APPLICATION SERVICE LAYER API
Developer Manual

Version 4.2c – August 2014

LOC-AID Technologies, Inc.

Revision History

Date	Version	Description	Author
June 20, 2011	0.1	Initial Version	QA
June 22, 2011	0.2	RegistrationService Schema • Update AppPhones Structure • Update RegistrationPhoneRequest Structure • Delete RegistrationCommand Structure	QA
		RegistrationService Schema (WS-ASL, Control, Croupier) • Update AppPhones Structure • Update RegistrationPhoneRequest Structure • Delete RegistrationCommand Structure	
June 29, 2011	0.2a	Minor formatting edits	NM
June 30, 2011	0.2b	Adding OTHER description on Glossary	NH
Aug 16, 2011	0.5	Update type decimal for lac and cellid parameters Registration Services	NH
Aug 22, 2011	0.5a	Correction of Endpoints	NM
Sep 23, 2011	1.0	Xpress 2, add new field for location response	NH
Oct 27, 2011	1.0a	Update new schema	NH
Nov 14, 2011	1.0b	New method: Get PhoneStatus	NH
Nov 22, 2011	1.0c	Examples for GetPhoneStatus	NH
June 21, 2012	2.4a	Add user error table	NM
Aug 24, 2012	3.0a	Add Xtra Schemas	QA
Sep 10, 2012	3.0b	Update Xtra Schemas – Xtra, InfoType	QA
Sep 24, 2012	3.1	Update Xtra Schemas – Profile	QA
Nov 12, 2012	3.4	Add new user error for Xtra	NH
Dec 10, 2012	3.7	Add new WiFi schemas	NH
Dec 17, 2012	3.7	Update WiFi schemas	EM
Jan 7, 2013	3.9	Update descriptions	NH/NM
Jan 17, 2013	3.9b	Typographical corrections	NM
Feb 28, 2013	3.9c	Typographical corrections	NM
Apr 8, 2013	4.1	New method getLocationPhone	NH
Jun 27, 2013	4.2	New locationInfo: LocationAddressWifi : WiFi + Address info (Google API)	NH
Apr 4, 2014	4.2a	Remove NONE status value.	NH
Apr 7, 2014	4.2b	Update registerPhone, getPhoneStatus, getLocationsDB, and getLocationPhone structures	NH
Aug 4, 2014	4.2c	Update error id by request types	NH

Contents

1. Getting Started

1.1. About This Guide

This guide provides a description of Application Service Layer features and an explanation of how the user can benefit by using any of our services.

1.2. Objectives

This guide aims at:

1. Introducing Application Service Layer.
2. Providing the developer with a description on how to use the services and its operations.

1.3. Who Should Use This Guide

Readers of this guide are assumed to be familiar with services concepts.

This guide is intended for Web Service Developers with experience in applications that use the SOAP protocol.

For further information, please contact LOC-AID support at *cs@loc-aid.net*.

1.4. Organization of this Guide

Chapter 1: Application Service Layer Definition
Refer to this chapter for a high level overview of the Application Service Layer (ASL).

Chapter 2: XML Schema Data Type Definition
Refer to this chapter for detailed coding instructions on how to use ASL's SOAP based Web Services and obtain an overview of the standard XML schema definitions

Chapter 3: ASL Function Specific APIs
Refer to this chapter for information on the different methods that are offered by ASL, as well as step by step coding instructions on how to return latitude and longitude coordinates.

Appendix
Refer to this chapter for information on the following topics:

1. Typical error messages received and resolutions
2. Glossary of Terms

Chapter 1: Application Service Layer Definition

Application service Layer (ASL) is a platform that allows you to easily integrate wireless location into a wide variety of content or services.
ASL has the following characteristics

1. Provide access to location from a variety of sources
    a. Mobile networks: AT&T, Verizon, Sprint, T-mobile, Telus, Rogers
    b. Network-related database: Global Cell-ID Database (G-CID)
    c. IP-based location
    d. WiFi-based location
    e. Smart phone location
2. Scalable.
3. Provide services in SOAP

We offer services that can be used through a wide range of delivery methods.
The available services are:

1. Registration Service
2. Location Service
3. UserRegistration Service

These services will be described in the Chapter 3

2. Chapter 2: XML Schema Data Type Definition

2.1. RegistrationService

Registration enables users to provide their permission to be located and to be provisioned to the ASL for future location requests.

RegisterPhoneRequest Structure

Specifies the information that needs to be provisioned in order to be located or not.

Name	Type	Description	Required (Y/N)
credentials	ns:Credentials	This attribute references to the Credentials Structure section	Y
appPhones	ns:RegistrationAppPhones	This attribute references to the RegistrationAppPhones Structure section.	Y

RegisterPhoneResponse Structure

Specifies the information related to the result of the registration process.

Name	Type	Description	Required (Y/N)
transactionResponse	ns:TransactionResponse	This attribute references to the TransactionResponse Structure section.	Y
classId	xsd:string	Class ID related to the application.	Y
phoneStatus	ns:PhoneStatus	A list of the result for each phone requested. (See PhoneStatus Structure section for further information)	Y

GetPhoneStatusRequest Structure

Specifies the information related to the GetPhoneStatusRequest

Name	Type	Description	Required (Y/N)
Credentials	ns:Credentials	This attribute references to the Credentials Structure section.	Y
Msisdn	xsd:string	This attribute references to the RegistrationAppPhones Structure section.	Y

GetPhoneStatusResponse Structure

Specifies the information delivered by the get Phone status method.

Name	Type	Description	Required (Y/N)
transactionResponse	ns:TransactionResponse	This attribute references to the TransactionResponse Structure section.	Y
msisdnPhoneStatus	ns:msisdnPhoneStatus	A list of phones with the subscription information for each application. (See msisdnPhoneStatus Structure section for further information)	Y

msisdnPhoneStatus Structure

Specifies the information related to each phone number requested and the current status of the subscription for each application

Name	Type	Description	Required (Y/N)
Msisdn	xsd:string	Phone number in MSISDN format.	Y
Response	tns:Response	This attribute references to the Response Structure section.	
classIdPhoneStatus	tns:classIdPhoneStatus	A list of classId with the current status of subscription. (See classIdPhoneStatus Structure section for further information)	Y

classIdPhoneStatus Structure

Specifies the information related to the application and the current status of the subscription for the phone number.

Name	Type	Description	Required (Y/N)
classId	xsd:string	Phone number in MSISDN format.	Y
subscription	xsd:string	Status of the subscription for a specific classId.	Y

Status	Description
OPTIN_COMPLETE	Subscribed (SL = 1, 2, 3, 4)
OPTIN_PENDING	Waiting for confirmation (SL = 3, 4)
OPTIN_SUSPENDED	Locked
OPTIN_DENIED	Deny subscription (SL = 3, 4)
CANCELLED	Subscription cancelled
NONE	No subscriptions

2.2. LocationService

LocationDBRequest Structure

Specifies the information related to the LocationDBRequest

Name	Type	Description	Required (Y/N)
credentials	ns0:Credentials	This attribute references to the Credentials Structure section.	Y
locationParams	ns0:LocationParams	This attribute references to the LocationParams Structure section.	Y
locationInfo	ns0:LocationInfo	This attribute references to the LocationInfo Structure section.	Y
trackingID	xsd:string	This is an optional request identifier attribute.	N

LocationDBResponse Structure

Specifies the information related to the LocationDBResponse.

Name	Type	Description	Required (Y/N)
transactionResponse	ns0:TransactionResponse	This attribute references to the TransactionResponse Structure section.	Y
locationXtremeResponse	ns0:LocationXtremeResponse+	A list of LocationXtremeResponse. (See LocationXtremeResponse Structure section for further information)	N
locationXpressResponse	ns0:LocationXpressResponse+	A list of LocationXpressResponse. (See LocationXpressResponse Structure section for further information)	N
locationXtraResponse	ns0:LocationXtraResponse+	A list of LocationXtraResponse. (See LocationXtraResponse Structure section for further information)	N
locationWifiResponse	ns0:LocationWifiResponse	A list of LocationWifiResponse. (See LocationWifiResponse Structure section for further information)	N
trackingID	xsd:string	This is an optional request identifier attribute.	N

LocationPhoneRequest Structure

Specifies the information related to the LocationPhoneRequest

Name	Type	Description	Required (Y/N)
Credentials	ns0:Credentials	This attribute references to the Credentials Structure section.	Y
locationParams	ns0:LocationParams	This attribute references to the LocationParams Structure section.	Y
locationInfo	ns0:LocationInfo	This attribute references to the LocationInfo Structure section.	Y
trackingID	xsd:string	This is an optional request identifier attribute.	N

LocationPhoneResponse Structure

Specifies the information related to the LocationPhoneResponse.

Name	Type	Description	Required (Y/N)
transactionResponse	ns0:TransactionResponse	This attribute references to the TransactionResponse Structure section.	Y
locationXsResponse	ns0:LocationXsResponse	A list of LocationXsResponse. (See LocationXsResponse Structure section for further information)	N
locationXtremeResponse	ns0:LocationXtremeResponse	A list of LocationXtremeResponse. (See LocationXtremeResponse Structure section for further information)	N

LocationInfo Structure

Specifies the information related to the location request that the system will send to get location

response. There are 7 different structures:

2.2.1.1. LocationXtreme Structure

Specifies the information related to the request for Location Service through LXG provider.

Name	Type	Description	Required (Y/N)
appPhones	tns:LocationAppPhones	This attribute references to the LocationAppPhones Structure section.	Y

2.2.1.2. LocationXpress Structure

Specifies the information related to the request for Location Service through CGI location source.

Name	Type	Description	Required (Y/N)
xpress	tns:ICID	A list of ICID Structure. (See ICID Structure section.	Y

2.2.1.3. LocationCombo Structure

Specifies the information related to the request for Location Service through CGI location source or LXG.

Name	Type	Description	Required (Y/N)
classId	xsd:string	Class ID related to the application.	Y
Combo	tns:Combo	A list of Combo Structure. (See Combo Structure section).	Y

2.2.1.4. LocationXtra Structure

Specifies the information related to the request for Location Service through geo-IP provider.

Name	Type	Description	Required (Y/N)
Xtra	tns:Xtra	A list of Xtra Structure. (See Xtra Structure section).	Y

2.2.1.5. LocationWifi Structure

Specifies the information related to the request for Location Service through WiFi provider

Name	Type	Description	Required (Y/N)
Wifi	tns:Wifi	A list of wifi Structure. (See Wifi Structure section).	Y

2.2.1.6. LocationComboWifi Structure

Specifies the information related to the request for Location Service through Wifi or LXG.

Name	Type	Description	Required (Y/N)
classId	xsd:string	Class ID related to the application.	Y
comboWifi	tns:ComboWifi	A list of ComboWifi Structure. (See ComboWifi Structure section).	Y

2.2.1.7. LocationAddressWifi Structure

Specifies the information related to the request for Location Service through WiFi provider and Address information.

Name	Type	Description	Required (Y/N)
Wifi	tns:Wifi	A list of wifi Structure. (See Wifi Structure section).	Y

2.2.1.8. LocationComboXs Structure

Specifies the information related to the request for Location Service through Xs or LXG.

Name	Type	Description	Required (Y/N)
xs	tns:XsRequestType	A list of Xs Structure. (See XsRequestType Structure section).	Y

LocationParams Structure

Specifies the information related to the LocationParams.

Name	Type	Description	Required (Y/N)
Age	xsd:string	Cache Memory	Y
coorType	tns:CoorTypeEnum	Coordinate type output (DECIMAL)	Y
locationMethod	xsd:string	This attribute represents the location method. (LEAST_EXPENSIVE | MOST_ACCURATE | CELL | A-GPS | OTHER | CGI | GSM | GEO-IP | WIFI).	Y
synType	tns:SyncTypeEnum	This attribute represents type of synchronization. The value is SYN.	Y

LocationXtremeResponse Structure

Specifies the information related to the LocationXtremeResponse.

Name	Type	Description	Required (Y/N)
coordinateGeo	tns:CoordinateGeo	This attribute references to the CoordinateGeo Structure section.	Y
Direction	xsd:string	Specifies the direction of movement (in degrees) of a positioned phone. This element is present if direction is provided in the carrier response. Currently this information is not provided by the carrier.	Y
Geometry	tns:Geometry	This attribute references to the Geometry Structure section.	Y
locationTime	tns:LocationTime	This attribute references to the LocationTime Structure section.	Y
msisdn	xsd:string	Phone number in MSISDN format.	Y
speed	xsd:string	The speed of the phone in m/s. This element is present if speed is provided in the carrier	Y

		response. Currently this information is not provided by the carrier.	
locationMethod	xsd:string	This attribute represents the location method. (LEAST_EXPENSIVE | MOST_ACCURATE | CELL | A-GPS | OTHER).	Y
response	tns:Response	This attribute references to the Response Structure section.	Y

LocationXpressResponse Structure

Specifies the information related to the LocationXpressResponse.

Name	Type	Description	Required (Y/N)
coordinateGeo	tns:CoordinateGeo	This attribute references to the CoordinateGeo Structure section.	Y
locationMethod	xsd:string	This attribute represents the location method. (GSM).	Y
xpressResponse	tns:ICIDResponse	This attribute references to the ICIDResponse Structure section.	Y
response	tns:Response	This attribute references to the Response Structure section.	Y

LocationXtraResponse Structure

Specifies the information related to the LocationXtraResponse.

Name	Type	Description	Required (Y/N)
locationMethod	xsd:string	This attribute represents the location method. (GEO-IP).	Y
ipInfo	tns:IpInfo	This attribute references to the IpInfo Structure section.	Y
response	tns:Response	This attribute references to the Response Structure section.	Y

LocationWifiResponse Structure

Specifies the information related to the LocationWifiResponse.

Name	Type	Description	Required (Y/N)
locationMethod	xsd:string	This attribute represents the location method. (WIFI).	Y
wifiResponse	tns:WifiResponse	This attribute references to the WifiResponse Structure section.	Y
Response	tns:Response	This attribute references to the Response Structure section.	Y

LocationXsResponse Structure

Specifies the information related to the LocationWifiResponse.

Name	Type	Description	Required

			(Y/N)
classId	xsd:string	Class ID related to the application.	Y
Msisdn	xsd:string	Phone number in MSISDN format.	Y
locationMethod	xsd:string	This attribute represents the location method. (SMART).	Y
xsResponse	tns:XsResponse	This attribute references to the XsResponse Structure section.	Y
Response	tns:Response	This attribute references to the Response Structure section.	Y

LocationAddressWifiResponse Structure

Specifies the information related to the LocationAddressWifiResponse.

Name	Type	Description	Required (Y/N)
locationWifiResponse	xsd:LocationWifiResponse	This attribute references to the LocationWifiResponse structure section.	Y
AddressResponse	tns:AddressResponse	This attribute references to the AddressResponse Structure section.	Y
Response	tns:Response	This attribute references to the Response Structure section.	Y

CoordinateGeo Structure

This structure returns the geographical coordinate of the device and the format in which the coordinates are presented.

Name	Type	Description	Required (Y/N)
coorType	tns:CoorTypeEnum	Coordinate type output (DECIMAL)	Y
X	xsd:string	Longitude. The first ordinate in a coordinate system Example: <X>80 14 24 W</X>	Y
Y	xsd:string	Latitude. Second ordinate in a coordinate system. Example: <Y>25 43 40 N</Y>	Y
Z	xsd:string	Altitud. The third ordinate in a coordinate system. Example: <Z> 52 </Z>	Y

Geometry Structure

This structure sets the description of the shape used to represent a geographic area which indicates where a mobile subscriber is located.

Name	Type	Description	Required (Y/N)
inRadius	xsd:doublé	The inner radius is the geodesic distance (in meters) between the center of the circle (that the arc is a part of) and the arc closest to the center. If the inner radius is 0 (zero) the area described represents a sector of a circle.	Y

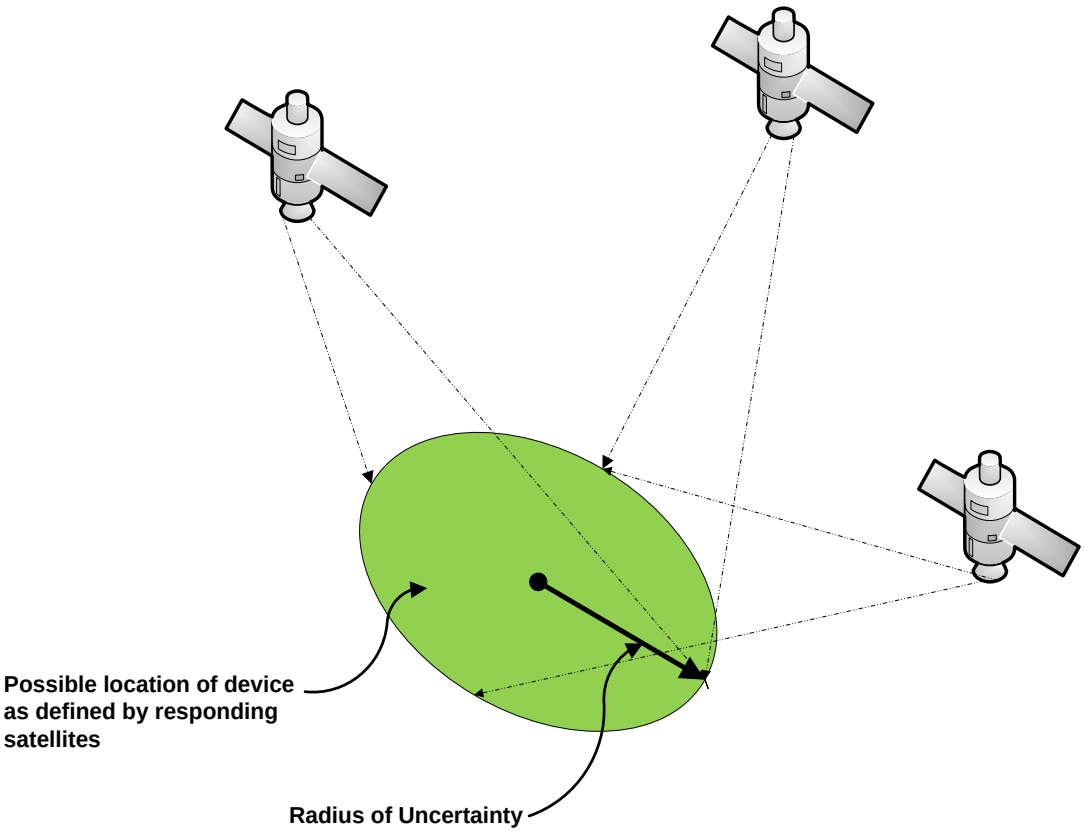
		Possible Values: Must be equal or greater than 0 (zero).	
outRadius	xsd:doublé	The radius of a circle furthest away from the position in a CircularArcArea (in meters). **Possible Values:** Must be equal or greater than 0 (zero).	Y
Radius	xsd:doublé	The radius is the area of the uncertainty of the location fix. This value is provided by the carrier and is an indication of the quality of the fix. Please see note to developer below.**Possible Values:** Must be equal or greater than 0 (zero).	Y
startAngle	xsd:doublé	The start angle is the angle (in degrees) between North and the first defined radius. **Defined Values:** 0-359 <startAngle>60</startAngle>	Y
stopAngle	xsd:doublé	The stop angle is the angle (in angularUnit) between the first and second defined radius. **Defined values:** 1-360	Y
Type	xsd:string	The name of the shape to be used. **Defined Values:** CircularArcArea | CircularArea | Point This parameter is not case sensitive. Depending on the chosen values some parameters in the Geometry Structure will be mandatory and some optional. Check the shape definition below for mandatory fields for each shape (*).	Y

Note to Developers:
1.) For a GetLocationsDB request a zero is typically returned for the inRadius, outRadius, startAngle, and stopAngle. The Type is generally "CircularArea".

2.) The Radius of uncertainty is provided in the carrier response to the location request. It is a standard metric that represents the size of the area that will provide a high probability of the phone's actual location. Qualitatively speaking, a small radius indicates a lower degree of uncertainty about the actual location of the phone. Larger accuracy values indicate larger error sources and thus lower 'resolution' of the phone's location. In no case is the phone guaranteed to be within the radius provided.

For AGPS, the value is derived from an algorithm that takes into account the position of the satellites being used, the number of satellites used to obtain the fix, signal path, and other factors. The figure below illustrated the concept of radius of un for an AGPS fix.

Figure 1: AGPS Radius of Uncertainty.



For a Cell-ID request the radius returned by the carrier is generally a fixed value managed by the carrier and is an indication of the area served by the cell sector associated to the mobile. The following diagrams help illustrate the concept of the radius of uncertainty for CellId.

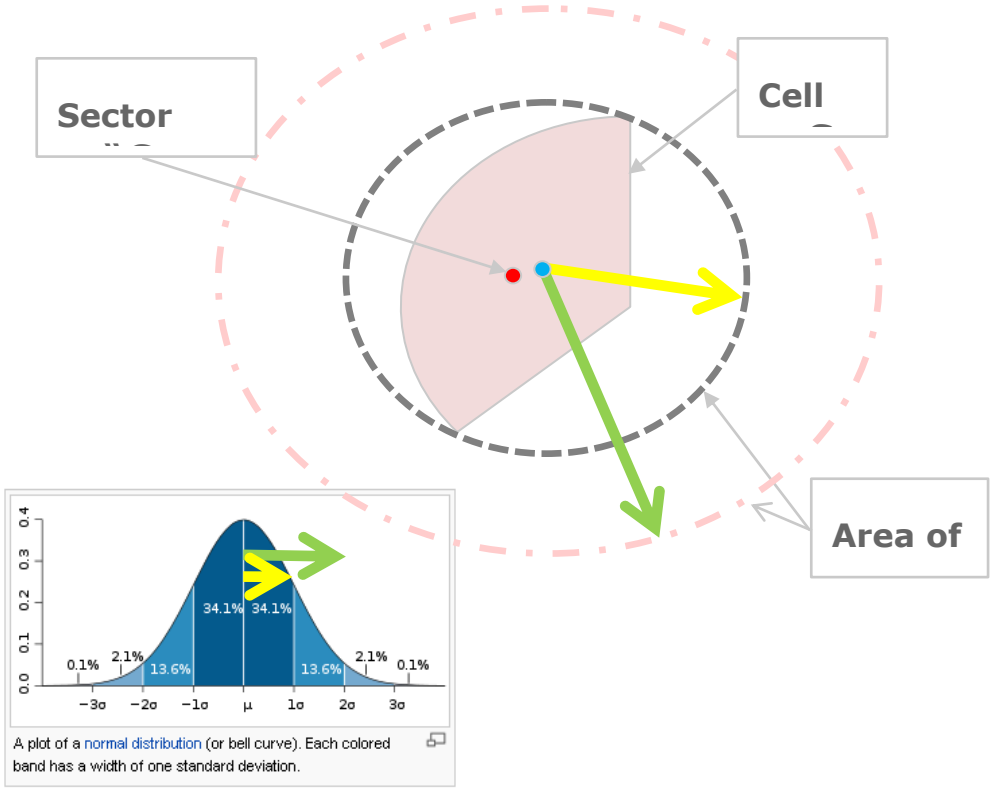


Figure 2: Cell sector coverage zone (area of the phone's probable location) and the radius of uncertainty

Shape Definition

2.2.1.9. Shape: Point

When this shape is selected, a point will be drawn in the map indicating the geographic coordinate.

Name	Type	Value	Example
inRadius	xsd:double	Zero (0)	<inRadius>0</inRadius>
outRadius	xsd:double	Zero (0)	<outRadius>0</outRadius>
Radius	xsd:double	Zero (0)	<radius>0</radius>
startAngle	xsd:double	Zero (0)	<startAngle>0</outRadius>
stopAngle	xsd:double	Zero (0)	<stopAngle>0</stopAngle>
Type	xsd:string	Point	<type>Point</type>

2.2.1.10. Shape: CircularArea

When this shape is selected, a circular area will be displayed on the map indicating where a mobile subscriber is located. Note: for a GetLocationsDB query, the shape that will be returned is 'CircularArea'

A circular area is the set of points on the ellipsoid, which are at a distance from the point of origin less than or equal to the radius. If the radius is zero (0), the shape will be a point.

Name	Type	Value	Example
inRadius	xsd:double	Zero (0)	<inRadius>0</inRadius>
outRadius	xsd:double	Zero (0)	<outRadius>0</outRadius>
Radius	xsd:doublé	Equal or greater than Zero (0)	<radius>50</radius>
startAngle	xsd:double	Zero (0)	<startAngle>0</outRadius>
stopAngle	xsd:double	Zero (0)	<stopAngle>0</stopAngle>
Type	xsd:string	CircularArea	<type>CircularArea</type>

2.2.1.11. Shape: CircularArcArea (future)

When this shape is selected, a circular arc area will be displayed in the map indicating where a mobile subscriber is located.

An arc is defined by a point of origin with one offset angle and one uncertainty angle plus one inner radius and one uncertainty radius.

Name	Type	Value	Example
inRadius	xs:double	Equal or greater than Zero (0)	<inRadius>0.0</inRadius>
outRadius	xs:double	Equal or greater than Zero (0)	<outRadius>0.246</outRadius>
Radius	xs:double	Zero (0)	<radius>0</radius>
startAngle	xs:double	0-359	<startAngle>103.0</startAngle>
stopAngle	xs:double	1-360	<stopAngle>246.0</stopAngle>
Type	xs:string	CircularArcArea	<type>CircularArcArea</type>

LocationTime Structure

This structure provides information about the time when the positioning was performed and about the UTC.

Name	Type	Description	Required (Y/N)
time	xsd:string	In a location answer this element indicates the time when the positioning was performed. The time is expressed as yyyyMMddhhmmss where: String: Description Yyyy: Year MM: Month Dd: Day Hh: Hours Mm: Minutes Ss: Seconds	Y
utc	xsd:string	Specifies the UTC offset in hours and minutes. Positive values indicate time zones east of Greenwich	Y

ICID Structure

Specifies the information related to the ICID (International Cell-ID Database) provider.

Name	Type	Description	Required (Y/N)
mcc	xsd:string	Mobile country code. Used to identify the country. **Valid values:** 0-999	Y
mnc	xsd:string	Mobile network code. Used to identify the cell operator. **Valid values:** 0-999	Y
lac	xsd:string	Location Area Code. Identifies a location area within a GSM PLMN network. **Valid values:** 0-65535	Y
cellid	xsd:string	Cell Identity. Identifies a cell within a location area. **Valid values:** 0-65535	Y
ta	xsd:string	Timing Advance. The length of time a signal takes to reach the base station from a mobile phone. **Valid values:** 0-63	N

ICIDResponse Structure

Specifies the information related to the response to a CGI query.

Name	Type	Description	Required (Y/N)
id	xsd:string	Data provider or other identifier for the source of the lat/lon data	Optional
mcc	xsd:string	Mobile country code. Used to identify the country.	Y
mnc	xsd:string	Mobile network code. Used to identify the cell operator.	Y
lac	xsd:string	Location Area Code. Identifies a location area within a GSM PLMN network.	Y
cellid	xsd:string	Cell Identity. Identifies a cell within a location area.	Y
ta	xsd:string	Timing Advance. The length of time a signal	N

		takes to reach the base station from a mobile phone.	
lastUpdate	xsd:string	Last time the local copy of this cell id was updated	N
invalid	xsd:string	True means an incorrect record was received from the provider	N
uncertainty	xsd:string	Is a radius of uncertainty expressed in meters.	N

XpressICIDResponse Structure

Specifies the information related to the XpressICIDResponse.

Name	Type	Description	Required (Y/N)
icidResponse	tns:ICIDResponse	This attribute references to the ICIDResponse Structure section.	Y
coordinateGeo	tns:CoordinateGeo	This attribute references to the CoordinateGeo Structure section.	Y
response	tns:Response	This attribute references to the Response Structure section.	Y

Combo Structure

Specifies the information related to a request that combines real-time location (sourced from cellular network-initiated location technology) and CGI responses.

Name	Type	Description	Required (Y/N)
msisdn	xsd:string	Phone number in MSISDN format.	Y
xpress	tns:ICID	This attribute references to the ICID Structure section.	Y

Xtra Structure

Specifies the information related to the geo-IP provider.

Name	Type	Description	Required (Y/N)
profile	xsd:string	Profile of the request, it should be related with the user. Define the information that is returned in the answer. (FULL: info + network + location)	Y
Ip	xsd:string	IP address. The request can have many occurrences.	Y

WifiParams Structure

Specifies the information related to the WiFi provider.

Name	Type	Description	Required (Y/N)
mac	xsd:string	The unique identifier, Hex byte values.	Y
rssi	xsd:string	Received signal strength indicator. **Valid values:** -113 to 0	N

speed	xsd:string	Current connection speed. **Valid values:** 0 – 1000	N
type	xsd:string	The type of WiFi point. **Valid values:** A, B, G, N	N

WifiNeighResponse Structure

The WifiNeighResponse parameter is very similar to the WifiParams parameter, except that it can accept multiple repetitions of this structure (representing multiple observed SSIDs). This structure is optional.

Name	Type	Description	Required (Y/N)
mac	xsd:string	The unique identifier, Hex byte values.	Y
rssi	xsd:string	Received signal strength indicator. **Valid values:** -113 to 0	N
speed	xsd:string	Current connection speed. **Valid values:** 0 – 1000	N
type	xsd:string	The type of WiFi point. **Valid values:** A, B, G, N	N
response	tns:Response	This attribute references to the Response Structure section.	N

Wifi Structure

Specifies the information related to the WiFi provider.

Name	Type	Description	Required (Y/N)
servCell	tns:WifiParams	This attribute references to the WifiParams Structure section.	Y
neighCell	tns:WifiParams	This attribute references to the WifiParams Structure section.	N

WifiResponse Structure

Specifies the information related to the Wifi provider.

Name	Type	Description	Required (Y/N)
servCell	tns:WifiNeighResponse	This attribute references to the WifiNeighResponse Structure section.	Y
neighCell	tns:WifiNeighResponse	This attribute references to the WifiNeighResponse Structure section.	N
uncertainty	xsd:string	Is a radius of uncertainty expressed in meters.	Y
coordinateGeo	tns:CoordinateGeo	This attribute references to the CoordinateGeo Structure section.	Y

XsResponse Structure

Specifies the information related to the Xs provider.

Name	Type	Description	Required (Y/N)
Lat	xsd:string	Latitude value. (degrees)	Y
lon	xsd:string	Longitude value. (degrees)	Y
hAccuracy	xsd:string	Horizontal accuracy. (meters)	Y
vAccuracy	xsd:string	Vertical accuracy. (meters)	Y
cached	xsd:string	Cache status, this is a cached response.	Y
sourceTs	xsd:string	Source timestamp in format yyyy-mm-ddTHH:MM:SS.SSSZ (in UTC).	Y
speed	xsd:string	Current speed value. (meters/second)	Y
bearing	xsd:string	Current bearing value. (degrees)	Y
phoneDelay	xsd:string	Difference between request time of location query and response from external call. (milliseconds)	Y

AddressResponseType Structure

Specifies the address information related to the location.

Name	Type	Description	Required (Y/N)
address	tns:AddressType	This attribute references to the AddressType structure	N
response	tns:Response	This attribute references to the Response Structure section.	N

AddressType Structure

Specifies the address information.

Name	Type	Description	Required (Y/N)
City	xsd:string	City name of the address that belongs to the coordinates.	N
Country	xsd:string	Country name of the address that belongs to the coordinates.	N
County	xsd:string	County name of the address that belongs to the coordinates.	N
stateName	xsd:string	State name of the address that belongs to the coordinates.	N
streetName	xsd:string	Street name of the address that belongs to the coordinates.	N
streetNumber	xsd:string	Street number of the address that belongs to the coordinates.	N
ZipCode	xsd:string	Zip code of the address that belongs to the coordinates.	N

ComboWifi Structure

Specifies the information related to a request that combines real-time location (sourced from cellular network-initiated location technology) and Wifi responses.

Name	Type	Description	Required

			(Y/N)
wifi	tns:Wifi	This attribute references to the Wifi Structure section.	Y
msisdn	xsd:string	Phone number in MSISDN format.	Y

XsRequestType Structure

Specifies the information related to a request that combines real-time location (sourced from cellular network-initiated location technology) and the Xs provider.

Name	Type	Description	Required (Y/N)
classId	xsd:string	Class ID related to the application.	Y
msisdn	xsd:string	Phone number in MSISDN format.	Y

IpInfo Structure

It is the geo-IP top-level node that encompasses the response.

Name	Type	Description	Required (Y/N)
info	tns:InfoType	This attribute references to the ÏnfoType Structure section.	Y
network	tns:NetworkType	This attribute references to the NetworkType Structure section.	N
location	tns:LocationType	This attribute references to the LocationType Structure section.	N

InfoType Structure

It is the top-level node that encompasses the response.

Name	Type	Description	Required (Y/N)
ip_Address	xsd:string	The referenced IP address	Y
ipType	xsd:string	The type of IP address, mapped or reserved	Y
anonymizerStatus	xsd:string	Indicates whether the IP address is associated with a known anonymous proxy, and that proxy's status: private, active, suspect, inactive, unknown.	N
gds-error	tns:Error	This attribute references to the gds-error Structure section.	N

Gds-error Structure

This element contains information about the failure geoIP Database Source.

Name	Type	Description	Required (Y/N)
http_status	xsd:string	Http error code	N
message	xsd:string	Diagnostic message of the error	N

NetworkType Structure

This node contains network details about the IP address.

Name	Type	Description	Required (Y/N)
organization	xsd:string	It is the entity responsible for the actions and content associated with a given block of IP addresses.	N
carrier	xsd:string	Provides the name of the organization that owns the ASN.	N
asn	xsd:int	The Autonomous System Number (ASN) is a globally unique number assigned to a group of networks administered by a single entity	N
connectionType	xsd:string	Different ways that users can connect to the internet.	N
lineSpeed	xsd:string	Indicates the speed of the connection to the Internet, divided into: high, medium, or low.	N
ipRoutingType	xsd:string	specifies how the connection is routed through the Internet and can be used to determine how close the user is to the public IP address	N
domain	tns:DomainType	This attribute references to the DomainType Structure section.	N

OrgDataType Structure

This node contains details about the Internet Service Provider (ISP) of the IP connection.

Name	Type	Description	Required (Y/N)
home	xsd:string	Indicates whether the connection is made from a residence.	N
organizationType	xsd:string	Organization is the entity responsible for the actions and content associated with a given block of IP addresses	N
naicsCode	xsd:string	North American Industry Classification System	N
isicCode	xsd:string	International Standard Industrial Classification	N

DomainType Structure

Specifies the information related to DomainType.

Name	Type	Description	Required (Y/N)
tld	xsd:string	Identifies the most general part of the domain name in a Web address.	N
sld	xsd:string	The SLD is the part of the domain name that precedes the top-level domain.	N

LocationType Structure

This node contains geographic details about the IP address.

Name	Type	Description	Required (Y/N)
continent	xsd:string	The continent in which the IP address is located.	N
coordinateGeo	tns:CoordinateGeo	This attribute references to the CoordinateGeo Structure section.	N
countryData	tns:CountryDataType	This attribute references to the CountryDataType Structure section.	N
region	xsd:string	Specifies generic or regional geographical designation that covers a larger area than state for some countries, and specific information for a few other countries.	N
stateData	tns:StateDataType	This attribute references to the StateDataType Structure section.	N
dma	xsd:int	Defined Market Areas (DMAs) are codes assigned to geographical regions where the population typically receives similar media.	N
msa	xsd:int	Metropolitan Statistical Areas (MSAs) are geographical boundaries of US counties or towns using the Core-Based Statistical Areas (CBSAs).	N
cityData	tns:CityDataType	This attribute references to the CityDataType Structure section.	N

CountryDataType Structure

Specifies the information related to CountryDataType of the IP location response.

Name	Type	Description	Required (Y/N)
country	xsd:string	The full country name.	N
countryCode	xsd:string	The two-letter code indicating the name of the country.	N
countryCf	xsd:int	The country confidence factor reflects a relative measure of certainty that the user is in the location identified in the country field. **Valid values:** 0(null) - 99. The higher the value, the greater the likelihood that the user is in the assigned state.	N

StateDataType Structure

Specifies the information related to StateDataType of the IP location response.

Name	Type	Description	Required (Y/N)
state	xsd:string	The full state name.	N

stateCode	xsd:string	The two-letter code indicating the name of the state.	N
stateCf	xsd:int	The state confidence factor reflects a relative measure of certainty that the user is in the location identified in the state field. **Valid values:** 0(null) - 99. The higher the value, the greater the likelihood that the user is in the assigned state.	N

CityDataType Structure

Specifies the information related to CityDataType of the IP location response.

Name	Type	Description	Required (Y/N)
City	xsd:string	The full city name.	N
postalCode	xsd:string	The two-letter code indicating the name of the state.	N
timeZone	xsd:int	Time zone is provided as a +/- offset from Greenwich Mean Time (GMT), represented as a floating point number, so that you can calculate what time it is in the location provided. **Valid values:** between -11 and 13. If city is unassigned and the country spans multiple time zones, a value of '999' is returned.	N
areaCode	xsd:string	A phone number prefix assigned to the corresponding city.	N
cityCf	xsd:int	The city confidence factor reflects a relative measure of certainty that the user is in the location identified in the city field. **Valid values:** 0(null) - 99. The higher the value, the greater the likelihood that the user is in the assigned state.	N
postalCodeCf	xsd:int	The postal code confidence factor reflects a relative measure of certainty that the user is in the location identified in the postal_code field. **Valid values:** 0(null) - 99. The higher the value, the greater the likelihood that the user is in the assigned state.	N

2.3. Common

Credentials Structure

Specifies the ASL access credential to authorize the request.

Name	Type	Description	Required (Y/N)
Login	xsd:string	Identifier of the User from ASL platform	Y
Password	xsd:string	Password to access to the ASL platform. User	Y

		account	

LocationAppPhones Structure

Specifies the information related to the phone numbers and authorized applications for a network-based location request.

Name	Type	Description	Required (Y/N)
classId	xsd:string	Class ID related to the application.	Y
Msisdn	xsd:string	Phone number in MSISDN format.	Y

PhoneStatus Structure

Specifies the information related to the PhoneStatus.

Name	Type	Description	Required (Y/N)
Msisdn	xsd:string	Phone number in MSISDN format.	Y
Response	tns:Response	This attribute references to the Response Structure section.	Y

RegistrationAppPhones Structure

Specifies the information related to the phones whose subscriptions are being modified by the request.

Name	Type	Description	Required (Y/N)
classId	xsd:string	Class ID related to the application.	Y
Msisdn	xsd:string	Phone number in MSISDN format.	Y
Command	xsd:string	Command for subscriber or unsubscribe a phone number. Commands supported: OPTIN, YES/Y, NO/N, CANCEL)	Y

TransactionResponse Structure

This structure specifies the information about the status and the identifier of request.

Name	Type	Description	Required (Y/N)
requestId	xsd:long	Identifier of request.	N
Response	tns:Response	This attribute references to the Response Structure section.	Y

Response Structure

Specifies the information related to the response.

Name	Type	Description	Required (Y/N)
Status	tns:StatusTypeEnum	Status code of the request: OK, ERROR, NOT_FOUND, FOUND, IN_PROGRESS.	Y
Error	tns:Error	This attribute references to the Error Structure	N

		section.	

Error Structure

Specifies the information related to the error.

Name	Type	Description	Required (Y/N)
errorId	xsd:int	General error code.	Y
errorDesc	xsd:string	General Message error.	Y

Chapter 3: ASL Function Specific APIs

3.1. Device Registration API

The Device Registration API is a Web Service that supports and manages phone number registration into the LOC-AID Xchange Gateway (LXG). Use this API to **provision and cancel** location permission settings for a phone number.

3.2. Location API

This API offers access to location from multiple sources:

- Mobile (cellular) networks enabled with location technology
- International Cell-ID database

ASL offers developers several options for selecting how location is retrieved:

- **A-GPS**

  Assisted GPS based positioning method is used to determine location. The phone takes readings from both GPS satellites and nearby cellular base stations (towers), and with the help of a location server on the network determines location. A-GPS readings are typically more accurate than Cell based readings, but can take more time.

- **CELL**

  Cell coverage based positioning method. The phone takes readings from nearby cellular base stations (towers), and with the help of a location server on the network determines location. Cell readings are typically faster than A-GPS readings, but can be less accurate.

- **GeoIP**

  IP (Internet Protocol) based positioning method. The host device (phone, tablet or computer) is connected to a network and assigned an IP address, which can be associated to a location (as well as connection type and other data).

- **OTHER**

  Some networks offer extremely coarse location as a final fallback to A-GPS and CELL. These results, while typically low-latency (comparable to CELL fixes), can have very high radii of uncertainty and are only used when other methods fail to yield results.

- **GSM**

Global System for Mobile Communications is the most popular standard for mobile phones in the world. GSM is a cellular network, which means that mobile phones connect to it by searching cells in the immediate vicinity.

- **GCID**

  Delivers the stored location of the cellular base station corresponding to the input parameters (MCC, MNC, LAC, cell).

  Here are typical location retrieval times for Cell, A-GPS CGI readings.

Location method	Response time
CELL TOWER BASED (CELL, OTHER)	3 – 9 secs
A-GPS	15 – 40 secs
GCID, CGI, GSM	1-2 sec
GEO-IP	1-2 sec
WIFI	1-2 sec

In addition to the A-GPS and CELL options, LOC-AID offers two additional retrieval options for network-based location:

- **WiFi**

  Location correlated to a basic service set identification (BSSID) which is defined as the MAC address of the wireless access point that is providing network access using the IEEE 802.11 family of standards.

- **MOST_ACCURATE**

  The fulfillment of the accuracy requirement takes precedence over the fulfillment of the cost requirement when choosing this location method. When you perform a Most_Accurate request, the system will first attempt to get an A-GPS fix. If the A-GPS request is unsuccessful, it will immediately attempt to determine the location using Cell-Id.

- **LEAST_EXPENSIVE**

  The fulfillment of the cost requirement takes precedence over fulfillment of the accuracy requirement when choosing this location method. Performing a Least_Expensive request will currently result in a Cell-Id request. If the Cell-id request is unsuccessful, it will not attempt an A-GPS request.

These services implement operations that allow you to obtain location information for registered devices in the LOC-AID system and for base stations around the world.

Note that prior to receiving location from the ASL, the end user must OPT-IN to the location enabled service (see the OPT-IN End User document in the Document Repository section of our Developer's Zone website for more details)

- **CGI**

  The CGI (Cell Global Identification) is a number that uniquely identifies a specific cell within its location area, network, and country. The CGI is composed of the MCC, MNC, LAI, and Cell Identity (CI)

CGI			
MCC	MNC	LAC	Cell ID
3 digits	2-3 digits	Up to 5 digits	Up to 5 digits

- **SMART**

  Smart location method retrieves the location of smart-phones that have been enabled with the LOCAIDER thin-client (in the future, SDK). Although accessible via the same Locaid API as carrier-based location, this returned location is obtained by invoking the device's Android/iOS proprietary API's which use GPS, WiFi access point lookup or Cell-ID lookup.

3.3. Device User Registration API

The Device userRegistration API is a Web Service that supports and manages user registration that may make use the services of Location and Registration in ASL

3.4. Endpoints

Subscription operations (carrier-based location)

To access the Phone Registration API go to the following URL:

https://asl.loc-aid.com/ASLWS/RegistrationService?wsdl

Location operations

To access the ASL Location API go to the following URL:

https://asl.loc-aid.com/ASLWS/LocationService?wsdl

This endpoint serves operations for mobile (carrier-based), CGI/G-CID, IP and WiFi-based location

3.5. Operations

The ASL has the following operations:

- Device Registration API
  - registerPhone
  - getPhoneStatus

- Location API
  - getLocationsDB – Location Service
  - getLocationPhone – Location Service for Smart phones

registerPhone operation

The registerPhone operation allows subscribe and unsubscribe one or more phone numbers into a specific application (ClassID).

Commands: OPTIN, CANCEL, YES, NO.

Input Message

Name	Type	Description	Required (Y/N)
Credentials	ns:Credentials	User credentials for ASL platform	Y
appPhones	ns:RegistrationAppPhones	A list of phones with subscriptions command.	Y

Output Message

Name	Type	Description
RegisterPhoneResponse	RegisterPhoneResponse Structure	Check Chapter 2: RegisterPhoneResponse Structure for further information about this data type.

Sample Code: registerPhone Request

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:reg="http://webservice.asl.locaid.net/RegistrationService"
xmlns:web="http://webservice.common.asl.locaid.net/">
  <soapenv:Header/>
  <soapenv:Body>
    <reg:RegisterPhoneRequest>
      <reg:credentials>
        <web:login>test@loc-aid.com</web:login>
        <web:password>password</web:password>
      </reg:credentials>
      <reg:appPhones>
        <web:classId>A2454</web:classId>
        <web:command>OPTIN</web:command>
       <web:msisdn>16478882020</web:msisdn>
      </reg:appPhones>
    </reg:RegisterPhoneRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

Sample Code: registerPhone Response

```
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Body>
    <ns2:RegisterPhoneResponse xmlns="http://webservice.common.asl.locaid.net/"
xmlns:ns2="http://webservice.asl.locaid.net/RegistrationService">
      <ns2:transactionResponse>
        <requestId>7155</requestId>
        <response>
          <status>OK</status>
        </response>
      </ns2:transactionResponse>
      <ns2:classId>A2454</ns2:classId>
      <ns2:phoneStatus>
        <msisdn>16478882020</msisdn>
        <response>
          <status>OK</status>
        </response>
      </ns2:phoneStatus>
    </ns2:RegisterPhoneResponse>
  </S:Body>
```

```
</S:Envelope>
```

getPhoneStatus operation

The getPhoneStatus operation allows identify the current status of the subscriptions for one or more devices.

Input Message

Name	Type	Description	Required (Y/N)
credentials	ns:Credentials	User credentials for ASL platform	Y
Msisdn	xs:string+	A list of phone numbers in MSISDN format (limit 100 MSISDN per request).	Y

Output Message

Name	Type	Description
GetPhoneStatus Response	GetPhoneStatusResponse Structure	Check Chapter 2: GetPhoneStatusResponse Structure for further information about this data type.

Sample Code: getPhoneStatus Request

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:reg="http://webservice.asl.locaid.net/RegistrationService"
xmlns:web="http://webservice.common.asl.locaid.net/">
  <soapenv:Header/>
  <soapenv:Body>
    <reg:GetPhoneStatusRequest>
      <reg:credentials>
        <web:login>test@loc-aid.com</web:login>
        <web:password>password</web:password>
      </reg:credentials>
      <reg:msisdn>16478882020</reg:msisdn>
      <reg:msisdn>16478882021</reg:msisdn>
    </reg:GetPhoneStatusRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

Sample Code: getPhoneStatusResponse

```
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Body>
    <ns2:RegisterPhoneResponse xmlns="http://webservice.common.asl.locaid.net/"
xmlns:ns2="http://webservice.asl.locaid.net/RegistrationService">
      <ns2:transactionResponse>
        <requestId>34112</requestId>
        <response>
```

```
          <status>OK</status>
        </response>
      </ns2:transactionResponse>
      <ns2:msisdnPhoneStatus>
        <msisdn>16478882021</msisdn>
        <classIdPhoneStatus>
          <classId>A2454</classId>
          <subscription>OPTIN_COMPLETE</subscription>
        </classIdPhoneStatus>
      </ns2:msisdnPhoneStatus>
      <ns2:msisdnPhoneStatus>
        <msisdn>16478882020</msisdn>
        <classIdPhoneStatus>
          <classId>T32A2</classId>
          <subscription>CANCELLED</subscription>
        </classIdPhoneStatus>
        <classIdPhoneStatus>
          <classId>XY454</classId>
          <subscription>OPTIN_COMPLETE</subscription>
        </classIdPhoneStatus>
      </ns2:msisdnPhoneStatus>
    </ns2:GetPhoneStatusResponse>
  </S:Body>
</S:Envelope>
```

getLocationsDB operation

The getLocationsDB operation allows requesting the location of one or more devices. The returned elements depend on what type of synchronization you select.

SyncType = syn

Select syncType = syn when you want elements related to the device location returned directly in the response: geographical coordinates, time of the location, the number of the device the position method and the status of the device location.

- Note that there is a maximum of 100 MSISDN's that can be submitted per request

***Note to developers**: A single getLocationsDB syncType=syn operation will accept single or multiple MSISDNs in the requested. The getLocationsDB operation will return location data as available for valid phone numbers and return the appropriate errors for invalid phone numbers.*

SyncType = asyn (future)

Select syncType = asyn if you want to obtain a transaction id that can be used to retrieve location as part of the getLocationsAnswer operation. The asyn parameter produces a different response than the syn parameter. Instead of location coordinates being returned directly in the response, the operation returns a transaction id that is used to invoke the getLocationsAnswer operation. The current status of each phone's location will be updated in getLocationsAnswer; depending on the

timing some phones' location will be "in progress" while others will have completed (location data or error messasge will be returned). Successive calls to getLocationsAnswer using the same transaction ID will NOT generate refreshed location for those with completed transactions. One location is delivered per device per getLocationsDB request.

- Note that asynchronous location results are available for up to 24 hours from the LXG system.

Input Message

Name	Type	Description	Required (Y/N)
credentials	ns0:Credentials	User credentials for ASL platform	Y
locationParams	ns0:LocationParams	Information related with the location.	Y
locationInfo	ns0:LocationInfo	Information needed to identify the object to be located.	Y

Output Message

Name	Type	Description
Return	LocationDBResponse Structure	Geographical Coordinates and elements related to the location. (Check Chapter 2: LocationDBResponse Structure for further information about this data type.)

Sample Code: getLocationsDB Request (syncType = syn)

Combo: both network-based and GCID data provided:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:loc="http://webservice.asl.locaid.net/LocationService"
xmlns:web="http://webservice.common.asl.locaid.net/">
  <soapenv:Header/>
  <soapenv:Body>
    <loc:LocationDBRequest>
      <loc:credentials>
        <web:login>test@loc-aid.net</web:login>
        <web:password>password</web:password>
      </loc:credentials>
      <loc:locationParams>
        <web:age>Y</web:age>
        <web:coorType>DECIMAL</web:coorType>
        <web:locationMethod>LEAST_EXPENSIVE</web:locationMethod>
        <web:synType>SYN</web:synType>
      </loc:locationParams>
     <loc:locationInfo xsi:type="web:LocationCombo"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
        <web:classId>J71QL</web:classId>
        <web:combo>
          <web:msisdn>12022716695</web:msisdn>
          <web:xpress>
            <web:mcc>310</web:mcc>
```

```
            <web:mnc>410</web:mnc>
            <web:lac>52003</web:lac>
            <web:cellid>1193</web:cellid>
             <web:ta></web:ta>
           </web:xpress>
         </web:combo>
       </loc:locationInfo>
     </loc:LocationDBRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

GSM query

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:loc="http://webservice.asl.locaid.net/LocationService"
xmlns:web="http://webservice.common.asl.locaid.net/">
  <soapenv:Header/>
  <soapenv:Body>
    <loc:LocationDBRequest>
      <loc:credentials>
        <web:login>test@loc-aid.net</web:login>
        <web:password>password</web:password>
      </loc:credentials>
      <loc:locationParams>
        <web:age>d</web:age>
        <web:coorType>DECIMAL</web:coorType>
        <web:locationMethod>LEAST_EXPENSIVE </web:locationMethod>
        <web:synType>SYN</web:synType>
      </loc:locationParams>
      <loc:locationInfo xsi:type="web:LocationXpress"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
        <web:xpress>
          <web:mcc>0310</web:mcc>
          <web:mnc>0410</web:mnc>
          <web:lac>52003</web:lac>
          <web:cellid>1193</web:cellid>
          <web:ta>1193</web:ta>
        </web:xpress>
      </loc:locationInfo>
    </loc:LocationDBRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

Network-based location only

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:loc="http://webservice.asl.locaid.net/LocationService"
xmlns:web="http://webservice.common.asl.locaid.net/">
  <soapenv:Header/>
```

```
  <soapenv:Body>
    <loc:LocationDBRequest>
      <loc:credentials>
        <web:login>test@loc-aid.net</web:login>
        <web:password>password</web:password>
      </loc:credentials>
      <loc:locationParams>
        <web:age>Y</web:age>
        <web:coorType>DECIMAL</web:coorType>
        <web:locationMethod>LEAST_EXPENSIVE </web:locationMethod>
        <web:synType>SYN</web:synType>
      </loc:locationParams>
      <loc:locationInfo xsi:type="web:LocationXtreme"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
        <web:appPhones>
          <web:classId>J71QL</web:classId>
          <web:msisdn>12022716695</web:msisdn>
        </web:appPhones>
      </loc:locationInfo>
    </loc:LocationDBRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

Geo-IP only

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:loc="http://webservice.asl.locaid.net/LocationService"
xmlns:web="http://webservice.common.asl.locaid.net/">
  <soapenv:Header/>
  <soapenv:Body>
    <loc:LocationDBRequest>
      <loc:credentials>
        <web:login>test@loc-aid.net</web:login>
        <web:password>password</web:password>
      </loc:credentials>
      <loc:locationParams>
        <!--Optional:-->
        <web:age>Y</web:age>
        <web:coorType>DMSDECIMAL</web:coorType>
        <web:locationMethod>GEO-IP</web:locationMethod>
        <web:synType>SYN</web:synType>
      </loc:locationParams>
       <loc:locationInfo xsi:type="web:LocationXtra"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
        <web:xtra>
          <web:profile>FULL</web:profile>
          <web:ip>8.8.8.8</web:ip>
        </web:xtra>
      </loc:locationInfo>
    </loc:LocationDBRequest>
```

```
  </soapenv:Body>
</soapenv:Envelope>
```

WiFi only

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:loc="http://webservice.asl.locaid.net/LocationService"
xmlns:web="http://webservice.common.asl.locaid.net/">
  <soapenv:Header/>
  <soapenv:Body>
    <loc:LocationDBRequest>
      <loc:credentials>
        <web:login>test2@loc-aid.net</web:login>
        <web:password>password</web:password>
      </loc:credentials>
      <loc:locationParams>
        <!--Optional:-->
        <web:age>Y</web:age>
        <web:coorType>DECIMAL</web:coorType>
        <web:locationMethod>WiFi</web:locationMethod>
        <web:synType>SYN</web:synType>
      </loc:locationParams>
       <loc:locationInfo xsi:type="web:LocationWifi"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
        <web:wifi>
          <web:servCell>
            <web:mac>b4:14:89:15:4c:51</web:mac>
          </web:servCell>
        </web:wifi>
      </loc:locationInfo>
    </loc:LocationDBRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

ComboWifi: both network-based and Wifi data provided:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:loc="http://webservice.asl.locaid.net/LocationService"
xmlns:web="http://webservice.common.asl.locaid.net/">
  <soapenv:Header/>
  <soapenv:Body>
    <loc:LocationDBRequest>
      <loc:credentials>
        <web:login>test@loc-aid.net</web:login>
        <web:password>password</web:password>
      </loc:credentials>
      <loc:locationParams>
        <web:age>Y</web:age>
        <web:coorType>DECIMAL</web:coorType>
        <web:locationMethod>LEAST_EXPENSIVE </web:locationMethod>
        <web:synType>SYN</web:synType>
```

```
      </loc:locationParams>
      <loc:locationInfo xsi:type="web:LocationComboWifi"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
        <web:classId>J71QL</web:classId>
        <web:comboWifi>
          <web:wifi>
            <web:servCell>
              <web:mac> b4:14:89:15:4c:51</web:mac>
            </web:servCell>
          </web:wifi>
          <web:msisdn>12022716695</web:msisdn>
        </web:comboWifi>
      </loc:locationInfo>
    </loc:LocationDBRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

AddressWiFi

```
 <soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:loc="http://webservice.asl.locaid.net/LocationService"
xmlns:web="http://webservice.common.asl.locaid.net/">
  <soapenv:Header/>
  <soapenv:Body>
    <loc:LocationDBRequest>
      <loc:credentials>
        <web:login> test@loc-aid.net </web:login>
        <web:password>password</web:password>
      </loc:credentials>
      <loc:locationParams>
        <web:age>Y</web:age>
        <web:coorType>DECIMAL</web:coorType>
        <web:locationMethod>WiFi</web:locationMethod>
        <web:synType>SYN</web:synType>
      </loc:locationParams>
      <loc:locationInfo xsi:type="web:LocationAddressWifi"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
        <web:wifi>
            <web:servCell>
          <web:mac>b4:14:89:15:4c:71</web:mac>
          <web:rssi>-113</web:rssi>
          <web:speed>40</web:speed>
          <web:type>A</web:type>
            </web:servCell>
        </web:wifi>
      </loc:locationInfo>
    </loc:LocationDBRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

Sample Code: getLocationsDB Response (syncType = syn)

Combo:

```
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Body>
    <ns2:LocationDBResponse xmlns="http://webservice.common.asl.locaid.net/"
xmlns:ns2="http://webservice.asl.locaid.net/LocationService">
      <ns2:transactionResponse>
        <requestId>7156</requestId>
        <response>
          <status>OK</status>
        </response>
      </ns2:transactionResponse>
      <ns2:locationXtremeResponse>
        <msisdn>12022716695</msisdn>
        <response>
          <status>ERROR</status>
          <error>
            <errorId>38</errorId>
            <errorDesc>The subscription has been canceled for this classId</errorDesc>
          </error>
        </response>
      </ns2:locationXtremeResponse>
      <ns2:locationXpressResponse>
        <coordinateGeo>
          <coorType>DECIMAL</coorType>
          <x>-96.8328247070312</x>
          <y>33.0427703857422</y>
          <z>0.0<\z>
        </coordinateGeo>
        <locationMethod>GSM</locationMethod>
        <xpressResponse>
          <id>135</id>
          <mcc>310</mcc>
          <mnc>410</mnc>
          <lac>52003</lac>
          <cellid>1193</cellid>
          <ta/>
          <uncertainty >3500</uncertainty >
        </xpressResponse>
        <response>
          <status>FOUND</status>
        </response>
      </ns2:locationXpressResponse>
    </ns2:LocationDBResponse>
  </S:Body>
</S:Envelope>
```

GSM query

```
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Body>
    <ns2:LocationDBResponse xmlns="http://webservice.common.asl.locaid.net/"
xmlns:ns2="http://webservice.asl.locaid.net/LocationService">
      <ns2:transactionResponse>
        <requestId>7157</requestId>
        <response>
          <status>OK</status>
        </response>
      </ns2:transactionResponse>
      <ns2:locationXpressResponse>
        <coordinateGeo>
          <coorType>DECIMAL</coorType>
          <x>-96.8328247070312</x>
          <y>33.0427703857422</y>
          <z>0.0</z>
        </coordinateGeo>
        <locationMethod>GSM</locationMethod>
        <xpressResponse>
          <id>154</id>
          <mcc>0310</mcc>
          <mnc>0410</mnc>
          <lac>52003</lac>
          <cellid>1193</cellid>
          <ta>1193</ta>
          <uncertainty>3500</uncertainty >
        </xpressResponse>
        <response>
          <status>FOUND</status>
        </response>
      </ns2:locationXpressResponse>
    </ns2:LocationDBResponse>
  </S:Body>
</S:Envelope>
```

Network-based location only

```
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Body>
    <ns2:LocationDBResponse xmlns="http://webservice.common.asl.locaid.net/"
xmlns:ns2="http://webservice.asl.locaid.net/LocationService">
      <ns2:transactionResponse>
        <requestId>7160</requestId>
        <response>
          <status>OK</status>
        </response>
      </ns2:transactionResponse>
      <ns2:locationXtremeResponse>
        <coordinateGeo>
```

```
          <coorType>DECIMAL</coorType>
          <x>-81.36579888888889</x>
          <y>28.645849166666668</y>
        </coordinateGeo>
        <geometry>
          <inRadius>0.0</inRadius>
          <outRadius>0.0</outRadius>
          <radius>1000.0</radius>
          <startAngle>0.0</startAngle>
          <stopAngle>0.0</stopAngle>
          <type>CircularArea</type>
        </geometry>
        <locationTime>
          <time>20110822171437</time>
          <utc>-0000</utc>
        </locationTime>
        <msisdn>12022716695</msisdn>
        <locationMethod>CELL</locationMethod>
        <response>
          <status>FOUND</status>
        </response>
      </ns2:locationXtremeResponse>
    </ns2:LocationDBResponse>
  </S:Body>
</S:Envelope>
```


Geo-IP only


```
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Body>
    <ns2:LocationDBResponse xmlns="http://webservice.common.asl.locaid.net/"
xmlns:ns2="http://webservice.asl.locaid.net/LocationService">
      <ns2:transactionResponse>
        <requestId>1040132</requestId>
        <response>
          <status>OK</status>
        </response>
      </ns2:transactionResponse>
      <ns2:locationXtraResponse>
        <locationMethod>geo-IP</locationMethod>
        <ipInfo>
          <info>
            <ipAddress>8.8.8.8</ipAddress>
            <ipType>Mapped</ipType>
            <anonymizerStatus>private</anonymizerStatus>
            <gds_error/>
          </info>
          <network>
            <organization>google incorporated</organization>
            <organizationData>
```

```
            <home>false</home>
            <organizationType>Business Conglomerate</organizationType>
            <naicsCode/>
            <isicCode/>
          </organizationData>
          <carrier>google inc.</carrier>
          <asn>15169</asn>
          <connectionType>ocx</connectionType>
          <lineSpeed>high</lineSpeed>
          <ipRoutingType>fixed</ipRoutingType>
          <domain>
            <tld>com</tld>
            <sld>google</sld>
          </domain>
        </network>
        <location>
          <continent>north america</continent>
          <coordinateGeo>
            <coorType>DECIMAL</coorType>
            <x>-122.07541</x>
            <y>37.41916</y>
          </coordinateGeo>
          <countryData>
            <country>united states</country>
            <countryCode>us</countryCode>
            <countryCf>99</countryCf>
          </countryData>
          <region>north america</region>
          <stateData>
            <state>california</state>
            <stateCode>ca</stateCode>
            <stateCf>80</stateCf>
          </stateData>
          <dma>807</dma>
          <msa>41940</msa>
          <cityData>
            <city>mountain view</city>
            <postalCode>94043</postalCode>
            <timeZone>-8</timeZone>
            <areaCode>650</areaCode>
            <cityCf>61</cityCf>
            <postalCodeCf>0</postalCodeCf>
          </cityData>
        </location>
      </ipInfo>
      <response>
        <status>FOUND</status>
      </response>
    </ns2:locationXtraResponse>
  </ns2:LocationDBResponse>
</S:Body>
```

```
</S:Envelope>
```

WiFi only

```
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Body>
    <ns2:LocationDBResponse xmlns="http://webservice.common.asl.locaid.net/"
xmlns:ns2="http://webservice.asl.locaid.net/LocationService">
      <ns2:transactionResponse>
        <requestId>187358</requestId>
        <response>
          <status>OK</status>
        </response>
      </ns2:transactionResponse>
      <ns2:locationWifiResponse>
        <locationMethod>WiFi</locationMethod>
        <wifiResponse>
          <servCell>
            <mac>b4:14:89:15:4c:51</mac>
          </servCell>
          <uncertainty>150</uncertainty>
          <coordinateGeo>
            <coorType>DECIMAL</coorType>
            <x>-122.39595519999999</x>
            <y>37.7911072</y>
            <z>0.0</z>
          </coordinateGeo>
        </wifiResponse>
        <response>
          <status>FOUND</status>
        </response>
      </ns2:locationWifiResponse>
    </ns2:LocationDBResponse>
  </S:Body>
</S:Envelope>
```

ComboWifi: both network-based and Wifi data provided:

```
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Body>
    <ns2:LocationDBResponse xmlns="http://webservice.common.asl.locaid.net/"
xmlns:ns2="http://webservice.asl.locaid.net/LocationService">
      <ns2:transactionResponse>
        <requestId>187362</requestId>
        <response>
          <status>OK</status>
        </response>
      </ns2:transactionResponse>
      <ns2:locationWifiResponse>
        <wifiResponse>
          <servCell>
```

```
            <mac>b4:14:89:15:4c:51xx</mac>
            <response>
              <status>ERROR</status>
              <error>
                <errorId>11003</errorId>
                <errorDesc>Invalid parameter mac</errorDesc>
              </error>
            </response>
          </servCell>
        </wifiResponse>
        <response>
          <status>ERROR</status>
          <error>
            <errorId>11003</errorId>
            <errorDesc>Invalid parameter mac</errorDesc>
          </error>
        </response>
      </ns2:locationWifiResponse>
      <ns2:locationXtremeResponse>
        <coordinateGeo>
          <coorType>DECIMAL</coorType>
          <x>-81.36579888888889</x>
          <y>28.645849166666668</y>
        </coordinateGeo>
        <geometry>
          <inRadius>0.0</inRadius>
          <outRadius>0.0</outRadius>
          <radius>1000.0</radius>
          <startAngle>0.0</startAngle>
          <stopAngle>0.0</stopAngle>
          <type>CircularArea</type>
        </geometry>
        <locationTime>
          <time>20121217203248</time>
          <utc>-0000</utc>
        </locationTime>
        <msisdn>12022716695</msisdn>
        <speed/>
        <locationMethod>CELL</locationMethod>
        <response>
          <status>FOUND</status>
        </response>
      </ns2:locationXtremeResponse>
    </ns2:LocationDBResponse>
  </S:Body>
</S:Envelope>
```

AddressWiFi

```
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Body>
```

```
    <ns2:LocationDBResponse xmlns="http://webservice.common.asl.locaid.net/"
xmlns:ns2="http://webservice.asl.locaid.net/LocationService">
      <ns2:transactionResponse>
        <requestId>5395683</requestId>
        <response>
          <status>OK</status>
        </response>
      </ns2:transactionResponse>
      <ns2:locationAddressWifiResponse>
        <locationWifiResponse>
          <locationMethod>WiFi</locationMethod>
          <wifiResponse>
            <servCell>
              <mac>b4:14:89:15:4c:71</mac>
              <rssi>-113</rssi>
              <speed>40</speed>
              <type>A</type>
            </servCell>
            <uncertainty>150</uncertainty>
            <coordinateGeo>
              <coorType>DECIMAL</coorType>
              <x>23.5987999</x>
              <y>38.054939999999995</y>
              <z>0.0</z>
            </coordinateGeo>
          </wifiResponse>
          <response>
            <status>FOUND</status>
          </response>
        </locationWifiResponse>
        <addressResponse>
          <address>
            <city>Waltham</city>
            <country>United States</country>
            <county>Middlesex</county>
            <stateName>Massachusetts</stateName>
            <streetName>Hersum Way</streetName>
            <streetNumber>1-99</streetNumber>
            <zipCode>02451</zipCode>
          </address>
          <response>
            <status>FOUND</status>
          </response>
        </addressResponse>
        <response>
          <status>OK</status>
        </response>
      </ns2:locationAddressWifiResponse>
    </ns2:LocationDBResponse>
  </S:Body>
</S:Envelope>
```

getLocationPhone operation

The getLocationPhone operation allows requesting the location of one or more devices. The returned elements depend on what type of synchronization you select.

SyncType = syn

Select syncType = syn when you want elements related to the device location returned directly in the response: geographical coordinates, time of the location, the number of the device the position method and the status of the device location.

- Note that there is a maximum of 100 MSISDN's that can be submitted per request

***Note to developers**: A single getLocationsPhone syncType=syn operation will accept single or multiple MSISDNs in the requested. The getLocationsPhone operation will return location data as available for valid phone numbers and return the appropriate errors for invalid phone numbers.*

Input Message

Name	Type	Description	Required (Y/N)
credentials	ns0:Credentials	User credentials for ASL platform	Y
locationParams	ns0:LocationParams	Information related with the location.	Y
locationInfo	ns0:LocationInfo	Information needed to identify the object to be located.	Y

Output Message

Name	Type	Description
Return	LocationPhoneResponse Structure	Geographical Coordinates and elements related to the location. (Check Chapter 2: LocationPhoneResponse Structure for further information about this data type.)

Sample Code: getLocationsPhone Request (syncType = syn)

Combo: both network-based and Xs data provided:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:loc="http://webservice.asl.locaid.net/LocationService"
xmlns:web="http://webservice.common.asl.locaid.net/">
  <soapenv:Header/>
  <soapenv:Body>
    <loc:LocationPhoneRequest>
      <loc:credentials>
        <web:login>test2@loc-aid.net</web:login>
        <web:password>password</web:password>
      </loc:credentials>
      <loc:locationParams>
        <!--Optional:-->
        <web:age>Y</web:age>
        <web:coorType>DECIMAL</web:coorType>
```

```
        <web:locationMethod>LEAST_EXPENSIVE</web:locationMethod>
        <web:synType>SYN</web:synType>
      </loc:locationParams>
      <loc:locationInfo xsi:type="web:LocationComboXs"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
        <web:xs>
          <web:classId>27S42</web:classId>
          <web:msisdn>1994336448</web:msisdn>
        </web:xs>
      </loc:locationInfo>
      <!--Optional:-->
      <loc:trackingID>12345</loc:trackingID>
    </loc:LocationPhoneRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

Sample Code: getLocationsPhone Response (syncType = syn)

Combo:

```
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Body>
    <ns2:LocationPhoneResponse xmlns="http://webservice.common.asl.locaid.net/"
xmlns:ns2="http://webservice.asl.locaid.net/LocationService">
      <ns2:transactionResponse>
        <requestId>545875</requestId>
        <response>
          <status>OK</status>
        </response>
      </ns2:transactionResponse>
      <ns2:locationXsResponse>
        <classId>27S42</classId>
        <msisdn>1994336448</msisdn>
        <locationMethod>SMART</locationMethod>
        <xsResponse>
          <lat>37.78815954927149</lat>
          <lon>-122.3938936461903</lon>
          <hAccuracy>30.0</hAccuracy>
          <vAccuracy>32.0</vAccuracy>
          <cached>true</cached>
          <sourceTs>2013-04-16T15:31.22.593</sourceTs>
          <speed>1.0</speed>
          <bearing>1.0</bearing>
          <phoneDelay>620</phoneDelay>
        </xsResponse>
        <response>
          <status>FOUND</status>
        </response>
      </ns2:locationXsResponse>
      <ns2:trackingID>12345</ns2:trackingID>
    </ns2:LocationPhoneResponse>
```

```
  </S:Body>
</S:Envelope>
```

3.6. Fault Codes

Below are the faults and error codes returned via the API response.

Common errors:

Error id	Error description
1	Unavailable Service
2	Input parameter login must not be empty
3	Input parameter password must not be empty
4	Invalid user credentials or user is inactive
13	Xml request is not valid
14	The Service is not allowed for this user
15	The params list for the request must not have more than {0} items
60	The provider is not available for the user

Errors by Request type

3.6.1. Mobile carrier-based location error responses

The following section refers to requests for Location Service using ClassId and mobile phone number; these are executed via the carrier gateway "LXG" and error codes will be returned according to that (see LXG API documents).

Name	Type	Description	Required (Y/N)
appPhones	tns:LocationAppPhones	This attribute references to the LocationAppPhones Structure section.	Y

Request-specific errors returned to queries containing the structure `appPhones` include the following:

Error id	Error description
17	Xtreme Communication Error: cannot connect to ws.loc-aid.net

3.6.2. CGI-based location error responses

The following section refers to requests for Location Service using CGI parameters (MCC, MNC, LAC, cell-ID); there are two types of requests:

1. Location via CGI only: these contain structure `xpress`
2. Location via CGI with fallback to carrier-based location (request also includes ClassID and phone number): these contain structure `combo`

Name	Type	Description	Required (Y/N)
Xpress	tns:ICID	A list of ICID Structure. (See ICID Structure section.	Y

Name	Type	Description	Required (Y/N)
classId	xsd:string	Class ID related to the application.	Y

Combo	tns:Combo	A list of Combo Structure. (See Combo Structure section).	Y

Request-specific errors returned to queries containing the structure `xpress` or `combo` include the following:

Error id	Error description
5	Input parameter mcc must not be empty
6	Input parameter mnc must not be empty
7	Input parameter lac must not be empty
8	Input parameter cellid must not be empty
9	Invalid parameter mcc
10	Invalid parameter mnc
11	Invalid parameter lac
12	Invalid parameter cellid
16	Invalid parameter ta
18	Xpress Communication Error

3.6.3. IP-based location error responses

The following section refers to a request for Location Service using xtra structure (referenced below); this is used to extract device location using an IP address.

Name	Type	Description	Required (Y/N)
Xtra	tns:xtra	A list of xtra Structure. (See Xtra Structure section).	Y

Request-specific errors returned to queries containing the structure `xtra` include the following:

Error id	Error description
51	Input parameter profile must not be empty
52	Input parameter ip must not be empty
53	Invalid parameter profile
54	Invalid parameter ip
55	Input parameter profile is not associated to the user
50	Xtra Communication Error

3.6.4. WiFi-based location error responses

The following section refers to requests for Location Service using WiFi paramaters (MAC address); there are three types of requests:

1. Location via WiFi only
2. Location via WiFi with fallback to carrier-based location (request also includes ClassID and phone number)
3. Location returned as address via WiFi

All of these requests will contain the structure WiFi, referenced below.

Name	Type	Description	Required (Y/N)
Wifi	tns:Wifi	A list of wifi Structure. (See Wifi Structure section).	Y

Request-specific errors returned to queries containing the structure `wifi` include the following:

Error id	Error description
57	Input parameter mac must not be empty
58	Invalid parameter mac
59	Invalid parameter rssi
61	Invalid parameter speed
62	Invalid parameter type
56	WiFi Communication Error

3.6.5. Smartphone location error responses

The following section refers to a request for Location Service using `xs` structure; this is used to extract mobile phone location using an application-enabled device with fallback to mobile carrier location.

Name	Type	Description	Required (Y/N)
Xs	tns:XsRequestType	A list of Xs Structure. (See XsRequestType Structure section).	Y

Request-specific errors returned to queries containing xs structure include the following:

Error id	Error description
73	Xs Communication Error
74	Input parameter classId must not be empty
75	Input parameter msisdn must not be empty
77	Address Not Found

3.6.6. Device Registration error responses

The following section refers to register phone requests of Registration Service using ClassId and mobile phone number; these are executed via the carrier gateway “LXG” and error codes will be returned according to that (see LXG API documents).

Name	Type	Description	Required (Y/N)
appPhones	ns:RegistrationAppPhones	This attribute references to the RegistrationAppPhones Structure section.	Y

Request-specific errors returned to queries containing the structure appPhones include the following:

Error id	Error description
17	Xtreme Communication Error: cannot connect to ws.loc-aid.net

3.6.7. Device Status Registration error responses

The following section refers to getPhoneStatus request for Registration Services using mobile phone number; this is executed via the carrier gateway “LXG” and error codes will be returned according to that (see LXG API documents).

Name	Type	Description	Required

			(Y/N)
Msisdn	xs:string+	A list of phone numbers in MSISDN format (limit 100 MSISDN per request).	Y

Request-specific errors returned to queries containing the structure getPhoneStatus include the following:

Error id	Error description
17	Xtreme Communication Error: cannot connect to ws.loc-aid.net

Chapter 4: Appendix

4.1. Glossary of Terms

A-GPS: Assisted GPS based positioning method is used to determine location. The phone takes readings from both GPS satellites and nearby cellular base stations (towers), and with the help of a location server on the network determines location. A-GPS readings are typically more accurate than Cell based readings, but can take more time.

CELL: Cell coverage based positioning method. The phone takes readings from nearby cellular base stations (towers), and with the help of a location server on the network determines location. Cell readings are typically faster than A-GPS readings, but can be less accurate.

CGI: The CGI (Cell Global Identification) is a number that uniquely identifies a specific cell within its location area, network, and country. The CGI is composed of the MCC, MNC, LAI, and Cell Identity (CI)

CLASSID: Identifier of an application associated to the developer.

D: Indicates that the time format will be in days.

DMS: Format in degrees, minutes and seconds. The associated coordinate is presented in X (longitude) and Y (latitude). For example, if the format is DMS then the result will be "X" equals 80 06 42 W and "Y" equals 26 24 04 N.

DECIMAL: Format in decimal. The associated coordinate is presented in X (longitude) and Y (latitude). For example, if the format is Decimal then the result will be "X" equals -80.1116 and "Y" equals 26.4011.

GeoIP: Is the technology that drives Locaid's Internet Protocol (IP) based geolocation service.

GPS: Global Positioning System is a global satellite-based system for determining precise location on Earth.

GSM: Global System for Mobile is the most popular standard for mobile phones in the world. GSM is a cellular network, which means that mobile phones connect to it by searching cells in the immediate vicinity.

H: Indicates that the time format will be in hours.

ICID: Intenational Cell Identity also refers to Cell Global Identity or Global Cell ID

IP: Intenet Protocol, the addressing method used to identify the source of a datagram

ISDN: Integrated Services Digital Network or Isolated Subscriber Digital Network is a telephone system network that integrates speech and data on the same lines.

LBS: Location-Based Services refers to a broad range of services that are based on (or enhanced by) information about the physical location of a user and/or device.

LEAST_EXPENSIVE: The fulfillment of the cost requirement takes precedence over fulfillment of the accuracy requirement when choosing a location method.

LOCATION METHOD: Method of location that depends on an available carrier and kind of device. It is called a positioning method.

M: Indicates that the time format will be in minutes.

MLP: Mobile Location Protocol is an application-level protocol that obtains the position of mobile stations (mobile phones, wireless personal digital assistants and so on) independent of underlying network technology.

MOST_ACCURATE: The fulfillment of the accuracy requirement takes precedence over fulfillment of the cost requirement when choosing a location method.

MS: Mobile Station.

MSISDN: Mobile Subscriber ISDN. MSISDN is a number uniquely identifying a subscription in a GSM or UMTS mobile network. Simply put, it is the telephone number to the SIM card in a mobile/cellular phone.

NONE: Indicates that this parameter is not going to contain a value.

OTHER: Some networks offer extremely coarse location as a final fallback to A-GPS and CELL. These results, while typically low-latency (comparable to CELL fixes), can have very

high radii of uncertainty and are only used when other methods fail to yield results.

PRIVACY FLOW: Communication term used by LOC-AID to document different communication requirements between an application and an end user regarding privacy disclosure. LOC-AID has several different privacy flows.

S: Indicates that the time format will be in seconds.

SLIA: Service Location Immediate Answer. Transaction of the MLP protocol.

SLIR: Service Location Immediate Request. Transaction of the MLP protocol.

SMS: Short Message Service, commonly referred to as "text messaging," is a service for sending short messages to mobile devices.

SMSC: A Short Message Service Center is a network element in the mobile telephone network which delivers SMS messages.

UMTS: Universal Mobile Telecommunications System is one of the third-generation (3G) cell phone technologies, which is also being developed into a 4G technology. To differentiate UMTS from competing network technologies, UMTS is sometimes marketed as 3GSM, emphasizing the combination of the 3G nature of the technology and the GSM standard which it was designed to succeed.

UTC: Coordinated Universal Time is the reference time zone from which all other time zones around the world are calculated. It is the successor of Greenwich Mean Time, abbreviated as GMT, and is still colloquially called GMT sometimes.

WIFI: WiFi is a popular technology that allows an electronic device to exchange data wirelessly (using radio waves) over a computer network, including high-speed Internet connections

Chapter 5: About LOC-AID Technologies

LOC-AID operates the world's largest mobile location data gateway and manages the most secure, privacy-protected platform for wireless providers including Verizon Wireless, Sprint, America Movil, TelCel, Bell Mobility, AT&T and TELUS. Based in San Francisco, CA, with offices across North America, LOC-AID simplifies and manages the complex technical and approval interfaces of location-based services (LBS) for mobile developers. LOC-AID also offers a portfolio of location-enablement services including geo-fencing, geo-coding, and location analytics.

For more information, visit www.loc-aid.com