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Information technology — Virtualization Management Specification

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CONTENTS

Foreword ... ix
Introduction ... 1
1 Scope ... 3
1.1 Resource Allocation Profile ... 3
1.2 System Virtualization Profile ... 3
1.3 Allocation Capabilities Profile ... 3
1.4 Processor Resource Virtualization Profile ... 3
1.5 Memory Resource Virtualization Profile ... 3
1.6 Storage Resource Virtualization Profile ... 3
1.7 Ethernet Port Resource Virtualization Profile ... 3
1.8 Virtual System Profile ... 3
1.9 Generic Device Resource Virtualization Profile ... 3
1.10 Virtual Ethernet Switch Profile ... 4
2 Normative references ... 4
3 Terms and definitions ... 5
4 Symbols and abbreviated terms ... 12
5 Resource Allocation Profile ... 14
5.1 Description ... 14
5.2 Implementation ... 18
5.3 Methods ... 27
5.4 Use cases ... 35
5.5 CIM elements ... 40
6 System Virtualization Profile ... 52
6.1 Description ... 52
6.2 Implementation ... 59
6.3 Methods ... 67
6.4 Use cases ... 84
6.5 CIM elements ... 110
7 Allocation Capabilities Profile ... 126
7.1 Description ... 126
7.2 Implementation ... 129
7.3 Methods ... 130
7.4 Use cases ... 134
7.5 CIM elements ... 139
8 Processor Resource Virtualization Profile ... 144
8.1 Description ... 144
8.2 Implementation ... 149
8.3 Methods ... 157
8.4 Use cases ... 158
8.5 CIM elements ... 168
9 Memory Resource Virtualization Profile ... 178
9.1 Description (informative) ... 178
9.2 Implementation ... 186
9.3 Methods ... 198
9.4 Use cases (informative) ... 198
9.5 CIM elements ... 207
10 Storage Resource Virtualization Profile ... 221
10.1 Description ... 222
10.2 Implementation ... 234
10.3 Methods ... 251
10.4 Use cases ... 253
10.5 CIM Elements ... 270
11 Ethernet Port Resource Virtualization Profile ... 282
11.1 Description ... 282
11.2 Implementation ... 291
11.3 Methods ... 303

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Documents
Document Sharing Hub
Full document details: BS ISO/IEC 19099:2014

11.4 Use cases 304
11.5 CIM elements 318
12 Virtual System Profile 341
12.1 Description 341
12.2 Implementation 350
12.3 Methods 360
12.4 Use-cases 363
12.5 CIM elements 374
13 Generic Device Resource Virtualization Profile 381
13.1 Description 381
13.2 Implementation 383
13.3 Methods 383
13.4 Use cases 383
13.5 CIM elements 388
14 Virtual Ethernet Switch Profile 390
14.1 Description 390
14.2 Implementation 394
14.3 Methods 395
14.4 Use cases 397
14.5 CIM elements 400
Annex A (Informative) Virtual system modeling — background information 407
A.1 Concepts: Model, view, controller 407
A.2 Aspect-oriented modeling approach 407
A.3 Presence of model information 408
A.4 Model extension through settings 409
Annex B (Informative) Implementation details 410
B.1 Dual-configuration implementation approach 410
B.2 Single-configuration implementation approach 413

Figures

Figure 1 – Resource Allocation Profile: Class Diagram 15
Figure 2 – Abstract instance diagram: Concrete resource pool 35
Figure 3 – Abstract instance diagram: Primordial pool with backed resources 36
Figure 4 – Abstract instance diagram: Primordial pool without backed resources 36
Figure 5 – Resource pool hierarchy instance diagram 37
Figure 6 – Simple resource allocation 38
Figure 7 – Profiles related to system virtualization 54
Figure 8 – System Virtualization Profile: Class diagram 56
Figure 9 – System Virtualization Profile instance diagram: Discovery, localization, and inspection 86
Figure 10 – Virtual system configuration based on input virtual system configurations and implementation defaults 98
Figure 11 – Virtual system resource modification 102
Figure 12 – System Virtualization Profile: Snapshot example 105
Figure 13 – Allocation Capabilities Profile: Class diagram 127
Figure 14 – Allocation capabilities associated to CIM_ComputerSystem and CIM_ResourcePool 135
Figure 15 – Allocation capabilities associated to CIM_ResourceAllocationSettingData 136
Figure 16 – Multiple CIM_AllocationCapabilities instances 137
Figure 17 – Processor Resource Virtualization Profile: Class Diagram 145
Figure 18 – Processor Resource Virtualization Profile: Instance diagram 159
Figure 19 – Defined state 160
Figure 20 – Active state 161
Figure 21 – CIM_ModifyResourceSettings – Before 163
Figure 22 – RASD to Modify Resources 164

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Full document details: BS ISO/IEC 19099:2014

Figure 23 – CIM_ModifyResourceSettings – After 165
Figure 24 – CIM_AddResourceSettings – Before 166
Figure 25 – RASD to add processor 167
Figure 26 – CIM_AddResourceSettings – After 168
Figure 27 – Memory Resource Virtualization Profile: Profile class diagram 179
Figure 28 – Instance Diagram: Concept of memory resource pool hierarchies 181
Figure 29 – Instance Diagram: Concept of memory resource allocation 183
Figure 30 – Instance Diagram: Memory composition 185
Figure 31 – Instance Diagram: Example CIM representation of memory resource virtualization 200
Figure 32 – Storage Resource Virtualization Profile: Profile class diagram 223
Figure 33 – Instance diagram: Concept of storage resource pool hierarchies 227
Figure 34 – Instance diagram: Concept of storage resource allocation 230
Figure 35 – Cooperation of DMTF SVPC and SNIA SMI-S profiles 233
Figure 36 – Instance diagram: Example CIM representation of storage resource virtualization 254
Figure 37 – Create virtual disk with implicit file creation 263
Figure 38 – Create virtual disk with pre-existing file 265
Figure 39 – Create dedicated virtual disk 267
Figure 40 – Create virtual delta disk and file 269
Figure 41 – Ethernet Port Resource Virtualization: Profile class diagram 283
Figure 42 – Virtual ethernet switch port allocation 287
Figure 43 – Instance Diagram: Ethernet adapter and Ethernet connection resource allocations 289
Figure 44 – Ethernet switch port and Ethernet connection resource pools 306
Figure 45 – Static Ethernet switch port allocation to a virtual Ethernet switch 308
Figure 46 – Ethernet adapter connection to static switch port 310
Figure 47 – Dynamic Ethernet switch port connection capabilities 313
Figure 48 – Dynamic Ethernet switch port allocation 314
Figure 49 – Allocation capabilities for simple Ethernet connection 315
Figure 50 – Simple connection of virtual machine to Ethernet switch 316
Figure 51 – Profiles related to system virtualization 343
Figure 52 – Virtual System Profile: Class diagram 344
Figure 53 – Virtual system states 349
Figure 54 – Virtual system representation and virtual system configuration 354
Figure 55 – Sample virtual system configuration 365
Figure 56 – Sample virtual system in "active" state 367
Figure 57 – Instance diagram: Profile conformance of scoped resources 368
Figure 58 – Generic Device Resource Virtualization: Class diagram 382
Figure 59 – Simple virtual device allocation 384
Figure 60 – Profile registration using central class 385
Figure 61 – Profile registration using scoping class 386
Figure 62 – Determining resource capabilities 387
Figure 63 – DMTF Management profiles related to the virtual Ethernet switch 392
Figure 64 – Virtual Ethernet Switch Profile: Class Diagram 393
Figure 65 – Basic example of virtual Ethernet switch 398
Figure A-1 – State-dependent presence of model elements 408
Figure B-2 – Sample virtual system in a state other than "defined" (Dual-configuration approach) 412
Figure B-3 – Sample virtual system in the "defined" state (Single-configuration approach) 414
Figure B-4 – Sample virtual system in a state other than "defined" (Single-configuration approach) 415

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Tables

Table 1 – Component documents 2
Table 2 – Related profiles for the Resource Allocation Profile 14
Table 3 – CIM_ResourcePoolConfigurationService.CreateChildResourcePool( ) method: Return code values 27
Table 4 – CIM_ResourcePoolConfigurationService.CreateChildResourcePool( ) method: Parameters 28
Table 5 – CIM_ResourcePoolConfigurationService.DeleteResourcePool( ) method: Return code values 28
Table 6 – CIM_ResourcePoolConfigurationService.DeleteResourcePool( ) method: Parameters 29
Table 7 – CIM_ResourcePoolConfigurationService.AddResourcesToResourcePool( ) method: Return code values 29
Table 8 – CIM_ResourcePoolConfigurationService.AddResourcesToResourcePool( ) method: Parameters 30
Table 9 – CIM_ResourcePoolConfigurationService.RemoveResourcesFromResourcePool( ) method: Return code values 31
Table 10 – CIM_ResourcePoolConfigurationService.RemoveResourcesFromResourcePool( ) method: Parameters 31
Table 11 – CIM_ResourcePoolConfigurationService.ChangeParentResourcePool( ) method: Return code values 32
Table 12 – CIM_ResourcePoolConfigurationService.ChangeParentResourcePool( ) method: Parameters 32
Table 13 – CIM elements: Resource Allocation Profile 40
Table 14 – Class: CIM_AffectedJobElement 41
Table 15 – Class: CIM_BaseMetricDefinition 41
Table 16 – Class: CIM_BaseMetricDefinition — Instantaneous consumption 42
Table 17 – Class: CIM_BaseMetricDefinition — Interval metrics 42
Table 18 – Class: CIM_BaseMetricDefinition — Aggregate consumption 42
Table 19 – Class: CIM_BaseMetricValue 43
Table 20 – Class: CIM_BaseMetricValue — Instantaneous consumption 43
Table 21 – Class: CIM_BaseMetricValue — Interval metrics 43
Table 22 – Class: CIM_BaseMetricValue — Aggregate consumption 44
Table 23 – Class: CIM_Component 44
Table 24 – Class: CIM_ConcreteJob 44
Table 25 – Class: CIM_ElementAllocatedFromPool 45
Table 26 – Class: CIM_ElementCapabilities 45
Table 27 – Class: CIM_ElementSettingData 45
Table 28 – Class: CIM_HostedDependency 46
Table 29 – Class: CIM_HostedResourcePool 46
Table 30 – Class: CIM_HostedService 46
Table 31 – Class: CIM_LogicalDevice 47
Table 32 – Class: CIM_MetricDefForME 47
Table 33 – Class: CIM_MetricForME 47
Table 34 – Class: CIM_ResourceAllocationFromPool 48
Table 35 – Class: CIM_ResourceAllocationSettingData (current settings) 48
Table 36 – Class: CIM_ResourceAllocationSettingData (defined settings) 49
Table 37 – Class: CIM_ResourcePool 49
Table 38 – Class: CIM_ResourcePoolConfigurationCapabilities 50
Table 39 – Class: CIM_ResourcePoolConfigurationService 50
Table 40 – Class: CIM_SettingsDefineState 51
Table 41 – Class: CIM_ServiceAffectsElement 51
Table 42 – Class: CIM_SystemDevice 51
Table 43 – Related profiles for the System Virtualization Profile 52
Table 44 – DefineSystem( ) method: Parameters 70
Table 45 – DefineSystem( ) method: Return code values 72
Table 46 – DestroySystem( ) method: Parameters 72
Table 47 – DestroySystem( ) method: Return code values 73

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Table 48 – AddResourceSettings( ) method: Parameters 73
Table 49 – AddResourceSettings( ) method: Return code values 74
Table 50 – ModifyResourceSettings( ) method: Parameters 75
Table 51 – ModifyResourceSettings( ) Method: Return code values 76
Table 52 – ModifySystemSettings( ) Method: Parameters 76
Table 53 – ModifySystemSettings( ) Method: Return code values 77
Table 54 – RemoveResourceSettings( ) Method: Parameters 78
Table 55 – RemoveResourceSettings( ) Method: Return code values 78
Table 56 – CreateSnapshot( ) method: Parameters 79
Table 57 – CreateSnapshot( ) method: Return code values 80
Table 58 – DestroySnapshot( ) method: Parameters 80
Table 59 – DestroySnapshot( ) method: Return code values 81
Table 60 – ApplySnapshot( ) method: Parameters 81
Table 61 – ApplySnapshot( ) method: Return code values 82
Table 62 – CIM Elements: System Virtualization Profile 110
Table 63 – Association: CIM_AffectedJobElement 111
Table 64 – Class: CIM_ConcreteJob 112
Table 65 – Class: CIM_Dependency Class 112
Table 66 – Association: CIM_ElementCapabilities (host system) 113
Table 67 – Association: CIM_ElementCapabilities (virtual system management) 113
Table 68 – Association: CIM_ElementCapabilities (snapshot service) 114
Table 69 – Association: CIM_ElementCapabilities (snapshots of virtual systems) 114
Table 70 – Association: CIM_ElementConformsToProfile 115
Table 71 – Association: CIM_HostedDependency 115
Table 72 – Association: CIM_HostedService (virtual system management service) 116
Table 73 – Association: CIM_HostedService (virtual system snapshot service) 116
Table 74 – Association: CIM_LastAppliedSnapshot 117
Table 75 – Association: CIM_MostCurrentSnapshotInBranch 117
Table 76 – Association: CIM_ReferencedProfile 118
Table 77 – Class: CIM_RegisteredProfile 118
Table 78 – Association: CIM_ServiceAffectsElement (virtual system management service) 119
Table 79 – Association: CIM_ServiceAffectsElement 120
Table 80 – Association: CIM_SnapshotOfVirtualSystem 120
Table 81 – Class: CIM_VirtualSystemManagementCapabilities 121
Table 82 – Class: CIM_VirtualSystemManagementCapabilities 121
Table 83 – Class: CIM_VirtualSystemManagementService 121
Table 84 – Class: CIM_VirtualSystemSettingData (input) 122
Table 85 – Class: CIM_VirtualSystemSettingData (Snapshot) 123
Table 86 – Class: CIM_VirtualSystemSnapshotCapabilities 124
Table 87 – Class: CIM_VirtualSystemSnapshotService 124
Table 88 – Class: CIM_VirtualSystemSnapshotServiceCapabilities 125
Table 89 – Related profiles for the Allocation Capabilities Profile 126
Table 90 – Operations: CIM_SettingsDefineCapabilities 131
Table 91 – Operations: CIM_ElementCapabilities 134
Table 92 – CIM elements: Allocation Capabilities Profile 139
Table 93 – Class: CIM_AllocationCapabilities 139
Table 94 – Class: CIM_ElementCapabilities 140
Table 95 – Class: CIM_ElementCapabilities (default) 140
Table 96 – Class: CIM_SettingsDefineCapabilities 141
Table 97 – Class: CIM_SettingsDefineCapabilities (Default) 141
Table 98 – Class: CIM_SettingsDefineCapabilities (minimums) 142
Table 99 – Class: CIM_SettingsDefineCapabilities (maximums) 142

Documents
Document Sharing Hub

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Table 100 – Class: CIM_SettingsDefineCapabilities (Increments) ... 143
Table 101 – Class: CIM_SettingsDefineCapabilities (Independent Supported Point) ... 143
Table 102 – Related profiles for the Processor Resource Virtualization Profile ... 144
Table 103 – Acronyms for RASD adapted for the representation of various flavors of allocation data ... 153
Table 104 – CIM Elements: Processor Resource Virtualization Profile ... 169
Table 105 – Association: CIM_Component for resource pool ... 170
Table 106 – Association: CIM_ElementAllocatedFromPool ... 171
Table 107 – Association: CIM_ElementSettingData ... 171
Table 108 – Association: CIM_ElementSettingData for processor resource allocation ... 172
Table 109 – Association: CIM_ElementSettingData (Processor Resource Pool) ... 172
Table 110 – Association: CIM_HostedDependency ... 173
Table 111 – Class: CIM_Processor (host processor) ... 173
Table 112 – Class: CIM_Processor (virtual system) ... 173
Table 113 – Class: CIM_RegisteredProfile ... 174
Table 114 – Association: CIM_ResourceAllocationFromPool ... 174
Table 115 – Class: CIM_ResourceAllocationSettingData ... 175
Table 116 – Class: CIM_ResourcePool ... 175
Table 117 – Association: CIM_SettingsDefineState ... 176
Table 118 – Association: CIM_SystemDevice (Host Processor) ... 176
Table 119 – Association: CIM_SystemDevice (Virtual Processor) ... 177
Table 120 – Related profiles for the Memory Resource Virtualization Profile ... 178
Table 121 – CIM Elements: Memory Resource Virtualization Profile ... 208
Table 122 – Association: CIM_AffectedJobElement ... 209
Table 123 – Class: CIM_AllocationCapabilities (memory allocation capabilities) ... 209
Table 124 – Class: CIM_AllocationCapabilities (memory allocation mutability) ... 210
Table 125 – Association: CIM_Component (memory resource) ... 211
Table 126 – Association: CIM_Component (resource pool) ... 211
Table 127 – Class: CIM_ConcreteJob ... 212
Table 128 – Association: CIM_ElementAllocatedFromPool ... 212
Table 129 – Association: CIM_ElementCapabilities (capabilities) ... 213
Table 130 – Association: CIM_ElementCapabilities (mutability) ... 213
Table 131 – Association: CIM_ElementSettingData (memory resource pool) ... 214
Table 132 – Association: CIM_ElementSettingData (memory resource) ... 214
Table 133 – Association: CIM_HostedDependency ... 215
Table 134 – Class: CIM_Memory (host system) ... 215
Table 135 – Class: CIM_Memory (virtual system) ... 216
Table 136 – Class: CIM_RegisteredProfile ... 216
Table 137 – Association: CIM_ResourceAllocationFromPool ... 216
Table 138 – Class: CIM_ResourceAllocationSettingData ... 217
Table 139 – Class: CIM_ResourcePool ... 218
Table 140 – Class: CIM_ResourcePoolConfigurationCapabilities ... 218
Table 141 – Association: CIM_SettingsDefineState ... 218
Table 142 – Association: CIM_ServiceAffectsElement ... 219
Table 143 – Association: CIM_SystemDevice (virtual memory) ... 219
Table 144 – Association: CIM_SystemDevice (host memory) ... 220
Table 145 – Related profiles for the Storage Resource Virtualization Profile ... 221
Table 146 – Optional Features ... 222
Table 147 – Predefined ResourceSubType values (EXPERIMENTAL) ... 237
Table 148 – Acronyms for RASD adapted for the representation of various flavors of allocation data ... 241
Table 149 – CIM Elements: Storage Resource Virtualization Profile ... 270
Table 150 – Association: CIM_Component for resource pool ... 272
Table 151 – Class: CIM_DiskDrive (Host) ... 272

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Documents
Document Sharing Hub
Full document details: BS ISO/IEC 19099:2014

Table 152 – Class: CIM_DiskDrive (Virtual System) 272
Table 153 – Association: CIM_ElementSettingData 273
Table 154 – Association: CIM_ElementSettingData 273
Table 155 – Association: CIM_ElementSettingData 274
Table 156 – Association: CIM_ElementSettingData 274
Table 157 – Association: CIM_HostedDependency 275
Table 158 – Class: CIM_LogicalDisk (Virtual System) 275
Table 159 – Association: CIM_ReferencedProfile 277
Table 160 – Class: CIM_RegisteredProfile 277
Table 161 – Class: CIM_ResourceAllocationSettingData 277
Table 162 – Class: CIM_ResourcePool 278
Table 163 – Association: CIM_SettingsDefineState 279
Table 164 – Class: CIM_StorageAllocationSettingData 279
Table 165 – Class: CIM_StorageVolume for host storage volume 280
Table 166 – Class: CIM_StorageExtent for virtual disks 281
Table 167 – Association: CIM_SystemDevice for host storage volumes 281
Table 168 – Association: CIM_SystemDevice for virtual resources 281
Table 169 – Related profiles for the Ethernet Port Resource Virtualization Profile 282
Table 170 – Acronyms for EASD adapted for the representation of various flavors of allocation data 295
Table 171 – CIM Elements: Ethernet Port Resource Virtualization Profile 318
Table 172 – Association: CIM_ActiveConnection 320
Table 173 – Association: CIM_Component for resource pool 321
Table 174 – Association: CIM_ElementAllocatedFromPool 321
Table 175 – Association: CIM_ElementSettingData for connection resources 322
Table 176 – Association: CIM_ElementSettingData for CIM_EthernetPort resource allocation 322
Table 177 – Association: CIM_ElementSettingData for CIM_EthernetPort resource allocation 323
Table 178 – Class: CIM_EthernetPort (host system) 323
Table 179 – Class: CIM_EthernetPort (virtual system) 323
Table 180 – Class: CIM_EthernetPortAllocationSettingData for Ethernet adapter (Q_EASD) 324
Table 181 – Class: CIM_EthernetPortAllocationSettingData for Ethernet adapter (R_EASD) 324
Table 182 – Class: CIM_EthernetPortAllocationSettingData for Ethernet adapter (C_EASD) 325
Table 183 – Class: CIM_EthernetPortAllocationSettingData for Ethernet adapter (D_EASD) 326
Table 184 – Class: CIM_EthernetPortAllocationSettingData for Ethernet adapter (M_EASD) 327
Table 185 – Class: CIM_EthernetPortAllocationSettingData for Ethernet connection (Q_EASD) 328
Table 186 – Class: CIM_EthernetPortAllocationSettingData for Ethernet connection (R_EASD) 329
Table 187 – Class: CIM_EthernetPortAllocationSettingData for Ethernet connection (C_EASD) 329
Table 188 – Class: CIM_EthernetPortAllocationSettingData for Ethernet connection (D_EASD) 330
Table 189 – Class: CIM_EthernetPortAllocationSettingData for Ethernet connection (M_EASD) 331
Table 190 – Class: CIM_EthernetPortAllocationSettingData for Ethernet switch port (Q_EASD) 332
Table 191 – Class: CIM_EthernetPortAllocationSettingData for Ethernet switch port (R_EASD) 332
Table 192 – Class: CIM_EthernetPortAllocationSettingData for Ethernet switch port (C_EASD) 333
Table 193 – Class: CIM_EthernetPortAllocationSettingData for Ethernet switch port (D_EASD) 334
Table 194 – Class: CIM_EthernetPortAllocationSettingData for Ethernet switch port (M_EASD) 335
Table 195 – Class: CIM_RegisteredProfile 335
Table 196 – Class: CIM_ResourcePool (Ethernet adapter) 336
Table 197 – Class: CIM_ResourcePool 336
Table 198 – Class: CIM_ResourcePool (Ethernet switch port) 337
Table 199 – Association: CIM_SettingsDefineState 339
Table 200 – Association: CIM_SystemDevice (Virtual EthernetPort) 339
Table 201 – Association: CIM_SystemDevice (host Ethernet adapter) 339
Table 202 – Related profiles for the Virtual System Profile 341
Table 203 – Observation of virtual system states 350

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Table 204 – Observation of virtual system state transitions 352
Table 205 – CIM_ComputerSystem.RequestStateChange( ) method: Parameters 361
Table 206 – CIM_PowerManagementService.RequestPowerStateChange( ) method: Parameters 361
Table 207 – CIM elements: Virtual System Profile 374
Table 208 – Association: CIM_AffectedJobElement 375
Table 209 – Class: CIM_ComputerSystem 375
Table 210 – Class: CIM_ConcreteJob 375
Table 211 – Association: CIM_ElementConformsToProfile 376
Table 212 – Association: CIM_ElementSettingData 377
Table 213 – Class: CIM_EnabledLogicalElementCapabilities 377
Table 214 – Association: CIM_ReferencedProfile 378
Table 215 – Class: CIM_RegisteredProfile 378
Table 216 – Association: CIM_SettingsDefineState 379
Table 217 – Class: CIM_VirtualSystemSettingData 379
Table 218 – Association: CIM_VirtualSystemSettingDataComponent 380
Table 219 – Related profiles for the Generic Device Resource Virtualization Profile 381
Table 220 – CIM Elements: Generic Device Resource Virtualization Profile 388
Table 221 – Class: CIM_AllocationCapabilities 388
Table 222 – Class: CIM_ElementCapabilities 389
Table 223 – Class: CIM_RegisteredProfile 389
Table 224 – Related profiles for the Virtual Ethernet Switch Profile 390
Table 225 – CIM Elements: Virtual System Profile 400
Table 226 – Class: CIM_ComputerSystem 401
Table 227 – Association: CIM_ElementSettingData 401
Table 228 – Association: CIM_HostedCollection 402
Table 229 – Association: CIM_MemberOfCollection 402
Table 230 – Class: CIM_NetworkVLAN 403
Table 231 – Class: CIM_RegisteredProfile 403
Table 232 – Association: CIM_SettingsDefineState 405
Table 233 – Association: CIM_SystemComponent 405
Table 234 – Class: CIM_VirtualEthernetSwitchSettingData 406
Table 235 – Association: CIM_VirtualSystemSettingDataComponent 406

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American National Standard
for Information Technology –

Virtualization Management Specification

Introduction

The information in this standard should be sufficient for a provider or consumer of this data to unambiguously identify the classes, properties, methods, and values that shall be instantiated to subscribe, advertise, produce, or consume an indication using the DMTF Common Information Model (CIM) Schema.

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

Document conventions

Typographical conventions

The following typographical conventions are used in this document:

- Document titles are marked in *italics*.
- Important terms that are used for the first time are marked in italics.
- ABNF rules are in `monospaced font`.

The following conventions are followed for defining formats of entries such as URIs:

- Literal characters within a format definition are surrounded by single quotes.
- Names of variables within a format are in standard text and are explicitly defined by means of a "Where: variable-name is …" section that follows the format definition.
- A specific value of a variable within a generalized example of a formatted entry is displayed in *italics*.
- Definitions of formats are case sensitive.
- Whitespace, if any, in formats is explicitly indicated.

In XML and MOF examples, an ellipsis ("`...`") indicates omitted or optional entries that would typically occupy the position of the ellipsis.

ABNF usage conventions

Format definitions in this document are specified using ABNF (see RFC 5234), with the following deviations:

- Literal strings are to be interpreted as case-sensitive Unicode characters, as opposed to the definition in RFC 5234 that interprets literal strings as case-insensitive US-ASCII characters.

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Experimental material

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

Experimental content is indicated by an Experimental Note.

In places where the Experimental Note cannot be used (for example, tables or figures), the "EXPERIMENTAL" label is used alone.

DMTF component documents

Table 1 lists the DMTF component documents that were combined to create this standard.

Table 1 – Component documents

Document Number	Document Title	Version
DSP1041	*Resource Allocation Profile*	1.1.0
DSP1042	*System Virtualization Profile*	1.0.0
DSP1043	*Allocation Capabilities Profile*	1.0.0
DSP1044	*Processor Resource Virtualization Profile*	1.0.0
DSP1045	*Memory Resource Virtualization Profile*	1.0.0
DSP1047	*Storage Resource Virtualization Profile*	1.0.0
DSP1050	*Ethernet Port Resource Virtualization Profile*	1.0.0
DSP1057	*Virtual System Profile*	1.0.0
DSP1059	*Generic Device Resource Virtualization Profile*	1.0.0
DSP1097	*Virtual Ethernet Switch Profile*	1.0.0

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1 Scope

1.1 Resource Allocation Profile

Clause 5 sets the basic resource allocation pattern for resource pools, allocations, and setting data. It also defines the resource-pool-lifecycle management and relationships.

1.2 System Virtualization Profile

Clause 6 is an autonomous profile that specifies the minimum top-level object model needed for the representation of host systems and the discovery of hosted virtual computer systems. In addition, it specifies a service for the manipulation of virtual computer systems and their resources, including operations for the creation, deletion, and modification of virtual computer systems and operations for the addition or removal of virtual resources to or from virtual computer systems.

1.3 Allocation Capabilities Profile

Clause 7 extends the management capability of referencing profiles by adding the ability to represent the default, supported and range of property values for resource allocation requests for a given resource, and the mutability of properties in a Resource Allocation Setting Data instance.

1.4 Processor Resource Virtualization Profile

Clause 8 is a component profile that extends the management capabilities of the specialized profiles by adding the support to represent and manage the allocation of processor resources to virtual systems.

1.5 Memory Resource Virtualization Profile

Clause 9 is a component DMTF management profile that extends the management capabilities of the referencing profile by adding the support to represent and manage the allocation of memory to virtual systems.

1.6 Storage Resource Virtualization Profile

Clause 10 is a component profile that extends the management capabilities of the referencing profile by adding the support to represent and manage the allocation of storage to virtual systems.

1.7 Ethernet Port Resource Virtualization Profile

Clause 11 is a component DMTF management profile that extends the management capabilities of the referencing profile by adding the support to represent and manage the allocation of Ethernet ports to virtual systems.

1.8 Virtual System Profile

Clause 12 is an autonomous profile that defines the minimum object model needed to provide for the inspection of a virtual system and its components. In addition, it defines optional basic control operations for activating, deactivating, pausing, or suspending a virtual system.

1.9 Generic Device Resource Virtualization Profile

Clause 13 is a concrete component profile that specializes the abstract Resource Allocation Profile described in clause 5 and the abstract Allocation Capabilities Profile described in clause 7.

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Clause 13 is intended for use when a more specific resource allocation profile (for example, the Processor Resource Virtualization Profile described in clause 8, the Memory Resource Virtualization Profile described in clause 9, and so on) for common resource types has not yet been defined or approved, or when the device in question is an unusual device type for which no more specific profile exists.

1.10 Virtual Ethernet Switch Profile

Clause 14 is an autonomous DMTF management profile that defines the minimum object model needed to provide for the inspection of a virtualization system's internal Ethernet switch and its components.

2 Normative references

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

DMTF, *CIM Schema 2.27*,
http://dmtf.org/standards/cim/schemas

DMTF DSP0004, *CIM Infrastructure Specification 2.6,*
http://www.dmtf.org/standards/published_documents/DSP0004_2.6.pdf

DMTF DSP0200, *CIM Operations over HTTP 1.3,*
http://www.dmtf.org/standards/published_documents/DSP0200_1.3.pdf

DMTF DSP0201, *Specification for the Representation of CIM in XML 2.3.1*,
http://www.dmtf.org/standards/published_documents/DSP201.pdf

DMTF DSP0207, *WBEM URI Mapping Specification 1.0,*
http://www.dmtf.org/standards/published_documents/DSP0207_1.0.pdf

DMTF DSP1001, *Management Profile Specification Usage Guide 1.0,*
http://www.dmtf.org/standards/published_documents/DSP1001_1.0.pdf

DMTF DSP1012, *Boot Control Profile 1.0*,
http://www.dmtf.org/standards/published_documents/DSP1012_1.0.pdf

DMTF DSP1014, *Ethernet Port Profile 1.0*,
http://www.dmtf.org/standards/published_documents/DSP1014_1.0.pdf

DMTF DSP1022, *CPU Profile 1.0*,
http://www.dmtf.org/standards/published_documents/DSP1022_1.0.pdf

DMTF DSP1026, *System Memory Profile 1.0*,
http://www.dmtf.org/standards/published_documents/DSP1026_1.0.pdf

DMTF DSP1027, *Power State Management Profile 1.0*,
http://www.dmtf.org/standards/published_documents/DSP1027_1.0.pdf

DMTF DSP1033, *Profile Registration Profile 1.0,*
http://www.dmtf.org/standards/published_documents/DSP1033_1.0.pdf

DMTF DSP1035, *Host LAN Network Port Profile 1.0*,
http://www.dmtf.org/standards/published_documents/DSP1035_1.0.pdf

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DMTF DSP1052, *Computer System Profile 1.0*,
http://www.dmtf.org/standards/published_documents/DSP1052_1.0.pdf

DMTF DSP1053, *Base Metrics Profile 1.0*,
http://www.dmtf.org/standards/published_documents/DSP1053_1.0.pdf

DMTF DSP1054, *Indications Profile 1.0*,
http://www.dmtf.org/standards/published_documents/DSP1054_1.0.pdf

IETF RFC1738, *Uniform Resource Locators (URL)*, December 1994,
http://www.ietf.org/rfc/rfc1738.txt

IETF RFC3986, *Uniform Resource Identifier (URI): Generic Syntax*,
http://tools.ietf.org/html/rfc3986

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

ISO/IEC Directives, Part 2, *Rules for the structure and drafting of International Standards,*
http://isotc.iso.org/livelink/livelink.exe?func=ll&objId=4230456&objAction=browse&sort=subtype

SNIA SMI-S, *Storage Management Technical Specification* 1.3,
http://www.snia.org/tech_activities/standards/curr_standards/smi/SMI-S_Technical_Position_v1.3.0r5.zip

NOTE This standard refers to the following clauses of SNIA SMI-S: 1.3, Part 2 *Common Profiles*:

Clause 6: *Generic Target Ports* profile 1.0
Clause 14: *Generic Initiator Ports* profile 1.0

This standard refers to the following clauses of SNIA SMI-S: 1.3, Part 3 *Block Devices*:

Clause 5: *Block Services* package 1.3
Clause 15: *Extent Composition* subprofile 1.2

This standard refers to the following clauses of SNIA SMI-S: 1.3, Part 6 *Host Elements*:

Clause 6: *Storage HBA* profile 1.3
Clause 7: *Host Discovered Resources* profile 1.2

NOTE All parts of the SNIA SMI-S Storage Management Technical Specification have been approved as American National Standards, under the designation INCITS 388-2011. All parts of the specification are available at the ANSI Electronic Standards Store (ESS) on the ANSI website, www.ansi.org.

3 Terms and definitions

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

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

The terms "clause," "subclause," "paragraph," and "annex" in this document are to be interpreted as described in ISO/IEC Directives, Part 2, Clause 5.

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

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The terms defined in DSP0004, DSP0200, and DSP1001 apply to this document. The following additional terms are used in this document.

3.1
allocated resource
the result of a resource allocation request — the assigned, separated, reserved, or shared part of the resource or emulated resource allocated to the consumer based on the resource allocation request

3.2
capability set
a set of instances of class CIM_SettingData associated with the association CIM_SettingsDefineCapabilities to a CIM_Capabilities instance, and the associated CIM_Capabilities instance.

3.3
child pool
pool whose resources are backed by other resource pools; consumer of resources from its parent resource pools; contains no host resources, instead draws resources from parent pools through resource allocations

3.4
client
an application that exploits facilities specified by the profiles in this standard

3.5
concrete memory resource pool
a resource pool that subdivides the capacity of its (primordial or concrete) parent resource pool

3.6
concrete storage resource pool
a storage resource pool that subdivides the capacity of its (primordial or concrete) parent resource pool

3.7
consumer
entity using allocated resources (for example, a virtual system)

3.8
current resource allocation setting data
resource allocation setting data that describes an allocated resource; differs from defined resource allocation setting data if the host system supports the dynamic modification of a resource allocation

3.9
current setting data
the virtual setting data associated with the current allocation state of a virtual resource or system.

3.10
dedicated virtual resource
virtual resource that has been given exclusive use of one or more host resources (the host resources are not shared with any other consumer)

3.11
defined resource allocation setting data
resource allocation setting data that describes a resource allocation request

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3.12
dynamic ethernet connection allocation
an Ethernet connection in which a default Ethernet switch port is instantiated as part of an Ethernet connection allocation

3.13
ethernet adapter
an EthernetPort, its associated LAN Endpoint(s) and, optionally, a VLAN Endpoint that models the Ethernet device on a virtual or host system

3.14
ethernet adapter allocation request
a request for an Ethernet adapter resource allocation to a virtual machine; represented as instance of CIM_EthernetPortAllocationSettingData.

3.15
ethernet adapter resource allocation
the allocation of an Ethernet port to a virtual system

3.16
ethernet adapter resource pool
a resource pool that represents Ethernet adapters available as resources for a virtual computer system resource allocation

3.17
ethernet connection
the connection of two LAN endpoints where one LAN endpoint is implemented by an Ethernet adapter, and the other LAN endpoint is implemented by an Ethernet switch port, resulting in the connection of a virtual or host system Ethernet adapter to an Ethernet switch port

3.18
ethernet connection allocation request
an allocation request for a connection between a LAN Endpoint on an Ethernet adapter and a LAN Endpoint on an Ethernet switch port. An Ethernet connection allocation request may cause the implicit allocation of the entities that it connects, such as virtual Ethernet adapters and virtual switch ports. Ethernet connection allocation request is represented as instance of CIM_EthernetPortAllocationSettingData.

3.19
ethernet connection allocation
the allocation of an Ethernet connection between the LAN Endpoints of an Ethernet adapter and an Ethernet switch port

3.20
ethernet connection resource pool
a resource pool that represents available Ethernet connections on a virtual Ethernet switch for a virtual computer system

3.21
ethernet switch port
an EthernetPort, its associated LAN Endpoint(s) and, optionally, a VLAN Endpoint that models the Ethernet port on an Ethernet switch

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3.22
ethernet switch port allocation request
a request for an Ethernet switch port resource allocation; represented as instance of CIM_EthernetPortAllocationSettingData.

3.23
ethernet switch port resource allocation
the allocation of an Ethernet port to a virtual Ethernet switch

3.24
ethernet switch port resource pool
a resource pool that represents Ethernet switch ports available as resources for a virtual Ethernet switch port resource allocation

3.25
host memory
a contiguous extent of memory contained by the host system that may be allocated with either exclusive or shared access to a memory resource pool

3.26
host processor resource
host processor resources are processor devices or computing resource contained by the host system that may be allocated with either exclusive or shared access to provide processing resources to a processor resource pool or a virtual system.

3.27
host resource
a device or computing resource contained by the host system that may be allocated with either exclusive or shared access through the host system to provide resources to a resource pool or consumer

3.28
host storage resource
a storage resource that exists in scope of or is accessible by a host system. A host system may contain or have access to one or more storage resources that may be as a whole or partially allocated to virtual systems

3.29
host system
the system that contains the host resources that are subject to resource allocation

3.30
implementation
a set of CIM providers that realize the classes specified by the profiles described in this standard

3.31
initiator port
a port that acts as the source for a data exchange operation

3.32
logical disk
the instantiation of allocated host resources that is exposed to a virtual system through a storage device; the result of a storage resource allocation based on a storage resource allocation request

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3.33
memory composition
the aggregation of memory extents into an encompassing memory extent

3.34
memory resource allocation
the allocation of memory from a memory resource pool to a virtual system

3.35
memory resource allocation request
a request for a memory resource allocation

3.36
memory resource pool
a resource pool that represents memory available for memory resource allocation

3.37
memory resource pool configuration service
a configuration service that supports the addition or removal of host memory to or from a memory resource pool, and the creation or deletion of concrete subpools of a memory resource pool

3.38
port
communication endpoint for systems or storage devices. A port enables the exchange of data according to one or more protocols

3.39
primordial resource pool
a resource pool with no parent that may aggregate host resources

3.40
primordial storage resource pool
a storage resource pool that aggregates storage resources available for or used by storage resource allocations

3.41
processor resource
a processor device or computing resource as seen by a consumer

3.42
processor resource allocation
the allocation of a processor resource from a processor resource pool to a virtual system

3.43
processor resource allocation request
a request for a processor resource allocation

3.44
processor resource pool
a resource pool that represents processor resources available for processor resource allocation

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3.45

processor resource pool configuration service

a configuration service that supports the addition or removal of host storage processor resources to or from a processor resource pool, and the creation or deletion of concrete subpools of a processor resource pool

3.46

resource allocation

process of assigning, separating, reserving, granting share of, or emulating resources for use by a consumer

3.47

resource allocation request

request for resources to be allocated

3.48

resource allocation setting data

RASD

CIM_ResourceAllocationSettingData - settings describing resource allocation; used by a host system to manage the allocation of resources and their relationship to host resources, resource pools used for the allocation, or both

3.49

resource pool

an abstract entity exposed by the virtualization platform for the purpose of allocation of allocated resources to consumers

3.50

resource type

generic type categorizing classes of resources (for example, processor, memory, network adapter)

3.51

shared virtual resource

virtual resource that has been given the use of host resources that may also be shared with other consumers

3.52

simple ethernet connection

an Ethernet connection in which a default Ethernet switch port and a default Ethernet adapter are instantiated as part of an Ethernet connection allocation

3.53

simple resource allocation

resource allocation with no logical device representing the allocated resources

3.54

static ethernet connection allocation

an Ethernet connection allocation where a specific pre-existing Ethernet switch port is requested as part of the allocation request

3.55

storage resource

a logical disk, a storage volume or a storage extent

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3.56
storage resource allocation
the allocation of a storage resource from a storage resource pool to a virtual system

3.57
storage resource allocation request
a request for a storage resource allocation

3.58
storage resource pool
a resource pool that represents storage resources available for storage resource allocation

3.59
storage resource pool configuration service
a configuration service that supports the addition or removal of host storage resources to or from a storage resource pool, and the creation or deletion of concrete subpools of a storage resource pool

3.60
storage volume
the instantiation of allocated host resources that is exposed to a virtual system through a storage device that is published for use outside of the scoping system. Like a logical disk, a storage volume is the result of a storage resource allocation based on a storage resource allocation request

3.61
target port
a port that acts as a target of a data exchange operation

3.62
virtual computer system
virtual system as applied to a computer system
Other common industry terms for such a system include *virtual machine*, *hosted computer*, *child partition*, *logical partition*, *domain*, *guest*, and *container*.

3.63
virtual Ethernet switch
the concept of a virtual system as applied to a virtual Ethernet switch
A virtual Ethernet switch is a specialized virtual system.

3.64
virtual memory
the instantiation of allocated host memory that is exposed to a virtual system through a logical memory device; the result of a memory resource allocation based on a memory resource allocation request

NOTE The definition of the term “virtual memory” is specialized from the term “virtual resource” defined in clause 5 and deviates from common computer industry parlance.

3.65
virtualization platform
virtualizing infrastructure provided by a host system that enables the deployment of virtual systems

3.66
virtual processor
the instantiation of the allocated host processor resources that is exposed to a virtual system via a logical processor device.

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3.67
virtual resource
an allocated resource that is represented as a logical device and assigned to a virtual system

3.68
virtual resource allocation
resource allocation with a logical device representing the allocated resources

3.69
virtual system
a computer system that is composed of virtual resources. Other common industry terms for such a system include *virtual machine*, *hosted computer*, *child partition*, *logical partition*, *domain*, *guest virtual machine*, and *container*.

3.70
virtualization platform
infrastructure that supports virtual systems. Other common industry terms for this infrastructure are *hypervisor* and *virtual machine monitor*.

4 Symbols and abbreviated terms

The abbreviations defined in DSP0004, DSP0200, and DSP1001 apply to this document. The following additional abbreviations are used in this document.

4.1
CIM
common information model

4.2
CIMOM
CIM object manager

4.3
CPU
central processing unit

4.4
EASD
ethernet port allocation setting data

4.5
ESD
element setting data

4.6
HBA
host bus adapter

4.7
MCA
capabilities settings of systems and of memory resource pools

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4.8
MMS
mutability settings of memory resource allocation requests or memory resource allocations

4.9
MRA
memory resource allocation

4.10
MRQ
memory resource allocation request

4.11
RASD
resource allocation setting data

4.12
SASD
storage allocation setting data

4.13
SAN
storage area network

4.14
SDC
settings define capabilities

4.15
SDS
settings define state

4.16
SLP
service location protocol

4.17
SMI-S
Storage Management Initiative Specification

4.18
SNIA
Storage Networking Industry Association

4.19
VESSD
virtual ethernet switch setting data

4.20
VS
virtual system

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4.21
VSSD
virtual system setting data

4.22
VSSDC
virtual system setting data component

5 Resource Allocation Profile

Profile Name: Resource Allocation

Version: 1.1.0

Organization: DMTF

CIM schema version: 2.22

Central Class: CIM_ResourcePool

Scoping Class: CIM_System

The Resource Allocation Profile is an abstract profile that extends the management capability of referencing profiles by adding the capability to represent the allocation of resources to consumers. This includes allocation of underlying supporting resources, such as power and cooling, and the allocation of computing resources, such as processors and memory. The resources may be virtualized. A general model is defined by the Resource Allocation Profile. Requirements and constraints specific to a resource type are defined in a referencing profile dedicated to the resource type. This profile defines a resource pool, allocated resources, allocation settings, and host resources.

The Resource Allocation Profile shall not be directly implemented. Implementation shall be based on a profile that specializes the requirements of this profile.

Table 2 identifies the profile on which the Resource Allocation Profile has a dependency.

Table 2 – Related profiles for the Resource Allocation Profile

Profile Name	Organization	Version	Requirement	Description
Allocation Capabilities	DMTF	1.0	Optional	Profile that describes allocation capabilities (see clause 7)

5.1 Description

This subclause provides an informative description of the management domain addressed by the profile described in this clause and describes how the CIM elements defined in the profile apply to the management domain.

Figure 1 is the class diagram for the Resource Allocation Profile. Cardinalities shown in the diagram reflect the constraints relative to implementations of this profile. For simplicity, the prefix *CIM_* has been removed from the names of the classes.

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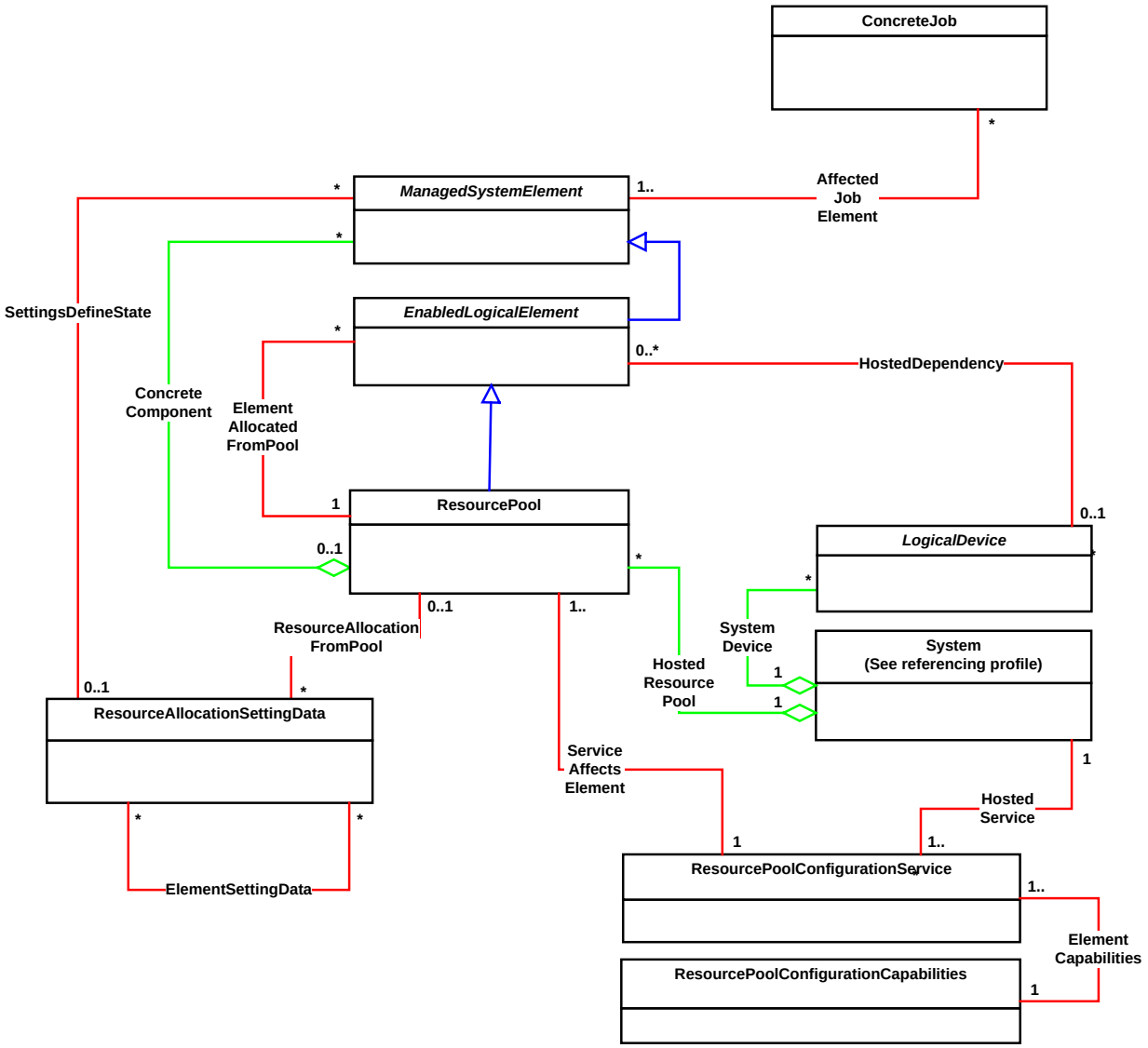

Figure 1 – Resource Allocation Profile: Class Diagram

5.1.1 General resource allocation concepts

The Resource Allocation Profile captures the general concept of defining the availability of a given resource type for allocation to consumers. The amount of resource available and the amount of resource allocated are modeled and managed. The aggregation of the underlying components that provide the resource (host resources) may be represented.

5.1.1.1 Host resources

Host resources are those that compose or enable a computer system. Examples include processors, memory, I/O, power supplied to the system, cooling allocated to the system, and so on.

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5.1.1.2 Resource pool

The profile described in this clause uses a resource pool as the focal point for resource allocations. Consumers receive resource allocations from resource pools based on resource allocation requests. A resource pool results from aggregation of host resources of a specific type into a resource pool.

For example, when modeling virtualized computer systems, host processors are aggregated into a pool, giving it a known computing capacity, from which virtual processors are allocated. When modeling virtualized storage, the pool may map to a RAID volume or other storage-aggregating construct. Using power as an example, the host power supplies may be aggregated into a pool, thus establishing the total power available for allocation. Power is then allocated to dependent resource consumers from the pool.

5.1.1.3 Resource allocation

A resource allocation is a resource that is allocated from a resource pool. A resource allocation request is a request for a resource allocation. A resource allocation is obtained based on a corresponding resource allocation request. Both resource allocation and resource allocation request are represented through instances of the CIM_ResourceAllocationSettingData class.

5.1.1.4 Hierarchies of resource pools

A hierarchy of resource pools may be supported. A hierarchy may be used to provide administrative controls over the set of resources or to partition resources into disjoint sets.

For example, the aggregate processor capability of the computer system may be divided into child pools for individual departments or users.

A hierarchy of resource pools represents the same type of resource and is acyclic. Hierarchies of resource pools consisting of different types of resources are not defined by the profile described in this clause.

5.1.1.5 Pool and resource management

The creation, deletion, and management of resource pools and assignment of the host resources that they contain are covered by the profile described in this clause. The allocation of resources to a consumer is covered in derived profiles. The CIM_ResourcePoolConfigurationService class provides extrinsic methods for the management of resource pools.

5.1.2 Simple resource allocation

Simple resource allocation is the allocation of resources (for example, power, cooling, and so on) to a consumer where no logical device represents the resource allocated.

5.1.3 Virtual resource allocation

Virtual resource allocation is the allocation of resources (for example, processor, memory, and so on) to a consumer using an allocated resource. Virtual resource allocation extends the concept of resource allocation with the addition of semantics specific to virtualization. The virtual resources represent the consumer's view of the allocated resource, which enables management of the allocated resource in the context of management of the consumer. Additional functionality, such as the management of resource allocation definition or state, is introduced.

Multiple virtual resource allocations or virtual resource allocation requests may affect a single resource. For example, a virtual disk may be affected by the allocation of a storage extent and of bandwidth. A resource allocation or resource allocation request may affect one resource or a comprehensive set of resources. For example, a set of virtual processors may be modeled by one resource allocation request.

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5.1.3.1 Virtual resource

A virtual resource represents the consumer's view of the allocated resource. In a processor example, the virtual processor represents the virtual resource and may be consumed by a virtual computer system. In a storage example, a storage volume represents the virtual resource and may be consumed by a physical or a virtual computer system.

The same CIM class is used to model both the host resource and the virtual resource. In many systems, virtualization-specific details are hidden from the consumer, and the consumer is presented with a virtual resource that looks no different than a host resource (that is, a resource that is not virtualized). The property values contained in the instance of a virtual resource reflect what the consumer of that resource is presented, not the virtualization-specific details of the allocation.

Information specific to resource allocation is modeled using resource allocations and resource allocation requests. These are represented by instances of the CIM_ResourceAllocationSettingData class. This approach ensures that general-purpose management applications may consume information about the virtual resources without having to know details of the underlying virtualization. This approach also prevents proliferation of virtualization-specific properties throughout the CIM schema, or mandatory subclassing of every possible device that may be virtualized. For example, the virtualized processor in the virtual computer system uses the same properties as a physical processor in a physical computer system.

Resource allocation CIM management profiles that specialize the profile described in this clause may allow or require different CIM classes to be used to represent the virtual and host resources. For example, a consumable storage device may be modeled using CIM_StorageVolume or CIM_LogicalDisk, while the hosting resource may be modeled using CIM_StorageExtent.

5.1.3.2 Dedicated virtual resources

Dedicated virtual resources are allocated to a consumer and are not available to other consumers. The host resource backs the virtual resource through a one-to-one mapping that is identified by the MappingBehavior property of CIM_ ResourceAllocationSettingData set to a value of 2 (Dedicated).

5.1.3.3 Shared virtual resources

Shared resources may be used by multiple consumers. The host resource may map to multiple virtual resources that may be allocated to the same resource consumer. One host resource is shared by many consumers (for example, a quorum drive in a cluster environment).

A virtual resource may map to different host resources over time. One virtual resource may be mapped to many backing host resources (for example, a virtual processor scheduled to run on different host processors during the course of execution).

5.1.3.4 Relationship between host resource and virtual resource

If the virtual resource always maps to the same host resource, the CIM_HostedDependency association may be used to reflect this relationship for a current allocation. Implementations that support scheduling across the pool of host resources transparent to the consumer may not expose the CIM_HostedDependency association because this relationship may change frequently.

5.1.3.5 Resource allocation definition and resource allocation state

For each resource that may be allocated, a resource allocation request represents the resource allocation definition. Once one or more elements requested by the resource allocation definition are allocated, a corresponding set of resource allocations represents the resource allocation state. Details of a resource allocation request or a resource allocation are represented by an instance of the CIM_ResourceAllocationSettingData class. Elements of resource allocation definition and resource allocation state may be changed independently.

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For example:

- A system may support changing the processor resource allocation for the next boot or reset of the virtual system while the system is running without changing the current state of the system. This behavior is reflected by updates to the defined settings.
- An implementation for virtual memory may support changing the resource allocation definition only. A change such as an increase in virtual memory becomes effective the next time the virtual system is activated.
- An implementation may support changing the settings for the currently running virtual system only where the values revert to the prior settings on the next boot or reset. This behavior is reflected by updates in the current settings only.
- An implementation may support changing the resource allocation definition and state of virtual processors simultaneously. A change such as an increase in the relative share of processing power that a group of processors scoped by a virtual system receive becomes effective immediately without a need for a re-activation, and remains effective beyond the next re-activation.

The kind of changes that are supported are defined in resource allocation CIM management profiles that specialize the profile described in this clause.

5.2 Implementation

This subclause provides normative requirements related to the arrangement of instances and properties of instances for implementations of the profile described in this clause. The CIM Schema definitions and requirements apply.

5.2.1 Common requirements

This subclause details requirements that shall be met regardless of whether simple resource allocation or virtual resource allocation is implemented. In addition to these common requirements, either the requirements in 5.2.2 or the requirements in 5.2.3 shall also be implemented.

5.2.1.1 Representation of a resource pool

Each resource pool managed using the profile described in this clause shall be represented by an instance of the CIM_ResourcePool class. It shall be associated with the instance of CIM_System that represents the scoping system through one instance of the CIM_HostedResourcePool association. Each resource pool shall represent resources of the same type.

5.2.1.2 Primordial and concrete resource pools

A resource pool may be primordial or concrete.

Primordial pools aggregate capacity; they represent the known manageable capacity for the host system. Capacity is drawn from the primordial pool to create concrete resource pools or to allocate resources to consumers. There shall be at least one primordial pool for each resource type managed through the profile described in this clause. The instance of the CIM_ResourcePool class that represents a primordial resource pool shall have the Primordial property set to a value of TRUE.

Concrete resource pools subdivide the resource capacity available at a system. A single concrete pool may represent all the capacity of a primordial pool. The instance of the CIM_ResourcePool class that represents a concrete resource pool shall have the Primordial property set to a value of FALSE.

If a one-to-one correspondence exists between the host resource and the virtual resource, the CIM_HostedDependency association may be used to indicate the correspondence.

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5.2.2 Modeling virtual resource allocation

Virtual resource allocation may be modeled. If virtual resource allocation is modeled, the requirements specified in this subclause shall be met.

5.2.2.1 Host resources

Host resources are modeled as a subclass of the CIM_LogicalDevice class. Host resources may be aggregated into one or more primordial resource pools and allocated to resource pools or resource consumers.

If aggregation of host resources is supported, at least one instance of the CIM_LogicalDevice class shall be associated with the instance of the CIM_ResourcePool class through an instance of the CIM_Component association. If aggregation of host resources is supported, the CIM_ResourceAllocationSettingData.Capacity property shall be supported.

If a resource pool is used for dedicated or shared resources, aggregation of host resources should be supported.

5.2.2.2 Virtual resources

Each virtual resource that is fully or partially allocated shall be represented by an instance of the CIM_LogicalDevice class. That instance shall be associated with the instance of the CIM_System class that represents the scoping virtual system through an instance of the CIM_SystemDevice association.

5.2.2.3 Resource allocation definition

Each resource shall have a resource allocation definition. Each element of a resource allocation definition shall be represented by one instance of the CIM_ResourceAllocationSettingData class.

5.2.2.4 Resource allocations

An instance of the CIM_LogicalDevice class that represents a virtual resource shall be associated to zero or more instances of the CIM_ResourceAllocationSettingData class that represents the resource allocation state through an instance of the CIM_SettingsDefineState association.

One instance of the CIM_ResourceAllocationSettingData class may be associated with more than one instance of the CIM_LogicalDevice class that represents a set of virtual resources.

An instance of the CIM_ResourceAllocationSettingData class that represents the current allocation state shall be associated with a virtual resource through an instance of the CIM_SettingsDefineState association.

An instance of the CIM_ResourceAllocationSettingData class that represents the defined allocation state shall be associated with the instance of the CIM_ResourceAllocationSettingData class that represents the current allocation state through an instance of the CIM_ElementSettingData association with the IsDefault property set to 1 (Is Default).

The non-key properties of the two instances of the CIM_ResourceAllocationSettingData class may match if both the current and defined settings are the same.

An instance of the CIM_ResourceAllocationSettingData class that represents a current resource allocation shall be associated with one instance of the CIM_ResourcePool class through an instance of the CIM_ResourceAllocationFromPool association.

An instance of CIM_ResourceAllocationSettingData that represents a defined resource allocation shall not be associated with instances of CIM_ResourcePool through the CIM_ResourceAllocationFromPool association.

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5.2.2.5 Dedicated allocations

If the value of the MappingBehavior property is set to 2 (Dedicated) in the instance of the CIM_ResourceAllocationSettingData class that represents the defined allocation state, and if no values are specified for the HostResource[ ] array property or the HostResource[ ] array property is not specified (NULL), the system shall select the host resources if the virtual resource is allocated.

If the value of the MappingBehavior property is set to 2 (Dedicated) in the instance of the CIM_Resource-AllocationSettingData class that represents the current allocation state, the HostResource[ ] array property shall contain the identities of host resources that are dedicated to the virtual resource. For dedicated resources, an instance of the CIM_HostedDependency association may be present between the instance of the CIM_LogicalDevice class that represents a dedicated host resource allocation and the instance of the CIM_LogicalDevice class that represents the virtual resource.

5.2.2.6 Allocations with affinity

Virtual resources may be allocated with affinity to host resources using values of the MappingBehavior property.

If the MappingBehavior property is set to 4 (Hard Affinity), only the resources specified in the HostResource[ ] array property shall be used. If no values are specified for the HostResource[ ] array property or the HostResource[ ] array property is not specified (NULL), the system shall select the host resources if the virtual resource is allocated and maintain the allocation of those resources to the virtual device.

If the MappingBehavior property is set to 3 (Soft Affinity), the resources specified in the HostResource[ ] array property are preferred, but alternative host resources may be used. If no values are specified for the HostResource[ ] array property or the HostResource[ ] array property is not specified (NULL), the system shall select the host resources if the virtual resource is allocated.

If the MappingBehavior property is set to 3 (Soft Affinity) or 4 (Hard Affinity), an instance of the CIM_HostedDependency association shall not be used between the instance of the CIM_LogicalDevice class that represents a dedicated host resource allocation and the instance of the CIM_LogicalDevice class that represents the virtual resource.

If values are specified for the HostResource[ ] array property, the number of resources listed in the HostResource[ ] array property shall be adequate to satisfy the allocation request but may include additional resources.

The HostResource[ ] array property that represents the defined allocation state shall be set to the user's request. The HostResource[ ] array property that represents the current allocation state shall be set to the current active behavior.

5.2.3 Modeling simple resource allocation

Simple resource allocation may be modeled. If simple resource allocation is modeled, the requirements in this subclause shall be met.

5.2.3.1 General requirements

Each instance of the CIM_ResourceAllocationSettingData class that represents a current allocation state or alternate allocation state shall be associated with one instance of the CIM_ResourcePool class through an instance of the CIM_ResourceAllocationFromPool association.

A logical device shall not be instantiated.

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5.2.3.2 Current allocation

An instance of the CIM_ResourceAllocationSettingData class that represents the current state shall be associated with one instance of the CIM_ResourceAllocationSettingData class through an instance of the CIM_ElementSettingData association with the IsCurrent property set to 1 (Is Current). If the CIM_ResourceAllocationSettingData class that represents the current state is modified, the IsCurrent property shall be set to a value other than 1 (Is Current).

5.2.3.3 Alternate allocations

Alternate allocations of the resource for the consumer may be supported. Each alternate allocation state shall be represented by an instance of the CIM_ResourceAllocationSettingData class that is associated with an instance of the CIM_ResourceAllocationSettingData class that represents the alternate allocation state through an instance of the CIM_ElementSettingData association with the IsCurrent property set to 2 (Is Not Current).

5.2.4 Resource pool management

Resource pool management may be modeled. If resource pool management is modeled, the requirements of this subclause shall be met. Implementations may support active management of instances of the CIM_ResourcePool class, or they may expose a read-only view of existing instances of the CIM_ResourcePool class.

An instance of the CIM_ResourcePoolConfigurationService class shall be implemented; however, the methods of the service are optional. The instance of the CIM_ResourcePoolConfigurationService class shall be associated with the host system through an instance of the CIM_HostedService association. One instance of CIM_ResourcePoolConfigurationCapabilities shall be associated with the CIM_ResourcePoolConfigurationService instance through the CIM_ElementCapabilities association. This instance of CIM_ResourcePoolConfigurationCapabilities shall reflect the methods supported. If active management is not supported by an implementation, all properties of the associated CIM_ResourcePoolConfigurationCapabilities instance shall be set to NULL.

5.2.5 Metrics

If metrics are implemented, the DSP1053 shall be implemented. If the instance of the CIM_BaseMetricDefinition class defines a metric that applies across the entire resource pool, the instance of CIM_BaseMetricDefinition class shall be associated with an instance of the CIM_ResourcePool class through the CIM_MetricDefForME association, and the instance of the CIM_BaseMetricDefinition class shall not be associated with any other instances of the CIM_ManagedElement class. An example of this type of metric is a metric that reports the total instantaneous resource consumption from the pool.

If the instance of the CIM_BaseMetricDefinition class defines a metric related to an individual virtual device's utilization of resources from the resource pool, the instance of the CIM_BaseMetricDefinition class shall be associated with the instance of the CIM_ResourcePool class through the CIM_MetricDefForME association, and the instance of the CIM_BaseMetricDefinition class shall be associated with the instance of the CIM_LogicalDevice class that represents the virtual device through an instance of the CIM_MetricDefForME association.

If the instance of the CIM_BaseMetricDefinition class defines a metric for the virtual device that is not related to the consumption by the device of resources from the resource pool, the instance of the CIM_BaseMetricDefinition class shall not be associated with the instance of the CIM_ResourcePool class.

If the instance of the CIM_BaseMetricDefinition class defines a metric related to the resource pool and a host resource, the instance of the CIM_BaseMetricDefinition class shall be associated with the instance of the CIM_ResourcePool class through an instance of the CIM_MetricDefForME association, and the

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instance of the CIM_BaseMetricDefinition class shall be associated with the instance of the CIM_ManagedElement class that represents the host resource through an instance of the CIM_MetricDefForME association.

5.2.6 Resource pool hierarchies

Hierarchies of resource pools may be modeled. A hierarchy of resource pools represents the same type of resource and shall be acyclic.

Child pools may be allocated from the parent pool using the CIM_ResourcePoolConfigurationService class.

Parent and child pools shall be scoped to the same system.

A pool may have virtual resources and child pools allocated from it simultaneously.

5.2.7 Virtual resource definition and modification

The CIM_ResourceAllocationSettingData class is used as an input for virtual system definition. The client and implementation considerations are defined. The Resource Allocation Profile specifies how to define and modify virtual resources using methods of the virtual system management service. In these method specifications, the CIM_ResourceAllocationSettingData class is used for parameterization of resource-allocation-specific properties. The capabilities model may be used to convey information about limitations for and default values of properties of the CIM_ResourceAllocationSettingData class; see 7.4.

5.2.7.1 CIM_ResourceAllocationSettingData.InstanceID property

A client shall set the InstanceID property to NULL if the instance of the CIM_ResourceAllocationSettingData class is created locally. A client shall not modify the InstanceID property in an instance of the CIM_ResourceAllocationSettingData class that was received from an implementation and is sent back to the implementation as a parameter of a modification method.

An implementation shall ignore any non-NULL value in a definition request.

In a modification request, an implementation shall use a non-NULL value to identify an existing instance of the CIM_ResourceAllocationSettingData class. If a value is specified that does not identify an instance of the CIM_ResourceAllocationSettingData class, an implementation shall return a return code that indicates an invalid parameter; see 5.3.

5.2.7.2 CIM_ResourceAllocationSettingData.ResourceType property

A client shall set the value of the ResourceType property to designate the type of the virtual resource allocation request.

The implementation shall use the value of the ResourceType property, as well as the value of the OtherResourceType property if the value of the ResourceType property is 1 (Other), to determine the type of the virtual resource allocation request. If the implementation does not support the requested resource type, it shall fail the method execution.

5.2.7.3 CIM_ResourceAllocationSettingData.OtherResourceType property (conditional)

If a client sets the value of the ResourceType property to a value other than 1 (Other), it shall set the value of OtherResourceType property to NULL. If a client sets the value of the ResourceType property to 1 (Other), it shall set the value of the OtherResourceType property to identify the type of the virtual resource allocation request in an implementation-dependent way.

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The implementation shall use the value of the OtherResourceType property if the value of the ResourceType property is 1 (Other) to determine the type of the virtual resource allocation request. If the implementation does not support the requested resource type, it shall fail the method execution.

5.2.7.4 CIM_ResourceAllocationSettingData.ResourceSubType property

A client may set the value of the ResourceSubType property to designate the subtype of the virtual resource allocation request. A client may set the value of the ResourceSubType property to NULL, requesting default behavior.

The implementation shall use the value of the ResourceSubType property to determine the subtype of the virtual resource allocation request. If the implementation does not support the requested virtual resource subtype, it shall return a return code that indicates an invalid parameter; see 5.3.

5.2.7.5 CIM_ResourceAllocationSettingData.PoolID property

A client may set the value of the PoolID property to designate a resource pool that shall be used for resource allocation. In this case, the values of the PoolID and ResourceType properties shall be equal to the values of respective properties in an instance of the CIM_ResourcePool class that represents the designated resource pool. A client may set the value of the PoolID property to NULL, requesting default behavior.

An implementation shall use the value of the PoolID and ResourceType properties to assign the resource pool that shall be used for the resource allocation. If the value of the PoolID property is NULL, the implementation may assign a default resource pool. If no resource pool exists with matching values of the PoolID and ResourceType properties, the implementation may either assign a default resource pool or fail the method execution. An implementation may defer the selection of a default resource pool until resource allocation actually occurs.

5.2.7.6 CIM_ResourceAllocationSettingData.ConsumerVisibility property

A client may set the value of the ConsumerVisibility property to specify whether the virtual resource or comprehensive set of virtual resources that is requested by the virtual resource allocation request shall be virtualized or shall be one or more passed-through host resources. A client may specify a value of NULL for the ConsumerVisibility property, requesting a default behavior.

If the property is set to a value other than NULL, the client shall perform one of the following actions:

- set a value of 0 (Unknown) to request default behavior (with the same effect as a value of NULL)
- set a value of 2 (Passed-Through) to specify that one or more passed-through host devices shall be allocated to the virtual resource requested by this virtual resource allocation request, and shall provide one or more elements in the HostResource[ ] array property that identify the host resources that shall be passed through
- set a value of 3 (Virtualized) to specify that the virtual resource that results from this virtual resource allocation request shall be virtualized

The client shall not use a value of 4 (Not Represented).

An implementation shall use the value of the ConsumerVisibility property to determine whether the virtual resource or comprehensive set of virtual resources requested by this virtual resource allocation request shall be virtualized or shall be a passed-through host resource.

- If the value of the ConsumerVisibility property is NULL or 0 (Unknown), the implementation may exhibit an implementation-specific default behavior that may also depend on the resource type, the selected resource pool, or both.

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- If the value of the ConsumerVisibility property is 2 (Passed-Through), the implementation shall establish a virtual resource allocation request or virtual resource allocation for host resources as specified by elements of the HostResource[ ] array property as passed-through devices in the resulting virtual resource allocation. If no values are specified by the HostResource[ ] array property, the implementation may exhibit an implementation-specific default behavior.
- If the value of the ConsumerVisibility property is 3 (Virtualized), the implementation shall establish a virtual resource allocation request or virtual resource allocation for a virtualized virtual device or a comprehensive set of virtualized virtual devices.
- If the value of the ConsumerVisibility property is 4 (Not Represented), the implementation shall fail the method execution.

5.2.7.7 CIM_ResourceAllocationSettingData.HostResource[ ] Array property

A client may set the value of the HostResource[ ] array property to indicate that the requested virtual resource allocation shall be based on host resources that are identified by element values. The kind of dependency is specified through the ConsumerVisibility property (see 5.2.7.6) and the MappingBehavior property (see 5.2.7.18). A client may set the value of the HostResource[ ] array property to NULL or may specify an empty array in order to request the implementation to decide whether the requested resource allocation shall be directly based on host resources.

An implementation shall use the value of the HostResource[ ] array property to determine whether and how the requested virtual resource allocation shall be based on host resources. Respective host resources are identified by element values of the HostResource[ ] array property. The implementation shall use the value of other properties such as ConsumerVisibility (see 5.2.7.6) and MappingBehavior (see 5.2.7.18) to determine the kind of dependency. If no value or an empty array is provided as the value of the HostResource[ ] array property, the implementation may provide a pure virtual resource for the request or may select host resources at its own discretion.

5.2.7.8 CIM_ResourceAllocationSettingData.AllocationUnits property

A client should set the value of the AllocationUnits property to specify a unit of measurement for the virtual resource allocation request. The unit of measurement shall be compatible with the requested resource type. A client may set the value of the AllocationUnits property to NULL, requesting the implementation to assume a resource-type-specific default value for the unit of measurement.

An implementation shall use the value of the AllocationUnits property to determine the unit of measurement for the virtual resource allocation request. If the provided value is not compatible with the resource type, the implementation shall fail the method execution. If a value is not provided (NULL), the implementation shall assume a resource-type-specific default value for the unit of measurement. A resource-type-specific resource allocation DMTF management profile may specify rules for the determination of the default value.

5.2.7.9 CIM_ResourceAllocationSettingData.VirtualQuantity property

A client should set the value of the VirtualQuantity property to specify the quantity of virtual resources that shall result from the virtual resource allocation request. A client may set the value of the VirtualQuantity property to NULL, requesting a default behavior. A resource-type-specific resource allocation DMTF management profile may specify rules for the determination of a default value.

5.2.7.10 CIM_ResourceAllocationSettingData.Reservation property

A client may set the value of the Reservation property to specify the amount of host resource that is requested by the virtual resource allocation request. The unit of measurement established by the value of the AllocationUnits property applies. A client may set the value of the Reservation property to NULL, requesting a default behavior.

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An implementation shall use the value of the Reservation property to determine the amount of host resource that is requested by the virtual resource allocation request. If a value is not provided (NULL), the implementation may exhibit an implementation-specific default behavior. A resource-type-specific resource allocation DMTF management profile may specify rules for the determination of a default value.

5.2.7.11 CIM_ResourceAllocationSettingData.Limit property

A client may set the value of the Limit property to specify the maximum amount of host resource that is requested by the virtual resource allocation request. The unit of measurement established by the value of the AllocationUnits property applies. A client may set the value of the Limit property to NULL, requesting a default behavior.

An implementation shall use the value of the Limit property to determine the maximum amount of host resource that is requested by the virtual resource allocation request. If a value is not provided (NULL), the implementation may exhibit an implementation-specific default behavior. A resource-type-specific resource allocation DMTF management profile may specify rules for the determination of a default value.

5.2.7.12 CIM_ResourceAllocationSettingData.Weight property

A client may set the value of the Weight property to specify a relative weight that is requested by the virtual resource allocation request with respect to other virtual resource allocation requests from the same resource pool. A client may set the value of the Weight property to NULL, requesting a default behavior.

An implementation shall use the value of the Weight property to determine a relative weight that is requested by the virtual resource allocation request with respect to other virtual resource allocation requests from the same resource pool. If a value is not provided (NULL), the implementation may exhibit an implementation-specific default behavior. A resource-type-specific resource allocation DMTF management profile may specify rules for the determination of a default value.

5.2.7.13 CIM_ResourceAllocationSettingData.AutomaticAllocation property

A client may set the value of the AutomaticAllocation property to specify that the requested resource allocation is obtained automatically when the virtual system is activated. A client may set the value of the AutomaticAllocation property to NULL, requesting a default value of TRUE.

An implementation shall use the value of the AutomaticAllocation property to determine whether the requested resource allocation is obtained automatically when the virtual system is activated. The default value shall be TRUE, requesting automatic resource allocation. Resource-type-specific resource allocation DMTF management profiles may specify a different default behavior.

5.2.7.14 CIM_ResourceAllocationSettingData.AutomaticDeallocation property

A client may set the value of the AutomaticDeallocation property to specify that the requested resource allocation is released automatically when the virtual system is deactivated. A client may set the value of the AutomaticDeallocation property to NULL, requesting a default value of TRUE.

An implementation shall use the value of the AutomaticDeallocation property to determine whether the resource allocation is automatically released when the virtual system is de-activated. The default value shall be TRUE, requesting automatic resource deallocation. Resource-type-specific resource allocation DMTF management profiles may specify a different default behavior.

5.2.7.15 CIM_ResourceAllocationSettingData.Parent property

A client may set the value of the Parent property to specify a parent resource required to establish the resource allocation. An example of such a parent resource would be a controller. A client may set the value of the Parent property to NULL, requesting a default behavior.

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An implementation shall use the value of the Parent property to determine if and which parent resource is required for the requested resource allocation. If no value is specified (NULL), the implementation may decide whether a parent resource is needed and eventually select one itself. If a value is specified, the implementation shall base the resource allocation request on the requested parent resource. If the requested parent resource is not capable to support the requested resource allocation, the implementation shall fail the request.

5.2.7.16 CIM_ResourceAllocationSettingData.Connection[ ] array property

A client may set the value of the Connection[ ] array property to specify connection information for the requested resource allocation. An example of connection information is the target network for a network adaptor or the target switch port for storage adaptors. Connection information is highly dependent on resource type and implementation; for details, refer to the resource-type-specific resource allocation DMTF management profile.

An implementation shall use the values within the Connection[ ] array property to determine connection information for the requested resource allocation. If no value is specified (NULL), the implementation may decide whether the requested resource allocation requires connection information and establish a default connection.

5.2.7.17 CIM_ResourceAllocationSettingData.Address property

A client may set the value of the Address property to specify an address for the new virtual device. In general, the requirement for the value of the Address property will depend on the resource type. For a particular resource type, restrictions on the potential value set may exist.

An implementation shall interpret the value of the Address property such that the new virtual resource adopts that address value while it is instantiated. If no value is specified (NULL), the implementation may assign a value for the Address that is specific to the implementation and resource type.

5.2.7.18 CIM_ResourceAllocationSettingData.MappingBehavior property

A client may set the value of the MappingBehavior property to specify whether the requested resource allocation has an affinity to or is directly based on host resources that are specified in the optional HostResource[ ] array property (see 5.2.7.7). A client may set the value of the MappingBehavior property to NULL or to 0 (Unknown) to request that the implementation shall decide on the mapping behavior. A client shall not specify a value of 1 (Not Supported).

An implementation shall use the value of the MappingBehavior property to determine how the requested resource allocation depends on host resources that are specified in the HostResource[ ] array property.

- If the value is 1 (Not Supported), the implementation shall return a return code that indicates an invalid parameter; see 5.3.
- If the value is not provided (NULL), is 0 (Unknown), or is 1 (Not Supported), the implementation shall establish an implementation-specific default behavior. The resource request may or may not be mapped to or based on host resources depending on the implementation's decision.
- If the value is 2 (Dedicated), the implementation shall establish a direct mapping of the virtual resource onto the resources specified through the HostResource[ ] array property. The implementation may establish a mapping in the resource allocation request resulting from this instance of the CIM_ResourceAllocationSettingData class; however, it is possible that the requested resources are not available at resource allocation time, resulting in an error condition at that time.

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5.3 Methods

This subclause details the requirements for supporting intrinsic operations and extrinsic methods for the CIM elements defined by the profile described in this clause.

5.3.1 CIM_ResourcePoolConfigurationService.CreateChildResourcePool( )

The CIM Schema description of this method applies. This optional method creates (or starts a job to create) a nested resource pool. Refer to the MOF for a detailed description.

If the SupportedSyncMethods property of the associated instance of CIM_ResourcePoolConfigurationCapabilities is set to 3 (CreateChildResourcePool Is Supported), the CreateChildResourcePool( ) method shall be implemented and shall not return a value of 1 or 4096.

If the SupportedAsyncMethods property of the associated instance of CIM_ResourcePoolConfigurationCapabilities is set to 3 (CreateChildResourcePool Is Supported), the CreateChildResourcePool( ) method shall be implemented and shall not return a value of 1.

If neither the SupportedSyncMethods nor the SupportedAsyncMethods property of the associated instance of CIM_ResourcePoolConfigurationCapabilities is set to 3 (CreateChildResourcePool Is Supported), the CreateChildResourcePool( ) method shall not be implemented, or if the method is implemented, it shall return the value 1.

If an implementation supports the resource pool hierarchy device model, it uses this method to create child pools.

Detailed requirements of the CreateChildResourcePool( ) method are specified in Table 3 and Table 4.

No standard messages are defined.

Table 3 – CIM_ResourcePoolConfigurationService.CreateChildResourcePool( ) method: Return code values

Value	Description
0	Job completed with no error
1	Not supported
2	Unknown
3	Timeout
4	Failed
5	Invalid parameter
6	In use
7	Incorrect ResourceType for the pool
8	Insufficient resources
4096	Method parameters checked – job started

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Table 4 – CIM_ResourcePoolConfigurationService.CreateChildResourcePool( ) method: Parameters

Qualifiers	Name	Type	Description/Values
IN	ElementName	String	The desired name of the resource pool
IN	Settings	String	A string representation of a CIM_ResourceAllocationSettingData instance that represents the allocation assigned to this child pool
IN	ParentPool	CIM_ResourcePool REF	The parent pool from which to create this pool
OUT	Pool	CIM_ResourcePool REF	The resulting resource pool
OUT	Job	CIM_ConcreteJob REF	Returned job if started
OUT	Error	String	Encoded error instance if the operation failed and did not return a job

5.3.2 CIM_ResourcePoolConfigurationService.DeleteResourcePool( )

The CIM Schema description of this method applies. This optional method deletes (or starts a job to delete) a resource pool. Refer to the MOF for a detailed description.

If the SupportedSyncMethods property of the associated instance of CIM_ResourcePoolConfigurationCapabilities is set to 4 (DeleteResourcePool Is Supported), the DeleteResourcePool( ) method shall be implemented and shall not return a value of 1 or 4096.

If the SupportedAsyncMethods property of the associated instance of CIM_ResourcePoolConfigurationCapabilities is set to 4 (DeleteResourcePool Is Supported), the DeleteResourcePool( ) method shall be implemented and shall not return a value of 1.

If neither the SupportedSyncMethods nor the SupportedAsyncMethods property of the associated instance of CIM_ResourcePoolConfigurationCapabilities is set to 4 (DeleteResourcePool Is Supported), the DeleteResourcePool( ) method shall not be implemented, or if the method is implemented, it shall return the value 1.

Detailed requirements of the DeleteResourcePool( ) method are specified in Table 5 and Table 6.

No standard messages are defined.

Table 5 – CIM_ResourcePoolConfigurationService.DeleteResourcePool( ) method: Return code values

Value	Description
0	Job completed with no error
1	Not supported
2	Unknown
3	Timeout
4	Failed
5	Invalid parameter
6	In use
7	Incorrect ResourceType for the pool
4096	Method parameters checked – job started

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