Car Connectivity Consortium

MirrorLink®

GPS Data Service

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VERSION HISTORY

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TERMS AND ABBREVIATIONS

GPS	Global Positioning System

1 ABOUT

This document specifies GPS service based on SBP (Service Binary Protocol) framework. The service is used to provide better GPS 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 GPS service is to provide better GPS data in car environments. The specification relies on NMEA as bearer of GPS data.

The following code shows the definition of service:

```
/* com.mirrorlink.GPS service, v1.0 */

/** NMEA object carrying NMEA sentence @mandatory @UID: 0x0AAC4540 */

Object NMEA {

  BYTES data; /// @UID: 0x144A776F

  TIME timeStamp; /// UTC time of data @UID: 0x59413FD1

};


/** gives configuration information of NMEA object @mandatory @UID: 0x9D08B19D*/

Object NMEA_description {

  INT supportedSentences; /** bit wise OR of supported sentences (see following chapter for details) @UID: 0x6E72B167*/

};
```

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

The service is composed of following Objects:

- NMEA Object: This Object allows accessing NMEA data in regular interval. Support of this Object is mandatory.
- NMEA_description object: This Object returns bit flags of supported NMEA sentences in the supportedSentences member variable. This object MUST be supported.

3 NMEA OBJECT

This Object delivers NMEA-0183 v3.0 [2] compatible NMEA strings included in the "data" member variable. Among all NMEA messages, only following 7 messages are supported.

- GGA: Global Positioning System Fixed Data
- GLL: Geographic Position - Latitude/Longitude
- GSA: GNSS DOP and Active Satellites
- GSV: GNSS Satellites in View
- RMC: Recommended Minimum Specific GNSS Data
- VTG: Course Over Ground and Ground Speed
- GST: GPS Pseudo Range Noise (PRN) statistics

As some NMEA sentences are delivering the same information redundantly, it is not necessary to support all of NMEA sentences. It is up to the server implementation to decide necessary combinations. As the Object can be used even for non-GPS-based positioning method, minimum set of message can be, for example, GLL only. The client for the service can Get NMEA_description object to check which sentences are supported.

Following table gives further explanation about member variables defined:

Name	Data type	Description
data	BYTES (byte array)	NMEA messages as byte array. Multiple NMEA sentences can be combined into single array.
timeStamp	TIME	Time stamp of the NMEA data embedded. It is a UTC time associated with the NMEA sentences contained.

Following tables gives further details member variable of NMEA_description object.

Name	Data type	Description
supported-Sentences	INT, bitwise OR of all supported NMEA sentences	This function returns list of supported list of NMEA sentences by bit flags. Following list shows bit flag for each sentence: • 0x0000 0001: GGA • 0x0000 0002: GLL • 0x0000 0004: GSA • 0x0000 0008: GSV • 0x0000 0010: RMC • 0x0000 0020: VTG • 0x0000 0040: GST

The NMEA_description SHOULD be accessed before NMEA object is subscribed. Accessing NMEA_description object while NMEA object is accessed MAY fail depending on server's resource status.

NMEA object MUST support the subscription type of regular interval. The minimum subscription interval of NMEA Object supported by the service server MUST be less than or equal to 1 second. In some server implementation, server MAY decide to send each NMEA sentence as separate SBP message rather than combining them into one message. In that case, subscription interval is not the interval between each sentence, but it SHOULD be the interval where the same sentence is repeated. And depending on the situation, some NMEA sentences MAY NOT be available for some time. For example, if location fix-up is not available yet, server MAY send only GSV sentence.

Note that Getting NMEA Object MAY return just one NMEA sentence which does not necessarily include positioning data. NMEA Object is intended for being used with Subscribe command, and sequences of NMEA sentences SHOULD be monitored to get meaningful information.

4 IMPLEMENTATION CONFIGURATIONS

Server implementation MUST support at least one active command. The client SHOULD first Get NMEA_description Object, and then it SHOULD Subscribe the NMEA Object.

If the current GPS location is not available, the SBP source endpoint MUST return “Not available” error code. This applies to the case when the GeoLocation Object is Subscribed. Then SBP sink endpoint SHOULD send Subscribe command again not earlier than 5s and not later than 30s to get notification again.

5 REFERENCES

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

[2] NMEA 0183 version 3.0, National Marine Electronics Association, July 2000.

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

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