



1

2

3

4

Document Number: DSP1037

Date: 2008-10-01

Version: 1.0.1

5 **DHCP Client Profile**

6 **Document Type: Specification**

7 **Document Status: Final Standard**

8 **Document Language: E**

9

10 Copyright Notice

11 Copyright © 2008 Distributed Management Task Force, Inc. (DMTF). All rights reserved.

12 DMTF is a not-for-profit association of industry members dedicated to promoting enterprise and systems
13 management and interoperability. Members and non-members may reproduce DMTF specifications and
14 documents for uses consistent with this purpose, provided that correct attribution is given. As DMTF
15 specifications may be revised from time to time, the particular version and release date should always be
16 noted.

17 Implementation of certain elements of this standard or proposed standard may be subject to third party
18 patent rights, including provisional patent rights (herein "patent rights"). DMTF makes no representations
19 to users of the standard as to the existence of such rights, and is not responsible to recognize, disclose,
20 or identify any or all such third party patent right, owners or claimants, nor for any incomplete or
21 inaccurate identification or disclosure of such rights, owners or claimants. DMTF shall have no liability to
22 any party, in any manner or circumstance, under any legal theory whatsoever, for failure to recognize,
23 disclose, or identify any such third party patent rights, or for such party's reliance on the standard or
24 incorporation thereof in its product, protocols or testing procedures. DMTF shall have no liability to any
25 party implementing such standard, whether such implementation is foreseeable or not, nor to any patent
26 owner or claimant, and shall have no liability or responsibility for costs or losses incurred if a standard is
27 withdrawn or modified after publication, and shall be indemnified and held harmless by any party
28 implementing the standard from any and all claims of infringement by a patent owner for such
29 implementations.

CONTENTS

31 Foreword 5

32 Introduction 6

33 1 Scope 7

34 2 Normative References..... 7

35 2.1 Approved References 7

36 2.2 Other References..... 7

37 3 Terms and Definitions 7

38 4 Symbols and Abbreviated Terms 9

39 5 Synopsis 9

40 6 Description 10

41 7 Implementation..... 10

42 7.1 DHCP Server Representation..... 10

43 7.2 DHCP Client Representation 11

44 7.3 Managing the DHCP Client’s State..... 11

45 7.4 DHCP Client Capabilities 13

46 7.5 DHCP Client-Server Relationship..... 13

47 7.6 Alternate DHCP Configuration 14

48 8 Methods..... 14

49 8.1 Profile Conventions for Operations..... 14

50 8.2 CIM_DHCPCapabilities..... 15

51 8.3 CIM_DHCPProtocolEndpoint..... 15

52 8.4 CIM_DHCPSettingData 15

53 8.5 CIM_ElementCapabilities 15

54 8.6 CIM_ElementSettingData 16

55 8.7 CIM_SAPSAPDependency..... 16

56 8.8 CIM_HostedAccessPoint 16

57 8.9 CIM_RemoteAccessAvailableToElement..... 17

58 8.10 CIM_RemoteServiceAccessPoint..... 17

59 9 Use Cases 17

60 9.1 Object Diagrams 17

61 9.2 Determine Which DHCP Options Are Supported 24

62 9.3 Determine If IP Configuration Originated through DHCP 24

63 9.4 View the DHCP Server IP Address..... 25

64 9.5 Determine Whether Alternate DHCP Configuration Is Supported..... 25

65 9.6 Determine Whether DHCP Then Static Is Supported..... 25

66 9.7 Select DHCP Options for DHCP Pending Configuration 26

67 9.8 Determine Whether ElementName Can Be Modified 26

68 10 CIM Elements 26

69 10.1 CIM_DHCPCapabilities..... 27

70 10.2 CIM_DHCPProtocolEndpoint..... 27

71 10.3 CIM_DHCPSettingData 27

72 10.4 CIM_ElementCapabilities 28

73 10.5 CIM_ElementSettingData 28

74 10.6 CIM_SAPSAPDependency..... 28

75 10.7 CIM_HostedAccessPoint 29

76 10.8 CIM_RemoteAccessAvailableToElement 29

77 10.9 CIM_RemoteServiceAccessPoint..... 29

78 10.10 CIM_RegisteredProfile..... 30

79 ANNEX A (informative) Change Log..... 31

80 ANNEX B (informative) Acknowledgments 32

81

82 **Figures**

83	Figure 1 – DHCP Client Profile: Class Diagram.....	10
84	Figure 2 – Registered Profile	18
85	Figure 3 – DHCP Assigned IP Configuration	18
86	Figure 4 – DHCP Assigned IP Configuration with Configuration Management.....	19
87	Figure 5 – DHCP Timeout to Static.....	20
88	Figure 6 – DHCP Timeout to Static with Configuration Management	21
89	Figure 7 – Static or DHCP Pending Configurations	22
90	Figure 8 – DHCP Supported on Dual NIC System	23
91	Figure 9 – Static Then DHCP	24
92		

93 **Tables**

94	Table 1 – Referenced Profiles	9
95	Table 2 – Operations: CIM_DHCPProtocolEndpoint	15
96	Table 3 – Operations: CIM_ElementCapabilities	15
97	Table 4 – Operations: CIM_ElementSettingData	16
98	Table 5 – Operations: CIM_SAPSAPDependency	16
99	Table 6 – Operations: CIM_HostedAccessPoint	16
100	Table 7 – Operations: CIM_RemoteAccessAvailableToElement	17
101	Table 8 – CIM Elements: DHCP Client Profile.....	26
102	Table 9 – Class: CIM_DHPCCapabilities.....	27
103	Table 10 – Class: CIM_DHCPProtocolEndpoint.....	27
104	Table 11 – Class: CIM_DHCPSettingData	27
105	Table 12 – Class: CIM_ElementCapabilities.....	28
106	Table 13 – Class: CIM_ElementSettingData	28
107	Table 14 – Class: CIM_SAPSAPDependency.....	28
108	Table 15 – Class: CIM_HostedAccessPoint	29
109	Table 16 – Class: CIM_RemoteAccessAvailableToElement	29
110	Table 17 – Class: CIM_RemoteServiceAccessPoint.....	29
111	Table 18 – Class: CIM_RegisteredProfile.....	30

112

113

Foreword

114 The *DHCP Client Profile* (DSP1037) was prepared by the Server Management Working Group of the
115 DMTF.

116 DMTF is a not-for-profit association of industry members dedicated to promoting enterprise and systems
117 management and interoperability.

118

Introduction

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

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

124

DHCP Client Profile

125 1 Scope

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

128 2 Normative References

129 The following referenced documents are indispensable for the application of this document. For dated
130 references, only the edition cited applies. For undated references, the latest edition of the referenced
131 document (including any amendments) applies.

132 2.1 Approved References

133 DMTF [DSP0200](#), *CIM Operations over HTTP 1.2.0*

134 DMTF [DSP0004](#), *CIM Infrastructure Specification 2.3.0*

135 DMTF [DSP1036](#), *IP Interface Profile*

136 DMTF [DSP1033](#), *Profile Registration Profile*

137 DMTF [DSP1000](#), *Management Profile Specification Template*

138 DMTF [DSP1001](#), *Management Profile Specification Usage Guide*

139 2.2 Other References

140 [ISO/IEC Directives, Part 2](#), *Rules for the structure and drafting of International Standards*

141 [Unified Modeling Language \(UML\) from the Open Management Group \(OMG\)](#)

142 IETF [RFC 1208](#), *A Glossary of Networking Terms*, March 1991

143 IETF [RFC 2131](#), *Dynamic Host Configuration Protocol*, March 1997

144 IETF [RFC 3315](#), *Dynamic Host Configuration Protocol for IPv6 (DHCPv6)*, July 2003

145 IETF [RFC 4291](#), *IP Version 6 Addressing Architecture*, February 2006

146 3 Terms and Definitions

147 For the purposes of this document, the terms and definitions in [DSP1033](#) and [DSP1001](#) and the following
148 apply.

149 3.1

150 **can**

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

152 3.2

153 **cannot**

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

- 155 **3.3**
156 **conditional**
157 indicates requirements to be followed strictly to conform to the document when the specified conditions
158 are met
- 159 **3.4**
160 **mandatory**
161 indicates requirements to be followed strictly to conform to the document and from which no deviation is
162 permitted
- 163 **3.5**
164 **may**
165 indicates a course of action permissible within the limits of the document
- 166 **3.6**
167 **need not**
168 indicates a course of action permissible within the limits of the document
- 169 **3.7**
170 **optional**
171 indicates a course of action permissible within the limits of the document
- 172 **3.8**
173 **referencing profile**
174 indicates a profile that owns the definition of this class and can include a reference to this profile in its
175 "Referenced Profiles" table
- 176 **3.9**
177 **shall**
178 indicates requirements to be followed strictly to conform to the document and from which no deviation is
179 permitted
- 180 **3.10**
181 **shall not**
182 indicates requirements to be followed strictly to conform to the document and from which no deviation is
183 permitted
- 184 **3.11**
185 **should**
186 indicates that among several possibilities, one is recommended as particularly suitable, without
187 mentioning or excluding others, or that a certain course of action is preferred but not necessarily required
- 188 **3.12**
189 **should not**
190 indicates that a certain possibility or course of action is deprecated but not prohibited
- 191 **3.13**
192 **unspecified**
193 indicates that this profile does not define any constraints for the referenced CIM element or operation

194 **4 Symbols and Abbreviated Terms**

195 **Experimental Maturity Level**

196 Some of the content considered for inclusion in *DHCP Client Profile* has yet to receive sufficient review to
 197 satisfy the adoption requirements set forth by the Technical Committee within the DMTF. This content is
 198 presented here as an aid to implementers who are interested in likely future developments within this
 199 specification. The content marked experimental may change as implementation experience is gained.
 200 There is a high likelihood that it will be included in an upcoming revision of the specification. Until that
 201 time, it is purely informational, and is clearly marked within the text.
 202 A sample of the typographical convention for experimental content is included here:

203 **EXPERIMENTAL**

204 Experimental content appears here

205 **EXPERIMENTAL**

206 The following abbreviations are used in this document.

207 **4.1**

208 **DHCP**

209 Dynamic Host Configuration Protocol

210 **4.2**

211 **IP**

212 Internet Protocol

213 **5 Synopsis**

214 **Profile Name:** DHCP Client

215 **Version:** 1.0.1

216 **Organization:** DMTF

217 **CIM Schema Version:** 2.19.1

218 **Central Class:** CIM_DHCPProtocolEndpoint

219 **Scoping Class:** CIM_ComputerSystem

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

223 **Table 1 – Referenced Profiles**

Profile Name	Organization	Version	Requirement	Description
<i>Profile Registration</i>	DMTF	1.0.0	Mandatory	None
<i>IP Interface</i>	DMTF	1.0.0	Mandatory	See section 7.2.1.

242 7.1.1 CIM_RemoteServiceAccessPoint.AccessInfo

243 The value of the AccessInfo property of each instance of CIM_RemoteServiceAccessPoint shall be the IP
244 address of the DHCP server. If the value of CIM_RemoteServiceAccessPoint.InfoFormat is 3 (IPv4
245 Address), then the value of the property shall be expressed in dotted decimal notation as defined in IETF
246 [RFC 1208](#).

247 EXPERIMENTAL

248 If the value of CIM_RemoteServiceAccessPoint.InfoFormat is 4 (IPv6 Address), then the value of the
249 property shall be expressed in the notation as defined in IETF [RFC 4291](#), section 2.2.

250 EXPERIMENTAL

251 7.1.2 CIM_RemoteServiceAccessPoint.InfoFormat

252 The value of the InfoFormat property shall be a value of 3 (IPv4 Address)

253 EXPERIMENTAL

254 or a value of 4 (IPv6 Address).

255 EXPERIMENTAL

256 7.1.3 Representing Multiple DHCP Servers

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

259 7.2 DHCP Client Representation

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

261 7.2.1 Relationship with CIM_IPProtocolEndpoint

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

265 7.2.1.1 CIM_SAPSAPDependency.Dependent

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

268 7.2.1.2 CIM_SAPSAPDependency.Antecedent

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

271 7.3 Managing the DHCP Client's State

272 This section describes the use of the EnabledState property to represent the state of an instance of
273 CIM_DHCPProtocolEndpoint.

274 7.3.1 CIM_DHCPProtocolEndpoint.RequestedState

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

280 When the last configuration process of the associated IP interface does not include an attempt to use the
281 DHCP client, the value of the RequestedState property of the CIM_DHCPProtocolEndpoint instance shall
282 be 3 (Disabled). This value indicates that the configuration process did not include an attempt to use
283 DHCP.

284 Before a configuration is applied to the associated IP interface, the value of the
285 CIM_DHCPProtocolEndpoint.RequestedState property shall be 5 (No Change).

286 7.3.2 CIM_DHCPProtocolEndpoint.EnabledState

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

289 7.3.2.1 Enabled

290 The EnabledState property shall have a value of 2 (Enabled) when the
291 CIM_DHCPProtocolEndpoint.ClientState property has a value of 8 (Bound).

292 7.3.2.2 Enabled but Offline

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

297 7.3.2.3 Disabled

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

302 7.3.3 CIM_DHCPProtocolEndpoint.ClientState

303 When the CIM_DHCPProtocolEndpoint.EnabledState property has a value other than 3 (Disabled), the
304 CIM_DHCPProtocolEndpoint.ClientState property shall identify the current status of the DHCP client
305 following the state diagram illustrated in Figure 5 of IETF [RFC 2131](#).

306 When the CIM_DHCPProtocolEndpoint.EnabledState property has a value of 3 (Disabled), the
307 CIM_DHCPProtocolEndpoint.ClientState property shall have the value 0 (Unknown).

308 7.3.4 Modifying ElementName Is Supported

309 This section describes the CIM elements and behaviors that shall be implemented when the
310 CIM_DHCPProtocolEndpoint.ElementName property supports being modified by the ModifyInstance
311 operation.

312 7.3.4.1 CIM_DHCPCapabilities

313 For the instance of CIM_DHCPCapabilities that is associated with the Central Instance through an
314 instance of CIM_ElementCapabilities, the CIM_DHCPCapabilities.ElementNameEditSupported property
315 shall have a value of TRUE when the implementation supports client modification of the
316 CIM_DHCPProtocolEndpoint.ElementName property. The CIM_DHCPCapabilities.MaxElementNameLen
317 property shall be implemented.

318 7.3.5 Modifying ElementName Is Not Supported

319 This section describes the CIM elements and behaviors that shall be implemented when the
320 CIM_DHCPProtocolEndpoint.ElementName property does not support being modified by the
321 ModifyInstance operation.

322 7.3.5.1 CIM_DHCPCapabilities

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

328 7.4 DHCP Client Capabilities

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

331 7.5 DHCP Client-Server Relationship

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

337 7.5.1 Identifying the DHCP Server That Provides Configuration

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

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

353 7.6 Alternate DHCP Configuration

354 An implementation may support the management of alternate configurations for the associated IP
355 interface that uses DHCP. The representation of alternate configurations is described in general in the [IP](#)
356 [Interface Profile](#). The configuration of the DHCP client as part of an alternate configuration for the
357 associated IP interface is optional behavior that is defined in this section.

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

363 7.6.1 Applying an Alternate Configuration

364 When an instance of CIM_DHCPSettingData is applied to the CIM_DHCPProtocolEndpoint instance, the
365 DHCP client shall transition to the INIT state and the value of the ClientState property of the
366 CIM_DHCPProtocolEndpoint instance shall be 2 (Init). The values specified in applicable properties of the
367 CIM_DHCPSettingData shall be used by the DHCP client during the binding acquisition process.

368 7.6.1.1 Successful Application of Settings

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

371 8 Methods

372 This section details the requirements for supporting intrinsic operations for the CIM elements defined by
373 this profile. No extrinsic methods are specified by this profile.

374 8.1 Profile Conventions for Operations

375 Support for operations for each profile class (including associations) is specified in the following
376 subclauses. Each subclause includes either the statement “All operations in the default list in section 8.1
377 are supported as described by [DSP0200 version 1.2](#)” or a table listing all the operations that are not
378 supported by this profile or where the profile requires behavior other than that described by [DSP0200](#)
379 [version 1.2](#).

380 The default list of operations is as follows:

- 381 • GetInstance
- 382 • Associators
- 383 • AssociatorNames
- 384 • References
- 385 • ReferenceNames
- 386 • EnumerateInstances
- 387 • EnumerateInstanceNames

388 A compliant implementation shall support all the operations in the default list for each class, unless the
389 “Requirement” column states something other than *Mandatory*.

390 **8.2 CIM_DHCPCapabilities**

391 All operations in the default list in section 8.1 are supported as described by [DSP0200 version 1.2](#).

392 **8.3 CIM_DHCPProtocolEndpoint**

393 Table 2 lists operations that either have special requirements beyond those from [DSP0200 version 1.2](#) or
 394 shall not be supported.

395 **Table 2 – Operations: CIM_DHCPProtocolEndpoint**

Operation	Requirement	Messages
ModifyInstance	Optional. See section 8.3.1.	None

396 **8.3.1 CIM_DHCPProtocolEndpoint—ModifyInstance Operation**

397 This section details the specific requirements for the ModifyInstance operation applied to an instance of
 398 CIM_DHCPProtocolEndpoint.

399 **8.3.1.1 CIM_DHCPProtocolEndpoint.ElementName Property**

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

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

409 **8.4 CIM_DHCPSettingData**

410 All operations in the default list in section 8.1 are supported as described by [DSP0200 version 1.2](#).

411 **8.5 CIM_ElementCapabilities**

412 Table 3 lists operations that either have special requirements beyond those from [DSP0200 version 1.2](#) or
 413 shall not be supported.

414 **Table 3 – Operations: CIM_ElementCapabilities**

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

415 **8.6 CIM_ElementSettingData**

416 Table 4 lists operations that either have special requirements beyond those from [DSP0200 version 1.2](#) or
 417 shall not be supported.

418 **Table 4 – Operations: CIM_ElementSettingData**

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

419 **8.7 CIM_SAPSAPDependency**

420 Table 5 lists operations that either have special requirements beyond those from [DSP0200 version 1.2](#) or
 421 shall not be supported.

422 **Table 5 – Operations: CIM_SAPSAPDependency**

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

423 **8.8 CIM_HostedAccessPoint**

424 Table 6 lists operations that either have special requirements beyond those from [DSP0200 version 1.2](#) or
 425 shall not be supported.

426 **Table 6 – Operations: CIM_HostedAccessPoint**

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

427 **8.9 CIM_RemoteAccessAvailableToElement**

428 Table 7 lists operations that either have special requirements beyond those from [DSP0200 version 1.2](#) or
 429 shall not be supported.

430 **Table 7 – Operations: CIM_RemoteAccessAvailableToElement**

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

431 **8.10 CIM_RemoteServiceAccessPoint**

432 All operations in the default list in section 8.1 are supported as described by [DSP0200 version 1.2](#).

433 **9 Use Cases**

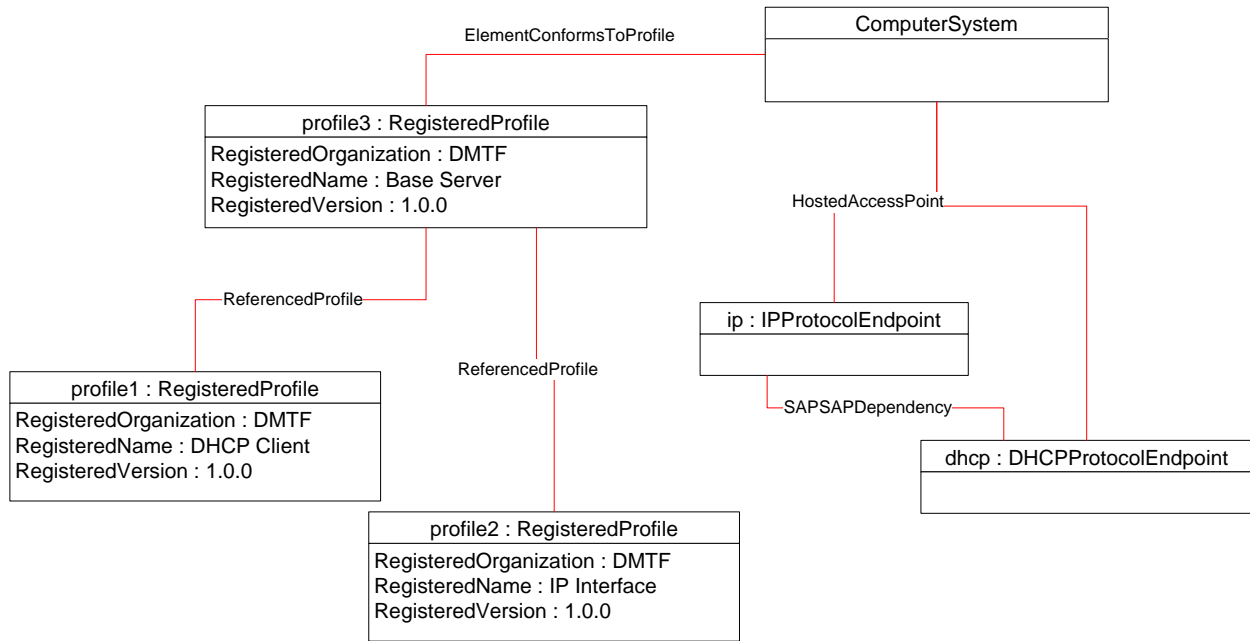
434 This section contains object diagrams and use cases for the *DHCP Client Profile*.

435 **9.1 Object Diagrams**

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

- 440 • profile3 identifies the DMTF *Base Server Profile* version 1.0.0.
- 441 • profile1 identifies the DMTF *DHCP Client Profile* version 1.0.0.
- 442 • profile2 identifies the DMTF [IP Interface Profile](#) version 1.0.0.

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

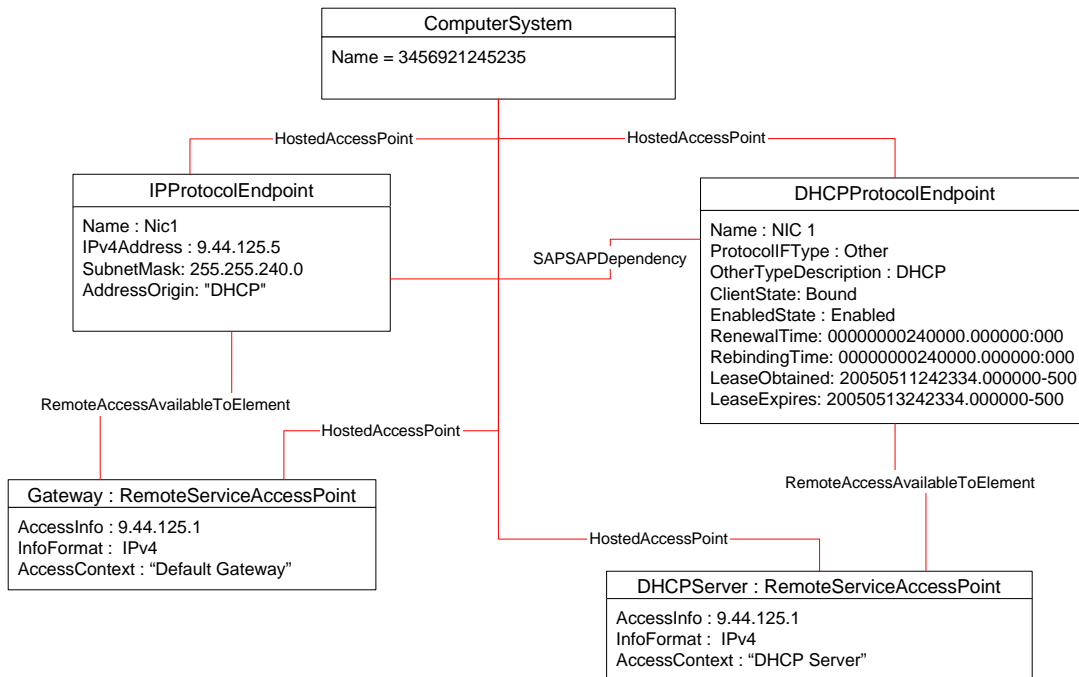


451

452

Figure 2 – Registered Profile

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

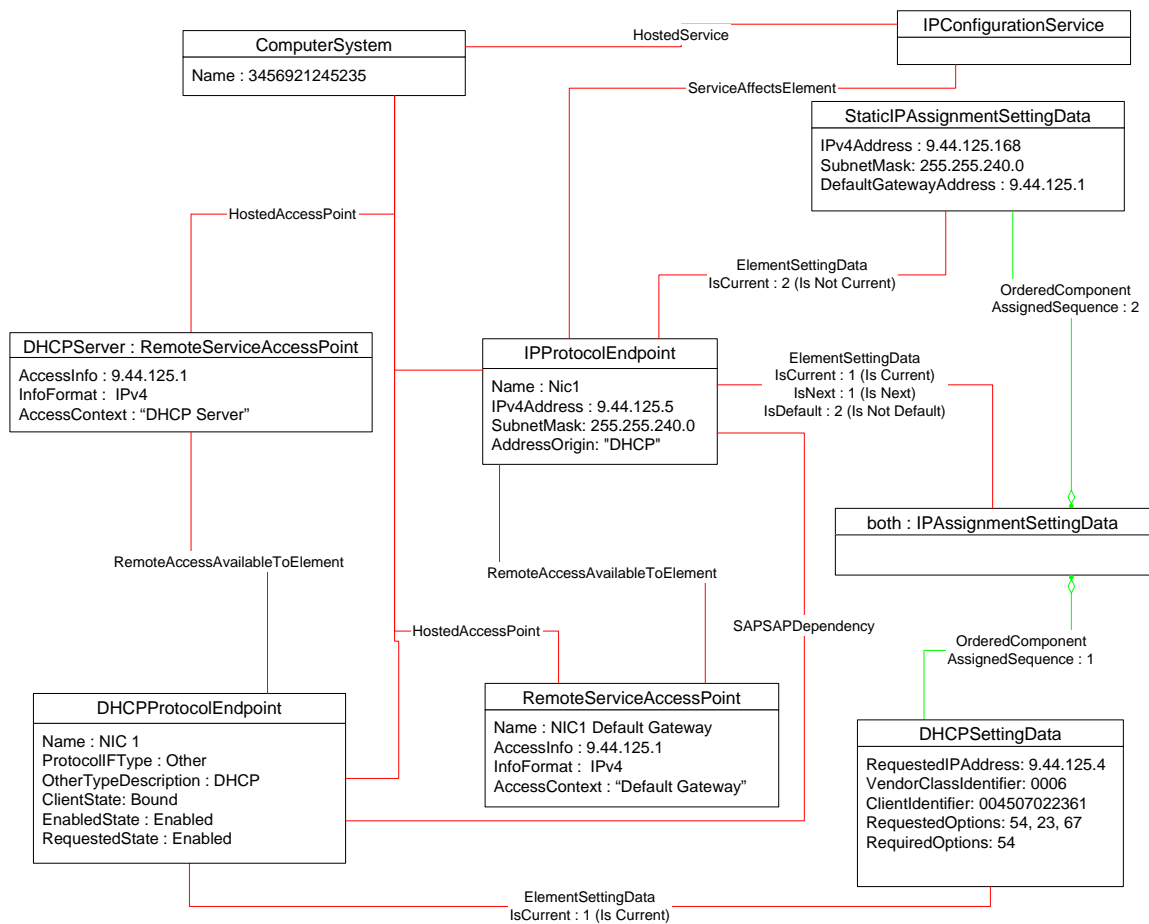


459

460

Figure 3 – DHCP Assigned IP Configuration

461 The object diagram in Figure 4 illustrates an implementation similar to that of Figure 3, with the addition of
 462 the optional configuration management functionality of the [IP Interface Profile](#). The
 463 CIM_DHCPProtocolEndpoint.ClientState property has a value of "Bound", indicating that a configuration
 464 was successfully obtained. DHCPServer is the instance of CIM_RemoteServiceAccessPoint that
 465 represents the DHCP server contacted by the DHCP client. The value of the
 466 CIM_IPProtocolEndpoint.AddressOrigin property is "DHCP", indicating that the IP configuration was
 467 obtained through DHCP. The IsCurrent property of the CIM_ElementSettingData instance that associates
 468 the CIM_StaticIPAssignmentSettingData instance with the CIM_IPProtocolEndpoint instance has a value
 469 of 2 (Is Not Current). This value indicates that the static configuration was not applied for the IP interface.
 470 The IsCurrent property of the instance of CIM_ElementSettingData that associates the
 471 CIM_DHCPSettingData instance with the CIM_DHCPProtocolEndpoint instance has a value of 1 (Is
 472 Current), indicating that the CIM_DHCPSettingData was applied.



473

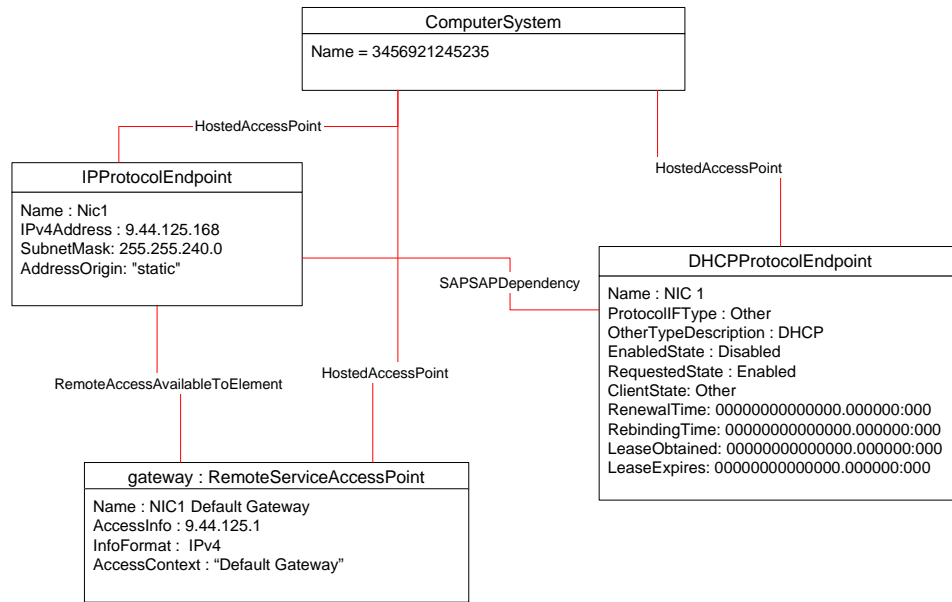
474

Figure 4 – DHCP Assigned IP Configuration with Configuration Management

475 The object diagram in Figure 5 provides an example of an IP interface that was configured to default to a
 476 statically assigned IP configuration if the DHCP client failed to obtain a configuration from a DHCP server.
 477 In this implementation, configuration management is not supported, so no instance of
 478 CIM_IPAssignmentSettingData is associated with the CIM_IPProtocolEndpoint instance to represent the
 479 configuration that was applied to the IP interface.

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

485 The AddressOrigin property of the CIM_IPProtocolEndpoint instance reflects that the address was
 486 assigned statically.



487

488

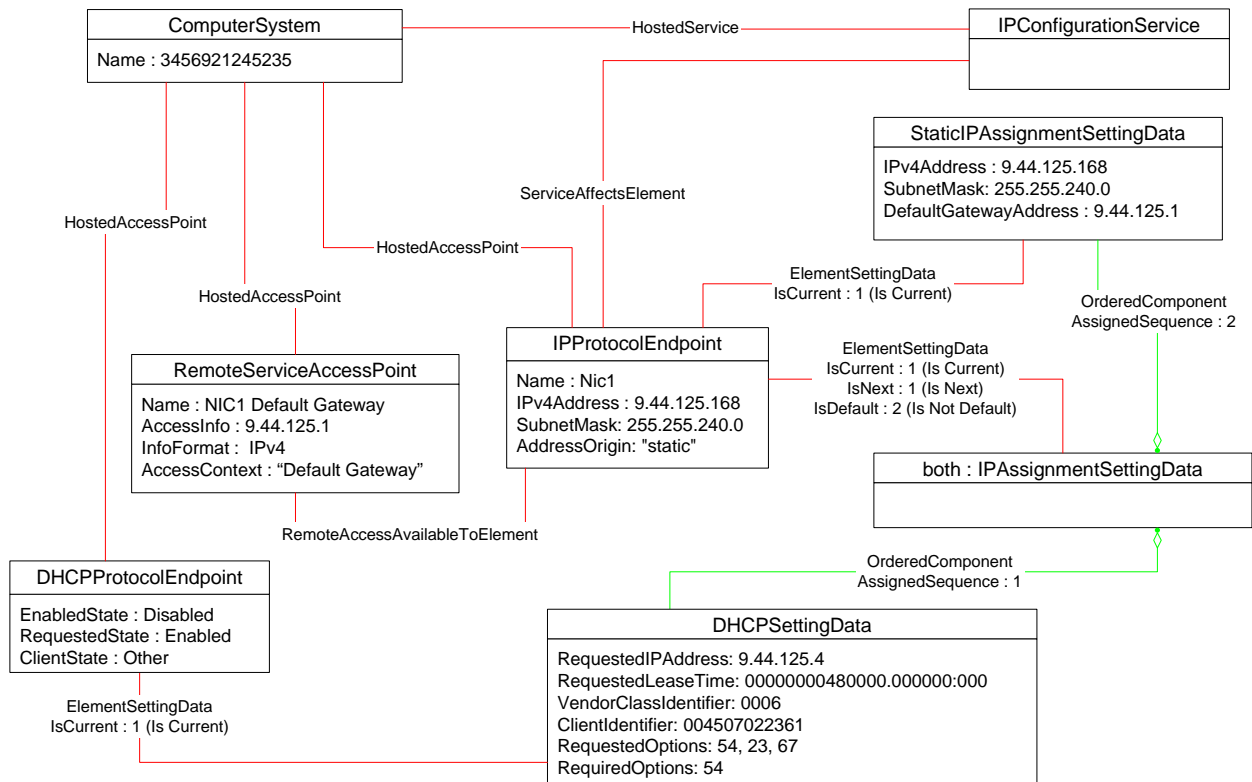
Figure 5 – DHCP Timeout to Static

489 The object diagram in Figure 6 provides an example of an IP interface that was configured to default to a
 490 statically assigned IP configuration if the DHCP client failed to obtain a configuration from a DHCP server.
 491 The instance of CIM_IPAssignmentSettingData associated with the CIM_IPProtocolEndpoint instance is
 492 for a configuration in which the CIM_DHCPSettingData is applied first, resulting in the DHCP client being
 493 enabled.

494 The DHCP client failed to acquire a configuration from the DHCP server. The EnabledState and
 495 ClientState properties of the CIM_DHCPProtocolEndpoint instance indicate that the DHCP client is now
 496 disabled. No instance of CIM_RemoteServiceAccessPoint is associated with the
 497 CIM_DHCPProtocolEndpoint because the DHCP client failed to communicate with a DHCP server.

498 The CIM_StaticIPAssignmentSettingData was then used to configure the IP interface, which is indicated
 499 by the IsCurrent property of the referencing instance of CIM_ElementSettingData having a value of 1 (Is
 500 Current).

501 The AddressOrigin property of the CIM_IPProtocolEndpoint instance reflects that the address was
 502 assigned statically.

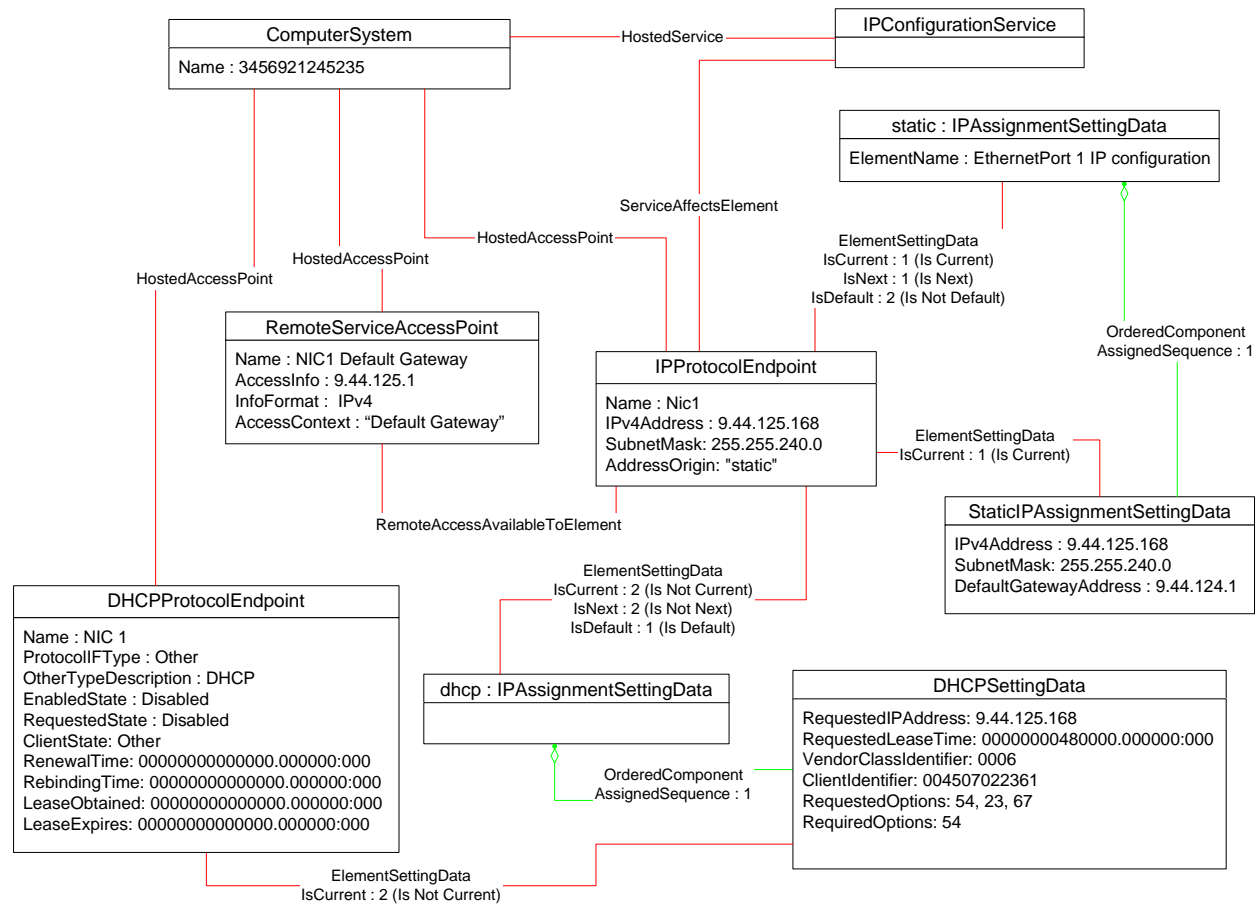


503

504

Figure 6 – DHCP Timeout to Static with Configuration Management

505 The object diagram in Figure 7 illustrates an IP interface with two supported alternate configurations. Two
 506 discrete IP configuration options are available for the IP interface. Each option is represented by an
 507 instance of CIM_IPAssignmentSettingData. One configuration option represents the ability to statically
 508 assign the IP configuration. This option is indicated by the instance of CIM_OrderedComponent that
 509 associates the CIM_IPAssignmentSettingData instance with an instance of
 510 CIM_StaticIPAssignmentSettingData. The other configuration option represents the ability to obtain the
 511 configuration through a DHCP client. This option is indicated by the instance of CIM_OrderedComponent
 512 that associates the CIM_IPAssignmentSettingData instance with an instance of CIM_DHCPSettingData.



513

514

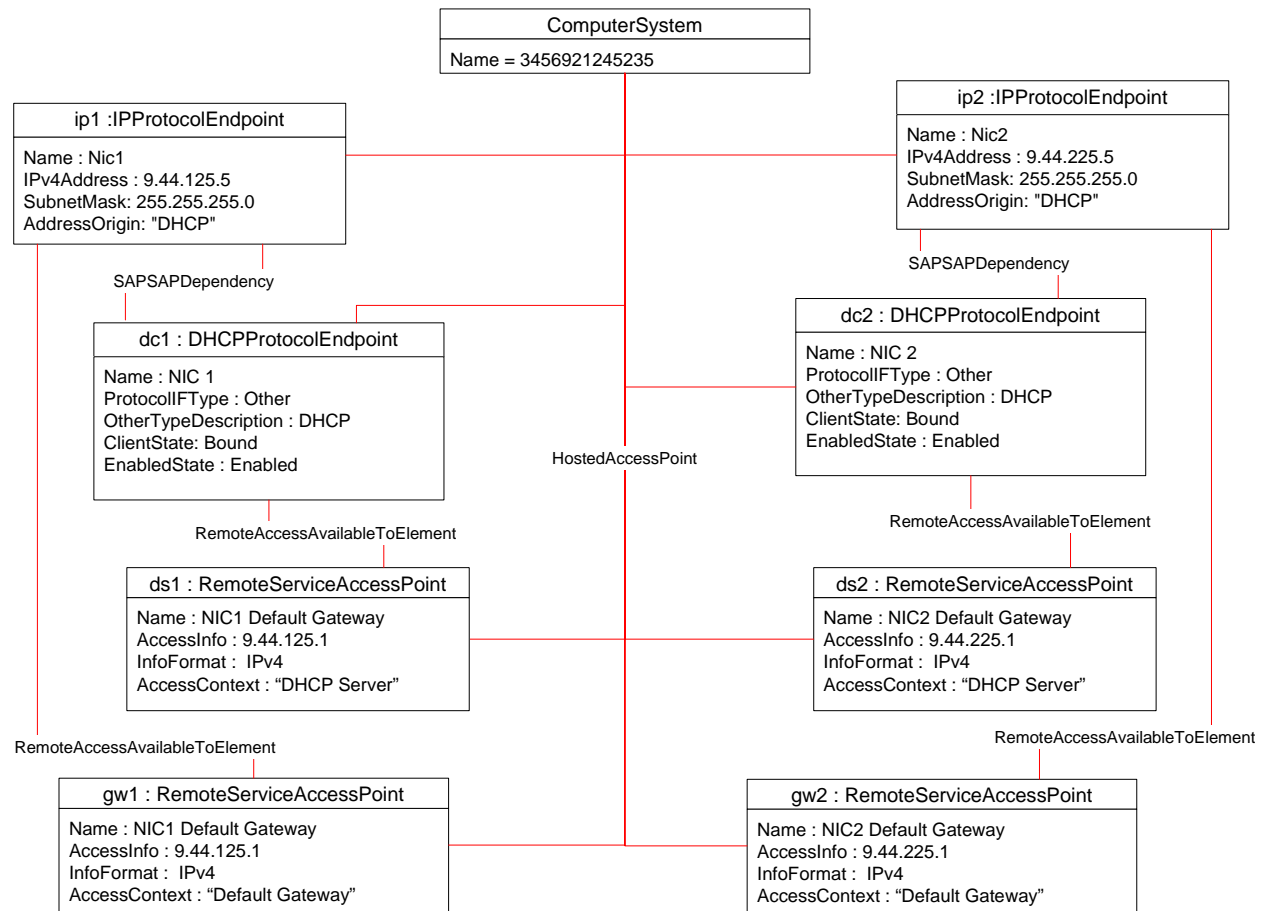
Figure 7 – Static or DHCP Pending Configurations

515 Each configuration option consists of a single instance of a subclass of CIM_IPAssignmentSettingData.
 516 Therefore, the value of the AssignedSequence property of the CIM_OrderedComponent instances is
 517 irrelevant.

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

521 However, the current configuration of the IP interface was statically assigned using the configuration
 522 identified by the CIM_IPAssignmentSettingData instance *static*. This configuration is indicated by the
 523 value of the CIM_ElementSettingData.IsCurrent property on the instance of CIM_ElementSettingData that
 524 associates the CIM_IPAssignmentSettingData instance *static* to the CIM_IPProtocolEndpoint instance
 525 and is also indicated by the value of the AddressOrigin property on the CIM_IPProtocolEndpoint instance.
 526 Note that configuration through DHCP was not used or even attempted; thus the
 527 CIM_DHCPProtocolEndpoint.RequestedState property has a value of 3 (Disabled).

528 Upon the next restart of the interface, the static configuration will be used again for the IP interface. This
 529 is indicated by the value of the CIM_ElementSettingData.IsNext property on the instance of
 530 CIM_ElementSettingData that associates the CIM_IPAssignmentSettingData instance *static* to the
 531 CIM_IPProtocolEndpoint instance. The object diagram in Figure 8 is for a dual NIC system in which the
 532 associated IP interfaces for both NICs have been configured through DHCP.

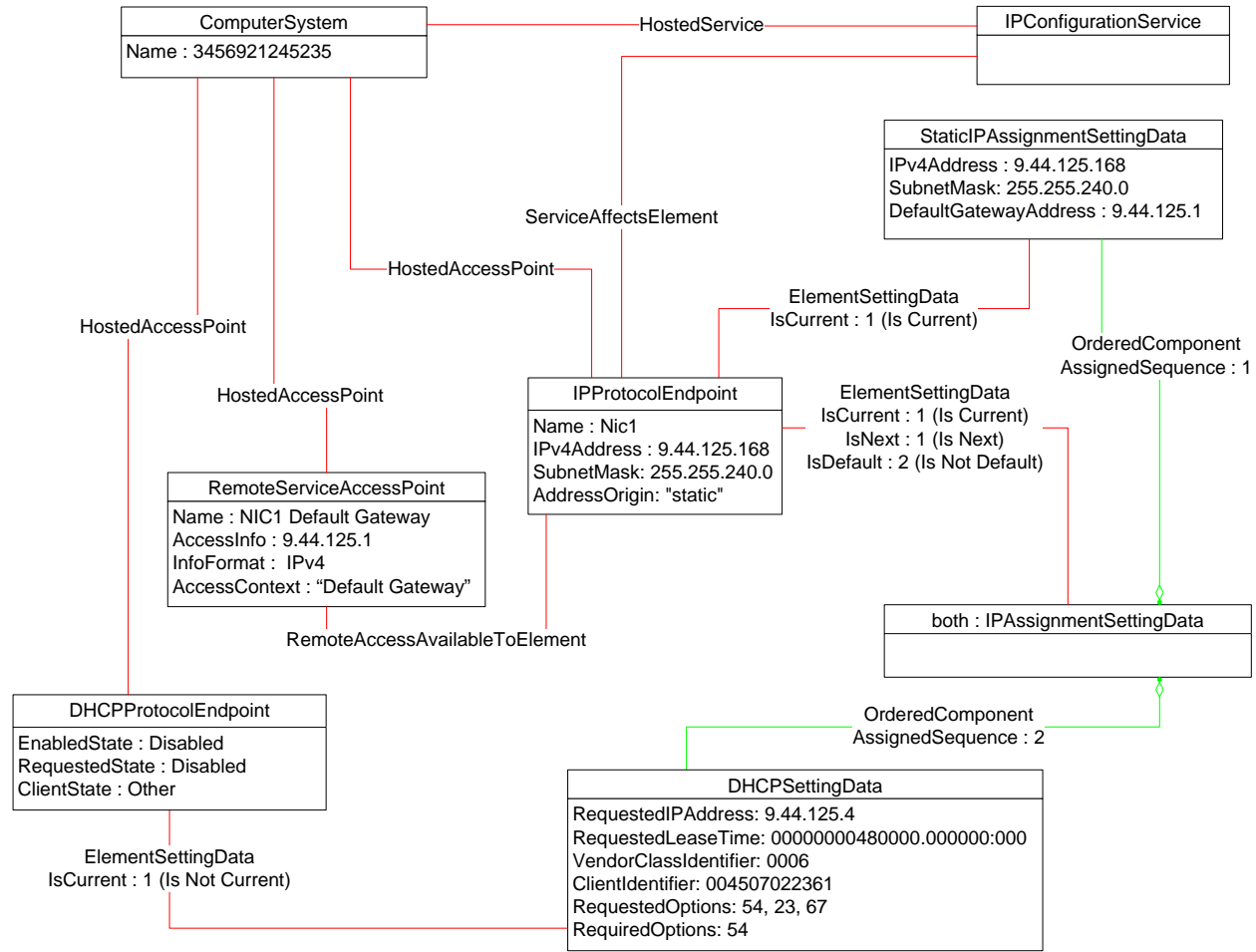


533

534

Figure 8 – DHCP Supported on Dual NIC System

535 The object diagram in Figure 9 illustrates an IP interface that supports an alternate configuration in which
 536 a static configuration will first be applied, and if the implementation determines it to be invalid, DHCP will
 537 be used. This configuration is indicated by the relative values of the AssignedSequence property on the
 538 instances of CIM_OrderedComponent that associate the CIM_DHCPSettingData and
 539 CIM_StaticIPAssignmentSettingData instances with the CIM_IPAssignmentSettingData instance.



540

541

Figure 9 – Static Then DHCP

542 9.2 Determine Which DHCP Options Are Supported

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

- 544 1) Find the instance of CIM_DHCPCapabilities that is associated with the Central Instance.
- 545 2) Query the OptionsSupported property.

546 9.3 Determine If IP Configuration Originated through DHCP

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

- 548 1) Find the instance of CIM_IPProtocolEndpoint that is associated with the
 549 CIM_DHCPProtocolEndpoint instance through an instance of CIM_SAPSAPDependency.
- 550 2) Query the CIM_IPProtocolEndpoint.AddressOrigin property. If the value is 4 (DHCP), the
 551 configuration was assigned through DHCP.

552 9.4 View the DHCP Server IP Address

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

- 554 1) Find all instances of CIM_RemoteAccessAvailableToElement that associate an instance of
555 CIM_RemoteServiceAccessPoint with the CIM_DHCPProtocolEndpoint instance.
 - 556 • If more than one instance exists, find the instance of
557 CIM_RemoteAccessAvailableToElement in which the OrderOfAccess property has the
558 value 1. Find the referenced CIM_RemoteServiceAccessPoint instance.
 - 559 • If exactly one instance exists, find the referenced CIM_RemoteServiceAccessPoint
560 instance.
 - 561 • If no instances exist, no DHCP server is currently modeled for the DHCP client.
- 562 2) View the AccessInfo property of the CIM_RemoteServiceAccessPoint instance.

563 9.5 Determine Whether Alternate DHCP Configuration Is Supported

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

- 566 1) Find the CIM_IPProtocolEndpoint instance with which the CIM_DHCPProtocolEndpoint
567 instance is associated through an instance of CIM_SAPSAPDependency.
- 568 2) Find all instances of CIM_IPAssignmentSettingData (the parent class and not subclasses) that
569 are associated with the CIM_IPProtocolEndpoint instance.
- 570 3) For each instance of CIM_IPAssignmentSettingData, look for at least one instance of
571 CIM_DHCPSettingData that is associated through an instance of CIM_OrderedComponent.
- 572 4) If at least one instance of CIM_IPAssignmentSettingData is found that satisfies the preceding
573 constraints, the implementation supports a configuration that uses DHCP to acquire a
574 configuration.

575 9.6 Determine Whether DHCP Then Static Is Supported

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

- 579 1) Find the CIM_IPProtocolEndpoint instance with which the CIM_DHCPProtocolEndpoint
580 instance is associated through an instance of CIM_SAPSAPDependency.
- 581 2) Find all instances of CIM_IPAssignmentSettingData (the parent class and not subclasses) that
582 are associated with the CIM_IPProtocolEndpoint instance.
- 583 3) For each instance of CIM_IPAssignmentSettingData:
 - 584 a) Find all instances of CIM_DHCPSettingData that are associated through an instance of
585 CIM_OrderedComponent.
 - 586 b) Find all instances of CIM_StaticIPAssignmentSettingData that are associated through an
587 instance of CIM_OrderedComponent.
 - 588 c) Determine if an instance of CIM_DHCPSettingData exists such that the value of the
589 AssignedSequence property of the CIM_OrderedComponent instance that associates the
590 instance of CIM_DHCPSettingData with the instance of CIM_IPAssignmentSettingData is
591 less than the value of the AssignedSequence property of an instance of
592 CIM_OrderedComponent that associates the CIM_StaticIPAssignmentSettingData
593 instance with the instance of CIM_IPAssignmentSettingData.
- 594 4) If such an instance of CIM_DHCPSettingData is found, DHCP then Static is supported.

595 9.7 Select DHCP Options for DHCP Pending Configuration

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

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

603 9.8 Determine Whether ElementName Can Be Modified

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

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

611 10 CIM Elements

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

615 **Table 8 – CIM Elements: DHCP Client Profile**

Element Name	Requirement	Description
Classes		
CIM_DHCPCapabilities	Mandatory	See sections 7.4 and 10.1.
CIM_DHCPProtocolEndpoint	Mandatory	See sections 7.2, 7.3, and 10.2.
CIM_DHCPSettingData	Optional	See sections 7.6 and 10.3.
CIM_ElementCapabilities	Mandatory	See section 10.4.
CIM_ElementSettingData	Conditional	See sections 7.6 and 10.5.
CIM_SAPSAPDependency	Mandatory	See sections 7.2 and 10.6.
CIM_HostedAccessPoint	Mandatory	See section 10.7.
CIM_RemoteAccessAvailableToElement	Conditional	See sections 7.5 and 10.8.
CIM_RemoteServiceAccessPoint	Optional	See sections 7.1 and 10.9.
CIM_RegisteredProfile	Optional	See section 10.10.
Indications		
None defined in this profile		

616 **10.1 CIM_DHCPCapabilities**

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

619 **Table 9 – Class: CIM_DHCPCapabilities**

Elements	Requirement	Notes
InstanceID	Mandatory	Key
ElementName	Mandatory	Pattern ".*"
ElementNameEditSupported	Mandatory	See sections 7.3.4.1 and 7.3.5.1.
MaxElementNameLen	Conditional	See sections 7.3.4.1 and 7.3.5.1.
OptionsSupported	Mandatory	None
IPv6OptionsSupported	Optional	EXPERIMENTAL

620 **10.2 CIM_DHCPProtocolEndpoint**

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

623 **Table 10 – Class: CIM_DHCPProtocolEndpoint**

Elements	Requirement	Notes
SystemCreationClassName	Mandatory	Key
CreationClassName	Mandatory	Key
SystemName	Mandatory	Key
Name	Mandatory	Key
NameFormat	Mandatory	Pattern ".*"
ProtocolIFType	Mandatory	This property shall have a value of 1 (Other).
OtherTypeDescription	Mandatory	This property shall have a value of "DHCP".
RequestedState	Mandatory	See section 7.3.1.
EnabledState	Mandatory	See section 7.3.2.
ClientState	Mandatory	See section 7.2.
ElementName	Mandatory	Pattern ".*"

624 **10.3 CIM_DHCPSettingData**

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

627 **Table 11 – Class: CIM_DHCPSettingData**

Elements	Requirement	Notes
InstanceID	Mandatory	Key
AddressOrigin	Mandatory	Matches 4 ("DHCP")
ElementName	Mandatory	Pattern ".*"

628 **10.4 CIM_ElementCapabilities**

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

631 **Table 12 – Class: CIM_ElementCapabilities**

Elements	Requirement	Notes
ManagedElement	Mandatory	This property shall be a reference to the Central Instance. Cardinality 1..*
Capabilities	Mandatory	This property shall be a reference to an instance of CIM_DHCPCapabilities. Cardinality 1

632 **10.5 CIM_ElementSettingData**

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

636 **Table 13 – Class: CIM_ElementSettingData**

Elements	Requirement	Notes
ManagedElement	Mandatory	This property shall be a reference to the Central Instance. Cardinality 1..*
SettingData	Mandatory	This property shall be a reference to an instance of CIM_DHCPSettingData. Cardinality *
IsCurrent	Mandatory	Matches 1 (Is Current) or 2 (Is Not Current)

637 **10.6 CIM_SAPSAPDependency**

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

640 **Table 14 – Class: CIM_SAPSAPDependency**

Elements	Requirement	Notes
Antecedent	Mandatory	See section 7.2.1.2. Cardinality 1
Dependent	Mandatory	See section 7.2.1.1. Cardinality 1

641 **10.7 CIM_HostedAccessPoint**

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

644 **Table 15 – Class: CIM_HostedAccessPoint**

Elements	Requirement	Notes
Antecedent	Mandatory	The value shall be a reference to the Scoping Instance. Cardinality 1
Dependent	Mandatory	The value shall be a reference to the Central Instance. Cardinality 1..*

645 **10.8 CIM_RemoteAccessAvailableToElement**

646 CIM_RemoteAccessAvailableToElement represents the relationship between a DHCP client and a DHCP
 647 server. This class associates an instance of CIM_DHCPProtocolEndpoint with an instance of
 648 CIM_RemoteServiceAccessPoint. Table 16 contains the requirements for elements of this class.

649 **Table 16 – Class: CIM_RemoteAccessAvailableToElement**

Elements	Requirement	Notes
Antecedent	Mandatory	This property shall be a reference to an instance of CIM_RemoteServiceAccessPoint. Cardinality *
Dependent	Mandatory	This property shall be a reference to the Central Instance. Cardinality 1..*
OrderOfAccess	Optional	See section 7.5.1.

650 **10.9 CIM_RemoteServiceAccessPoint**

651 CIM_RemoteServiceAccessPoint represents the managed system's view of the DHCP server. Table 17
 652 contains the requirements for elements of this class.

653 **Table 17 – Class: CIM_RemoteServiceAccessPoint**

Elements	Requirement	Notes
SystemCreationClassName	Mandatory	Key
CreationClassName	Mandatory	Key
SystemName	Mandatory	Key
Name	Mandatory	Key
InfoFormat	Mandatory	Pattern ".*"
AccessContext	Mandatory	Matches 7 (DHCP Server)
AccessInfo	Mandatory	See section 7.1.1.
InfoFormat	Mandatory	See section 7.1.2.
ElementName	Mandatory	Pattern ".*"

654 **10.10 CIM_RegisteredProfile**

655 CIM_RegisteredProfile identifies the *DHCP Client Profile* in order for a client to determine whether an
 656 instance of CIM_IPProtocolEndpoint is conformant with this profile. The CIM_RegisteredProfile class is
 657 defined by the [Profile Registration Profile](#). With the exception of the mandatory values specified for the
 658 properties in Table 18, the behavior of the CIM_RegisteredProfile instance is in accordance with the
 659 [Profile Registration Profile](#).

660 **Table 18 – Class: CIM_RegisteredProfile**

Elements	Requirement	Notes
RegisteredName	Mandatory	This property shall have a value of "DHCP Client".
RegisteredVersion	Mandatory	This property shall have a value of "1.0.1".
RegisteredOrganization	Mandatory	This property shall have a value of "DMTF".

661 NOTE: Previous versions of this document included the suffix "Profile" for the RegisteredName value. If
 662 implementations querying for the RegisteredName value find the suffix "Profile", they should ignore the suffix, with
 663 any surrounding white spaces, before any comparison is done with the value as specified in this document.

664
665
666
667

ANNEX A (informative)

Change Log

Version	Date	Description
1.0.0a	2006/06/12	Preliminary Release
1.0.0	2008/08/10	Final Release
1.0.1	2009/09/26	Errata Release

668

669
670
671
672

ANNEX B (informative)

Acknowledgments

673 The authors wish to acknowledge the following people.

674 **Editor:**

- 675 • Aaron Merkin – IBM
- 676 • Jeff Hilland – HP
- 677 • Jim Davis – WBEM Solutions

678 **Contributors:**

- 679 • Jon Hass – Dell
- 680 • Khachatur Papanyan – Dell
- 681 • Enoch Suen – Dell
- 682 • Jeff Hilland – HP
- 683 • Christina Shaw – HP
- 684 • Aaron Merkin – IBM
- 685 • Perry Vincent – Intel
- 686 • John Leung – Intel
- 687