



1

2

3

4

**Document Identifier: DSP1017**

**Date: 2019-03-15**

**Version: 1.0.1**

5

## **SSH Service Profile**

6

**Supersedes: 1.0.0**

7

**Document Class: Normative**

8

**Document Status: Published**

9

**Document Language: en\_US**

10

11 Copyright notice

12 Copyright © 2009, 2019 DMTF. All rights reserved.

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

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28 withdrawn or modified after publication, and shall be indemnified and held harmless by any party  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

31 For information about patents held by third-parties which have notified the DMTF that, in their opinion,  
32 such patent may relate to or impact implementations of DMTF standards, visit  
33 <http://www.dmtf.org/about/policies/disclosures.php>.

34 This document's normative language is English. Translation into other languages is permitted.

# CONTENTS

36	Foreword .....	6
37	Introduction.....	7
38	1 Scope .....	9
39	3 Terms and definitions .....	10
40	4 Symbols and abbreviated terms.....	10
41	5 Synopsis .....	11
42	6 Description .....	12
43	6.1 SSH session life cycle.....	13
44	7 Implementation requirements.....	13
45	7.1 Representing an SSH service.....	13
46	7.1.1 CIM_ProtocolService.Protocol.....	13
47	7.1.2 SSH service capabilities .....	13
48	7.1.3 Managing the SSH service's state .....	13
49	7.1.4 CIM_ProtocolService ElementName constraints.....	14
50	7.1.5 Default configuration of the service .....	15
51	7.2 Representing an SSH session.....	15
52	7.2.1 Relationship with service .....	15
53	7.2.2 Port for session .....	15
54	7.2.3 Session default configuration.....	16
55	7.3 Relationship with IP interfaces (optional).....	16
56	8 Methods.....	16
57	8.1 CIM_ProtocolService.ListenOnPort( ) (optional) .....	16
58	8.2 CIM_ProtocolService.RequestStateChange( ) .....	18
59	8.2.1 CIM_ProtocolService.RequestStateChange( ) ConditionalSupport .....	19
60	8.3 Profile conventions for operations .....	19
61	8.4 CIM_BindsTo .....	19
62	8.5 CIM_ElementCapabilities .....	20
63	8.6 CIM_ElementSettingData .....	20
64	8.6.1 CIM_ElementSettingData – ModifyInstance.....	20
65	8.7 CIM_HostedAccessPoint .....	21
66	8.8 CIM_HostedService .....	21
67	8.9 CIM_ProtocolService .....	21
68	8.9.1 CIM_ProtocolService – ModifyInstance.....	21
69	8.10 CIM_ProvidesEndpoint .....	22
70	8.11 CIM_ServiceAccessBySAP .....	22
71	8.12 CIM_SSHTCapabilities .....	22
72	8.13 CIM_SSHSettingData .....	23
73	8.13.1 CIM_SSHSettingData – ModifyInstance.....	23
74	8.14 CIM_SSHProtocolEndpoint .....	23
75	8.14.1 ModifyInstance.....	23
76	8.14.2 DeleteInstance.....	23
77	8.15 CIM_TCPProtocolEndpoint.....	24
78	8.15.1 ModifyInstance.....	24
79	8.15.2 DeleteInstance.....	24
80	9 Use cases.....	24
81	9.1 Object diagrams.....	24
82	9.2 Configuring session default settings .....	29
83	9.3 Modifying active session settings .....	29
84	9.4 Disabling the SSH service .....	29
85	9.5 Determining the SSH service capabilities.....	29
86	9.6 Determining the listening port(s) of the SSH service.....	29

87	9.7	Adding a listening port for the SSH service .....	30
88	9.8	Stopping the SSH service from listening on a specific port .....	31
89	9.9	Determining whether ElementName can be modified .....	32
90	9.10	Determining whether state management is supported .....	32
91	10	CIM Elements .....	32
92	10.1	CIM_BindsTo—TCPProtocolEndpoint .....	33
93	10.2	CIM_BindsTo — IPProtocolEndpoint .....	33
94	10.3	CIM_ElementCapabilities .....	33
95	10.4	CIM_ElementSettingData – SSH service .....	34
96	10.5	CIM_ElementSettingData – SSH session .....	34
97	10.6	CIM_HostedAccessPoint .....	34
98	10.7	CIM_HostedService .....	35
99	10.8	CIM_ProtocolService .....	35
100	10.9	CIM_ProvidesEndpoint .....	35
101	10.10	CIM_RegisteredProfile .....	36
102	10.11	CIM_ServiceAccessBySAP .....	36
103	10.12	CIM_SSHCapabilities .....	37
104	10.13	CIM_SSHProtocolEndpoint .....	37
105	10.14	CIM_SSHSettingData .....	38
106	10.15	CIM_TCPProtocolEndpoint .....	39
107	ANNEX A (informative)	Change log .....	40
108			

## 109 Figures

110	Figure 1 – SSH Service Profile: Class diagram .....	12
111	Figure 2 – Registered Profile .....	25
112	Figure 3 – SSH service listening for connections .....	26
113	Figure 4 – One active session .....	27
114	Figure 5 – Session changed .....	28
115	Figure 6 – Listening on a single port on all interfaces .....	30
116	Figure 7 – Port added bound to specific interface .....	31
117		

## 118 Tables

119	Table 1 – Referenced profiles .....	11
120	Table 2 – CIM_ProtocolService.ListenOnPort( ) method: Return code values .....	17
121	Table 3 – CIM_ProtocolService.ListenOnPort( ) method: Parameters .....	17
122	Table 4 – CIM_ProtocolService.RequestStateChange( ) method: Return code values .....	18
123	Table 5 – CIM_ProtocolService.RequestStateChange( ) method: Parameters .....	18
124	Table 6 – Operations: CIM_BindsTo .....	19
125	Table 7 – Operations: CIM_ElementCapabilities .....	20
126	Table 8 – Operations: CIM_ElementSettingData .....	20
127	Table 9 – Operations: CIM_HostedAccessPoint .....	21
128	Table 10 – Operations: CIM_HostedService .....	21
129	Table 11 – Operations: CIM_ProtocolService .....	21
130	Table 12 – Operations: CIM_ProvidesEndpoint .....	22
131	Table 13 – Operations: CIM_ServiceAccessBySAP .....	22
132	Table 14 – Operations: CIM_SSHSettingData .....	23
133	Table 15 – Operations: CIM_SSHProtocolEndpoint .....	23

134 Table 16 – Operations: CIM\_TCPProtocolEndpoint ..... 24

135 Table 17 – CIM Elements: SSH Service Profile ..... 32

136 Table 18 – Class: CIM\_BindsTo ..... 33

137 Table 19 – Class: CIM\_BindsTo ..... 33

138 Table 20 – Class: CIM\_ElementCapabilities ..... 33

139 Table 21 – Class: CIM\_ElementSettingData (SSH service) ..... 34

140 Table 22 – Class: CIM\_ElementSettingData (SSH session) ..... 34

141 Table 23 – Class: CIM\_HostedAccessPoint ..... 34

142 Table 24 – Class: CIM\_HostedService ..... 35

143 Table 25 – Class: CIM\_ProtocolService ..... 35

144 Table 26 – Class: CIM\_ProvidesEndpoint ..... 35

145 Table 27 – Class: CIM\_RegisteredProfile ..... 36

146 Table 28 – Class: CIM\_ServiceAccessBySAP ..... 36

147 Table 29 – Class: CIM\_SSHTCapabilities ..... 37

148 Table 30 – Class: CIM\_SSHProtocolEndpoint ..... 37

149 Table 31 – Class: CIM\_SSHSettingData ..... 38

150 Table 32 – Class: CIM\_TCPProtocolEndpoint ..... 39

151

152

## Foreword

153 The SSH Service Profile (DSP1017) was prepared by the Server Management Working Group.

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

### 156 Acknowledgments

157 The DMTF acknowledges the following individuals for their contributions to this document:

#### 158 Contributors:

- 159 • Aaron Merkin - IBM

160 Participants from the DMTF Server Management Working Group:

- 161 • Jon Hass – Dell
- 162 • Jeff Hilland – Hewlett Packard Enterprise
- 163 • John Leung – Intel
- 164 • Khachatur Papanyan – Dell
- 165 • Sivakumar Sathappan – AMD
- 166 • Christina Shaw – Hewlett Packard Enterprise
- 167 • Enoch Suen – Dell
- 168 • Perry Vincent – Intel

169

170

## Introduction

171 The information in this specification should be sufficient for a provider or consumer of this data to identify  
172 unambiguously the classes, properties, methods, and values that shall be instantiated and manipulated to  
173 represent and manage an SSH service, its associated configuration information, and any active  
174 connections.

175 The target audience for this specification is implementers who are writing CIM-based providers or  
176 consumers of management interfaces that represent the component described in this document.  
177





179

# SSH Service Profile

## 180 1 Scope

181 The SSH Service Profile extends the management capability of referencing profiles by adding the  
182 capability to represent an SSH service and its associated sessions.

## 183 2 Normative references

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

188 DMTF DSP0004, *CIM Infrastructure Specification 3.0*,  
189 [http://www.dmtf.org/standards/published\\_documents/DSP0004\\_3.0.pdf](http://www.dmtf.org/standards/published_documents/DSP0004_3.0.pdf)

190 DMTF DSP0215, *Server Management Managed Element Addressing Specification 1.0*,  
191 [http://www.dmtf.org/standards/published\\_documents/DSP0215\\_1.0.pdf](http://www.dmtf.org/standards/published_documents/DSP0215_1.0.pdf)

192 DMTF DSP0223, *Generic Operations 1.0*,  
193 [http://www.dmtf.org/standards/published\\_documents/DSP0223\\_1.0.pdf](http://www.dmtf.org/standards/published_documents/DSP0223_1.0.pdf)

194 DMTF DSP0228, *Message Registry XML Schema 1.0*,  
195 [http://schemas.dmtf.org/wbem/messageregistry/1/dsp0228\\_1.2.0.xsd](http://schemas.dmtf.org/wbem/messageregistry/1/dsp0228_1.2.0.xsd)

196 DMTF DSP1001, *Management Profile Specification Usage Guide 1.1*,  
197 [http://www.dmtf.org/standards/published\\_documents/DSP1001\\_1.1.pdf](http://www.dmtf.org/standards/published_documents/DSP1001_1.1.pdf)

198 DMTF DSP1033, *Profile Registration Profile 1.0*,  
199 [https://www.dmtf.org/sites/default/files/standards/documents/DSP1033\\_1.0.pdf](https://www.dmtf.org/sites/default/files/standards/documents/DSP1033_1.0.pdf)

200 DMTF DSP1053, *Base Metrics Profile 1.0*,  
201 [https://www.dmtf.org/sites/default/files/standards/documents/DSP1053\\_1.0.pdf](https://www.dmtf.org/sites/default/files/standards/documents/DSP1053_1.0.pdf)

202 DMTF DSP1054, *Indications Profile 1.2*,  
203 [http://www.dmtf.org/standards/published\\_documents/DSP1054\\_1.2.pdf](http://www.dmtf.org/standards/published_documents/DSP1054_1.2.pdf)

204 DMTF DSP8016, *WBEM Operations Message Registry 1.0*,  
205 [http://schemas.dmtf.org/wbem/messageregistry/1/dsp8016\\_1.0.xml](http://schemas.dmtf.org/wbem/messageregistry/1/dsp8016_1.0.xml)

206 DMTF DSP8020, *Message Registry XML Schema Specification 1.0*,  
207 [http://schemas.dmtf.org/wbem/metricregistry/1/dsp8020\\_1.0.xsd](http://schemas.dmtf.org/wbem/metricregistry/1/dsp8020_1.0.xsd)

208 IETF RFC5234, *ABNF: Augmented BNF for Syntax Specifications, January 2008*,  
209 <http://tools.ietf.org/html/rfc5234>

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 The Open Group, "Regular Expressions" in *The Single UNIX® Specification, Version 2*,  
213 <http://www.opengroup.org/onlinepubs/7908799/xbd/re.html>

214 Unified Modeling Language (UML) Specifications,  
215 [http://www.omg.org/technology/documents/modeling\\_spec\\_catalog.htm#UML](http://www.omg.org/technology/documents/modeling_spec_catalog.htm#UML)

## 216 **3 Terms and definitions**

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

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

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

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

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

### 232 **3.1**

#### 233 **conditional**

234 indicates requirements to be followed strictly in order to conform to the document when the specified  
235 conditions are met

### 236 **3.2**

#### 237 **mandatory**

238 indicates requirements to be followed strictly in order to conform to the document and from which no  
239 deviation is permitted

### 240 **3.3**

#### 241 **optional**

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

### 243 **3.4**

#### 244 **referencing profile**

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

## 247 **4 Symbols and abbreviated terms**

248 The abbreviations defined in [DSP0004](#), [DSP0223](#), and [DSP1001](#) apply to this document. The following  
249 additional abbreviations are used in this document.

### 250 **4.1**

#### 251 **CIM**

252 Common Information Model

### 253 **4.2**

#### 254 **IP**

255 Internet Protocol

256 **4.3**  
 257 **SSH**  
 258 Secure Shell

259 **4.4**  
 260 **TCP**  
 261 Transmission Control Protocol

262 **5 Synopsis**

263 **Profile Name:** SSH Service Profile

264 **Version:** 1.0.0b

265 **Organization:** DMTF

266 **CIM Schema Version:** 2.12

267 **Central Class:** CIM\_ProtocolService

268 **Scoping Class:** CIM\_ComputerSystem

269 The SSH Service Profile extends the management capability of referencing profiles by adding the  
 270 capability to represent an SSH service in a managed system. This profile includes a specification of the  
 271 SSH service, its associated configuration, and any active sessions.

272 Table 1 identifies profiles on which this profile has a dependency.

273 **Table 1 – Referenced profiles**

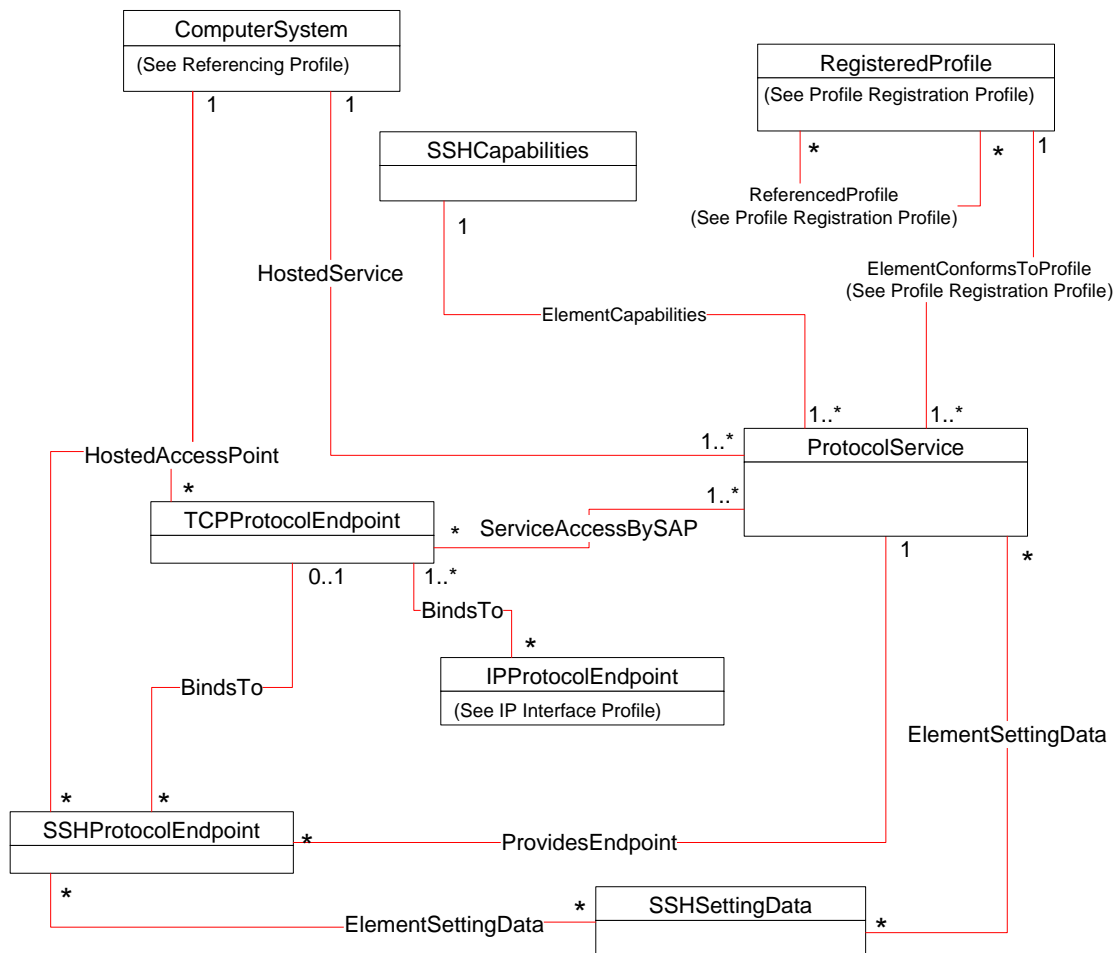
Profile Name	Organization	Version	Relationship	Behavior
Profile Registration Profile	DMTF	1.0	Mandatory	
IP Interface Profile	DMTF	1.0	Optional	See clause 7.3.

274 The central class for the SSH Service Profile shall be the CIM\_ProtocolService class. The central  
 275 instance of the SSH Service Profile shall be an instance of CIM\_ProtocolService. The scoping class for  
 276 the SSH Service Profile shall be CIM\_ComputerSystem. The scoping instance of the SSH Service Profile  
 277 shall be the instance of CIM\_ComputerSystem to which the central instance is associated through an  
 278 instance of the CIM\_HostedService association.

## 279 6 Description

280 The SSH Service Profile describes an SSH service, its associated configuration, and active sessions.

281 Figure 1 represents the class schema for the SSH Service Profile.



282

283 **Figure 1 – SSH Service Profile: Class diagram**

284 The SSH Service Profile extends the management capability of referencing profiles by adding the  
 285 capability to represent an SSH service hosted on a managed system. Functionality within the scope of  
 286 this profile includes:

- 287 • representation of the SSH service
- 288 • representation of active SSH sessions at the SSH server
- 289 • configuration of the SSH service
- 290 • configuration of the SSH sessions from the SSH server

291 Functionality explicitly excluded from the scope of this profile includes modeling of the SSH session at the  
292 SSH client.

293 This profile represents the capabilities of the SSH service, the current configuration of the SSH service,  
294 active sessions, and the default settings when new sessions are activated. The SSH service is  
295 represented by an instance of CIM\_ProtocolService. The capabilities of the SSH service are represented  
296 by an instance of CIM\_SSHCapabilities. The current configuration of the SSH service is modeled with the  
297 properties from the instance of CIM\_ProtocolService. Each active session with the SSH service is  
298 represented by an instance of CIM\_SSHProtocolEndpoint. The current configuration of an active session  
299 is reflected in the values of the properties from the CIM\_SSHProtocolEndpoint. CIM\_SSHSettingData  
300 represents a complete configuration that an SSH session could have. For example, an instance of  
301 CIM\_SSHSettingData contains the configuration that will be in effect for an SSH session when it is first  
302 established. CIM\_TCPProtocolEndpoint is an optional endpoint used to model the TCP port(s) over which  
303 an SSH service listens or an SSH session is active.

## 304 **6.1 SSH session life cycle**

305 When an SSH session is established with the SSH service, an instance of CIM\_SSHProtocolEndpoint is  
306 created. The CIM\_SSHProtocolEndpoint instance exists for the duration of the SSH session that it  
307 represents. When the SSH session is ended, the CIM\_SSHProtocolEndpoint will be removed. When the  
308 CIM\_SSHProtocolEndpoint is explicitly deleted through an intrinsic DeleteInstance operation, the SSH  
309 session is ended.

## 310 **7 Implementation requirements**

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

### 313 **7.1 Representing an SSH service**

314 An instance of CIM\_ProtocolService shall represent the SSH service being modeled.

#### 315 **7.1.1 CIM\_ProtocolService.Protocol**

316 The Protocol property of the CIM\_ProtocolService instance shall have a value of 2 (SSH).

#### 317 **7.1.2 SSH service capabilities**

318 An instance of CIM\_SSHCapabilities shall be associated with the CIM\_ProtocolService instance through  
319 an instance of CIM\_ElementCapabilities. This instance of CIM\_SSHCapabilities shall represent the  
320 capabilities of the SSH service.

#### 321 **7.1.3 Managing the SSH service's state**

322 This clause describes the usage of the RequestedState and EnabledState properties to represent the  
323 state of an instance of CIM\_ProtocolService.

##### 324 **7.1.3.1 State management supported**

325 Exactly one instance of CIM\_SSHCapabilities shall be associated with an instance of  
326 CIM\_ProtocolService, which indicates support for managing the state of the SSH service.

327 Support for managing the state of the SSH service is conditional behavior. This clause describes the CIM  
328 elements and behaviors that shall be implemented when this behavior is supported.

**329 7.1.3.2 CIM\_ProtocolService.RequestStateChange() supported**

330 When the CIM\_SSHCapabilities.RequestedStatesSupported property contains at least one value, the  
331 CIM\_ProtocolService.RequestStateChange() method shall be implemented and supported. The  
332 CIM\_ProtocolService.RequestStateChange() method shall not return a value of 1 (Unspecified).

**333 7.1.3.3 CIM\_ProtocolService.RequestedState**

334 When state management is supported, the RequestedState property shall be supported. When state  
335 management is Unspecified, the RequestedState property may be supported.

336 Upon successful invocation of the CIM\_ProtocolService.RequestStateChange() method, the value of the  
337 RequestedState property shall be the value of the RequestedState parameter. If the method is not  
338 successfully invoked, the value of the RequestedState property is indeterminate. When the  
339 RequestedStatesSupported property of the associated instance of CIM\_SSHCapabilities contains one or  
340 more values, the RequestedState property shall have one of the values specified or 5 (No Change).  
341 When the RequestedStatesProperty of the associated instance of  
342 CIM\_EnabledLogicalElementCapabilities does not contain any values, the RequestedState property shall  
343 have the value of 12 (Not Applicable).

**344 7.1.3.4 EnabledState**

345 When the RequestedState parameter has a value of 2 (Enabled) or 3 (Disabled), upon successful  
346 completion of the CIM\_ProtocolService.RequestStateChange() method, the value of the EnabledState  
347 property shall equal the value of the RequestedState property. If the method does not complete  
348 successfully, the value of the EnabledState property is indeterminate. The EnabledState property shall  
349 have the value 2 (Enabled), 3 (Disabled), or 5 (Not Applicable).

**350 7.1.3.5 Indicating state management support with CIM\_SSHCapabilities**

351 When state management is supported, the RequestedStatesSupported property of the  
352 CIM\_SSHCapabilities instance associated with the CIM\_ProtocolService instance via an instance of  
353 CIM\_ElementCapabilities shall contain at least one value. The RequestedStatesSupported property may  
354 have zero or more of the following values: 2 (Enabled), 3 (Disabled), or 11 (Reset).

**355 7.1.4 CIM\_ProtocolService ElementName constraints**

356 The ElementName property of CIM\_ProtocolService may be modifiable by a client or it may have a fixed  
357 value.

**358 7.1.4.1 ElementName is not modifiable**

359 When an implementation does not support modification of the ElementName property by a client, the  
360 ElementName property shall be formatted as a free-form string of variable length (pattern ".\*").

**361 7.1.4.2 ElementName is modifiable**

362 The CIM\_ProtocolService.ElementName property may be modified by a client. This is conditional  
363 behavior. This clause describes the CIM elements and behavioral requirements when an implementation  
364 supports client modification of the CIM\_ProtocolService.ElementName property.

**365 7.1.4.2.1 CIM\_SSHCapabilities.ElementNameEditSupported**

366 This property shall have a value of TRUE when the implementation supports client modification of the  
367 CIM\_ProtocolService.ElementName property.

#### 368 7.1.4.2.2 CIM\_EnabledLogicalElementCapabilities.MaxElementNameLen

369 The MaxElementNameLen property shall be implemented when the ElementNameEditSupported  
370 property has a value of TRUE. The MaxElementNameLen property shall indicate the maximum length of  
371 a string that the implementation will accept as a value for the ElementName property of the associated  
372 CIM\_ProtocolService instance.

### 373 7.1.5 Default configuration of the service

374 The default configuration is the configuration of the service when it was first installed on the managed  
375 system. When an implementation exposes the default configuration, the default configuration shall be  
376 represented by an instance of CIM\_SSHSettingData associated with the CIM\_ProtocolService through an  
377 instance of CIM\_ElementSettingData where the IsDefault property of the CIM\_ElementSettingData  
378 instance has a value of 1 (Is Default).

#### 379 7.1.5.1 Listening port

380 An SSH service can listen on one or more TCP ports for incoming connection requests. An  
381 implementation may model the TCP port(s) to which the SSH service is bound. When the implementation  
382 models the TCP ports, the following requirements apply.

##### 383 7.1.5.1.1 CIM\_TCPProtocolEndpoint

384 For each IP port to which the SSH service is bound there shall be modeled an instance of  
385 CIM\_TCPProtocolEndpoint in which the PortNumber property of the instance indicates the port number to  
386 which the SSH service is listening.

##### 387 7.1.5.1.2 Relationship to SSH service

388 For each CIM\_TCPProtocolEndpoint instance, there shall be an instance of CIM\_ServiceAccessBySAP  
389 that associates the CIM\_ProtocolService instance with the CIM\_TCPProtocolEndpoint.

#### 390 7.1.5.2 Managing listening ports

391 The implementation may support managing the ports on which the SSH Service listens. This is an  
392 optional behavior. The ListenOnPort() method (see clause 8.1) of the CIM\_ProtocolService can be used  
393 to add ports on which the SSH service will listen. Using the DeleteInstance intrinsic operation to delete an  
394 instance of CIM\_TCPProtocolEndpoint will stop the SSH service from listening on the represented port  
395 (see clause 8.15.2).

## 396 7.2 Representing an SSH session

397 Each active session with the SSH service shall be represented with an instance of  
398 CIM\_SSHProtocolEndpoint.

### 399 7.2.1 Relationship with service

400 An instance of CIM\_ProvidesEndpoint shall associate the CIM\_ProtocolService with the  
401 CIM\_SSHProtocolEndpoint.

### 402 7.2.2 Port for session

403 An implementation may model the TCP port to which the SSH session is bound. This is optional behavior.  
404 When the implementation models the TCP port the following requirements apply.

### 405 7.2.2.1 CIM\_TCPProtocolEndpoint

406 When the TCP port to which the SSH session is bound is modeled, the TCP port shall be modeled using  
407 an instance of CIM\_TCPProtocolEndpoint.

### 408 7.2.2.2 Relationship to session

409 An instance of CIM\_BindsTo shall associate the CIM\_SSHProtocolEndpoint instance with the  
410 CIM\_TCPProtocolEndpoint.

## 411 7.2.3 Session default configuration

412 When an SSH session is created, it will have an initial configuration. Implementations can indicate to  
413 clients the configuration that will be assigned to a session. An implementation can also indicate to clients  
414 the configuration that an active session had when the session was first established.

### 415 7.2.3.1 Configuration that will be assigned

416 An implementation may assign the same initial configuration for all SSH sessions spawned. When the  
417 implementation assigns the same initial configuration for all SSH sessions, the configuration that a  
418 session will have when it is established shall be represented by an instance of CIM\_SSHSettingData  
419 associated with the CIM\_ProtocolService through an instance of CIM\_ElementSettingData where the  
420 IsNext property of the CIM\_ElementSettingData instance has a value of 1 (Is Next).

### 421 7.2.3.2 Initial configuration of a session

422 The initial configuration of a session may be modeled. This is optional behavior. When the configuration  
423 that a session had when it was established is modeled, it shall be represented by an instance of  
424 CIM\_SSHSettingData associated with the CIM\_SSHProtocolEndpoint through an instance of  
425 CIM\_ElementSettingData where the IsCurrent property of the CIM\_ElementSettingData instance has a  
426 value of 1 (Is Current).

427 It is not necessary that there be a discrete copy of CIM\_SSHSettingData for each active session. It is only  
428 necessary that the CIM\_SSHSettingData associated with the CIM\_SSHProtocolEndpoint accurately  
429 reflect the initial configuration of the session.

## 430 7.3 Relationship with IP interfaces (optional)

431 When the specific port for an SSH session or service is modeled, the specific IP interface over which the  
432 session is active may be modeled. This is optional behavior. When the implementation models the  
433 specific interface over which an SSH session is active, there shall be an instance of the CIM\_BindsTo  
434 association where the value of the Antecedent property shall be a reference to the  
435 CIM\_IPProtocolEndpoint and the value of the Dependent property shall be a reference to the  
436 CIM\_TCPProtocolEndpoint.

## 437 8 Methods

438 This clause details the requirements for supporting intrinsic operations and extrinsic methods for the CIM  
439 elements defined by this profile.

### 440 8.1 CIM\_ProtocolService.ListenOnPort() (optional)

441 The CIM\_ProtocolService.ListenOnPort() method shall be supported when the  
442 ListeningPortManagementProperty of the associated instance of CIM\_SSHCapabilities has a value of  
443 TRUE. When the value of ListeningPortManagementProperty of the associated instance of



444 CIM\_SSHTCapabilities has a value of FALSE, the CIM\_ProtocolService.ListenOnPort() method shall not  
 445 be supported.

446 The CIM\_ProtocolService.ListenOnPort() method is used to configure additional ports on which the  
 447 ProtocolService will listen. ListenOnPort() method's detailed requirements are specified in Table 2 and  
 448 Table 3.

449 No standard messages are defined.

450 **Table 2 – CIM\_ProtocolService.ListenOnPort() method: Return code values**

Value	Description
0	Request was successfully executed.
2	Error occurred
0x1000	Job started: REF returned to started CIM_ConcreteJob

451 **Table 3 – CIM\_ProtocolService.ListenOnPort() method: Parameters**

Qualifiers	Name	Type	Description/Values
IN	IPEndpoint	CIM_IPProtocolEndpoint REF	Optional reference to specific IPProtocolEndpoint to which the created TCPProtocolEndpoint will be bound
OUT	Job	CIM_TCPProtocolEndpoint REF	TCPProtocolEndpoint created if method is successful
IN, REQ	PortNumber	uint16	Desired port number for the service to listen on

452 When the method completes successfully, the implementation shall create an instance of  
 453 CIM\_TCPProtocolEndpoint. The value of the PortNumber property of the instance of  
 454 CIM\_TCPProtocolEndpoint shall be the value of the PortNumber parameter of the method invocation.  
 455 The implementation shall create an instance of CIM\_ServiceAccessBySAP that references the instance  
 456 of CIM\_TCPProtocolEndpoint and references the instance of CIM\_ProtocolService on which the method  
 457 was invoked.

458 The IPEndpoint parameter for the method is optional. The implementation shall perform the following  
 459 actions when the IPEndpoint parameter is not specified:

- 460 • The implementation shall create an instance of CIM\_HostedAccessPoint that references the  
 461 newly created CIM\_TCPProtocolEndpoint instance and the instance of CIM\_ComputerSystem  
 462 with which the CIM\_ProtocolService instance is associated through an instance of  
 463 CIM\_HostedService (the scoping system).
- 464 • For each instance of CIM\_IPProtocolEndpoint that is associated through the  
 465 CIM\_HostedAccessPoint association with the CIM\_ComputerSystem instance with which the  
 466 instance of CIM\_ProtocolService on which this method was invoked is associated through an  
 467 instance of CIM\_HostedService, the implementation shall create an instance of the  
 468 CIM\_BindsTo association where the value of the Antecedent property shall be a reference to  
 469 the CIM\_IPProtocolEndpoint and the value of the Dependent property shall be a reference to  
 470 the CIM\_TCPProtocolEndpoint.

471 The implementation shall perform the following actions when the IPEndpoint parameter is specified:

- 472 • The implementation shall create an instance of CIM\_HostedAccessPoint that references the  
 473 newly created CIM\_TCPProtocolEndpoint instance and the instance of CIM\_ComputerSystem

474 with which the CIM\_IPProtocolEndpoint instance is associated through an instance of  
475 CIM\_HostedAccessPoint.

- 476 • The implementation shall create an instance of the CIM\_BindsTo association where the value of  
477 the Antecedent property shall be a reference to the CIM\_IPProtocolEndpoint and the value of  
478 the Dependent property shall be a reference to the CIM\_TCPProtocolEndpoint.

## 479 8.2 CIM\_ProtocolService.RequestStateChange()

480 CIM\_ProtocolService.RequestStateChange() method invocation will change the element's state to the  
481 value specified in the RequestedState parameter. The Enabled and Disabled values of the  
482 RequestedState parameter correspond to enabling or disabling the functionality represented by the  
483 instance of CIM\_ProtocolService. A value of 2 (Enabled) shall correspond to a request to enable the  
484 functionality. A value of 3 (Disabled) shall correspond to a request to disable the functionality. A value of  
485 11 (Reset) shall initiate a reset of the SSH service.

486 See clause 7.1.3 for information about the effect of this method on the RequestedState property.

487 The method shall be considered successful if the availability of the functionality upon completion of the  
488 method corresponds to the desired availability indicated by the RequestedState parameter. It is not  
489 necessary that an actual change in state occur for the method to be considered successful. It is sufficient  
490 that the resultant state be equal to the requested state. Upon successful completion of the method, the  
491 Return Value shall be zero.

492 See clause 7.1.3.4 for information about the effect of this method on the EnabledState property.

493 Detailed requirements of the RequestStateChange() method are specified in Table 4 and Table 5.

494 No standard messages are defined.

495 Invoking the CIM\_ProtocolService.RequestStateChange() method multiple times could result in earlier  
496 requests being overwritten or lost.

497 **Table 4 – CIM\_ProtocolService.RequestStateChange() method: Return code values**

Value	Description
0	Request was successfully executed.
1	Method is unsupported in the implementation.
2	Error occurred
0x1000	Job started: REF returned to started CIM_ConcreteJob

498 **Table 5 – CIM\_ProtocolService.RequestStateChange() method: Parameters**

Qualifiers	Name	Type	Description/Values
IN, REQ	RequestedState	uint16	Valid state values : 2 (Enabled) 3 (Disabled) 11 (Reset)
OUT	Job	CIM_ConcreteJob REF	Returned if job started
IN, REQ	TimeoutPeriod	datetime	Client specified maximum amount of time the transition to a new state is supposed to take: 0 or NULL – No time requirements <interval> – Maximum time allowed

499 **8.2.1 CIM\_ProtocolService.RequestStateChange() ConditionalSupport**

500 When the CIM\_EnabledLogicalElementCapabilities.RequestedStatesSupported property contains at least  
 501 one value, the CIM\_ProtocolService.RequestStateChange() method shall be implemented and  
 502 supported. The CIM\_ProtocolService.RequestStateChange() method shall not return a value of 1  
 503 (Unspecified).

504 **8.3 Profile conventions for operations**

505 Support for operations for each profile class (including associations) is specified in the following sub-  
 506 clauses. Each subclause includes either the statement “All operations in the default list in clause 8.3 are  
 507 supported as described by DSP0200 version 1.2” or a table listing all the operations that are Unspecified  
 508 by this profile or where the profile requires behavior other than that described by DSP0200.

509 The default list of operations is as follows:

- 510 • GetInstance
- 511 • Associators
- 512 • AssociatorNames
- 513 • References
- 514 • ReferenceNames
- 515 • EnumerateInstances
- 516 • EnumerateInstanceNames

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

519 **8.4 CIM\_BindsTo**

520 Table 6 lists operations that either have special requirements beyond those from DSP0200 or shall not be  
 521 supported.

522 **Table 6 – Operations: CIM\_BindsTo**

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

## 523 8.5 CIM\_ElementCapabilities

524 Table 7 lists operations that either have special requirements beyond those from DSP0200 or shall not be  
525 supported.

526 **Table 7 – Operations: CIM\_ElementCapabilities**

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

## 527 8.6 CIM\_ElementSettingData

528 Table 8 lists operations that either have special requirements beyond those in DSP0200 or shall not be  
529 supported.

530 **Table 8 – Operations: CIM\_ElementSettingData**

Operation	Requirement	Messages
ModifyInstance	Optional	See clause 8.6.1.
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

### 531 8.6.1 CIM\_ElementSettingData – ModifyInstance

532 When an instance of CIM\_ElementSettingData associates an instance of CIM\_SSHSettingData with an  
533 instance of CIM\_SSHProtocolEndpoint, the following rules shall govern the behavior of the  
534 ModifyInstance operation:

- 535 • The ModifyInstance operation shall not allow the IsDefault property to be modified.
- 536 • The ModifyInstance operation shall not allow the IsCurrent property to be modified.
- 537 • When the ModifyInstance operation is used to modify the IsNext property to have a value of 1  
538 (Is Next), the ModifyInstance operation shall implement the following behavior:
  - 539 – The ModifyInstance operation shall find all other instances of CIM\_ElementSettingData  
540 that associate an CIM\_SSHSettingData instance with the CIM\_SSHProtocolEndpoint  
541 instance referenced by the target instance of CIM\_ElementSettingData.
  - 542 – For each instance of CIM\_ElementSettingData found, the ModifyInstance operation shall  
543 modify the value of its IsNext property to have a value of 2 (Is Not Next).

544 **8.7 CIM\_HostedAccessPoint**

545 Table 9 lists operations that either have special requirements beyond those from DSP0200 or shall not be  
546 supported.

547 **Table 9 – Operations: CIM\_HostedAccessPoint**

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

548 **8.8 CIM\_HostedService**

549 Table 10 lists operations that either have special requirements beyond those from DSP0200 or shall not  
550 be supported.

551 **Table 10 – Operations: CIM\_HostedService**

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

552 **8.9 CIM\_ProtocolService**

553 Table 11 lists operations that either have special requirements beyond those from DSP0200 or shall not  
554 be supported.

555 **Table 11 – Operations: CIM\_ProtocolService**

Operation	Requirement	Messages
ModifyInstance	Optional. See clause 8.9.1.	None

556 **8.9.1 CIM\_ProtocolService – ModifyInstance**

557 When the ElementNameEditSupported property of the CIM\_SSHCapabilities has a value of TRUE, the  
558 ModifyInstance operation shall allow the value of the ElementName property of the CIM\_ProtocolService  
559 instance to be modified. The ModifyInstance operation shall enforce the length restriction specified in the  
560 MaxElementNameLen property of the CIM\_SSHCapabilities.

561 When the ElementNameEditSupported property of the CIM\_SSHCapabilities has a value of FALSE, the  
 562 ModifyInstance operation shall not change the value of the ElementName property of the  
 563 CIM\_ProtocolService instance.

## 564 8.10 CIM\_ProvidesEndpoint

565 Table 12 lists operations that either have special requirements beyond those from DSP0200 or shall not  
 566 be supported.

567 **Table 12 – Operations: CIM\_ProvidesEndpoint**

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

## 568 8.11 CIM\_ServiceAccessBySAP

569 Table 13 lists operations that either have special requirements beyond those from DSP0200 or shall not  
 570 be supported.

571 **Table 13 – Operations: CIM\_ServiceAccessBySAP**

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

## 572 8.12 CIM\_SSHCapabilities

573 All operations in the default list in clause 8.3 are supported as described by DSP0200 version 1.2.

574 **8.13 CIM\_SSHSettingData**

575 Table 14 lists operations that either have special requirements beyond those from DSP0200 or shall not  
576 be supported.

577 **Table 14 – Operations: CIM\_SSHSettingData**

Operation	Requirement	Messages
ModifyInstance	Optional. See clause 8.13.1.	None

578 **8.13.1 CIM\_SSHSettingData – ModifyInstance**

579 When the CIM\_SSHSettingData instance is associated with the CIM\_ProtocolService instance through an  
580 instance of CIM\_ElementSettingData and the value of the IsDefault property of the  
581 CIM\_ElementSettingData instance that associates the CIM\_SSHSettingData with the  
582 CIM\_ProtocolService has a value of 1 (Is Default), the ModifyInstance operation shall not be supported.

583 When the CIM\_SSHSettingData instance is not associated with an instance of CIM\_ProtocolService  
584 through an instance of CIM\_ElementSettingData where the IsDefault property has a value of 1 (Is  
585 Default), the ModifyInstance operation may be supported for the CIM\_SSHSettingData instance.

586 **8.14 CIM\_SSHProtocolEndpoint**

587 Table 15 lists operations that either have special requirements beyond those from DSP0200 or shall not  
588 be supported.

589 **Table 15 – Operations: CIM\_SSHProtocolEndpoint**

Operation	Requirement	Messages
ModifyInstance	Optional. See clause 8.14.1.	None
DeleteInstance	Optional. See clause 8.14.2.	None

590 **8.14.1 ModifyInstance**

591 The ModifyInstance operation may be supported for an instance of CIM\_SSHProtocolEndpoint. When the  
592 ModifyInstance operation is supported for an CIM\_SSHProtocolEndpoint instance, the ModifyInstance  
593 operation shall not modify the following properties:

- 594 • NameFormat
- 595 • ProtocolIFType
- 596 • OtherTypeDescription

597 **8.14.2 DeleteInstance**

598 The DeleteInstance operation may be supported for instances of CIM\_SSHProtocolEndpoint. When the  
599 DeleteInstance operation is invoked against an instance, the corresponding SSH session shall be  
600 terminated prior to deleting the CIM\_SSHProtocolEndpoint instance. The implementation shall also  
601 remove any association instances that reference the CIM\_SSHProtocolEndpoint.

## 602 8.15 CIM\_TCPProtocolEndpoint

603 Table 16 lists operations that either have special requirements beyond those in DSP0200 or shall not be  
604 supported.

605 **Table 16 – Operations: CIM\_TCPProtocolEndpoint**

Operation	Requirement	Messages
ModifyInstance	Optional	None
DeletelInstance	Optional	See clause 8.15.1.

### 606 8.15.1 ModifyInstance

607 The ModifyInstance operation may be supported for an instance of CIM\_TCPProtocolEndpoint. When the  
608 ModifyInstance operation is supported for an CIM\_TCPProtocolEndpoint instance, the ModifyInstance  
609 operation shall not modify the following properties:

- 610 • NameFormat
- 611 • ProtocolIFType
- 612 • PortNumber

### 613 8.15.2 DeletelInstance

614 When the CIM\_ProtocolService.ListenOnPort() method is supported for the instance of  
615 CIM\_ProtocolService with which the CIM\_TCPProtocolEndpoint is associated through an instance of  
616 CIM\_ServiceAccessBySAP, the DeletelInstance operation shall be supported for the instance of  
617 CIM\_TCPProtocolEndpoint. When the CIM\_ProtocolService.ListenOnPort() method is not supported, the  
618 DeletelInstance operation shall not be supported.

619 When the DeletelInstance operation is successful for an instance of CIM\_TCPProtocolEndpoint, the SSH  
620 service shall stop listening on the TCP port indicated by the PortNumber property of the  
621 CIM\_TCPProtocolEndpoint. The implementation shall also remove any association instances that  
622 reference the CIM\_TCPProtocolEndpoint.

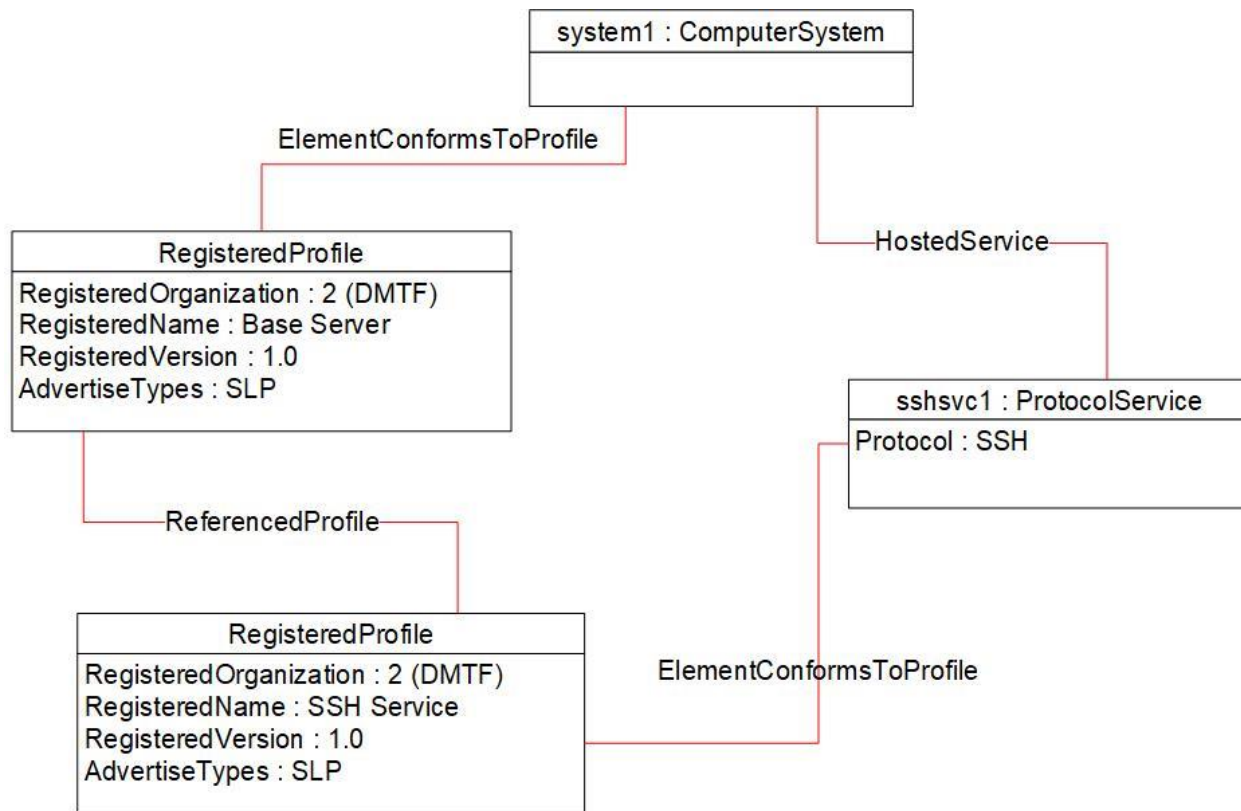
## 623 9 Use cases

624 The following clauses outline common use cases for client interaction with the SSH Service Profile.

### 625 9.1 Object diagrams

626 The object diagram in Figure 2 shows how instances of CIM\_RegisteredProfile are used to identify the  
627 version of the SSH Service Profile with which an instance of CIM\_ProtocolService and its associated  
628 instances are conformant. An instance of CIM\_RegisteredProfile exists for each profile that is  
629 instrumented in the system. One instance of CIM\_RegisteredProfile identifies the “DMTF Base Server  
630 Profile version 1.0”. The other instance identifies the “DMTF SSH Service Profile version 1.0”. The  
631 CIM\_ProtocolService instance is scoped to an instance of CIM\_ComputerSystem. This instance of  
632 CIM\_ComputerSystem is conformant with the DMTF Base Server Profile version 1.0 as indicated by the  
633 CIM\_ElementConformsToProfile association to the CIM\_RegisteredProfile instance. The  
634 CIM\_ProtocolService instance is conformant with this profile as indicated by the  
635 CIM\_ElementConformsToProfile association between the instance and the instance of  
636 CIM\_RegisteredProfile that identifies this profile.





637

638

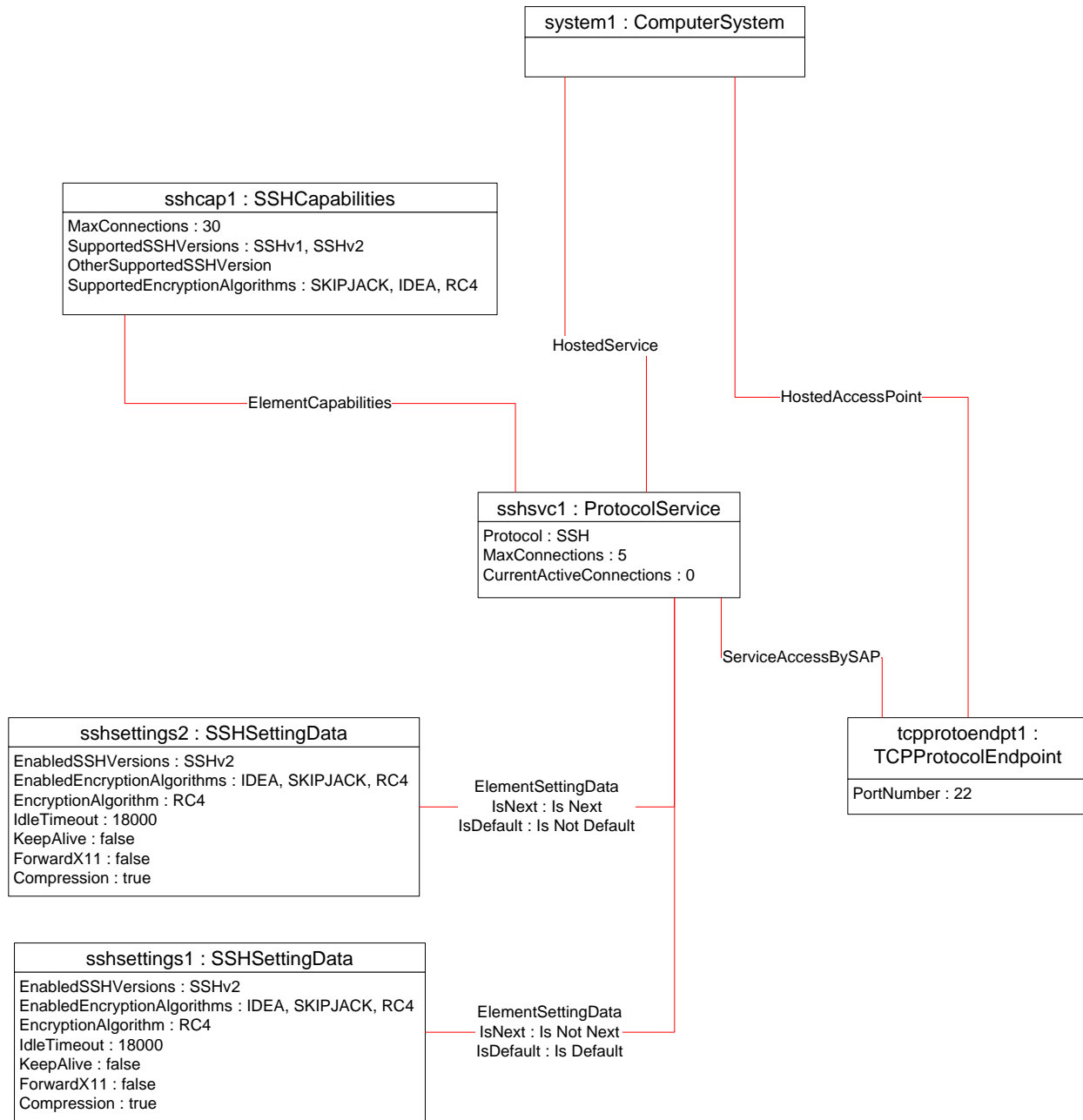
**Figure 2 – Registered Profile**

639  
640

Figure 3 through Figure 5 illustrate the sequence of the SSH service listening for connections, an SSH session being established, and the configuration of the SSH session changed from the initial values.

641  
642  
643  
644  
645  
646  
647  
648

Figure 3 is an object diagram that shows the SSH service enabled and listening for incoming connections. The instance of CIM\_SSHSettingData labeled sshsettings2 indicates the settings that will be applied to an SSH session when it is established. The CIM\_SSHSettingData labeled sshsettings1 represents the default configuration for a session. The CIM\_SSHCapabilities instance indicates the capabilities of the SSH service and its associated sessions. In this example, the SSH service supports SSHv1 and SSHv2, as indicated by the value of the SupportedEncryptionAlgorithms property. However, the administrator has configured the service to enable sessions using only SSHv2. This configuration is indicated by the value of the EnabledSSHVersions property on the associated CIM\_SSHSettingData instances.

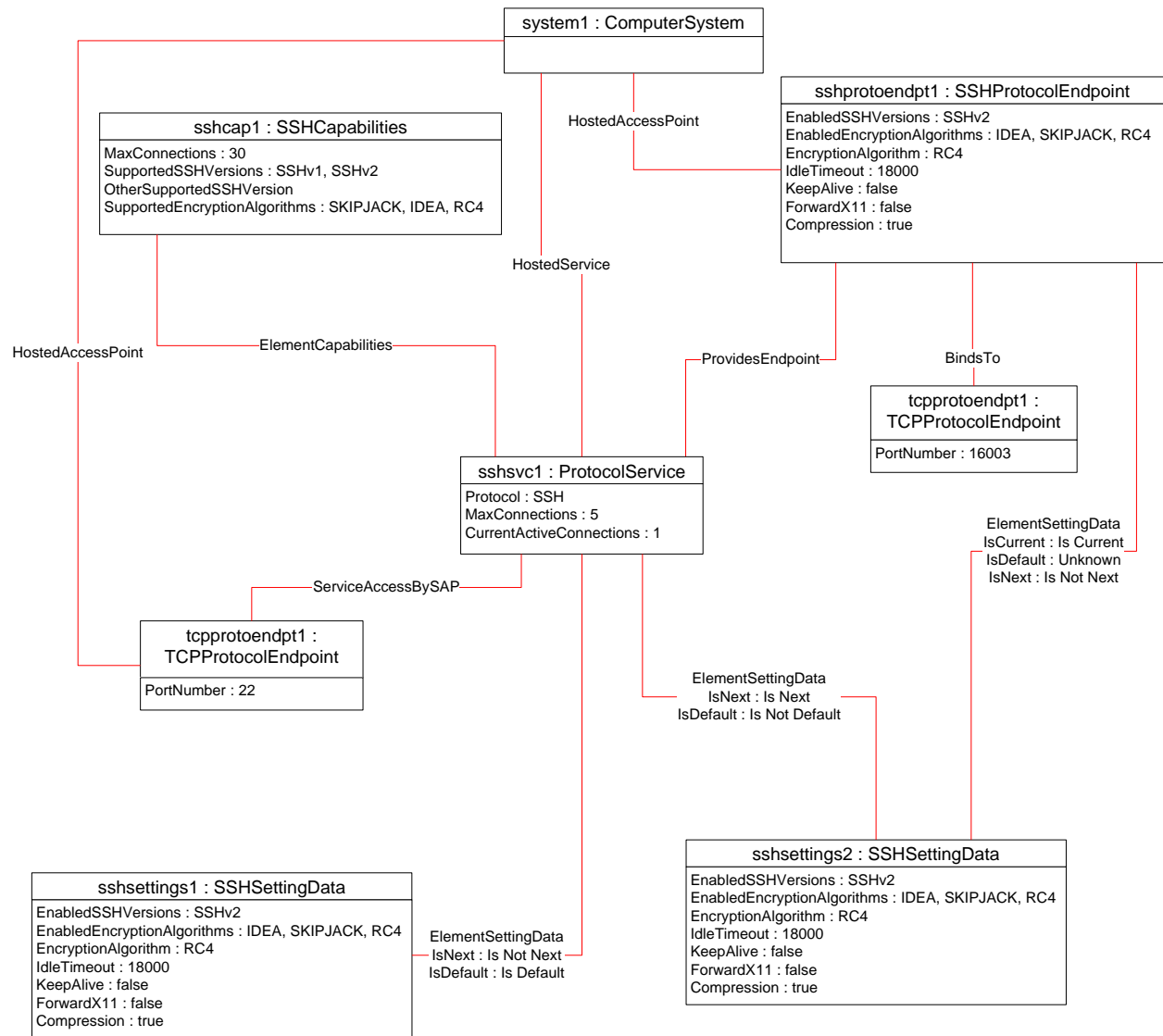


649

650

Figure 3 – SSH service listening for connections

651 The object diagram in Figure 4 represents the same configuration as Figure 3 with the addition of an  
 652 instance of CIM\_SSHProtocolEndpoint representing a newly established session. Notice that the value of the  
 653 CurrentActiveConnections property of the CIM\_ProtocolService instance (sshsvc1) has been  
 654 incremented to reflect that a session is active. The values of the properties for the established session  
 655 (sshprotoendpt1) correspond to the values on the CIM\_SSHSettingData where the value of the IsNext  
 656 property on the CIM\_ElementSettingData instance that associated the settings with the service had a  
 657 value of 1 (Is Next).



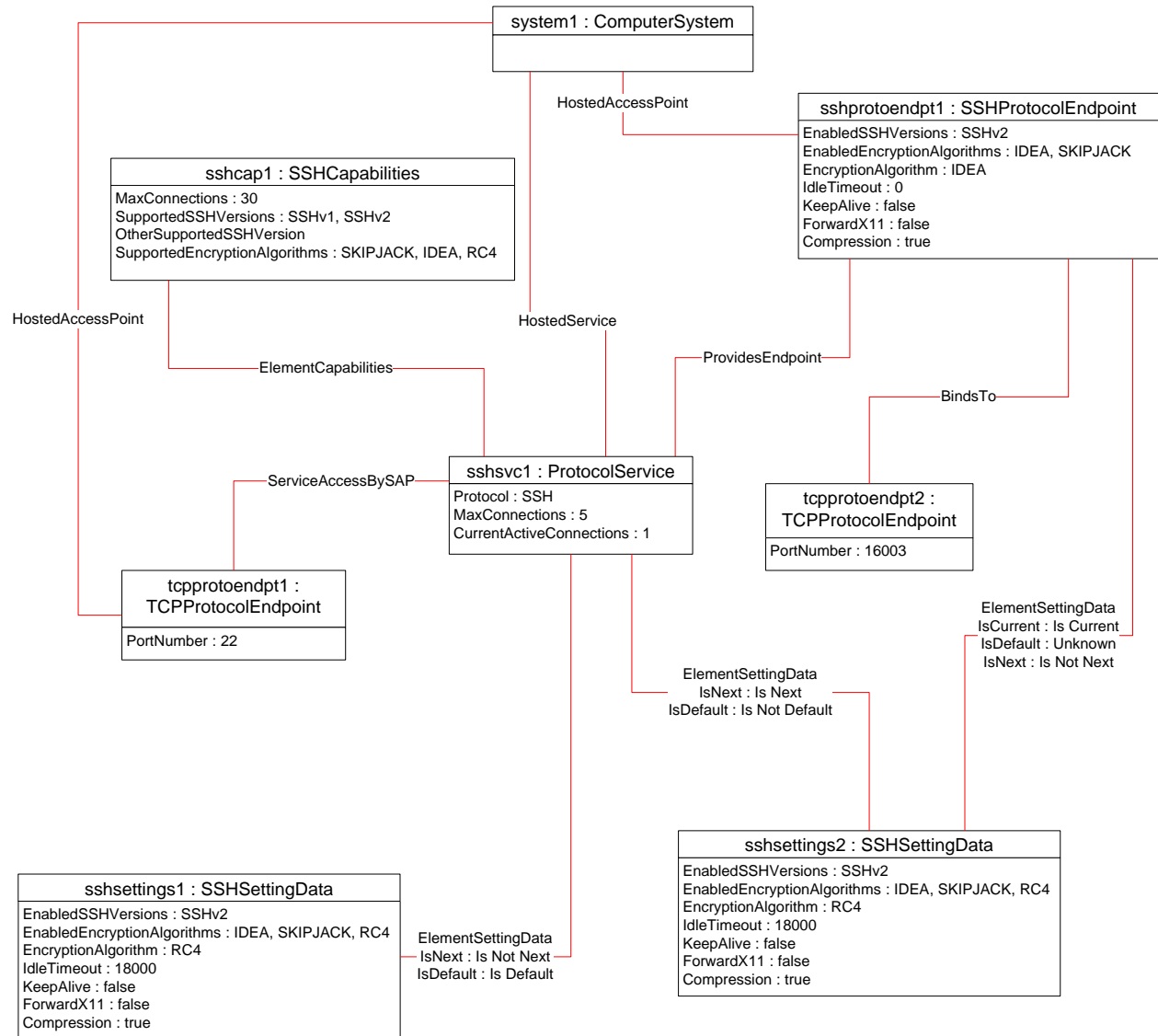
658

659

**Figure 4 – One active session**

660 The object diagram in Figure 5 represents the same configuration as in Figure 4 with the exception that  
 661 the user has changed session parameters from the values in effect when the session was initially  
 662 established. In the example above, the user has changed the encryption algorithm from RC4 to IDEA.  
 663 This change is reflected in the value of the EncryptionAlgorithm property of sshprotoendpt1 because the

664 CIM\_SSHProtocolEndpoint contains the actual values for the session. Notice that the value of the  
 665 EncryptionAlgorithm property of sshsettings2 remains unchanged.



667

Figure 5 – Session changed

## 668 9.2 Configuring session default settings

669 When an SSH session is established, session settings have default values. A user can change the default  
670 values for subsequent sessions' settings as follows:

- 671 1) Find the instance of CIM\_ElementSettingData that associates an instance of  
672 CIM\_SSHSettingData with the CIM\_ProtocolService where the value of its IsNext property is 1  
673 (Is Next) and the value of the IsDefault property is not 1 (Is Default).
- 674 2) Modify the properties of the referenced CIM\_SSHSettingData instance.

## 675 9.3 Modifying active session settings

676 A user can find the active sessions for an SSH service and modify their configuration as follows:

- 677 1) Find an instance of CIM\_SSHProtocolEndpoint associated with the CIM\_ProtocolService  
678 through an instance of CIM\_ProvidesEndpoint.
- 679 3) Modify the properties of the CIM\_SSHProtocolEndpoint as desired.

## 680 9.4 Disabling the SSH service

681 If an implementation supports disabling the SSH service, a user can disable the SSH service by invoking  
682 the RequestStateChange() method on CIM\_ProtocolService instance with a value of Disabled for the  
683 RequestedState parameter.

## 684 9.5 Determining the SSH service capabilities

685 A user can determine the capabilities of the SSH service as follows:

- 686 1) Find the instance of CIM\_SSHCapabilities associated with the CIM\_ProtocolService through an  
687 instance of CIM\_ElementCapabilities.
- 688 4) View the properties of the CIM\_SSHCapabilities instance to see the supported function.

## 689 9.6 Determining the listening port(s) of the SSH service

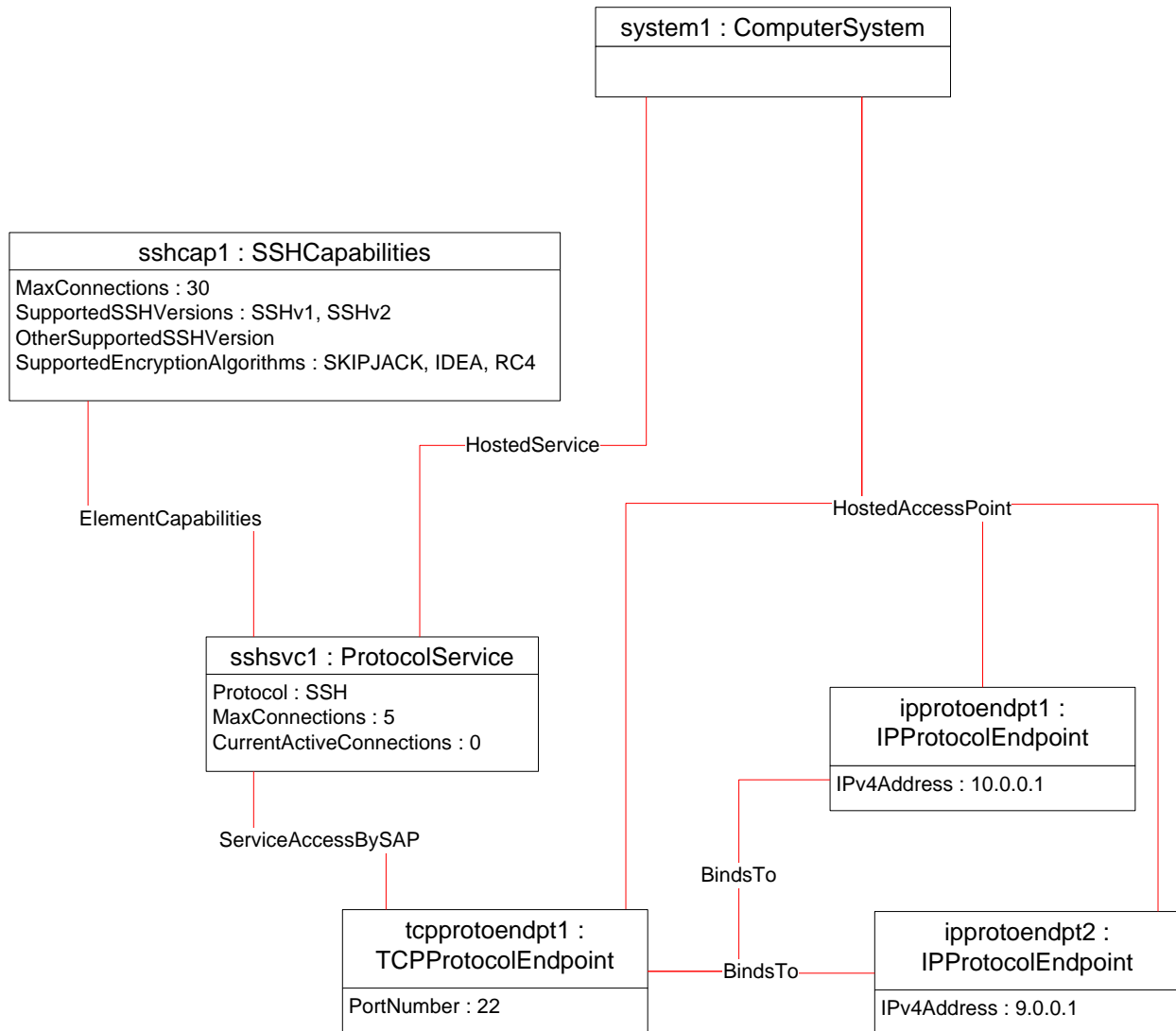
690 An implementation can model the TCP port upon which the SSH service listens for incoming connection  
691 requests. When the implementation models the port, a client can determine the ports to which the SSH  
692 service is bound as follows:

- 693 1) Find all instances of CIM\_TCPProtocolEndpoint associated with the CIM\_ProtocolService  
694 through an instance of CIM\_ServiceAccessBySAP.

695 For each instance of CIM\_TCPProtocolEndpoint, query the PortNumber property.

696 Applying this query to Figure 6, the client would find a single instance of CIM\_TCPProtocolEndpoint and  
697 the value of the PortNumber property would be 22.

698 Figure 6 is an object diagram for the SSH service listening on TCP port 22 for incoming connection  
699 requests across all of the IP interfaces of the host system. This is illustrated by the CIM\_BindsTo  
700 association instances from the CIM\_TCPProtocolEndpoint to the instances of CIM\_IPProtocolEndpoint.



701

702

**Figure 6 – Listening on a single port on all interfaces**

## 703 9.7 Adding a listening port for the SSH service

704 An implementation can support adding and removing bindings between the SSH service and TCP ports.  
 705 When an implementation supports adding bindings, a client can configure the service to listen on all  
 706 interfaces or a specific interface.

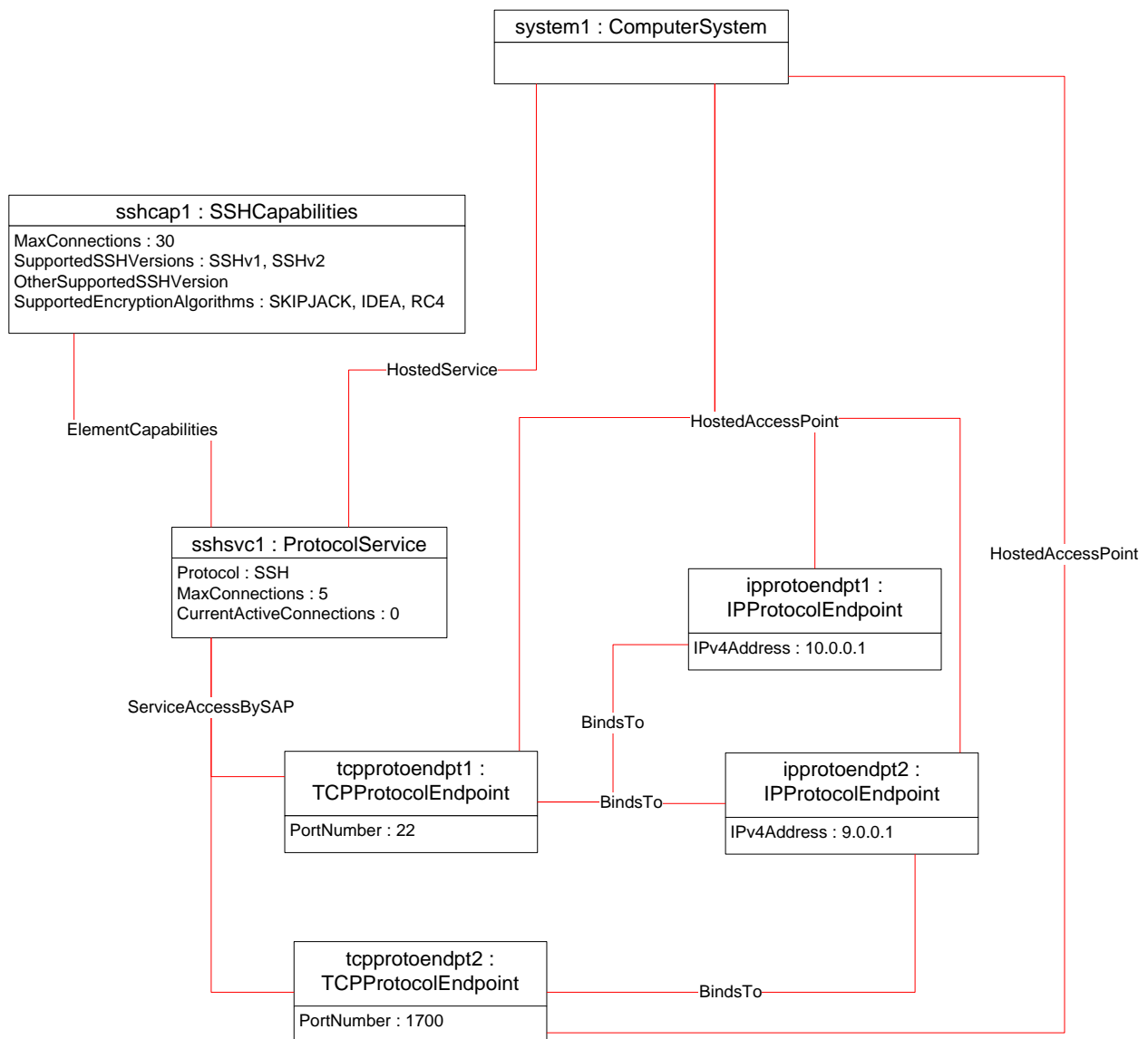
707 To have the SSH service listen on a port across all IP interfaces of the system, the client can invoke the  
 708 ListenOnPort method of the CIM\_ProtocolService instance, specifying the desired PortNumber. To have  
 709 the SSH service listen on a port for a specific interface, the client can invoke the ListenOnPort()  
 710 method of the CIM\_ProtocolService instance, specifying a reference to the CIM\_IPProtocolEndpoint instance that  
 711 represents the specific IP interface.

712 Figure 7 reflects the algorithm above applied to the configuration represented in Figure 6 where the  
 713 ListenOnPort() method was invoked with the IPEndpoint parameter containing a reference to  
 714 ipprotoendpt2 and a PortNumber parameter of 1700. The instance tcpprotoendpt2 is created and  
 715 associated with ipprotoendpt2.

716 **9.8 Stopping the SSH service from listening on a specific port**

717 A client can stop the SSH service from listening on a specific port by invoking the intrinsic DeleteInstance  
 718 operation against the instance of CIM\_TCPProtocolEndpoint that represents the port.

719 Using the configuration shown in Figure 7 as an example, invoking the DeleteInstance operation against  
 720 the instance tcpprotoendpt2 would cause the SSH service to no longer listen on port 1700.



721

722

**Figure 7 – Port added bound to specific interface**

## 723 9.9 Determining whether ElementName can be modified

724 For a given instance of CIM\_ProtocolService, a client can determine whether it can modify the  
725 ElementName as follows:

- 726 1) Find the CIM\_SSHCapabilities instance that is associated with the target instance.
- 727 a) Query the value of the ElementNameEditSupported property of the CIM\_SSHCapabilities  
728 instance. If the value is TRUE, the client can modify the ElementName property of the  
729 target instance.

## 730 9.10 Determining whether state management is supported

731 For a given instance of CIM\_ProtocolService, a client can determine whether state management is  
732 supported as follows:

- 733 1) Find the CIM\_EnabledLogicalElementCapabilities instance that is associated with the  
734 CIM\_LANEndpoint instance.
- 735 a) Query the value of the RequestedStatesSupported property. If at least one value is  
736 specified, state management is supported.

## 737 10 CIM Elements

738 Table 17 shows the instances of CIM Elements for this profile. Instances of these CIM Elements shall be  
739 implemented as described in Table 17. Clause 7 may impose additional requirements on these elements.

740 **Table 17 – CIM Elements: SSH Service Profile**

Element Name	Requirement	Notes
<b>Classes</b>		
CIM_BindsTo	Optional	See clause 10.1.
CIM_ElementCapabilities	Mandatory	See clause 10.2.
CIM_ElementSettingData	Optional	See clauses 10.4 and 10.5.
CIM_HostedAccessPoint	Mandatory	See clause 10.5.
CIM_HostedService	Mandatory	See clause 10.7.
CIM_ProtocolService	Mandatory	See clause 10.8.
CIM_ProvidesEndpoint	Mandatory	See clause 10.9.
CIM_RegisteredProfile	Mandatory	See clause 10.10
CIM_ServiceAccessBySAP	Conditional	See clause 10.11
CIM_SSHCapabilities	Mandatory	See clause 10.12.
CIM_SSHProtocolEndpoint	Mandatory	See clause 10.13.
CIM_SSHSettingData	Optional	See clause 10.14.
CIM_TCIPProtocolEndpoint	Optional	See clause 10.15.
<b>Indications</b>		
None defined in this profile		



741 **10.1 CIM\_BindsTo—TCPProtocolEndpoint**

742 When an instance of CIM\_TCPProtocolEndpoint is instrumented, CIM\_BindsTo is used to relate the  
 743 CIM\_SSHProtocolEndpoint instance with the CIM\_TCPProtocolEndpoint instance on which it is  
 744 dependent.

745 **Table 18 – Class: CIM\_BindsTo**

Properties	Requirement	Notes
Antecedent	Mandatory	The value of this property shall be a reference to an instance of CIM_TCPProtocolEndpoint. Cardinality 0..1
Dependent	Mandatory	The value of this property shall be a reference to an instance of CIM_SSHProtocolEndpoint. Cardinality *

746 **10.2 CIM\_BindsTo — IPProtocolEndpoint**

747 When the relationship with an underlying IP interface is modeled according to clause 7.3, CIM\_BindsTo is  
 748 used to relate the CIM\_TCPProtocolEndpoint instance with the CIM\_IPProtocolEndpoint instance on  
 749 which it is dependent.

750 **Table 19 – Class: CIM\_BindsTo**

Properties	Requirement	Notes
Antecedent	Mandatory	The value of this property shall be a reference to an instance of CIM_IPProtocolEndpoint. Cardinality *
Dependent	Mandatory	The value of this property shall be a reference to an instance of CIM_TCPProtocolEndpoint. Cardinality 1..*

751

752 **10.3 CIM\_ElementCapabilities**

753 CIM\_ElementCapabilities is used to associate an instance of CIM\_SSHCapabilities with the  
 754 CIM\_ProtocolService

755 **Table 20 – Class: CIM\_ElementCapabilities**

Properties	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 the CIM_SSHCapabilities instance. Cardinality 1

756 **10.4 CIM\_ElementSettingData – SSH service**

757 CIM\_ElementSettingData is used to associate instances of CIM\_SSHSettingData with instances of  
758 CIM\_ProtocolService.

759 **Table 21 – Class: CIM\_ElementSettingData (SSH service)**

Properties	Requirement	Notes
ManagedElement	Mandatory	This property shall be a reference to the Central Instance. Cardinality *
Setting	Mandatory	This property shall be a reference to an instance of CIM_SSHSettingData. Cardinality *
IsDefault	Mandatory	Matches 1 (Is Default) or 2 (Is Not Default)
IsNext	Mandatory	Matches 1 (Is Current) or 2 (Is Not Current)

760 **10.5 CIM\_ElementSettingData – SSH session**

761 CIM\_ElementSettingData is used to associate instances of CIM\_SSHSettingData with instances of  
762 CIM\_SSHProtocolEndpoint.

763 **Table 22 – Class: CIM\_ElementSettingData (SSH session)**

Properties	Requirement	Notes
ManagedElement	Mandatory	This property shall be a reference to an instance of CIM_SSHProtocolEndpoint. Cardinality *
Setting	Mandatory	This property shall be a reference to an instance of CIM_SSHSettingData. Cardinality *
IsCurrent	Mandatory	Matches 1 (Is Current) or 2 (Is Not Current)

764 **10.6 CIM\_HostedAccessPoint**

765 CIM\_HostedAccessPoint is used to relate the CIM\_SSHProtocolEndpoint and CIM\_TCPProtocolEndpoint  
766 instances to their scoping CIM\_ComputerSystem instance.

767 **Table 23 – Class: CIM\_HostedAccessPoint**

Properties	Requirement	Notes
Antecedent	Mandatory	This property shall be a reference to an instance of CIM_ComputerSystem. Cardinality 1
Dependent	Mandatory	This property shall be a reference to an instance of CIM_SSHProtocolEndpoint or CIM_TCPProtocolEndpoint. Cardinality *

768 **10.7 CIM\_HostedService**

769 CIM\_HostedService is used to relate the CIM\_ProtocolService to its scoping CIM\_ComputerSystem  
770 instance.

771 **Table 24 – Class: CIM\_HostedService**

Properties	Requirement	Notes
Antecedent	Mandatory	This property shall be a reference to the Scoping Instance. Cardinality 1
Dependent	Mandatory	This property shall be a reference to the Central Instance. Cardinality 1..*

772 **10.8 CIM\_ProtocolService**

773 CIM\_ProtocolService represents the SSH service.

774 **Table 25 – Class: CIM\_ProtocolService**

Properties	Requirement	Notes
SystemCreationClassName	Mandatory	None
CreationClassName	Mandatory	None
SystemName	Mandatory	None
Name	Mandatory	None
Protocol	Mandatory	See clause 7.1.1.
MaxConnections	Mandatory	A value of 0 (zero) shall indicate unknown.
RequestedState	Mandatory	See clause 7.1.3.
EnabledState	Mandatory	See clause 7.1.3.
ElementName	Mandatory	See clause 7.1.4.
OperationalStatus	Mandatory	None
HealthState	Mandatory	None
RequestStateChange( )	Mandatory	See clause 8.2.
ListenOnPort()	Mandatory	See clause 8.1.

775 **10.9 CIM\_ProvidesEndpoint**

776 CIM\_ProvidesEndpoint is used to associate the instance of CIM\_ProtocolService with an instance of  
777 CIM\_SSHProtocolEndpoint representing a session with the service.

778 **Table 26 – Class: CIM\_ProvidesEndpoint**

Properties	Requirement	Notes
Antecedent	Mandatory	This property shall be a reference to the instance of CIM_ProtocolService. Cardinality 1
Dependent	Mandatory	This property shall be a reference to an instance of CIM_SSHProtocolEndpoint. Cardinality *

779 **10.10 CIM\_RegisteredProfile**

780 CIM\_RegisteredProfile identifies the Profile. The CIM\_RegisteredProfile class is defined by the Profile  
 781 Registration Profile. With the exception of the mandatory values specified for the properties in Table 27,  
 782 the behavior of the CIM\_RegisteredProfile instance is in accordance with the constraints specified in the  
 783 Profile Registration Profile.

784 **Table 27 – Class: CIM\_RegisteredProfile**

Properties	Requirement	Notes
RegisteredName	Mandatory	This property shall have a value of "SSH Service Profile".
RegisteredVersion	Mandatory	This property shall have a value of "1.0.1".
RegisteredOrganization	Mandatory	This property shall have a value of 2(DMTF).

785

786 **10.11 CIM\_ServiceAccessBySAP**

787 CIM\_ServiceAccessBySAP is used to associate the instance of CIM\_ProtocolService with an instance of  
 788 CIM\_TCProtocolEndpoint over which a session with the service can be established.

789 **Table 28 – Class: CIM\_ServiceAccessBySAP**

Properties	Requirement	Notes
Antecedent	Mandatory	This property shall be a reference to the instance of CIM_ProtocolService. Cardinality 1..*
Dependent	Mandatory	This property shall be a reference to an instance of CIM_TCProtocolEndpoint. Cardinality *

790 **10.12 CIM\_SSHCapabilities**

791 CIM\_SSHCapabilities represents the capabilities of an SSH service.

792 **Table 29 – Class: CIM\_SSHCapabilities**

Properties	Requirement	Notes
InstanceID	Mandatory	None
ElementName	Mandatory	pattern ".**"
RequestedStatesSupported	Mandatory	See clause 7.1.2.
ElementNameEditSupported	Mandatory	See clause 7.1.2.
MaxElementNameLen	Conditional	See clause 7.1.2.
MaxConnections	Mandatory	None
SupportedSSHVersions	Mandatory	None
OtherSupportedSSHVersion	Conditional	This property shall have a value when the SupportedSSHVersions property has a value of "Other".
SupportedEncryptionAlgorithms	Mandatory	None
OtherSupportedEncryptionAlgorithm	Conditional	This property shall have a value when the SupportedEncryptionAlgorithms property has a value of "Other".
ListeningPortManagementSupported	Mandatory	See clause 8.1.
MaxListeningPorts	Mandatory	A value of 0 (zero) shall indicate unknown.

793 **10.13 CIM\_SSHProtocolEndpoint**

794 CIM\_SSHProtocolEndpoint represents a session established with the SSH service.

795 **Table 30 – Class: CIM\_SSHProtocolEndpoint**

Properties	Requirement	Notes
SystemCreationClassName	Mandatory	None
CreationClassName	Mandatory	None
SystemName	Mandatory	None
Name	Mandatory	None
NameFormat	Mandatory	pattern ".**"
ProtocolIType	Mandatory	matches 1 (Other)
OtherTypeDescription	Mandatory	matches "SSH"
ElementName	Mandatory	pattern ".**"
EnabledSSHVersions	Mandatory	None
OtherEnabledSSHVersions	Conditional	This property shall have a value when the EnabledEncryptionAlgorithms property has a value of "Other".
SSHVersion	Mandatory	None
OtherSSHVersion	Conditional	This property shall have a value when the SSHVersion property has a value of "Other".
EnabledEncryptionAlgorithms	Mandatory	None

Properties	Requirement	Notes
OtherEnabledEncryptionAlgorithm	Conditional	This property shall have a value when the EnabledEncryptionAlgorithms property has a value of "Other".
EncryptionAlgorithm	Mandatory	None
OtherEncryptionAlgorithm	Conditional	This property shall have a value when the EncryptionAlgorithm property has a value of "Other".
IdleTimeout	Mandatory	None
KeepAlive	Mandatory	None
ForwardX11	Mandatory	None
Compression	Mandatory	None

796 **10.14 CIM\_SSHSettingData**

797 CIM\_SSHSettingData represents settings that can be applied to an SSH session.

798

**Table 31 – Class: CIM\_SSHSettingData**

Properties	Requirement	Notes
InstanceID	Mandatory	None
ElementName	Mandatory	pattern ".*"
EnabledSSHVersions	Mandatory	None
OtherEnabledSSHVersions	Conditional	This property shall have a value when the EnabledEncryptionAlgorithms property has a value of "Other".
SSHVersion	Mandatory	None
OtherSSHVersion	Conditional	This property shall have a value when the SSHVersion property has a value of "Other".
EnabledEncryptionAlgorithms	Mandatory	None
OtherEnabledEncryptionAlgorithm	Conditional	This property shall have a value when the EnabledEncryptionAlgorithms property has a value of "Other".
EncryptionAlgorithm	Mandatory	None
OtherEncryptionAlgorithm	Conditional	This property shall have a value when the EncryptionAlgorithm property has a value of "Other".
IdleTimeout	Mandatory	None
KeepAlive	Mandatory	None
ForwardX11	Mandatory	None
Compression	Mandatory	None

799 **10.15 CIM\_TCPProtocolEndpoint**

800 CIM\_TCPProtocolEndpoint represents an IP port to which either an SSH session or service can be  
 801 bound.

802 **Table 32 – Class: CIM\_TCPProtocolEndpoint**

Properties	Requirement	Notes
SystemCreationClassName	Mandatory	None
CreationClassName	Mandatory	None
SystemName	Mandatory	None
Name	Mandatory	None
NameFormat	Mandatory	pattern “.*”
ProtocolIFType	Mandatory	matches 4111 ("TCP")
ElementName	Mandatory	pattern “.*”
PortNumber	Mandatory	None

803  
804  
805  
806

## ANNEX A (informative)

### Change log

Version	Date	Description
1.0.0	2009-06-16	
1.0.1	2019-02-11	This errata addresses these issues: <ul style="list-style-type: none"><li>• Updated RegisteredVersion to reflect errata version number in clause 10.10</li><li>• Updated RegisteredOrganization description to reflect correct value for DMTF in clause 10.10 and figure 2 in 9.1</li></ul>

807  
808