



**Publicly Available Specification (PAS);
Intelligent Transport Systems (ITS);
MirrorLink®;
Part 11: UPnP Notification Server Service**

CAUTION

The present document has been submitted to ETSI as a PAS produced by CCC and approved by the ETSI Technical Committee Intelligent Transport Systems (ITS).

CCC is owner of the copyright of the document CCC-TS-028 and/or had all relevant rights and had assigned said rights to ETSI on an "as is basis". Consequently, to the fullest extent permitted by law, ETSI disclaims all warranties whether express, implied, statutory or otherwise including but not limited to merchantability, non-infringement of any intellectual property rights of third parties. No warranty is given about the accuracy and the completeness of the content of the present document.

Reference

RTS/ITS-98-11

Keywords

interface, ITS, PAS, smartphone

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format at www.etsi.org/deliver.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommiteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

©ETSI 2019.

© Car Connectivity Consortium 2011-2019.

All rights reserved.

ETSI logo is a Trade Mark of ETSI registered for the benefit of its Members.

MirrorLink® is a registered trademark of Car Connectivity Consortium LLC.

RFB® and VNC® are registered trademarks of RealVNC Ltd.

UPnP® is a registered trademark of Open Connectivity Foundation, Inc.

Other names or abbreviations used in the present document may be trademarks of their respective owners.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members.

3GPP™ and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

oneM2M™ logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners.

GSM® and the GSM logo are trademarks registered and owned by the GSM Association.

Contents

Intellectual Property Rights	5
Foreword.....	5
Modal verbs terminology.....	5
1 Scope	6
2 References	6
2.1 Normative references	6
2.2 Informative references.....	6
3 Definition of terms, symbols and abbreviations.....	7
3.1 Terms.....	7
3.2 Symbols.....	7
3.3 Abbreviations	7
4 Service Modeling Definition	7
4.1 Service Type.....	7
4.2 TmNotificationServer Service Architecture.....	7
4.3 State Variables.....	7
4.3.1 State Variable Overview	7
4.3.2 ActiveNotiEvent	8
4.3.3 NotiAppListUpdate.....	8
4.3.4 A_ARG_TYPE_Notification.....	9
4.3.5 A_ARG_TYPE_AppID	11
4.3.6 A_ARG_TYPE_ProfileID	11
4.3.7 A_ARG_TYPE_ActionID	11
4.3.8 A_ARG_TYPE_NotiID.....	11
4.3.9 A_ARG_TYPE_String	12
4.3.10 A_ARG_TYPE_URI	12
4.3.11 A_ARG_TYPE_INT	12
4.3.12 A_ARG_TYPE_BooL	12
4.4 Eventing and Moderation	12
4.5 Supporting Multiple Client Profiles	13
4.6 Actions	13
4.6.1 General.....	13
4.6.2 GetNotification	13
4.6.2.1 General	13
4.6.2.2 Arguments.....	13
4.6.2.3 Effect on State	13
4.6.2.4 Errors.....	14
4.6.3 GetSupportedApplications	14
4.6.3.1 General	14
4.6.3.2 Arguments.....	14
4.6.3.3 Effect on State	14
4.6.3.4 Errors.....	14
4.6.4 SetAllowedApplications	15
4.6.4.1 General	15
4.6.4.2 Arguments.....	15
4.6.4.3 Effect on State	15
4.6.4.4 Errors.....	16
4.6.5 InvokeNotiAction	16
4.6.5.1 General	16
4.6.5.2 Arguments.....	16
4.6.5.3 Effect on State	16
4.6.5.4 Errors.....	17
4.6.6 Error Code Summary	17
5 Theory of Operation	18
5.1 Initialization steps.....	18

5.2	Handling of notification	18
5.2.1	Not using Head Unit UI for notification	18
5.2.2	Using Head Unit UI for notification	19
5.3	Displaying a notification message.....	21
5.4	XML Signature Minimum Set.....	22
6	A_ARG_TYPE_Notification XSD Schema.....	22
7	XML Service Description	24
Annex A (informative): Authors and Contributors.....		26
History		27

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Full standard:
<https://standards.iteh.ai/catalog/standards/sist/148e9356-479f-4d18-ade4-3a35c6728ccb/etsi-ts-103-544-11-v1.3.1-2019-10>

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

Foreword

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

The present document is part 11 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).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

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 *TmNotificationServer* service is an UPnP service that allows control points to receive diverse notifications from the devices that support the *TmNotificationServer* service.

The *TmNotificationServer* service enables the following features to:

- send a notification to the head unit;
- get an action described in the notification.

2 References

2.1 Normative references

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.

Referenced documents which are not found to be publicly available in the expected location might be found at <https://docbox.etsi.org/Reference/>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

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

[1] UPnP™ Forum: "UPnP™ Device Architecture 1.1", 15 October 2008.

NOTE: Available at <http://upnp.org/specs/arch/UPnP-arch-DeviceArchitecture-v1.1.pdf>.

[2] W3C Recommendation 11 April 2013: "XML Signature Syntax and Processing Version 1.1".

NOTE: Available at <http://www.w3.org/TR/xmlsig-core/>.

2.2 Informative references

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.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[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

Void.

4 Service Modeling Definition

4.1 Service Type

The following service type identifies a service that is compliant with the present document:

urn:schemas-upnp-org:service:TmNotificationServer:1

TmNotificationServer defined in the present document refers to the same service type. The *TmNotificationServer* service shall follow defined UPnP behaviour within the UPnP Device Architecture 1.1 [1].

4.2 TmNotificationServer Service Architecture

This service provides the features for a MirrorLink UPnP Control Point to receive notifications from a MirrorLink UPnP Server Device.

Based on information of the notification evented to the MirrorLink UPnP Control Point, the MirrorLink UPnP Control Point may launch the applications to bring it to foreground on the MirrorLink Server or may create its own native user interface. In both cases, this does allow the end-user to act on the given notification.

4.3 State Variables

4.3.1 State Variable Overview

Table 4-1: Service State Variables

Variable Name	Req. or Opt.	Data Type	Allowed Value	Default Value	Eng. Units
ActiveNotiEvent	R	string	Undefined	Empty string	N/A
NotiAppListUpdate	R	string	Undefined	Empty string	N/A
A_ARG_TYPE_Notification	R	string	Undefined	Empty string	N/A
A_ARG_TYPE_AppID	R	string	Undefined	Empty string	N/A
A_ARG_TYPE_ProfileID	R	ui4	Undefined	0	N/A
A_ARG_TYPE_ActionID	R	string	Undefined	Empty string	N/A
A_ARG_TYPE_NotiID	R	string	Undefined	Empty string	N/A
A_ARG_TYPE_String	R	string	Undefined	Empty string	N/A

Variable Name	Req. or Opt.	Data Type	Allowed Value	Default Value	Eng. Units
A_ARG_TYPE_URI	R	string	Undefined	Empty string	N/A
A_ARG_TYPE_INT	R	ui4	Undefined	0	N/A
A_ARG_TYPE_Bool	R	string	true false	false	N/A
R = REQUIRED. O = OPTIONAL. X = Non-standard.					

4.3.2 ActiveNotiEvent

ActiveNotiEvent is an evented state variable of type *A_ARG_TYPE_NotiID*, which contains the most urgent notification that needs to be handled from the MirrorLink UPnP Control Point. *ActiveNotiEvent* shall originate from an application (as given in *appId*), which has been set using the *SetAllowedApplications* actions.

It is the responsibility of the MirrorLink UPnP Server to decide on the most urgent notification.

If a notification event A gets overloaded by another notification event B, the notification event A may become pending again, once notification event B is cleared and A is still pending. In that case the MirrorLink UPnP Server shall again provide an event update for the notification event A.

If the state variable is an empty string, no notification is available on the MirrorLink UPnP Server to be handled from the MirrorLink UPnP Control Point.

On receiving an *ActiveNotiEvent* event, the MirrorLink UPnP Control Point can query specific notification by invoking the *GetNotification* action. The MirrorLink Client shall immediately respond to an incoming notification, unless safety related or other higher priority tasks currently require the user's attention. Notifications from unsupported applications shall be immediately cleared, sending an *InvokeNotiAction* with *ActionID* set to "0x00".

Implementation Note:

A MirrorLink 1.1 Client may not immediately respond to an incoming notification.

The MirrorLink UPnP Server shall clear the active notification if the MirrorLink UPnP Control Point has responded to the notification by either using the *InvokeNotiAction* action or by launching the respective application using *TmApplicationServer:1* service *LaunchApplication* action. The MirrorLink UPnP Server shall clear the active notification if the notification is not available on the MirrorLink UPnP Server anymore.

When the event is issued the first time, the *ActiveNotiEvent* value shall contain either a single value of type *A_ARG_TYPE_NotiID*, in case a notification is available, or of an empty string, in case no notification is available.

4.3.3 NotiAppListUpdate

NotiAppListUpdate is an evented state variable of type *A_ARG_TYPE_String*, which contains a comma separated list of applications identifiers of applications, supporting notifications. Each application identifier is of type *A_ARG_TYPE_AppID*.

The state variable is evented, implying that clients can subscribe to receive notifications every time the variable changes using UPnP standardized eventing mechanisms. It is important to note that this variable only contains the application identifiers of those applications, whose entries in supported applications list have changed since the last time an event notification was sent out (i.e. applications which either have added or removed notification support).

On receiving a *NotiAppListUpdate* event, a MirrorLink UPnP Control Point can retrieve the supported application list by invoking the *GetSupportedApplications* action, to validate, whether an application has removed or added notification support.

NotiAppListUpdate value shall consist of a comma separated list of all application identifiers from applications supporting notification, when the event is issued by the *TmNotificationServer* service for the first time.

4.3.4 A_ARG_TYPE_Notification

The format of the *A_ARG_TYPE_Notification* state variable is an XML document. It includes detailed information about a notification.

Table 4-2: Structure of the A_ARG_TYPE_Notification

Element	Description	Parent	Availability
notification	Notification element contains detailed information of an event occurred on a phone and is delivered to the MirrorLink UPnP Control Point	-	Required
notiID	Unique identifier of Notification event. (<i>A_ARG_TYPE_NotiID</i>)	notification	Required
notiTitle	Title of the Notification event. In other words, it is a name of an event occurred. For example, a title of the notification "New text message" or "New email" will be showed as a notification pop-up window. MirrorLink UPnP Control Point shall trim from the right all characters in excess of the specified <i>notiTitleMaxLength</i> parameter within the <i>TmClientProfile</i> service. (<i>A_ARG_TYPE_String</i>)	notification	Required
notiBody	Body of the Notification event. It includes detailed information of an event for a user. For example, text message content for a new text message event, or caller ID for an incoming call event. MirrorLink UPnP Server may include white space characters, like tab, line feed and carriage return. MirrorLink UPnP Control Point shall trim from the right all characters in excess of the specified <i>notiBodyMaxLength</i> parameter within the <i>TmClientProfile</i> service. (<i>A_ARG_TYPE_String</i>) Default: Empty String	notification	Optional
iconList	List of available notification icons	notification	Optional
icon*	Describes a notification icon	iconList	Required
mimetype	Type of icon image (see below). <ul style="list-style-type: none"> At least one icon type should support a transparent background, such as <i>mimetype /image/png</i>. One icon type shall be either <i>mimetype image/png</i> and colour depth 24 or a <i>mimetype</i> and colour depth identical to values set in the client icon preferences as specified using the <i>TmClientProfileServer:1</i> service's <i>SetClientProfile</i> action. MirrorLink UPnP Control Point shall have support for displaying icons with <i>mimetype image/png</i> and colour depth 24. (<i>A_ARG_TYPE_String</i>)	icon	Required
width	Width of icon (<i>A_ARG_TYPE_INT</i>)	icon	Required
height	Height of icon (<i>A_ARG_TYPE_INT</i>)	icon	Required
depth	Color depth of icon (<i>A_ARG_TYPE_INT</i>)	icon	Required
url	URL to icon (<i>A_ARG_TYPE_URI</i>)	icon	Required
appID	Application ID of the notification to let the MirrorLink UPnP Control Point know where the notification comes from. (<i>A_ARG_TYPE_AppID</i>)	notification	Required

Element	Description	Parent	Availability
actionList	A list of actions for a notification. The list is provided by an application initiating the notification so a user can directly select one of those actions for the notification. For example, the user can "Reply" to the new text message or "Ignore" it. The list includes "Reply" and "Ignore" actions as its elements. A MirrorLink Client should launch the application with provided <i>appID</i> , without showing any notification, if the <i>actionList</i> element is missing.	notification	Optional
action*	Individual action, associated with the notification. MirrorLink UPnP Control Point shall remove from the end all actions in excess of the specified <i>maxActions</i> parameter within the <i>TmClientProfile</i> service.	actionList	Required
actionID	Unique identifier of an action. When a user selects an action for a notification through the native notification UI served by the MirrorLink UPnP Control Point, <i>actionID</i> shall be sent to the MirrorLink UPnP Server. Shall be non-zero (0x0000) (<i>A_ARG_TYPE_ActionID</i>)	action	Required
actionName	Action name. This name will be shown as a button label on the native notification UI. MirrorLink UPnP Control Point shall trim from the right all characters in excess of the specified <i>actionNameMaxLength</i> parameter within the <i>TmClientProfile</i> service. (<i>A_ARG_TYPE_String</i>)	action	Required
launchApp	Application launch required Launch application after invoked the action, as given in the application ID (<i>appID</i>) if value is set to true. (<i>A_ARG_TYPE_Boolean</i>) Default: false	action	Optional
iconList	List of available action icons	action	Optional
icon*	Describes an action icon	iconList	Required
mimetype	Type of icon image (see below). <ul style="list-style-type: none"> At least one icon type should support a transparent background, such as <i>mimetype / image/png</i>. One icon type shall be either <i>mimetype image/png</i> and colour depth 24 or a <i>mimetype</i> and colour depth identical to values set in the client icon preferences as specified using the <i>TmClientProfileServer:1</i> service's <i>SetClientProfile</i> action. MirrorLink UPnP Control Point shall have support for displaying icons with <i>mimetype image/png</i> and colour depth 24. (<i>A_ARG_TYPE_String</i>)	icon	Required
width	Width of icon (<i>A_ARG_TYPE_INT</i>)	icon	Required
height	Height of icon (<i>A_ARG_TYPE_INT</i>)	icon	Required
depth	Color depth of icon (<i>A_ARG_TYPE_INT</i>)	icon	Required
url	URL to icon (<i>A_ARG_TYPE_URI</i>)	icon	Required