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# BIOS Management Profile

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# Foreword

The *BIOS Management Profile* (DSP1061) was prepared by the Desktop Mobile Working Group and the Physical Platform Profiles Working Group of the DMTF.

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# Introduction

This document defines the classes used to describe and manipulate the BIOS configuration in a managed system. The information in this specification is intended to be sufficient for a provider or consumer of this data to identify unambiguously the classes, properties, methods, and values that shall be instantiated and manipulated to represent and manage BIOS attributes of managed systems and subsystems that are modeled 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.

# BIOS Management Profile

## 1 Scope

The *BIOS Management Profile* extends the management capabilities of referencing profiles by adding the capability to represent and configure BIOS attributes, such as a Network Controller or IDE Controller. The individual BIOS attribute's relationship with a respective device is also described. Additionally, the profile's registration for the schema implementation version information is described.

## 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.

### 2.1 Approved References

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

DMTF DSP0200, *CIM Operations over HTTP* 1.2, http://www.dmtf.org/standards/published_documents/DSP0200_1.2.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

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

DMTF DSP1058, *Base Desktop and Mobile Profile 1.0*, http://www.dmtf.org/standards/published_documents/DSP1058_1.0.pdf

DMTF DSP8016, *WBEM Operations Registry 1.0*, http://schemas.dmtf.org/wbem/messageregistry/1/DSP8016_1.0.xml

### 2.2 Other References

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 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 to conform to the document when the specified conditions are met

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

**3.10**
**shall not**
indicates requirements to be followed strictly 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**
keyword that indicates that this profile does not define any constraints for the referenced CIM element or operation

**3.14**
**BIOS attribute**
a BIOS element that provides information, a control surface, or both for basic hardware setup and configuration in a computer system
BIOS attributes are typically accessible in the computer's system and option ROM setup screens.

# 4 Symbols and Abbreviated Terms

**4.1**
**BIOS**
Basic Input Output System

# 5 Synopsis

**Profile Name:** BIOS Management

**Version:** 1.0.0

**Organization:** DMTF

**CIM Schema Version:** 2.22

**Central Class:** CIM_BIOSElement

**Scoping Class:** CIM_ComputerSystem

The *BIOS Management Profile* extends the management capability of the referencing profiles by adding the capability to represent and configure BIOS attributes in a managed system.

Table 1 lists specifications on which this profile has dependency.

**Table 1 – Related Specifications**

| Specification Name | Organization | Version | Relationship | Behavior |
|---|---|---|---|---|
| Profile Registration | DMTF | 1.0 | Mandatory | None |
| BIOS Attribute Registry | DMTF | Any | Optional | Recommended to give a client a standardized naming and behavior definition of the BIOS attribute being managed |

# 6 Description (Informative)

The *BIOS Management Profile* describes the elements needed to provide the capability to manage the BIOS attributes of a computer system.

Figure 1 represents the class schema for the *BIOS Management Profile*. For simplicity, the *CIM_* prefix has been removed from the names of the classes. The CIM_BIOSElement class represents a BIOS of a computer system. An implementation may have more than one BIOS in the computer system. The CIM_BIOSAttribute class represents the BIOS attributes of a BIOS element in a computer system. Each

BIOS attribute is represented by an instance of the CIM_BIOSAttribute class. The properties of the CIM_BIOSAttribute class and its subclasses give a client descriptive information about the BIOS attribute and the current value of the attribute. The descriptive properties provide information to the client about the ability to change the value and the legal possibilities for a new value. The CIM_BIOSService class is implemented to provide methods to change the values of BIOS attributes. This is necessary because the ModifyInstance operation is not supported on the CIM_BIOSAttribute class. The CIM_BIOSServiceCapabilities class is used to advertise to a client the methods that can be used to change the value of BIOS attributes and is implemented anytime the CIM_BIOSService class is implemented. The CIM_BIOSService and CIM_BIOSServiceCapabilities classes are not required for implementations that have exclusively read-only BIOS attributes. As a way of organizing or grouping the CIM_BIOSAttribute instances, an implementation may implement collections. An instance of the CIM_ConcreteCollection class shall be static to the implementation and used as a logical grouping by associating CIM_BIOSAttribute instances with the CIM_ConcreteCollection instance through the CIM_OrderedMemberOfCollection association.

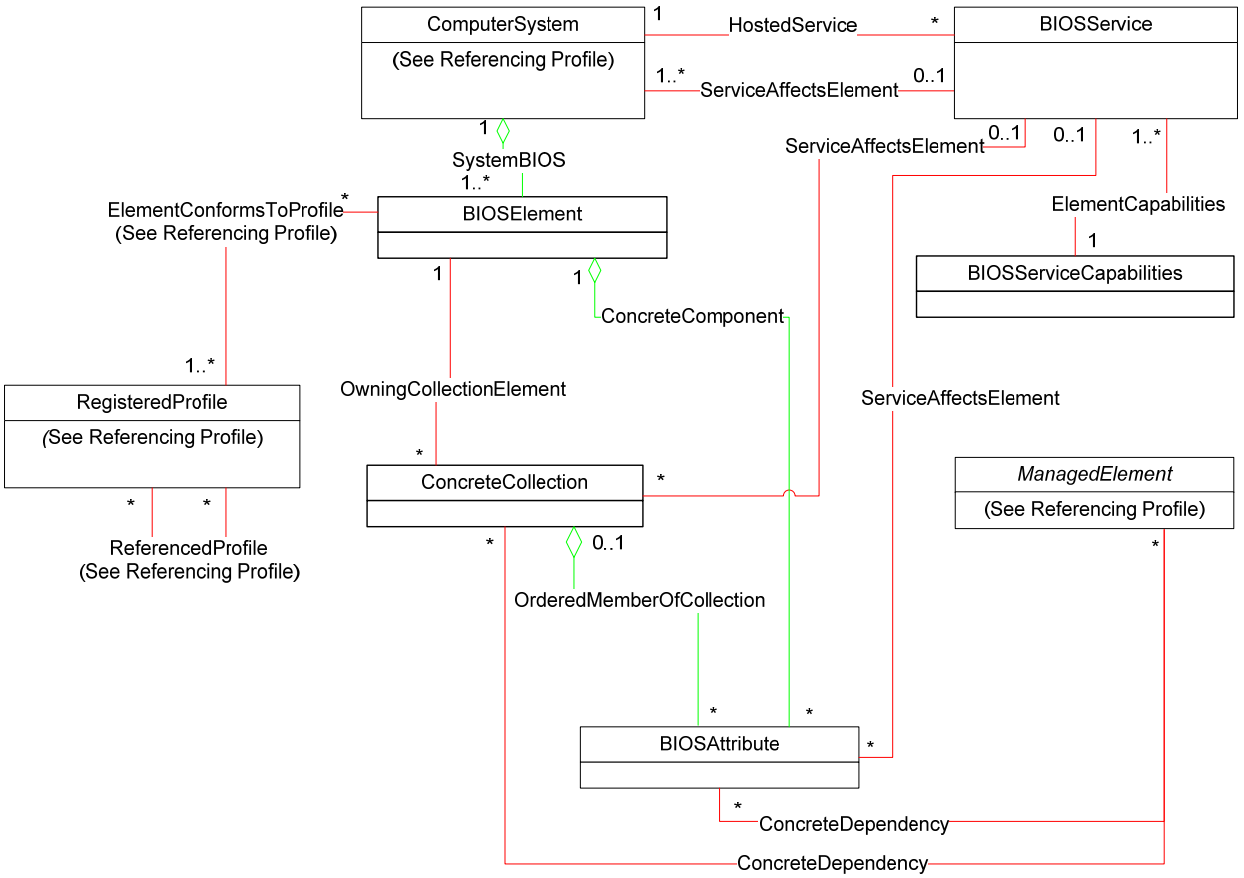



**Figure 1 – BIOS Management Profile: Class Diagram**

# 7 Implementation

This section details the requirements related to the instantiation of instances and their properties for implementations of this profile. Methods are specified in section 8, and properties are specified in section 10.

## 7.1 CIM_BIOSAttribute

Each BIOS attribute shall be represented by an instance of the CIM_BIOSAttribute class.

### 7.1.1 CIM_BIOSAttribute.AttributeName

For each CIM_BIOSAttribute instance, the AttributeName property shall contain a unique, non-modifiable value for the implementation namespace. The AttributeName property shall have a string value that corresponds to the BIOS attribute that the CIM_BIOSAttribute instance represents. When the CIM_BIOSElement.RegistryURIs property is not Null (BIOS Attribute Registry is implemented), the AttributeName property shall contain a value previously defined in a BIOS attribute registry published by the entity creating or defining the BIOS attribute and shall use the following format: “<OrgID>:<identifier>”.

The value of <OrgID> shall include a copyrighted, trademarked, or otherwise unique name that is owned by the entity creating or defining the BIOS attribute, or is a registered ID that is assigned to the entity by a recognized global authority. In addition, <OrgID> shall not contain a colon (:). For DMTF-defined instances, the algorithm shall be used with the <OrgID> set to "DMTF".

### 7.1.2 CIM_BIOSAttribute.CurrentValue

The CIM_BIOSAttribute.CurrentValue[] property shall be an array of character strings of variable length (pattern .*) that represent the current value of the BIOS attribute that is represented by the CIM_BIOSAttribute instance. An implementation may have BIOS attributes capable of multiple current values. When a CIM_BIOSAttribute instance has more than one current value, each value shall be represented in an individual element of the CurrentValue[] array. The number of current values represented by this property is dynamic and can be based on the implementation.

### 7.1.3 CIM_BIOSAttribute.DefaultValue

The CIM_BIOSAttribute.DefaultValue[] property shall be an array of strings that represents the default value of the BIOS attribute that is represented by the CIM_BIOSAttribute instance. The default value is based on the implementation.

When a CIM_BIOSAttribute instance represents a multi-valued BIOS attribute, each component value of the default value shall be represented in an individual element of the DefaultValue[] array.

Support for the DefaultValue[] property is optional.

### 7.1.4 CIM_BIOSAttribute.PendingValue

The CIM_BIOSAttribute.PendingValue[] property shall be an array of strings that represent the pending value of the BIOS attribute that is represented by the CIM_BIOSAttribute instance as result of invoking the CIM_BIOSService.SetBIOSAttribute(), CIM_BIOSService.SetBIOSAttributes(), CIM_BIOSService.SetBIOSAttributeEmbeddedInstance(), or CIM_BIOSService.RestoreBIOSDefaults() method.

Support for the PendingValue[] property is conditional. If an implementation queues or caches BIOS attribute set operations for an application at a later time, the PendingValue[] property shall be supported.

When a CIM_BIOSAttribute instance represents a multi-valued BIOS attribute that has a new value pending, each component value of the pending value shall be represented in an individual element of the PendingValue[] array.

## 7.2 CIM_BIOSEnumeration

The CIM_BIOSEnumeration class extends the CIM_BIOSAttribute class to provide informational detail of enumeration data types and advertises the possible values to a client. Support for the CIM_BIOSEnumeration class is optional.

### 7.2.1 CIM_BIOSEnumeration.PossibleValues

The PossibleValues property shall be an array of character strings of variable length (pattern .*) to indicate the possible values of the BIOS attribute that is represented by the instance when the instance represents an enumeration data type.

## 7.3 CIM_BIOSInteger

The CIM_BIOSInteger class extends the CIM_BIOSAttribute class to provide informational detail of integer data types. Support for the CIM_BIOSInteger class is optional.

### 7.3.1 CIM_BIOSInteger.UpperBound and CIM_BIOSInteger.LowerBound

The CIM_BIOSInteger.UpperBound and CIM_BIOSInteger.LowerBound properties shall be integer values.

When not Null, the CIM_BIOSAttribute.UpperBound and CIM_BIOSAttribute.LowerBound properties shall contain integers that define the potential lower limit and upper limit of the BIOSAttribute.CurrentValue value.

### 7.3.2 CIM_BIOSInteger.ProgrammaticUnit

When not Null, the CIM_BIOSInteger.ProgrammaticUnit property shall contain a value that defines the programmatic unit of the CIM_BIOSAttribute.CurrentValue[], CIM_BIOSAttribute.DefaultValue[], and CIM_BIOSAttribute.PendingValue[] properties that are represented by the CIM_BIOSInteger instance and shall comply with the ISPUnit definition in DSP0004.

### 7.3.3 CIM_BIOSInteger.ScalarIncrement

When not Null, the CIM_BIOSInteger.ScalarIncrement property shall contain an integer that defines the quantity of units separating each potential value of the CIM_BIOSAttribute.CurrentValue property of the attribute represented in the instance.

## 7.4 CIM_BIOSString

The CIM_BIOSString class extends the CIM_BIOSAttribute class to provide informational detail of String data types. Support for the CIM_BIOSString class is optional.

### 7.4.1 CIM_BIOSString.ValueExpression

The CIM_BIOSString.ValueExpression property denotes a Perl-compatible regular expression (PCRE) syntax to use in validating attribute values. For a string attribute where CIM_BIOSString.StringType=7 (regex) this property shall have a value.

### 7.4.2 CIM_BIOSString.MinLength and CIM_BIOSString.MaxLength

When not Null, the CIM_BIOSString.MinLength and CIM_BIOSString.MaxLength properties shall contain integers that define the potential minimum and maximum character length of the BIOSAttribute.CurrentValue value.

## 7.5 CIM_BIOSPassword

The CIM_BIOSPassword class extends the CIM_BIOSAttribute class to provide information detail about manageable BIOS-based passwords.

### 7.5.1 CIM_BIOSPassword.MinLength

The MinLength property specifies the minimum string length allowed when modifying this BIOS attribute. A value of Null means zero length.

### 7.5.2 CIM_BIOSPassword.MaxLength

The MaxLength property specifies the maximum string length allowed when modifying this BIOS attribute. A value of Null means that the maximum length is unknown. A value of 0 defines the maximum length as the largest length that can be represented by this data type.

### 7.5.3 CIM_BIOSPassword.CurrentValue[ ]

The CurrentValue[ ] property shall always return an empty array when read.

### 7.5.4 CIM_BIOSPassword.PendingValue[ ]

The PendingValue[ ] property shall always return an empty array when read.

### 7.5.5 CIM_BIOSPassword.PasswordEncoding (Optional)

The value of the PasswordEncoding property specifies that the encoding tag used to denote the format of the password string was created or set using one of the following methods:

- Keyboard in hexadecimal format containing keyboard scan code input. An example of a password structured in this format is "321539191E1F1F11181320", which is the representation of "my password" in U.S. English keyboard scan codes.
- ASCII denotes clear text that shall comply with the ASCII character set. Character encodings from decimal 32 to decimal 126 are supported. An example is "my password".
- Pin denotes that only numeric input in ASCII text is allowed for the password instance. An example is "1234".
- Unicode denotes Unicode text that shall comply with supported Unicode character encoding. An example is “00780323”.

### 7.5.6 CIM_BIOSPassword.IsSet

This property is provided because the CurrentValue property and PendingValue property always return an empty array for all password instances that contain a valid or invalid password entry.

This property returns TRUE if the current password instance is valid and returns FALSE otherwise.

Valid password entry encoding formats are optionally defined in the PasswordEncoding property.

## 7.6 Relationship between the BIOS and Managed System

For each CIM_BIOSElement instance that represents a BIOS of a managed system, one CIM_SystemBIOS instance shall associate the CIM_BIOSElement instance with the CIM_ComputerSystem instance that represents the managed system.

When the association is used in this way, its GroupComponent property shall reference the CIM_ComputerSystem instance and its PartComponent property shall reference the CIM_BIOSElement instance.

## 7.7 CIM_ConcreteComponent

The CIM_ConcreteComponent class is used to associate CIM_BIOSAttribute instances with a CIM_BIOSElement instance. When the association is used in this way, its GroupComponent property

447 shall reference the CIM_BIOSElement instance and its PartComponent property shall reference the
448 CIM_BIOSAttribute instance.

449 ### 7.7.1 CIM_ConcreteComponent with CIM_ConcreteCollection Implementation

450 For each CIM_BIOSAttribute instance that is associated with a CIM_ConcreteCollection instance through
451 a CIM_OrderedMemberOfCollection instance, one CIM_ConcreteComponent instance may associate the
452 CIM_BIOSAttribute instance with the CIM_BIOSElement instance.

453 ### 7.7.2 CIM_ConcreteComponent without CIM_ConcreteCollection Implementation

454 For each CIM_BIOSAttribute instance that is not associated with a CIM_ConcreteCollection instance
455 through a CIM_OrderedMemberOfCollection instance, one CIM_ConcreteComponent instance shall
456 associate the CIM_BIOSAttribute instance with the CIM_BIOSElement instance.

457 ## 7.8 CIM_BIOSElement

458 The BIOS Image and Option ROM shall be represented by an instance of the CIM_BIOSElement class.
459 One instance of CIM_BIOSElement shall exist for the implementation.

460 ## 7.9 CIM_BIOSService

461 Support for the CIM_BIOSService class is conditional. When a CIM_BIOSAttribute instance has an
462 IsReadOnly property with a value of FALSE, the CIM_BIOSService class shall be supported.

463 When implemented, one CIM_HostedService instance shall associate a CIM_BIOSService instance with
464 the Scoping Instance of CIM_ComputerSystem that represents the computer system on which it is
465 hosted, and one CIM_ServiceAffectsElement instance shall associate the CIM_BIOSService instance
466 with the CIM_ComputerSystem instance that represents the managed system.

467 All instances of CIM_BIOSAttribute associated with the instance of CIM_BIOSService using
468 CIM_ServiceAffectsElement shall be within the scope of the CIM_ComputerSystem instance that is
469 associated with the instance of CIM_BIOSService using CIM_ServiceAffectsElement.

470 An implementation may support a single CIM_BIOSService instance used to manage multiple computer
471 systems.

472 An implementation may support a single computer system with multiple CIM_BIOSService instances.

473 An implementation shall not support a single BIOS attribute managed by multiple CIM_BIOSService
474 instances.

475 ## 7.10 CIM_ConcreteDependency

476 A CIM_ConcreteDependency instance may be used to associate an instance of a concrete subclass of
477 the CIM_ManagedElement class with either a CIM_BIOSAttribute instance that directly affects the
478 managed element or a CIM_ConcreteCollection instance that contains CIM_BIOSAttribute instances that
479 collectively affect the managed element.

480 The Dependent property shall reference the CIM_ManagedElement instance. If a
481 CIM_ConcreteDependency instance is used to associate with a CIM_BIOSAttribute instance, the
482 Antecedent property shall reference the CIM_BIOSAttribute instance. If CIM_ConcreteDependency is
483 used to associate with a CIM_ConcreteCollection instance, the Antecedent property shall reference the
484 CIM_ConcreteCollection instance.

485 A CIM_ConcreteDependency instance may be used to associate a CIM_ManagedElement instance with
486 both a CIM_BIOSAttribute instance and a CIM_ConcreteCollection instance that contains
487 CIM_BIOSAttribute instances that are already associated with the CIM_ManagedElement instance.

## 7.11 CIM_ElementCapabilities and CIM_BIOSServiceCapabilities (Optional)

Support for the CIM_BIOSServiceCapabilities class and the CIM_ElementCapabilities class is optional. If CIM_BIOSService is instantiated, a CIM_BIOSServiceCapabilities instance shall be associated with the CIM_BIOSService instance through a CIM_ElementCapabilities instance.

## 7.12 CIM_ConcreteCollection (Optional)

The CIM_ConcreteCollection class is used to define a collection of BIOS attributes supported in the context of a particular profile or implementation. An implementation may define a collection by type or support user-definable collections.

### 7.12.1 Relationship with CIM_BIOSElement

Every CIM_ConcreteCollection instance that represents a collection of BIOS attributes shall be associated with exactly one CIM_BIOSElement instance through a CIM_OwningCollectionElement instance.

### 7.12.2 Relationship with CIM_BIOSAttribute

A CIM_BIOSAttribute instance may be associated with one or more CIM_ConcreteCollection instances through a CIM_OrderedMemberOfCollection instance.

#### 7.12.2.1 CIM_OrderedMemberOfCollection.AssignedSequence

The CIM_OrderedMemberOfCollection.AssignedSequence property is optionally used when a collection also represents the ordering of BIOS attributes. When the AssignedSequence property is used, all CIM_OrderedMemberOfCollection instances that associate CIM_BIOSAttribute instances with the same CIM_ConcreteCollection instance shall have a value for the AssignedSequence property.

### 7.12.3 Static BIOS Attribute Collections

The implementation may instantiate CIM_ConcreteCollection instances to form logical groupings of attributes by functionality (for examples, see Table 2).

### 7.12.4 CIM_ConcreteCollection.ElementName

For each CIM_ConcreteCollection instance, the ElementName property shall contain a unique, non-modifiable value for the implementation namespace. The ElementName property may contain a value that is user-friendly. When the CIM_ConcreteCollection instance represents a static DMTF or vendor collection, the ElementName property shall be generated as a structured value property of the form `<OrgID> : <unique identifier>. <OrgID>` shall include a copyrighted, trademarked, or otherwise unique name that is owned by the business entity creating or defining the ElementName, or is a registered unique identifier that is assigned to the business entity by a recognized global authority. In addition, to ensure uniqueness, `<OrgID>` shall not contain a colon. When using this algorithm, the first colon to appear in ElementName shall appear between `<OrgID>` and `<unique identifier>`.

For CIM_ConcreteCollection instances defined by the *BIOS Management Profile*, the value for ElementName shall be formatted as follows:

```
"DMTF:" <unique identifier>
```

`<unique identifier>` shall be a string value defined in Table 2.

525 **Table 2 – CIM_ConcreteCollection Unique Identifiers**

| Unique Identifiers | Examples |
|---|---|
| Integrated Devices | Fast IR, Internal Modem, Integrated NIC, External USB Ports, Parallel Ports, Serial Ports, PC Card 1394 |
| Video Attributes | Ambient Light Sensor, Brightness, Brightness (AC), LCD Panel Expansion, Primary Video |
| Performance Attributes | Multi-Core Support, HDD Acoustic Mode |
| Power Management | Auto On Mode, Auto On Time and day of the week, Wake on LAN/WAN |
| Maintenance Attributes | Serial Number, Asset Tag |
| Post Behavior Attributes | Adapter Warnings, Fn key Emulation, Fast Boot, Virtualization, Keypad (Embedded), Mouse/Touchpad, NumLock LED, USB Emulation |
| Wireless Attributes | Internal Bluetooth, Internal Wi-Fi, Internal Cellular, Wireless Switch, Wi-Fi Catcher |
| Docking Attributes | Dock Device, Undocking Method, PCI Slot monitoring, Universal connect |
| Security Attribute | Passwords, Passwords changeable, Password Bypass, Wireless AP change, TPM Enable |
| System Attributes | System Info, Processor Info, Memory Info, Date/Time, Device Info, Battery Info, Boot Sequence |

526 ## 7.13 CIM_ServiceAffectsElement (Optional)

527 A CIM_ServiceAffectsElement instance is used to associate CIM_BIOSAttribute instances or
528 CIM_ConcreteCollection instances that contain the CIM_BIOSAttribute instances with a
529 CIM_BIOSService instance. A CIM_ServiceAffectsElement instance is also used to associate
530 CIM_ComputerSystem instances with a CIM_BIOSService instance (see 10.18).

531 ### 7.13.1 CIM_ServiceAffectsElement Association with CIM_BIOSAttribute

532 For each CIM_BIOSAttribute instance that is not associated with a CIM_ConcreteCollection instance
533 through a CIM_OrderedMemberOfCollection instance, one CIM_ServiceAffectsElement instance shall
534 associate the CIM_BIOSAttribute instance with the CIM_BIOSService instance.

535 For each CIM_BIOSAttribute instance that is associated with a CIM_ConcreteCollection instance through
536 a CIM_OrderedMemberOfCollection instance, one CIM_ServiceAffectsElement instance may optionally
537 associate the CIM_BIOSAttribute instance with the CIM_BIOSService instance.

538 When the association is used as described in this section, its AffectingElement property shall reference
539 the CIM_BIOSService instance and its AffectedElement property shall reference the CIM_BIOSAttribute
540 instance.

541 ### 7.13.2 CIM_ServiceAffectsElement Association with CIM_ConcreteCollection

542 For each CIM_BIOSAttribute instance that is associated with a CIM_ConcreteCollection instance through
543 a CIM_OrderedMemberOfCollection instance, one CIM_ServiceAffectsElement instance shall associate
544 the CIM_BIOSService instance with this CIM_ConcreteCollection instance.

545 When the association is used in this way, its AffectingElement property shall reference the
546 CIM_BIOSService instance and its AffectedElement property shall reference the CIM_ConcreteCollection
547 instance.

548 ### 7.13.3 CIM_ServiceAffectsElement Association with CIM_ComputerSystem

549 The AffectingElement property shall reference the CIM_BIOSService instance. The AffectedElement
550 property shall reference the CIM_ComputerSystem instance.

551 # 8 Methods

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

554 ## 8.1 CIM_BIOSService.SetBIOSAttribute()

555 The SetBIOSAttribute( ) method is used to set or change the value of a BIOS attribute. This method may
556 optionally be implemented; however, at least one extrinsic method must be implemented for the
557 CIM_BIOSService instance.

558 Invocation of the SetBIOSAttribute( ) method shall change the value of the
559 CIM_BIOSAttribute.CurrentValue or CIM_BIOSAttribute.PendingValue property to the value specified by
560 the AttributeValue parameter if the CIM_BIOSAttributeValue.IsReadOnly property is FALSE. Invocation of
561 this method when the CIM_BIOSAttributeValue.IsReadOnly property is TRUE shall result in no change to
562 the value of the CIM_BIOSAttributeValue.CurrentValue property. The results of changing this value are
563 described with the SetResult parameter.

564 Return code values for the SetBIOSAttribute( ) method are specified in Table 3. Standard messages are
565 specified in Table 4, and parameters are specified in Table 5.Invoking the SetBIOSAttribute( ) method
566 multiple times can result in the earlier requests being overwritten or lost.

567 **Table 3 – SetBIOSAttribute( ) Method: Return Code Values**

| Value | Description |
|---|---|
| 0 | Completed with no error |
| 1 | Not supported |
| 2 | Error occurred |
| 3..32767 | DMTF reserved |
| 32768..65535 | Vendor specific |

568 Implementation of standard messages is optional. Standard messages defined for this method are
569 described in Table 4.

570 **Table 4 – SetBIOSAttribute( ) Method: Standard Messages**

| (return) Message ID | Message |
|---|---|
| WIP.201 | Authentication failed |
| WIP.203 | Operation not supported by CIM service |
| WIP.209 | Missing CIM method parameter |
| WIP.212 | Invalid CIM method parameter value |
| WIP.228 | Operation timeout |

571 **Table 5 – SetBIOSAttribute() Method: Parameters**

| Qualifiers | Name | Type | Description/Values |
|---|---|---|---|
| IN, Optional | TargetBIOS | REF | Shall reference the CIM_BIOSElement instance in which the operation is targeted |
| IN, REQ | AttributeName | String | Shall contain the BIOS attribute name representing the BIOS attribute to be modified, as specified by BIOSAttribute.AttributeName property. The specified BIOS attribute shall be unique and already exist. |
| OUT | SetResult | Uint32 | Shall specify the result of invoking SetBIOSAttribute for the targeted BIOS attribute specified in the AttributeName parameter. See Table 6 for possible return values. |
| IN, REQ | AttributeValue[] | array of strings | Shall contain a new value to assign to the specified BIOSAttribute. A value of NULL indicates the factory default value for the BIOSAttribute is requested. If this value is valid, it will be applied to the CurrentValue or PendingValue property of the specified BIOSAttribute depending on the system BIOS implementation. |
| IN, Optional | AuthorizationToken | String | Shall contain a token to modify BIOSAttribute values for this computer system. This is usually the BIOS administrator password. If this is a password, the PasswordEncoding parameter shall be used to denote the format of the password string. This is an embedded instance of CIM_Credential. |
| IN, Optional | PasswordEncoding | Uint32 | Shall contain an encoding tag that specifies the format the password string is being passed to the BIOS. See section 7.5.5 for examples of encoding tags. |

572 **Table 6 – SetBIOSAttribute() Method: SetResult Parameter Values**

| Result Value | Condition |
|---|---|
| 2 (Set CurrentValue Property) | CIM_BIOSAttribute.CurrentValue property is set to the new value. |
| 3 (Set PendingValue Property) | BIOSAttribute.PendingValue property is set to the new value. |

## 573 8.2 CIM_BIOSService.SetBIOSAttributeEmbeddedInstance()

574 The SetBIOSAttributeEmbeddedInstance() method is used to set or change the value of a BIOS attribute.
575 The EmbeddedInstance is a string representation of a CIM_BIOSAttribute instance. It may be
576 implemented for an implementation that supports the changing of one element in the
577 CIM_BIOSAttribute.CurrentValue array when the array has multiple elements. This method may optionally
578 be implemented; however, at least one extrinsic method must be implemented for the CIM_BIOSService
579 instance.

580 Invocation of the SetBIOSAttributeEmbeddedInstance() method shall change the value of the
581 CIM_BIOSAttribute.CurrentValue or CIM_BIOSAttribute.PendingValue property to the CurrentValue
582 specified in the AttributeConfig parameter embedded instance of CIM_BIOSAttribute. The results of
583 changing this value are described with the SetResult parameter.

584 Return code values for the SetBIOSAttributeEmbeddedInstance() method are specified in Table 7.
585 Standard messages are specified in Table 8, and parameters are specified in Table 9.

586 Invoking the SetBIOSAttributeEmbeddedInstance() method multiple times can result in the earlier
587 requests being overwritten or lost.

588 **Table 7 – SetBIOSAttributeEmbeddedInstance( ) Method: Return Code Values**

| Value | Description |
|---|---|
| 0 | Completed with no error |
| 1 | Not supported |
| 2 | Error occurred |
| 3..32767 | DMTF reserved |
| 32768..65535 | Vendor specific |

589 Implementation of standard messages is optional. Standard messages defined for this method are
590 described in Table 8.

591 **Table 8 – SetBIOSAttributeEmbeddedInstance( ) Method: Standard Messages**

| (return) Message ID | Message |
|---|---|
| WIP.201 | Authentication failed |
| WIP.203 | Operation not supported by CIM service |
| WIP.209 | Missing CIM method parameter |
| WIP.212 | Invalid CIM method parameter value |
| WIP.228 | Operation timeout |

592 **Table 9 – SetBIOSAttributeEmbeddedInstance( ) Method: Parameters**

| Qualifiers | Name | Type | Description/Values |
|---|---|---|---|
| IN, Optional | TargetBIOS | REF | Shall reference the CIM_BIOSElement instance in which the operation is targeted |
| IN, REQ | AttributeConfig | String | Shall contain an embedded instance of CIM_BIOSAttribute representing the targeted BIOS attribute and the desired value. The specified BIOS attribute shall be unique and already exist. |
| OUT | SetResult | uint32 | Specifies the result of invoking SetBIOSAttributeEmbeddedInstance for the targeted BIOS attribute specified in the AttributeConfig parameter. See Table 10 for possible return values. |
| IN, Optional | AuthorizationToken | String | Shall contain a token to modify BIOSAttribute values for this computer system. This is usually the BIOS administrator password. If this is a password, the PasswordEncoding parameter shall be used to denote the format of the password string. This is an embedded instance of CIM_Credential. |
| IN, Optional | PasswordEncoding | uint32 | Shall contain an encoding tag that specifies the format the password string is being passed to the BIOS. See section 7.5.5 for examples of encoding tags. |

593 **Table 10 – SetBIOSAttributeEmbeddedInstance ( ) Method: SetResult Parameter Values**

| Result Value | Condition |
|---|---|
| 2 (Set CurrentValue Property) | CIM_BIOSAttribute.CurrentValue property is set to the new value. |
| 3 (Set PendingValue Property) | BIOSAttribute.PendingValue property is set to the new value. |

## 8.3 CIM_BIOSService.RestoreBIOSDefaults()

Invocation of the CIM_BIOSService.RestoreBIOSDefaults() method shall set all BIOS attributes to their respective default values. This method may optionally be implemented; however, at least one extrinsic method must be implemented for the CIM_BIOSService instance.

If no default values are specified for the BIOS attributes, the existing values shall remain unchanged.

The return code values of the CIM_BIOSService.RestoreBIOSDefaults() method are specified in Table 11. Standard messages are specified in Table 12, and parameters are specified in Table 13.

**Table 11 – RestoreBIOSDefaults() Method: Return Code Values**

| Value | Description |
|---|---|
| 0 | Completed with no error |
| 1 | Not supported |
| 2 | Error occurred |
| 3..32767 | DMTF reserved |
| 32768..65535 | Vendor specific |

Implementation of standard messages is optional. Standard messages defined for this method are described in Table 12.

**Table 12 – RestoreBIOSDefaults() Method: Standard Messages**

| (return) Message ID | Message |
|---|---|
| WIP.201 | Authentication failed |
| WIP.203 | Operation not supported by CIM service |
| WIP.209 | Missing CIM method parameter |
| WIP.212 | Invalid CIM method parameter value |
| WIP.228 | Operation timeout |

**Table 13 – RestoreBIOSDefaults() Method: Parameters**

| Qualifiers | Name | Type | Description/Values |
|---|---|---|---|
| IN, REQ | TargetBIOS | REF | Shall reference the CIM_BIOSElement instance in which the operation is targeted |
| IN, Optional | AuthorizationToken | String | Shall contain a token to modify BIOSAttribute values for this computer system. This is usually the BIOS administrator password. If this is a password, the PasswordEncoding parameter shall be used to denote the format of the password string. This is an embedded instance of CIM_Credential. |
| IN, Optional | PasswordEncoding | uint32 | Shall contain an encoding tag that specifies the format the password string is being passed to the BIOS. See section 7.5.5 for examples of encoding tags. |

## 8.4 CIM_BIOSService.SetBIOSAttributes()

The SetBIOSAttributes( ) method is used to set or change the values of a group of BIOS attributes. This method may optionally be implemented; however, at least one extrinsic method must be implemented for the CIM_BIOSService instance.

Invocation of the SetBIOSAttributes( ) method shall change the values of the CIM_BIOSAttribute.CurrentValue or PendingValue properties that correspond to the names specified by the AttributeName parameter and the values specified by the AttributeValue parameter if the respective CIM_BIOSAttribute.IsReadOnly property is FALSE. Invocation of this method when the respective CIM_BIOSAttribute.IsReadOnly property is TRUE shall result in no change to the corresponding value of the CIM_BIOSAttribute.CurrentValue property.

If more than one value is specified for a particular BIOS attribute, the AttributeName parameter shall contain multiple identical array entries that represent the BIOS attribute name that corresponds to each respective BIOS attribute value described by the AttributeValue parameter. If the CollectionElementName parameter is specified, this operation targets BIOS attributes that are members of this specified collection only. If BIOS attributes represented by the AttributeName parameter are not members of this collection, the SetResult parameter that corresponds to these BIOS attributes shall return a value of 5 (No Attempt to Set Value due to Error). If the CollectionElementName parameter is not specified, the BIOS attributes represented by the AttributeName parameter can be members of any collection or associated with no collection at all. The value of ConcreteCollection.ElementName supplied for this parameter can be user friendly and shall be unique within the scope of the instantiating Namespace; if the value is not unique, this parameter shall not be supplied.

Return code values for the SetBIOSAttributes( ) method are specified in Table 14. Standard messages are specified in Table 15, and parameters are specified in Table 16.

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

**Table 14 – SetBIOSAttributes( ) Method: Return Code Values**

| Value | Description |
|---|---|
| 0 | Completed with no error |
| 1 | Not supported |
| 2 | Error occurred |
| 3..32767 | DMTF reserved |
| 32768..65535 | Vendor specific |

Implementation of standard messages is optional. Standard messages defined for this method are described in Table 15.

**Table 15 – SetBIOSAttributes( ) Method: Standard Messages**

| (return) Message ID | Message |
|---|---|
| WIP.201 | Authentication failed |
| WIP.203 | Operation not supported by CIM service |
| WIP.209 | Missing CIM method parameter |
| WIP.212 | Invalid CIM method parameter value |
| WIP.228 | Operation timeout |

635 **Table 16 – SetBIOSAttributes( ) Method: Parameters**

| Qualifiers | Name | Type | Description/Values |
|---|---|---|---|
| IN, Optional | TargetBIOS | REF | Shall reference the CIM_BIOSElement instance in which the operation is targeted |
| IN, Optional | CollectionElementName | String | Shall contain the ConcreteCollection containing the BIOS attributes to be modified, as specified by the ConcreteCollection.ElementName property. The value of ConcreteCollection.ElementName supplied for this parameter can be user friendly and shall be unique within the scope of the instantiating Namespace; if the value is not unique, this parameter shall not be supplied. If BIOS attributes represented by the AttributeName parameter are not members of this collection, the SetResult parameter that corresponds to these BIOS Attributes shall return 5 (No Attempt to Set Value due to Error). If CollectionElementName is not specified, the BIOS Attributes represented by the AttributeName parameter can be members of any collection or associated with no collection at all. |
| IN, REQ | AttributeName[ ] | Array of strings | Shall contain the BIOS attribute names representing the BIOS attributes to be modified, as specified by BIOSAttribute.AttributeName properties. The specified BIOS attributes must already exist. The values of BIOSAttribute.AttributeName supplied for this parameter shall be unique within the scope of the instantiating Namespace. The BIOS attribute name members of this array must correspond with array members of the values represented by the AttributeValue parameter. If more than one value is specified for a particular BIOS attribute, this parameter shall contain multiple identical array entries describing the BIOS attribute name that corresponds with each respective BIOS attribute value specified by the AttributeValue parameter. |
| OUT | SetResult[ ] | Array of uint32 | SetResult returns the results of invoking this method for each specified attribute value. Each array element of SetResult contains the result of setting the new value that corresponds with each respective BIOS attribute value specified by the AttributeValue parameter. See Table 17 for possible result values. |

| Qualifiers | Name | Type | Description/Values |
|---|---|---|---|
| IN, REQ | AttributeValue[] | Array of strings | Shall contain new values to assign to the BIOS attributes specified in the AttributeName parameter. The BIOS attribute value members of this array must correspond with the array members of the names represented by the AttributeName parameter. If more than one value is specified for a particular BIOS attribute, this parameter shall contain an entry for each BIOS attribute value. A value of NULL indicates the factory default values for the BIOSAttribute is requested. If this value is valid, it will be applied to the CurrentValue or PendingValue property of the specified BIOSAttribute depending on the system BIOS implementation and any requirements for a system restart. The result of applying the values are described in the corresponding array entries of the SetResult parameter. |
| IN, Optional | AuthorizationToken | String | Shall contain a token to modify BIOSAttribute values for this computer system. This is usually the BIOS administrator password. If this is a password, the PasswordEncoding parameter shall be used to denote the format of the password string. This is an embedded instance of CIM_Credential. |
| IN, Optional | PasswordEncoding | uint32 | Shall contain an encoding tag that specifies the format the password string is being passed to the BIOS. See section 7.5.5 for examples of encoding tags. |

636 **Table 17 – SetBIOSAttributes() Method: SetResult Parameter Values**

| Result Value | Condition |
|---|---|
| 2 (Set CurrentValue Property) | CIM_BIOSAttribute.CurrentValue property is set to the new value. |
| 3 (Set PendingValue Property) | BIOSAttribute.PendingValue property is set to the new value. |
| 4 (Error Setting Value) | An unspecified error occurred while setting the value. |
| 5 (No Attempt to Set Value due to Error) | No attempt to set the value due to a prior unspecified error |
| 6 (Value-Rolled-Back) | A previously set value was rolled-back to its original value due to a prior unspecified error. |

637 ## 8.5 Profile Conventions for Operations

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

640 The default list of operations is as follows:

641 • GetInstance
642 • Associators
643 • AssociatorNames
644 • References

- ReferenceNames
- EnumerateInstances
- EnumerateInstanceNames

## 8.6 CIM_BIOSAttribute Operations

Table 18 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 18, all operations in the default list in 8.5 shall be implemented as defined in DSP0200.

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

**Table 18 – Operations: CIM_BIOSAttribute**

| Operation | Requirement | Messages |
|---|---|---|
| ModifyInstance | Not supported | None |

### 8.6.1 CIM_BIOSAttribute — ModifyInstance

The ModifyInstance operation shall not be supported.

## 8.7 CIM_BIOSElement Operations

All operations in the default list in 8.5 shall be implemented as defined in DSP0200.

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

## 8.8 CIM_BIOSService Operations

All operations in the default list in 8.5 shall be implemented as defined in DSP0200.

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

## 8.9 CIM_BIOSServiceCapabilities Operations

All operations in the default list in 8.5 shall be implemented as defined in DSP0200.

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

## 8.10 CIM_SystemBIOS Operations

Table 19 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 19, all operations in the default list in 8.5 shall be implemented as defined in DSP0200.

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

**Table 19 – Operations: CIM_SystemBIOS**

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

## 8.11 CIM_ConcreteComponent Operations

Table 20 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 20, all operations in the default list in 8.5 shall be implemented as defined in DSP0200.

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

**Table 20 – Operations: CIM_ConcreteComponent**

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

## 8.12 CIM_ConcreteDependency Operations

Table 21 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 21, all operations in the default list in 8.5 shall be implemented as defined in DSP0200.

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

**Table 21 – Operations: CIM_ConcreteDependency**

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

## 8.13 CIM_ConcreteCollection Operations

All operations in the default list in 8.5 shall be implemented as defined in DSP0200.

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

## 8.14 CIM_ServiceAffectsElement Operations (Association with CIM_BIOSAttribute)

Table 22 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 22, all operations in the default list in 8.5 shall be implemented as defined in DSP0200.

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

**Table 22 – Operations: CIM_ServiceAffectsElement**

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

## 8.15 CIM_ServiceAffectsElement Operations (Association with CIM_ConcreteCollection)

Table 23 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 23, all operations in the default list in 8.5 shall be implemented as defined in DSP0200.

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

**Table 23 – Operations: CIM_ServiceAffectsElement**

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

## 8.16 CIM_ServiceAffectsElement Operations (Association with CIM_ComputerSystem)

Table 24 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 24, all operations in the default list in 8.5 shall be implemented as defined in DSP0200.

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

**Table 24 – Operations: CIM_ServiceAffectsElement**

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

## 8.17 CIM_OrderedMemberOfCollection Operations

Table 25 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 25, all operations in the default list in 8.5 shall be implemented as defined in DSP0200.

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

**Table 25 – Operations: CIM_OrderedMemberOfCollection**

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

## 8.18 CIM_OwningCollectionElement Operations

Table 26 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 26, all operations in the default list in 8.5 shall be implemented as defined in DSP0200.

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

**Table 26 – Operations: CIM_OwningCollectionElement**

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

## 8.19 CIM_HostedService Operations

Table 27 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 27, all operations in the default list in 8.5 shall be implemented as defined in DSP0200.

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

**Table 27 – Operations: CIM_HostedService**

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

## 8.20 CIM_ElementCapabilities Operations

Table 28 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 28, all operations in the default list in 8.5 shall be implemented as defined in DSP0200.

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

**Table 28 – Operations: CIM_ElementCapabilities**

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

# 9 Use Cases (Informative)

All use cases are based on the implementation conformance to the DMTF *BIOS Management Profile*.

## 9.1 Object Diagrams

The object diagram in Figure 2 shows how CIM_RegisteredProfile instances are used to identify the version of the *BIOS Management Profile* with which a CIM_BIOSService instance and its associated instances are conformant. A CIM_RegisteredProfile instance exists for each profile that is instrumented in the system. One CIM_RegisteredProfile instance identifies the DMTF *Base Desktop and Mobile Profile*, version 1.0.0, a specialization of the DMTF *Computer System Profile*. The other instance identifies the DMTF *BIOS Management Profile*, version 1.0.0. The Central Instance is the CIM_BIOSElement instance. The Scoping Instance is the CIM_ComputerSystem instance.

This CIM_ComputerSystem instance is conformant with the *Base Desktop and Mobile Profile* version 1.0.0, as indicated by the CIM_ElementConformsToProfile association with the CIM_RegisteredProfile instance.

This CIM_BIOSElement instance is conformant with the *BIOS Management Profile* version 1.0.0, as indicated by the CIM_ElementConformsToProfile association with the CIM_RegisteredProfile instance.

The CIM_ReferencedProfile relationship between the *Base Desktop and Mobile Profile* and the *BIOS Management Profile* places the CIM_BIOSElement instance within the scope of the *BIOS Management Profile.*

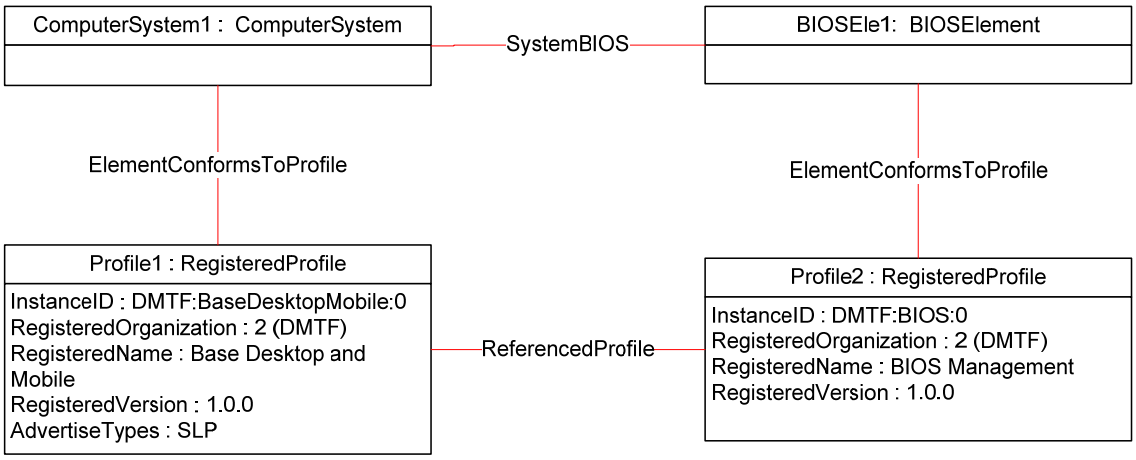



**Figure 2 – BIOS Management Profile: Object Diagram**

## 9.2 Object Diagrams

Figure 3 represents a BIOS attribute for a managed system's BIOS. The CIM_BIOSElement instance that is referenced by the CIM_ConcreteComponent instance identifies the managed system's BIOS, and the CIM_ComputerSystem instance referenced by the CIM_SystemBIOS instance identifies the managed system.

Based on the AttributeName property, BIOSAttribute1 is the computer's Asset Tag. It is settable based on the value of the IsReadOnly property.

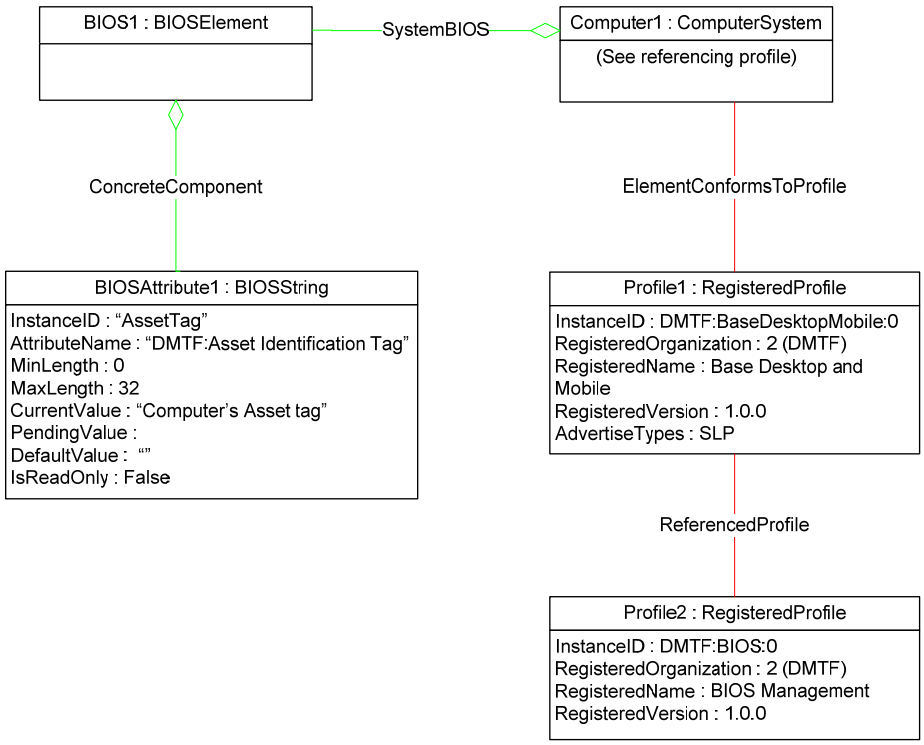



**Figure 3 – BIOS Management Profile: Object Diagram**

## 9.3 Show All BIOS Attributes in the Computer System

A client can show all of the BIOS attributes in a computer system as follows:

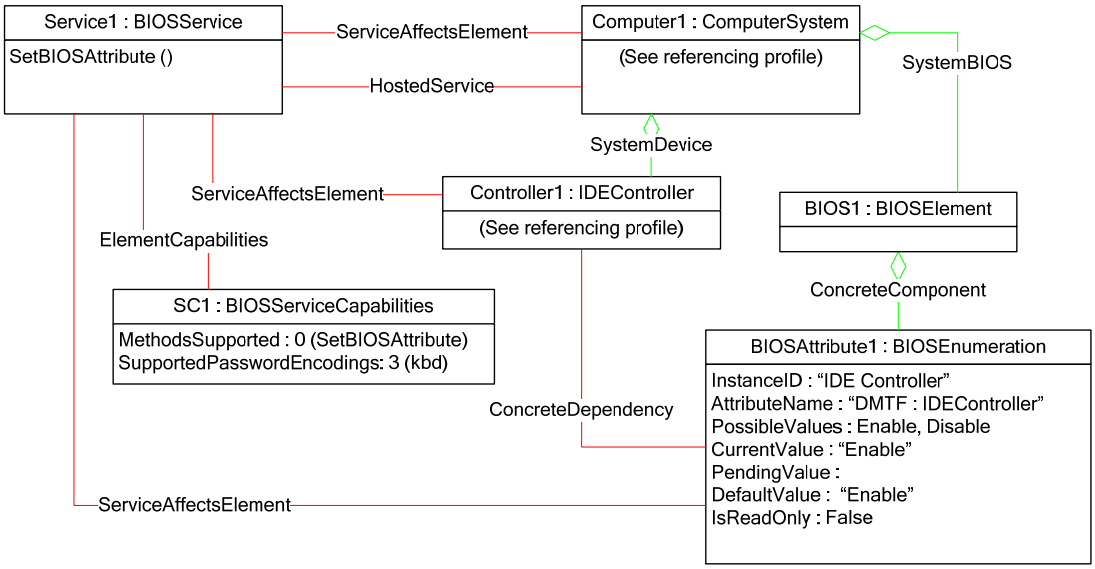
1) Starting from the CIM_BIOSElement instance that represents the BIOS of the computer system, select all of the CIM_BIOSAttribute or CIM_ConcreteCollection instances that are associated through CIM_ConcreteComponent instances.
2) If any CIM_ConcreteCollection instances result, select all of the CIM_BIOSAttribute instances that are associated through CIM_OrderedMemberOfCollection instances. These represent the BIOS attributes of the computer system.
3) Iterate through the instances and get the values of the CIM_BIOSAttribute.AttributeName and CIM_BIOSAttribute.CurrentValue properties of each instance. These represent the BIOS attribute and the value of the attribute.

## 9.4 Find BIOS Attributes Associated with a Specific Device

A client can find the BIOS attributes associated with a specific device as follows:

1) Select all of the CIM_BIOSAttribute or CIM_ConcreteCollection instances that are associated with the instance of a subclass of CIM_ManagedElement that represents the given device through a CIM_ConcreteDependency instance.
2) If any CIM_ConcreteCollection instances result, select all of the CIM_BIOSAttribute instances that are associated through CIM_OrderedMemberOfCollection instances.

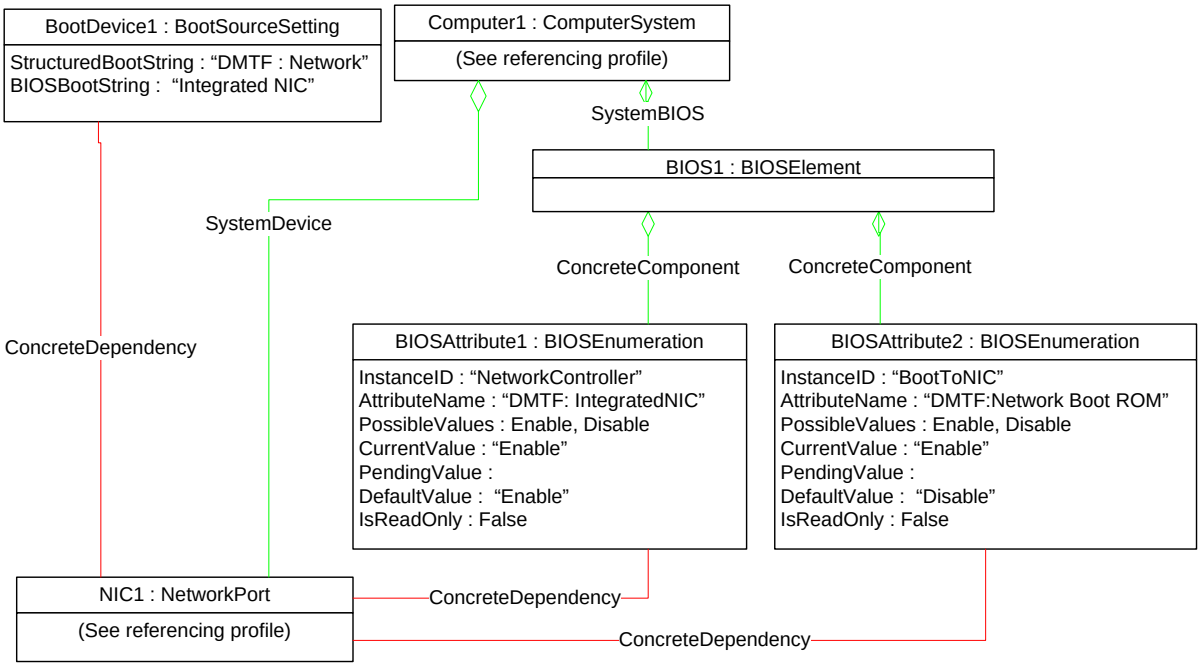
In Figure 4, the CIM_BIOSAttribute instance is associated with a CIM_IDEController instance through a CIM_ConcreteDependency instance.




779

780 **Figure 4 – BIOS Management Profile: Object Diagram**

781 Figure 5 represents a CIM_ManagedElement instance with dependencies to multiple CIM_BIOSAttribute
782 instances.




783

784 **Figure 5 – BIOS Management Profile: Object Diagram**

## 9.5 Find a Collection of Attributes

Figure 6 shows a possible implementation in which BIOS collections are supported. This support is indicated by the existence of CC1 associated through the CIM_OwningCollectionElement instance with BIOS1. The presence of a DMTF-defined unique identifier as a value for the CIM_ConcreteCollection.ElementName property indicates that the collection is static and the value may not be modified.

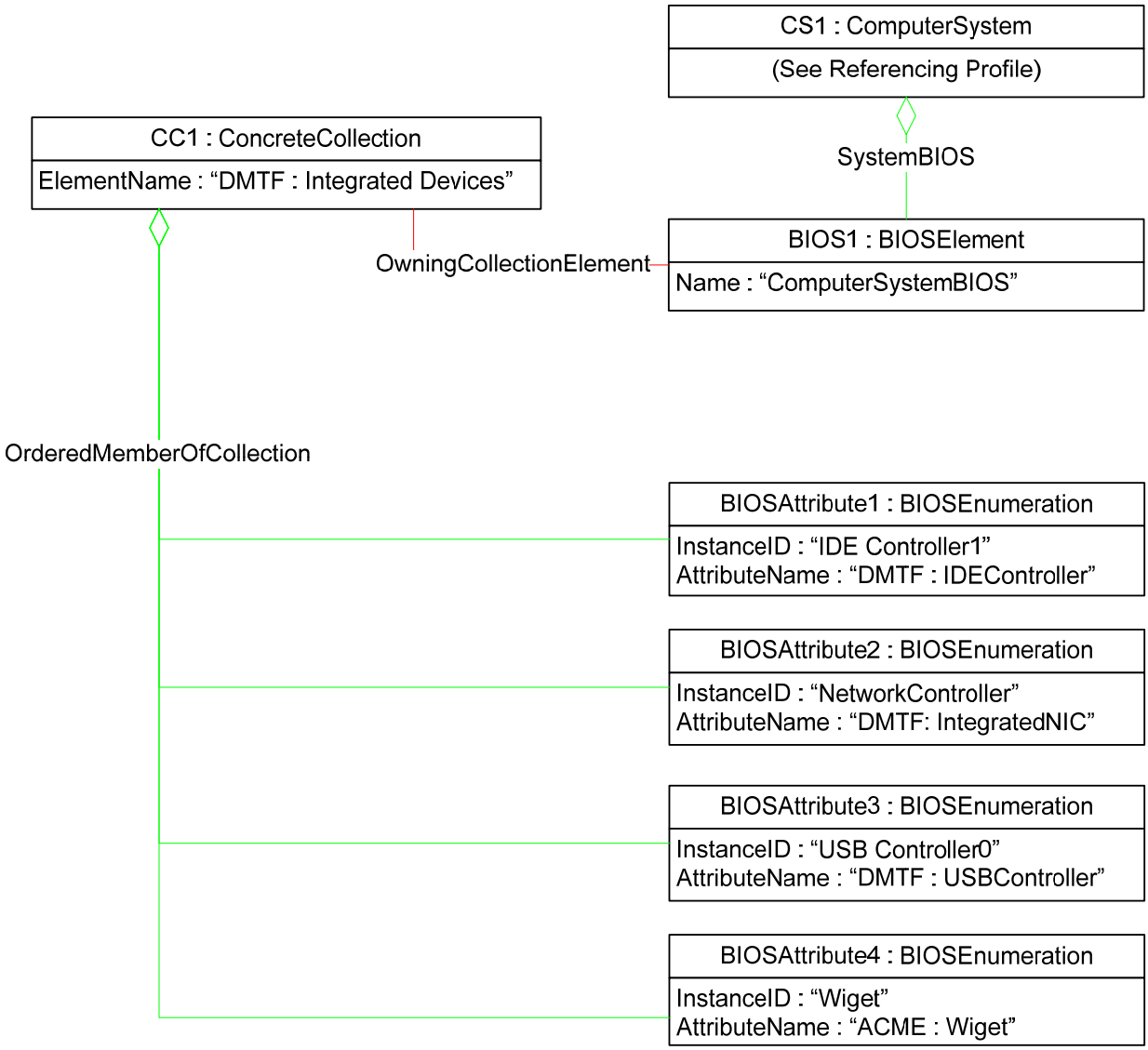



**Figure 6 – BIOS Management Profile: Object Diagram**

## 9.6 Determine Whether a BIOS Attribute's Value Can Be Modified

A client can determine if a given BIOS attribute's value can be modified by querying the CIM_BIOSAttribute.IsReadOnly property. If the value is FALSE, the value can be modified and the client can use the CIM_ServiceAffectsElement association to locate the service hosting the method or methods to change the value. The client can also expect an advertisement of the available methods by traversing the CIM_ElementCapabilities instance to the CIM_BIOSServiceCapabilities instance.

In Figure 7, the CIM_BIOSAttribute instance represents a BIOS password. Based on the IsReadOnly property, this attribute can be modified by the SetBIOSAttribute() method. Based on the CIM_BIOSServiceCapabilities.SupportedEncodings property, the BIOS can decipher only a keyboard scan code representation of the password. Based on the CIM_BIOSServiceCapabilities.MethodsSupported property, the CIM_BIOSService.SetBIOSAttribute() method will be used to make any changes to this attribute's value.

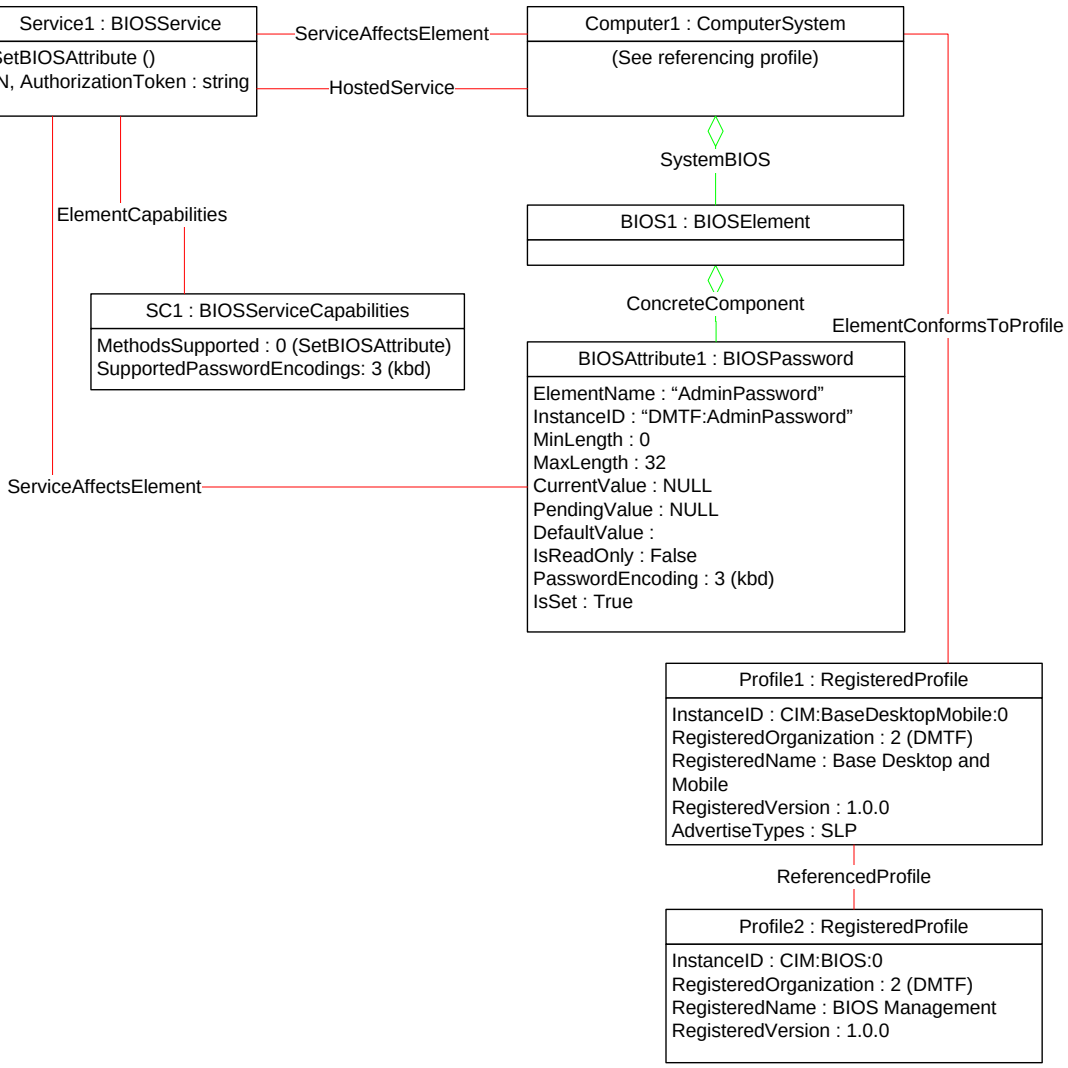



**Figure 7 – BIOS Management Profile: Object Diagram**

## 9.7 Modifying a BIOS Attribute

A client can change a BIOS attribute's value as follows:

Invoke the CIM_BIOSService.SetBIOSAttribute( ) method, specifying the AttributeName and AttributeValue parameters.

### 9.7.1 Modifying a BIOS Attribute (Password Required)

An implementation may require a BIOS administrator password as an input parameter during the invocation of the CIM_BIOSService.SetBIOSAttribute( ) method. In addition to the requirements in 9.7, an embedded CIM_Credential instance that represents the BIOS password shall also be provided as the AuthorizationToken input parameter as defined in the CIM_BIOSService class.

### 9.7.2 Modifying a Group of BIOS Attributes

A client can change a group of BIOS attribute values by invoking the CIM_BIOSService.SetBIOSAttributes( ) method and specifying parameters including CollectionElementName, AttributeName, and AttributeValue.

# 10 CIM Elements

Table 29 shows the list of CIM Elements for this profile and details their requirements. The implementation requirements for the classes and properties described in this section are defined in section 7 (“Implementation”).

**Table 29 – CIM Elements: BIOS Management Profile**

| Element Name | Requirement | Description |
|---|---|---|
| **Classes** | | |
| CIM_BIOSAttribute | Mandatory | See 7.1 and 10.1. |
| CIM_BIOSElement | Mandatory | See 10.8. |
| CIM_BIOSService | Conditional | See 7.9 and 10.2. |
| CIM_BIOSEnumeration | Conditional | See 7.2 and 10.4. |
| CIM_BIOSInteger | Optional | See 7.3 and 10.5. |
| CIM_BIOSPassword | Mandatory | See 10.6. |
| CIM_BIOSString | Optional | See 7.4 and 10.7. |
| CIM_BIOSServiceCapabilities | Conditional | See 7.11, 7.9, and 10.3. |
| CIM_ConcreteComponent | Conditional | See 7.7 and 10.11. |
| CIM_SystemBIOS | Mandatory | See 7.6 and 10.10. |
| CIM_ConcreteDependency | Optional | See 7.10 and 10.9. |
| CIM_ElementCapabilities | Optional | See 7.11 and 10.12. |
| CIM_RegisteredProfile | Mandatory | See 10.13. |
| CIM_ConcreteCollection | Optional | See 7.12 and 10.14. |
| CIM_OrderedMemberOfCollection | Optional | See 7.12.2.1 and 10.15. |
| CIM_OwningCollectionElement | Optional | See 7.12.1 and 10.16. |
| CIM_ServiceAffectsElement | Optional | See 7.13, 10.17, and 10.18. |
| CIM_HostedService | Optional | See 10.19. |
| **Indications** | | |
| None defined in this profile | | |

## 10.1 CIM_BIOSAttribute

The CIM_BIOSAttribute class is implemented to represent a BIOS attribute. Table 30 contains the requirements for elements of this class.

**Table 30 – Class: CIM_BIOSAttribute**

| Elements | Requirement | Notes |
|---|---|---|
| InstanceID | Mandatory | **Key**: This element shall specify the unique identifier for an instance of this class within the implementation namespace. |
| AttributeName | Mandatory | See 7.1.1. |
| CurrentValue | Mandatory | See 7.1.2. |
| DefaultValue | Optional | See 7.1.3. |
| PendingValue | Conditional | See 7.1.4. |
| IsReadOnly | Mandatory | |
| IsOrderedList | Optional | If the implementation decides to represent the BIOS attribute with multiple values, this property can be used to represent precedence of these values. |

## 10.2 CIM_BIOSService

The CIM_BIOSService class shall be implemented when an implementation has BIOS attributes with values that are settable as indicated by the CIM_BIOSAttribute.IsReadOnly property having the value FALSE. The CIM_BIOSService class provides methods to modify the value of the CIM_BIOSAttribute.CurrentValue or CIM_BIOSAttribute.PendingValue property of a CIM_BIOSAttribute instance. Support for any of the extrinsic methods is optional.

Table 31 contains the requirements for elements of this class.

**Table 31 – Class: CIM_BIOSService**

| Elements | Requirement | Notes |
|---|---|---|
| SystemCreationClassName | Mandatory | Key |
| SystemName | Mandatory | Key |
| CreationClassName | Mandatory | Key |
| Name | Mandatory | Key |
| SetBIOSAttribute( ) | Optional | See 8.1. At least one extrinsic method shall be implemented for this class. |
| SetBIOSAttributes( ) | Optional | See 8.4. At least one extrinsic method shall be implemented for this class. |
| SetBIOSAttributeEmbeddedInstance( ) | Optional | See 8.2. At least one extrinsic method shall be implemented for this class. |
| RestoreBIOSDefaults( ) | Optional | See 8.3. At least one extrinsic method shall be implemented for this class. |

## 10.3 CIM_BIOSServiceCapabilities

The CIM_BIOSServiceCapabilities class is used to advertise the capabilities of a CIM_BIOSService instance.

Table 32 contains the requirements for elements of this class.

**Table 32 – Class: CIM_BIOSServiceCapabilities**

| Elements | Requirement | Notes |
|---|---|---|
| InstanceID | Mandatory | **Key**: This element shall specify the unique identifier for an instance of this class within the implementation namespace. |
| MethodsSupported | Mandatory | |
| SupportedPasswordEncodings | Optional | This element may be used to specify the password encoding supported by the BIOS. See 7.5.5. |

## 10.4 CIM_BIOSEnumeration

The CIM_BIOSEnumeration class is used to extend a CIM_BIOSAttribute instance to advertise possible value information of enumeration data types. Elements of this class shall be returned in addition to the elements defined in Table 30 for the CIM_BIOSAttribute class.

Table 33 contains the requirements for elements of this class.

**Table 33 – Class: CIM_BIOSEnumeration**

| Elements | Requirement | Notes |
|---|---|---|
| PossibleValues | Mandatory | See 7.2.1. |
| PossibleValuesDescription | Optional | This element may be used to provide descriptions for respective values in the PossibleValues property. |

## 10.5 CIM_BIOSInteger

The CIM_BIOSInteger class is used to extend a CIM_BIOSAttribute instance to provide additional detail and behavior information of integer data types. Elements of this class shall be returned in addition to the elements defined in Table 30 for the CIM_BIOSAttribute class.

Table 34 contains the requirements for elements of this class.

**Table 34 – Class: CIM_BIOSInteger**

| Elements | Requirement | Notes |
|---|---|---|
| LowerBound | Mandatory | See 7.3.1. |
| UpperBound | Mandatory | See 7.3.1. |
| ProgrammaticUnit | Optional | See 7.3.2. |
| ScalarIncrement | Optional | See 7.3.3. |

## 10.6 CIM_BIOSPassword

The CIM_BIOSPassword class is used to extend a CIM_BIOSAttribute instance to provide additional detail and behavior information of a BIOS's passwords. Elements of this class shall be returned in addition to the elements defined in Table 30 for the CIM_BIOSAttribute class.

Table 35 contains the requirements for elements of this class.

**Table 35 – Class: CIM_BIOSPassword**

| Elements | Requirement | Notes |
|---|---|---|
| IsSet | Mandatory | See 7.5.6. |
| MinLength | Mandatory | See 7.5.1. |
| MaxLength | Mandatory | See 7.5.2. |
| CurrentValue | Mandatory | OVERRIDE: This element shall return an empty array if IsSet is TRUE. |
| PendingValue | Mandatory | OVERRIDE: This element shall return an empty array if IsSet is TRUE. |
| PasswordEncoding | Optional | See 7.5.5. |

## 10.7 CIM_BIOSString

The CIM_BIOSString class is used to extend a CIM_BIOSAttribute instance to provide additional detail and behavior information of string data types. Elements of this class shall be returned in addition to the elements defined in Table 30 for the CIM_BIOSAttribute class.

Table 36 contains the requirements for elements of this class.

**Table 36 – Class: CIM_BIOSString**

| Elements | Requirement | Notes |
|---|---|---|
| StringType | Optional | This element may be used to describe the type of string for the BIOS attribute. |
| MinLength | Mandatory | See 7.4.2. |
| MaxLength | Mandatory | See 7.4.2. |
| ValueExpression | Conditional | See 7.4.1. |

## 10.8 CIM_BIOSElement

The CIM_BIOSElement class is used to represent the BIOS Image and Option ROM.

Table 37 contains the requirements for elements of this class.

**Table 37 – Class: CIM_BIOSElement**

| Elements | Requirement | Notes |
|---|---|---|
| Manufacturer | Mandatory | This element shall identify the manufacturer of the BIOS. |
| PrimaryBIOS | Optional | This element shall indicate if the BIOS represented by the instance is the primary BIOS of the computer system. |
| Version | Mandatory | Key |
| Name | Mandatory | Key |

| Elements | Requirement | Notes |
|---|---|---|
| SoftwareElementState | Mandatory | Key |
| SoftwareElementID | Mandatory | Key |
| TargetOperatingSystem | Mandatory | **Key**: This element shall identify the operating system environment of the BIOS, if applicable. This property shall be set to 66 (Not Applicable) if the BIOS operating system environment is not applicable for the implementation. |
| RegistryURIs | Optional | This element shall indicate the publication location of the registry or registries to which the implementation complies, such as a well-known URL. |

## 10.9 CIM_ConcreteDependency

The CIM_ConcreteDependency association is used to relate the dependency of a concrete subclass of a CIM_ManagedElement instance to a CIM_BIOSAttribute or CIM_ConcreteCollection instance. An instance of this association is conditional on the existence of an instance of a concrete subclass of CIM_ManagedElement that needs to be associated with a CIM_BIOSAttribute or CIM_ConcreteCollection instance. Table 38 contains the requirements for elements of this class.

**Table 38 – Class: CIM_ConcreteDependency**

| Elements | Requirement | Notes |
|---|---|---|
| Antecedent | Mandatory | **Key**: This element shall be a reference to an instance of the CIM_BIOSAttribute or CIM_ConcreteCollection class. |
| Dependent | Mandatory | **Key**: This element shall be a reference to an instance of a concrete subclass of the CIM_ManagedElement class. |

## 10.10 CIM_SystemBIOS

The CIM_SystemBIOS class associates a CIM_BIOSElement instance with a CIM_ComputerSystem instance of which the CIM_BIOSElement instance is a member. Table 39 contains the requirements for elements of this class.

**Table 39 – Class: CIM_SystemBIOS**

| Elements | Requirement | Notes |
|---|---|---|
| GroupComponent | Mandatory | **Key**: This element shall be a reference to the CIM_ComputerSystem instance of which the current CIM_BIOSElement instance is a member. |
| PartComponent | Mandatory | **Key**: This element shall be a reference to the current CIM_BIOSElement instance. |

## 10.11 CIM_ConcreteComponent

The CIM_ConcreteComponent class associates a CIM_BIOSAttribute instance with a CIM_BIOSElement instance of which the CIM_BIOSAttribute instance is a member. Table 40 contains the requirements for elements of this class.

886 **Table 40 – Class: CIM_ConcreteComponent**

| Elements | Requirement | Notes |
|---|---|---|
| GroupComponent | Mandatory | **Key**: This element shall be a reference to the CIM_BIOSElement instance of which the current CIM_BIOSAttribute instance is a member. |
| PartComponent | Mandatory | **Key**: This element shall be a reference to the current CIM_BIOSAttribute instance. |

887 ## 10.12 CIM_ElementCapabilities

888 The CIM_ElementCapabilities class associates a CIM_BIOSService instance with the
889 CIM_BIOSServiceCapabilities instance that advertises the capabilities of the service.

890 Table 41 contains the requirements for elements of this class.

891 **Table 41 – Class: CIM_ElementCapabilities**

| Elements | Requirement | Notes |
|---|---|---|
| ManagedElement | Mandatory | **Key:** This element shall be a reference to CIM_BIOSService instance. |
| Capabilities | Mandatory | **Key:** This element shall be a reference to the respective CIM_BIOSServiceCapabilities instance. |

892 ## 10.13 CIM_RegisteredProfile

893 The CIM_RegisteredProfile class is defined by the *Profile Registration Profile*. The requirements denoted
894 in Table 42 are in addition to those mandated by the *Profile Registration Profile*.

895 **Table 42 – Class: CIM_RegisteredProfile**

| Elements | Requirement | Description |
|---|---|---|
| RegisteredName | Mandatory | This element shall have a value of “BIOS Management”. |
| RegisteredVersion | Mandatory | This element shall have a value of “1.0.0”. |
| RegisteredOrganization | Mandatory | This element shall have a value of 2 (DMTF). |

896 ## 10.14 CIM_ConcreteCollection

897 The CIM_ConcreteCollection class represents collections of CIM_BIOSAttribute instances. Table 43
898 contains the requirements for elements of this class.

899 **Table 43 – Class: CIM_ConcreteCollection**

| Elements | Requirement | Notes |
|---|---|---|
| InstanceID | Mandatory | **Key**: This element shall specify the unique identifier for an instance of this class within the Implementation namespace. |
| ElementName | Mandatory | See 7.12.4. |
| Description | Optional | This element may be used to describe the collection of BIOS attributes. |

## 10.15 CIM_OrderedMemberOfCollection

The CIM_OrderedMemberOfCollection class is used to aggregate CIM_BIOSAttribute instances to a CIM_ConcreteCollection instance. The existence of a CIM_OrderedMemberOfCollection instance is conditional on the existence of a CIM_ConcreteCollection instance. This class identifies an attribute or collection of attributes as being part of a specific collection of indications. Table 44 contains the requirements for elements of this class.

**Table 44 – Class: CIM_OrderedMemberOfCollection**

| Elements | Requirement | Notes |
|---|---|---|
| Collection | Mandatory | **Key:** This element shall reference a CIM_ConcreteCollection instance. |
| Member | Mandatory | **Key:** This element shall reference a CIM_BIOSAttribute instance. |
| AssignedSequence | Optional | See 7.12.2.1. |

## 10.16 CIM_OwningCollectionElement

The CIM_OwningCollectionElement class is used to associate CIM_ConcreteCollection instances with a CIM_BIOSElement instance. The existence of a CIM_OwningCollectionElement instance is conditional on the existence of a CIM_ConcreteCollection instance. Table 45 contains the requirements for elements of this class.

**Table 45 – Class: CIM_OwningCollectionElement**

| Elements | Requirement | Notes |
|---|---|---|
| OwningElement | Mandatory | **Key:** This element shall reference the CIM_BIOSElement instance. |
| OwnedElement | Mandatory | **Key:** This element shall reference a CIM_ConcreteCollection instance. |

## 10.17 CIM_ServiceAffectsElement — BIOSAttribute or ConcreteCollection

The CIM_ServiceAffectsElement class is used to associate CIM_BIOSAttribute instances or CIM_ConcreteCollection instances with a CIM_BIOSService instance. If CIM_BIOSService is instantiated and there is at least one respective CIM_BIOSAttribute instance where the CIM_BIOSAttribute.IsReadOnly property has a value of FALSE, CIM_BIOSService shall be associated with CIM_BIOSAttribute or CIM_ConcreteCollection instances through CIM_ServiceAffectsElement instances. Table 46 contains the requirements for elements of this class.

**Table 46 – Class: CIM_ServiceAffectsElement–BIOSAttribute**

| Elements | Requirement | Notes |
|---|---|---|
| AffectingElement | Mandatory | **Key:** This element shall reference a CIM_BIOSService instance. |
| AffectedElement | Mandatory | **Key:** This element shall be a reference to a CIM_BIOSAttribute or CIM_ConcreteCollection instance. |

## 10.18 CIM_ServiceAffectsElement — ComputerSystem

The CIM_ServiceAffectsElement class is used to associate CIM_ComputerSystem instances with a CIM_BIOSService instance. If CIM_BIOSService is instantiated and there is at least one respective CIM_BIOSAttribute instance where the CIM_BIOSAttribute.IsReadOnly property has a value of FALSE, CIM_BIOSService shall be associated with CIM_ComputerSystem instances through CIM_ServiceAffectsElement instances. Table 47 contains the requirements for elements of this class.

**Table 47 – Class: CIM_ServiceAffectsElement–ComputerSystem**

| Elements | Requirement | Notes |
|---|---|---|
| AffectingElement | Mandatory | **Key**: This element shall reference a CIM_BIOSService instance. |
| AffectedElement | Mandatory | **Key:** This element shall be a reference to a CIM_ComputerSystem instance. |

## 10.19 CIM_HostedService

The CIM_HostedService class is used to associate CIM_BIOSService instances to the CIM_ComputerSystem instance that represents the computer system on which it is hosted. If CIM_BIOSService is instantiated, the CIM_ComputerSystem instance shall be associated with the CIM_BIOSService instance through a CIM_HostedService instance. Table 48 contains the requirements for elements of this class.

**Table 48 – Class: CIM_HostedService**

| Elements | Requirement | Notes |
|---|---|---|
| Antecedent | Mandatory | **Key:** This element shall reference of the Scoping Instance (CIM_ComputerSystem instance). |
| Dependant | Mandatory | **Key:** This element shall be a reference to a CIM_BIOSService instance. |

# ANNEX A
# (Informative)

# Change Log

| Version | Date | Description |
|---|---|---|
| 1.0.0 | 2009-06-17 | DMTF Standard Release |