# BIOS and Boot Management Profile

**Document Number: DCIM1040**
**Document Type: Specification**
**Document Status: Published**
**Document Language: E**
**Date: 2012-10-19**

**Version: 1.2.2**

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# BIOS and Boot Management Profile

## 1 Scope

The BIOS and Boot Management Profile extends the management capabilities of referencing profiles by adding the capability to represent the configuration of the system BIOS setup and to manage the boot of the system. The system BIOS setup is modeled with multiple attributes that allow configuration of the BIOS.

## 2 Normative References

Refer to the following documents for more information.

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

- DMTF DSP1033, *Profile Registration Profile 1.0.0*
- DMTF DSP1061, *Management Profile 1.0.0*
- DMTF DSP0200, *CIM Operations over HTTP 1.2.0*
- DMTF DSP0004, *CIM Infrastructure Specification 2.3.0*
- DMTF DSP1000, *Management Profile Specification Template*
- DMTF DSP1001, *Management Profile Specification Usage Guide*
- DMTF DSP0226, *Web Services for Management (WS-Management) Specification 1.1.0*
- DMTF DSP0227, *WS-Management CIM Binding Specification 1.0.0*
- 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
- Unified Modeling Language (UML) from the Open Management Group (OMG), http://www.uml.org
- *BIOS Boot Specification v1.01* (January 11, 1996), http://www.phoenix.com/NR/rdonlyres/56E38DE2-3E6F-4743-835F-B4A53726ABED/0/specsbbs101.pdf
- DCIM LC Management Profile *1.2.0*
- *Dell Lifecycle Controller Best Practices Guide 1.0, http://en.community.dell.com/techcenter/extras/m/white_papers/20066173.aspx*
- *Dell WSMAN Licenses and Privileges 1.0*
- *Advanced Configuration and Power Interface (ACPI) Specification v4.0*, http://www.acpi.info/DOWNLOADS/ACPIspec40a.pdf
- Dell Tech Center MOF Library: http://www.delltechcenter.com/page/DCIM.Library.MOF
- Related Managed Object Format (MOF) files:

- DCIM_BootConfigSetting.mof
- DCIM_BootSourceSetting.mof
- DCIM_BIOSEnumeration.mof
- DCIM_BIOSInteger.mof
- DCIM_BIOSService.mof
- DCIM_BIOSString.mof
- DCIM_BIOSPassword.mof
- DCIM_LCElementConformsToProfile
- DCIM_LCRegisteredProfile

# 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 in order to conform to the document when the specified conditions are met.

## 3.4

**Mandatory –** Indicates requirements to be followed strictly in order to conform to the document and from which no deviation is permitted.

## 3.5

**may** – Indicates a course of action permissible within the limits of the document.

## 3.6

**Optional** – Indicates a course of action permissible within the limits of the document.

### 3.7

**need not** – 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 “Related Profiles” table.

### 3.9

**shall –** Indicates requirements to be followed strictly in order to conform to the document and from which no deviation is permitted.

### 3.10

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

### 3.11

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

### 3.12

**should not –** Indicates that a certain possibility or course of action is deprecated but not prohibited.

### 3.13

**FQDD** – Fully Qualified Device Descriptor is used to identify a particular component in a system.

### 3.14

**Interop Namespace –** Interop Namespace is where instrumentation instantiates classes to advertise its capabilities for client discovery.

### 3.15

**Implementation Namespace** – Implementation Namespace is where instrumentation instantiates classes relevant to executing core management tasks.

### 3.16

**ENUMERATE –** Refers to WS-MAN ENUMERATE operation as described in Section 8.2 of DSP0226_V1.1 and Section 9.1 of DSP0227_V1.0

### 3.17

**GET** – Refers to WS-MAN GET operation as defined in Section 7.3 of DSP00226_V1.1 and Section 7.1 of DSP0227_V1.0

# 4 Symbols and Abbreviated Terms

## 4.1

**CIM** – Common Information Model

## 4.2

**iDRAC –** Integrated Dell Remote Access Controller – management controller for blades and monolithic servers

## 4.3

**CMC** – Chassis Manager Controller – management controller for the modular server chassis

## 4.4

**iSCSI –** Internet Small Computer System Interface, an Internet Protocol (IP)-based storage networking standard for linking data storage facilities.

## 4.5

**WBEM –** Web-Based Enterprise Management

## 4.6

**IPL –** Initial Program Load, refers to the IPL list (an initial priority list of boot devices). An Initial Program Load Device is any device in the system that can boot and load an operating system. In standard AT machines, this is the floppy drive or hard drive. See *BIOS Boot Specification*.

## 4.7

**BCV –** A Boot Connection Vector is a pointer that points to code inside the option ROM that performs device initialization, detect if a peripheral (such as a SCSI hard drive) is attached, and optionally hook INT 13h. The BCV resides in a PnP option ROM Expansion Header. An example of an option ROM with a BCV is a PnP ISA SCSI controller. See *BIOS Boot Specification*.

# 5 Synopsis

**Profile Name:** BIOS and Boot Management

**Version:** 1.2.1

**Organization:** Dell Inc.

**CIM Schema Version:** 2.19.1

**Central Class:** DCIM_BIOSService

**Scoping Class:** CIM_ComputerSystem

The BIOS and Boot Management Profile extends the management capability of the referencing profiles by adding the capability to describe BIOS attributes, each BIOS configuration item is represented by an instance one of these classes DCIM_BIOSEnumeration, DCIMBIOSString, DCIM_BIOSInteger and boot management where each boot list is represented by DCIM_BootConfigSetting and each boot source device by DCIM_BootSourceSetting. DCIM_BIOSService shall be the Central Class. CIM_ComputerSystem shall be the Scoping Class. The instance of DCIM_BIOSService shall be the Central Instance. The instance of CIM_ComputerSystem shall be the Scoping Instance.

Table 1 lists profiles that are related to this profile.

126 **Table 1 – Related Profiles**

| Profile Name | Organization | Version | Relationship |
|---|---|---|---|
| Profile Registration Profile | DMTF | 1.0 | Mandatory |

127 # 6 Description

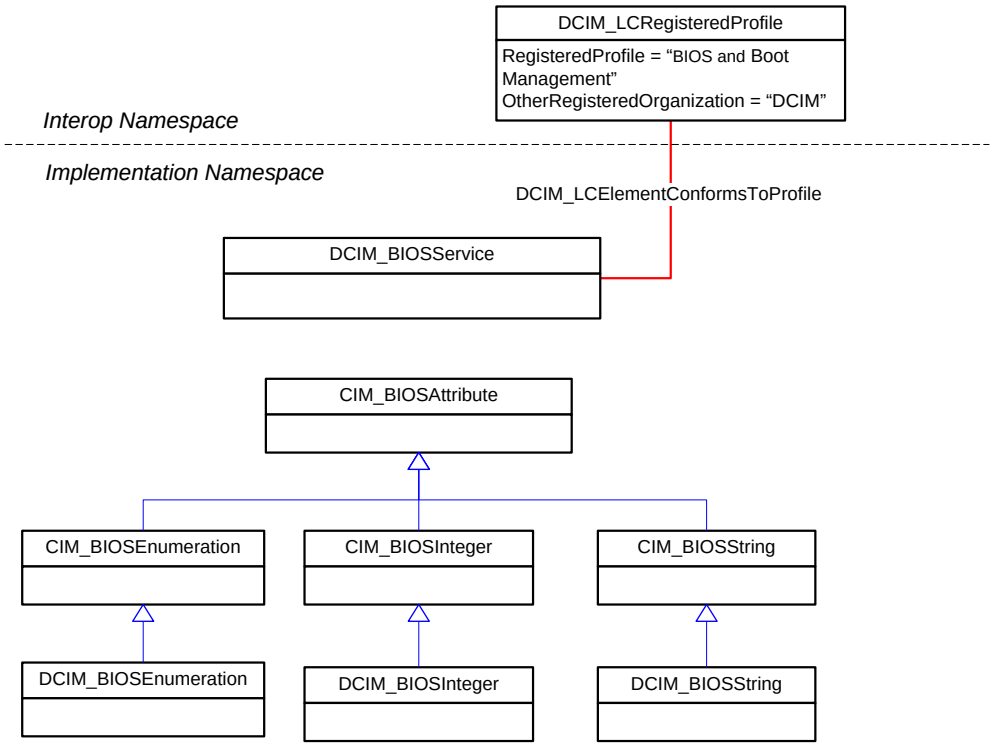
128 The BIOS and Boot Management Profile describes the BIOS setup configuration that includes boot
129 management. The profile also describes the relationship of the BIOS classes to the DMTF and Dell profile
130 version information.

131 Figure 1 shows the BIOS and Boot Management Profile.

132 Each of the CIM_BIOSAttribute sub-classes (DCIM_BIOSEnumeration, DCIM_BIOSString,
133 DCIM_BIOSInteger) represent a configurable attribute in BIOS. Depending on the data type of the
134 attribute the BIOS configuration attribute is either instantiated as DCIM_BIOSEnumeration,
135 DCIM_BIOSString, or DCIM_BIOSInteger instance.

136 The DCIM_BIOSService class is used to configure the BIOS attributes. The SetAttribute() and
137 SetAttributes() methods on the DCIM_BIOSService class configure BIOS attributes, DCIM_BIOSAttribute
138 subclass instances.

139 The BIOS and Boot Management Profile information is represented with the instance of
140 CIM_RegisteredProfile.




141

142 **Figure 1 – BIOS and Boot Management Profile: Class Diagram – BIOS Management**

Figure 2 shows the object diagram schema for the boot management feature of the BIOS and Boot Management Profile. For simplicity, the prefix CIM_ has been removed from the class names.

DCIM_BootConfigSetting represents each boot list. DCIM_BootSourceSetting represents each of the boot list boot devices or sources that are shown under their corresponding boot list.

**NOTE:** the InstanceID property value prefix of the DCIM_BootSourceSetting instance matches the InstanceID of the DCIM_BootConfigSetting. IPL boot list contains a BCV boot list. For example, IPL list may contain CDROM, Floppy and Hard Disk. Hard Disk may represent a BCV list that contains multiple BCV devices such as multiple RAID or SCSI controllers that are arranged in a boot priority list. For more details on IPL and BCV, see *BIOS Boot Specification*.

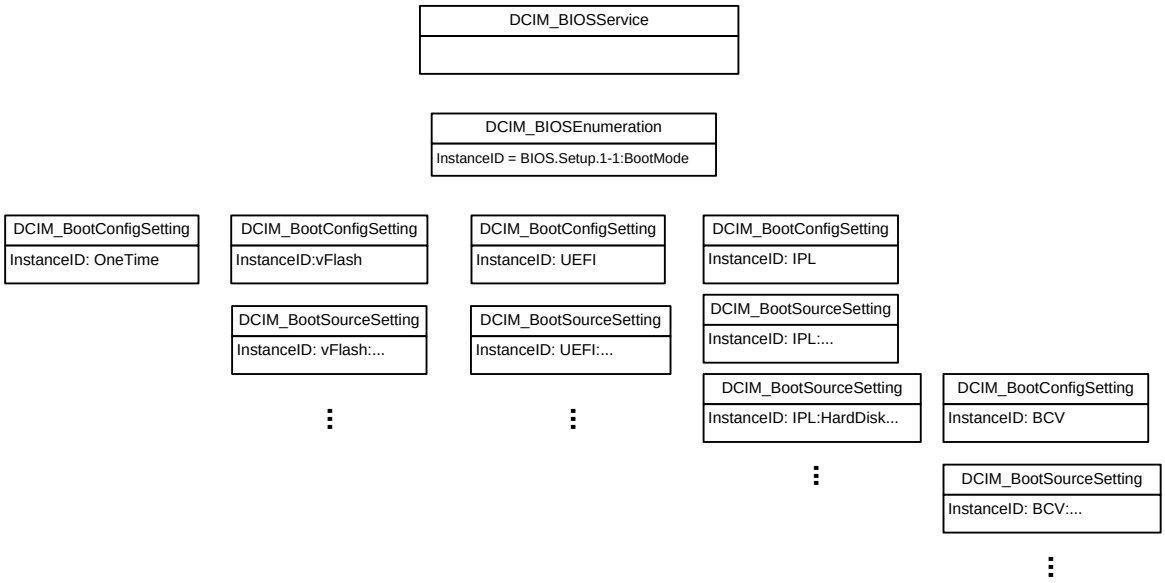



**Figure 2 – BIOS and Boot Management Profile: Boot Management**

# 7 Implementation Requirements

This section provides the requirements and guidelines to implement the properties of the classes. Methods are listed in section 8. Table 2 provides the instances of CIM Elements for this profile. Instances of the CIM Elements shall be implemented as described in Table 2.

**Table 2 – CIM Elements: BIOS and Boot Management Profile**

| Element Name | Requirement | Description |
|---|---|---|
| **Classes** | | |
| DCIM_BIOSEnumeration | Mandatory | The class shall be implemented in the *Implementation Namespace.*<br>See section 7.1.1 |
| DCIM_BIOSInteger | Mandatory | The class shall be implemented in the *Implementation Namespace.*<br>See section 7.1.3 |
| DCIM_BIOSString | Mandatory | The class shall be implemented in the *Implementation Namespace.*<br>See section 7.1.2 |
| DCIM_BIOSPassword | Mandatory | The class shall be implemented in the *Implementation Namespace.*<br>See section 7.1.4 |
| DCIM_BootConfigSetting | Mandatory | The class shall be implemented in the *Implementation Namespace.*<br>See section 7.2.1 |
| DCIM_BootSourceSetting | Mandatory | The class shall be implemented in the *Implementation Namespace.*<br>See section 7.2.2 |
| DCIM_BIOSService | Mandatory | The class shall be implemented in the *Implementation Namespace.*<br>See section 7.3.1 |
| DCIM_LCElementConformsToProfile | Mandatory | The class shall be implemented in the *Implementation Namespace.* |
| DCIM_LCElementConformsToProfile | Mandatory | The class shall be implemented in the *Interop Namespace.* |
| DCIM_LCRegisteredProfile | Mandatory | The class shall be implemented in the *Interop Namespace.*<br>See section 7.4.1 |

## 7.1 BIOS Management

### 7.1.1 DCIM_BIOSEnumeration

This section describes the implementation of the DCIM_BIOSEnumeration class that represents an enumeration type BIOS attribute. This class shall be instantiated in the Implementation Namespace.

#### 7.1.1.1 Resource URIs for WinRM®

The class resource URI shall be “http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_BIOSEnumeration?__cimnamespace=root/dcim”

168 The key property shall be the InstanceID.

169 The instance Resource URI for DCIM_BIOSEnumeration instance shall be:
170 http://schemas.dell.com/wbem/wscim/1/cim-
171 schema/2/DCIM_BIOSEnumeration?__cimnamespace=root/dcim+InstanceID= BIOS.Setup.1-
172 1:<AttributeName> ,

173 where <AttributName> is the AttributeName property value.

174 #### 7.1.1.2 Operations

175 The following table details the operations implemented on the DCIM_BIOSEnumeration class

176 **Table 3 – DCIM_BIOSEnumeration - Operations**

| Operation Name | Requirements | Required Input |
|---|---|---|
| Get | Mandatory | Instance URI |
| Enumerate | Mandatory | Class URI |
| DCIM_BIOSService.SetAttributte() | Mandatory | See section 8.1 |
| DCIM_BIOSService.SetAttributes() | Mandatory | See section 8.2 |

177

178 #### 7.1.1.3 Properties

179 The following table lists the properties implemented for the DCIM_BIOSEnumeration instance
180 representing a BIOS controller enumeration attribute. The “Requirements” column shall denote whether
181 the property is implemented (for requirement definitions, see section 3). The “Additional Requirements”
182 column shall denote either possible values for the property, or requirements on the value formulation.

183 **Table 4 – Class: DCIM_BIOSEnumeration**

| Properties | Type | Requirements | Additional Requirements |
|---|---|---|---|
| InstanceID | String | Mandatory | The property value shall be formed as follows: “BIOS.Setup.1-1:<AttributeName property value>”. |
| AttributeName | String | Mandatory | The property value shall be from the “AttributeName” column in Tables in section 7.1.5. |
| AttributeDisplayName | String | Mandatory | The property value shall be from the “AttributeDisplayName” column in Tables in section 7.1.5. |
| GroupID | String | Mandatory | See section 7.1.5. |
| GroupDisplayName | String | Mandatory | See section 7.1.5. |
| CurrentValue[] | String | Mandatory | The property value shall be one of the values in the “PossibleValues” column in Tables in section 7.1.5. |
| PendingValue[] | String | Mandatory | The property value shall be one of the values in the “PossibleValues” column in Tables in section 7.1.5. |
| IsReadOnly | Boolean | Mandatory | The property value shall be the value in the “IsReadOnly” column in Tables in section 7.1.5. |
| FQDD | String | Mandatory | The property shall be set to “BIOS.Setup.1-1”. |
| DisplayOrder | uint16 | Mandatory | The property shall represent the sequence number denoting the preferred placement of the attribute in the list of all BIOS attributes. |
| Dependency | String | Optional | The property shall be formatted as XML describing the attributes dependence on other attribute(s). |
| PossibleValues[] | String | Mandatory | The property value shall be equal to the array of the values in “PossibleValues” column at the corresponding row in in Tables in section 7.1.5. |
| PossibleValuesDescription[] | String | Mandatory | The array property’s each value shall represent the description of the value in the PossibleValue array property at the corresponding index. |

184

185 ### 7.1.2 DCIM_BIOSString

186 This section describes the implementation for the DCIM_BIOSString class that represents a string type
187 BIOS attribute. This class shall be instantiated in the Implementation Namespace.

188 #### 7.1.2.1 Resource URIs for WinRM®

189 The class Resource URI shall be “http://schemas.dell.com/wbem/wscim/1/cim-
190 schema/2/DCIM_BIOSString?__cimnamespace=root/dcim”

191 The key property shall be the InstanceID.

192 The instance Resource URI for DCIM_BIOSString instance shall be:
193 http://schemas.dell.com/wbem/wscim/1/cim-
194 schema/2/DCIM_BIOSString?__cimnamespace=root/dcim+InstanceID= BIOS.Setup.1-
195 1:<AttributeName> ,

where <AttributeName> is the AttributeName property value.

#### 7.1.2.2 Operations

The following table details the implemented operations on DCIM_BIOSString.

**Table 5 – DCIM_BIOSString - Operations**

| Operation Name | Requirements | Required Input |
|---|---|---|
| Get | Mandatory | Instance URI |
| Enumerate | Mandatory | Class URI |
| DCIM_BIOSService.SetAttribute() | Mandatory | See section 8.1 |
| DCIM_BIOSService.SetAttributes() | Mandatory | See section 8.2 |

#### 7.1.2.3 Properties

The following table details the properties implemented for DCIM_BIOSString instance representing a BIOS string attribute. The “Requirements” column shall denote whether the property is implemented (for requirement definitions, see section 3). The “Additional Requirements” column shall denote either possible values for the property, or requirements on the value formulation.

206 **Table 6 – Class: DCIM_BIOSString**

| Properties | Type | Requirements | Additional Requirements |
|---|---|---|---|
| InstanceID | String | Mandatory | The property value shall be formed as follows: “BIOS.Setup.1-1:<AttributeName property value>”. |
| AttributeName | String | Mandatory | The property value shall be from the “AttributeName” column in tables in section 7.1.5. |
| AttributeDisplayName | String | Mandatory | The property value shall be from the “AttributeDisplayName” column in Tables in section 7.1.5. |
| GroupID | String | Mandatory | See section 7.1.5. |
| GroupDisplayName | String | Mandatory | See section 7.1.5. |
| CurrentValue[] | String | Mandatory | If the ValueExpression property is non-NULL non-blank value, the the property value shall match the Regex format described in the ValueExpression property value . |
| PendingValue[] | String | Mandatory | If the ValueExpression property is non-NULL non-blank value, the the property value shall match the Regex format described in the ValueExpression property value . |
| IsReadOnly | Boolean | Mandatory | The property value shall be the value in the “IsReadOnly” column at the corresponding row in Tables in section 7.1.5. |
| FQDD | String | Mandatory | The property shall be set to “BIOS.Setup.1-1”. |
| DisplayOrder | uint16 | Mandatory | The property shall represent the sequence number denoting the preferred placement of the attribute in the list of all BIOS attributes. |
| Dependency | String | Optional | The property shall be formatted as XML describing the attributes dependence on other attribute(s). See *Lifecycle Controller (LC) Integration Best Practices Guide* for details. |
| MinLength | uint64 | Mandatory | The property value shall be the value in the “MinLength” column at the corresponding row in in tables in section 7.1.5.<br>The omission or NULL shall denote that no known constraint exists on the CurrentValue and PendingValue properties. |
| MaxLength | uint64 | Mandatory | The property value shall be the value in the “MaxLength” column at the corresponding row in in Tables in section 7.1.5<br>The omission or NULL shall denote that no known constraint exists on the CurrentValue and PendingValue properties. |
| ValueExpression | String | Conditional | The property value shall be implemented if the IsReadOnly property has value FALSE.<br>The property shall a Perl-compatible regular<br>expression (PCRE) syntax to use in validating Attribute values. |

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### 7.1.3 DCIM_BIOSInteger

This section describes the implementation of the DCIM_BIOSInteger class that represents an integer type BIOS attribute. This class shall be instantiated in the Implementation Namespace.

#### 7.1.3.1 Resource URIs for WinRM®

The class resource URI shall be “http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_BIOSInteger?__cimnamespace=root/dcim”

The key property shall be the InstanceID.

The instance Resource URI for DCIM_BIOSInteger instance shall be:
“http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_BIOSInteger?__cimnamespace=root/dcim+InstanceID= BIOS.Setup.1-1:<AttributeName>”

where <AttributeName> is the AttributeName property value.

#### 7.1.3.2 Operations

The following table details the implemented operations on DCIM_BIOSInteger.

**Table 7 – DCIM_BIOSInteger - Operations**

| Operation Name | Requirements | Required Input |
|---|---|---|
| Get | Mandatory | Instance URI |
| Enumerate | Mandatory | Class URI |
| DCIM_BIOSService.SetAttribute() | Mandatory | See section 8.1 |
| DCIM_BIOSService.SetAttributes() | Mandatory | See section 8.2 |

#### 7.1.3.3 Properties

The following table details the properties implemented for the DCIM_BIOSInteger instance representing a BIOS integer attribute. The “Requirements” column shall denote whether the property is implemented (for requirement definitions, see section 3). The “Additional Requirements” column shall denote either possible values for the property, or requirements on the value formulation.

229 **Table 8 – Class: DCIM_BIOSInteger**

| Properties | Type | Requirements | Additional Requirements |
|---|---|---|---|
| InstanceID | String | Mandatory | The property value shall be formed as follows: “BIOS.Setup.1-1:<AttributeName property value>”. |
| AttributeName | String | Mandatory | The property value shall be from the “AttributeName” column in Tables in section 7.1.5. |
| AttributeDisplayName | String | Mandatory | The property value shall be from the “AttributeDisplayName” column in Tables in section 7.1.5. |
| GroupID | String | Mandatory | See section 7.1.5. |
| GroupDisplayName | String | Mandatory | See section 7.1.5. |
| CurrentValue[] | String | Mandatory | The property value shall match the format described in “Value Expression” column at the corresponding row in Tables in section 7.1.5. |
| PendingValue[] | String | Mandatory | The property value shall match the format described in “Value Expression” column at the corresponding row in Tables in section 7.1.5. |
| IsReadOnly | Boolean | Mandatory | The property value shall be the value in the “IsReadOnly” column at the corresponding row in Tables in section 7.1.5. |
| FQDD | String | Mandatory | The property shall be set to “BIOS.Setup.1-1”. |
| DisplayOrder | uint16 | Mandatory | The property shall represent the sequence number denoting the preferred placement of the attribute in the list of all BIOS attributes. |
| Dependency | String | Optional | The property shall be formatted as XML describing the attributes dependence on other attribute(s). See *Lifecycle Controller (LC) Integration Best Practices Guide* for details. |
| LowerBound | uint64 | Mandatory | The property value shall be the value in the “LowerBound” column at the corresponding row in Tables in section 7.1.5. |
| UpperBound | uint64 | Mandatory | The property value shall be the value in the “UpperBound” column at the corresponding row in Tables in section 7.1.5. |

230 ### 7.1.4 DCIM_BIOSPassword

231 This section describes the implementation for the DCIM_BIOSPassword class that represents a string
232 type BIOS attribute. This class shall be instantiated in the Implementation Namespace.

233 #### 7.1.4.1 Resource URIs for WinRM®

234 The class resource URI shall be “http://schemas.dell.com/wbem/wscim/1/cim-
235 schema/2/DCIM_BIOSPassword?__cimnamespace=root/dcim”

236 The key property shall be the InstanceID.

237 The instance Resource URI for DCIM_BIOSPassword instance shall be:
238 http://schemas.dell.com/wbem/wscim/1/cim-
239 schema/2/DCIM_BIOSPassword?__cimnamespace=root/dcim+InstanceID= BIOS.Setup.1-
240 1:<AttributeName> , where <AttributeName> is the AttributeName property value.

#### 7.1.4.2 Operations

The following table details the operations implemented on the DCIM_BIOSPassword class.

**NOTE:** The.SetAttribute() and SetAttributes() methods of the DCIM_BIOSService class are NOT supported for DCIM_BIOSPassword class.

**Table 9 – DCIM_BIOSPassword - Operations**

| Operation Name | Requirements | Required Input |
|---|---|---|
| Get | Mandatory | Instance URI |
| Enumerate | Mandatory | Class URI |
| DCIM_BIOSService.ChangeBIOSPassord() | Mandatory | See section 8.1 |

#### 7.1.4.3 Properties

The following table details the properties implemented for the DCIM_BIOSPassword instance representing a BIOS string attribute. The “Requirements” column shall denote whether the property is implemented (for requirement definitions, see section 3). The “Additional Requirements” column shall denote either possible values for the property, or requirements on the value formulation.

252 **Table 10 – Class: DCIM_BIOSPassword**

| Properties | Type | Requirements | Additional Requirements |
|---|---|---|---|
| InstanceID | String | Mandatory | The property value shall be formed as follows: "BIOS.Setup.1-1:<AttributeName property value>". |
| AttributeName | String | Mandatory | The property value shall be from the "AttributeName" column in Tables in section 7.1.5.8. |
| AttributeDisplayName | String | Mandatory | The property value shall be from the "AttributeDisplayName" column in Tables in section 7.1.5.8. |
| GroupID | String | Mandatory | See section 7.1.5.8. |
| GroupDisplayName | String | Mandatory | See section 7.1.5.8. |
| CurrentValue[] | String | Mandatory | The property value shall match the format described in "Value Expression" column at the corresponding row in Tables in section 7.1.5.8. |
| PendingValue[] | String | Mandatory | The property value shall match the format described in "Value Expression" column at the corresponding row in Tables in section 7.1.5.8. |
| IsReadOnly | Boolean | Mandatory | The property value shall be the value in the "IsReadOnly" column at the corresponding row in Tables in section 7.1.5.8. |
| FQDD | String | Mandatory | The property shall be set to "BIOS.Setup.1-1". |
| DisplayOrder | uint16 | Mandatory | The property shall represent the sequence number denoting the preferred placement of the attribute in the list of all BIOS attributes. |
| Dependency | String | Optional | The property shall be formatted as XML describing the attributes dependence on other attribute(s). See *Lifecycle Controller (LC) Integration Best Practices Guide* for details. |
| MinLength | uint64 | Mandatory | The property value shall be the value in the "MinLength" column at the corresponding row in in Tables in section 7.1.5.8.<br>The omission or NULL shall denote that no known constraint exists on the CurrentValue and PendingValue properties. |
| MaxLength | uint64 | Mandatory | The property value shall be the value in the "MaxLength" column at the corresponding row in in Tables in section 7.1.5.8<br>The omission or NULL shall denote that no known constraint exists on the CurrentValue and PendingValue properties. |
| IsSet | Boolean | Mandatory | This property shall return TRUE if the PasswordState property has value 2 (Installed), otherwise this property shall be set to FALSE. |

| Properties | Type | Requirements | Additional Requirements |
|---|---|---|---|
| PasswordState | Uint16 | Mandatory | The property shall represent the current state of the password that the attribute represents.<br>The property shall have one of the following values:<br>• 0 (Unknown) password state is not available,<br>• 2 (Installed) password is currently set or installed,<br>• 3 (Uninstalled) password is currently not set or is uninstalled,<br>• 4(Hardware Disabled) password is disabled by hardware jumper. |

### 7.1.5 BIOS Attributes

This section lists and describes the attributes and their logical grouping. For changes in attributes from the BIOS and Boot Management Profile version 1.1 please refer to the ANNEX A.

**NOTE:** The BIOS attributes listed in this section may not be applicable for all Dell systems. A particular attribute is applicable based on the model of a Dell system, the features available in the system and the BIOS version of the system.

#### 7.1.5.1 Processor Settings

This section describes the attributes for Processor Settings configuration.

For the DCIM_BIOSEnumeration, DCIM_BIOSString, and DCIM_BIOSInteger:

- GroupID property shall be “ProcSettings”
- GroupDisplayName property shall be “Processor Settings”

The following table provides the values for the DCIM_BIOSEnumeration class of this group.The column headers represent the properties of the DCIM_BIOSEnumeration class. Each of the cells represent the values of the properties. Each of the listed values under the PossibleValues header is an element of an array.

269

270 **Table 11 – DCIM_BIOSEnumeration Processor Settings**

| AttributeName | AttributeDisplayName | IsReadOnly | Display Order | PossibleValues |
|---|---|---|---|---|

| AttributeName | AttributeDisplayName | IsReadOnly | Display Order | PossibleValues |
|---|---|---|---|---|
| LogicalProc | Logical Processor | FALSE | 301 | • Disabled<br>• Enabled |
| ProcHyperTransport | HyperTransport Technology | FALSE | 302 | • HT1<br>• HT3 |
| ProcHtAssist | HT Assist | FALSE | 303 | • Disabled<br>• Enabled |
| QpiSpeed[1] | QPI Speed | FALSE | 304 | MaxDataRate:,8GTps,7GTps, and 6GTps |
| ProcVirtualization | Virtualization Technology | FALSE | 305 | • Disabled<br>• Enabled |
| DmaVirtualization[2] | DMA Virtualization | Attribute Value Dependant[2] | 306 | • Disabled<br>• Enabled |
| ProcDramPrefetcher | DRAM Prefetcher | | 307 | • Disabled<br>• Enabled |
| ProcAdjCacheLine | Adjacent Cache Line Prefetch | FALSE | 308 | • Disabled<br>• Enabled |
| ProcSoftwarePrefetcher | Hardware Prefetch Training on Software Prefetch | | 309 | • Disabled<br>• Enabled |
| ProcHwPrefetcher | Hardware Prefetcher | FALSE | 310 | • Disabled<br>• Enabled |
| DcuStreamerPrefetcher | DCU Streamer Prefetcher | FALSE | 311 | • Disabled<br>• Enabled |
| DataReuse | Data Reuse | FALSE | 312 | • Disabled<br>• Enabled |
| QpiBandwidthPriority[1] | Intel(R) QPI Bandwidth Priority | FALSE | 313 | • InputOutput<br>• Compute |
| ProcExecuteDisable | Execute Disable | FALSE | 314 | • Disabled<br>• Enabled |
| ProcC1E[3] | C1E | FALSE | 315 | • Disabled<br>• Enabled |
| ProcCores | Number of Cores per Processor | FALSE | 316 | • All<br>• Dual<br>• Quad<br>• 1<br>• 2<br>• 4<br>• 6<br>• 8<br>• 10<br>• 12<br>• 14 |

| AttributeName | AttributeDisplayName | IsReadOnly | Display Order | PossibleValues |
|---|---|---|---|---|
| | | | | • 16 |
| ProcTurboMode | Processor Turbo Mode | FALSE | 317 | • Disabled<br>• Enabled |
| ProcCStates[3] | Processor C States | FALSE | 318 | • Disabled<br>• Enabled |
| CorePerfBoost | Core Performance Boost | FALSE | 330 | • Disabled<br>• Enabled |

NOTE: 1 – Intel© QuickPath Interconnect is a point-to-point processor interconnect developed by Intel that replaces the Front Side Bus (FSB).

NOTE: 2 – The DmaVirtualization is read-only (IsReadOnly=TRUE) and shall have value “Disabled”, if the ProcVirtualization attribute is set to “Disabled”.

NOTE: 3 – Processor C states are used to adjust the power consumption of the processor as described by Advanced Configuration and Power Interface (ACPI) Specification.

The following table describes the values for the DCIM_BIOSString of this group. The column headers represent the properties of the DCIM_BIOSString class. Each of the cells represent the values of the properties.

281

282 **Table 12 – DCIM_BIOSString Processor Settings**

| AttributeName | Attribute Description | IsReadOnly | Display Order | MinLength | MaxLength |
|---|---|---|---|---|---|
| Proc64bit | Processor 64-bit Support | TRUE | 340 | 0 | 4 |
| ProcCoreSpeed | Processor Core Speed | TRUE | 341 | 0 | 16 |
| ProcBusSpeed | Processor Bus Speed | TRUE | 342 | | |
| Proc1Id | Family-Model-Stepping | TRUE | 350 | 0 | 8 |
| Proc1Brand | Brand | TRUE | 351 | 0 | 80 |
| Proc1L2Cache | Level 2 Cache | TRUE | 352 | 0 | 16 |
| Proc1L3Cache | Level 3 Cache | TRUE | 353 | 0 | 16 |
| Proc2Id | Family-Model-Stepping | TRUE | 360 | 0 | 8 |
| Proc2Brand | Brand | TRUE | 361 | 0 | 80 |
| Proc2L2Cache | Level 2 Cache | TRUE | 362 | 0 | 16 |
| Proc2L3Cache | Level 3 Cache | TRUE | 363 | 0 | 16 |
| Proc3Id | Family-Model-Stepping | TRUE | 370 | 0 | 8 |
| Proc3Brand | Brand | TRUE | 371 | 0 | 80 |
| Proc3L2Cache | Level 2 Cache | TRUE | 372 | 0 | 16 |
| Proc3L3Cache | Level 3 Cache | TRUE | 373 | 0 | 16 |
| Proc4Id | Family-Model-Stepping | TRUE | 380 | 0 | 8 |
| Proc4Brand | Brand | TRUE | 381 | 0 | 80 |
| Proc4L2Cache | Level 2 Cache | TRUE | 382 | 0 | 16 |
| Proc4L3Cache | Level 3 Cache | TRUE | 383 | 0 | 16 |

283 The following table describes the values for the DCIM_BIOSInteger of this group. The column headers
284 represent the properties of the DCIM_BIOSInteger class. Each of the cells represent the values of the
285 properties.

286 **Table 13 – DCIM_BIOSInteger Processor Settings**

| AttributeName | AttributeDisplayName | IsReadOnly | Display Order | LowerBound | UpperBound |
|---|---|---|---|---|---|
| Proc1NumCores | Number of Cores | TRUE | 354 | 0 | 65535 |
| Proc2NumCores | Number of Cores | TRUE | 364 | 0 | 65535 |
| Proc3NumCores | Number of Cores | TRUE | 374 | 0 | 65535 |
| Proc4NumCores | Number of Cores | TRUE | 384 | 0 | 65535 |

287 #### 7.1.5.2 SATA Settings

288 This section describes the attributes for SATA Settings configuration.

For the DCIM_BIOSEnumeration and DCIM_BIOSString:

- GroupID property shall be “SataSettings”
- GroupDisplayName property shall be “SATA Settings”.

The following table describes the values for the DCIM_BIOSEnumeration of this group. Each of the column headings correspond to a property name on the DCIM_BIOSEnumeration class. The column headers represent the properties of the DCIM_BIOSEnumeration class. Each of the cells represent the values of the properties. Each of the listed values under the PossibleValues header is an element of an array.

**Table 14 – DCIM_BIOSEnumeration SATA Settings**

| AttributeName | AttributeDisplayName | IsReadOnly | Display Order | PossibleValues |
|---|---|---|---|---|
| EmbSata | Embedded SATA | FALSE | 402 | • AtaMode<br>• AhciMode<br>• RaidMode<br>• Off |
| SataPortA | Port A | FALSE | 404 | • Auto<br>• Off |
| SataPortB | Port B | FALSE | 408 | • Auto<br>• Off |
| SataPortC | Port C | FALSE | 412 | • Auto<br>• Off |
| SataPortD | Port D | FALSE | 416 | • Auto<br>• Off |
| SataPortE | Port E | FALSE | 420 | • Auto<br>• Off |
| SataPortF | Port F | FALSE | 424 | • Auto<br>• Off |
| SataPortG | Port G | FALSE | 428 | • Auto<br>• Off |
| SataPortH | Port H | FALSE | 432 | • Auto<br>• Off |
| eSataPort1 | eSATA Port | FALSE | 436 | • Auto<br>• Off |

The following table describes the values for the DCIM_BIOSString of this group. The column headers represent the properties of the DCIM_BIOSString class. Each of the cells represent the values of the properties.

**Table 15 – DCIM_BIOSString SATA Settings**

| AttributeName | Attribute Description | IsReadOnly | Display Order | MinLength | MaxLength |
|---|---|---|---|---|---|
| SataPortAModel | Model | TRUE | 405 | 0 | 40 |
| SataPortADriveType | Drive Type | TRUE | 406 | 0 | 20 |

| AttributeName | Attribute Description | IsReadOnly | Display Order | MinLength | MaxLength |
|---|---|---|---|---|---|
| SataPortACapacity[1] | Capacity | TRUE | 407 | 0 | 8 |
| SataPortBModel | Model | TRUE | 409 | 0 | 40 |
| SataPortBDriveType | Drive Type | TRUE | 410 | 0 | 20 |
| SataPortBCapacity[1] | Capacity | TRUE | 411 | 0 | 8 |
| SataPortCModel | Model | TRUE | 413 | 0 | 40 |
| SataPortCDriveType | Drive Type | TRUE | 414 | 0 | 20 |
| SataPortCCapacity[1] | Capacity | TRUE | 415 | 0 | 8 |
| SataPortDModel | Model | TRUE | 417 | 0 | 40 |
| SataPortDDriveType | Drive Type | TRUE | 418 | 0 | 20 |
| SataPortDCapacity[1] | Capacity | TRUE | 419 | 0 | 8 |
| SataPortEModel | Model | TRUE | 421 | 0 | 40 |
| SataPortEDriveType | Drive Type | TRUE | 422 | 0 | 20 |
| SataPortECapacity[1] | Capacity | TRUE | 423 | 0 | 8 |
| SataPortFModel | Model | TRUE | 425 | 0 | 40 |
| SataPortFDriveType | Drive Type | TRUE | 426 | 0 | 20 |
| SataPortFCapacity[1] | Capacity | TRUE | 427 | 0 | 8 |
| SataPortGModel | Model | TRUE | 429 | 0 | 40 |
| SataPortGDriveType | Drive Type | TRUE | 430 | 0 | 20 |
| SataPortGCapacity[1] | Capacity | TRUE | 431 | 0 | 8 |
| SataPortHModel | Model | TRUE | 433 | 0 | 40 |
| SataPortHDriveType | Drive Type | TRUE | 434 | 0 | 20 |
| SataPortHCapacity[1] | Capacity | TRUE | 435 | 0 | 8 |
| eSataPort1Model | Model | TRUE | 437 | 0 | 40 |
| eSataPort1DriveType | Drive Type | TRUE | 438 | 0 | 20 |
| eSataPort1Capacity[1] | Capacity | TRUE | 439 | 0 | 8 |

302 NOTE: 1 – Capacity of the of a hard-disk drive where units are embedded in the string itself.

303 **7.1.5.3 Boot Settings**

304 This section describes the attributes for Boot Settings configuration.

For the DCIM_BIOSEnumeration:

- GroupID property shall be “BootSettings”.
- GroupDisplayName property shall be “Boot Settings”.

The following table describes the values for the DCIM_BIOSEnumeration of this group. The column headers represent the properties of the DCIM_BIOSEnumeration class. Each of the cells represent the values of the properties. Each of the listed values under the PossibleValues header is an element of an array.

**Table 16 – DCIM_BIOSEnumeration Boot Settings**

| AttributeName | AttributeDisplayName | IsReadOnly | Display Order | PossibleValues |
|---|---|---|---|---|
| BootMode | Boot Mode | FALSE | 501 | • Bios<br>• Uefi |
| BootSeqRetry | Boot Sequence Retry | FALSE | 503 | • Disabled<br>• Enabled |

### 7.1.5.4 Slot Disablement

This section describes the attributes for Slot Desablement configuration.

For the DCIM_BIOSEnumeration:

- GroupID property shall be “SlotDisablement”.
- GroupDisplayName property shall be “Slot Disablement”.

The following table describes the values for the DCIM_BIOSEnumeration of this group. The column headers represent the properties of the DCIM_BIOSEnumeration class. Each of the cells represent the values of the properties. Each of the listed values under the PossibleValues header is an element of an array.

**Table 17 – DCIM_BIOSEnumeration Slot Disablement**

| AttributeName | AttributeDisplayName | IsReadOnly | Display Order | PossibleValues |
|---|---|---|---|---|
| Slot1 | Slot 1 | TRUE | 1601 | • Disabled<br>• Enabled |
| Slot2 | Slot 2 | TRUE | 1602 | • Disabled<br>• Enabled |
| Slot3 | Slot 3 | TRUE | 1603 | • Disabled<br>• Enabled |
| Slot4 | Slot 4 | TRUE | 1604 | • Disabled<br>• Enabled |
| Slot5 | Slot 5 | FALSE | 1605 | • Disabled<br>• Enabled |
| Slot6 | Slot 6 | FALSE | 1606 | • Disabled<br>• Enabled |
| Slot7 | Slot 7 | FALSE | 1607 | • Disabled<br>• Enabled |

### 7.1.5.5 Serial Communication

This section describes the attributes for Seial Communication configuration.

For the DCIM_BIOSEnumeration:

- GroupID property shall be “SerialCommSettings”.
- GroupDisplayName property shall be “Serial Communication”.

The following table describes the values for the DCIM_BIOSEnumeration of this group. The column headers represent the properties of the DCIM_BIOSEnumeration class. Each of the cells represent the values of the properties. Each of the listed values under the PossibleValues header is an element of an array.

**Table 18 – DCIM_BIOSEnumeration Serial Communication**

| AttributeName | AttributeDisplayName | IsReadOnly | Display Order | PossibleValues |
|---|---|---|---|---|
| SerialComm | Serial Communication | FALSE | 1001 | • OnNoConRedir<br>• OnConRedirCom1<br>• OnConRedirCom2<br>• Off |
| SerialPortAddress | Serial Port Address | FALSE | 1003 | • Serial1Com1Serial2Com2<br>• Serial1Com2Serial2Com1 |
| ExtSerialConnector | External Serial Connector | FALSE | 1005 | • Serial1<br>• Serial2<br>• RemoteAccDevice |
| FailSafeBaud | Failsafe Baud Rate | FALSE | 1007 | • 115200<br>• 57600<br>• 19200<br>• 9600 |
| ConTermType | Remote Terminal Type | FALSE | 1009 | • Vt100Vt220<br>• Ansi |
| RedirAfterBoot | Redirection After Boot | FALSE | 1011 | • Enabled<br>• Disabled |

### 7.1.5.6 System Profile Settings

This section describes the attributes for System Profile Settings configuration.

For the DCIM_BIOSEnumeration:

- GroupID property shall be “SysProfileSettings”.

- GroupDisplayName property shall be “System Profile Settings”.

The following table describes the values for the DCIM_BIOSEnumeration of this group. The column headers represent the properties of the DCIM_BIOSEnumeration class. Each of the cells represent the values of the properties. Each of the listed values under the PossibleValues header is an element of an array.

**Table 19 – DCIM_BIOSEnumeration System Profile Settings**

| AttributeName | AttributeDisplayName | IsReadOnly | Display Order | PossibleValues |
|---|---|---|---|---|
| SysProfile | System Profile | FALSE | 1202 | • PerfPerWattOptimizedOs<br>• PerfPerWattOptimizedDapc<br>• PerfOptimized<br>• Custom<br>• DenseCfgOptimized |
| ProcPwrPerf | CPU Power Management | TRUE | 1203 | • MaxPerf<br>• MinPwr<br>• SysDbpm<br>• OSDbpm |
| MemFrequency | Memory Frequency | TRUE | 1204 | • MaxPerf<br>• 1333MHz<br>• 1067MHz<br>• 800MHz |
| ProcTurboMode | Turbo Boost | TRUE | 317 | • Disabled<br>• Enabled |
| ProcC1E | C1E | TRUE | 315 | • Disabled<br>• Enabled |
| ProcCStates | C States | TRUE | 318 | • Disabled<br>• Enabled |
| MemPwrMgmt | Memory Power Management | TRUE | 1205 | • Enabled<br>• Disabled |
| MemPatrolScrub | Memory Patrol Scrub | TRUE | 1206 | • Extended<br>• Standard<br>• Disabled |
| PowerDelivery | Power Delivery | TRUE | 1207 | • MaxReliability<br>• MinPwr |
| MemRefreshRate | Memory Refresh Rate | TRUE | 1208 | • 1x<br>• 2x |

### 7.1.5.7 Integrated Devices

This section describes the attributes for Integrated Devices configuration.

For the DCIM_BIOSEnumeration:

- GroupID property shall be “IntegratedDevices”.

- GroupDisplayName property shall be “Integrated Devices”.

The following table describes the values for the DCIM_BIOSEnumeration of this group. The column headers represent the properties of the DCIM_BIOSEnumeration class. Each of the cells represent the values of the properties. Each of the listed values under the PossibleValues header is an element of an array.

**Table 20 – DCIM_BIOSEnumeration Integrated Devices**

| AttributeName | AttributeDisplayName | IsReadOnly | Display Order | PossibleValues |
|---|---|---|---|---|
| IntegratedRaid | Integrated RAID Controller | FALSE | 903 | • Disabled<br>• Enabled |
| UsbPorts | User Accessible USB Ports | FALSE | 905 | • AllOn<br>• OnlyBackPortsOn<br>• AllOff |
| InternalUsb1 | Internal USB Port 1 | FALSE | 907 | • On<br>• Off |
| InternalUsb2 | Internal USB Port 2 | FALSE | 909 | • On<br>• Off |
| InternalUsb | Internal USB Port | FALSE | 906 | • On<br>• Off |
| OsWatchdogTimer | OS Watchdog Timer | FALSE | 921 | • Disabled<br>• Enabled |
| EmbVideo | Embedded Video Controller | Feature Dependant[1] | 923 | • Disabled<br>• Enabled |
| SriovGlobalEnable[2] | SR-IOV Global Enable | FALSE[2] | 924 | • Disabled<br>• Enabled |
| IntegratedSas | Integrated SAS Controller | FALSE | 901 | • Enabled<br>• Disabled |
| InternalSdCard | Internal SD Card Port | Feature Dependant[3] | 911 | • On<br>• Off |
| InternalSdCardRedundancy | Internal SD Card Redundancy | Attribute Value Dependant[3] | 912 | • Mirror<br>• Disabled |
| EmbNic1Nic2 | Embedded NIC1 and NIC2 | FALSE | 915 | • Enabled<br>• DisabledOs<br>• Disabled |
| EmbNic1 | Embedded Gb NIC1 | FALSE | 916 | • Enabled<br>• EnabledPxe<br>• EnablediScsi |

| AttributeName | AttributeDisplayName | IsReadOnly | Display Order | PossibleValues |
|---|---|---|---|---|
| | | | | • Disabled |
| EmbNic2 | Embedded Gb NIC2 | FALSE | 917 | • Enabled<br>• EnabledPxe<br>• EnablediScsi<br>• Disabled |
| EmbNic3Nic4 | Embedded NIC3 and NIC4 | FALSE | 918 | • Enabled<br>• DisabledOs<br>• Disabled |
| EmbNic3 | Embedded Gb NIC3 | FALSE | 919 | • Enabled<br>• EnabledPxe<br>• EnablediScsi<br>• Disabled |
| EmbNic4 | Embedded Gb NIC4 | FALSE | 920 | • Enabled<br>• EnabledPxe<br>• EnablediScsi<br>• Disabled |
| IntegratedNetwork1 | Integrated Network 1 | FALSE | 913 | • DisabledOs<br>• Enabled |
| IntegratedNetwork2 | Integrated Network 2 | FALSE | 914 | • DisabledOs<br>• Enabled |

NOTE: 1 – The attribute's read-only status (IsReadOnly property value) depends on the particular platform model, or platform features, or the platform's bios version.

NOTE: 2 – Single Root I/O Virtuatlization.

NOTE: 3 – The InternalSdCardRedundancy is read-only (IsReadOnly=TRUE) and shall have value "Disabled", if the InternalSdCard attribute is set to "Disabled".

#### 7.1.5.8 System Security

This section describes the attributes for System Security configuration.

For the DCIM_BIOSEnumeration, DCIM_BIOSPassword, and DCIM_BIOSInteger:

- GroupID property shall be "SysSecurity".
- GroupDisplayName property shall be "System Security".

The following table describes the values for the DCIM_BIOSEnumeration of this group. The column headers represent the properties of the DCIM_BIOSEnumeration class. Each of the cells represent the values of the properties. Each of the listed values under the PossibleValues header is an element of an array.

**Table 21 – DCIM_BIOSEnumeration System Security**

| AttributeName | AttributeDisplayName | IsReadOnly | Display Order | PossibleValues |
|---|---|---|---|---|
| IntelTxtResetAux[1] | Intel TXT Reset Aux | TRUE | | • NoResetAuxReq<br>• ResetAuxReq<br>• ResetAuxPreqAttempted |
| IntelTxt[1] | Intel(R) TXT | Attribute Value Dependan[8] | 1319 | • On<br>• Off |
| PasswordStatus | Password Status | FALSE | 1304 | • Unlocked<br>• Locked |
| TpmSecurity | TPM Security | FALSE | 1307 | • Off<br>• OnPbm<br>• OnNoPbm |
| TpmActivation | TPM Activation | TRUE | 1309 | • NoChange<br>• Activate<br>• Deactivate |
| TpmClear | TCM Clear | TRUE | 1311 | • Yes<br>• No |
| TcmSecurity | TCM Security | FALSE | 1314 | • Off<br>• OnPbm<br>• OnNoPbm |
| TcmActivation | TCM Activation | Attribute Value Dependant[2,3] | 1316 | • NoChange<br>• Activate<br>• Deactivate |
| TcmClear | TPM Clear | Attribute Value Dependant[2,4] | 1318 | • Yes<br>• No |
| PwrButton | Power Button | FALSE | 1320 | • Disabled<br>• Enabled |
| NmiButton | NMI Button | Attribute Value Dependant[5,6] | 1322 | • Disabled<br>• Enabled |
| AcPwrRcvry | AC Power Recovery | Attribute Value Dependant[5,7] | 1326 | • Last<br>• On<br>• Off |
| AcPwrRcvryDelay | AC Power Recovery Delay | FALSE | 1327 | • Immediate<br>• Random<br>• User |

NOTE: 1 – Intel© Trusted Execution Technology.

NOTE: 2 – TpmActivation, TpmClear attributes shall be read-only and the IsReadOnly property shall have value TRUE, if the TpmSecurity attribute has the CurrentValue property value “Off”; otherwise those attributes shall be settable and the IsReadOnly property shall have value TRUE.

NOTE: 3 – TpmActivation shall have value “NoChange”, if the TpmSecurity attribute has the CurrentValue property value “Off”.

NOTE: 4 – TpmClear shall have value “No”, if TpmSecurity attribute has the CurrentValue property value “Off”.

NOTE: 5 – TcmActivation, TcmClear attributes are settable (IsReadOnly=FALSE), if the SysProfile attribute is set to "Custom"; otherwise those attributes are read-only (IsReadOnly=TRUE).

NOTE: 6 – TcmActivation shall have value "NoChange", if TcmSecurity attribute has the CurrentValue property value "Off".

NOTE: 7 – TcmClear shall have value "No", if TcmSecurity attribute has the CurrentValue property value "Off".

NOTE: 8 – The IntelTxt shall be read-only and IsReadOnly property shall have value TRUE, if:

- ProcVirtualization attribute has the CurrentValue property value "Disabled", or
- TpmActivation attribute has the CurrentValue property value "Deactivate", or
- TpmClear attribute has the CurrentValue property value "Yes", or
- TpmSecurity does NOT have the CurrentValue property value "OnPbm"

The following table describes the values for the DCIM_BIOSPassword of this group. The column headers represent the properties of the DCIM_BIOSPassword class. Each of the cells represent the values of the properties.

**Table 22 – DCIM_BIOSPassword System Security**

| AttributeName | AttributeDisplayName | IsReadOnly | MinLength | MaxLength |
|---|---|---|---|---|
| SysPassword | System Password | TRUE (but may be changed through the DCIM_BIOSService.ChangePassword() method. | 0 | 32 |
| SetupPassword | Setup Password | TRUE (but may be changed through the DCIM_BIOSService.ChangePassword() method. | 0 | 32 |

The following table describes the values for the DCIM_BIOSInteger of this group. The column headers represent the properties of the DCIM_BIOSInteger class. Each of the cells represent the values of the properties.

**Table 23 – DCIM_BIOSInteger System Security**

| AttributeName | AttributeDisplayName | IsReadOnly | Display Order | LowerBound | UpperBound |
|---|---|---|---|---|---|
| AcPwrRcvryUserDelay | User Defined Delay (30s to 240s) | TRUE | 1437 | 30 | 240 |

### 7.1.5.9 Memory Settings

This section describes the attributes for Memory Settings configuration.

For the DCIM_BIOSEnumeration and DCIM_BIOSString:

- GroupID property shall be "MemSettings".
- GroupDisplayName property shall be "Memory Settings".

The following table describes the values for the DCIM_BIOSEnumeration of this group. The column headers represent the properties of the DCIM_BIOSEnumeration class. Each of the cells represent the

values of the properties. Each of the listed values under the PossibleValues header is an element of an array.

**Table 24 – DCIM_BIOSEnumeration Memory Settings**

| AttributeName | AttributeDisplayName | IsReadOnly | Display Order | PossibleValues |
|---|---|---|---|---|
| MemTest | System Memory Testing | FALSE | 206 | • Disabled<br>• Enabled |
| MemOptimizer | Memory Optimizer Technology | Feature Dependant1 | 207 | • Disabled<br>• Enabled |
| MemOpMode | Memory Operating Mode | TRUE | 208 | • OptimizerMode<br>• AdvEccMode<br>• SpareMode<br>• MirrorMode |
| RedundantMem | Redundant Memory | TRUE | 209 | • Disabled<br>• Mirror<br>• IntraNodeMirror<br>• DimmSpare<br>• Dddc |
| SnoopFilter | Snoop Filter | FALSE | 210 | • Enabled<br>• Disabled |
| NodeInterleave | Node Interleaving | Feature Dependant[1] | 211 | • Disabled<br>• Enabled |
| MemLowPower | Low Power Mode | TRUE | 212 | • Disabled<br>• Enabled |
| MemVolt | Memory Operating Voltage | TRUE | 213 | • AutoVolt<br>• Volt135V<br>• Volt15V |
| MemOpVoltage | Memory Operating Voltage | TRUE | 214 | • AutoVolt<br>• Volt15V |
| RedundantMemInUse | Redundant Memory Configuration In Use | TRUE | 218 | • NotInUse<br>• InUse |
| RedundantMemCfgValid | Redundant Memory Configuration Valid | TURE | 220 | • Invalid<br>• Valid |

NOTE: 1 – The attribute's read-only status (IsReadOnly property value) depends on the particular platform model, or platform features, or the platform's bios version.

The following table describes the values for the DCIM_BIOSString of this group. The column headers represent the properties of the DCIM_BIOSString class. Each of the cells represent the values of the properties.

**Table 25 – DCIM_BIOSString Memory Settings**

| AttributeName | Attribute Description | IsReadOnly | Display Order | MinLength | MaxLength |
|---|---|---|---|---|---|
| SysMemSize | System Memory Size | TRUE | 201 | 0 | 20 |
| SysMemType | System Memory Type | TRUE | 202 | 0 | 16 |
| SysMemSpeed | System Memory Speed | TRUE | 203 | 0 | 16 |
| SysMemVolt | System Memory Voltage | TRUE | 204 | 0 | 8 |
| VideoMem | Video Memory | TRUE | 205 | 0 | 16 |

### 7.1.5.10 Miscellaneous Settings

This section describes the attributes for miscellaneous settings configuration.

For the DCIM_BIOSEnumeration and DCIM_BIOSString:

- GroupID property shall be “MiscSettings”.
- GroupDisplayName property shall be “Miscellaneous Settings”.

The following table describes the values for the DCIM_BIOSEnumeration of this group. The column headers represent the properties of the DCIM_BIOSEnumeration class. Each of the cells represent the values of the properties. Each of the listed values under the PossibleValues header is an element of an array.

**Table 26 – DCIM_BIOSEnumeration Miscellaneous Settings**

| AttributeName | AttributeDisplayName | IsReadOnly | Display Order | PossibleValues |
|---|---|---|---|---|
| NumLock | Keyboard NumLock | FALSE | 1506 | "On", "Off" |
| ReportKbdErr | Report Keyboard Errors | FALSE | 1508 | "Report","NoReport" |
| ErrPrompt | F1/F2 Prompt on Error | FALSE | 1510 | “Disabled”, “Enabled” |
| SystemUefiShell | System UEFI Shell | FALSE | 1512 | “Disabled”, “Enabled” |

The following table describes the values for the DCIM_BIOSString of this group. The column headers represent the properties of the DCIM_BIOSString class. Each of the cells represent the values of the properties..

427 **Table 27 – DCIM_BIOSString Miscellaneous Settings**

| AttributeName | Attribute Description | IsReadOnly | Display Order | MinLength | MaxLength |
|---|---|---|---|---|---|
| AssetTag | Asset Tag | FALSE | 1504 | 0 | 10 |

428 #### 7.1.5.1 System Information

429 This section describes the attributes for System Information.

430 For the DCIM_BIOSString:

431 - GroupID property shall be “SysInformation”.

432 - GroupDisplayName property shall be “System Information”.

433 The following table describes the values for the DCIM_BIOSString of this group. The column headers
434 represent the properties of the DCIM_BIOSString class. Each of the cells represent the values of the
435 properties.

436 **Table 28 – DCIM_BIOSString System Information**

| AttributeName | Attribute Description | IsReadOnly | Display Order | MinLength | MaxLength |
|---|---|---|---|---|---|
| SystemModelName | System Model Name | TRUE | 1701 | | |
| SystemBiosVersion | System BIOS Version | TRUE | 1702 | | |
| SystemServiceTag | System Service Tag | TRUE | 1703 | | |
| SystemManufacturer | System Manufacturer | TRUE | 1704 | | |
| SysMfrContactInfo | System Manufacturer Contact Information | TRUE | 1705 | | |

437

438

439 ## 7.2 Boot Management

440 Each of DCIM_BootConfigSetting instances shall represent a boot list, and each boot list can be enabled
441 to be used in the next boot using the algorithm in “Boot State Enablement” column. The following boot
442 lists shall be implemented:

443 **Table 29 – Boot Lists**

| Boot Lists | DCIM_BootConfigSetting.InstanceID | Boot State Enablement | Description |
|---|---|---|---|
| IPL/BIOS | IPL | SetAttribute() or SetAttributes() method with AttributeName “BootMode” and AttributeValue “Bios” | IPL, that is defined in the BIOS Boot Specification, lists the traditional BIOS boot sources. |
| BCV | BCV | SetAttribute() or SetAttributes() method with AttributeName “BootMode” and AttributeValue “Bios” | BCV, that is defined in the BIOS Boot Specification, usually lists the storage controllers for booting from a particular hard drive.<br>NOTE: BCV is nested within the IPL. |

| | | | |
|---|---|---|---|
| | | | Selecting “Hard drive C” in IPL, selects the BCV list for booting.<br>NOTE: The BCV list corresponds to an IPL boot device represented with DCIM_BootSourceSetting.InstanceID property value “IPL:HardDisk”. |
| UEFI | UEFI | SetAttribute() or SetAttributes() method with AttributeName “BootMode” and AttributeValue “Uefi” | List of UEFI devices for boot. |
| vFlash Partition | vFlash | ChangeBootOrderByInstanceID() on DCIM_BootConfigSetting with InstanceID “OneTime” and source[] containing a single vFlash DCIM_BootSourSetting InstanceID | vFlash partitions to boot from. |
| One Time Boot | OneTime | ChangeBootOrderByInstanceID() on DCIM_BootConfigSetting with InstanceID “OneTime” and source[] containing a single DCIM_BootSourSetting InstanceID from any boot list. | One time boot list contains a single boot device selected for one time boot. After the reboot, the boot list reverts to the original boot list. |

DCIM_BootConfigSetting shall represent a collection of DCIM_BootSourceSetting instances; where the DCIM_BootSourceSetting.InstanceID substring that prefixes the first colon shall match the DCIM_BootConfigSetting.InstanceID value. For more information, see Figure 2.

For example, DCIM_BootSourceSetting.InstanceID with value of “**vFlash**:LABEL1:1” belongs to DCIM_BootConfigSetting boot list with InstanceID “**vFlash**”.

All the boot devices within the list may be sorted using the ChangeBootOrderByInstanceID() method (section 8.7) and may be enabled or disabled using the ChangeBootSourceState() method (see section 8.6).

The state of the boot list for the next boot shall be changed through the DCIM_BIOSEnumeration with AttributeName “BootMode” (section 7.1.5.3) or through execution of ChangeBootOrderByInstanceID() method on the DCIM_BootConfigSetting instance with InstanceID “OneTime” with the source[] parameter having a single DCIM_BootSourceSetting InstanceID from any of the lists including vFlash.

Each boot list contains boot devices that shall be represented by DCIM_BootSourceSetting.

### 7.2.1 DCIM_BootConfigSetting

This section describes the implementation for the DCIM_BootConfigSetting class that represents a particular boot list.

This class shall be instantiated in the Implementation Namespace.

#### 7.2.1.1 Resource URIs for WinRM®

The class Resource URI shall be “http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_BootConfigSetting?__cimnamespace=root/dcim”

The key property shall be the InstanceID.

The instance Resource URI for DCIM_BootConfigSetting instance shall be:
“http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_BootConfigSetting?__cimnamespace=root/dcim+InstanceID=<a value from Table 29 DCIM_BootConfigSetting.InstanceID column>”

#### 7.2.1.2 Operations

The following table details the implemented operations on DCIM_BootConfigSetting.

**Table 30 – DCIM_BootConfigSetting – Operations**

| Operation Name | Requirements | Required Input |
|---|---|---|
| Get | Mandatory | Instance URI |
| Enumerate | Mandatory | Class URI |
| Invoke | Mandatory | Instance URI |
| DCIM_BIOSService.SetAttribute() | Mandatory | See section 8.1 with AttributeName = "BootMode" |
| DCIM_BIOSService.SetAttributes() | Mandatory | See section 8.2 with AttributeName = "BootMode" |

#### 7.2.1.3 Properties

The table lists the properties implemented for DCIM_BootConfigSetting. The "Requirements" column shall denote whether the property is implemented (for requirement definitions, see section 3). The "Additional Requirements" column shall denote either possible values for the property, or requirements on the value formulation.

**Table 31 – Class: DCIM_BootConfigSetting**

| Properties | Type | Requirement | Additional Requirements |
|---|---|---|---|
| InstanceID | string | Mandatory | The property value shall be from Table 29 "DCIM_BootConfigSetting.InstanceID" column. |
| ElementName | string | Mandatory | |
| IsCurrent | uint8 | Mandatory | Values of:<br>• 1 = Is Current (Is the current boot configuration),<br>• 2 = Is Not Current (Is not the current boot configuration) |
| IsDefault | uint8 | Mandatory | The property shall have Is Not Default (is not the default boot configuration).<br>No default boot configurations are supported. |
| IsNext | uint8 | Mandatory | Values of:<br>• 1 = Is Next (is the next boot configuration the system will use for booting)<br>• 2 = Is Not Next (is not the next boot configuration the system will use for booting)<br>• 3= Is Next For Single Use (is the next boot configuration the system will use for booting for single use, one time boot only) |

The DCIM_BootConfigSetting.IsCurrent, IsNext and IsDefault properties shall represent the current state of the boot list.

- The IsNext property set to 1(Is Next) shall represents that the boot list is configured to be used for the next boot. vFlash boot list shall not have this value.

- The IsNext property set to 3(Is Next for Single Use) shall represent that the boot list is configured to be used ONLY for the next boot. Only the OneTime boot list may have this value for the IsNext property.

### 7.2.2 DCIM_BootSourceSetting

This section describes the implementation for the DCIM_BootSourceSetting class that represents a boot device.

This class shall be instantiated in the Implementation Namespace.

#### 7.2.2.1 Resource URIs for WinRM®

The class Resource URI shall be "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_BootSourceSetting?__cimnamespace=root/dcim"

The key property shall be the InstanceID.

The instance Resource URI for DCIM_BootSourceSetting instance shall be:
"http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_BootSourceSetting?__cimnamespace=root/dcim+InstanceID=<InstanceID see Table 33>"

#### 7.2.2.2 Operations

The following table lists the operations implemented on DCIM_BootSourceSetting.

**Table 32 – DCIM_BootSourceSetting – Operations**

| Operation Name | Requirements | Required Input |
|---|---|---|
| Get | Mandatory | Instance URI |
| Enumerate | Mandatory | Class URI |
| DCIM_BootConfigSetting. ChangeBootSourceState() | Mandatory | See section 8.6. |
| DCIM_BootConfigSetting. ChangeBootOrderByInstanceID | Mandatory | See section 8.7. |

#### 7.2.2.3 Properties

The following table lists the properties implemented for DCIM_BootSourceSetting. The table lists the properties implemented for DCIM_BootSourceSetting. The "Requirements" column shall denote whether the property is implemented (for requirement definitions, see section 3). The "Additional Requirements" column shall denote either possible values for the property, or requirements on the value formulation.

506 **Table 33 – Class: DCIM_BootSourceSetting**

| Properties | Type | Requirement | Additional Requirements |
|---|---|---|---|
| InstanceID | string | Mandatory | The property value shall have prefix from Table 29 "DCIM_BootConfigSetting.InstanceID" column followed by a unique ID representing the boot source.<br>For example:<br>• UEFI:Disk.USBFront.2-1:3156051d1529b8f4f88c99f54b895350 (boot source belongs to **UEFI** bootlist)<br>• IPL:NIC.Slot.4-2:d0f2c6c736adb8c2238153293a0c026c (boot source belongs to **IPL** bootlist)<br>• BCV:RAID.Integrated.1-1:b84a10539d2ccaca5e86b7de3cae08a8 (boot source belongs to **BCV** bootlist) |
| BIOSBootString | string | Mandatory | The property shall represent theboot source name |
| BootString | string | Mandatory | The property shall represent the boot source name |
| BootSourceType | string | Mandatory | The property shall represent the boot configuration that the boot source belongs to, and shall match the values in Table 29 "DCIM_BootConfigSetting.InstanceID" column. |
| PendingAssignedSequence | uint8 | Mandatory | The property value shall be set through the successful execution of the ChangeBootOrderByInstanceID() method, and shall indicate the pending assigned sequence of the boot source. |
| CurrentAssignedSequence | uint8 | Mandatory | The property shall represent the boot order in the zero-based indexed boot sequence. |
| PendingEnabledStatus | uint8 | Mandatory | The property value shall be set through the successful execution of the ChangeBootSourceState () method, and shall indicate the pending enabled status of the boot source. The property shall have one of the following values:<br>• 0 = Disabled<br>• 1 = Enabled |
| CurrentEnabledStatus | | Mandatory | The property shall represent the current status of the boot source. If the property value is 0 (Disabled), the boot source shall not be used during boot. The property shall have one of the following values:<br>• 0 = Disabled<br>• 1 = Enabled |
| ElementName | | Mandatory | |

| Properties | Type | Requirement | Additional Requirements |
|---|---|---|---|
| FailThroughSupported | | Mandatory | The property shall indicate the behavior of the boot source failure. The property shall have one of the following values:<br>• 0 = Unknown<br>• 1 = Is Supported indicates that the next boot source in the boot order shall be used.<br>• 2 = Is Not Supported indicates that the boot order is terminated and no other boot sources shall be used. |

## 7.3 Service for Method Invocations

### 7.3.1 DCIM_BIOSService

This section describes the implementation for the DCIM_BIOSService class that represents the BIOS and boot management service.

This class shall be instantiated in the Implementation Namespace.

The DCIM_LCElementConformsToProfile association(s) shall reference the DCIM_BIOSService instance(s).

#### 7.3.1.1 Resource URIs for WinRM®

The class Resource URI shall be "http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_BIOSService?__cimnamespace=root/dcim"

The key properties shall be SystemCreationClassName, CreationClassName, SystemName and Name.

The instance Resource URI for DCIM_BIOSService instance shall be:
"http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_BIOSService?__cimnamespace=root/dcim+SystemCreationClassName=DCIM_ComputerSystem+CreationClassName=DCIM_BIOSService+SystemName=DCIM:ComputerSystem+Name=DCIM:BIOSService"

#### 7.3.1.2 Operations

The following table lists the operations implemented on DCIM_BIOSService.

**Table 34 – DCIM_BIOSService – Operations**

| Operation Name | Requirements | Required Input |
|---|---|---|
| Get | Mandatory | Instance URI |
| Enumerate | Mandatory | Class URI |
| Invoke | Mandatory | Instance URI |

#### 7.3.1.3 Properties

The following table lists the implemented properties for DCIM_BIOSService instance representing a system in a system. The "Requirements" column shall denote whether the property is implemented (for requirement definitions, see section 3). The "Additional Requirements" column shall denote either possible values for the property, or requirements on the value formulation.

532 **Table 35 – Class: DCIM_BIOSService**

| Properties | Type | Requirement | Description |
|---|---|---|---|
| SystemCreationClassName | string | Mandatory | The property value shall be “DCIM_ComputerSystem”. |
| CreationClassName | string | Mandatory | The property value shall be “DCIM_BIOSService”. |
| SystemName | string | Mandatory | The property value shall be “DCIM:ComputerSystem”. |
| Name | string | Mandatory | The property value shall be “DCIM:BIOSService” |
| ElementName | string | Mandatory | The property value shall be “BIOS Service”. |

533 ## 7.4 Profile Registration

534 ### 7.4.1 BIOS and Boot Management Profile Registration

535 This section describes the implementation for the DCIM_LCRegisteredProfile class.

536 This class shall be instantiated in the Interop Namespace.

537 The DCIM_ElementConformsToProfile association(s) shall reference the DCIM_LCRegisteredProfile
538 instance.

539 #### 7.4.1.1 Resource URIs for WinRM®

540 The class Resource URI shall be "http://schemas.dmtf.org/wbem/wscim/1/cim-
541 schema/2/CIM_RegisteredProfile?__cimnamespace=root/interop"

542 The key property shall be the InstanceID property.

543 The instance Resource URI shall be: “http://schemas.dell.com/wbem/wscim/1/cim-
544 schema/2/DCIM_LCRegisteredProfile?__cimnamespace=root/interop+InstanceID=DCIM:BIOSandBootM
545 anagement:1.0.0”

546 #### 7.4.1.2 Operations

547 The following table details the operations implemented on DCIM_LCRegisteredProfile.

548 **Table 36 – DCIM_LCRegisteredProfile - Operations**

| Operation Name | Requirements | Required Input |
|---|---|---|
| Get | Mandatory | Instance URI |
| Enumerate | Mandatory | Class URI |

549

#### 7.4.1.3 Properties

The following table details the implemented properties for DCIM_LCRegisteredProfile instance representing BIOS and Boot Management Profile implementation. The “Requirements” column shall denote whether the property is implemented (for requirement definitions, see section 3.3, 3.4, and 3.6). The “Additional Requirements” column shall denote either possible values for the property, or requirements on the value formulation.

**Table 37 – Class: DCIM_LCRegisteredProfile**

| Properties | Requirement | Type | Additional Requirements |
|---|---|---|---|
| InstanceID | Mandatory | String | The property value shall be "DCIM:BIOSandBootManagement:1.0.0". |
| RegisteredName | Mandatory | String | This property shall have a value of “BIOS and Boot Management”. |
| RegisteredVersion | Mandatory | String | This property shall have a value of “1.2.0”. |
| RegisteredOrganization | Mandatory | String | This property shall have a value of 1 (Other). |
| OtherRegisteredOrganization | Mandatory | String | This property shall match “DCIM” |
| AdvertisedTypes[] | Mandatory | Uint16 | This property array shall contain [1(Other), 1 (Other)]. |
| AdvertiseTypeDescriptions[] | Mandatory | String | This property array shall contain ["WS-Identify", "Interop Namespace"]. |

# 8 Methods

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

## 8.1 CIM_BIOSService.SetAttribute()

The SetAttribute( ) method is used to set or change the value of a BIOS attribute.

Invoking the SetAttribute( ) method shall change the value of the attribute's CurrentValue or attribute's PendingValue property to the value specified by the AttributeValue parameter if the attribute's IsReadOnly property is FALSE. Invoking this method when the attribute's IsReadOnly property is TRUE shall result in no change to the value of the attribute's CurrentValue property. The results of changing this value are described with the SetResult parameter.

Return code values for the SetAttribute( ) method are specified in Table 38 and parameters are specified in Table 39.

**NOTE:** Invoking the SetAttribute( ) method multiple times can result in the earlier requests being overwritten or lost.

**Table 38 – SetAttribute( ) Method: Return Code Values**

| Value | Description |
|---|---|
| 0 | Completed with no error |
| 2 | Failed |

**Table 39 – SetAttribute( ) Method: Parameters**

| Qualifiers | Name | Type | Description/Values |
|---|---|---|---|
| IN, REQ | Target | String | Shall be set to "BIOS.Setup.1-1" |
| IN, REQ | AttributeName | String | Shall contain the AttributeName property value for the attribute to be modified. |
| IN, REQ | AttributeValue[] | String | Shall contain the desired attribute value.<br>If the value is valid, the CurrentValue or PendingValue property of the specified attribute shall be modified. |
| OUT | SetResult | String | Returns:<br>• "Set CurrentValue" when the attribute's current value is set.<br>• "Set PendingValue" when the attribute's pending value is set. |
| OUT | RebootRequired | String | Returns:<br>• "Yes" if reboot is required.<br>• "No" if reboot is not required. |
| OUT | MessageID | String | Error MessageID |
| OUT | Message | String | Error Message |
| OUT | MessageArguments[] | String | Error MessageArguments |

575 **Table 40 – SetAttribute( ) Method: Standard Messages**

| MessageID (OUT parameter) | Message | MessageArguments[] |
|---|---|---|
| BIOS001 | The command was successful | |
| BIOS002 | Resource allocation failure | |
| BIOS003 | Missing required parameter | |
| BIOS004 | Invalid parameter value for <parameter name> | Parameter |
| BIOS005 | Mismatch in AttributeName and AttributeValue count | |
| BIOS006 | Configuration job already created, cannot set attribute on specified target until existing job is completed or is cancelled | |
| BIOS007 | Configuration job already created, cannot create another config job on specified target until existing job is completed or is cancelled | |
| BIOS008 | No pending data is present to create a Configuration job | |
| BIOS009 | System Services is currently in use, cannot create Configuration job | |
| BIOS010 | System Services is disabled, cannot create Configuration job | |
| BIOS011 | Configuration job already created, pending data cannot be deleted | |
| BIOS012 | No pending data present to delete | |
| BIOS013 | Invalid AttributeName %s | Attribute Name |
| BIOS014 | Invalid AttributeValue for AttributeName %s | Attribute Name |
| BIOS015 | AttributeValue cannot be changed for ReadOnly AttributeName %s | Attribute Name |
| BIOS016 | AttributeValue cannot be changed for Disabled AttributeName %s | Attribute Name |
| BIOS017 | Unable to delete vFlash pending one-time boot configuration | |

576

## 577 8.2 DCIM_BIOSService.SetAttributes( )

578 The SetAttributes( ) method is used to set or change the values of a group of attributes.

579 Invoking the SetAttributes( ) method shall change the values of the attribute's CurrentValue or
580 PendingValue properties that correspond to the names specified by the AttributeName parameter and the
581 values specified by the AttributeValue parameter if the respective attribute's IsReadOnly property is
582 FALSE. Invoking this method when the respective attribute's IsReadOnly property is TRUE shall result in
583 no change to the corresponding value of the attribute's CurrentValue property.

584 Return code values for the SetAttributes( ) method are specified in Table 41, and parameters are
585 specified in Table 42.

586 **NOTE:** Invoking the SetAttributes( ) method multiple times can result in the earlier requests being
587 overwritten or lost.

588 **Table 41 – SetAttributes( ) Method: Return Code Values**

| Value | Description |
|---|---|
| 0 | Completed with no error |
| 2 | Failed |

589 **Table 42 – SetAttributes( ) Method: Parameters**

| Qualifiers | Name | Type | Description/Values |
|---|---|---|---|
| IN, REQ | Target | String | Shall be set to “BIOS.Setup.1-1” |
| IN, REQ | AttributeName[] | String | The array parameter shall contain the AttributeName property values for the attributes to be modified. |
| IN, REQ | AttributeValue[] | String | The array parameter shall contain the desired attribute values.<br>If the value is valid, the CurrentValue or PendingValue property of the specified attribute will be modified. |
| OUT | SetResult[] | String | Returns:<br>• "Set CurrentValue" when the attribute’s current value is set.<br>• “Set PendingValue” when the attribute’s pending value is set. |
| OUT | RebootRequired[] | String | Returns:<br>• “Yes” if reboot is required.<br>• “No” if reboot is not required. |
| OUT | MessageID[] | String | Error MessageID |
| OUT | Message[] | String | Error Message |
| OUT | MessageArguments[] | String | Error MessageArguments |

590 **Table 43 – SetAttributes( ) Method: Standard Messages**

| MessageID (OUT parameter) | Message | MessageArguments[] |
|---|---|---|
| BIOS001 | The command was successful | |
| BIOS002 | Resource allocation failure | |
| BIOS003 | Missing required parameter | |
| BIOS004 | Invalid parameter value for <parameter name> | Parameter |
| BIOS005 | Mismatch in AttributeName and AttributeValue count | |
| BIOS013 | Invalid AttributeName %s | Attribute Name |
| BIOS014 | Invalid AttributeValue for AttributeName %s | Attribute Name |
| BIOS015 | AttributeValue cannot be changed for ReadOnly AttributeName %s | Attribute Name |
| BIOS016 | AttributeValue cannot be changed for Disabled AttributeName %s | Attribute Name |

The SetAttribute( ) method is used to set or change the value of a BIOS attribute.

Invoking the SetAttribute( ) method shall change the value of the attribute's CurrentValue or attribute's PendingValue property to the value specified by the AttributeValue parameter if the attribute's IsReadOnly property is FALSE. Invoking this method when the attribute's IsReadOnly property is TRUE shall result in no change to the value of the attribute's CurrentValue property. The results of changing this value are described with the SetResult parameter.

Return code values for the SetAttribute( ) method are specified in Table 44 and parameters are specified in Table 45.

**NOTE:** Invoking the SetAttribute( ) method multiple times can result in the earlier requests being overwritten or lost.

**Table 44 – SetAttribute( ) Method: Return Code Values**

| Value | Description |
|---|---|
| 0 | Completed with no error |
| 2 | Failed |

**Table 45 – SetAttribute( ) Method: Parameters**

| Qualifiers | Name | Type | Description/Values |
|---|---|---|---|
| IN, REQ | Target | String | Shall be set to "BIOS.Setup.1-1" |
| IN, REQ | AttributeName | String | Shall contain the AttributeName property value for the attribute to be modified. |
| IN, REQ | AttributeValue[] | String | Shall contain the desired attribute value.<br>If the value is valid, the CurrentValue or PendingValue property of the specified attribute will be modified. |
| OUT | SetResult | String | Returns:<br>• "Set CurrentValue" when the attribute's current value is set.<br>• "Set PendingValue" when the attribute's pending value is set. |
| OUT | RebootRequired | String | Returns:<br>• "Yes" if reboot is required.<br>• "No" if reboot is not required. |
| OUT | MessageID | String | Error MessageID |
| OUT | Message | String | Error Message |
| OUT | MessageArguments[] | String | Error MessageArguments |

## 8.3 DCIM_BIOSService.ChangePassword ()

The ChangePassword( ) method is used to set or change the value of a BIOS attribute.

Invoking the ChangePassword( ) method shall change the value of the password attribute's PendingValue property to the value specified by the AttributeValue.

Return code values for the ChangePassword( ) method are specified in Table 46 and parameters are specified in Table 47.

610 **NOTE:** Invoking the ChangePassword( ) method multiple times can result in the earlier requests being
611 overwritten or lost.

612 **Table 46 – ChangePassword( ) Method: Return Code Values**

| Value | Description |
|---|---|
| 0 | Completed with no error |
| 2 | Failed |

613 **Table 47 – ChangePassword( ) Method: Parameters**

| Qualifiers | Name | Type | Description/Values |
|---|---|---|---|
| IN, REQ | Target | String | Shall be set to "BIOS.Setup.1-1" |
| IN, REQ | PasswordType | Uint16 | Shall be one of the following values:<br>• 1 = System Password<br>• 2 = Setup Password |
| IN, REQ | OldPassword | String | Shall contain the old password string:<br>If the PasswordType parameter has the value 1(System Password) , the OldPassword shall have the current value of SysPassword attribute or SetupPassword attribute, else the method shall return 2(Failed).<br>If the PasswordType parameter has the value 2(Setup Password) , the OldPassword shall have the current value of SetupPassword attribute, else the method shall return 2(Failed). |
| IN, REQ | NewPassword | String | Shall be set to new password string.<br>NewPassword may be set to NULL (or omitted) in order to clear the old password. Clearing the password may succeed even if the password was previously cleared. |
| OUT | MessageID | String | Error MessageID |
| OUT | Message | String | Error Message |
| OUT | MessageArguments[] | String | Error MessageArguments |

614

615 **Table 48 – ChangePassword( ) Method: Standard Messages**

| MessageID (OUT parameter) | Message | MessageArguments[] |
|---|---|---|
| BIOS001 | The command was successful | |
| BIOS002 | Resource allocation failure | |
| BIOS003 | Missing required parameter | |
| BIOS004 | Invalid parameter value for <parameter name> | Parameter |
| BIOS024 | BIOS password authentication failed | |
| BIOS025 | Unable to set BIOS password. Password is disabled by Jumper | |

## 8.4 DCIM_BIOSService.CreateTargetedConfigJob()

The CreateTargetedConfigJob( ) method is used to apply the pending values created by the SetAttribute, SetAttributes, ChangePassword, ChangeBootSourceState, and ChangeBootOrderByInstanceID methods. The successful execution of this method creates a job for application of pending values.

NOTE: This method only creates the RebootJob and does not schedule it.

**NOTE:** If CreateTargetedConfigJob method is executed without the three optional input parameters, configuration job is created but not scheduled. However, you can schedule this configuration job later using the DCIM_JobService.SetupJobQueue () method from the "Job Control Profile". You can run the DCIM_JobService.SetupJobQueue () to schedule several configuration jobs including the reboot job. Refer to "Job Control Profile" for more details.

Return code values for the CreateTargetedConfigJob( ) method are specified in Table 49, and parameters are specified in Table 50.

Subsequent calls to CreateTargetedConfigJob after the first CreateTargetedConfigJob will result in error until the first job is completed."

**Table 49 – CreateTargetedConfigJob( ) Method: Return Code Values**

| Value | Description |
|---|---|
| 2 | Failed |
| 4096[1] | Job Created[1] |

**Table 50 – CreateTargetedConfigJob( ) Method: Parameters**

| Qualifiers | Name | Type | Description/Values |
|---|---|---|---|
| IN, REQ | Target | String | Shall be set to "BIOS.Setup.1-1" |
| IN | RebootJobType | Uint16 | Shall contain the requested reboot type:<br>1 - PowerCycle<br>2 - Graceful Reboot without forced shutdown<br>3 - Graceful Reboot with forced shutdown. |
| IN | ScheduledStartTime | String | Schedules the "configuration job" and the optional "reboot job" at the specified start time in the format: yyyymmddhhmmss.<br>A special value of "TIME_NOW" schedules the job(s) immediately. |
| IN | UntilTime | String | End time for the job execution in format: yyyymmddhhmmss. :<br>If this parameter is not NULL, then ScheduledStartTime parameter shall also be specified.<br>**NOTE:** This parameter has a dependency on "ScheduledStartTime" parameter. Both "ScheduledStartTime" and "UntilTime" parameters define a time window for scheduling the job(s). After scheduling, jobs are executed within the time window. |
| OUT | Job[1] | CIM_ConcreteJob REF | Reference to the newly created pending value application job.[1] |
| OUT | MessageID | String | Error MessageID |
| OUT | Message | String | Error Message |

| Qualifiers | Name | Type | Description/Values |
|---|---|---|---|
| OUT | MessageArguments[] | String | Error MessageArguments |

NOTE: 1 – If return code is 4096 (Job Created), the newly created job does not execute if the LC core services are not running. Verify that DCIM_LCEnumeration with AttributeName equal to “LifecycleControllerState” has the CurrentValue property equal to “Enabled”. For more information, see DCIM LC Management Profile.

**Table 51 – CreateTargetedConfigJob( ) Method: Standard Messages**

| MessageID (OUT parameter) | Message | MessageArguments[] |
|---|---|---|
| BIOS001 | The command was successful | |
| BIOS002 | Resource allocation failure | |
| BIOS003 | Missing required parameter | |
| BIOS004 | Invalid parameter value for <parameter name> | Parameter |
| BIOS007 | Configuration job already created, cannot create another config job on specified target until existing job is completed or is cancelled | |
| BIOS008 | No pending data is present to create a Configuration job | |
| BIOS009 | System Services is currently in use, cannot create Configuration job | |
| BIOS010 | System Services is disabled, cannot create Configuration job | |
| BIOS011 | Configuration job already created, pending data cannot be deleted | |
| BIOS012 | No pending data present to delete | |
| BIOS017 | Unable to delete vFlash pending one-time boot configuration | |

## 8.5 DCIM_BIOSService.DeletePendingConfiguration( )

The DeletePendingConfiguration( ) method is used to cancel the pending values created by the SetAttribute and SetAttributes methods. The DeletePendingConfiguration( ) method cancels the pending configuration changes made before the configuration job is created with CreateTargetedConfigJob(). This method only operates on the pending changes prior to CreateTargetedConfigJob() being called. After the configuration job is created, use the DeleteJobQueue() method in the Job Control profile to cancel the pending changes.

Return code values for the DeletePendingConfiguration( ) method are specified in Table 52, and parameters are specified in Table 53.

646 **Table 52 – DeletePendingConfiguration( ) Method: Return Code Values**

| Value | Description |
|---|---|
| 0 | Completed with no error |
| 2 | Failed |

647 **Table 53 – DeletePendingConfiguration( ) Method: Parameters**

| Qualifiers | Name | Type | Description/Values |
|---|---|---|---|
| IN, REQ | Target | String | FQDD of the BIOS |
| OUT | MessageID | String | Error MessageID |
| OUT | Message | String | Error Message |
| OUT | MessageArguments[] | String | Error MessageArguments |

648 **Table 54 – DeletePendingConfiguration( ) Method: Standard Messages**

| MessageID (OUT parameter) | Message | MessageArguments[] |
|---|---|---|
| BIOS001 | The command was successful | |
| BIOS002 | Resource allocation failure | |
| BIOS003 | Missing required parameter | |
| BIOS004 | Invalid parameter value for <parameter name> | Parameter |
| BIOS011 | Configuration job already created, pending data cannot be deleted | |
| BIOS012 | No pending data present to delete | |
| BIOS017 | Unable to delete vFlash pending one-time boot configuration | |

649

## 650 8.6 DCIM_BootConfigSetting.ChangeBootSourceState( )

651 The ChangeBootSourceState( ) method is used change the enabled or disabled state of a single or
652 multiple boot devices.

653 Invoking the ChangeBootSourceState( ) method shall change the boot sources state and affect
654 DCIM_BootSourceSetting.PendingEnabledStatus properties. Upon the successful invocation, the
655 DCIM_BootSourceSetting.PendingEnabledStatus shall have the value specified by the EnabledState
656 parameter for the DCIM_BootSourceSetting instances with the InstanceID property matching the
657 InstanceID parameter value(s).

658 **NOTE:** Invoking the ChangeBootSourceState( ) method multiple times can result in the earlier requests
659 being overwritten or lost.

660 Upon the successful completion of the returned job, the CurrentEnabledStatus shall have the same value
661 as the PendingEnabledStatus.

662 Return code values for the ChangeBootSourceState( ) method are specified in Table 55 and parameters
663 are specified in Table 56.

664 **Table 55 – ChangeBootSourceState( ) Method: Return Code Values**

| Value | Description |
|---|---|
| 0 | Completed with no error |
| 2 | Failed |

665 **Table 56 – ChangeBootSourceState( ) Method: Parameters**

| Qualifiers | Name | Type | Description/Values |
|---|---|---|---|
| IN, REQ | EnabledState | String | Shall contain the requested state for the boot device. |
| IN, REQ | source[] | String | Shall contain the InstanceID value(s) for DCIM_BootSourceSetting instances to be affected. |
| OUT | Job | CIM_ConcreteJob REF | Reference to the newly created pending value application job. |
| OUT | MessageID | String | Error MessageID |
| OUT | Message | String | Error Message |
| OUT | MessageArguments[] | String | Error MessageArguments |

666 **Table 57 – ChangeBootSourceState( ) Method: Standard Messages**

| MessageID (OUT parameter) | Message | MessageArguments[] |
|---|---|---|
| BOOT001 | The command was successful | |
| BOOT002 | Resource allocation failure | |
| BOOT003 | Method not supported | |
| BOOT004 | Invalid number of Boot Source arguments | |
| BOOT005 | Missing required parameter | |
| BOOT006 | Invalid Boot Source InstanceID | |
| BOOT007 | Boot Source does not belong to specified Boot Configuration | |
| BOOT008 | Source argument contains more devices than are present on the system | |
| BOOT009 | Boot Sources cannot be found for this Boot Configuration | |

667 ## 8.7 DCIM_BootConfigSetting.ChangeBootOrderByInstanceID( )

668 The ChangeBootOrderByInstanceID( ) method is used to change the order of boot devices within the boot
669 list.

670 Invoking the ChangeBootOrderByInstanceID( ) method shall order the boot devices in the list in
671 accordance to the corresponding array element in the Source parameter array. The omitted boot devices
672 in the Source parameter array shall be omitted in the boot list ordering.

673 Each element of the Source parameter array shall have value of a DCIM_BootSourceSetting.InstanceID
674 property.

675 Upon successful completion of this method, the value of the PendingAssignedSequence property on each
676 instance of CIM_BootSourceSetting shall be updated such that the values are monotonically increasing in
677 correlation with the position the “source” input parameter array. That is, the first position in the array shall

have the lowest non-zero value for PendingAssignedSequence. The second position will have the second lowest value, and so on.

Upon successful completion of this method, the value of the PendingAssignedSequence property on each instance of DCIM_BootSourceSetting, that relates to the target DCIM_BootConfigSetting instance that is not present in the input array, shall be assigned a value of 0.

**NOTE:** Invoking the ChangeBootOrderByInstanceID( ) method multiple times can result in the earlier requests being overwritten or lost.

Upon the successful completion of the returned job, the CurrentAssignedSequence shall have the same value as the PendingAssignedSequence.

Return code values for the ChangeBootOrderByInstanceID( ) method are specified in Table 58 and parameters are specified in Table 59.

**Table 58 – ChangeBootOrderByInstanceID( ) Method: Return Code Values**

| Value | Description |
|---|---|
| 0 | Completed with no error |
| 2 | Failed |
| 4096[1] | Job Created[1] |

**Table 59 – ChangeBootOrderByInstanceID( ) Method: Parameters**

| Qualifiers | Name | Type | Description/Values |
|---|---|---|---|
| IN, REQ | source[] | String | Shall contain the InstanceID value(s) for DCIM_BootSourceSetting instances to change the order of. |
| OUT | Job | CIM_ConcreteJob REF | Reference to the newly created pending value application job. |
| OUT | MessageID | String | Error MessageID |
| OUT | Message | String | Error Message |
| OUT | MessageArguments[] | String | Error MessageArguments |

NOTE: 1 – 4096(Job Created) shall be returned, only and only if the soure parameter array contains boot source reference for an unattached vFlash partition. If return code is 4096 (Job Created), the newly created job does not execute if the LC core services are not running. Verify that DCIM_LCEnumeration with AttributeName equal to “LifecycleControllerState” has the CurrentValue property equal to “Enabled”. For more information, see DCIM LC Management Profile.

**Table 60 – ChangeBootOrderByInstanceID( ) Method: Standard Messages**

| MessageID (OUT parameter) | Message | MessageArguments[] |
|---|---|---|
| BOOT001 | The command was successful | |
| BOOT002 | Resource allocation failure | |
| BOOT003 | Method not supported | |
| BOOT004 | Invalid number of Boot Source arguments | |
| BOOT005 | Missing required parameter | |
| BOOT006 | Invalid Boot Source InstanceID | |

| MessageID (OUT parameter) | Message | MessageArguments[] |
|---|---|---|
| BOOT007 | Boot Source does not belong to specified Boot Configuration | |
| BOOT008 | Source argument contains more devices than are present on the system | |
| BOOT009 | Boot Sources cannot be found for this Boot Configuration | |
| BOOT010 | Could not locate vFlash partition index | |
| BOOT011 | Failed to set vFlash partition for one time boot | |
| BOOT012 | Job started to attach and set vFlash partition for one time boot | |
| BOOT014 | Virtual media not ready | |
| BOOT015 | Job to attach and set vFlash partition for one time boot completed successfully | |

# 9 Use Cases

See *Lifecycle Controller (LC) Integration Best Practices Guide*.

# 10 CIM Elements

No additional requirements are specified.

# 11 Privilege and License Requirement

The following table describes the privilege and license requirements for the listed operations . For the detailed explanation of the privileges and licenses, refer to the Dell WSMAN Licenses and Privileges specification.

**Table 61 – Privilege and License Requirements**

| Class and Method | Operation | User Privilege Required | License Required |
|---|---|---|---|
| DCIM_BIOSService | ENUMERATE, GET | Login | None. |
| DCIM_BIOSPassword | ENUMERATE, GET | Login | LM_REMOTE_CONFIGURATION |
| DCIM_BIOSService.SetAttribute() | INVOKE | Login, Configure | LM_REMOTE_CONFIGURATION |
| DCIM_BIOSService.SetAttributes() | INVOKE | Login, Configure | LM_REMOTE_CONFIGURATION |
| DCIM_BIOSService. CreateTargetedConfigJob() | INVOKE | Login, Configure | LM_REMOTE_CONFIGURATION |

| Class and Method | Operation | User Privilege Required | License Required |
|---|---|---|---|
| DCIM_BIOSService. DeletePendingConfiguration() | INVOKE | Login, Configure | LM_REMOTE_CONFIGURATION |
| DCIM_BIOSService. ChangePassword() | INVOKE | Login, Configure | LM_REMOTE_CONFIGURATION |
| DCIM_BIOSEnumeration | ENUMERATE, GET | Login | LM_REMOTE_CONFIGURATION |
| DCIM_BIOSInteger | ENUMERATE, GET | Login | LM_REMOTE_CONFIGURATION |
| DCIM_BIOSString | ENUMERATE, GET | Login | LM_REMOTE_CONFIGURATION |
| DCIM_BootSourceSetting | ENUMERATE, GET | Login | LM_REMOTE_CONFIGURATION, LM_VIRTUAL_FLASH_PARTITIONS[1] |
| DCIM_BootConfigSetting | ENUMERATE, GET | Login | LM_REMOTE_CONFIGURATION, LM_VIRTUAL_FLASH_PARTITIONS[1] |
| DCIM_BootConfigSetting. ChangeBootOrderByInstanceID() | INVOKE | Login, System Control | LM_REMOTE_CONFIGURATION, LM_VIRTUAL_FLASH_PARTITIONS[1] |
| DCIM_BootConfigSetting. ChangeBootSourceState() | INVOKE | Login, System Control | LM_REMOTE_CONFIGURATION, LM_VIRTUAL_FLASH_PARTITIONS[1] |
| DCIM_LCElementConformsToProfile | ENUMERATE, GET | Login | None. |
| DCIM_LCRegisteredProfile | ENUMERATE, GET | Login | None. |

NOTE: 1 – For vFlash boot representation and configuration the requester needs to have LM_VIRTUAL_FLASH_PARTITIONS license. For NON-vFlash boot representation and configuration, LM_VIRTUAL_FLASH_PARTITIONS is NOT necessary.

# ANNEX A
(informative)

# BIOS Attribute Changes from Version 1.1

## A.1 BIOS Change Categories

Changes to BIOS attributes in this version loosely fall into the following categories:

- Power Profiles Depreciated; replaced by System Profiles
- New System Profile values are:
  - Performance Per Watt Optimized (DAPC),
  - Performance Per Watt Optimized (OS),
  - Performance Optimized,
  - Dense Configuration Optimized,
  - Custom.
- Additional sub knobs for System Profile like Memory Patrol Scrub, Memory Refresh Rate
- Turbo, C1E and C states moved to System Profile group.
- Removed the Fan Control settings in BIOS setup.
- Added capability to allow PCI slot enable/disable.
- QPI frequency selection
- Network Daughter Cards (NDCs) replace LOMS on most of our newest generation systems
- Fron panel LCD management is moved completely to iDRAC

## A.2 Table of Specific Attribute Changes

The following table uses the programmatic attribute name and not the attribute display name to identify specific BIOS attributes. Refer to the BIOS Attribute Registry (TBD: link to the attribute registry site) for individual attribute display name, possible value, and other attribute meta-data. For the complete list of BIOS attributes, see section 7.1.5 BIOS Attributes

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| Attribute | FQDD | Notes |
|---|---|---|
| ***Deleted in this version.*** | | |
| PowerMgmt | BIOS.Setup.1 | Changed to SysProfile in this version. |
| FanPwrPerf | BIOS.Setup.1 | Fan management removed from BIOS |
| MemDynamicPwr | BIOS.Setup.1 | This attribute is specific to iDPT (Monroe Technology) on Nehelem EX - 4 socket platforms (eg McCave) |
| MemPwrPerf | BIOS.Setup.1 | Changed to several memory related attributes in this version. |
| | | |
| ***Changed in this version.*** | | |
| FrontLcd | System.Embedded.1 | Changed FQDD from BIOS.Setup.1 to System.Embedded.1 |
| UserLcdStr | System.Embedded.1 | Changed FQDD from BIOS.Setup.1 to System.Embedded.1 |
| ProcTurboMode | BIOS.Setup.1 | Changed Group = SysProfileSettings |
| ProcCStates | BIOS.Setup.1 | Changed Group = SysProfileSettings |
| ProcC1E | BIOS.Setup.1 | Changed Group = SysProfileSettings |
| | | |
| ***Added in this version.*** | | |
| MemPatrolScrub | BIOS.Setup.1 | Group = SysProfileSettings |
| MemRefreshRate | BIOS.Setup.1 | Group = SysProfileSettings |
| SysProfile | BIOS.Setup.1 | Group = SysProfileSettings |
| MemFrequency | BIOS.Setup.1 | Group = SysProfileSettings |
| MemPwrMgmt | BIOS.Setup.1 | Group = SysProfileSettings |
| PowerDelivery | BIOS.Setup.1 | Group = SysProfileSettings |

| Attribute | FQDD | Notes |
|---|---|---|
| Slot1 | BIOS.Setup.1 | Group = SlotDisablement |
| Slot2 | BIOS.Setup.1 | Group = SlotDisablement |
| Slot3 | BIOS.Setup.1 | Group = SlotDisablement |
| Slot4 | BIOS.Setup.1 | Group = SlotDisablement |
| Slot5 | BIOS.Setup.1 | Group = SlotDisablement |
| Slot6 | BIOS.Setup.1 | Group = SlotDisablement |
| Slot7 | BIOS.Setup.1 | Group = SlotDisablement |
| QPISpeed | BIOS.Setup.1 | Group = ProcSettings |
| IntegratedNetwork1 | BIOS.Setup.1 | Group = IntegratedDevices |
| IntegratedNetwork2 | BIOS.Setup.1 | Group = IntegratedDevices |
| | | |

# ANNEX B
# (informative)

## Change Log

| Version | Date | Description |
|---|---|---|
| 1.2.1 | 04/18/2012 | Added the DCIM_BIOSService.ElementName property.<br>Corrected the DCIM_BIOSService.SystemName property description.<br>Corrected the section for the descriptions of the DCIM_BIOSPassword property values.<br>Corrected the DCIM_BIOSString.CurrentValue and PendingValue property value descriptions.<br>Corrected the “DCIM_BIOSPassword System Security” Table columns and column headers. |
| 1.2.2 | 10/19/2012 | Corrected the read/write behavior for the IntelTxt attribute. |
| | | |