Ethernet Port Profile

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Foreword

The Ethernet Port Profile (DCIM1012) was prepared by the Dell CIM Review Board.

Introduction

This specification identifies the necessary classes, properties, methods, and values to be instantiated and manipulated to represent and manage Ethernet port modeled using the DMTF Common Information Model (CIM) core and extended model definitions.

This document is intended for implementers who write CIM-based providers or consumers of management interfaces representing the component described herein.

Ethernet Port Profile

1   Scope

The Ethernet Port Profile extends the management capability of referencing profiles by adding the ability to represent an Ethernet port, its associated controller, and Ethernet interfaces. This profile also includes Ethernet port side band configuration based on NC-SI configuration (see DSP0222). Associations with the port's physical aspects and profile-implementation version information are modeled in this profile.

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 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 DSP0222, *Network Controller Sideband Interface (NC-SI) Specification*

DMTF DSP1033, *Profile Registration Profile*

DMTF DSP1014, *Ethernet Port Profile*

2.2   References under Development

None.

2.3   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

Unified Modeling Language (UML) from the Open Management Group (OMG), http://www.uml.org/

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

4.2
LAN
Local Area Network

4.3
NC-SI
Network Controller Sideband Interface

5   Synopsis

Profile Name: Ethernet Port

Version: 1.0.0a

Organization: Dell

CIM Schema Version: 2.11

Central Class: CIM_EthernetPort

Scoping Class: CIM_ComputerSystem

Specializes: DMTF Ethernet Port Profile 1.0

The Ethernet Port extends the management capability of referencing profiles by adding the ability to represent an Ethernet interface in a managed system.

CIM_EthernetPort shall be the Central Class of this profile. The CIM_EthernetPort instance shall be the Central Instance of this profile. CIM_ComputerSystem shall be the Scoping Class of this profile. The CIM_ComputerSystem instance with which the Central Instance is associated through a CIM_SystemDevice instance shall be the Scoping Instance of this profile.

Table 1 shows the profiles on which the Ethernet Port Profile has dependencies.

Table 1 – Referenced Profiles

Profile Name	Organization	Version	Description
Profile Registration	DMTF	1.0	Mandatory
Ethernet Port	DMTF	1.0	Specializes

6   Description

The Ethernet Port Profile specializes DMTF Ethernet Port Profile 1.0, The Ethernet Port Profile constrains the generalized model of a network port to usage for modeling an Ethernet port. This profile is intended to define CIM elements and constraints other than those included in the specialized profile. To implement this profile, it is necessary to understand and implement the Host LAN Network Port Profile.

The following functionality is mandatory within the scope of this profile:

• A specification of the Ethernet port and related hardware

• Active network interfaces through the network port

The following is optional within the scope of this profile:

• Modeling of the controller and its relationship with the Ethernet port

• Modeling the NC-SI configuration for the Ethernet port

The following is not covered in this profile:

- Modeling of networks in which the Ethernet interface participates

Figure 1 represents the class schema of the Ethernet Port Profile. The CIM_EthernetPort class represents the Ethernet port and is a subclass (specialization) of the CIM_NetworkPort class. It replaces the CIM_NetworkPort class as the subject for constraints defined in the Host LAN Network Port Profile.
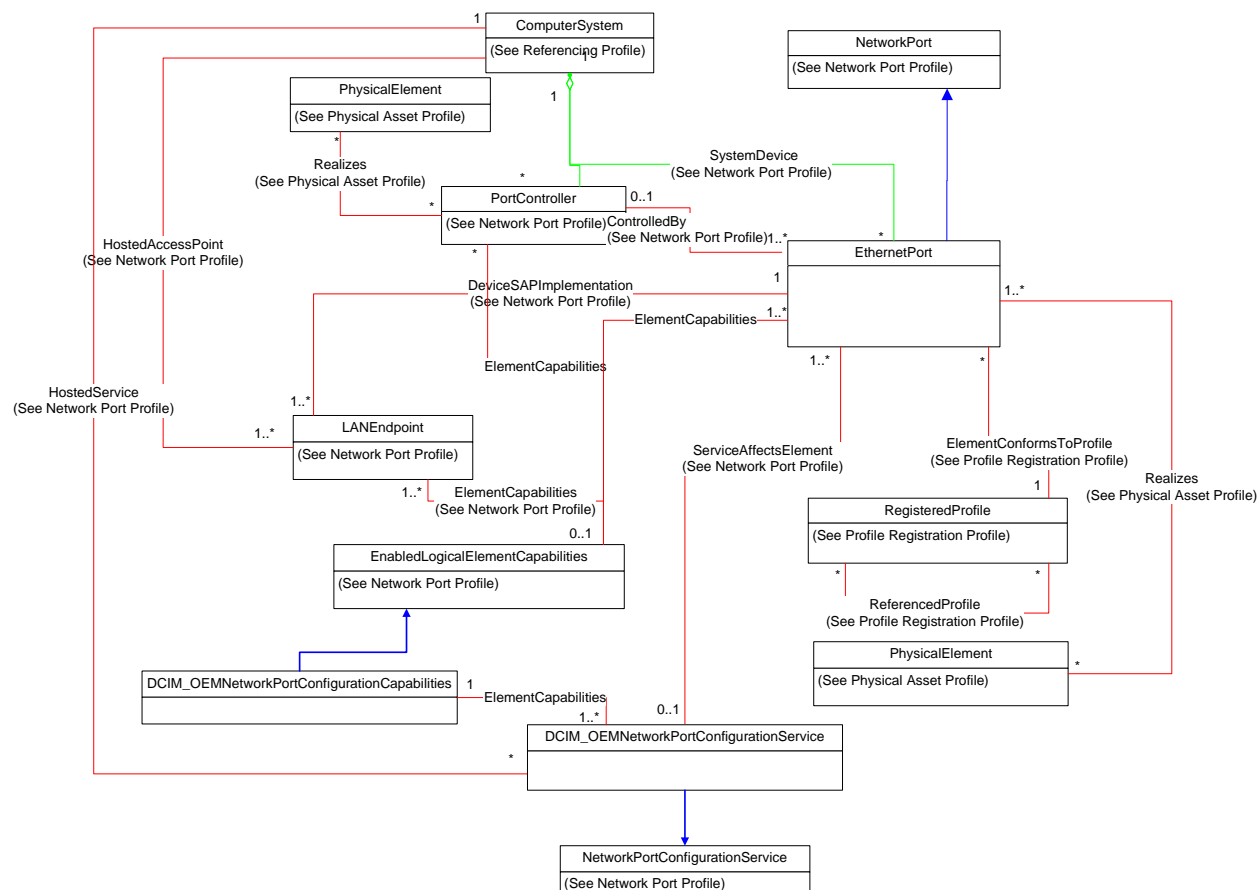
Figure 1 – Ethernet Port Profile: Class Diagram

The CIM_LANEndpoint class represents an access point at the data-link layer. It is identified by the MAC address to which the Ethernet port responds.

7   Implementation Requirements

This section defines the requirements for the arrangement of instances and properties of instances for implementations of this profile.

7.1   CIM_EthernetPort.PermanentAddress

When the permanent address is known, the PermanentAddress property shall be formatted as 12 contiguous uppercase hex digits (pattern "^[0123456789ABCDEFabcdef]{12}$"). When the permanent address is not known, the PermanentAddress property shall be formatted as a zero-length string (pattern.{0}).

7.2   Network Controller Sideband Interface (NC-SI) Configuration

This clause specifies the requirements for configuration of the NC-SI for the Ethernet port. If management or representation of the NC-SI configuration is supported, the requirements specified in this clause shall be met.

A DCIM_OEMNetworkPortConfigurationService instance shall be implemented. One and only one DCIM_OEMNetworkPortConfigurationCapabilities instance shall be associated with the DCIM_OEMNetworkPortConfigurationService instance through ElementCapabilities association.

The DCIM_OEMNetworkPortConfigurationCapabilities.SupportedNCSIMode property shall contain at least one value. The DCIM_OEMNetworkPortConfigurationCapabilities.SupportedNCSIModes property shall contain such values that if used as the values for the RequestedNCSIMode parameter, the DCIM_OEMNetworkPortConfigurationService.RequestNCSIModeChange() method execution shall return 0 (Completed with No Error) under some condition.

8   Methods

8.1   Method: DCIM_OEMNetworkPortConfigurationService.RequestNCSIModeChange( )

RequestNCSIModeChange() changes the NC-SI mode of operation for the Ethernet port.

Return values for RequestNCSIModeChange( ) shall be as specified in Table 2 where the method-execution behavior matches the return-code description. RequestNCSIModeChange( ) method parameters are specified in Table 3.

Table 2 – DCIM_OEMNetworkPortConfigurationService.RequestNCSIModeChange( ) Method: Return Code Values

Value	Description
0	Request was successfully executed.
1	Method is not supported in the implementation.
2	Error occurred
4096	Job started

Table 3 – DCIM_OEMNetworkPortConfigurationService.RequestNCSIModeChange( ) Method: Parameters

Qualifiers	Name	Type	Description/Values
IN, REQ	RequestedNCSIMode	uint16	Requested NC-SI mode
IN, REQ	EthernetPort	CIM_EthernetPort REF	Ethernet port to configure NC-SI mode
OUT	Job	CIM_ConcreteJob REF	Returned if job started

Invoking the DCIM_OEMNetworkPortConfigurationService.RequestNCSIModeChange( ) method multiple times could result in earlier requests becoming overwritten or lost.

No standard messages are defined for this method.

8.1.1   General Requirements

If the RequestedNCSIMode parameter or the EthernetPort parameter is NULL, the DCIM_OEMNetworkPortConfigurationService.RequestNCSIModeChange() method shall return 2 (Unknown or Unspecified Error).

If the instance referenced by the EthernetPort parameter is not associated with DCIM_OEMNetworkPortConfigurationService, the DCIM_OEMNetworkPortConfigurationService.RequestNCSIModeChange() method shall return 2 (Unknown or Unspecified Error).

The DCIM_OEMNetworkPortConfigurationService.RequestNCSIModeChange() method shall return 2 (Unknown or Unspecified Error) if the RequestedNCSIMode parameter specifies a value not listed in the DCIM_OEMNetworkPortConfigurationServiceCapabilities.SupportedNCSIModes property of the associated DCIM_OEMNetworkPortConfigurationCapabilities instance.

The DCIM_OEMNetworkPortConfigurationService.RequestNCSIModeChange() method shall return 2 (Unknown or Unspecified Error) if the DCIM_OEMNetworkPortConfigurationServiceCapabilities.AvailableRequestedStates property is not null and does not contain the value specified by the RequestedState parameter.

8.1.2   Conditional Requirement

If the DCIM_OEMNetworkPortConfigurationServiceCapabilities.SupportedNCSIModes array contains more than one element, the DCIM_OEMNetworkPortConfigurationService.RequestNCSIModeChange() method shall be implemented and shall not return 1 (Not Supported).

8.2   Profile Conventions for Operations

Support for operations for each profile class (including associations) is specified in the following subclause.

The default list of operations is as follows:

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

8.3   CIM_EthernetPort

All operations are supported as for CIM_NetworkPort in the Host LAN Network Port Profile.

8.4   CIM_ElementCapabilities

Table 4 lists operations that either have special requirements beyond those from DSP0200 version 1.2 or shall not be supported.

Table 4 – Operations: CIM_ElementCapabilities

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

8.5   CIM_HostedService

Table 4 lists operations that either have special requirements beyond those from [DSP0200 version 1.2](#) or shall not be supported.

Table 5 – Operations: CIM_HostedService

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

8.6   CIM_ServiceAffectsElement

Table 4 lists operations that either have special requirements beyond those from [DSP0200 version 1.2](#) or shall not be supported.

Table 6 – Operations: CIM_ServiceAffectsElement

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

9   Use Cases

This section contains object diagrams and use cases for the Ethernet Port Profile.

9.1   Object Diagrams

Error! Reference source not found. illustrates how CIM_RegisteredProfile instances identify the version of the DMTF Ethernet Port Profile and DCIM Ethernet Port Profile with which a CIM_EthernetPort instance and its associated instances are conformant. A CIM_RegisteredProfile instance exists for each profile instrumented in the system. One CIM_RegisteredProfile instance identifies the DMTF Base Server Profile, version 1.0. reg1 identifies the DMTF Ethernet Port Profile, version 1.0.0, and reg2 identifies the DCIM Ethernet Port Profile 1.0.0.
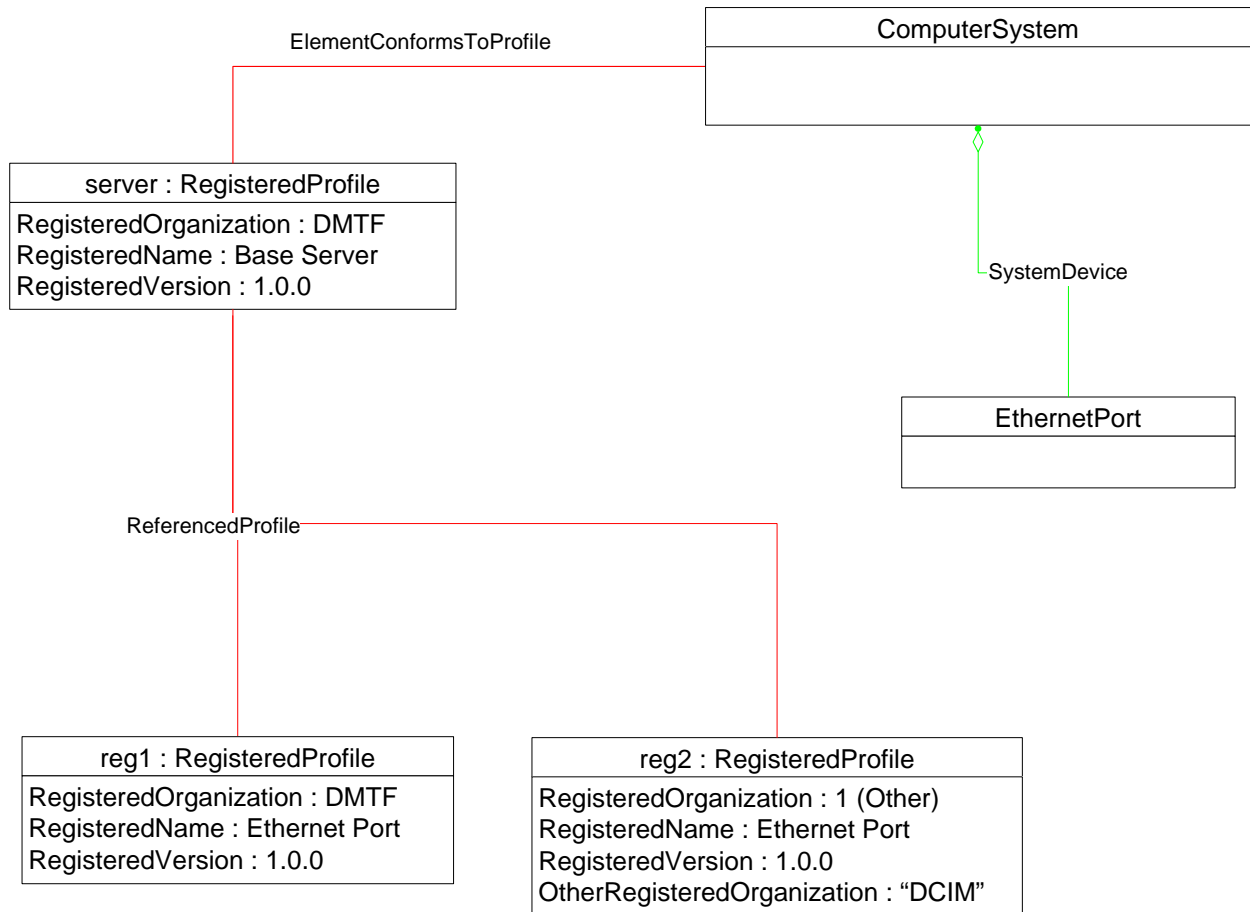
Figure 2 – Registered Profile

In Figure 2, the Central Instance is the CIM_EthernetPort and the Scoping Instance is the CIM_ComputerSystem instance. This CIM_ComputerSystem instance is conformant with the DMTF Base Server Profile version 1.0 as indicated by the CIM_ElementConformsToProfile association to the CIM_RegisteredProfile instance.

The CIM_ReferencedProfile relationship between BaseSystem and reg1 *and* reg2 places the CIM_EthernetPort instance within the scope of reg1 *and* reg2. Thus, the CIM_EthernetPort instance is conformant with the DCIM and DMTF Ethernet Port Profile version 1.0.0.

Figure 3 shows a single Ethernet port providing a single Ethernet interface. The Ethernet port is represented by a CIM_EthernetPort instance. The Ethernet interface is represented by a CIM_LANEndpoint instance.
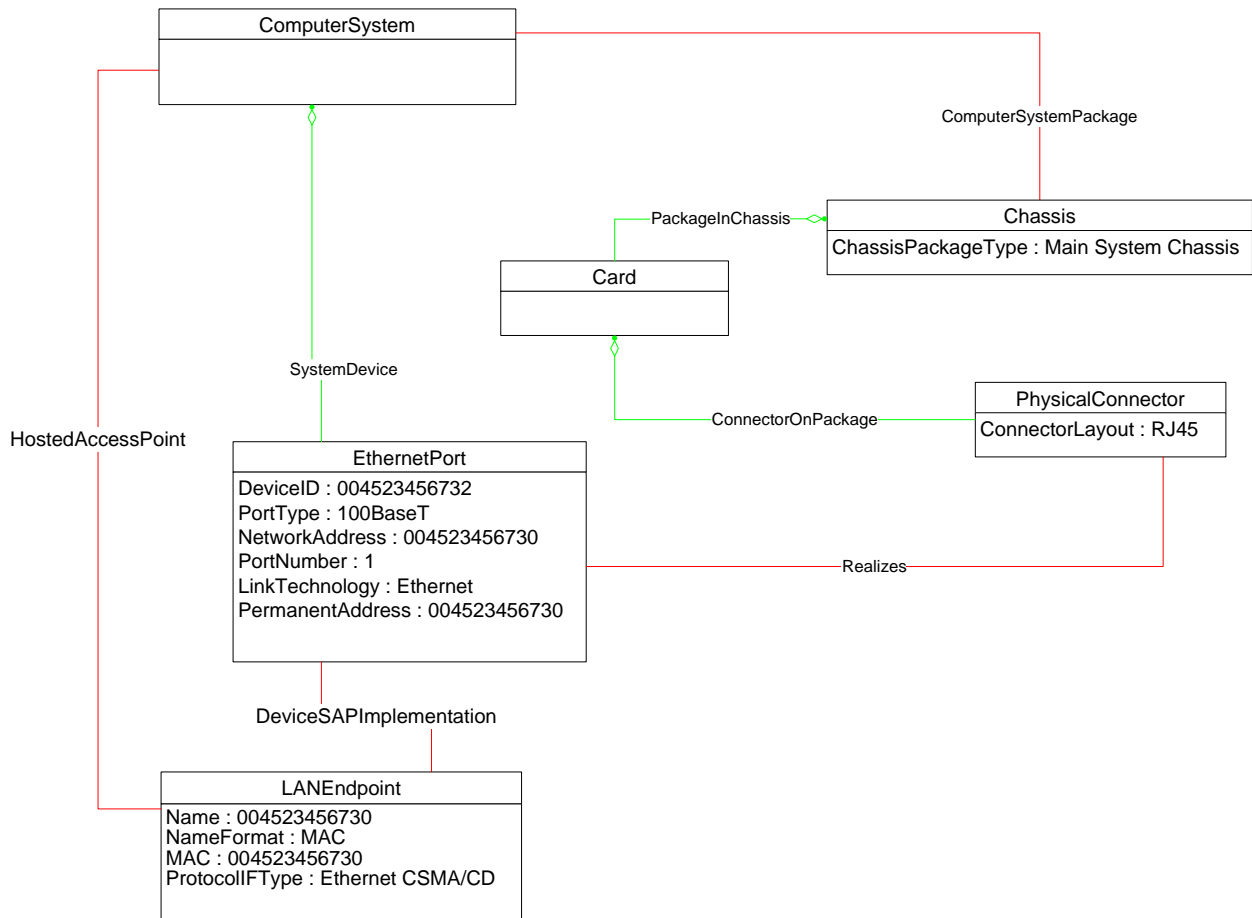
Figure 3 – Single Interface

9.2   NC-SI Configuration

Figure 4 represents an instantiation of DCIM Ethernet Port Profile. npservice1 contains the current NC-SI configuration mode, represented by the CurrentNCSIMode property value. npservice1 also contains the RequestNCSIModeChange() method for configuring NC-SI for a different mode of operation. The possible NC-SI modes of operation for eth0 are represented in the cap1.SupportedNCSIModes property.
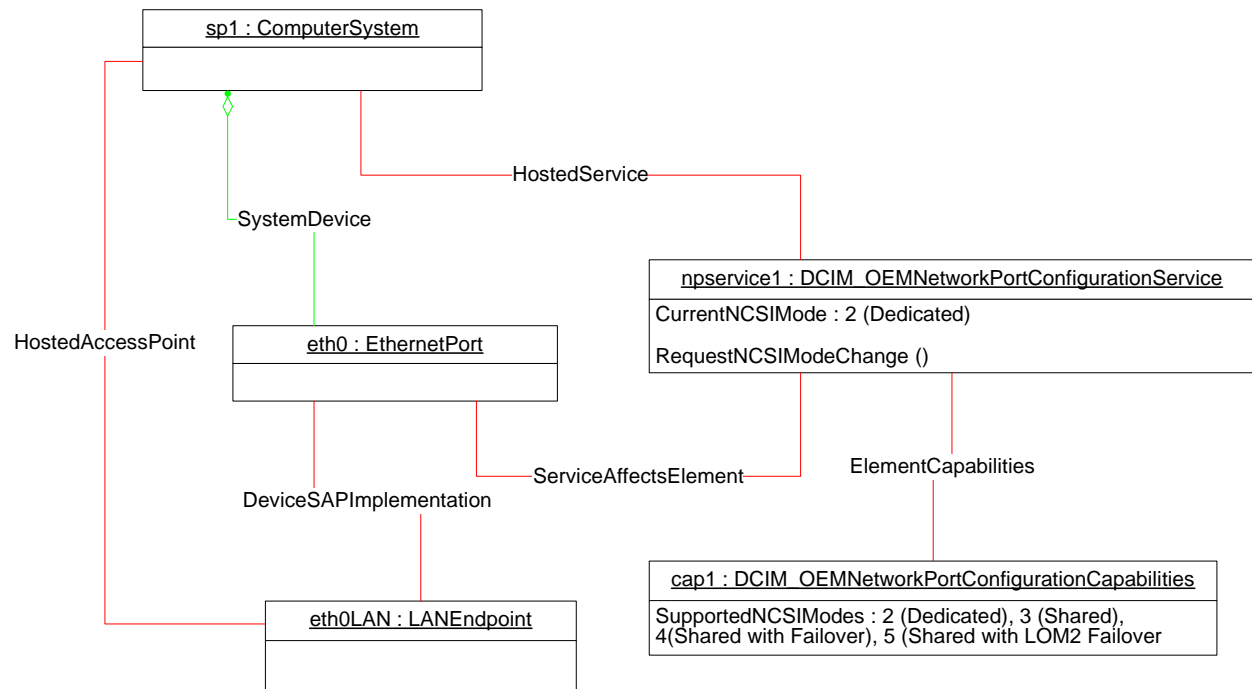
Figure 4 – NC-SI Configuration

9.3   Query MAC Address for an Interface

A client can determine the MAC addresses in use for an Ethernet port as follows:

1)   Find all CIM_LANEndpoint instances associated with the CIM_EthernetPort through a CIM_DeviceSAPImplementation instance.

2)   Query the MACAddress property of each CIM_LANEndpoint instance.

9.4   Determine Physical Connector for an Ethernet Address

One or more MAC addresses can be associated with a physical Ethernet interface. A client can determine which CIM_PhysicalConnector is associated with an Ethernet address as follows:

1)   Find the CIM_EthernetPort instance associated with the CIM_LANEndpoint instance through a CIM_DeviceSAPImplementation instance.

2)   Find the CIM_PhysicalConnector instance associated with the CIM_EthernetPort instance through a CIM_Realizes instance.

10 CIM Elements

Table 7 shows the instances of CIM Elements for this profile. Instances of the CIM Elements shall be implemented as described in Table 7. Section 0 may impose additional requirements on these elements.

Table 7 – CIM Elements: Ethernet Port Profile

Element Name	Requirement	Notes
Classes		
CIM_EthernetPort	Mandatory	See section 10.1.
CIM_ElementCapabilities	Conditional	See section 10.2.
CIM_HostedService	Conditional	See section 10.3.
DCIM_OEMNetworkPortConfigurationCapabilities	Conditional	See section 10.4.
DCIM_OEMNetworkPortConfigurationService	Optional	See section 10.5.
CIM_ServiceAffectsElement	Conditional	See section 10.6.
CIM_RegisteredProfile	Mandatory	See section 10.7.
Indications		
None defined in this profile		

10.1 CIM_EthernetPort

CIM_EthernetPort represents the hardware and device aspects of an Ethernet interface. The constraints defined in Table 8 are in addition to those placed on the base CIM_NetworkPort class in the base Host LAN Network Port Profile.

Table 8 – Class: CIM_EthernetPort

Properties	Requirement	Notes
PortType	Mandatory	None
NetworkAddresses	Mandatory	Shall be formatted as 12 contiguous uppercase hex digits (pattern "^[0123456789ABCDEFabcdef]{12}$")
Capabilities	Mandatory	None
EnabledCapabilities	Mandatory	None
LinkTechnology	Mandatory	Match 2 ("Ethernet")
PermanentAddress	Mandatory	See section 7.1.

10.2   CIM_ElementCapabilities

CIM_ElementCapabilities associates a DCIM_OEMNetworkPortConfigurationService instance with the DCIM_OEMNetworkPortConfigurationCapabilities instance describing the capabilities of the DCIM_OEMNetworkPortConfigurationService instance. CIM_ElementCapabilities is mandatory when the DCIM_OEMNetworkPortConfigurationService instance is instantiated.

Table 9 – CIM_ElementCapabilities

Properties	Requirement	Notes
ManagedElement	Mandatory	**Key**: Shall reference the instance of DCIM_OEMNetworkPortConfigurationService Cardinality 1..* indicating one or more references
Capabilities	Mandatory	**Key**: Shall reference the instance of DCIM_OEMNetworkPortConfigurationCapabilities Cardinality 1 indicating one and only one reference

10.3   CIM_HostedService

CIM_HostedService associates a DCIM_OEMNetworkPortConfigurationService instance with the Scoping Instance. CIM_HostedService is mandatory when the DCIM_OEMNetworkPortConfigurationService instance is instantiated.

Table 10 – Class: CIM_HostedService

Properties	Notes	Description
Antecedent	Mandatory	**Key:** Shall reference the Scoping Instance. Cardinality 1 indicating one and exactly one reference
Dependent	Mandatory	**Key:** Shall reference the Central Instance Cardinality * indicating zero or more references

10.4   DCIM_OEMNetworkPortConfigurationCapabilities

DCIM_OEMNetworkPortConfigurationCapabilities represents the capabilities of the network port configuration service. DCIM_OEMNetworkPortConfigurationCapabilities is mandatory when the DCIM_OEMNetworkPortConfigurationService instance is instantiated.

Table 11 – DCIM_OEMNetworkPortConfigurationCapabilities

Properties	Requirement	Notes
InstanceID	Mandatory	**Key**
SupportedNCSIModes	Mandatory	

10.5   DCIM_OEMNetworkPortConfigurationService

DCIM_OEMNetworkPortConfigurationService represents the network port configuration service.

Table 12 – Class: DCIM_OEMActiveDirectoryService

Properties and Methods	Requirement	Description
SystemCreationClassName	Mandatory	**Key**
CreationClassName	Mandatory	**Key**
SystemName	Mandatory	**Key**
Name	Mandatory	**Key**
CurrentNCSIMode	Mandatory	
RequestNCSIModeChange( )	Conditional	See section 8.1.

10.6   CIM_ServiceAffectsElement

Table 13 details the requirements for CIM_ServiceAffectsElement instances. CIM_ServiceAffectsElement is mandatory when the DCIM_OEMNetworkPortConfigurationService instance is instantiated.

Table 13 – Class: CIM_ServiceAffectsElement

Elements	Requirement	Notes
ServiceProvided	Mandatory	**Key** This property shall be a reference to the DCIM_OEMNetworkPortConfigurationService instance of the profile. Cardinality 0..1
UserOfService	Mandatory	**Key** This property shall be a reference to DCIM_OEMActiveDirectoryGroup. Cardinality 1..*
ElementAffects	Mandatory	Matches 5 (Manages)

10.7   CIM_RegisteredProfile

CIM_RegisteredProfile determines whether a CIM_LogicalModule instance is conformant with the Ethernet Port 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 14, the behavior of the CIM_RegisteredProfile instance is defined by the Profile Registration Profile.

Table 14 – Class: CIM_RegisteredProfile

Properties	Requirement	Notes
RegisteredName	Mandatory	This property shall have a value of "Ethernet Port".
RegisteredVersion	Mandatory	This property shall have a value of "1.0.0a".
RegisteredOrganization	Mandatory	This property shall have a value of 1 (Other).
OtherRegisteredOrganization	Mandatory	The property value shall match "DCIM".

ANNEX A
(informative)

Change Log

Version	Date	Description
1.0.0	02/12/2009	Initial version.

ANNEX B
(informative)

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