[MS-SSDP]:
SSDP:
Networked Home Entertainment Devices (NHED) Extensions

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Revision Summary

Date	Revision History	Revision Class	Comments
07/20/2007	0.1	Major	MCPP Milestone 5 Initial Availability
09/28/2007	1.0	Major	Updated and revised the technical content.
10/23/2007	1.0.1	Editorial	Revised and edited the technical content.
11/30/2007	1.0.2	Editorial	Revised and edited the technical content.
01/25/2008	1.0.3	Editorial	Revised and edited the technical content.
03/14/2008	1.0.4	Editorial	Revised and edited the technical content.
05/16/2008	1.0.5	Editorial	Revised and edited the technical content.
06/20/2008	1.0.6	Editorial	Revised and edited the technical content.
07/25/2008	1.0.7	Editorial	Revised and edited the technical content.
08/29/2008	1.1	Minor	Updated the technical content.
10/24/2008	1.1.1	Editorial	Revised and edited the technical content.
12/05/2008	1.2	Minor	Updated the technical content.
01/16/2009	1.2.1	Editorial	Revised and edited the technical content.
02/27/2009	1.2.2	Editorial	Revised and edited the technical content.
04/10/2009	1.2.3	Editorial	Revised and edited the technical content.
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07/02/2009	1.2.5	Editorial	Revised and edited the technical content.
08/14/2009	1.2.6	Editorial	Revised and edited the technical content.
09/25/2009	1.3	Minor	Updated the technical content.
11/06/2009	1.4	Minor	Updated the technical content.
12/18/2009	1.4.1	Editorial	Revised and edited the technical content.
01/29/2010	1.4.2	Editorial	Revised and edited the technical content.
03/12/2010	1.4.3	Editorial	Revised and edited the technical content.
04/23/2010	1.4.4	Editorial	Revised and edited the technical content.

Date	Revision History	Revision Class	Comments
06/04/2010	1.4.5	Editorial	Revised and edited the technical content.
07/16/2010	1.4.5	No change	No changes to the meaning, language, or formatting of the technical content.
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02/11/2011	1.4.5	No change	No changes to the meaning, language, or formatting of the technical content.
03/25/2011	1.4.5	No change	No changes to the meaning, language, or formatting of the technical content.
05/06/2011	1.4.5	No change	No changes to the meaning, language, or formatting of the technical content.
06/17/2011	1.5	Minor	Clarified the meaning of the technical content.
09/23/2011	1.5	No change	No changes to the meaning, language, or formatting of the technical content.
12/16/2011	2.0	Major	Significantly changed the technical content.
03/30/2012	2.0	No change	No changes to the meaning, language, or formatting of the technical content.
07/12/2012	2.0	No change	No changes to the meaning, language, or formatting of the technical content.
10/25/2012	2.0	No change	No changes to the meaning, language, or formatting of the technical content.
01/31/2013	2.0	No change	No changes to the meaning, language, or formatting of the technical content.
08/08/2013	3.0	Major	Significantly changed the technical content.

Contents

1 Introduction

The SSDP: Networked Home Entertainment Devices (NHED) Extensions are a set of extensions to the Simple Service Discovery Protocol (SSDP), as specified in [UPNPARCH1], and are used to detect devices on a home network. In this specification, the SSDP: Networked Home Entertainment Devices (NHED) Extensions are referred to as SSDPE.

Sections 1.8, 2, and 3 of this specification are normative and can contain the terms MAY, SHOULD, MUST, MUST NOT, and SHOULD NOT as defined in RFC 2119. Sections 1.5 and 1.9 are also normative but cannot contain those terms. All other sections and examples in this specification are informative.

1.1 Glossary

The following terms are defined in [MS-GLOS]:

URI

The following terms are specific to this document:

Universal Plug and Play (UPnP): A set of computer network protocols promulgated by the UPnP Forum [UPnP]. The goals of UPnP are to allow devices to connect seamlessly and to simplify the implementation of networks in home (data sharing, communications, and entertainment) and corporate environments. UPnP achieves this by defining and publishing UPnP device control protocols built upon open, Internet-based communication standards.

MAY, SHOULD, MUST, SHOULD NOT, MUST NOT: These terms (in all caps) are used as described in [RFC2119]. All statements of optional behavior use either MAY, SHOULD, or SHOULD NOT.

1.2 References

References to Microsoft Open Specifications documentation do not include a publishing year because links are to the latest version of the documents, which are updated frequently. References to other documents include a publishing year when one is available.

A reference marked "(Archived)" means that the reference document was either retired and is no longer being maintained or was replaced with a new document that provides current implementation details. We archive our documents online [Windows Protocol].

1.2.1 Normative References

We conduct frequent surveys of the normative references to assure their continued availability. If you have any issue with finding a normative reference, please contact dochelp@microsoft.com. We will assist you in finding the relevant information. Please check the archive site, http://msdn2.microsoft.com/en-us/library/E4BD6494-06AD-4aed-9823-445E921C9624, as an additional source.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997, http://www.rfc-editor.org/rfc/rfc2119.txt

[RFC3986] Berners-Lee, T., Fielding, R., and Masinter, L., "Uniform Resource Identifier (URI): Generic Syntax", STD 66, RFC 3986, January 2005, http://www.ietf.org/rfc/rfc3986.txt

[UPnP] UPnP Forum, "Standards", http://www.upnp.org/standardizeddcps/default.asp

[UPNPARCH1] UPnP Forum, "UPnP Device Architecture 1.0", October 2008, http://www.upnp.org/specs/arch/UPnP-arch-DeviceArchitecture-v1.0.pdf

1.2.2 Informative References

[MS-GLOS] Microsoft Corporation, "Windows Protocols Master Glossary".

[SSDP1] Goland, Yaron Y., Cai, T., Leach, P., Gu, Y., and Albright, S., "Simple Service Discovery Protocol (SSDP)", 1999, http://tools.ietf.org/html/draft-cai-ssdp-v1-03

If you have any trouble finding [SSDP1], please check here.

1.3 Overview

SSDP (as specified in [UPNPARCH1]) is used to detect **Universal Plug and Play** (as specified in [UPnP]) devices on a network. SSDP is maintained by the UPnP Forum and is published by the UPnP Implementers Corporation.

The SSDP: Networked Home Entertainment Devices (NHED) Extensions, also known as SSDPE, provide a mechanism for a control point to discover a device on the network without requiring the device to implement a complete SSDP stack. SSDP is simplified by removing the requirement for a description document (substituted with device-specific information in an Alternate Location (AL) header in each announcement) and by removing the need for a multicast listener (substituted with frequent periodic announcements).

1.4 Relationship to Other Protocols

The SSDP: Networked Home Entertainment Devices (NHED) Extensions depend on protocols described in section 1.1 of [UPNPARCH1], specifically:

- HTTP (Multicast over UDP) (HTTPMU)
- Universal Datagram Protocol (UDP)
- Internet Protocol (IP)

1.5 Prerequisites/Preconditions

The SSDP: Networked Home Entertainment Devices (NHED) Extensions have no additional prerequisites/preconditions beyond what is required for SSDP, as specified in [UPNPARCH1].

1.6 Applicability Statement

The SSDP: Networked Home Entertainment Devices (NHED) Extensions provide a mechanism for a control point to discover a device on the network without requiring the device to implement a complete SSDP stack.

1.7 Versioning and Capability Negotiation

The SSDP: Networked Home Entertainment Devices (NHED) Extensions do not specify anything beyond what is specified by [UPNPARCH1].

1.8 Vendor-Extensible Fields

The AL header (as specified in [SSDP1]) in the ssdp:alive message contains a bracketed list of **URIs** (as specified in [RFC3986]). The vendor may extend that list with any URIs that comply with the rules specified in [RFC3986].

1.9 Standards Assignments

There are no standards assignments other than what is specified in [UPNPARCH1].

2 Messages

2.1 Transport

The SSDP: Networked Home Entertainment Devices (NHED) Extensions do not specify anything beyond what is specified by [UPNPARCH1].

2.2 Message Syntax

The SSDP: Networked Home Entertainment Devices (NHED) Extensions MUST follow the Simple Service Discovery Protocol discovery advertisement messages syntax, as specified in [UPNPARCH1] section 1.1, with the following exceptions:

- The LOCATION header MUST contain the single character "*".
- The AL header (as specified by [SSDP1]) is required and MUST contain a list of URIs ([RFC3986]), with each URI framed by the characters "<" and ">".

The SSDP: Networked Home Entertainment Devices (NHED) Extensions SHOULD NOT implement the Simple Service Discovery Protocol discovery search messages syntax as specified in [UPNPARCH1] section 1.2.

3 Protocol Details

3.1 Device Details

SSDP (as specified in [UPNPARCH1]) is used for device discovery between control points and devices. On the device, specific messages are multicast.

3.1.1 Abstract Data Model

No abstract data model is required.

3.1.2 Timers

Because the SSDP: Networked Home Entertainment Devices (NHED) Extensions are implemented such that the traditional SSDP search does not exist on the device, the device SHOULD send ssdp:alive messages on a periodic basis that is more frequent than the Simple Service Discovery Protocol default.

3.1.3 Initialization

The SSDP: Networked Home Entertainment Devices (NHED) Extensions do not specify anything beyond what is specified by [UPNPARCH1].

3.1.4 Higher-Layer Triggered Events

The SSDP: Networked Home Entertainment Devices (NHED) Extensions do not specify anything beyond what is specified by [UPNPARCH1].

3.1.5 Message Processing Events and Sequencing Rules

The SSDP: Networked Home Entertainment Devices (NHED) Extensions do not specify anything beyond what is specified by [UPNPARCH1].

3.1.6 Timer Events

The SSDP: Networked Home Entertainment Devices (NHED) Extensions do not specify anything beyond what is specified by [UPNPARCH1].

3.1.7 Other Local Events

The SSDP: Networked Home Entertainment Devices (NHED) Extensions do not specify anything beyond what is specified by [UPNPARCH1].

3.2 Control Point Details

SSDP is used for device discovery between control points (as specified in [UPNPARCH1]) and devices (as specified in [UPNPARCH1]). The control point listens for multicast messages from the device.

3.2.1 Abstract Data Model

No abstract data model is required.

3.2.2 Timers

No timers are required.

3.2.3 Initialization

The SSDP: Networked Home Entertainment Devices (NHED) Extensions do not specify anything beyond what is specified by [UPNPARCH1].

3.2.4 Higher-Layer Triggered Events

The SSDP: Networked Home Entertainment Devices (NHED) Extensions do not specify anything beyond what is specified by [UPNPARCH1].

3.2.5 Message Processing Events and Sequencing Rules

The SSDP: Networked Home Entertainment Devices (NHED) Extensions do not specify anything beyond what is specified by [UPNPARCH1].

3.2.6 Timer Events

The SSDP: Networked Home Entertainment Devices (NHED) Extensions do not specify anything beyond what is specified by [UPNPARCH1].

3.2.7 Other Local Events

The SSDP: Networked Home Entertainment Devices (NHED) Extensions do not specify anything beyond what is specified by [UPNPARCH1].

4 Protocol Examples

A new device is set up and plugged in to the home network for the first time. When it is turned on, the device first sends over port 1900 a UDP multicast message of ssdp:byebye, and then, immediately afterward, a message of ssdp:alive. The ssdp:byebye message is sent just before the ssdp:alive message to ensure cancellation of any previously sent ssdp:alive message.

The following examples could be used for a particular Microsoft Xbox 360 device.

```
NOTIFY * HTTP/1.1
HOST:239.255.255.250:1900
NT:urn:schemas-microsoft-com:nhed:presence:1
NTS:ssdp:byebye
LOCATION:*
USN:uuid:00000000-0000-0000-0200-00125A8A0960::urn:schemas-microsoft-
com:nhed:presence:1
```

```
NOTIFY * HTTP/1.1
HOST:239.255.255.250:1900
NT:urn:schemas-microsoft-com:nhed:presence:1
NTS:ssdp:alive
LOCATION:*
CACHE-CONTROL:max-age=4
AL:<urn:schemas-microsoft-com:nhed:attributes?type=X02&firmwarever=
5766.0&udn=uuid:10000000-0000-0000-0200-00125A8A0960>
USN:uuid:00000000-0000-0000-0200-00125A8A0960::urn:schemas-microsoft-
com:nhed:presence:1
SERVER:dashboard/1.0 UpnP/1.0 xbox/2.0
```

Note In these examples, the NT, USN, and AL header values are placeholders to be replaced by application-specific values.

The device continues to resend these messages every 5 seconds until a control point that is listening on the network for this ssdp:alive message responds with the appropriate behavior. The contract between the control point and the device for the expected control point response behavior is outside the scope of this protocol. However, as an example, a device could listen on an agreed-upon TCP port, and when the control point connects to this TCP port (in response to having received a device ssdp:alive message) the device could assume it has been discovered and cease sending the SSDP messages.

5 Security

5.1 Security Considerations for Implementers

The SSDP: Networked Home Entertainment Devices (NHED) Extensions do not specify anything beyond what is specified by [UPNPARCH1].

5.2 Index of Security Parameters

There are no security parameters for the SSDP: Networked Home Entertainment Devices (NHED) Extensions.

6 Appendix A: Product Behavior

The information in this specification is applicable to the following Microsoft products or supplemental software. References to product versions include released service packs:

- Windows Vista operating system
- Windows 7 operating system
- Windows 8 operating system
- Windows 8.1 operating system

Exceptions, if any, are noted below. If a service pack or Quick Fix Engineering (QFE) number appears with the product version, behavior changed in that service pack or QFE. The new behavior also applies to subsequent service packs of the product unless otherwise specified. If a product edition appears with the product version, behavior is different in that product edition.

Unless otherwise specified, any statement of optional behavior in this specification that is prescribed using the terms SHOULD or SHOULD NOT implies product behavior in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term MAY implies that the product does not follow the prescription.

7 Change Tracking

This section identifies changes that were made to the [MS-SSDP] protocol document between the January 2013 and August 2013 releases. Changes are classified as New, Major, Minor, Editorial, or No change.

The revision class **New** means that a new document is being released.

The revision class **Major** means that the technical content in the document was significantly revised. Major changes affect protocol interoperability or implementation. Examples of major changes are:

- A document revision that incorporates changes to interoperability requirements or functionality.
- An extensive rewrite, addition, or deletion of major portions of content.
- The removal of a document from the documentation set.
- Changes made for template compliance.

The revision class **Minor** means that the meaning of the technical content was clarified. Minor changes do not affect protocol interoperability or implementation. Examples of minor changes are updates to clarify ambiguity at the sentence, paragraph, or table level.

The revision class **Editorial** means that the language and formatting in the technical content was changed. Editorial changes apply to grammatical, formatting, and style issues.

The revision class **No change** means that no new technical or language changes were introduced. The technical content of the document is identical to the last released version, but minor editorial and formatting changes, as well as updates to the header and footer information, and to the revision summary, may have been made.

Major and minor changes can be described further using the following change types:

- New content added.
- Content updated.
- Content removed.
- New product behavior note added.
- Product behavior note updated.
- Product behavior note removed.
- New protocol syntax added.
- Protocol syntax updated.
- Protocol syntax removed.
- New content added due to protocol revision.
- Content updated due to protocol revision.
- Content removed due to protocol revision.
- New protocol syntax added due to protocol revision.

- Protocol syntax updated due to protocol revision.
- Protocol syntax removed due to protocol revision.
- New content added for template compliance.
- Content updated for template compliance.
- Content removed for template compliance.
- Obsolete document removed.

Editorial changes are always classified with the change type **Editorially updated.**

Some important terms used in the change type descriptions are defined as follows:

- **Protocol syntax** refers to data elements (such as packets, structures, enumerations, and methods) as well as interfaces.
- **Protocol revision** refers to changes made to a protocol that affect the bits that are sent over the wire.

The changes made to this document are listed in the following table. For more information, please contact protocol@microsoft.com.

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
6 Appendix A: Product Behavior	Modified this section to include references to Windows 8.1 operating system.	Y	Content updated.

8 Index

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