Document Number: DSP1020

Date: 2009-06-16

Version: 1.0.0

Pass-Through Module Profile

Document Type: Specification

Document Status: DMTF Standard

Document Language: E

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Foreword

The *Pass-Through Module Profile* (DSP1020) was prepared by the Server Management Working Group and the Physical Platform Profiles Working Group.

DMTF is a not-for-profit association of industry members dedicated to promoting enterprise and systems management and interoperability.

Acknowledgments

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Introduction

The information in this specification should be sufficient for a provider or consumer of this data to identify unambiguously the classes, properties, methods, and values that shall be instantiated and manipulated to represent and manage a pass-through module of a modular system that is 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 that represent the component described in this document.

Pass-Through Module Profile

1 Scope

The *Pass-Through Module Profile* is a component profile for modeling pass-through modules of modular systems. A pass-through module acts as a conduit for network connectivity for components within a modular system without performing any higher order network protocol function.

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 2.3,*
http://www.dmtf.org/standards/published_documents/DSP0004_2.3.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
can
used for statements of possibility and capability, whether material, physical, or causal

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

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

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

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

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

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

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

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

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

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

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

4 Symbols and Abbreviated Terms

The following symbols and abbreviations are used in this document.

4.1
CIM
Common Information Model

5 Synopsis

Profile Name: Pass-Through Module

Version: 1.0.0

Organization: DMTF

CIM Schema Version: 2.22

Central Class: CIM_PassThroughModule

Scoping Class: CIM_ComputerSystem

The *Pass-Through Module Profile* extends management capability to include support for pass-through modules of modular systems.

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

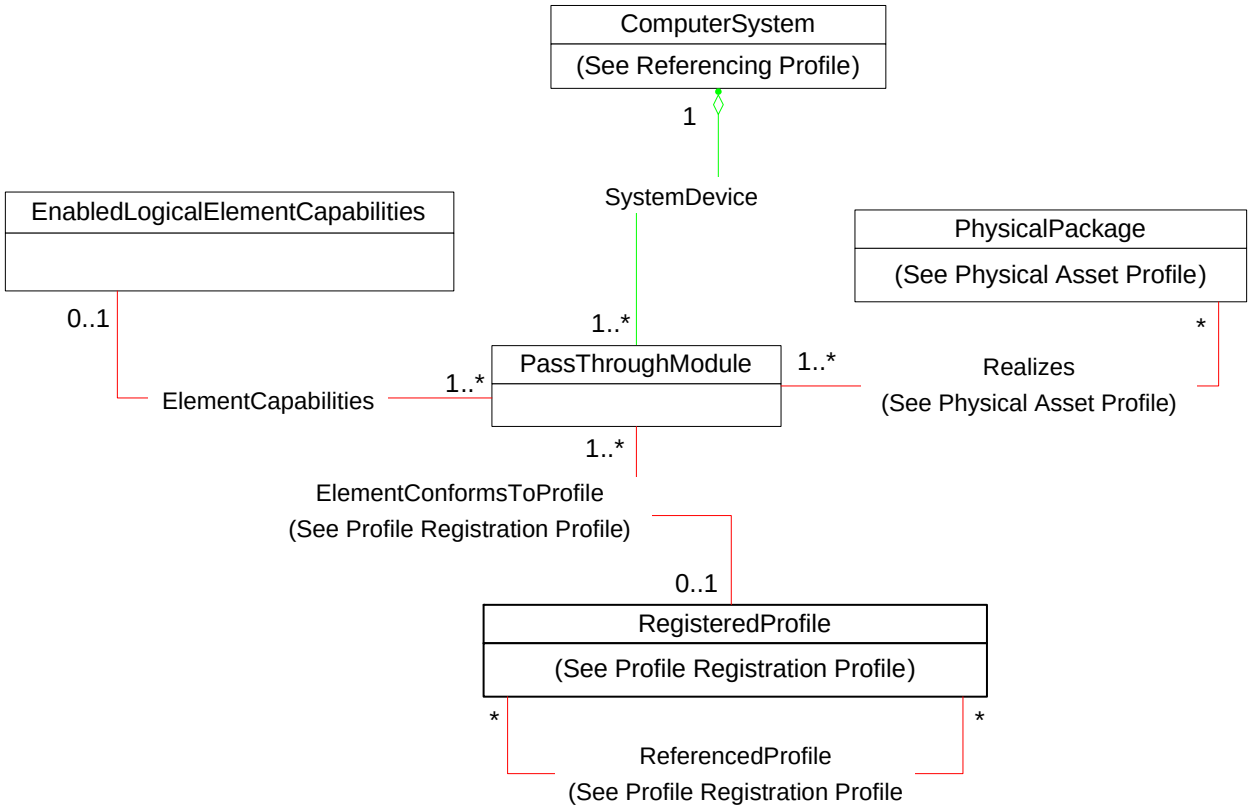
Table 1 – Referenced Profiles

Profile Name	Organization	Version	Description
Profile Registration	DMTF	1.0	Mandatory
Physical Asset	DMTF	1.0	Optional

6 Description

The *Pass-Through Module Profile* describes pass-through modules of modular systems. A pass-through module is a device that is a replacement for physical cables and allows internal network physical ports in a chassis or rack to be accessible from the external network. A pass-through module may be a fixed internal-port-to-external-port relationship or a configurable mapping of internal ports to output ports through a cross-point switching function.

205 Figure 1 represents the class schema for the *Pass-Through Module Profile*. For simplicity, the prefix CIM_
206 has been removed from the names of the classes.



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208 **Figure 1 – Pass-Through Module Profile: Class Diagram**

209 # 7 Implementation Requirements

210 This section details the requirements related to the arrangement of instances and their properties for
211 implementations of this profile. Required methods are listed in section 8, and properties are listed in
212 section 10.

213 ## 7.1 CIM_PassThroughModule

214 An instance of CIM_PassThroughModule shall represent the pass-through module.

215 ### 7.1.1 Pass-Through Module State Management Is Supported—Conditional

216 When management of the state of a pass-through module is supported, exactly one instance of
217 CIM_EnabledLogicalElementCapabilities shall be associated with the CIM_PassThroughModule instance
218 through an instance of CIM_ElementCapabilities.

219 Support for managing the state of the pass-through module is optional behavior. This section describes
220 the CIM elements and behaviors that shall be implemented when this behavior is supported.

7.1.1.1 CIM_EnabledLogicalElementCapabilities

When state management is supported, exactly one instance of CIM_EnabledLogicalElement capabilities shall be associated with the CIM_PassThroughModule instance through an instance of the CIM_ElementCapabilities association.

7.1.1.1.1 CIM_EnabledLogicalElementCapabilities.RequestedStatesSupported

The RequestedStatesSupported property may contain zero or more of the following values: 2 (Enabled), 3 (Disabled), or 11 (Reset).

7.1.1.2 CIM_PassThroughModule.RequestedState

When the CIM_PassThroughModule.RequestStateChange( ) method is successfully invoked, the value of the RequestedState property shall be the value of the RequestedState parameter. If the method is not successfully invoked, the value of the RequestedState property is indeterminate.

The CIM_PassThroughModule.RequestedState property shall have one of the values specified in the CIM_EnabledLogicalElementCapabilities.RequestedStatesSupported property or 5 (No Change).

7.1.1.3 CIM_PassThroughModule.EnabledState

When the RequestedState parameter has a value of 2 (Enabled) or 3 (Disabled) and the CIM_PassThroughModule.RequestStateChange( ) method completes successfully, the value of the EnabledState property shall equal the value of the CIM_PassThroughModule.RequestedState property.

If the method does not complete successfully, the value of the EnabledState property is indeterminate.

The EnabledState property shall have the value 2 (Enabled), 3 (Disabled), or 5 (Not Applicable).

7.1.2 Pass-Through Module State Management Is Not Supported

This section describes the CIM elements and behaviors that shall be implemented when management of the Pass-Through Module state is not supported.

7.1.2.1 CIM_EnabledLogicalElementCapabilities

When state management is not supported, exactly one instance of CIM_EnabledLogicalElementCapabilities may be associated with the CIM_PassThroughModule instance through an instance of the CIM_ElementCapabilities association.

7.1.2.1.1 CIM_EnabledLogicalElementCapabilities.RequestedStatesSupported

The CIM_EnabledLogicalElementCapabilities.RequestedStatesSupported property shall not contain any values.

7.1.2.2 CIM_PassThroughModule.RequestedState

The RequestedState property shall have the value 12 (Not Applicable).

7.1.2.3 CIM_PassThroughModule.EnabledState

The EnabledState property shall have one of the following values: 2 (Enabled), 3 (Disabled), or 5 (Not Applicable).

7.1.3 Modifying ElementName Is Supported—Conditional

The CIM_PassThroughModule.ElementName property may support being modified by the ModifyInstance operation. See section 8.6.1.1. This behavior is conditional. This section describes the CIM elements and behavior requirements when an implementation supports client modification of the CIM_PassThroughModule.ElementName property.

7.1.3.1 CIM_EnabledLogicalElementCapabilities

An instance of CIM_EnabledLogicalElementCapabilities shall be associated with the CIM_PassThroughModule instance through an instance of CIM_ElementCapabilities.

7.1.3.1.1 CIM_EnabledLogicalElementCapabilities.ElementNameEditSupported

The ElementNameEditSupported property shall have a value of TRUE when the implementation supports client modification of the CIM_PassThroughModule.ElementName property.

7.1.3.1.2 CIM_EnabledLogicalElement.MaxElementNameLen

The MaxElementNameLen property shall be implemented.

7.1.4 Modifying ElementName Is Not Supported

This section describes the CIM elements and behaviors that shall be implemented when the CIM_PassThroughModule.ElementName property does not support being modified by the ModifyInstance operation.

7.1.4.1 CIM_EnabledLogicalElementCapabilities

An instance of CIM_EnabledLogicalElementCapabilities may be associated with the CIM_PassThroughModule instance through an instance of CIM_ElementCapabilities.

7.1.4.1.1 CIM_EnabledLogicalElementCapabilities.ElementNameEditSupported

The ElementNameEditSupported property shall have a value of FALSE when the implementation does not support client modification of the CIM_PassThroughModule.ElementName property.

7.1.4.1.2 CIM_EnabledLogicalElement.MaxElementNameLen

The MaxElementNameLen property may be implemented. The MaxElementNameLen property is irrelevant in this context.

7.2 Management of Port Assignments

An implementation may support management of port assignments.

7.2.1 CIM_PassThroughModule.IsProgrammable

When an implementation supports management of port assignments, the IsProgrammable property of the CIM_PassThroughModule instance shall have a value of TRUE.

7.2.2 Mapping Ports through the AssignPorts Method

Support for mapping ports on the CIM_PassThroughModule instance through the AssignPorts( ) method is conditional behavior. When the IsProgrammable property has a value of TRUE, the AssignPorts( ) method shall be implemented and shall be supported.

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_PassThroughModule.AssignPorts()

Invocation of the CIM_PassThroughModule.AssignPorts( ) method creates a mapping or removes a mapping between an internal and external port pair.

Detailed requirements of the AssignPorts( ) method are specified in Table 2 and Table 3.

No standard messages are defined.

Table 2 – CIM_PassThroughModule.AssignPorts( ) Method: Return Code Values

Value	Description
0	Request was successfully executed.
1	Method is unsupported.
2	Error occurred

Table 3 – CIM_PassThroughModule.AssignPorts( ) Method: Parameters

Qualifiers	Name	Type	Description/Values
IN	Mapped	Boolean	If TRUE, the ports will be mapped to each other. If FALSE, the ports will be unmapped from each other.
IN	InternalPort	uint16	Identifies the internal port to be mapped
IN	ExternalPort	uint16	Identifies the external port to be mapped

8.2 Method: CIM_PassThroughModule.RequestStateChange()

Invocation of the CIM_PassThroughModule.RequestStateChange( ) method changes the element's state to the value specified in the RequestedState parameter. The 2 (Enabled) and 3 (Disabled) values of the RequestedState parameter shall correspond to enabling or disabling the module represented by the instance of CIM_PassThroughModule on or off accordingly.

See section 7.1.1.2 for information about the effect of this method on the RequestedState property.

The method shall be considered successful if the availability of the module upon completion of the method corresponds to the desired availability indicated by the RequestedState parameter. An actual change in state is not necessary for the method to be considered successful as long as the resultant state is equal to the requested state. Upon successful completion of the method, the Return Value shall be 0 (zero).

See section 7.1.2.3 for information about the effect of this method on the EnabledState property.

Detailed requirements of the RequestStateChange( ) method are specified in Table 4 and Table 5.

No standard messages are defined.

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

316 **Table 4 – CIM_PassThroughModule.RequestStateChange( ) Method: Return Code Values**

Value	Description
0	Request was successfully executed.
2	Error occurred
0x1000	Job started: REF returned to started CIM_ConcreteJob

317 **Table 5 – CIM_PassThroughModule.RequestStateChange( ) Method: Parameters**

Qualifiers	Name	Type	Description/Values
IN, REQ	RequestedState	uint16	Valid state values: 2 (Enabled) 3 (Disabled)) 11 (Reset)
OUT	Job	CIM_ConcreteJob REF	Returned if job started
IN, REQ	TimeoutPeriod	datetime	Client specified maximum amount of time the transition to a new state is supposed to take: 0 or NULL – No time requirements <interval> – Maximum time allowed

318 8.3 Profile Conventions for Operations

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

321 The default list of operations is as follows:

322 • GetInstance

323 • Associators

324 • AssociatorNames

325 • References

326 • ReferenceNames

327 • EnumerateInstances

328 • EnumerateInstanceNames

329 8.4 CIM_ElementCapabilities

330 Table 6 lists implementation requirements for operations. If implemented, these operations shall be
331 implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 6, all operations in
332 the default list in 8.3 shall be implemented as defined in DSP0200.

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

334 **Table 6 – Operations: CIM_ElementCapabilities**

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

335 ## 8.5 CIM_EnabledLogicalElementCapabilities

336 All operations in the default list in 8.3 shall be implemented as defined in DSP0200.

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

338 ## 8.6 CIM_PassThroughModule

339 Table 7 lists implementation requirements for operations. If implemented, these operations shall be
340 implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 7, all operations in
341 the default list in 8.3 shall be implemented as defined in DSP0200.

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

343 **Table 7 – Operations: CIM_PassThroughModule**

Operation	Requirement	Messages
ModifyInstance	Optional. See section 8.6.1.	None

344 ### 8.6.1 CIM_PassThroughModule—ModifyInstance Operation

345 This section details the specific requirements for the ModifyInstance operation that is applied to an
346 instance of CIM_PassThroughModule.

347 #### 8.6.1.1 CIM_PassThroughModule.ElementName Property

348 When an instance of CIM_EnabledLogicalElementCapabilities is associated with the
349 CIM_PassThroughModule instance and the
350 CIM_EnabledLogicalElementCapabilities.ElementNameEditSupported property has a value of TRUE, the
351 implementation shall allow the ModifyInstance operation to change the value of the ElementName
352 property of the CIM_PassThroughModule instance. The ModifyInstance operation shall enforce the length
353 restriction specified in the MaxElementNameLen property of the CIM_EnabledLogicalElementCapabilities
354 instance.

355 When an instance of CIM_EnabledLogicalElementCapabilities is not associated with the
356 CIM_PassThroughModule instance, or the ElementNameEditSupported property of the
357 CIM_EnabledLogicalElementCapabilities has a value of FALSE, the implementation shall not allow the
358 ModifyInstance operation to change the value of the ElementName property of the
359 CIM_PassThroughModule instance.

360 ## 8.7 CIM_SystemDevice

361 Table 8 lists implementation requirements for operations. If implemented, these operations shall be
362 implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 8, all operations in
363 the default list in 8.3 shall be implemented as defined in DSP0200.

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

365 **Table 8 – Operations: CIM_SystemDevice**

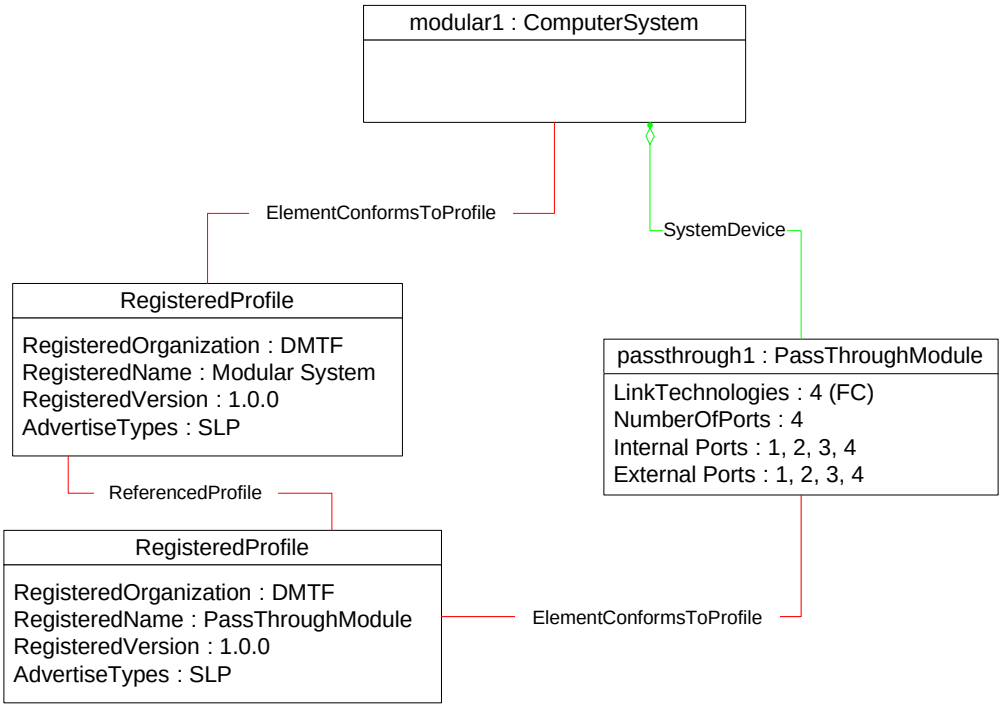
Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

366 # 9 Use Cases

367 This section outlines the use cases specific to pass-through modules. Use cases for functionality that is
368 not specific to modular systems are documented in the profiles for that functionality. Use cases are
369 informative and not intended to define the requirements for conformance.

370 ## 9.1 Object Diagrams

371 The object diagram in Figure 2 illustrates a single pass-through module installed in a modular system.
372 *passthrough1* is conformant with the *Pass-Through Module Profile* as indicated by the
373 CIM_ElementConformsToProfile association that references the instance. This instance of
374 CIM_PassThroughModule represents a four-port, fiber-channel pass-through module. The internal and
375 external ports are directly mapped, as indicated by the corresponding array positions for each internal
376 and external port index.



377

378 **Figure 2 – Instance Diagram**

379 The object diagram in Figure 3 illustrates a single pass-through module installed in a modular system.
380 *passthrough1* is a four-port, fiber-channel pass-through module. Internal port 1 is mapped to external port
381 3. Internal port 3 is mapped to external port 4. Internal ports 2 and 4 and external ports 1 and 2 are not
382 mapped.

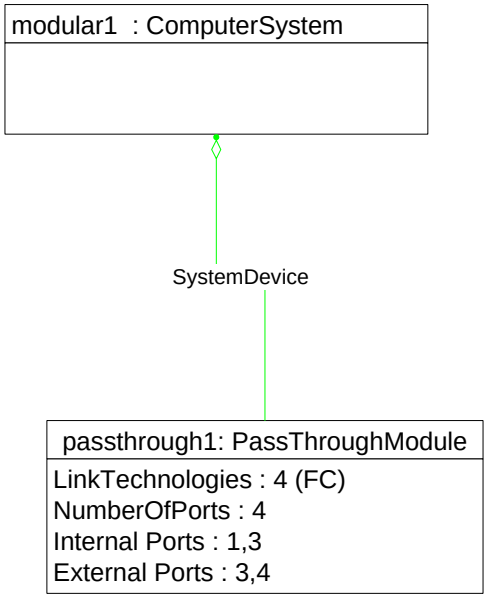


Figure 3 – Port Mappings Crossed

9.2 Determine Pass-Through Module Link Technology

A client can determine the link technology or technologies supported by a pass-through module by querying the value of the CIM_PassThroughModule.LinkTechnologies property.

9.3 Determine Pass-Through Module Port Mappings

A client can determine which internal ports are mapped to which external ports as follows:

1) Query the value of the CIM_PassThroughModule.InternalPorts property.
2) Query the value of the CIM_PassThroughModule.ExternalPorts property.
3) Compare the corresponding array indices of each property.

The port number at array index *x* of the InternalPorts property will be mapped to the port number at array index *x* of the ExternalPorts property.

9.4 Determine Whether Port Mappings Are Configurable

A client can determine whether port mappings are configurable by querying the value of the IsProgrammable property of the CIM_PassThroughModule instance. A value of TRUE indicates that the ports are configurable and the AssignPorts( ) method will be supported.

9.5 Manage Port Mappings on a Pass-Through Module

A client can manage the port mappings on an instance of CIM_PassThroughModule as follows:

1) Verify that port mappings are configurable as described in section 9.4.
2) If port mappings are configurable, invoke the AssignPorts( ) method with the target internal port, external port, and a flag that indicates whether the ports should be mapped or unmapped from each other.

9.6 Determining If ElementName Can Be Modified

For a given instance of CIM_PassThroughModule, a client can determine whether it can modify the ElementName as follows:

1) Find the CIM_EnabledLogicalElementCapabilities instance that is associated with the target instance.
2) Query the value of the ElementNameEditSupported property of the CIM_EnabledLogicalElementCapabilities instance. If the value is TRUE, the client can modify the ElementName property of the target instance.

9.7 Determining If State Management Is Supported

For a given instance of CIM_PassThroughModule, a client can determine whether state management is supported as follows:

1) Find the CIM_EnabledLogicalElementCapabilities instance that is associated with the target instance.
2) Query the value of the RequestedStatesSupported property. If at least one value is specified, state management is supported.

10 CIM Elements

Table 9 shows the instances of CIM Elements for this profile. Instances of the CIM Elements shall be implemented as described in Table 9. Sections 7 ("Implementation Requirements") and 8 ("Methods") may impose additional requirements on these elements.

Table 9 – Required CIM Elements: Pass-Through Module Profile

Element Name	Requirement	Notes
Classes		
CIM_ElementCapabilities	Conditional	See section 10.1.
CIM_EnabledLogicalElementCapabilities	Optional	See section 10.2.
CIM_PassThroughModule	Mandatory	See section 10.3.
CIM_RegisteredProfile	Mandatory	See section 10.4.
CIM_SystemDevice	Mandatory	See section 0.
Indications		
None defined in this profile		

10.1 CIM_ElementCapabilities

CIM_ElementCapabilities is used to associate CIM_PassThroughModule with the instance of CIM_EnabledLogicalElementCapabilities that describes the capabilities of the pass-through module. CIM_ElementCapabilities is conditional on the instantiation of CIM_EnabledLogicalElementCapabilities.

Table 10 provides information about the properties of CIM_ElementCapabilities.

Table 10 – Class: CIM_ElementCapabilities

Properties	Requirement	Notes
ManagedElement	Mandatory	Shall reference the Central Instance Cardinality 1..*
Capabilities	Mandatory	Shall reference the instance of CIM_EnabledLogicalElementCapabilities Cardinality 0..1

10.2 CIM_EnabledLogicalElementCapabilities

CIM_EnabledLogicalElementCapabilities represents the capabilities of the pass-through module. Table 11 provides information about the properties of CIM_EnabledLogicalElementCapabilities.

Table 11 – Class: CIM_EnabledLogicalElementCapabilities

Properties	Requirement	Notes
InstanceID	Mandatory	None
RequestedStatesSupported	Mandatory	See sections 7.1.1.1.1 and 7.1.2.1.1.
ElementNameEditSupported	Mandatory	See sections 7.1.3.1.1 and 7.1.4.1.1.
MaxElementNameLen	Conditional	See sections 7.1.3.1.2 and 7.1.4.1.2.

10.3 CIM_PassThroughModule

CIM_PassThroughModule represents a pass-through module. Table 12 provides information about the properties of CIM_PassThroughModule.

Table 12 – Class: CIM_PassThroughModule

Properties and Methods	Requirement	Notes
LinkTechnologies	Mandatory	None
OtherLinkTechnologies	Conditional	When an array index of LinkTechnologies contains the value “Other”, the same array index of this property shall contain a value that identifies the link technology.
Is Programmable	Mandatory	None
NumberOfPorts	Mandatory	None
InternalPorts	Mandatory	None
ExternalPorts	Mandatory	None
SystemCreationClassName	Mandatory	None
SystemName	Mandatory	None
CreationClassName	Mandatory	None
DeviceID	Mandatory	None
EnabledState	Mandatory	See sections 7.1.1.3 and 7.1.2.3.
RequestedState	Mandatory	See sections 7.1.1.2 and 7.1.2.2.
RequestStateChange()	Conditional	See section 8.2.
AssignPorts()	Conditional	See sections 7.2 and 8.1.

10.4 CIM_RegisteredProfile

CIM_RegisteredProfile identifies the *Pass-Through Module Profile* in order for a client to determine whether an instance of CIM_ComputerSystem is conformant with this profile. The CIM_RegisteredProfile class is defined by the *Profile Registration Profile*. With the exception of the mandatory values specified for the properties in Table 13, the behavior of the CIM_RegisteredProfile instance is in accordance with the constraints specified in the *Profile Registration Profile*.

Table 13 – Class: CIM_RegisteredProfile

Properties	Requirement	Notes
RegisteredName	Mandatory	This property shall have a value of "Pass-Through Module”.
RegisteredVersion	Mandatory	This property shall have a value of "1.0.0".
RegisteredOrganization	Mandatory	This property shall have a value of 2 (DMTF).

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

10.5 CIM_SystemDevice

CIM_SystemDevice is used to associate an instance of CIM_PassThroughModule with an instance of CIM_ComputerSystem that represents a modular enclosure. Table 14 provides information about the properties of CIM_SystemDevice.

Table 14 – Class: CIM_SystemDevice

Properties	Requirement	Notes
GroupComponent	Mandatory	This property shall be a reference to the Scoping Instance. Cardinality 1
PartComponent	Mandatory	This property shall be a reference to the Central Instance. Cardinality 1..*

ANNEX A
(informative)

Change Log

Version	Date	Description
1.0.0	6/16/2009	DMTF Standard Release