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Generic Device Resource Virtualization Profile

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Generic Device Resource Virtualization Profile

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Foreword

71 The *Generic Device Resource Virtualization Profile* (DSP1059) was prepared by the System Virtualization
72 Partitioning and Clustering workgroup of the DMTF.

73 DMTF is a not-for-profit association of industry members dedicated to promoting enterprise and systems
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76 **Editor:**

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78 **Contributors:**

- 79 • Gareth Bestor – IBM
- 80 • Jim Fehlig – Novell
- 81 • Steve Hand – Symantec
- 82 • Larry Lamers EMC/VMware
- 83 • Daniel Hiltgen – EMC/VMware
- 84 • Michael Johanssen – IBM
- 85 • Larry Lamers – EMC/VMware
- 86 • Aaron Merkin – IBM
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89

90

Introduction

91 The information in this specification should be sufficient for a provider or consumer of this data to identify
92 unambiguously the classes, properties, methods, and values that shall be instantiated and manipulated to
93 represent and manage a generic virtual device modeled using the DMTF Common Information Model
94 (CIM) core and extended model definitions.

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

97

Generic Device Resource Virtualization Profile

98 1 Scope

99 The *Generic Device Resource Virtualization Profile* is a concrete component profile that specializes the
100 abstract *Resource Allocation Profile* and the abstract *Allocation Capabilities Profile*.

101 The *Generic Device Resource Virtualization Profile* is intended for use when a more specific resource
102 allocation profile (for example, the *Processor Resource Virtualization Profile*, *Memory Resource*
103 *Virtualization Profile*, and so on) for common resource types has not yet been defined or approved, or
104 when the device in question is an unusual device type for which no more specific profile exists.

105 2 Normative References

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

109 2.1 Approved References

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

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

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

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

114 2.2 References under Development

115 DMTF [DSP1041](#), *Resource Allocation Profile*

116 DMTF [DSP1043](#), *Allocation Capabilities Profile*

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

118 2.3 Other References

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

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

121 3 Terms and Definitions

122 For the purposes of this document, the following terms and definitions apply. For the purposes of this
123 document, the terms and definitions given in [DSP1033](#) and [DSP1001](#) also apply.

124 3.1

125 can

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

127 3.2

128 cannot

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

Generic Device Resource Virtualization Profile

- 130 **3.3**
131 **conditional**
132 indicates requirements to be followed strictly to conform to the document when the specified conditions
133 are met
- 134 **3.4**
135 **mandatory**
136 indicates requirements to be followed strictly to conform to the document and from which no deviation is
137 permitted
- 138 **3.5**
139 **may**
140 indicates a course of action permissible within the limits of the document
- 141 **3.6**
142 **need not**
143 indicates a course of action permissible within the limits of the document
- 144 **3.7**
145 **optional**
146 indicates a course of action permissible within the limits of the document
- 147 **3.8**
148 **referencing profile**
149 indicates a profile that owns the definition of this class and can include a reference to this profile in its
150 "Referenced Profiles" table
- 151 **3.9**
152 **shall**
153 indicates requirements to be followed strictly to conform to the document and from which no deviation is
154 permitted
- 155 **3.10**
156 **shall not**
157 indicates requirements to be followed strictly to conform to the document and from which no deviation is
158 permitted
- 159 **3.11**
160 **should**
161 indicates that among several possibilities, one is recommended as particularly suitable, without
162 mentioning or excluding others, or that a certain course of action is preferred but not necessarily required
- 163 **3.12**
164 **should not**
165 indicates that a certain possibility or course of action is deprecated but not prohibited
- 166 **3.13**
167 **unspecified**
168 indicates that this profile does not define any constraints for the referenced CIM element or operation
- 169 **3.14**
170 **allocated resource**
171 the partitioned or virtual resource that has been allocated to a consumer based on the associated
172 resource allocation

173 **3.15**
 174 **host resource**
 175 a device or computing resource contained by the host system that may be allocated with either exclusive
 176 or shared access through the host system to provide resources to a resource pool or consumer

177 **3.16**
 178 **host system**
 179 the scoping system containing resources that may be allocated and/or virtualized

180 **3.17**
 181 **virtual computer system**
 182 a virtual system as applied to a computer system
 183 Other common industry terms for such a system include virtual machine, hosted computer, child partition,
 184 logical partition, domain, guest, and container.

185 **3.18**
 186 **virtual resource**
 187 the instantiation of the allocated resource that is exposed to a consumer through a logical device

188 **4 Symbols and Abbreviated Terms**

189 The following abbreviations are used in this document.

190 **4.1**
 191 **RASD**
 192 CIM_ResourceAllocationSettingData

193 **5 Synopsis**

194 **Profile Name:** *Generic Device Resource Virtualization*
 195 **Version:** 1.0.0a
 196 **Organization:** DMTF
 197 **CIM Schema Version:** 2.16
 198 **Specializes:** *Resource Allocation Profile* and *Allocation Capabilities Profile*
 199 **Central Class:** CIM_ResourcePool
 200 **Scoping Class:** CIM_System

201 The *Generic Device Resource Virtualization Profile* is a component profile that provides the capability to
 202 manage a virtual device.

203 The Central Class of the *Generic Device Resource Virtualization Profile* shall be CIM_ResourcePool. The
 204 Scoping Class shall be CIM_System. Table 1 lists profiles upon which this profile has a dependency.

205 **Table 1 – Referenced Profiles**

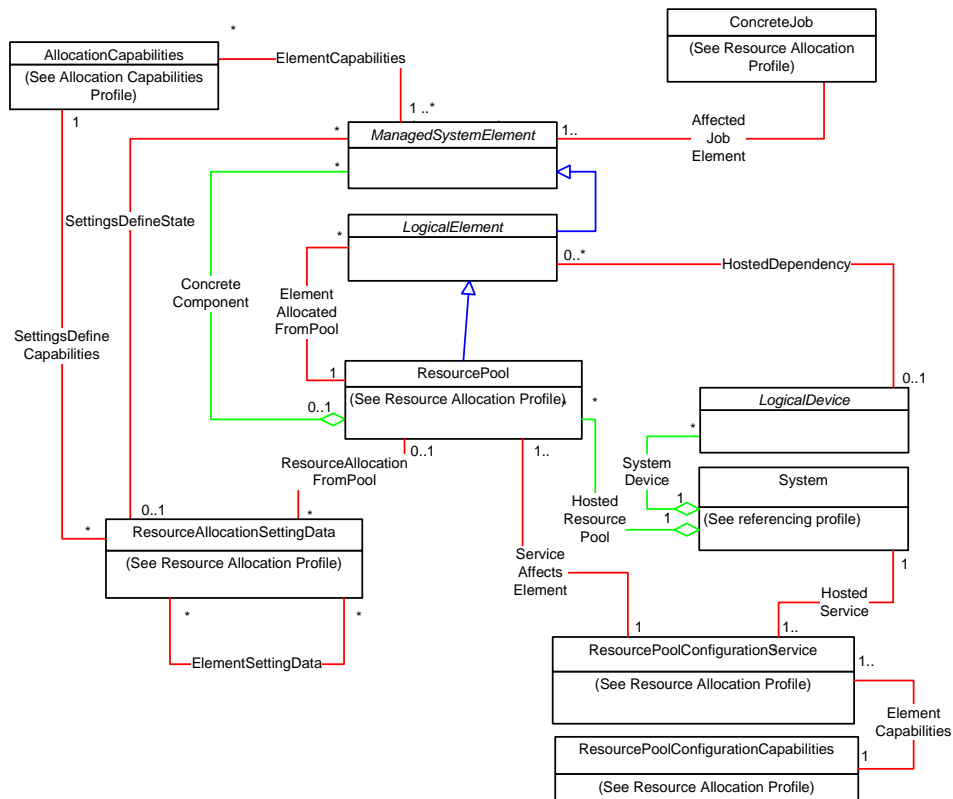
| Profile Name | Organization | Version | Requirement | Description |
|--------------------------------|--------------|---------|-------------|-------------|
| <i>Resource Allocation</i> | DMTF | 1.0.0 | Specializes | See 7.1. |
| <i>Allocation Capabilities</i> | DMTF | 1.0.0 | Specializes | See 7.2. |
| <i>Profile Registration</i> | DMTF | 1.0.0 | Mandatory | |

206 **6 Description**

207 The *Generic Device Resource Virtualization Profile* is a component profile that defines basic
 208 implementation for a virtual device including resource allocation from a resource pool as specified in the
 209 abstract *Resource Allocation Profile* and specification of resource capabilities as specified in the abstract
 210 *Allocation Capabilities Profile*.

211 Figure 1 presents the class schema for the *Generic Device Resource Virtualization Profile*. The prefix
 212 CIM_ has been removed from the names of the classes.

213 Note that most of the behavioral constraints for many of the classes identified are inherited from the
 214 abstract *Resource Allocation Profile* and *Allocation Capabilities Profile*. Therefore, although they are
 215 shown, they are not referenced in this specification.



216

217 **Figure 1 – Generic Device Resource Virtualization Profile: Class Diagram**

218 **6.1 Resource Allocation Profile and Allocation Capabilities Profile**

219 Implementations of the *Generic Device Resource Virtualization Profile* will conform to the *Resource*
 220 *Allocation Profile* and to the *Allocation Capabilities Profile*. This profile does not further constrain the
 221 flexibility stated in these profiles subject to the constraint described in “Virtual Resource Allocation,”
 222 clause 7.2, of the *Resource Allocation Profile*). For example, allocations may occur from the primordial
 223 pool or pool hierarchies, active pool management may be implemented, and the allocation capabilities
 224 pattern may be used to help the management client understand valid attribute values.

225 7 Implementation

226 This section details the requirements related to the arrangement of instances and their properties for
227 implementations of this profile.

228 7.1 Resource Allocation Profile

229 The *Resource Allocation Profile* specifies two alternatives for modeling resource allocation.
230 Implementations conforming to this profile shall implement the normative content in “Virtual Resource
231 Allocation” (clause 7.2) in the *Resource Allocation Profile*.

232 7.2 Allocation Capabilities Profile

233 The *Allocation Capabilities Profile* specifies ways for an implementation to use instances of
234 CIM_AllocationCapabilities and the CIM_SettingsDefineCapabilities association for a set of
235 CIM_ResourceAllocationSettingData instances to describe the default property values, supported
236 property values, and range of property values for a resource allocation request.

237 An instance of the CIM_AllocationCapabilities class shall be used to represent the allocation capabilities
238 of a conformant resource pool. That instance shall be associated with the instance of the
239 CIM_ResourcePool class that represents the conformant resource pool through the
240 CIM_ElementCapabilities association.

241 Instances of the CIM_ResourceAllocationSettingData class shall be used to represent defaults and
242 supported property values and ranges of the allocation capabilities of conformant resource pools. These
243 instances shall be associated with the instance of the CIM_AllocationCapabilities class that represents
244 the allocation capabilities of a conformant resource pool through the CIM_SettingsDefineCapabilities
245 association.

246 7.3 Resource Type

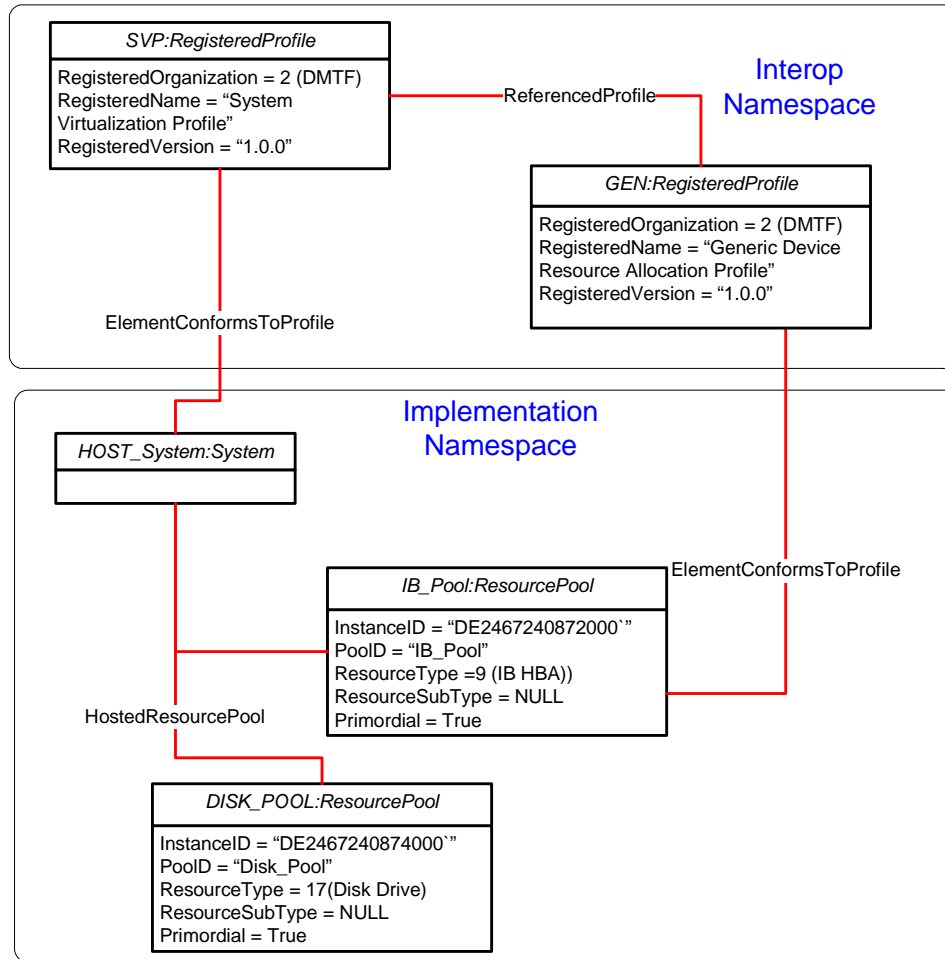
247 If the virtual device is one of the types specified in the CIM_ResourceAllocationSettingData MOF (and the
248 CIM_AllocationCapabilities and CIM_ResourcePool MOFs), then the type field should be set accordingly.
249 If there is no appropriate type value, the type field shall be set to 1 (Other) and the OtherResourceType
250 attribute shall be set to a short string specifying the type.

251 For a specific resource type the type attribute value in the associated
252 CIM_ResourceAllocationSettingData, CIM_AllocationCapabilities, and CIM_ResourcePool instances shall
253 all be set to the same value.

254 The ResourceSubType attribute may be set to specify an implementation-specific sub-type.

255 8 Methods

256 All intrinsic and extrinsic methods are supported as defined in the *Resource Allocation Profile* and the
257 *Allocation Capabilities Profile*.



284

285

Figure 3 – Profile Registration Using Central Class

286

9.2.2 Determining Resource Types in Implementations Using Scoping Class Registration Methodology

287

288

This use case assumes that the client knows the reference that refers to an instance of the CIM_RegisteredProfile class that represents an implementation of this profile. There are no CIM_ElementConformsToProfile associations from this instance of CIM_RegisteredProfile.

289

290

291

A client can determine which resource types this profile applies to as follows:

292

1) The client determines the scoping profile by following the CIM_ReferenceProfile association.

293

2) The client determines the scoping class by following the CIM_ElementConformsToProfile association from the scoping CIM_RegisteredProfile instance to the scoping CIM_System instance.

294

295

296

3) The client determines all instances of CIM_ResourcePool that are associated by CIM_HostedResourcePool to the scoping class.

297

298

4) For each instance of CIM_ResourcePool discovered in the previous step, the client checks whether the CIM_ElementConformsToProfile association is present for that pool.

299

300

5) For each of the associated CIM_ResourcePool instances that do not have the CIM_ElementConformsToProfile association the client obtains the ResourceType field, indicating that the resource type conforms to this profile.

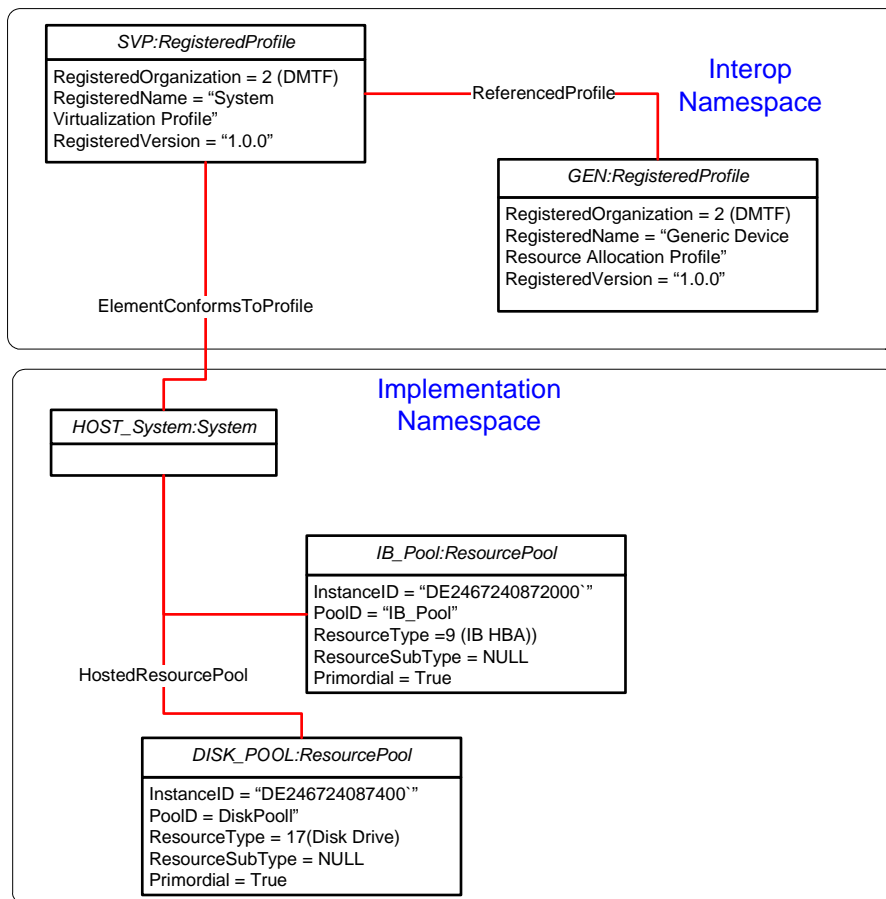
301

302

Generic Device Resource Virtualization Profile

303 The result is a list of resource types that conform to this profile.

304 In the example shown in Figure 4 there are no CIM_ElementConformsToProfile associations from the
 305 instance of CIM_RegisteredProfile representing this profile that the client could traverse to the scoping
 306 class, HOST_System. This instance of CIM_System “hosts” two resource pools, neither of which have a
 307 CIM_ElementConformsToProfile association. The client can then determine the types of these pools: 9
 308 (IB HBA) and 17 (Disk Drive). These resource types conform to the *Generic Device Resource*
 309 *Virtualization Profile*.



310

311

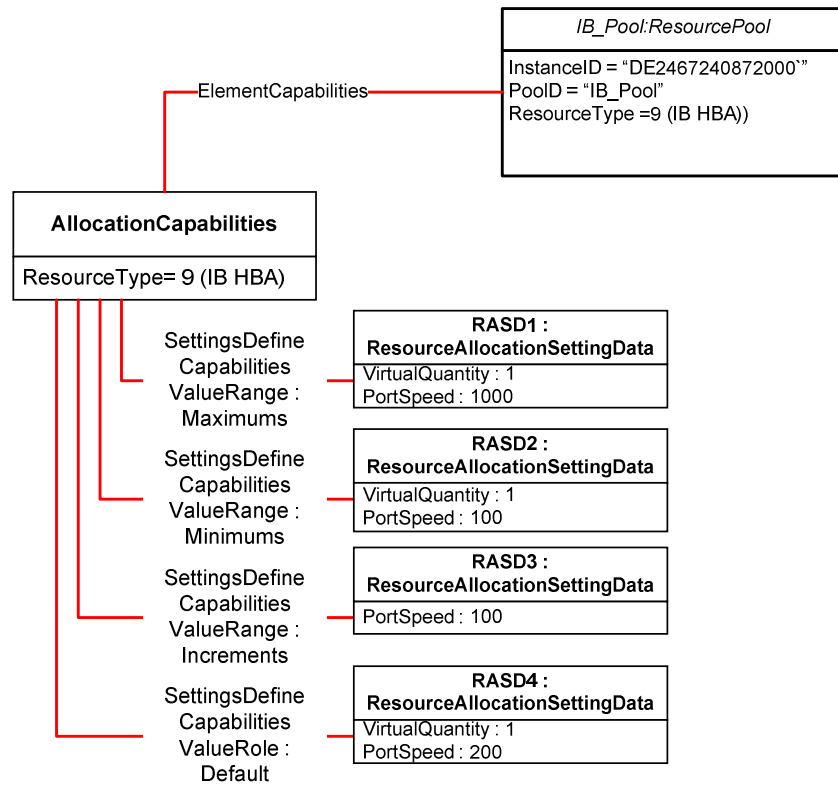
Figure 4 – Profile Registration Using Scoping Class

312 9.3 Determining Resource Capabilities

313 Once the client has found a resource pool for the desired resource it can determine the possible values to
 314 be used in an allocation request as follows:

- 315 1) From the CIM_ResourcePool select all of the instances of CIM_AllocationCapabilities
 316 associated with the CIM_ElementCapabilities association. Each of these
 317 CIM_AllocationCapabilities instances describes a possible set of allocation request values.
 318 (Typically there would only be one.)
- 319 2) From the selected CIM_AllocationCapabilities instance follow the
 320 CIM_SettingsDefineCapabilities with the ValueRole property set to 0 (Default) to find the default
 321 CIM_ResourceAllocationSetting instance values. (The example in Figure 5 shows a
 322 hypothetical PortSpeed property whose default value is 200.)

323 3) In a similar fashion, follow the CIM_SettingsDefineCapabilities with the ValueRange property
 324 set to Maximum, Minimum and Increments to find these values. (In the example the minimum
 325 PortSpeed is 100, Maximum is 1000, and requests must be made in increments of 100.)



326

327

Figure 5 – Determining Resource Capabilities

328 10 CIM Elements

329 All CIM element requirements specified by the *Resource Allocation Profile* and the *Allocation Capabilities*
 330 *Profile* are required by the *Generic Device Resource Virtualization Profile*. This clause specifies additional
 331 requirements that modify or extend those of the *Resource Allocation Profile* and the *Allocation*
 332 *Capabilities Profile*.

333 Table 2 shows the instances of CIM elements for this profile. Instances of the CIM elements shall be
 334 implemented as described in Table 2. Sections 7 (“Implementation”) and 8 (“Methods”) may impose
 335 additional requirements on these elements.

336

Table 2 – CIM Elements: Generic Device Resource Virtualization Profile

| Element Name | Requirement | Description |
|------------------------------|-------------|-------------|
| Classes | | |
| CIM_AllocationCapabilities | Mandatory | See 10.1. |
| CIM_ElementCapabilities | Mandatory | See 10.2. |
| CIM_RegisteredProfile | Mandatory | See 10.3. |
| Indications | | |
| None defined in this profile | | |

Generic Device Resource Virtualization Profile

337 10.1 CIM_AllocationCapabilities

338 CIM_AllocationCapabilities represents the allocation capabilities of a resource pool.

339 Table 3 provides information about the properties of CIM_AllocationCapabilities.

340 **Table 3 – Class: CIM_AllocationCapabilities**

| Elements | Requirement | Notes |
|-----------------------|-------------|--|
| InstanceID | Mandatory | Key |
| ResourceType | Mandatory | See 7.3. |
| OtherResourceType | Conditional | This property shall be used if ResourceType matches 1 (Other). |
| RequestTypesSupported | Mandatory | None |
| SharingMode | Mandatory | None |

341 10.2 CIM_ElementCapabilities

342 CIM_ElementCapabilities associates an instance of CIM_AllocationCapabilities with CIM_ResourcePool.

343 Table 4 defines the properties of CIM_ElementCapabilities.

344 **Table 4 – Class: CIM_ElementCapabilities**

| Properties | Requirement | Notes |
|-----------------|-------------|---|
| ManagedElement | Mandatory | Key Cardinality 1..* |
| Capabilities | Mandatory | Key This property shall be a reference to the CIM_AllocationCapabilities instance. Cardinality * |
| Characteristics | Mandatory | |

345 10.3 CIM_RegisteredProfile

346 An implementation shall use an instance of class CIM_RegisteredProfile to represent an implementation
347 of this profile. With the exception of the mandatory values specified for the properties in Table 5, the
348 behavior of the CIM_RegisteredProfile instance is in accordance with the *Profile Registration Profile*.

349 **Table 5 – Class: CIM_RegisteredProfile**

| Elements | Requirement | Notes |
|------------------------|-------------|---|
| RegisteredName | Mandatory | This property shall have a value of "Generic Device Resource Virtualization". |
| RegisteredVersion | Mandatory | This property shall have a value of "1.0.0". |
| RegisteredOrganization | Mandatory | This property shall have a value of 2 (DMTF). |

350