Privacy Checking Protocol

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Open Mobile Alliance

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1. Scope

The OMA (Location) Privacy Checking Protocol (PCP) is an application-level protocol for asserting the privacy settings of a mobile subscriber for mobile network provided services. Such services may include e.g. Location and Presence. PCP may be used as the protocol between a network server providing the network service and an external privacy policy resource.

2. References

2.1 Normative References

[22.071] 3GPP TS 22.071 Release 6: "Location Services (LCS); Service description, Stage 1", URL: http://www.3gpp.org/ftp/Specs/latest/Rel-6/22_series/

[23.271] 3GPP TS 23.271 Release 6: "Functional stage 2 description of LCS", URL: http://www.3gpp.org/ftp/Specs/latest/Rel-6/23_series/

[23.003] 3GPP TS 23.003 Release 6: "Numbering, addressing and identification", URL: http://www.3gpp.org/ftp/Specs/latest/Rel-6/23_series/

[ASCII] US-ASCII. Coded Character Set - 7-Bit American Standard Code for Information Interchange. Standard ANSI X3.4-1986, ANSI, 1986.

[IOPPROC] "OMA Interoperability Policy and Process", Version 1.10, Open Mobile Alliance™, OMA-IOP-Process-V1_10, URL: http://www.openmobilealliance.org/

[MLS AD] "OMA Mobile Location Service Architecture", Open Mobile Alliance™. OMA-AD-MLS-V1_0, URL: http://www.openmobilealliance.org/

[OMA-MLP] "Mobile Location Protocol". Open Mobile Alliance™. OMA-TS-MLP-V3_2, URL: http://www.openmobilealliance.org/

[OWSER Prac] "OMA Web Services Enabler(OWSER) Best Practice : WSDL Style Guide", Version 1.1, Open Mobile Alliance™, URL: http://www.openmobilealliance.org/

[OWSER1.1] "OMA Web Services Enabler(OWSER): Core Specification", Version 1.1, Open Mobile Alliance™, 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

[RFC2396] "Uniform Resource Identifiers (URI): Generic Syntax", T. Berners-Lee, August 1998, URL: http://www.ietf.org/rfc/rfc2396.txt

[RFC2543] "SIP: Session Initiation Protocol", M. Handly, March 1999, URL: http://www.ietf.org/rfc/rfc2543.txt

[RFC3261] "SIP: Session Initiation Protocol", J. Rosenberg, June 2002, URL: http://www.ietf.org/rfc/rfc3261.txt

[RFC3966] "The tel URI for Telephone Numbers, H. Schulzrinne, December 2004, URL: http://www.ietf.org/rfc/rfc3966.txt

[WSDL1.1] "Web Services Description Language(WSDL) Version 1.1". Erik Christensen, Francisco Cubrera, Greg Meredith, Sanjiva Weeravarana,, W3C NOTE, March 15, 2001, URL: http://www.w3.org/TR/wsdl.html

[XML-1.0] "Extensible Markup Language (XML) 1.0" W3C Recommendation: REC-xml-20001006, URL: http://www.w3c.org

2.2 Informative References

[23.032] 3GPP TS 23.032: " Universal Geographical Area Description (GAD)"

[E.164] ITU-T E.164: "The international public telecommunication numbering plan

[WAPARCH] "WAP Architecture". Open Mobile Alliance™. WAP-210-WAPArch.
URL: http://www.wapforum.org/

3. Terminology and Conventions

3.1 Conventions

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

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

Notational Conventions and Generic Grammar

The following rules are used throughout this specification to describe basic parsing constructs.

- ANSI X3.4-1986 defines the US-ASCII coded character set, see ref. [5]

CR	= <US-ASCII CR, carriage return (13)>
LF	= <US-ASCII LF, linefeed (10)>
SP	= <US-ASCII SP, space (32)>

- A set of characters enclosed in brackets ([...]) is a one-character expression that matches any of the characters in that set. E.g., "[lcs]" matches either an "l", "c", or "s". A range of characters is indicated with a dash. E.g., "[a-z]" matches any lower-case letter.

The one-character expression can be followed by an interval operator, for example [a-zA-Z]{min,max} in which case the one-character expression is repeated at least min and at most max times. E.g., "[a-zA-Z]{2,4}" matches for example the strings "at", "Good", and "biG".

3.2 Definitions

Lid	Reference point between PMD entity and Location Server. See also [23.271]
Lpp	Reference point between PPR and Location Server. See also [23.271]
Privacy Checking Entity	A network entity responsible for privacy functionalities of PPR and PMD.
Privacy Profile Register	Stores privacy information of the target mobile and executes privacy checks and sends the privacy check results to requesting network elements using Lpp interface.
Pseudonym	A fictitious identity, which may be used to conceal the true identity (i.e. MSISDN and IMSI) of a target UE from the requestor and the LCS client, or to conceal the true identity of the requestor or the target.
Pseudonym Mediation Device	Functionality that verifies pseudonyms to verinyms supporting Lid interface.
Verinym	True identity, i.e. MSISDN or IMSI, of the target or requestor.

3.3 Abbreviations

ANSI	American National Standards Institute
GMLC	Gateway Mobile Location Center
HTTP	Hypertext Transfer Protocol
HTTPS	HTTP Secure
LCS	Location Services
MDN	Mobile Dialing Number
MIN	Mobile Identification Number
MLC	Mobile Location Center
MLP	Mobile Location Protocol

MPC	Mobile Positioning Center
MS	Mobile Station
MSID	Mobile Station Identifier
OMA	Open Mobile Alliance
PCE	Privacy Checking Entity
PMD	Pseudonym Mediation Device
PPR	Privacy Profile Register
SSL	Secure Socket Layer
TLS	Transport Layer Security
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
WAP	Wireless Application Protocol
WSDL	Web Service Definition Language
XML	Extensible Markup Language

4. Introduction

Location services based on the location of mobile devices are becoming increasingly widespread. The Location information is sensitive information. Therefore the Location service requires specific care with privacy and security. The PCP (Privacy Checking Protocol) is used to protect the privacy of the user of the target terminal.

The PCP is used to check privacy profile of positioning target before providing or gathering location data and the mediation service between a pseudonym and a verinym. The PCP is also utilized in order to do the privacy update notification service.

The purpose of this specification is to specify the detailed technical specification of the interface between a Location Server and a Privacy Checking Entity (PCE) described in MLS Architecture Document [MLS AD]. In the 3GPP context, PCP V1.0 will be an instantiation of the stage 2 specifications for the Lid/Lpp reference points [23.271].

5. Privacy Checking Protocol

5.1 Overview

The Privacy Checking Protocol (PCP) is an application-level protocol for asserting mobile subscribers privacy settings from an external Privacy Checking Entity. PCP may be used as the protocol between a Location Server and an external privacy checking entity.

The Figure 1 shows services for location privacy control between three entities, Location Server, Privacy Checking Entity, and MLS Clients. The PCE is equivalent to PPR(Privacy Profile Register) including PMD(Pseudonym Mediation Device) functionality. The Location Request/Response message between location server and MLS client refer to the MLP [OMA-MLP].

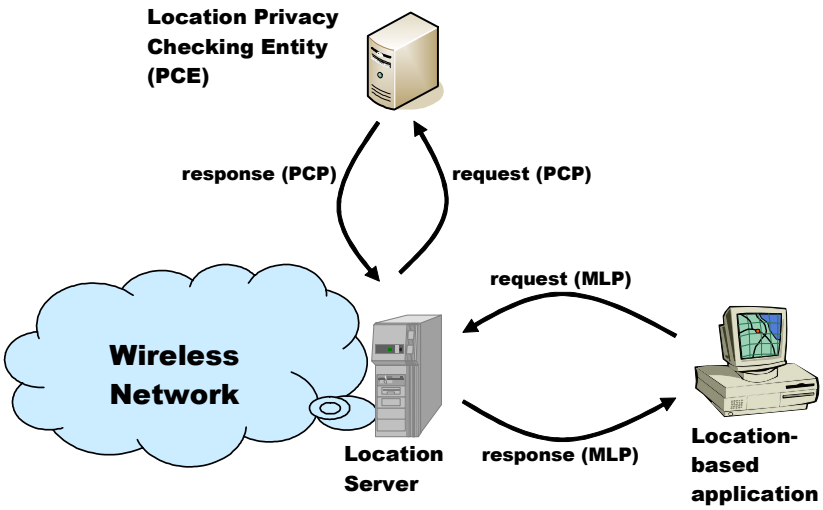


Figure 1: PCP Overview

5.2 PCP Services

Service	Description
Location Privacy Checking Service	This is a standard service for checking the privacy settings of a target mobile subscriber in Location. This service consists of the following messages: - Location Privacy Assertion Request - Location Privacy Assertion Response
Pseudonym/Verinym Mediation Service	This is a standard service for mediating a Pseudonym and a Verinym of target mobile subscriber in Location. This service consists of the following messages: - Pseudonym Request - Pseudonym Response - Verinym Request - Verinym Response
Privacy Profile Update Notification Service	This is a standard service for notifying the update of Privacy Profile of a target mobile subscriber in Location. This service consists of the following messages: - Location Privacy Profile Update Notification - Location Privacy Profile Update Notification Ack

5.3 Protocol Structure

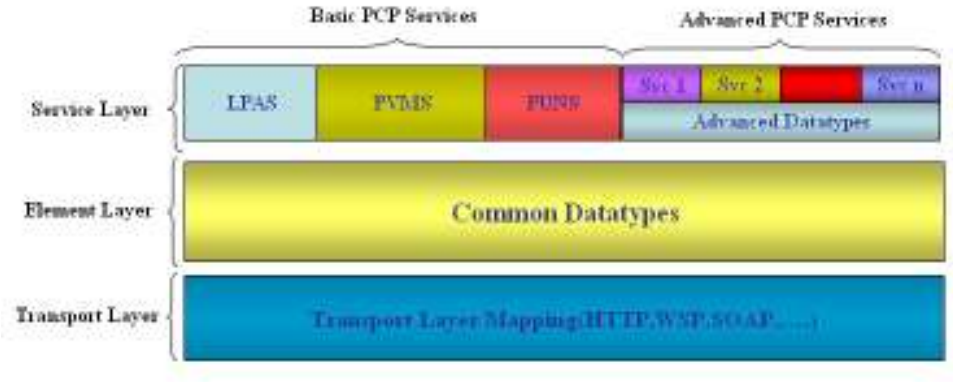


Figure 2: PCP Structure

Figure 2 shows a layered view of PCP. In PCP, the transport protocol is separated from the XML content. WSDL definitions of PCP bind among the message interface description, the concrete protocols, and the service access point.

On the lowest level, the transport protocol defines how XML content is transported. Possible PCP transport protocols include HTTP, WSP, SOAP and others.

The Element Layer defines all common datatypes used by the services in the service layer. The common datatypes are consisted of identity datatypes, functional datatypes, servicetype datatypes, result datatypes and shape datatypes.

The Service Layer defines the actual services offered by the PCP framework. Basic PCP Services are based on location services defined by 3GPP [23.271] and described in 5.2 PCP services as follows;

- LPAS: Location Privacy Assertion Service
- PVMS: Psedonym Verinym Mediation Service
- PUNS: Profile Update Notification Service

The "Advanced PCP Services" are additional services that either will be specified in other specifications or are specified by other fora that conform to the PCP framework.

5.4 Security

The information carried on Privacy Checking Protocol (PCP) is sensitive personal information and SHALL be protected against modification and disclosure of information to unauthorized parties. The communicating parties MUST authenticate each other.

The main threat to PCP is incorrect release of location info from a Location Server due to rouge PCE providing incorrect privacy assertions or manipulation of the communication between a Location Server and a PCE.

This specification does not define any specific security mechanisms to be used. However, the requirements above still imply that if PCP is carried over an internal interface its implementation MUST ensure that the communicating entities are legitimate and that the information exchange is protected against intercept and modifications.

When PCP is carried by a transport protocol over an external interface, the transport protocol MUST provide mutual authentication between the Location sServer and the PCE, and confidentiality and integrity protection of the information exchanged. The protection mechanisms MUST be in accordance with chapter 7.1.2 in OMA Web Services Enabler (OWSER) [OWSER1.1].

6. Datatype Definitions

6.1 Identity Datatypes

6.1.1 ueidType

```
<xs:complexType name="ueidType">
        <xs:choice>
                    <xs:element name="msid" type="msidType"/>
                    <xs:element name="pseudoid" type="pseudoIdType"/>
        </xs:choice>
</xs:complexType>
```

6.1.2 msidType

```
<xs:complexType name="msidType">
<xs:annotation>
        <xs:documentation>
        Description goes here.
        </xs:documentation>
</xs:annotation>
<xs:all>
        <xs:element name="msisdn" type="e164NumberType" minOccurs="0"/>
        <xs:element name="imsi" type="imsiType" minOccurs="0"/>
        <xs:element name="mdn" type="mdnType" minOccurs="0"/>
        <xs:element name="min" type="minType" minOccurs="0"/>
</xs:all>
</xs:complexType>


<xs:simpleType name="imsiType">
<xs:annotation>
        <xs:documentation>
        This simple datatype defines a datatype for IMSI number. This defines
        IMSI at a very high level and doesn't define IMSI structure as defined
        in the 3GPP TS23.003 [23.003] doc. Defining the IMSI structure
datatype as defined
        in TS23.003 is not possible with schema capabilities.
        </xs:documentation>
</xs:annotation>
<xs:restriction base="xs:nonNegativeInteger">
        <xs:totalDigits value="15"/>
</xs:restriction>
</xs:simpleType>
```

6.1.3 pseudoidType

```
<xs:simpleType name="pseudoIdType">
<xs:restriction base="xs:string"/>
</xs:simpleType>
```

6.1.4 clientType

```
<xs:complexType name="clientType">
<xs:sequence>
        <xs:element name="clientId" type="clientIdType"/>
        <xs:element name="clientCategory" type="clientCategoryType"/>
        <xs:element name="clientName" type="clientNameType" minOccurs="0"/>
</xs:sequence>
```

```
</xs:complexType>
```

6.1.5 clientIdType

```
<xs:complexType name="clientIdType">
<xs:choice>
        <xs:element name="externalId" type="e164NumberType"/>
        <xs:element name="internalId" type="internalIdType"/>
</xs:choice>
</xs:complexType>

<xs:simpleType name="internalIdType">
<xs:annotation>
        <xs:documentation>
        Value "1" represents "LCS client broadcasting location related
information"
        Value "2" represents "OM LCS client in the HPLMN"
        Value "3" represents "OM LCS client in the VPLMN"
        Value "4" represents "LCS client recording anonymous location
information"
        Value "5" represents "LCS Client supporting a bearer service,
teleservice or
        supplementary service to the target UE"
        </xs:documentation>
</xs:annotation>
<xs:restriction base="xs:positiveInteger">
        <xs:minInclusive value="1"/>
        <xs:maxInclusive value="5"/>
</xs:restriction>
</xs:simpleType>
```

6.1.6 clientNameType

```
<xs:complexType name="clientNameType">
<xs:choice>
        <xs:element name="msisdn" type="e164NumberType"/>
        <xs:element name="logicalId" type="xs:string"/>
        <xs:element name="emailId" type="emailIdType"/>
        <xs:element name="absoluteHTTPURL" type="absoluteHTTPURLType"/>
        <xs:element name="SIPURI" type="SIPURIType"/>
        <xs:element name="IMSPublicId" type="IMSPublicIdType"/>
</xs:choice>
</xs:complexType>
```

6.1.7 sessionType

```
<xs:complexType name="sessionType">
<xs:choice>
        <xs:element name="APN" type="apnNiType"/>
        <xs:element name="DIAL" type="dialNumberType"/>
</xs:choice>
</xs:complexType>
```

6.1.8 requestorIdType

```
<xs:complexType name="requestorIdType">
<xs:choice>
        <xs:element name="logicalId" type="xs:string"/>
        <xs:element name="msisdn" type="e164NumberType"/>
        <xs:element name="emailId" type="emailIdType"/>
        <xs:element name="absoluteHTTPURL" type="absoluteHTTPURLType"/>
```

```
        <xs:element name="SIPURI" type="SIPURIType"/>
        <xs:element name="IMSPublicId" type="IMSPublicIdType"/>
        <xs:element name="imsi" type="imsiType"/>
        <xs:element name="mdn" type="mdnType"/>
</xs:choice>
</xs:complexType>
```

6.1.9 serviceidType

```
<xs:simpleType name="serviceIdType">
<xs:restriction base="xs:string"/>
</xs:simpleType>
```

6.1.10 callSessionRelatedIdType

```
<xs:complexType name="callSessionRelatedIdType">
        <xs:choice>
                    <xs:element name="E164" type="e164NumberType"/>
                    <xs:element name="APN" type="apnNiType"/>
        </xs:choice>
</xs:complexType>
```

6.1.11 codewordType

```
<xs:simpleType name="codewordType">
<xs:restriction base="xs:string"/>
</xs:simpleType>
```

6.1.12 pceServerType

```
<xs:complexType name="pceServerType">
        <xs:sequence>
        <xs:element name="id" type="xs:NMTOKEN"/>
        <xs:element name="pwd" type="xs:string" minOccurs="0"/>
        </xs:sequence>
</xs:complexType>
```

6.1.13 mdnType

```
<xs:simpleType name="mdnType">
    <xs:annotation>
        <xs:documentation>
        The Mobile Dialing Number.
        </xs:documentation>
    </xs:annotation>
    <xs:restriction base=”xs:nonNegativeInteger”>
        <xs:totalDigits value=”10”/>
    </xs:restriction>
</xs:simpleType>
```

6.1.14 minType

```
<xs:simpleType name="minType">
    <xs:annotation>
        <xs:documentation>
        The Mobile Indentification Number.
        </xs:documentation>
    </xs:annotation>
    <xs:restriction base=”xs:nonNegativeInteger”>
        <xs:totalDigits value=”10”/>
```

```
    </xs:restriction>
</xs:simpleType>
```

6.1.15 pceClientType

```
<xs:complexType name="pceClientType">
        <xs:sequence>
        <xs:element name="id" type="xs:NMTOKEN"/>
        <xs:element name="pwd" type="xs:string" minOccurs="0"/>
        </xs:sequence>
</xs:complexType>
```

6.2 Functional Datatypes

6.2.1 roamingType

```
<xs:complexType name="roamingType">
        <xs:attribute name="flag" type="xs:boolean" use="required"/>
</xs:complexType>
```

6.2.2 servingNodeType

```
<xs:complexType name="servingNodeType">
        <xs:simpleContent>
        <xs:extension base="164NumberType ">
        <xs:attribute name="capability" use="required">
        <xs:annotation>
        <xs:documentation>
        Value 1 represents R98 and R99 capabilities set
        Value 2 represents Rel 4 capabilities set
        Value 3 represents Rel 5 capabilities set
        Value 4 represents Rel 6 capabilities set
        Value 5 represents Rel 7 or later capabilities set
        </xs:documentation>
                    </xs:annotation>
                    <xs:simpleType>
        <xs:restriction base="xs:integer">
                                    <xs:minInclusive value="1"/>
        </xs:restriction>
                    </xs:simpleType>
        </xs:attribute>
        </xs:extension>
        </xs:simpleContent>
</xs:complexType>
```

6.2.3 privacyActionType

```
<xs:complexType name="privacyActionType">
    <xs:annotation>
        <xs:documentation>
        The privacy action type may be one of: 1) callRelated, 2)
callUnRelated, 3) Both CallRelated and CallUnRelated or 4) a pseudo external
id.
        See 3GPP 23.271 for additional details.
        </xs:documentation>
    </xs:annotation>
        <xs:choice>
```

```
                                    <xs:sequence>
                                    <xs:element name="callRelatedAction"
type="actionType"/>
                                    <xs:element name="callUnrelatedAction"
type="actionType" minOccurs="0"/>
                                    </xs:sequence>
                        <xs:element name="pseudoExternalId" type="xs:string"
minOccurs="0"/>

        </xs:choice>
            <xs:element name="callUnrelatedAction” type=”actionType” />
</xs:complexType>
```

6.2.4 actionType

```
<xs:simpleType name="actionType" final="restriction">
<xs:restriction base="xs:string">
        <xs:enumeration value="POSITION_NOT_ALLOWED"/>
        <xs:enumeration value="NOTIFY_POSITION_IF_GRANTED"/>
        <xs:enumeration value="NOTIFY POSITION IF NO RESPONSE"/>
        <xs:enumeration value="NOTIFY_POSITION"/>
        <xs:enumeration value="POSITION_WITHOUT_NOTIFY"/>
</xs:restriction>
</xs:simpleType>
```

6.2.5 e164NumberType

```
<xs:simpleType name="e164NumberType">
        <xs:annotation>
        <xs:documentation>
        This simple datatype defines a datatype for E.164 international public
        telecommunication number for networks. This datatype defines
        E.164 number at a very high level and doesn't define E.164 structure
as
        defined in the ITU-T E.164 [E.164]  doc(section 6.2.3). Defining this
number
        structure as defined in E.164 is not possible with schema
capabilities.
        </xs:documentation>
        </xs:annotation>
        <xs:restriction base="xs:nonNegativeInteger">
        <xs:totalDigits value="15"/>
        </xs:restriction>
</xs:simpleType>
```

6.2.6 apnNiType

```
<xs:simpleType name="apnNiType">
<xs:annotation>
                        <xs:documentation>
                        APN-NI (APN Network Identifier)
                        The APN Network Identifier. This defines to which
external network
                        the GGSN     is connected and optionally a requested
service by the MS.

                        The APN Network Identifier shall contain at least one
label and shall have a
                        maximum length of 63 octets. The labels shall consist
only of the alphabetic
```

```
                        characters (A-Z and a-z), digits (0-9) and the hyphen (-
). An APN Network
                        Identifier shall not start with any of the strings "rac",
"lac", "sgsn" or "rnc",
                        and it shall not end in ".gprs". Further, it shall not
take the value "*".
                        </xs:documentation>
</xs:annotation>
        <xs:restriction base="xs:string">
                        <xs:minLength value="1"/>
                        <xs:maxLength value="63"/>
        <xs:pattern value="[\w\-]+"/>
        </xs:restriction>
</xs:simpleType>
```

6.2.7 dialNumberType

```
<xs:simpleType name="dialNumberType">
<xs:restriction base="xs:string">
        <xs:pattern value="[0-9]+"/>
</xs:restriction>
</xs:simpleType>
```

6.2.8 absoluteHTTPURLType

```
<xs:simpleType name="absoluteHTTPURLType">
<xs:restriction base="xs:anyURI ">
        <xs:pattern value=”https?:.*"/>
</xs:restriction>
</xs:simpleType>
```

6.2.9 SIPURIType

```
<xs:simpleType name="SIPURIType">
<xs:annotation>
        <xs:documentation>
        This defines a simple version of the SIP URI pattern defined in RFC
3261 [RFC3261]
        </xs:documentation>
</xs:annotation>
<xs:restriction base="xs:anyURI">
        <xs:pattern value="sips?:.*"/>
</xs:restriction>
</xs:simpleType>
```

6.2.10 telURIType

```
<xs:simpleType name="telURIType">
<xs:annotation>
        <xs:documentation>
        This defines a simple version of the tel URI pattern is defined in RFC
3966 [RFC3966].
        </xs:documentation>
</xs:annotation>
<xs:restriction base="xs:anyURI">
        <xs:pattern value="tel?:.*"/>
</xs:restriction>
</xs:simpleType>
```

6.2.11 emailIdType

```
<xs:simpleType name="emailIdType">
```

```
<xs:restriction base="xs:string">
        <xs:pattern value="(\w+\.)*\w+@(\w+\.)+\w+"/>
</xs:restriction>
</xs:simpleType>
```

6.2.12 IMSPublicIdType

```
<xs:complexType name="IMSPublicIdType">
<xs:annotation>
<xs:documentation>
IMS Public User Identity/identities shall take the form of a SIP URI (as
defined in RFC 3261 [RFC3261]  and RFC 2396 [RFC2396]) or the "tel:"-URI format
RFC 3966 [RFC3966] .
</xs:documentation>
</xs:annotation>
        <xs:choice>
                                    <xs:element name="SIPURI"
type="SIPURIType"/>
                                    <xs:element name="TELURI"
type="telURIType"/>
        </xs:choice>
</xs:complexType>
```

6.3 Location Datatypes

6.3.1 locationEstimateType

```
<xs:complexType name="locationEstimateType">
        <xs:sequence>
                                    <xs:element name="time" type="timeType"/>
                                    <xs:element name="shape" type="shapeType"/>
                                    <xs:sequence minOccurs="0">
                                    <xs:element name="alt" type="altitudeType"/>
                                    <xs:element name="alt unc"
type="altitudeUncertaintyType" minOccurs="0"/>
                                    </xs:sequence>
                                    <xs:element name="speed" type="speedType"
minOccurs="0"/>
                                    <xs:element name="direction"
type="directionType" minOccurs="0"/>
                                    <xs:element name="lev conf"
type="probabilityType" minOccurs="0"/>
        </xs:sequence>
</xs:complexType>
```

6.3.2 timeType

```
<xs:simpleType name="timeType">
<xs:annotation>
                                    <xs:documentation>
                                    The time is expressed as yyyyMMddhhmmss.
                                    </xs:documentation>
        </xs:annotation>
        <xs:restriction base="xs:string">
                                    <xs:length value="14"/>
                                    <xs:pattern value="[0-9]+"/>
        </xs:restriction>
</xs:simpleType>
```

6.3.3 altitudeType

```
<xs:simpleType name="altitudeType">
        <xs:annotation>
                                <xs:documentation>
                                The altitude of the MS in meters in respect
of the ellipsoid
                                which is used to be define the coordinates.
                                </xs:documentation>
        </xs:annotation>
        <xs:restriction base="xs:integer"/>
</xs:simpleType>
```

6.3.4 altitudeUncertaintyType

```
<xs:simpleType name="altitudeUncertaintyType">
                    <xs:annotation>
                                <xs:documentation>
                                Uncertainty of altitude estimate in meters.
                                </xs:documentation>
                    </xs:annotation>
                    <xs:restriction base="xs:nonNegativeInteger"/>
</xs:simpleType>
```

6.3.5 speedType

```
<xs:simpleType name="speedType">
        <xs:annotation>
                                <xs:documentation>
                                The speed of the MS in m/s.
                                </xs:documentation>
        </xs:annotation>
        <xs:restriction base="xs:nonNegativeInteger"/>
</xs:simpleType>
```

6.3.6 directionType

```
<xs:simpleType name="directionType">
        <xs:annotation>
                                <xs:documentation>
                                The speed of the MS in m/s.
                                </xs:documentation>
        </xs:annotation>
        <xs:restriction base="xs:double">
                                <xs:minInclusive value="0"/>
                                <xs:maxInclusive value="360"/>
        </xs:restriction>
</xs:simpleType>
```

6.3.7 probabilityType

```
<xs:simpleType name="probabilityType">
        <xs:annotation>
                                <xs:documentation>
                                This indicates the probability in percent
that the MS is located
                                in the position area that is returned.
                                </xs:documentation>
        </xs:annotation>
        <xs:restriction base="xs:double">
                                <xs:minInclusive value="0"/>
```

```
                                        <xs:maxInclusive value="100"/>
        </xs:restriction>
</xs:simpleType>
```

6.4 ServiceType Datatypes

6.4.1 clientCategoryType

```
<xs:simpleType name="clientCategoryType">
<xs:restriction base="xs:string">
        <xs:enumeration value="Value Added"/>
        <xs:enumeration value="Emergency"/>
        <xs:enumeration value="PLMN Operator"/>
        <xs:enumeration value="Lawful Interception"/>
</xs:restriction>
</xs:simpleType>
```

6.4.2 serviceTypeType

```
<xs:simpleType name="ServiceTypeType">
        <xs:annotation>
        <xs:documentation>
        According to the latest 3GPP document, these are the Service Types:
        Value “0” represents “emergencyServices”
        Value “1” represents “emergencyAlertServices”
        Value “2” represents “personTracking”
        Value “3” represents “fleetManagement”
        Value “4” represents “assetManagement”
        Value “5” represents “trafficCongestionReporting”
        Value “6” represents “roadsideAssistance”
        Value “7” represents “routingToNearestCommercialEnterprise”
        Value “8” represents “navigation”
        Value “9” represents “citySightseeing”
        Value “10” represents “localizedAdvertising”
        Value “11” represents “mobileYellowPages”
        Value “12” represents “trafficAndPublicTransportationInfo”
        Value “13” represents “weather”
        Value “14” represents “assetAndServiceFinding”
        Value “15” represents “gaming”
        Value “16” represents “findYourFriend”
        Value “17” represents “dating”
        Value “18” represents “chatting”
        Value “19” represents “routeFinding”
        Value “20” represents “whereAmI”
        Value “21” – 255 represents “Non Standard LCS Services”
        </xs:documentation>
        </xs:annotation>
        <xs:restriction base="xs: nonNegativeInteger">
        <xs:minInclusive value="0"/>
        <xs:maxInclusive value="255"/>
        </xs:restriction>
</xs:simpleType>
```

6.4.3 locationTypeType

```
<xs:simpleType name="locationTypeType">
<xs:annotation>
        <xs:documentation>
        According to the latest 3GPP document, there are three types of
location
```

```
        types in the LCS authorisation request.
        Value "1" represents "current location"
        Value "2" represents "current or last known location"
        Value "3" represents "initial location"
        </xs:documentation>
</xs:annotation>
<xs:restriction base="xs:positiveInteger">
        <xs:minInclusive value="1"/>
        <xs:maxInclusive value="3"/>
</xs:restriction>
</xs:simpleType>
```

6.5 Shape Datatypes

6.5.1 shapeType

```
<xs:complexType name="shapeType">
<xs:choice>
        <xs:element name="point" type="pointType"/>
        <xs:element name="lineString" type="lineStringType"/>
        <xs:element name="polygon" type="polygonType"/>
        <xs:element name="box" type="boxType"/>
        <xs:element name="circularArea" type="circularAreaType"/>
        <xs:element name="circularArcArea" type="circularArcAreaType"/>
        <xs:element name="ellipticalArea" type="ellipticalAreaType"/>
        <xs:element name="multiLineString">
        <xs:complexType>
        <xs:sequence>
        <xs:element name="lineString" type="lineStringType"
maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="gid" type="xs:ID"/>
        <xs:attribute name="srsName" type="xs:string"/>
        </xs:complexType>
        </xs:element>
        <xs:element name="multiPoint">
        <xs:complexType>
        <xs:sequence>
        <xs:element name="point" type="pointType" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="gid" type="xs:ID"/>
        <xs:attribute name="srsName" type="xs:string"/>
        </xs:complexType>
        </xs:element>
        <xs:element name="multiPolygon">
        <xs:complexType>
        <xs:choice maxOccurs="unbounded">
        <xs:element name="polygon" type="polygonType"/>
        <xs:element name="box" type="boxType"/>
        <xs:element name="circularArea" type="circularAreaType"/>
        <xs:element name="circularArcArea" type="circularArcAreaType"/>
        <xs:element name="ellipticalArea" type="ellipticalAreaType"/>
        </xs:choice>
        <xs:attribute name="gid" type="xs:ID"/>
        <xs:attribute name="srsName" type="xs:string"/>
        </xs:complexType>
        </xs:element>
        <xs:element name="linearRing" type="linearRingType"/>
```

```
        </xs:choice>
</xs:complexType>
```

6.5.2 distanceUnitType

```
<xs:simpleType name="distanceUnitType">
<xs:restriction base="xs:string"/>
</xs:simpleType>
```

6.5.3 angularUnitType

```
<xs:simpleType name="angularUnitType">
        <xs:restriction base="xs:string">
                    <xs:enumeration value="Degrees"/>
                    <xs:enumeration value="Radians"/>
        </xs:restriction>
</xs:simpleType>
```

6.5.4 angleType

```
<xs:simpleType name="angleType">
        <xs:restriction base="xs:float">
        <xs:minInclusive value="0"/>
        <xs:maxInclusive value="360"/>
        </xs:restriction>
</xs:simpleType>
```

6.5.5 coordType

```
<xs:element name=”coord” type=”coordType”/>
<xs:complexType name="coordType">
        <xs:sequence>
        <xs:element name="X" type="xs:string"/>
        <xs:element name="Y" type="xs:string" minOccurs="0"/>
        <xs:element name="Z" type="xs:string" minOccurs="0"/>
        </xs:sequence>
</xs:complexType>
```

6.5.6 radiusType

```
<xs:simpleType name="radiusType">
        <xs:restriction base="xs:nonNegativeInteger"/>
</xs:simpleType>
```

6.5.7 boxType

```
<xs:complexType name="boxType">
        <xs:sequence>
        <xs:element ref="coord" />
        <xs:element ref="coord" />
        </xs:sequence>
        <xs:attribute name="gid" type="xs:ID"/>
        <xs:attribute name="srsName" type="xs:string"/>
</xs:complexType>
```

6.5.8 circularArcAreaType

```
<xs:complexType name="circularArcAreaType">
        <xs:sequence>
        <xs:element ref="coord" />
        <xs:element name="inRadius" type="radiusType"/>
        <xs:element name="outRadius" type="radiusType"/>
        <xs:element name="startAngle" type="angleType"/>
```

```
        <xs:element name="stopAngle" type="angleType"/>
        <xs:element name="angularUnit" type="angularUnitType"
default="Degrees" minOccurs="0"/>
        <xs:element name="distanceUnit" type="distanceUnitType"
minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="gid" type="xs:ID"/>
        <xs:attribute name="srsName" type="xs:string"/>
</xs:complexType>
```

6.5.9 circularAreaType

```
<xs:complexType name="circularAreaType">
        <xs:sequence>
        <xs:element ref="coord" />
        <xs:element name="radius" type="radiusType"/>
        <xs:element name="distanceUnit" type="distanceUnitType"
default="meter" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="gid" type="xs:ID"/>
        <xs:attribute name="srsName" type="xs:string"/>
</xs:complexType>
```

6.5.10 ellipticalAreaType

```
<xs:complexType name="ellipticalAreaType">
        <xs:sequence>
        <xs:element ref="coord" />
        <xs:element name="angle" type="angleType"/>
        <xs:element name="semiMajor" type="xs:nonNegativeInteger"/>
        <xs:element name="semiMinor" type="xs:nonNegativeInteger"/>
        <xs:element name="angularUnit" type="angularUnitType"
default="Degrees" minOccurs="0"/>
        <xs:element name="distanceUnit" type="distanceUnitType"
default="meter" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="gid" type="xs:ID"/>
        <xs:attribute name="srsName" type="xs:string"/>
</xs:complexType>
```

6.5.11 lineStringType

```
<xs:complexType name="lineStringType">
        <xs:sequence>
        <xs:element ref="coord" />
        <xs:element ref="coord" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="gid" type="xs:ID"/>
        <xs:attribute name="srsName" type="xs:string"/>
</xs:complexType>
```

6.5.12 linearRingType

```
<xs:complexType name="linearRingType">
        <xs:sequence>
        <xs:element ref="coord" />
        <xs:element ref="coord" />
        <xs:element ref="coord" />
        <xs:element ref="coord" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="gid" type="xs:ID"/>
```

```
        <xs:attribute name="srsName" type="xs:string"/>
</xs:complexType>
```

6.5.13 pointType

```
<xs:complexType name="pointType">
        <xs:sequence>
        <xs:element name="coord" type="coordType"/>
        </xs:sequence>
        <xs:attribute name="gid" type="xs:ID"/>
        <xs:attribute name="srsName" type="xs:string"/>
</xs:complexType>
```

6.5.14 polygonType

```
<xs:complexType name="polygonType">
        <xs:sequence>
        <xs:element name="outerBoundaryIs">
        <xs:complexType>
        <xs:sequence>
                    <xs:element name="LinearRing" type="linearRingType"/>
        </xs:sequence>
        </xs:complexType>
        </xs:element>
        <xs:element name="innerBoundaryIs" minOccurs="0"
maxOccurs="unbounded">
        <xs:complexType>
        <xs:sequence>
                    <xs:element name="LinearRing" type="linearRingType"/>
        </xs:sequence>
        </xs:complexType>
        </xs:element>
        </xs:sequence>
        <xs:attribute name="gid" type="xs:ID"/>
        <xs:attribute name="srsName" type="xs:string"/>
</xs:complexType>
```

6.6 Result Datatypes

6.6.1 ResultType

```
<xs:simpleType name="resultType">
<xs:restriction base="xs:nonNegativeInteger"/>
</xs:simpleType>
```

6.6.2 addInfoType

```
<xs:simpleType name="addInfoType">
<xs:restriction base="xs:string"/>
</xs:simpleType>
```

7. Service Definitions

7.1 Header Components

7.1.1 Header Primitives

Parameter name	Status	Description
version	M	Version
pceClient	C	The PCP Client should always populate the pceClient element.The PCP Server should always populate the pceServer element.
pceServer	C	

7.1.2 Header Schema

```
<xs:element name="pcp_hdr">
        <xs:complexType>
        <xs:choice>
        <xs:element name="pceServer" type="pceServerType"/>
        <xs:element name="pceClient" type="pceClientType"/>
        </xs:choice>
        <xs:attribute name="ver" type="xs:string" fixed="1.0.0"/>
        </xs:complexType>
</xs:element>
```

Example

```
<pcp_hdr ver="1.0.0">
        <pceClient>
        <id>theClientId</id>
        <pwd>thePassword</pwd>
        </pceClient>
</pcp_hdr>
```

7.2 Location Privacy Assertion Service

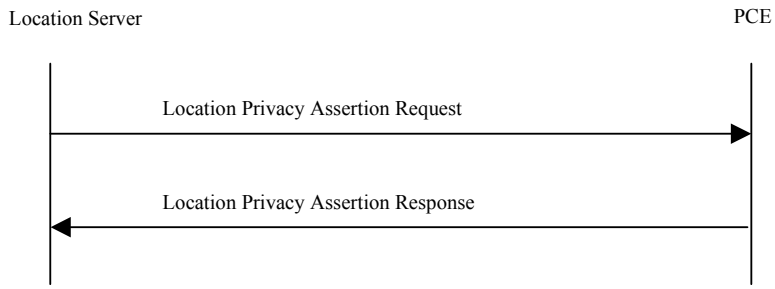
This service is used between a Location Server and an external Privacy Checking Entity.

7.2.1 Message Flow

This is a standard service for asserting the privacy settings of a target mobile subscriber, for which a third party has requested the location.

The service consists of the following messages:

- Location Privacy Assertion Request
- Location Privacy Assertion Response



7.2.2 Service Primitives

7.2.3.1 Location Privacy Assertion Request

Parameter name	Status	Description
ueid	M	Identity of the target subscriber If PCS supports pseudonym/verinym mediation services, pseudonym of target subscriber
client	M	Identifies the client Identity of LCS client, i.e. LCS client external identity or internal identity Categories of LCS client, i.e. Value added, Emergency, PLMN operator or Lawful interception Name of LCS client, if needed(and type of LCS client name if available)
serviceid	O	Identity of the requesting service.
callSessionRelatedId	O	Identifies whether Call/Session Related Request
serviceType	O	Indicates the category of service
requestor	O	Identifies the mobile subscriber requesting the location based service
codeword	O	Identity of the requesting subscriber
locationType	O	Type of location, i.e. “current location”, “current or last known location” or “initial location”

servingNode	O	Address of the serving node – E.164 number And, if needed, LCS capability set of serving node
locationEstimate	O	Location estimate, if needed and available (This is only relevant for location privacy assertion request with location estimate)

7.2.3.2 Location Privacy Assertion Response

Parameter name	Status	Description
Success		
privacyAction	M	If the serving node supports rel'6 or later LCS, Indicator for call/session related class of privacy check related actions, if needed Indicator for call/session unrelated class of privacy check related actions, if needed If the serving node supports pre-rel'6 LCS, Pseudo External ID
additionalLocationCheck	C	Indicator on additional privacy check with location estimate For the location request to be fully authorized, an additional Location Privacy Assertion Request with location estimate is needed when the Location Server has received the location information of the target UE.
msid	C	Identity of target subscriber, in case Location Privacy Assertion Request contains the pseudonym of target UE and pseudonym/verinym mediation service is supported in PCE
Failed		
result	M	Error Code
addinfo	C	Adding Information

7.2.3 Service Schema

7.2.3.1 Location Privacy Assertion Request

```
<xs:element name="LPARequest" type="LPARequestType"/>
<xs:complexType name="LPARequestType">
        <xs:annotation>
                    <xs:documentation>
                                This service allows the privacy settings for
a UE terminal to be checked
                                for a  particular client and service.
                    </xs:documentation>
        </xs:annotation>
        <xs:sequence>
                    <xs:element name="ueid" type="ueidType"/>
                    <xs:element name="client" type="clientType"/>
                    <xs:element name="serviceid" type="serviceIdType"
minOccurs="0"/>

                    <xs:element name="callSessionRelatedId"
type="callSessionRelatedIdType" minOccurs="0"/>
                    <xs:element name="serviceType" type="serviceTypeType"
minOccurs="0"/>
                    <xs:element name="requestor" type="requestorIdType"
minOccurs="0"/>
                    <xs:element name="codeword" type="codewordType"
minOccurs="0"/>
                    <xs:element name="locationType" type="locationTypeType"
minOccurs="0"/>
                    <xs:element name="servingNode" type="servingNodeType"
minOccurs="0"/>
                    <xs:element name="locationEstimate"
type="locationEstimateType" minOccurs="0"/>
        </xs:sequence>
</xs:complexType>
```

Example

```
<LPARequest >
<ueid>
<msid>
        <msisdn>123456789</msisdn>
        </msid>
        </ueid>
        <client>
        <clientId>
        <externalId>333</externalId>
        </clientId>
        <clientCategory>Value Added</clientCategory>
        </client>
        <serviceType>2</serviceType>
        <requestor>
        <logicalId>theRequetorID</logicalId>
        </requestor>
        <codeword>theCodeword</codeword>
        <locationType>3</locationType>
        <servingNode capability="1">0</servingNode>
</LPARequest>
```

7.2.3.2 Location Privacy Assertion Response

```
<xs:element name="LPAResponse" type="LPAResponseType"/>
<xs:complexType name="LPAResponseType">
        <xs:choice>
                        <xs:sequence>
                                        <xs:element name="privacyAction"
type="privacyActionType"/>
                                        <xs:element name="additionalLocationCheck"
type="xs:boolean" minOccurs="0"/>
                                        <xs:element name="msid" type="msidType"
minOccurs="0"/>
                        </xs:sequence>
                        <xs:sequence>
                                        <xs:element name="result"
type="resultType"/>
                                        <xs:element name="addInfo"
type="addInfoType" minOccurs="0"/>
                        </xs:sequence>
        </xs:choice>
</xs:complexType>
```

Example

```
<LPAResponse>
        <privacyAction>
                        <callRelatedAction>NOTIFY_POSITION</callRelatedAction>

        <callUnrelatedAction>NOTIFY_POSITION_IF_GRANTED</callUnrelatedAction>
        </privacyAction>
        <additionalLocationCheck>false</additionalLocationCheck>
        <msid>
                        <msisdn>1234567890</msisdn>
        </msid>
</LPAResponse>
```

7.3 Pseudonym/Verinym Mediation Service

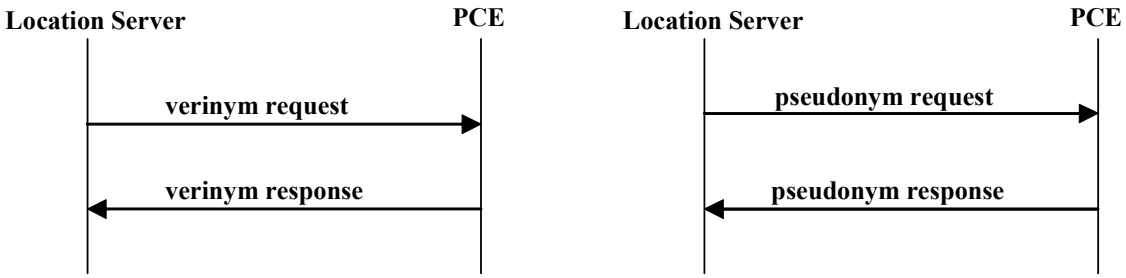
This service is used between a Location Server and a PMD(pseudonym mediation device functionality) in external PCE to identifying a target subscriber. This service provides four messages to obtaining a pseudonym and a verinym.

7.3.1 Message Flow

This is a standard service for mediating a pseudonym into verinym and/or verinym to pseudonym for providing anonymity support for location services.

The service consists of the following messages:

- Verinym Request
- Verinym Response
- Pseudonym Request
- Pseudonym Response



7.3.2 Service Primitives

7.3.3.1 Verinym Request

Parameter name	Status	Description
pseudoid	M	Pseudonym of the target subscriber
client	O	Identity of the requesting LCS client
serviceid	O	Identiy of the requesting service
requestor	O	Identifiers the mobile subscriber requesting the pseudonym
codeword	O	Identifies the requesting LCS client

7.3.3.2 Verinym Response

Parameter name	Status	Description
Success msid	M	Verinym of the target subscriber
Failed result	M	Error Code;
addinfo	C	Adding Information

7.3.3.3 Pseudonym Request

Parameter name	Status	Description
msid	M	Verinym of the target subscriber
client	O	Identity of the requesting LCS client
serviceid	O	Identity of the requesting service
requestor	O	Identifiers the mobile subscriber requesting the pseudonym
codeword	O	Identifies the requesting LCS client
expirationDate	O	Requesting expiration date of the pseudonym

7.3.3.4 Pseudonym Response

Parameter name	Status	Description
Success pseudoid	M	Pseudonym of the target subscriber
expirationDate	O	Expiration date of the pseudonym

Failed result	M	Error Code
addinfo	C	Adding Information

7.3.3 Service Schema

7.3.3.1 Verinym Request

```
<xs:element name="VerinymRequest" type="VerinymRequestType"/>
<xs:complexType name="VerinymRequestType">
<xs:sequence>
<xs:element name="pseudoid" type="pseudoIdType"/>
<xs:element name="client" type="clientType" minOccurs="0"/>
<xs:element name="serviceid" type="serviceIdType" minOccurs="0"/>
<xs:element name="requestor" type="requestorIdType" minOccurs="0"/>
<xs:element name="codeword" type="codewordType" minOccurs="0"/>
</xs:sequence>
</xs:complexType>
```

Example

```
<VerinymRequest>
<pseudoid>thePseudoid</pseudoid>
<client>
        <clientId>
        <externalId>12345678910</externalId>
        </clientId>
        <clientCategory>Value Added</clientCategory>
</client>
<serviceid>theServiceId</serviceid>
<requestor>
        <logicalId>theRequestorId</logicalId>
</requestor>
<codeword>theCodeword</codeword>
</VerinymRequest>
```

7.3.3.2 Verinym Response

```
<xs:element name="VerinymResponse" type="VerinymResponseType"/>
<xs:complexType name="VerinymResponseType">
<xs:choice>
   <xs:element name="msid" type="msidType"/>
        <xs:sequence>

                        <xs:element name="result" type="resultType"/>

        </xs:sequence>
<xs:element name=”addInfo” type=”addInfoType” minOccurs=”0”/>
</xs:choice>
</xs:complexType>
```

Example

```
<VerinymResponse>
<msid>
        <msisdn>1234567890</msisdn>
</msid>
</VerinymResponse>
```

7.3.3.3 Pseudonym Request

```
<xs:complexType name="PseudonymRequestType">
<xs:sequence>
        <xs:element name="msid" type="msidType"/>
        <xs:element name="client" type="clientType" minOccurs="0"/>
        <xs:element name="serviceid" type="serviceIdType" minOccurs="0"/>
        <xs:element name="requestor" type="requestorIdType" minOccurs="0"/>
        <xs:element name="codeword" type="codewordType" minOccurs="0"/>
        <xs:element name="expirationDate" type="timeType" minOccurs="0"/>
</xs:sequence>
</xs:complexType>
```

Example

```
<PseudonymRequest>
<msid>
        <msisdn>1234567890</msisdn>
</msid>
<client>
        <clientId>
        <externalId>12345678910</externalId>
        </clientId>
        <clientCategory>Value Added</clientCategory>
</client>
<serviceid>theServiceId</serviceid>
<codeword>theCodeword</codeword>
<expirationDate>20051231000000</expirationDate>
</PseudonymRequest>
```

7.3.3.4 Pseudonym Response

```
<xs:element name="PseudonymResponse" type="PseudonymResponseType"/>
<xs:complexType name="PseudonymResponseType">
<xs:choice>
        <xs:sequence>
        <xs:element name="pseudoid" type="pseudoIdType"/>
        <xs:element name="expirationDate" type="timeType" minOccurs="0"/>
        </xs:sequence>
<xs:sequence>
        <xs:element name="result" type="resultType"/>
        <xs:element name=”addInfo” type=”addInfoType” minOccurs=”0”/>
        </xs:sequence>
</xs:choice>
</xs:complexType>
```

Example

```
<PseudonymResponse>
<pseudoid>thePseudoid</pseudoid>
<expirationDate>20051130240000</expirationDate>
</PseudonymResponse>
```

7.4 Privacy Profile Update Notification Service

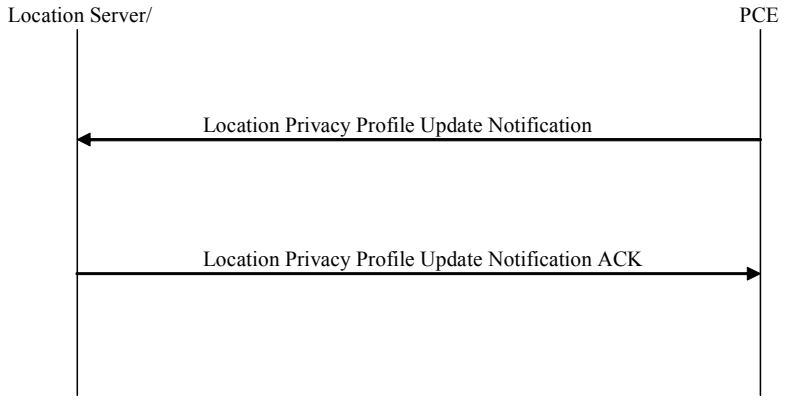
This service is used between a Location Server and PPR(Privacy Profile Register), equivalent to PCE. This service provides location privacy profile update notification and notification ack message to notifying and verifying notification of target subscriber’s privacy profile update

7.4.1 Message Flow

This is a standard service for notifying the update of location privacy profile of a target mobile subscriber, for which location server has requested the location privacy assertion.

The service consists of the following messages:

- Location Privacy Profile Update Notification
- Location Privacy Profile Update Notification Ack



7.4.2 Service Primitives

7.4.3.1 Location Privacy Profile Update Notification

Parameter name	Status	Description
msid	M	Identity of the target subscriber who update privacy profile

7.4.3.2 Location Privacy Profile Update Notification Ack

Parameter name	Status	Description
Success;		
ack	C	Acknowledgement of profile update notification message
Faild;		Error Code
result	C	
addinfo	C	Adding Information

7.4.3 Service Schema

7.4.3.1 Location Privacy Profile Update Notification

```
<xs:element name="LPUNotification" type="LPUNotificationType"/>
<xs:complexType name="LPUNotificationType">
<xs:sequence>
        <xs:element name="msid" type="msidType"/>
</xs:sequence>
</xs:complexType>
```

Example

```
<LPUNotification>
```

```
<msid>
        <msisdn>1234567890</msisdn>
</msid>
</LPUNotification>
```

7.4.3.2 Location Privacy Profile Update Notification Ack

```
<xs:element name="LPUAck" type="LPUAckType"/>
<xs:complexType name="LPUAckType">
<xs:choice>
        <xs:element name="ack" type="emptyType"
        </xs:sequence>
                    <xs:element name="result" type="resultType"/>
                    <xs:element name="addInfo" type="addInfoType"
        </xs:sequence>
minOccurs="0"/>    </xs:choice>
</xs:complexType>
<xs:complexType name=”emptyType”>
<xs:complexContent>
<xs:restriction base=”xs:anyType”>
</xs:restriction>
</xs:complexContent>
</xs:complexType>
```

Example

```
<LPUAck>
<ack/>
</LPUAck>
```

8. PCP WSDL Definitions

8.1 PCP Web Services

This section describes how to use PCP over the Web Services.

PCP Web Services use the request and response message pattern between LS and PCE. In the context of PCP, the PCP client is referred to Location Server and the PCP server is the Privacy Checking Entity. For more information about OMA Web Services, refer to [WSDL1.1], [OWSER1.1] and [OWSER Prac].

The binding of PCP WSDL definitions define the protocols and operational styles of the binding. The SOAP/HTTP binding is supported for PCP Web Services recommended by OMA Web Services [OWSER1.1].

In SOAP message style, WSDL 1.1 is defined by document and RPC styles. However, standard convention for RPC style has not yet been adopted. This section provides document message style for PCP Web Service.

8.1.1 PCP Web Services using SOAP/HTTP

PCP Web Services consist of PCPQueryServices and PCPNotificationService.

PCPQueryService contains Privacy Assertion Service and Psuedonym/Verinym Mediation Service. The following sequence diagram of SOAP over binding HTTP (cf. Figure 3) is used for PCPQueryService.

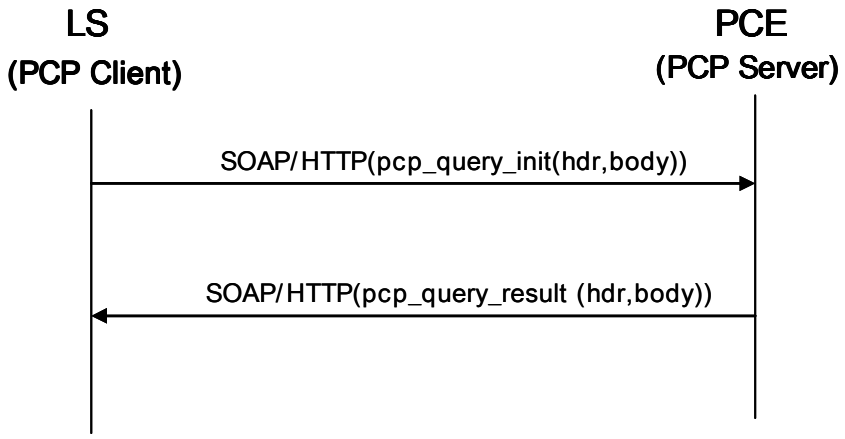


Figure 3: SOAP/HTTP sequence for PCPQueryservice

PCPNotificationService contains Privacy Update Notification Service. The following sequence diagram of SOAP over binding HTTP (cf. Figure 4) is used for PCPNotificatonService.

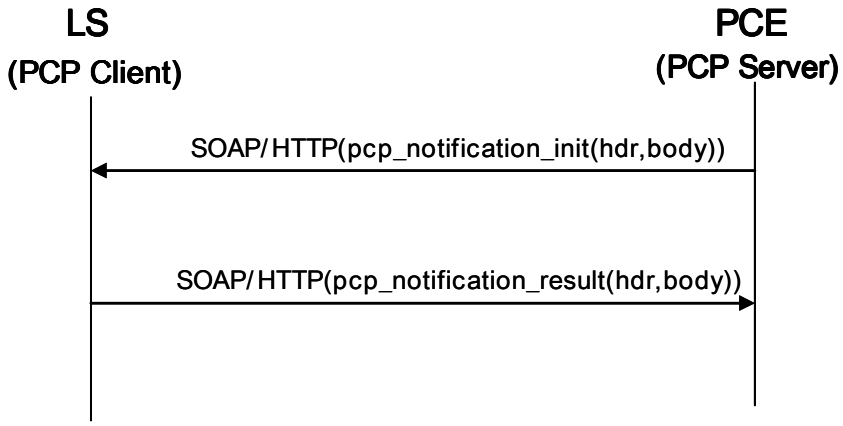


Figure 4: SOAP/HTTP sequence for PCPNotificationService

8.1.2 Request and Response Encapsulation

A request SHALL have a header part and a body part. A response MAY have a header part and SHALL have a body part. To be able to make a service request with a single XML document the header and the body are encapsulated in the same service schema. The context header holds the authentication data pertinent to a particular pcp request. The body part is described in the sections 6 to 7.

8.1.3 PCP Web Services Schema

8.1.3.1 PCPQueryService Initiation and Result

```
<!--                              pcp_svc_init                                  --
>
<xs:element name="pcp_query_init">
        <xs:complexType>
        <xs:sequence>
                    <xs:element ref="pcp_hdr"/>
                    <xs:sequence>
                    <xs:choice>
                                <xs:element ref="LPARequest"/>
                                <xs:element ref="VerinymRequest"/>
                                <xs:element ref="PseudonymRequest"/>
                    </xs:choice>
                    <xs:element name="extension.message" type="xs:anyType"
minOccurs="0"/>
                    </xs:sequence>
        </xs:sequence>
        </xs:complexType>
</xs:element>

<xs:element name="pcp_query_result">
        <xs:complexType>
        <xs:sequence>
                    <xs:element ref="pcp_hdr"/>
                    <xs:sequence>
                    <xs:choice>
                                <xs:element ref="LPAResponse"/>
                                <xs:element ref="VerinymResponse"/>
                                <xs:element ref="PseudonymResponse"/>
                    </xs:choice>
```

```
                        <xs:element name="extension.message" type="xs:anyType"
minOccurs="0"/>
                        </xs:sequence>
        </xs:sequence>
        </xs:complexType>
</xs:element>
```

8.1.3.2 PCPNotificationService Initiation and Result

```
<xs:element name="pcp notification init">
        <xs:complexType>
        <xs:sequence>
                        <xs:element ref="pcp hdr"/>
                        <xs:sequence>
                        <xs:choice>
                                        <xs:element ref="LPUNotification"/>
                        </xs:choice>
                        <xs:element name="extension.message" type="xs:anyType"
minOccurs="0"/>
                        </xs:sequence>
        </xs:sequence>
        </xs:complexType>
</xs:element>

<xs:element name="pcp_notification_result">
        <xs:complexType>
        <xs:sequence>
                        <xs:element ref="pcp_hdr"/>
                        <xs:sequence>
                        <xs:choice>
                                        <xs:element ref="LPUAck"/>
                        </xs:choice>
        <xs:element name="extension.message" type="xs:anyType" minOccurs="0"/>
                        </xs:sequence>
        </xs:sequence>
        </xs:complexType>
</xs:element>
```

8.2 PCP WSDL Documents

8.2.1 Service Interface Documents

The Service Interface Documents contain the message and portTypes definitions. This document names are "PCPQueryService.wsdl" and "PCPNotificationService.wsdl" as following.

PCPQueryService.wsdl

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- April, 5, 2006 -->
<wsdl:definitions name="PCPQueryService"
targetNamespace="http://www.openmobilealliance.org/wsdl/loc_pcp/v1_0/interface"
xmlns="http://schemas.xmlsoap.org/wsdl/"
xmlns:tns="http://www.openmobilealliance.org/wsdl/loc_pcp/v1_0/interface"
xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
xmlns:wsdlsoap="http://schemas.xmlsoap.org/wsdl/soap/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema">

        <wsdl:types>
```

```
                        <schema elementFormDefault="qualified"
targetNamespace="http://www.openmobilealliance.org/wsdl/loc_pcp/v1_0/interface"
>
                                    <element name="pcp_query_init">
                                                <complexType>
                                                            <sequence>

        <element name="RequestMessage" nillable="true" type="xsd:string"/>
                                                            </sequence>
                                                <complexType>
                                    </element>
                                    <element name="pcp query result">
                                                <complexType>
                                                            <sequence>
                                                            <element
name="ResponseMessage" nillable="true" type="xsd:string"/>
                                                            </sequence>
                                                <complexType>
                                    </element>
                        </schema>
        </wsdl:types>
        <wsdl:message name="PCPResponseMessage">
                        <wsdl:part name="PCPQueryResponse"
element="tns:pcp_query_result"/>
        </wsdl:message>
        <wsdl:message name="PCPRequestMessage">
                        <wsdl:part name="PCPQueryRequest"
element="tns:pcp_query_init"/>
        </wsdl:message>
        <wsdl:portType name="PCPQueryService">
                        <wsdl:operation name="PCPQuery">
                                    <wsdl:input name="PCPRequest"
message="tns:PCPRequestMessage"/>
                                    <wsdl:output name="PCPResponse"
message="tns:PCPResponseMessage"/>
                        </wsdl:operation>
        </wsdl:portType>
</wsdl:definitions>
```

PCPNotificationService.wsdl

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- April, 5, 2006 -->
<wsdl:definitions name="PCPNotificationService"
targetNamespace="http://www.openmobilealliance.org/wsdl/loc_pcp/v1_0/interface"
xmlns="http://schemas.xmlsoap.org/wsdl/"
xmlns:impl="http://www.openmobilealliance.org/wsdl/loc_pcp/v1_0/interface"
xmlns:tns="http://www.openmobilealliance.org/wsdl/loc pcp/v1 0/interface"
xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
xmlns:wsdlsoap="http://schemas.xmlsoap.org/wsdl/soap/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema">

        <wsdl:types>
                        <schema elementFormDefault="qualified"
targetNamespace="http://www.openmobilealliance.org/wsdl/loc pcp/v1 0/interface"
>
                                    <element name="pcp_notification_init">
                                                <complexType>
                                                            <sequence>
```

```
        <element name="NotificationRequest" nillable="true"
type="xsd:string"/>
                                                              </sequence>
                                                    </complexType>
                                          </element>
                                          <element name="pcp_notification_result">
                                                    <complexType>
                                                              <sequence>

        <element name="NotificationResponse" nillable="true"
type="xsd:string"/>
                                                              </sequence>
                                                    </complexType>
                                          </element>
                              </schema>
        </wsdl:types>

        <wsdl:message name="PCPNotificationMessage">
                              <wsdl:part name="PCPNotificationRequest"
element="tns:pcp_notification_init"/>
        </wsdl:message>
        <wsdl:message name="PCPNotificationAckMessage">
                              <wsdl:part name="PCPNotificationResponse"
element="tns:pcp_notification_result"/>
        </wsdl:message>
        <wsdl:portType name="PCPNotificationService">
                              <wsdl:operation name="PCPNotification">
                                          <wsdl:input name="PCPNotificationRequest"
message="tns:PCPNotificationMessage"/>
                                          <wsdl:output name="PCPNotificationResponse"
message="tns:PCPNotificationAckMessage"/>
                              </wsdl:operation>
        </wsdl:portType>
</wsdl:definitions>
```

8.2.2 Service Binding Documents

The Service Binding Documents contain both the binding to be used and the service definition associated with the binding. This document imports one Service Interface Document. This document names are “PCPQueryServiceBinding.wsdl” and “PCPNotificationServiceBinding.wsdl” as following.

PCPQueryServiceBinding.wsdl

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- April, 5, 2006 -->
<wsdl:definitions name="PCPQueryServiceBinding"
targetNamespace="http://www.openmobilealliance.org/wsdl/loc_pcp/v1_0/service"
xmlns="http://schemas.xmlsoap.org/wsdl/"
xmlns:tns="http://www.openmobilealliance.org/wsdl/loc_pcp/v1_0/service"
xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
xmlns:wsdlsoap="http://schemas.xmlsoap.org/wsdl/soap/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:interface="http://www.openmobilealliance.org/wsdl/loc pcp/v1 0/interface"
>

        <import
namespace="http://www.openmobilealliance.org/wsdl/loc_pcp/v1_0/interface"
location="PCPQueryService.wsdl"/>
```

```
        <wsdl:binding name="PCPQueryServiceSoapBinding"
type="interface:PCPQueryService">
                        <wsdlsoap:binding style="document"
transport="http://schemas.xmlsoap.org/soap/http"/>
                        <wsdl:operation name="PCPQuery">
                                        <wsdlsoap:operation/>
                                        <wsdl:input>
                                                        <wsdlsoap:body use="literal"/>
                                        </wsdl:input>
                                        <wsdl:output>
                                                        <wsdlsoap:body use="literal"/>
                                        </wsdl:output>
                        </wsdl:operation>
        </wsdl:binding>
        <wsdl:service name="PCPQueryServiceService">
                        <wsdl:port name="PCPQueryService"
binding="tns:PCPQueryServiceSoapBinding">
                                        <wsdlsoap:address
location="http://localhost/PCPServerWeb/services/PCPQueryService"/>
                        </wsdl:port>
        </wsdl:service>
</wsdl:definitions>
```

PCPNotificationServiceBinding.wsdl

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- April, 5, 2006 -->
<wsdl:definitions name="PCPNotificationServiceBinding"
targetNamespace="http://www.openmobilealliance.org/wsdl/loc pcp/v1 0/service"
xmlns="http://schemas.xmlsoap.org/wsdl/"
xmlns:impl="http://www.openmobilealliance.org/wsdl/loc pcp/v1 0/service"
xmlns:tns="http://www.openmobilealliance.org/wsdl/loc_pcp/v1_0/service"
xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
xmlns:wsdlsoap="http://schemas.xmlsoap.org/wsdl/soap/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:interface="http://www.openmobilealliance.org/wsdl/loc pcp/v1 0/interface"
>

        <import
namespace="http://www.openmobilealliance.org/wsdl/loc_pcp/v1_0/interface"
location="PCPNotificationService.wsdl"/>
        <wsdl:binding name="PCPNotificationServiceSoapBinding"
type="interface:PCPNotificationService">
                        <wsdlsoap:binding style="document"
transport="http://schemas.xmlsoap.org/soap/http"/>
                        <wsdl:operation name="PCPNotification">
                                        <wsdlsoap:operation/>
                                        <wsdl:input>
                                                        <wsdlsoap:body use="literal"/>
                                        </wsdl:input>
                                        <wsdl:output>
                                                        <wsdlsoap:body use="literal"/>
                                        </wsdl:output>
                        </wsdl:operation>
        </wsdl:binding>
        <wsdl:service name="PCPNotificationServiceService">
                        <wsdl:port name="PCPNotificationService"
binding="tns:PCPNotificationServiceSoapBinding">
```

```
                                    <wsdlsoap:address
location="http://localhost/PCPClientWeb/services/PCPClient"/>
                        </wsdl:port>
        </wsdl:service>
</wsdl:definitions>
```

9. Result codes

9.1 Result codes

This table defines the result codes that indicate the result of the request or individual positioning. The error codes are divided in ranges:

0	-	99	Privacy Checking Entity specific errors
100	-	199	Request specific errors
200	-	299	Network specific errors
300	-	499	Reserved for future use
500	-	599	Vendor specific errors

Resid	Slogan	Description
0	OK	Reserved for future use.
1	SYSTEM FAILURE	The request can not be handled because of a general problem in the privacy checking entity.
2	UNSPECIFIED ERROR	An unspecified error used in case none of the other errors applies.
3	UNAUTHORIZED APPLICATION	The requesting location-based application is not allowed to access the location server or a wrong password has been supplied.
4	UNKNOWN SUBSCRIBER	Unknown subscriber. The user is unknown, i.e. no such subscription exists.
101	CONGESTION IN PCE	The request cannot be handled due to congestion in the Privacy Checking Entity.
103	UNSUPPORTED VERSION	The Privacy Checking Entity does not support the indicated protocol version.
105	FORMAT ERROR	A protocol element in the request has invalid format.
106	SYNTAX ERROR	The request has invalid syntax.
107	PROTOCOL ELEMENT NOT SUPPORTED	The Privacy Checking Entity does not support some protocol element(s) specified in the request.
108	SERVICE NOT SUPPORTED	The requested service is not supported in the Privacy Checking Entity.
109	PROTOCOL ELEMENT ATTRIBUTE NOT SUPPORTED	A protocol element attribute is not supported in the Privacy Checking Entity.
110	INVALID PROTOCOL ELEMENT VALUE	A protocol element in the request has an invalid value.
111	INVALID PROTOCOL ELEMENT ATTRIBUTE VALUE	A protocol element attribute in the request has a wrong value.
112	PROTOCOL ELEMENT VALUE NOT SUPPORTED	A specific value of a protocol element is not supported in the Privacy Checking Entity.
113	PROTOCOL ELEMENT ATTRIBUTE VALUE NOT SUPPORTED	A specific value of a protocol element attribute is not supported in the Privacy Checking Entity.
204	DISALLOWED BY LOCAL REGULATIONS	The request is disallowed by local regulatory requirements.
207	MISCONFIGURATION OF PRIVACY CHECKING ENTITY	The Privacy Checking Entity is not completely configured to be able to respond to the request.
500 -599		Vendor specific errors

Appendix A. Change History (Informative)

A.1 Approved Version History

Reference	Date	Description
OMA-TS-PCP-V1_0	19 Jul 2011	No prior version –or- No previous version within OMA

Appendix B. Static Conformance Requirements (Normative)

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

B.1 SCR for PCP Client

B.1.1 Service initiation

Item	Function	Reference	Status	Requirement
PCP-A-C-001	Service initiation	8,2	M	PCP-A-C-002 AND PCP-A-C-003
PCP-A-C-002	header	7.1	M	
PCP-A-C-003	Location Privacy Assertion Request	7.2	O	PCP-B-C-003
PCP-A-C-004	Verinym Request	7.3	O	PCP-B-C-004
PCP-A-C-005	Pseudonym Request	7.3	O	PCP-B-C-005
PCP-A-C-006	Privacy profile update notification	7.4	O	PCP-B-C-006

B.1.2 Service Result

Item	Function	Reference	Status	Requirement
PCP-B-C-001	Service result	8.2	M	PCP-B-C-002 AND PCP-B-C-003
PCP-B-C-002	header	7.1	O	
PCP-B-C-003	Location Privacy Assertion Response	7.2	M	
PCP-B-C-004	Verinym Response	7.3	O	
PCP-B-C-005	Pseudonym Response	7.3	O	
PCP-B-C-006	Privacy profile update notification ack	7.4	O	

B.1.3 Header

Item	Function	Reference	Status	Requirement
PCP-C-C-001	version	7.1	M	
PCP-C-C-002	PCE Client	7.1	C	
PCP-C-C-003	PCE Server	7.1	C	

B.1.4 Location Privacy Assertion Request

Item	Function	Reference	Status	Requirement
PCP-D-C-001	ueid	7.2.2.1	M	
PCP-D-C-002	client	7.2.2.1	M	
PCP-D-C-010	serviceid	7.2.2.1	O	
PCP-D-C-003	callSessionRelatedId	7.2.2.1	O	
PCP-D-C-004	serviceType	7.2.2.1	O	
PCP-D-C-005	requestor	7.2.2.1	O	
PCP-D-C-006	codeword	7.2.2.1	O	
PCP-D-C-007	locationType	7.2.2.1	O	
PCP-D-C-008	servingNode	7.2.2.1	O	
PCP-D-C-009	locationEstimate	7.2.2.1	O	

B.1.5 Location Privacy Assertion Response

Item	Function	Reference	Status	Requirement

Item	Function	Reference	Status	Requirement
PCP-E-C-001	privacyAction	7.2.2.2	M	
PCP-E-C-002	additionalLocationCheck	7.2.2.2	C	
PCP-E-C-003	msid	7.2.2.2	C	

B.1.6 Verinym Request

Item	Function	Reference	Status	Requirement
PCP-F-C-001	pseudoid	7.3.2.1	M	
PCP-F-C-002	client	7.3.2.1	O	
PCP-F-C-004	serviceId	7.3.2.1	O	
PCP-F-C-005	requestor	7.3.2.1	O	
PCP-F-C-006	codeword	7.3.2.1	O	

B.1.7 Verinym Response

Item	Function	Reference	Status	Requirement
PCP-G-C-001	msid	7.3.2.2	M	

B.1.8 Pseudonym Request

Item	Function	Reference	Status	Requirement
PCP-H-C-001	msid	7.3.2.3	M	
PCP-H-C-002	client	7.3.2.3	O	
PCP-H-C-004	serviceId	7.3.2.3	O	
PCP-H-C-005	requestor	7.3.2.3	O	
PCP-H-C-006	codeword	7.3.2.3	O	
PCP-H-C-007	expirationDate	7.3.2.3	O	

B.1.9 Pseudonym Response

Item	Function	Reference	Status	Requirement
PCP-I-C-001	pseudoid	7.3.2.4	M	
PCP-I-C-002	expirationDate	7.3.2.4	O	

B.1.10 Privacy Profile Update Notification

Item	Function	Reference	Status	Requirement
PCP-J-C-001	msid	7.4.2.1	M	

B.1.11 Privacy Profile Update Notification Ack

Item	Function	Reference	Status	Requirement
PCP-K-C-001	ACK	7.4.2.2	C	

B.1.12 Support for Identity Datatypes

Item	Function	Reference	Status	Requirement
PCP-L -C-001	ueidType	6.1.1	M	
PCP-L-C-002	msidType	6.1.2	M	
PCP-L-C-003	pseudoidType	6.1.3	M	
PCP-L-C-004	clientType	6.1.4	M	
PCP-L-C-005	clientIdType	6.1.5	O	
PCP-L-C-006	clientNameType	6.1.6	O	
PCP-L-C-007	sessionType	6.1.7	O	
PCP-L-C-008	requestorIdType	6.1.8	O	

Item	Function	Reference	Status	Requirement
PCP-L-C-009	serviceidType	6.1.9	O	
PCP-L-C-010	callSessionRelatedIdType	6.1.10	O	
PCP-L-C-011	codewordType	6.1.11	O	
PCP-L-C-012	pceServerType	6.1.12	O	
PCP-L-C-013	PceClientType	6.1.13	O	

B.1.13 Support for Function Datatypes

Item	Function	Reference	Status	Requirement
PCP-M-C-001	roamingType	6.2.1	O	
PCP-M-C-002	servingNodeType	6.2.2	O	
PCP-M-C-003	privacyActionType	6.2.3	M	
PCP-M-C-004	actionType	6.2.4	O	
PCP-M-C-005	E164NumberType	6.2.5	O	
PCP-M-C-006	apnNiType	6.2.6	O	
PCP-M-C-007	dialNumberType	6.2.7	O	
PCP-M-C-008	absolutedHTTPURLType	6.2.8	O	
PCP-M-C-009	SIPURIType	6.2.9	O	
PCP-M-C-010	telURIType	6.2.10	O	
PCP-M-C-011	emailIdType	6.2.11	O	
PCP-M-C-012	IMSPublicIdType	6.2.12	O	
PCP-M-C-013	mdnType	6.2.13	O	
PCP-M-C-014	minType	6.2.14	O	

B.1.14 Support for Location Datatypes

Item	Function	Reference	Status	Requirement
PCP-N-C-001	locationEstimateType	6.3.1	C	
PCP-N-C-002	timeType	6.3.2	O	
PCP-N-C-003	altitudeType	6.3.3	O	
PCP-N-C-004	altitudeUncertaintyType	6.3.4	O	
PCP-N-C-005	speedType	6.3.5	O	
PCP-N-C-006	directionType	6.3.6	O	
PCP-N-C-007	probabilityType	6.3.7	O	

B.1.15 Support for ServiceType Datatypes

Item	Function	Reference	Status	Requirement
PCP-O-C-001	clientCategoryType	6.4.1	O	
PCP-O-C-002	serviceTypeType	6.4.2	O	
PCP-O-C-003	locationTypeType	6.4.3	O	

B.1.16 Support for Shape Datatypes

Item	Function	Reference	Status	Requirement
PCP-P-C-001	shapeType	6.5.1	O	
PCP-P-C-002	distanceUnitType	6.5.2	O	
PCP-P-C-003	angularUnitType	6.5.3	O	
PCP-P-C-004	angleType	6.5.4	O	
PCP-P-C-005	coordType	6.5.5	O	

Item	Function	Reference	Status	Requirement
PCP-P-C-006	radiusType	6.5.6	O	
PCP-P-C-007	boxType	6.5.7	O	
PCP-P-C-008	circularArcAreaType	6.5.8	O	
PCP-P-C-009	circularAreaType	6.5.9	O	
PCP-P-C-010	ellipticalAreaType	6.5.10	O	
PCP-P-C-011	lineStringType	6.5.11	O	
PCP-P-C-012	linearRingType	6.5.12	O	
PCP-P-C-013	pointType	6.5.13	O	
PCP-P-C-014	polygonType	6.5.14	O	

B.1.17 Support for Result Datatypes

Item	Function	Reference	Status	Requirement
PCP-Q-C-001	resultType	6.6.1	M	
PCP-Q-C-001	addinfoType	6.6.2	O	

B.1.18 Services

Item	Function	Reference	Status	Requirement
PCP-R-C-001	Location Privacy Assertion Service	7.2.2	M	PCP-A-C-003 AND PCP-B-C-003
PCP-R-C-002	Pseudonym Service	7.3.3.3 7.3.3.4	O	PCP-A-C-005 AND PCP-B-C-005
PCP-R-C-003	Verinym Service	7.3.3.1 7.3.3.2	O	PCP-A-C-004 AND PCP-B-C-004
PCP-R-C-004	Privacy Profile Update Notification Service	7.4.3	O	PCP-A-C-006 AND PCP-B-C-006

B.2 SCR for PCP Server

B.2.1 Service Initiation

Item	Function	Reference	Status	Requirement
PCP-A-S-001	Service initiation	8.2	M	PCP-A-S-002 AND PCP-A-S-003
PCP-A-S-002	header	7.1	M	
PCP-A-S-003	Location Privacy Assertion Request	7.2	O	PCP-B-S-003
PCP-A-S-004	Verinym Request	7.3	O	PCP-B-S-004
PCP-A-S-005	Pseudonym Request	7.3	O	PCP-B-S-005
PCP-A-S-006	Privacy profile update notification	7.4	O	PCP-B-S-006

B.2.2 Service Result

Item	Function	Reference	Status	Requirement
PCP-B-S-001	Service result	8.2	M	PCP-B-S-002 AND PCP-B-S-003
PCP-B-S-002	header	7.1	O	
PCP-B-S-003	Location Privacy Assertion Response	7.2	M	
PCP-B-S-004	Verinym Response	7.3	O	
PCP-B-S-005	Pseudonym Response	7.3	O	
PCP-B-S-006	Privacy profile update	7.4	O	

Item	Function	Reference	Status	Requirement
	notification ack			

B.2.3 Header

Item	Function	Reference	Status	Requirement
PCP-C-S-001	version	7.1	M	
PCP-C-S-002	PCE Client	7.1	O	
PCP-C-S-003	PCE Server	7.1	O	

B.2.4 Location Privacy Assertion Request

Item	Function	Reference	Status	Requirement
PCP-D-S-001	ueid	7.2.2.1	M	
PCP-D-S-002	client	7.2.2.1	M	
PCP-D-S-010	serviceid	7.2.2.1	O	
PCP-D-S-003	callSessionRelatedId	7.2.2.1	O	
PCP-D-S-004	serviceType	7.2.2.1	O	
PCP-D-S-005	requestor	7.2.2.1	O	
PCP-D-S-006	codeword	7.2.2.1	O	
PCP-D-S-007	locationType	7.2.2.1	O	
PCP-D-S-008	servingNode	7.2.2.1	O	
PCP-D-S-009	locationEstimate	7.2.2.1	O	

B.2.5 Location Privacy Assertion Response

Item	Function	Reference	Status	Requirement
PCP-E-S-001	privacyAction	7.2.2.2	M	
PCP-E-S-002	additionalLocationCheck	7.2.2.2	C	
PCP-E-S-003	msid	7.2.2.2	C	

B.2.6 Verinym Request

Item	Function	Reference	Status	Requirement
PCP-F-S-001	pseudoid	7.3.2.1	M	
PCP-F-S-002	client	7.3.2.1	O	
PCP-F-S-004	serviceId	7.3.2.1	O	
PCP-F-S-005	requestor	7.3.2.1	O	
PCP-F-S-006	codeword	7.3.2.1	O	

B.2.7 Verinym Response

Item	Function	Reference	Status	Requirement
PCP-G-S-001	msid	7.3.2.2	M	

B.2.8 Pseudonym Request

Item	Function	Reference	Status	Requirement
PCP-H-S-001	msid	7.3.2.3	M	
PCP-H-S-002	client	7.3.2.3	O	
PCP-H-S-004	serviceId	7.3.2.3	O	
PCP-H-S-005	requestor	7.3.2.3	O	
PCP-H-S-006	codeword	7.3.2.3	O	
PCP-H-S-007	expirationDate	7.3.2.3	O	

B.2.9 Pseudonym Response

Item	Function	Reference	Status	Requirement
PCP-I-S-001	pseudoid	7.3.2.4	M	
PCP-I-S-002	expirationDate	7.3.2.4	O	

B.2.10 Privacy Profile Update Notification

Item	Function	Reference	Status	Requirement
PCP-J-S-001	msid	7.4.2.1	M	

B.2.11 Privacy Profile Update Notification Ack

Item	Function	Reference	Status	Requirement
PCP-K-S-001	ACK	7.4.2.2	C	

B.2.12 Support for Identity Datatypes

Item	Function	Reference	Status	Requirement
PCP-L-S-001	ueidType	6.1.1	M	
PCP-L-S-002	msidType	6.1.2	M	
PCP-L-S-003	pseudoidType	6.1.3	M	
PCP-L-S-004	clientType	6.1.4	M	
PCP-L-S-005	clientIdType	6.1.5	O	
PCP-L-S-006	clientNameType	6.1.6	O	
PCP-L-S-007	sessionType	6.1.7	O	
PCP-L-S-008	requestorIdType	6.1.8	O	
PCP-L-S-009	serviceidType	6.1.9	O	
PCP-L-S-010	callSessionRelatedIdType	6.1.10	O	
PCP-L-S-011	codewordType	6.1.11	O	
PCP-L-S-012	pceServerType	6.1.12	O	
PCP-L-S-013	PceClientType	6.1.13	O	

B.2.13 Support for Function Datatypes

Item	Function	Reference	Status	Requirement
PCP-M-S-001	roamingType	6.2.1	O	
PCP-M-S-002	servingNodeType	6.2.2	O	
PCP-M-S-003	privacyActionType	6.2.3	M	
PCP-M-S-004	actionType	6.2.4	O	
PCP-M-S-005	E164NumberType	6.2.5	O	
PCP-M-S-006	apnNiType	6.2.6	O	
PCP-M-S-007	dialNumberType	6.2.7	O	
PCP-M-S-008	absolutedHTTPURLType	6.2.8	O	
PCP-M-S-009	SIPURIType	6.2.9	O	
PCP-M-S-010	telURIType	6.2.10	O	
PCP-M-S-011	emailIdType	6.2.11	O	
PCP-M-S-012	IMSPublicIdType	6.2.12	O	
PCP-M-S-013	mdnType	6.2.13	O	
PCP-M-S-014	minType	6.2.14	O	

B.2.14 Support for Location Datatypes

Item	Function	Reference	Status	Requirement
PCP-N-S-001	locationEstimateType	6.3.1	C	
PCP-N-S-002	timeType	6.3.2	O	
PCP-N-S-003	altitudeType	6.3.3	O	
PCP-N-S-004	altitudeUncertaintyType	6.3.4	O	
PCP-N-S-005	speedType	6.3.5	O	
PCP-N-S-006	directionType	6.3.6	O	
PCP-N-S-007	probabilityType	6.3.7	O	

B.2.15 Support for ServiceType Datatypes

Item	Function	Reference	Status	Requirement
PCP-O-S-001	clientCategoryType	6.4.1	O	
PCP-O-S-002	serviceTypeType	6.4.2	O	
PCP-O-S-003	locationTypeType	6.4.3	O	

B.2.16 Support for Shape Datatypes

Item	Function	Reference	Status	Requirement
PCP-P-S-001	shapeType	6.5.1	O	
PCP-P-S-002	distanceUnitType	6.5.2	O	
PCP-P-S-003	angularUnitType	6.5.3	O	
PCP-P-S-004	angleType	6.5.4	O	
PCP-P-S-005	coordType	6.5.5	O	
PCP-P-S-006	radiusType	6.5.6	O	
PCP-P-S-007	boxType	6.5.7	O	
PCP-P-S-008	circularArcAreaType	6.5.8	O	
PCP-P-S-009	circularAreaType	6.5.9	O	
PCP-P-S-010	ellipticalAreaType	6.5.10	O	
PCP-P-S-011	lineStringType	6.5.11	O	
PCP-P-S-012	linearRingType	6.5.12	O	
PCP-P-S-013	pointType	6.5.13	O	
PCP-P-S-014	polygonType	6.5.14	O	

B.2.17 Support for Result Datatypes

Item	Function	Reference	Status	Requirement
PCP-Q-S-001	resultType	6.6.1	M	
PCP-Q-S-001	addinfoType	6.6.2	O	

B.2.18 Services

Item	Function	Reference	Status	Requirement
PCP-R-S-001	Location Privacy Assertion Service	7.2.2	M	PCP-A-S-003 AND PCP-B-S-003
PCP-R-S-002	Pseudonym Service	7.3.3.3 7.3.3.4	O	PCP-A-S-005 AND PCP-B-S-005
PCP-R-S-003	Verinym Service	7.3.3.1 7.3.3.2	O	PCP-A-S-004 AND PCP-B-S-004
PCP-R-S-004	Privacy Profile Update Notification Service	7.4.3	O	PCP-A-S-006 AND PCP-B-S-006

Appendix C. PCP XML Schema

```
<?xml version="1.0" encoding="UTF-8"?>
< xs:schema targetNamespace="http://www.openmobilealliance.org/schemas/loc_pce/v1.0/"
xmlns="http://www.openmobilealliance.org/schemas/loc_pce/v1.0/" xmlns:xs="http://www.w3.org/2001/XMLSchema"
elementFormDefault="qualified">
    <xs:annotation>
        <xs:documentation>
        This schema defines the datatypes required for the PCP.
        All the required datatypes and also the request and response datatype
        are defined in this schema.
        </xs:documentation>
    </xs:annotation>

        <!--                pcp_svc_init                -->
        <xs:element name="pcp_query_init">
            <xs:complexType>
                <xs:sequence>
                    <xs:element ref="pcp_hdr"/>
                    <xs:sequence>
                        <xs:choice>
                            <xs:element ref="LPARequest"/>
                            <xs:element ref="VerinymRequest"/>
                            <xs:element ref="PseudonymRequest"/>
                        </xs:choice>
                        <xs:element name="extension.message" type="xs:anyType" minOccurs="0"/>
                    </xs:sequence>
                </xs:sequence>
            </xs:complexType>
        </xs:element>

        <xs:element name="pcp_query_result">
            <xs:complexType>
                <xs:sequence>
                    <xs:element ref="pcp_hdr"/>
                    <xs:sequence>
                        <xs:choice>
                            <xs:element ref="LPAResponse"/>
                            <xs:element ref="VerinymResponse"/>
                            <xs:element ref="PseudonymResponse"/>
                        </xs:choice>
                        <xs:element name="extension.message" type="xs:anyType" minOccurs="0"/>
                    </xs:sequence>
                </xs:sequence>
            </xs:complexType>
        </xs:element>

        <xs:element name="pcp_notification_init">
            <xs:complexType>
                <xs:sequence>
                    <xs:element ref="pcp_hdr"/>
                    <xs:sequence>
                        <xs:choice>
                            <xs:element ref="LPUNotification"/>
                        </xs:choice>
                        <xs:element name="extension.message" type="xs:anyType" minOccurs="0"/>
                    </xs:sequence>
                </xs:sequence>
            </xs:complexType>
        </xs:element>

        <xs:element name="pcp_notification_result">
            <xs:complexType>
                <xs:sequence>
                    <xs:element ref="pcp_hdr"/>
```

```
                        <xs:sequence>
                            <xs:choice>
                                <xs:element ref="LPUAck"/>
                            </xs:choice>
                            <xs:element name="extension.message" type="xs:anyType" minOccurs="0"/>
                        </xs:sequence>
                    </xs:sequence>
                </xs:complexType>
            </xs:element>

            <!--                pcp_hdr                -->
            <xs:element name="pcp_hdr">
                <xs:complexType>
                    <xs:choice>
                        <xs:element name="pceServer" type="pceServerType"/>
                        <xs:element name="pceClient" type="pceClientType"/>
                    </xs:choice>
                    <xs:attribute name="ver" type="xs:string" fixed="1.0.0"/>
                </xs:complexType>
            </xs:element>
            <xs:complexType name="pceServerType">
                <xs:sequence>
                    <xs:element name="id" type="xs:NMTOKEN"/>
                    <xs:element name="pwd" type="xs:string" minOccurs="0"/>
                </xs:sequence>
            </xs:complexType>
            <xs:complexType name="pceClientType">
                <xs:sequence>
                    <xs:element name="id" type="xs:NMTOKEN"/>
                    <xs:element name="pwd" type="xs:string" minOccurs="0"/>
                </xs:sequence>
            </xs:complexType>

            <!--                LPARequest                -->
            <xs:element name="LPARequest" type="LPARequestType"/>
            <xs:complexType name="LPARequestType">
                <xs:annotation>
                    <xs:documentation>
                    service allows the privacy settings for a UE terminal to be checked
                    a  particular client and service.
                    </xs:documentation>
                </xs:annotation>
                <xs:sequence>
                    <xs:element name="ueid" type="ueidType"/>
                    <xs:element name="client" type="clientType"/>
                    <xs:element name="serviceid" type="serviceIdType" minOccurs="0"/>
                    <xs:element name="callSenssionRelatedId" type="callSessionRelatedIdType" minOccurs="0"/>
                    <xs:element name="serviceType" type="serviceTypeType" minOccurs="0"/>
                    <xs:element name="requestor" type="requestorIdType" minOccurs="0"/>
                    <xs:element name="codeword" type="codewordType" minOccurs="0"/>
                    <xs:element name="locationType" type="locationTypeType" minOccurs="0"/>
                    <xs:element name="servingNode" type="servingNodeType" minOccurs="0"/>
                    <xs:element name="locationEstimate" type="locationEstimateType" minOccurs="0"/>
                </xs:sequence>
            </xs:complexType>

            <!--                LPAResponse                -->
            <xs:element name="LPAResponse" type="LPAResponseType"/>
            <xs:complexType name="LPAResponseType">
                <xs:choice>
                    <xs:sequence>
                        <xs:element name="privacyAction" type="privacyActionType"/>
                        <xs:element name="additionalLocationCheck" type="xs:boolean" minOccurs="0"/>
                        <xs:element name="msid" type="msidType" minOccurs="0"/>
                    </xs:sequence>
                    <xs:sequence>
                        <xs:element name="result" type="resultType"/>
```

```
                        <xs:element name="addInfo" type="addInfoType" minOccurs="0"/>
                    </xs:sequence>
            </xs:choice>
    </xs:complexType>

    <xs:annotation>
            <xs:documentation>                  Verinym Request</xs:documentation>
    </xs:annotation>
    <xs:element name="VerinymRequest" type="VerinymRequestType"/>
    <xs:complexType name="VerinymRequestType">
            <xs:sequence>
                    <xs:element name="pseudoid" type="pseudoIdType"/>
                    <xs:element name="client" type="clientType" minOccurs="0"/>
                    <xs:element name="serviceid" type="serviceIdType" minOccurs="0"/>
                    <xs:element name="requestor" type="requestorIdType" minOccurs="0"/>
                    <xs:element name="codeword" type="codewordType" minOccurs="0"/>
            </xs:sequence>
    </xs:complexType>

    <xs:annotation>
            <xs:documentation>                  VerinymResponse</xs:documentation>
    </xs:annotation>
    <xs:element name="VerinymResponse" type="VerinymResponseType"/>
    <xs:complexType name="VerinymResponseType">
            <xs:choice>
                    <xs:element name="msid" type="msidType"/>
                    <xs:sequence>
                            <xs:element name="result" type="resultType"/>
                            <xs:element name="addInfo" type="addInfoType" minOccurs="0"/>
                    </xs:sequence>
            </xs:choice>
    </xs:complexType>

    <xs:annotation>
            <xs:documentation>                  PseudonymRequest</xs:documentation>
    </xs:annotation>
    <xs:element name="PseudonymRequest" type="PseudonymRequestType"/>
    <xs:complexType name="PseudonymRequestType">
            <xs:sequence>
                    <xs:element name="msid" type="msidType"/>
                    <xs:element name="client" type="clientType" minOccurs="0"/>
                    <xs:element name="serviceid" type="serviceIdType" minOccurs="0"/>
                    <xs:element name="requestor" type="requestorIdType" minOccurs="0"/>
                    <xs:element name="codeword" type="codewordType" minOccurs="0"/>
                    <xs:element name="expirationDate" type="timeType" minOccurs="0"/>
            </xs:sequence>
    </xs:complexType>

    <xs:annotation>
            <xs:documentation>                  PseudonymResponse</xs:documentation>
    </xs:annotation>
    <xs:element name="PseudonymResponse" type="PseudonymResponseType"/>
    <xs:complexType name="PseudonymResponseType">
            <xs:choice>
                    <xs:sequence>
                            <xs:element name="pseudoid" type="pseudoIdType"/>
                            <xs:element name="expirationDate" type="timeType" minOccurs="0"/>
                    </xs:sequence>
                    <xs:sequence>
                            <xs:element name="result" type="resultType"/>
                            <xs:element name="addInfo" type="addInfoType" minOccurs="0"/>
                     </xs:sequence>
    </xs:choice>
    </xs:complexType>

    <xs:annotation>
            <xs:documentation>                  LPUNotification</xs:documentation>
```

```
        </xs:annotation>
        <xs:element name="LPUNotification" type="LPUNotificationType"/>
        <xs:complexType name="LPUNotificationType">
                <xs:sequence>
                        <xs:element name="msid" type="msidType"/>
                </xs:sequence>
        </xs:complexType>

        <xs:annotation>
                <xs:documentation>                      LPUAck</xs:documentation>
        </xs:annotation>
        <xs:element name="LPUAck" type="LPUAckType"/>
        <xs:complexType name="LPUAckType">
                <xs:choice>
                        <xs:element name="ack" type="emptyType"/>
                        <xs:sequence>
                                <xs:element name="result" type="resultType"/>
                                <xs:element name="addInfo" type="addInfoType" minOccurs="0"/>
                        </xs:sequence>
                </xs:choice>
        </xs:complexType>
        <xs:complexType name="emptyType">
                <xs:complexContent>
                        <xs:restriction base="xs:anyType"/>
                </xs:complexContent>
</xs:complexType>               <!-- ====================== 6.1 Identity Type definition ======================-->
        <xs:complexType name="ueidType">
                <xs:choice>
                        <xs:element name="msid" type="msidType"/>
                        <xs:element name="pseudoid" type="pseudoIdType"/>
                </xs:choice>
        </xs:complexType>
        <xs:complexType name="msidType">
                <xs:annotation>
                        <xs:documentation>
                                Description goes here.
                        </xs:documentation>
                </xs:annotation>
                <xs:all>
                        <xs:element name="msisdn" type="e164NumberType" minOccurs="0"/>
                        <xs:element name="imsi" type="imsiType" minOccurs="0"/>
                        <xs:element name="mdn" type="mdnType" minOccurs="0"/>
                        <xs:element name="min" type="minType" minOccurs="0"/>
                </xs:all>
        </xs:complexType>

        <xs:simpleType name="imsiType">
                <xs:annotation>
                        <xs:documentation>
                                This simple datatype defines a datatype for IMSI number. This defines
                                IMSI at a very high level and doesn't define IMSI structure as defined
                                in the 3GPP TS23.003 [23.003] doc. Defining the IMSI structure datatype as defined in
TS23.003 is not
                                possible with schema capabilities.
                        </xs:documentation>
                </xs:annotation>
                <xs:restriction base="xs:nonNegativeInteger">
                        <xs:totalDigits value="15"/>
                </xs:restriction>
        </xs:simpleType>
        <xs:simpleType name="pseudoIdType">
                <xs:restriction base="xs:string"/>
        </xs:simpleType>
        <xs:complexType name="clientType">
                <xs:sequence>
                        <xs:element name="clientId" type="clientIdType"/>
                        <xs:element name="clientCategory" type="clientCategoryType"/>
```

```
                        <xs:element name="clientName" type="clientNameType" minOccurs="0"/>
                    </xs:sequence>
            </xs:complexType>
            <xs:complexType name="clientIdType">
                    <xs:choice>
                        <xs:element name="externalId" type="e164NumberType"/>
                        <xs:element name="internalId" type="internalIdType"/>
                    </xs:choice>
            </xs:complexType>
                    <xs:simpleType name="internalIdType">
                    <xs:annotation>
                        <xs:documentation>
                                Value "1" represents "LCS client broadcasting location related information"
                                Value "2" represents "OM LCS client in the HPLMN"
                                Value "3" represents "OM LCS client in the VPLMN"
                                Value "4" represents "LCS client recording anonymous location information"
                                Value "5" represents "LCS Client supporting a bearer service, teleservice or supplementary
service to the target UE"
                        </xs:documentation>
                    </xs:annotation>
                    <xs:restriction base="xs:positiveInteger">
                        <xs:minInclusive value="1"/>
                        <xs:maxInclusive value="5"/>
                    </xs:restriction>
            </xs:simpleType>
            <xs:complexType name="clientNameType">
                    <xs:choice>
                        <xs:element name="msisdn" type="e164NumberType"/>
                        <xs:element name="logicalId" type="xs:string"/>
                        <xs:element name="emailId" type="emailIdType"/>
                        <xs:element name="absoluteHTTPURL" type="absoluteHTTPURLType"/>
                        <xs:element name="SIPURI" type="SIPURIType"/>
                        <xs:element name="IMSPublicId" type="IMSPublicIdType"/>
                    </xs:choice>
            </xs:complexType>
            <xs:complexType name="sessionType">
                    <xs:choice>
                        <xs:element name="APN" type="apnNiType"/>
                        <xs:element name="DIAL" type="dialNumberType"/>
                    </xs:choice>
            </xs:complexType>
            <xs:complexType name="requestorIdType">
                    <xs:choice>
                        <xs:element name="logicalId" type="xs:string"/>
                        <xs:element name="msisdn" type="e164NumberType"/>
                        <xs:element name="emailId" type="emailIdType"/>
                        <xs:element name="AbsoluteHTTPURL" type="absoluteHTTPURLType"/>
                        <xs:element name="SIPURI" type="SIPURIType"/>
                        <xs:element name="IMSPublicId" type="IMSPublicIdType"/>
                        <xs:element name="imsi" type="imsiType"/>
                        <xs:element name="mdn" type="mdnType"/>
                    </xs:choice>
            </xs:complexType>
            <xs:simpleType name="serviceIdType">
                    <xs:restriction base="xs:string"/>
            </xs:simpleType>
            <xs:complexType name="callSessionRelatedIdType">
                    <xs:choice>
                        <xs:element name="E164" type="e164NumberType"/>
                        <xs:element name="APN" type="apnNiType"/>
                    </xs:choice>
            </xs:complexType>
            <xs:simpleType name="codewordType">
                    <xs:restriction base="xs:string"/>
            </xs:simpleType>

            <!-- ====================== 6.2 Functional Data Type Definition ======================-->
```

```
<xs:complexType name="roamingType">
        <xs:attribute name="flag" type="xs:boolean" use="required"/>
</xs:complexType>
<xs:complexType name="servingNodeType">
        <xs:simpleContent>
                <xs:extension base="xs:integer">
                        <xs:attribute name="capability" use="required">
                                <xs:annotation>
                                        <xs:documentation>
                                        Value 1 represents R98 and R99 capabilities set
                                        Value 2 represents Rel 4 capabilities set
                                        Value 3 represents Rel 5 capabilities set
                                        Value 4 represents Rel 6 or later capabilities set
                                        </xs:documentation>
                                </xs:annotation>
                                <xs:simpleType>
                                        <xs:restriction base="xs:integer">
                                                <xs:minInclusive value="1"/>
                                        </xs:restriction>
                                </xs:simpleType>
                        </xs:attribute>
                </xs:extension>
        </xs:simpleContent>
</xs:complexType>
<xs:complexType name="privacyActionType">
   <xs:annotation>
       <xs:documentation>
       The privacy action type may be one of: 1) callRelated, 2) callUnRelated, 3) Both CallRelated and CallUnRelated or 4)
a pseudo external id.
       See 3GPP 23.271 for additional details.
       </xs:documentation>
    </xs:annotation>

        <xs:choice>
                <xs:element name="callUnRelatedAction" type="actionType" />
                <xs:sequence>
                        <xs:element name="callRelatedAction" type="actionType"/>
                        <xs:element name="callUnrelatedAction" type="actionType" minOccurs="0"/>
                </xs:sequence>
                <xs:element name="pseudoExternalId" type="xs:string" minOccurs="0"/>
        </xs:choice>
</xs:complexType>
<xs:simpleType name="actionType" final="restriction">
        <xs:restriction base="xs:string">
                <xs:enumeration value="POSITION_NOT_ALLOWED"/>
                <xs:enumeration value="NOTIFY_POSITION_IF_GRANTED"/>
                <xs:enumeration value="NOTIFY_POSITION_IF_NO_RESPONSE"/>
                <xs:enumeration value="NOTIFY_POSITION"/>
                <xs:enumeration value="POSITION_WITHOUT_NOTIFY"/>
        </xs:restriction>
</xs:simpleType>
<xs:simpleType name="e164NumberType">
        <xs:annotation>
                <xs:documentation>
                        This simple datatype defines a datatype for E.164 international public
                        telecommunication number for networks. This datatype defines
                        E.164 number at a very high level and doesn't define E.164 structure as
                        defined in the ITU-T E.164 [E.164] doc(section 6.2.3). Defining this number
                        structure as defined in E.164 is not possible with schema capabilities.
                </xs:documentation>
        </xs:annotation>
        <xs:restriction base="xs:nonNegativeInteger">
                <xs:totalDigits value="15"/>
        </xs:restriction>
</xs:simpleType>
<xs:simpleType name="apnNiType">
        <xs:annotation>
```

```
                        <xs:documentation>
                                APN-NI (APN Network Identifier)
                                The APN Network Identifier. This defines to which external network
                                the GGSN is connected and optionally a requested service by the MS.

                                The APN Network Identifier shall contain at least one label and shall have a
                                maximum length of 63 octets. The labels shall consist only of the alphabetic
                                characters (A-Z and a-z), digits (0-9) and the hyphen (-). An APN Network
                                Identifier shall not start with any of the strings "rac", "lac", "sgsn" or "rnc",
                                and it shall not end in ".gprs". Further, it shall not take the value "*".
                        </xs:documentation>
                </xs:annotation>
                <xs:restriction base="xs:string">
                        <xs:minLength value="1"/>
                        <xs:maxLength value="63"/>
                        <xs:pattern value="[\w\-]+"/>
                </xs:restriction>
        </xs:simpleType>
        <xs:simpleType name="dialNumberType">
                <xs:restriction base="xs:string">
                        <xs:pattern value="[0-9]+"/>
                </xs:restriction>
        </xs:simpleType>
        <xs:simpleType name="absoluteHTTPURLType">
                <xs:restriction base="xs:anyURI">
                        <xs:pattern value="https?:.*"/>
                </xs:restriction>
        </xs:simpleType>
        <xs:simpleType name="SIPURIType">
                <xs:annotation>
                        <xs:documentation>
                                SIP URL pattern is defined based on the SIP URL description provided in RFC 2543
                                [RFC2543] (Section 2)
                        </xs:documentation>
                </xs:annotation>
                <xs:restriction base="xs:anyURI">
                        <xs:pattern value="sips?:.*"/>
                </xs:restriction>
        </xs:simpleType>
        <xs:simpleType name="telURIType">
                <xs:restriction base="xs:anyURI">
                        <xs:pattern value="tel?:.*"/>
                </xs:restriction>
        </xs:simpleType>
        <xs:simpleType name="emailIdType">
                <xs:restriction base="xs:string">
                        <xs:pattern value="(\w+\.)*\w+@(\w+\.)+\w+"/>
                </xs:restriction>
        </xs:simpleType>
        <xs:complexType name="IMSPublicIdType">
            <xs:annotation>
                <xs:documentation>
                IMS Public User Identity/identities shall take the form of a SIP URI (as defined in RFC 3261
                [RFC3261]  and RFC 2396 [RFC2396]) or the "tel:"-URI format RFC 3966 [RFC3966] .
                </xs:documentation>
             </xs:annotation>
                <xs:choice>
                        <xs:element name="SIPURI" type="SIPURIType"/>
                        <xs:element name="telURI" type="telURIType"/>
                </xs:choice>
        </xs:complexType>

        <xs:simpleType name="mdnType">
                  <xs:annotation>
                     <xs:documentation>
                       This Mobile Dialing Number
                     </xs:documentation>
```

```
            </xs:annotation>

            <xs:restriction base="xs:nonNegativeInteger">
               <xs:totalDigits value="10"/>
            </xs:restriction>
         </xs:simpleType>

         <xs:simpleType name="minType">
            <xs:annotation>
               <xs:documentation>
                  This Mobile Identification Number
               </xs:documentation>
            </xs:annotation>

            <xs:restriction base="xs:nonNegativeInteger">
               <xs:totalDigits value="10"/>
            </xs:restriction>
 </xs:simpleType>



<!-- ==================== 6.3 Location Data Type Definition ======================-->
<xs:complexType name="locationEstimateType">
         <xs:sequence>
                  <xs:element name="time" type="timeType"/>
                  <xs:element name="shape" type="shapeType"/>
                  <xs:sequence minOccurs="0">
                           <xs:element name="alt" type="altitudeType"/>
                           <xs:element name="alt_unc" type="altitudeUncertaintyType" minOccurs="0"/>
                  </xs:sequence>
                  <xs:element name="speed" type="speedType" minOccurs="0"/>
                  <xs:element name="direction" type="directionType" minOccurs="0"/>
                  <xs:element name="lev_conf" type="probabilityType" minOccurs="0"/>
         </xs:sequence>
</xs:complexType>
<xs:simpleType name="timeType">
         <xs:annotation>
                  <xs:documentation>
                  The time is expressed as yyyyMMddhhmmss.
                  </xs:documentation>
         </xs:annotation>
         <xs:restriction base="xs:string">
                  <xs:length value="14"/>
                  <xs:pattern value="[0-9]+"/>
         </xs:restriction>
</xs:simpleType>
<xs:simpleType name="altitudeType">
         <xs:annotation>
                  <xs:documentation>
                  The altitude of the MS in meters in respect of the ellipsoid
                  which is used to be define the coordinates.
                  </xs:documentation>
         </xs:annotation>
         <xs:restriction base="xs:integer"/>
</xs:simpleType>
<xs:simpleType name="altitudeUncertaintyType">
         <xs:annotation>
                  <xs:documentation>
                  Uncertainty of altitude estimate in meters.
                  </xs:documentation>
          </xs:annotation>
          <xs:restriction base="xs:nonNegativeInteger"/>
</xs:simpleType>
<xs:simpleType name="speedType">
         <xs:annotation>
                  <xs:documentation>
                  The speed of the MS in m/s.
```

```
                </xs:documentation>
            </xs:annotation>
            <xs:restriction base="xs:nonNegativeInteger"/>
    </xs:simpleType>
    <xs:simpleType name="directionType">
            <xs:annotation>
                <xs:documentation>
                The speed of the MS in m/s.
                </xs:documentation>
            </xs:annotation>
            <xs:restriction base="xs:double">
                <xs:minInclusive value="0"/>
                <xs:maxInclusive value="360"/>
            </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="probabilityType">
            <xs:annotation>
                <xs:documentation>
                This indicates the probability in percent that the MS is located
                in the position area that is returned.
                </xs:documentation>
            </xs:annotation>
            <xs:restriction base="xs:double">
                <xs:minInclusive value="0"/>
                <xs:maxInclusive value="100"/>
            </xs:restriction>
    </xs:simpleType>

    <!-- ==================== 6.4 Service Type Data Type Definition ======================-->
    <xs:simpleType name="locationTypeType">
            <xs:annotation>
                <xs:documentation>
                According to the latest 3GPP document, there are three types of location
                types in the LCS authorisation request.
                Value "1" represents "current location"
                Value "2" represents "current or last known location"
                Value "3" represents "initial location"
                </xs:documentation>
            </xs:annotation>
            <xs:restriction base="xs:positiveInteger">
                <xs:minInclusive value="1"/>
                <xs:maxInclusive value="3"/>
            </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="serviceTypeType">
            <xs:annotation>
                <xs:documentation>
                According to the latest 3GPP document, these are the Service Types:
                Value "0" represents "emergencyServices"
                Value "1" represents "emergencyAlertServices"
                Value "2" represents "personTracking"
                Value "3" represents "fleetManagement"
                Value "4" represents "assetManagement"
                Value "5" represents "trafficCongestionReporting"
                Value "6" represents "roadsideAssistance"
                Value "7" represents "routingToNearestCommercialEnterprise"
                Value "8" represents "navigation"
                Value "9" represents "citySightseeing"
                Value "10" represents "localizedAdvertising"
                Value "11" represents "mobileYellowPages"
                Value "12" represents "trafficAndPublicTransportationInfo"
                Value "13" represents "weather"
                Value "14" represents "assetAndServiceFinding"
                Value "15" represents "gaming"
                Value "16" represents "findYourFriend"
                Value "17" represents "dating"
                Value "18" represents "chatting"
```

```
                        Value "19" represents "routeFinding"
                        Value "20" represents "whereAmI"
                        Value "21" - 255 represents "Non Standard LCS Services"
                        </xs:documentation>
                </xs:annotation>
                <xs:restriction base="xs:nonNegativeInteger">
                        <xs:minInclusive value="0"/>
                        <xs:maxExclusive value="255"/>
                </xs:restriction>
        </xs:simpleType>
        <xs:simpleType name="clientCategoryType">
                <xs:restriction base="xs:string">
                        <xs:enumeration value="Emergency"/>
                        <xs:enumeration value="Value Added"/>
                        <xs:enumeration value="PLMN Operator"/>
                        <xs:enumeration value="Lawful Interception"/>
                </xs:restriction>
        </xs:simpleType>

        <!-- ==================== 6.5 Shape Data Type Definition ======================-->
        <xs:complexType name="shapeType">
                <xs:choice>
                        <xs:element name="point" type="pointType"/>
                        <xs:element name="lineString" type="lineStringType"/>
                        <xs:element name="polygon" type="polygonType"/>
                        <xs:element name="box" type="boxType"/>
                        <xs:element name="circularArea" type="circularAreaType"/>
                        <xs:element name="circularArcArea" type="circularArcAreaType"/>
                        <xs:element name="ellipticalArea" type="ellipticalAreaType"/>
                        <xs:element name="multiLineString">
                                <xs:complexType>
                                        <xs:sequence>
                                                <xs:element name="lineString" type="lineStringType"
maxOccurs="unbounded"/>
                                        </xs:sequence>
                                        <xs:attribute name="gid" type="xs:ID"/>
                                        <xs:attribute name="srsName" type="xs:string"/>
                                </xs:complexType>
                        </xs:element>
                        <xs:element name="multiPoint">
                                <xs:complexType>
                                        <xs:sequence>
                                                <xs:element name="point" type="pointType"
maxOccurs="unbounded"/>                                                                 </xs:sequence>
                                        <xs:attribute name="gid" type="xs:ID"/>
                                        <xs:attribute name="srsName" type="xs:string"/>
                                </xs:complexType>
                        </xs:element>
                        <xs:element name="multiPolygon">
                                <xs:complexType>
                                        <xs:choice maxOccurs="unbounded">
                                                <xs:element name="polygon" type="polygonType"/>
                                                <xs:element name="box" type="boxType"/>
                                                <xs:element name="circularArea" type="circularAreaType"/>
                                                <xs:element name="circularArcArea" type="circularArcAreaType"/>
                                                <xs:element name="ellipticalArea" type="ellipticalAreaType"/>
                                        </xs:choice>
                                        <xs:attribute name="gid" type="xs:ID"/>
                                        <xs:attribute name="srsName" type="xs:string"/>
                                </xs:complexType>
                        </xs:element>
                        <xs:element name="linearRing" type="linearRingType"/>
                </xs:choice>
        </xs:complexType>
        <xs:simpleType name="distanceUnitType">
                <xs:restriction base="xs:string"/>
        </xs:simpleType>
```

```
<xs:simpleType name="angularUnitType">
	<xs:restriction base="xs:string">
		<xs:enumeration value="Degrees"/>
		<xs:enumeration value="Radians"/>
	</xs:restriction>
</xs:simpleType>
<xs:simpleType name="angleType">
	<xs:restriction base="xs:float">
		<xs:minInclusive value="0"/>
		<xs:maxInclusive value="360"/>
	</xs:restriction>
</xs:simpleType>
<xs:element name="coord" type="coordType"/>
<xs:complexType name="coordType">
	<xs:sequence>
		<xs:element name="X" type="xs:string"/>
		<xs:element name="Y" type="xs:string" minOccurs="0"/>
		<xs:element name="Z" type="xs:string" minOccurs="0"/>
	</xs:sequence>
</xs:complexType>
<xs:simpleType name="radiusType">
	<xs:restriction base="xs:nonNegativeInteger"/>
</xs:simpleType>
<xs:complexType name="boxType">
	<xs:sequence>
		<xs:element ref="coord"/>
		<xs:element ref="coord"/>
	</xs:sequence>
	<xs:attribute name="gid" type="xs:ID"/>
	<xs:attribute name="srsName" type="xs:string"/>
</xs:complexType>
<xs:complexType name="circularArcAreaType">
	<xs:sequence>
		<xs:element ref="coord"/>
		<xs:element name="inRadius" type="radiusType"/>
		<xs:element name="outRadius" type="radiusType"/>
		<xs:element name="startAngle" type="angleType"/>
		<xs:element name="stopAngle" type="angleType"/>
		<xs:element name="angularUnit" type="angularUnitType" default="Degrees" minOccurs="0"/>
		<xs:element name="distanceUnit" type="distanceUnitType" minOccurs="0"/>
	</xs:sequence>
	<xs:attribute name="gid" type="xs:ID"/>
	<xs:attribute name="srsName" type="xs:string"/>
</xs:complexType>
<xs:complexType name="circularAreaType">
	<xs:sequence>
		<xs:element ref="coord"/>
		<xs:element name="radius" type="radiusType"/>
		<xs:element name="distanceUnit" type="distanceUnitType" default="meter" minOccurs="0"/>
	</xs:sequence>
	<xs:attribute name="gid" type="xs:ID"/>
	<xs:attribute name="srsName" type="xs:string"/>
</xs:complexType>
<xs:complexType name="ellipticalAreaType">
	<xs:sequence>
		<xs:element ref="coord"/>
		<xs:element name="angle" type="angleType"/>
		<xs:element name="semiMajor" type="xs:nonNegativeInteger"/>
		<xs:element name="semiMinor" type="xs:nonNegativeInteger"/>
		<xs:element name="angularUnit" type="angularUnitType" default="Degrees" minOccurs="0"/>
		<xs:element name="distanceUnit" type="distanceUnitType" default="meter" minOccurs="0"/>
	</xs:sequence>
	<xs:attribute name="gid" type="xs:ID"/>
	<xs:attribute name="srsName" type="xs:string"/>
</xs:complexType>
<xs:complexType name="lineStringType">
	<xs:sequence>
```

```
                        <xs:element ref="coord"/>
                        <xs:element ref="coord" maxOccurs="unbounded"/>
                </xs:sequence>
                <xs:attribute name="gid" type="xs:ID"/>
                <xs:attribute name="srsName" type="xs:string"/>
        </xs:complexType>
        <xs:complexType name="linearRingType">
                <xs:sequence>
                        <xs:element ref="coord"/>
                        <xs:element ref="coord"/>
                        <xs:element ref="coord"/>
                        <xs:element ref="coord" minOccurs="0" maxOccurs="unbounded"/>
                </xs:sequence>
                <xs:attribute name="gid" type="xs:ID"/>
                <xs:attribute name="srsName" type="xs:string"/>
        </xs:complexType>
        <xs:complexType name="pointType">
                <xs:sequence>
                        <xs:element ref="coord"/>
                </xs:sequence>
                <xs:attribute name="gid" type="xs:ID"/>
                <xs:attribute name="srsName" type="xs:string"/>
        </xs:complexType>
        <xs:complexType name="polygonType">
                <xs:sequence>
                        <xs:element name="outerBoundaryIs">
                                <xs:complexType>
                                        <xs:sequence>
                                                <xs:element name="LinearRing" type="linearRingType"/>
                                        </xs:sequence>
                                </xs:complexType>
                        </xs:element>
                        <xs:element name="innerBoundaryIs" minOccurs="0" maxOccurs="unbounded">
                                <xs:complexType>
                                        <xs:sequence>
                                                <xs:element name="LinearRing" type="linearRingType"/>
                                        </xs:sequence>
                                </xs:complexType>
                        </xs:element>
                </xs:sequence>
                <xs:attribute name="gid" type="xs:ID"/>
                <xs:attribute name="srsName" type="xs:string"/>
        </xs:complexType>

        <!-- ====================== 6.6 Result Data Type Definition ======================-->
        <xs:simpleType name="resultType">
                <xs:restriction base="xs:nonNegativeInteger"/>
        </xs:simpleType>
        <xs:simpleType name="addInfoType">
                <xs:restriction base="xs:string"/>
        </xs:simpleType>
</xs:schema>
```

Appendix D. Adaptation to 3GPP LCS (Informative)

D.1 Version mapping between 3GPP TS23.271 and this specification

The following table shows the version number of this specification conforming to a certain version of 3GPP TS23.271, i.e. the version of this specification for the correct reference in a certain version of the 3GPP specification.

3GPP TS23.271 version number	Conforming version number of OMA PCP
Release 6	Version 1

Note: In case there are versions not appearing in this table, it should be interpreted that such update did not affect the other specification. That is, the version number not appearing in the table should apply to the conformance mapping for the closest smaller version number in the table.

D.2 The terminology mapping table with 3GPP LCS Specifications

The following is a list of the terms in PCP used differently from the ones defined for 3GPP:

Term		Notes
PCP	3GPP	
Privacy Checking Entity	Privacy Profile Register Pseudonym Mediation Device	

D.3 The corresponding terms used for the location procedures in 3GPP LCS Definition

The following is a list of terms defined in PCP corresponding to the 3GPP LCS definition in TS23.271 for the location procedures.

Location procedures defined in 3GPP(23.271)	Services defined in OMA PCP
LCS Authorisation request	Location Privacy Assertion Request
LCS Authorisation response	Location Privacy Assertion Response
LCS Identity Request	Verinym Request
LCS Identity Response	Verinym Response
LCS Privacy Profile Update notification	Location Privacy Profile Update Notification
LCS Privacy Profile Update notification ack	Location Privacy Profile Update Notification Ack