



Gateway Management Object Architecture

Candidate Version 1.0 – 02 Nov 2010

Open Mobile Alliance

OMA-AD-GwMO-V1_0-20101102-C

Use of this document is subject to all of the terms and conditions of the Use Agreement located at <http://www.openmobilealliance.org/UseAgreement.html>.

Unless this document is clearly designated as an approved specification, this document is a work in process, is not an approved Open Mobile Alliance™ specification, and is subject to revision or removal without notice.

You may use this document or any part of the document for internal or educational purposes only, provided you do not modify, edit or take out of context the information in this document in any manner. Information contained in this document may be used, at your sole risk, for any purposes. You may not use this document in any other manner without the prior written permission of the Open Mobile Alliance. The Open Mobile Alliance authorizes you to copy this document, provided that you retain all copyright and other proprietary notices contained in the original materials on any copies of the materials and that you comply strictly with these terms. This copyright permission does not constitute an endorsement of the products or services. The Open Mobile Alliance assumes no responsibility for errors or omissions in this document.

Each Open Mobile Alliance member has agreed to use reasonable endeavors to inform the Open Mobile Alliance in a timely manner of Essential IPR as it becomes aware that the Essential IPR is related to the prepared or published specification. However, the members do not have an obligation to conduct IPR searches. The declared Essential IPR is publicly available to members and non-members of the Open Mobile Alliance and may be found on the “OMA IPR Declarations” list at <http://www.openmobilealliance.org/ipr.html>. The Open Mobile Alliance has not conducted an independent IPR review of this document and the information contained herein, and makes no representations or warranties regarding third party IPR, including without limitation patents, copyrights or trade secret rights. This document may contain inventions for which you must obtain licenses from third parties before making, using or selling the inventions. Defined terms above are set forth in the schedule to the Open Mobile Alliance Application Form.

NO REPRESENTATIONS OR WARRANTIES (WHETHER EXPRESS OR IMPLIED) ARE MADE BY THE OPEN MOBILE ALLIANCE OR ANY OPEN MOBILE ALLIANCE MEMBER OR ITS AFFILIATES REGARDING ANY OF THE IPR'S REPRESENTED ON THE “OMA IPR DECLARATIONS” LIST, INCLUDING, BUT NOT LIMITED TO THE ACCURACY, COMPLETENESS, VALIDITY OR RELEVANCE OF THE INFORMATION OR WHETHER OR NOT SUCH RIGHTS ARE ESSENTIAL OR NON-ESSENTIAL.

THE OPEN MOBILE ALLIANCE IS NOT LIABLE FOR AND HEREBY DISCLAIMS ANY DIRECT, INDIRECT, PUNITIVE, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES ARISING OUT OF OR IN CONNECTION WITH THE USE OF DOCUMENTS AND THE INFORMATION CONTAINED IN THE DOCUMENTS.

© 2010 Open Mobile Alliance Ltd. All Rights Reserved.

Used with the permission of the Open Mobile Alliance Ltd. under the terms set forth above.

Contents

1. SCOPE (INFORMATIVE)	4
2. REFERENCES	5
2.1 NORMATIVE REFERENCES	5
2.2 INFORMATIVE REFERENCES	5
3. TERMINOLOGY AND CONVENTIONS	6
3.1 CONVENTIONS	6
3.2 DEFINITIONS	6
3.3 ABBREVIATIONS	6
4. INTRODUCTION (INFORMATIVE)	7
4.1 VERSION 1.0	7
5. ARCHITECTURAL MODEL	8
5.1 DEPENDENCIES	8
5.2 ARCHITECTURAL DIAGRAM	8
5.2.1 Transparent mode	8
5.2.2 Proxy mode	8
5.2.3 Adaptation mode	9
5.3 FUNCTIONAL COMPONENTS AND INTERFACES/REFERENCE POINTS DEFINITION	9
5.3.1 Protocol Endpoints	9
5.3.2 Interfaces	10
5.4 SECURITY CONSIDERATIONS	10
APPENDIX A. CHANGE HISTORY (INFORMATIVE)	11
A.1 APPROVED VERSION HISTORY	11
A.2 DRAFT/CANDIDATE VERSION 1.0 HISTORY	11
APPENDIX B. GWMO DATA FLOW DIAGRAM (INFORMATIVE)	12

Figures

Figure 1: Transparent mode GwMO Architectural Diagram using interfaces	8
Figure 2: Proxy mode GwMO Architectural Diagram using interfaces	8
Figure 3: Adaptation mode GwMO Architectural Diagram using interfaces	9
Figure 4: GwMO Data Flow Diagram	12

1. Scope

(Informative)

The scope of the Gateway Management Object architecture document is to define the architecture for the DM Gateway Management Object v1.0 enabler. This document fulfils the functional capabilities and information flows needed to support this enabler as described in the Gateway Management Object requirements document [GwMO-RD].

2. References

2.1 Normative References

- [GwMO-RD] “Gateway Management Object Requirements”, Open Mobile Alliance™, OMA-RD-GwMO-V1_0,
URL:<http://www.openmobilealliance.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

- [DM-DICT] “Device Management Dictionary”, Version 1.0, Open Mobile Alliance™, OMA-SUP-DM-
DM_Dictionary-V1_0,
URL:<http://www.openmobilealliance.org/>
- [OMADICT] “Dictionary for OMA Specifications”, Version x.y, Open Mobile Alliance™,
OMA-ORG-Dictionary-Vx_y,
URL:<http://www.openmobilealliance.org/>

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

Device	See [OMADICT].
Device Management Client	See [DM-DICT].
Device Management Gateway	See [DM-DICT].
Device Management Server	See [DM-DICT].
End Device	See [OMADICT].
Interface	See [OMADICT].
Management Object	See [OMADICT].

3.3 Abbreviations

DM	Device Management
GwMO	Gateway Management Object
MO	Management Object
OMA	Open Mobile Alliance

4. Introduction (Informative)

The Gateway Management Object aims to enable remote operations for the DM Gateway and end Devices behind the DM Gateway. The Gateway Management Object specifications will provide capabilities of processing management actions such as fan-out of DM commands from a DM Server to multiple end Devices and aggregation of responses from multiple end Devices.

The objective of this document is to describe the architecture for managing the DM Gateway and end Devices behind the DM Gateway.

4.1 Version 1.0

The GwMO 1.0 enabler release is expected to meet all the requirements defined in [GwMO-RD].

5. Architectural Model

5.1 Dependencies

The Gateway Management Object architecture diagram indicates dependencies on the OMA DM architecture.

5.2 Architectural Diagram

5.2.1 Transparent mode

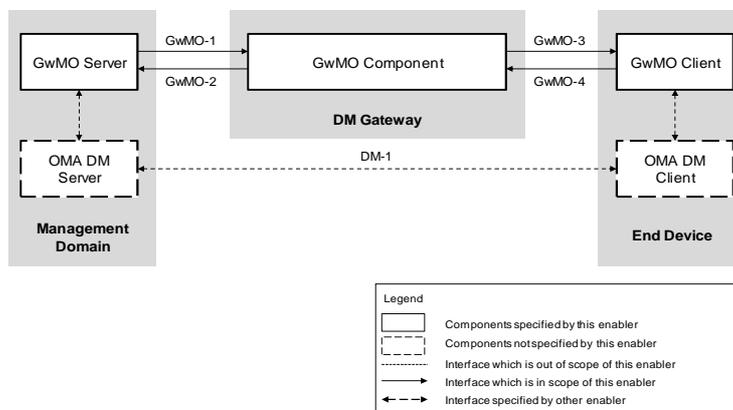


Figure 1: Transparent mode GwMO Architectural Diagram using interfaces

5.2.2 Proxy mode

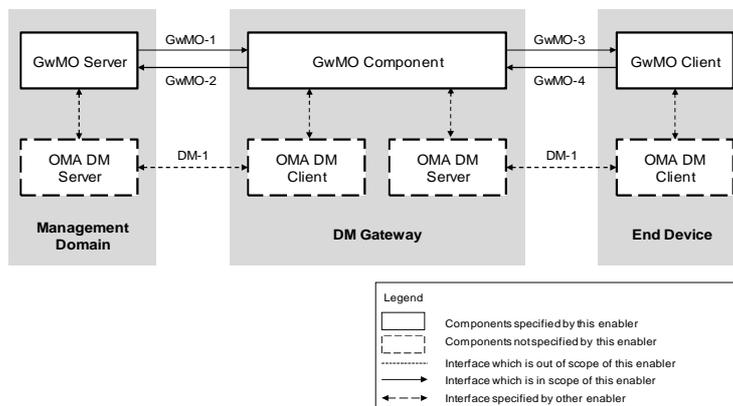


Figure 2: Proxy mode GwMO Architectural Diagram using interfaces

5.2.3 Adaptation mode

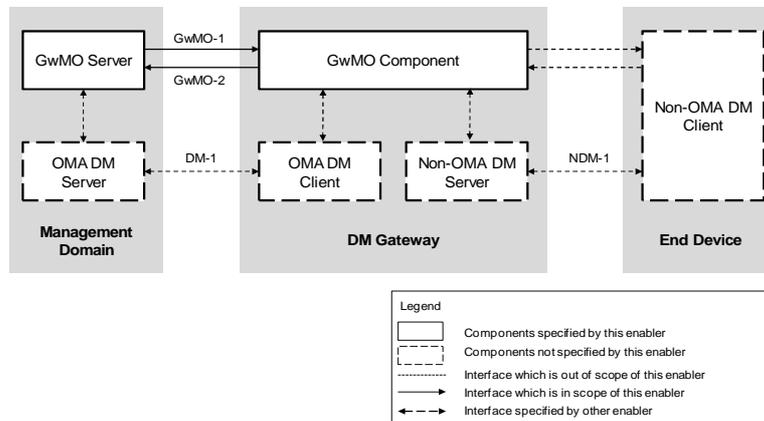


Figure 3: Adaptation mode GwMO Architectural Diagram using interfaces

5.3 Functional Components and Interfaces/reference points definition

5.3.1 Protocol Endpoints

5.3.1.1 GwMO Server

The GwMO Server is a logical entity which is dedicated to issue GwMO operations to the DM Gateway or consume the GwMO Alerts from the DM Gateway. The GwMO Server interacts with the GwMO Component.

5.3.1.2 GwMO Component

The GwMO Component is the abstract software component that conforms to the requirements for the DM Gateway specified in the OMA GwMO Enabler. The GwMO Component enables the management of the End Devices that are not directly accessible to the OMA DM Server. The GwMO Component supports the following three modes, as specified in the [GwMO-RD]:

- **Transparent Mode:** The DM Gateway maintains a mapping between the local/private and global/public identity of the device to assist the DM Server in sending a notification to the DM Client deployed behind the DM Gateway.
- **Proxy Mode:** The DM Gateway manages devices on behalf of the DM Server over DM protocol.
- **Adaptation Mode:** The DM Gateway manages non-OMA-DM devices on behalf of the OMA-DM Server over a device supported protocol.

In the Proxy mode of operation, the GwMO Component provides other functions like fan-out of DM commands from a OMA DM Server to multiple End Devices and aggregation of responses from multiple End Devices so that a consolidated response is sent back to the OMA DM Server. Additionally it also provides the ability to store configuration data and software images for the End Devices.

5.3.1.3 OMA DM Server

The OMA DM Server is defined in the OMA DM Enabler and is the subject of those specifications.

5.3.1.4 Non-OMA DM Server

The Non-OMA DM Server is the abstract software component that does not conform to the requirements for OMA DM Server specified in the OMA Device Management Enabler. GwMO does not define or specify the Non-OMA DM Server.

5.3.1.5 OMA DM Client

The OMA DM Client is defined in the OMA DM Enabler and is the subject of those specifications.

5.3.1.6 Non-OMA DM Client

The Non-OMA DM Client is the abstract software component that does not conform to the requirements for OMA DM Client specified in the OMA Device Management Enabler. GwMO does not define or specify the Non-OMA DM Client.

5.3.1.7 GwMO Client

GwMO Client is a logical entity that resides in the End Device, dedicated to receive DM notifications from the DM Server through DM Gateway and sends device GwMO alerts to GwMO Server. The GwMO Client interacts with GwMO Component.

5.3.2 Interfaces

5.3.2.1 GwMO-1 Interface

The GwMO-1 interface allows a GwMO Server to invoke GwMO Operations on the End Device via the DM Gateway using the underlying DM-1 interface.

5.3.2.2 GwMO-2 Interface

The GwMO-2 interface allows the End Device to send GwMO Alerts to the GwMO Server via the DM Gateway using the underlying DM-1 interface.

5.3.2.3 GwMO-3 Interface

The GwMO-3 interface allows the GwMO component to send notifications to End Device.

5.3.2.4 GwMO-4 Interface

The GwMO-4 interface allows the DM Client to register its End Device to the DM Gateway. The GwMO Component may send device management commands on behalf of GwMO Server and DM Client may return status and alerts to the GwMO Component using the underlying DM-1 interface in Transparent Mode and Proxy Mode or using NDM-1 interface in Adapatation Mode.

5.3.2.5 DM-1 Interface

The DM-1 interface is defined in the OMA DM Enabler and is the subject of those specifications. It provides a formal interface over which Servers may send device management commands to Clients and Clients may return status and alerts to Servers.

5.3.2.6 NDM-1 Interface

The NDM-1 interface is defined outside of OMA. It provides an interface over which Servers may send device management commands to Clients and Clients may return status and alerts to Servers using non-OMA DM protocol. This interface is outside the scope of OMA DM.

5.4 Security Considerations

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-AD-GwMO-V1_0	04 May 2010	All	New baseline, agreed in "OMA-DM-GwMO-2010-0003-INP_Baseline_AD"
	05 July 2010	5	GwMO Architecture Diagram, agreed in "OMA-DM-GwMO-2010-0017R04-CR_Architecture_Diagram"
	27 July 2010	4, 5, Appendix	Incorporated the following CRs: OMA-DM-GwMO-2010-0018R01-CR_AD_component_interface_descriptions OMA-DM-GwMO-2010-0025-CR_DFD_in_AD_Appendix OMA-DM-GwMO-2010-0026R01-CR_AD_missing_descriptions
	12 Aug 2010	All	Incorporated: OMA-DM-GwMO-2010-0029-CR_AD_component_description_fixes Language set to English UK, harmonization of hyperlinks in normative references
	07 Oct 2010	All	Incorporated: OMA-DM-GwMO-2010-0046R02-CR_3_mode_operation_edited_text OMA-DM-GwMO-2010-0048R02-CR_separate_arch_for_3_modes_operation OMA-DM-GwMO-2010-0059-CR_AD_Clean_up
	08 Oct 2010	App A 2	Added row in the history box for the 07 October 2010 version
Candidate Version OMA-AD-GwMO-V1_0	02 Nov 2010	N/A	Status changed to Candidate by TP TP ref # OMA-TP-2010-0443-INP_GwMO_V1_0_AD_for_Candidate_approval

Appendix B. GwMO Data Flow Diagram (Informative)

The data flow diagram in Figure 4 identifies the major functionalities provided by the GwMO enabler.

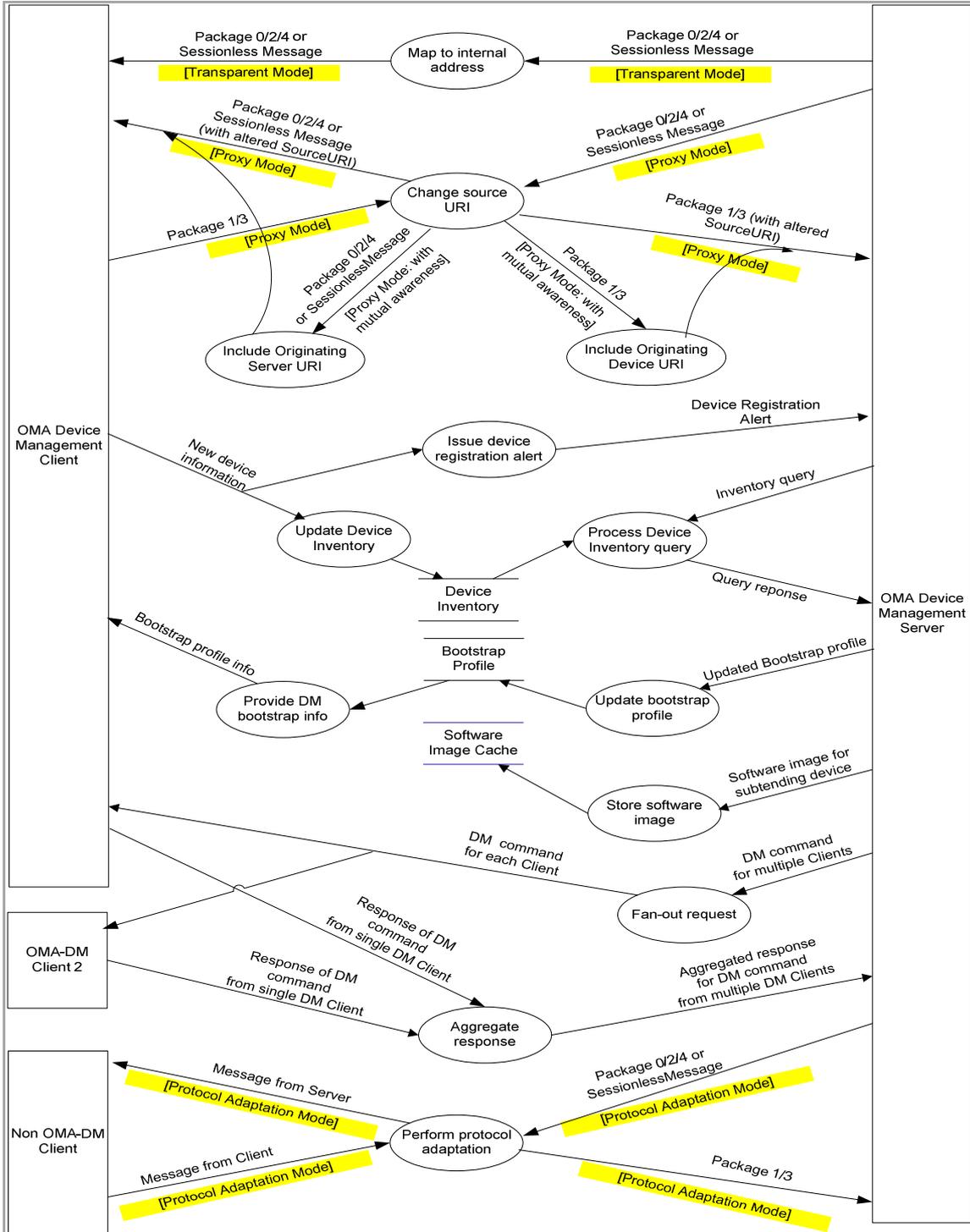


Figure 4: GwMO Data Flow Diagram