OMA Device Management Server Delegation Protocol

Candidate Version 1.3 – 06 Mar 2012

Open Mobile Alliance

OMA-TS-DM_Server_Delegation_Protocol-V1_3-20120306-C

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1. Scope

This document specifies the OMA Device Management Server to Server delegation mechanism.

A DM Server can use this mechanism to delegate the DM Client authority to another DM Server.

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2. References

2.1 Normative References

[DMDELXSD] "Server Delegation Protocol Schema, Version 1.3". Open Mobile Alliance™. URL:http://www.openmobilealliance.org

[DMDICT] "OMA Device Management Dictionary", Draft Version 1.0, Open Mobile Alliance™, URL:http://www.openmobilealliance.org/

[DMREPRO] "OMA Device Management Representation Protocol, Version 1.3". Open Mobile Alliance™. URL:http://www.openmobilealliance.org

[DMSTDOBJ] "OMA Device Management Standardized Objects, Version 1.3". Open Mobile Alliance™. OMA-TS-DM_StdObj-V1_3. 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

[RFC2616] "Hypertext Transfer Protocol – HTTP/1.1", R. Fielding, et al., June 1999, URL:http://www.ietf.org/rfc/rfc2616.txt

[SCRRULES] "SCR Rules and Procedures", Open Mobile Alliance™, OMA-ORG-SCR_Rules_and_Procedures, URL:http://www.openmobilealliance.org/

2.2 Informative References

None.

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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.

Any reference to components of the DTD's or XML snippets is specified in this “`typeface`”.

3.2 Definitions

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

3.3 Abbreviations

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

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4. Introduction

This specification defines the DM Client authority delegation process involving two DM Servers.

The delegation process is the process by which one Management Authority (the delegating MA) delegates or revokes the management control of a DM Tree to another MA; in this specification several types of delegation and revocation of delegation are described. In addition to describing multiple process flows, this specification defines the DM server to DM Server delegation protocol.

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5. Client Authority Delegation

5.1 Overview

The delegation of authority to manage a DM Client to alternate DM Servers, within a Management Authority or between Management Authorities, is a useful function for any Management Authority, as it provides flexibility in the management of a network of DM Clients. In this specification, a mechanism is specified to transfer between DM Servers the authority to manage a DM Client: it is called Client Authority Delegation.

The delegation of a DM Client authority involves at least two DM Servers and one DM Client.

The delegation mechanism consists of one DM Server (Delegating Server) which delegates the authority to manage a DM Client to a second DM Server (Delegated Server).

For example, collaborative management of a DM Client by two DM Servers is a likely scenario in enterprise and service provider business relationships. The enterprise will manage the portion of DM Client associated with the business of the enterprise such as specific enterprise applications, while the service provider will manage the communications aspects of the DM Client. The enterprise and service provider are each a Management Authority over the DM Client.

The delegation of the management authority can be achieved by the following steps:

1. Accepting delegation request
2. Adding account information of the Delegated Server
3. Configuring ACLs of the Management Tree

In this specification two scenarios are described. In the first one (5.2.1), the Delegated Server provides the information about its DMAcc to the Delegating Server, which add this information in the DM Client; in the second one (5.2.2), the Delegated Server provides the Bootstrap Server URL to the Delegating Server, which forwards this information to the DM Client.

Obviously, once a Management Autorithy has transferred the authority to manage aDM Client, is should be possible to revoke the control and resume back the authority: in the following sections several scenarios of revocation are described.

In this specification three different scenarios are described. In the first one (5.2.3), the Delegating Server wants to interrupt the delegation in a “gentle” way: in order to give to the Delegated Server the possibility to terminate safely all activities with the DM Client, it waits for Delegated Server confirmation before revoking the delegation ; in the second one (5.2.4) the Delegated Server asks to the Delegating Server to terminate the delegation and resume the autorithy on DM Client; the last one (5.2.5) is similar to the first one, but in this case the Delegating Server interrupts the delegation without notice.

In the following sections, each process is described in detail; the Delegating Server is shown as DMS-1 and the Delegated Server is shown as DMS-2.

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5.2 Process Flows

5.2.1 Delegation using DMS-2 DMAcc approach

In this scenario, DMS-1 creates the DMS-2 DMAcc on the DM Client according to the information provided by DMS-2.

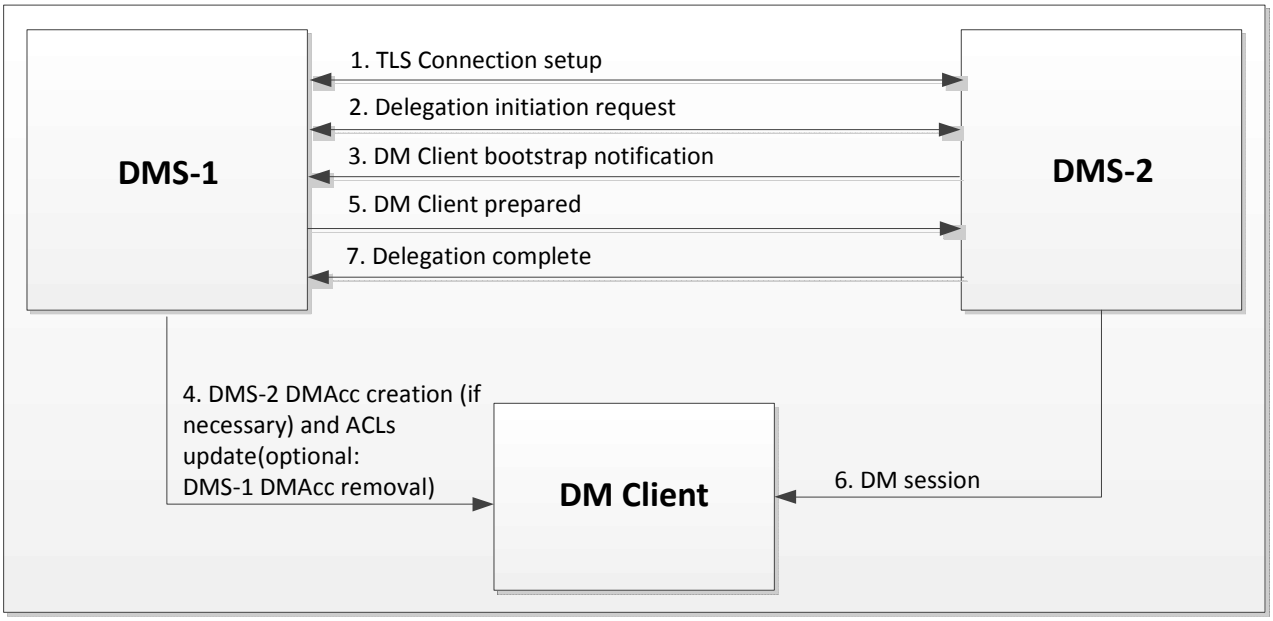

Figure 1: Delegation process – Setup DMAcc for DMS-2

5.2.1.1 Step 1: TLS Connection Setup

Mutual authentication of DM Servers will be done by establishing an HTTPS session. Both Servers MUST support the X.509 digital certificate based authentication on TLS.

5.2.1.2 Step 2: Delegation Initiation Request

The delegation process may be initiated by the DMS-1 or by the DMS-2.

5.2.1.3 Step 3: DMS-2 bootstrap notification

The DMS-2 notifies the DMS-1 if DM Client has been already successfully bootstrapped, or if the DMS-2 DMAcc has to be created on DM Client.

5.2.1.4 Step 4: DM Client preparation

Based on the Step 3 response, if not originally done by the DMS-2, the DMS-1 creates the DMS-2 DMAcc on the DM Client.

The DMS-1 updates the DM Tree ACLs accordingly to the DMS-2 serverId.

The DMS-1 indicates to the DM Client that no DM session must be initiated to the DMS-2. Note: this behaviour can be achieved by setting to false the NoAutoInitialSession node in DMAcc (see the section 5.3.1 in [DMSTDOBJ]). This value can be changed later, if required, by the DMS-1 or the DMS-2: e.g., the DMS-1 MAY implement a timeout waiting for Delegation complete message and if this timeout expires without response, it MAY impose to the DM Client to connect automatically to the DMS-2.

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5.2.1.5 Step 4b: Optional - DMS-1 DMAcc removal from DM Client Delegation complete

If the DMS-1 is to do full delegation, then it deletes its own DMAcc from the DM Client.

5.2.1.6 Step 5: DM Client prepared

The DMS-1 notifies the DMS-2 that the DM Client preparation is done.

5.2.1.7 Step 6: DM session initiation

The DMS-2 initiates a DM session with the DM Client.

5.2.1.8 Step 7: Delegation complete

The DMS-2 notifies the DMS-1 that the delegation process is complete.

5.2.2 Delegation using DMS-2 Bootstrap Server URL approach

In this scenario, DMS-1 forwards to the DM Client the Boostrap Server URL provided by DMS-2.

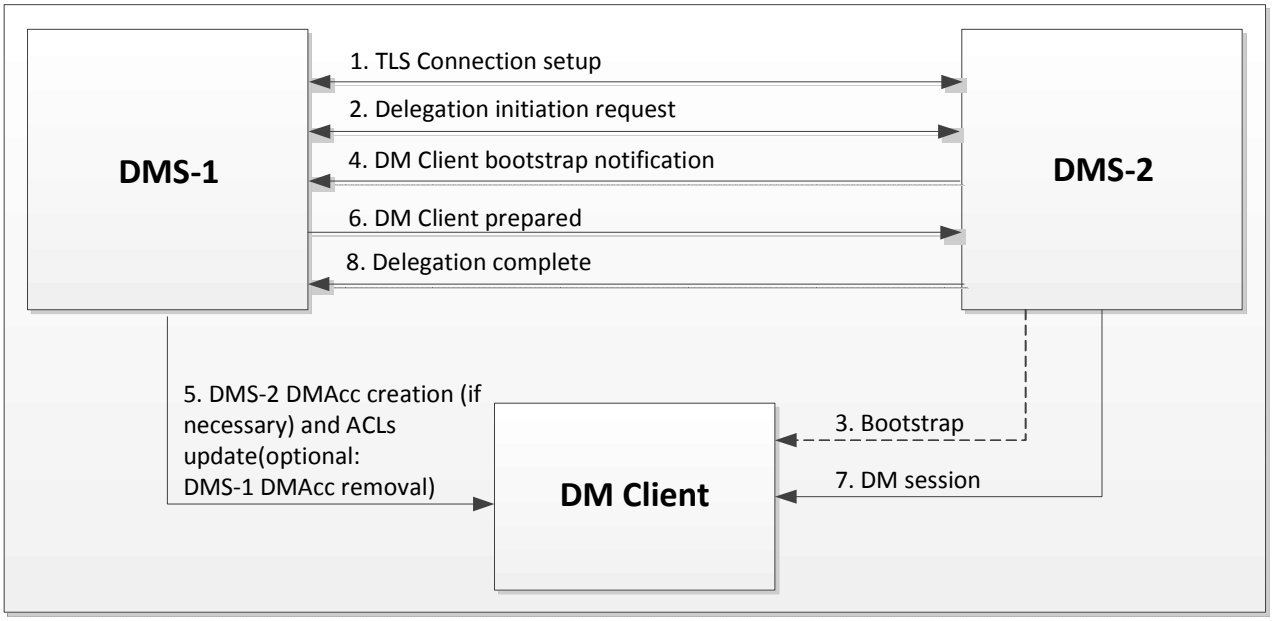

Figure 2: Delegation process - Bootstrap Server URL

5.2.2.1 Step 1 and 2: TLS Connection Setup and Delegation Initiation Request

The flows for the Steps 1 and 2 are identical to what is being described in the sections 5.2.1.1 and 5.2.1.2.

5.2.2.2 Step 3: DMS-1 requests DMS-2 for its Bootstrap Server URL

The DMS-1 requests the DMS-2's Bootstrap Server URL to the DMS-2.

The DMS-2 sends its Bootstrap Server URL to the DMS-1.

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5.2.2.3 Step 4: DM Client bootstrap setup

The DMS-1 provides the DMS-2's Bootstrap Server URL to the DM Client (for example, by adding a new entry in the Bootstrap Config MO on the device).

5.2.2.4 Step 5: DM Client request DMS-2 bootstrap

Using the DMS-2's Bootstrap Server URL, the DM Client requests the DMS-2's bootstrap from the Bootstrap Server. (The Bootstrap Server and the DMS-2 may be the same physical device.)

The Bootstrap Server provides the DMS-2's bootstrap information to the DM Client.

5.2.2.5 Step 6: DM session initiation

After getting bootstrapped, the DM Client initiates a DM session with the DMS-2.

5.2.2.6 Step 7: DMS-2 bootstrap complete

The DMS-2 notifies the DMS-1 that the DM Client has been successfully bootstrapped.

5.2.2.7 Step 8: DMS-1 update ACLs

The DMS-1 updates the DM Tree ACLs accordingly to the DMS-2 serverId.

5.2.2.8 Step 8b: Optional - DMS-1 DMAcc removal from DM Client Delegation complete

The flow for the Step 8b is identical to what is being described in the sections 5.2.1.5.

5.2.2.9 Step 9: Client prepared

The DMS-1 notifies the DMS-2 that the DM Client preparation is done.

5.2.2.10 Step 10: Delegation complete

The DMS-2 notifies the DMS-1 that the delegation process is complete.

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5.2.3 Delegation Revocation (asked)

If the DMS-1 still has its DMAcc on the DM Client, then DMS-1 can choose to revoke the delegation; in this scenario the DMS-1 requests to the DMS-2 to terminate all activities with DM Client and waits for the notification from the DMS-2 before terminating the delegation.

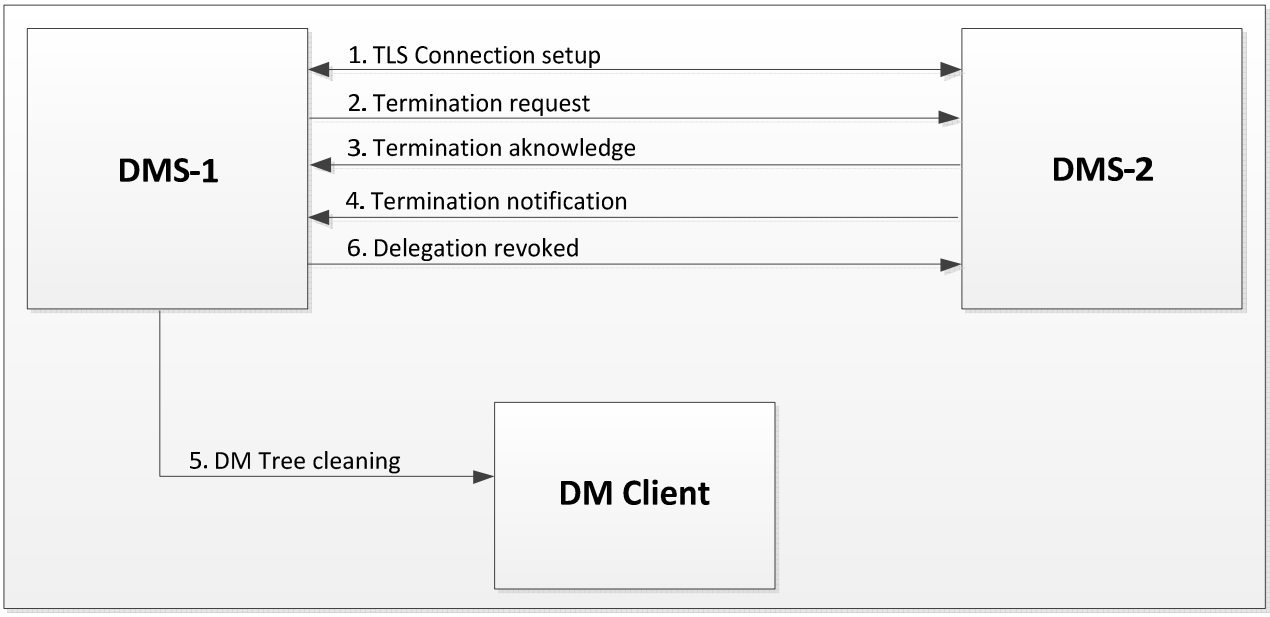

Figure 3: Delegation Revocation (asked) Process

5.2.3.1 Step 1: TLS Connection setup

The flow for the Step 1 is identical to what is being described in the section 5.2.1.1.

5.2.3.2 Step 2: Activities termination request

The DMS-1 asks to the DMS-2 to terminate all activities on the DM Client in order to safely revoke delegation.

5.2.3.3 Step 3: Activities acknowledge

The DMS-2 acknowledges to the DMS-1 of the termination request.

5.2.3.4 Step 4: Activities termination notification

The DMS-2 notifies to the DMS-1 that all of its activities on the DM Client has been terminated and the delegation can safely revoked.

Note: the DMS-1 MAY implement a timeout for the DMS-2's activities termination notification; if this timeout expires, the DMS-1 MAY proceed with the Step 5 even if the notification (noted in this step) has not been received.

5.2.3.5 Step 5: Delegation Removal

The DMS-1 deletes and cleans the DMS-2 from the DM Client Management Tree (DMAcc removal).

5.2.3.6 Step 6: Delegation Revocation notification

The DMS-1 notifies the DMS-2 that the delegation has been revoked successfully.

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5.2.4 Delegation Revocation (requested)

In this scenario the DMS-2 requests for some reasons to the DMS-1 to terminate the delegation. Then the DMS-1 interrupts the delegation without any wait.

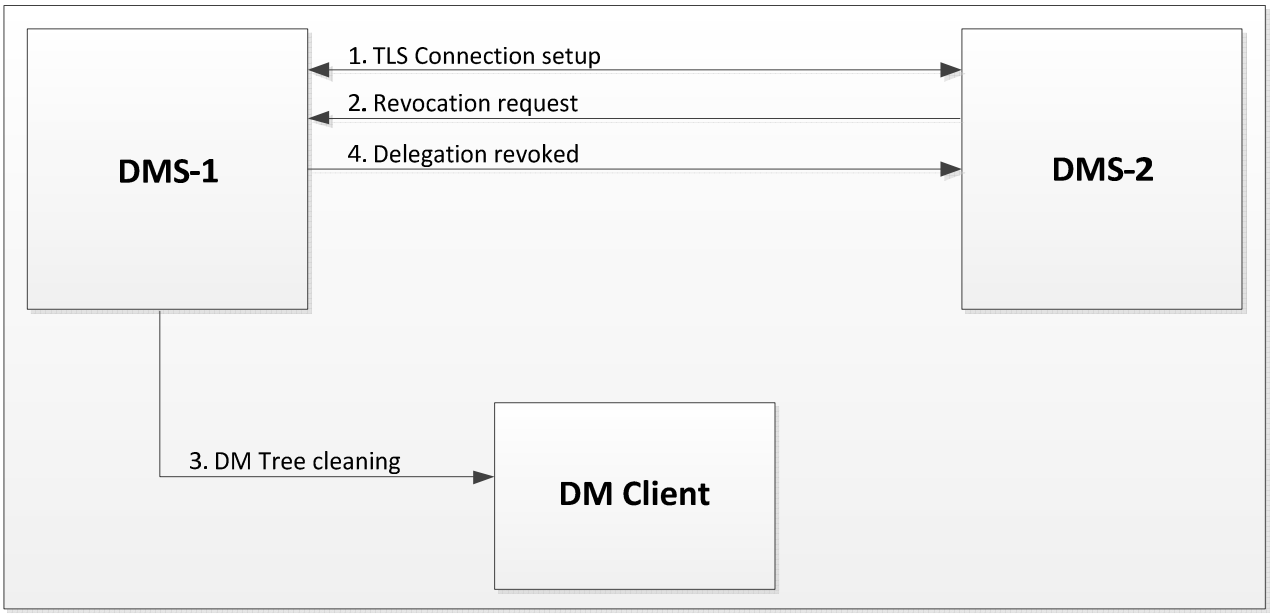

Figure 4: Delegation Revocation (requested) process

5.2.4.1 Step 1: TLS Connection setup

The flow for the Step 1 is identical to what is being described in the section 5.2.1.1.

5.2.4.2 Step 2: Delegation Revocation request

The DMS-2 requests to the DMS-1 the revocation of delegation.

5.2.4.3 Step 3: Delegation Removal

The DMS-1 deletes and cleans the DMS-2 from the DM Client Management Tree (DMAcc removal).

5.2.4.4 Step 4: Delegation Revocation notification

The DMS-1 notifies the DMS-2 that the delegation has been revoked successfully.

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5.2.5 Delegation Revocation (forced)

In this scenario the DMS-1 interrupts for some reasons the delegation without any forewarning to the DMS-2; once the delegation has been terminated, the DMS-1 MAY notify the DMS-2.

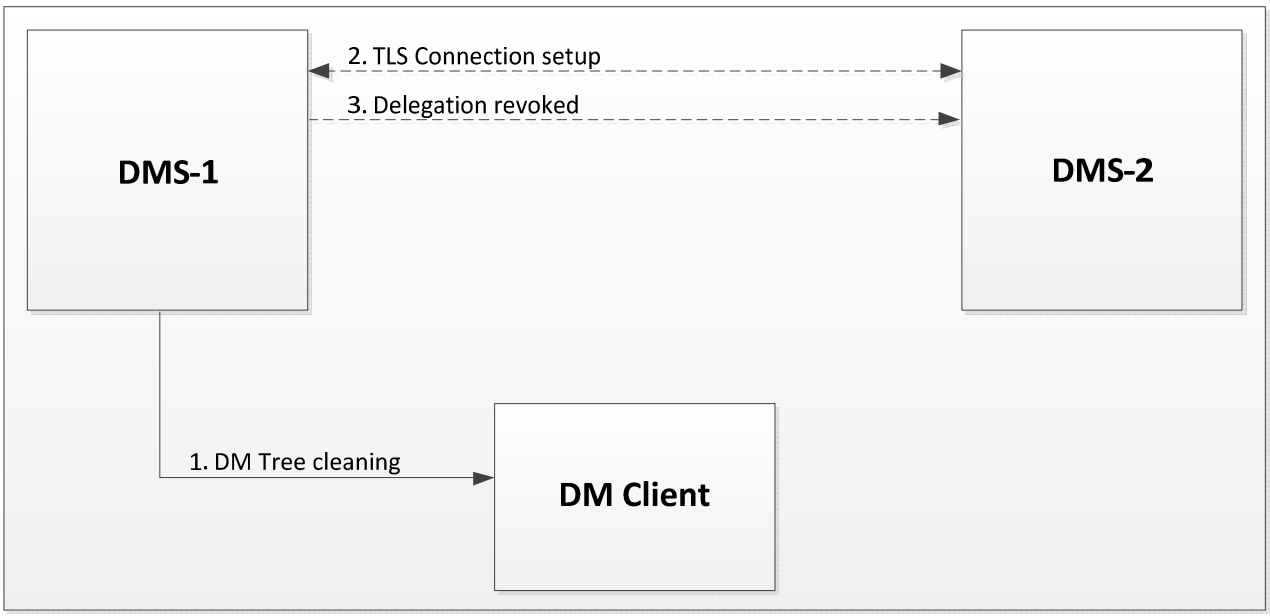

Figure 5: Delegation Revocation (forced) process

5.2.5.1 Step 1: Delegation Removal

The DMS-1 deletes and cleans the DMS-2 from the DM Client Management Tree (DMAcc removal).

5.2.5.2 Step 2: TLS Connection setup

The flow for the Step 2 is identical to what is being described in the section 5.2.1.1.

5.2.5.3 Step 3: Optional - Delegation Revocation notification

The DMS-1 notifies the DMS-2 that the delegation has been revoked.

5.3 DM Server to DM Server Interface

This chapter defines the message structure for the DM delegation protocol as well as its binding over the Hypertext Transfer Protocol (HTTP) as defined by [RFC2616].

In order to exchange the delegation protocol messages, DM Servers MUST use HTTP POST method with “application/vnd.dm.delegation+xml” value for “Content-Type” HTTP header and a xml document containing delegation protocol parameters as HTTP body. The schema for this XML document is specified in [DMDELXSD].

The target URL MUST be in the form of "https://<host>[:<port>][…]/<interface_name>”. Both DM Servers MUST expose a protocol end point for the DM delegation protocol as they act both as HTTP client and server.

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The HTTP response will include the response status code. The body of the HTTP Response MUST either carry a DM delegation protocol message as a reponse to the request in the POST or no content. When no content is provided, the HTTP status code SHALL be the status reponse to the DM delegation protocol request message. If content is provided, the content-type for the body SHOULD be “application/vnd.dm.delegation+xml”.

The message flow diagrams in the following sections illustrate the protocol exchanges in the true case, where no error conditions occur.

If a failure occurs at any point in a delegation process (sections 5.3.1 and 5.3.2), the delegation session between the DM Server SHOULD be terminated immediately. Upon sending or receiving a failure message, the DM Servers, if possible, SHOULD undo all changes done to the DM Client, purge any saved state information associated with the delegation process and revert to the existing delegation scheme prior to the start of the process. The DM Server MAY start the process again at any time.

In a revocation process (sections 5.3.3, 0 and 5.3.5), if the DMS-1 fails in removing the DMS-2 data from DM Client, it SHOULD notify the DMS-2 that delegation could be compromised. In Asked Revocation (section 5.3.3), if the DMS-2 fails in stopping safely activities on DM Client, it MAY avoid to notify the DMS-1 and the DMS-1 SHOULD proceed with the DMS-2 data removal.

5.3.1 Delegation using DMS-2 DMAcc

Figure 6 through Figure 8 illustrate the delegation process using the DMAcc MO of the DMS-2.

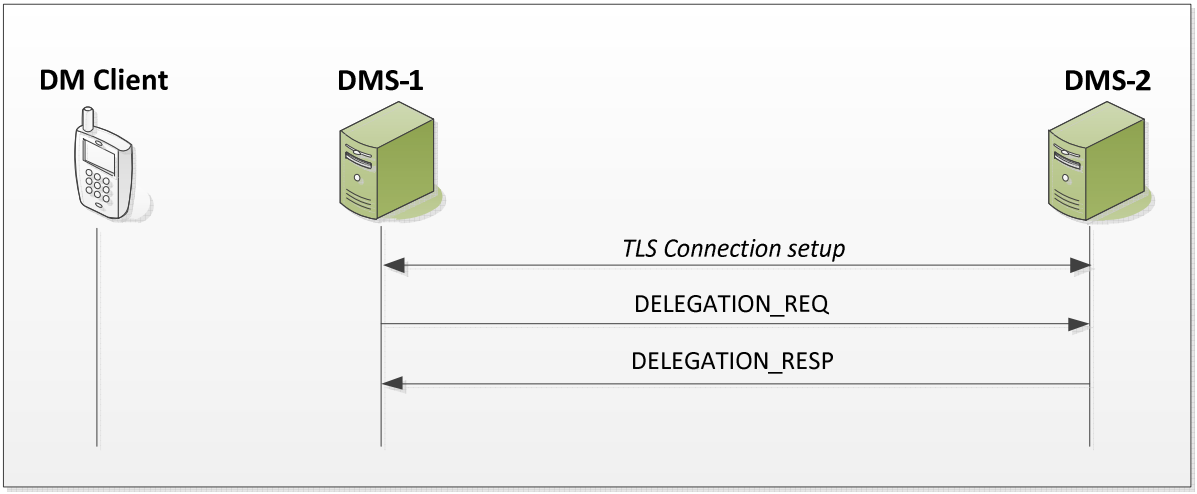

Figure 6: Delegation Protocol message exchange (initiated by DMS-1)

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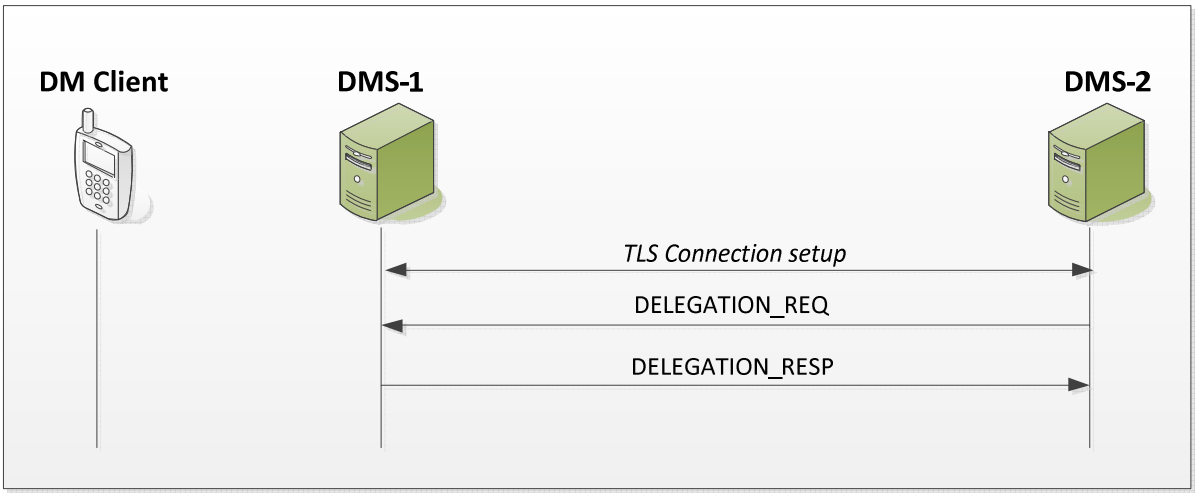

Figure 7: Delegation Protocol message exchange (initiated by DMS-2)

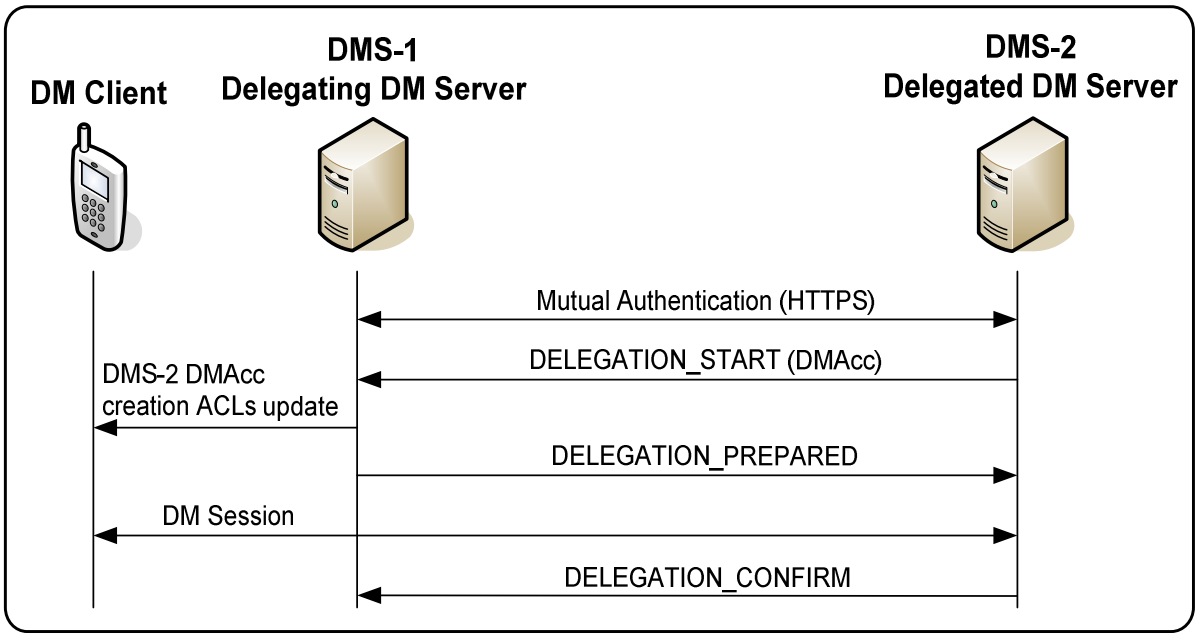

Figure 8: Delegation Protocol message exchange

A description summary of the various delegation protocol messages is provided in the following subsections:

5.3.1.1 DELEGATION_REQ

Delegation Request is the first message sent from the delegation initiator DM Server to its peer DM Server. The semantics of this message depends upon whether the delegation is initiated by the DMS-1 (Figure 6) or by the DMS-2 (Figure 7).

If the delegation is initiated by the DMS-1, this message is a request asking the DMS-2 if it is willing to accept management of a DM Client.

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If the delegation is initiated by the DMS-2, this message is a request from the DMS-2 asking the DMS-1 to grant the management of a DM Client.

This message is asynchronous and carried by HTTP POST. The HTTP response carries the DELEGATION_RESP message.

Table 1: DELEGATION_REQ parameters table

Name	*Type*	*Value(s)*	*Description*
serverId	String		DM Server Identifier
deviceId	string		Device identifier
deviceMan	string	See /DevInfo/Man [DMSTDOBJ]	Device Manufacturer
deviceMod	string	See /DevInfo/Mod [DMSTDOBJ]	Device Model
DMTreeURI	string		The part of DM Tree which management is to be delegated
isDelegationFull	boolean	true/false	True if delegation confirmed is full, false otherwise
sessionId	string		Session Identifier

5.3.1.2 DELEGATION_RESP

The Delegation Response message is sent to the delegation initiator DM Server from its peer DM Server. The semantics of this message depends upon whether the delegation is initiated by the DMS-1 (Figure 6) or by the DMS-2 (Figure 7).

If the delegation is initiated by the DMS-1, this message is sent from the DMS-2 to the DMS-1 with an acknowledgement (isAknowledged set to true) if it is willing to accept management of the DM Client. If the DMS-2 does not wish to accept the request, it sends a DELEGATION_RESP with a negative acknowledgement (isAknowledged set to false).

On the other hand, if the delegation is initiated by the DMS-2, this message is sent from the DMS-1 to the DMS-2 with an acknowledgement (isAknowledged set to true) if it is willing to delegate the management of the DM Client. If the DMS-1 does not wish to accept the request it sends a DELEGATION_RESP with a negative acknowledgement (isAknowledged set to false).

This message is carried by the HTTP response to DELEGATION_REQ (5.3.1.1).

Table 2: DELEGATION_RESP parameters table

Name	*Type*	*Value(s)*	*Description*
reasonCode	int	See section 11 “Response Status Codes” in [DMREPRO]	reason Code
status	string	DELEGATION_RESP	Status field
isAknowledged	boolean	true/false	Acknowledgement value
sessionId	string		Session Identifier

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5.3.1.3 BOOTSTRAP_CONFIRMED

The BOOTSTRAP_CONFIRMED message is sent by the DMS-2 in order to communicate to DMS-1 that the DM Client has been already bootstrapped (isClientBootstapped set to true) or that DMS-1 has to create DMS-2 DMAcc (bootstrap details are provided) . Upon receiving the BOOTSTRAP_CONFIRMED message, the DMS-1 will create the DMS-2 DMAcc on the DM Client (if required) and then update the ACLs on the DM Client as to what the DMS-2 can access. The DMS-1 will notify the DM Client not to automatically establish a DM session with the DMS-2.

This message is asynchronous and carried by HTTP POST. The HTTP response has no content.

Table 3: BOOTSTRAP_CONFIRMED parameters table

Name	*Type*	*Value(s)*	*Description*
reasonCode	int	See section 11 “Response Status Codes” in [DMREPRO]	reason Code
status	string	BOOTSTRAP_CONFIRMED	Status field
isClientBootstapped	boolean	true/false	True if the DMS-2 has bootstrapped DM Client, false otherwise.
DMAcc	complex	see section 5.3.1 of [DMSTDOBJ]	If isClientBootstapped is false, contains the DMS-2 bootstrap information to be used by the DMS-1 in order to create the DMS-2 DMAcc on DM Client.
sessionId	string		Session Identifier

5.3.1.4 DELEGATION_PREPARED

A Delegation Prepared message is sent by the DMS-1 to notify the DMS-2 that the DM Client is ready. Upon receiving the DELEGATION_PREPARED message, the DMS-2 will establish a DM session with the DM Client. If the DMS-1 has removed its own DMAcc from the DM Client (full delegation), this message carries also full delegation confirmation.

This message is asynchronous and carried by HTTP POST. The HTTP response has no content.

Table 4: DELEGATION_PREPARED parameters table

Name	*Type*	*Value(s)*	*Description*
reasonCode	int	See section 11 “Response Status Codes” in [DMREPRO]	reason Code
status	string	PREPARED	Status field
isDelegationFull	boolean	true/false	True if delegation confirmed is full, false otherwise
sessionId	string		Session Identifier

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5.3.1.5 DELEGATION_CONFIRMED

Delegation Confirmed is sent from the DMS-2 to the DMS-1 once a DM session has been established between the DMS-2 and the DM Client.

This message is asynchronous and carried by HTTP POST. The HTTP response has no content.

Table 5: DELEGATION_CONFIRMED parameters table

Name	*Type*	*Value(s)*	*Description*
reasonCode	int	See section 11 "Response Status Codes" in [DMREPRO]	reason Code
status	string	CONFIRMED	Status field
sessionId	string		Session Identifier

5.3.1.6 DELEGATION_FAILURE

A Delegation Failure message may be sent at anytime from either the DMS-1 or the DMS-2 to halt the delegation process.

This message is asynchronous and carried by HTTP POST. The HTTP response has no content.

Table 6: DELEGATION_FAILURE parameters table

Name	*Type*	*Value(s)*	*Description*
reasonCode	int	See section 11 "Response Status Codes" in [DMREPRO]	reason Code
status	string	FAILURE	Status field
sessionId	string		Session Identifier

5.3.2 Delegation using DMS-2 Bootstrap Server URL

Assuming the steps 1-4 in the Figure 2 are successful, the DMS-1 needs to wait a finite duration before declaring that the step 7 has failed.

Figure 9 through Figure 11 illustrate the delegation process using the Bootstrap Server URL of the DMS-2.

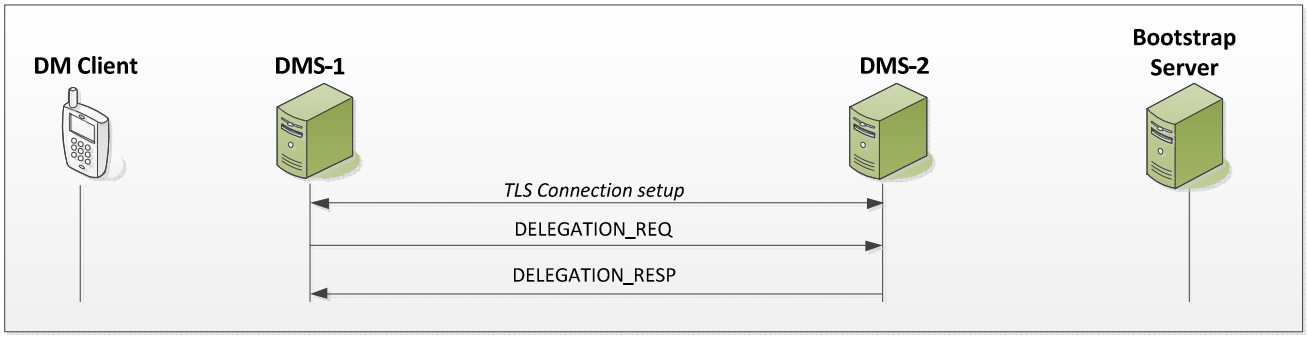

Figure 9: Delegation Protocol message exchange (initiated by DMS-1)

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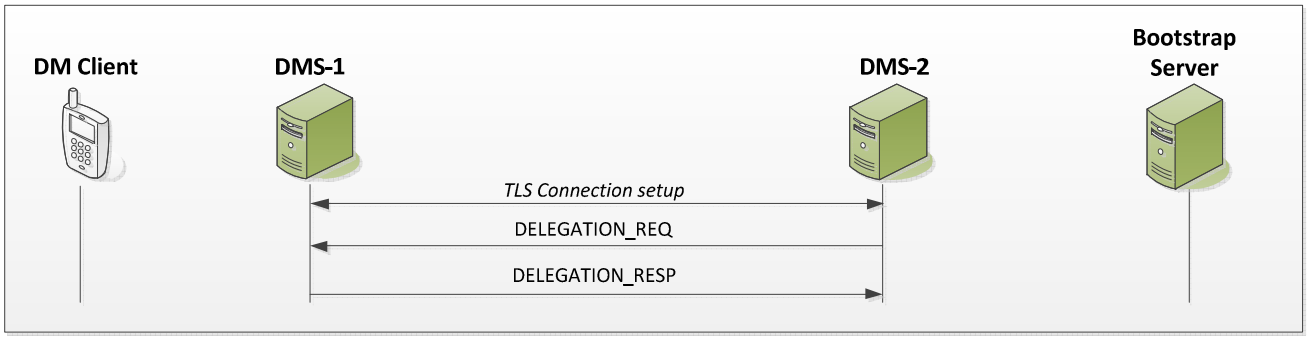

Figure 10: Delegation Protocol message exchange (initiated by DMS-2)

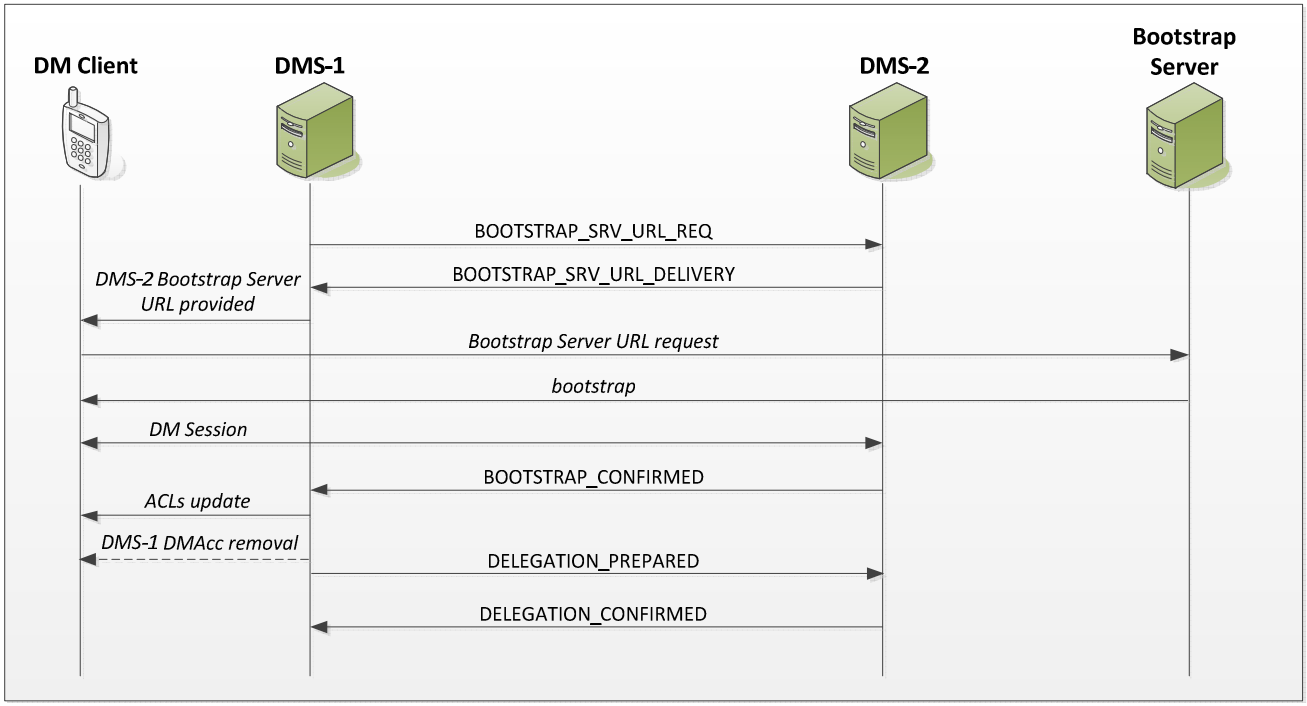

Figure 11: Delegation Protocol message exchange

A summary description of the various delegation protocol messages is provided in the following subsections:

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5.3.2.1 DELEGATION_REQ

The semantics of this message is the same as described in the section 5.3.1.1, with the slight change that references to the Figure 6 and the Figure 7 need to be replaced by references to Figure 9 and the Figure 10 respectively.

5.3.2.2 DELEGATION_RESP

The semantics of this message is the same as described in the section 5.3.1.2, with the slight change that references to the Figure 6 and the Figure 7 need to be replaced by references to the Figure 9 and Figure 10 respectively.

5.3.2.3 BOOTSTRAP_SRV_URL_REQ

The Bootstrap Server URL request is sent from the DMS-1 to the DMS-2 after mutual authentication.

This message is asynchronous and carried by HTTP POST. The HTTP response carries the BOOTSTRAP_SRV_URL_DELIVERY message.

Table 7: BOOTSTRAP_SRV_URL_REQ parameters table

Name	*Type*	*Value(s)*	*Description*
reasonCode	int	See section 11 “Response Status Codes” in [DMREPRO]	reason Code
status	string	BOOT_SRV_URL_REQ	Status field
sessionId	string		Session Identifier

5.3.2.4 BOOTSTRAP_SRV_URL_DELIVERY

The DMS-2 delivers its Bootstrap Server URL to the DMS-1. This causes the DMS-1 to provide this URL to the DM Client (for example, by adding a new entry in the Bootstrap Config MO on the device).

Next, the DM Client will request the Bootstrap Server for the DMS-2 bootstrap information. The Bootstrap Server provides the DMS-2 bootstrap information to the DM Client. Following a successful bootstrap procedure, the DM Client initiates a DM Session with the DMS-2.

This message is carried by the HTTP response to BOOTSTRAP_SRV_URL_REQ (5.3.2.3).

Table 8: BOOTSTRAP_SRV_URL_DELIVERY parameters table

Name	*Type*	*Value(s)*	*Description*
reasonCode	int	See section 11 “Response Status Codes” in [DMREPRO]	reason Code
status	string	BOOT_SRV_URL_DEL	Status field
bootstrapURL	string		The DMS-2 Bootstrap Server URL
sessionId	string		Session Identifier

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5.3.2.5 BOOTSTRAP_ CONFIRMED

Bootstrap Confirmed is sent from the DMS-2 to the DMS-1 to notify the successful bootstrap of the DM Client. Upon receiving the BOOTSTRAP_CONFIRMED message, the DMS-1 will update the ACLs on the DM Client as to what the DMS-2 can access.

This message is asynchronous and carried by HTTP POST. The HTTP response has no content.

Table 9: BOOTSTRAP_CONFIRMED parameters table

Name	*Type*	*Value(s)*	*Description*
reasonCode	int	See section 11 "Response Status Codes" in [DMREPRO]	reason Code
status	string	BOOTSTRAP_CONFIRMED	Status field
sessionId	string		Session Identifier

5.3.2.6 DELEGATION_PREPARED

A Delegation Prepared message is sent by the DMS-1 to notify the DMS-2 that the DM Client is ready. If the DMS-1 has removed its own DMAcc from the DM Client (full delegation), this message carries also full delegation confirmation.

This message is asynchronous and carried by HTTP POST. The HTTP response has no content.

Table 10: DELEGATION_PREPARED parameters table

Name	*Type*	*Value(s)*	*Description*
reasonCode	int	See section 11 "Response Status Codes" in [DMREPRO]	reason Code
status	string	PREPARED	Status field
isDelegationFull	boolean	true/false	True if delegation confirmed is full, false otherwise
sessionId	string		Session Identifier

5.3.2.7 DELEGATION_CONFIRMED

The semantics of this message is the same as described in the section 5.3.1.5

5.3.2.8 DELEGATION_FAILURE

The semantics of this message is the same as described in the section 5.3.1.6.

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5.3.3 Delegation revocation (asked)

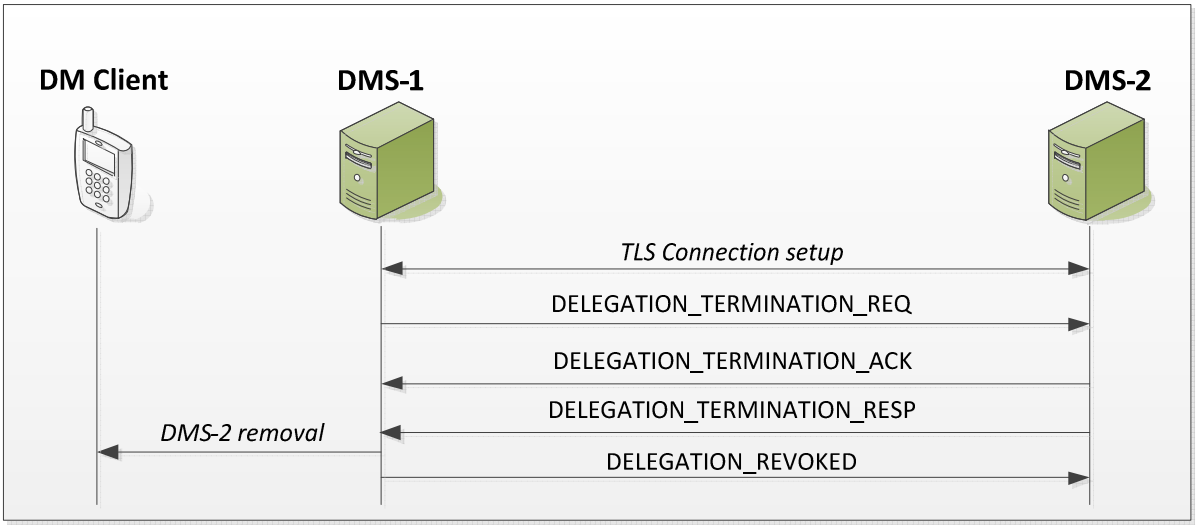

Figure 12: Delegation Revocation (asked) message exchange

A summary description of the protocol messages is provided in the following subsections.

5.3.3.1 DELEGATION_TERMINATION_REQ

After mutual authentication, Delegation Termination Request is sent from the DMS-1 to the DMS-2 asking to terminate all of its activities with the DM Client. This message contains the DM Client information (deviceId).

This message is asynchronous and carried by HTTP POST. The HTTP response carries the DELEGATION_TERMINATION_ACK message.

Table 11: DELEGATION_TERMINATION_REQ parameters table

Name	*Type*	*Value(s)*	*Description*
deviceId	string		Device id
status	string	DEL_TERM_REQ	Status field
sessionId	string		Session Identifier

5.3.3.2 DELEGATION_TERMINATION_ACK

The DMS-2 sends to the DMS-1 acknowledgement of the Delegation Termination Request.

This message is carried by the HTTP response to DELEGATION_TERMINATION_REQ (5.3.3.1).

Table 12: DELEGATION_TERMINATION_ACK parameters table

Name	*Type*	*Value(s)*	*Description*
reasonCode	int	See section 11 “Response Status Codes” in [DMREPRO]	reason Code

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status	string	DEL_TERM_ACK	Status field
sessionId	string		Session Identifier

5.3.3.3 DELEGATION_TERMINATION_RESP

After terminating all activities involving the DM Client, the DMS-2 sends Delegation Termination Response to the DMS-1.

This message is asynchronous and carried by HTTP POST. The HTTP response has no content.

Table 13: DELEGATION_TERMINATION_RESP parameters table

Name	*Type*	*Value(s)*	*Description*
reasonCode	int	See section 11 "Response Status Codes" in [DMREPRO]	reason Code
status	string	DEL_TERM_RESP	Status field
sessionId	string		Session Identifier

5.3.3.4 DELEGATION_REVOKED

The DMS-1 sends the Delegation Revoked message after the DM Client has been cleaned from the DMS-2 data.

This message is asynchronous and carried by HTTP POST. The HTTP response has no content.

Table 14: DELEGATION_REVOKED parameters table

Name	*Type*	*Value(s)*	*Description*
reasonCode	int	See section 11 "Response Status Codes" in [DMREPRO]	reason Code
status	string	DEL_REVOKED	Status field
sessionId	string		Session Identifier

5.3.3.5 REVOCATION_FAILURE

A Revocation Failure message may be sent at anytime from either the DMS-1 or the DMS-2 to halt the revocation process.

This message is asynchronous and carried by HTTP POST. The HTTP response has no content.

Table 15: REVOCATION_FAILURE parameters table

Name	*Type*	*Value(s)*	*Description*
reasonCode	int	See section 11 "Response Status Codes" in [DMREPRO]	reason Code
status	string	FAILURE	Status field
sessionId	string		Session Identifier

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5.3.4 Delegation revocation (requested)

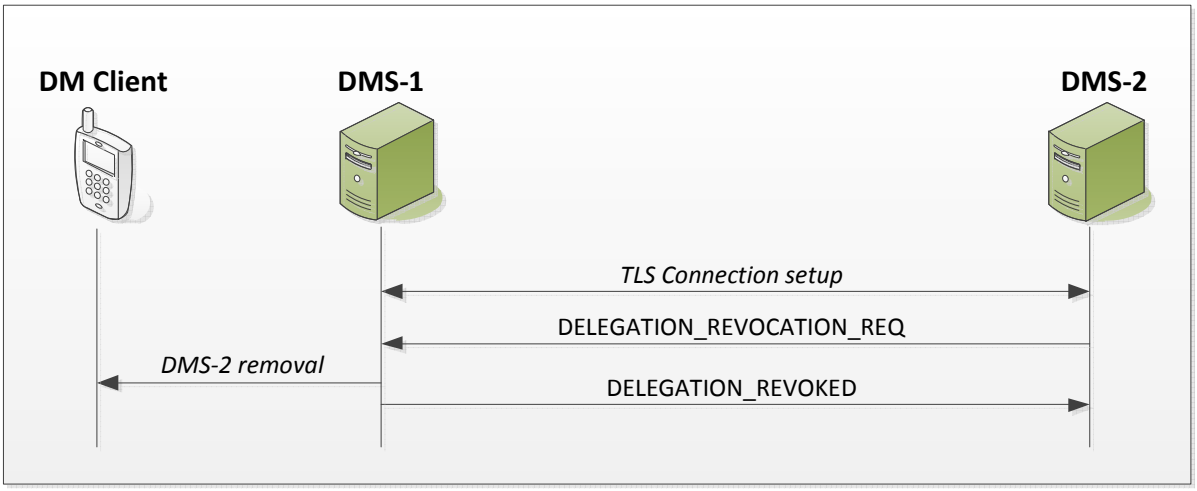

Figure 13: Delegation Revocation (requested) message exchange

A description summary of the protocol messages is provided in the following subsections.

5.3.4.1 DELEGATION_REVOCATION_REQ

After mutual authentication, the Delegation Revocation Request is sent from the DMS-2 to the DMS-1 asking delegation revocation. This message contains the DM Client information (deviceId and DMTreeURI).

This message is asynchronous and carried by HTTP POST. The HTTP response has no content.

Table 16: DELEGATION_REVOCATION_REQ parameters table

Name	*Type*	*Value(s)*	*Description*
deviceId	string		Device id
status	string	DEL_TERM_REQ	Status field
sessionId	string		Session Identifier

5.3.4.2 DELEGATION_REVOKED

The DMS-1 sends the Delegation Revoked message after the DM Client has been cleaned from the DMS-2 data.

This message is asynchronous and carried by HTTP POST. The HTTP response has no content.

Table 17: DELEGATION_REVOKED parameters table

Name	*Type*	*Value(s)*	*Description*
reasonCode	int	See section 11 “Response Status Codes” in [DMREPRO]	reason Code

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Status	string	DEL_REVOKED	Status field
sessionId	string		Session Identifier

5.3.4.3 REVOCATION_FAILURE

The semantics of this message is the same as described in section 5.3.1.6.

5.3.5 Delegation revocation (forced)

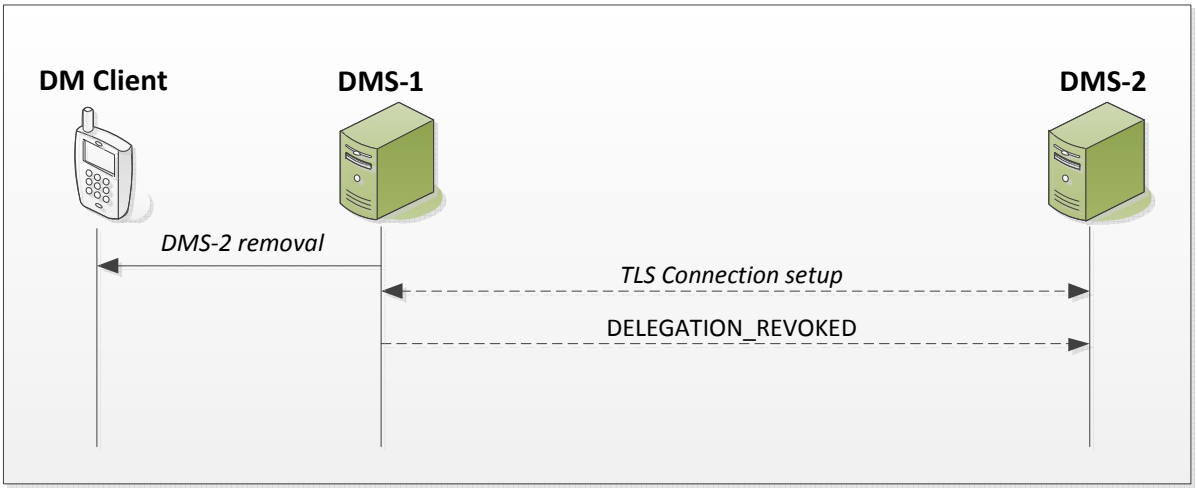

Figure 14: Delegation Revocation (forced) message exchange

A summary description of the protocol messages is provided in the following subsections.

5.3.5.1 DELEGATION_REVOKED

After mutual authentication and the DM Client has been cleaned from the DMS-2 data, the DMS-1 sends the Delegation Revoked message containing the DM Client Information (deviceId and DMTreeURI).

This message is asynchronous and carried by HTTP POST. The HTTP response has no content.

Table 18: DELEGATION_REVOKED parameters table

Name	*Type*	*Value(s)*	*Description*
deviceId	string		Device id
reasonCode	int	See section 11 “Response Status Codes” in [DMREPRO]	reason Code
status	string	DEL_REVOKED	Status field

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5.3.5.2 REVOCATION_FAILURE

The semantics of this message is the same as described in the section 5.3.1.6.

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Appendix A. Change History (Informative)

A.1 Approved Version History

Reference	Date	Description
N/A	N/A	No prior 1.3 version

A.2 Draft/Candidate Version 1.3 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-TS-DM_Server_Protocol-V1_3	10 May 2011	All	Baseline using OMA-TS-DM_Protocol-V1_3-20110419-D section 11, as agreed in "OMA-DM-DM13-2011-0041R01-INP_DM_Server_To_Server_Protocol_Baseline"
	18 May 2011	2, 5	Incorporated: OMA-DM-DM13-2011-0032R01-CR_MMA_Delegation_Process_and_Protocol
	04 July 2011	2.1, 2.2, 3.2, 3.3, 4, 5	Incorporated: OMA-DM-DM13-2011-0053R01-CR_DelegationTS_minor_updates
	18 Aug 2011	5	Incorporated: OMA-DM-DM13-2011-0071R01-CR_SrvDelegationOverview
	22 Sep 2011	All	Incorporated: OMA-DM-DM13-2011-0069-CR_Serv_Delegation_Update OMA-DM-DM13-2011-0082-CR_typo_fix_delegationTS
	11 Oct 2011	All	Incorporated: OMA-DM-DM13-2011-0092R01-CR_Server_Delegation_Protocol
	17 Nov 2011	5.3 & B.1	Incorporated: OMA-DM-DM13-2011-0116-CR_Delegation_Protocol_over_HTTP_POST OMA-DM-DM13-2011-0110R01-CR_SCR_server_delegation_protocol
	06 Jan 2012	5.2, 5.3,	Incorporated: OMA-DM-DM13-2011-0145-CR_CONR_Server_Delegation_BugFix Sorting of normative references in alphabetical order
	12 Jan 2012	2, 3, 5.3.1.2	Incorporated: OMA-DM-DM13-2011-0146R02-CR_CONR_Server_Delegation_Missing_parameter OMA-DM-DM13-2012-0001R01-CR_CONR_Delegation_References
	31 Jan 2012	All	Incorporated OMA-DM-DM13-2012-0018R01-CR_CONR_Server_Delegation_round_2 Restored cross-references in the whole document Applied 2012 TS template to SCR tables according to AI DM-2012-A008 + added reference to SCRRULES Applied 2012 template to introduction section.
	16 Feb 2012	All	Incorporated: OMA-DM-DM13-2012-0057R01-CR_Delegation_Protocol_CONR_R015 Restored cross-references in App B
	23 Feb 2012	4.1	Header removed by DSO according to Action Item DM-2012-A030
Candidate Version OMA-TS-DM_Server_Protocol-V1_3	06 Mar 2012	N/A	Status changed to Candidate by TP Ref # OMA-TP-2012-0084-INP_DM_V1_3_ERP_and_ETR_for_Candidate_re_approval

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Appendix B. Static Conformance Requirements (Normative)

The notation used in this appendix is specified in [SCRRULES].

B.1 SCR for DM Server

Item	Function	Reference	Requirement
DM-DEL-S-001-M	Support the X.509 digital certificate based mutual authentication on TLS	Section 5.2.1.1	
DM-DEL-S-002-M	Support the interface and the specified parameters	Section 5.3	
DM-DEL-S-003-O	Support the immediate termination of the delegation process if a failure occurs	Section 5.3	
DM-DEL-S-004-O	Support to undo all changes done to the DM Client if a failure occurs and purge any saved state information associated with the delegation process and revert to the existing delegation scheme prior to the start of the process	Section 5.3	
DM-DEL-S-005-O	Support the restart of the delegation process following a failure	Section 5.3	
DM-DEL-S-006-O	Support the notification of the delegated server in the case of a delegation revocation	Section 5.3	
DM-DEL-S-007-M	Support the HTTP POST method with “application/vnd.dm.delegation+xml” value for “Content-Type” HTTP header and protocol parameters in XML document as [DMDELXSD] is HTTP body.	Section 5.3	
DM-DEL-S-008-M	The target URL MUST be in the form of "https://<host>[:<port>]/<interface_name>”	Section 5.3	

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Appendix C. HTTP Binding Example (Informative)

According to specification in 5.3 and in [DMDELXSD], here a binding example of Server Delegation Protocol messages to HTTP protocol is provided. The example covers steps from DELEGATION_REQ (5.3.1.1) to BOOTSTRAP_CONFIRMED (5.3.1.3) of "Delegation using DMS-2 DMAcc" flow (5.3.1).

```
POST /DM_interface/DM_delegation HTTP/1.1
Host: <DMS-2.example2.com>
Content-Type: application/vnd.dm.delegation+xml
Accept: application/vnd vnd.dm.delegation+xml
Content-Length: nnnn

<?xml version="1.0" encoding="UTF-8"?>
<delegation_req xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://www.openmobilealliance.org/tech/profiles/dm_dm
13_delegationprotocol-v1_0.xsd">
            <serverId>DM_Server_ABC</serverId>
            <deviceId>IMEI:AAAAAABBCCCCCCD</deviceId>
            <deviceMan>VendorXYZ</deviceMan>
            <deviceMod>Mod5462</deviceMod>
            <DMTreeURI>/SCOMO</DMTreeURI>
            <isDelegationFull>false</isDelegationFull>
            <sessionId>ABCDERFGHCHDJKD</sessionId>
</delegation_req>

HTTP/1.1 200 OK
Content-Type: application/vnd.dm.delegation+xml
Content-Length: nnnn

<?xml version="1.0" encoding="UTF-8"?>
<delegation_resp xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://www.openmobilealliance.org/tech/profiles/dm_dm
13_delegationprotocol-v1_0.xsd">
            <reasonCode>200</reasonCode>
            <status>DELEGATION_RESP</status>
            <isAknowledged>true</isAknowledged>
            <sessionId>ABCDERFGHCHDJKD</sessionId>
</delegation_resp>

-----------------------------------------------------
```

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```
POST /DM_interface/DM_delegation HTTP/1.1
Host: DMS-1.example1.com
Content-Type: application/vnd.dm.delegation+xml
Accept: application/vnd vnd.dm.delegation+xml
Content-Length: nnnn


<?xml version="1.0" encoding="UTF-8"?>
<bootstrap_confirmed xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://www.openmobilealliance.org/tech/profiles/dm_dm
13_delegationprotocol-v1_0.xsd">
             <reasonCode>200</reasonCode>
             <status>BOOTSTRAP_CONFIRMED</status>
             <isClientBootstapped>true</isClientBootstapped>
             <sessionId>ABCDERFGHCHDJKD</sessionId>
</bootstrap_confirmed>


HTTP/1.1 204 OK No Content
```

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