SCOMO Architecture

Approved Version 1.0 – 06 Dec 2011

Open Mobile Alliance

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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

[DMPRO]	"OMA Device Management Protocol, Version 1.2". Open Mobile Alliance™. OMA-TS-DM-Protocol-V1_2_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
[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 2.8, Open Mobile Alliance™, OMA-ORG-Dictionary-V2_8, 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

Interface	See [OMA-DICT].
Content Provider	An entity that provides data which forms the basis of a service.
Device	See [OMA-DICT]
Device Management	Management of the Device configuration and other managed objects of Devices from the point of view of the various Management Authorities. Device Management includes: - Setting initial configuration information in Devices - Subsequent updates of persistent information in Devices - Retrieval of management information from Devices - Processing events and alarms generated by Devices
Device Management System	A background system capable to interact with a (set of) Device(s) for the purpose of Device Management.
Enterprise	A business with deployment and Management Authority for WLAN Bearers, Local Wired Bearers, computers, Devices, software, and employees.
Enterprise Device Management Server	Part of the Device Management System that is under administration of an Enterprise Management Authority.
Management Authority	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
Management Object	A data model for information which is a logical part of the interfaces exposed by DM components
Software Component Management Object	A management tree object defined for software components which will be used for delivering and managing software components within client device.
Software Component Activation	The process which results in services or resources a software component embodies to be made accessible to other entities (including the end-user).
Software Component Deactivation	The process which results in services or resources a software component embodies to be made inaccessible to other entities (including the end-user). .
Service Provider	An entity that provides and administers a service to a Subscriber and/or User. The Network Operator is often a Service Provider.
Software Originator	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.
Subscriber	The individual or organisation that is paying for service.
User	The individual who is in possession of and operates the Device.
SCOMO Alert	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

DM   Device Management

DMS   Device Management Server

OMA   Open Mobile Alliance

SCOMO   Software Component Management Object

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.
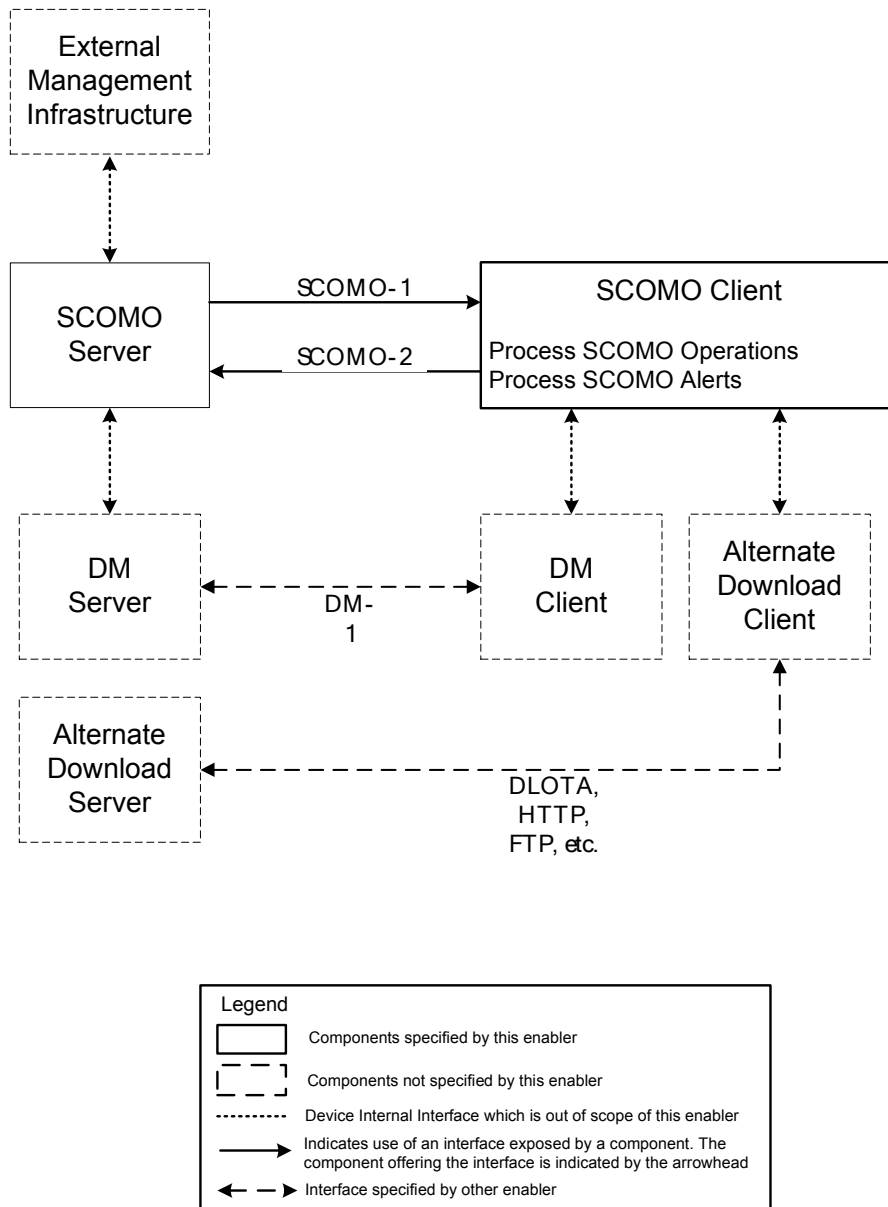
5.2 Architectural Diagram

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
OMA-AD-SCOMO-V1_0-20111206-A	06 Dec 2011	Document approved by TP Ref TP Doc# OMA-TP-2011-0430-INP_SCOMO_V1_0_ERP_for_final_Approval