Enabler Test Specification for SCOMO

Candidate Version 1.0 – 26 Jun 2009

Open Mobile Alliance

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1. Scope

This document describes in detail available test cases for Software Component Management Object 1.0, http://www.openmobilealliance.org/.

The test cases are split in two categories, conformance and interoperability test cases.

The conformance test cases are aimed to verify the adherence to normative requirements described in the technical specifications.

The interoperability test cases are aimed to verify that implementations of the specifications work satisfactory.

If either conformance or interoperability tests do not exists at the creation of the test specification this part should be marked not available.

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
[SCOMOAD]	"Software Component Management Object Architecture", Version 1.0, Open Mobile Alliance™, OMA-AD-SCOMO-V1_0 URL:http//www.openmobilealliance.org/
[SCOMOTS]	"Software Component Management Object", Version 1.0, Open Mobile Alliance™, OMA-TS-SCOMO-V1_0 URL: 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/

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", are normative, unless they are explicitly indicated to be informative.

The following numbering scheme is used:

> **xxx-y.z-con-number** where:
> | | |
> |---|---|
> | xxx | Name of enabler, e.g. MMS or Browsing |
> | y.z | Version of enabler release, e.g. 1.2 or 1.2.1 |
> | 'con' | Indicating this test is a conformance test case |
> | number | Leap number for the test case |

Or

> **xxx-y.z-int-number** where:
> | | |
> |---|---|
> | xxx | Name of enabler, e.g. MMS or Browsing |
> | y.z | Version of enabler release, e.g. 1.2 or 1.2.1 |
> | 'int' | Indicating this test is a interoperability test case |
> | number | Leap number for the test case |

3.2 Definitions

<Node>	Path from the root to the node that is configured to the SCTS before the testing is done (e.g. './Inventory/Deployed' or './Download'). Test case is driven to this configured interior node. The <Node> can be different between different Test Cases
Test Object	The implementation under test is referred to as the Test Object. In this document, the client

3.3 Abbreviations

DDF	Device Description Framework
DL	Download
DLOTA	Download Over-The-Air
DM	Device Management
MO	Management Object
OMA	Open Mobile Alliance
SCOMO	Software Component Management Object
SCR	Static Conformance Requirement

4. Introduction

The purpose of this document is to provide test cases for SCOMO Enabler Release 1.0 [SCOMOTS].

The following items are needed at a high level to adequately execute the SCOMO IOP test cases.

- A Device Management (DM) client in the device that is configured to interact with a DM server

- A DM server capable of accessing and setting software component management objects in a mobile device, if necessary

- A download mechanism, such as OMA-DM or DLOTA, for supporting download of software components

Client vendor must have sample software packages available for the server to use.

The implementation of some features is optional for the Clients and/or the Servers in the SCOMO Enabler. The tests associated with these optional features are marked as "(Includes Optional Features)" in the test specification.

5. SCOMO Conformance Test Cases

There are no conformance cases identified for the Client and Server at this time. Mandatory SCR items will be covered in the interoperability test cases

6. SCOMO Interoperability Test Cases

6.1 Verification of Tree Structure

Test Case Id	SCOMO-1.0-int-001
Test Object	SCOMO Client and SCOMO Server
Test Case Description	The purpose of this test is to verify that the SCOMO Client supports the required SCOMO elements and the required nodes in the DM tree
Specification Reference	[SCOMOTS] section 7 (and sub-sections)
SCR Reference	SCOMO-T-001-M SCOMO-T-002-M SCOMO-T-003-O SCOMO-T-004-M
ETR Reference	DDF DDF-MOI DDF-MUST DDF-Cond DDF-DFType DDF-Format DDF-Min-Occ DDF-Max-Occ
Tool	None
Test code	None
Preconditions	1. The SCOMO Client MUST support SCOMO 2. The SCOMO Client MUST be configured to work with a SCOMO Server
Test Procedure	1. Perform an ADD to create the ../x* Node in the Management Tree, if one does not exist 2. Perform a GET on node ../x*, to verify that ../x* was added and to determine whether sub-nodes are added automatically

Pass-Criteria	1. The SCOMO Client created a SCOMO ../x* when requested by the Server. ADD command returns a response of 1200.
	2. Verify that the GET command on node ../x* returns a response of 1200
	3. Verify the metatype is the Management Object identifier: " urn:oma:mo:oma-scomo:1.0"
	4. Verify the GET performed on ../x* in step (2) indicates the presence of all required nodes and all optional nodes listed as supported in the Client ICS but no other nodes.

6.2 Server/Client Interoperability - Delivery using Large Object (Synchronous Report)

Test Case Id	SCOMO-1.0-int-002
Test Object	SCOMO Client and SCOMO Server
Test Case Description	The purpose is to test client and server interoperability when delivering a Delivery Package using Large Object, using synchronous reporting
Specification Reference	[SCOMO-TS] Chapter 5 (Software Component Management Framework)
SCR Reference	SCOMO-C-001-M (Support for Download)
	SCOMO-C-024-O (Support synchronous result reporting)
	SCOMO-S-001-M (Support for the SCOMO)
ETR Reference	OMA-DM-Delivery
Tool	None
Test code	None
Preconditions	• An established DM session between DM Client and DM Server
	• The SCOMO Client MUST support downloading of a Package based on Large Object (from DM Server)
	• In this test case "<X>" denotes the string that is used in the actual MO

Test Procedure	1. Perform an Add command to add the /Inventory/Delivered/<X> node, if it does not exist
	2. Perform Add commands to add child nodes of the /Download/<X> node (unless they already exist or Device created them as a result of step 1 above)
	3. Perform a Replace command on node /Inventory/Delivered/<X>/Data (uses Large Object feature)
	4. Perform a Get on node /Inventory/ Delivered /<X>/Status
	5. Perform a Get on node /Inventory/Deployed/<X>
	6. Perform an Exec on node /Inventory/Delivered/<X>/Operations/Install
	7. Perform a Get on node /Inventory/ Delivered /<X>/Status (this step may need be repeated several times to poll for changes in the Status value)
	8. Perform a Get on node /Inventory/Deployed/<X> and all its direct child nodes

Pass-Criteria	1. The Add commands (steps 1, 2):
	  a. The SCOMO Client creates an /Inventory/Delivered/<X> branch including child nodes
	  b. Returns response with result code 1200 (OK)

	2. The Replace command on node /Inventory/Delivered/<X>/Data (step 3):
	  a. Returns response with result code 1200 (OK)
	  b. The Data leaf containing data of the Delivery Package is replaced

	3. The Get commands on node /Inventory/Delivered/<X>/Status (step 4):
	  a. Returns response with result code 1200 (OK)
	  b. Status value changes from existing Status to 10 (Idle/Start)

	4. The response for Get command on node /Inventory/Deployed/<X> (step 5) returns error with a valid error code (due to the fact that the node should not exist)
	5. The response for the Exec command (step 6): a. MUST have status code 1200

	6. The Get commands on node /Inventory/Delivered/<X>/Status (step 7):
	  a. Returns response status code 1200 (OK)
	  b. Status value changes from existing status to 40 (Install Progressing) then 10 (Idle/Start)

	7. The Get commands on node /Inventory/Deployed/<X> and its direct child nodes (step 8):
	  a. Has response with status code 1200 (OK)
	  b. PkgIDRef node (if exists) is either empty or points to the ID of the package that was downloaded
	  c. MUST return all the following mandatory nodes: ID, Version, State, Status, Operations
	  d. MAY return some or all of the following optional nodes: Name, Description, PkgIDRef, EnvType, Ext

6.3 Server/Client Interoperability - Delivery using Large Object (Asynchronous Report)

Test Case Id	SCOMO-1.0-int-003
Test Object	SCOMO Client and SCOMO Server
Test Case Description	The purpose is to test client and server interoperability when delivering a Delivery Package using Large Object and asynchronous reporting
Specification Reference	[SCOMO-TS] Chapter 5 (Software Component Management Framework)
SCR Reference	SCOMO-C-001-M (Support for Download) SCOMO-C-025-O (Support asynchronous result reporting) SCOMO-S-001-M (Support for the SCOMO)
ETR Reference	OMA-DM-Delivery
Tool	None
Test code	None
Preconditions	• An established DM session between DM Client and DM Server • The SCOMO Client MUST support downloading of a Package based on Large Object (from DM Server) • In this test case "<X>" denotes the string that is used in the actual MO
Test Procedure	1. Perform an Add command to add the /Inventory/Delivered/<X> node, if it does not exist 2. Perform Add commands to add child nodes of the /Download/<X> node (unless they already exist or Device created them as a result of step 1 above) 3. Perform a Replace command on node /Inventory/Delivered/<X>/Data (uses Large Object feature) 4. Perform a Get on node /Inventory/ Delivered /<X>/Status 5. Perform a Get on node /Inventory/Deployed/<X> 6. Perform an Exec on node /Inventory/Delivered/<X>/Operations/Install 7. Perform a Get on node /Inventory/ Delivered /<X>/Status (this step may need be repeated several times to poll for changes in the Status value) 8. Perform a Get on node /Inventory/Deployed/<X> and all its direct child nodes

Pass-Criteria	1. The Add commands (steps 1, 2):
	    a. The SCOMO Client creates an /Inventory/Delivered/<X> branch including child nodes
	    b. Returns response with result code 1200 (OK)
	2. The Replace command on node /Inventory/Delivered/<X>/Data (step 3):
	    a. Returns response with result code 1200 (OK)
	    b. The Data leaf containing data of the Delivery Package is replaced
	3. The Get commands on node /Inventory/Delivered/<X>/Status (step 4):
	    a. Returns response with result code 1200 (OK)
	    b. Status value changes from existing Status to 10 (Idle/Start)
	4. The response for Get command on node /Inventory/Deployed/<X> (step 5) returns error with a valid error code (due to the fact that the node should not exist)
	5. The response for the Exec command (step 6):
	    a. MUST have status code 1200
	6. The Get commands on node /Inventory/Delivered/<X>/Status (step 7):
	    a. Returns response status code 200 (OK)
	    b. Status value changes from existing status to 40 (Install Progressing) then 10 (Idle/Start)
	7. The Get commands on node /Inventory/Deployed/<X> and its direct child nodes (step 8):
	    a. Has response with status code 1200 (OK)
	    b. PkgIDRef node (if exists) is either empty or points to the ID of the package that was downloaded
	    c. MUST return all the following mandatory nodes: ID, Version, State, Status, Operations
	    d. MAY return some or all of the following optional nodes: Name, Description, PkgIDRef, EnvType, Ext

6.4 Delivery using Alternate Download (Synchronous Report)

Test Case Id	SCOMO-1.0-int-004
Test Object	SCOMO Client and SCOMO Server
Test Case Description	The purpose is to test client and server interoperability when delivering a Delivery Package using Alternate Download
Specification Reference	[SCOMO-TS] Chapter 5 (Software Component Management Framework)

SCR Reference	SCOMO-C-002-O (Support for Alternate Download (requires SCOMO-C-026-O AND SCOMO-C-027-O)) SCOMO-C-024-O (Support synchronous result reporting) SCOMO-S-001-M (Support for the SCOMO) SCOMO-DMS-001-M (Provide metadata with the Deployment Component)
ETR Reference	Alternate-Delivery Report
Tool	None
Test code	None
Preconditions	• An established DM session between DM Client and DM Server • The SCOMO Client MUST support downloading of a Package based on Alternate Download Mechanism (e.g. DLOTA) • In this test case "<X>" denotes the string that is used in the actual MO
Test Procedure	1. Perform an Add command to add the /Download/<X> node, if it doesn't exist. 2. Perform Add commands to add child nodes of the /Download/<X> node (unless they already exist or Device created them as a result of step 1 above) 3. Perform a Get on node /Download/<X>/Status 4. Perform a Get on node /Inventory/Delivered/<X> 5. Perform an Exec on node /Download/<X>/Operations/ Download 6. Perform a Get on node /Download/<X>/Status (this step may need be repeated several times to poll for changes in the Status value) 7. Perform a Get on node /Inventory/Delivered/<X> and all its direct child nodes

Pass-Criteria	1.	The Add commands (steps 1, 2):
	1.1	The SCOMO Client creates a /Download/<X> branch including child nodes
	1.2	Returns response with result code 1200 (OK).
	2.	The Get command on node /Download/<X>/Status (steps 3, 6):
	2.1	Returns response status code 1200 (OK)
	2.2	Status value changes from existing Status to Idle/Start value
	3.	The response for Get command on node /Inventory/Delivered/<X> (step 4) returns error with a valid error code (due to the fact that the node should not exist)
	4.	The response for the Exec command (step 5):
	4.1	MUST have status code 1200
	5.	The Get commands on node /Inventory/Delivered/<X>/Status (steps 3, 6):
	5.1	Returns response status code 1200 (OK)
	5.2	Status value changes from existing status to 10 (Idle/Start), then 30 (Download Progressing), then (40 Download Complete) (this pass criteria may depend on the download duration and the exact timing of the Get command processing)
	6.	The Get commands on node /Inventory/Deployed/<X> and its direct child nodes (step 7):
	6.1	Has response with result code 1200 (OK)
	6.2	PkgID from the existing node MUST preserve the same value as in Download/<X>/PkgID
	6.3	MUST return all the following mandatory nodes: PkgID, Data, PkgType, Status, State
	6.4	MAY return some or all of the following optional nodes: Name, Description, EnvType, Ext

6.5   Delivery using Alternate Download (Asynchronous Report)

Test Case Id	SCOMO-1.0-int-005
Test Object	SCOMO Client and SCOMO Server
Test Case Description	The purpose is to test client and server interoperability when delivering a Delivery Package using Alternate Download
Specification Reference	[SCOMO-TS] Chapter 5 (Software Component Management Framework)
SCR Reference	SCOMO-C-002-O (Support for Alternate Download (requires SCOMO-C-026-O AND SCOMO-C-027-O))
	SCOMO-C-025-O (Support asynchronous result reporting)
	SCOMO-S-001-M (Support for the SCOMO)
	SCOMO-DMS-001-M (Provide metadata with the Deployment Component)

ETR Reference	Alternate-Delivery Report
Tool	None
Test code	None
Preconditions	• An established DM session between DM Client and DM Server • The SCOMO Client MUST support downloading of a Package based on Alternate Download Mechanism (e.g. DLOTA) • In this test case "<X>" denotes the string that is used in the actual MO
Test Procedure	1. Perform an Add command to add the /Download/<X> node, if it doesn't exist. 2. Perform Add commands to add child nodes of the /Download/<X> node (unless they already exist or Device created them as a result of step 1 above) 3. Perform a Get on node /Download/<X>/Status 4. Perform a Get on node /Inventory/Delivered/<X> 5. Perform an Exec on node /Download/<X>/Operations/ Download 6. Perform a Get on node /Download/<X>/Status (this step may need be repeated several times to poll for changes in the Status value) 7. Perform a Get on node /Inventory/Delivered/<X> and all its direct child nodes

Pass-Criteria	1. The Add commands (steps 1, 2):
	1.1 The SCOMO Client creates a /Download/<X> branch including child nodes
	1.2 Returns response with result code 1200 (OK).
	2. The Get command on node /Download/<X>/Status (steps 3, 6):
	2.1 Returns response status code 1200 (OK)
	2.2 Status value changes from existing Status to Idle/Start value
	3. The response for Get command on node /Inventory/Delivered/<X> (step 4) returns error with a valid error code (due to the fact that the node should not exist)
	4. The response for the Exec command (step 5):
	4.1 MUST have status code 1202
	5. The Get commands on node /Inventory/Delivered/<X>/Status (steps 3, 6):
	5.1 Returns response status code 1200 (OK)
	5.2 Status value changes from existing status to 10 (Idle/Start), then 30 (Download Progressing), then (40 Download Complete) (this pass criteria may depend on the download duration and the exact timing of the Get command processing)
	6. The Get commands on node /Inventory/Deployed/<X> and its direct child nodes (step 7):
	6.1 Has response with result code 1200 (OK)
	6.2 PkgID from the existing node MUST preserve the same value as in Download/<X>/PkgID
	6.3 MUST return all the following mandatory nodes: PkgID, Data, PkgType, Status, State
	6.4 MAY return some or all of the following optional nodes: Name, Description, EnvType, Ext
	7. The response for Generic Alert after Exec command (step 5):
	7.1 Generic Alert equals 1226
	7.2 Has result code 1200 (OK).
	7.3 <Source><LocURI> gets value of the Primitive node on which the Exec command was invoked.
	7.4 <Target><LocURI> gets the newly created dynamic node value under the Deployed tree for the Deployment Component

6.6 Update Component (Synchronous Report)

Test Case Id	SCOMO-1.0-int-006
Test Object	SCOMO Client and SCOMO Server
Test Case Description	The purpose is to test client and server interoperability when updating an existing software component.
Specification Reference	[SCOMO-TS] Chapter 5 (Software Component Management Framework)
Tool	None
Test code	None

SCR Reference	SCOMO-C-001-M (Support for Download (requires SCOMO-C-002-O OR SCOMO-C-005-O))
	SCOMO-C-024-O (Support synchronous result reporting)
	SCOMO-C-029-O (Support installation Primitives on Delivered sub-tree (requires SCOMO-C-021-O OR SCOMO-C-022-O))
	SCOMO-S-001-M (Support for the SCOMO)
	SCOMO-DMS-001-M (Provide metadata with the Deployment Component)
ETR Reference	Update
	Inventory
	Report
Preconditions	• An established DM session between DM Client and DM Server
	• In this test case "<X>" denotes the string that is used in the actual MO, for an existing pre-deployed Deployment Component
	• The existing Deployment Component is reflected in the Inventory (under ./Inventory/Deployed/<X> subtree)
	• A Delivery Package, containing an update for the Deployment Component
	• The meta data within the Delivery Package uses the same ID as ./Inventory/Deployed/<X>/ID node
	• The meta data within the Deployed Component uses a different Version than ./Inventory/Deployed/<X>/Value node
	• The DM Server has proper ACL rights to access all relevant nodes of the DM Tree
Test Procedure	1. Perform a Get on node /Inventory/Deployed/<X>
	2. Perform an Exec on node /Download/<X>/Operations/ DownloadInstall
	3. Perform a Get on node /Inventory/Deployed/<X>

Pass-Criteria	1. The responses for both Get commands on node Inventory/Deployed/<X> (steps 1, 3):
	1.1 Has result code 1200 (OK).
	1.2 MUST return all the following mandatory nodes: ID, PkgIDRef, Version, State, Status, Ext
	1.3 MAY return some or all of the following optional nodes: Name, Description, EnvType
	2. The response for the Exec command (step 2):
	2.1 MUST have result code 1200
	3. Comparing the values of the following nodes MUST reflect the up-to-date metadata as follows:
	3.1 ID value remains the same
	3.2 Version value changes from the existing value to the value that was in the metadata of the Deployment Component within the Delivery Package
	3.3 PkgIDRef (if exists) is either empty or points to the package that was downloaded
	3.4 State value changes from existing value to 20 (Active).
	3.5 Status value is either in the state of Idle (10) or Activate Progressing (50).
	4. If supported by the Deployment Component – verify that it has been updated (updated functionality, UI or other visible indication)

6.7 Update Component (Asynchronous Report)

Test Case Id	SCOMO-1.0-int-007
Test Object	SCOMO Client and SCOMO Server
Test Case Description	The purpose is to test client and server interoperability when updating an existing software component.
Specification Reference	[SCOMO-TS] Chapter 5 (Software Component Management Framework)
Tool	None
Test code	None
SCR Reference	SCOMO-C-001-M (Support for Download (requires SCOMO-C-002-O OR SCOMO-C-005-O)) SCOMO-C-025-O (Support asynchronous result reporting) SCOMO-C-029-O (Support installation Primitives on Delivered sub-tree (requires SCOMO-C-021-O OR SCOMO-C-022-O)) SCOMO-S-001-M (Support for the SCOMO) SCOMO-DMS-001-M (Provide metadata with the Deployment Component)
ETR Reference	Update Inventory Report

Preconditions	• An established DM session between DM Client and DM Server • In this test case "<X>" denotes the string that is used in the actual MO, for an existing pre-deployed Deployment Component • The existing Deployment Component is reflected in the Inventory (under ./Inventory/Deployed/<X> subtree) • A Delivery Package, containing an update for the Deployment Component • The meta data within the Delivery Package uses the same ID as ./Inventory/Deployed/<X>/ID node • The meta data within the Deployed Component uses a different Version than ./Inventory/Deployed/<X>/Value node • The DM Server has proper ACL rights to access all relevant nodes of the DM Tree
Test Procedure	1. Perform a Get on node /Inventory/Deployed/<X> 2. Perform an Exec on node /Download/<X>/Operations/ DownloadInstall 3. Perform a Get on node /Inventory/Deployed/<X>
Pass-Criteria	1. The responses for both Get commands on node Inventory/Deployed/<X> (steps 1, 3): 1.1 Has result code 1200 (OK). 1.2 MUST return all the following mandatory nodes: ID, PkgIDRef, Version, State, Status, Ext 1.3 MAY return some or all of the following optional nodes: Name, Description, EnvType 2. The response for the Exec command (step 2): 2.1 MUST have result code 1202 3. Comparing the values of the following nodes MUST reflect the up-to-date metadata as follows: 3.1 ID value remains the same 3.2 Version value changes from the existing value to the value that was in the metadata of the Deployment Component within the Delivery Package 3.3 PkgIDRef (if exists) is either empty or points to the package that was downloaded 3.4 State value changes from existing value to 20 (Active). 3.5 Status value is either in the state of Idle (10) or Activate Progressing. 4. If supported by the Deployment Component – verify that it has been updated (updated functionality, UI or other visible indication) 5. The response for Generic Alert after Exec command (step 2): 5.1 Generic Alert equals 1226 5.2 Has result code 1200 (OK). 5.3 <Source><LocURI> gets value of the Primitive node on which the Exec command was invoked. 5.4 <Target><LocURI> gets the newly created dynamic node value under the Deployed tree for the Deployment Component

Appendix A.   Change History   (Informative)

A.1   Approved Version History

Reference	Date	Description
n/a	n/a	No prior version –or- No previous version within OMA

A.2   Draft/Candidate Version 1.0 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-ETS-SCOMO-V1_0	11 Nov 2008	All	Initial revision, based on template from 2008 (Nov. 4)
	06 Jan 2009	6	CR incorporated: OMA-IOP-MEC-2008-0220 OMA-IOP-MEC-2008-0221 OMA-IOP-MEC-2008-0222
	15 Jan 2009	5	CR incorporated: OMA-IOP-MEC-2008-0246
	02 Jun 2009	All	OMA-IOP-MEC-2009-0101
	08 Jun 2009	All	Made public after IOP WG agreement
Candidate Versions OMA-ETS-SCOMO-V1_0	26 Jun 2008	n/a	TP approved during TP#25 Boston