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Foreword

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

121 DMTF is a not-for-profit association of industry members dedicated to promoting enterprise and systems
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142

143

Introduction

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

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

149 Document conventions

150 Typographical conventions

151 The following typographical conventions are used in this document:

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

154 ABNF usage conventions

155 Format definitions in this document are specified using ABNF (see [RFC5234](#)), with the following
156 deviations:

- 157 • Literal strings are to be interpreted as case-sensitive Unicode characters, as opposed to the
158 definition in [RFC5234](#) that interprets literal strings as case-insensitive US-ASCII characters.

159 Deprecated material

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

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

167 The following typographical convention indicates deprecated material:

168 DEPRECATED

169 Deprecated material appears here.

170 DEPRECATED

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

173 Experimental material

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

179 The following typographical convention indicates experimental material:

180 **EXPERIMENTAL**

181 Experimental material appears here.

182 **EXPERIMENTAL**

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

185

187

DHCP Client Profile

188 1 Scope

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

191 2 Normative references

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

196 DMTF DSP0004, *CIM Infrastructure Specification 2.7*,
197 http://www.dmtf.org/standards/published_documents/DSP0004_2.7.pdf

198 DMTF DSP0200, *CIM Operations over HTTP 1.3*,
199 https://www.dmtf.org/sites/default/files/standards/documents/DSP0200_1.3.pdf

200 DMTF DSP1001, *Management Profile Specification Usage Guide 1.1*,
201 http://www.dmtf.org/standards/published_documents/DSP1001_1.1.pdf

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

204 DMTF DSP1036, *IP Interface Profile 1.0*,
205 http://www.dmtf.org/standards/published_documents/DSP1036_1.0.pdf

206 IETF RFC2131, *Dynamic Host Configuration Protocol*, March 1997, <http://www.ietf.org/rfc/rfc2131.txt>

207 IETF RFC3315, *Dynamic Host Configuration Protocol for IPv6 (DHCPv6)*, July 2003,
208 <http://www.ietf.org/rfc/rfc3315.txt>

209 IETF RFC4291, *IP Version 6 Addressing Architecture*, February 2006, <http://www.ietf.org/rfc/rfc4291.txt>

210 ISO/IEC Directives, Part 2, *Principles and rules for the structure and drafting of ISO and IEC documents*,
211 <http://isotc.iso.org/livelink/livelink.exe?func=ll&objId=4230456&objAction=browse&sort=subtype>

212 3 Terms and definitions

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

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

221 The terms "clause", "subclause", "paragraph", and "annex" in this document are to be interpreted as
222 described in [ISO/IEC Directives, Part 2](#), Clause 6.

223 The terms "normative" and "informative" in this document are to be interpreted as described in [ISO/IEC](#)
224 [Directives, Part 2](#), Clause 3. In this document, clauses, subclauses, or annexes labeled "(informative)" do
225 not contain normative content. Notes and examples are always informative elements.

226 The terms defined in [DSP0004](#), [DSP0223](#), and [DSP1001](#) apply to this document. The following additional
227 terms are used in this document.

228 **3.1**

229 **can**

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

231 **3.2**

232 **cannot**

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

234 **3.3**

235 **conditional**

236 indicates requirements to be followed strictly to conform to the document when the specified conditions
237 are met

238 **3.4**

239 **mandatory**

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

242 **3.5**

243 **may**

244 indicates a course of action permissible within the limits of the document

245 **3.6**

246 **need not**

247 indicates a course of action permissible within the limits of the document

248 **3.7**

249 **optional**

250 indicates a course of action permissible within the limits of the document

251 **3.8**

252 **referencing profile**

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

255 **3.9**

256 **shall**

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

259 **3.10**

260 **shall not**

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

263 **3.11**
 264 **should**
 265 indicates that among several possibilities, one is recommended as particularly suitable, without
 266 mentioning or excluding others, or that a certain course of action is preferred but not necessarily required

267 **3.12**
 268 **should not**
 269 indicates that a certain possibility or course of action is deprecated but not prohibited

270 **3.13**
 271 **unspecified**
 272 indicates that this profile does not define any constraints for the referenced CIM element or operation

273 **4 Symbols and abbreviated terms**

274 The following abbreviations are used in this document.

275 **4.1**
 276 **DHCP**
 277 Dynamic Host Configuration Protocol

278 **4.2**
 279 **IP**
 280 Internet Protocol

281 **5 Synopsis**

282 **Profile Name:** DHCP Client
 283 **Version:** 1.0.4
 284 **Organization:** DMTF
 285 **CIM Schema Version:** 2.27
 286 **Central Class:** CIM_DHCPProtocolEndpoint
 287 **Scoping Class:** CIM_ComputerSystem

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

291 **Table 1 – Referenced profiles**

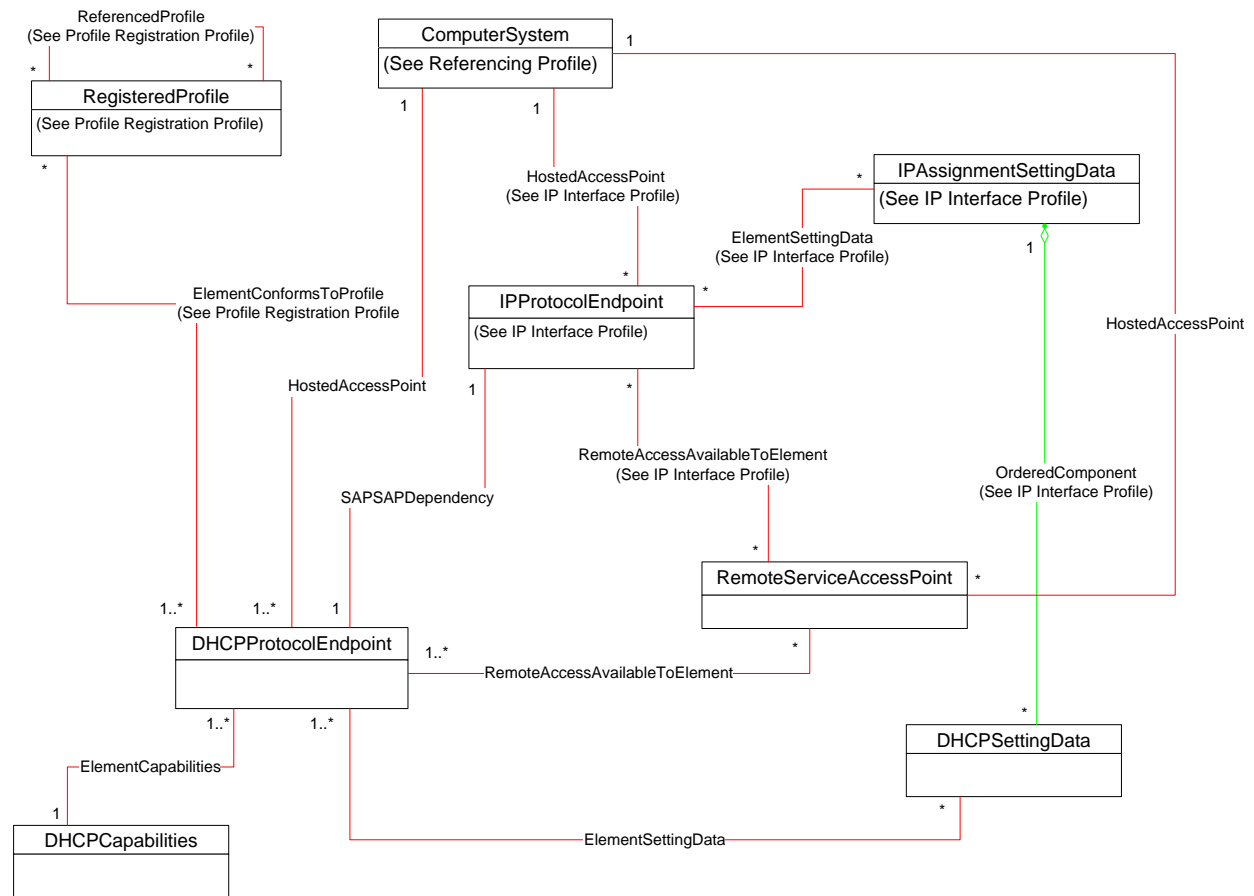
Profile Name	Organization	Version	Requirement	Description
Profile Registration	DMTF	1.0	Mandatory	None
IP Interface	DMTF	1.0	Mandatory	See 7.2.1.

292 **6 Description**

293 The *DHCP Client Profile* extends the management capability of referencing profiles by adding the
 294 capability to represent a DHCP client and its associated capabilities and configuration. The DHCP client

295 is modeled with an instance of CIM_DHCPProtocolEndpoint. The DHCP client's capabilities are modeled
 296 with an instance of CIM_DHCPCapabilities. Aspects of the DHCP client's configuration are modeled with
 297 properties of DHCPProtocolEndpoint as well as with CIM_DHCPSettingData.

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



300

301

Figure 1 – DHCP Client Profile: Class diagram

302 7 Implementation

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

305 7.1 DHCP server representation

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

309 7.1.1 CIM_RemoteServiceAccessPoint.AccessInfo

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

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

316 7.1.2 CIM_RemoteServiceAccessPoint.InfoFormat

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

318 7.1.3 Representing multiple DHCP servers

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

321 7.2 DHCP client representation

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

323 7.2.1 Relationship with CIM_IPProtocolEndpoint

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

327 7.2.1.1 CIM_SAPSAPDependency.Dependent

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

330 7.2.1.2 CIM_SAPSAPDependency.Antecedent

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

333 7.3 Managing the DHCP client's state

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

336 7.3.1 CIM_DHCPProtocolEndpoint.RequestedState

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

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

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

348 **7.3.2 CIM_DHCPProtocolEndpoint.EnabledState**

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

351 **7.3.2.1 Enabled**

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

354 **7.3.2.2 Enabled but Offline**

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

359 **7.3.2.3 Disabled**

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

364 **7.3.3 CIM_DHCPProtocolEndpoint.ClientState**

365 When the CIM_DHCPProtocolEndpoint.EnabledState property has a value other than 3 (Disabled), the
366 CIM_DHCPProtocolEndpoint.ClientState property shall identify the current status of the DHCP client
367 following the state diagram illustrated in Figure 5 of IETF [RFC2131](#).

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

370 **7.3.4 Modifying ElementName is supported**

371 This clause describes the CIM elements and behaviors that shall be implemented when the
372 CIM_DHCPProtocolEndpoint.ElementName property supports being modified by the ModifyInstance
373 operation.

374 **7.3.4.1 CIM_DHCCapabilities**

375 For the instance of CIM_DHCCapabilities that is associated with the Central Instance through an
376 instance of CIM_ElementCapabilities, the CIM_DHCCapabilities.ElementNameEditSupported property
377 shall have a value of TRUE when the implementation supports client modification of the
378 CIM_DHCPProtocolEndpoint.ElementName property. The CIM_DHCCapabilities.MaxElementNameLen
379 property shall be implemented.

380 **7.3.5 Modifying ElementName is not supported**

381 This clause describes the CIM elements and behaviors that shall be implemented when the
382 CIM_DHCPProtocolEndpoint.ElementName property does not support being modified by the
383 ModifyInstance operation.

384 7.3.5.1 CIM_DHCPCapabilities

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

390 7.4 DHCP client capabilities

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

393 7.5 DHCP client-server relationship

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

399 7.5.1 Identifying the DHCP server that provides configuration

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

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

415 7.6 Alternate DHCP configuration

416 An implementation may support the management of alternate configurations for the associated IP
417 interface that uses DHCP. The representation of alternate configurations is described in general in the
418 [DSP1036](#). The configuration of the DHCP client as part of an alternate configuration for the associated IP
419 interface is optional behavior that is defined in this clause.

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

425 7.6.1 Applying an alternate configuration

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

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

430 7.6.1.1 Successful application of settings

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

433 8 Methods

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

436 8.1 Profile conventions for operations

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

439 The default list of operations is as follows:

- 440 • GetInstance
- 441 • EnumerateInstances
- 442 • EnumerateInstanceNames
- 443 • Associators
- 444 • AssociatorNames
- 445 • References
- 446 • ReferenceNames

447 8.2 CIM_DHCPCapabilities

448 All operations in the default list in 8.1 shall be implemented as defined in [DSP0200](#).

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

450 8.3 CIM_DHCPProtocolEndpoint

451 Table 2 lists implementation requirements for operations. If implemented, these operations shall be
452 implemented as defined in [DSP0200](#). In addition, and unless otherwise stated in Table 2, all operations in
453 the default list in 8.1 shall be implemented as defined in [DSP0200](#).

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

455 **Table 2 – Operations: CIM_DHCPProtocolEndpoint**

Operation	Requirement	Messages
ModifyInstance	Optional. See 8.3.1.	None

456 8.3.1 CIM_DHCPProtocolEndpoint — ModifyInstance operation

457 This clause details the specific requirements for the ModifyInstance operation applied to an instance of
458 CIM_DHCPProtocolEndpoint.

459 **8.3.1.1 CIM_DHCPProtocolEndpoint.ElementName property**

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

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

469 **8.4 CIM_DHCPSettingData**

470 All operations in the default list in 8.1 shall be implemented as defined in [DSP0200](#).

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

472 **8.5 CIM_ElementCapabilities**

473 Table 3 lists implementation requirements for operations. If implemented, these operations shall be
 474 implemented as defined in [DSP0200](#). In addition, and unless otherwise stated in Table 3, all operations in
 475 the default list in 8.1 shall be implemented as defined in [DSP0200](#).

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

477 **Table 3 – Operations: CIM_ElementCapabilities**

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

478 **8.6 CIM_ElementSettingData**

479 Table 4 lists implementation requirements for operations. If implemented, these operations shall be
 480 implemented as defined in [DSP0200](#). In addition, and unless otherwise stated in Table 4, all operations in
 481 the default list in 8.1 shall be implemented as defined in [DSP0200](#).

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

483 **Table 4 – Operations: CIM_ElementSettingData**

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

484 8.7 CIM_SAPSAPDependency

485 Table 5 lists implementation requirements for operations. If implemented, these operations shall be
 486 implemented as defined in [DSP0200](#). In addition, and unless otherwise stated in Table 5, all operations in
 487 the default list in 8.1 shall be implemented as defined in [DSP0200](#).

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

489 **Table 5 – Operations: CIM_SAPSAPDependency**

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

490 8.8 CIM_HostedAccessPoint

491 Table 6 lists implementation requirements for operations. If implemented, these operations shall be
 492 implemented as defined in [DSP0200](#). In addition, and unless otherwise stated in Table 6, all operations in
 493 the default list in 8.1 shall be implemented as defined in [DSP0200](#).

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

495 **Table 6 – Operations: CIM_HostedAccessPoint**

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

496 8.9 CIM_RemoteAccessAvailableToElement

497 Table 7 lists implementation requirements for operations. If implemented, these operations shall be
 498 implemented as defined in [DSP0200](#). In addition, and unless otherwise stated in Table 7, all operations in
 499 the default list in 8.1 shall be implemented as defined in [DSP0200](#).

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

501 **Table 7 – Operations: CIM_RemoteAccessAvailableToElement**

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

502 8.10 CIM_RemoteServiceAccessPoint

503 All operations in the default list in 8.1 shall be implemented as defined in [DSP0200](#).

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

505 **9 Use cases**

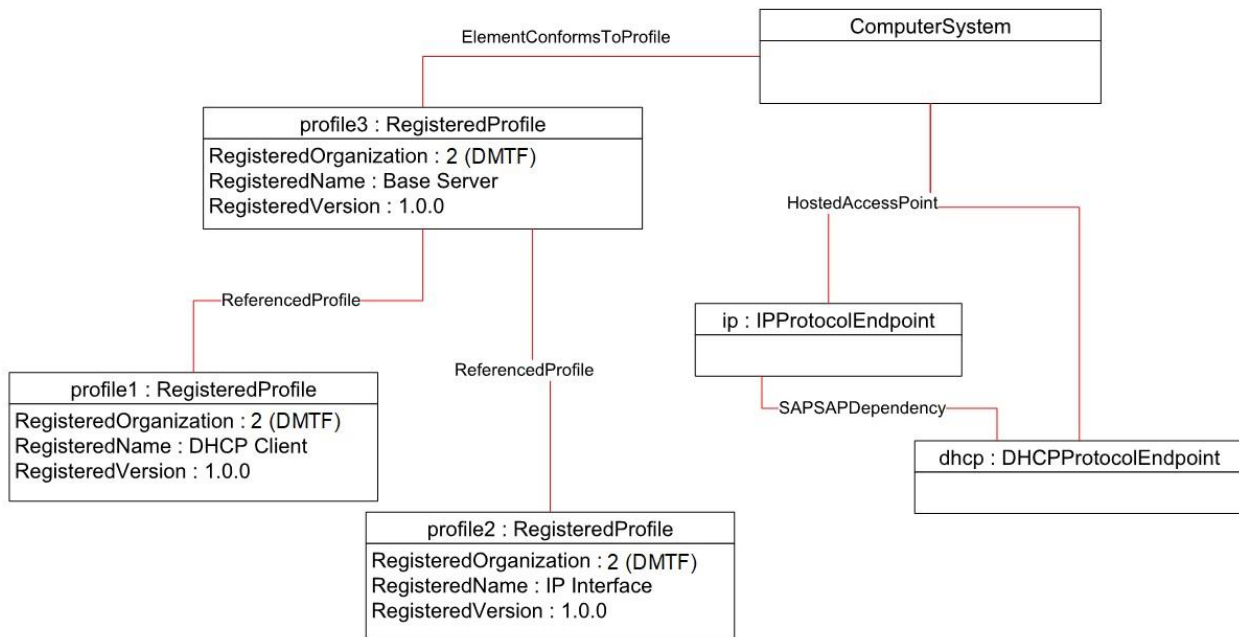
506 This clause contains object diagrams and use cases for the *DHCP Client Profile*.

507 **9.1 Object diagrams**

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

- 512 • profile3 identifies the DMTF *Base Server Profile* version 1.0.0.
- 513 • profile1 identifies the DMTF *DHCP Client Profile* version 1.0.2.
- 514 • profile2 identifies the DMTF [IP Interface Profile](#) version 1.0.0.

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

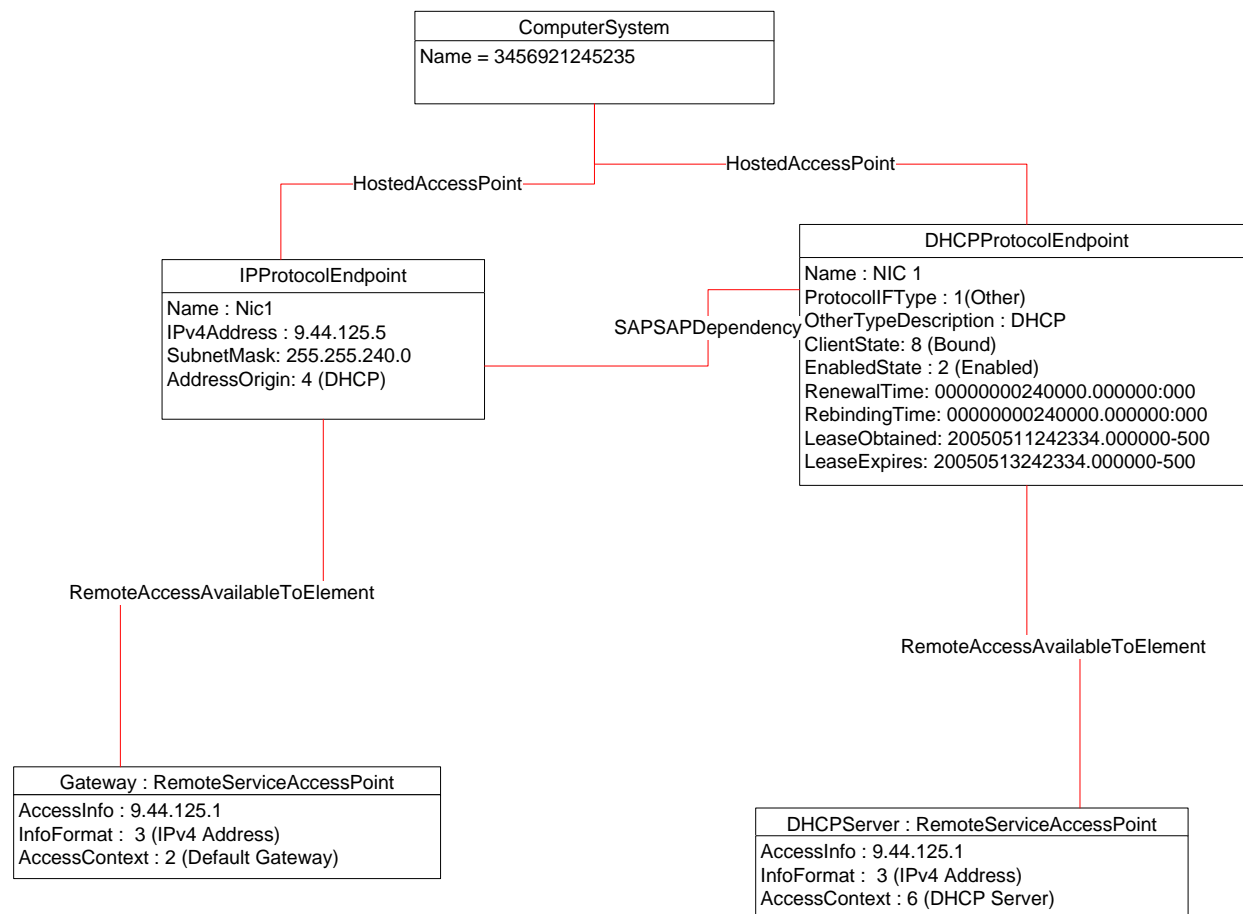


523

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Figure 2 – Registered profile

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

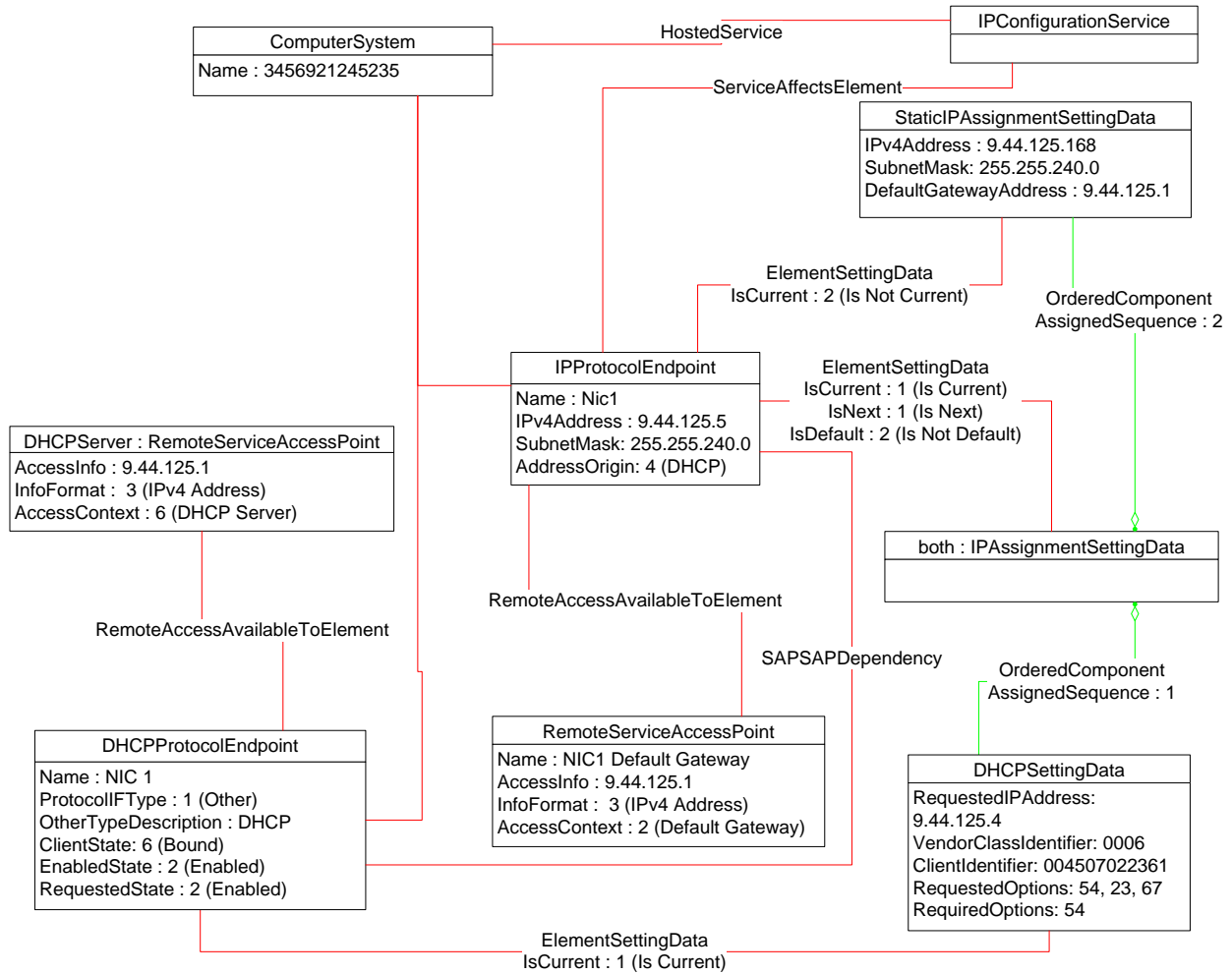


531

532

Figure 3 – DHCP assigned IP configuration

533 The object diagram in Figure 4 illustrates an implementation similar to that of Figure 3, with the addition of
 534 the optional configuration management functionality of [DSP1036](#). The
 535 CIM_DHCPProtocolEndpoint.ClientState property has a value of "Bound", indicating that a configuration
 536 was successfully obtained. DHCPServer is the instance of CIM_RemoteServiceAccessPoint that
 537 represents the DHCP server contacted by the DHCP client. The value of the
 538 CIM_IPProtocolEndpoint.AddressOrigin property is "DHCP", indicating that the IP configuration was
 539 obtained through DHCP. The IsCurrent property of the CIM_ElementSettingData instance that associates
 540 the CIM_StaticIPAssignmentSettingData instance with the CIM_IPProtocolEndpoint instance has a value
 541 of 2 (Is Not Current). This value indicates that the static configuration was not applied for the IP interface.
 542 The IsCurrent property of the instance of CIM_ElementSettingData that associates the
 543 CIM_DHCPSettingData instance with the CIM_DHCPProtocolEndpoint instance has a value of 1 (Is
 544 Current), indicating that the CIM_DHCPSettingData was applied.



545

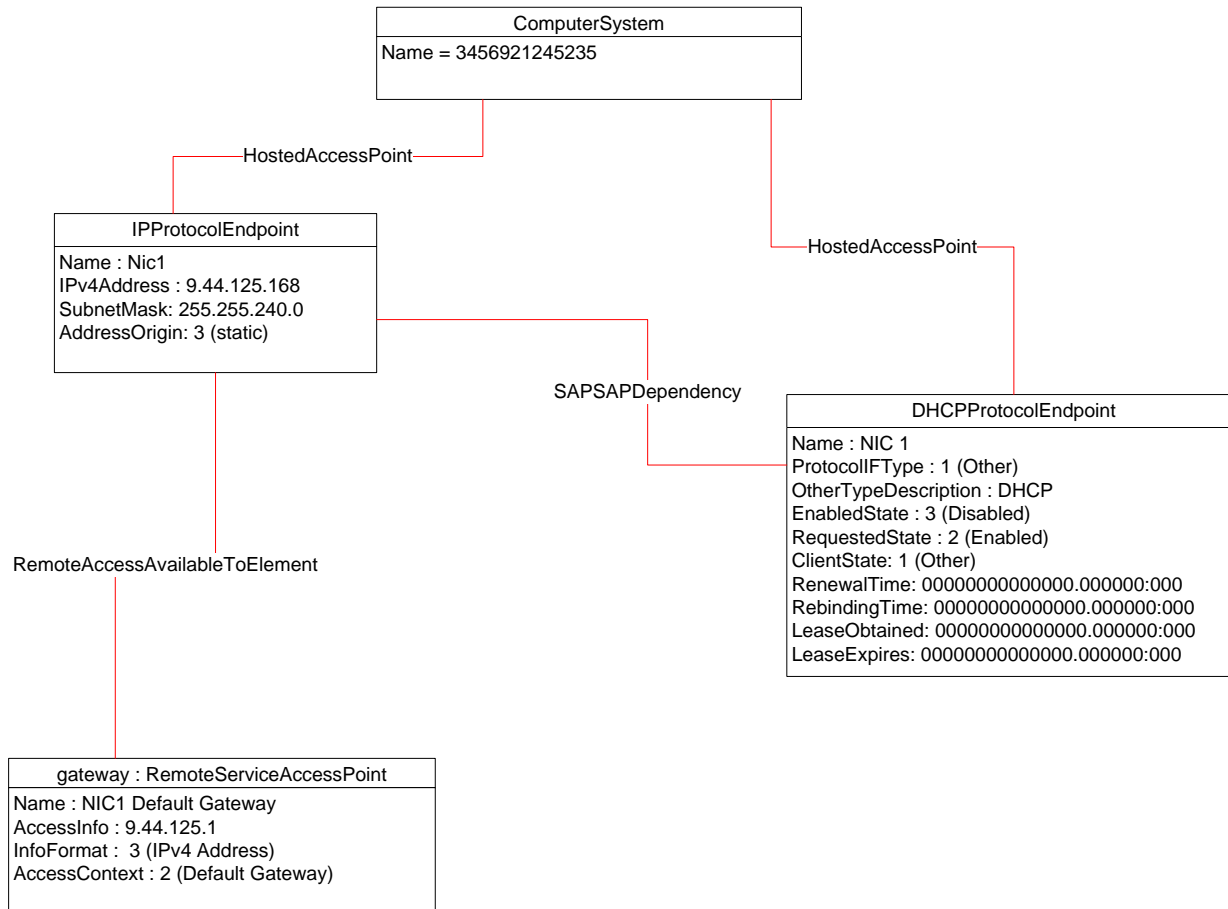
546

Figure 4 – DHCP assigned IP configuration with configuration management

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

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

557 The AddressOrigin property of the CIM_IPProtocolEndpoint instance reflects that the address was
 558 assigned statically.



559

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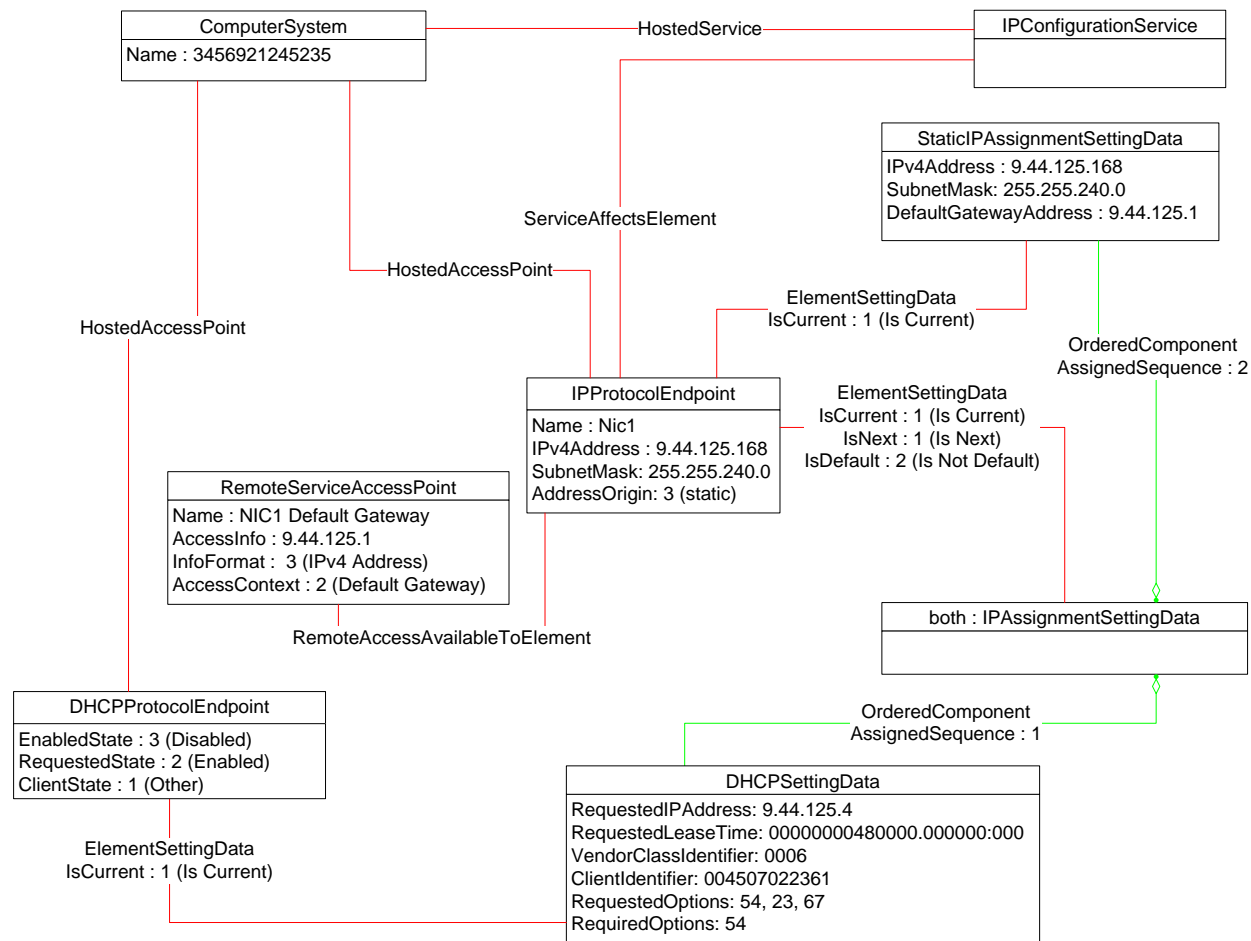
Figure 5 – DHCP timeout to static

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

566 The DHCP client failed to acquire a configuration from the DHCP server. The EnabledState and
 567 ClientState properties of the CIM_DHCPProtocolEndpoint instance indicate that the DHCP client is now
 568 disabled. No instance of CIM_RemoteServiceAccessPoint is associated with the
 569 CIM_DHCPProtocolEndpoint because the DHCP client failed to communicate with a DHCP server.

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

573 The AddressOrigin property of the CIM_IPProtocolEndpoint instance reflects that the address was
 574 assigned statically.

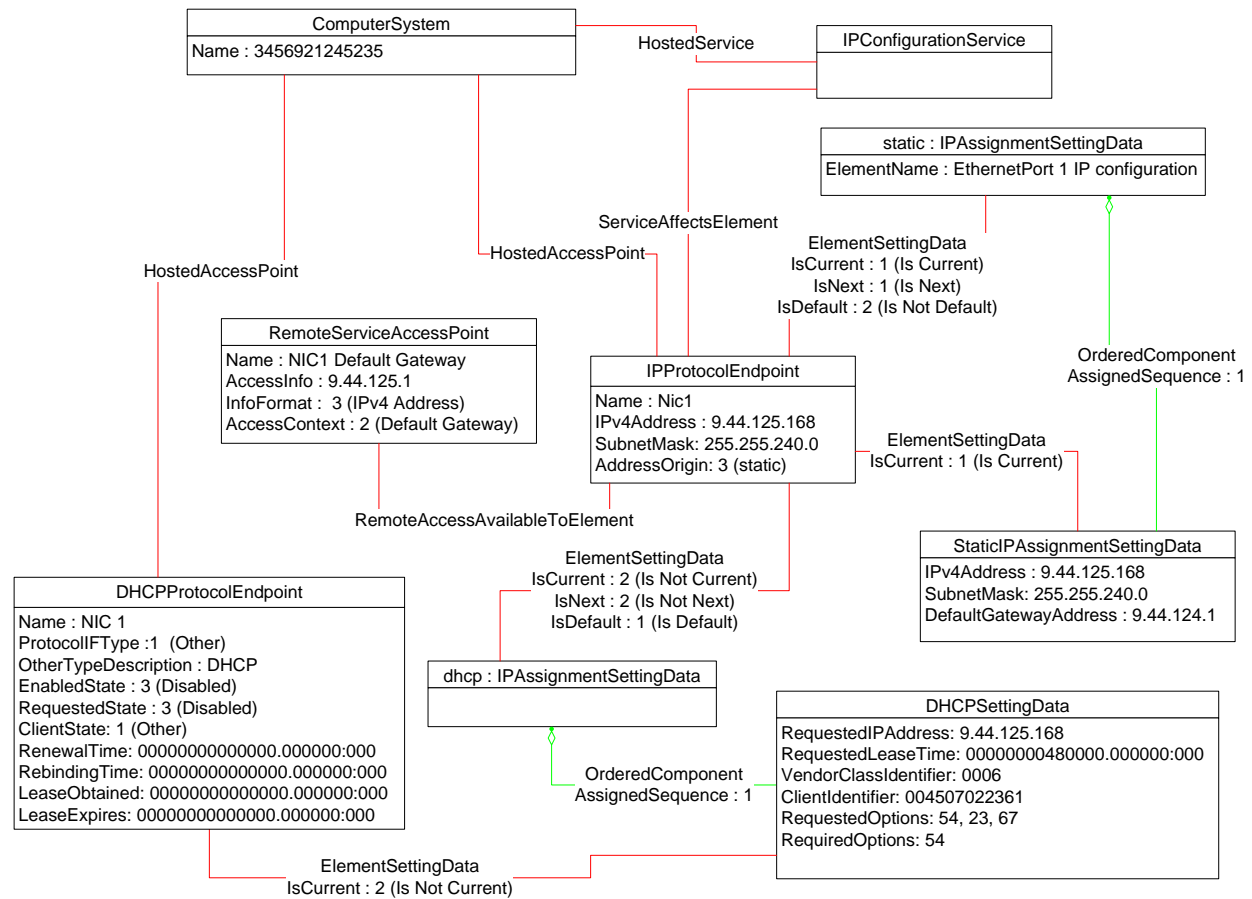


575

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Figure 6 – DHCP timeout to static with configuration management

577 The object diagram in Figure 7 illustrates an IP interface with two supported alternate configurations. Two
 578 discrete IP configuration options are available for the IP interface. Each option is represented by an
 579 instance of CIM_IPAssignmentSettingData. One configuration option represents the ability to statically
 580 assign the IP configuration. This option is indicated by the instance of CIM_OrderedComponent that
 581 associates the CIM_IPAssignmentSettingData instance with an instance of
 582 CIM_StaticIPAssignmentSettingData. The other configuration option represents the ability to obtain the
 583 configuration through a DHCP client. This option is indicated by the instance of CIM_OrderedComponent
 584 that associates the CIM_IPAssignmentSettingData instance with an instance of CIM_DHCPSettingData.



585

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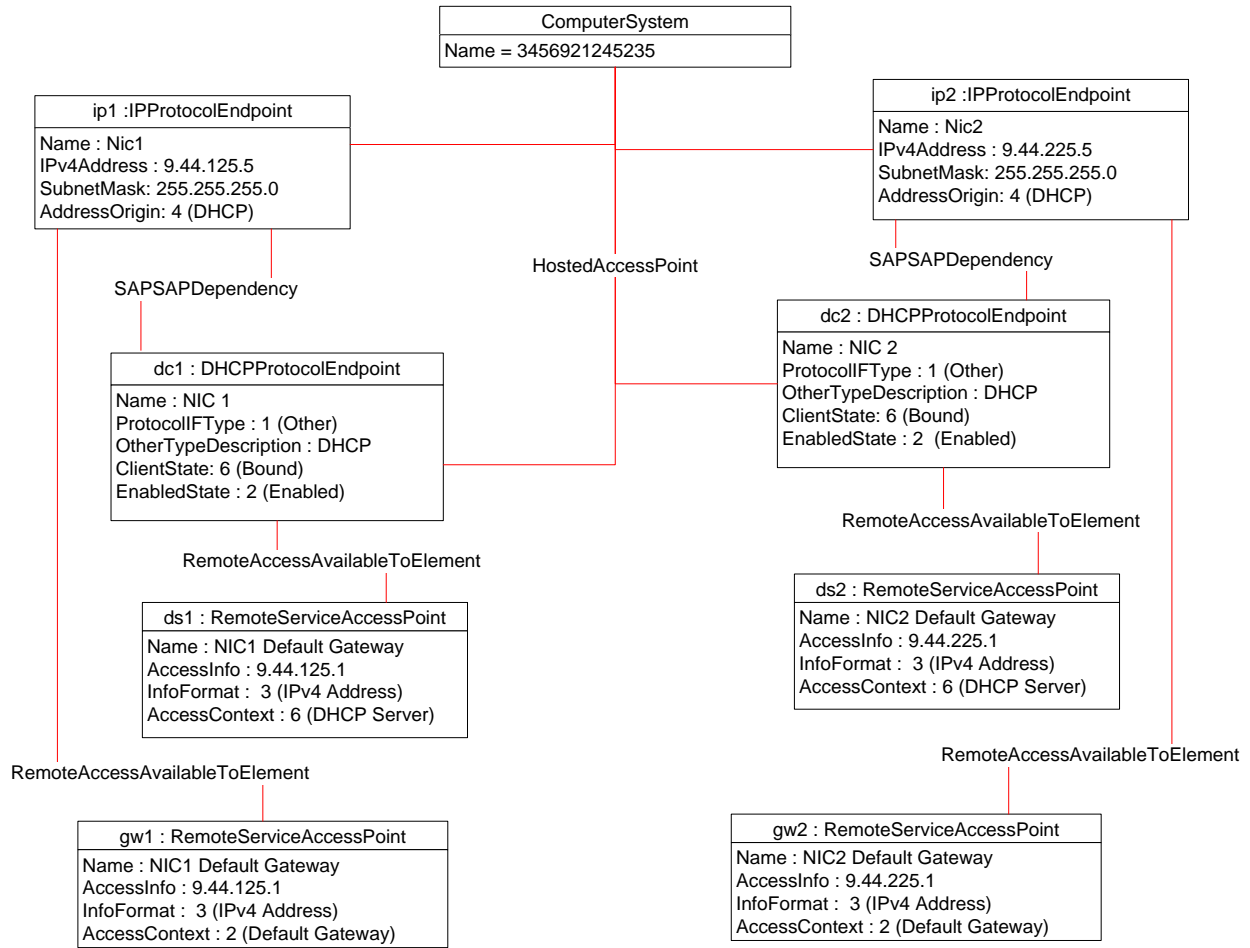
Figure 7 – Static or DHCP pending configurations

587 Each configuration option consists of a single instance of a subclass of CIM_IPAssignmentSettingData.
 588 Therefore, the value of the AssignedSequence property of the CIM_OrderedComponent instances is
 589 irrelevant.

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

593 However, the current configuration of the IP interface was statically assigned using the configuration
 594 identified by the CIM_IPAssignmentSettingData instance *static*. This configuration is indicated by the
 595 value of the CIM_ElementSettingData.IsCurrent property on the instance of CIM_ElementSettingData that
 596 associates the CIM_IPAssignmentSettingData instance *static* to the CIM_IPProtocolEndpoint instance
 597 and is also indicated by the value of the AddressOrigin property on the CIM_IPProtocolEndpoint instance.
 598 Note that configuration through DHCP was not used or even attempted; thus the
 599 CIM_DHCPProtocolEndpoint.RequestedState property has a value of 3 (Disabled).

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

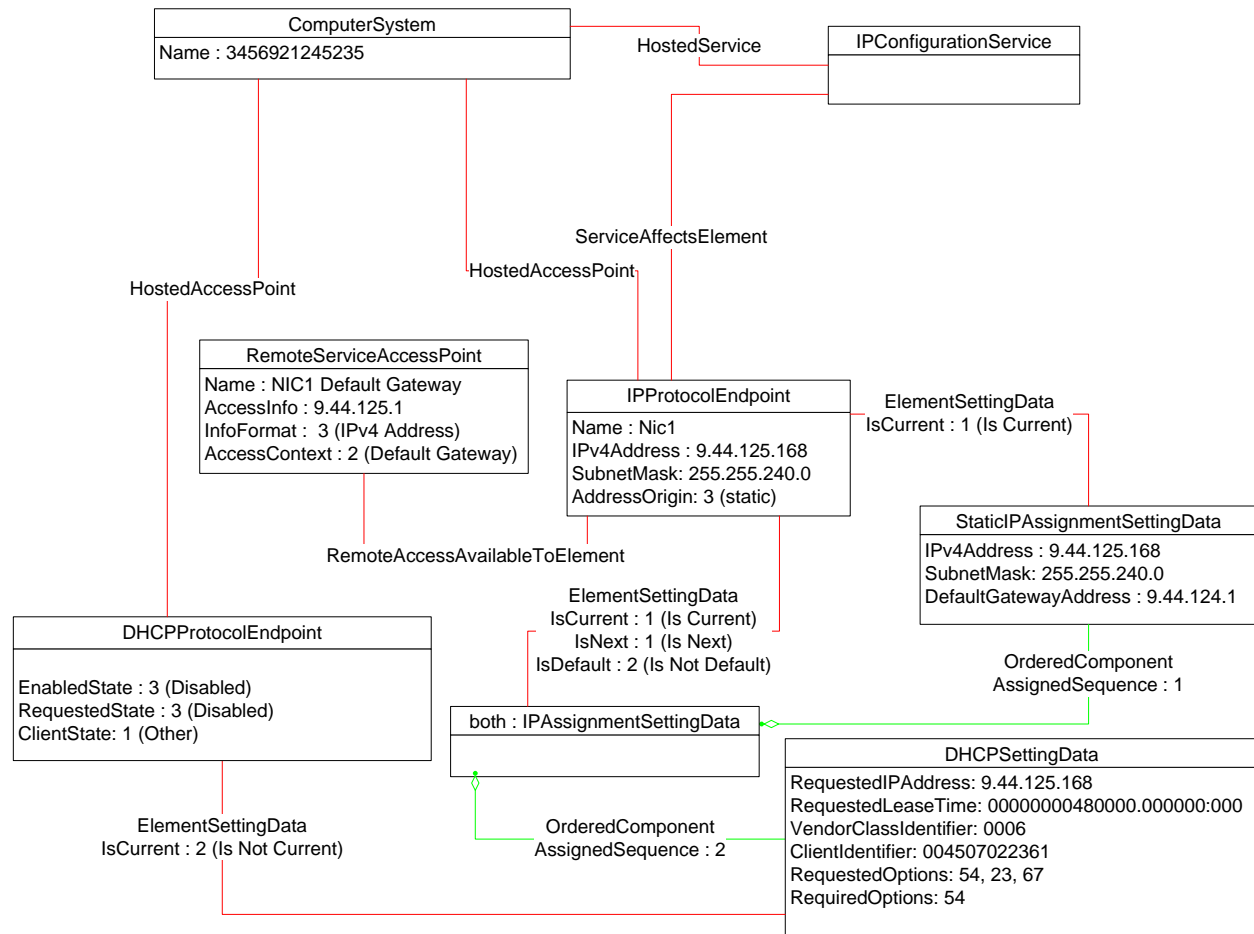


605

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Figure 8 – DHCP supported on dual NIC system

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



612

613

Figure 9 – Static then DHCP

614 9.2 Determine which DHCP options are supported

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

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

618 9.3 Determine whether IP configuration originated through DHCP

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

- 620 1) Find the instance of CIM_IPProtocolEndpoint that is associated with the
 621 CIM_DHCPProtocolEndpoint instance through an instance of CIM_SAPSDependency.
- 622 2) Query the CIM_IPProtocolEndpoint.AddressOrigin property. If the value is 4 (DHCP), the
 623 configuration was assigned through DHCP.

624 9.4 View the DHCP server IP address

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

- 626 1) Find all instances of CIM_RemoteAccessAvailableToElement that associate an instance of
627 CIM_RemoteServiceAccessPoint with the CIM_DHCPProtocolEndpoint instance.
 - 628 • If more than one instance exists, find the instance of
629 CIM_RemoteAccessAvailableToElement in which the OrderOfAccess property has the
630 value 1. Find the referenced CIM_RemoteServiceAccessPoint instance.
 - 631 • If exactly one instance exists, find the referenced CIM_RemoteServiceAccessPoint
632 instance.
 - 633 • If no instances exist, no DHCP server is currently modeled for the DHCP client.
- 634 2) View the AccessInfo property of the CIM_RemoteServiceAccessPoint instance.

635 9.5 Determine whether alternate DHCP configuration is supported

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

- 638 1) Find the CIM_IPProtocolEndpoint instance with which the CIM_DHCPProtocolEndpoint
639 instance is associated through an instance of CIM_SAPSAPDependency.
- 640 2) Find all instances of CIM_IPAssignmentSettingData (the parent class and not subclasses) that
641 are associated with the CIM_IPProtocolEndpoint instance.
- 642 3) For each instance of CIM_IPAssignmentSettingData, look for at least one instance of
643 CIM_DHCPSettingData that is associated through an instance of CIM_OrderedComponent.
- 644 4) If at least one instance of CIM_IPAssignmentSettingData is found that satisfies the preceding
645 constraints, the implementation supports a configuration that uses DHCP to acquire a
646 configuration.

647 9.6 Determine whether DHCP then static is supported

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

- 651 1) Find the CIM_IPProtocolEndpoint instance with which the CIM_DHCPProtocolEndpoint
652 instance is associated through an instance of CIM_SAPSAPDependency.
- 653 2) Find all instances of CIM_IPAssignmentSettingData (the parent class and not subclasses) that
654 are associated with the CIM_IPProtocolEndpoint instance.
- 655 3) For each instance of CIM_IPAssignmentSettingData:
 - 656 a) Find all instances of CIM_DHCPSettingData that are associated through an instance of
657 CIM_OrderedComponent.
 - 658 b) Find all instances of CIM_StaticIPAssignmentSettingData that are associated through an
659 instance of CIM_OrderedComponent.
 - 660 c) Determine if an instance of CIM_DHCPSettingData exists such that the value of the
661 AssignedSequence property of the CIM_OrderedComponent instance that associates the
662 instance of CIM_DHCPSettingData with the instance of CIM_IPAssignmentSettingData is
663 less than the value of the AssignedSequence property of an instance of
664 CIM_OrderedComponent that associates the CIM_StaticIPAssignmentSettingData
665 instance with the instance of CIM_IPAssignmentSettingData.
- 666 4) If such an instance of CIM_DHCPSettingData is found, DHCP then Static is supported.

667 **9.7 Select DHCP options for DHCP pending configuration**

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

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

675 **9.8 Determine whether ElementName can be modified**

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

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

683 **10 CIM Elements**

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

687 **Table 8 – CIM Elements: DHCP client profile**

Element Name	Requirement	Description
Classes		
CIM_DHCPCapabilities	Mandatory	See 7.4 and 10.1.
CIM_DHCPProtocolEndpoint	Mandatory	See 7.2, 7.3, and 10.2.
CIM_DHCPSettingData	Optional	See 7.6 and 10.3.
CIM_ElementCapabilities	Mandatory	See 10.4.
CIM_ElementSettingData	Conditional	See 7.6 and 10.5.
CIM_SAPSAPDependency	Mandatory	See 7.2 and 10.6.
CIM_HostedAccessPoint (DHCPProtocolEndpoint)	Mandatory	See 10.7.
CIM_HostedAccessPoint (RemoteServiceAccessPoint)	Conditional	See 10.7.
CIM_RemoteAccessAvailableToElement	Conditional	See 7.5 and 10.8.
CIM_RemoteServiceAccessPoint	Optional	See 7.1 and 10.10.
CIM_RegisteredProfile	Optional	See 10.11.
Indications		
None defined in this profile		

688 **10.1 CIM_DHCPCapabilities**

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

691 **Table 9 – Class: CIM_DHCPCapabilities**

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

692 **10.2 CIM_DHCPProtocolEndpoint**

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

695 **Table 10 – Class: CIM_DHCPProtocolEndpoint**

Elements	Requirement	Description
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 7.3.1.
EnabledState	Mandatory	See 7.3.2.
ClientState	Mandatory	See 7.2.
ElementName	Mandatory	Pattern ".*"

696 **10.3 CIM_DHCPSettingData**

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

699 **Table 11 – Class: CIM_DHCPSettingData**

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

700 **10.4 CIM_ElementCapabilities**

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

703 **Table 12 – Class: CIM_ElementCapabilities**

Elements	Requirement	Description
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

704 **10.5 CIM_ElementSettingData**

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

708 **Table 13 – Class: CIM_ElementSettingData**

Elements	Requirement	Description
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)

709 **10.6 CIM_SAPSAPDependency**

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

712 **Table 14 – Class: CIM_SAPSAPDependency**

Elements	Requirement	Description
Antecedent	Mandatory	See 7.2.1.2. Cardinality 1
Dependent	Mandatory	See 7.2.1.1. Cardinality 1

713 **10.7 CIM_HostedAccessPoint — CIM_DHCPProtocolEndpoint reference**

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

716 **Table 15 – Class: CIM_HostedAccessPoint**

Elements	Requirement	Description
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..*

717 **10.8 CIM_HostedAccessPoint — CIM_RemoteServiceAccessPoint reference**

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

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

724 **Table 16 – Class: CIM_HostedAccessPoint — CIM_RemoteServiceAccessPoint**

Elements	Requirement	Description
Antecedent	Mandatory	Key: This shall be a reference to the Scoping Instance. Cardinality 1
Dependent	Mandatory	Key: This shall be a reference to an instance of CIM_RemoteServiceAccessPoint. Cardinality *

725 **10.9 CIM_RemoteAccessAvailableToElement**

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

729 **Table 17 – Class: CIM_RemoteAccessAvailableToElement**

Elements	Requirement	Description
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 7.5.1.

730 **10.10 CIM_RemoteServiceAccessPoint**

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

733 **Table 18 – Class: CIM_RemoteServiceAccessPoint**

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

734 **10.11 CIM_RegisteredProfile**

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

740 **Table 19 – Class: CIM_RegisteredProfile**

Elements	Requirement	Description
RegisteredName	Mandatory	This property shall have a value of "DHCP Client".
RegisteredVersion	Mandatory	This property shall have a value of "1.0.4".
RegisteredOrganization	Mandatory	This property shall have a value of 2 (DMTF).

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

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ANNEX A (informative)

Change log

Version	Date	Description
1.0.0	2008-08-10	
1.0.1	2009-09-26	Errata Release
1.0.2	2010-09-15	Version 1.0.1 of the Final Standard formatted for DMTF Standard release
1.0.3	2012-01-09	Errata 1.0.3 <ul style="list-style-type: none"> • Clause 9 - Correction in association for CIM_RemoteServiceAccessPoint. • Clause 10 – Removed duplicate entry for CIM_RemoteServiceAccessPoint.InfoFormat.
1.0.4	2019-01-29	This errata addresses these issues: <ul style="list-style-type: none"> • Updated RegisteredVersion to reflect errata version number in clause 10.2. • Updated RegisteredOrganization description to reflect correct value for DMTF in clause 10.2. • Updated use cases to reflect the above fixes.

749

Bibliography

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- 752 IETF RFC1208, *A Glossary of Networking Terms*, March 1991, <https://tools.ietf.org/html/rfc1208>
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754