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Information technology – UPnP device architecture –
Part 18-11: Remote Access Device Control Protocol – Remote Access Discovery
Agent Service

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International Standard ISO/IEC 29341-18-11 was prepared by UPnP Forum Steering committee[1], was adopted, under the fast track procedure, by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

The list of all currently available parts of the ISO/IEC 29341 series, under the general title *Information technology – UPnP device architecture*, can be found on the IEC web site.

This International Standard has been approved by vote of the member bodies, and the voting results may be obtained from the address given on the second title page.

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[1] UPnP Forum Steering committee, UPnP Forum, 3855 SW 153rd Drive, Beaverton, Oregon 97006 USA. See also "Introduction".

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1 Overview and Scope

This service definition is compliant with the UPnP Device Architecture version 1.0. It defines a service type referred to herein as *RADAConfig* service. This service type enables configuration of the in-band synchronization mechanism between Remote Access Clients and Remote Access Server.

1.1 Introduction

A Remote Access Discovery Agent aggregates information about UPnP devices and services from two primary sources, depending if the devices are located in the local network or they are located in a remote device. For aggregating the devices and services available in the local network, the Remote Access Discovery Agent is constantly monitoring the SSDP traffic, which enables the RADA to have an up-to-date image of the UPnP network. The RADA finds information about remote UPnP devices and services by synchronizing with remote RADAs.
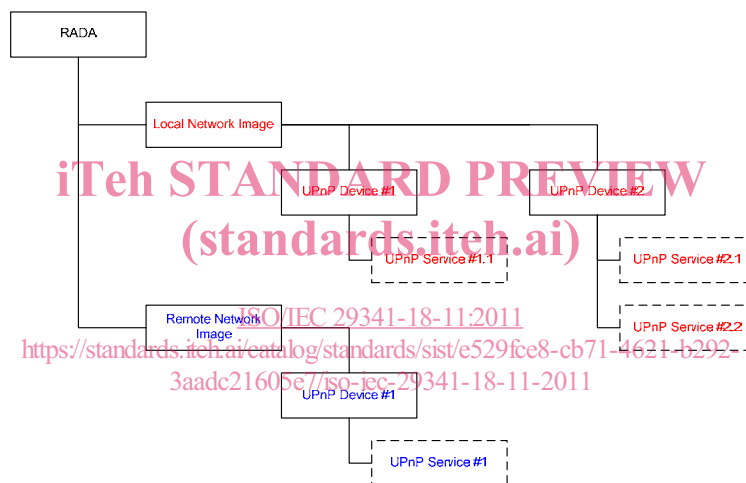
Figure 1-1 — SSDP Aggregation.

The main purpose in maintaining this aggregate view of available devices, is to alleviate the timing dependencies inherent in the UPnP Discovery mechanism. When a UPnP Control Point issues a search request, the request packet contains a parameter that specifies the maximum number of seconds a device can wait before sending the response. In remote scenarios, it is possible that this value will be exceeded with normal network traffic delay.

This aggregate view also serves to minimize the amount of SSDP traffic that needs to flow across the remote transport, as some remote scenarios may be cost-sensitive in regards to the amount of data that is transferred, since SSDP is often described as a "chatty" protocol.

The aggregate view could be used to restrict the visibility of local UPnP devices and services from remote devices and of UPnP devices and services hosted by remote devices to your local network.

This service does not address the actual transport protocol used to facilitate Remote Access.

The *RADAConfig* service is a UPnP service that provides control points with the following functionality:

- Customize which local devices are visible in remote networks
- Customize which remote devices are visible in the local network

This service does not address:

- Aggregation of the the local view of the UPnP network.
- Relaying discovery messages in the local network on behalf of remote devices
- Transport protocol used to facilitate Remote Access or its configurtion.

1.2 Vendor-defined Extensions

Whenever vendors create additional vendor-defined state variables, actions or properties, their assigned names and XML representation MUST follow the naming conventions and XML rules as specified in [DEVICE], Clause 2.5, "Description: Non-standard vendor extensions".

1.3 References

1.3.1 Normative References

This clause lists the normative references used in this specification and includes the tag inside square brackets that is used for each such reference:

[DEVICE] – UPnP Device Architecture, version 1.0. Available at: http://www.upnp.org/specs/arch/UPnP-arch-DeviceArchitecture-v1.0-20080424.pdf. Latest version available at: http://www.upnp.org/specs/arch/UPnP-arch-DeviceArchitecture-v1.0.pdf.

[DADS-XSD] – XML Schema for UPnP RA Discovery Agent XML Data Structures Available at: http://www.upnp.org/schemas/ra/dads-v1-20090930.xsd. Latest version available at: http://www.upnp.org/schemas/ra/dads-v1.xsd.

[RAServer] – RAServer:1, UPnP Forum, Available at: http://www.upnp.org/specs/ra/UPnP-ra-RAServer-v1-Device-20090930.pdf. Latest version available at: http://www.upnp.org/specs/ra/UPnP-ra-RAServer-v1-Device.pdf.

[RADASync] – RADASync:1, UPnP Forum, Available at: http://www.upnp.org/specs/ra/UPnP-ra-RADASync-v1-Service-20090930.pdf. Latest version available at: http://www.upnp.org/specs/ra/UPnP-ra-RADASync-v1-Service.pdf.

[RFC 2119] – IETF RFC 2119, Key words for use in RFCs to Indicate Requirement Levels, S. Bradner, March 1997. Available at: http://www.ietf.org/rfcs/rfc2119.txt.

[XML] – "Extensible Markup Language (XML) 1.0 (Third Edition)", François Yergeau, Tim Bray, Jean Paoli, C. M. Sperberg-McQueen, Eve Maler, eds., W3C Recommendation, February 4, 2004. Available at: http://www.w3.org/TR/2004/REC-xml-20040204/.

1.3.2 Informative References

This clause lists the informative references that are provided as information in helping understand this specification:

[RAARCH] – RAArchitecture:1, UPnP Forum, Available at: http://www.upnp.org/specs/ra/UPnP-ra-RAArchitecture-v1-20090930.pdf. Latest version available at: http://www.upnp.org/specs/ra/UPnP-ra-RAArchitecture-v1.pdf.

2 Service Modeling Definitions

2.1 Service Type

The following service type identifies a service that is compliant with this specification:

urn:schemas-upnp-org:service:*RADAConfig:1*

RADAConfig service is used herein to refer to this service type.

2.2 Terms and Abbreviations

2.2.1 Abbreviations

Table 2-1 — Abbreviations

Definition	Description
RAC	Remote Access Client
RADA	Remote Access Discovery Agent
RAS	Remote Access Server

2.2.2 Terms

2.2.2.1 Local device

A local device is a UPnP device that is attached to the physical network where the RADA is located.

2.2.2.2 Remote Access Client

The Remote Access Client (RAC) is the peer physical device that is not part of the physical home network. The RAC is exposing only the UPnP devices and services that are embedded in the physical device.

2.2.2.3 Remote Access Server

The Remote Access Server (RAS) is the peer physical device located in the home network. RAS is exposing to the RAC the UPnP devices and services available in the physical home network as well as any embedded in the physical RAS device.

2.2.2.4 Remote device

A remote device is a UPnP device that is not attached to the physical network where the RADA is located.

2.2.2.5 SystemInfo Change

The SystemInfo change happens when one of the following occurs:

- A Remote Access connection is established
- A Remote Access connection is ended
- A Remote Access Transport profile is added/modified/deleted
- A device joins a remote network
- A device leaves a remote network
- A filter is added/modified/deleted

2.2.2.6 UpdateID

An unsigned integer associated with *SystemInfo*. The value is incremented each time the *SystemInfo* is modified. Upon reaching the value 2^{32}-1, the next update rolls the value back to zero.

2.3 *RADAConfig* Service Architecture

The Remote Access Architecture defines management interfaces that allow the configuration of the ACLs that will restrict the visibility of the home devices from the remote control points and of remote devices from local control points.

2.4 State Variables

Reader Note: For a first-time reader, it may be more helpful to read the action definitions before reading the state variable definitions.

2.4.1 State Variable Overview

Table 2-2 — State Variables

Variable Name	R/O [a]	Data Type	Allowed Values	Eng. Units
SystemInfo	*R*	**string**	See Clause 2.4.2	
SystemInfoUpdateID	*R*	**ui4**	See Clause 2.4.3	
A_ARG_TYPE_FilterList	*R*	**string**	See Clause 2.4.4	
A_ARG_TYPE_UUID	*R*	**string**	See Clause 2.4.5	
[a] *R* = Required, *O* = Optional, *X* = Non-standard				

2.4.2 *SystemInfo*

This state variable contains the snapshot of all devices that are reachable/visible from the RADA, which are grouped according to the network in which they are present. The state variable contains also the identity of the remote networks, and filters that determine how the synchronization process will be performed.

The structure of the *SystemInfo* state variable is a DADS XML Document:

- <systemInfo> is the root element.
- See the DADS schema [DADS-XSD] for more details on the structure. The available properties and their names are described in Annex A.1 of [RADASync].

Note that since the value of *SystemInfo* is XML, it needs to be escaped (using the normal XML rules: [XML] Clause 2.4 Character Data and Markup) before embedding in a SOAP response message.

Note: implementers must be aware that this state variable is shared with the RADASync service, which updates the information about remote devices, and with the RATAConfig service, which maintains information about Remote Access Transport profiles. This state variable MUST be updated by the device and propagated internally to those other services (if present on the same device). Each modification in *SystemInfo* MUST be signalled by the device through the *SystemInfoUpdateID* evented state variable (see Clause 2.4.3).

2.4.3 *SystemInfoUpdateID*

This state variable contains the value of the *updateID* attribute of the <systemInfo> element in the *SystemInfo* state variable XML Document. Its value is updated each time a SystemInfo Change occurs (see Clause 2.2.2.5). Note that the *SystemInfo* state variable may also be changed by the RADASync and RATAConfig services. Therefore, the RADAConfig service MUST event the *SystemInfoUpdateID* state variable, even if one of the other services (on the same device) is responsible for changing the *SystemInfo*.