The M2M Interface Enabler SHALL provide the capability for the Device Management Server to establish a session between the M2M Service Layer and the Device Management Server.	
M2Mi-HLF-003	The M2M Interface Enabler SHALL provide the capability allow M2M Service Layer to manage objects on Devices using the Device Management Server's interfaces.	
M2Mi-HLF-004	The M2M Interface Enabler SHALL provide the capability to allow the M2M Service Layer to perform group based actions using the Device Management Server's interfaces. Refer use cases sections like Energy, Enterprise, Public Service etc.,. in [oneM2Musecases]	

Table 2: High-Level Functional Requirements

6.1.1 Security

The requirements for this section are derived from [oneM2MRequirements] section 6.4

Label	Description	Release
M2Mi-SEC-001	The M2M Interface Enabler SHALL ensure confidentiality of data in a session between the M2M Service Layer and the Device Management Server.	
M2Mi-SEC-002	The M2M Interface Enabler SHALL ensure integrity of data in a session between the M2M Service Layer and the Device Management Server.	
M2Mi-SEC-003	The M2M Interface Enabler SHALL ensure protection mechanisms against security threats, in a session between the M2M Service Layer and the Device Management Server.	
M2Mi-SEC-004	The M2M Interface Enabler SHALL ensure authenticity of data in a session between the M2M Service Layer and the Device Management Server.	
M2Mi-SEC-005	The M2M Interface Enabler SHALL allow the Device Management Server to perform granular authorization of Session Operations initiated by the M2M Service Layer - i.e. the M2M Service Layer can be authorized to make only certain operations on the Device Management Server, based on the resources affected by each operation	

Table 3: High-Level Functional Requirements – Security Items

6.1.2 Session Establishment

The requirements for this section are derived from [oneM2MRequirements] section 6.1

Label	Description	Release
M2Mi-SSE-001	The M2M Interface Enabler SHALL support the capability to allow M2M Service Layer and the Device Management Server to authenticate each other.	
M2Mi-SSE-002	The M2M Interface Enabler SHALL support the capability to have multiple sessions in parallel running between M2M Service Layer and the Device Management Server.	
M2Mi-SSE-003	The M2M Interface Enabler SHALL support the capability to manage session connectivity between M2M Service Layer and the Device Management Server.	

M2Mi-SSE-004	The M2M Interface Enabler SHALL specify retry policies (i.e., periodic contact establishment (schedule), upon event detection with time window) on interactions from Device Management Server to the M2M Service Layer	

Table 4: High-Level Functional Requirements – Session Establishment

6.1.3 Session Operations

The requirements for this section are derived from [oneM2MRequirements] section 6.1

Label	Description	Release
M2Mi-SSO-001	The M2M Interface Enabler SHALL support the capability for M2M Service layer to perform pass-through management operations on devices managed by Device Management Server.	
M2Mi-SSO-002	The M2M Interface Enabler SHALL be capable of defining mechanisms to support triggering of immediate operations to device for requests received from the M2M Service Layer. If the device is not available the Device Management Server SHALL return an appropriate error code.	
M2Mi-SSO-003	The M2M Interface Enabler SHALL be capable of allowing the M2M Service Layer to indicate request treatment policies for delivery of operations to the device. These policies SHALL include: Retry policy, Request Time out.	
M2Mi-SSO-004	The M2M Interface Enabler SHALL ensure that the M2M Service Layer is authorized to perform interactions with objects on a device by utilizing the security mechanisms provided by the Device Management Server to authorize access, to its objects.	
M2Mi-SSO-005	The M2M Interface Enabler SHALL support a session between M2M Service Layer and the Device Management Server which translates into operations on multiple devices	
M2Mi-SSO-006	The M2M Interface Enabler SHALL support multiple sessions between M2M Service Layer and the Device Management Server which would translate towards operations on one device	

Table 5: High-Level Functional Requirements – Session Operations

6.1.4 Events

The requirements for this section are derived from [oneM2MRequirements] section 6.1

Label	Description	Release
M2Mi-EVE-001	The M2M Interface Enabler SHALL allow the M2M Service Layer to subscribe and unsubscribe to changes in the values of one or more defined attributes/resources of the devices managed by the Device Management Server.	
M2Mi-EVE-002	The M2M Interface Enabler SHALL allow the M2M Service Layer to subscribe to events within the Device Management Server.	
M2Mi-EVE-003	The M2M Interface Enabler SHALL provide the capability deliver events to subscribed M2M Service Layer systems.	
M2Mi-EVE-004	The M2M Interface Enabler SHALL allow the M2M Service Layer to request events based on event filters including: Event Code; Specific parameters changing value; Device; Any combination of the previous criteria.	
M2Mi-EVE-005	The M2M Interface Enabler SHALL be capable of allowing the M2M Service Layer to retrieve a list of events emitted by the devices that are managed by the Device Management Server.	
M2Mi-EVE-006	The M2M Interface Enabler SHALL be capable of allowing the M2M Service Layer to retrieve a list of events emitted by the Device Management Server.	

Table 6: High-Level Functional Requirements – Events

6.1.5 Resource Discovery

The requirements for this section are derived from [oneM2MRequirements] section 6.1

Label	Description	Release
M2Mi-RED-001	The M2M Interface Enabler SHALL be capable of allowing the M2M Service Layer to discover devices that are managed by the Device Management Server.	
M2Mi-RED-002	The M2M Interface Enabler SHALL be capable of allowing the M2M Service Layer to discover the metadata related to the objects of devices that are managed by the Device Management Server.	
M2Mi-RED-003	The M2M Interface Enabler SHALL allow M2M Service Layer to perform bulk discovery of devices and related objects' metadata from Device Management Server	

Table 7: High-Level Functional Requirements – Resource Discovery

Appendix A. Change History (Informative)

A.1 Approved Version History

Reference	Date	Description
n/a	n/a	No prior version

A.2 Draft/Candidate Version 1.0 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-RD-M2MInterface-V1_0	10 Jan 2014	n/a	RD creation
	15 Jan 2014	4	Introduction to the RD
	24 Jan 2014	6	Updated the requirements Incorporated CR: OMA-DM-M2MInterface-2014-0003R01-CR_Requirements_addition
	14 Feb 2014	5,6	Updated end-to-end description, added new requirements Incorporated CR: OMA-DM-M2MInterface-2014-0004R01-CR_Requirements_addition2
	28 Feb 2014	2.2, 6	Updated references in individual section , URL entry in reference Incorporated CR: OMA-DM-M2MInterface-2014-0005R02-CR_reference_addition
	09 Sep 2014	5 & 6	Updated the comment from oneM2M on resource explanation in the requirements produced in this document Incorporated CR: OMA-DM-M2MInterface-2014-0007-CR_oneM2M_comments
	29 Oct 2014	n/a	Treatment of CONR comments agreed in the last meeting Incorporated CR: OMA-DM-M2MInterface-2014-0009-CR_CONR_treatement
	11 Nov 2014	n/a	To add cb version in the final document
Candidate Version OMA-RD-M2MInterface-V1_0	25 Nov 2014	n/a	Status changed to Candidate by TP TP Ref # OMA-TP-2014-0265-INP_Management_Interface_for_M2M_V1_0_RRP_for_Candidate_Approval

Appendix B. Use Cases (Informative)

Refer [oneM2M UseCases]