



# **SACMO Architecture**

Approved Version 1.0 – 29 Jul 2014

---

**Open Mobile Alliance**

OMA-AD-SACMO-V1\_0-20140729-A

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.

© 2014 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
  - 5.3 FUNCTIONAL COMPONENTS AND INTERFACES/REFERENCE POINTS DEFINITION.....9
    - 5.3.1 Components .....9
    - 5.3.2 Interfaces.....10
  - 5.4 SECURITY CONSIDERATIONS .....10
- APPENDIX A. CHANGE HISTORY (INFORMATIVE).....11
  - A.1 APPROVED VERSION HISTORY .....11
- APPENDIX B. FLOWS (INFORMATIVE) .....12
  - B.1 OMA DM DOWNLOAD OF A SOFTWARE & APPLICATION CONTROL MO .....12
    - B.1.1 Normal Flow .....12
    - B.1.2 Alternative Flow – 1 .....12
    - B.1.3 Alternative Flow – 2 .....12
    - B.1.4 Alternative Flow – 3 .....12
  - B.2 DOWNLOAD OF A SOFTWARE & APPLICATION CONTROL MO USING ALTERNATE DOWNLOAD MECHANISMS ..12
    - B.2.1 Normal Flow .....12
    - B.2.2 Alternative Flow – 1 .....13
    - B.2.3 Alternative Flow – 2 .....13
    - B.2.4 Alternative Flow – 3 .....13
  - B.3 SERVER INTERACTIONS WITH SACMO(S) ON THE DEVICE.....13
    - B.3.1 Normal Flow .....13
    - B.3.2 Alternative Flow – 1 .....13
    - B.3.3 Alternative Flow – 2 .....13
    - B.3.4 Alternative Flow – 3 .....14

# Figures

- Figure 1: SACMO Architectural Model .....8

# Tables

No table of figures entries found.

# 1. Scope

**(Informative)**

This document defines the architecture for the Software and Application Control Management Object v1.0 enabler. This document fulfils the functional capabilities and information flows needed to support this enabler as described in the Software and Application Control Management Object requirements document [SACMO-RD].

## 2. References

### 2.1 Normative References

- [DMPRO] “OMA Device Management Protocol, Version 1.2”. Open Mobile Alliance .  
OMA-TS-DM-Protocol-V1\_2\_0.  
[URL: http://www.openmobilealliance.org](http://www.openmobilealliance.org)
- [DMRD] “Device Management Requirements”, Version 1.2, Open Mobile Alliance™, OMA-RD-DM-V1\_2,  
[URL: http://www.openmobilealliance.org](http://www.openmobilealliance.org)
- [DMTND] “OMA Device Management Tree and Description, Version 1.2”. Open Mobile Alliance™. OMA-TS-DM\_TND-V1\_2.  
[URL: http://www.openmobilealliance.org/](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](http://www.ietf.org/rfc/rfc2119.txt)
- [SACMO-RD] SACMO Requirements, Open Mobile Alliance™, OMA-RD-SACMO-V1\_0,  
[URL: http://www.openmobilealliance.org/](http://www.openmobilealliance.org/)

### 2.2 Informative References

- [OMADICT] “Dictionary for OMA Specifications”, Version 2.7, Open Mobile Alliance™,  
OMA-ORG-Dictionary-V2\_7,  
[URL: http://www.openmobilealliance.org/](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

|                                 |   |
|---------------------------------|---|
| <b>Device</b>                   | See [OMADICT]   |
| <b>Device Management</b>        | See [DMRD]  |
| <b>Device Management System</b> | See [DMRD]  |
| <b>Interface</b>                | See [OMADICT]   |
| <b>Management Object</b>        | See [DMRD]  |
| <b>SACMO Alert</b>              | SACMO specific alerts which convey the result of SACMO Operations via DM Generic Alert mechanism [DMPRO]. |
| <b>SACMO Operation</b>          | Any operation which may be invoked on a MO.   |

### 3.3 Abbreviations

|              |  |
|--------------|--|
| <b>DM</b>    | Device Management                                  |
| <b>DMS</b>   | Device Management Server                           |
| <b>OMA</b>   | Open Mobile Alliance                               |
| <b>SACMO</b> | Software and Application Control Management Object |

## 4. Introduction

**(Informative)**

Software and Application Control Management Object aims to enable remote operations for software and application control in the Device. Software and application control management specifications will provide capabilities of processing management actions such as workflow, processing or on device management of software and applications utilising existing management objects. The SACMO architecture has to support DM operations to be applied according to workflow scripts in the device, whereby any combination of operations on existing Management Objects can be applied and conditionally executed, with just the combined result being reported back to the DM server.

A management tree object [DMTND] defined for SACMO will be used for setting up parameters and operational functionality necessary for managing a workflow object.

The objective of this document is to describe the architecture for SACMO.

### 4.1 Version 1.0

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

## 5. Architectural Model

### 5.1 Dependencies

The SACMO architecture diagram indicates dependencies on the OMA DM architecture. It also optionally depends upon the OMA Download [DLOTA] architecture.

### 5.2 Architectural Diagram

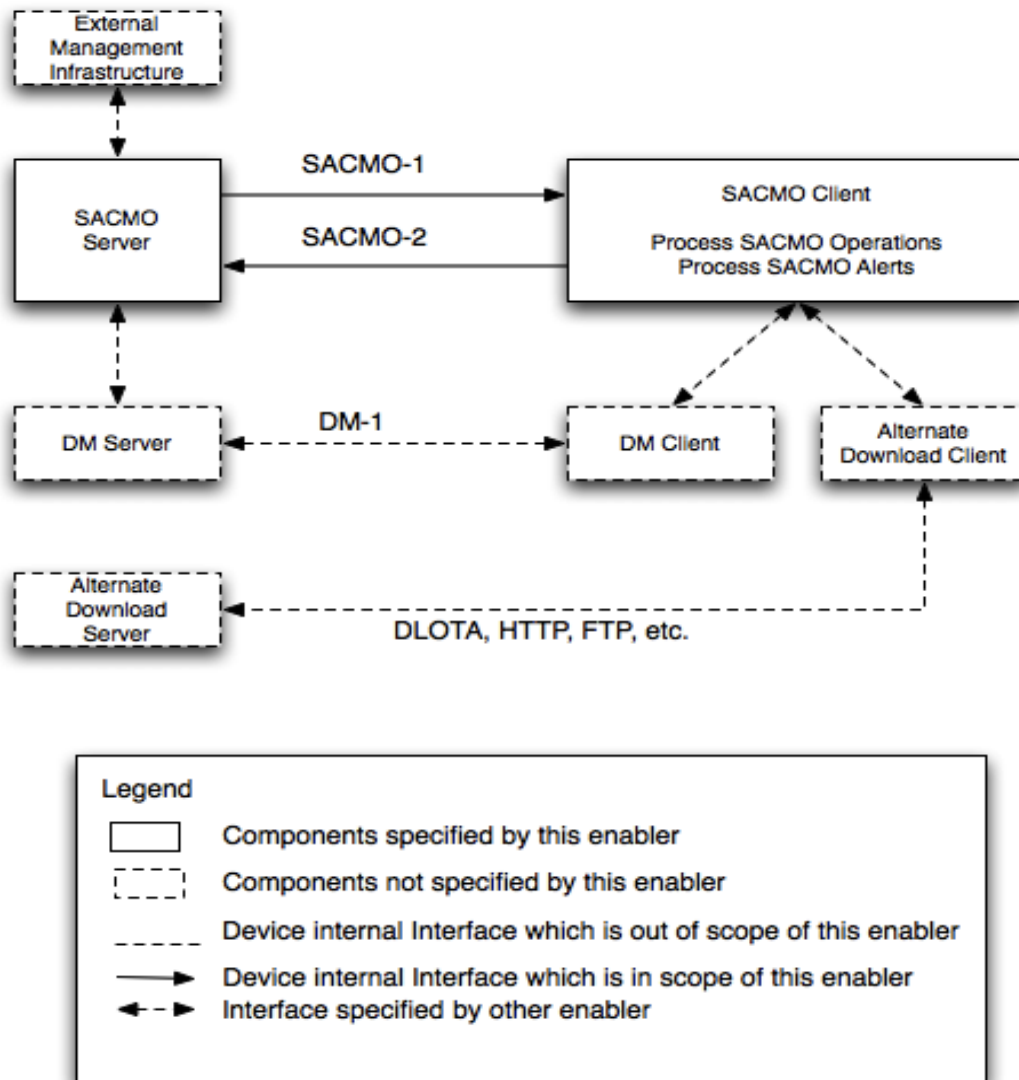


Figure 1: SACMO Architectural Model



## 5.3 Functional Components and Interfaces/reference points definition

### 5.3.1 Components

#### 5.3.1.1 SACMO Server

The SACMO Server is a logical entity which is dedicated to issue SACMO Operations to the device or consume the SACMO Alerts from the device.

#### 5.3.1.2 SACMO Client

The SACMO Client is responsible for executing SACMO Operations. It consumes the Software and Application Control Management Object delivered to the device and is expected to relay SACMO Alerts conveying a success or failure result back to the SACMO Server.

#### 5.3.1.3 The Device Management Client

The DM Client component makes it possible to initiate software and application control management in the device from a DM server. The DM Enabler provides support for device discovery and parameter setup by the DM Client component. The SACMO Enabler provides a management object for software and application control that the DM Client component provides access to, such that the DM Server can manipulate it. The DM Client interacts with a Software and Application Control Agent in the device that is responsible for conducting the management activities using a delivered software and application control management object. The DM Client employs the Generic Alert [DMPRO] mechanism to communicate the final notification comprising the status of the management activity. SACMO does not define or specify the Device Management Client.

#### 5.3.1.4 Alternate Download Client

The alternate download client is an optional feature that may exist on the device and used for downloading software and application control management objects to the device when the DMPRO is not being used for such downloads. The alternate download client may support DLOTA or something else. SACMO does not define or specify the alternate download client.

#### 5.3.1.5 The Device Management Server

The SACMO architecture requires the DM Server component to support device discovery, determination of an appropriate software and application control management object and delivery of a software and application control management object to the device over Large Object downloads if the device can support that. It also facilitates receipt of a final notification from the device employing the Generic Alert mechanism. SACMO does not define or specify the Device Management Server.

#### 5.3.1.6 The Alternate Download Server

The Alternate Download Server is an optional feature of the device management system that makes it possible to download software and application control management objects using the alternate download mechanism, such as DLOTA. The Download Server is not defined or specified within the scope of SACMO.

#### 5.3.1.7 External Management Infrastructure

The Device Management System comprises of a set of external management components over and above the device management server that participate in the overall process of managing devices. The external management infrastructure is used but not defined or specified within the scope of the SACMO.

## 5.3.2 Interfaces

### 5.3.2.1 The SACMO-1 Interface

The SACMO-1 interface allows a SACMO Server to invoke SACMO Operations on the device using the underlying DM-1 interface.

### 5.3.2.2 The SACMO-2 Interface

The SACMO-2 interface allows the SACMO Client to send SACMO Alerts to the SACMO Server using the underlying DM-1 interface.

### 5.3.2.3 The 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.

## 5.4 Security Considerations

The management object defined in this enabler is dependent on the security mechanisms and protections provided by the DM enabler. No new security issues are introduced by these management objects. Readers are encouraged to review the DM enabler security specifications for more information regarding these mechanisms.

## Appendix A. Change History

(Informative)

### A.1 Approved Version History

| Reference                    | Date        | Description   |
|------------------------------|-------------|---|
| OMA-AD-SACMO-V1_0-20140729-A | 29 Jul 2014 | Status changed to Approved by TP<br>TP Ref # OMA-TP-2014-0159-INP_SACMO_V1_0_ERP_for_final_Approval |

## Appendix B. Flows (informative)

### B.1 OMA DM Download of a Software & Application Control MO

This flow describes interactions between device and the SACMO Server wherein the SACMO Server delivers a software and application control MO to the device over the OMA-DM protocol.

#### B.1.1 Normal Flow

1. The SACMO Server initiates a session with the device.
2. The SACMO Server determines an appropriate Software and Application Control MO for delivery.
3. The SACMO Server using the DM server delivers the Software and Application MO over the DM Protocol [DMPRO].
4. The device acknowledges the receipt of the Software and Application MO delivery.

#### B.1.2 Alternative Flow – 1

In the step 1, the device initiates a session with the SACMO Server to request a software and application Control MO.

#### B.1.3 Alternative Flow – 2

In the step 2, SACMO Server optionally performs software inventory query to determine an appropriate Software and application MO.

#### B.1.4 Alternative Flow – 3

Before step 1, the External Management Infrastructure requests the SACMO Server to download a Software and Application Control MO to the device.

### B.2 Download of a Software & Application Control MO using Alternate Download Mechanisms

This flow describes the interaction between device and the SACMO Server wherein the SACMO Server delivers a Software and Application Control MO to the device using an alternate download mechanism.

#### B.2.1 Normal Flow

1. The SACMO Server initiates a session with the device.
2. The SACMO Server determines an appropriate Software and Application Control MO for delivery.
3. The SACMO Server determines an appropriate alternate download mechanism.
4. The SACMO Server asks the device to retrieve the Software and Application Control MO using an alternate download mechanism.

5. The device retrieves the software and application control MO using the alternate download mechanism.
6. The device acknowledges the receipt of the software and application MO delivery.

### **B.2.2 Alternative Flow – 1**

In the step 1, the device initiates a session with the SACMO Server to request a software and application control MO.

### **B.2.3 Alternative Flow – 2**

In the step 3, SACMO Server optionally retrieves software inventory from the device to determine an appropriate Software and Application Control MO.

### **B.2.4 Alternative Flow – 3**

Before step 1, the External Management Infrastructure requests the SACMO Server to download a software and application control MO to the device.

## **B.3 Server Interactions with SACMO(s) on the Device**

This flow describes the interaction between device and the SACMO Server wherein the SACMO Server invokes SACMO functionality on the device

### **B.3.1 Normal Flow**

1. The SACMO Server initiates a session with the device.
2. The SACMO Server asks the SACMO Client on the device to perform a SACMO Operation.
3. The SACMO Client performs the requested SACMO Operation.
4. The SACMO Client reports results of the requested SACMO Operation to the SACMO Server.

### **B.3.2 Alternative Flow – 1**

In the step 1, the device requests the SACMO Server to invoke a SACMO Operation.

### **B.3.3 Alternative Flow – 2**

Before step 1, the External Management Infrastructure requests the SACMO Server to perform a SACMO Operation on the device.

### B.3.4 Alternative Flow – 3

In the step 2, the SACMO Server asks the SACMO Client to perform a combined SACMO operation, e.g. RunWorkflow, TerminateWorkflow, RollbackWorkflow etc.

In the step 3, the SACMO Client on the device performs the requested combined SACMO operation.

In the step 4, the SACMO Client reports results of the requested combined SACMO operation to the SACMO Server.