[MS-UPMC]:
UPnP Device and Service Templates:
Media Property and Compatibility Extensions

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Revision Summary

Date	Revision History	Revision Class	Comments
01/29/2010	0.1	Major	First Release.
03/12/2010	0.1.1	Editorial	Revised and edited the technical content.
04/23/2010	0.1.2	Editorial	Revised and edited the technical content.
06/04/2010	0.1.3	Editorial	Revised and edited the technical content.
07/16/2010	0.1.3	No change	No changes to the meaning, language, or formatting of the technical content.
08/27/2010	1.0	Major	Significantly changed the technical content.
10/08/2010	1.0	No change	No changes to the meaning, language, or formatting of the technical content.
11/19/2010	1.0	No change	No changes to the meaning, language, or formatting of the technical content.
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Contents

1 Introduction

This document defines the **Microsoft Media Property Extensions (MMPE)**, the **Microsoft Compatibility Extension Flags (MCEF)**, and the **Microsoft Power Management Extensions (MPME)** to the **Universal Plug and Play (UPnP)** interoperability guidelines, as specified by the UPnP Forum [UPnP] and used by the **Digital Living Network Alliance (DLNA)** [DLNA].

1.1 Glossary

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

Hypertext Transfer Protocol (HTTP)
Universal Plug and Play (UPnP)
UTF-8
XML

The following terms are specific to this document:

device description document (DDD): A document used to specify device information and its capabilities, as described in the **UPnP** standard [UPnP].

digital item declaration language (DIDL-Lite): A subset of the Digital Item Declaration Language (DIDL), which is an **XML** dialect developed within ISO/MPEG21 [MPEG-21].

Digital Living Network Alliance (DLNA): A cross-industry organization of leading consumer electronics, computing industry, and mobile device companies, which are focused on delivering interoperability guidelines, based upon open industry standards, in order to complete the cross-industry digital convergence.

digital media player (DMP): A Device Class that is defined in the **DLNA guidelines**. A **DMP** implements an **UPnP** AV control point that issues actions to a **DMS** with unexposed **DMR** functionality.

digital media reader (DMR): A Device Class that is defined in the **DLNA guidelines**. A **DMR** is a **UPnP** Device that implements the **UPnP** MediaRenderer Device type.

digital media server (DMS): A Device Class that is defined in the **DLNA guidelines**. A **DMS** is a **UPnP** Device that implements the **UPnP** MediaServer Device type.

DLNA guidelines: The DLNA Networked Device Interoperability Guidelines [DLNA] consist of three volumes that provide vendors with the information required to build interoperable networked platforms and devices for the digital home, including architecture and protocols, profiles for media formats, and link protection.

Microsoft Compatibility Extension Flags (MCEF): Flags provided by **DMRs** and **DMPs** to filter specific **res** elements exposed to these devices.

Microsoft Media Property Extensions (MMPE): Additional metadata properties that describe a media item that further enriches the metadata properties defined by [UPnP].

Microsoft Power Management Extensions (MPME): **XML** tags used to communicate the devices support of magic packets.

Real-Time Streaming Protocol (RTSP): As specified in [RFC2326].

res: Identifies a resource. A resource is typically some type of a binary asset, such as a photo, song, video, etc. A **res** element contains an URI that identifies the resource.

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

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.

[DLNA] Digital Living Network Alliance, "The DLNA Networked Device Interoperability Guidelines", http://www.dlna.org/industry/certification/guidelines/

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

[MS-DTYP] Microsoft Corporation, "Windows Data Types", January 2007.

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

[RFC3629] Yergeau, F., "UTF-8, A Transformation Format of ISO 10646", STD 63, RFC 3629, November 2003, http://www.ietf.org/rfc/rfc3629.txt

[RFC5234] Crocker, D., Ed., and Overell, P., "Augmented BNF for Syntax Specifications: ABNF", STD 68, RFC 5234, January 2008, http://www.ietf.org/rfc/rfc5234.txt

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

[XML10] World Wide Web Consortium, "Extensible Markup Language (XML) 1.0 (Third Edition)", February 2004, http://www.w3.org/TR/REC-xml

1.2.2   Informative References

[MPEG-21] Various, "ISO/IEC 21000 - Multimedia framework (MPEG-21)", http://www.upnp.org/schemas/av/didl-lite-v2.xsd

[MS-DLNHND] Microsoft Corporation, "Digital Living Network Alliance (DLNA) Networked Device Interoperability Guidelines: Microsoft Extensions", January 2010.

[MS-GLOS] Microsoft Corporation, "Windows Protocols Master Glossary", March 2007.

[MS-REMSI] Microsoft Corporation, "Remote Media Streaming Initiation Protocol Specification", January 2010.

[RFC2326] Schulzrinne, H., Rao, A., and Lanphier, R., "Real Time Streaming Protocol (RTSP)", RFC 2326, April 1998, http://www.ietf.org/rfc/rfc2326.txt

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

Release: Friday, February 4, 2011

[UPNPCDS1] UPnP Forum, "ContentDirectory:1 Service Template Version 1.01", June 2002, http://www.upnp.org/standardizeddcps/documents/ContentDirectory1.0.pdf

1.3 Overview

Microsoft Compatibility Extension Flags (MCEF) are used to request specific device behavior(s) to enhance interoperability among UPnP Devices. For example, device manufacturers can develop a UPnP capable network device in order to retrieve information about the media content that is exposed to the network by a **digital media server (DMS)**. Such a device is enabled to include the MCEFs in its **device description document (DDD)** or User-Agent Header in order to tailor the metadata attributes in the **XML** responses that are provided by the DMS during interaction for enhanced interoperability.

Microsoft Media Property Extensions (MMPE) are used to expose several media content properties that are defined by Microsoft. These properties are generally not expressible, or are difficult to express, with the existing UPnP metadata attributes. In order to provide the expected query results with the existing attributes, additional processing capabilities are required on the device. For example, by using the additional properties defined by Microsoft, the device is relieved of the "heavy-lifting" involved in generating similar results and is enabled to provide a richer media browsing experience to their users.

Microsoft Power Management Extensions (MPME) are used to expose UPnP Device capabilities for power management. For example, a UPnP Device can support sleep mode and accept wake requests from other UPnP Devices. At the same time, a UPnP Device can support waking other UPnP Devices.

1.4 Relationship to Protocols and Other Structures

MMPE are extensions to the XML syntax called **DIDL-Lite**, which are defined in the UPnP ContentDirectory service specification. For more information, see [UPNPCDS1] Appendix A.

MPME are extensions to the XML syntax for UPnP DDDs. The DDDs are defined in [UPNPARCH1] section 2.1.

MMPE, MCEF, and MPME can be used in implementations of the Digital Living Network Alliance (DLNA) Home Networked Device Interoperability Guidelines: Microsoft Extensions [MS-DLNHND].

MMPE and MCEF can be used by implementers of the Remote Media Streaming Initiation Protocol [MS-REMSI].

1.5 Applicability Statement

The MMPE and MCEF are only applicable to implementations of the Microsoft Extensions to the Digital Living Network Alliance (DLNA) Home Networked Device Interoperability Guidelines [MS-DLNHND] and to implementations of the Remote Media Streaming Initiation Protocol [MS-REMSI].

The MPME is only applicable to implementations of the Microsoft Extensions to the Digital Living Network Alliance (DLNA) Home Networked Device Interoperability Guidelines.

Implementations of the MMPE and/or MCEF and/or MPME are not required in order to interoperate with Windows. The Media Property and Compatibility Extensions enhance the Digital Living Network Alliance (DLNA) Home Networked Device Interoperability Guidelines and the Remote Media Streaming Initiation Protocol without breaking interoperability.

Implementers are recommended to consider whether or not the MMPE and/or MCEF and/or MPME are applicable to their scenarios in order to provide a richer multimedia experience.

1.6 Versioning and Localization

The MMPE, MCEF, and MPME do not support versioning.

The MMPE, MCEF, and MPME do not explicitly address localization. However, these Microsoft Extensions use the **UTF-8** character set, as specified in [DLNA] section 7.2.5.9 and [RFC3629].

1.7 Vendor-Extensible Fields

None.

2 Structures

This protocol references commonly used data types, as defined in [MS-DTYP].

2.1 MMPE

Each MMPE is a property that describes a media item, where all but one of the properties can be included in a DIDL-Lite XML document. In the case of the property that is not included, the name of the property is used as the name of an XML tag that is included within a <desc> XML tag, which itself is included within an <item> tag that contains all of the tags associated with the media item.

The properties can also be specified as input parameters to the UPnP ContentDirectory [UPNPCDS1] service Search and Browse actions, wherever those actions allow properties to be used. For example, the ContentDirectory service Search action allows property names to be used to formulate a search query.

- The sourceURL property (section 2.1.5) cannot appear in DIDL-Lite

- The XML tags MUST follow the syntax rules for XML defined in [XML10]. Unless otherwise specified, any characters in the value of an XML tag MUST be escaped, using the XML escaping mechanism defined in [XML10] section 2.4.

- The syntax of each tag is specified using ABNF [RFC5234].

2.1.1 Artist Properties

A group of XML properties that supports various artist roles, which is included in the multimedia content, such as album artist, performer (also known as a contributing artist), and conductor. Support for the artist properties enables devices to provide results for queries such as "browse by performer, and then find albums by the selected performer".

2.1.1.1 artistAlbumArtist

This property specifies the name of an artist that is listed on the album when the media item is part of an album (i.e., a music album). For some albums, the name of the album artist can differ from the name of the artist of individual songs.

Multiple instances of this property are allowed.

The syntax of the property is defined as follows:

PropertyName = "microsoft:artistAlbumArtist"; UTF-8

PropertyValue = ALPHA; UTF-8

MMPE = "<" PropertyName ">" PropertyValue "</" PropertyName ">";

2.1.1.2 artistPerformer

This property specifies the name of a performing artist that is associated with the media item.

Multiple instances of this property are allowed.

The syntax of the property is defined as follows:

PropertyName = "microsoft:artistPerformer"; UTF-8

PropertyValue = ALPHA; UTF-8

MMPE = "<" PropertyName ">" PropertyValue "</" PropertyName ">";

2.1.1.3 artistConductor

This property specifies the name of a conductor (typically, a musical conductor) that is associated with the media item.

Multiple instances of this property are allowed.

The syntax of the property is defined as follows:

PropertyName = "microsoft:artistConductor"; UTF-8

PropertyValue = ALPHA; UTF-8

MMPE = "<" PropertyName ">" PropertyValue "</" PropertyName ">";

2.1.2 Author Properties

A group of properties that supports various roles that one or more authors can have in multimedia content: Composer, Original Lyricist, or Writer. Support for the Author attributes enables devices to provide results for queries such as "browse by composer, and then find genres for the selected composer".

2.1.2.1 authorComposer

Specifies the name of a composer (typically, a musical composer) that is associated with the media item.

Multiple instances of this property are allowed.

The syntax of the property is defined as follows:

PropertyName = "microsoft:authorComposer"; UTF-8

PropertyValue = ALPHA; UTF-8

MMPE = "<" PropertyName ">" PropertyValue "</" PropertyName ">";

2.1.2.2 authorOriginalLyricist

This property specifies the name of a person who created the original lyrics of the media item.

Multiple instances of this property are allowed.

The syntax of the property is defined as follows:

PropertyName = "microsoft:authorOriginalLyricist"; UTF-8

PropertyValue = ALPHA; UTF-8

MMPE = "<" PropertyName ">" PropertyValue "</" PropertyName ">";

2.1.2.3   authorWriter

This property specifies the name of a person who is considered the writer of the media item.

Multiple instances of this property are allowed.

The syntax of the property is defined as follows:

PropertyName = "microsoft:authorWriter"; UTF-8

PropertyValue = ALPHA; UTF-8

MMPE = "<" PropertyName ">" PropertyValue "</" PropertyName ">";

2.1.3   Ratings Properties

The Ratings properties support metadata that is supplied from both the user and from the metadata provider. These properties allow devices to provide "prioritized" or "scoped" results to end users based on their preferences. This enables a user, for example, to choose to browse only musical content that has been rated at "5 or more stars".

There are four Ratings-related properties:

- userRating and userEffectiveRating represent the user rating (if present) and an automatic rating, respectively. The values of the userRating and userEffectiveRating properties are expressed as a number, in the range between 0 and 99, inclusive.

- userRatingInStars and userEffectiveRatingInStars represent the same information as userRating and userEffectiveRating, respectively. The values of the userRatingInStars and userEffectiveRatingInStars properties are expressed as a number, in the range between 0 and 5, inclusive.

At most, one instance of each property is allowed.

2.1.3.1   userRating

The syntax of the property is defined as follows:

PropertyName = "microsoft:userRating"; UTF-8

PropertyValue = 1*2DIGIT; unsigned integer ranges from 0 to 99

MMPE = "<" PropertyName ">" PropertyValue "</" PropertyName ">";

2.1.3.2   userEffectiveRating

The syntax of the property is defined as follows:

PropertyName = "microsoft:userEffectiveRating"; UTF-8

PropertyValue = 1*2DIGIT; unsigned integer ranges from 0 to 99

MMPE = "<" PropertyName ">" PropertyValue "</" PropertyName ">";

2.1.3.3   userRatingInStars

The syntax of the property is defined as follows:

PropertyName = "microsoft:userRatingInStars"; UTF-8

PropertyValue = "0" / "1" / "2" / "3" / "4" / "5"; unsigned integer ranges from 0 to 5

MMPE = "<" PropertyName ">" PropertyValue "</" PropertyName ">";

2.1.3.4   userEffectiveRatingInStars

The syntax of the property is defined as follows:

PropertyName = "microsoft:userEffectiveRatingInStars"; UTF-8

PropertyValue = "0" / "1" / "2" / "3" / "4" / "5"; unsigned integer ranges from 0 to 5

MMPE = "<" PropertyName ">" PropertyValue "</" PropertyName ">";

2.1.4   serviceProvider

The serviceProvider property represents the name of the distributor of the media item. The serviceProvider property allows devices to return results categorized by the entity that provided the content.

Multiple instances of this property are allowed.

The syntax of the property is defined as follows:

PropertyName = "microsoft:serviceProvider"; UTF-8

PropertyValue = ALPHA; UTF-8

MMPE = "<" PropertyName ">" PropertyValue "</" PropertyName ">";

2.1.5   sourceURL

The sourceURL property supports the grouping of results by file system path, which enables a device to group media files by parent folder. For example, the device can return results that enumerate all of the pictures in the "January Ski Trip to Canada" folder.

Note The use of the "ParentID" attribute can provide results similar to sourceURL, but only for a container hierarchy that replicates the file system hierarchy.

At most, one instance of each property is allowed.

The syntax of the property is defined as follows:

PropertyName = "microsoft:sourceURL"; UTF-8

PropertyValue = ALPHA; UTF-8

MMPE = "<" PropertyName ">" PropertyValue "</" PropertyName ">";

2.1.6   year

The year property enables the organization of multimedia content based solely on year, whereas the commonly-used "dc:date" UPnP property provides the whole date. For example, use of the year property enables a device to more easily return results for all of the pictures taken in "2006".

The syntax of the property is defined as follows:

PropertyName = "microsoft:year"; UTF-8

PropertyValue = 4DIGIT; unsigned integer, format YYYY

MMPE = "<" PropertyName ">" PropertyValue "</" PropertyName ">";

2.1.7 folderPath

The folderPath property represents a folder path to the media item, relative to a root folder.

At most, one instance of each property is allowed.

The syntax of the property is defined as follows:

PropertyName = "microsoft:folderPath"; UTF-8

PropertyValue = ALPHA; UTF-8

MMPE = "<" PropertyName ">" PropertyValue "</" PropertyName ">";

2.2 MCEF

MCEFs are used to define specific behavior(s) for a particular device in order to enhance interoperability. The flags can be provided by a **DMP**, or **digital media reader (DMR)** via its User-Agent header, as described in [MS-DLNHND] or its DDD, as defined in [UPNPARCH1] section 2.1. To provide the flag, the device MUST specify the Microsoft-defined microsoft:X_DeviceCaps tag within the Device node of the DDD, as shown in section 3.2.1. The syntax to follow for this tag is specified using ABNF [RFC5234], as follows:

CompatibilityFlag= 1*DIGIT ; it is the decimal numerical representation of the bitwise-OR operation among the hexadecimal flags used, as defined in section 2.2.1;

```
<microsoft:X_DeviceCaps xmlns:microsoft="urn:schemas-microsoft-com:WMPNSS-1-
0"/>CompatibilityFlag</microsoft:X_DeviceCaps>
```

Note The Microsoft-defined microsoft:X_DeviceCaps attribute does not change in any respect the manner regarding how DDDs are made available to other devices in the network as, described by [UPNPARCH1].

2.2.1 Compatibility Flag Values and Behaviors

Any flag value that is not documented in this section is considered reserved and SHOULD not be used.

2.2.1.1 WMC_COMPAT_EXCLUDE_HTTP

This flag causes a DMS to exclude **res** and upnp:albumArtURI elements in the DIDL-Lite response of the Browse or Search UPnP actions that implement the **HTTP** protocol in their URLs, as specified in [UPnP].

Value: %x1

This flag affects the response of UPnP Actions: ContentDirectory:Browse, ContentDirectory:Search, and ConnectionManager:GetProtocolInfo.

```
<res duration="0:03:20.000" bitrate="24000" protocolInfo="http-
get:*:audio/mpeg:DLNA.ORG_PN=MP3;DLNA.ORG_OP=01;DLNA.ORG_FLAGS=0150000000000000000000000000000
00" sampleFrequency="44100" bitsPerSample="16" nrAudioChannels="2"
microsoft:codec="{00000055-0000-0010-8000-00AA00389B71}" xmlns:microsoft="urn:schemas-
microsoft-com:WMPNSS-1-
0/">http://127.0.0.1:10243/WMPNSSv4/2815481477/0_ezI0OTI3N0I5LUU2MUQtNDdEMi05MTI3LTJBNjFDOTFG
M0M5N30uMC40.mp3</res>
<upnp:albumArtURI dlna:profileID="JPEG_TN" xmlns:dlna="urn:schemas-dlna-org:metadata-1-
0/">http://127.0.0.1:10243/WMPNSSv4/2815481477/ezI0OTI3N0I5LUU2MUQtNDdEMi05MTI3LTJBNjFDOTFGM0
M5N30uMC40.jpg?albumArt=true,formatID=13</upnp:albumArtURI>
```

The ProtocolInfo string reflects the support of only non-HTTP transport-dependent formats. Any ProtocolInfo specified by using http-get:*:*:*MUST be excluded from the response. For more information regarding the syntax of the ProtocolInfo string, see [UPnP].

Note This flag MUST NOT be used in combination with WMC_COMPAT_EXCLUDE_RTSP.

2.2.1.2   WMC_COMPAT_EXCLUDE_RTSP

This flag causes a DMS to exclude res elements in the DIDL-Lite response of the Browse or Search UPnP actions that implement the **RTSP** protocol in their URLs, as specified by [UPnP]. Elements in the DIDL-Lite response, as demonstrated in the following syntax block, MUST be removed with the use of this flag.

Value: %x2

This flag affects the response of UPnP Actions: ContentDirectory:Browse, ContentDirectory:Search, and ConnectionManager:GetProtocolInfo.

```
<res duration="0:03:20.000" bitrate="24000" protocolInfo="rtsp-rtp-
udp:*:audio/mpeg:DLNA.ORG_PN=MP3;DLNA.ORG_OP=10;DLNA.ORG_FLAGS=8310000000000000000000000000000
00;DLNA.ORG_MAXSP=5" sampleFrequency="44100" bitsPerSample="16" nrAudioChannels="2"
microsoft:codec="{00000055-0000-0010-8000-00AA00389B71}" xmlns:microsoft="urn:schemas-
microsoft-com:WMPNSS-1-
0/">rtsp://127.0.0.1:554/WMPNSSv4/2815481477/0_ezI0OTI3N0I5LUU2MUQtNDdEMi05MTI3LTJBNjFDOTFGM0
M5N30uMC40.mp3</res>
```

A consequence of constructing the DIDL-Lite response as shown in this example, is that the ProtocolInfo string MUST reflect the support of only non-RTSP transport-dependent formats. Any ProtocolInfo string that is specified by using rtsp-rtp-udp:*:*:*MUST be excluded from the response. For more information regarding the syntax of the ProtocolInfo string, see [UPnP].

Note This flag MUST NOT be used in combination with **WMC_COMPAT_EXCLUDE_HTTP** because at least one protocol (either HTTP or RTSP) SHOULD be enabled. This flag MUST NOT be used in combination with WMC_COMPAT_INCLUDE_RTSP_FOR_VIDEO.

2.2.1.3   WMC_COMPAT_EXCLUDE_DLNA

This flag causes a DMS to exclude all DLNA-defined attributes and parameters in the DIDL-Lite responses given by the Browse or Search UPnP actions, as specified by [UPnP].

Value: %x4

This flag affects the response of UPnP Actions: ContentDirectory:Browse, ContentDirectory:Search, and ConnectionManager:GetProtocolInfo.

Note The dlna:profileID and xmlns:dlna attributes MUST NOT be included in the upnp:albumArtURI nodes.

```
<upnp:albumArtURI dlna:profileID="JPEG_SM" xmlns:dlna="urn:schemas-dlna-org:metadata-1-
0/">http://127.0.0.1:10243/WMPNSSv4/2815481477/0_ezI0OTI3N0I5LUU2MUQtNDdEMi05MTI3LTJBNjFDOTFG
M0M5N30uMC40.jpg?albumArt=true</upnp:albumArtURI>
```

The following content feature flags MUST also be removed from the protocolInfo attribute of res nodes:

- DLNA.ORG_PN

- DLNA.ORG_OP

- DLNA.ORG_PS

- DLNA.ORG_CI

- DLNA.ORG_FLAGS

- DLNA.ORG_MAXSP

```
<res duration="0:03:20.000" bitrate="24000" protocolInfo="http-
get:*:audio/mpeg:DLNA.ORG_PN=MP3;DLNA.ORG_OP=01;DLNA.ORG_FLAGS=015000000000000000000000000000
00" sampleFrequency="44100" bitsPerSample="16" nrAudioChannels="2"
microsoft:codec="{00000055-0000-0010-8000-00AA00389B71}" xmlns:microsoft="urn:schemas-
microsoft-com:WMPNSS-1-
0/">http://127.0.0.1:10243/WMPNSSv4/2815481477/0_ezI0OTI3N0I5LUU2MUQtNDdEMi05MTI3LTJBNjFDOTFG
M0M5N30uMC40.mp3</res>
```

Because some devices fall down if the string DLNA exists in the protocol response, the WMC_COMPAT_EXCLUDE_DLNA_1_5 compatibility flag MUST be set to indicate that the specified attributes have not been included in the upnp:albumArtURI and res nodes. Setting this compatibility flag causes the server to not include the DLNA string as specified in the XML response.

Moreover, because DLNA support is non-existent if the WMC_COMPAT_INCLUDE_RTSP_FOR_VIDEO flag has been set, it MUST be ignored. By setting this flag, RTSP-based URLs will be excluded from res nodes in the case of video content.

Note In order to preserve backwards compatibility, when the WMC_COMPAT_EXCLUDE_RTSP flag is included within the descriptor <desc> tag, it can be escaped as described in [MS-DLNHND] section 3.4.5.1.

In the case of the UPnP action ConnectionManager:GetProtocolInfo, all format support information MUST NOT contain protocol information that announces DLNA profiles, as specified in [DLNA].

```
http-get:*:audio/x-ms-wma:DLNA.ORG_PN=WMABASE
```

Note The XML tags can be escaped, as described in section 3.1 of this document, when this compatibility flag is used.

2.2.1.4   WMC_COMPAT_EXCLUDE_DLNA_1_5

This flag causes a DMS to map the DLNA Profile ID "MP3X" to "MP3", and to map the DLNA Profile IDs "WMVSPLL_BASE" and "WMVSPML_BASE" to "WMVMED_BASE". In addition, this flag causes the

DLNA Profile ID for any media item whose DLNA Profile ID begins with "WMDRM_" to be omitted. When this flag is used, all URLs MUST have a file extension, such as ".mp3" for MP3 content and ".pcm" for LPCM content.

Value: %x8

This flag affects the response of UPnP Actions: ContentDirectory:Browse, ContentDirectory:Search, and ConnectionManager:GetProtocolInfo.

```
<res duration="0:03:20.000" bitrate="24000" protocolInfo="http-
get:*:audio/mpeg:DLNA.ORG_PN=MP3;DLNA.ORG_OP=01;DLNA.ORG_FLAGS=015000000000000000000000000000
00" sampleFrequency="44100" bitsPerSample="16" nrAudioChannels="2"
microsoft:codec="{00000055-0000-0010-8000-00AA00389B71}" xmlns:microsoft="urn:schemas-
microsoft-com:WMPNSS-1-
0/">http://127.0.0.1:10243/WMPNSSv4/2815481477/1_ezI0OTI3N0I5LUU2MUQtNDdEMi05MTI3LTJBNjFDOTFG
M0M5N30uMC40.mp3</res>
```

Note The XML tags can be escaped, as described in section <u>3.1</u> of this document, when this compatibility flag is used.

2.2.1.5   WMC_COMPAT_EXCLUDE_PCMPARAMS

This flag causes a DMS to exclude sample rate and channels information from the protocolInfo attribute in the res element for audio/L16 and audio/L8 MIME types.

Value: %x10

This flag affects the response of UPnP Actions: ContentDirectory:Browse and ContentDirectory:Search.

```
<res duration="0:03:20.000" bitrate="176400" protocolInfo="http-
get:*:audio/L16;rate=44100;channels=2:DLNA.ORG_PN=LPCM;DLNA.ORG_OP=10;DLNA.ORG_CI=1;DLNA.ORG_
FLAGS=015000000000000000000000000000" sampleFrequency="44100" bitsPerSample="16"
nrAudioChannels="2" microsoft:codec="{00000001-0000-0010-8000-00AA00389B71}"
xmlns:microsoft="urn:schemas-microsoft-com:WMPNSS-1-
0/">http://127.0.0.1:10243/WMPNSSv4/2815481477/ezI0OTI3N0I5LUU2MUQtNDdEMi05MTI3LTJBNjFDOTFGM0
M5N30uMC40?formatID=20</res>
```

2.2.1.6   WMC_COMPAT_EXCLUDE_WMDRMND

This flag causes a DMS to not generate res tags where the URL requires the use of WMDRM-ND.

Value: %x20

This flag affects the response of UPnP Actions: ContentDirectory:Browse and ContentDirectory:Search.

2.2.1.7   WMC_COMPAT_INCLUDE_RTSP_FOR_VIDEO

This flag causes a DMS to include res tags with RTSP-based URLs for video even if <u>WMC_COMPAT_EXCLUDE_RTSP</u> and/or <u>WMC_COMPAT_EXCLUDE_DLNA_1_5</u> are set.

Value: %x40

This flag affects the response of UPnP Actions: ContentDirectory:Browse and ContentDirectory:Search.

2.2.1.8   WMC_COMPAT_EXCLUDE_WMALOSSLESS_NONTRANSCODED

This flag causes a DMS to not generate res tags with URLs for non-transcoded WMA Lossless content. This flag MUST be ignored if used in combination with WMC_COMPAT_EXCLUDE_RES_FILTERING.

Value: %x80

This flag affects the response of UPnP Actions: ContentDirectory:Browse and ContentDirectory:Search.

2.2.1.9   WMC_COMPAT_EXCLUDE_SEARCH

This flag causes the ContentDirectory:Search UPnP action to not be supported for this DMS. In order to accomplish this action, ContentDirectory:GetSearchCapabilities MUST NOT provide any search capabilities.

Value: %x100

This flag affects the response of UPnP Actions: ContentDirectory:Search and ContentDirectory:GetSearchCapabilities.

2.2.1.10   WMC_COMPAT_DO_NOT_LIMIT_RESPONSE_SIZE

This flag causes the DIDL-Lite responses to not be limited to 200 kB in size for these UPnP actions.

Value: %x400

This flag affects the response of UPnP Actions: ContentDirectory:Browse and ContentDirectory:Search.

2.2.1.11   WMC_COMPAT_EXCLUDE_VIDEO_TRANSCODING

This flag causes a DMS to not offer res tags with URLs that correspond to transcoded versions of video items. This flag MUST be ignored if used in combination with WMC_COMPAT_EXCLUDE_RES_FILTERING.

Value: %x800

This flag affects the response of UPnP Actions: ContentDirectory:Browse and ContentDirectory:Search.

2.2.1.12   WMC_COMPAT_PLAYLIST_FAKECHILDCOUNT

This flag causes a value of "1" to be returned for the child count of playlists containers. This flag is used to counteract the reduction in performance caused by calculating the "real" child count for playlist container.

Value: %x1000

This flag affects the response of UPnP Actions: ContentDirectory:Browse and ContentDirectory:Search.

2.2.1.13   WMC_COMPAT_EXCLUDE_NONPCM_AUDIO_TRANSCODING

This flag causes res tags with URLs that correspond to transcoded versions of audio items to not be offered, unless the res tag is for an audio item transcoded into LPCM. This flag MUST be ignored if used in combination with WMC_COMPAT_EXCLUDE_RES_FILTERING.

Value: %x2000

This flag affects the response of UPnP Actions: ContentDirectory:Browse and ContentDirectory:Search.

2.2.1.14   WMC_COMPAT_EXCLUDE_TRANSCODING_TO_MPEG2

This flag causes res tags with URLs that correspond to transcoded versions of video items into the MPEG-2 format to not be offered. This flag MUST be ignored if used in combination with WMC_COMPAT_EXCLUDE_RES_FILTERING.

Value: %x4000

This flag affects the response of UPnP Actions: ContentDirectory:Browse and ContentDirectory:Search.

2.2.1.15   WMC_COMPAT_EXCLUDE_RES_FILTERING

All DIDL-Lite responses from a DMS MUST contain all applicable transcoding res elements associated to the requested media.

Value: %x8000

This flag affects the response of UPnP Actions: ContentDirectory:Browse and ContentDirectory:Search.

2.3   MPME

MPMEs are used to signal support for specific behaviors for a particular device in order to enhance power management. The MPME XML tags can be provided by a DMR or a DMS in its DDD, as described in [UPNPARCH1] section 2.1. This section defines the MPME XML tags.

2.3.1   Magic Packets

This section defines MPME XML tags for indicating support for magic packets. For more information about magic packets, see [MS-DLNHND] section 2.2.5.

2.3.1.1   microsoft:magicPacketWakeSupported

This is an XML tag that a UPnP device provides in its DDD to announce that it can be awakened by the use of a magic packet.<1>

For more information about the syntax of magic packet, see [MS-DLNHND] section 2.2.5.

An UPnP device MUST only provide this information if it implements a low power mode of operation.

An UPnP device that can be woken from a low power mode MUST provide the following tag in its DDD:

flag = "1" / "0"; true or false, respectively.

```
<microsoft:magicPacketWakeSupported xmlns:microsoft="urn:schemas-microsoft-com:WMPNSS-1-
0">flag</microsoft:magicPacketWakeSupported>
```

2.3.1.2   microsoft:magicPacketSendSupported

This is an XML tag that a UPnP device provides in its DDD to announce whether the device is able to wake a sleeping UPnP device.<2> The following syntax shows how the element is used to announce this capability.

flag = "1" / "0"; true or false respectively.

```
<microsoft:magicPacketSendSupported xmlns:microsoft="urn:schemas-microsoft-com:WMPNSS-1-
0">flag</microsoft:magicPacketSendSupported>
```

3   Structure Examples

3.1   MMPE Examples

In order to preserve backwards compatibility, XML tags inside the descriptor <desc> tag can be escaped. For more information, refer to [MS-DLNHND] section 3.4.5.1. For example, "<microsoft:artistAlbumArtist>" can appear as "<microsoft:artistAlbumArtist>" in the XML response.

3.1.1   Artist Properties Tags

The following is an example of the usage of the Artist properties in an XML response:

```
<desc id="Artist"  nameSpace="urn:schemas-microsoft-com:WMPNSS-1-0/"
xmlns:microsoft="urn:schemas-microsoft-com:WMPNSS-1-0/">
    <microsoft:artistAlbumArtist>Album</microsoft:artistAlbumArtist>
    <microsoft:artistPerformer>Performer</microsoft:artistPerformer>
    <microsoft:artistConductor>Conductor</microsoft:artistConductor>
</desc>
```

3.1.2   Author Properties Tags

The following is an example of the usage of the Author properties in an XML response:

```
<desc id="Author" nameSpace="urn:schemas-microsoft-com:WMPNSS-1-0/"
xmlns:microsoft="urn:schemas-microsoft-com:WMPNSS-1-0/">
    <microsoft:authorComposer>Composer</microsoft:authorComposer>
    <microsoft:authorOriginalLyricist>Lyricist</microsoft:authorOriginalLyricist>
    <microsoft:authorWriter>Writer</microsoft:authorWriter>
</desc
```

3.1.3   Ratings Properties Tags

The following is an example of the usage of the Ratings properties in an XML response:

```
<desc id="UserRating" nameSpace="urn:schemas-microsoft-com:WMPNSS-1-0/"
xmlns:microsoft="urn:schemas-microsoft-com:WMPNSS-1-0/">
    <microsoft:userRating>50</microsoft:userRating>
    <microsoft:userEffectiveRating>60</microsoft:userEffectiveRating>
    <microsoft:userRatingInStars>3</microsoft:userRatingInStars>
    <microsoft:userEffectiveRatingInStars>3</microsoft:userEffectiveRatingInStars>
</desc>
```

3.1.4   serviceProvider Property Tag

The following is an example of the usage of the serviceProvider property in an XML response:

```
<desc id="ServiceProvider" nameSpace="urn:schemas-microsoft-com:WMPNSS-1-0/"
xmlns:microsoft="urn:schemas-microsoft-com:WMPNSS-1-0/">
    <microsoft:serviceProvider>Service Provider</microsoft:serviceProvider>
</desc>
```

3.1.5 year Property Tag

The following is an example of the usage of the year property in an XML response:

```
<desc id="Year" nameSpace="urn:schemas-microsoft-com:WMPNSS-1-0/"
xmlns:microsoft="urn:schemas-microsoft-com:WMPNSS-1-0/">
    <microsoft:year>2004</microsoft:year>
</desc>
```

3.1.6 folderPath Property Tag

The following is an example of the usage of the folderPath property in an XML response: <3>

```
<desc id="folderPath" nameSpace="urn:schemas-microsoft-com:WMPNSS-1-0/"
xmlns:microsoft="urn:schemas-microsoft-com:WMPNSS-1-0/">
    <microsoft:folderPath>Audio\Songs</microsoft:folderPath>
</desc>
```

3.2 MCEF Examples

3.2.1 X_DeviceCaps Example

Device compatibility flags are specified in a DDD by using the following format:

```
<device>
    <UDN>uuid:00000000-1111-2222-3333-444444444444</UDN>
    <friendlyName>Sample Renderer</friendlyName>
    <deviceType>urn:schemas-upnp-org:device:MediaRenderer:1</deviceType>
    <manufacturer>Microsoft</manufacturer>
    ...
    <microsoft:X_DeviceCaps xmlns:microsoft="urn:schemas-microsoft-com:WMPNSS-1-
0"/>94</microsoft:X_DeviceCaps>
</device
```

Use of microsoft:X_DeviceCaps requires that the Microsoft XML namespace (urn:schemas-microsoft-com:WMPNSS-1-0) be specified in the DDD. The value for microsoft:X_DeviceCaps is given in decimal and represents a bitwise OR combination of the individual compatibility flag values described in section 2.2. In this example, the value of "94" for microsoft:X_DeviceCaps indicates the following compatibility flags:

- WMC_COMPAT_EXCLUDE_RTSP

- WMC_COMPAT_EXCLUDE_DLNA

- WMC_COMPAT_EXCLUDE_DLNA_1_5

- WMC_COMPAT_EXCLUDE_PCMPARAMS

- WMC_COMPAT_INCLUDE_RTSP_FOR_VIDEO

3.3 MPME Examples

3.3.1 magicPacketWakeSupported

The following example shows a DDD that announces that the UPnP device supports microsoft:magicPacketWakeSupported (section 2.3.1.1). <4>

```
<device>
    <UDN>uuid:00000000-1111-2222-3333-444444444444</UDN>
    <friendlyName>Sample Renderer</friendlyName>
    <deviceType>urn:schemas-upnp-org:device:MediaRenderer:1</deviceType>
    <manufacturer>Microsoft</manufacturer>
    ...
    <microsoft:magicPacketWakeSupported
      xmlns:microsoft="urn:schemas-microsoft-com:WMPNSS-1-0">1
      </microsoft:magicPacketWakeSupported>
</device>
```

3.3.2 magicPacketSendSupported

The following example shows a DDD that announces that the UPnP device supports microsoft:magicPacketSendSupported (section 2.3.1.2). <5>

```
<device>
    <UDN>uuid:00000000-1111-2222-3333-444444444444</UDN>
    <friendlyName>Sample Renderer</friendlyName>
    <deviceType>urn:schemas-upnp-org:device:MediaRenderer:1</deviceType>
    <manufacturer>Microsoft</manufacturer>
    ...
    <microsoft:magicPacketSendSupported
      xmlns:microsoft="urn:schemas-microsoft-com:WMPNSS-1-0">1
      </microsoft:magicPacketSendSupported>
</device>
```

4 Security Considerations

The MMPE and MCEF do not introduce any new security considerations beyond those that already apply to XML-based formats. Therefore, the same security considerations that pertain to the UPnP and **DLNA guidelines** also apply.

5   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® Home Server 2011 server software

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.

<1> Section 2.3.1.1: The microsoft:magicPacketWakeSupported XML tag is not supported in Windows Vista.

<2> Section 2.3.1.2: The microsoft:magicPacketSendSupported XML tag is not supported in Windows Vista.

<3> Section 3.1.6: The FolderPath XML tag is not supported in Windows Vista.

<4> Section 3.3.1: The microsoft:magicPacketWakeSupported XML tag is not supported in Windows Vista.

<5> Section 3.3.2: The microsoft:magicPacketSendSupported XML tag is not supported in Windows Vista.

6   Change Tracking

No table of changes is available. The document is either new or has had no changes since its last release.

7 Index

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