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**Publicly Available Specification (PAS);
Intelligent Transport Systems (ITS);
MirrorLink®;
Part 15: Application Programming Interface (API) Level 1 & 2**

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Full standard:
<https://standards.iteh.ai/catalog/standards/sist/dacb9deb-1130-4486-8b5f-94f1ebfc492d/etsi-ts-103-544-15-v1.3.1-2019-10>

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Intelligent Transport Systems (ITS).

The present document is part 15 of a multi-part deliverable. Full details of the entire series can be found in part 1 [i.1].

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

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1 Scope

The present document is part of the MirrorLink® specification which specifies an interface for enabling remote user interaction of a mobile device via another device. The present document is written having a vehicle head-unit to interact with the mobile device in mind, but it will similarly apply for other devices, which provide a colour display, audio input/output and user input mechanisms.

The MirrorLink API specifies an interface to the MirrorLink Server, which allows any application to either get information about MirrorLink Server's or Client's properties or to set them to specific values. In addition, the API specifies callback functions, which are used from the MirrorLink Server to inform the application about any change.

2 References

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References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents are necessary for the application of the present document.

[1] W3C: "JSpeech Grammar Format".

NOTE: Available at <https://www.w3.org/TR/jsgf/>.

[2] ETSI TS 103 544-22 (V1.3.1): "Publicly Available Specification (PAS); Intelligent Transport Systems (ITS); MirrorLink®; Part 22: Android Specific Specifications enabling AIDL-based MirrorLink® Applications".

[3] IETF RFC 2397: 'The "data" URL scheme', August 1998.

NOTE: Available at <http://tools.ietf.org/html/rfc2397>.

[4] ETSI TS 103 544-9 (V1.3.1): "Publicly Available Specification (PAS); Intelligent Transport Systems (ITS); MirrorLink®; Part 9: UPnP Application Server Service".

[5] Car Connectivity Consortium CCC-RQ-005: "Application Requirements for Drive Certification".

NOTE: Available at https://carconnectivity.org/wp-content/uploads/2019/09/CCC-RQ-005-MirrorLink-ApplicationRequirements_2.0.8.pdf.

[6] ETSI TS 103 544-2 (V1.3.1): "Publicly Available Specification (PAS); Intelligent Transport Systems (ITS); MirrorLink®; Part 2: Virtual Network Computing (VNC) based Display and Control".

[7] ETSI TS 103 544-6 (V1.3.1): "Publicly Available Specification (PAS); Intelligent Transport Systems (ITS); MirrorLink®; Part 6: Service Binary Protocol (SBP)".

[8] ETSI TS 103 544-10 (V1.3.1): "Publicly Available Specification (PAS); Intelligent Transport Systems (ITS); MirrorLink®; Part 10: UPnP Client Profile Service".

[9] ETSI TS 103 544-12 (V1.3.1): "Publicly Available Specification (PAS); Intelligent Transport Systems (ITS); MirrorLink®; Part 12: UPnP Server Device".

- [10] ETSI TS 103 544-11 (V1.3.1): "Publicly Available Specification (PAS); Intelligent Transport Systems (ITS); MirrorLink®; Part 11: UPnP Notification Server Service".
- [11] IEEE Std 754-2019™: "IEEE Standard for Floating-Point Arithmetic", 22 July 2019.
- NOTE: Available at <https://ieeexplore.ieee.org/document/8766229>.
- [12] ISO 639-1: "Codes for the representation of names of languages -- Part 1: Alpha-2 code".

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- [i.1] ETSI TS 103 544-1 (V1.3.1): "Publicly Available Specification (PAS); Intelligent Transport Systems (ITS); MirrorLink®; Part 1: Connectivity".

3 Definition of terms, symbols and abbreviations

3.1 Terms

Void.

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ACMS	Application Certification Management System
API	Application Programming Interface
AV	Audio-Video
BT	Bluetooth
BVRA	Bluetooth Voice Recognition Activation
CCC	Car Connectivity Consortium
CDB	Common Data Bus
HFP	Bluetooth Hands-Free Profile
HSML	High-Speed Media Link
IPL	Initial Playback Latency
LSS	Latency Switched Sources
ML	MirrorLink
OS	Operating System
PCM	Pulse-Code Modulation
RFB	Remote Framebuffer
RTP	Real-Time Protocol
SBP	Service Binary Protocol
TTS	Text-To-Speech
UDN	Unique Device Name

UI	User Interface
UID	Unique IDentifier
UPnP	Universal Plug and Play
URI	Uniform Resource Identifier
URL	Universal Resource Locator
USB	Universal Serial Bus
UTF	Unicode Transformation Format
UUID	Universally Unique IDentifier
VNC	Virtual Network Computing
WFD	Wi-Fi Display

4 Introduction

The MirrorLink API specifies an interface to the MirrorLink Server, which allows any application to either get information about MirrorLink Server's or Client's properties or to set them to specific values. In addition, the API specifies callback functions, which are used from the MirrorLink Server to inform the application about any change. Callback functions shall be implemented from the applications for any evented function.

The MirrorLink APIs define a baseline API that shall be made accessible to 3rd party app developers and does in no way restrict private APIs that can be developed by a MirrorLink Server vendor to satisfy his proprietary needs.

The MirrorLink API specifies the interface in a platform/OS independent manner. Platform specific specification will describe the detailed platform specific view of the MirrorLink API, which shall be implemented from any MirrorLink Server device.

The platform specific implementation of the MirrorLink API shall provide method to implement the features specified in the present document, with at least the values provided in the present document.

A specific API function can be marked as Mandatory or Optional:

- Any Mandatory marked function shall be fully implemented from the MirrorLink Server.
- Any Optional marked function should be fully implemented from the MirrorLink Server. In case the function is not fully implemented, the MirrorLink Server shall implement an empty shell, which responds with defined default values and a success flag set to "False" (if available).

The MirrorLink API specifies functions with three types of API functions:

- **Get:** The function is providing read access to information available on the MirrorLink Server.
- **Set:** The function is providing write access to information available on the MirrorLink Server.
- **Callback:** The function is a callback function, invoked from the MirrorLink Server. The implementation of the callback functionality will be specified in the platform specific specifications.

All three functions may have a Success return value specified. The return value is set to True, if the action has been successful or the information requested is available. Otherwise the return value is set to False.

Some of the data provided via the MirrorLink API will not be available from MirrorLink 1.0 clients. In such case, the MirrorLink Server shall provide a default value as specified.

The MirrorLink API uses a set of Data Types, given in Table 1. The platform specific API may use other data types, as long as the original intend of the MirrorLink API is not compromised. Therefore, the platform specific implementation of the MirrorLink API may use existing platform APIs are sub-classed versions of them.

Table 1: Data Types and Default Values

Data Type	Description
bool	Data type representing the logical values true and false The representation of false is all-bits-zero, and the representation of true is unspecified except that it shall have at least one bit set Default: FALSE
uint8	Data type representing integer values ranging from 0 to positive 255 (0xFF) Default: 0
uint16	Data type representing integer values ranging from 0 to positive 65,535 (0xFFFF) Default: 0
uint32	Data type representing integer values ranging from 0 to positive 4,294,967,295 (0xFFFFFFFF) Default: 0
int8	Data type representing integer values ranging from negative 128 (0x80) to positive 127 (0x7F) Default: 0
int16	Data type representing integer values ranging from negative 32,768 (0x8000) to positive 32,767 (0x7FFF) Default: 0
int32	Data type representing an integer values ranging from negative 2,147,483,648 (0x80000000) to positive 2,147,483,647 (0x7FFFFFFF) Default: 0
float	Data type representing a 32-bit floating point value, single-precision [11] Default: 0.0
double	Data type representing a 64-bit floating point value, double-precision [11] Default: 0.0
string8	Array of UTF8 characters. Each character takes 1 byte (UTF8) Default: " "
string16	Array of UTF16 characters. Each character takes 2 bytes (UTF16) Default: " "
url	Data type representing a URL Default: " "
<i>typeName</i> []	Data type representing an array of values of type <i>typeName</i> Default: Zero-length array
<i>structureName</i>	Data type representing the Structure <i>structureName</i> , as specified in Clause Definitions Default: Default value for each element of the structure
<i>void*</i>	Pointer to a data structure Default: " 0x0 "

The MirrorLink API does not intend to specify, how information provided via MirrorLink has to be used to fulfil driver distraction guidelines [5]. This information is provided from driver distraction guideline documents [5] and associated test plans.

If the MirrorLink API replicates functionality, available via OS/Platform APIs, then those API shall be used, as defined in the Platform specific specifications.

The platform specific API may rearrange the defined parameter, or add additional parameter. The platform specific API shall not remove any parameter.

5 Definitions

5.1 0xE001 - Structure Rect

Table 2: Structure Rect

Feature Name	Description	Type	API Level
x	Horizontal offset of the upper left corner	uint16	1+
y	Vertical offset of the upper left corner	uint16	1+
width	Width of the rectangle	uint16	1+
height	Height of the rectangle	uint16	1+

5.2 0xE002 - Structure ServiceInfo

Table 3: Structure ServiceInfo

Feature Name	Description	Type	API Level
Minor Version	Minor service version	uint8	1+
Major Version	Major service version	uint8	1+
Service ID	Service identifier	uint16	1+
Name	Service name	string8	1+
isSource	True if the Service is implemented as a source on the server	bool	2+
isConfiguration Available	True if the Service exposes configuration objects and no application has claimed write access to them. Always False when IsSource is True	bool	2+

5.3 0xE003 - Structure Action

Table 4: Structure Action

Feature Name	Description	Type	API Level
actionID	Action identifier; shall be non-zero. The <i>actionID</i> shall be unique within one notification. Otherwise the MirrorLink Server will reject the notification	uint16	1+
name	Action name	string8	1+
launchApp	Flag whether to launch the app Default: False	bool	1+
iconUrl	URL to the icon associated with the action Icon shall be of mimetype "image/png" with a color depth of 24 iconUrl can make use of the data URI scheme [3] to provide immediate access to the icon data Default: No Icon	url	1+
actionType	Action type identifier. If left unspecified, maps to the UPnP Launch action [4]. (ACTION_CREATE_SHORTCUT, ACTION_CALL, ACTION_MAP, ACTION_ROUTE, etc.)	Platform dependent	2+

5.4 0xE004 - FbContext

Table 5: Structure FbContext

Feature Name	Description	Type	API Level
applicationCategory	Category of the application.	uint32	1+
videoContentCategory	Category of the framebuffer video content.	uint32	1+
framebufferArea	Framebuffer rectangle for the specified region.	Rect	1+

6 MirrorLink API Elements

6.1 Introduction

The MirrorLink API consists of multiple optional and mandatory modules. Their availability and obligation of a module is dependent on the API level as defined in, as listed in Table 6.

Table 6: MirrorLink API Modules

Common API Module	API Level	Module Reference	Obligation
Common API Info	1	0xF001 – 0xF002	Mandatory
	2	0xF001 – 0xF003	Mandatory
Device Info	1	0x0101 – 0x0105	Mandatory
	2	0x0101 – 0x0114	Mandatory
Certification Information	1	0x0201 – 0x0204	Mandatory
	2	0x0205 – 0x0209	Mandatory
Connection Information	1, 2	0x0301 – 0x0306	Mandatory
Display Information	1, 2	0x0401 – 0x0406	Mandatory
Event Information	1	0x0501 – 0x0505	Mandatory
	2	0x0501 – 0x0505	Deprecated
Client Virtual Keyboard	1	0x0601 – 0x0603	Optional
	2	0x0601 – 0x0603	Deprecated
Key Event Listing	1	0x0701 – 0x0702	Optional
	2	0x0701 – 0x0702	Deprecated
Context Information	1	0x0801 – 0x0806	Mandatory
	2	0x0801 – 0x080A	Mandatory
Device Status Information	1	0x0901 – 0x0907	Mandatory
	2	0x0901 – 0x0904	Mandatory
Data Services	1	0x0A01 – 0x0A0C	Optional
	2	0x0A01 – 0x0A0D	Mandatory
Notifications	1	0x0B01 – 0x0B09	Optional
	2	0x0B01 – 0x0B0C	Mandatory
Actions	2	0x0C01 – 0x0C07	Mandatory

A function may be available only from a specific API level onwards. The minimum API level is given in the function description. If no API level is given, the function is available from API level 1 onwards. In case a function's behaviour or response is dependent on the API level, this is specified within the function's description. Unless specified, all functions shall behave and response the same way, independent of the API level.