



Presence SIMPLE Architecture

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Contents

1. SCOPE (INFORMATIVE)	5
2. REFERENCES	6
2.1 NORMATIVE REFERENCES	6
2.2 INFORMATIVE REFERENCES	7
3. TERMINOLOGY AND CONVENTIONS	8
3.1 CONVENTIONS	8
3.2 DEFINITIONS	8
3.3 ABBREVIATIONS	8
4. INTRODUCTION (INFORMATIVE)	10
4.1 SECURITY CONSIDERATIONS	10
4.1.1 SIP Signalling Security	10
4.1.2 XDM security	10
4.2 REQUIREMENTS	10
5. ARCHITECTURAL MODEL	11
5.1 DEPENDENCIES	11
5.1.1 Collaboration with Service Enablers	11
5.1.2 Collaboration with Device Management	11
5.1.3 Collaboration with XDM Enabler	11
5.2 ARCHITECTURAL DIAGRAM	11
5.3 FUNCTIONAL COMPONENTS AND REFERENCE POINTS	12
5.3.1 Presence Functional Entities	12
5.3.1.1 Presence Server	12
5.3.1.2 Presence Source	13
5.3.1.3 Watcher	13
5.3.1.4 Watcher Information Subscriber	13
5.3.1.5 Resource List Server	13
5.3.1.6 Presence XML Document Management Server	14
5.3.1.7 Resource List Server XML Document Management Server	14
5.3.1.8 Content Server	14
5.3.2 External Entities Providing Services to Presence	14
5.3.2.1 SIP/IP Core network	14
5.3.2.2 Shared XML Document Management Server (XDMS)	15
5.3.2.3 Aggregation Proxy	15
5.3.2.4 Device Management Server	15
5.3.2.5 XML Document Management Client	15
5.3.2.6 Device Management Client	15
5.3.3 Description of the Reference Points	15
5.3.3.1 Reference Point PRS-1: Presence Source – SIP/IP Core	15
5.3.3.2 Reference Point PRS-2: Watcher – SIP/IP Core network	15
5.3.3.3 Reference Point PRS-3: SIP/IP Core – Presence Server	16
5.3.3.4 Reference Point PRS-4: SIP/IP Core – Resource List Server	16
5.3.3.5 Reference Point PRS-5: Presence Server – Shared XDM Server	16
5.3.3.6 Reference Point PRS-6: Presence XDM Server – SIP/IP Core (Void)	17
5.3.3.7 Reference Point PRS-7: Aggregation Proxy – Presence XDM Server	17
5.3.3.8 Reference Point PRS-8: Presence Server – Presence XDM Server	17
5.3.3.9 Reference Point PRS-9: Resource List Server – Shared XDM Server	17
5.3.3.10 Reference Point PRS-10: Resource List Server – RLS XDM Server	17
5.3.3.11 Reference Point PRS-11: RLS XDM Server – SIP/IP Core (Void)	17
5.3.3.12 Reference Point PRS-12: RLS XDM Server – Aggregation Proxy	17
5.3.3.13 Reference Point PRS-13: Presence Source – Content Server	17
5.3.3.14 Reference Point PRS-14: Watcher – Content Server	18
5.3.3.15 Reference Point PRS-15: Presence Server – Content Server	18
5.3.3.16 Reference Point PRS-16: Watcher Information Subscriber – SIP/IP Core	18
5.3.3.17 Reference Point XDM-1: XDM Client – SIP/IP Core (Void)	18

5.3.3.18 Reference Point XDM-3: XDM Client – Aggregation Proxy..... 18

5.3.3.19 Reference Point XDM-2: Shared XDMS – SIP/IP Core (Void) 18

5.3.3.20 Reference Point XDM-4: Shared XDMS – Aggregation Proxy..... 18

5.3.3.21 Reference Point IP-1: SIP/IP Core network – Remote Presence Network (based on a SIP/IP Core) 18

5.3.3.22 Reference Point DM-1: DM Client – DM Server 19

5.3.4 Presence Information Format 19

5.3.5 Presence Authorisation Rules 19

5.3.5.1 Subscription Authorization Rules..... 19

5.3.5.2 Presence Content Rules 19

5.3.6 Charging..... 19

5.3.6.1 Charging Architecture 19

5.3.7 Registration..... 19

5.3.8 Presence Service Provisioning 20

APPENDIX A. CHANGE HISTORY (INFORMATIVE).....21

A.1 APPROVED VERSION HISTORY21

Figures

Figure 1: SIMPLE Presence Architecture..... 12

1. Scope

(Informative)

The scope of this document is to provide an architecture for the OMA Presence SIMPLE 1.1 enabler (Presence Enabler), which includes a general network-agnostic model for presence using the IETF SIMPLE specifications and aligned with 3GPP and 3GPP2 Presence Service framework.

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2.1 Normative References

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- [RFC4660] “Functional Description of Event Notification Filtering”, H.Khartabil et al, Sep 2006, RFC 4660, URL: <http://www.ietf.org/rfc/rfc4660.txt>

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URL: URL: http://www.3gpp2.org/Public_html/specs/index.cfm
NOTE: 3GPP2 Work in progress.
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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.

3.2 Definitions

Context Collaboration Model	An extension of the Context Model. It expands on the Context Model by describing the interactions (collaborations) between the entities of this architecture and external entities (e.g. entities in other architectures).
Context Model	A model that identifies all Contextual Items relevant to understanding architecture.
Contextual Item	A logical entity in an architecture.
Presence Content Rules	Rules that determine the content of Presence Information sent to the Watchers.
Presence Information	Defined in [OMA PRESRD].
Presence Information Element	Defined in [OMA PRESRD].
Presence List	A resource list (or URI List) to ask for Presence Information for a list of users.
Presence Service	Defined in [OMA PRESRD].
Presence Source	Defined in [OMA PRESRD].
Presentity	Defined in [OMA PRESRD].
URI List	A collection of URIs put together for convenience.
User Agent	A logical entity that can act as both a user agent client and user agent server. [RFC3261].
Watcher	Defined in [OMA PRESRD].
Watcher Information	Defined in [OMA PRESRD].
Watcher Information Subscriber	Defined in [OMA PRESRD].

3.3 Abbreviations

3GPP	3rd Generation Partnership Project
3GPP2	3rd Generation Partnership Project 2
AD	Architecture Document
DM	Device Management
GAA	Generic Authentication Architecture
HLR	Home Location Register
HTTP	Hyper Text Transfer Protocol
IETF	Internet Engineering Task Force
IMS	IP Multimedia Subsystem
IP	Internet Protocol

MIME	Multipurpose Internet Mail Extension
MMD	MultiMedia Domain
MSC	Mobile Switching Centre
OMA	Open Mobile Alliance
PIDF	Presence Information Data Format
PoC	Push-to-talk over Cellular
PRS	Presence
PS	Presence Server
RD	Requirement Document
RLS	Resource List Server
SIMPLE	SIP Instant Message and Presence Leveraging Extensions
SIP	Session Initiation Protocol
UE	User Equipment
URI	Uniform Resource Identifier
XCAP	XML Configuration Access Protocol
XDM	XML Document Management
XDMC	XDM Client
XDMS	XDM Server
XML	Extensible Markup Language

4. Introduction

(Informative)

The OMA Presence SIMPLE enabler is a service that manages the collection and controlled dissemination of Presence Information. Multiple standards fora are working on presence. This section describes the OMA Presence SIMPLE enabler and how it relates to similar work of other industry/standards fora.

The IETF has defined protocols and formats for presence (see [RFC3265], [RFC3856], [RFC3857], [RFC3863], [RFC3903], [RFC4662], etc.). The work of OMA and other fora leverages these standards.

3GPP and 3GPP2 have defined a Presence Service framework in [3GPP TS 23.141] and [3GPP2 X.S0027-001-0]. This framework has a defined presence reference architecture both in “network layer” and “application layer” meaning that 3GPP and 3GPP2 specifications [3GPP TS 24.141] and [3GPP2 X.P0027-003-0] respectively define end-to-end Presence Information flows. The term “network layer” refers to the communication that is required between the Presence Service functional elements (e.g. PS) and various network elements as they are defined in the network architectures of 3GPP and 3GPP2 (e.g. MSC, HLR). The term “application layer” refers to the communication that is required between the various Presence Service elements (e.g. PS and Presence Source), which includes the “application layer” functional entities. OMA Presence SIMPLE is aligned with 3GPP and 3GPP2 Presence Service framework while it fulfils OMA specific requirements.

Additionally, there are presence services that exist or can be envisaged that do not leverage core network infrastructure as defined by 3GPP and 3GPP2. However, those presence services are still relevant and thus supported by this architecture.

4.1 Security Considerations

This section describes the mechanisms required for the secure operation of a Presence service.

4.1.1 SIP Signalling Security

Mutual authentication can be performed, prior to any service interaction, between:

- a PS and a Presence Source, or
- a PS and a Watcher, or
- a PS and a Watcher Information Subscriber, or
- an RLS and a Watcher.

For an IMS realization, the PS and RLS rely on the security mechanisms provided by the SIP/IP Core network, for securing the service environments e.g. authentication of the service usage.

4.1.2 XDM security

The XDM security is specified in [OMA XDMAD] "*Security Considerations*".

4.2 Requirements

All the requirements as defined in the [OMA PRESRD] are met with this document.

5. Architectural Model

5.1 Dependencies

5.1.1 Collaboration with Service Enablers

The Presence Enabler provides a variety of services that can be invoked from other Enablers. Those Enablers can assume one or more of the following roles:

- Presence Source: publishes Presence Information to the Presence Enabler.
- Watcher: subscribes to retrieve Presence Information from the Presence Enabler.
- Watcher Information Subscriber: subscribes to retrieve Watcher Information from the Presence Enabler.
- XDMC: manages XML documents stored in the Presence XDMS and RLS XDMS.

5.1.2 Collaboration with Device Management

The Device Management Enabler can be utilised to configure terminals with relevant data. The Presence Enabler does not define interfaces between Device Management Clients and Presence Sources or Watchers.

5.1.3 Collaboration with XDM Enabler

The Presence SIMPLE Enabler introduces two new XDMSs – Presence XDMS and RLS XDMS. The XML documents stored in these two XDMSs can be accessed using procedures defined in XDM Enabler.

The PS has a co-located XDMC in order to interact with the Presence XDMS and the Shared XDMS. The RLS has a co-located XDMC in order to interact with the RLS XDMS and the Shared XDMS.

5.2 Architectural Diagram

The following figure illustrates the OMA Presence architecture:

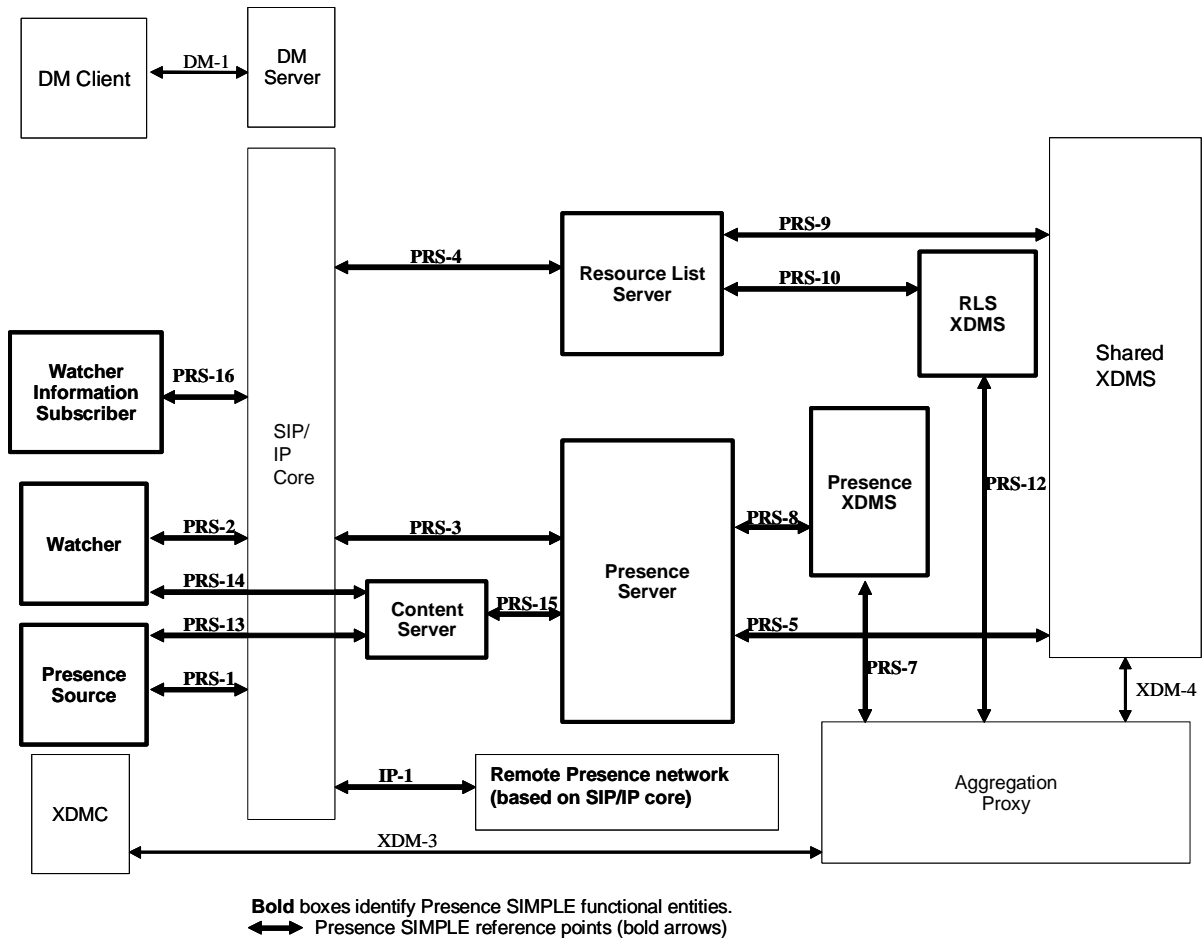


Figure 1: SIMPLE Presence Architecture

Elements shown in bold are defined in this architecture document. The remaining elements are external to this specification.

The reference points shown here in bold are those that are specified in the Presence Enabler. Other relevant reference points (XDM-3, XDM-4) are specified in the XDM Enabler [OMA XDMAD].

The access network used by the Presence architecture may include any radio or other access as well as the other nodes required to support IP connectivity and IP mobility.

5.3 Functional Components and Reference Points

5.3.1 Presence Functional Entities

This section describes the entities specified as part of the Presence Enabler.

5.3.1.1 Presence Server

The PS is an entity that accepts, stores and distributes Presence Information. The PS supports the following:

- Accepts, authorizes and stores Presence Information published by Presence Sources [RFC3903].

- Composes Presence Information from Presence Sources.
- Authorizes Watchers' subscriptions and distributes Presence Information [RFC3265] [RFC3856].
- Authorizes Watcher Information Subscribers' subscriptions and distributes Watcher Information [RFC3265] [RFC3857].
- Regulates the distribution of Presence Information and Watcher Information in the manner as requested by Watchers.
- Stores or retrieves MIME objects to/from the Content Server.
- Fetches documents from the Shared XDMS and the Presence XDMS.

5.3.1.2 Presence Source

The Presence Source is an entity that provides Presence Information to a Presence Service. The Presence Source can be located in a user's terminal or within a network entity. The Presence Source supports the following:

- Publishes Presence Information on behalf of the Presentity according to [RFC3903].
- Stores MIME objects to the Content Server.
- Compresses/decompresses the presence related SIP messages when the Presence Source resides in the terminal.

5.3.1.3 Watcher

A Watcher is an entity that requests Presence Information about a Presentity or multiple Presentities from the Presence Service. The Watcher can be located in a user's terminal or within a network entity. The Watcher supports the following:

- Subscribes to Presentity's Presence Information [RFC3265] [RFC3856].
- Subscribes to multiple Presentities' Presence Information [RFC3265] [RFC4662].
- Retrieves MIME objects from the Content Server.
- Requests the PS to regulate the distribution of Presence Information.
- Processes Presence Information.
- Compresses/decompresses the presence related SIP messages when the Watcher resides in the terminal.

5.3.1.4 Watcher Information Subscriber

A Watcher Information Subscriber is an entity that requests Watcher Information about a Presentity from the Presence Service. The Watcher information Subscriber can be located in a user's terminal or within a network entity. The Watcher Information Subscriber supports the following:

- Subscribes to Watcher Information [RFC3265] [RFC3857].
- Requests the PS to regulate the distribution of Watcher Information.
- Compresses/decompresses the presence related SIP messages when the Watcher Information Subscriber resides in the terminal.

5.3.1.5 Resource List Server

The RLS is the functional entity that accepts and manages subscriptions to Presence Lists, which enables a Watcher application to subscribe to the Presence Information of multiple Presentities using a single subscription transaction. The RLS supports the following:

- Authorizes Watchers' subscriptions and distributes Presence Information [RFC3265] [RFC3856] [RFC 4662].
- Performs back-end subscriptions on behalf of the Watcher [RFC3265] [RFC3856] [RFC4662].
- Regulates the distribution of Presence Information in the manner as requested by Watchers [RFC4660].
- Propagates the Watcher's request to regulate the distribution of Presence Information in the back-end subscriptions [RFC4660].
- Fetches documents from the Shared XDMS and the RLS XDMS.

5.3.1.6 Presence XML Document Management Server

The Presence XDMS is an XDMS defined in [OMA XDMAD] that supports the following function:

- Manages XML documents (e.g. Presence Authorization Rules) which are specific to the use of a PS.

5.3.1.7 Resource List Server XML Document Management Server

The RLS XDMS is an XDMS defined in [OMA XDMAD] that supports the following function:

- Manages XML documents (e.g. Presence Lists), which are specific to the use of an RLS.

5.3.1.8 Content Server

The Content Server is the functional entity that is capable of managing MIME objects for Presence, allowing the Presence Sources or the PS to store MIME objects within, and support retrieval of those objects by the PS or the Watchers as required for content indirection [RFC4483].

The Content Server relies on external authentication and authorization done for the Presence Sources and Watchers. When realized with 3GPP IMS or 3GPP2 MMD networks, GAA [3GPP TS 33.222] or GBA [3GPP2 S.S0114-0] can be used for that purpose.

The authentication and authorization done by the Content Server for the PS is outside the scope of this document.

NOTE: Any usage of the Content Server for tasks not related to presence content indirection is outside the scope of this document.

5.3.2 External Entities Providing Services to Presence

This section describes the entities specified by other OMA Enablers or external organizations.

5.3.2.1 SIP/IP Core network

The SIP/IP Core is a network of servers, such as proxies and/or registrars that perform a variety of services in support of the Presence 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.

This release of the Presence Enabler utilizes IMS and MMD networks. Future releases may fully specify how the Presence Enabler utilizes additional types of SIP/IP Cores. It is possible that certain future deployments may not have a SIP/IP Core at all, which would be an item for further study.

When the Presence Service is realized using IMS or MMD, the Presence functional entities will utilize the capabilities of IMS as specified in 3GPP [3GPP TS 23.228] and 3GPP2 [3GPP2 X.S0013-002-A], respectively. In such cases the IMS network performs the following additional functions in support of the Presence Service:

- Routes the SIP signalling between the Presence functional entities.
- Provides discovery and address resolution services.

- Supports SIP compression/decompression.
- Performs authentication and authorization of the Presence functional entities.
- Maintains the registration state.
- Provides charging information.

5.3.2.2 Shared XML Document Management Server (XDMS)

The functionality of the Shared XDMS is described in [OMA XDMAD].

5.3.2.3 Aggregation Proxy

The functionality of the Aggregation Proxy is described in [OMA XDMAD].

5.3.2.4 Device Management Server

Device Management Server supports the following function that are needed in support of the Presence Service:

- Initializes and updates all the configuration parameters necessary for the Presence functional entities within the terminals (e.g. Watcher, Presence Source, etc).

5.3.2.5 XML Document Management Client

The XDMC is defined in [OMA XDMAD] and supports the following function:

- Manages XML documents (e.g., Presence Authorisation Rules).

5.3.2.6 Device Management Client

The Device Management Client performs the following functions that are needed in support of the Presence Service:

- Receives the initial configuration parameters and the updated parameters needed for Presence Service sent by the Device Management Server.

5.3.3 Description of the Reference Points

The Reference Points named as PRS are in scope of this Architecture.

5.3.3.1 Reference Point PRS-1: Presence Source – SIP/IP Core

The PRS-1 reference point supports the communication between the Presence Source and the SIP/IP Core network. The protocol for the PRS-1 reference point is SIP and the traffic is routed to (and from) the PS via the SIP/IP Core.

PRS-1 supports the following functions:

- Publication of Presence Information from Presence Sources to the PS according to [RFC3903].
- SIP compression/decompression when the Presence Source resides in the terminal.

When the SIP/IP Core network corresponds with 3GPP IMS or 3GPP2 MMD networks, the PRS-1 reference point conforms with the following reference points: Pep, Pex, Pen depending on the instantiation of the Presence Source (e.g. PUA, PNA, PEA) [3GPP TS 23.141], [3GPP2 X.S0027-001-0].

5.3.3.2 Reference Point PRS-2: Watcher – SIP/IP Core network

The PRS-2 reference point supports the communication between the Watcher and SIP/IP Core network. The protocol for the PRS-2 reference point is SIP and the traffic is routed to (and from) either PS or RLS via the SIP/IP Core.

PRS-2 is used to:

- Subscribe to a Presentity's Presence Information and receive notifications.
- Subscribe to Presence Information and receive notifications for Presence Lists.
- Include Watcher preferences in subscription requests.
- SIP compression/decompression when the Watcher resides in the terminal.

When the SIP/IP Core network corresponds with 3GPP IMS or 3GPP2 MMD networks, the PRS-2 reference point conforms with the Pw reference point [3GPP TS 23.141], [3GPP2 X.S0027-001-0].

5.3.3.3 Reference Point PRS-3: SIP/IP Core – Presence Server

The PRS-3 reference point supports the communication between the SIP/IP Core network and the PS. The protocol for the PRS-3 reference point is SIP.

PRS-3 supports the following functions:

- Publish Presence Information.
- Subscribe to a single Presentity's Presence Information and receive notifications pertaining to the Presentity.
- Subscribe to Watcher Information and receive notifications.
- Regulate notifications of Presence Information or Watcher Information, as requested by Watchers.

When SIP/IP Core network corresponds with 3GPP IMS or 3GPP2 MMD networks, the PRS-3 reference point conforms with the Pwp reference point [3GPP TS 23.141], [3GPP2 X.S0027-001-0].

5.3.3.4 Reference Point PRS-4: SIP/IP Core – Resource List Server

The PRS-4 reference point supports the communication between the SIP/IP Core network and the RLS. The protocol for the PRS-4 reference point is SIP.

PRS-4 is used to route the SIP messages from the SIP/IP Core to and from the appropriate RLS in order to:

- Receive a subscription and send aggregated notifications for a Presence List.
- Subscribe to Presence Information and receive notifications for each Presentity in a Presence List.
- Regulate the aggregated notifications of a Presence List, as requested by Watchers.
- Propagate the Watcher's request to regulate the distribution of Presence Information in the back-end subscriptions.

When SIP/IP Core network corresponds with 3GPP IMS or 3GPP2 MMD networks, the PRS-4 reference point conforms with the Pwp reference point [3GPP TS 23.141], [3GPP2 X.S0027-001-0].

5.3.3.5 Reference Point PRS-5: Presence Server – Shared XDM Server

The PRS-5 reference point supports the communication between the Shared XDMS and the PS. The protocol for the PRS-5 reference point is XCAP.

The PRS-5 reference point supports the following:

- Transfer of URI Lists to the PS.

5.3.3.6 Reference Point PRS-6: Presence XDM Server – SIP/IP Core (Void)

Use of this reference point is not supported in this release.

5.3.3.7 Reference Point PRS-7: Aggregation Proxy – Presence XDM Server

The PRS-7 reference point is between the Aggregation Proxy and the Presence XDMS. The protocol for the PRS-7 reference point is XCAP.

The PRS-7 reference point provides the following function:

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

5.3.3.8 Reference Point PRS-8: Presence Server – Presence XDM Server

The PRS-8 reference point is between the PS and the Presence XDMS. The protocol for the PRS-8 reference point is XCAP.

The PRS-8 reference point provides the following function:

- Transfer of XML documents (e.g. Presence Authorization Rules) from the Presence XDMS to the PS.

5.3.3.9 Reference Point PRS-9: Resource List Server – Shared XDM Server

The PRS-9 reference point supports the communication between the Shared XDMS and the RLS. The protocol for the PRS-9 reference point is XCAP.

The PRS-9 reference point supports the following:

- Transfer of URI Lists to the RLS.

5.3.3.10 Reference Point PRS-10: Resource List Server – RLS XDM Server

The PRS-10 reference point supports the communication between the RLS XDMS and the RLS. The protocol for the PRS-10 reference point is XCAP.

The PRS-10 reference point supports the following:

- Transfer of XML documents (e.g., Presence Lists) from the RLS XDMS to the RLS.

5.3.3.11 Reference Point PRS-11: RLS XDM Server – SIP/IP Core (Void)

Use of this reference point is not supported in this release.

5.3.3.12 Reference Point PRS-12: RLS XDM Server – Aggregation Proxy

The PRS-12 reference point is between the Aggregation Proxy and the RLS XDMS. The protocol for the PRS-12 reference point is XCAP.

The PRS-12 reference point provides the following function:

- RLS-specific document management (e.g. create, modify, retrieve, delete).

5.3.3.13 Reference Point PRS-13: Presence Source – Content Server

The PRS-13 reference point is between the Presence Source and the Content Server. The protocol for the PRS-13 reference point is HTTP.

The PRS-13 reference point provides the following function:

- Storage of MIME objects related to presence publications in the Content Server.

NOTE: The Presence Source is responsible to correlate the presence publication with the MIME objects it has stored on the Content Server.

5.3.3.14 Reference Point PRS-14: Watcher – Content Server

The PRS-14 reference point is between the Watcher and the Content Server. The protocol for the PRS-14 reference point is HTTP.

The PRS-14 reference point provides the following function:

- Retrieval of MIME objects related to presence notifications from the Content Server.

5.3.3.15 Reference Point PRS-15: Presence Server – Content Server

The PRS-15 reference point is between the PS and the Content Server. The protocol for the PRS-15 reference point is HTTP.

The PRS-15 reference point provides the following functions:

- Retrieval of MIME objects related to presence publications from the Content Server.
- Storage of MIME objects related to presence notifications in the Content Server.

5.3.3.16 Reference Point PRS-16: Watcher Information Subscriber – SIP/IP Core

The PRS-16 reference point is between the Watcher Information Subscriber and the SIP/IP Core. The protocol for the PRS-16 reference point is SIP.

The PRS-16 reference point provides the following functions:

- Subscribe to Watcher Information and receive notifications.
- Include Watcher Information Subscriber preferences in subscription requests.
- SIP compression/decompression when the Watcher Information Subscriber resides in the terminal.

When the SIP/IP Core network corresponds with 3GPP IMS or 3GPP2 MMD networks, the PRS-16 reference point conforms with the Pep reference point [3GPP TS 23.141], [3GPP2 X.S0027-001-0].

5.3.3.17 Reference Point XDM-1: XDM Client – SIP/IP Core (Void)

Use of this reference point is not supported in this release.

5.3.3.18 Reference Point XDM-3: XDM Client – Aggregation Proxy

The XDM-3 reference point is described in [OMA XDMAD].

5.3.3.19 Reference Point XDM-2: Shared XDMS – SIP/IP Core (Void)

Use of this reference point is not supported in this release.

5.3.3.20 Reference Point XDM-4: Shared XDMS – Aggregation Proxy

The XDM-4 reference point is described in [OMA XDMAD].

5.3.3.21 Reference Point IP-1: SIP/IP Core network – Remote Presence Network (based on a SIP/IP Core)

The IP-1 reference point supports the communication between the SIP/IP Core network and a Remote Presence Network based on a SIP/IP Core 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 with the Pw reference point as it is defined in [3GPP 23.141] and [3GPP2X.S0027-001-0].

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

The DM-1 reference point is described in [OMA DM]. The Presence Enabler will define the presence configuration object(s).

5.3.4 Presence Information Format

The Presence Service uses the Presence Information Data Format (PIDF) [RFC3863] and its extensions as the base format through which Presence Information is represented.

The OMA Presence Enabler defines the semantics of several presence elements, and allows for those elements to be extended. Those elements are represented in XML using the PIDF format.

5.3.5 Presence Authorisation Rules

The following sections describe Presence Authorisation Rules that Presentities can define to control the dissemination of their Presence Information. Presence Authorization Rules consist of Subscription Authorization Rules and Presence Content Rules.

5.3.5.1 Subscription Authorization Rules

Subscription Authorization Rules determine how incoming subscriptions are handled.

Subscription Authorisation Rules determine those Watchers who are allowed to subscribe to the Presence Information of a Presentity and those who are not allowed. The Subscription Authorization Rules may include lists that can be stored in the Presence XDMS or the Shared XDMS.

The Subscription Authorization Rules support the following actions:

- Accept
- Reject
- Polite block
- Deferred decision

The document containing the Subscription Authorization Rules is stored in the Presence XDMS.

5.3.5.2 Presence Content Rules

Presence Content Rules determine which Presence Information is disseminated to Watchers that have been accepted by Subscription Authorization Rules. A Presentity can define Presence Content Rules that apply to one or more Watchers.

The same document containing the Subscription Authorization Rules also includes the Presence Content Rules.

5.3.6 Charging

5.3.6.1 Charging Architecture

Both online and offline charging are supported.

5.3.7 Registration

When the SIP/IP Core corresponds with 3GPP/3GPP2 IMS, a UE that supports the Watcher Information Subscriber, Presence Source or Watcher functionality uses the 3GPP/3GPP2 IMS registration mechanisms [3GPP TS 23.228] [3GPP2 X.S0013-002-A].

5.3.8 Presence Service Provisioning

The Presence Service provider can set up the Presence Service configurations remotely in the terminal device by using the device management mechanism specified in [OMA PROAD]. The updates of the Presence Service configurations are remotely performed in the terminal device by using [OMA DM].

A terminal device containing the Watcher, Watcher Information Subscriber or Presence Source functional entities, compliant with [OMA PROUA] is able to receive the contents sent by service provider. The exact syntax and definition of parameters needed for Presence Enabler are specified in [OMA PROCONT], while the specific semantics are defined in the Presence Enabler. The bootstrap mechanism defined in [OMA PROSEC] and [OMA DM] is used to enhance the security of the provisioning.

Appendix A. Change History

(Informative)

A.1 Approved Version History

Reference	Date	Description
OMA-AD-Presence-SIMPLE-V1_0-20060725-A	25 Jul 2006	TP approved: OMA-TP-2006-0223R04-INP_Presence_SIMPLE_V1_0_for_final_approval
OMA-AD-Presence-SIMPLE-V1_0_1-20061128-A	28 Nov 2006	CR incorporated: OMA-PAG-2006-0390R02
OMA-AD-Presence-SIMPLE-V1_1-20080627-A	27 Jun 2008	Status changed to Approved by TP TP ref# OMA-TP-2008-0250- INP_Presence_SIMPLE_V1_1_ERP_for_Final_Approval
OMA-AD-Presence-SIMPLE-V1_1_1-20090128-D	28 Jan 2009	CRs incorporated: OMA-PAG-2008-0859 OMA-PAG-2008-0868
OMA-AD-Presence-SIMPLE-V1_1_1-20100225-A	25 Feb 2010	Status changed to Approved by TP TP ref# OMA-TP-2010-0110- INP_Presence_SIMPLE_V1_1_1_ERP_for_notification