Power State Management Profile

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Foreword

The *Power State Management Profile* (DSP1027) was prepared by the Physical Platform Profiles Working Group and the Server Management Working Group of the DMTF.

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124 # Introduction

125 The information in this specification should be sufficient for a provider or consumer of this data to identify
126 unambiguously the classes, properties, methods, and values that must be instantiated and manipulated to
127 describe and control the power state and hardware management for a computer system using the DMTF
128 Common Information Model (CIM) core and extended model definitions. The target audience for this
129 specification is implementers who are writing CIM-based providers or consumers of management
130 interfaces that represent the component described in this document.

131 <h1 style="text-align:center">Power State Management Profile</h1>

1 Scope

The *Power State Management Profile* describes the classes, associations, properties, and methods used to manage the power of a computer system.

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.

Advanced Configuration and Power Interface Specification, 3.0, September 2, 2004,
http://www.acpi.info/DOWNLOADS/ACPIspec30.pdf

DMTF DSP0004, *CIM Infrastructure Specification 2.5,*
http://www.dmtf.org/standards/published_documents/DSP0004_2.5.pdf

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

DMTF DSP0223, Generic Operations 1.0
http://www.dmtf.org/standards/published_documents/DSP0223_1.0.pdf

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

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

ISO, 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

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 parentheses 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.

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

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

170 **3.1**
171 **can**
172 used for statements of possibility and capability, whether material, physical, or causal

173 **3.2**
174 **cannot**
175 used for statements of possibility and capability, whether material, physical, or causal

176 **3.3**
177 **conditional**
178 indicates requirements to be followed strictly in order to conform to the document when the specified
179 conditions are met

180 **3.4**
181 **mandatory**
182 indicates requirements to be followed strictly in order to conform to the document and from which no
183 deviation is permitted

184 **3.5**
185 **may**
186 indicates a course of action permissible within the limits of the document

187 **3.6**
188 **need not**
189 indicates a course of action permissible within the limits of the document

190 **3.7**
191 **optional**
192 indicates a course of action permissible within the limits of the document

193 **3.8**
194 **referencing profile**
195 indicates a profile that owns the definition of this class and can include a reference to this profile in its
196 "Referenced Profiles" table

197 **3.9**
198 **shall**
199 indicates requirements to be followed strictly in order to conform to the document and from which no
200 deviation is permitted

201 **3.10**
202 **shall not**
203 indicates requirements to be followed strictly in order to conform to the document and from which no
204 deviation is permitted

205 **3.11**
206 **should**
207 indicates that among several possibilities, one is recommended as particularly suitable, without
208 mentioning or excluding others, or that a certain course of action is preferred but not necessarily required

209 **3.12**
210 **should not**
211 indicates that a certain possibility or course of action is deprecated but not prohibited

212 **3.13**
213 **unspecified**
214 indicates that this profile does not define any constraints for the referenced CIM element or operation

215 **3.14**
216 **Immediate Power State Change**
217 indicates the power state transition that will be initiated immediately

218 **3.15**
219 **Pending Power State Change**
220 indicates the power state transition that will be initiated sometime in the future

221 **4   Symbols and abbreviated terms**

222 The following abbreviations are used in this document.

223 **4.1**
224 **ACPI**
225 Advanced Configuration and Power Interface

226 **4.2**
227 **CIM**
228 Common Information Model

229 **5   Synopsis**

230 **Profile Name:** Power State Management

231 **Version:** 2.0.1

232 **Organization:** DMTF

233 **CIM Schema Version:** 2.23

234 **Central Class:** CIM_PowerManagementService

235 **Scoping Class:** CIM_ComputerSystem

236 The *Power State Management Profile* extends the management capability of the referencing profiles by
237 adding the capability to describe and manage the power state of computer systems.

238 CIM_PowerManagementService shall be the Central Class of this profile. The instance of
239 CIM_PowerManagementService shall be the Central Instance of this profile. CIM_ComputerSystem shall
240 be the Scoping Class of this profile. The instance of CIM_ComputerSystem with which the Central
241 Instance is associated through an instance of CIM_HostedService or
242 CIM_AssociatedPowerManagementService shall be the Scoping Instance of this profile.

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

244   **Table 1 – Related profiles**

Profile Name	Organization	Version	Requirement	Description
Profile Registration	DMTF	1.0	Mandatory	

245 6   Description

246 The *Power State Management Profile* defines the behavior of the power management service and related
247 classes used to describe and control power state and hardware reset management for a computer
248 system. The profile describes the classes, property values, and methods that constitute a Pending Power
249 State Change and an Immediate Power State Change.

250 The CIM_ComputerSystem class is not part of this profile but is shown for clarification in all the class and
251 instance diagrams.

252 Figure 1 represents the class schema of the *Power State Management Profile* and shows the elements of
253 the *Power State Management Profile*, as well as the dependent relationships between the elements of
254 *Power State Management Profile* and the referencing profiles. For simplicity, the prefix CIM_ has been
255 removed from the names of the classes.
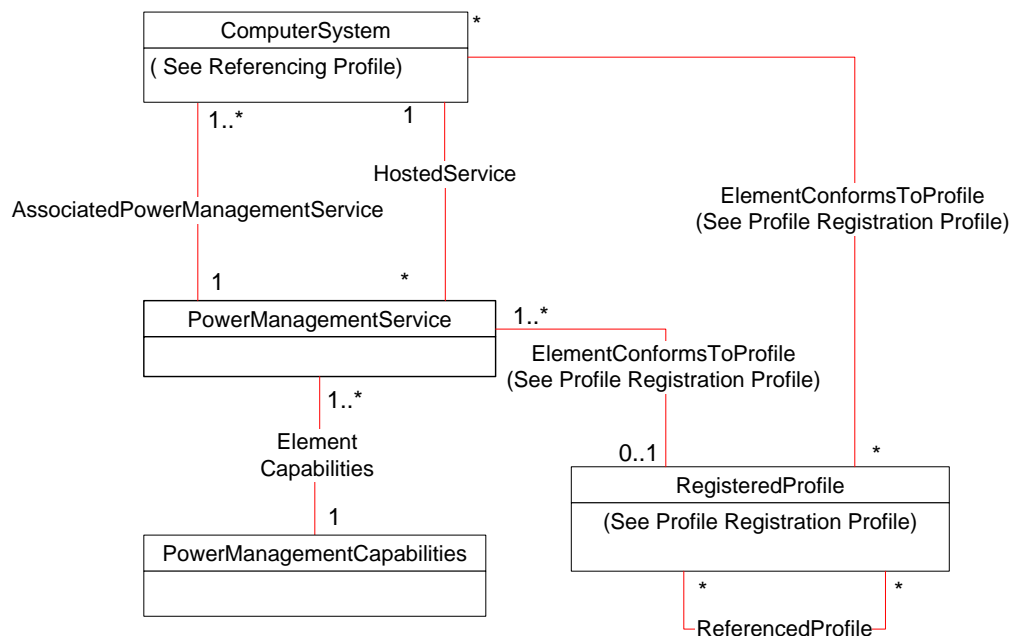
256

257   **Figure 1 – Power State Management Profile: Class diagram**

258 7   Implementation

259 This clause details the requirements related to the arrangement of instances and their properties for
260 implementations of this profile. Methods are listed in clause 8 ("Methods"), and properties are listed in
261 clause 10 ("CIM Elements").

262 **7.1 CIM_PowerManagementService**

263 At least one instance of CIM_PowerManagementService shall be associated with one or more instances
264 of CIM_ComputerSystem through an instance of CIM_AssociatedPowerManagementService. The
265 managed system that is hosting the power management service, represented by an instance of
266 CIM_ComputerSystem, shall be associated with CIM_PowerManagementService through the
267 CIM_HostedService association.

268 **7.1.1 CIM_PowerManagementService.ElementName**

269 The ElementName property shall be formatted as a free-form string of variable length (pattern ".*").

270 **7.2 CIM_PowerManagementCapabilities**

271 One CIM_PowerManagementCapabilities instance shall be associated with one or more instances of
272 CIM_PowerManagementService through the CIM_ElementCapabilities association.

273 **7.2.1 CIM_PowerManagementCapabilities.PowerChangeCapabilities**

274 The PowerChangeCapabilities property array is used to represent the power state related capabilities of
275 the instances of CIM_ComputerSystem associated with the CIM_PowerManagementService instances
276 with which the CIM_PowerManagementCapabilities instance is associated. This property is also used to
277 indicate support for client management of the power state through the
278 CIM_PowerManagementService.RequestPowerStateChange( ) method. When the
279 RequestPowerStateChange( ) method is supported, the PowerChangeCapabilities property array shall
280 contain the value 3 (Power State Settable).

281 When the PowerStatesSupported property contains the value in the "PowerStatesSupported Value"
282 column, the PowerChangeCapabilities property shall contain the value specified in the
283 "PowerChangeCapabilities Value" column.

284 **Table 2 – PowerStatesSupported and PowerChangeCapabilities values**

PowerStatesSupported Value	PowerChangeCapabilities Value
5 (Power Cycle (Off - Soft))	4 (Power Cycling Supported)
9 (Power Cycle (Off-Hard))	6 (Off Hard Power Cycling Supported)
10 (Master Bus Reset)	7 (HW Reset Supported)
11 (Diagnostic Interrupt (NMI))	7 (HW Reset Supported)
12 (Off - Soft Graceful)	8 (Graceful Shutdown Supported)
13 (Off - Hard Graceful)	8 (Graceful Shutdown Supported)
14 (Master Bus Reset Graceful)	7 (HW Reset Supported) and 8 (Graceful Shutdown Supported)
15 (Power Cycle (Off - Soft Graceful))	4 (Power Cycling Supported) and 8 (Graceful Shutdown Supported)
16 (Power Cycle (Off - Hard Graceful))	6 (Off Hard Power Cycling Supported) and 8 (Graceful Shutdown Supported)

285 **7.2.2 CIM_PowerManagementCapabilities.ElementName**

286 The ElementName property shall be formatted as a free-form string of variable length (pattern ".*").

287   **7.2.3   CIM_PowerManagementCapabilities.PowerStatesSupported**

288   The PowerStatesSupported property array is used to represent the power states that are supported by
289   the associated computer system.

290   **7.2.4   CIM_PowerManagementCapabilities.RequestedPowerStatesSupported**

291   The RequestedPowerStatesSupported property is an array that contains the supported requested power
292   states for the instance of CIM_PowerManagementService. This property shall contain the values to be
293   used as the PowerState parameter in the RequestPowerStateChange() (see 8.1). This property
294   represents a subset of the power states modeled by the property PowerStatesSupported.

295   **7.3   CIM_AssociatedPowerManagementService.PowerState**

296   The PowerState property indicates the current power state of the associated computer system
297   represented by an instance of CIM_ComputerSystem. The PowerState property shall have one of the
298   values specified in the PowerStatesSupported property of the instance of
299   CIM_PowerManagementCapabilities that is associated with the instance of
300   CIM_PowerManagmentService that is referenced by the CIM_AssociatedPowerManagementService
301   association.

302   The RequestPowerStateChange( ) method of the CIM_PowerManagementService shall be used to
303   change the value of the PowerState property.

304   **7.3.1   Power states values**

305   Table 3 specifies the correspondence between CIM_AssociatedPowerManagementService.PowerState
306   property values and standard ACPI power states. The value of the PowerState property shall have the
307   same meaning as the corresponding ACPI state in Table 3. Note that it is not necessary for the managed
308   system to actually support the ACPI specification. The PowerState values not represented in Table 3 do
309   not have any corresponding ACPI power states.

310   **Table 3 – PowerState values and ACPI states**

PowerState enum Value	Description	Corresponding ACPI State
2 (On)	System is fully on.	G0 (S0)
3 (Sleep - Light)	System is in Standby or Sleep state.	G1 (S1 or S2)
4 (Sleep -Deep)	System is in Standby or Sleep state.	G1 (S3)
6 (Off - Hard)	System is powered off except for the real-time clock, power consumption is zero.	G3
7 (Hibernate (Off - Soft))	System is in hibernation. System context and OS image was written to non-volatile storage. System and devices are powered off.	G1 (S4)
8 (Off - Soft)	System is powered off where the system consumes a minimal amount of power..	G2 (S5)

311   **7.4   Representing power state changes**

312   The CIM_AssociatedPowerManagementService.RequestedPowerState property indicates the requested
313   power state of the associated computer system.

314   The CIM_AssociatedPowerManagementService.PowerOnTime property indicates the date-time that the
315   power state change indicated by the RequestedPowerState property was or will be initiated. When the
316   PowerOnTime property is non-Null, the value shall be a date-time and shall not specify a time interval. A

317 value of Null for the PowerOnTime property shall indicate that the last power state change was initiated
318 immediately or shall indicate that the last requested time to initiate the power state change is unknown.

319 When the Pending Power State Change exists for the instance of CIM_ComputerSystem that is
320 referenced by the CIM_AssociatedPowerManagementService association, the RequestedPowerState
321 property shall have the value of 2 (On), 3 (Sleep - Light), 4 (Sleep -Deep), 5 (Power Cycle (Off - Soft)), 6
322 (Off - Hard), 7 (Hibernate (Off - Soft)), 8 (Off - Soft), 9 (Power Cycle (Off-Hard)), 10 (Master Bus Reset),
323 11 (Diagnostic Interrupt (NMI)), 12 (Off - Soft Graceful), 13 (Off - Hard Graceful), 14 (Master Bus Reset
324 Graceful), 15 (Power Cycle (Off - Soft Graceful)), or 16 (Power Cycle (Off - Hard Graceful)) and the value
325 of the PowerOnTime property shall identify a date-time in the future.

326 When a Power State Change is in progress for the instance of CIM_ComputerSystem that is referenced
327 by the CIM_AssociatedPowerManagementService association, the TransitioningToPowerState property
328 shall have the value of 2 (On), 3 (Sleep - Light), 4 (Sleep -Deep), 5 (Power Cycle (Off - Soft)), 6 (Off -
329 Hard), 7 (Hibernate (Off - Soft)), 8 (Off - Soft), 9 (Power Cycle (Off-Hard)), 10 (Master Bus Reset), 11
330 (Diagnostic Interrupt (NMI)), 12 (Off - Soft Graceful), 13 (Off - Hard Graceful), 14 (Master Bus Reset
331 Graceful), 15 (Power Cycle (Off - Soft Graceful)), or 16 (Power Cycle (Off - Hard Graceful)).

332 The RequestedPowerState, TransitioningToPowerState, and PowerOnTime properties are affected by
333 the invocation of the CIM_PowerManagementService.RequestPowerStateChange( ) method; see 8.1.

334 The difference between 14 (Master Bus Reset Graceful) and 15 (Power Cycle (Off-Soft Graceful)) may
335 not be discernible and should be treated as equivalent.

336 7.5 Representing In-Progress power state transitions

337 The representation of In-Progress power state transitions can be optionally supported. The
338 TransitioningToPowerState property is used to represent current power state transition in progress.

339 If the In-Progress power state transitions are not modeled, then the
340 CIM_AssociatedPowerManagementService.TransitioningToPowerState property shall be NULL.

341 If the In-Progress power state transitions are modeled, then the
342 AssociatedPowerManagementService.TransitioningToPowerState shall be non-NULL.

343 If the CIM_AssociatedPowerManagementService.TransitioningToPowerState is non-NULL, and a power
344 state transition is not in progress, the
345 CIM_AssociatedPowerManagementService.TransitioningToPowerState property shall have the value 19
346 (No Change).

347 If the CIM_AssociatedPowerManagementService.TransitioningToPowerState is non-NULL, does not
348 have the value 19 (No Change) which represents a state transition in progress, the
349 CIM_AssociatedPowerManagementService.PowerState property shall have the value 0 (Unknown).

350 7.6 Representing available requested power states

351 The representation of available requested power states can be optionally supported. The
352 AvaliableRequestedPowerStates property is an array that contains the currently available power states
353 that can be used as the PowerState parameter of the
354 CIM_PowerManagementService.RequestPowerStateChange( ) method for the instance of
355 CIM_PowerManagementService.

356 If available requested power states are not modeled, then the
357 CIM_AssociatedPowerManagementService.AvailableRequestedPowerStates property shall be NULL.

358   If available requested power states are modeled, then the
359   CIM_AssociatedPowerManagementService.AvailableRequestedPowerStates property shall be non-
360   NULL.

361   If CIM_AssociatedPowerManagementService.AvailableRequestedPowerStates is non-NULL, it shall
362   contain zero or more of the values contained in the
363   CIM_PowerManagementCapabilities.RequestedPowerStatesSupported property of the instance of
364   CIM_PowerManagementCapabilities associated with the CIM_PowerManagementService instance,
365   where zero number of values indicates that there are no available requested power states.

366   The CIM_AssociatedPowerManagementService.AvailableRequestedPowerStates shall not contain any
367   values that are not contained in the
368   CIM_PowerManagementCapabilities.RequestedPowerStatesSupported property of the instance of
369   CIM_PowerManagementCapabilities associated with the CIM_PowerManagementService instance.

370   Each value shall be contained in the
371   CIM_AssociatedPowerManagementService.AvailableRequestedPowerStates property only if an
372   invocation of the CIM_PowerManagementService.RequestPowerStateChange() method where the
373   PowerState parameter equals the value would complete successfully.

374   8   Methods

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

377   8.1   CIM_PowerManagementService.RequestPowerStateChange( )

378   The RequestPowerStateChange() method is used to set the power state that the user wants for the
379   target computer system and when that system should be put into the new state. The
380   PowerChangeCapabilities property array of the associated instance of
381   CIM_PowerManagementCapabilities is used to represent the capabilities of the
382   RequestPowerStateChange() method. When this method is supported, the PowerChangeCapabilities
383   property shall contain the value 3 (Power State Settable).

384   RequestPowerStateChange() method return code values shall be as specified in Table 4.
385   RequestPowerStateChange() method parameters are specified in Table 5.

386   Invoking the RequestPowerStateChange() method multiple times could result in earlier requests being
387   overwritten or lost.

388   No standard messages are defined for this method.

389   **Table 4 – CIM_PowerManagementService.RequestPowerStateChange( ) Method: Return code**
390   **values**

Value	Description
0	The initiation of Pending/Immediate Power State Change was successful.
1	Method is not supported in the implementation.
2	Error occurred
4096	Job started: REF returned to started CIM_ConcreteJob

391   **Table 5 – CIM_PowerManagementService.RequestPowerStateChange( ) method: Parameters**

Qualifiers	Name	Type	Description/Values
IN	PowerState	uint16	See 8.1.3.
IN	ManagedElement	CIM_ComputerSystem REF	See 8.1.4.
IN	Time	Datetime	See 8.1.5.
OUT	Job	CIM_ConcreteJob REF	See 8.1.6.
IN	TimeoutPeriod	Datetime	See 8.1.7.

392   ### 8.1.1   Establishing a Pending Power State Change

393   The RequestPowerStateChange( ) method can be invoked with the Time parameter specified, which will
394   result in establishing the Pending Power State Change. The Pending Power State Change will be
395   reflected in the PowerOnTime and RequestedPowerState properties of the instance of
396   CIM_AssociatedPowerManagementService that references the CIM_PowerManagementService and the
397   instance of CIM_ComputerSystem that is represented by the ManagedElement parameter.

398   The TimeoutPeriod and Time parameters shall not be supported for the same invocation of the
399   RequestPowerStateChange( ) method. When the TimeoutPeriod and Time parameters are specified for
400   the same method invocation, the method shall return a value of 2.

401   When the method invocation is to establish the Pending Power State Change, the method may return the
402   Job output parameter and return a value of 4096. When the method invocation returns the Job output
403   parameter, the status of the referenced CIM_Job instance shall reflect the status of the attempt to
404   establish the Pending Power State Change. When the method invocation does not return the Job output
405   parameter, the method completion shall be synchronous with the establishment of the Pending Power
406   State Change.

407   ### 8.1.2   Initiating an Immediate Power State Change

408   The RequestPowerStateChange( ) method may be invoked without the Time parameter, which will result
409   in the immediate initiation of a power state change. This clause describes requirements for when the
410   Time parameter is not specified.

411   When the method invocation is to initiate the Immediate Power State Change, the method may return the
412   Job output parameter and a return code value of 4096. When the method invocation returns the Job
413   output parameter, the status of the referenced CIM_Job instance shall reflect the status of the initiated
414   power state change request. When the method invocation does not return the Job output parameter, the
415   method completion shall be synchronous with the initiation of the Immediate Power State Change.

416   **8.1.3   PowerState**

417   The PowerState parameter indicates the desired power state of the computer system. When the value
418   used for the PowerState parameter is not equal to one of the values in the PowerStatesSupported
419   property array of the associated instance of CIM_PowerManagementCapabilities, the method shall return
420   2. When the value used for the PowerState parameter is not equal to one of the values in the
421   RequestedPowerStatesSupported property of the associated instance of
422   CIM_PowerManagementCapabilities, the method shall return 2.

423   When the value 5 (Power Cycle (Off - Soft)) or the value 15 (Power Cycle (Off - Soft Graceful)) is
424   supported for the PowerState parameter, the PowerChangeCapabilities property array of the associated
425   instance of CIM_PowerManagementCapabilities shall contain the value 4 (Power Cycling Supported).

426   When the value 9 (Power Cycle (Off-Hard)) or the value 16 (Power Cycle (Off-Hard Graceful)) is
427   supported for the PowerState parameter, the PowerChangeCapabilities property array of the associated
428   instance of CIM_PowerManagementCapabilities shall contain the value 6 (Off Hard Power Cycling
429   Supported).

430   When the values 10 (Master Bus Reset) or 11 (Diagnostic Interrupt (NMI)) are supported for the
431   PowerState parameter, the PowerChangeCapabilities property array of the associated instance of
432   CIM_PowerManagementCapabilities shall contain the value 7 (HW Reset Supported).

433   When the value 12 (Power Off - Soft Graceful), 13 (Power Off - Hard Graceful), 14 (Master Bus Reset
434   Graceful), 15 (Power Cycle (Off - Soft Graceful)), or 16 (Power Cycle (Off - Hard Graceful)), is supported
435   for the PowerState parameter, the PowerManagementCapabilities property array of the associated
436   instance of CIM_PowerManagementCapabilities shall contain the value 8 (Graceful Shutdown
437   Supported).

438   When the CIM_PowerManagementService.RequestPowerStateChange( ) method returns a value of 0 or
439   4096, the RequestedPowerState property of the instance of CIM_AssociatedPowerManagementService
440   that references the CIM_PowerManagementService instance and the CIM_ComputerSystem instance
441   indicated by the ManagedElement parameter shall be set to the value of the PowerState parameter of the
442   method.

443   The values of CIM_PowerManagementService.RequestPowerStateChange( ) method PowerState
444   parameter shall have the meaning specified in Table 6.

445   **Table 6 – PowerState parameter values**

446

PowerState enum Value	Description
2 (Power On)	Initiate the transition of the system to full on state (corresponding ACPI state G0/S0).
3 (Sleep - Light)	Initiate the transition of the system to standby or sleep state (corresponding ACPI state G1/S1 or G1/S2).
4 (Sleep - Deep)	Initiate the transition of the system to standby or sleep state (corresponding ACPI state G1/S3).
5 (Power Cycle (Off Soft))	Transition the system to off state (corresponding ACPI state G2/S5), in which the system consumes a minimal amount of power, followed by a transition to on state (corresponding ACPI state G0/S0).

PowerState enum Value	Description
6 (Power Off - Hard)	Initiate the transition of the system to power off state (corresponding ACPI state G3), in which the power consumption is zero except for the real-time clock.
7 (Hibernate)	Transition the system to hibernation state (corresponding ACPI state G1/S4) – write system context to non-volatile storage, power off the system and devices.
8 (Power Off - Soft)	Initiate the transition of the system to off state (corresponding ACPI state G2/S5), in which the system consumes a minimal amount of power.
9 (Power Cycle (Off Hard))	Transition the system to power off state (corresponding ACPI state G3), in which the power consumption is zero except for the real-time clock, followed by a transition to on state (corresponding ACPI state G0/S0).
10 (Master Bus Reset)	Perform hardware reset on the system.
11 (Diagnostic Interrupt (NMI))	Assert an NMI on the system.
12 (Power Off - Soft Graceful)	Perform an orderly transition to power off state (corresponding ACPI state G2/S5), in which the system consumes a minimal amount of power.
13 (Power Off - Hard Graceful)	Perform an orderly transition to power off state (corresponding ACPI state G3), in which the power consumption is zero except for the real-time clock.
14 (Master Bus Reset Graceful)	Perform an orderly shutdown of the system followed by hardware reset.
15 (Power Cycle (Off - Soft Graceful))	Perform an orderly transition of the system to power off state (corresponding ACPI state G2/S5), in which the system consumes a minimal amount of power, followed by a transition to on state (corresponding ACPI state G0/S0).
16 (Power Cycle (Off - Hard Graceful))	Perform an orderly transition of the system to power off state (corresponding ACPI state G3), in which the power consumption is zero except for the real-time clock, followed by a transition to on state (corresponding ACPI state G0/S0).

447

8.1.4 ManagedElement

449 The ManagedElement parameter indicates the reference to the instance of CIM_ComputerSystem that
450 represents the target computer system whose power state is to be set.

451 If the instance of CIM_ComputerSystem is not associated with the instance of
452 CIM_PowerManagementService through the CIM_AssociatedPowerManagementService association, the
453 RequestPowerStateChange( ) method shall return 2 (Error Occurred).

454 **8.1.5   Time**

455 The Time parameter is used to set the power state of the managed system at a certain time and can be
456 used only to set the power state to On or Power Cycle. The Time parameter shall be supported when the
457 PowerChangeCapabilities property array of the associated instance of
458 CIM_PowerManagementCapabilities contains the value 5 (Timed Power On Supported). The Time
459 parameter shall not be supported when the PowerState parameter has any value other than 2 (Power
460 On), 5 (Power Cycle (Off Soft)) 9 (Power Cycle (Off Hard)), 15 (Power Cycle (Off-Soft Graceful)), or 16
461 (Power Cycle (Off-Hard Graceful)). When the Time parameter is specified and is not supported, the
462 method shall return a value of 2.

463 When the Time parameter is specified and the method returns a value of 0, the PowerOnTime property of
464 the CIM_AssociatedPowerManagementService association that references the CIM_ComputerSystem
465 instance identified by the ManagedElement parameter and references the
466 CIM_PowerManagementService instance shall have the date-time value that indicates when the
467 computer system will undergo the power state change indicated by the PowerState parameter. When the
468 Time parameter complies with the interval format of the Datetime data type, the interval value indicated
469 by the Time parameter shall be interpreted relative to the current date-time and the calculated absolute
470 date-time shall be the value of the PowerOnTime property. When the Time parameter complies with the
471 timestamp format of the Datetime data type, the PowerOnTime property shall have the value of the Time
472 parameter.

473 When the Time parameter is either Null or 0, an immediate initiation of the power state change shall
474 occur.

475 **8.1.6   Job**

476 The Job is an OUT parameter. It is a reference to the instance of CIM_Job that represents the job or task
477 that may be started by the invocation of the RequestPowerStateChange( ) method.

478 The method may return the Job output parameter and a return code value of 4096 when the parameters
479 for the method have been validated, regardless of whether the method will create a Pending Power State
480 Change or an Immediate Power State Change.

481 **8.1.7   TimeoutPeriod**

482 The TimeoutPeriod parameter specifies the maximum amount of time that the client allows the
483 RequestPowerStateChange( ) method to complete execution.

484 If the TimeoutPeriod parameter is specified and the value is not in the interval format of the Datetime data
485 type, the method shall return a value of 2. If the TimeoutPeriod parameter is specified and the
486 implementation is able to determine if the power state change will take more time than the TimeoutPeriod
487 parameter, the method shall return a value of 2. A value of 0 or Null for the TimeoutPeriod shall indicate
488 that no timeout requirements exist.

489 **8.2   Profile conventions for operations**

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

492 The default list of operations is as follows:

493   • GetInstance

494   • Associators

495   • AssociatorNames

496   • References

497 • ReferenceNames

498 • EnumerateInstances

499 • EnumerateInstanceNames

500 **8.3 CIM_PowerManagementService**

501 All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

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

503 **8.4 CIM_PowerManagementCapabilities**

504 All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

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

506 **8.5 CIM_AssociatedPowerManagementService**

507 Table 7 lists implementation requirements for operations. If implemented, these operations shall be
508 implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 7, all operations in
509 the default list in 8.2 shall be implemented as defined in DSP0200.

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

511 **Table 7 – Operations: CIM_AssociatedPowerManagementService**

Operation	Requirement	Messages
ModifyInstance	Optional. See 8.5.1.	None
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

512 **8.5.1 CIM_AssociatedPowerManagementService—ModifyInstance**

513 When the ModifyInstance operation is supported for an instance of
514 CIM_AssociatedPowerManagementService, the ModifyInstance operation shall not modify the following
515 properties:

516 • PowerState

517 • OtherPowerState

518 • PowerOnTime

519 • RequestedPowerState

520 These properties can be affected by the invocation of the RequestPowerStateChange( ) method; see 8.1.

521 **8.6 CIM_ElementCapabilities**

522 Table 8 lists implementation requirements for operations. If implemented, these operations shall be
523 implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 8, all operations in
524 the default list in 8.2 shall be implemented as defined in DSP0200.

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

526 **Table 8 – Operations: CIM_ElementCapabilities**

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

527 8.7 CIM_HostedService

528 Table 9 lists implementation requirements for operations. If implemented, these operations shall be
529 implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 9, all operations in
530 the default list in 8.2 shall be implemented as defined in DSP0200.

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

532 **Table 9 – Operations: CIM_HostedService**

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

533 9 Use cases

534 This clause contains object diagrams and use cases for the *Power State Management Profile*.

535 9.1 Object diagrams

536 This clause contains object diagrams for the *Power State Management Profile.* For simplicity, the prefix
537 CIM_ has been removed from the names of the classes in the diagrams.

538 9.1.1 Advertising the profile conformance

539 Figure 2 represents a possible instantiation of the *Power State Management Profile*. In this instantiation,
540 the managed system, system1, hosts a power management service, pwrmgtsvc1. system1 is also the
541 scoping instance for pwrmgtsvc1. Thus, following the CIM_ElementConformsToProfile association to
542 profile1 and then the referenced CIM_ReferencedProfile association to profile2, the client can retrieve
543 profile2. profile2 will show the version of the current *Power State Management Profile* implementation.

544
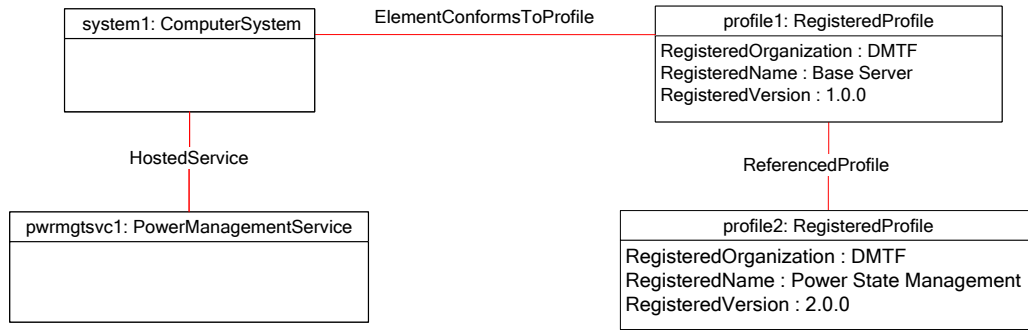
Figure 2 – Registered Profile

545

546   **9.1.2   Monolithic system**

547   Figure 3 shows the CIM instances required to control power for a single, monolithic system, system1.
548   system1 hosts the power management service, pwrmgtsvc1, which manages the power for system1.
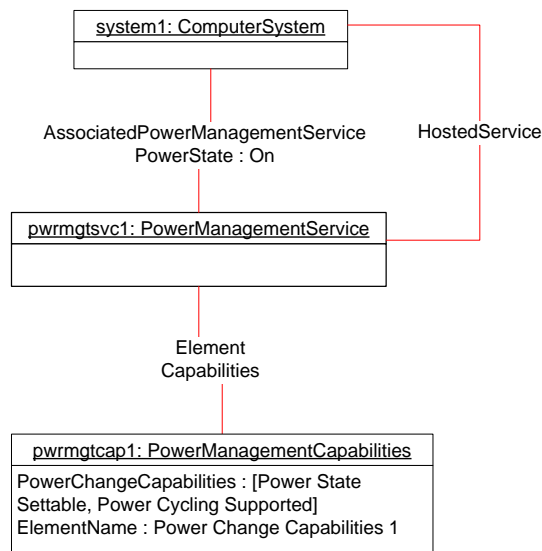
549

550   **Figure 3 – Power control instance diagram: Monolithic system**

551 **9.1.3 Monolithic system with service processor**

552 Figure 4 shows the CIM instances required to control power for a monolithic system with an attached
553 service processor. The power management service, pwrmgtsvc1, hosted by the service processor, sp1, is
554 responsible for managing the power of the system, system1. Optionally, the service processor may host
555 another power management service, pwrmgtsvc2, to control its own power.

556 A service processor in this sense may be an add-in remote management component or an integrated
557 baseboard management controller.
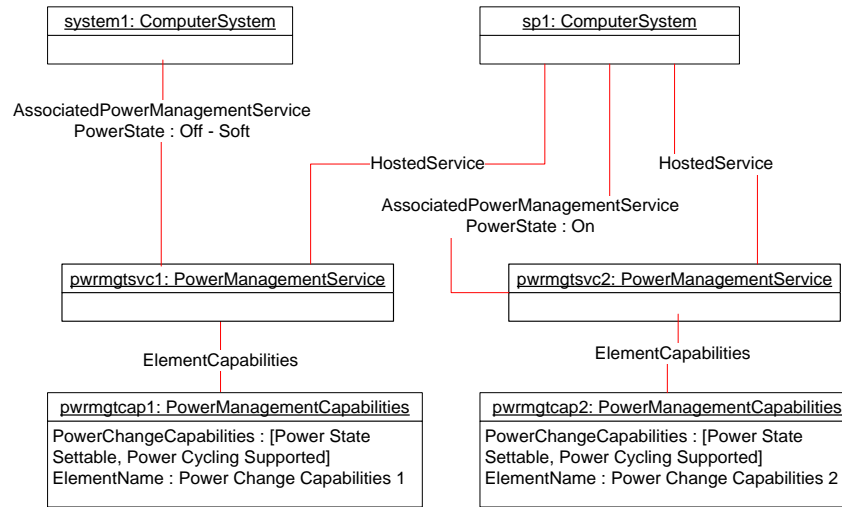
558

559 **Figure 4 – Power control instance diagram: Monolithic system with service processor**

560 **9.1.4 Modular system with chassis service processor**

561 Figure 5 shows the CIM instances required to represent a modular computer system. The chassis
562 manager, chassismgr1, hosts one or more power management services (pwrmgtsvc2) to control the
563 power of all the blade systems. Optionally, the chassis manager may host another power management
564 service (pwrmgtsvc1) to control its own power.

565

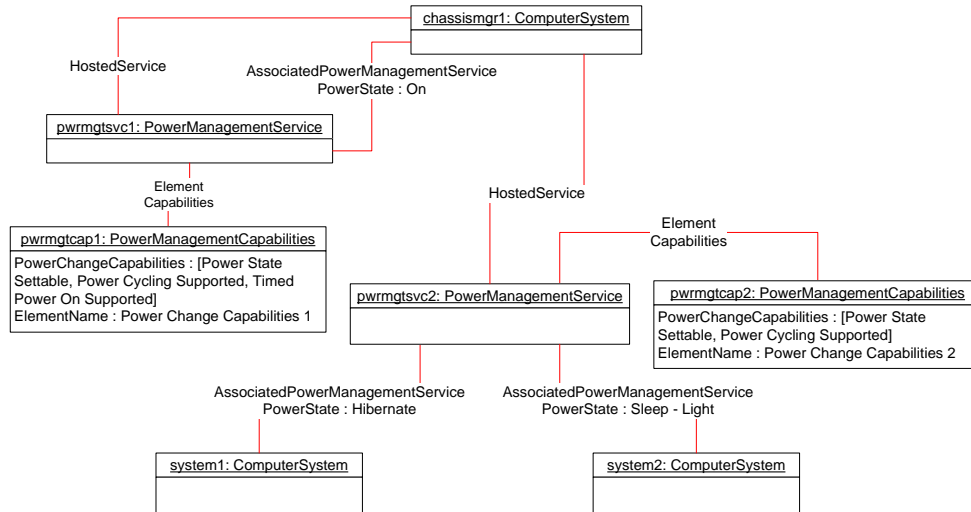566 **Figure 5 – Power control instance diagram: Modular system with chassis service processor**

567 **9.2 Determine the power state of the computer system**

568 A client can determine the power state of the computer system as follows:

569 For the instance of CIM_ComputerSystem that represents the given computer system, select the
570 referencing instance of CIM_AssociatedPowerManagementService.

571 The PowerState property of the referencing instance of CIM_AssociatedPowerManagementService
572 represents the power state of the computer system.

573 **9.3 Find the power management service for a computer system**

574 A client can find the power management service for a computer system as follows:

575 For the instance of CIM_ComputerSystem that represents the given computer system, select the instance
576 of CIM_PowerManagementService that represents the power management service for the computer
577 system through the CIM_AssociatedPowerManagementService association.

578 **9.4 Find all the computer systems for a power management service**

579 A client can find all the computer systems for a power management service as follows:

580 For the instance of CIM_PowerManagementService that represents the given power management
581 service, select all of the instances of CIM_ComputerSystem that are associated with it through the
582 CIM_AssociatedPowerManagementService association.

583 **9.5   Change the power state of the computer system**

584   A client can change the power state of the computer system as follows:

585   1)   Navigate from the target instance of CIM_ComputerSystem to the instance of
586   CIM_PowerManagementService that represents the service that manages that system by using
587   the CIM_AssociatedPowerManagementService association.

588   2)   Invoke the RequestPowerStateChange( ) method of the instance of
589   CIM_PowerManagementService with an argument that contains the PowerState action
590   appropriate to the operation.

591 **9.6   Determine whether the power cycle is supported for a computer system**

592   A client can determine whether Power Cycle is supported for a computer system as follows:

593   1)   Navigate from the target instance of CIM_ComputerSystem to the instance of
594   CIM_PowerManagementService using the CIM_AssociatedPowerManagementService
595   association.

596   2)   Using the instance of CIM_PowerManagementService, navigate to the instance of
597   CIM_PowerManagementCapabilities through the CIM_ElementCapabilities association.

598   If the PowerChangeCapabilities property array contains the value 4 (Power Cycling Supported), Power
599   Cycle shall be supported for the computer system.

600 **9.7   Execute Power Cycle (Off–Soft) within a given time**

601   A client can execute Power Cycle (Off–Soft) within a given time as follows:

602   1)   Navigate from the target instance of CIM_ComputerSystem to the instance of
603   CIM_PowerManagementService using the CIM_AssociatedPowerManagementService
604   association.

605   2)   Invoke the RequestPowerStateChange( ) method of the instance of
606   CIM_PowerManagementService with the Power State argument set to 5 (Power Cycle (Off–
607   Soft)) and the TimeoutPeriod argument set to "t".

608 **9.8   Execute Power Cycle (Off–Soft Graceful)**

609   A client can determine whether Power Cycle and Graceful Shutdown is supported for a computer system
610   as follows:

611   1)   Navigate from the target instance of CIM_ComputerSystem to the instance of
612   CIM_PowerManagementService using the CIM_AssociatedPowerManagementService
613   association.

614   2)   Using the instance of CIM_PowerManagementService, navigate to the instance of
615   CIM_PowerManagementCapabilities through the CIM_ElementCapabilities association.

616   If the PowerChangeCapabilities property array contains the value 4 (Power Cycling Supported) and 8
617   (Graceful Shutdown Supported), Power Cycle and Graceful Shutdown shall be supported for the
618   computer system.

619 If the Power Cycle and Graceful Shutdown is supported, then a client can execute Power Cycle (Off−Soft
620 Graceful) as follows:

1) Navigate from the target instance of CIM_ComputerSystem to the instance of
CIM_PowerManagementService using the CIM_AssociatedPowerManagementService
association.

2) Invoke the RequestPowerStateChange( ) method of the instance of
CIM_PowerManagementService with the Power State argument set to 15 (Power Cycle (Off−
Soft Graceful))

9.9 Display power states that can potentially be requested

628 A client can display the potential power states that can be requested on the computer system as follows:

1) For the instance of CIM_ComputerSystem that represents the given computer system, select
the referencing instance of CIM_AssociatedPowerManagementService.

2) Using the instance of CIM_PowerManagementService, navigate to the instance of
CIM_PowerManagementCapabilities through the CIM_ElementCapabilities association.

3) The RequestedPowerStatesSupported property of the instance of
CIM_PowerManagementCapabilities represents the power states that can potentially be
requested on the computer system.

4) The CIM_ AssociatedPowerManagementService.AvailableRequestedPowerStates property
contains a subset of power state values from the
CIM_PowerManagementCapabilities.RequestedPowerStatesSupported property. This subset
represents currently available power state values for power state change requests, and it may
change dynamically based on the current state of the computer system. A client application
should use these properties to provide some visible differentiation between the available and
unavailable power state values.

9.10 Determine the available power states that can be requested

644 A client can determine the available power states that that can be requested on the computer system as
645 follows:

1) For the instance of CIM_ComputerSystem that represents the given computer system, select
the referencing instance of CIM_AssociatedPowerManagementService.

2) The AvailableRequestedPowerStates property of the referencing instance of
CIM_AssociatedPowerManagementService represents the power states that can be currently
requested on the computer system.

9.11 Change the power state of the computer system based on available power states

653 A client can change the power state of the computer system based on the current power state and the
654 available power states that can be requested as follows:

1) For the instance of CIM_ComputerSystem that represents the given computer system, select
the referencing instance of CIM_AssociatedPowerManagementService.

2) Navigate from the target instance of CIM_ComputerSystem to the instance of
CIM_PowerManagementService that represents the service that manages that system by using
the CIM_AssociatedPowerManagementService association.

3) Invoke the RequestPowerStateChange( ) method of the instance of
CIM_PowerManagementService with an argument that contains the PowerState with a value

662   that is one of the values in the AvailableRequestedPowerStates property of the
663   CIM_AssociatedPowerManagementService instance.

664   **10 CIM Elements**

665 Table 10 shows the instances of CIM Elements for this profile. Instances of the CIM Elements shall be
666 implemented as described in Table 10. Clauses 7 ("Implementation") and 8 ("Methods") may impose
667 additional requirements on these elements.

668   **Table 10 – CIM Elements: Power State Management Profile**

Element Name	Requirement	Description
Classes		
PowerManagementCapabilities	Mandatory	See 7.2 and 10.1.
PowerManagementService	Mandatory	See 7.1 and 10.2.
AssociatedPowerManagementService	Mandatory	See 10.3.
ElementCapabilities	Mandatory	See 10.4.
HostedService	Mandatory	See 10.5.
RegisteredProfile	Mandatory	See 10.6.
Indications		
None defined in this profile		

669   **10.1 CIM_PowerManagementCapabilities**

670 CIM_PowerManagementCapabilities represents the power management capabilities of a computer
671 system. Table 11 contains the requirements for elements of this class.

672   **Table 11 – Class: CIM_PowerManagementCapabilities**

Elements	Requirement	Notes
InstanceID	Mandatory	**Key**
PowerChangeCapabilities	Mandatory	See 7.2.1.
ElementName	Mandatory	See 7.2.2.
PowerStatesSupported	Mandatory	See 7.2.3.
RequestedPowerStatesSupported	Mandatory	See 7.2.4.

673   **10.2 CIM_PowerManagementService**

674 CIM_PowerManagementService represents the power management service responsible for controlling
675 the power of a computer system. Table 12 contains the requirements for elements of this class.

676   **Table 12 – Class: CIM_PowerManagementService**

Elements	Requirement	Notes
CreationClassName	Mandatory	**Key**
Name	Mandatory	**Key**
ElementName	Mandatory	See 7.1.1.
RequestPowerStateChange( )	Conditional	See 8.1.

677 **10.3 CIM_AssociatedPowerManagementService**

678 CIM_AssociatedPowerManagementService associates the CIM_ComputerSystem instance that
679 represents the target computer system with the CIM_PowerManagementService instance that represents
680 the service responsible for controlling the power of a computer system. Table 13 contains the
681 requirements for elements of this class.

682 **Table 13 – Class: CIM_AssociatedPowerManagementService**

Elements	Requirement	Notes
ServiceProvided	Mandatory	**Key** Cardinality 1
UserOfService	Mandatory	**Key** Cardinality *
PowerState	Mandatory	See 7.3.
RequestedPowerState	Conditional	See 7.4.
PowerOnTime	Conditional	See 7.4.
TransitioningToPowerState	Optional	See 7.5.
AvailableRequestedPowerStates	Optional	See 7.6.

683 **10.4 CIM_ElementCapabilities**

684 CIM_ElementCapabilities associates the CIM_PowerManagementService instance that represents the
685 service responsible for controlling the power of a computer system with the
686 CIM_PowerManagementCapabilities instance that represents the power management capabilities of a
687 computer system. Table 14 contains the requirements for elements of this class.

688 **Table 14 – Class: CIM_ElementCapabilities**

Elements	Requirement	Notes
ManagedElement	Mandatory	This property shall be a reference to the instance of CIM_PowerManagementService. Cardinality 1..*
Capabilities	Mandatory	This property shall be a reference to the instance of CIM_PowerManagementCapabilities. Cardinality 1

689 ## 10.5 CIM_HostedService

690 CIM_HostedService associates the CIM_ComputerSystem instance with the
691 CIM_PowerManagementService instance that it hosts. Table 15 contains the requirements for elements
692 of this class.

693 **Table 15 – Class: CIM_HostedService**

Elements	Requirement	Notes
Antecedent	Mandatory	This property shall be a reference to the instance of CIM_ComputerSystem. Cardinality 1..*
Dependent	Mandatory	This property shall be a reference to the instance of CIM_PowerManagementService. Cardinality *

694 ## 10.6 CIM_RegisteredProfile

695 CIM_RegisteredProfile is defined by the *Profile Registration Profile*. The requirements denoted in
696 Table 16 are in addition to those mandated by the *Profile Registration Profile*.

697 **Table 16 – Class: CIM_RegisteredProfile**

Elements	Requirement	Notes
RegisteredName	Mandatory	This property shall have a value of "Power State Management".
RegisteredVersion	Mandatory	This property shall have a value of "2.0.1".
RegisteredOrganization	Mandatory	This property shall have a value of 2 (DMTF).

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

701 <div align="center">**ANNEX A**</div>
702 <div align="center">**(informative)**</div>
703
704 <div align="center">**Change log**</div>

Version	Date	Description
1.0.0	2008-04-11	
1.0.2	2008-12-12	Added RequestedPowerStatesSupported property to PowerManagementCapabilities.
2.0.0	2009-12-14	Added TransitioningToPowerState and AvaliableRequestedPowerStates properties to CIM_AssociatedPowerManagementService. Fixed Table 3 on ACPI to PowerState property mapping. Added a table on the meaning of PowerState parameter of RequestPowerStateChange( ) method. Addressed PPP WG ballot and TC ballot comments.
2.0.1	2016-04-24	Add clarification in clause 7.4 on the discernibility between 14 (Master Bus Reset Graceful) and 15 (Power Cycle (Off-Soft Graceful)). Allow scope from either.

705

706