



Lightweight M2M – Event Log Object (LwM2M Object – EventLog)

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Open Mobile Alliance

OMA-TS-LWM2M_EventLog-V2_1-20240123-A

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1. Scope

This document defines a set of Objects to be used in conjunction with the Lightweight M2M enabler in order to interact with event logs within a device.

The LwM2M object provides a standardised interface to query logs within a device. The actual implementation of the underlying log functionality is outside the scope of this TS.

2. References

2.1. Normative References

[3GPP-TS_23.203]	"3GPP TS 23.203 "Policy and charging control architecture", URL: http://www.3gpp.org
[BCP 14]	"Key words for use in RFCs to Indicate Requirement Levels", B. Leiba, May 2017, URL: https://www.rfc-editor.org/info/bcp14
[RFC2119]	"Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997, URL: https://www.rfc-editor.org/rfc/rfc2119.txt
[RFC8174]	"Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", B. Leiba, May 2017, URL: https://www.rfc-editor.org/rfc/rfc8174.txt

Table: 2.1.-1 Normative References

2.2. Informative References

[3GPP-TS_21.905]	3GPP TS "3GPP Vocabulary", URL: http://www.3gpp.org
[OMADICT]	"Dictionary for OMA Specifications", Open Mobile Alliance, OMA-ORG-Dictionary-V2_9, URL: http://www.openmobilealliance.org/

Table: 2.2.-1 Informative References

3. Terminology and Conventions

3.1. 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 BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

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

3.2. Definitions

LTE	WB-E-UTRAN as defined in [3GPP-TS_23.401].
NB-IoT	NarrowBand IoT is a subset of E-UTRAN.

Table: 3.2.-1 Definitions

See also [3GPP-TS_21.905] for 3GPP-specific definitions.

3.3. Abbreviations

AS	Application Server
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Table: 3.3.-1 Abbreviations

See also [3GPP-TS_21.905] for 3GPP-specific abbreviations.

4. Introduction

This specification enables the transfer of log information from a device to an LwM2M server.

4.1. Version 1.0

V1.0 of the specification covers:

1. Communication of generic log information

4.1.1. Version 1.0.1

4.2. Version 2.0

4.3. Version 2.1

5. Use cases

5.1. Controlling the recording of log data

This uses the LogStart/Stop resource, 4011/4012

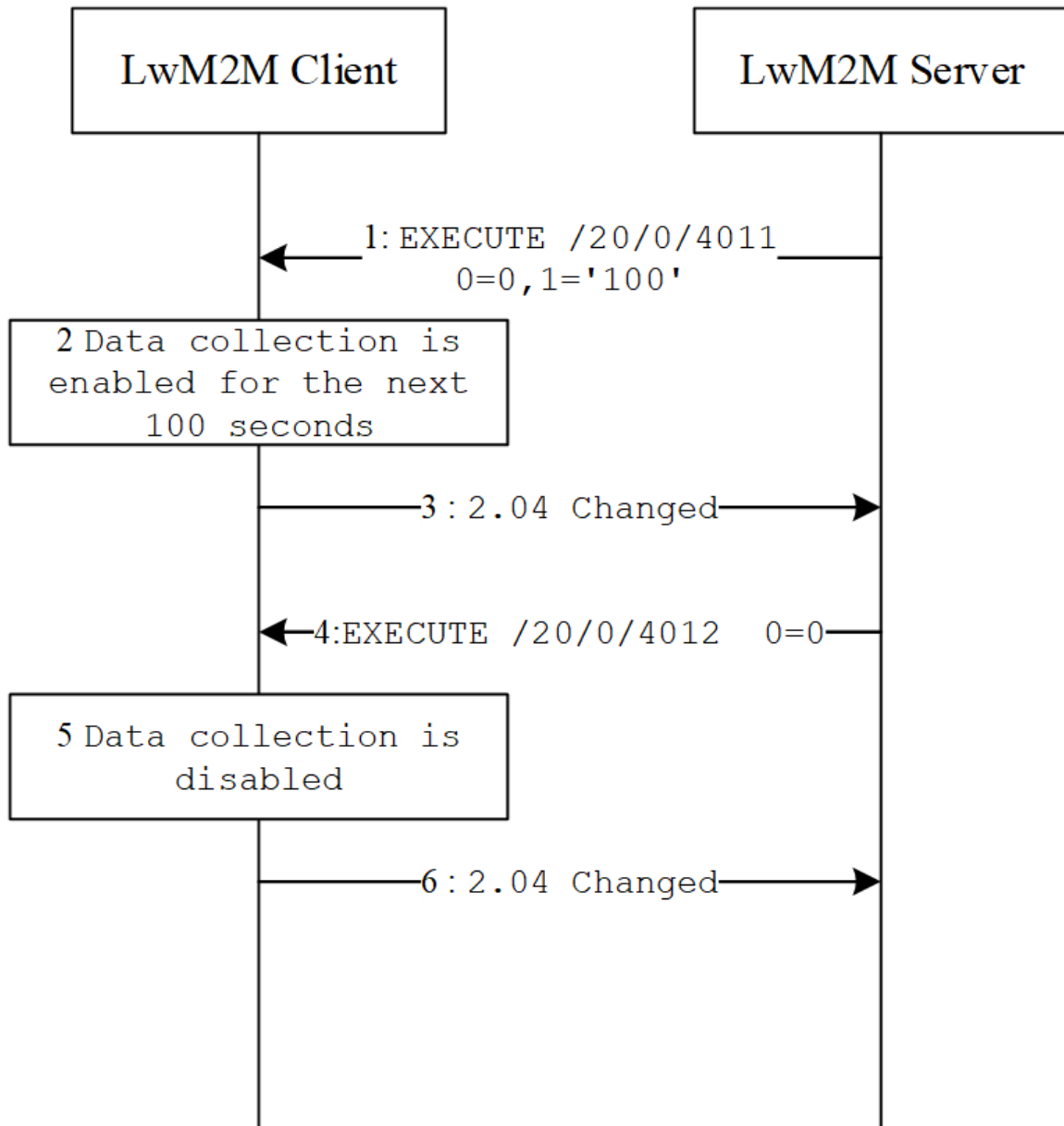


Figure: 5.1.-1 Controlling the recording of log data procedure

- The LwM2M Server sends an EXECUTE command to the LwM2M Client on the device specifying
 - the IDs of the Log Object and its instance (`/20/0`),
 - the Log Start Resource ID (`4011`) to indicate to start the Data Collection logging process and

- the payload containing the arguments of the EXECUTE command : namely argument 1 for indicating a Data Collection Period of 100s is requested, and argument 0 (which could be omitted) for indicating that the logging process is started with a virgin Data Collection
2. The LwM2M Client enables log data collection for the next 100 seconds
 3. The LwM2M Client sends successful response to LwM2M Server.
 4. The LwM2M Server sends an EXECUTE command to the LwM2M Client on the device specifying
 - the IDs of the Log Object and its Instance (20/0),
 - the Log Start Resource ID (4012) to indicate to stop the Data Collection logging process and
 - the payload containing the argument 0 (which could be omitted here) of the EXECUTE command for indicating that Data Collection is preserved when the logging process is stopped
 5. The LwM2M Client disable log data collection
 6. The LwM2M Client sends successful response to LwM2M Server.

5.2. Reporting the logging status

This uses the LogStatus resource 4013. The LogStatus could be reported either by a READ from the LwM2M Server or NOTIFICATION from the LwM2M Client. This use case introduces the READ for example.

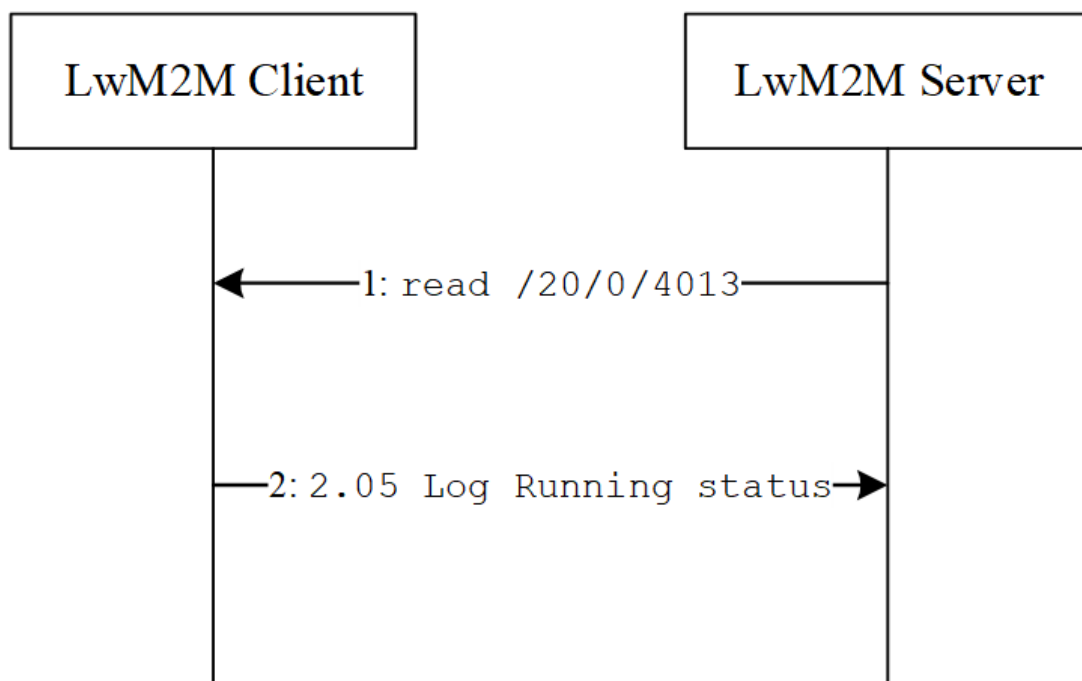


Figure: 5.2.-1 Reporting the logging status procedure

1. The LwM2M Server sends a read request to the LwM2M Client running on the device specifying
 - the IDs of the Log Object and its instance (/20/0),
 - the LogStatus Resource ID 4013 to indicate to get the log status information.
2. The LwM2M Client returns the log running status to the LwM2M server

5.3. Collecting the log data

This uses the LogData resource, 4014

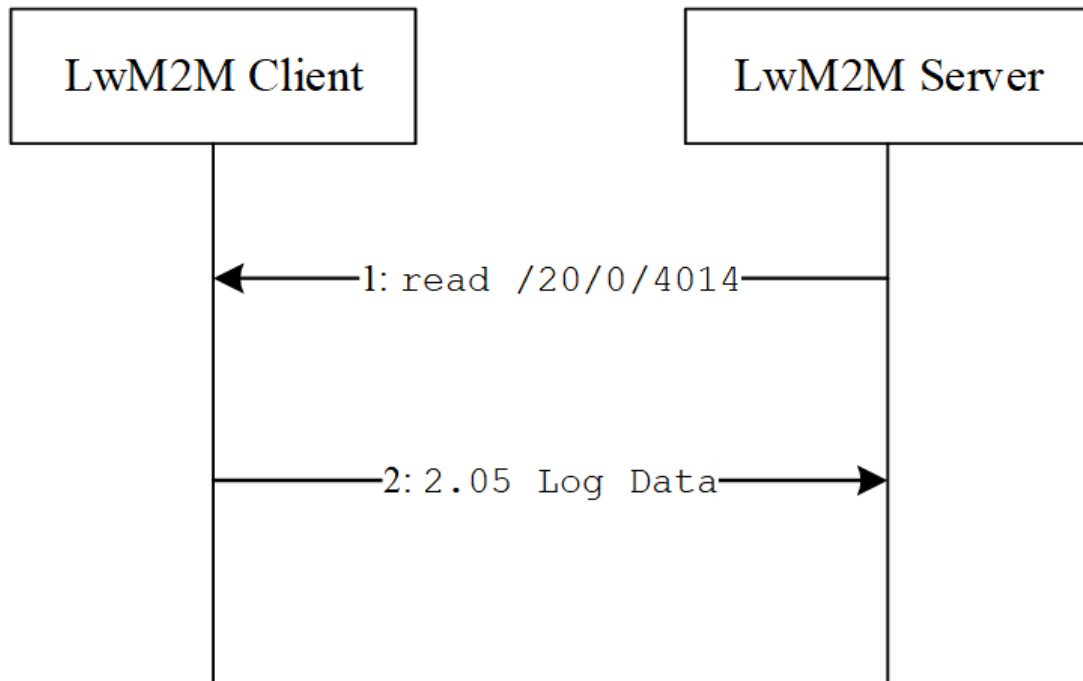


Figure: 5.3.-1 Collecting the log data procedure

1. The LwM2M Server sends a read request to the LwM2M Client running on the device specifying:
 - the IDs of the Log Object and its instance (/20/0),
 - the LogData Resource ID 4014 to indicate to get the log data information.
2. The LwM2M Client returns the log data to the LwM2M Server

5.4. Collecting the log data in real time

This uses the LogDataIncremental resource, 4016

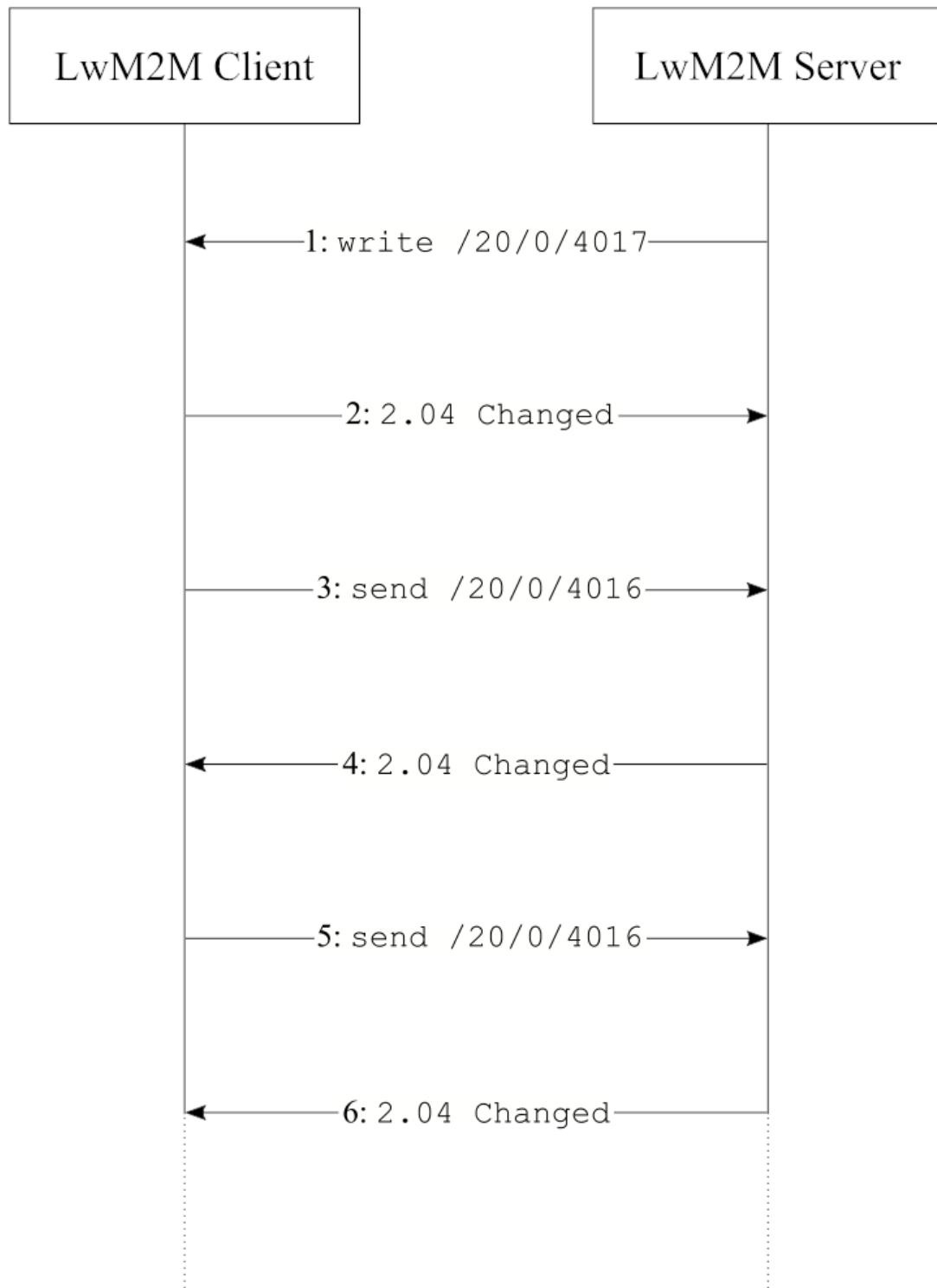


Figure: 5.4.-1 Collecting the log data in real time procedure

1. The LwM2M Server sends a write request to the LwM2M Client specifying:
 - the intended log collection interval (/20/0/4017).
2. The LwM2M Client sends response to the LwM2M Server with the changed result.

3. The LwM2M Client starts periodically sending log data information in LwM2M Send operation payloads.

5.5. Categorizing the log data

This uses the LogClass resource, 4010

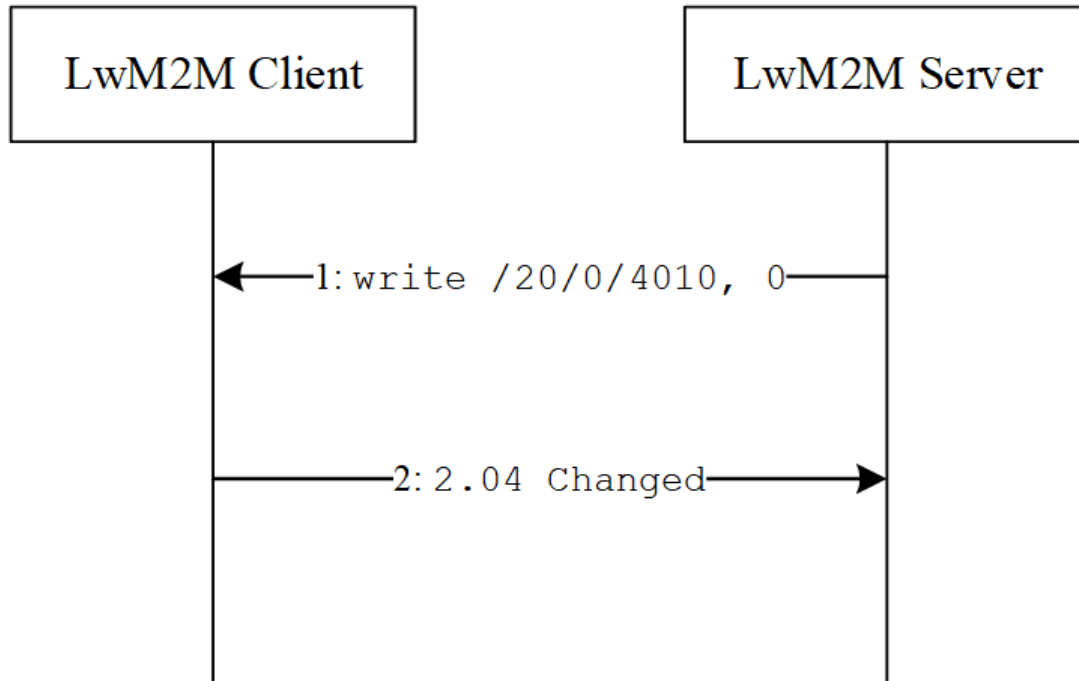


Figure: 5.5.-1 Categorizing the log data procedure

1. The LwM2M Server sends a write request to the LwM2M Client specifying:
 - the IDs of the Log Object and its instance (/20/0),
 - the Log Class Resource ID 4010 to indicate to set the log class information,
 - the payload containing the argument 0 of the EXECUTE command for indicating that only generic log class should be collected.
2. The LwM2M Client sends response to the LwM2M Server with the changed result.

6. LwM2M Object: Event Log

Description

The Event Log Object is a multiple Instances Object defined for logging data in a straightforward and generic way. The Resources of that Object are based on the OMA LwM2M set of reusable Resources dedicated to logging event activity.

Object definition

Name	Object ID	Object Version	LWM2M Version
Event Log	20	2.1	1.1
Object URN		Instances	Mandatory
urn:oma:lwm2m:oma:20:2.1		Multiple	Optional

Table: 6.-1 LwM2M Object: Event Log object definition

Resource definitions

ID	Name	Operations	Instances	Mandatory	Type	Range or Enumeration	Units	Description
4010	LogClass	RW	Single	Optional	Integer	255		Define the Log Event Class: 0: generic (default) 1: system 2: security 3: event 4: trace 5: panic 6: charging [7-99]: reserved [100-255]: vendor specific
4011	LogStart	E	Single	Optional				Actions: a) Start data collection(DC) b) LogStatus is set to 0 (running) c) DC is emptied (default) or extended according arg'o' value Arguments definitions are described in the table below.

4012	LogStop	E	Single	Optional				Actions: a) Stop data collection(DC) b) 1st LSB of LogStatus is set to "1"(stopped) c) DC is kept (default) or emptied according arg'o' value Arguments definitions are described in the table below.
4013	LogStatus	R	Single	Optional	Integer	8-Bits		Data Collection process status: Each bit of this Resource Instance value defines specific status: 1st LSB 0=running, 1=stopped 2nd LSB 1=LogData contains Valid Data 0=LogData doesn't contain Valid Data 3rd LSB 1=Error occurred during Data Collection 0=No error [4th - 7th] LSB:reserved 8th LSB: vendor specific.
4014	LogData	R	Single	Mandatory	Opaque			Read Access on that Resource returns the Data Collection associated to the current Object Instance.

4015	LogDataFormat	RW	Single	Optional	Integer	255	<p>when set by the Server, this Resource indicates to the Client, what is the Server preferred data format to use when the LogData Resource is returned . when retrieved by the Server, this Resource indicates which specific data format is used when the LogData Resource is returned to the Server 0 or Resource not present : no specific data format (sequence of bytes) : : OMA-LwM2M TLV format 2 : OMA-LwM2M JSON format 3: OMA-LwM2M CBOR format [4..99] reserved [100..255] vendor specific data format</p>
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4016	LogDataIncremental		Single	Optional	Opaque		<p>Log data collected since the last Send operation described for the LogDataIncremental Minimum Send Interval resource, or since that interval has been set to a positive value if the first Send operation has not yet been performed. The data shall have the same format as the LogData resource, but its collection and emptying is independent from it and from the LogStart/LogStop logic. This resource may only be included in a Send operation payload. Attempting to access it via the Device Management and Service Enablement Interface shall result in generating the Method Not Allowed error.</p>
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4017	LogDataIncrementalMinimumSendInterval	RW	Single	Optional	Unsigned Integer	Minimum number of seconds between consecutive Send operations containing the LogDataIncremental resource. If this resource is zero or not present, then LogDataIncremental shall never be sent in a Send operation. If set to a positive number, a Send operation containing the LogDataIncremental resource shall be performed after the specified number of seconds since the previous one or when a new log information is generated, whichever happens later, and the data collection shall be atomically emptied upon successful delivery. If the LwM2M client is connected to multiple servers, this resource SHOULD be handled independently for each server.
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Table: 6.-2 LwM2M Object: Event Log Resource definitions

As an extension to the definition of resource 4013 (LogStatus), within the context of this Object starting with version 2.1, the 4th LSB, defined in the Resource Description as "reserved", shall mean: 1=LogDataIncremental collection active, 0=LogDataIncremental collection stopped.

7. Guidance on how to use the resource, the generic object

- Configuration phase: the LogClass is set, the OBSERVE on LogStatus is requested

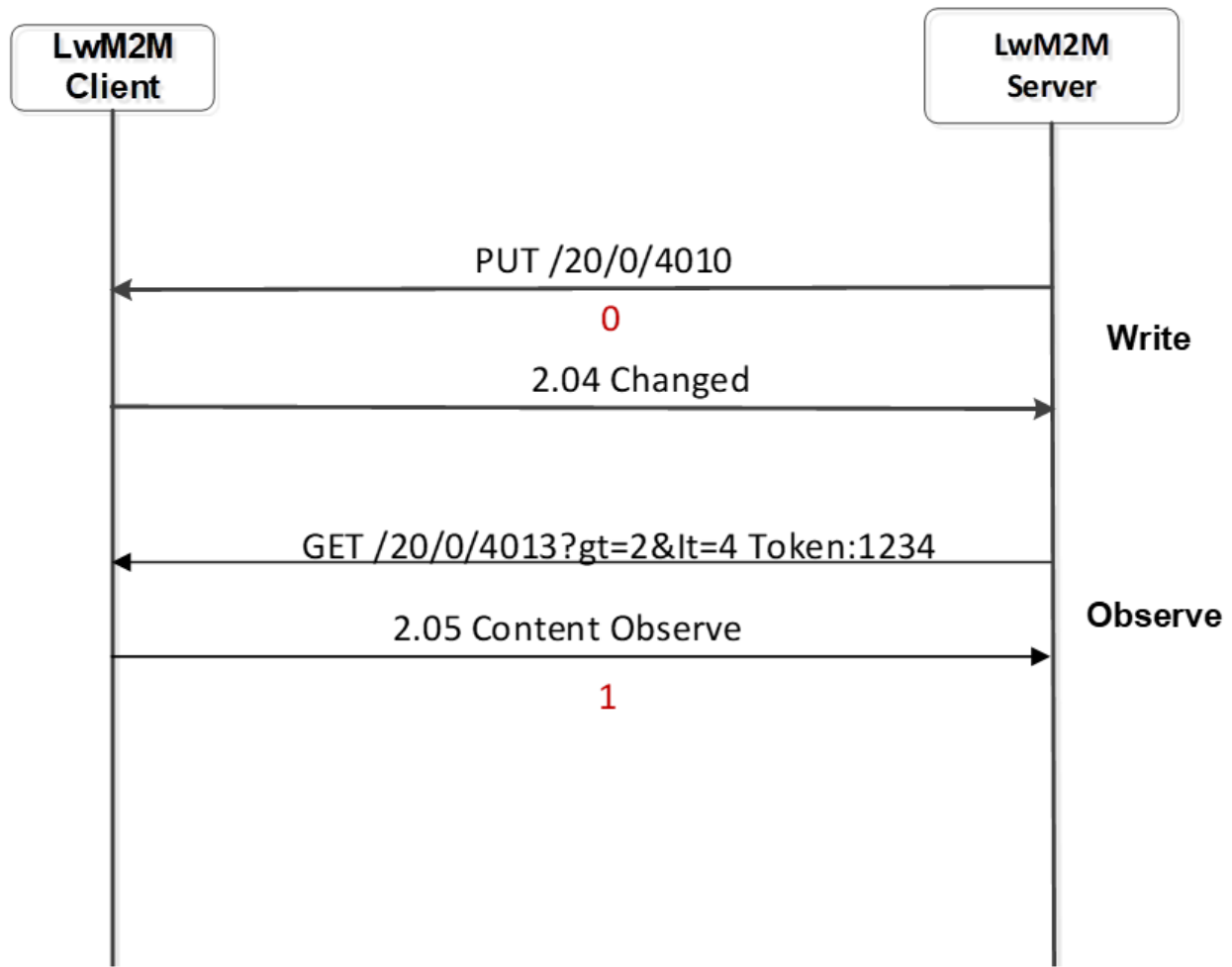


Figure: 7.-1 Data Collection Configuration sequence

- Active phase :
- The Data Collection process is started with a period of 5 minutes (300 sec)
- Some LogStatus notification take place for LwM2M Server Analysis
- When Data Collection logging ends (period expires), the LwM2M Server can retrieve the LogData information (the data format is pre-configured between the Client and the Server)

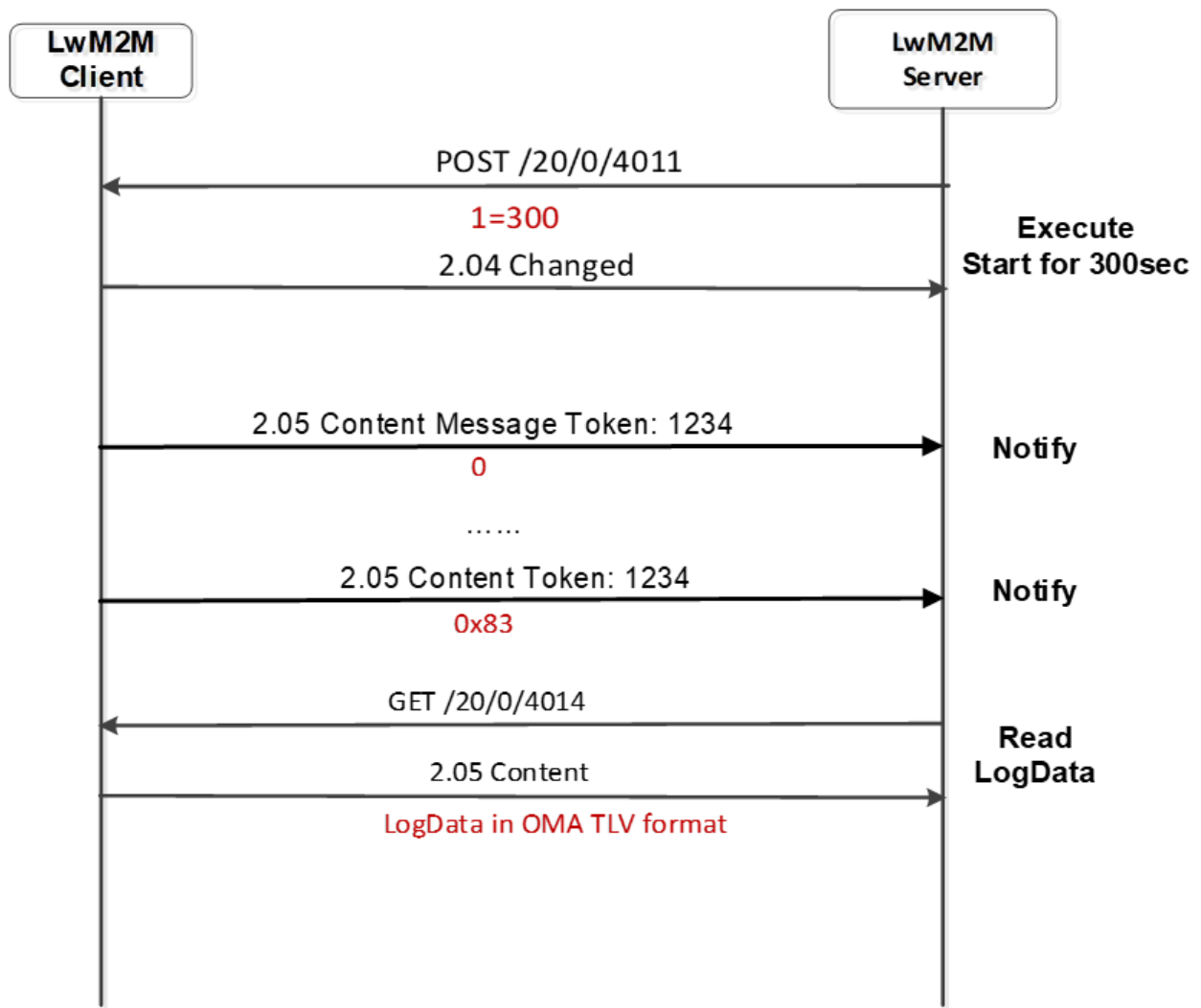


Figure: 7.-2 Data Collection Logging nominal sequence

Appendix A. Change History (Informative)

A.1 Approved Version History

Reference	Date	Description
OMA-TS-LwM2M_EventLog-V1_o-20180615-A	15 Jun 2018	Status changed to Approved by DM Doc Ref # OMA-DM&SE-2018-0060- INP_LWM2M_EventLog_V1_o_ERP_for_final_Approval
OMA-TS-LWM2M_EventLog-V1_o_1-20200616-A	16 Jun 2020	Status changed to Approved by DMSE WG DMSE WG Ref # OMA-DM&SE-2020-0020- INP_LwM2M_EventLog_V1_o_1_ERP_for_Final_Approval
OMA-TS-LWM2M_EventLog-V2_o-20230131-A	31 Jan 2023	Status changed to Approved by DMSE WG on 31 Jan 2023
OMA-TS-LWM2M_EventLog-V2_1-20240123-A	23 Jan 2024	Approved by DMSE WG on 23 Jan 2024, Ref: PR#12

Table: A.1-1 Approved Version History

Appendix B. Example objects and resources (Informative)

Object name	Object ID	Object Instance ID
Event Log Object	20	0

Table: B.-1 Object Instances of the Example

Resource Name	Resource ID	Resource Instance ID	Value	Notes
LogClass	4010		0	Generic log.
LogStatus	4013		1	The log status is stopped, LogData contains Valid Data and LogDataIncremental collection is active
LogData	4014		61-7C-E3-01-C1-11-00-00-05-00-60-18-18-18-0C-00-01-41-06-00-02-00-40-0C-00-00-00-00	4545> 2017/8/1 0:46:37.803 - NAS_DBG_TIMER: (00:00:31.685729): LAYER_NAS => LAYER_NAS: action: (TIMER_STOP), prim_id: (EMM_T3410_TIMER_EXPIRY_MSG), duration: 0x00 (0)
LogDataFormat	4015		1	OMA-LwM2M TLV format
LogDataIncremental	4016			Value of this resource is transient and only appears in LwM2M Send messages
LogDataIncrementalMinimumSendInterval	4017		120	LwM2M Send messages with incremental log messages are sent every two minutes

Table: B.-2 Event Log Object