Car Connectivity Consortium

MirrorLink®

Location Data Service

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TERMS AND ABBREVIATIONS

GPS	Global Positioning System

1 ABOUT

This document specifies location service based on SBP (Service Binary Protocol) framework. The service is used to provide better location data in car environments.

The specification lists a series of requirements, either explicitly or within the text, which are mandatory elements for a compliant solutions. Recommendations are given, to ensure optimal usage and to provide suitable performance. All recommendations are optional.

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are following the notation as described in RFC 2119 [1].

1. MUST: This word, or the terms "REQUIRED" or "SHALL", mean that the definition is an absolute requirement of the specification.
2. MUST NOT: This phrase, or the phrase "SHALL NOT", mean that the definition is an absolute prohibition of the specification.
3. SHOULD: This word, or the adjective "RECOMMENDED", mean that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
4. SHOULD NOT: This phrase, or the phrase "NOT RECOMMENDED" mean that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
5. MAY: This word, or the adjective "OPTIONAL", means that an item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product while another vendor may omit the same item. An implementation which does not include a particular option MUST be prepared to interoperate with another implementation which does include the option, though perhaps with reduced functionality. In the same vein an implementation which does include a particular option MUST be prepared to interoperate with another implementation which does not include the option (except, of course, for the feature the option provides.)

2 INTRODUCTION

The purpose of Location service is to provide better location data in car environments. The specification defines a high-level interface to location information provided by the vehicle system. The Location service API itself is agnostic of the underlying location information sources. Vehicle system sources MAY deliver improved location information inferred from different methods e.g. dead reckoning, map matching, involvement of vehicle sensors, differential global position system etc. if available. Note that this service provides high-level abstraction of location compared to com.mirrorlink.GPS service which focuses on NMEA based GPS data.

The following code shows the definition of service:

```
/* com.mirrorlink.location service, v1.0 */
/** STRUCTURE holding location coordinate. */
STRUCTURE Coordinates {
  /** geographic coordinates @unit: decimal degrees @optional: NaN @UID: 0x64F8F3F1 @range: -90 to 90 with North positive */
  DOUBLE latitude;
  /** geographic coordinates @unit: decimal degrees @optional: NaN @UID: 0x7581892A @range: -180 to 180 with East positive */
  DOUBLE longitude;
  /** height of the position above the [WGS84] ellipsoid @unit: meters  @optional: NaN
  @UID: 0x970E9047 */
  DOUBLE altitude;
  /** accuracy level of the latitude and longitude coordinates @unit: meters @optional: NaN
  @UID: 0x5EC654DE */
  DOUBLE accuracy;
  /** accuracy level of the altitude information @unit: meters @optional: NaN
  @UID: 0xC28B9440 */
  DOUBLE altitudeAccuracy;
  /** direction of travel @unit: degrees, where 0° = heading < 360°,
  counting clockwise relative to the true north @optional: NaN @UID: 0x813C675D */
  DOUBLE heading;
  /** magnitude of the horizontal component of current velocity @unit: meters per second
  @optional: NaN @UID: 0x23234962 */
  DOUBLE speed;
};
/** high-level location object @mandatory @UID: 0x572A6461 */
Object GeoLocation   {
  STRUCTURE Coordinates coord; /// Location coordinate structure @mandatory @UID 0xBAD026D0
  TIME timeStamp; /// UTC time when the position was acquired. @mandatory @UID: 0x59413FD1
};
```

This service uses the name of "com.mirrorlink.location" to uniquely identify this service in CDB layer.

The service is composed of following Objects:

- GeoLocation Object: This is a high-level representation of geo-location data. The center location of the vehicle's front axle SHALL be assumed as the positioning reference point. Future revision of this specification can add additional objects to provide control and further details on the positioning method used by GeoLocation object. The support of this object is mandatory.

3 GEOLOCATION OBJECT

GeoLocation Object returns the current geo-location directly. If the current geo-location is not available, server MUST return “Not available” error code. This applies to the case when the GeoLocation Object is Subscribed. When the positioning method is no longer available due to the reason like lost satellite reception, server MUST return “Not available” error code. Then SBP sink endpoint SHOULD send Subscribe command again not earlier than 5s and not later than 30s to get notification again.

GeoLocation Object owns Coordinate STRUCTURE as member variable. When a positioning method does not support some member variables like “heading”, server can skip that member variable. But all supported member variables MUST be always present during the CDB session so that client does not need to check if some feature is supported or not again and again. If part of data is temporarily unavailable, the server MUST return “Not available” error code Default value for all optional member variables are NaN (Not a Number) as defined in the IEEE standard [3]. Note that default value has meaning when the received data is delivered to upper layer.

Member variables defined in the Coordinates STRUCTURE has the same meaning as the member variables defined in Coordinates interface from W3C’s Geolocation API specification [2]. One difference is that, in this specification, member variables are all optional with the default value of NaN while the W3C API allows null value for not available data.

GeoLocation object can be accessed by using Subscribe command or Get command. Server implementation MUST support the subscription type of both regular interval and on change for both objects. In case of on change, it is up to server to decide the minimum distance to send new notification.

4 IMPLEMENTATION CONFIGURATIONS

Server implementation MUST support at least one active command.

5 REFERENCES

[1] IETF, RFB 2119, Keys words for use in RFCs to Indicate Requirement Levels, March 1997. http://www.ietf.org/rfc/rfc2119.txt

[2] http://dev.w3.org/geo/api/spec-source.html#coordinates_interface

[3] http://en.wikipedia.org/wiki/IEEE_754-1985