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INTERNATIONAL STANDARD

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Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 8: Diagnostics

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DIGITAL LIVING NETWORK ALLIANCE (DLNA) HOME NETWORKED DEVICE INTEROPERABILITY GUIDELINES –

Part 8: Diagnostics

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International Standard IEC 62481-8 has been prepared under technical area 8: Multimedia home systems and applications for end-user network, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this International Standard is based on the following documents:

CDV	Report on voting
100/2746/CDV	100/2890/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of IEC 62481 series, published under the general title *Digital Living Network Alliance (DLNA) home networked device interoperability guidelines,* can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Consumers are acquiring, viewing, and managing an increasing amount of digital media (photos, music, and video) on devices in the consumer electronics (CE), mobile, and personal computer (PC) domains. As such, they want to conveniently enjoy the content, regardless of the source, across different devices and locations in the home. The digital home vision integrates the internet, mobile, and broadcast networks through a seamless, interoperable network, which will provide a unique opportunity for manufacturers and consumers alike. In order to deliver on this vision, a common set of industry design guidelines is needed that allows vendors to participate in a growing marketplace, leading to more innovation, simplicity, and value for consumers. This document serves that purpose and provides vendors with the information needed to build interoperable networked platforms and devices for the digital home.

DIGITAL LIVING NETWORK ALLIANCE (DLNA) HOME NETWORKED DEVICE INTEROPERABILITY GUIDELINES –

Part 8: Diagnostics

1 Scope

This part of IEC 62481 specifies guidelines for Diagnostics. The DLNA Diagnostics guidelines focus mostly on the collection of data through test actions and queries. The procedures for troubleshooting and remedies are outside the scope of the DLNA guidelines. The user can be an operator accessing the Diagnostics Application through a TR-069 (an application layer protocol for remote management of end-user devices) management interface, or a technician or end-user accessing it through a browser or screen interface as shown in Figure 1.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62481-1-1:2017, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 1-1: Architecture and protocols*

IEEE 1905, *IEEE Standard for a Convergent Digital Home Network for Heterogeneous Technologies, Institute of Electrical and Electronics Engineers* http://standards.ieee.org/about/get/

UPnP BasicManagement:2, UPnP Forum
http://upnp.org/specs/dm/UPnP-dm-BasicManagement-v2-Service.pdf

UPnP ConfigurationManagement:2, UPnP Forum
http://upnp.org/specs/dm/UPnP-dm-ConfigurationManagement-v2-Service.pdf

3 Terms, definitions and definitions

For the purposes of this document, the terms and definitions given in IEC 62481-1-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1 Definition of terms

3.1.1
Diagnostics Controller
DLNA Device Capability that invokes diagnostics actions on a Diagnostics Device

3.1.2
Diagnostics Endpoint
DLNA Device Capability that accepts diagnostics actions from a Diagnostics Controller

3.1.3
BMS
BasicManagement Service
UPnP service that provides access to basic diagnostics functionality through action requests

Note 1 to entry: The BasicManagement Service specification is a standard UPnP DCP.

3.1.4
CfgMS
ConfigurationManagement Service
UPnP service that makes available device information through action requests

Note 1 to entry: The ConfigurationManagement Service specification is a standard UPnP DCP.

3.2 Conventions

In IEC 62481-1-1:2017 and this document, a number of terms, conditions, mechanisms, sequences, parameters, events, states, or similar terms are printed with the first letter of each word in uppercase and the rest lowercase (e.g. Move). Any lowercase uses of these words have the normal technical English meanings.

4 Networking architecture and guideline conventions

4.1 DLNA home networking architecture

This document extends the DLNA home networking architecture that is defined in Clause 4, IEC 62481-1-1:2017.

4.2 Document conventions

See Clause 6 of IEC 62481-1-1:2017 for a description of the DLNA document conventions.

4.3 Guideline structure and layout

See 7.1 of IEC 62481-1-1:2017 for guideline and attribute table layout descriptions.

5 DLNA Device Model

5.1 General

Refer to Clause 5 of IEC 62481-1-1:2017 for detailed descriptions of the existing DLNA Device Model. This document extends the existing DLNA devices and system usages.

5.2 Diagnostic Device Functions

For the Diagnostics guidelines, the following Device Functions are defined.

- UPnP BasicManagement Service: a UPnP BasicManagement Service makes available diagnostics features and functions and services diagnostics action requests.
- UPnP ConfigurationManagement Service: a UPnP ConfigurationManagement Service makes available device information through action requests.
- UPnP BasicManagement Control Point: a UPnP BasicManagement Control Point issues action requests to UPnP BasicManagement Service to implement diagnostics features and functions.

- UPnP ConfigurationManagement Control Point: a UPnP ConfigurationManagement Control Point issues action requests to ConfigurationManagement Services to get device information.
- Diagnostics Application: a Diagnostics Application interfaces with a UPnP BasicManagement Control Point, UPnP ConfigurationManagement Service, 1905 Management Primitives, and other not-specified-by-DLNA diagnostics Device Functions to provide meaningful and actionable information regarding DLNA devices. It provides input to a user or management system interface to enable a user to control and see results from diagnostics features and functions.
- 1905 Management Primitives: a function that provides a 1905 signaling capability on a physical interface. It can also receive requests and report 1905 data to a co-resident Diagnostics Application.

5.3 Device Capabilities

For the Diagnostics guidelines, the following Device Capabilities are defined:

- a Diagnostics Endpoint (+DIAGE+) with the role of offering diagnostics services and responding to diagnostics action requests;
- a Diagnostics Controller (+DIAGC+) with the role of providing a Diagnostics Application and a control point for issuing action requests to a Diagnostics Endpoint.

5.4 System usages

The diagnostics system usage has a Diagnostics Controller capability to instruct a Diagnostics Endpoint capability to execute specific diagnostics actions.

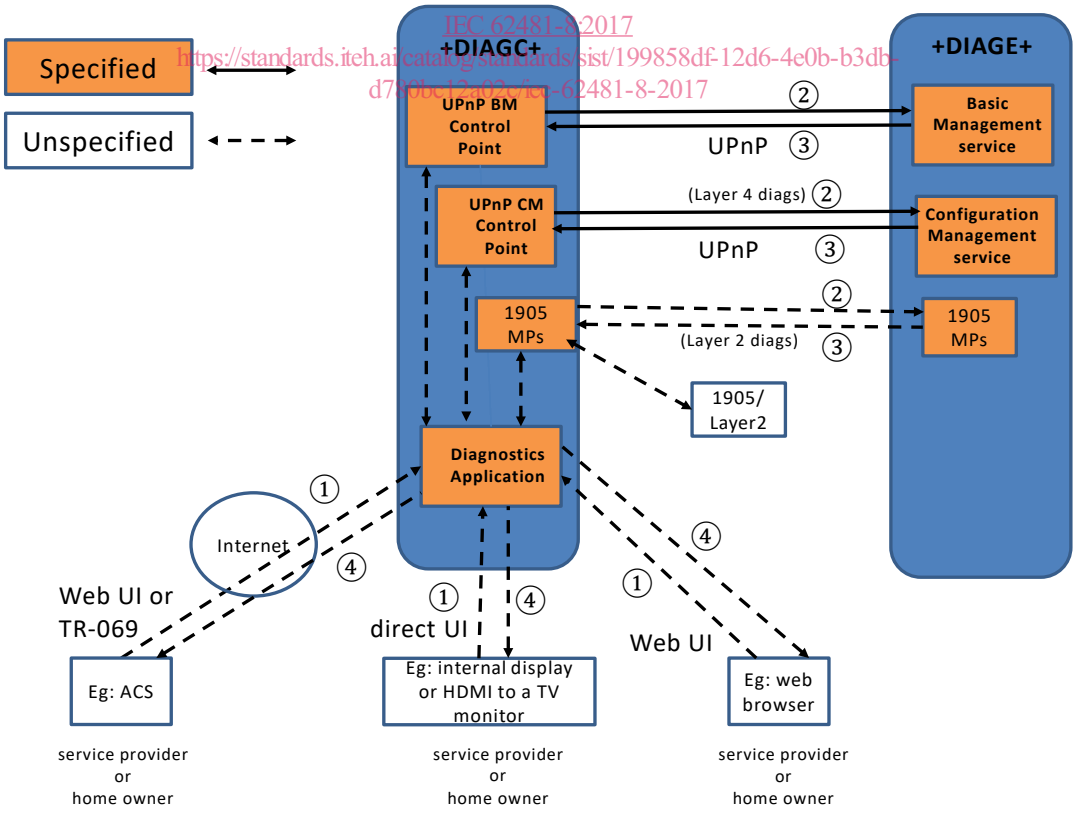

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Figure 1 illustrates this device interaction model. The following steps are performed in this system usage:

1. User or management system interacts with Diagnostics Application (unspecified in DLNA).
2. Diagnostics Application invokes UPnP actions or 1905 messages to request diagnostics functions.
3. Transport diagnostics information via UPnP action or 1905 messages.
4. Present diagnostics information to user or management system (unspecified in DLNA).

NOTE The Diagnostics Controller (+DIAGC+) capability and the Diagnostics Endpoint (+DIAGE+) capability functionality can be incorporated in any valid DLNA Device Class. Thus both capabilities inherit other Device Functions (e.g. IP Connectivity) at other layers in the DLNA Device Architecture, for the purpose of DLNA certification. Implementing these capabilities external to an existing DLNA Device Class (e.g., as a stand-alone device) is not prohibited, but such usages will not be included in DLNA's certification procedures.

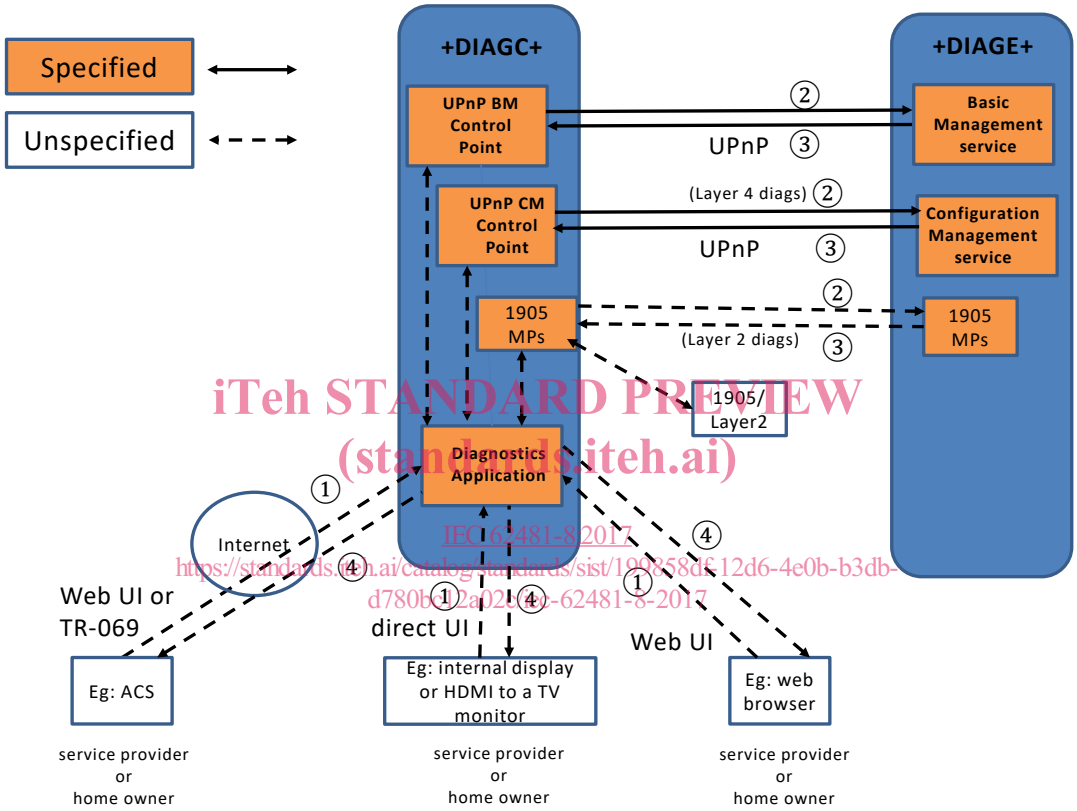
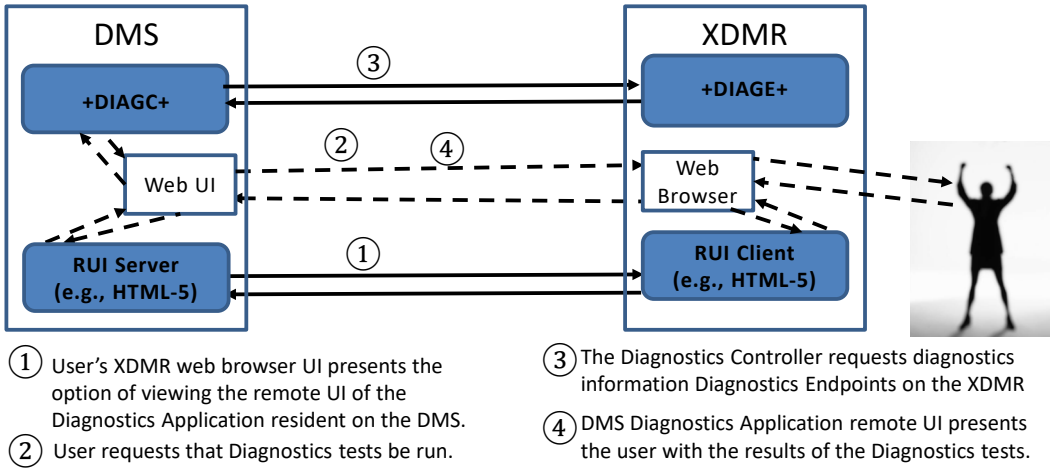


Figure 1 – Diagnostics system usage

Figure 2 provides some examples of how the new capabilities can exist within some of the existing DLNA Devices Classes, and potential usages in the context of 2-box pull and 3-box scenarios.

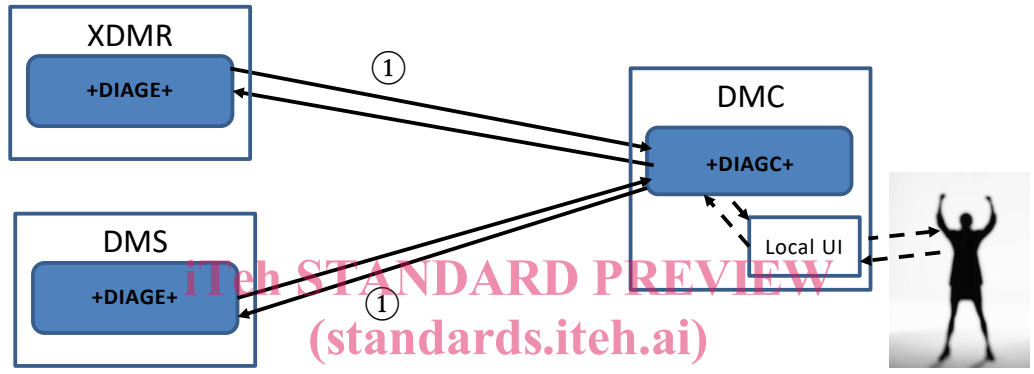


1 User's XDMR web browser UI presents the option of viewing the remote UI of the Diagnostics Application resident on the DMS.

2 User requests that Diagnostics tests be run.

3 The Diagnostics Controller requests diagnostics information Diagnostics Endpoints on the XDMR

4 DMS Diagnostics Application remote UI presents the user with the results of the Diagnostics tests.



1 User accesses local Diagnostics Application by using the UI on the DMC and requests diagnostics testing. Diagnostics Controller gets diagnostics information from all Diagnostics Endpoints and presents the user with the results.

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Figure 2 – Examples of diagnostics usage in the context of DLNA 2-box Pull and 3-box usage models

6 Diagnostics guidelines

6.1 General

Clause 6 contains guidelines for Device Functions that are elements of DLNA Diagnostics Endpoint and Controller capabilities.

6.2 Device Discovery & Control

6.2.1

[GUIDELINE] A Diagnostics Endpoint capability shall be allowed to be deployed in conjunction with any DLNA Device Class.

[ATTRIBUTES]

M		+DIAGE+	n/a	n/a	IEC 62481-1-1:2017	AUJYC	

[COMMENT] These capabilities can also exist externally to DLNA Device Classes. However, such existence is outside the scope of these guidelines. By existing within a DLNA Device Class, these capabilities inherit all the networking and connectivity functionality of the underlying DLNA Device Class.