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5 **DHCP Client Profile**

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9

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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:** 1.0.0

216 **Organization:** DMTF

217 **CIM Schema Version:** 2.19

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.

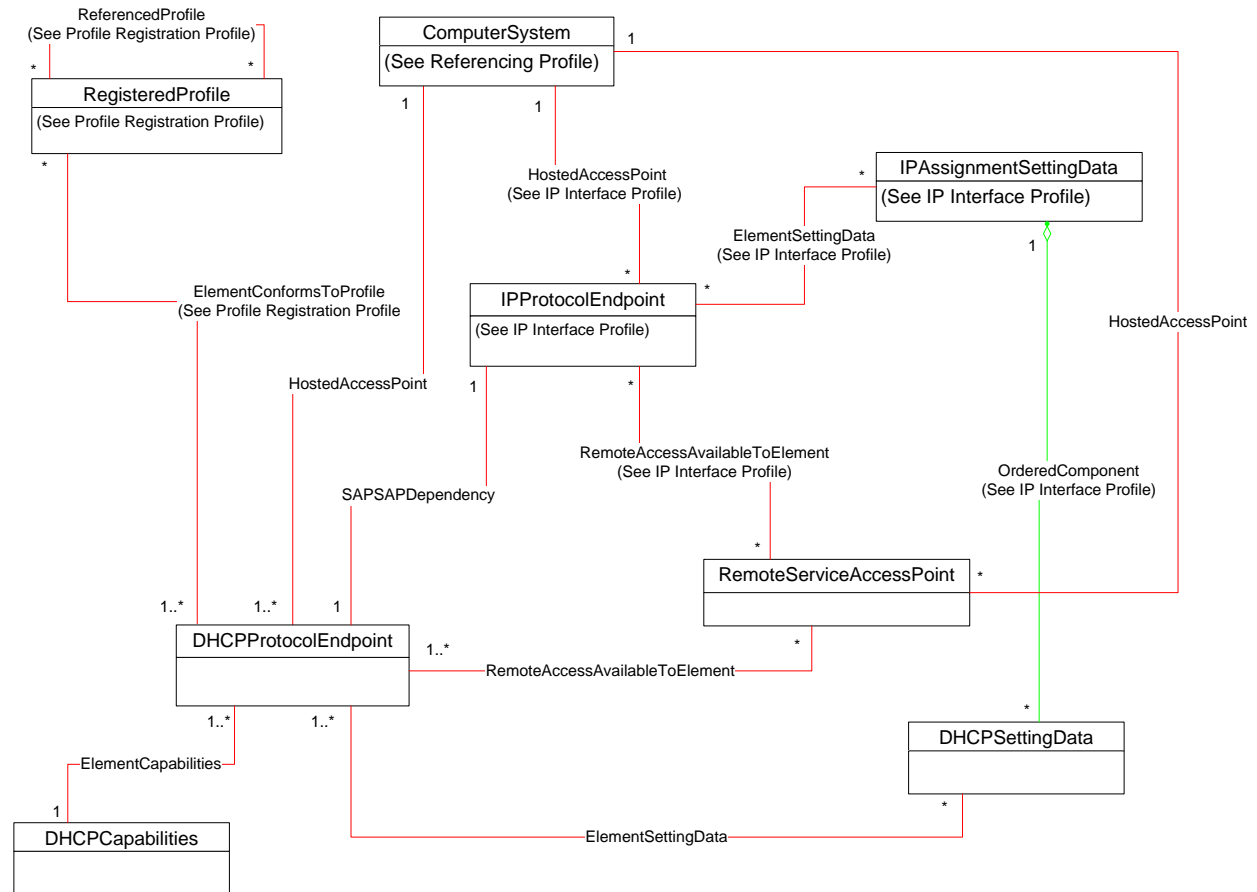
223 **Table 1 – Referenced Profiles**

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

224 **6 Description**

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

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



232

233 **Figure 1 – DHCP Client Profile: Class Diagram**

234 **7 Implementation**

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

237 **7.1 DHCP Server Representation**

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

241 7.1.1 CIM_RemoteServiceAccessPoint.AccessInfo

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

246 EXPERIMENTAL

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

249 EXPERIMENTAL

250 7.1.2 CIM_RemoteServiceAccessPoint.InfoFormat

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

252 EXPERIMENTAL

253 or a value of 4 (IPv6 Address).

254 EXPERIMENTAL

255 7.1.3 Representing Multiple DHCP Servers

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

258 7.2 DHCP Client Representation

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

260 7.2.1 Relationship with CIM_IPProtocolEndpoint

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

264 7.2.1.1 CIM_SAPSAPDependency.Dependent

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

267 7.2.1.2 CIM_SAPSAPDependency.Antecedent

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

270 7.3 Managing the DHCP Client's State

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

273 7.3.1 CIM_DHCPProtocolEndpoint.RequestedState

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

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

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

285 7.3.2 CIM_DHCPProtocolEndpoint.EnabledState

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

288 7.3.2.1 Enabled

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

291 7.3.2.2 Enabled but Offline

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

296 7.3.2.3 Disabled

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

301 7.3.3 CIM_DHCPProtocolEndpoint.ClientState

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

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

307 7.3.4 Modifying ElementName Is Supported

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

311 7.3.4.1 CIM_DHCPCapabilities

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

317 7.3.5 Modifying ElementName Is Not Supported

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

321 7.3.5.1 CIM_DHCPCapabilities

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

327 7.4 DHCP Client Capabilities

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

330 7.5 DHCP Client-Server Relationship

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

336 7.5.1 Identifying the DHCP Server That Provides Configuration

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

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

352 7.6 Alternate DHCP Configuration

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

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

362 7.6.1 Applying an Alternate Configuration

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

367 7.6.1.1 Successful Application of Settings

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

370 8 Methods

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

373 8.1 Profile Conventions for Operations

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

379 The default list of operations is as follows:

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

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

389 **8.2 CIM_DHCPCapabilities**

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

391 **8.3 CIM_DHCPProtocolEndpoint**

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

394 **Table 2 – Operations: CIM_DHCPProtocolEndpoint**

Operation	Requirement	Messages
ModifyInstance	Optional. See section 8.3.1.	None

395 **8.3.1 CIM_DHCPProtocolEndpoint—ModifyInstance Operation**

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

398 **8.3.1.1 CIM_DHCPProtocolEndpoint.ElementName Property**

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

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

408 **8.4 CIM_DHCPSettingData**

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

410 **8.5 CIM_ElementCapabilities**

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

413 **Table 3 – Operations: CIM_ElementCapabilities**

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

414 **8.6 CIM_ElementSettingData**

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

417 **Table 4 – Operations: CIM_ElementSettingData**

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

418 **8.7 CIM_SAPSAPDependency**

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

421 **Table 5 – Operations: CIM_SAPSAPDependency**

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

422 **8.8 CIM_HostedAccessPoint**

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

425 **Table 6 – Operations: CIM_HostedAccessPoint**

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

426 **8.9 CIM_RemoteAccessAvailableToElement**

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

429 **Table 7 – Operations: CIM_RemoteAccessAvailableToElement**

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

430 **8.10 CIM_RemoteServiceAccessPoint**

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

432 **9 Use Cases**

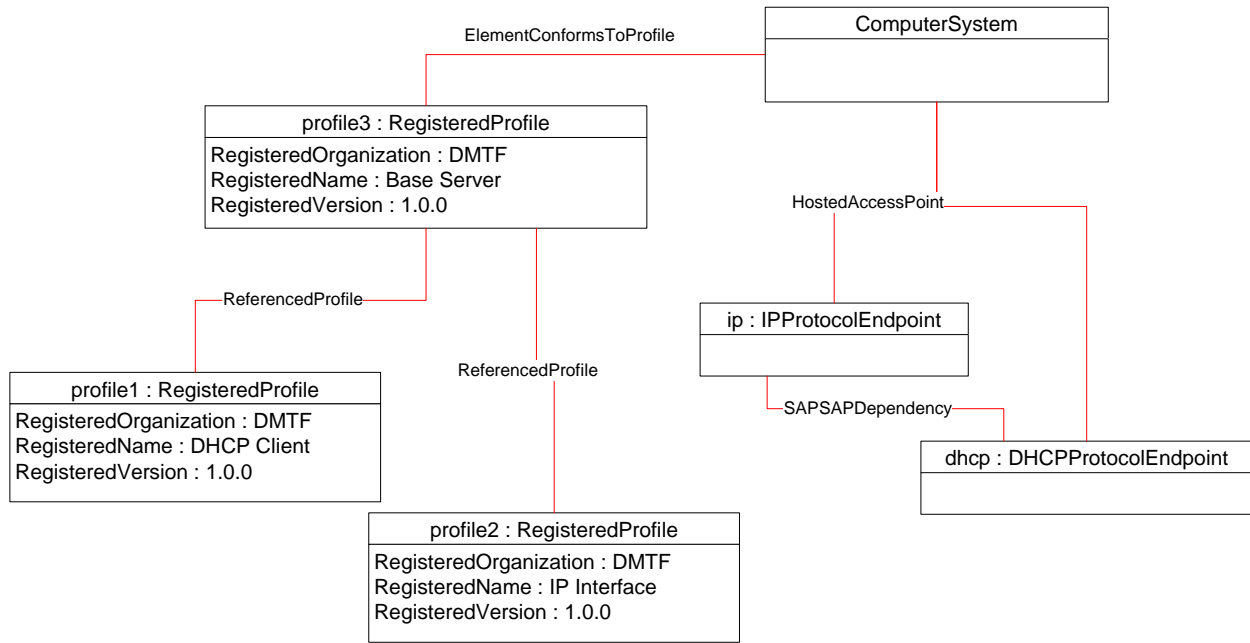
433 This section contains object diagrams and use cases for the *DHCP Client Profile*.

434 **9.1 Object Diagrams**

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

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

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

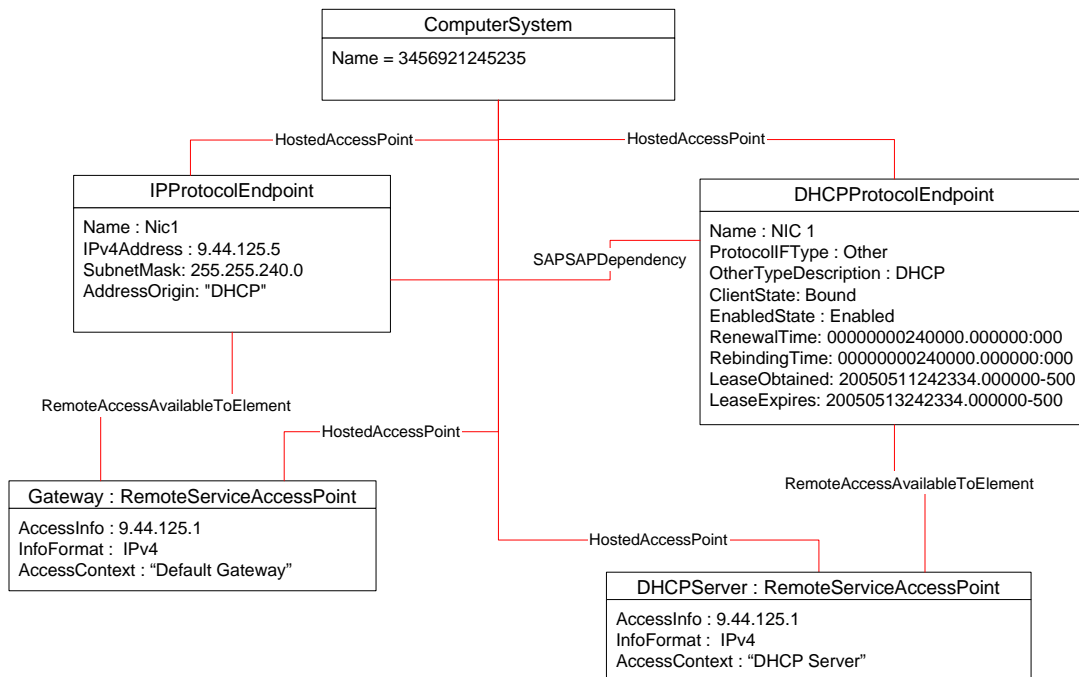


450

451

Figure 2 – Registered Profile

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

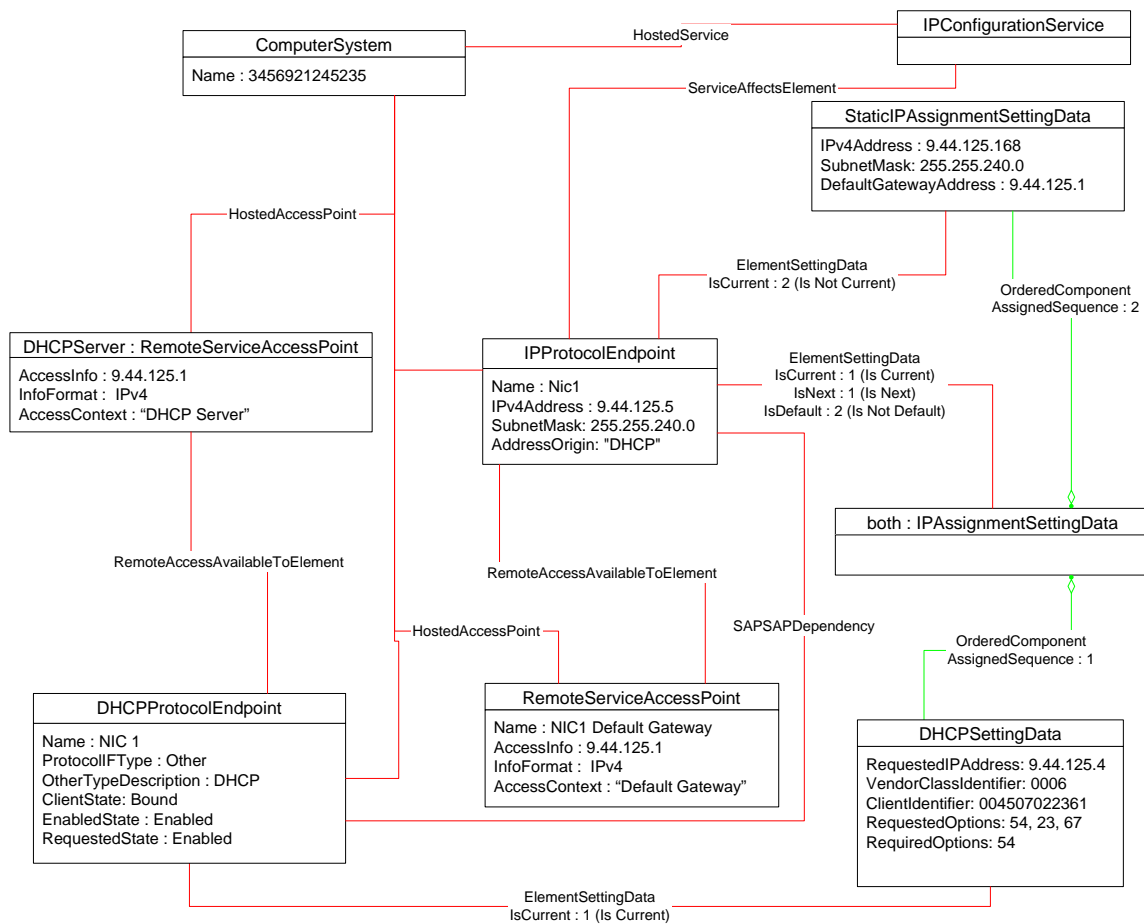


458

459

Figure 3 – DHCP Assigned IP Configuration

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



472

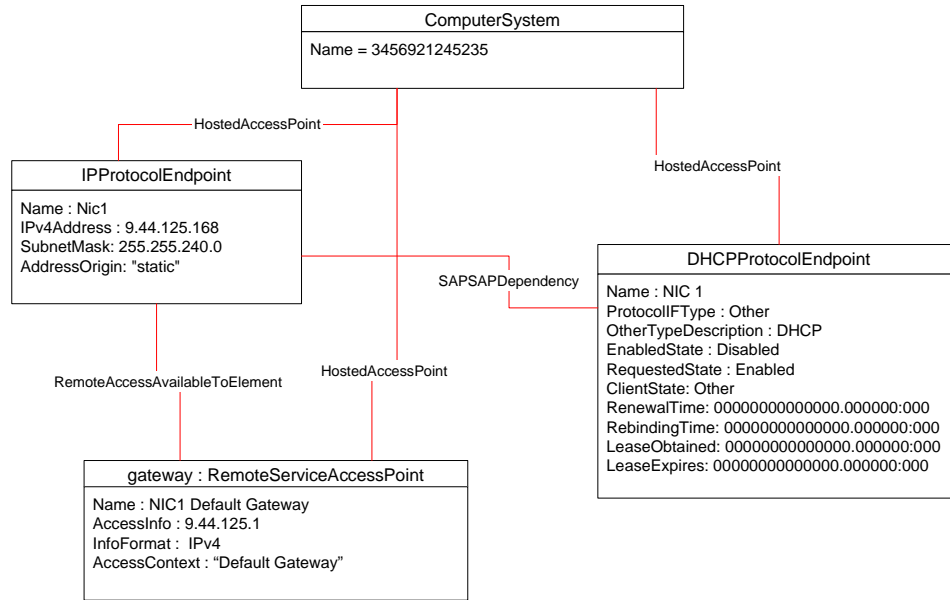
473

Figure 4 – DHCP Assigned IP Configuration with Configuration Management

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

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

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



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487

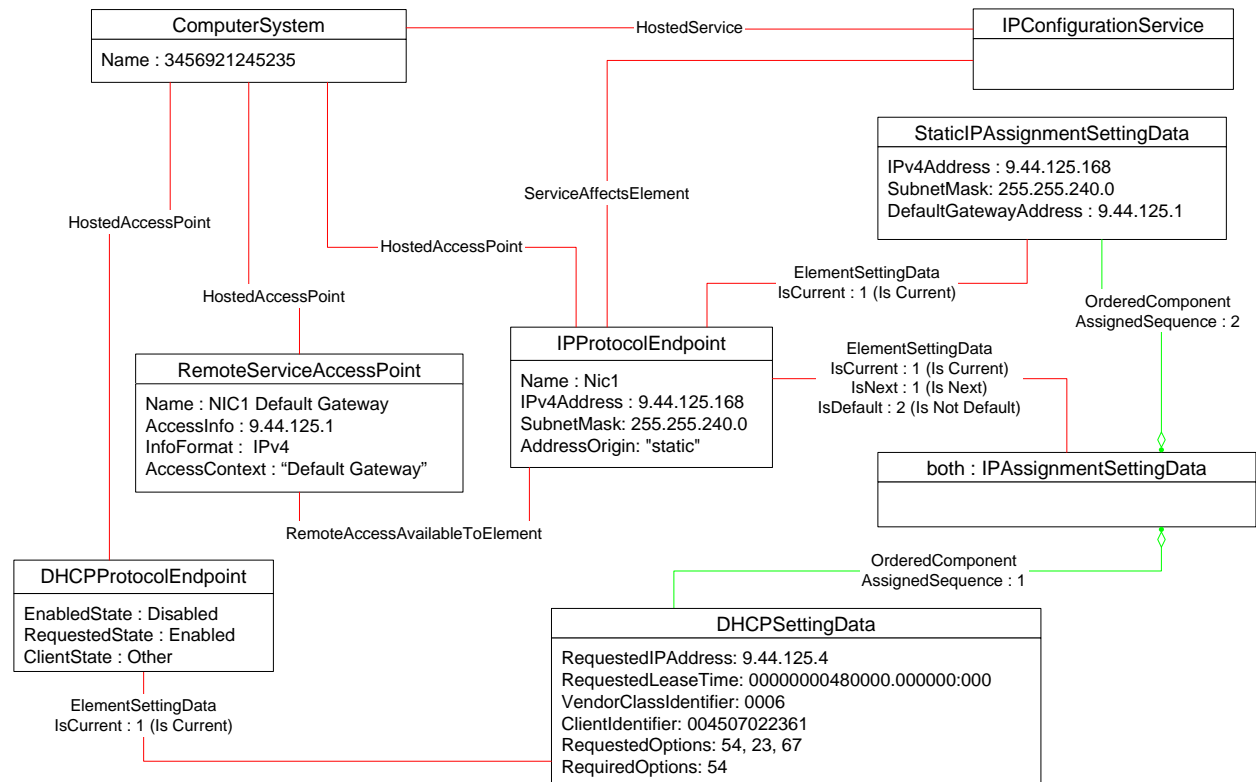
Figure 5 – DHCP Timeout to Static

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

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

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

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

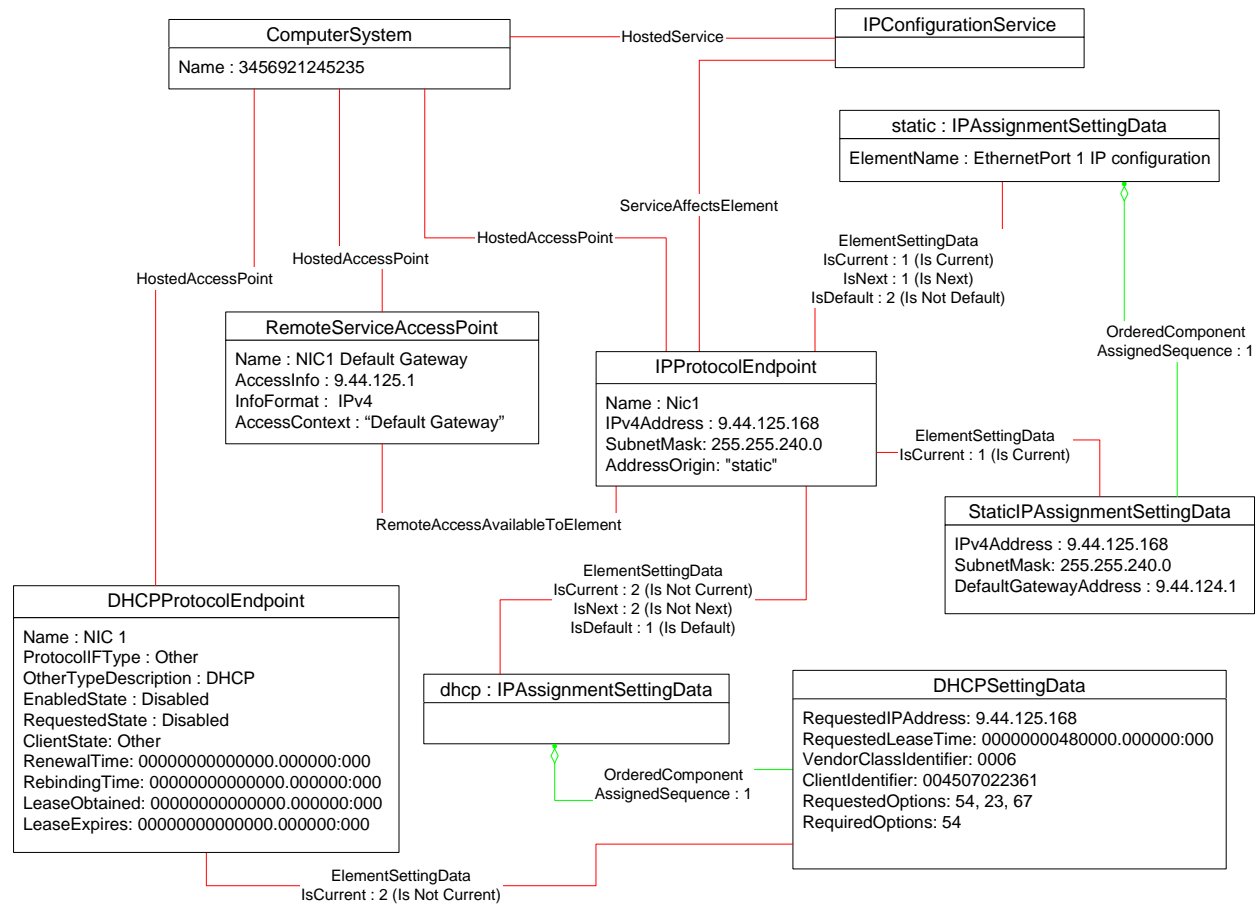


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Figure 6 – DHCP Timeout to Static with Configuration Management

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



512

513

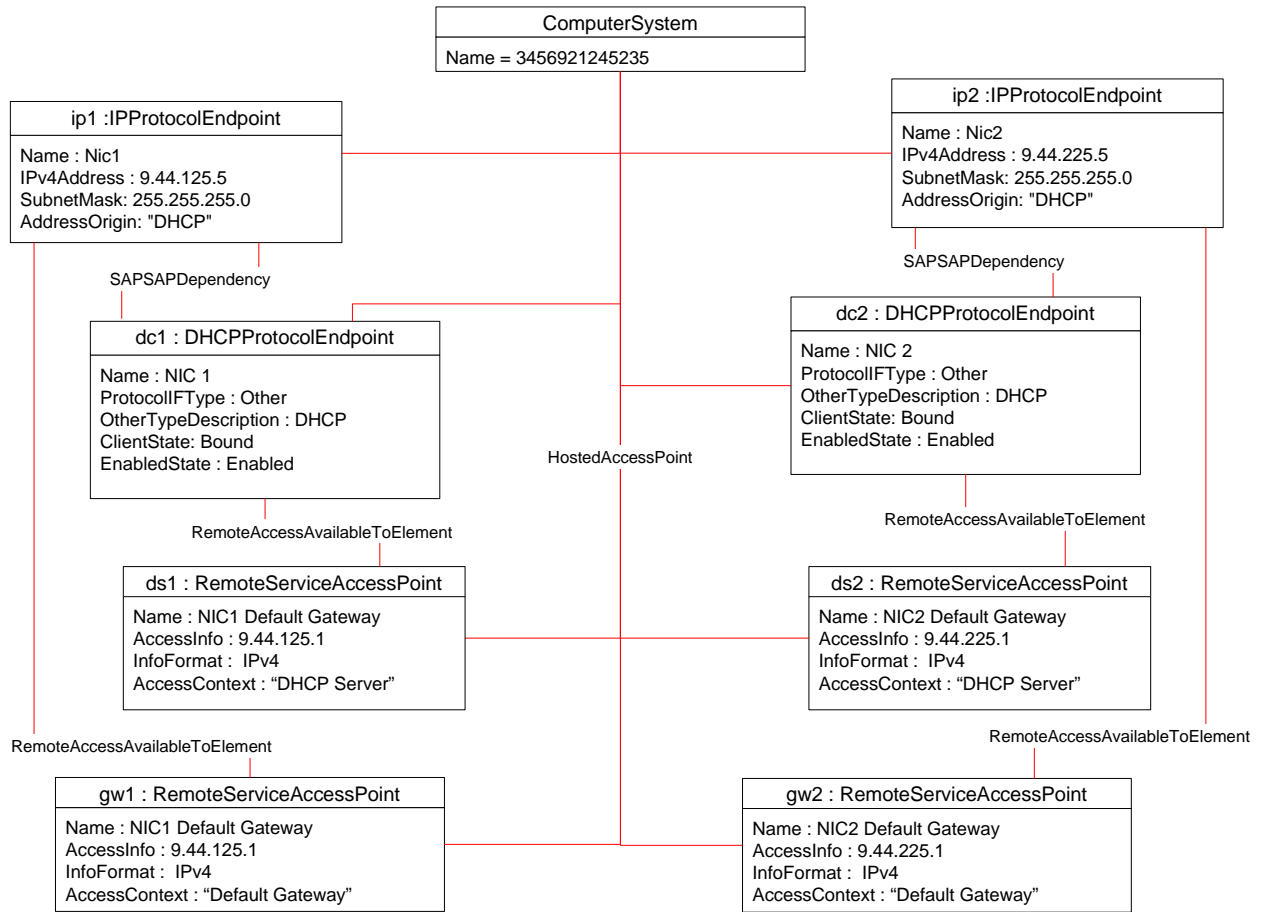
Figure 7 – Static or DHCP Pending Configurations

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

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

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

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

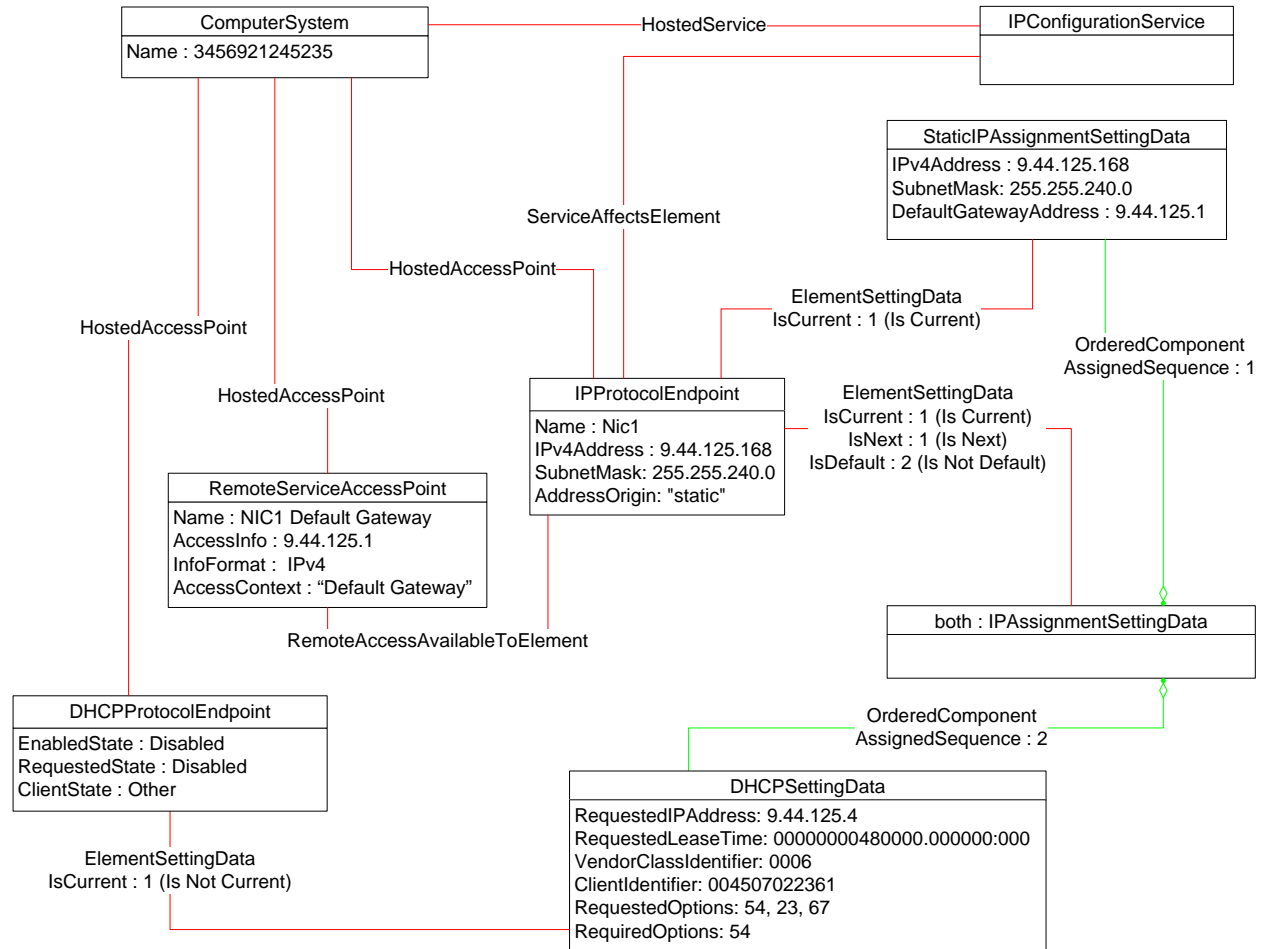


532

533

Figure 8 – DHCP Supported on Dual NIC System

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



539

540

Figure 9 – Static Then DHCP

541 9.2 Determine Which DHCP Options Are Supported

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

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

545 9.3 Determine If IP Configuration Originated through DHCP

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

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

551 9.4 View the DHCP Server IP Address

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

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

562 9.5 Determine Whether Alternate DHCP Configuration Is Supported

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

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

574 9.6 Determine Whether DHCP Then Static Is Supported

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

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

594 9.7 Select DHCP Options for DHCP Pending Configuration

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

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

602 9.8 Determine Whether ElementName Can Be Modified

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

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

610 10 CIM Elements

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

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

Element Name	Requirement	Description
Classes		
CIM_DHPCCapabilities	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		

615 **10.1 CIM_DHCPCapabilities**

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

618 **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

619 **10.2 CIM_DHCPProtocolEndpoint**

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

622 **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 ".*"

623 **10.3 CIM_DHCPSettingData**

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

626 **Table 11 – Class: CIM_DHCPSettingData**

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

627 **10.4 CIM_ElementCapabilities**

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

630 **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_DHPCCapabilities. Cardinality 1

631 **10.5 CIM_ElementSettingData**

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

635 **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)

636 **10.6 CIM_SAPSAPDependency**

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

639 **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

640 **10.7 CIM_HostedAccessPoint**

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

643 **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..*

644 **10.8 CIM_RemoteAccessAvailableToElement**

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

648 **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.

649 **10.9 CIM_RemoteServiceAccessPoint**

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

652 **Table 17 – Class: CIM_RemoteServiceAccessPoint**

Elements	Requirement	Notes
SystemCreationClassName	Mandatory	Key
CreationClassName	Mandatory	Key
SystemName	Mandatory	Key
Name	Mandatory	Key
NameFormat	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 ".*"

653 **10.10 CIM_RegisteredProfile**

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

659 **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 "1.0.0".
RegisteredOrganization	Mandatory	This property shall have a value of "DMTF".

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

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ANNEX A (informative)

Change Log

Version	Date	Description
1.0.0a	2006/06/12	Preliminary Release
1.0.0	2008/08/10	Final Release

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671

ANNEX B (informative)

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