



# **Gateway Management Object Architecture**

## **Candidate Version 1.1 – 25 Jun 2013**

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**Open Mobile Alliance**  
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# 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
  - 4.2 VERSION 1.1 .....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.....9
    - 5.2.3 Adaptation Mode .....9
  - 5.3 FUNCTIONAL COMPONENTS AND INTERFACES/REFERENCE POINTS DEFINITION .....10
    - 5.3.1 Protocol Endpoints.....10
    - 5.3.2 Interfaces.....11
  - 5.4 SECURITY CONSIDERATIONS .....12
- APPENDIX A. CHANGE HISTORY (INFORMATIVE).....13
  - A.1 APPROVED VERSION HISTORY .....13
  - A.2 DRAFT/CANDIDATE VERSION 1.1 HISTORY .....13
- APPENDIX B. GWMO DATA FLOW DIAGRAM (INFORMATIVE).....14
- APPENDIX C. HIERARCHICAL ARCHITECTURE DIAGRAM FOR OPERATION MODES .....15

# Figures

- Figure 1: Transparent Mode GwMO Architectural Diagram Using Interfaces .....8
- Figure 2: Proxy Mode GwMO Architectural Diagram Using Interfaces .....9
- Figure 3: Adaptation Mode GwMO Architectural Diagram Using Interfaces Using Fanout MO or Using Protocol Encapsulation [GwMOTS].....9
- Figure 4: Adaptation Mode GwMO Architectural Diagram Using Interfaces Using DM Gateway in Origin Server Role [GwMOTS] .....10
- Figure 5: GwMO Data Flow Diagram .....14
- Figure 6: Support for Hierarchical Architecture.....15

# 1. Scope

**(Informative)**

The scope of the Gateway Management Object architecture document is to define the architecture for the DM Gateway Management Object v1.1 enabler. This document fulfills 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

- [DM-DICT] “Device Management Dictionary”, Version 1.0, Open Mobile Alliance™, OMA-SUP-DM-DM\_Dictionary-V1\_0,  
URL:<http://www.openmobilealliance.org/>
- [GwMO-RD] “Gateway Management Object Requirements”, Open Mobile Alliance™, OMA-RD-GwMO-V1\_1,  
URL:<http://www.openmobilealliance.org/>
- [GwMO-RD V1\_0] “Gateway Management Object Requirements”, Open Mobile Alliance™, OMA-RD-GwMO-V1\_0,  
URL:<http://www.openmobilealliance.org/>
- [GwMOTS] “OMA DM Gateway Management Object Technical Specification, Version 1.0”, Open Mobile Alliance™, OMA-TS-GwMO-V1\_0,  
URL:<http://www.openmobilealliance.org/>
- [OMA-DM] “OMA Device Management Protocol”, Version 1.3, Open Mobile Alliance™,  
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

None

## 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 [DMDICT] for all definitions used in this document.

**GwMO Operations**            An operation exposed by an OMA DM Management Object defined as part of the GwMO technical specification.

### 3.3 Abbreviations

Kindly consult [DMDICT] for all abbreviations used in this document.

## 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 fanout 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 of the requirements defined in [GwMO-RD V1\_0].

### 4.2 Version 1.1

The GwMO 1.1 Enabler release is expected to meet all of the requirements defined in [GwMO-RD].

## 5. Architectural Model

### 5.1 Dependencies

The Gateway Management Object depends on:

- OMA-DM V.1.3 [OMA-DM]

### 5.2 Architectural Diagram

#### 5.2.1 Transparent Mode

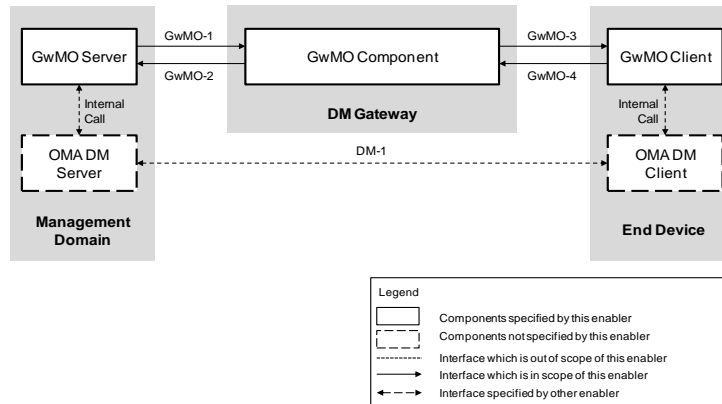


Figure 1: Transparent Mode GwMO Architectural Diagram Using Interfaces



## 5.2.2 Proxy Mode

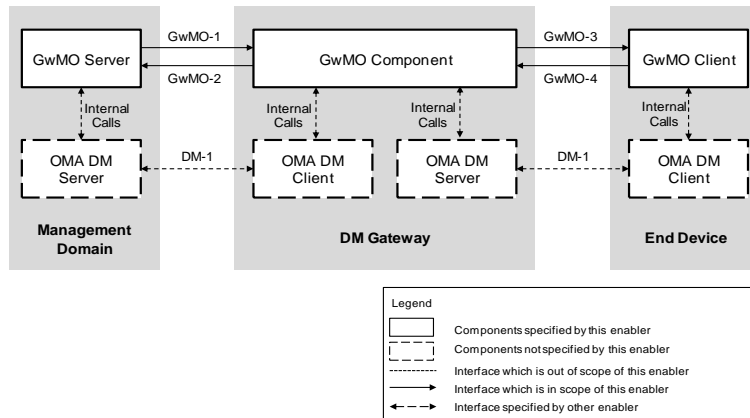


Figure 2: Proxy Mode GwMO Architectural Diagram Using Interfaces

## 5.2.3 Adaptation Mode

### 5.2.3.1 Adaptation Using Fanout MO or Using Protocol Encapsulation

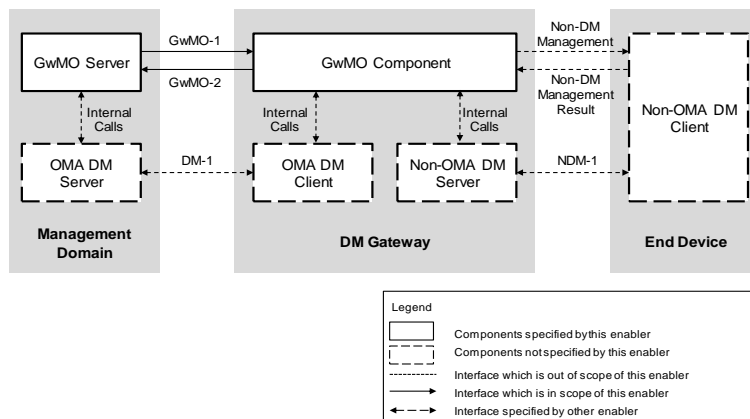


Figure 3: Adaptation Mode GwMO Architectural Diagram Using Interfaces Using Fanout MO or Using Protocol Encapsulation [GwMOTS]

### 5.2.3.2 Adaptation Using DM Gateway in Origin Server Role

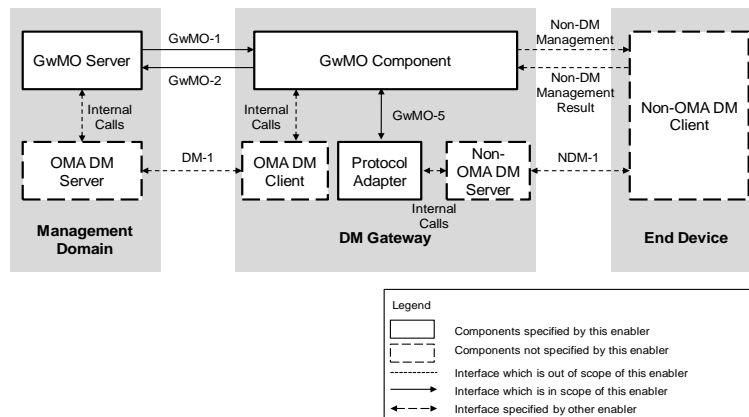


Figure 4: Adaptation Mode GwMO Architectural Diagram Using Interfaces Using DM Gateway in Origin Server Role [GwMOTS]

## 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 that 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 assists the DM Server in sending a DM Notification to the End Device(s) behind the DM Gateway. In this mode, the DM Gateway forwards the DM Notification to the End Device(s). The DM Gateway does not participate in the management session that gets established between the DM Server and the End Device after the delivery of the DM Notification to the End Device(s).
- **Proxy Mode:** The DM Gateway manages End Device(s) behind the DM Gateway on behalf of the DM Server over DM protocol. Two related DM sessions are established: one is between the DM Server and the DM Gateway (working as DM Client); the other is between the DM Gateway (working as DM Server) and the End Device(s).
- **Adaptation Mode:** The DM Gateway manages End Device(s) behind the DM Gateway on behalf of the OMA DM Server over a non-OMA-DM protocol.

The DM Gateway can operate in different modes for different devices simultaneously. In Transparent Mode, the GwMO provides fanout of DM Notifications from an OMA DM server to multiple End Devices. In Proxy Mode, the GwMO

Component provides other functions, such as fanout of DM Notifications and DM messages from an 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 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 Protocol Adapter

The Protocol Adapter is the abstract software component that allows the GwMO Component to interact with non-OMA DM Server.

### 5.3.1.7 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.

### 5.3.1.8 GwMO Client

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

If DM Gateway supports Hierarchical Architecture, it also allows:

- A DM Gateway acting on behalf of GwMO Server to invoke GwMO Operations on an End Device which is reachable via an intermediate DM Gateway using the underlying DM-1 interface.
- The GwMO Component to send notifications to its Child DM Gateway.

Please refer to Appendix C for the Hierarchical Architecture diagrams.

### 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.

If DM Gateway supports Hierarchical Architecture, it also allows:

- A DM Gateway to send GwMO Alerts to the GwMO Server via an intermediate DM Gateway using the underlying DM-1 interface.
- The DM Client to register its Child DM Gateway to the DM Gateway.

Please refer to Appendix C for the Hierarchical Architecture diagrams.

### **5.3.2.3 GwMO-3 Interface**

The GwMO-3 interface allows the GwMO component to send notifications to the 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 the GwMO Server and the 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 the NDM-1 interface in Adaptation Mode.

### **5.3.2.5 GwMO-5 Interface**

The GwMO-5 interface allows the DM Gateway to interact with Protocol Adapter component in order to send commands and exchange data structures needed for performing the OMA DM protocol to non-OMA DM protocol adaptation.

### **5.3.2.6 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.

### **5.3.2.7 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**

The GwMO Enabler provides mechanism to meet the security requirements addressed in [GwMO-RD].

GwMO supports single authentication mechanism for group of End Devices for notification fanout operation.

## 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 1.1 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-AD-GwMO-V1_1	14 Feb 2013	All	New baseline AD is based on GwMO v1.0 AD in OMA-AD-GwMO-V1_0-20120306-C and proposed in OMA-DM-GwMO-2013-0006-INP_AD_baseline_for_GwMO_v1.1
	22 Apr 2013	5.3.2, Appendix C	OMA-DM-GwMO-2013-0014R04-CR_DM_Gateway_Hierarchical_Architecture_Design
	23 Apr 2013	5.3.2	OMA-DM-GwMO-2013-0017-CR_Clarify_GwMO-1_and_GwMO-2
	14 May 2013	Appendix C	OMA-DM-GwMO-2013-0022R01-CR_Simplified_GwMO_v1.1_arch_Gw_Gw_interface
	10 Jun 2013	All	Completed implementation of OMA-DM-GwMO-2013-0022R01-CR_Simplified_GwMO_v1.1_arch_Gw_Gw_interface OMA-DM-GwMO-2013-0023R05-CR_NDM_Interface OMA-DM-GwMO-2013-0025-CR_GwMO_v1.1_AD_review_comment_NEC OMA-DM-GwMO-2013-0027-CR_AD_ALU_ADRR_Comments
Candidate Version OMA-AD-GwMO-V1_1	25 Jun 2013	n/a	Status changed to Candidate by TP TP Ref # OMA-TP-2013-0206-INP_GwMO_V1_1_AD_for_Candidate_Approval

# Appendix B. GwMO Data Flow Diagram (Informative)

The data flow diagram in Figure 5 identifies the major functionalities provided by the GwMO enabler.

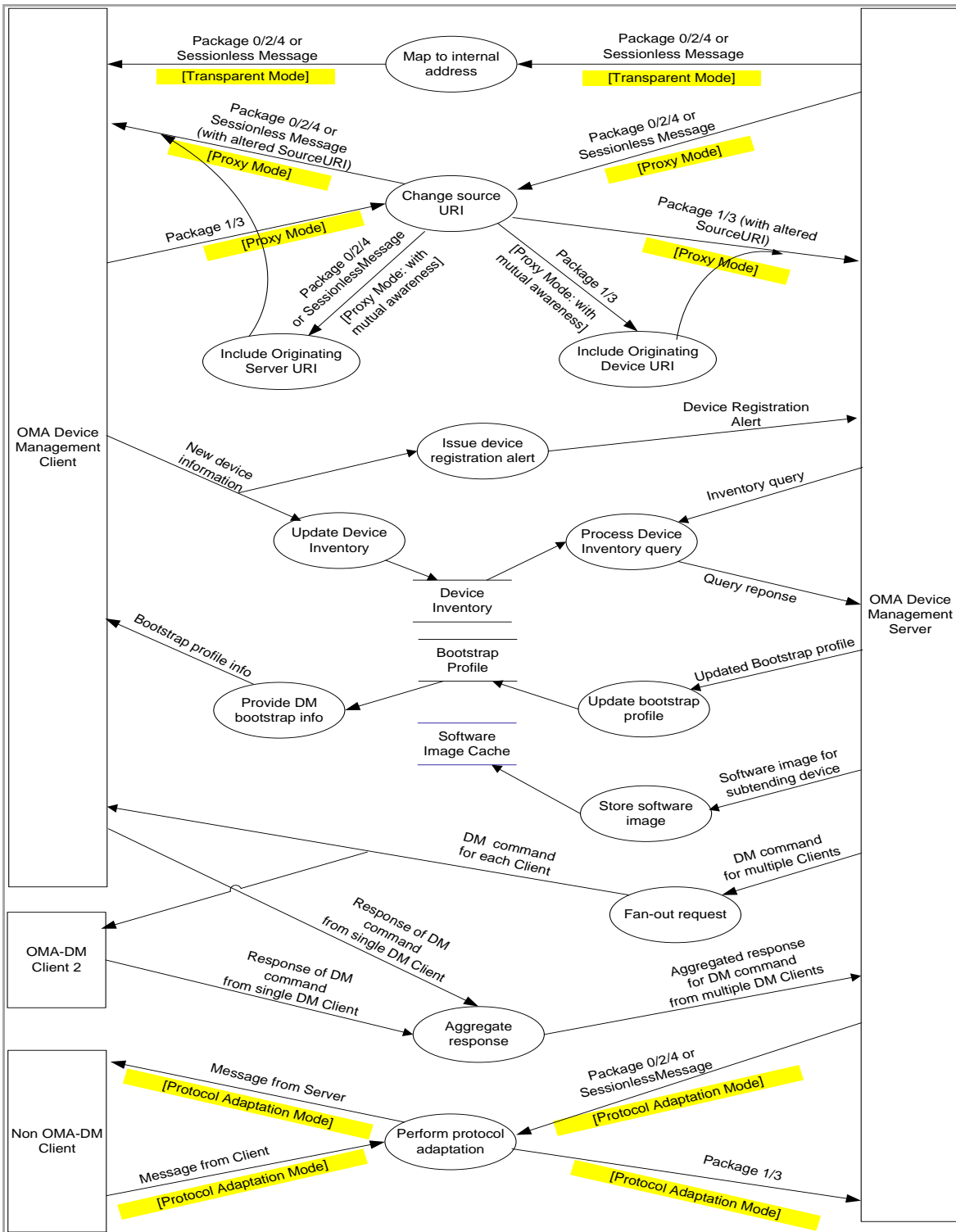
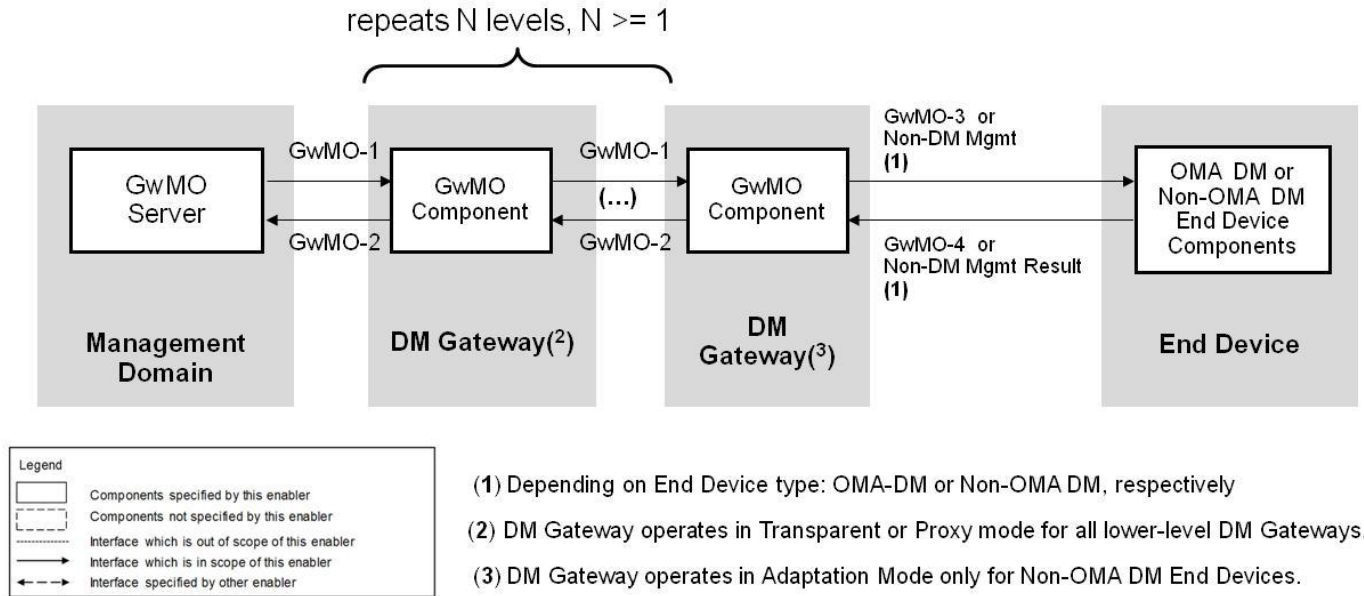


Figure 5: GwMO Data Flow Diagram

## Appendix C. Hierarchical Architecture Diagram for Operation Modes

To support hierarchical architecture, architectural components and interfaces, namely OMA-DM Client, OMA-DM Server, DM-1 and NDM-1, in the architectural model (Section 5.2, Figures 1, 2 & 3) remain unchanged.

GwMO-1 and GwMO-2 are extended with functions described in chapter 5.3 to address the hierarchical Gateways. GwMO-3 and GwMO-4 are the same as in non hierarchical architecture..



**Figure 6: Support for Hierarchical Architecture**