Virtual Ethernet Switch Profile
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Foreword

This profile — the Virtual Ethernet Switch Profile (DSP1097) — was prepared by the System Virtualization, Partitioning and Clustering Working Group of the DMTF.

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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 the components described in this document. The target audience for this specification is implementers who are writing CIM-based providers or consumers of management interfaces that represent the components described in this document.
Virtual Ethernet Switch Profile

1 Scope

This profile — the Virtual Ethernet Switch Profile — is an autonomous DMTF management profile that defines the minimum object model needed to provide for the inspection of a virtualization system’s internal Ethernet switch and its components.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated or versioned references, only the edition cited (including any corrigenda or DMTF update versions) applies. For references without a date or version, the latest published edition of the referenced document (including any corrigenda or DMTF update versions) applies.


DMTF DSP1014, Ethernet Port Profile 1.0, http://www.dmtf.org/standards/published_documents/DSP1014_1.0.pdf

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


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

3 Terms and definitions

In this document, some terms have a specific meaning beyond the normal English meaning. Those terms are defined in this clause.

The terms "shall" ("required"), "shall not," "should" ("recommended"), "should not" ("not recommended"), "may," "need not" ("not required"), "can" and "cannot" in this document are to be interpreted as described in ISO/IEC Directives, Part 2, Annex H. The terms in parenthesis are alternatives for the preceding term, for use in exceptional cases when the preceding term cannot be used for linguistic reasons. Note that ISO/IEC Directives, Part 2, Annex H specifies additional alternatives. Occurrences of such additional alternatives shall be interpreted in their normal English meaning.

The terms "clause," "subclause," "paragraph," and "annex" in this document are to be interpreted as described in ISO/IEC Directives, Part 2, Clause 5.

The terms "normative" and "informative" in this document are to be interpreted as described in ISO/IEC Directives, Part 2, Clause 3. In this document, clauses, subclauses, or annexes labeled "(informative)" do not contain normative content. Notes and examples are always informative elements.

The terms defined in DSP0004, DSP0200, and DSP1001 apply to this document. The following additional terms are used in this document.

3.1 client

an application that exploits facilities specified by this profile

3.2 implementation

a set of CIM providers that realize the classes specified by this profile

3.3 virtualization platform

virtualizing infrastructure provided by a host system that enables the deployment of virtual systems

4 Symbols and abbreviated terms

The abbreviations defined in DSP0004, DSP0200, and DSP1001 apply to this document. The following additional abbreviations are used in this document.

4.1 CIM

Common Information Model

4.2 CIMOM

CIM object manager
5 Synopsis

Profile Name: Virtual Ethernet Switch
Version: 1.0.0
Organization: DMTF
CIM Schema Version: 2.26
Central Class: CIM_ComputerSystem
Scoping Class: CIM_ComputerSystem

This profile is an autonomous profile that defines the minimum object model needed to provide for the inspection of a virtual Ethernet switch and its components.

The instance of the CIM_ComputerSystem class representing a virtual Ethernet switch shall be the central instance and the scoping instance of this profile.

Table 1 lists DMTF management profiles on which this profile depends.

<table>
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<tr>
<th>Profile Name</th>
<th>Organization</th>
<th>Version</th>
<th>Relationship</th>
<th>Description</th>
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<td>Profile Registration</td>
<td>DMTF</td>
<td>1.0</td>
<td>Mandatory</td>
<td>The profile that specifies registered profiles</td>
</tr>
<tr>
<td>Virtual System</td>
<td>DMTF</td>
<td>1.0</td>
<td>Specializes</td>
<td>The autonomous profile that specifies the minimum object model needed to define a virtual system</td>
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6 Description

This profile specializes the autonomous Virtual System Profile. This profile defines the minimum top-level object model needed to define a virtualization system’s internal Ethernet switch. The primary design objective applied by this profile is that a virtual Ethernet switch and its components appear to a client as a hosted virtual system with dedicated switch functionality. Typical management tasks such as enumerating, analyzing, controlling, or configuring an Ethernet switch should be enabled without requiring the client to understand specific aspects of an Ethernet switch.

6.1 DMTF management profile relationships

This profile is complementary to the Virtual System Profile, which it specializes, and to the System Virtualization Profile:

- The Virtual Ethernet Switch Profile focuses on specializing the use of the components specified in the Virtual System Profile to model the internal Ethernet Switches that are typically used to provide Ethernet connectivity within and outside of the virtualization platform.
- The Virtual System Profile focuses on virtualization aspects that relate to virtual systems and their virtual resources, such as modeling the structure of virtual systems and their resources. The profile introduces the concept of virtual system configurations allowing the inspection of virtual system configuration and state information.
- The System Virtualization Profile focuses on virtualization aspects that relate to host systems and their resources, such as modeling the relationships between host resources and virtual resources. Further, it addresses virtualization-specific tasks such as the creation or modification of virtual Ethernet switches and their configurations.

Figure 1 shows a structure of DMTF management profiles. For example, an implementation that instruments a virtualization platform may implement some of the following DMTF management profiles:

- The Virtual Ethernet Switch Profile enables the inspection and basic operations on a virtual Ethernet Switch.
- The Virtual System Profile enables the inspection of and basic operations on virtual systems.
- The System Virtualization Profile enables the inspection of host systems, their capabilities, and their services for creation and manipulation of virtual systems, including virtual Ethernet switches.

Resource-type-specific profiles enable the inspection and operation of resources for one particular resource type. They apply to both virtual and host resources; they do not cover virtualization-specific aspects of resources. A client may exploit resource-type-specific management profiles for the inspection and manipulation of virtual and host resources in a similar manner.

- The Ethernet Port Resource Virtualization Profile is a specific resource allocation profile that enables the inspection and operation of resources for the two virtualization-specific uses of the CIM_EthernetPort class and the simple resource allocation used for the connection between an Ethernet adapter and an Ethernet switch port. This profile specializes the abstract Resource Allocation Profile and the abstract Allocation Capabilities Profile and is scoped by the System Virtualization Profile. A client may exploit this resource allocation profile to inspect all of the following:
  - the allocation of virtual Ethernet adapters and virtual Ethernet switch ports
  - the connection of an Ethernet adapter (virtual or physical) to a virtual Ethernet switch port
  - the allocation dependencies that the virtual resources have on host resources and resource pools
  - the capabilities describing possible values for the resource allocations
the capabilities describing the mutability of the resource allocations

**Figure 1 – DMTF Management profiles related to the virtual Ethernet switch**

### 6.2 Virtual Ethernet switch class schema

Figure 2 shows the class schema of this profile. It outlines the elements that are owned or specialized by this profile, as well as the dependency relationships between elements of this profile and other profiles. For simplicity in diagrams, the CIM_ prefix has been removed from class and association names.

The *Computer System Profile* references additional classes in its class diagram that outline relationships with certain resources, services, and protocol endpoints. The *Virtual Ethernet Switch Profile* provides no specialization of these dependencies. For that reason they are not shown in the class diagram. For details, refer to the *Computer System Profile* and to the component profiles referenced there.
This profile specifies the use of the following classes and associations:

- the CIM_ComputerSystem class to represent a virtual Ethernet switch
- the CIM_RegProfile class and the CIM_ElementConformsToProfile association to model conformance with this profile
- The CIM_NetworkVLAN class represents a collection of VLAN endpoints that are members of the same VLAN.
- The CIM_LANEndpoint class represents the Ethernet communication endpoint of the CIM_EthernetPort that that represents an Ethernet switch port.
- The CIM_VLANEndpoint class represents an endpoint on a virtual Ethernet switch which is assigned to a given VLAN or accepts traffic from one or more VLANs.
- The CIM_VLANEndpointSettingData class represents the configuration data for CIM_VLANEndpoint instances.
- The CIM_ConnectivityCollection class represents a collection of LANEndpoints that are able to communicate with each other.
- the CIM_VirtualEthernetSwitchSettingData class specializes the CIM_VirtualSwitchSettingData class that specializes the CIM_VirtualSystemSettingData class to add Ethernet switch-specific aspects of a virtual Ethernet switch.
- The CIM_SystemComponent association is used to model the relationship between the virtualization system’s host resource pool of resource type 33 (Ethernet Connection) and the Virtual Ethernet Switch represented by the CIM_ComputerSystem class to which the resource pool’s Ethernet connections can be made. Etherent Connection resource pools are used for the allocation of a connection between an Ethernet port, that is typically part of a virtual system, and an Ethernet switch port.
• The CIM_HostedCollection association is used to model the relationship of the Virtual Ethernet Switch represented by the CIM_ComputerSystem class to each CIM_NetworkVLAN instance that represents a VLAN available in the switch. It is also used to model the relationship of the host system represented by the CIM_ComputerSystem class to each CIM_ConnectivityCollection.

• the CIM_VirtualSystemSettingDataComponent association to model the aggregation of instances of the CIM_EthernetPortAllocationSettingData class to one instance of the CIM_VirtualEthernetSwitchSettingData class, forming a virtual Ethernet switch configuration

• the CIM_SettingsDefineState association to model the relationship between an instance of the CIM_ComputerSystem class representing a virtual Ethernet Switch and an instance of the CIM_VirtualEthernetSwitchSettingData class representing virtualization-specific aspects of that virtual Ethernet switch

• the CIM_ElementSettingData association to model the relationship between an element and configuration data applicable to the element

In general, any mention of a class in this document means the class itself or its subclasses. For example, a statement such as “an instance of the CIM_LogicalDevice class” implies an instance of the CIM_LogicalDevice class or a subclass of the CIM_LogicalDevice class.

6.3 Ethernet switch states and transitions

The Virtual Ethernet Switch Profile adds no specialization to the states and transitions as specified in the Virtual System Profile. Unlike the Virtual System Profile model’s requirement to match a model of a physical system, the virtual Ethernet switch model is solely intended for use in a virtualization system and does not have a defined corresponding physical system model. Thus, the need for power and enabled state transitions are minimal and most implementations will implement the minimum as described in the Virtual System Profile.

7 Implementation

This clause details the requirements related to classes and their properties for implementations of this profile. The CIM Schema descriptions for any referenced element and its sub-elements apply.

The list of all methods covered by this profile is provided in clause 8. The list of all properties covered by this profile is provided in clause 10.

In references to CIM Schema properties that enumerate values, the numeric value is normative and the descriptive text following it in parenthesis is informational. For example, in the statement “If an instance of the CIM_VirtualSystemManagementCapabilities class contains the value 3 (DestroySystemSupported) in an element of the SynchronousMethodsSupported[ ] array property”, the “value 3” is normative text and “(DestroySystemSupported)” is descriptive text.

Unless explicitly described, the text in this clause does not relax any of the implementation details described in clause 7 of the Virtual System Profile.

7.1 Virtual Ethernet switch

The CIM_ComputerSystem class shall be used to represent virtual Ethernet switches. One instance of the CIM_ComputerSystem class shall exist for each virtual Ethernet switch that is conformant to this profile, regardless of its state.

This subclause and all secondary subclauses apply to instances of the CIM_ComputerSystem class that represent virtual Ethernet switches in this profile and the virtual system in the Virtual System Profile.
7.1.1 CIM_ComputerSystem.Dedicated property
The Dedicated property shall be supported and set to match the value 38 (Ethernet Switch).

7.1.2 CIM_VirtualEthernetSwitchSettingData.VirtualSystemType
The VirtualSystemType property shall be supported and contain the value “DMTF:Virtual Ethernet Switch”.

7.1.3 CIM_VirtualEthernetSwitchSettingData.AssociatedResourcePool
The AssociatedResourcePool property shall be supported when VirtualEthernetSwitchSettingData is used as an instance in a virtual system configuration as specified in the Virtual System Profile. The property shall contain the list of host resource pools are associated with an Ethernet Switch for the purpose of the allocation of Ethernet connections between a virtual machine and an Ethernet switch.

7.1.4 CIM_NetworkVLAN.TypeOfMedia
The TypeOfMedia property shall be set to the value 3 (Ethernet).

8 Methods
This profile does not define any extrinsic methods beyond those defined or referenced in the Virtual System Profile.

8.1 Profile conventions for operations
The implementation requirements on operations for each profile class (including associations) are specified in class-specific subclauses of this clause.

The default list of operations for all classes is:
- GetInstance( )
- EnumerateInstances( )
- EnumerateInstanceNames( )

For classes that are referenced by an association, the default list also includes
- Associators( )
- AssociatorNames( )
- References( )
- ReferenceNames( )

Implementation requirements on operations defined in the default list are provided in the class-specific subclauses of this clause.

The implementation requirements for methods of classes listed in 8.1, but not addressed by a separate subclause of this clause are specified by the “Methods” clauses of respective base profiles, namely DSP1041 and DSP1043. These profiles are specialized by this profile; in these cases, this profile does not add method specifications beyond those defined in its base profiles.
8.1.1 CIM_ComputerSystem

All operations in the default list in 8.1 shall be implemented as specified by DSP0200. In addition, the requirements of the CIM schema and other prerequisite specifications (including profiles) apply.

8.1.2 CIM_NetworkVLAN

All operations in the default list in 8.1 shall be implemented as specified by DSP0200. In addition, the requirements of the CIM schema and other prerequisite specifications (including profiles) apply.

8.1.3 CIM_ConnectivityCollection

All operations in the default list in 8.1 shall be implemented as specified by DSP0200. In addition, the requirements of the CIM schema and other prerequisite specifications (including profiles) apply.

8.1.4 CIM_ElementSettingData

All operations in the default list in 8.1 shall be implemented as specified by DSP0200. In addition, the requirements of the CIM schema and other prerequisite specifications (including profiles) apply.

8.1.5 CIM_HostedCollection

All operations in the default list in 8.1 shall be implemented as specified by DSP0200. In addition, the requirements of the CIM schema and other prerequisite specifications (including profiles) apply.

8.1.6 CIM_MemberOfCollection

All operations in the default list in 8.1 shall be implemented as specified by DSP0200. In addition, the requirements of the CIM schema and other prerequisite specifications (including profiles) apply.

8.1.7 CIM_RegisteredProfile

All operations in the default list in 8.1 shall be implemented as specified by DSP0200. In addition, the requirements of the CIM schema and other prerequisite specifications (including profiles) apply.

8.1.8 CIM_SystemComponent

All operations in the default list in 8.1 shall be implemented as specified by DSP0200. In addition, the requirements of the CIM schema and other prerequisite specifications (including profiles) apply.

8.1.9 CIM_VirtualEthernetSwitchSettingData

All operations in the default list in 8.1 shall be implemented as specified by DSP0200. In addition, the requirements of the CIM schema and other prerequisite specifications (including profiles) apply.

8.1.10 CIM_VirtualSystemSettingDataComponent

All operations in the default list in 8.1 shall be implemented as specified by DSP0200. In addition, the requirements of the CIM schema and other prerequisite specifications (including profiles) apply.
9 Use cases

The following use cases and object diagrams illustrate the use of this profile. They are for informational purposes only and do not introduce behavioral requirements for implementations of the profile.

9.1 Virtual system detection and inspection

The Virtual System Profile includes a set of valid use cases that are not included in this document. This document includes only those use cases that are specific to the understanding, discovery, and management of a virtual Ethernet switch.

9.1.1 Example of virtual Ethernet switch and its relationship to a virtualization platform’s host system

Figure 3 shows an example of a Virtual Ethernet Switch (ES1) hosted by the virtualization platform (HS1). Although the diagram is simplified, the virtual Ethernet switch as modeled is a compliant virtual system as specified in the Virtual System Profile and this profile. This example switch has one Ethernet switch port represented by the instance of the CIM_EthernetPort class ESP1. The allocation was from resource pool RP1 and is a compliant Ethernet switch port allocation as specified in the Ethernet Port Resource Virtualization Profile and the System Virtualization Profile. The Ethernet switch port is a member of the connectivity collection CC1, as shown with the CIM_MemberOfCollection association between instances LEP1:LANEndPoint and CC1:ConnectivityCollection. The Ethernet Port Resource Virtualization Profile compliant Ethernet switch port in the example is VLAN aware, as shown through the VLANEndpoint instance VEP1 and its membership in the NetworkVLAN collection NV1. ES1 has one Ethernet Connection resource pool, RP2, that is used as specified in the Ethernet Port Resource Virtualization Profile and is associated to ES1 with the SystemComponent association.

Figure 3 – Basic example of virtual Ethernet switch
9.1.2 Discover conformant virtual Ethernet switches using SLP

This use case describes how to locate instances of the CIM_ComputerSystem class that represent virtual Ethernet Switches that are central instances of this profile (the Virtual Ethernet Switch Profile). This is a two-step process:

1) The service location protocol (SLP) is used to locate CIM object managers (CIMOMs) where this profile is implemented. A CIMOM using SLP facilities provides information about itself to SLP in the form of an SLP service template. The service template may contain information about the set of DMTF management profiles that is implemented at the CIMOM.

2) Normal CIM enumeration and association resolution is used to find instances of the CIM_ComputerSystem class that represent central instances of this profile.

Assumption: This profile is registered in at least one CIMOM that maintains a registration with an SLP Directory Agent; the registration includes information about registered DMTF management profiles. The client is able to make SLP calls and invoke intrinsic CIM operations.

A client can locate instances of the CIM_ComputerSystem class that represent virtual systems that are central instances of this profile as follows:

1) The client invokes the SLPFindSrvs() SLP function:
   - The value of the srvtype parameter is set to "service:wbem".
   - The value of the scopelist parameter is set to "default".
   - The value of the filter parameter is set to "(RegisteredProfilesSupported=DMTF:Virtual Ethernet Switch Profile)".
   The result is a list of URLs that identify CIMOMs where this profile (the Virtual Ethernet Switch Profile) is implemented.

2) The client contacts each of the CIMOMs and enumerates or queries the CIM_RegisteredProfile class.
   - As input, the client needs to use the address information of one server obtained in step 1) and issue the intrinsic EnumeratelInstanceNames() CIM operation on the CIM_RegisteredProfile class. Alternatively, the client may issue the intrinsic ExecuteQuery CIM operation and specify a where clause that, for example, limits the value ranges for the RegisteredName and RegisteredVersion properties of the CIM_RegisteredProfile class.
   - As a result, the client receives a list of references to instances of the CIM_RegisteredProfile class that represent implementations of this profile (the Virtual Ethernet Switch Profile) at the intended target location. On a query operation this list is already limited according to the input selection criteria.

3) The client selects one reference and resolves the CIM_ElementConformsToProfile association from the instance of the CIM_RegisteredProfile class to instances of the CIM_ComputerSystem class.
   - As input, the client needs to provide the reference to an instance of the CIM_RegisteredProfile class that was selected from the result set obtained in step 2).
   - As a result, the client receives a list of references referencing instances of the CIM_ComputerSystem class that represents virtual Ethernet switches.

Result: The result is that the client knows a set of references referencing instances of the CIM_ComputerSystem class that represent virtual Ethernet Switches that are central instances of this profile.

9.1.3 Locate virtual Ethernet switches hosted by a host system

Assumption: The client knows a reference to an instance of the CIM_System class that is a central instance of the System Virtualization Profile and represents a host system.
The client invokes the intrinsic AssociatorNames( ) CIM operation for the list of virtual systems, as follows:

- The value of the ObjectName parameter is set to refer to the instance of the CIM_System class.
- The value of the AssocClass parameter is set to "CIM_HostedDependency".
- The value of the ResultClass parameter is set to "CIM_ComputerSystem".

The result is a list of references to instances of the CIM_ComputerSystem class.

The resulting set of references to instances of the CIM_ComputerSystem class where the property dedicated matches “38 (Ethernet Switch)” represent Ethernet switches that are hosted by the host system. From this list the client invokes the intrinsic AssociatorNames( ) CIM operation on each element for an associated CIM_VirtualEthernetSwitchSettingData, as follows:

- The value of the ObjectName parameter is set to refer to the instance of the CIM_ComputerSystem class received in the previous operation.
- The value of the AssocClass parameter is set to "CIM_SettingsDefineState".
- The value of the ResultClass parameter is set to "CIM_VirtualEthernetSwitchSettingData".

**Result:** Each ComputerSystem with an associated instance of CIM_VirtualEthernetSwitchSettingData where the VirtualSystemType matches “DMTF:VirtualEthernetSwitch is a host virtual Ethernet switch.

### 10 CIM elements

Table 2 lists CIM elements that are defined or specialized for this profile. Each CIM element shall be implemented as described in Table 2. The CIM Schema descriptions for any referenced element and its sub-elements apply.

Clauses 7 ("Implementation") and 8 ("Methods") may impose additional requirements on these elements.

**Table 2 – CIM Elements: Virtual System Profile**

<table>
<thead>
<tr>
<th>Element</th>
<th>Requirement</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Classes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIM_ComputerSystem</td>
<td>Mandatory</td>
<td>See 10.1.</td>
</tr>
<tr>
<td>CIM_ConnectivityCollection</td>
<td>Optional</td>
<td>See 10.2.</td>
</tr>
<tr>
<td>CIM_ElementSettingData for CIM_VirtualEthernetSwitchSettingData</td>
<td>Mandatory</td>
<td>See 10.3.</td>
</tr>
<tr>
<td>CIM_ElementSettingData for CIM_VLANEndpointSettingData</td>
<td>Conditional</td>
<td>See DMTF DSP1050</td>
</tr>
<tr>
<td>CIM_ElementSettingData for CIM_VirtualEthernetPortSettingData</td>
<td>Conditional</td>
<td>See DMTF DSP1050</td>
</tr>
<tr>
<td>CIM_HostedCollection</td>
<td>Optional</td>
<td>See 10.4.</td>
</tr>
<tr>
<td>CIM_MemberOfCollection</td>
<td>Optional</td>
<td>See 10.5.</td>
</tr>
<tr>
<td>CIM_NetworkVLAN</td>
<td>Optional</td>
<td>See 10.6.</td>
</tr>
<tr>
<td>CIM_RegisteredProfile</td>
<td>Mandatory</td>
<td>See 10.7.</td>
</tr>
<tr>
<td>CIM_SettingsDefineState</td>
<td>Mandatory</td>
<td>See 10.8.</td>
</tr>
<tr>
<td>CIM_SystemComponent</td>
<td>Conditional</td>
<td>See 10.9.</td>
</tr>
<tr>
<td>Element</td>
<td>Requirement</td>
<td>Notes</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-----------------</td>
<td>----------------</td>
</tr>
<tr>
<td>CIM_VirtualEthernetSwitchSettingData</td>
<td>Mandatory</td>
<td>See 10.10.</td>
</tr>
<tr>
<td>CIM_VirtualSystemSettingDataComponent</td>
<td>Conditional</td>
<td>See 10.11.</td>
</tr>
</tbody>
</table>

**Indications**
None defined in this profile

### 10.1 CIM_ComputerSystem

The use of the CIM_ComputerSystem class is specialized in the [Computer System Profile](#) and refined in this profile.

The requirements in Table 3 are in addition to those mandated by the [Computer System Profile](#).

#### Table 3 – Class: CIM_ComputerSystem

<table>
<thead>
<tr>
<th>Elements</th>
<th>Requirement</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated</td>
<td>Mandatory</td>
<td>See 7.1.1.</td>
</tr>
</tbody>
</table>

### 10.2 CIM_ConnectivityCollection (Optional)

An implementation may use an instance of the CIM_ConnectivityCollection class to represent a collection of associated CIM_LANEndpoint instances that have current or potential connectivity between the endpoints in this collection.

### 10.3 CIM_ElementSettingData (CIM_VirtualEthernetSwitchSettingData)

The CIM_ElementSettingData association associates the top-level instance of the CIM_VirtualEthernetSwitchSettingData class in a “State” virtual Ethernet switch configuration and top-level instances of the CIM_VirtualEthernetSwitchSettingData class in other virtual Ethernet Switch system configurations. The use of the CIM_ElementSettingData class is specialized in the [Computer System Profile](#) and refined in this profile.
Table 4 lists the requirements for this association.

### Table 4 – Association: CIM_ElementSettingData

<table>
<thead>
<tr>
<th>Element</th>
<th>Requirement</th>
<th>Notes</th>
</tr>
</thead>
</table>
| ManagedElement| Mandatory   | **Key:** Reference to an instance of the CIM_VirtualEthernetSwitchSettingData class that represents the virtual-switch specific properties of the virtual Ethernet Switch  
**Cardinality:** 0..1 |
| SettingData   | Mandatory   | **Key:** Reference to an instance of the CIM_VirtualEthernetSwitchSettingData class that represents a virtual Ethernet switch configuration  
**Cardinality:** * |
| IsDefault     | Mandatory   | None                                                                 |
| IsCurrent     | Unspecified | None                                                                 |
| IsNext        | Mandatory   | Shall be set to 1 (Not Applicable)                                    |
| IsMinimum     | Mandatory   | Shall be set to 1 (Not Applicable)                                    |

**NOTE 1:** The cardinality of the ManagedElement role is 0..1 (and not 1) because there are instances of the CIM_VirtualSystemSwitchData class through the CIM_ElementSettingData association.

**NOTE 2:** The cardinality of the SettingData role is * (and not 1) because there are instances of the CIM_VirtualEthernetSwitchSettingData class through the CIM_ElementSettingData association.

#### 10.4 CIM_HostedCollection (optional)

The CIM_HostedCollection association may associate an instance of the CIM_ComputerSystem class representing a virtual Ethernet Switch and an instance of CIM_NetworkVLAN or associates an instance of the CIM_System class representing the host system and an instances of CIM_ConnectivityCollection.

Support of the CIM_HostedCollection association is conditional on the support of CIM_NetworkVLAN or CIM_ConnectivityCollection.

Table 5 lists the requirements for this association.

### Table 5 – Association: CIM_HostedCollection

<table>
<thead>
<tr>
<th>Elements</th>
<th>Requirement</th>
<th>Notes</th>
</tr>
</thead>
</table>
| Antecedent | Mandatory   | **Key:** Reference to an instance of the CIM_ComputerSystem class that represents a virtual Ethernet Switch or the instance of CIM_ComputerSystem class that represent the host.  
**Cardinality:** 1 |
| Dependent  | Mandatory   | **Key:** Reference to an instance of CIM_NetworkVLAN or an instance of CIM_ConnectivityCollection  
**Cardinality:** * |
10.5 CIM_MemberOfCollection (optional)

The CIM_MemberOfCollection association associates an aggregation of instances of the
CIM.ProtocolEndpoint class representing either a CIM_VLANEndpoint instances or CIM_LANEndpoint
instances to either an instance of CIM_ConnectivityCollection for LAN endpoints or NetworkVLAN for
VLAN endpoints.

Table 6 lists the requirements for this association.

<table>
<thead>
<tr>
<th>Elements</th>
<th>Requirement</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIM_Collection</td>
<td>Mandatory</td>
<td>Key: Reference to an instance of the CIM_ProtocolEndpoint</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cardinality: 1</td>
</tr>
<tr>
<td>CIM_ManagedElement</td>
<td>Mandatory</td>
<td>Key: Reference to an instance of CIM_NetworkVLAN or an instance of CIM_ConnectivityCollection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cardinality: *</td>
</tr>
</tbody>
</table>

10.6 CIM_NetworkVLAN (optional)

The CIM_NetworkVLAN class represents a collection of VLANEndpoints that are members of the VLAN.
When modeling switches with VLAN support there should be an instance of NetworkVLAN for every
VLAN available in a switch.

Table 7 contains the requirements for this association specific to this profile.

<table>
<thead>
<tr>
<th>Element</th>
<th>Requirement</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>TypeOfMedia</td>
<td>Mandatory</td>
<td>See 7.1.3.</td>
</tr>
</tbody>
</table>

10.7 CIM RegisteredProfile

The use of the CIM_RegisteredProfile class is specialized by the Profile Registration Profile. The
requirements denoted in Table 8 are in addition to those mandated by the Profile Registration Profile.

<table>
<thead>
<tr>
<th>Elements</th>
<th>Requirement</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>RegisteredOrganization</td>
<td>Mandatory</td>
<td>Shall be set to 2 (DMTF)</td>
</tr>
<tr>
<td>RegisteredName</td>
<td>Mandatory</td>
<td>Shall be set to “Virtual Ethernet Switch”</td>
</tr>
<tr>
<td>RegisteredVersion</td>
<td>Mandatory</td>
<td>Shall be set to the version of this profile: “1.0.0”</td>
</tr>
</tbody>
</table>

10.8 CIM_SettingsDefineState

The CIM_SettingsDefineState association associates an instance of the CIM_ComputerSystem class
representing a virtual Ethernet Switch and an instance of the CIM_VirtualEthernetSwitchSettingData class
that represents the virtualization-specific properties of a virtual system and is the top-level instance of the
“State” virtual system configuration.
Table 9 contains the requirements for this association.

### Table 9 – Association: CIM_SettingsDefineState

<table>
<thead>
<tr>
<th>Elements</th>
<th>Requirement</th>
<th>Notes</th>
</tr>
</thead>
</table>
| ManagedElement       | Mandatory   | **Key:** Reference to an instance of the CIM_ComputerSystem class that represents a virtual Ethernet switch  
Cardinality: 0..1 |
| SettingData          | Mandatory   | **Key:** Reference to an instance of the CIM_VirtualEthernetSwitchSettingData class that represents the virtualization-specific properties of a virtual system  
Cardinality: 1 |

NOTE: The cardinality of the ManagedElement role is 0..1 (and not 1) because there are instances of the CIM_VirtualEthernetSwitchSettingData class that do not have an associated instance of the CIM_ComputerSystem class through the CIM_SettingsDefineState association.

### 10.9 CIM_SystemComponent (conditional)

The CIM_SystemComponent association associates an instance of the CIM_ComputerSystem class representing a virtual Ethernet Switch and one or more instances of the CIM_ResourcePool class that represent a pool of available Ethernet switch port connections for allocation to a virtual computer system.

Support of the CIM_SystemComponent association is conditional with respect to the support of the allocation of Ethernet switch port connections between the associated virtual Ethernet switch to a virtual computer system through the use of resource pools (see DMTF DSP1050.)

Table 10 lists the requirements for this association.

### Table 10 – Association: CIM_SystemComponent

<table>
<thead>
<tr>
<th>Elements</th>
<th>Requirement</th>
<th>Notes</th>
</tr>
</thead>
</table>
| GroupComponent       | Mandatory   | **Key:** Reference to an instance of the CIM_ComputerSystem class that represents a virtual Ethernet Switch  
Cardinality: 1 |
| PartComponent        | Mandatory   | **Key:** Reference to an instance of the CIM_ResourcePool class which represents a pool of allowable Ethernet Connection allocations  
Cardinality: * |

### 10.10 CIM_VirtualEthernetSwitchSettingData

The CIM_VirtualEthernetSwitchSettingData class specializes the CIM_VirtualSystemSettingData class, specified in the Virtual System Profile, by adding switch-specific properties.

The requirements in Table 11 are in addition to those mandated by the Virtual System Profile.

Table 11 contains the requirements for this class.

### Table 11 – Class: CIM_VirtualEthernetSwitchSettingData

<table>
<thead>
<tr>
<th>Element</th>
<th>Requirement</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>VirtualSystemType</td>
<td>Mandatory</td>
<td>See 7.1.2.</td>
</tr>
</tbody>
</table>
### 10.11 CIM_VirtualSystemSettingDataComponent (conditional)

CIM_VirtualSystemSettingDataComponent is specialized in the [System Virtualization Profile](#). The requirements in Table 12 are in addition to those mandated by the [System Virtualization Profile](#).

#### Table 12 – Association: CIM_VirtualSystemSettingDataComponent

<table>
<thead>
<tr>
<th>Elements</th>
<th>Requirement</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>GroupComponent</td>
<td>Mandatory</td>
<td><strong>Key:</strong> Reference to an instance of the CIM_VirtualEthernetSwitchSettingData class that represents the virtual aspects of a virtual Ethernet switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Cardinality:</strong> 1</td>
</tr>
<tr>
<td>PartComponent</td>
<td>Mandatory</td>
<td><strong>Key:</strong> Reference to an instance of the CIM_ResourceAllocationSettingData class that represents virtual aspects of a virtual resource</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Cardinality:</strong> 0..*</td>
</tr>
</tbody>
</table>
ANNEX A
(informative)

Change Log

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0.0</td>
<td>2010-10-21</td>
<td>Released as DMTF Standard</td>
</tr>
</tbody>
</table>