Lightweight M2M – Binary App Data Container

Candidate Version 1.0 – 05 Dec 2017

Open Mobile Alliance

OMA-TS-LWM2M_BinaryAppDataContainer-V1_0-20171205-C

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1. Scope

This document defines an Object to be used to transfer Application Data with the Lightweight M2M enabler in order to manage application service data on the device.

2. References

2.1 Normative References

[RFC2119] "Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997, URL:http://www.ietf.org/rfc/rfc2119.txt

[RFC4234] "Augmented BNF for Syntax Specifications: ABNF". D. Crocker, Ed., P. Overell. October 2005, URL:http://www.ietf.org/rfc/rfc4234.txt

[SCRRULES] "SCR Rules and Procedures", Open Mobile Alliance™, OMA-ORG-SCR_Rules_and_Procedures, URL:http://www.openmobilealliance.org/

2.2 Informative References

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

BinaryAppDataCont	Application Data Container

3.3 Abbreviations

OMA	Open Mobile Alliance
PDN	Packet data network
PS	Packet switched

4. Introduction

LwM2M is designed to support both device management (DM) and service enablement (SE). OMA only specify LwM2M objects for DM, while external organizations may specify and register LwM2M objects for SE (e.g. IPSO objects). However, domain specific applications/devices (e.g. water meter) may not want to expose their data models as LwM2M objects due to security concern or integration cost with legacy systems. Instead, an opaque data blob transfer is often used.

Current practices rely on vendor-specific extension of LwM2M objects to solve the problem above, and this is a well-supported feature of LwM2M's tooling and infrastructure But for the support of legacy systems, or where the formatting of data is to remain opaque, it is desirable to define a standardized, generic means to transfer application-specific data using LwM2M protocol. Please note that this object should ONLY be used in those circumstances where the use of an existing or proprietary LwM2M object is unacceptable.

5. Application Data Container Use cases

5.1 Architecture

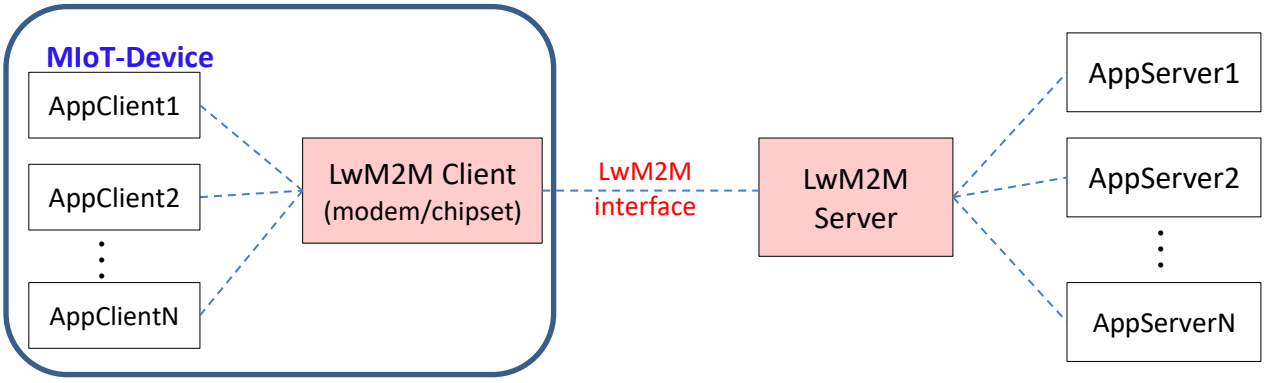

Figure 1: Application data transfer by LwM2M architecture

It is desirable to use a standardized, generic means to transfer application-specific data by LwM2M protocol which supports transferring service data transparently between Application Client and Application Server.

LwM2M Client can communicate with Application client by AT command or API interface. LwM2M Server can communicate with Application Server by standard interface. Both interfaces are out of scope of LwM2M specification.

5.2 LwM2M Client Reports Application Data

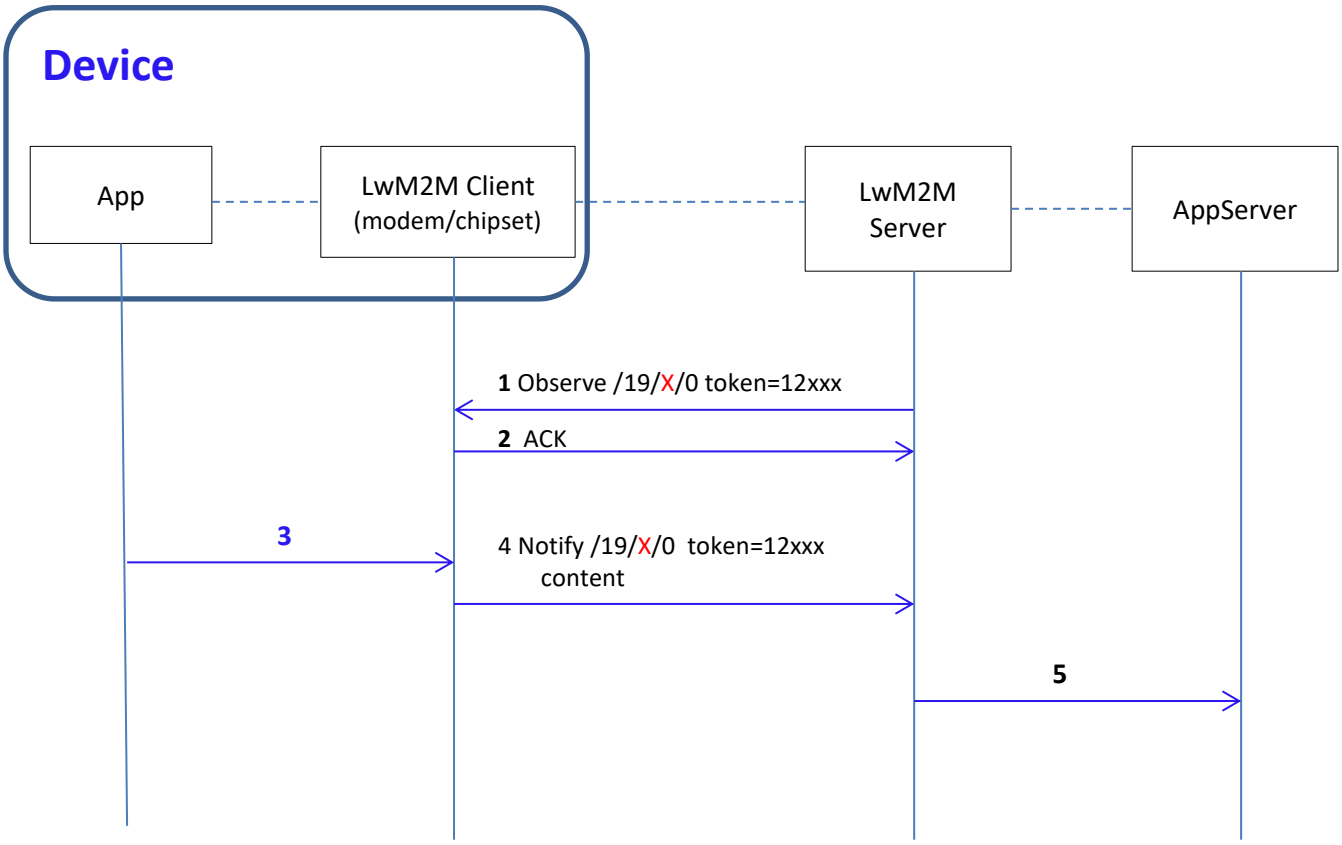

Figure 2: LwM2M Client Reports Application Data

Figure 2 shows an example exchange where the Client reports an Application Data.

Step 1: The LwM2M Server sends the Observe request to LwM2M Client by instant X of Object 19. The instant number is specified in section 6.

Step 2: The LwM2M Client sends the ACK to the server.

Step 3: The Application Client sends the application data to LwM2M Client.

Note: The interface of Step 3 between application client and LwM2M Client is out of the scope of LwM2M specification, eg, AT command or API.

Step 4: The LwM2M Client sends the Notify message to the LwM2M Server.

Step 5: The LwM2M Server sends the application data the Application Server.

Note: The interface of Step 5 between application server and LwM2M server is out of the scope of LwM2M specification, eg, API.

5.3 LwM2M Server Sends Application Data

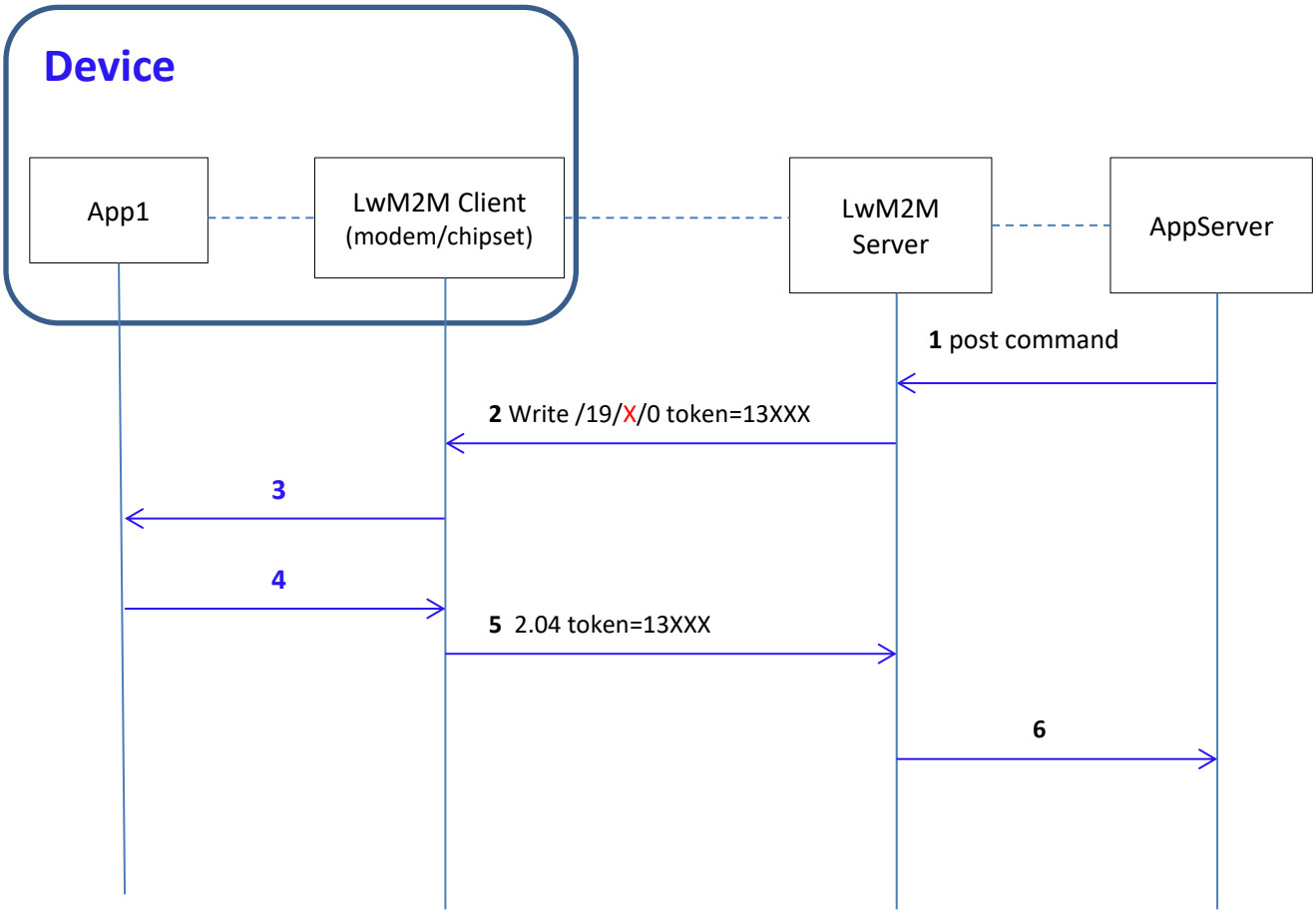

Figure 3: LwM2M Server Sends the Application Data

Figure 3 shows an example exchange where the Server sends an Application Data message to the Client, eg, “TURN ON” command.

Step 1: The Application Server sends the message to LwM2M Server.

Note: The interface of Step 1 between application server and LwM2M server is out of the scope of LwM2M specification, eg, API.

Step 2: The LwM2M Server sends the Write request to LwM2M Client by instant X of Object 19. The instant number is specified in section 6.

Step 3: The LwM2M Client sends the data to the Application Client.

Step 4: The Application Client sends the application data to LwM2M Client.

Note: The interface of Step 3 and 4 between application client and LwM2M Client are out of the scope of LwM2M specification, eg, AT command or API.

Step 5: The LwM2M Client sends the response message to the LwM2M Server.

Step6: The LwM2M Server sends the application data the Application Server.

Note: The interface of Step 6 between application server and LwM2M server is out of the scope of LwM2M specification, eg, API.

6. LwM2M Object: Application Data Container

Description

This LwM2M Objects provides the application service data related to a LwM2M Server, eg. Water meter data.

There are several methods to create instance to indicate the message direction based on the negotiation between Application and LwM2M. The Client and Server should negotiate the instance(s) used to exchange the data. For example:

- Using a single instance for both directions communication, from Client to Server and from Server to Client.
- Using an instance for communication from Client to Server and another one for communication from Server to Client
- Using several instances

Object definition

Name	Object ID	Instances	Mandatory	Object URN
BinaryAppDataContainer	19	Multiple	Optional	urn:oma:lwm2m:oma:19:1.0

Resource definitions

ID	Name	Operations	Instances	Mandatory	Type	Range or Enumeration	Units	Description
0	Data	RW	Multiple	Mandatory	Opaque			Indicates the application data content
1	Data Priority	RW	Single	Optional	Integer	1 bytes		Indicates the Application data priority: 0:Immediate 1:BestEffort 2:Latest 3-100: Reserved for future use. 101-254: Proprietary mode.
2	Data Creation Time	RW	Single	Optional	Time			Indicates the object instance creation timestamp.
3	Data Description	RW	Single	Optional	String	32 bytes		Indicates the data description. e.g. "meter reading"
4	Data Format	RW	Single	Optional	String	32 bytes		Indicates the format of the Application Data. e.g. YG-Meter-Water-Reading UTF8-string
5	App ID	RW	Single	Optional	Integer	2 bytes		Indicates the destination Application ID.

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 Version OMA-TS-LWM2M_BinaryAppDataContainer-V1_0	28 Aug 2017	All	First draft
Candidate Version OMA-TS-LWM2M_BinaryAppDataContainer-V1_0	05 Dec 2017	n/a	Status changed to Candidate by TP TP Ref # OMA-TP-2017-0052-INP_LwM2M__APPDATA-V1_0_ERP_for_1st_Candidate_Approval

Appendix B. Example LwM2M Client (Informative)

Instance 0 is used to send application data from LwM2M client to LwM2M server. Instance 1 is used to send application data from LwM2M server to LwM2M client.

Object	Object ID	Object Instance ID
BinaryAppDataContainer Object[0]	19	0
BinaryAppDataContainer Object[1]	19	1

Table 1: Object Instances of the example

Resource Name	Resource ID	Resource Instance ID	Value	Notes
Data	0	0	InNlcnZpY2VJZCI6Ik1ldGVyIiwNCiJzZXJ2aWNlRGF0YSI6ew0KImN1cnJlbnRSZWFkaW5nIjoiNDYuMyIsDQoic2lnbmFsU3RyZW5ndGgiOjE2LA0KImRhaWx5QWN0aXZpdHlUaW1lIjo1NzA2DQo=	**In this example, the Message Data is an encoded version of data for a water meter reading, including:** • **Current reading** • **Signal strength** • **temperature**
Data Priority	1		0	
DataCreation Time	2		1367491215	May 2nd, 2013 at 11:42 AM GMT
Data Description	3		"MeterReading"	

Table 2: BinaryAppDataContainer Object Instance [0]

Resource Name	Resource ID	Resource Instance ID	Value	Notes
Data	1	0	InNlcnZpY2VJZCI6IldhdGVyTWV0ZXIiLA0KImNtZCI6IlNFVF9URU1QRVJBVFVSRV9SRUFEX1BFUklPRCIsDQoicGFyYXMiOnsNCiJ2YWx1ZSI6NA0KICAgIH0sDQoNCg0K	**In this example, the Message Data is an encoded version of data for a water meter reading, including:** • **Command ("Set Temperature Read Period")** • **Parameters associated with the command**
Data Priority	2		1	
DataCreation Time	3		1367491215	May 2nd, 2013 at 11:42 AM GMT
Data Description	4		"ReadPeriodSet"	

Table 3: BinaryAppDataContainer Object Instance [1]