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Alarm Device Profile

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Foreword

The *Alarm Device Profile* (DSP1028) was prepared by the Desktop and Mobile Working Group.

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Acknowledgments

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Introduction

This document defines the classes used to describe the alarm devices in a managed system. Also included are descriptions of association classes that describe the relationship of the alarm device with the device's physical aspects and the DMTF profile version information. The information in this specification is intended to be sufficient for a provider or consumer of this data to identify unambiguously the classes, properties, methods, and values that are mandatory to be instantiated and manipulated to represent and manage alarm devices of managed systems and subsystems modeled using the DMTF CIM core and extended model definitions.

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

Alarm Device Profile

1 Scope

The *Alarm Device Profile* extends the management capabilities of referencing profiles by adding the capability to represent alarm devices for manageability. The alarm device as a logical device is modeled as referencing the alarm device physical package for physical asset information and the profile registration for the schema implementation version information.

2 Normative References

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

2.1 Approved References

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

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

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

DMTF DSP1011, *Physical Asset Profile 1.0,*
http://www.dmtf.org/standards/published_documents/DSP1011_1.0.pdf

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

2.2 Other References

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

3 Terms and Definitions

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

3.1
alarm device
a device that emits sound or light, or exhibits motion, to draw attention to a problem situation. An example of an alarm device is the amber warning LED on a workstation computer.

3.2
can
used for statements of possibility and capability, whether material, physical, or causal

3.3
cannot
used for statements of possibility and capability, whether material, physical, or causal

3.4
conditional
indicates requirements to be strictly followed in order to conform to the document when the specified conditions are met

3.5
mandatory
indicates requirements to be strictly followed, in order to conform to the document and from which no deviation is permitted

3.6
may
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
optional
indicates a course of action permissible within the limits of the document

3.9
referencing profile
indicates a profile that owns the definition of this class and can include a reference to this profile in its "Referenced Profiles" table

3.10
shall
indicates requirements to be strictly followed, in order to conform to the document and from which no deviation is permitted

3.11
shall not
indicates requirements to be strictly followed, in order to conform to the document and from which no deviation is permitted

3.12
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.

3.13
should not
indicates that a certain possibility or course of action is deprecated but not prohibited

3.14
unspecified
indicates that this profile does not define any constraints for the referenced CIM element

4 Symbols and Abbreviated Terms

4.1
CIM
Common Information Model

4.2
FRU
Field Replaceable Unit

4.3
LED
Light-Emitting Diode

5 Synopsis

Profile Name: Alarm Device

Version: 1.0.0

Organization: DMTF

CIM Schema Version: 2.22

Central Class: CIM_AlarmDevice

Scoping Class: CIM_ComputerSystem

The *Alarm Device Profile* extends the management capability of the referencing profiles to describe and set the logical properties of an alarm device. For the purposes of this profile, an alarm device is defined to be an LED or audible alarm that reports a problem. Alarm device properties include a description of the alarm's type (such as audible-only) and the current state of the alarm. The profile also describes operations such as turning an alarm on or off. Table 1 identifies profiles on which this profile has a dependency.

Table 1 – Referenced Profiles

Profile Name	Organization	Version	Relationship	Behavior
Physical Asset	DMTF	1.0.	Optional	
Profile Registration	DMTF	1.0	Mandatory	

6 Description

The *Physical Asset Profile* may be used to represent the physical description of the alarm device. If implemented, information such as FRU is represented by an instance of the CIM_PhysicalPackage class that is associated to the CIM_AlarmDevice instance through the CIM_Realizes association. The device that the alarm device is associated with is represented by a CIM_LogicalDevice subclass instance associated to a CIM_AlarmDevice instance through the CIM_AssociatedAlarm association. The version of the *Alarm Device Profile* implemented is represented through the CIM_RegisteredProfile class.

Figure 1 represents the class schema for the *Alarm Device Profile*. For simplicity, the prefix CIM_ has been removed from the names of the classes.

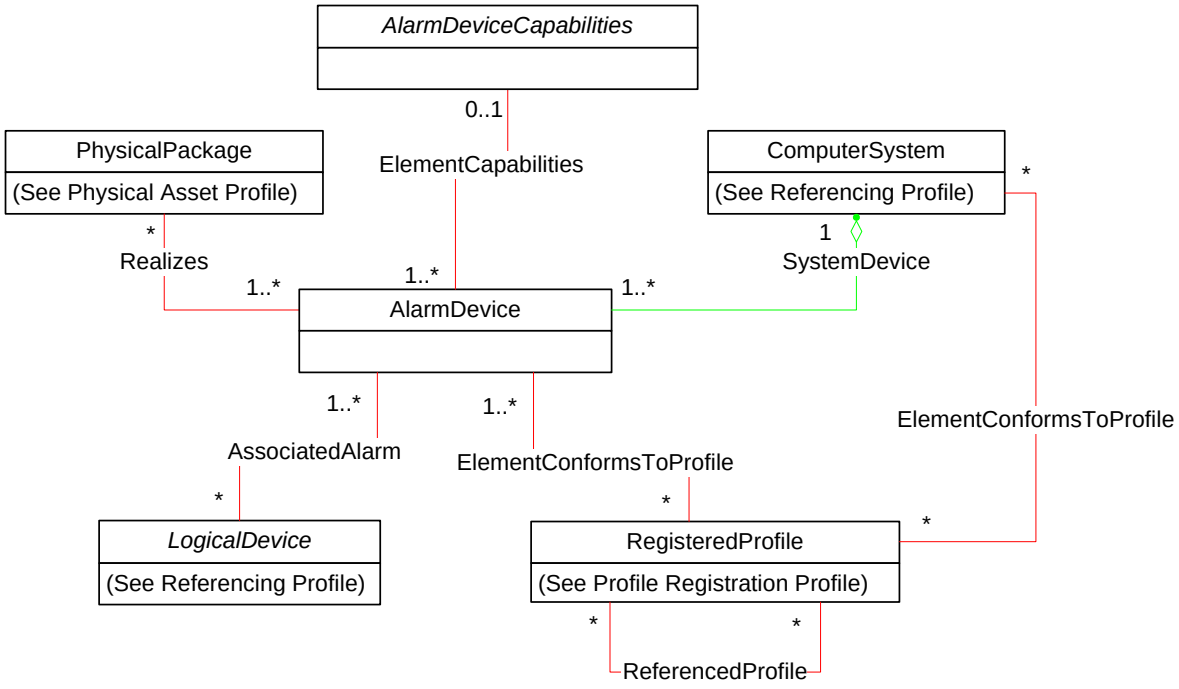

Figure 1 – Class Diagram

7 Implementation Requirements

This section details the requirements related to the arrangement of instances and properties of instances for implementations of this profile.

7.1 CIM_AlarmDevice

At least one instance of CIM_AlarmDevice shall be instantiated.

7.2 CIM_AlarmDevice.AlarmState Value Formulation

Table 2 describes the mapping between the CIM_AlarmDevice.AlarmState property values and the corresponding description of the state of the alarm. The CIM_AlarmDevice.AlarmState property shall match one of the values that are specified in Table 2. When the CIM_AlarmDevice.SetAlarmState( ) method does not complete successfully and the alarm is in an indeterminate state, the CIM_AlarmDevice.AlarmState property shall have a value of 0 (Unknown). When the method does complete successfully, the value of CIM_AlarmDevice.AlarmState shall match the value of the RequestedAlarmState parameter. The value of the CIM_AlarmDevice.AlarmState property may also change as the result of a change to the alarm's state by a non-CIM implementation.

Table 2 – AlarmState Values

Value	Description	Extended Description
0	Unknown	The alarm state is unknown.
1	Off	The alarm is not active.
2	Steady	The alarm is active and indicating steadily.
3	Alternating	The alarm is active and indicating in an alternating pattern.

7.3 CIM_AlarmDevice.RequestedState Value Formulation

When state management is supported, the RequestedState property shall be supported. The CIM_AlarmDevice.RequestedState property shall be set to the value of the RequestedState parameter of the CIM_AlarmDevice.SetAlarmState( ) method, if the method is executed and is supported.

7.4 CIM_AlarmDevice.AudioIndicatorIsDisabled, CIM_AlarmDevice.VisualIndicatorIsDisabled, and CIM_AlarmDevice.MotionIndicatorIsDisabled Value Formulations

Table 3 describes the mapping between the CIM_AlarmDevice.AudioIndicatorIsDisabled, CIM_AlarmDevice.VisualIndicatorIsDisabled, and CIM_AlarmDevice.MotionIndicatorIsDisabled property values and the corresponding description of the enablement of the alarm. The CIM_AlarmDevice.AudioIndicatorIsDisabled, CIM_AlarmDevice.VisualIndicatorIsDisabled, and CIM_AlarmDevice.MotionIndicatorIsDisabled properties shall match one of the values that are specified in Table 3. The value of the properties may also change as the result of a change to the alarm by a non-CIM implementation.

Table 3 – Alarm Indicator Values

Property	Value	Description
AudioIndicatorIsDisabled	True	The audio indicator is disabled (that is, muted).
AudioIndicatorIsDisabled	False	The audio indicator is enabled.
VisualIndicatorIsDisabled	True	The visual indicator is disabled (that is, dimmed).
VisualIndicatorIsDisabled	False	The visual indicator is enabled.
MotionIndicatorIsDisabled	True	The motion indicator is disabled (that is, stopped).
MotionIndicatorIsDisabled	False	The motion indicator is enabled.

When the CIM_AlarmDevice.SetAlarmIndicator( ) method completes successfully, the value of the corresponding CIM_AlarmDevice property shall be changed to correspond with the value of the corresponding method parameter as shown in Table 4.

Table 4 – Alarm Indicators Modified by SetAlarmIndicator( ) Method

Parameter	Parameter Value	Property	Property Value
AudioIndicator	1 (Disable)	AudioIndicatorIsDisabled	True
AudioIndicator	2 (Enable)	AudioIndicatorIsDisabled	False
VisualIndicator	1 (Disable)	VisualIndicatorIsDisabled	True
VisualIndicator	2 (Enable)	VisualIndicatorIsDisabled	False
MotionIndicator	1 (Disable)	MotionIndicatorIsDisabled	True
MotionIndicator	2 (Enable)	MotionIndicatorIsDisabled	False

7.5 CIM_AssociatedAlarm (Optional)

The CIM_AssociatedAlarm association class is used in the *Alarm Device Profile* to associate the alarm device to the component that uses or requires it. If a component that uses or requires the alarm is represented by an instance of a subclass of CIM_LogicalDevice, then the CIM_AssociatedAlarm association class shall be used.

When no instance of CIM_AssociatedAlarm references the instance of CIM_AlarmDevice, the alarm represented by CIM_AlarmDevice works on behalf of the whole managed system. In this case, the CIM_ComputerSystem instance and the CIM_AlarmDevice instance shall be associated only through an instance of CIM_SystemDevice.

7.6 CIM_AlarmDevice.ElementName

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

7.7 Managing the Alarm Device's State

This section describes the management of the alarm device's state.

7.7.1 CIM_AlarmDeviceCapabilities (Optional)

CIM_AlarmDeviceCapabilities is used for advertising the capabilities of the CIM_AlarmDevice instance. When no CIM_AlarmDeviceCapabilities instance is associated with the CIM_AlarmDevice instance, state management shall not be supported.

7.7.1.1 CIM_AlarmDeviceCapabilities.RequestedAlarmStatesSupported

CIM_AlarmDeviceCapabilities.RequestedAlarmStatesSupported is an array that contains the supported requested alarm states for the instance of CIM_AlarmDevice. The value of the CIM_AlarmDeviceCapabilities.RequestedAlarmStatesSupported property shall be an empty array or contain any combination of the following values: 1 (Off), 2 (Steady), or 3 (Alternating).

7.7.1.2 CIM_AlarmDeviceCapabilities.ChangeableAlarmIndicatorsSupported

CIM_AlarmDeviceCapabilities.ChangeableAlarmIndicatorsSupported is an array that contains the supported alarm indicators that can be enabled and disabled for the instance of CIM_AlarmDevice. The value of the CIM_AlarmDeviceCapabilities.ChangeableAlarmIndicatorsSupported property shall be an empty array or contain any combination of the following values: 1 (Audio), 2 (Visual), or 3 (Motion).

8 Methods

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

8.1 Method: CIM_AlarmDevice.SetAlarmState( )

The SetAlarmState( ) method will change the current state of the alarm. Successful completion of the method will change CIM_AlarmDevice.AlarmState to the value specified in the RequestedAlarmState parameter. The CIM_AlarmDevice.AlarmState property shall be affected by the SetAlarmState( ) method invocation as specified in Section 7.2.

The SetAlarmState( ) method's detailed requirements are specified in Table 5 and Table 6. The values specified in Table 5 shall be returned by SetAlarmState( ) method when the execution behavior of the method matches the description in Table 5.

Table 5 – CIM_AlarmDevice.SetAlarmState( ) Method: Return Code Values

Value	Description
0	Initiation of the state change request was successful.
1	Specified state is not supported.
2	Error occurred.

309 Table 6 specifies SetAlarmState( ) method parameters. If the RequestedState parameter is not provided,
310 the CIM_AlarmDevice.SetAlarmState( ) method shall return a value of 2 (Error occurred).

311 **Table 6 – CIM_AlarmDevice.SetAlarmState( ) Method: Parameters**

Qualifiers	Name	Type	Description/Values
IN	RequestedAlarmState	uint16	Valid state values: 1 (Off) 2 (Steady) 3 (Alternating)

312 ## 8.2 Method: CIM_AlarmDevice.SetAlarmIndicator( )

313 The CIM_AlarmDevice.SetAlarmIndicator( ) method will change the state of one or more of the indicators
314 within the instance of CIM_AlarmDevice to the values specified in the AudioIndicator, VisualIndicator, and
315 MotionIndicator parameters, without changing the current CIM_AlarmDevice.AlarmState. The
316 CIM_AlarmDevice.AudioIndicatorIsDisabled, CIM_AlarmDevice.VisualIndicatorIsDisabled, and
317 CIM_AlarmDevice.MotionIndicatorIsDisabled properties shall be affected by the
318 CIM_AlarmDevice.SetAlarmIndicator( ) method invocation as specified in section 7.3.

319 Detailed requirements of the CIM_AlarmDevice.SetAlarmIndicator( ) method are specified in Table 7 and
320 Table 8. The return code values specified in Table 7 shall be returned by the method when the execution
321 behavior of the method matches the description in Table 7. Table 8 specifies method parameters. When
322 one or more of the AudioIndicator, VisualIndicator, and MotionIndicator parameters provided to the
323 method are NULL, the method shall return a value of 2 (Error occurred). If at least one of the parameters
324 has not been provided to the method, the method shall return a value of 2 (Error occurred).

325 **Table 7 – CIM_AlarmDevice.SetAlarmIndicator( ) Method: Return Code Values**

Value	Description
0	Initiation of the state change request was successful.
1	Method is not supported in the implementation.
2	Error Occurred.

326 **Table 8 – CIM_AlarmDevice.SetAlarmIndicator( ) Method: Parameters**

Qualifiers	Name	Type	Description/Values
IN	AudioIndicator	uint16	0 (No Change) 1 (Disable) 2 (Enable)
IN	VisualIndicator	uint16	0 (No Change) 1 (Disable) 2 (Enable)
IN	MotionIndicator	uint16	0 (No Change) 1 (Disable) 2 (Enable)

8.3 Profile Conventions for Operations

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

The default list of operations is as follows:

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

8.4 CIM_AssociatedAlarm

Table 9 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 9, all operations in the default list in 8.3 shall be implemented as defined in DSP0200.

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

Table 9 – Operations: CIM_AssociatedAlarm

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

8.5 CIM_AlarmDevice

Table 10 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 10, all operations in the default list in 8.3 shall be implemented as defined in DSP0200.

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

Table 10 – Operations: CIM_AlarmDevice

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

8.6 CIM_AlarmDeviceCapabilities

Table 11 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 11, all operations in the default list in 8.3 shall be implemented as defined in DSP0200.

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

355 **Table 11 - Operations: CIM_AlarmDeviceCapabilities**

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

356 ## 8.7 CIM_SystemDevice

357 Table 12 lists implementation requirements for operations. If implemented, these operations shall be
358 implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 12, all operations
359 in the default list in 8.3 shall be implemented as defined in DSP0200.

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

361 **Table 12 – Operations: CIM_SystemDevice**

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

362 # 9 Use Cases

363 This section contains object diagrams and use cases for the *Alarm Device Profile*.

364 ## 9.1 Object Diagrams

365 Figure 2 represents a possible instantiation of the *Alarm Device Profile*. In this instantiation, an
366 AlarmDevice instance, alarm1, is associated with a computer system, system1. The physical package
367 information for alarm1 is represented as well. capabilities1 represents the possible state management.

368 Because alarm1 does not have the CIM_AssociatedAlarm association reference, alarm1 works on behalf
369 of system1, which is denoted by the CIM_SystemDevice association. system1 is also the scoping
370 instance for alarm1. Thus, following the CIM_ElementConformsToProfile association to profile1 and then
371 the referenced CIM_ReferencedProfile association to a CIM_RegisteredProfile instance with the
372 RegisteredName property set to “Alarm Device”, the client can retrieve profile2. profile2 shows the version
373 of the current Alarm Device Profile implementation.

374 For simplicity, the prefix CIM_ has been removed from the class names in the figure.

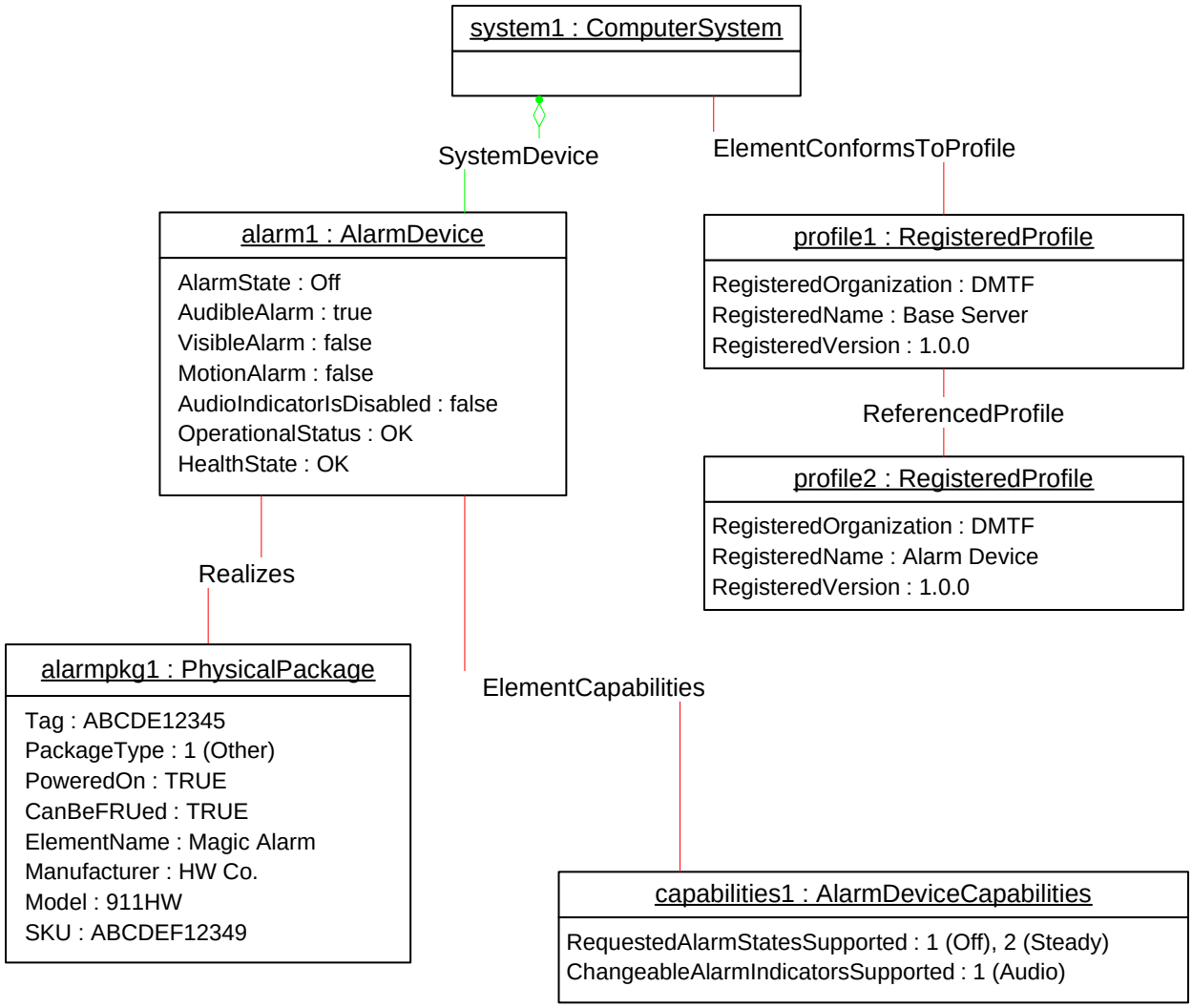

Figure 2 – Instance Diagram 1

Figure 3 represents a possible instantiation of the *Alarm Device Profile*. In this instantiation, an alarm device instance, alarm1, is a system device of system1. The CIM_AssociatedAlarm association can be followed to the port controller, port1. alarm1 thus works on behalf of the port controller.

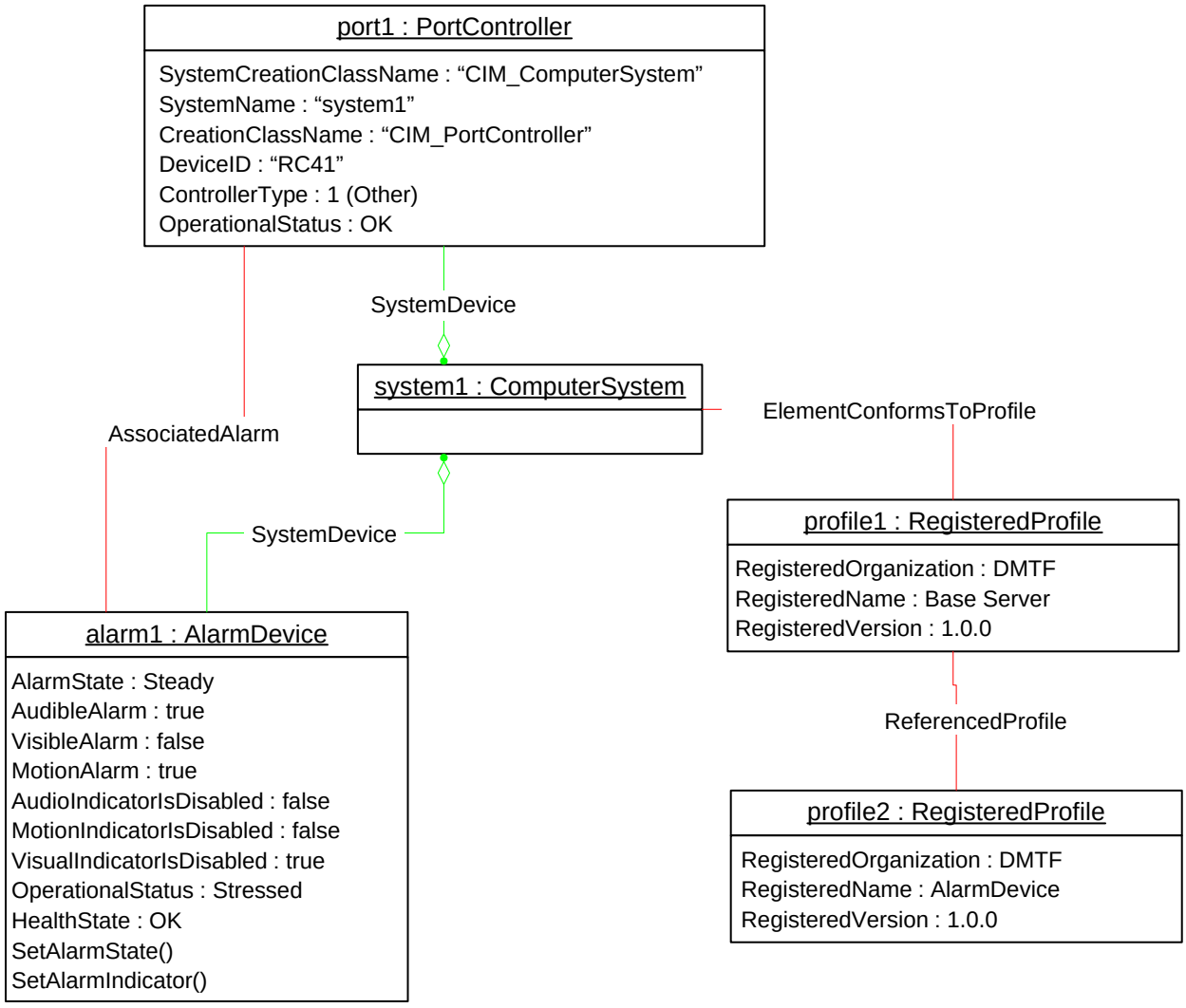

Figure 3 – Instance Diagram 2

9.2 Change the Alarm State

A client can change the alarm state as follows:

1) Find the instance of CIM_AlarmDeviceCapabilities that is associated with the instance of CIM_AlarmDevice through an instance of CIM_ElementCapabilities. If the instance is not found, the alarm state cannot be changed.

2) Retrieve the value of the CIM_ AlarmDeviceCapabilities.RequestedAlarmStatesSupported property. If the property is a non-empty array, execute the SetAlarmState( ) method with the value of the RequestedAlarmState parameter set to a value listed in the array. This operation will begin a change of state for the alarm represented by this instance.

9.3 Change an Alarm Indicator

A client can change an alarm indicator as follows:

1) Find the instance of CIM_AlarmDeviceCapabilities that is associated with the instance of CIM_AlarmDevice through an instance of CIM_ElementCapabilities. If the instance is not found, the alarm state cannot be changed.

2) Retrieve the value of the CIM_AlarmDeviceCapabilities.RequestedAlarmIndicatorStatesSupported property. If the property is a non-empty array, query the array to determine which alarm indicators may be managed for state.

3) Execute the SetAlarmIndicator( ) method with a parameter corresponding to a supported indicator. The parameter value may be set to enable or disable the indicator.

10 CIM Elements

Table 13 shows the instances of CIM Elements for this profile. Instances of these CIM Elements shall be implemented as described in Table 13.

Table 13 – CIM Elements: Alarm Device Profile

Element Name	Requirement	Description
Classes		
CIM_AlarmDevice	Mandatory	See 10.1.
CIM_AlarmDeviceCapabilities	Optional	See 10.2.
CIM_AssociatedAlarm	Conditional	See 10.3.
CIM_RegisteredProfile	Mandatory	See 10.4.
CIM_SystemDevice	Mandatory	See 0.

10.1 CIM_AlarmDevice

CIM_AlarmDevice is used to represent the alarm device. Table 14 contains the requirements for elements of this class.

Table 14 – CIM_AlarmDevice

Properties	Requirement	Description
SystemCreationClassName	Mandatory	**Key**
SystemName	Mandatory	**Key**
CreationClassName	Mandatory	**Key**
DeviceID	Mandatory	**Key**
AudibleAlarm	Mandatory	None
VisibleAlarm	Mandatory	None
MotionAlarm	Mandatory	None
AudioIndicatorIsDisabled	Conditional	See 7.4.
VisualIndicatorIsDisabled	Conditional	See 7.4.
MotionIndicatorIsDisabled	Conditional	See 7.4.

Properties	Requirement	Description
AlarmState	Mandatory	See 7.2.
OperationalStatus	Mandatory	None
HealthState	Mandatory	None
ElementName	Mandatory	See 7.6.
RequestedState	Mandatory	See 7.3.

10.2 CIM_AlarmDeviceCapabilities

CIM_AlarmDeviceCapabilities represents the capabilities of an alarm device. Table 15 contains the requirements for elements of this class.

Table 15 – Class: CIM_AlarmDeviceCapabilities

Properties	Requirement	Description
InstanceID	Mandatory	**Key**
RequestedAlarmStatesSupported	Mandatory	See 7.7.1.1.
ChangeableAlarmIndicatorsSupported	Mandatory	See 7.7.1.2.

10.3 CIM_AssociatedAlarm

The CIM_AssociatedAlarm class is used to associate an instance of CIM_AlarmDevice with a device represented by an instance of the CIM_LogicalDevice subclass that uses or requires the alarm. Table 16 contains the requirements for elements of this class.

Table 16 – Class: CIM_AssociatedAlarm

Properties	Requirement	Description
Antecedent	Mandatory	**Key** This property shall be a reference to CIM_AlarmDevice. Cardinality 1..*
Dependent	Mandatory	**Key** This property shall reference the instance of a subclass of CIM_LogicalDevice that represents the device that uses or requires the alarm. Cardinality *

10.4 CIM_ElementCapabilities

The CIM_ElementCapabilities class is used to associate an instance of CIM_AlarmDeviceCapabilities with an instance of CIM_AlarmDevice. Table 17 contains the requirements for elements of this class.

Table 17 – Class: CIM_ElementCapabilities

Properties	Requirement	Notes
ManagedElement	Mandatory	**Key** This property shall be a reference to CIM_AlarmDevice. Cardinality 1..*
Capabilities	Mandatory	**Key** This property shall be a reference to the CIM_AlarmDeviceCapabilities instance. Cardinality 1

10.5 CIM_RegisteredProfile

The CIM_RegisteredProfile class is defined by the *Profile Registration Profile*. The requirements denoted in Table 18 are in addition to those mandated by the *Profile Registration Profile*.

Table 18 – Class: CIM_RegisteredProfile

Properties	Requirement	Notes
RegisteredName	Mandatory	Matches "Alarm Device"
RegisteredVersion	Mandatory	Matches "1.0.0"
RegisteredOrganization	Mandatory	Shall contain 2 (DMTF)

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

10.6 CIM_SystemDevice

The CIM_SystemDevice class is used to associate an instance of CIM_AlarmDevice with the instance of CIM_ComputerSystem of which the CIM_AlarmDevice instance is a member. Table 19 contains the requirements for elements of this class.

Table 19 – Class: CIM_SystemDevice

Properties	Requirement	Description
GroupComponent	Mandatory	**Key** This property shall be a reference to the CIM_ComputerSystem instance of which the CIM_ AlarmDevice instance is a member. Cardinality 1
PartComponent	Mandatory	**Key** This property shall be a reference to CIM_AlarmDevice. Cardinality 1..*

ANNEX A
(informative)
Change Log

Version	Date	Description
1.0.0a	01/17/2007	Preliminary Standard
1.0.0	06-22-2009	DMTF Standard Release