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## 5 **Allocation Capabilities Profile**

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105

## Foreword

106 The Allocation Capabilities Profile (DSP1043) was prepared by the System Virtualization, Partitioning,  
107 and Clustering Work Group.

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

110

## Introduction

111 The information in this specification should be sufficient for a provider or consumer of this data to identify  
112 unambiguously the classes, properties, methods, and values that shall be instantiated and manipulated to  
113 represent and manage the allocation capabilities of host systems and resource pools modeled using the  
114 DMTF CIM core and extended model definitions.

115 The target audience for this specification is implementers who are writing CIM-based providers or  
116 consumers of management interfaces representing the component described in this document.

117

118

# Allocation Capabilities Profile

## 119 1 Scope

120 The *Allocation Capabilities Profile* extends the management capability of referencing profiles by adding  
121 the ability to represent the default, supported and range of property values for resource allocation  
122 requests for a given resource, and the mutability of properties in a Resource Allocation Setting Data  
123 instance.

## 124 2 Normative References

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

### 128 2.1 Approved References

- 129 DMTF DSP0200, *CIM Operations over HTTP 1.2.0*  
130 DMTF DSP0004, *CIM Infrastructure Specification 2.3.0*  
131 DMTF DSP1000, *Management Profile Specification Template*  
132 DMTF DSP1001, *Management Profile Specification Usage Guide*

### 133 2.2 References Under Development

- 134 DMTF DSP1041, *Resource Allocation Profile*

### 135 2.3 Other References

- 136 ISO/IEC Directives, Part 2, *Rules for the structure and drafting of International Standards*,  
137 <http://isotc.iso.org>  
138 "Augmented BNF for Syntax Specifications", IETF RFC 2234, 1997, <http://www.ietf.org/rfc/rfc2234.txt>  
139 Unified Modeling Language (UML) from the Open Management Group (OMG), <http://www.uml.org>  
140 *WBEM URI Mapping Specification*, <http://www.dmtf.org/standards/wbem/DSP0207.pdf>

## 141 3 Terms and Definitions

142 For the purposes of this document, the following terms and definitions apply. For the purposes of this  
143 document, the terms and definitions in DSP1001 also apply.

### 144 3.1

#### 145 **can**

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

## Allocation Capabilities Profile

- 147 **3.2**  
148 **cannot**  
149 used for statements of possibility and capability, whether material, physical, or causal
- 150 **3.3**  
151 **conditional**  
152 indicates requirements to be followed strictly in order to conform to the document if the specified  
153 conditions are met
- 154 **3.4**  
155 **mandatory**  
156 indicates requirements to be followed strictly in order to conform to the document and from which no  
157 deviation is permitted
- 158 **3.5**  
159 **may**  
160 indicates a course of action permissible within the limits of the document
- 161 **3.6**  
162 **need not**  
163 indicates a course of action permissible within the limits of the document
- 164 **3.7**  
165 **optional**  
166 indicates a course of action permissible within the limits of the document
- 167 **3.8**  
168 **referencing profile**  
169 indicates a profile that owns the definition of this class and can include a reference to this profile in its  
170 "Referenced Profiles" table
- 171 **3.9**  
172 **shall**  
173 indicates requirements to be followed strictly in order to conform to the document and from which no  
174 deviation is permitted
- 175 **3.10**  
176 **shall not**  
177 indicates requirements to be followed strictly in order to conform to the document and from which no  
178 deviation is permitted
- 179 **3.11**  
180 **should**  
181 indicates that among several possibilities, one is recommended as particularly suitable, without  
182 mentioning or excluding others, or that a certain course of action is preferred but not necessarily required
- 183 **3.12**  
184 **should not**  
185 indicates that a certain possibility or course of action is deprecated but not prohibited

- 186 **3.13**  
187 **unspecified**  
188 indicates that this profile does not define any constraints for the referenced CIM element or operation
- 189 **3.14**  
190 **host system**  
191 the scoping computer system in a virtualization environment that contains computing resources or system  
192 devices that are capable of being virtualized
- 193 **3.15**  
194 **virtual system**  
195 a virtualized computer system that is composed of partitioned or virtualized computing resources and  
196 system devices. Other common industry terms for such a system include virtual machine, hosted  
197 computer, child partition, logical partition, domain, guest, and container. In some virtualization  
198 environments, a Virtual system may act as the host system to other nested virtual systems, for example, a  
199 logically partitioned system in which each partition runs an instance of a hypervisor.
- 200 **3.16**  
201 **host resource**  
202 system devices or computing resources contained by the host system that may be utilized — either  
203 exclusively or shared — through the virtualization platform to provide resources to a virtual system
- 204 **3.17**  
205 **virtual resource**  
206 system devices or computing resources that are given or allocated by the virtualization platform to the  
207 virtual system. virtual resources are typically represented using the same CIM class as their respective  
208 host resource.
- 209 **3.18**  
210 **resource type**  
211 a generic type that can be used to categorize classes of host resources or virtualized host resources, for  
212 example, processor, memory, network adapter, and so on
- 213 **3.19**  
214 **resource pool**  
215 an abstract entity exposed by the Virtualization Platform for the purpose of allocation and assignment of  
216 Virtual Resources to Virtual Systems. In the case where host resources of the same resource type can be  
217 meaningfully separated, multiple mutually exclusive resource pools may exist.
- 218 **3.20**  
219 **current setting data**  
220 the virtual setting data associated with the current allocation state of a virtual resource or system.
- 221 **3.21**  
222 **capability set**  
223 a set of instances of class CIM\_SettingData associated with the association  
224 CIM\_SettingsDefineCapabilities to a CIM\_Capabilities instance, and the associated CIM\_Capabilities  
225 instance.
- 226

227 **4 Symbols and Abbreviated Terms**

228 **4.1**

229 **CIM**

230 Common Information Model

231 **4.2**

232 **CPU**

233 Central Processing Unit

234 **5 Synopsis**

235 **Profile Name:** *Allocation Capabilities Profile*

236 **Version:** 1.0.0

237 **Organization:** DMTF

238 **CIM schema version:** 2.15

239 **Central Class:** CIM\_AllocationCapabilities

240 **Scoping Class:** CIM\_System

241  
242 This abstract profile specification shall not be directly implemented; implementation shall be based on a  
243 profile specification for the capabilities of a resource pool or virtualization system for a specific class of  
244 resources, such as CPU and system memory. The scoping association paths between the central class  
245 and the scoping class shall be specified by the incorporating concrete profiles.

246

247

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

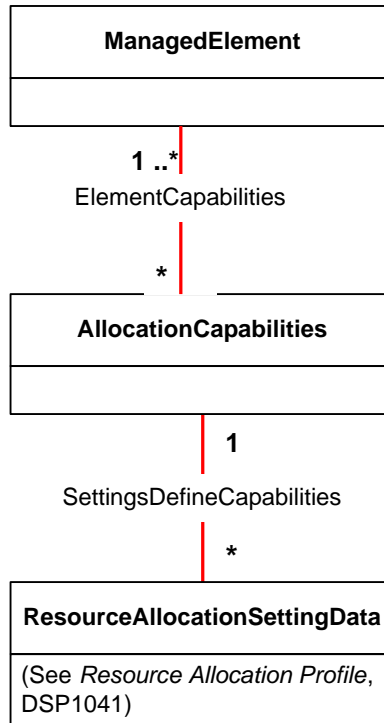
249 **Table 1 – Referenced Profiles**

Profile Name	Organization	Version	Relationship	Behavior
<i>Resource Allocation Profile</i>	DMTF	1.0	Mandatory	

250 **6 Description**

251 The *Allocation Capabilities Profile* is an abstract profile that describes the use of the class  
252 CIM\_AllocationCapabilities and the use of association CIM\_SettingsDefineCapabilities to a set of  
253 CIM\_ResourceAllocationSettingData instances to describe the default property values, supported  
254 property values, and range of property values for a resource allocation request.

255 Figure 1 represents the class schema for the *Allocation Capabilities Profile*. For simplicity, the prefix CIM\_  
256 has been removed from the names of the classes.



257

258

**Figure 1 – Allocation Capabilities Profile: Class Diagram**

259 The CIM\_ManagedElement class in Figure 1 represents a potential provider of resources such as a host  
 260 system (CIM\_ComputerSystem) or a resource pool (CIM\_ResourcePool), or the CIM\_ManagedElement  
 261 class represents an instance of CIM\_ResourceAllocationSettingData.

262 CIM\_ElementCapabilities associates the CIM\_AllocationCapabilities instance to a subclass of  
 263 CIM\_ManagedElement.

264 If a CIM\_AllocationCapabilities instance associated using the CIM\_ElementCapabilities association is  
 265 used to define the allocation capabilities of the managed element, the set of  
 266 CIM\_ResourceAllocationSettingData instances together with properties of the CIM\_AllocationCapabilities  
 267 instance defines a supported set of default property values, supported property values, and range of  
 268 supported property values required to form a valid allocation request for the resource type.

269 If a CIM\_AllocationCapabilities instance is associated using the CIM\_ElementCapabilities association to  
 270 an instance of CIM\_ResourceAllocationSettingData, the set of associated  
 271 CIM\_ResourceAllocationSettingData instances represents the supported changes or the range of valid  
 272 changes for the properties in the CIM\_ResourceAllocationSettingData instance.

273 CIM\_SettingsDefineCapabilities associates instances of CIM\_ResourceAllocationSettingData to a  
 274 CIM\_AllocationCapabilities instance and defines the type of capability the  
 275 CIM\_ResourceAllocationSettingData represents.

276 Note that the allocation capabilities do not reflect the current or dynamic state of any allocations. Rather  
 277 they define valid allocation requests or valid settings modifications supported by the host system or  
 278 resource pool without regard to the current availability of a host resource.

## Allocation Capabilities Profile

### 279 **6.1 CIM\_SettingsDefineCapabilities**

280 The CIM\_SettingsDefineCapabilities association indicates that the non-null, non-key set of properties of  
281 the component CIM\_ResourceAllocationSettingData instance specifies some capabilities of the  
282 associated CIM\_AllocationCapabilities instance. The interpretation of the set of properties in the  
283 associated CIM\_ResourceAllocationSettingData is governed by the CIM\_SettingsDefineCapabilities  
284 properties: PropertyPolicy, ValueRole, and ValueRange.

#### 285 **6.1.1 PropertyPolicy**

286 The CIM Schema description of this property applies.

287 PropertyPolicy defines whether or not the non-null, non-key properties of the associated  
288 CIM\_ResourceAllocationSettingData instance are treated independently or as a correlated set.

289 This profile assumes that the value of the PropertyPolicy property is 0 (“Independent”) if the ValueRange  
290 contains a value of 1 (“Minimums”), 2 (“Maximums”) or 3 (“Increments”). In these cases multiple instances  
291 of CIM\_AllocationCapabilities with independent sets of capabilities are used to express correlated sets of  
292 capabilities.

293 PropertyPolicy can be set to 0 (“Independent”) or 1 (“Correlated”) if the property ValueRange is set to  
294 “Point” to express the independence or the dependence of the set of properties in the associated  
295 CIM\_ResourceAllocationSettingData instance.

296

#### 297 **6.1.2 ValueRole**

298 The CIM Schema description of this property applies.

299 The possible values for the ValueRole property are as follows:

300 0 (“Default”) indicates that property values of the component CIM\_ResourceAllocationSettingData  
301 instance are the default values that are used if a new CIM\_ResourceAllocationSettingData instance is  
302 created for elements whose capabilities are defined by the associated CIM\_AllocationCapabilities  
303 instance.

304

305 4 (“Supported”) indicates that the component CIM\_ResourceAllocationSettingData instance represents a  
306 set of supported property values or the increments within a supported range of values.

307

#### 308 **6.1.3 ValueRange**

309 The CIM Schema description of this property applies.

310 The possible values for the ValueRange property are as follows:

- 311 • 0 (“Point”) indicates that the component CIM\_ResourceAllocationSettingData instance provides a  
312 single set of values.
- 313 • 1 (“Minimums”) indicates that this CIM\_ResourceAllocationSettingData instance provides minimum  
314 values for numeric properties with a linear range. Unless restricted by a “Maximums” value on the  
315 same set of properties, all values that collate higher than the specified values are also considered to  
316 be supported by the associated capabilities instance.
- 317 • 2 (“Maximums”) indicates that this CIM\_ResourceAllocationSettingData instance provides maximum  
318 values for numeric properties with a linear range. Unless restricted by a “Minimums” value on the

319 same set of properties, all values that collate lower than the specified values are also considered to  
 320 be supported by the associated capabilities instance.

- 321 • 3 (“Increments”) indicates that this CIM\_ResourceAllocationSettingData instance provides increment  
 322 values for numeric properties. These values represent the respective increment between the  
 323 maximum and minimum values of the supported numeric settings.

## 324 **7 Implementation**

325 This section details the requirements related to the arrangement of instances and properties of those  
 326 instances for implementations of this profile.

327 Each instance of CIM\_AllocationCapabilities shall be associated with one or more instances of  
 328 CIM\_ManagedElement through the CIM\_ElementCapabilities association class.

329 Each instance of CIM\_AllocationCapabilities shall be associated with zero or more instances of  
 330 CIM\_ResourceAllocationSettingData through the CIM\_SettingsDefineCapabilities association class. The  
 331 ResourceType property for each instance of CIM\_ResourceAllocationSettingData associated with an  
 332 instance of CIM\_AllocationCapabilities through the CIM\_SettingsDefineCapabilities association shall have  
 333 the same value as the ResourceType property of the CIM\_AllocationCapabilities instance.

334 If a CIM\_ResourceAllocationSettingData instance has an associated CIM\_AllocationCapabilities instance  
 335 to represent the mutability of its properties and no non-null values are found for a property in the instance  
 336 or instances of CIM\_ResourceAllocationSettingData associated to the CIM\_AllocationCapabilities  
 337 instance with the CIM\_SettingsDefineCapabilities association that property is not mutable.

338 If multiple CIM\_AllocationCapabilities instances are associated through the CIM\_ElementCapabilities  
 339 association class to a single instance of CIM\_ManagedElement, each instance of  
 340 CIM\_AllocationCapabilities and associated CIM\_ResourceAllocationSettingData instances shall define  
 341 one correlated set. A setting from one set shall not be combined with a setting from another set to define  
 342 a valid allocation request for a given resource.

### 343 **7.1 Default Class CIM\_AllocationCapabilities - Optional**

344 The default CIM\_AllocationCapabilities instance of a given resource type associated with a managed  
 345 element may be modeled. This section describes the behavioral requirements if a default  
 346 CIM\_AllocationCapabilities instance is modeled.

347 The CIM\_ElementCapabilities instance that associates the CIM\_AllocationCapabilities instance of a given  
 348 resource type to a managed element that represents a default CIM\_AllocationCapabilities instance shall  
 349 be implemented as specified in section 10.3. Each instance of CIM\_ManagedElement shall be referenced  
 350 by at most one instance of CIM\_ElementCapabilities as specified in section 10.3 for a given resource  
 351 type. This implies that at most a single default CIM\_AllocationCapabilities instance for a given resource  
 352 type may be associated to a managed element.

### 353 **7.2 Modeling Default Settings - Optional**

354 The default resource allocation settings for a CIM\_AllocationCapabilities instance associated with a  
 355 managed element may be modeled. This section describes the behavioral requirements if the default  
 356 allocation settings are modeled.

357 The CIM\_SettingsDefineCapabilities instance that associates the CIM\_ResourceAllocationSettingData  
 358 representing the default settings with the CIM\_AllocationCapabilities instance shall be implemented as  
 359 specified in section 10.5. Each instance of CIM\_AllocationCapabilities shall be referenced by at most one  
 360 instance of CIM\_SettingsDefineCapabilities implemented as specified in section 10.5. This implies that at  
 361 most a single default resource allocation settings exists and is modeled with a single instance of  
 362 CIM\_ResourceAllocationSettingData.

## Allocation Capabilities Profile

### 363 7.3 Modeling Minimum Settings - Optional

364 The minimum resource allocation settings for a CIM\_AllocationCapabilities instance associated with a  
365 managed element may be modeled. This section describes the behavioral requirements if the minimum  
366 allocation settings are modeled.

367 The CIM\_SettingsDefineCapabilities instance that associates the CIM\_ResourceAllocationSettingData  
368 representing the minimum settings with the CIM\_AllocationCapabilities instance shall be implemented as  
369 specified in section 10.6. Each instance of CIM\_AllocationCapabilities shall be referenced by at most one  
370 instance of CIM\_SettingsDefineCapabilities implemented as specified in section 10.6. This implies that at  
371 most a single minimum resource allocation settings exists and is modeled with a single instance of  
372 CIM\_ResourceAllocationSettingData.

### 373 7.4 Modeling Maximum Settings - Optional

374 The maximum resource allocation settings for a CIM\_AllocationCapabilities instance associated with a  
375 managed element may be modeled. This section describes the behavioral requirements if the maximum  
376 allocation settings are modeled.

377 The CIM\_SettingsDefineCapabilities instance that associates the CIM\_ResourceAllocationSettingData  
378 representing the maximum settings with the CIM\_AllocationCapabilities instance shall be implemented as  
379 specified in section 10.7. Each instance of CIM\_AllocationCapabilities shall be referenced by at most one  
380 instance of CIM\_SettingsDefineCapabilities implemented as specified in section 10.7. This implies that at  
381 most a single maximum resource allocation settings exists and is modeled with a single instance of  
382 CIM\_ResourceAllocationSettingData.

### 383 7.5 Modeling Increment Settings - Optional

384 The increment resource allocation settings for a CIM\_AllocationCapabilities instance associated with a  
385 managed element may be modeled. This section describes the behavioral requirements if the increment  
386 allocation settings are modeled.

387 The CIM\_SettingsDefineCapabilities instance that associates the CIM\_ResourceAllocationSettingData  
388 representing the increment settings with the CIM\_AllocationCapabilities instance shall be implemented as  
389 specified in section 10.8. Each instance of CIM\_AllocationCapabilities shall be referenced by at most one  
390 instance of CIM\_SettingsDefineCapabilities implemented as specified in section 10.8. This implies that at  
391 most a single increment resource allocation settings exists and is modeled with a single instance of  
392 CIM\_ResourceAllocationSettingData.

### 393 7.6 Modeling Supported Point Settings - Optional

394 The supported point resource allocation settings for a CIM\_AllocationCapabilities instance associated  
395 with a managed element may be modeled. This section describes the behavioral requirements if the  
396 supported allocation settings for a managed element are modeled.

397 The CIM\_SettingsDefineCapabilities instance that associated the CIM\_ResourceAllocationSettingData  
398 representing the supported point settings with the CIM\_AllocationCapabilities instance shall be  
399 implemented as specified in section 10.9.

400

## 401 8 Methods

402 This section details the requirements for supporting intrinsic operations for the CIM elements defined by  
403 this profile. This profile does not specify requirements for any extrinsic methods.

## 404 8.1 Profile Conventions for Operations

405 Support for operations for each profile class (including associations) is specified in the following  
 406 subclauses. Each subclause includes either the statement “All operations in the default list in section 8.1  
 407 are supported as described by DSP0200 v1.2” or a table listing all of the operations that are not  
 408 supported by this profile or where the profile requires behavior other than that described by DSP0200.

409 The default list of operations is as follows:

- 410 • GetInstance
- 411 • Associators
- 412 • AssociatorNames
- 413 • References
- 414 • ReferenceNames
- 415 • EnumerateInstances
- 416 • EnumerateInstanceNames

417 A compliant implementation shall support all of the operations in the default list for each class, unless the  
 418 “Requirements” column states something other than Mandatory.

## 419 8.2 CIM\_AllocationCapabilities

420 All operations from the default list are supported as described by DSP0200 v1.2.

## 421 8.3 CIM\_ResourceAllocationSettingData

422 All operations from the default list are supported as described by DSP0200 v1.2.

## 423 8.4 CIM\_SettingsDefineCapabilities

424 Table 2 lists operations that either have special requirements beyond those from DSP0200 v1.2 or shall  
 425 not be supported.

426 **Table 2 – Operations: CIM\_SettingsDefineCapabilities**

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

## Allocation Capabilities Profile

### 427 8.5 CIM\_ElementCapabilities

428 Table 3 lists operations that either have special requirements beyond those from DSP0200 v1.2 or shall  
429 not be supported.

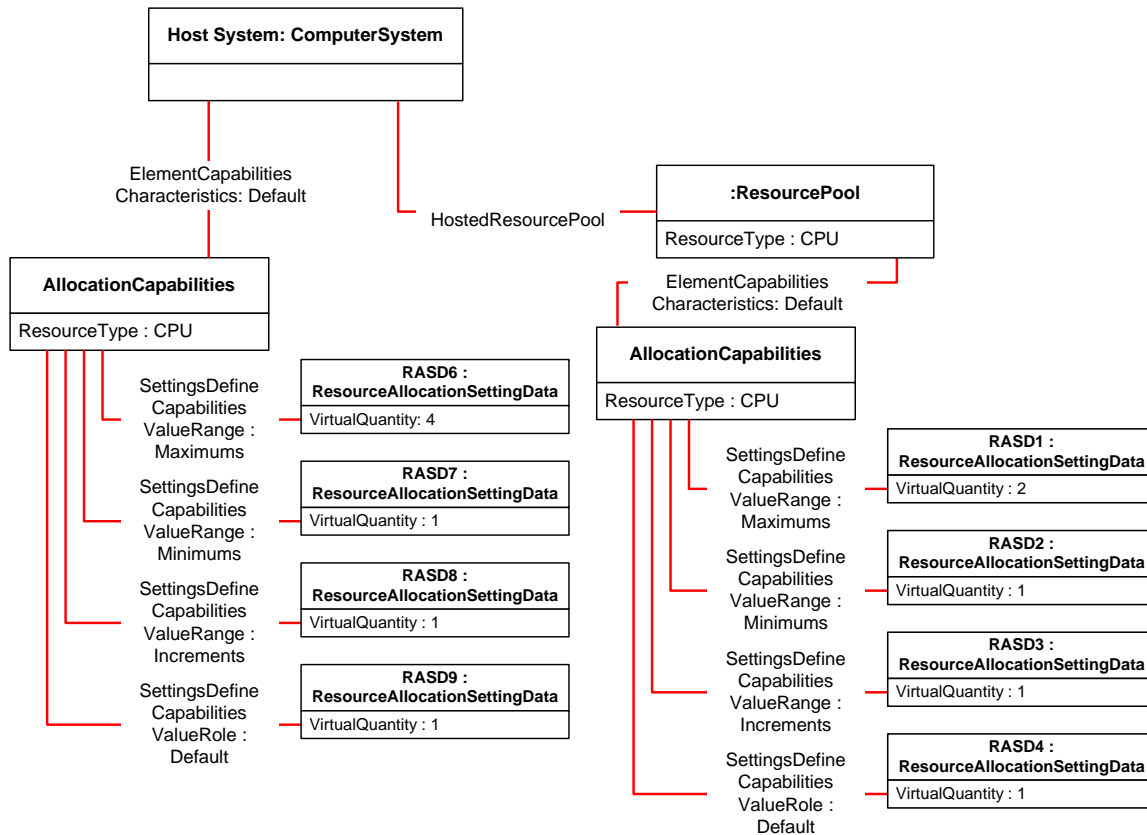
430 **Table 3 – Operations: CIM\_ElementCapabilities**

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

### 431 9 Use Cases

432 This section contains object diagrams and use cases for the DMTF Allocation Capabilities Profile. Use  
433 cases are informative and are not intended to define the requirements for conformance.

434 CIM\_AllocationCapabilities and its associated set of CIM\_ResourceAllocationSettingData instances  
435 define the allocation capability for a given resource type of a host system or resource pool, or describes  
436 the mutability and the valid ranges for change of a CIM\_ResourceAllocationSettingData instance. Figure  
437 2 demonstrates uses of CIM\_AllocationCapabilities to represent the allocation capabilities of a  
438 virtualization system and one resource pool within the virtualization system. Figure 3 demonstrates the  
439 use of CIM\_AllocationCapabilities to represent the mutability of a property within an associated Current  
440 CIM\_ResourceAllocationSettingData.



441

442 **Figure 2 – Allocation Capabilities Associated to CIM\_ComputerSystem and CIM\_ResourcePool**

443 **9.1 Associating CIM\_AllocationCapabilities with a Host System**

444 The CIM\_AllocationCapabilities instance associated to the host system defines the allocation capabilities  
 445 of the host system for a resource type. In Figure 2 the host system is capable of accepting allocation  
 446 requests for systems with up to 4 CPUs and a minimum of one CPU or if no value for CPU VirtualQuantity  
 447 is specified in an allocation request the default value of 1 is used.

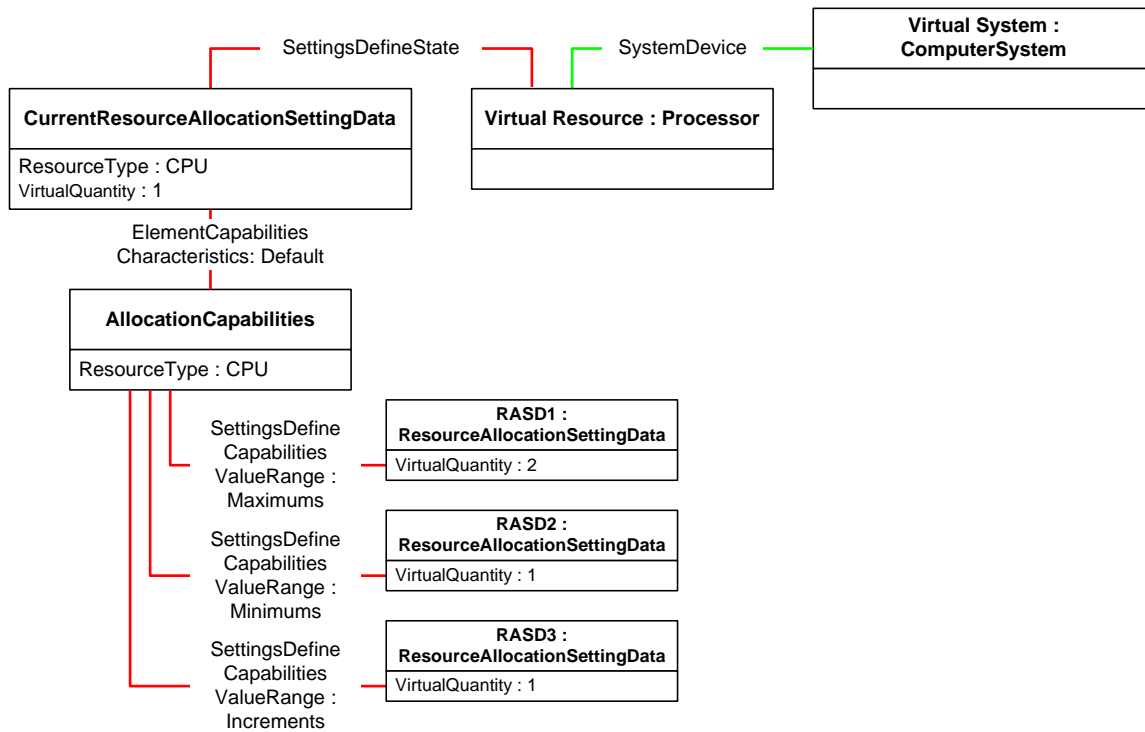
448 **9.2 Associating CIM\_AllocationCapabilities with a Resource Pool**

449 The CIM\_AllocationCapabilities instance associated to the resource pool defines the allocation  
 450 capabilities of the resource pool. This usage allows a host system to present the capabilities of multiple  
 451 resource pools for a resource type. As illustrated in Figure 2, the capability set for this specific CPU  
 452 resource pool subsets the overall capabilities of the virtualization system. The specific resource pool  
 453 instance in the figure limits the maximum CPUs in a virtual system to two.

454 **9.3 Associating CIM\_AllocationCapabilities with a  
 455 CIM\_ResourceAllocationSettingData Instance**

456 As shown in Figure 3, the instance of CIM\_AllocationCapabilities that is associated to the current  
 457 CIM\_ResourceAllocationSettingData instances specifies the mutability of the VirtualQuantity property in  
 458 the associated Current CIM\_ResourceAllocationSettingData instance. Figure 3 shows a capability set of a  
 459 current CIM\_ResourceAllocationSettingData associated to a single instance of CIM\_Processor. This  
 460 specifies that the VirtualQuantity property in the Current CIM\_ResourceAllocationSettingData can be  
 461 changed from 1 to 2.

## Allocation Capabilities Profile



462

463

**Figure 3 – Allocation Capabilities Associated to CIM\_ResourceAllocationSettingData**

464

## 9.4 Associating Multiple CIM\_AllocationCapabilities with One Resource Pool Instance

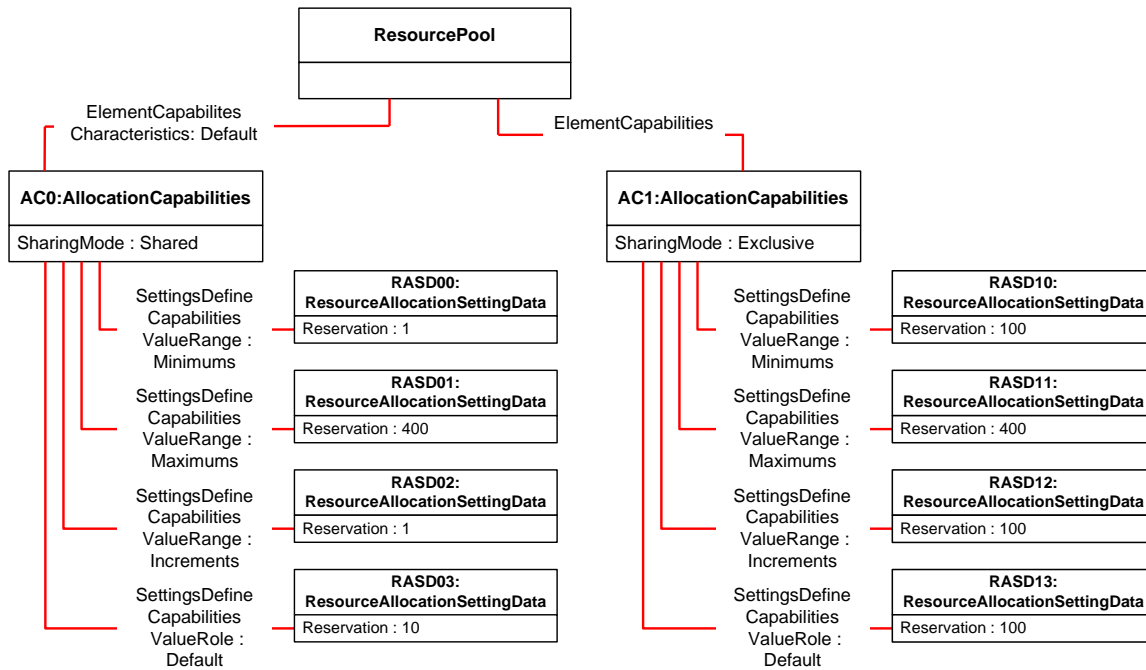
465

466 Figure 4 shows an example in which multiple capability sets are used to express multiple capabilities of a  
 467 single resource pool. This example shows a system that allows either shared or exclusive access of a  
 468 resource. Based on the type of allocation selected the Default, Minimum and Increment  
 469 CIM\_ResourceAllocationSettingData instances reflect different property values. Each capability set  
 470 defines one correlated set. A setting from one set may not be combined with a setting from another set to  
 471 form a valid allocation request for a given resource.

472 While this example is based on the SharingMode property in CIM\_AllocationCapabilities, other  
 473 possibilities exist. For example, different capability sets may be based on the AllocationUnits property in  
 474 CIM\_ResourceAllocationSettingData.

475 The property CIM\_ElementCapabilities.Characteristics set to 2 (“Default”) shows that the  
 476 CIM\_AllocationCapabilities instance AC0 represents the default capability set for this resource pool.

477 This same pattern applies to capability sets associated with a host system or  
 478 CIM\_ResourceAllocationSettingData, as well as to the example shown in Figure 4.



479

480

Figure 4 – Multiple CIM\_AllocationCapabilities Instances

481 **9.5 Discovering a Host System’s Allocation Capability for a Given Resource**  
 482 **Type**

483 The client can enumerate the CIM\_AllocationCapabilities instances associated to the target  
 484 CIM\_ComputerSystem (host system) with the CIM\_ElementCapabilities association, filtering on the  
 485 CIM\_AllocationCapabilities.ResourceType property to select only the CIM\_AllocationCapabilities  
 486 instances of the desired resource type.

487 **9.6 Discovering the Allocation Capability for a Given Resource Type for a**  
 488 **Specific Resource Pool**

489 The client enumerates the CIM\_ResourcePool instances by filtering on the  
 490 CIM\_ResourcePool.ResourceType property to select only the CIM\_ResourcePool instances of the  
 491 desired resource type. For each of the target instances of CIM\_ResourcePool select all of the instances  
 492 of CIM\_AllocationCapabilities associated with the CIM\_ElementCapabilities association.

493 **9.7 Determining the Default instance of CIM\_AllocationCapabilities for a Given**  
 494 **Resource Type**

495 From the selected CIM\_AllocationCapabilities instance(s) (see sections 9.5 and 9.6) the client selects the  
 496 CIM\_AllocationCapabilities instance associated through the CIM\_ElementCapabilities association where  
 497 the value of the CIM\_ElementCapabilities.Characteristics property is 2 (“Default”).

## Allocation Capabilities Profile

### 498 **9.8 Determining the Default, Supported Point and Valid Ranges of Property** 499 **Values Representing the Allocation Capability from a Selected Instance of** 500 **CIM\_AllocationCapabilities**

501 The client finds the CIM\_ResourceAllocationSettingData instance associated with a selected instance of  
502 CIM\_AllocationCapabilities (see sections 9.5 and 9.6) through the CIM\_SettingsDefineCapabilities  
503 association where the value of the CIM\_SettingsDefineCapabilities.ValueRole property is 0 (“Default”).  
504 The values within the selected CIM\_ResourceAllocationSettingData instance represent the default values  
505 for the host system or the selected resource pool. A null value specifies that the property is not relevant  
506 for the resource type.

507 After determining that there is a non-null default property value, the client finds the  
508 CIM\_ResourceAllocationSettingData instances associated with a selected instance of  
509 CIM\_AllocationCapabilities (see sections 9.5 and 9.6) through the CIM\_SettingsDefineCapabilities  
510 association where the value of the CIM\_SettingsDefineCapabilities.ValueRole property is 3 (“Supported”)  
511 and the value of the CIM\_SettingsDefineCapabilities.ValueRange property is 0 (“Point”). The set of non-  
512 null values for a given property within the selected set of CIM\_ResourceAllocationSettingData represents  
513 supported values for that property.

514 For numeric properties the client finds the CIM\_ResourceAllocationSettingData instances associated with  
515 a selected instance of CIM\_AllocationCapabilities (see sections 9.5 and 9.6) through the  
516 CIM\_SettingsDefineCapabilities associations where the value of the  
517 CIM\_SettingsDefineCapabilities.ValueRole property is 1 (“Minimums”), 2 (“Maximums”), or 3  
518 (“Increments”). The minimum and maximum values define the range of valid parameters. The increment  
519 values describe the valid steps within a specified range. Each of these instances represents a limitation  
520 on the range of supported values. For example, if a property has a minimum value but no maximum value  
521 specified, the maximum is not limited. If the property has a maximum value but no minimum value there is  
522 no minimum value.

### 523 **9.9 Discovering the Supported Changes of a Property Value in an Instance of a** 524 **CIM\_ResourceAllocationSettingData**

525 The client enumerates the set of CIM\_AllocationCapabilities instances associated with the association  
526 CIM\_ElementCapabilities to the target CIM\_ResourceAllocationSettingData instance.

527 The client finds the CIM\_ResourceAllocationSettingData instance associated with a selected instance of  
528 CIM\_AllocationCapabilities through the CIM\_SettingsDefineCapabilities association where the value of  
529 the CIM\_SettingsDefineCapabilities.ValueRole property is 3 (“Supported”) and the value of the  
530 ValueRange property is 0 (“Point”). The set of non-null values for a given property within the selected set  
531 of CIM\_ResourceAllocationSettingData represents supported point values for that property.

532 For numeric properties the client finds the CIM\_ResourceAllocationSettingData instances associated with  
533 a selected instance of CIM\_AllocationCapabilities through the CIM\_SettingsDefineCapabilities  
534 associations where the value of the CIM\_SettingsDefineCapabilities.ValueRole property is 1  
535 (“Minimums”), 2 (“Maximums”), or 3 (“Increments”). The minimum and maximum values define a range of  
536 supported values for numeric properties. The increments value describes the valid steps within a  
537 specified range. Each of these instances represents a limitation on the range of supported values. For  
538 example, if a property has a minimum value but no maximum value specified, the maximum is not limited.  
539 If the property has a maximum value but no minimum value specified, the minimum is not constrained.

## 540 **10 CIM Elements**

541 Table 4 shows the instances of CIM Elements for this profile. Instances of the CIM Elements shall be  
542 implemented as described in Table 4. Sections 7 (“Implementation”) and 8 (“Methods”) may impose  
543 additional requirements on these elements.

544

**Table 4 – CIM Elements: Allocation Capabilities Profile**

Element Name	Requirement	Description
<b>Classes</b>		
CIM_AllocationCapabilities	Mandatory	See section 10.1.
CIM_ElementCapabilities	Mandatory	See section 10.2.
CIM_SettingsDefineCapabilities	Mandatory	See sections 10.3, 10.5, 10.6, 10.7, 10.8, and 10.9
<b>Indications</b>		
None defined in this profile		

## 545 10.1 CIM\_AllocationCapabilities

546 CIM\_AllocationCapabilities represents the allocation capabilities of a host system or resource pool or  
 547 represents the mutability a CIM\_ResourceAllocationSettingData instance.

548 Table 5 provides information about the properties of CIM\_AllocationCapabilities.

549

**Table 5 – Class: CIM\_AllocationCapabilities**

Elements	Requirement	Notes
InstanceID	Mandatory	<b>Key</b>
ResourceType	Mandatory	None
OtherResourceType	Conditional	Shall be used if ResourceType matches 1 ("Other")
RequestTypesSupported	Mandatory	None
SharingMode	Mandatory	None
SupportedAddStates	Optional	None
SupportedRemoveStates	Optional	None

## 550 10.2 CIM\_ElementCapabilities

551 CIM\_ElementCapabilities associates an instance of CIM\_AllocationCapabilities with a subclass of  
 552 CIM\_ManagedElement assumed to be CIM\_System, CIM\_ResourcePool, or  
 553 CIM\_ResourceAllocationSettingData.

554 Table 6 defines the properties of CIM\_ElementCapabilities.

555

**Table 6 – Class: CIM\_ElementCapabilities**

Properties	Requirement	Notes
ManagedElement	Mandatory	<b>Key</b> Cardinality 1..*
Capabilities	Mandatory	<b>Key</b> shall be a reference to the CIM_AllocationCapabilities instance. Cardinality *
Characteristics	Mandatory	

## Allocation Capabilities Profile

### 556 10.3 CIM\_ElementCapabilities — Default

557 CIM\_ElementCapabilities associates an instance of CIM\_AllocationCapabilities with a subclass of  
558 CIM\_ManagedElement assumed to be CIM\_System, CIM\_ResourcePool, or  
559 CIM\_ResourceAllocationSettingData representing the default capabilities.

560 Table 6 defines the properties of CIM\_ElementCapabilities.

561 **Table 7 – Class: CIM\_ElementCapabilities (Default)**

Properties	Requirement	Notes
ManagedElement	Mandatory	<b>Key</b> Cardinality 1
Capabilities	Mandatory	<b>Key</b> shall be a reference to a default CIM_AllocationCapabilities instance Cardinality 1
Characteristics	Mandatory	<b>Matches 2 “Default”</b>

### 562 10.4 CIM\_SettingsDefineCapabilities

563 CIM\_SettingsDefineCapabilities associates a CIM\_ResourceAllocationSettingData instance, representing  
564 the settable or mutable allocation settings for a resource, with a CIM\_AllocationCapabilities instance.

565 Table 8 provides information about the properties of CIM\_SettingsDefineCapabilities.

566 **Table 8 – Class: CIM\_SettingsDefineCapabilities**

Elements	Requirement	Notes
GroupComponent	Mandatory	Shall be a reference to an instance of CIM_AllocationCapabilities Cardinality 1
PartComponent	Mandatory	Shall be a reference to an instance of CIM_ResourceAllocationSettingData Cardinality 1..*
PropertyPolicy	Mandatory	
ValueRole	Mandatory	
ValueRange	Mandatory	

### 567 10.5 CIM\_SettingsDefineCapabilities — Default

568 CIM\_SettingsDefineCapabilities associates a CIM\_ResourceAllocationSettingData instance, representing  
569 default allocation settings for a resource, with a CIM\_AllocationCapabilities instance.

570 Table 9 provides information about the properties of CIM\_SettingsDefineCapabilities (Default).

571

**Table 9 – Class: CIM\_SettingsDefineCapabilities (Default)**

Elements	Requirement	Notes
GroupComponent	Mandatory	Shall be a reference to an instance of CIM_AllocationCapabilities Cardinality 1
PartComponent	Mandatory	Shall be a reference to an instance of CIM_ResourceAllocationSettingData Cardinality 1
PropertyPolicy	Mandatory	Matches 0 (“Independent”)
ValueRole	Mandatory	Matches 0 (“Default”)
ValueRange	Mandatory	Matches 0 (“Point”)

**572 10.6 CIM\_SettingsDefineCapabilities — Minimums**

573 CIM\_SettingsDefineCapabilities associates a CIM\_ResourceAllocationSettingData instance representing  
574 the minimum values of valid numeric settings to a CIM\_AllocationCapabilities instance.

575 Table 10 provides information about the properties of CIM\_SettingsDefineCapabilities (Minimums).

576

**Table 10 – Class: CIM\_SettingsDefineCapabilities (Minimums)**

Elements	Requirement	Notes
GroupComponent	Mandatory	Shall be a reference to an instance of CIM_AllocationCapabilities Cardinality 1
PartComponent	Mandatory	Shall be a reference to an instance of CIM_ResourceAllocationSettingData Cardinality 1
PropertyPolicy	Mandatory	Matches 0 (“Independent”)
ValueRole	Mandatory	Matches 3 (“Supported”)
ValueRange	Mandatory	Matches 1 (“Minimums”)

## Allocation Capabilities Profile

### 577 10.7 CIM\_SettingsDefineCapabilities — Maximums

578 CIM\_SettingsDefineCapabilities associates a CIM\_ResourceAllocationSettingData instance representing  
579 the maximum values of valid numeric settings to a CIM\_AllocationCapabilities instance.

580 Table 11 provides information about the properties of CIM\_SettingsDefineCapabilities (Maximums).

581 **Table 11 – Class: CIM\_SettingsDefineCapabilities (Maximums)**

Elements	Requirement	Notes
GroupComponent	Mandatory	Shall be a reference to an instance of CIM_AllocationCapabilities Cardinality 1
PartComponent	Mandatory	Shall be a reference to an instance of CIM_ResourceAllocationSettingData Cardinality 1
PropertyPolicy	Mandatory	Matches 0 (“Independent”)
ValueRole	Mandatory	Matches 3 (“Supported”)
ValueRange	Mandatory	Matches 2 (“Maximums”)

### 582 10.8 CIM\_SettingsDefineCapabilities — Increments

583 CIM\_SettingsDefineCapabilities associates a CIM\_ResourceAllocationSettingData instance, representing  
584 the increment between the maximum and minimum values of supported numeric settings, to a  
585 CIM\_AllocationCapabilities instance.

586 Table 12 provides information about the properties of CIM\_SettingsDefineCapabilities (Increments).

587 **Table 12 – Class: CIM\_SettingsDefineCapabilities (Increments)**

Elements	Requirement	Notes
GroupComponent	Mandatory	Shall be a reference to an instance of CIM_AllocationCapabilities Cardinality 1
PartComponent	Mandatory	Shall be a reference to an instance of CIM_ResourceAllocationSettingData Cardinality 1
PropertyPolicy	Mandatory	Matches 0 (“Independent”)
ValueRole	Mandatory	Matches 3 (“Supported”)
ValueRange	Mandatory	Matches 3 “Increments”

588

### 589 10.9 CIM\_SettingsDefineCapabilities — Supported Point

590 CIM\_SettingsDefineCapabilities associates a CIM\_ResourceAllocationSettingData instance, representing  
591 the settable or mutable allocation settings for a resource, with a CIM\_AllocationCapabilities instance.

592 Table 13 provides information about the properties of CIM\_SettingsDefineCapabilities (Independent  
593 Supported Point).

594

**Table 13 – Class: CIM\_SettingsDefineCapabilities (Independent Supported Point)**

Elements	Requirement	Notes
GroupComponent	Mandatory	Shall be a reference to an instance of CIM_AllocationCapabilities Cardinality 1
PartComponent	Mandatory	Shall be a reference to an instance of CIM_ResourceAllocationSettingData Cardinality 1..*
PropertyPolicy	Mandatory	Matches 0 1 (“Independent” or “Correlated”)
ValueRole	Mandatory	Matches 3 (“Supported”)
ValueRange	Mandatory	Matches 0 (“Point”)

595

596

597

**ANNEX A**  
(informative)

598  
599  
600  
601  
602

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