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5 **BIOS Management Profile**

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166

Foreword

167 The *BIOS Management Profile* (DSP1061) was prepared by the Desktop Mobile Working Group and the
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198

Introduction

199 This document defines the classes used to describe and manipulate the BIOS configuration in a managed
200 system. The information in this specification is intended to be sufficient for a provider or consumer of this
201 data to identify unambiguously the classes, properties, methods, and values that shall be instantiated and
202 manipulated to represent and manage BIOS attributes of managed systems and subsystems that are
203 modeled using the DMTF Common Information Model (CIM) core and extended model definitions.

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

206 BIOS Management Profile

207 1 Scope

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

212 2 Normative References

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

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

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

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

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

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

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

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

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

232 3 Terms and Definitions

233 For the purposes of this document, the following terms and definitions apply.

234 3.1

235 **can**

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

237 3.2

238 **cannot**

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

- 240 **3.3**
241 **conditional**
242 indicates requirements to be followed strictly to conform to the document when the specified conditions
243 are met
- 244 **3.4**
245 **mandatory**
246 indicates requirements to be followed strictly to conform to the document and from which no deviation is
247 permitted
- 248 **3.5**
249 **may**
250 indicates a course of action permissible within the limits of the document
- 251 **3.6**
252 **need not**
253 indicates a course of action permissible within the limits of the document
- 254 **3.7**
255 **optional**
256 indicates a course of action permissible within the limits of the document
- 257 **3.8**
258 **referencing profile**
259 indicates a profile that owns the definition of this class and can include a reference to this profile in its
260 "Referenced Profiles" table
- 261 **3.9**
262 **shall**
263 indicates requirements to be followed strictly to conform to the document and from which no deviation is
264 permitted
- 265 **3.10**
266 **shall not**
267 indicates requirements to be followed strictly to conform to the document and from which no deviation is
268 permitted
- 269 **3.11**
270 **should**
271 indicates that among several possibilities, one is recommended as particularly suitable, without
272 mentioning or excluding others, or that a certain course of action is preferred but not necessarily required
- 273 **3.12**
274 **should not**
275 indicates that a certain possibility or course of action is deprecated but not prohibited
- 276 **3.13**
277 **unspecified**
278 keyword that indicates that this profile does not define any constraints for the referenced CIM element or
279 operation
- 280 **3.14**
281 **BIOS attribute**
282 a BIOS element that provides information, a control surface, or both for basic hardware setup and
283 configuration in a computer system

284 BIOS attributes are typically accessible in the computer’s system and option ROM setup screens.

285 **4 Symbols and Abbreviated Terms**

286 **4.1**

287 **BIOS**

288 Basic Input Output System

289 **5 Synopsis**

290 **Profile Name:** BIOS Management

291 **Version:** 1.0.1

292 **Organization:** DMTF

293 **CIM Schema Version:** 2.22

294 **Central Class:** CIM_BIOSElement

295 **Scoping Class:** CIM_ComputerSystem

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

298 Table 1 lists specifications on which this profile has dependency.

299 **Table 1 – Related Specifications**

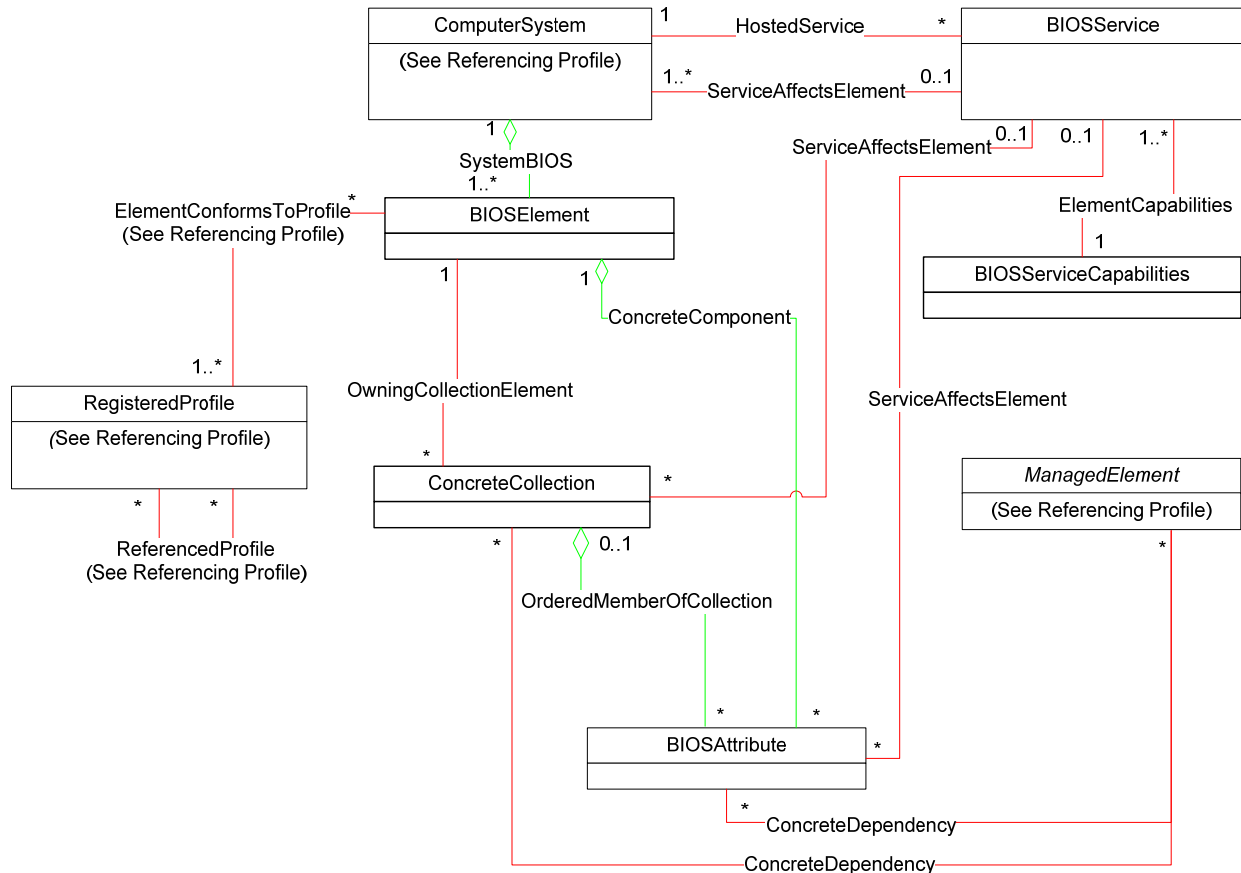
Specification Name	Organization	Version	Relationship	Behavior
Profile Registration	DMTF	1.0	Mandatory	None
BIOS Attribute Registry	DMTF	Any	Optional	Recommended to give a client a standardized naming and behavior definition of the BIOS attribute being managed

300 **6 Description (Informative)**

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

303 Figure 1 represents the class schema for the *BIOS Management Profile*. For simplicity, the *CIM_* prefix
 304 has been removed from the names of the classes. The *CIM_BIOSElement* class represents a BIOS of a
 305 computer system. An implementation may have more than one BIOS in the computer system. The
 306 *CIM_BIOSAttribute* class represents the BIOS attributes of a BIOS element in a computer system. Each
 307 BIOS attribute is represented by an instance of the *CIM_BIOSAttribute* class. The properties of the
 308 *CIM_BIOSAttribute* class and its subclasses give a client descriptive information about the BIOS attribute
 309 and the current value of the attribute. The descriptive properties provide information to the client about the
 310 ability to change the value and the legal possibilities for a new value. The *CIM_BIOSService* class is
 311 implemented to provide methods to change the values of BIOS attributes. This is necessary because the
 312 *ModifyInstance* operation is not supported on the *CIM_BIOSAttribute* class. The
 313 *CIM_BIOSServiceCapabilities* class is used to advertise to a client the methods that can be used to
 314 change the value of BIOS attributes and is implemented anytime the *CIM_BIOSService* class is
 315 implemented. The *CIM_BIOSService* and *CIM_BIOSServiceCapabilities* classes are not required for

316 implementations that have exclusively read-only BIOS attributes. As a way of organizing or grouping the
 317 CIM_BIOSAttribute instances, an implementation may implement collections. An instance of the
 318 CIM_ConcreteCollection class shall be static to the implementation and used as a logical grouping by
 319 associating CIM_BIOSAttribute instances with the CIM_ConcreteCollection instance through the
 320 CIM_OrderedMemberOfCollection association.



321

322

Figure 1 – BIOS Management Profile: Class Diagram

323 7 Implementation

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

327 7.1 CIM_BIOSAttribute

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

329 7.1.1 CIM_BIOSAttribute.AttributeName

330 For each CIM_BIOSAttribute instance, the AttributeName property shall contain a unique, non-modifiable
 331 value for the implementation namespace. The AttributeName property shall have a string value that
 332 corresponds to the BIOS attribute that the CIM_BIOSAttribute instance represents. When the
 333 CIM_BIOSElement.RegistryURIs property is not Null (BIOS Attribute Registry is implemented), the

334 AttributeName property shall contain a value previously defined in a BIOS attribute registry published by
335 the entity creating or defining the BIOS attribute and shall use the following format: "<OrgID>:<identifier>".

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

340 **7.1.2 CIM_BIOSAttribute.CurrentValue**

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

347 **7.1.3 CIM_BIOSAttribute.DefaultValue**

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

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

353 Support for the DefaultValue[] property is optional.

354 **7.1.4 CIM_BIOSAttribute.PendingValue**

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

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

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

365 **7.2 CIM_BIOSEnumeration**

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

369 **7.2.1 CIM_BIOSEnumeration.PossibleValues**

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

373 **7.3 CIM_BIOSInteger**

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

376 **7.3.1 CIM_BIOSInteger.UpperBound and CIM_BIOSInteger.LowerBound**

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

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

382 **7.3.2 CIM_BIOSInteger.ProgrammaticUnit**

383 When not Null, the CIM_BIOSInteger.ProgrammaticUnit property shall contain a value that defines the
384 programmatic unit of the CIM_BIOSAttribute.CurrentValue[], CIM_BIOSAttribute.DefaultValue[], and
385 CIM_BIOSAttribute.PendingValue[] properties that are represented by the CIM_BIOSInteger instance
386 and shall comply with the ISPUnt definition in [DSP0004](#).

387 **7.3.3 CIM_BIOSInteger.ScalarIncrement**

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

391 **7.4 CIM_BIOSString**

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

394 **7.4.1 CIM_BIOSString.ValueExpression**

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

398 **7.4.2 CIM_BIOSString.MinLength and CIM_BIOSString.MaxLength**

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

402 **7.5 CIM_BIOSPassword**

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

405 **7.5.1 CIM_BIOSPassword.MinLength**

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

408 **7.5.2 CIM_BIOSPassword.MaxLength**

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

412 **7.5.3 CIM_BIOSPassword.CurrentValue[]**

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

414 **7.5.4 CIM_BIOSPassword.PendingValue[]**

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

416 **7.5.5 CIM_BIOSPassword.PasswordEncoding (Optional)**

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

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

428 **7.5.6 CIM_BIOSPassword.IsSet**

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

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

432 If no BIOS password exists, then this property shall be set to FALSE.

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

434 **7.6 Relationship between the BIOS and Managed System**

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

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

441 **7.7 CIM_ConcreteComponent**

442 The CIM_ConcreteComponent class is used to associate CIM_BIOSAttribute instances with a
443 CIM_BIOSElement instance. When the association is used in this way, its GroupComponent property
444 shall reference the CIM_BIOSElement instance and its PartComponent property shall reference the
445 CIM_BIOSAttribute instance.

446 **7.7.1 CIM_ConcreteComponent with CIM_ConcreteCollection Implementation**

447 For each CIM_BIOSAttribute instance that is associated with a CIM_ConcreteCollection instance through
448 a CIM_OrderedMemberOfCollection instance, one CIM_ConcreteComponent instance may associate the
449 CIM_BIOSAttribute instance with the CIM_BIOSElement instance.

450 **7.7.2 CIM_ConcreteComponent without CIM_ConcreteCollection Implementation**

451 For each CIM_BIOSAttribute instance that is not associated with a CIM_ConcreteCollection instance
452 through a CIM_OrderedMemberOfCollection instance, one CIM_ConcreteComponent instance shall
453 associate the CIM_BIOSAttribute instance with the CIM_BIOSElement instance.

454 **7.8 CIM_BIOSElement**

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

457 **7.9 CIM_BIOSService**

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

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

464 All instances of CIM_BIOSAttribute associated with the instance of CIM_BIOSService using
465 CIM_ServiceAffectsElement shall be within the scope of the CIM_ComputerSystem instance that is
466 associated with the instance of CIM_BIOSService using CIM_ServiceAffectsElement.

467 An implementation may support a single CIM_BIOSService instance used to manage multiple computer
468 systems.

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

470 An implementation shall not support a single BIOS attribute managed by multiple CIM_BIOSService
471 instances.

472 **7.10 CIM_ConcreteDependency**

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

477 The Dependent property shall reference the CIM_ManagedElement instance. If a
478 CIM_ConcreteDependency instance is used to associate with a CIM_BIOSAttribute instance, the
479 Antecedent property shall reference the CIM_BIOSAttribute instance. If CIM_ConcreteDependency is
480 used to associate with a CIM_ConcreteCollection instance, the Antecedent property shall reference the
481 CIM_ConcreteCollection instance.

482 A CIM_ConcreteDependency instance may be used to associate a CIM_ManagedElement instance with
483 both a CIM_BIOSAttribute instance and a CIM_ConcreteCollection instance that contains
484 CIM_BIOSAttribute instances that are already associated with the CIM_ManagedElement instance.

485 7.11 CIM_ElementCapabilities and CIM_BIOSServiceCapabilities (Optional)

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

489 7.12 CIM_ConcreteCollection (Optional)

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

493 7.12.1 Relationship with CIM_BIOSElement

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

497 7.12.2 Relationship with CIM_BIOSAttribute

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

500 7.12.2.1 CIM_OrderedMemberOfCollection.AssignedSequence

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

505 7.12.3 Static BIOS Attribute Collections

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

508 7.12.4 CIM_ConcreteCollection.ElementName

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

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

520 "DMTF:" <unique identifier>

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

522

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

523 7.13 CIM_ServiceAffectsElement (Optional)

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

528 7.13.1 CIM_ServiceAffectsElement Association with CIM_BIOSAttribute

529 For each CIM_BIOSAttribute instance that is not associated with a CIM_ConcreteCollection instance
 530 through a CIM_OrderedMemberOfCollection instance, one CIM_ServiceAffectsElement instance shall
 531 associate the CIM_BIOSAttribute instance with the CIM_BIOSService instance.

532 For each CIM_BIOSAttribute instance that is associated with a CIM_ConcreteCollection instance through
 533 a CIM_OrderedMemberOfCollection instance, one CIM_ServiceAffectsElement instance may optionally
 534 associate the CIM_BIOSAttribute instance with the CIM_BIOSService instance.

535 When the association is used as described in this clause, its AffectingElement property shall reference
 536 the CIM_BIOSService instance and its AffectedElement property shall reference the CIM_BIOSAttribute
 537 instance.

538 7.13.2 CIM_ServiceAffectsElement Association with CIM_ConcreteCollection

539 For each CIM_BIOSAttribute instance that is associated with a CIM_ConcreteCollection instance through
 540 a CIM_OrderedMemberOfCollection instance, one CIM_ServiceAffectsElement instance shall associate
 541 the CIM_BIOSService instance with this CIM_ConcreteCollection instance.

542 When the association is used in this way, its AffectingElement property shall reference the
 543 CIM_BIOSService instance and its AffectedElement property shall reference the CIM_ConcreteCollection
 544 instance.

545 **7.13.3 CIM_ServiceAffectsElement Association with CIM_ComputerSystem**

546 The AffectingElement property shall reference the CIM_BIOSService instance. The AffectedElement
547 property shall reference the CIM_ComputerSystem instance.

548 **8 Methods**

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

551 **8.1 CIM_BIOSService.SetBIOSAttribute()**

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

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

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

564 **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

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

567 **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

568

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 7.5.5 for examples of encoding tags.

569

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.

570 8.2 CIM_BIOSService.SetBIOSAttributeEmbeddedInstance()

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

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

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

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

585 **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

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

588 **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

589 **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 7.5.5 for examples of encoding tags.

590 **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.

591 **8.3 CIM_BIOSService.RestoreBIOSDefaults()**

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

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

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

598 **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

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

601 **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

602 **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 7.5.5 for examples of encoding tags.

603 **8.4 CIM_BIOSService.SetBIOSAttributes()**

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

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

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

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

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

628 **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

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

631 **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

632

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 7.5.5 for examples of encoding tags.

633

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.

634 **8.5 Profile Conventions for Operations**

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

637 The default list of operations is as follows:

- 638 • GetInstance
- 639 • Associators
- 640 • AssociatorNames
- 641 • References

- 642 • ReferenceNames
- 643 • EnumerateInstances
- 644 • EnumerateInstanceNames

645 **8.6 CIM_BIOSAttribute Operations**

646 Table 18 lists implementation requirements for operations. If implemented, these operations shall be
 647 implemented as defined in [DSP0200](#). In addition, and unless otherwise stated in Table 18, all operations
 648 in the default list in 8.5 shall be implemented as defined in [DSP0200](#).

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

650 **Table 18 – Operations: CIM_BIOSAttribute**

Operation	Requirement	Messages
ModifyInstance	Not supported	None

651 **8.6.1 CIM_BIOSAttribute — ModifyInstance**

652 The ModifyInstance operation shall not be supported.

653 **8.7 CIM_BIOSElement Operations**

654 All operations in the default list in 8.5 shall be implemented as defined in [DSP0200](#).

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

656 **8.8 CIM_BIOSService Operations**

657 All operations in the default list in 8.5 shall be implemented as defined in [DSP0200](#).

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

659 **8.9 CIM_BIOSServiceCapabilities Operations**

660 All operations in the default list in 8.5 shall be implemented as defined in [DSP0200](#).

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

662 **8.10 CIM_SystemBIOS Operations**

663 Table 19 lists implementation requirements for operations. If implemented, these operations shall be
 664 implemented as defined in [DSP0200](#). In addition, and unless otherwise stated in Table 19, all operations
 665 in the default list in 8.5 shall be implemented as defined in [DSP0200](#).

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

667 **Table 19 – Operations: CIM_SystemBIOS**

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

668 **8.11 CIM_ConcreteComponent Operations**

669 Table 20 lists implementation requirements for operations. If implemented, these operations shall be
 670 implemented as defined in [DSP0200](#). In addition, and unless otherwise stated in Table 20, all operations
 671 in the default list in 8.5 shall be implemented as defined in [DSP0200](#).

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

673 **Table 20 – Operations: CIM_ConcreteComponent**

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

674 **8.12 CIM_ConcreteDependency Operations**

675 Table 21 lists implementation requirements for operations. If implemented, these operations shall be
 676 implemented as defined in [DSP0200](#). In addition, and unless otherwise stated in Table 21, all operations
 677 in the default list in 8.5 shall be implemented as defined in [DSP0200](#).

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

679 **Table 21 – Operations: CIM_ConcreteDependency**

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

680 **8.13 CIM_ConcreteCollection Operations**

681 All operations in the default list in 8.5 shall be implemented as defined in [DSP0200](#).

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

683 **8.14 CIM_ServiceAffectsElement Operations (Association with CIM_BIOSAttribute)**

684 Table 22 lists implementation requirements for operations. If implemented, these operations shall be
 685 implemented as defined in [DSP0200](#). In addition, and unless otherwise stated in Table 22, all operations
 686 in the default list in 8.5 shall be implemented as defined in [DSP0200](#).

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

688 **Table 22 – Operations: CIM_ServiceAffectsElement**

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

689 **8.15 CIM_ServiceAffectsElement Operations (Association with**
 690 **CIM_ConcreteCollection)**

691 Table 23 lists implementation requirements for operations. If implemented, these operations shall be
 692 implemented as defined in [DSP0200](#). In addition, and unless otherwise stated in Table 23, all operations
 693 in the default list in 8.5 shall be implemented as defined in [DSP0200](#).

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

695 **Table 23 – Operations: CIM_ServiceAffectsElement**

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

696 **8.16 CIM_ServiceAffectsElement Operations (Association with**
 697 **CIM_ComputerSystem)**

698 Table 24 lists implementation requirements for operations. If implemented, these operations shall be
 699 implemented as defined in [DSP0200](#). In addition, and unless otherwise stated in Table 24, all operations
 700 in the default list in 8.5 shall be implemented as defined in [DSP0200](#).

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

702 **Table 24 – Operations: CIM_ServiceAffectsElement**

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

703 **8.17 CIM_OrderedMemberOfCollection Operations**

704 Table 25 lists implementation requirements for operations. If implemented, these operations shall be
 705 implemented as defined in [DSP0200](#). In addition, and unless otherwise stated in Table 25, all operations
 706 in the default list in 8.5 shall be implemented as defined in [DSP0200](#).

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

708 **Table 25 – Operations: CIM_OrderedMemberOfCollection**

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

709 **8.18 CIM_OwningCollectionElement Operations**

710 Table 26 lists implementation requirements for operations. If implemented, these operations shall be
 711 implemented as defined in [DSP0200](#). In addition, and unless otherwise stated in Table 26, all operations
 712 in the default list in 8.5 shall be implemented as defined in [DSP0200](#).

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

714 **Table 26 – Operations: CIM_OwningCollectionElement**

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

715 **8.19 CIM_HostedService Operations**

716 Table 27 lists implementation requirements for operations. If implemented, these operations shall be
 717 implemented as defined in [DSP0200](#). In addition, and unless otherwise stated in Table 27, all operations
 718 in the default list in 8.5 shall be implemented as defined in [DSP0200](#).

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

720 **Table 27 – Operations: CIM_HostedService**

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

721 **8.20 CIM_ElementCapabilities Operations**

722 Table 28 lists implementation requirements for operations. If implemented, these operations shall be
 723 implemented as defined in [DSP0200](#). In addition, and unless otherwise stated in Table 28, all operations
 724 in the default list in 8.5 shall be implemented as defined in [DSP0200](#).

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

726 **Table 28 – Operations: CIM_ElementCapabilities**

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

727 **9 Use Cases (Informative)**

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

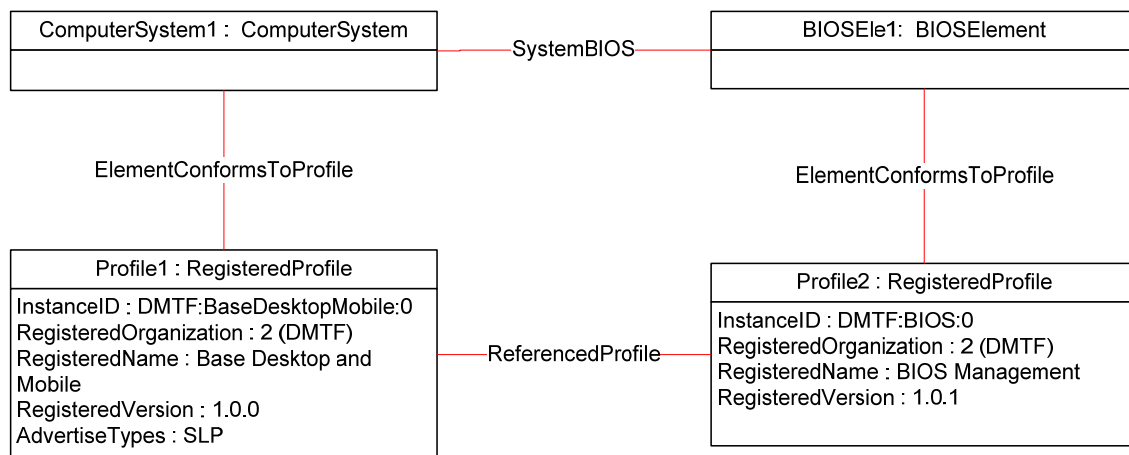
729 **9.1 Object Diagrams**

730 The object diagram in Figure 2 shows how CIM_RegisteredProfile instances are used to identify the
 731 version of the *BIOS Management Profile* with which a CIM_BIOSService instance and its associated
 732 instances are conformant. A CIM_RegisteredProfile instance exists for each profile that is instrumented in
 733 the system. One CIM_RegisteredProfile instance identifies the DMTF [Base Desktop and Mobile Profile](#),
 734 version 1.0.0, a specialization of the DMTF [Computer System Profile](#). The other instance identifies the
 735 DMTF *BIOS Management Profile*, version 1.0.1. The Central Instance is the CIM_BIOSElement instance.
 736 The Scoping Instance is the CIM_ComputerSystem instance.

737 This CIM_ComputerSystem instance is conformant with the [Base Desktop and Mobile Profile](#) version
 738 1.0.0, as indicated by the CIM_ElementConformsToProfile association with the CIM_RegisteredProfile
 739 instance.

740 This CIM_BIOSElement instance is conformant with the *BIOS Management Profile* version 1.0.1, as
 741 indicated by the CIM_ElementConformsToProfile association with the CIM_RegisteredProfile instance.

742 The CIM_ReferencedProfile relationship between the [Base Desktop and Mobile Profile](#) and the *BIOS
 743 Management Profile* places the CIM_BIOSElement instance within the scope of the *BIOS Management
 744 Profile*.



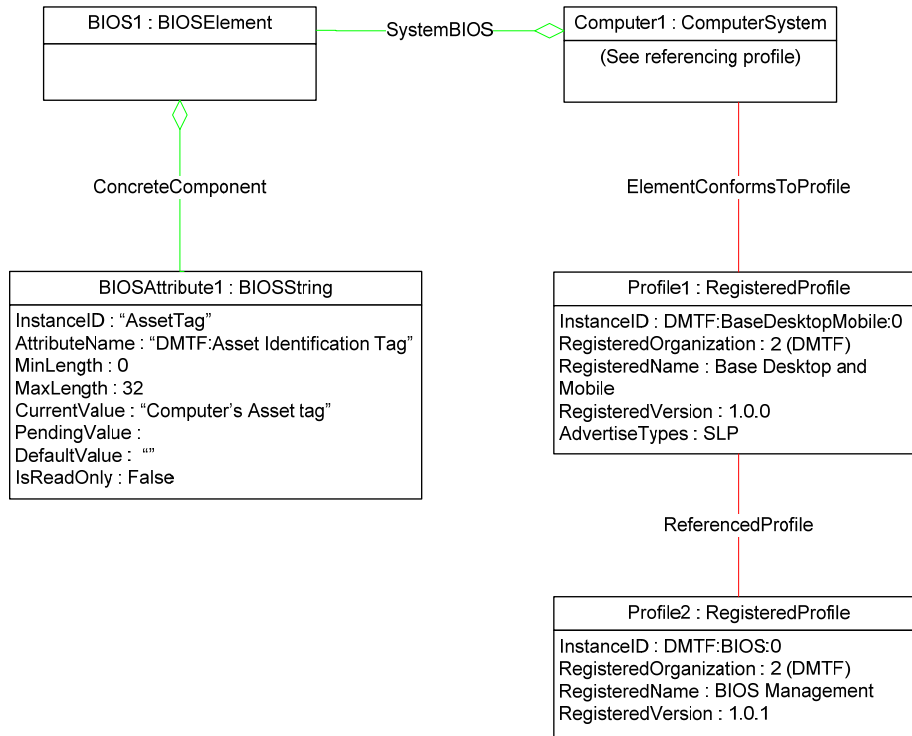
745

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

747 **9.2 Object Diagrams**

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

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



754

755

Figure 3 – BIOS Management Profile: Object Diagram

756 **9.3 Show All BIOS Attributes in the Computer System**

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

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

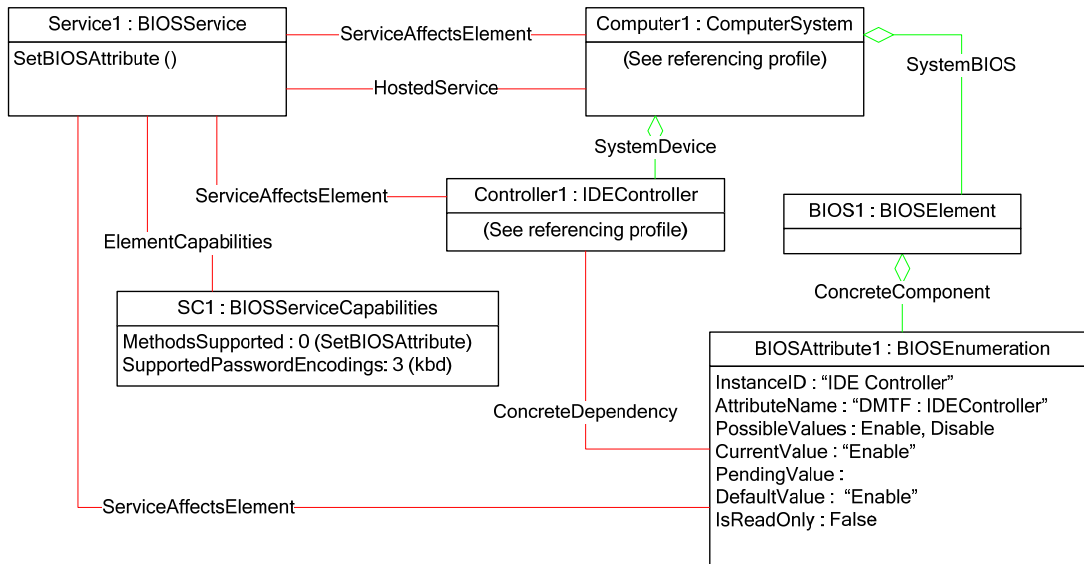
767 **9.4 Find BIOS Attributes Associated with a Specific Device**

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

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

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

775 CIM_ConcreteDependency instance.

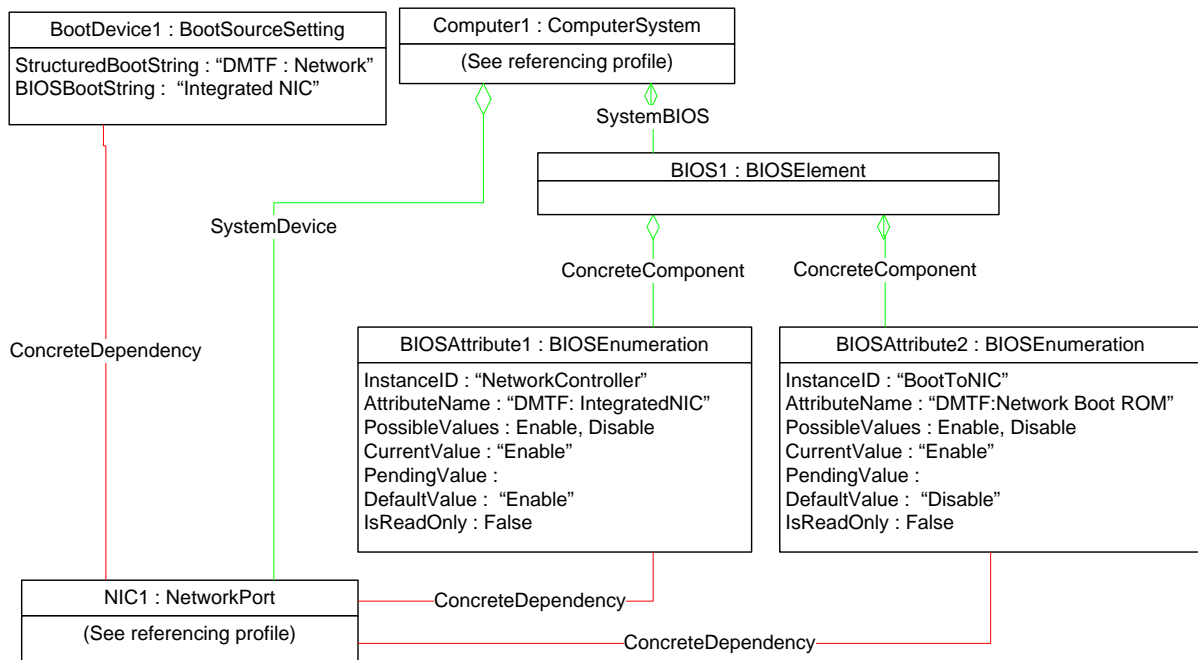


776

777

Figure 4 – BIOS Management Profile: Object Diagram

778 Figure 5 represents a CIM_ManagedElement instance with dependencies to multiple CIM_BIOSAttribute instances.
779



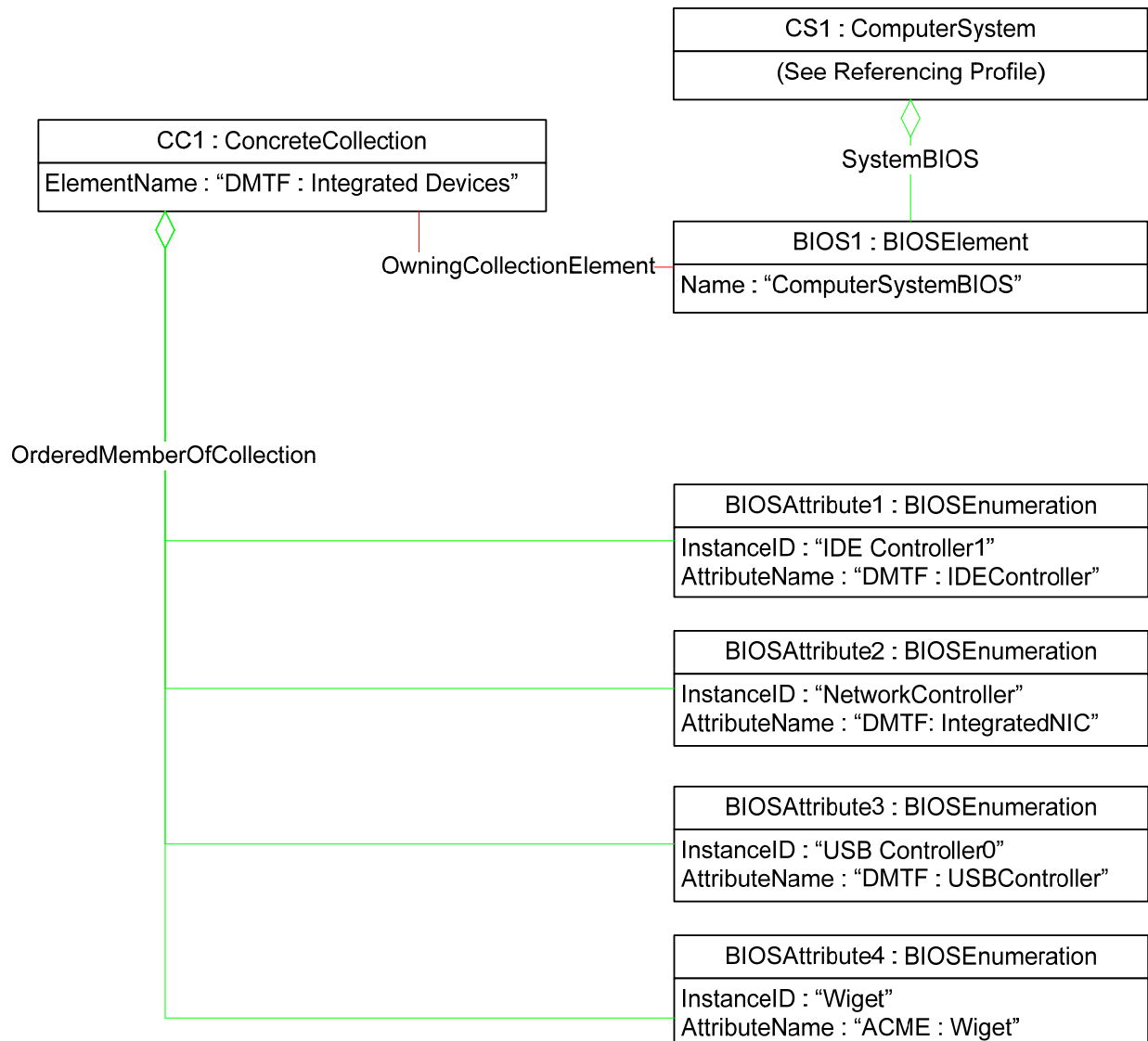
780

781

Figure 5 – BIOS Management Profile: Object Diagram

782 **9.5 Find a Collection of Attributes**

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



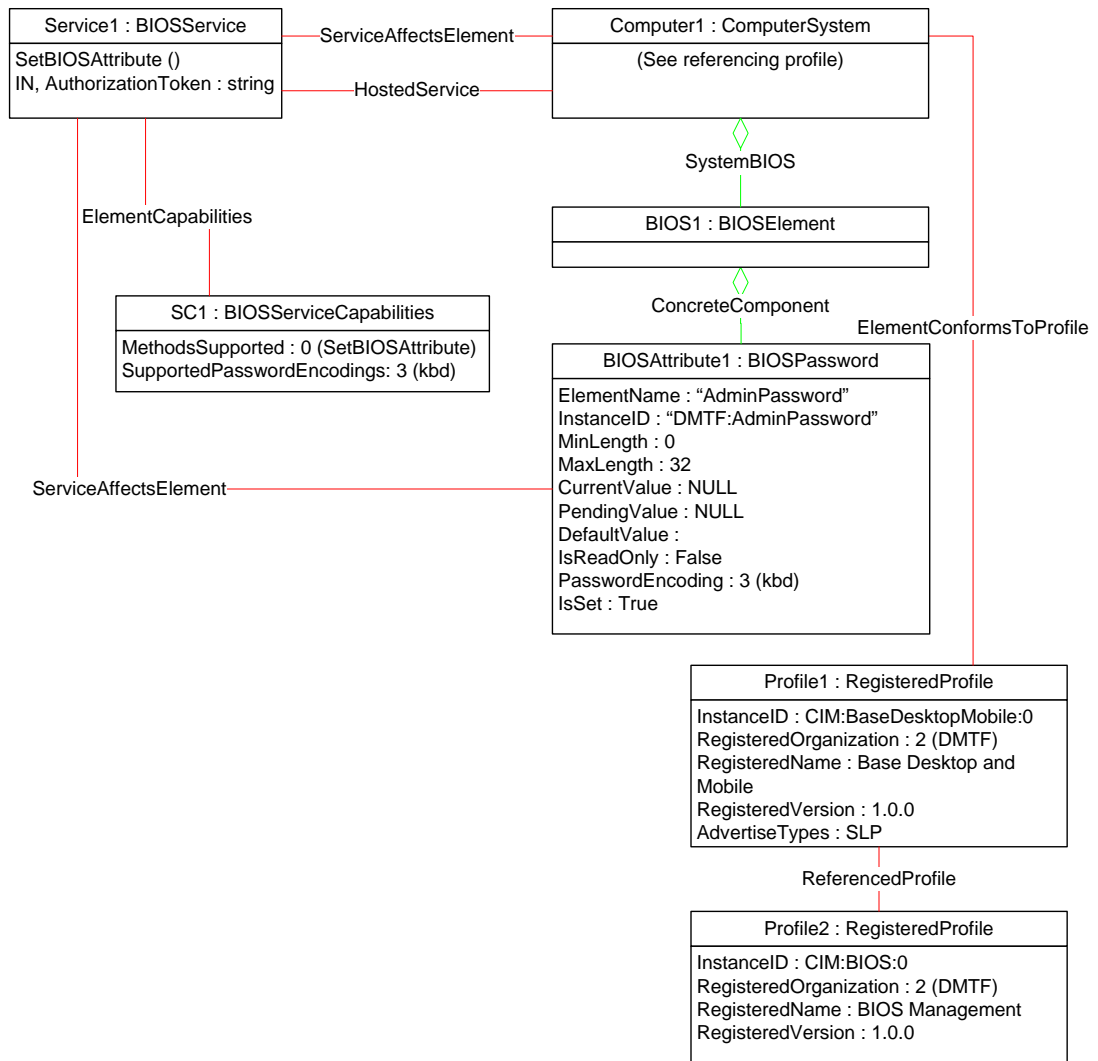
788

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

790 **9.6 Determine Whether a BIOS Attribute’s Value Can Be Modified**

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

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



802

803

Figure 7 – BIOS Management Profile: Object Diagram

804 **9.7 Modifying a BIOS Attribute**

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

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

808 **9.7.1 Modifying a BIOS Attribute (Password Required)**

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

813 **9.7.2 Modifying a Group of BIOS Attributes**

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

817 **10 CIM Elements**

818 Table 29 shows the list of CIM Elements for this profile and details their requirements. The
 819 implementation requirements for the classes and properties described in this clause are defined in clause
 820 7 ("Implementation").

821 **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	Optional	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		

822 **10.1 CIM_BIOSAttribute**

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

825 **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.

826 **10.2 CIM_BIOSService**

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

832 Table 31 contains the requirements for elements of this class.

833 **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.

834 10.3 CIM_BIOSServiceCapabilities

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

837 Table 32 contains the requirements for elements of this class.

838 **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.

839 10.4 CIM_BIOSEnumeration

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

843 Table 33 contains the requirements for elements of this class.

844 **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.

845 10.5 CIM_BIOSInteger

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

849 Table 34 contains the requirements for elements of this class.

850 **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.

851 **10.6 CIM_BIOSPassword**

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

855 Table 35 contains the requirements for elements of this class.

856 **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.

857 **10.7 CIM_BIOSString**

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

861 Table 36 contains the requirements for elements of this class.

862 **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.

863 **10.8 CIM_BIOSElement**

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

865 Table 37 contains the requirements for elements of this class.

866 **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.

867 **10.9 CIM_ConcreteDependency**

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

873 **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.

874 **10.10 CIM_SystemBIOS**

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

878 **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.

879 **10.11 CIM_ConcreteComponent**

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

883

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.

884 **10.12 CIM_ElementCapabilities**

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

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

888

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.

889 **10.13 CIM_RegisteredProfile**

890 The CIM_RegisteredProfile class is defined by the [Profile Registration Profile](#). The requirements denoted
 891 in Table 42 are in addition to those mandated by the [Profile Registration Profile](#).

892

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 “1.0.1”.
RegisteredOrganization	Mandatory	This element shall have a value of 2 (DMTF).

893 **10.14 CIM_ConcreteCollection**

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

896

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.

897 **10.15 CIM_OrderedMemberOfCollection**

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

903 **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.

904 **10.16 CIM_OwningCollectionElement**

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

909 **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.

910 **10.17 CIM_ServiceAffectsElement — BIOSAttribute or ConcreteCollection**

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

917 **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.

918 **10.18 CIM_ServiceAffectsElement — ComputerSystem**

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

924 **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.

925 **10.19 CIM_HostedService**

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

931 **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.

932
933
934
935

ANNEX A (Informative)

Change Log

Version	Date	Description
1.0.0	2009-06-17	DMTF Standard Release
1.0.1	2010-09-15	DMTF Standard Errata Release. Fixed Mantis bugs 559 and 561.

936