



# **SCOMO Architecture**

Candidate Version 1.0 – 24 Oct 2008

---

**Open Mobile Alliance**

OMA-AD-SCOMO-V1\_0-20081024-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.

© 2008 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 .....	7
4. INTRODUCTION (INFORMATIVE).....	8
4.1 PLANNED PHASES.....	8
4.2 SECURITY CONSIDERATIONS.....	8
5. ARCHITECTURAL MODEL.....	9
5.1 DEPENDENCIES.....	9
5.2 ARCHITECTURAL DIAGRAM .....	9
5.3 FUNCTIONAL COMPONENTS AND INTERFACES .....	10
5.3.1 Components .....	10
5.3.2 Interfaces.....	10
5.4 FLOWS .....	11
5.4.1 OMA DM Download of a Software Component .....	11
5.4.2 Download of a Software Component using Alternate Download Mechanisms.....	11
5.4.3 Server Interactions with SCOMO(s) on the Device.....	12
APPENDIX A. CHANGE HISTORY (INFORMATIVE).....	14
A.1 APPROVED VERSION HISTORY .....	14
A.2 DRAFT/CANDIDATE VERSION 1.0 HISTORY .....	14

## Figures

Figure 1: SCOMO Architectural Model.....	9
--	---

# 1. Scope

**(Informative)**

This document defines the requirements for Software Component Management architecture, which is based on OMA DM v1.2 specifications and makes use of the functionalities provided by OMA DM v1.2 specifications to define special capabilities to manage software components in the client 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>
- [DMPRO] “OMA Device Management Protocol, Version 1.2”. Open Mobile Alliance™.  
OMA-TS-DM-Protocol-V1\_2\_0.  
URL: <http://www.openmobilealliance.org>
- [SCOMO-RD] SCOMO Requirements, Open Mobile Alliance™, OMA-RD-SCOMO-V1\_0,  
URL: <http://www.openmobilealliance.org/>

### 2.2 Informative References

- [OMA-DICT] “Dictionary for OMA Specifications”, Version 2.5, Open Mobile Alliance™,  
OMA-ORG-Dictionary-V2\_6,  
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.

This is an informative document, which is not intended to provide testable requirements to implementations.

### 3.2 Definitions

<b>Interface</b>	See [OMA-DICT].
<b>Content Provider</b>	An entity that provides data which forms the basis of a service.
<b>Device</b>	See [OMA-DICT]
<b>Device Management</b>	Management of the Device configuration and other managed objects of Devices from the point of view of the various Management Authorities. Device Management includes: <ul style="list-style-type: none"> <li>- Setting initial configuration information in Devices</li> <li>- Subsequent updates of persistent information in Devices</li> <li>- Retrieval of management information from Devices</li> <li>- Processing events and alarms generated by Devices</li> </ul>
<b>Device Management System</b>	A background system capable to interact with a (set of) Device(s) for the purpose of Device Management.
<b>Enterprise</b>	A business with deployment and Management Authority for WLAN Bearers, Local Wired Bearers, computers, Devices, software, and employees.
<b>Enterprise Device Management Server</b>	Part of the Device Management System that is under administration of an Enterprise Management Authority.
<b>Management Authority</b>	An entity that has the right to perform a specific Device Management function on a Device or manipulate a given data element or parameter. For example, the Network Operator, handset manufacturer, enterprise, or Device owner may be the authority or share authority for managing the Device. One Management Authority may own all Device resources or may share or delegate all or parts of these with/to other Management Authorities
<b>Management Object</b>	A data model for information which is a logical part of the interfaces exposed by DM components
<b>Software Component Management Object</b>	A management tree object defined for software components which will be used for delivering and managing software components within client device.
<b>Software Component Activation</b>	The process which results in services or resources a software component embodies to be made accessible to other entities (including the end-user).
<b>Software Component Deactivation</b>	The process which results in services or resources a software component embodies to be made inaccessible to other entities (including the end-user).
<b>Service Provider</b>	An entity that provides and administers a service to a Subscriber and/or User. The Network Operator is often a Service Provider.
<b>Software Originator</b>	The entity that creates, directly or through a third party, software and/or data targeted for use in a Device, Platform or Base Station. In the event that the software and/or data is controlled by a Regulatory Agency, the Software Originator is responsible for obtaining any Regulatory Agency license and Label.
<b>Subscriber</b>	The individual or organisation that is paying for service.
<b>User</b>	The individual who is in possession of and operates the Device.
<b>SCOMO Alert</b>	SCOMO specific alerts which convey the result of SCOMO Operations via DM Generic Alert mechanism [DMPRO].

**SCOMO Operations** Download, Install, Update, Remove, Activate and Deactivate operations which may be invoked on a Software Component MO as well as inventory queries.

### 3.3 Abbreviations

<b>DM</b>	Device Management
<b>DMS</b>	Device Management Server
<b>SCOMO</b>	Software Component Management Object
<b>OMA</b>	Open Mobile Alliance

## 4. Introduction (Informative)

Software Component Management aims to enable remote operations for software components in the Device. Software Component Management specifications will provide capabilities of processing management actions such as installation, upgrading or removing of software.

A management tree object [DMTND] defined for software components (SCOMO) will be used for setting up parameters and operational functionality necessary for managing a software component.

The objective of this document is to describe the architecture for managing Software Components.

### 4.1 Planned Phases

The SCOMO 1.0 enabler release is expected to meet all the requirements defined in [SCOMO-RD] and no additional phases are planned at this stage.

### 4.2 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.



## 5. Architectural Model

### 5.1 Dependencies

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

### 5.2 Architectural Diagram

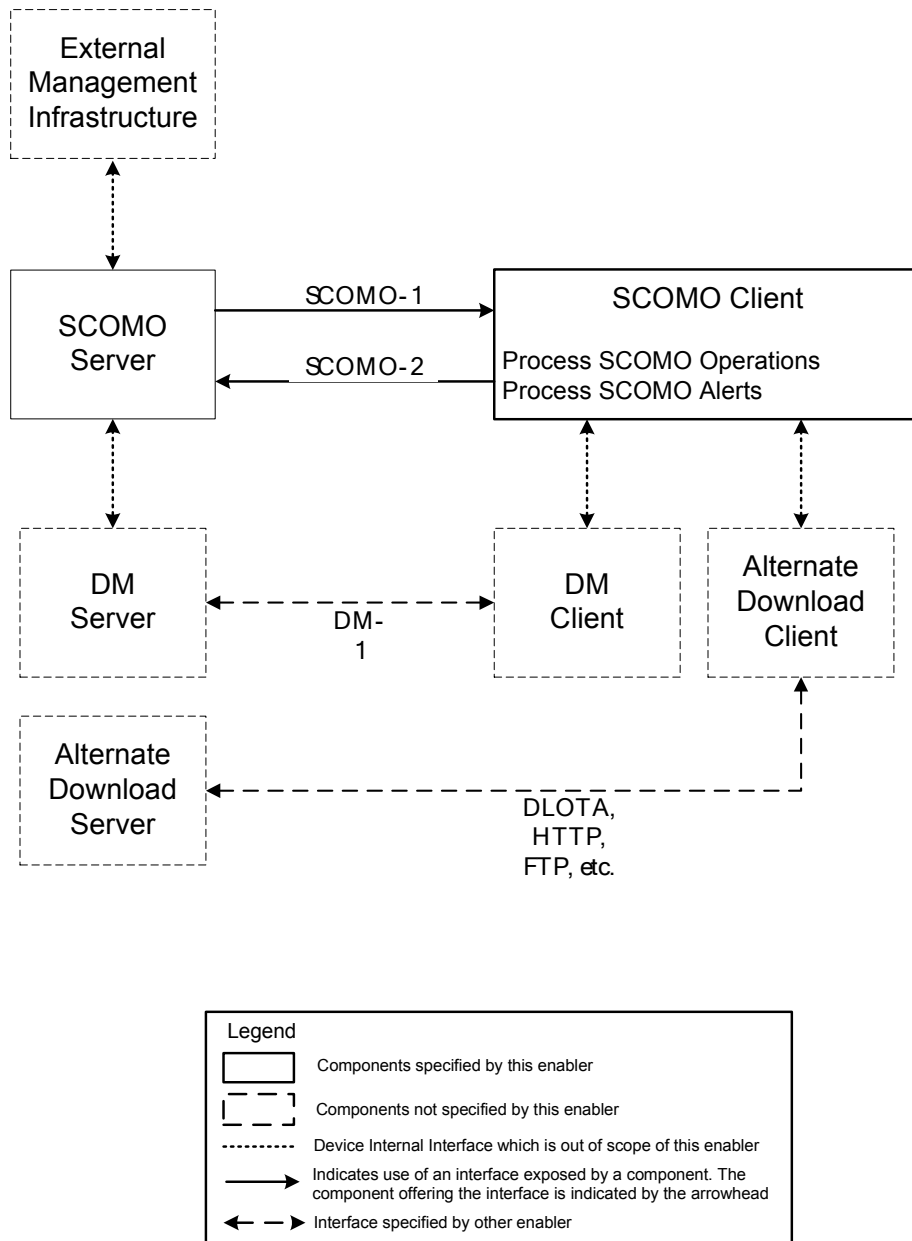


Figure 1: SCOMO Architectural Model

## 5.3 Functional Components and Interfaces

### 5.3.1 Components

#### 5.3.1.1 SCOMO Server

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

#### 5.3.1.2 SCOMO Client

The SCOMO Client is responsible for executing SCOMO Operations. It consumes the Software Component delivered to the device and is expected to relay SCOMO Alerts conveying a success or failure result back to the SCOMO Server .

#### 5.3.1.3 The Device Management Client

The DM Client component makes it possible to initiate software component 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 SCOMO enabler provides a management object for software components that the DM Client component provides access to, such that the DM server can manipulate it. The DM client interacts with a Software Component Agent in the device that is responsible for conducting the management activities using a delivered software component management object. The DM client employs the Generic Alert [DMPRO] mechanism to communicate the final notification comprising the status of the management activity. ScoMo 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 components to the device when the DMPRO is not being used for such downloads. The alternate download client may support DLOTA or something else. SCOMO does not define or specify the alternate download client

#### 5.3.1.5 The Device Management Server

The SCOMO architecture requires the DM server component to support device discovery, determination of an appropriate software component and delivery of a software component 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. SCOMO 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 management objects using the alternate download mechanism, such as DLOTA. The Download Server is not defined or specified within the scope of SCOMO

#### 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 SCOMO.

### 5.3.2 Interfaces

#### 5.3.2.1 The SCOMO-1 Interface

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

### 5.3.2.2 The SCOMO-2 Interface

The SCOMO-2 interface allows the SCOMO Client to send SCOMO Alerts to the SCOMO 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 Flows

### 5.4.1 OMA DM Download of a Software Component

*This flow describes interactions between device and the SCOMO Server wherein the SCOMO Server delivers a software component to the device over the OMA-DM protocol.*

#### 5.4.1.1 Normal Flow

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

#### 5.4.1.2 Alternative Flow – 1

In the step 1, the device initiates a session with the SCOMO Server to request a software component.

#### 5.4.1.3 Alternative Flow – 2

In the step 2, SCOMO Server optionally performs software inventory query to determine an appropriate Software Component.

#### 5.4.1.4 Alternative Flow – 3

Before step 1, the External Management Infrastructure request the SCOMO Server to download a Software Component to the device.

### 5.4.2 Download of a Software Component using Alternate Download Mechanisms

*This flow describes the interaction between device and the SCOMO Server wherein the SCOMO Server delivers a Software Component to the device using an alternate download mechanism.*

#### 5.4.2.1 Normal Flow

1. The SCOMO Server initiates a session with the device.

2. The SCOMO Server determines an appropriate Software Component for delivery.
3. The SCOMO Server determines an appropriate alternate download mechanism.
4. The SCOMO Server asks the device to retrieve the Software Component using an alternate download mechanism..
5. The device retrieves the software component using the alternate download mechanism.
6. The device acknowledges the receipt of the software component delivery.

#### **5.4.2.2 Alternative Flow – 1**

In the step 1, the device initiates a session with the SCOMO Server to request a software component.

#### **5.4.2.3 Alternative Flow – 2**

In the step 3, SCOMO Server optionally retrieves software inventory from the device to determine an appropriate Software Component.

#### **5.4.2.4 Alternative Flow – 3**

Before step 1, the External Management Infrastructure requests the SCOMO Server to download a software component to the device.

### **5.4.3 Server Interactions with SCOMO(s) on the Device**

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

#### **5.4.3.1 Normal Flow**

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

#### **5.4.3.2 Alternative Flow – 1**

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

#### **5.4.3.3 Alternative Flow – 2**

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

#### 5.4.3.4 Alternative Flow – 3

In the step 2, the SCOMO Server asks the SCOMO Client to perform a combined SCOMO operation, e.g. DownloadAndInstall, UpdateAndActivate, DownloadAndInstallAndActivate etc.

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

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

## 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-SCOMO-V1_0	21 Feb 2006	5	Corrected Arch Diagram and text section for the graph
	05 Jun 2006	4, 5	Moved to 2006 AD template Incorporated CRs: OMA-DM-SCOMO-2006-0019 OMA-DM-SCOMO-2006-0020
	07 Jul 2006	5	Add definition and abbreviation according to SCOMO RD Incorporated CR: OMA-DM-SCOMO-2006-0026R02
	22 Aug 2006	5	Incorporated CR: OMA-DM-SCOMO-2006-0036 OMA-DM-SCOMO-2006-0037
	08 Dec 2006	5	Incorporated CR: OMA-DM-SCOMO-2006-0030 OMA-DM-SCOMO-2006-0046R021
	25 May 2007	5	Incorporated: OMA-DM-SCOMO-2007-0030
	21 Aug 2007	5	Incorporated: OMA-DM-SCOMO-2007-0057
	22 Aug 2007	5	Incorporated: OMA-DM-SCOMO-2007-0062
	23 Nov 2007	2.2, 3.2, 4.2, 5.4.3, Figure 1	Incorporated: OMA-DM-SCOMO-2006-0055- OMA-DM-SCOMO-2006-0059R01 OMA-DM-SCOMO-2007-0028R01 OMA-DM-SCOMO-2007-0065
	09 Jul 2008	All	Editorial Clean up
Candidate Versions OMA-AD-SCOMO-V1_0	24 Oct 2008	n/a	Status changed to Candidate by OMA TP TP Ref# OMA-TP-2008-0414- INP_Software_Component_Management_Object_V1_0_ERP_for_Can didate_Approval