XML Document Management Architecture

Candidate Version 2.0 – 16 Sep 2008

Open Mobile Alliance

OMA-AD-XDM-V2_0-20080916-C

Contents

Figures

1. Scope   (Informative)

This document presents an overview of the XML Document Management (XDM) enabler release 2.0. Specifically, it serves as an introduction to the functionality and architecture (i.e. logical entities and reference points between them) of the XDM enabler.

2. References

2.1   Normative References

[3GPP2-X.S0013-000]   3GPP2 X.S0013-000 "All-IP Core Network Multimedia Domain: Overview",
URL: http://www.3gpp2.org/Public_html/specs/index.cfm

[3GPP2-X.S0013-002]   3GPP2 X.S0013-002 "All-IP Core Network Multimedia Domain: IP Multimedia Subsystem - Stage 2",
URL: http://www.3gpp2.org/Public_html/specs/index.cfm

[3GPP-TS_23.002]   3GPP TS 23.002 "Network architecture",
URL: http://www.3gpp.org/ftp/Specs/archive/23_series/23.002/

[3GPP-TS_23.228]   3GPP TS 23.228 "IP Multimedia Subsystem (IMS); Stage 2",
URL: http://www.3gpp.org/ftp/Specs/archive/23_series/23.228/

[Charging_AD]   "Charging Architecture", Version 1.0, Open Mobile Alliance™, OMA-AD-Charging-V1_0,
URL: http://www.openmobilealliance.org/

[Dict]   "Dictionary for OMA Specifications", Version 2.4, Open Mobile Alliance™, OMA-ORG-Dictionary-V2_4,
URL: http://www.openmobilealliance.org/

[DM_Bootstrap]   "OMA Device Management Bootstrap", Version 1.2, Open Mobile Alliance™, OMA-TS-DM_Bootstrap-V1_2,
URL: http://www.openmobilealliance.org/

[DM_ERELD]   "Enabler Release Definition for OMA Device Management", Version 1.2, Open Mobile Alliance™, OMA-ERELD-DM-V1_2,
URL: http://www.openmobilealliance.org/

[IETF-XCAP_Diff_Event]   IETF draft-ietf-sip-xcapevent-03 "An Extensible Markup Language (XML) Configuration Access Protocol (XCAP) Diff Event Package", J. Urpalainen, May 2008,
URL: http://www.ietf.org/internet-drafts/draft-ietf-sip-xcapevent-03.txt

Note: Work in progress

[IM_ERELD-V1_0]   "Enabler Release Definition for SIMPLE IM", Draft Version 1.0, Open Mobile Alliance™, OMA-ERELD-SIMPLE_IM-V1_0,
URL: http://www.openmobilealliance.org/

[PoC_AD-V1_0]   "Push to talk over Cellular (PoC) – Architecture", Version 1.0, Open Mobile Alliance™, OMA-AD-PoC-V1_0,
URL: http://www.openmobilealliance.org/

[PoC_ERELD-V1_0]   "Enabler Release Definition for Push-to-Talk over Cellular", Version 1.0, Open Mobile Alliance™, OMA-ERELD-POC-V1_0,
URL: http://www.openmobilealliance.org/

[PoC_ERELD-V2_0]   "Enabler Release Definition for Push-to-Talk over Cellular", Draft Version 2.0, Open Mobile Alliance™, OMA-ERELD-POC-V2_0,
URL: http://www.openmobilealliance.org/

[RFC2119]   IETF RFC 2119 "Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997,
URL: http://www.ietf.org/rfc/rfc2119.txt

[RFC4662]   IETF RFC 4662 "A Session Initiation Protocol (SIP) Event Notification Extension for Resource Lists", A. B. Roach, B. Campbell, J. Rosenberg, August 2006,
URL: http://www.ietf.org/rfc/rfc4662.txt

[XDM_Core]   "XML Document Management (XDM) Specification", Version 2.0, Open Mobile Alliance™, OMA-TS-XDM_Core-V2_0,

URL: http://www.openmobilealliance.org/

[XDM_ERELD-V1_1]   "Enabler Release Definition for XML Document Management", Version 1.1, Open Mobile Alliance™,
                              OMA-ERELD-XDM-V1_1,
                              URL: http://www.openmobilealliance.org/

[XDM_ERELD-V2_0]   "Enabler Release Definition for XML Document Management", Version 2.0, Open Mobile Alliance™,
                              OMA-ERELD-XDM-V2_0,
                              URL: http://www.openmobilealliance.org/

[XDM_Group]   "Shared Group XDM Specification", Version 1.0, Open Mobile Alliance™, OMA-TS-
                              XDM_Shared_Group-V1_0,
                              URL: http://www.openmobilealliance.org/

[XDM_List]   "Shared List XDM Specification ", Version 2.0, Open Mobile Alliance™, OMA-TS-XDM_Shared-V2_0,
                              URL: http://www.openmobilealliance.org/

[XDM_Policy]   "Shared Policy XDM Specification", Version 1.0, Open Mobile Alliance™, OMA-TS-
                              XDM_Shared_Policy-V1_0,
                              URL: http://www.openmobilealliance.org/

[XDM_Profile]   "Shared Profile XDM Specification", Version 1.0, Open Mobile Alliance™, OMA-TS-
                              XDM_Shared_Profile-V1_0,
                              URL: http://www.openmobilealliance.org/

[XDM_RD]   "XML Document Management Requirements", Version 2.0, Open Mobile Alliance™, OMA-RD-XDM-
                              V2_0,
                              URL: http://www.openmobilealliance.org/

2.2   Informative References

[3GPP-TS_33.222]   3GPP TS 33.222 "Generic Authentication Architecture (GAA); Access to network application functions
                              using Hypertext Transfer Protocol over Transport Layer Security (HTTPS)",
                              URL: http://www.3gpp.org/ftp/Specs/archive/33_series/33.222/

[PRS_ERELD-V1_1]   "Enabler Release Definition for OMA Presence SIMPLE", Version 1.1, Open Mobile Alliance™, OMA-
                              ERELD-Presence_SIMPLE-V1_1,
                              URL: http://www.openmobilealliance.org/

[RFC4825]   IETF RFC 4825 "The Extensible Markup Language (XML) Configuration Access protocol (XCAP) ", J.
                              Rosenberg, May 2007,
                              URL: http://www.ietf.org/rfc/rfc4825.txt

[W3C-XQUERY]   W3C Recommendation "XQuery 1.0: An XML Query Language", Scott Boag et al, January23 2007,
                              World Wide Web Consortium (W3C),
                              URL: http://www.w3.org/TR/xquery

3. Terminology and Conventions

3.1 Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except "Scope" and "Introduction", are normative, unless they are explicitly indicated to be informative.

3.2 Definitions

Chargeable Event	A service delivery that has taken place, and can be specified and recorded. (Source: [Dict])
Interface	The common boundary between two associated systems. (Source: [Dict])
Limited XQuery over HTTP	The subset of XQuery functions that are used in OMA XDM Search requests.
Primary Principal	The Primary Principal is the user associated with the XCAP User Identity, which defines where the document resides.
Principal	An entity that has an identity, that is capable of providing consent and other data, and to which authenticated actions are done on its behalf. Examples of Principals include an individual user, a group of individuals, a corporation, service enablers/applications, system entities and other legal entities. (Source: [Dict])
Reference Point	A conceptual point at the conjunction of two non-overlapping functional groups (source: ITU-T I.112). It consists of none or any number of interfaces of any kind. (Source: [Dict])
Resource List Meta-Information	A document describing the state of virtual subscriptions associated with a list subscription. (Source: [RFC4662])
Resource List Server	RLSes accept subscriptions to resource lists and send notifications to update subscribers of the state of the resources in a resource list. (Source: [RFC4662])
Shared XDMSs	A logical entity to group XDMSs defined by the XDM enabler.
XCAP Resource	An HTTP resource representing an XML document, an element within an XML document, or an attribute of an element within an XML document that follows the naming and validation constraints of XCAP. (Source: [RFC4825])

3.3 Abbreviations

DM	Device Management
GAA	Generic Authentication Architecture
HTTP	Hyper Text Transfer Protocol
IETF	Internet Engineering Task Force
IP	Internet Protocol
OMA	Open Mobile Alliance
PoC	Push to talk over Cellular
RLMI	Resource List Meta-Information
RLS	Resource List Server
SIP	Session Initiation Protocol
TLS	Transport Layer Security

UE	User Equipment
XCAP	XML Configuration Access Protocol
XDM	XML Document Management
XDMC	XML Document Management Client
XDMS	XML Document Management Server
XML	Extensible Markup Language
XQuery	XML Query

4. Introduction (Informative)

This Architecture Document describes the features and architecture of the OMA XDM enabler.

The XDM enabler defines a common mechanism that makes user-specific service-related information accessible to the service enablers that need them. Such information is expected to be stored in the network where it can be located, accessed and manipulated (e.g. created, changed, deleted, etc.). XDM specifies how such information will be defined in well-structured XML documents, as well as the common protocol for access and manipulation of such XML documents.

The XDM Specification [XDM_Core] defines the features of the XDM enabler, which include the following:

- The common protocol, XML Configuration Access Protocol (XCAP) [RFC4825], by which Principals can store and manipulate their service-related data, stored in a network as XML documents.

- The SIP subscription/notification mechanism by which Principals can be notified of changes to such documents.

- The mechanism by which Principals can search service-related data stored in a network as XML documents using limited XQuery [W3C-XQUERY].

Documents accessed and manipulated via XCAP are stored in logical repositories in the network, called XDMS. Each repository may be associated with a functional entity which uses its data to perform its functions.

Each XML document stored in an XDMS is described as an XCAP Application Usage, which enables applications to use the document via XCAP. The XDM enabler describes Application Usages which can be reused by multiple enablers and are stored in the Shared XDMSs, of which there are four types: Shared List XDMS, Shared Group XDMS, Shared Policy XDMS and Shared Profile XDMS. The documents supported by these XDMSs are as follows:

- URI List and Group Usage List documents in the Shared List XDMS [XDM_List];

- Group document in the Shared Group XDMS [XDM_Group];

- User access policy document in the Shared Policy XDMS [XDM_Policy]; and

- User Profile document in the Shared Profile XDMS [XDM_Profile].

In addition to above documents the XDM Enabler also defines the Extended Group Advertisement.

Due to the reusable nature of the XDM enabler, there will be interactions with other service enablers, and therefore, the architectural design of the XDM enabler accommodates the needs of those enablers.

The Architecture Document also describes aspects on backward compatibility towards the XDM Enabler version 1.1 [XDM_ERELD-V1_1] and the PoC Enabler version 1.0 [PoC_ERELD-V1_0] concerning XML document handling.

4.1 Planned Phases

This release of XDM enabler is targeted to support the OMA application enablers of SIMPLE IM V1.0 [IM_ERELD-V1_0] and PoC V2.0 [PoC_ERELD-V2_0]. This release of XDM enabler is also backward compatible with earlier versions of PoC V1.0 [PoC_ERELD-V1_0], Presence SIMPLE V1.1 [PRS_ERELD-V1_1] and XDM V1.1 [XDM_ERELD-V1_1].

To accommodate this, this release of XDM enabler:

- Inherits Shared XDMS from [XDM_ERELD-V1_1] and rename it as Shared List XDMS [XDM_List], which SHALL be fully backward compatible with earlier versions of XDM, PoC and Presence SIMPLE Enablers;

- Inherits PoC Group document in PoC XDMS from [PoC_ERELD-V1_0] and extends it as reusable Group document in Shared Group XDMS [XDM_Group], which SHALL be fully backward compatible with earlier versions of XDM and PoC Enablers;

- Inherits PoC User Access Policy document in PoC XDMS from [PoC_ERELD-V1_0] and extends it as reusable User Access Policy document in Shared Policy XDMS [XDM_Policy], which SHALL be fully backward compatible with earlier versions of XDM and PoC Enablers;

- Defines new Shared Profile XDMS [XDM_Profile].

- Inherits PoC Group Advertisement [PoC_ERELD-V1_0] and extends it as reusable Extended Group Advertisement for other enablers [XDM_Group], which SHALL be fully backward compatible with earlier version of PoC Enabler.

Also, while inheriting all features from [XDM_ERELD-V1_1], this release of XDM enabler supports the following features:

- Search for information in documents stored in an XDMS;

- Subscription for notification of changes in XML documents stored in an XDMS;

- Network-to-network interface to enable search of information across XDMS of multiple domains and retrieval of document from remote network.

The following features are planned to be supported in the future release of XDM enabler:

- Extended search for information in documents stored in multiple XDMSs and enabler specific servers;

- Extended document management operations including copy, forward, suspend, resume;

- Document access control for all kinds of document management operations and delegation of document access control rights to other users;

- Document change history management;

- Extended network-to-network interface support for all kinds of operations;

- Other features as identified in the future.

4.2   Security Considerations

The XDMC is to be authenticated prior to accessing the XDM service as specified in [XDM_Core]. TLS is used as specified in [RFC4825] in order to provide integrity and confidentiality protection to the exchanged messages. HTTP Digest is the default authentication mechanism as specified in [RFC4825].

For a 3GPP realisation the Generic Authentication Architecture (GAA) can be used as an underlying network mechanism as specified in [3GPP-TS_33.222].

5. Architectural Model

5.1 Architectural Diagram
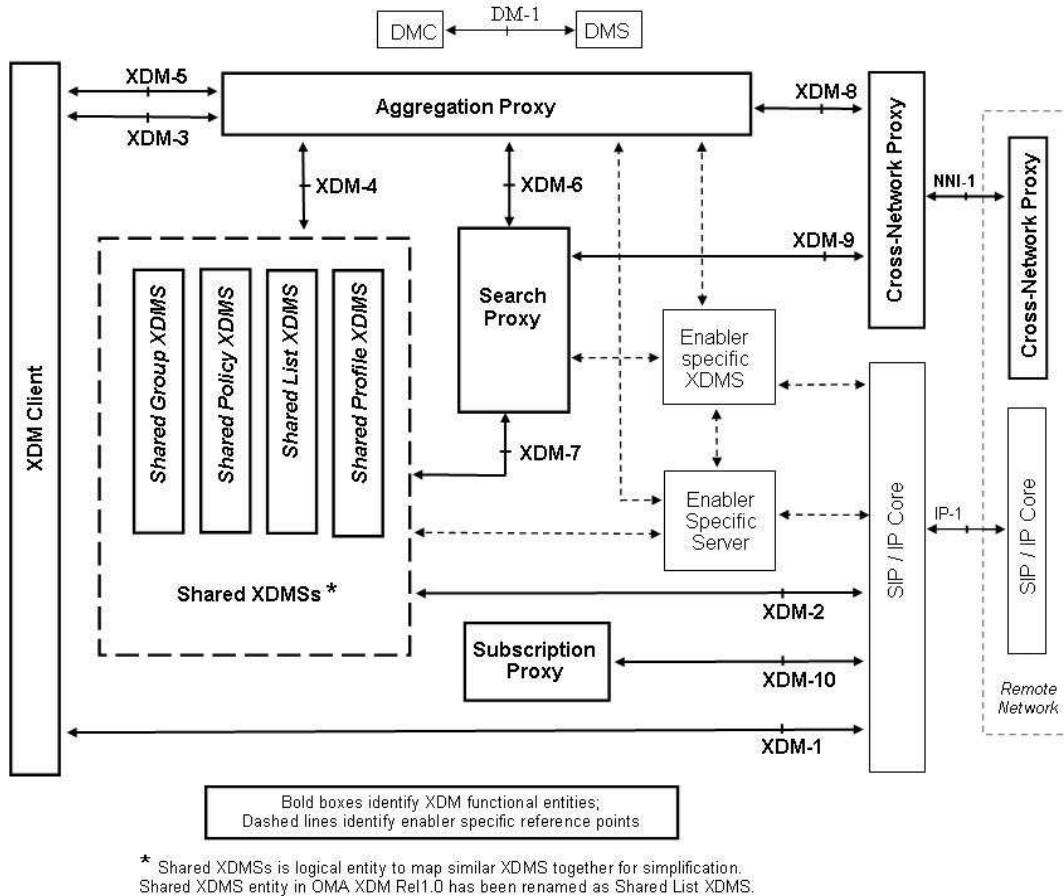
Figure 1: XDM Architecture

5.2 Functional Entities

5.2.1 XDM Functional Entities

5.2.1.1 XDM Client

The XDMC is a client entity that provides access to the various XDMS features as described in Section 4. An application implementing an XDMC may implement various subsets of those features, as required, subject to certain mandatory requirements described in [XDM_Core].

The XDMC can be implemented in both terminal and server entities.

5.2.1.2 Aggregation Proxy

The Aggregation Proxy is the single contact point for the XDMC implemented in a UE to access XML documents stored in any XDMS. The Aggregation Proxy performs the following functions:

- Performs authentication of the XDMC;

- Routes individual XCAP requests to the correct XDMS or to the Cross-Network Proxy;

- Routes individual Search requests to the Search Proxy;

- Optionally performs compression/decompression;

- Support secure data transfer between the Aggregation Proxy and the XDMC, using TLS or other means.

5.2.1.3 Subscription Proxy

The Subscription Proxy is the contact point for the XDMC to subscribe for notification of changes in XML documents stored in any XDMS. The Subscription Proxy supports the following functions:

- Performs back-end subscriptions as an RLS as described in [RFC4662], using procedures defined in [IETF-XCAP_Diff_Event] for notification of changes in XML documents from a particular XDMS;

- Maps XCAP Resources to SIP addresses of appropriate XDMSs;

- Receives notifications from XDMS, and using RLMI as defined in [RFC4662] aggregates them prior to sending them to the XDMC;

- Sends aggregated notifications to the XDMC.

5.2.1.4 Search Proxy

The Search Proxy is a server entity that performs the following functions:

- Forwards search requests to the XDMS, and to the Cross-Network Proxy when needed;

- Receives responses from the XDMS, and from the Cross-Network Proxy when needed;

- Combines results from the XDMS, and also from the Cross-Network Proxy before sending responses to the XDMC;

- Sends search responses to the XDMC.

5.2.1.5 Cross-Network Proxy

The Cross-Network Proxy is the single contact point for the XDM enablers located in different networks to communicate over trusted connection. The Cross-Network Proxy performs the following functions:

- Performs authorization of the trusted network;

- Routes individual outgoing XCAP requests to the Cross-Network Proxy of the remote network;

- Routes individual outgoing search requests to the Cross-Network Proxy of the remote network;

- Routes individual incoming XCAP responses to the Aggregation Proxy;

- Routes individual incoming search responses to the Search proxy;

- Optionally performs compression/decompression;

- Support secure data transfer between Cross-Network Proxies using TLS or other means.

5.2.1.6 Shared List XDMS

The Shared List XDMS is a server entity that supports the following functions:

- Manages and supports content of URI List and Group Usage List XML documents as described in [XDM_List];

- Performs authorisation of incoming SIP and XCAP requests;

- Notifies subscribers of changes in XML documents;

- Provides aggregation of notifications of changes to multiple XML documents.

5.2.1.7   Shared Group XDMS

The Shared Group XDMS is a server entity that supports the following functions:

- Manages and supports content of Group XML documents as described in [XDM_Group];

- Performs authorisation of incoming SIP and XCAP requests;

- Notifies subscribers of changes in XML documents;

- Provides aggregation of notifications of changes to multiple XML documents;

- Provides search results.

5.2.1.8   Shared Profile XDMS

The Shared Profile XDMS is a server entity that supports the following functions:

- Manages and supports content of User Profile XML documents as described in [XDM_Profile];

- Performs authorisation of incoming SIP and XCAP requests;

- Notifies subscribers of changes in XML documents;

- Provides aggregation of notifications of changes to multiple XML documents;

- Provides search results.

5.2.1.9   Shared Policy XDMS

The Shared Policy XDMS is a server entity that supports the following functions:

- Manages and supports content of user access policy XML documents as described in [XDM_Policy];

- Performs authorisation of incoming SIP and XCAP requests;

- Notifies subscribers of changes in XML documents;

- Provides aggregation of notifications of changes to multiple XML documents.

5.2.2   Enabler specific Functional Entities

Each of these functional entities is defined in the specifications for the enabler in question.

5.2.2.1   Enabler specific XDMS

The enabler specific XDMSs are server entities that support the following functions:

- Performs authorisation of incoming SIP and XCAP requests;

- Manages XML documents, which are specific to the service enabler;

- Provides aggregation of notifications of changes to multiple documents stored on the enabler specific XDMS;

- Notifies subscribers of changes to the enabler specific documents stored in the network;

- Provides search results if applicable.

5.2.2.2 Enabler specific Server

The functionality of the enabler specific Servers are defined in the specifications for the enabler in question.

5.2.3 External Functional Entities Providing Services to XDM

5.2.3.1 SIP/IP Core

The SIP/IP Core is a network of servers, such as proxies and/or registrars, which perform a variety of services in support of the XDM Service, such as routing, authentication, compression, etc. The specific features offered by different types of SIP/IP Core networks will depend on the particulars of those networks.

When the SIP/IP Core is realized using IMS, the OMA XDMSs utilizes the capabilities of IMS as specified in 3GPP [3GPP-TS_23.228] and 3GPP2 [3GPP2-X.S0013-002], respectively. In such cases the SIP/IP Core performs the following additional functions in support of the XDM Service:

- Routes the SIP signalling between the XDMC, Subscription Proxy and the XDMSs;

- Provides discovery and address resolution services;

- Supports SIP compression;

- Performs a certain type of authorization of the XDMC based on user's service profile;

- Maintains the registration state;

- Provides charging information.

5.2.3.2 Device Management Server

The Device Management Server performs the following functions:

- Initializes and updates the configuration parameters necessary for the XDMC, by using mechanisms specified in [DM_Bootstrap] and [DM_ERELD].

5.2.3.3 Device Management Client

The Device Management Client performs the following functions in support of an XDMC residing in a UE:

- Receives the initial configuration parameters and the updated parameters needed for XDM service sent by the Device Management Server, by using mechanisms specified in [DM_Bootstrap] and [DM_ERELD].

5.2.3.4 Charging Enabler

The OMA Charging Enabler [Charging_AD] coordinates charging data triggers and flow from OMA enablers into an underlying charging infrastructure, supporting on-line and off-line charging. XDM entities that may optionally report Chargeable Events are:

- Aggregation Proxy;

- Subscription Proxy;

- Search Proxy;

- Shared XDMSs (i.e. Shared Profile XDMS, Shared Group XDMS, Shared Policy XDMS, and Shared List XDMS);

- Enabler specific XDMSs.

5.3   Description of Reference Points

5.3.1   XDM Reference Points

5.3.1.1   Reference Point XDM-1: XDMC – SIP/IP Core

The XDM-1 reference point supports the communication between the XDMC and the SIP/IP Core network. The protocol for the XDM-1 reference point is SIP.

The XDM-1 reference point provides the following functions:

- Subscription to the modification of any XDM documents;

- Notification of the modification of any XDM documents.

When SIP/IP Core corresponds with 3GPP/3GPP2 IMS, the XDM-1 reference point conforms to the ISC reference point for XDMCs implemented in a server entity and to the Gm reference points for XDMCs implemented in a terminal entity as specified in [3GPP-TS_23.002] [3GPP2-X.S0013-000].

5.3.1.2   Reference Point XDM-2: Shared XDMSs – SIP/IP-Core

The XDM-2 reference point supports the communication between the Shared XDMSs (i.e. Shared Profile XDMS, Shared Group XDMS, Shared Policy XDMS, and Shared List XDMS) and the SIP/IP Core. The protocol for the XDM-2 reference point is SIP.

The XDM-2 reference point provides the following functions:

- Subscription to the modification of XML documents handled by a particular Shared XDMS;

- Notification of the modification of XML documents handled by a particular Shared XDMS.

When SIP/IP Core corresponds with 3GPP/3GPP2 IMS, the XDM-2 reference point conforms to the ISC reference point [3GPP-TS_23.002] [3GPP2-X.S0013-000].

5.3.1.3   Reference Point XDM-3: XDMC – Aggregation Proxy

The XDM-3 reference point is between the XDMC and the Aggregation Proxy. The protocol for the XDM-3 reference point is XCAP.

The XDM-3 reference point provides the following functions:

- XML document management of XML documents (e.g. create, modify, retrieve, delete) handled by any XDMS;

- Mutual authentication between XDMC and Aggregation Proxy;

- Optional compression.

When the SIP/IP Core network corresponds with 3GPP/3GPP2 IMS, then the XDM-3 reference point conforms to the Ut reference point [3GPP-TS_23.002] [3GPP2-X.S0013-000].

5.3.1.4   Reference Point XDM-4: Aggregation Proxy – Shared XDMSs

The XDM-4 reference point is between the Aggregation Proxy and the Shared XDMSs. The protocol for the XDM-4 reference point is XCAP.

The XDM-4 reference point provides the following functions:

- XML document management (e.g. create, modify, retrieve, delete) of XML documents handled by a particular Shared XDMS.

5.3.1.5   Reference Point XDM-5: XDMC – Aggregation Proxy

The XDM-5 reference point is between the XDMC and the Aggregation Proxy. The protocol for the XDM-5 reference point is Limited XQuery over HTTP [XDM_Core].

The XDM-5 reference point provides the following functions:

- Searching information from XML documents stored in any XDMS;

- Mutual authentication of search requests between XDMC and Aggregation Proxy;

- Optional compression.

When the SIP/IP Core network corresponds with 3GPP/3GPP2 IMS, then the XDM-5 reference point conforms to the Ut reference point [3GPP-TS_23.002] [3GPP2-X.S0013-000].

5.3.1.6   Reference Point XDM-6: Aggregation Proxy – Search Proxy

The XDM-6 reference point is between the Aggregation Proxy and the Search Proxy. The protocol for the XDM-6 reference point is Limited XQuery over HTTP [XDM_Core].

The XDM-6 reference point provides the following functions:

- Searching information from XML documents stored in any XDMS.

5.3.1.7   Reference Point XDM-7: Search Proxy – Shared XDMSs

The XDM-7 reference points is between the Search Proxy and the Shared XDMSs. The protocol for the XDM-7 reference point is Limited XQuery over HTTP [XDM_Core].

The XDM-7 reference point provides the following functions:

- Searching information from XML documents stored in either the Shared Group XDMS or the Shared Profile XDMS.

5.3.1.8   Reference Point XDM-8: Aggregation Proxy – Cross-Network Proxy

The XDM-8 reference point is between the Aggregation Proxy and the Cross-Network Proxy. The protocol for the XDM-8 reference point is XCAP.

The XDM-8 reference point provides the following functions:

- Forwarding of requests/responses to the Cross-Network Proxy.

5.3.1.9 Reference Point XDM-9: Search Proxy – Cross-Network Proxy

The XDM-9 reference point is between the Search Proxy and the Cross-Network Proxy. The protocol for the XDM-9 reference point is "Limited XQuery over HTTP".

The XDM-9 reference point provides the following functions:

- Forwarding of search requests/responses between the Search Proxy and the Cross-Network Proxy.

5.3.1.10 Reference Point XDM-10: Subscription Proxy – SIP/IP Core

The XDM-10 reference point supports the communication between the Subscription Proxy and the SIP/IP Core network. The protocol for the XDM-10 reference point is SIP.

The XDM-10 reference point provides the following functions:

- Subscription to the modification of any XML documents;

- Notification of the modification of any XML documents;

- Back-end subscription to the modification of XML documents handled by a particular XDMS;

- Notification of the modification of XML documents handled by a particular XDMS.

When SIP/IP Core network corresponds with 3GPP IMS or 3GPP2 MMD networks, the XDM-10 reference point conforms to the ISC reference point as specified in [3GPP-TS_23.002] [3GPP2-X.S0013-000].

5.3.1.11 Reference Point IP-1: SIP/IP Core – SIP/IP Core of remote network

The IP-1 reference point supports the communication between the SIP/IP Core network and an XDMS in the remote network via the SIP/IP Core of the remote network. The protocol for the IP-1 reference point is SIP.

When the SIP/IP Core network corresponds with 3GPP IMS or 3GPP2 MMD networks, the IP-1 reference point conforms to the Mw reference point as specified in [3GPP-TS_23.002] [3GPP2-X.S0013-000].

5.3.1.12 Reference Point NNI-1: Cross-Network Proxy – Cross-Network Proxy of remote network

The NNI-1 reference point supports the communication between XDM enablers in different domains connected via Cross-Network Proxies. The protocols for the NNI-1 reference point are XCAP and "limited XQuery over HTTP" transported using any secure protocol or connection i.e. TLS.

5.3.2 Enabler specific Reference Points

5.3.2.1 Reference Points: "Enabler specific XDMS" – SIP/IP-Core

Each of these reference points are named by and defined in the specifications for the enabler in question.

They support the communication between an enabler specific XDMS and the SIP/IP Core network.

The protocol for the reference points is SIP.

These reference points provide the following functions:

- Subscription to the modification of enabler specific XML documents;

- Notification of the modification of enabler specific XML documents.

5.3.2.2   Reference Points: "Enabler specific Server" – SIP/IP-Core

Each of these reference points are named by and defined in the specifications for the enabler in question.

They support the communication between an enabler specific Server and the SIP/IP Core network. The protocol for the reference points is SIP.
These reference points provide the following functions:

- Subscription to the modification of enabler specific XML documents;

- Notification of the modification of enabler specific XML documents.

5.3.2.3   Reference Points: Aggregation Proxy – "Enabler specific XDMS"

Each of these reference points are named in the specification for the enabler in question and owned by it. The basic XML Document Management requirements for the reference points are described in [XDM_Core].The enabler unique requirements for the reference points are described in the corresponding enabler specification".

The protocol for these reference points is XCAP.

These reference points provide the following functions:

- "Enabler specific" XML document management (e.g. create, modify, retrieve, delete).

5.3.2.4   Reference Points: Shared XDMSs – "Enabler Specific Server"

Each of these reference points are named in the specification for the enabler in question and owned by it. The requirements for the reference points are described in [XDM_Core] and in the enabler specific specification.

The protocol for the reference points is XCAP

They provide the one or more of the following functions:

- Retrieval of URI Lists in Shared List XDMS;

- Retrieval of group data in Shared Group XDMS;

- Retrieval of user profile data in Shared Profile XDMS;

- Retrieval of user access policy data in Shared Policy XDMS.

5.3.2.5   Reference Points: "Enabler specific XDMS" – "Enabler specific Server"

Each of these reference points are named by and defined in the specifications for the enabler in question.

The protocol for the reference points is defined in the specifications for the enabler in question.

They provide the following function:

- Transfer of enabler specific data from the enabler specific XDMS to the enabler specific server.

5.3.2.6 Reference Points: "Search Proxy" – "Enabler specific XDMSs"

Each of these reference points are named by and defined in the specifications for the enabler in question. The protocol for these reference points is Limited XQuery over HTTP [XDM_Core].

They provide the following functions:

- Searching enabler specific information from XML documents stored in the enabler specific XDMS.

5.3.2.7 Reference Points: "Enabler specific Server" – "Aggregation Proxy"

Each of these reference points are named in the specification for the enabler in question and owned by it. The basic XML Document Management requirements for the reference points are described in [XDM_Core]. The enabler unique requirements for the reference points are described in the corresponding enabler specification".

The protocol for these reference points is XCAP.

These reference points provide the following functions:

- "Enabler specific" XML document management (e.g. create, modify, retrieve, delete) in a remote network.

5.3.3 External Reference Points Providing Services to XDM

5.3.3.1 Reference Point DM-1: DM Client – DM Server

The DM-1 reference point is described in [DM_Bootstrap] and [DM_ERELD]. The XDM enabler defines the XDM configuration object(s).

5.3.3.2 Reference Point CH-1/CH-2: Charging Enabler – Charging Enabler Users

The XDM CH-1/CH-2 Reference Points consist of the CH-1 and CH-2 Charging Enabler Interfaces. The CH-1 and CH-2 Interfaces are described in [Charging_AD].

The functional entities of Aggregation Proxy, Subscription Proxy, Search Proxy, Shared XDMS (i.e., Shared Profile XDMS, Shared Group XDMS, Shared Policy XDMS, and Shared List XDMS) act as Charging Enabler users [Charging_AD]. Figure 2 shows the Reference Points between these entities and the charging enabler. Two Interfaces are currently supported by the Charging Enabler, CH-1 for offline charging and CH-2 for on line charging. These are described in [Charging_AD].
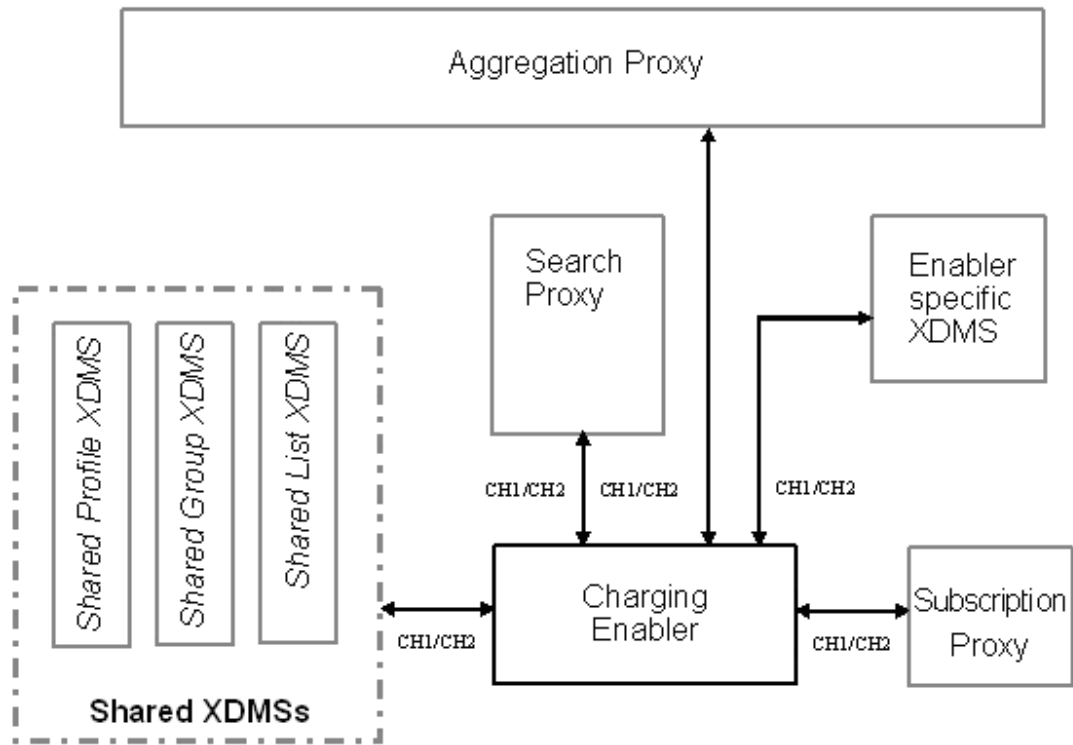
Figure 2: Support of charging through the OMA Charging Enabler

6. Backward compatibility towards the XDM Enabler version 1.1 and the PoC Enabler version 1.0.

The following deployment scenarios are supported for the purpose of backward compatibility:

Scenario A) where:

- The XDM Enabler version 1.1 [XDM_ERELD-V1_1] is replaced with the XDM Enabler version 2.0 [XDM_ERELD-V2_0]. The PoC Enabler version 1.0 [PoC_ERELD-V1_0] is replaced with the PoC Enabler version 2.0 [PoC_ERELD-V2_0]. The PoC Enabler version 2.0 shares Group and User Access Policy documents in Shared Group XDMS and Shared Policy XDMS, with other enablers (e.g., SIMPLE IM Enabler version 1.0 [IM_ERELD-V1_0]);

- The XDM version 1.1 clients implemented in a PoC version 1.0 compliant UE are supported for the purpose of backward compatibility;

- The XDM version 1.1 clients implemented in a PoC version 1.0 compliant PoC Application Server are not supported, as the PoC Enabler is upgraded to version 2.0;

- The XDM version 2.0 clients implemented in a PoC version 2.0 compliant UE are supported;

- The XDM version 2.0 clients implemented in a PoC version 2.0 compliant PoC Application Server are supported.

In order to support the above Scenario A),

- The Aggregation Proxy supports also via the Reference Point XDM-4 the Reference Point PoC-7 [PoC_AD-V1_0] to route the PoC group or PoC user access policy document requests to Shared Group XDMS or Shared Policy XDMS respectively;

- The Shared Group XDMS supports also via the Reference Point XDM-2 the Reference Point PoC-6 [PoC_AD-V1_0] to process the PoC group documents SIP requests and to generate corresponding responses and to generate SIP requests and to process corresponding responses as if it is PoC XDMS [PoC_AD-V1_0];

- The Shared Group XDMS supports also via the Reference Point XDM-4 the Reference Point PoC-7 [PoC_AD-V1_0] to process the PoC group documents requests and to generate corresponding responses as if it is PoC XDMS [PoC_AD-V1_0];

- The Shared Policy XDMS supports also via the Reference Point XDM-2 the Reference Point PoC-6 [PoC_AD-V1_0] to process the PoC user access policy document SIP requests and to generate corresponding responses and to generate SIP requests and to process corresponding responses as if it is PoC XDMS [PoC_AD-V1_0];

- The Shared Policy XDMS supports also via the Reference Point XDM-4 the Reference Point PoC-7 [PoC_AD-V1_0] to process the PoC user access policy document requests and to generate corresponding responses as if it is PoC XDMS [PoC_AD-V1_0];

- The XDM version 1.0 clients implemented in a PoC version 1.0 compliant UE are able to make requests through the Reference Point XDM-3 to access the PoC group or PoC user access policy documents in Shared Group XDMS or Shared Policy XDMS, as if they reside in PoC XDMS.

Scenario B) are where:

- The XDM Enabler version 1.1 [XDM_ERELD-V1_1] is replaced with the XDM Enabler version 2.0 [XDM_ERELD-V2_0] due to other enablers (e.g., SIMPLE IM version 1.0 [IM_ERELD-V1_0]) than PoC Enabler version 1.0 [PoC_ERELD-V1_0]. However, the PoC Enabler version 1.0 remains as it is. The PoC Enabler version 1.0 does not share PoC group or PoC user access policy documents with other enablers, but keep those in PoC XDMS [PoC_AD-V1_0];

- The XDM version 1.1 clients implemented in a PoC version 1.0 compliant UE are supported for the purpose of backward compatibility;

- XDM version 1.1 clients implemented in a PoC version 1.0 compliant PoC Application Server are supported for the purpose of backward compatibility;

- The XDM version 2.0 clients implemented in a PoC version 2.0 compliant UE are supported.;

- XDM version 2.0 clients implemented in a PoC version 2.0 compliant PoC Application Server are not supported as the PoC Enabler remain as version 1.0.

In order to support the above Scenario B),

- The Aggregation Proxy supports also via the Reference Point XDM-4 the Reference Point PoC-7 [PoC_AD-V1_0] to route the PoC group or PoC user access policy documents requests to PoC XDMS;

- The XDM version 2.0 clients implemented in a PoC version 2.0 compliant UE are able to use their embedded PoC version 1.0 functions to make requests through the Reference Point XDM-3 to access the PoC group or PoC user access policy documents in PoC XDMS.

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 2.0 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-AD_XDM-V2_0	19 Oct 2005		First version for XDM 2.0 made using OMA-AD-XDM-V1_0-20050923-C as a basis.
	26 Dec 2005	2 5.2 7.1.3 7.2.1	Incorporation of CR-0573R02
	26 Dec 2005	7.1.2	Incorporation of CR-0617
	10 Mar 2006	7.1.2 7.5.5 7.4.3 1, 4 7.1.5, 7.1.6	OMA-PAG-2005-0681R01 OMA-PAG-2006-0001 OMA-PAG-2006-0021 OMA-PAG-2006-0078 OMA-PAG-2006-0082
	12 Apr 2006	5.5 5.6 7.4.1	OMA-PAG-2006-0155R01 OMA-PAG-2006-0156 OMA-PAG-2006-0107R02
	11 Jun 2006	2.1, 5.4, 7, 7.1.2, 7.4.10, 7.8	Incorporation of CRs: OMA-PAG-2006-0235 OMA-PAG-2006-0236 OMA-PAG-2006-0237 OMA-PAG-2006-0257 OMA-PAG-2006-0290R01
	13 Sep 2006		Draft reverted to status prior to incorporation of CR OMA-PAG-2006-0290R01 which had accidentally been marked agreed.
	25 Sep 2006	2.1, 3.2, 7.1.2, 7.8, 7.8.1	Incorporation of CR: OMA-PAG-2006-0290R04
	23 Oct 2006	2.1, 3.3, 4, 7.1.2, 7.1.3, 7.4.5, 7.4.6, 7.4.7, 7.5.6	Incorporation of CR: OMA-PAG-2006-0558R02

Document Identifier	Date	Sections	Description
	20 Nov 2006	Whole document because of new AD template	Incorporation of CR: OMA-PAG-2006-684R03 OMA-PAG-2006-685R02 OMA-PAG-2006-709 OMA-PAG-2006-719R01 OMA-PAG-2006-720R01 OMA-PAG-2006-721R01 OMA-PAG-2006-0723R02 OMA-PAG-2006-726R02 OMA-PAG-2006-755 OMA-PAG-2006-756 OMA-PAG-2006-757 OMA-PAG-2006-758 OMA-PAG-2006-759 OMA-PAG-2006-761 OMA-PAG-2006-762 OMA-PAG-2006-763 OMA-PAG-2006-764 OMA-PAG-2006-765 OMA-PAG-2006-766 OMA-PAG-2006-768 OMA-PAG-2006-769 OMA-PAG-2006-770 OMA-PAG-2006-771 + Editorial corrections
	21 Nov 2006	3.2, 5.2.3.3	Incorporation of CR: OMA-PAG-2006-0782
	17 Dec 2006	2, 4, 4.1, 5.1, 5.2.1.2 5.2.1.3, 5.2.1.7, 5.3.1.8, 5.3.1.9, 5.2.1.4, 5.2.1.5, 5.2.1.6, 5.3.2.1, 5.3.2.2, 5.3.2.3, 5.3.2.7, 5.3.3	Incorporation of CRs: OMA-PAG-2006-0693 OMA-PAG-2006-0814R03 OMA-PAG-2006-0828 OMA-PAG-2006-0829R01 OMA-PAG-2006-0833R01 OMA-PAG-2006-0858R01
	19 Dec 2006	3.2, 5.2.1.7, 5.3.3.2	Incorporation of CRs: OMA-PAG-2006-0865R02 OMA-PAG-2006-0870

Document Identifier	Date	Sections	Description
	15 Feb 2007	2.1, 2.2, 3.1.3.2, 3.3 4.1, 4.2, 5, 5.2.1.2, 5.2.1.3, 5.2.1.7, 5.2.3.3, 5.3.1.8, 5.3.1.9, 5.3.3.1, 5.3.3.2,	Incorporation of CRs: OMA-PAG-2007-0007R02 OMA-PAG-2007-0035 OMA-PAG-2007-0037 OMA-PAG-2007-0040 OMA-PAG-2007-0080 OMA-PAG-2007-0081 OMA-PAG-2007-0083R01 OMA-PAG-2007-0084 OMA-PAG-2007-0085 OMA-PAG-2007-0086R01 OMA-PAG-2007-0087 OMA-PAG-2007-0090 OMA-PAG-2007-0098 OMA-PAG-2007-0100R01
	02 Mar 2007	2.2, 5.3.1.8 5.3.1.9 5.3.2.5	Incorporation of CRs: OMA-PAG-2007-0116 OMA-PAG-2007-0117R01 OMA-PAG-2007-0118R01 OMA-PAG-2007-0119
	06 Mar 2007	all	Incorporation of CR: OMA-PAG-2007-0137R01
	25 Mar 2006	5.1, 5.2.1.2 5.2.1.3, 5.3.2.3, 5.3.2.4, 5.3.2.5, 5.3.2.6, 5.3.2.7, 5.3.2.10	Incorporation of CR: OMA-PAG-2007-0142R01
	05 Apr 2007	5.2.1.8	Incorporation of CR: OMA-PAG-2007-0151R01
	24 Apr 2007	2.1, 2.2, 3.2, 4, 6, 5.2.3.1, 5.2.3.2, 5.2.3.3, 5.3.1.5 5.3.1.6 5.3.1.7 5.3.1.8 5.3.1.9 5.3.2.9,	Incorporation of CR: OMA-PAG-2007-0172R03 OMA-PAG-2007-0199R02 OMA-PAG-2007-0207R01
	14 Jun 2007	all	Incorporation of CRs: OMA-PAG-2007-0338R02 OMA-PAG-2007-0358R01 OMA-PAG-2007-0444R01
Candidate Version OMA-AD_XDM-V2_0	24 Jul 2007	n/a	Status changed to Candidate by TP (2007-07-11 to 2007-07-24) TP ref # OMA-TP-2007-0284-INP_XDM_V2_0_ERP_for_Candidate_approval
Draft Version OMA-AD_XDM-V2_0	17 Jun 2008	all	Incorporation of CRs: OMA-PAG-2008-0201R02 OMA-PAG-2008-0260
	09 Jul 2008	all	Incorporation of CRs: OMA-PAG-2008-0367R03 OMA-PAG-2008-0392R02

Document Identifier	Date	Sections	Description
Candidate Version OMA-AD_XDM-V2_0	16 Sep 2008	n/a	Status changed to Candidate by TP (2008-09-03 to 2008-09-16) TP ref # OMA-TP-2008-0332R01-INP_XDM_V2_0_ERP_for_Candidate_Re_Approval