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Power State Management Profile

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CONTENTS

Figures

Tables

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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Introduction

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

Power State Management Profile

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 references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) 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 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

For the purposes of this document, the terms and definitions in DSP1033 and DSP1001 and the following terms and definitions apply.

3.1
can
used for statements of possibility and capability, whether material, physical, or causal

3.2
cannot
used for statements of possibility and capability, whether material, physical, or causal

3.3
conditional
indicates requirements to be followed strictly in order to conform to the document when the specified conditions are met

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

3.5
may
indicates a course of action permissible within the limits of the document

3.6
need not
indicates a course of action permissible within the limits of the document

3.7
optional
indicates a course of action permissible within the limits of the document

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

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

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

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

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

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

3.14
Immediate Power State Change
indicates the power state transition that will be initiated immediately

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

4 Symbols and Abbreviated Terms

The following abbreviations are used in this document.

4.1
ACPI
Advanced Configuration and Power Interface

4.2
CIM
Common Information Model

5 Synopsis

Profile Name: Power State Management

Version: 2.0.0

Organization: DMTF

CIM Schema Version: 2.23

Central Class: CIM_PowerManagementService

Scoping Class: CIM_ComputerSystem

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

CIM_PowerManagementService shall be the Central Class of this profile. The instance of CIM_PowerManagementService shall be the Central Instance of this profile. CIM_ComputerSystem shall be the Scoping Class of this profile. The instance of CIM_ComputerSystem with which the Central Instance is associated through an instance of CIM_HostedService shall be the Scoping Instance of this profile.

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

Table 1 – Related Profiles

Profile Name	Organization	Version	Requirement	Description
Profile Registration	DMTF	1.0	Mandatory	

6 Description

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

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

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

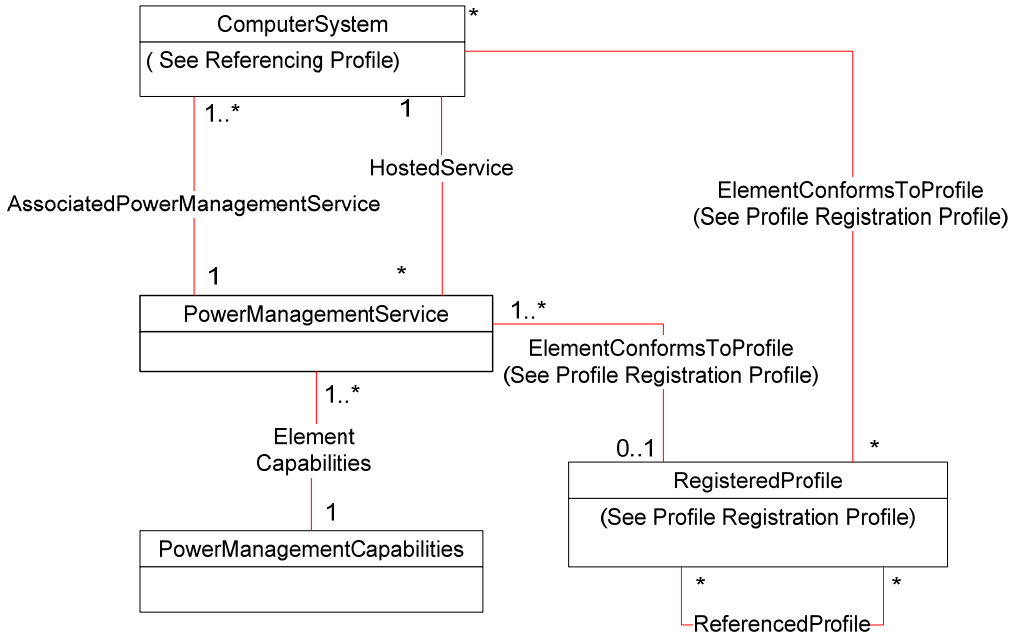

Figure 1 – Power State Management Profile: Class Diagram

7 Implementation

This section details the requirements related to the arrangement of instances and their properties for implementations of this profile. Methods are listed in section 8 (“Methods”), and properties are listed in section 10 (“CIM Elements”).

7.1 CIM_PowerManagementService

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

7.1.1 CIM_PowerManagementService.ElementName

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

7.2 CIM_PowerManagementCapabilities

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

7.2.1 CIM_PowerManagementCapabilities.PowerChangeCapabilities

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

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

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)

7.2.2 CIM_PowerManagementCapabilities.ElementName

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

7.2.3 CIM_PowerManagementCapabilities.PowerStatesSupported

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

7.2.4 CIM_PowerManagementCapabilities.RequestedPowerStatesSupported

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

7.3 CIM_AssociatedPowerManagementService.PowerState

The PowerState property indicates the current power state of the associated computer system represented by an instance of CIM_ComputerSystem. The PowerState property shall have one of the values specified in the PowerStatesSupported property of the instance of CIM_PowerManagementCapabilities that is associated with the instance of

289 CIM_PowerManagmentService that is referenced by the CIM_AssociatedPowerManagementService
290 association.

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

293 7.3.1 Power States Values

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

299 **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)

300 7.4 Representing Power State Changes

301 The CIM_AssociatedPowerManagementService.RequestedPowerState property indicates the requested
302 power state of the associated computer system.

303 The CIM_AssociatedPowerManagementService.PowerOnTime property indicates the date-time that the
304 power state change indicated by the RequestedPowerState property was or will be initiated. When the
305 PowerOnTime property is non-Null, the value shall be a date-time and shall not specify a time interval. A
306 value of Null for the PowerOnTime property shall indicate that the last power state change was initiated
307 immediately or shall indicate that the last requested time to initiate the power state change is unknown.

308 When the Pending Power State Change exists for the instance of CIM_ComputerSystem that is
309 referenced by the CIM_AssociatedPowerManagementService association, the RequestedPowerState
310 property shall have the value of 2 (On), 3 (Sleep - Light), 4 (Sleep -Deep), 5 (Power Cycle (Off - Soft)), 6
311 (Off - Hard), 7 (Hibernate (Off - Soft)), 8 (Off - Soft), 9 (Power Cycle (Off-Hard)), 10 (Master Bus Reset),
312 11 (Diagnostic Interrupt (NMI)), 12 (Off - Soft Graceful), 13 (Off - Hard Graceful), 14 (Master Bus Reset
313 Graceful), 15 (Power Cycle (Off - Soft Graceful)), or 16 (Power Cycle (Off - Hard Graceful)) and the value
314 of the PowerOnTime property shall identify a date-time in the future.

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

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

7.5 Representing In-Progress Power State Transitions

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

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

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

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

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

7.6 Representing Available Requested Power States

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

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

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

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

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

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

8 Methods

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

8.1 CIM_PowerManagementService.RequestPowerStateChange( )

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

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

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

No standard messages are defined for this method.

Table 4 – CIM_PowerManagementService.RequestPowerStateChange( ) Method: Return Code 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

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.

8.1.1 Establishing a Pending Power State Change

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

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

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

8.1.2 Initiating an Immediate Power State Change

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

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

8.1.3 PowerState

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

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

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

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

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

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

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

Table 6 – PowerState Parameter Values

433

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).
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).

PowerState enum Value	Description
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).

434

435 8.1.4 ManagedElement

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

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

441 8.1.5 Time

442 The Time parameter is used to set the power state of the managed system at a certain time and can be
443 used only to set the power state to On or Power Cycle. The Time parameter shall be supported when the
444 PowerChangeCapabilities property array of the associated instance of
445 CIM_PowerManagementCapabilities contains the value 5 (Timed Power On Supported). The Time
446 parameter shall not be supported when the PowerState parameter has any value other than 2 (Power
447 On), 5 (Power Cycle (Off Soft)) 9 (Power Cycle (Off Hard)), 15 (Power Cycle (Off-Soft Graceful)), or 16
448 (Power Cycle (Off-Hard Graceful)). When the Time parameter is specified and is not supported, the
449 method shall return a value of 2.

450 When the Time parameter is specified and the method returns a value of 0, the PowerOnTime property of
451 the CIM_AssociatedPowerManagementService association that references the CIM_ComputerSystem
452 instance identified by the ManagedElement parameter and references the
453 CIM_PowerManagementService instance shall have the date-time value that indicates when the
454 computer system will undergo the power state change indicated by the PowerState parameter. When the
455 Time parameter complies with the interval format of the Datetime data type, the interval value indicated
456 by the Time parameter shall be interpreted relative to the current date-time and the calculated absolute
457 date-time shall be the value of the PowerOnTime property. When the Time parameter complies with the
458 timestamp format of the Datetime data type, the PowerOnTime property shall have the value of the Time
459 parameter.

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

462 8.1.6 Job

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

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

468 8.1.7 TimeoutPeriod

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

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

8.2 Profile Conventions for Operations

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

The default list of operations is as follows:

- GetInstance
- Associators
- AssociatorNames
- References
- ReferenceNames
- EnumerateInstances
- EnumerateInstanceNames

8.3 CIM_PowerManagementService

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

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

8.4 CIM_PowerManagementCapabilities

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

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

8.5 CIM_AssociatedPowerManagementService

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

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

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

8.5.1 CIM_AssociatedPowerManagementService—ModifyInstance

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

- PowerState
- OtherPowerState
- PowerOnTime
- RequestedPowerState

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

8.6 CIM_ElementCapabilities

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

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

Table 8 – Operations: CIM_ElementCapabilities

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

8.7 CIM_HostedService

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

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

Table 9 – Operations: CIM_HostedService

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

9 Use Cases

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

9.1 Object Diagrams

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

9.1.1 Advertising the Profile Conformance

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

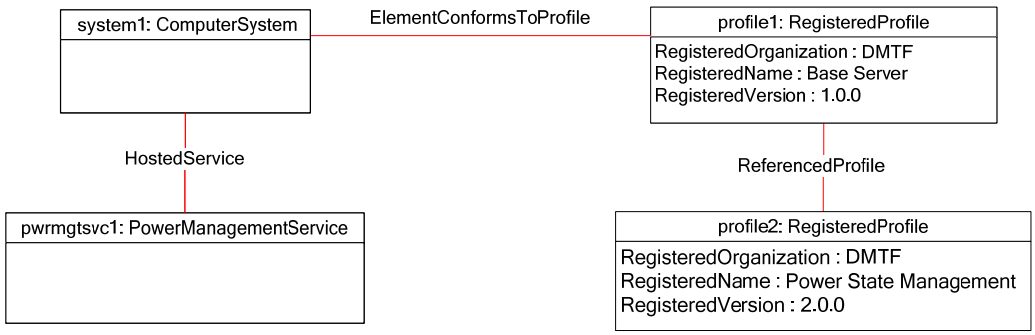

Figure 2 – Registered Profile

9.1.2 Monolithic System

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

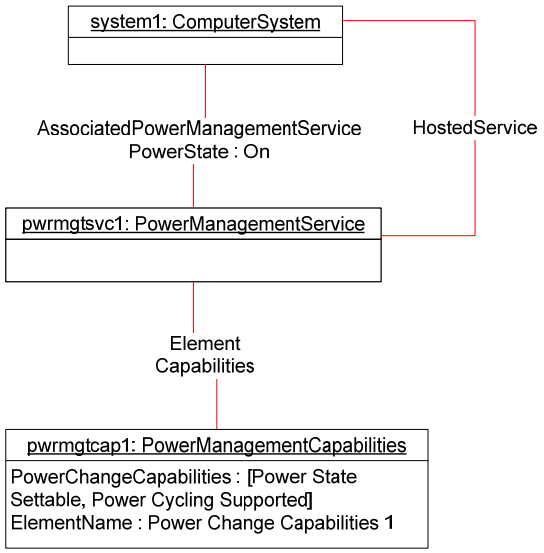

Figure 3 – Power Control Instance Diagram: Monolithic System

9.1.3 Monolithic System with Service Processor

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

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

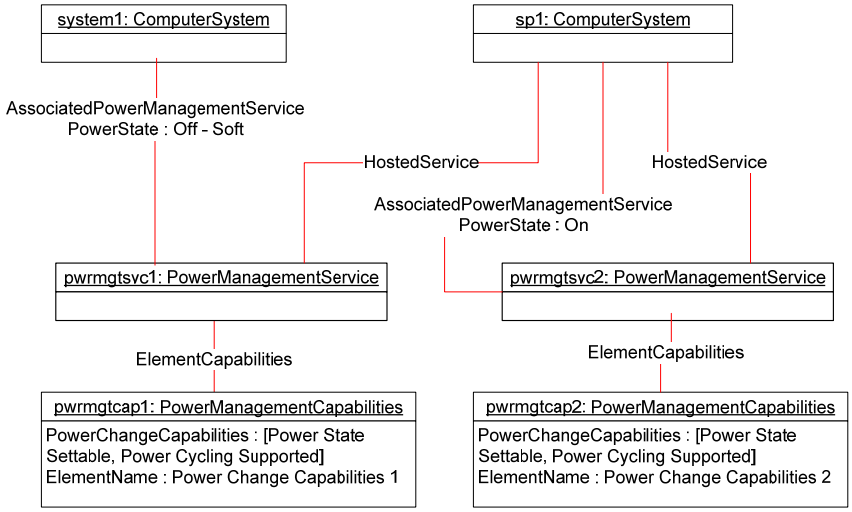

Figure 4 – Power Control Instance Diagram: Monolithic System with Service Processor

9.1.4 Modular System with Chassis Service Processor

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

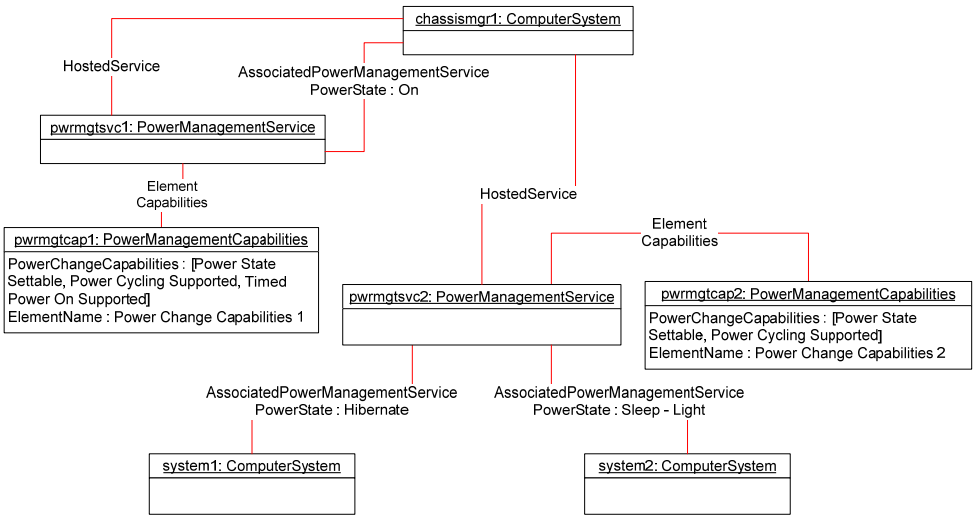

Figure 5 – Power Control Instance Diagram: Modular System with Chassis Service Processor

9.2 Determine the Power State of the Computer System

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

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

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

9.3 Find the Power Management Service for a Computer System

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

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

9.4 Find All the Computer Systems for a Power Management Service

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

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

9.5 Change the Power State of the Computer System

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

1) 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.
2) Invoke the RequestPowerStateChange( ) method of the instance of CIM_PowerManagementService with an argument that contains the PowerState action appropriate to the operation.

9.6 Determine Whether the Power Cycle Is Supported for a Computer System

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

1) Navigate from the target instance of CIM_ComputerSystem to the instance of CIM_PowerManagementService using the CIM_AssociatedPowerManagementService association.
2) Using the instance of CIM_PowerManagementService, navigate to the instance of CIM_PowerManagementCapabilities through the CIM_ElementCapabilities association.

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

9.7 Execute Power Cycle (Off–Soft) within a Given Time

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

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

592 2) Invoke the RequestPowerStateChange( ) method of the instance of
593 CIM_PowerManagementService with the Power State argument set to 5 (Power Cycle (Off–
594 Soft)) and the TimeoutPeriod argument set to “t”.

595 9.8 Execute Power Cycle (Off–Soft Graceful)

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

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

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

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

606 If the Power Cycle and Graceful Shutdown is supported, then a client can execute Power Cycle (Off–Soft
607 Graceful) as follows:

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

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

614 9.9 Display Power States That Can Potentially Be Requested

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

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

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

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

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

9.10 Determine the Available Power States That Can Be Requested

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

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

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

A client can change the power state of the computer system based on the current power state and the 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 that is one of the values in the AvailableRequestedPowerStates property of the CIM_AssociatedPowerManagementService instance.

10 CIM Elements

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

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		

10.1 CIM_PowerManagementCapabilities

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

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.

10.2 CIM_PowerManagementService

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

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.

10.3 CIM_AssociatedPowerManagementService

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

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.

10.4 CIM_ElementCapabilities

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

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

10.5 CIM_HostedService

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

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 *

10.6 CIM_RegisteredProfile

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

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 “2.0.0”.
RegisteredOrganization	Mandatory	This property shall have a value of 2 (DMTF).

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

ANNEX A (informative)

Change Log

Version	Date	Description
1.0.0b	2006/07/11	Preliminary Standard version.
1.0.0c	2007/01/30	Preliminary Standard refresh. Updated CIM schema version from 2.11 to 2.15 to reflect the correct schema that contains all the properties that the profile references.
1.0.0	2008/04/11	Final Standard version.
1.0.2	2008/12/12	Added RequestedPowerStatesSupported property to PowerManagementCapabilities.
2.0.0	2009-12-14	DMTF Standard Release. 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.