DHCP Client Profile

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This document’s normative language is English. Translation into other languages is permitted.
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Foreword

The DHCP Client Profile (DSP1037) was prepared by the Server Management Working Group, the Physical Platform Profiles Working Group and the Server Desktop Mobile Platforms Working Group of the DMTF.

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Introduction

The information in this specification should be sufficient for a provider or consumer of this data to identify unambiguously the classes, properties, methods, and values that shall be instantiated and manipulated to represent and manage a DHCP client.

The target audience for this specification is implementers who are writing CIM-based providers or consumers of management interfaces that represent the component described in this document.

Document conventions

Typographical conventions

The following typographical conventions are used in this document:

- Document titles are marked in *italics*.
- ABNF rules are in monospaced font.

ABNF usage conventions

Format definitions in this document are specified using ABNF (see RFC5234), with the following deviations:

- Literal strings are to be interpreted as case-sensitive Unicode characters, as opposed to the definition in RFC5234 that interprets literal strings as case-insensitive US-ASCII characters.

Deprecated material

Deprecated material is not recommended for use in new development efforts. Existing and new implementations may use this material, but they shall move to the favored approach as soon as possible. CIM service shall implement any deprecated elements as required by this document in order to achieve backwards compatibility. Although CIM clients may use deprecated elements, they are directed to use the favored elements instead.

Deprecated material should contain references to the last published version that included the deprecated material as normative material and to a description of the favored approach.

The following typographical convention indicates deprecated material:

```
DEPRECATED
```

Deprecation material appears here.

```
DEPRECATED
```

In places where this typographical convention cannot be used (for example, tables or figures), the "DEPRECATED" label is used alone.

Experimental material

Experimental material has yet to receive sufficient review to satisfy the adoption requirements set forth by the DMTF. Experimental material is included in this document as an aid to implementers who are interested in likely future developments. Experimental material may change as implementation experience is gained. It is likely that experimental material will be included in an upcoming revision of the document. Until that time, experimental material is purely informational.
The following typographical convention indicates experimental material:

---

EXPERIMENTAL

Experimental material appears here.

---

In places where this typographical convention cannot be used (for example, tables or figures), the "EXPERIMENTAL" label is used alone.
1 Scope

The DHCP Client Profile extends the management capability of referencing profiles by adding the capability to represent a DHCP client that is associated with an IP interface.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated or versioned references, only the edition cited (including any corrigenda or DMTF update versions) applies. For references without a date or version, the latest published edition of the referenced document (including any corrigenda or DMTF update versions) applies.

- DMTF DSP1033, Profile Registration Profile 1.0, https://www.dmtf.org/sites/default/files/standards/documents/DSP1033_1.0.pdf

3 Terms and definitions

In this document, some terms have a specific meaning beyond the normal English meaning. Those terms are defined in this clause.

The terms "shall" ("required"), "shall not", "should" ("recommended"), "should not" ("not recommended"), "may", "need not" ("not required"), "can" and "cannot" in this document are to be interpreted as described in ISO/IEC Directives, Part 2, Clause 7. The terms in parenthesis are alternatives for the preceding term, for use in exceptional cases when the preceding term cannot be used for linguistic reasons. Note that ISO/IEC Directives, Part 2, Clause 7 specifies additional alternatives. Occurrences of such additional alternatives shall be interpreted in their normal English meaning.

The terms "clause", "subclause", "paragraph", and "annex" in this document are to be interpreted as described in ISO/IEC Directives, Part 2, Clause 6.
The terms "normative" and "informative" in this document are to be interpreted as described in ISO/IEC Directives, Part 2, Clause 3. In this document, clauses, subclauses, or annexes labeled "(informative)" do not contain normative content. Notes and examples are always informative elements.

The terms defined in DSP0004, DSP0223, and DSP1001 apply to this document. The following additional terms are used in this document.

3.1 can
used for statements of possibility and capability, whether material, physical, or causal

3.2 cannot
used for statements of possibility and capability, whether material, physical, or causal

3.3 conditional
indicates requirements to be followed strictly to conform to the document when the specified conditions are met

3.4 mandatory
indicates requirements to be followed strictly to conform to the document and from which no deviation is permitted

3.5 may
indicates a course of action permissible within the limits of the document

3.6 need not
indicates a course of action permissible within the limits of the document

3.7 optional
indicates a course of action permissible within the limits of the document

3.8 referencing profile
indicates a profile that owns the definition of this class and can include a reference to this profile in its "Referenced Profiles" table

3.9 shall
indicates requirements to be followed strictly to conform to the document and from which no deviation is permitted

3.10 shall not
indicates requirements to be followed strictly to conform to the document and from which no deviation is permitted
should indicates that among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required

should not indicates that a certain possibility or course of action is deprecated but not prohibited

unspecified indicates that this profile does not define any constraints for the referenced CIM element or operation

### 4 Symbols and abbreviated terms

The following abbreviations are used in this document.

#### 4.1 DHCP
Dynamic Host Configuration Protocol

#### 4.2 IP
Internet Protocol

### 5 Synopsis

**Profile Name**: DHCP Client

**Version**: 1.0.4

**Organization**: DMTF

**CIM Schema Version**: 2.27

**Central Class**: CIM_DHCPProtocolEndpoint

**Scoping Class**: CIM_ComputerSystem

The **DHCP Client Profile** extends the capability of referencing profiles by adding the capability to manage a DHCP client and its associated capabilities and configuration. Table 1 identifies profiles on which this profile has a dependency.

<table>
<thead>
<tr>
<th>Profile Name</th>
<th>Organization</th>
<th>Version</th>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile Registration</td>
<td>DMTF</td>
<td>1.0</td>
<td>Mandatory</td>
<td>None</td>
</tr>
<tr>
<td>IP Interface</td>
<td>DMTF</td>
<td>1.0</td>
<td>Mandatory</td>
<td>See 7.2.1.</td>
</tr>
</tbody>
</table>

### 6 Description

The **DHCP Client Profile** extends the management capability of referencing profiles by adding the capability to represent a DHCP client and its associated capabilities and configuration. The DHCP client
is modeled with an instance of CIM_DHCPProtocolEndpoint. The DHCP client's capabilities are modeled with an instance of CIM_DHCPCapabilities. Aspects of the DHCP client's configuration are modeled with properties of DHCPProtocolEndpoint as well as with CIM_DHCPSettingData.

Figure 1 represents the class schema for the DHCP Client Profile. For simplicity, the prefix CIM_ has been removed from the names of the classes.

### Figure 1 – DHCP Client Profile: Class diagram

#### 7 Implementation

This clause details the requirements related to the arrangement of instances and properties of instances for implementations of this profile.

#### 7.1 DHCP server representation

When the DHCP client successfully acquires a configuration from a DHCP server, an instance of CIM_RemoteServiceAccessPoint shall represent the DHCP server from which the DHCP client received its configuration.
7.1.1 CIM_RemoteServiceAccessPoint.AccessInfo

The value of the AccessInfo property of each instance of CIM_RemoteServiceAccessPoint shall be the IP address of the DHCP server. If the value of CIM_RemoteServiceAccessPoint.InfoFormat is 3 (IPv4 Address), then the value of the property shall be expressed in dotted decimal notation as defined in IETF RFC1208.

If the value of CIM_RemoteServiceAccessPoint.InfoFormat is 4 (IPv6 Address), then the value of the property shall be expressed in the notation as defined in IETF RFC4291, section 2.2.

7.1.2 CIM_RemoteServiceAccessPoint.InfoFormat

The value of the InfoFormat property shall be a value of 3 (IPv4 Address) or a value of 4 (IPv6 Address).

7.1.3 Representing multiple DHCP servers

An instance of CIM_RemoteServiceAccessPoint may represent each DHCP server that responded to the client's DHCPDISCOVER message.

7.2 DHCP client representation

The DHCP client shall be modeled using an instance of CIM_DHCPProtocolEndpoint.

7.2.1 Relationship with CIM_IPProtocolEndpoint

The DHCP client is associated with a single IP interface, which is instrumented according to the IP Interface Profile (DSP1036). A single instance of CIM_SAPSAPDependency shall associate the Central Instance with the CIM_IPProtocolEndpoint defined in DSP1036.

7.2.1.1 CIM_SAPSAPDependency.Dependent

A reference to the CIM_DHCPProtocolEndpoint instance shall be the value of the Dependent property of the CIM_SAPSAPDependency instance.

7.2.1.2 CIM_SAPSAPDependency.Antecedent

A reference to the CIM_IPProtocolEndpoint instance shall be the value of the Antecedent property of the CIM_SAPSAPDependency instance.

7.3 Managing the DHCP client’s state

This clause describes the use of the EnabledState property to represent the state of an instance of CIM_DHCPProtocolEndpoint.

7.3.1 CIM_DHCPProtocolEndpoint.RequestedState

When the last configuration process of the associated IP interface includes the use of the DHCP client to acquire all or part of the configuration, the value of the RequestedState property of the CIM_DHCPProtocolEndpoint instance shall be 2 (Enabled), regardless of whether the configuration was successfully obtained. This value indicates that the configuration process included an attempt to use DHCP.

When the last configuration process of the associated IP interface does not include an attempt to use the DHCP client, the value of the RequestedState property of the CIM_DHCPProtocolEndpoint instance shall be 3 (Disabled). This value indicates that the configuration process did not include an attempt to use DHCP.
Before a configuration is applied to the associated IP interface, the value of the
CIM_DHCPProtocolEndpoint-Requested State property shall be 5 (No Change).

7.3.2  CIM_DHCPProtocolEndpoint-Enabled State

Valid values for the CIM_DHCPProtocolEndpoint-Enabled State property shall be 2 (Enabled), 3
(Disabled), or 6 (Enabled but Offline).

7.3.2.1  Enabled

The Enabled State property shall have a value of 2 (Enabled) when the
CIM_DHCPProtocolEndpoint-Client State property has a value of 8 (Bound).

7.3.2.2  Enabled but Offline

The Enabled State property shall have a value of 6 (Enabled but Offline) when the
CIM_DHCPProtocolEndpoint-Client State property has a value other than 8 (Bound) or 0 (Unknown). This
value shall indicate that the DHCP client is actively attempting to acquire a configuration for the
associated IP interface.

7.3.2.3  Disabled

The Enabled State property shall have a value of 3 (Disabled) when the DHCP client is disabled for the
associated IP interface. This value is appropriate when the DHCP client is not actively attempting to
acquire a configuration either because the last configuration applied to the associated IP interface did not
use DHCP or because the DHCP client failed to acquire a configuration and was disabled.

7.3.3  CIM_DHCPProtocolEndpoint-Client State

When the CIM_DHCPProtocolEndpoint-Enabled State property has a value other than 3 (Disabled), the
CIM_DHCPProtocolEndpoint-Client State property shall identify the current status of the DHCP client
following the state diagram illustrated in Figure 5 of IETF RFC2131.

When the CIM_DHCPProtocolEndpoint-Enabled State property has a value of 3 (Disabled), the
CIM_DHCPProtocolEndpoint-Client State property shall have the value 0 (Unknown).

7.3.4  Modifying ElementName is supported

This clause describes the CIM elements and behaviors that shall be implemented when the
CIM_DHCPProtocolEndpoint-Element Name property supports being modified by the ModifyInstance
operation.

7.3.4.1  CIM_DHPCapabilities

For the instance of CIM_DHPCapabilities that is associated with the Central Instance through an
instance of CIM_ElementCapabilities, the CIM_DHPCapabilities-ElementNameEditSupported property
shall have a value of TRUE when the implementation supports client modification of the
CIM_DHCPProtocolEndpoint-Element Name property. The CIM_DHPCapabilities-MaxElementNameLen
property shall be implemented.

7.3.5  Modifying ElementName is not supported

This clause describes the CIM elements and behaviors that shall be implemented when the
CIM_DHCPProtocolEndpoint-Element Name property does not support being modified by the
ModifyInstance operation.
7.3.5.1 CIM_DHCPCapabilities

For the instance of CIM_DHCPCapabilities that is associated with the Central Instance through an instance of CIM_ElementCapabilities, the CIM_DHCPCapabilities.ElementNameEditSupported property shall have a value of FALSE when the implementation does not support client modification of the CIM_DHCPProtocolEndpoint.ElementName property. The CIM_DHCPCapabilities.MaxElementNameLen property may be implemented. The MaxElementNameLen property is irrelevant in this context.

7.4 DHCP client capabilities

Exactly one instance of CIM_DHCPCapabilities shall be associated with the Central Instance through an instance of CIM_ElementCapabilities.

7.5 DHCP client-server relationship

A DHCP client will receive its configuration from exactly one DHCP server. An instance of CIM_RemoteAccessAvailableToElement shall associate each CIM_RemoteServiceAccessPoint instance that represents a DHCP server to the CIM_DHCPProtocolEndpoint instance that represents the DHCP client. Instrumentation of CIM_RemoteAccessAvailableToElement is conditional upon instrumentation of CIM_RemoteServiceAccessPoint.

7.5.1 Identifying the DHCP server that provides configuration

When more than one instance of CIM_RemoteServiceAccessPoint is associated with the CIM_DHCPProtocolEndpoint instance through an instance of CIM_RemoteAccessAvailableToElement, the CIM_RemoteAccessAvailableToElement.OrderOfAccess property shall be implemented. For each instance of CIM_RemoteAccessAvailableToElement that associates the CIM_DHCPProtocolEndpoint instance with an instance of CIM_RemoteServiceAccessPoint that represents a DHCP server from which the DHCP client did not receive the IP configuration, the OrderOfAccess property shall have the value 0 (zero). For the instance of CIM_RemoteAccessAvailableToElement that associates the CIM_DHCPProtocolEndpoint instance with the instance of CIM_RemoteServiceAccessPoint that represents the DHCP server from which the DHCP client received the IP configuration, the OrderOfAccess property shall have the value 1.

When exactly one instance of CIM_RemoteServiceAccessPoint is associated with the instance of CIM_DHCPProtocolEndpoint through an instance of CIM_RemoteAccessAvailableToElement, the CIM_RemoteAccessAvailableToElement.OrderOfAccess property may be implemented. If the CIM_RemoteAccessAvailableToElement.OrderOfAccess property is implemented, the property shall have the value 1.

7.6 Alternate DHCP configuration

An implementation may support the management of alternate configurations for the associated IP interface that uses DHCP. The representation of alternate configurations is described in general in the DSP1036. The configuration of the DHCP client as part of an alternate configuration for the associated IP interface is optional behavior that is defined in this clause.

When an alternate configuration for the associated IP interface includes the configuration of the DHCP client, at least one instance of CIM_DHCPProtocolSettingData shall be associated with the CIM_DHCPProtocolEndpoint instance through an instance of CIM_ElementSettingData. The CIM_ElementSettingData instance is conditional on the existence of an instance of CIM_DHCPProtocolSettingData.

7.6.1 Applying an alternate configuration

When an instance of CIM_DHCPProtocolSettingData is applied to the CIM_DHCPProtocolEndpoint instance, the DHCP client shall transition to the INIT state and the value of the ClientState property of the

Version 1.0.4 Published
CIM_DHCPProtocolEndpoint instance shall be 2 (Init). The values specified in applicable properties of the
CIM_DHCPSettingData shall be used by the DHCP client during the binding acquisition process.

7.6.1.1 Successful application of settings
DHCP settings shall be considered to be successfully applied if the DHCP client transitions to a client
state of Bound and the ClientState property of the CIM_DHCPProtocolEndpoint has the value 8 (Bound).

8 Methods
This clause details the requirements for supporting intrinsic operations for the CIM elements defined by
this profile. No extrinsic methods are specified by this profile.

8.1 Profile conventions for operations
For each profile class (including associations), the implementation requirements for operations, including
those in the following default list, are specified in class-specific subclauses of this clause.

The default list of operations is as follows:

• GetInstance
• EnumerateInstances
• EnumerateInstanceNames
• Associators
• AssociatorNames
• References
• ReferenceNames

8.2 CIM_DHCPCapabilities
All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE Related profiles may define additional requirements on operations for the profile class.

8.3 CIM_DHCPProtocolEndpoint
Table 2 lists implementation requirements for operations. If implemented, these operations shall be
implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 2, all operations in
the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE Related profiles may define additional requirements on operations for the profile class.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Requirement</th>
<th>Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>ModifyInstance</td>
<td>Optional. See 8.3.1.</td>
<td>None</td>
</tr>
</tbody>
</table>

8.3.1 CIM_DHCPProtocolEndpoint — ModifyInstance operation
This clause details the specific requirements for the ModifyInstance operation applied to an instance of
CIM_DHCPProtocolEndpoint.
8.3.1.1 CIM_DHCPProtocolEndpoint.ElementName property

When an instance of CIM_DHCPCapabilities is associated with the CIM_DHCPProtocolEndpoint instance and the CIM_DHCPCapabilities.ElementNameEditSupported property has a value of TRUE, the implementation shall allow the ModifyInstance operation to change the value of the ElementName property of the CIM_DHCPProtocolEndpoint instance. The ModifyInstance operation shall enforce the length restriction specified in the MaxElementNameLen property of the CIM_DHCPCapabilities instance.

When no instance of CIM_DHCPCapabilities is associated with the CIM_DHCPProtocolEndpoint instance, or the ElementNameEditSupported property of the CIM_DHCPCapabilities has a value of FALSE, the implementation shall not allow the ModifyInstance operation to change the value of the ElementName property of the CIM_DHCPProtocolEndpoint instance.

8.4 CIM_DHCPSettingData

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE Related profiles may define additional requirements on operations for the profile class.

8.5 CIM_ElementCapabilities

Table 3 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 3, all operations in the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE Related profiles may define additional requirements on operations for the profile class.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Requirement</th>
<th>Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associators</td>
<td>Unspecified</td>
<td>None</td>
</tr>
<tr>
<td>AssociatorNames</td>
<td>Unspecified</td>
<td>None</td>
</tr>
<tr>
<td>References</td>
<td>Unspecified</td>
<td>None</td>
</tr>
<tr>
<td>ReferenceNames</td>
<td>Unspecified</td>
<td>None</td>
</tr>
</tbody>
</table>

8.6 CIM_ElementSettingData

Table 4 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 4, all operations in the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE Related profiles may define additional requirements on operations for the profile class.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Requirement</th>
<th>Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associators</td>
<td>Unspecified</td>
<td>None</td>
</tr>
<tr>
<td>AssociatorNames</td>
<td>Unspecified</td>
<td>None</td>
</tr>
<tr>
<td>References</td>
<td>Unspecified</td>
<td>None</td>
</tr>
<tr>
<td>ReferenceNames</td>
<td>Unspecified</td>
<td>None</td>
</tr>
</tbody>
</table>
8.7 CIM_SAPSAPDependency

Table 5 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 5, all operations in the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE Related profiles may define additional requirements on operations for the profile class.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Requirement</th>
<th>Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associators</td>
<td>Unspecified</td>
<td>None</td>
</tr>
<tr>
<td>AssociatorNames</td>
<td>Unspecified</td>
<td>None</td>
</tr>
<tr>
<td>References</td>
<td>Unspecified</td>
<td>None</td>
</tr>
<tr>
<td>ReferenceNames</td>
<td>Unspecified</td>
<td>None</td>
</tr>
</tbody>
</table>

8.8 CIM_HostedAccessPoint

Table 6 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 6, all operations in the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE Related profiles may define additional requirements on operations for the profile class.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Requirement</th>
<th>Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associators</td>
<td>Unspecified</td>
<td>None</td>
</tr>
<tr>
<td>AssociatorNames</td>
<td>Unspecified</td>
<td>None</td>
</tr>
<tr>
<td>References</td>
<td>Unspecified</td>
<td>None</td>
</tr>
<tr>
<td>ReferenceNames</td>
<td>Unspecified</td>
<td>None</td>
</tr>
</tbody>
</table>

8.9 CIM_RemoteAccessAvailableToElement

Table 7 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 7, all operations in the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE Related profiles may define additional requirements on operations for the profile class.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Requirement</th>
<th>Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associators</td>
<td>Unspecified</td>
<td>None</td>
</tr>
<tr>
<td>AssociatorNames</td>
<td>Unspecified</td>
<td>None</td>
</tr>
<tr>
<td>References</td>
<td>Unspecified</td>
<td>None</td>
</tr>
<tr>
<td>ReferenceNames</td>
<td>Unspecified</td>
<td>None</td>
</tr>
</tbody>
</table>

8.10 CIM_RemoteServiceAccessPoint

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE Related profiles may define additional requirements on operations for the profile class.
9 Use cases

This clause contains object diagrams and use cases for the DHCP Client Profile.

9.1 Object diagrams

The object diagram in Figure 2 shows one method for advertising conformance with the DHCP Client Profile. The instance of CIM_RegisteredProfile is used to identify the version of the DHCP Client Profile with which an instance of CIM_DHCPProtocolEndpoint and its associated instances are conformant. An instance of CIM_RegisteredProfile exists for each profile instrumented in the system.

- profile3 identifies the DMTF Base Server Profile version 1.0.0.
- profile1 identifies the DMTF DHCP Client Profile version 1.0.2.
- profile2 identifies the DMTF IP Interface Profile version 1.0.0.

The IP Interface Profile (DSP1036) is specified as mandatory to be implemented when this profile is implemented. The CIM_DHCPProtocolEndpoint instance is scoped to an instance of CIM_ComputerSystem. This instance of CIM_ComputerSystem is conformant with the DMTF Base Server Profile version 1.0.0 as indicated by the CIM_ElementConformsToProfile association with the CIM_RegisteredProfile instance. The CIM_ComputerSystem instance is the Scoping Instance for the CIM_DHCPProtocolEndpoint. By following the CIM_ReferencedProfile association, a client can determine that the CIM_DHCPProtocolEndpoint instance is conformant with the version of the DHCP Client Profile identified by profile1.

Figure 2 – Registered profile
The object diagram in Figure 3 illustrates an implementation in which an IP interface was successfully configured through DHCP. The CIM_DHCPProtocolInstance.ClientState property has a value of "Bound" indicating that a configuration was successfully obtained. DHCPServer is the instance of CIM_RemoteServiceAccessPoint that represents the DHCP server contacted by the DHCP client. The value of the CIM_IPProtocolEndpoint.AddressOrigin property is "DHCP" indicating that the IP configuration was obtained through DHCP.

Figure 3 – DHCP assigned IP configuration

The object diagram in Figure 4 illustrates an implementation similar to that of Figure 3, with the addition of the optional configuration management functionality of DSP1036. The CIM_DHCPProtocolEndpoint.ClientState property has a value of "Bound", indicating that a configuration was successfully obtained. DHCPServer is the instance of CIM_RemoteServiceAccessPoint that represents the DHCP server contacted by the DHCP client. The value of the CIM_IPProtocolEndpoint.AddressOrigin property is "DHCP", indicating that the IP configuration was obtained through DHCP. The IsCurrent property of the CIM_ElementSettingData instance that associates the CIM_StaticIPAssignmentSettingData instance with the CIM_IPProtocolEndpoint instance has a value of 2 (Is Not Current). This value indicates that the static configuration was not applied for the IP interface. The IsCurrent property of the instance of CIM_ElementSettingData that associates the CIM_DHCPSettingData instance with the CIM_DHCPProtocolEndpoint instance has a value of 1 (Is Current), indicating that the CIM_DHCPProtocolEndpoint instance was applied.
The object diagram in Figure 5 provides an example of an IP interface that was configured to default to a statically assigned IP configuration if the DHCP client failed to obtain a configuration from a DHCP server. In this implementation, configuration management is not supported, so no instance of CIM_IPAssignmentSettingData is associated with the CIM_IPProtocolEndpoint instance to represent the configuration that was applied to the IP interface.

The RequestedState property of the CIM_DHCPProtocolEndpoint has a value of "Enabled", indicating that the DHCP client did attempt to acquire a configuration. The EnabledState and ClientState properties of the CIM_DHCPProtocolEndpoint instance indicate that the DHCP client is now disabled. No instance of CIM_RemoteServiceAccessPoint is associated with the CIM_DHCPProtocolEndpoint instance because the DHCP client failed to communicate with a DHCP server.

The AddressOrigin property of the CIM_IPProtocolEndpoint instance reflects that the address was assigned statically.
The object diagram in Figure 6 provides an example of an IP interface that was configured to default to a statically assigned IP configuration if the DHCP client failed to obtain a configuration from a DHCP server. The instance of CIM_IPAssignmentSettingData associated with the CIM_IPProtocolEndpoint instance is for a configuration in which the CIM_DHCPSettingData is applied first, resulting in the DHCP client being enabled. The DHCP client failed to acquire a configuration from the DHCP server. The EnabledState and ClientState properties of the CIM_DHCPProtocolEndpoint instance indicate that the DHCP client is now disabled. No instance of CIM_RemoteServiceAccessPoint is associated with the CIM_DHCPProtocolEndpoint because the DHCP client failed to communicate with a DHCP server. The CIM_StaticIPAssignmentSettingData was then used to configure the IP interface, which is indicated by the IsCurrent property of the referencing instance of CIM_ElementSettingData having a value of 1 (Is Current). The AddressOrigin property of the CIM_IPProtocolEndpoint instance reflects that the address was assigned statically.
The object diagram in Figure 7 illustrates an IP interface with two supported alternate configurations. Two discrete IP configuration options are available for the IP interface. Each option is represented by an instance of CIM_IPAssignmentSettingData. One configuration option represents the ability to statically assign the IP configuration. This option is indicated by the instance of CIM_OrderedComponent that associates the CIM_IPAssignmentSettingData instance with an instance of CIM_StaticIPAssignmentSettingData. The other configuration option represents the ability to obtain the configuration through a DHCP client. This option is indicated by the instance of CIM_OrderedComponent that associates the CIM_IPAssignmentSettingData instance with an instance of CIM_DHCPSettingData.
Each configuration option consists of a single instance of a subclass of CIM_IPAssignmentSettingData. Therefore, the value of the AssignedSequence property of the CIM_OrderedComponent instances is irrelevant.

The default configuration is to attempt to obtain a configuration through DHCP. This default is indicated by the IsDefault property having a value of 1 (Is Default) on the CIM_ElementSettingData instance that associates the CIM_IPAssignmentSettingData instance with the CIM_IPProtocolEndpoint instance.

However, the current configuration of the IP interface was statically assigned using the configuration identified by the CIM_IPAssignmentSettingData instance static. This configuration is indicated by the value of the CIM_ElementSettingData.IsCurrent property on the instance of CIM_ElementSettingData that associates the CIM_IPAssignmentSettingData instance static to the CIM_IPProtocolEndpoint instance and is also indicated by the value of the AddressOrigin property on the CIM_IPProtocolEndpoint instance.

Note that configuration through DHCP was not used or even attempted; thus the CIM_DHCPProtocolEndpoint.RequestedState property has a value of 3 (Disabled).

Upon the next restart of the interface, the static configuration will be used again for the IP interface. This is indicated by the value of the CIM_ElementSettingData.IsNext property on the instance of CIM_ElementSettingData that associates the CIM_IPAssignmentSettingData instance static to the CIM_IPProtocolEndpoint instance. The object diagram in Figure 8 is for a dual NIC system in which the associated IP interfaces for both NICs have been configured through DHCP.
Figure 8 – DHCP supported on dual NIC system
The object diagram in Figure 9 illustrates an IP interface that supports an alternate configuration in which a static configuration will first be applied, and if the implementation determines it to be invalid, DHCP will be used. This configuration is indicated by the relative values of the AssignedSequence property on the instances of CIM_OrderedComponent that associate the CIM_DHCPSettingData and CIM_StaticIPAssignmentSettingData instances with the CIM_IPAssignmentSettingData instance.

**Figure 9 – Static then DHCP**

### 9.2 Determine which DHCP options are supported

A client can determine the DHCP options that are supported by a DHCP client as follows:

1) Find the instance of CIM_DHCPCapabilities that is associated with the Central Instance.

2) Query the OptionsSupported property.

### 9.3 Determine whether IP configuration originated through DHCP

A client can determine if the configuration for an IP interface was assigned through DHCP as follows:

1) Find the instance of CIM_IPProtocolEndpoint that is associated with the CIM_DHCPProtocolEndpoint instance through an instance of CIM_SAPSAPDependency.

2) Query the CIM_IPProtocolEndpoint.AddressOrigin property. If the value is 4 (DHCP), the configuration was assigned through DHCP.
9.4 View the DHCP server IP address

A client can view information about the DHCP server that granted the lease to the DHCP client as follows:

1) Find all instances of CIM_RemoteAccessAvailableToElement that associate an instance of CIM_RemoteServiceAccessPoint with the CIM_DHCPProtocolEndpoint instance.

   - If more than one instance exists, find the instance of CIM_RemoteAccessAvailableToElement in which the OrderOfAccess property has the value 1. Find the referenced CIM_RemoteServiceAccessPoint instance.

   - If exactly one instance exists, find the referenced CIM_RemoteServiceAccessPoint instance.

   - If no instances exist, no DHCP server is currently modeled for the DHCP client.

2) View the AccessInfo property of the CIM_RemoteServiceAccessPoint instance.

9.5 Determine whether alternate DHCP configuration is supported

A client can determine whether an implementation supports an alternate configuration that uses DHCP to acquire its configuration as follows:

1) Find the CIM_IPProtocolEndpoint instance with which the CIM_DHCPProtocolEndpoint instance is associated through an instance of CIM_SAPSAPDependency.

2) Find all instances of CIM_IPAssignmentSettingData (the parent class and not subclasses) that are associated with the CIM_IPProtocolEndpoint instance.

3) For each instance of CIM_IPAssignmentSettingData, look for at least one instance of CIM_DHCPProtocolEndpoint instance that associates through an instance of CIM_OrderedComponent.

4) If at least one instance of CIM_IPAssignmentSettingData is found that satisfies the preceding constraints, the implementation supports a configuration that uses DHCP to acquire a configuration.

9.6 Determine whether DHCP then static is supported

An implementation can support attempting to acquire its IP configuration through a DHCP client and defaulting to a static configuration if the client fails to acquire a configuration from a DHCP server. A client can determine whether this functionality is supported as follows:

1) Find the CIM_IPProtocolEndpoint instance with which the CIM_DHCPProtocolEndpoint instance is associated through an instance of CIM_SAPSAPDependency.

2) Find all instances of CIM_IPAssignmentSettingData (the parent class and not subclasses) that are associated with the CIM_IPProtocolEndpoint instance.

3) For each instance of CIM_IPAssignmentSettingData:

   a) Find all instances of CIM_DHCPProtocolEndpoint that are associated through an instance of CIM_OrderedComponent.

   b) Find all instances of CIM_StaticIPAssignmentSettingData that are associated through an instance of CIM_OrderedComponent.

   c) Determine if an instance of CIM_DHCPProtocolEndpoint exists such that the value of the AssignedSequence property of the CIM_OrderedComponent instance that associates the instance of CIM_DHCPProtocolEndpoint with the instance of CIM_IPAssignmentSettingData is less than the value of the AssignedSequence property of an instance of CIM_OrderedComponent that associates the CIM_StaticIPAssignmentSettingData instance with the instance of CIM_IPAssignmentSettingData.

4) If such an instance of CIM_DHCPProtocolEndpoint is found, DHCP then Static is supported.
9.7 Select DHCP options for DHCP pending configuration

When the implementation supports pending configuration management, a client can configure the DHCP options that will be used by the DHCP client when the pending configuration is applied as follows:

1) Determine the supported DHCP options as specified in 9.2.
2) Find the instance of CIM_DHCPSettingData that is associated with the CIM_DHCPProtocolEndpoint instance through an instance of CIM_ElementSettingData.
3) If an option is required, assign the value to the RequiredOptions property.
4) If an option is desired but not required, assign the value to the RequestedOptions property.

9.8 Determine whether ElementName can be modified

A client can determine whether it can modify the ElementName property of an instance of CIM_DHCPProtocolEndpoint as follows:

1) Find the CIM_DHCPCapabilities instance that is associated with the CIM_DHCPProtocolEndpoint instance.
2) Query the value of the ElementNameEditSupported property of the CIM_DHCPCapabilities instance. If the value is TRUE, the client can modify the ElementName property of the target instance.

10 CIM Elements

Table 8 shows the instances of CIM Elements for this profile. Instances of the CIM Elements shall be implemented as described in Table 8. Clauses 7 ("Implementation") and 8 ("Methods") may impose additional requirements on these elements.

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Classes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIM_DHCPCapabilities</td>
<td>Mandatory</td>
<td>See 7.4 and 10.1.</td>
</tr>
<tr>
<td>CIM_DHCPProtocolEndpoint</td>
<td>Mandatory</td>
<td>See 7.2, 7.3, and 10.2.</td>
</tr>
<tr>
<td>CIM_DHCPSettingData</td>
<td>Optional</td>
<td>See 7.6 and 10.3.</td>
</tr>
<tr>
<td>CIM_ElementCapabilities</td>
<td>Mandatory</td>
<td>See 10.4.</td>
</tr>
<tr>
<td>CIM_ElementSettingData</td>
<td>Conditional</td>
<td>See 7.6 and 10.5.</td>
</tr>
<tr>
<td>CIM_SAPSAPDependency</td>
<td>Mandatory</td>
<td>See 7.2 and 10.6.</td>
</tr>
<tr>
<td>CIM_HostedAccessPoint (DHCPProtocolEndpoint)</td>
<td>Mandatory</td>
<td>See 10.7.</td>
</tr>
<tr>
<td>CIM_HostedAccessPoint (RemoteServiceAccessPoint)</td>
<td>Conditional</td>
<td>See 10.7.</td>
</tr>
<tr>
<td>CIM_RemoteAccessAvailableToElement</td>
<td>Conditional</td>
<td>See 7.5 and 10.8.</td>
</tr>
<tr>
<td>CIM_RemoteServiceAccessPoint</td>
<td>Optional</td>
<td>See 7.1 and 10.10.</td>
</tr>
<tr>
<td>CIM_RegisteredProfile</td>
<td>Optional</td>
<td>See 10.11.</td>
</tr>
</tbody>
</table>

**Indications**

None defined in this profile
10.1 CIM_DHPCapabilities

CIM_DHPCapabilities represents the capabilities of a DHCP client. Table 9 contains the requirements for elements of this class.

<table>
<thead>
<tr>
<th>Elements</th>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>InstanceID</td>
<td>Mandatory</td>
<td>Key</td>
</tr>
<tr>
<td>ElementName</td>
<td>Mandatory</td>
<td>Pattern &quot;..*&quot;</td>
</tr>
<tr>
<td>ElementNameEditSupported</td>
<td>Mandatory</td>
<td>See 7.3.4.1 and 7.3.5.1.</td>
</tr>
<tr>
<td>MaxElementNameLen</td>
<td>Conditional</td>
<td>See 7.3.4.1 and 7.3.5.1.</td>
</tr>
<tr>
<td>OptionsSupported</td>
<td>Mandatory</td>
<td>None</td>
</tr>
<tr>
<td>IPv6OptionsSupported</td>
<td>Optional</td>
<td>None</td>
</tr>
</tbody>
</table>

10.2 CIM_DHCPProtocolEndpoint

CIM_DHCPProtocolEndpoint represents the DHCP client that is associated with an IP interface. Table 10 contains the requirements for elements of this class.

<table>
<thead>
<tr>
<th>Elements</th>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SystemCreationClassName</td>
<td>Mandatory</td>
<td>Key</td>
</tr>
<tr>
<td>CreationClassName</td>
<td>Mandatory</td>
<td>Key</td>
</tr>
<tr>
<td>SystemName</td>
<td>Mandatory</td>
<td>Key</td>
</tr>
<tr>
<td>Name</td>
<td>Mandatory</td>
<td>Key</td>
</tr>
<tr>
<td>NameFormat</td>
<td>Mandatory</td>
<td>Pattern &quot;..*&quot;</td>
</tr>
<tr>
<td>ProtocolIFType</td>
<td>Mandatory</td>
<td>This property shall have a value of 1 (Other).</td>
</tr>
<tr>
<td>OtherTypeDescription</td>
<td>Mandatory</td>
<td>This property shall have a value of “DHCP”.</td>
</tr>
<tr>
<td>RequestedState</td>
<td>Mandatory</td>
<td>See 7.3.1.</td>
</tr>
<tr>
<td>EnabledState</td>
<td>Mandatory</td>
<td>See 7.3.2.</td>
</tr>
<tr>
<td>ClientState</td>
<td>Mandatory</td>
<td>See 7.2.</td>
</tr>
<tr>
<td>ElementName</td>
<td>Mandatory</td>
<td>Pattern &quot;..*&quot;</td>
</tr>
</tbody>
</table>

10.3 CIM_DHCPSettingData

CIM_DHCPSettingData indicates that the IP configuration should be obtained through the DHCP client if possible. Table 11 contains the requirements for elements of this class.

<table>
<thead>
<tr>
<th>Elements</th>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>InstanceID</td>
<td>Mandatory</td>
<td>Key</td>
</tr>
<tr>
<td>AddressOrigin</td>
<td>Mandatory</td>
<td>Matches 4 (“DHCP”)</td>
</tr>
<tr>
<td>ElementName</td>
<td>Mandatory</td>
<td>Pattern &quot;..*&quot;</td>
</tr>
</tbody>
</table>
10.4 CIM_ElementCapabilities

CIM_ElementCapabilities associates an instance of CIM_DHCPCapabilities with the CIM_DHCPProtocolEndpoint instance. Table 12 contains the requirements for elements of this class.

Table 12 – Class: CIM_ElementCapabilities

<table>
<thead>
<tr>
<th>Elements</th>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ManagedElement</td>
<td>Mandatory</td>
<td>This property shall be a reference to the Central Instance. Cardinality 1..*</td>
</tr>
<tr>
<td>Capabilities</td>
<td>Mandatory</td>
<td>This property shall be a reference to an instance of CIM_DHCPCapabilities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cardinality 1</td>
</tr>
</tbody>
</table>

10.5 CIM_ElementSettingData

CIM_ElementSettingData associates instances of CIM_DHCPSettingData with the CIM_DHCPProtocolEndpoint instance for which they provide configuration. Table 13 contains the requirements for elements of this class.

Table 13 – Class: CIM_ElementSettingData

<table>
<thead>
<tr>
<th>Elements</th>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ManagedElement</td>
<td>Mandatory</td>
<td>This property shall be a reference to the Central Instance. Cardinality 1..*</td>
</tr>
<tr>
<td>SettingData</td>
<td>Mandatory</td>
<td>This property shall be a reference to an instance of CIM_DHCPSettingData.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cardinality *</td>
</tr>
<tr>
<td>IsCurrent</td>
<td>Mandatory</td>
<td>Matches 1 (Is Current) or 2 (Is Not Current)</td>
</tr>
</tbody>
</table>

10.6 CIM_SAPSAPDependency

CIM_SAPSAPDependency relates the CIM_DHCPProtocolEndpoint instance with the CIM_IPProtocolEndpoint instance. Table 14 contains the requirements for elements of this class.

Table 14 – Class: CIM_SAPSAPDependency

<table>
<thead>
<tr>
<th>Elements</th>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antecedent</td>
<td>Mandatory</td>
<td>See 7.2.1.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cardinality 1</td>
</tr>
<tr>
<td>Dependent</td>
<td>Mandatory</td>
<td>See 7.2.1.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cardinality 1</td>
</tr>
</tbody>
</table>
10.7 CIM_HostedAccessPoint — CIM_DHCPProtocolEndpoint reference

CIM_HostedAccessPoint relates the CIM_DHCPProtocolEndpoint instance to the scoping CIM_ComputerSystem instance. Table 15 contains the requirements for elements of this class.

<table>
<thead>
<tr>
<th>Elements</th>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antecedent</td>
<td>Mandatory</td>
<td>The value shall be a reference to the Scoping Instance. Cardinality 1</td>
</tr>
<tr>
<td>Dependent</td>
<td>Mandatory</td>
<td>The value shall be a reference to the Central Instance. Cardinality 1..*</td>
</tr>
</tbody>
</table>

10.8 CIM_HostedAccessPoint — CIM_RemoteServiceAccessPoint reference

An instance of CIM_HostedAccessPoint Association between an instance of CIM_DHCPProtocolEndpoint and CIM_RemoteServiceAccessPoint shall only be instantiated if CIM_RemoteServiceAccessPoint is supported.

CIM_HostedAccessPoint relates the CIM_RemoteServiceAccessPoint instance that represents the default gateway with its scoping CIM_ComputerSystem instance. Table 16 provides information about the properties of CIM_HostedAccessPoint.

<table>
<thead>
<tr>
<th>Elements</th>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antecedent</td>
<td>Mandatory</td>
<td>Key: This shall be a reference to the Scoping Instance. Cardinality 1</td>
</tr>
<tr>
<td>Dependent</td>
<td>Mandatory</td>
<td>Key: This shall be a reference to an instance of CIM_RemoteServiceAccessPoint. Cardinality *</td>
</tr>
</tbody>
</table>
10.9 CIM_RemoteAccessAvailableToElement

CIM_RemoteAccessAvailableToElement represents the relationship between a DHCP client and a DHCP server. This class associates an instance of CIM_DHCPProtocolEndpoint with an instance of CIM_RemoteServiceAccessPoint. Table 17 contains the requirements for elements of this class.

Table 17 – Class: CIM_RemoteAccessAvailableToElement

<table>
<thead>
<tr>
<th>Elements</th>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antecedent</td>
<td>Mandatory</td>
<td>This property shall be a reference to an instance of CIM_RemoteServiceAccessPoint. Cardinality *</td>
</tr>
<tr>
<td>Dependent</td>
<td>Mandatory</td>
<td>This property shall be a reference to the Central Instance. Cardinality 1..*</td>
</tr>
<tr>
<td>OrderOfAccess</td>
<td>Optional</td>
<td>See 7.5.1.</td>
</tr>
</tbody>
</table>

10.10 CIM_RemoteServiceAccessPoint

CIM_RemoteServiceAccessPoint represents the managed system’s view of the DHCP server. Table 18 contains the requirements for elements of this class.

Table 18 – Class: CIM_RemoteServiceAccessPoint

<table>
<thead>
<tr>
<th>Elements</th>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SystemCreationClassName</td>
<td>Mandatory</td>
<td>Key</td>
</tr>
<tr>
<td>CreationClassName</td>
<td>Mandatory</td>
<td>Key</td>
</tr>
<tr>
<td>SystemName</td>
<td>Mandatory</td>
<td>Key</td>
</tr>
<tr>
<td>Name</td>
<td>Mandatory</td>
<td>Key</td>
</tr>
<tr>
<td>AccessContext</td>
<td>Mandatory</td>
<td>Matches 7 (DHCP Server)</td>
</tr>
<tr>
<td>AccessInfo</td>
<td>Mandatory</td>
<td>See 7.1.1.</td>
</tr>
<tr>
<td>InfoFormat</td>
<td>Mandatory</td>
<td>See 7.1.2.</td>
</tr>
<tr>
<td>ElementName</td>
<td>Mandatory</td>
<td>Pattern &quot;.*&quot;</td>
</tr>
</tbody>
</table>

10.11 CIM_RegisteredProfile

CIM_RegisteredProfile identifies the DHCP Client Profile in order for a client to determine whether an instance of CIM_IPProtocolEndpoint is conformant with this profile. The CIM_RegisteredProfile class is defined by the Profile Registration Profile (DSP1033). With the exception of the mandatory values specified for the properties in Table 19, the behavior of the CIM_RegisteredProfile instance is in accordance with the DSP1033.

Table 19 – Class: CIM_RegisteredProfile

<table>
<thead>
<tr>
<th>Elements</th>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RegisteredName</td>
<td>Mandatory</td>
<td>This property shall have a value of “DHCP Client”.</td>
</tr>
<tr>
<td>RegisteredVersion</td>
<td>Mandatory</td>
<td>This property shall have a value of “1.0.4”.</td>
</tr>
<tr>
<td>RegisteredOrganization</td>
<td>Mandatory</td>
<td>This property shall have a value of 2 (DMTF).</td>
</tr>
</tbody>
</table>

NOTE Previous versions of this document included the suffix “Profile” for the RegisteredName value. If implementations querying for the RegisteredName value find the suffix “Profile”, they should ignore the suffix, with any surrounding white spaces, before any comparison is done with the value as specified in this document.
ANNEX A
(informative)

Change log

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0.0</td>
<td>2008-08-10</td>
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<td>Version 1.0.1 of the Final Standard formatted for DMTF Standard release</td>
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<td>1.0.2</td>
<td>2010-09-15</td>
<td>Errata 1.0.3</td>
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<td>• Clause 9 - Correction in association for CIM_RemoteServiceAccessPoint.</td>
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<td>1.0.3</td>
<td>2012-01-09</td>
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<td>1.0.4</td>
<td>2019-01-29</td>
<td>This errata addresses these issues:</td>
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<td>• Updated RegisteredVersion to reflect errata version number in clause 10.2.</td>
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<td>• Updated RegisteredOrganization description to reflect correct value for DMTF in clause 10.2.</td>
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<td>• Updated use cases to reflect the above fixes.</td>
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</table>
Bibliography

750  DMTF DSP4014, *DMTF Process for Working Bodies 2.6*,
753
754