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Foreword

The *Network Management Profile* (DSP1046) was prepared by the Network Services Management Working Group of the DMTF.

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The DMTF acknowledges the following individuals for their contributions to this document:

Editors:

- Hemal Shah – Broadcom Corporation
- Alex Zhdankin – Cisco Systems

Contributors:

- Steve Neely – Cisco Systems
- Shishir Pardikar – Citrix
- Eric Wels - Hitachi
- John Parchem – Microsoft Corporation
- Lawrence Lamers – VMware
- Bhumip Khasnabish – ZTE

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 Network Services and the associated configuration information. 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.

Document conventions

Typographical conventions

The following typographical conventions are used in this document:

- Document titles are marked in *italics*.
- ABNF rules are in `monospaced font`.

174

175 # Network Management Profile

176 ## 1 Scope

177 The *Network Management Profile* is a base profile that specifies the CIM schema and use cases
178 associated with the common aspects of the Network and Network Services management. This profile
179 includes a specification of the Network Management Service, Network, Network Ports, Protocol Endpoints
180 and other classes necessary for representing the basic connectivity and administrative aspects of the
181 Network.

182 ## 2 Normative references

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

187 DMTF DSP0004, *CIM Infrastructure Specification 2.6*,
188 https://www.dmtf.org/standards/documents/DSP0004_2.6.0_0.pdf

189 DMTF DSP0200, *CIM Operations over HTTP 1.3,*
190 http://www.dmtf.org/standards/documents/DSP0200_1.3.pdf

191 DMTF DSP0223, *Generic Operations 1.0*,
192 https://www.dmtf.org/standards/documents/DSP0223_1.0.2.pdf

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

195 DMTF DSP1014, *Ethernet Port Profile 1.0,*
196 https://www.dmtf.org/standards/documents/DSP1014_1.0.1.pdf

197 DMTF DSP1116, *IP Configuration Profile 1.0,*
198 http://www.dmtf.org/standards/documents/DSP1116_1.0.pdf

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

201 DMTF DSP1048, *Network Policy Management Profile 1.0,*
202 http://www.dmtf.org/standards/documents/DSP1048_1.0.pdf

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

205 ## 3 Terms and definitions

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

208 The terms "shall" ("required"), "shall not", "should" ("recommended"), "should not" ("not recommended"),
209 "may," "need not" ("not required"), "can" and "cannot" in this document are to be interpreted as described
210 in ISO/IEC Directives, Part 2, Clause 7. The terms in parenthesis are alternatives for the preceding term,
211 for use in exceptional cases when the preceding term cannot be used for linguistic reasons. Note that
212 ISO/IEC Directives, Part 2, Clause 7 specifies additional alternatives. Occurrences of such additional
213 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 6.

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, DSP0223, and DSP1001 apply to this document. The following additional terms are used in this document.

3.1
conditional

indicates requirements to be followed strictly to conform to the document when the specified conditions are met

3.2
mandatory

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

3.3
optional

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

3.4
pending configuration

indicates the configuration that will be applied to an IP network connection the next time the IP network connection accepts a configuration

3.5
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

3.6
unspecified

indicates that this profile does not define any constraints for the referenced CIM element or operation

3.7
Network

The term Network in this specification applies to a logical, virtual, or physical network that is managed as an independent entity or an entity contained within another network, or an entity that is a peer to other networks.

3.8
VLAN Network

A VLAN Network is a specific type of network representing a Virtual LAN.

3.9
Contained Network

A Contained Network is a specific type of network that is contained within another network. One or more contained networks are aggregated by the containing network.

3.10
Containing Network

A Containing Network is a specific type of network that contains one or more networks. The containing network aggregates one or more contained networks.

3.11
Dependent Network

A Dependent Network is a specific type of network whose existence depends on another network.

3.12
Network Port

A Network Port represents a managed entity for communication within a network.

3.13
Network Port Group

A Network Port Group represents a collection of network ports.

3.14
Network Service

A Network Service represents an operational function of a network. For example, DHCP Service in an IP network.

4 Symbols and abbreviated terms

The abbreviations defined in DSP0004, DSP0223, and DSP1001 apply to this document. The following additional abbreviations are used in this document.

4.1
IP

Internet Protocol

4.2
VLAN

Virtual Local Area Network

5 Synopsis

Profile name: Network Management Profile

Version: 1.0.0

Organization: DMTF

CIM Schema version: 2.53

Central class: CIM_NetworkManagementService

Scoping class: CIM_System (HostingSystem)

The *Network Management Profile* is a base profile that specifies the CIM schema and use cases associated with the common aspects of the Network and Network Services management. This profile includes a specification of the Network Management Service, Network, Network Ports, Protocol Endpoints and other classes necessary for representing the basic connectivity and administrative aspects of the Networks and Network Services.

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

294 **Table 1 – Referenced profiles**

Profile Name	Organization	Version	Requirement	Description
Profile Registration	DMTF	1.0	Mandatory	See DSP1033
Ethernet Port	DMTF	1.0	Optional	See DSP1014
Network Policy Management	DMTF	1.0	Optional	See DSP1048

6 Description

The *Network Management Profile* describes the common aspects of the Network management. This profile includes a specification of the Network Management Service, Network, Network Ports, Protocol Endpoints and other classes necessary for representing the basic connectivity and administrative aspects of the Network.

This profile enables many aspects of network management including but not limited to:

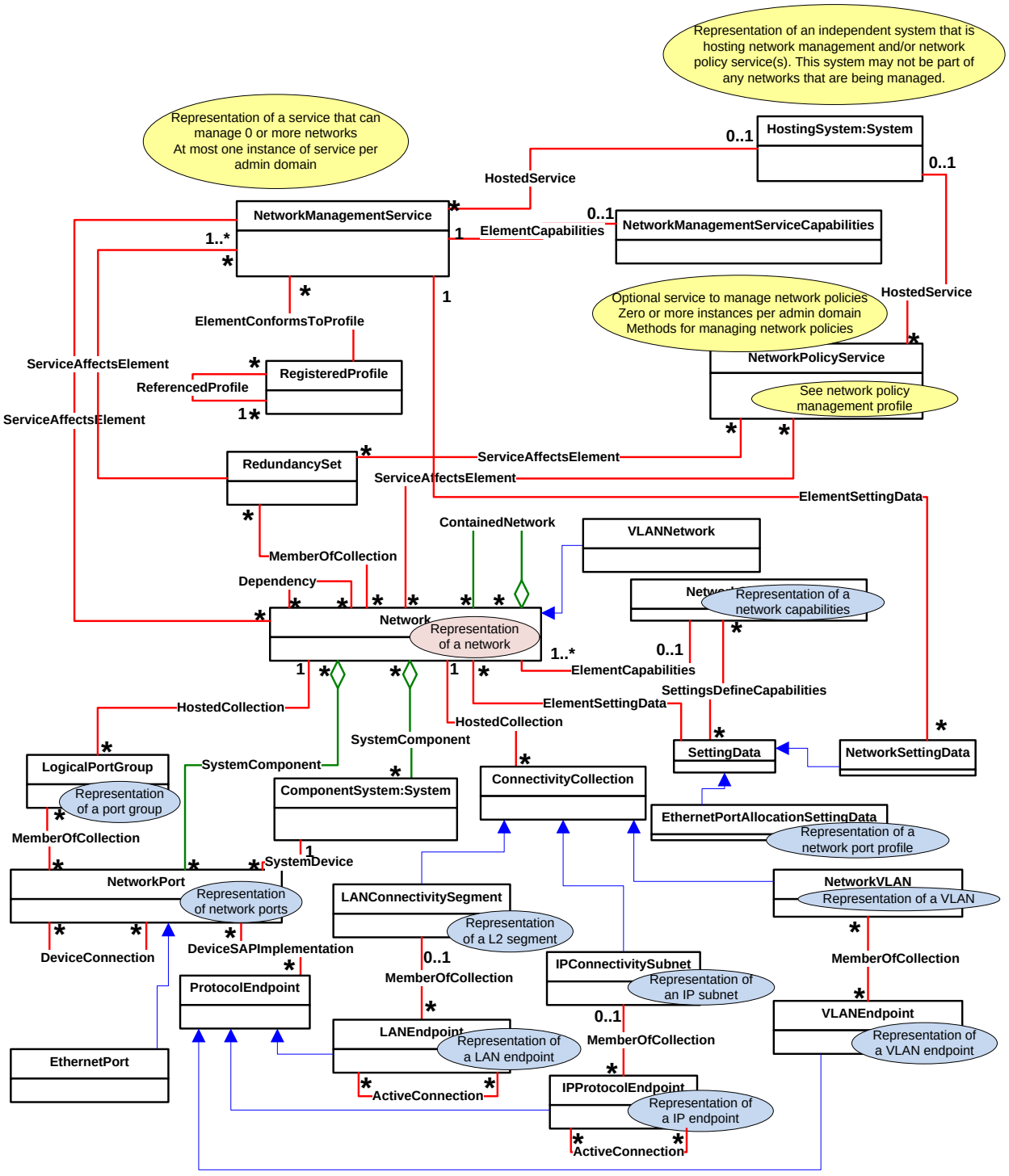
- Network topology discovery
- Network capabilities discovery
- Network monitoring and statistics collection
- Network configuration and control
- Network view (a snapshot of network)
- Network resources (ports, protocol endpoints, port groups, etc.) inventory
- Network resources configuration and control

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 must be instantiated and manipulated to represent and manage the networks and network resources modeled using the DMTF CIM core and extended model definitions.

6.1 Class diagram

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

315



316

317 **Figure 1 – Network Management Profile: Class diagram**

318 CIM_NetworkManagementService is the central class. CIM_NetworkManagementService represents the
319 service that is managing networks represented by CIM_Network. CIM_NetworkManagementService class
320 supports extrinsic methods for creation, deletion, and modification of networks and network resources.

CIM_HostingSystem represents the system hosting the network management service. This relationship between CIM_HostingSystem and CIM_NetworkManagementService is represented by CIM_HostedService. The capabilities of the network management service are described by CIM_NetworkManagementSerrviceCapabilities. CIM_NetworkManagementServiceCapabilities class is derived from the CIM_EnabledLogicalElementCapabilities class. CIM_NetworkManagementServiceCapabilties is associated with CIM_NetworkManagementService through CIM_ElementCapabilities. CIM_ServiceAffectsElement is used to represent the relationship between the CIM_NetworkManagementService and the resources managed by CIM_NetworkManagementService.

The CIM_Network class represents a logical, virtual, or physical network. CIM_Network supports a representation of a network. A network can be an independent network or a network contained within another network, or a network that is related to other networks. The relationship of a network contained within a network is represented by CIM_ContainedNetwork. A VLAN network is represented by CIM_VLANNetwork that is derived from CIM_Network. CIM_RedundancySet is used to model failover and load balancing of networks.

The capabilities of a network are described by one or more instances of CIM_NetworkCapabilities. CIM_NetworkCapabilities is derived from the CIM_EnabledLogicalElementCapabilities class. CIM_NetworkCapabilties is associated with CIM_Network through CIM_ElementCapabilities.

The configuration of a network is described by one or more instances of the CIM_SettingData. CIM_EthernetPortAllocationSettingData represents a network port profile. Network port profiles provisioned on a network are represented by one or more instances of CIM_EthernetPortAllocationSettingData. CIM_EthernetPortAllocationSettingData is derived from the CIM_SettingData. CIM_SettingData is associated with Network through CIM_ElementSettingData.

The following network resources are represented.

1) CIM_NetworkPort represents a port of a network. CIM_NetworkPort is associated with CIM_Network through CIM_SystemComponent. CIM_EthernetPort is a derived class of CIM_NetworkPort that represents an Ethernet port. Connection between two CIM_NetworkPort instances is represented by CIM_DeviceConnection.

2) CIM_ComponentSystem represents a system within a network. CIM_ComponentSystem is associated with CIM_Network through CIM_SystemComponent. The relationship between CIM_NetworkPort and CIM_ComponentSystem is represented by CIM_SystemDevice.

3) CIM_LogicalPortGroup represents a port group within a network. CIM_LogicalPortGroup is associated with *Network* through CIM_HostedCollection.

4) CIM_LANConnectivitySegment represents a layer 2 segment or subnet within a network. CIM_LANConnectivitySegment is associated with CIM_Network through CIM_HostedCollection.

5) CIM_IPConnectivitySubnet represents a layer 2 segment or subnet within a network. CIM_IPConnectivitySubnet is associated with CIM_Network through CIM_HostedCollection.

6) CIM_NetworkVLAN represents a VLAN. CIM_NetworkVLAN is associated with CIM_Network through CIM_HostedCollection.

7) CIM_ProtocolEndpoint represents a protocol endpoint. CIM_LANEndpoint represents layer 2 protocol endpoint. CIM_LANEndpoint is derived from CIM_ProtocolEndpoint. The relationship of CIM_LANEndpoint with a specific CIM_LANConnectivitySegment is modeled by CIM_MemberOfCollection. CIM_IPProtocolEndpoint represents IP layer endpoint. CIM_IPProtocolEndpoint is also derived from CIM_ProtocolEndpoint. The relationship of CIM_IPProtocolEndpoint with a specific CIM_IPConnectivitySubnet is modeled by CIM_MemberOfCollection. CIM_VLANEndpoint represents layer 2 VLAN endpoint. CIM_VLANEndpoint is derived from CIM_ProtocolEndpoint. The relationship of CIM_VLANEndpoint with a specific CIM_NetworkVLAN is modeled by CIM_MemberOfCollection. CIM_DeviceSAPImplementation models the relationship between CIM_NetworkPort and CIM_ProtocolEndpoint. Connectivity between LAN endpoints is modeled

by CIM_ActiveConnection. Similarly, connectivity between IP protocol endpoints is modeled by CIM_ActiveConnection.

CIM_NetworkPolicyService represents the service that is managing network policies. CIM_HostingSystem represents the system hosting the network policy service. This relationship between CIM_HostingSystem and CIM_NetworkPolicyService is represented by CIM_HostedService. CIM_ServiceAffectsElement is used to represent the relationship between the CIM_NetworkPolicyService and the resources affected by CIM_NetworkPolicyService.

Support for the Network Management Profile is advertised by CIM_RegisteredProfile.

7 Implementation requirements

This clause details the requirements related to the instantiations of instances and properties of instances for implementations of this profile.

7.1 Representing the Network Management Service

An instance of CIM_NetworkManagementService represents a network management service.

At least one instance of CIM_NetworkManagementService shall exist.

Each instance of the CIM_NetworkManagementService shall be associated to the scoping instance of CIM_System (HostingSystem) with CIM_HostedService association.

7.2 Representing the Network Management Service Capabilities

An instance of CIM_NetworkManagementServiceCapabilties represents network management service capabilities.

One or more instances of CIM_NetworkManagementServiceCapabilities may exist.

Each instance of the CIM_NetworkManagementServiceCapabilities shall be associated to exactly one instance of CIM_NetworkManagementService with CIM_ElementCapabilities association.

7.3 Representing the Network

7.3.1 CIM_Network

An instance of CIM_Network represents a network.

Zero or more instances of CIM_Network shall exist.

Each instance of the CIM_Network shall be associated to at least one instance of CIM_NetworkManagementService with one instance of CIM_ServiceAffectsElement association.

7.3.1.1 CIM_VLANNetwork

VLAN networks represent a specialization of networks modeled in general.

An instance of CIM_VLANNetwork shall represent a VLAN network.

7.3.2 Networks contained within a network

If a network represented by an instance of CIM_Network is contained within a network represented by another instance of CIM_Network, then the instance of CIM_Network shall be associated to the other instance of CIM_Network with an instance of CIM_ContainedNetwork.

7.3.3 Network dependency

Networks can be dependent on each other. For example, an overlay L2 network that is dependent on several underlying L3 networks.

CIM_Dependency shall be used to show dependency between networks.

The dependency of one network represented by an instance of CIM_Network on another network represented by another instance of CIM_Network shall be represented by an instance of CIM_Dependency that associates these two instances of CIM_Network.

7.4 Representation of network ports

7.4.1 CIM_NetworkPort

An instance of CIM_NetworkPort shall represent a network port.

Zero or more instances of CIM_NetworkPort may exist.

An instance of CIM_NetworkPort shall be associated to at least one instance of CIM_Network with an instance of CIM_SystemComponent.

7.4.2 CIM_LogicalPortGroup

An instance of CIM_LogicalPortGroup shall represent a network port group.

Zero or more instances of CIM_LogicalPortGroup may exist.

An instance of CIM_LogicalPortGroup shall be associated with one instance of CIM_Network through an instance of CIM_ HostedCollection.

7.5 Representation of collections of protocol endpoints

7.5.1 CIM_LANConnectivitySegment

An instance of CIM_LANConnectivitySegment shall represent a collection of network layer 2 protocol endpoints (see 7.6.1) that are connected within a network (see 7.3.1).

Zero or more instances of CIM_LANConnectivitySegment may exist.

Zero or more instances of CIM_LANEndpoint may be associated with an instance of CIM_LANConnectivitySegment.

An instance of CIM_LANConnectivitySegment shall be associated to one instance of CIM_Network with an instance of CIM_HostedCollection.

7.5.2 CIM_IPConnectivitySubnet

An instance of CIM_IPConnectivitySubnet shall represent a collection of network layer 3 protocol endpoints (see 7.6.2) that are connected within a network (see 7.3.1).

Zero or more instances of CIM_IPConnectivitySubnet may exist.

Zero or more instances of CIM_IPProtocolEndpoint may be associated with an instance of CIM_IPConnectivitySubnet.

An instance of CIM_IPConnectivitySubnet shall be associated to one instance of CIM_Network with an instance of CIM_HostedCollection.

7.5.3 CIM_NetworkVLAN

An instance of CIM_NetworkVLAN shall represent a collection of VLAN endpoints (see 7.6.3) for a specific VLAN within a network (see 7.3.1).

Zero or more instances of CIM_NetworkVLAN may exist.

Zero or more instances of CIM_VLANEndpoint may be associated with an instance of CIM_NetworkVLAN.

For each instance of CIM_NetworkVLAN, all instances of CIM_VLANEndpoint associated with the instance CIM_NetworkVLAN shall have the same value for the CIM_VLANEndpoint.VLANId and this value shall be same as the value of CIM_NetworkVLAN.VLANId.

An instance of CIM_NetworkVLAN shall be associated to one instance of CIM_VLANNetwork with an instance of CIM_HostedCollection.

7.6 Representation of protocol endpoints

7.6.1 CIM_LANEndpoint

An instance of CIM_LANEndpoint shall represent a network layer 2 protocol endpoint within a network (see 7.3.1).

Zero or more instances of CIM_LANEndpoint may exist.

An instance of CIM_LANEndpoint shall either be 1) associated to one instance of CIM_NetworkPort with one instance of CIM_DeviceSAPImplementation, or 2) associated to one instance of CIM_LANConnectivitySegment with one instance of CIM_MemberOfCollection, or 3) both.

7.6.2 CIM_IPProtocolEndpoint

An instance of CIM_IPProtocolEndpoint shall represent a network layer 3 protocol endpoint within a network.

Zero or more instances of CIM_IPProtocolEndpoint may exist.

An instance of CIM_IPProtocolEndpoint shall either be 1) associated to one instance of CIM_NetworkPort with one instance of CIM_DeviceSAPImplementation, or 2) associated to one instance of CIM_IPConnectivitySubnet with one instance of CIM_MemberOfCollection, or 3) both.

7.6.3 CIM_VLANEndpoint

An instance of CIM_VLANEndpoint shall represent a VLAN endpoint within a network.

Zero or more instances of CIM_VLANEndpoint may exist.

An instance of CIM_VLANEndpoint shall either be 1) associated to one instance of CIM_NetworkPort with one instance of CIM_DeviceSAPImplementation, or 2) associated to one instance of CIM_NetworkVLAN with one instance of CIM_MemberOfCollection, or 3) both.

An instance of CIM_VLANEndpoint may be associated to one instance of CIM_LANEndpoint with an instance of CIM_BindsTo.

NOTE The relationships between these protocol endpoints are modeled by Ethernet Port Profile and IP Configuration Profile.

7.7 CIM_NetworkSettingData

An instance of CIM_NetworkSettingData represents a configuration of a network or a template network configuration.

An instance of CIM_NetworkSettingData shall be associated to an instance of CIM_Network or an instance of CIM_NetworkManagementServiceCapabilities or an instance of CIM_NetworkCapabilities.

An instance of CIM_NetworkSettingData representing a configuration of an existing network shall be associated to an instance of CIM_Network with an instance of CIM_ElementSettingData.

An instance of CIM_NetworkSettingData representing a template network configuration shall be associated to an instance of CIM_NetworkManagementServiceCapabilities with an instance of CIM_SettingsDefineCapabilities.

An instance of CIM_NetworkSettingData representing a template configuration of an existing network shall be associated to an instance of CIM_NetworkCapabilities with an instance of CIM_SettingsDefineCapabilities.

7.8 CIM_EthernetPortAllocationSettingData

An instance of CIM_EthernetPortAllocationSettingData represents a network port configuration. An instance of CIM_EthernetPortAllocationSettingData can be used to represent a network port profile defined by using DSP8049.

An instance of CIM_EthernetPortAllocationSettingData shall be associated to an instance of CIM_NetworkPort or an instance of CIM_NetworkCapabilities.

An instance of CIM_EthernetPortAllocationSettingData representing a configuration of an existing network port shall be associated to an instance of CIM_NetworkPort with an instance of CIM_ElementSettingData.

An instance of CIM_EthernetPortAllocationSettingData representing a template network port configuration shall be associated to an instance of CIM_NetworkCapabilities with an instance of CIM_SettingsDefineCapabilities.

8 Methods

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

8.1 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
- EnumerateInstances
- EnumerateInstanceNames
- Associators
- AssociatorNames
- References
- ReferenceNames

8.2 CIM_NetworkManagementService

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.3 CIM_NetworkManagementServiceCapabilties

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.4 CIM_NetworkPolicyService

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.5 CIM_RedundancySet

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.6 CIM_Network

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.7 CIM_VLANNetwork

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.8 CIM_NetworkCapabilities

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.9 CIM_NetworkSettingData

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.10 CIM_EthernetPortAllocationSettingData

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.11 CIM_NetworkPort

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.12 CIM_EthernetPort

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.13 CIM_LogicalPortGroup

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.14 CIM_System

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.15 CIM_ConnectivityCollection

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.16 CIM_LANConnectivitySegment

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.17 CIM_LANEndpoint

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.18 CIM_IPConnectivitySubnet

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.19 CIM_IPProtocolEndpoint

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.20 CIM_NetworkVLAN

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.21 CIM_VLANEndpoint

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.22 CIM_RegisteredProfile

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.23 CIM_ElementConformsToProfile

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.24 CIM_HostedService

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.25 CIM_ElementCapabilities

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.26 CIM_ServiceAffectsElement

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.27 CIM_ContainedNetwork

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.28 CIM_MemberOfCollection

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.29 CIM_HostedCollection

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.30 CIM_Dependency

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.31 CIM_PeerNetwork

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.32 CIM_ElementSettingData

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.33 CIM_SystemComponent

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.34 CIM_SettingsDefineCapabilities

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.35 CIM_SystemDevice

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.36 CIM_DeviceConnection

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.37 CIM_ActiveConnection

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

8.38 CIM_DeviceSAPImplementation

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

9 Use cases

This clause contains object diagrams and use cases for the *Network Management Profile*.

9.1 Miscellaneous object diagrams

The object diagram in Figure 2 shows one possible method for advertising profile conformance.

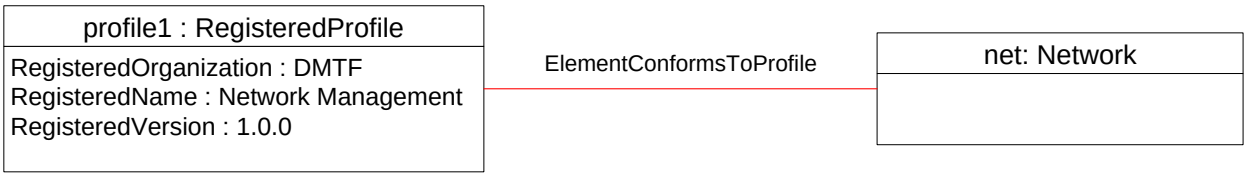


Figure 2 – Registered profile

9.2 Representing VLAN networks within an L2 network

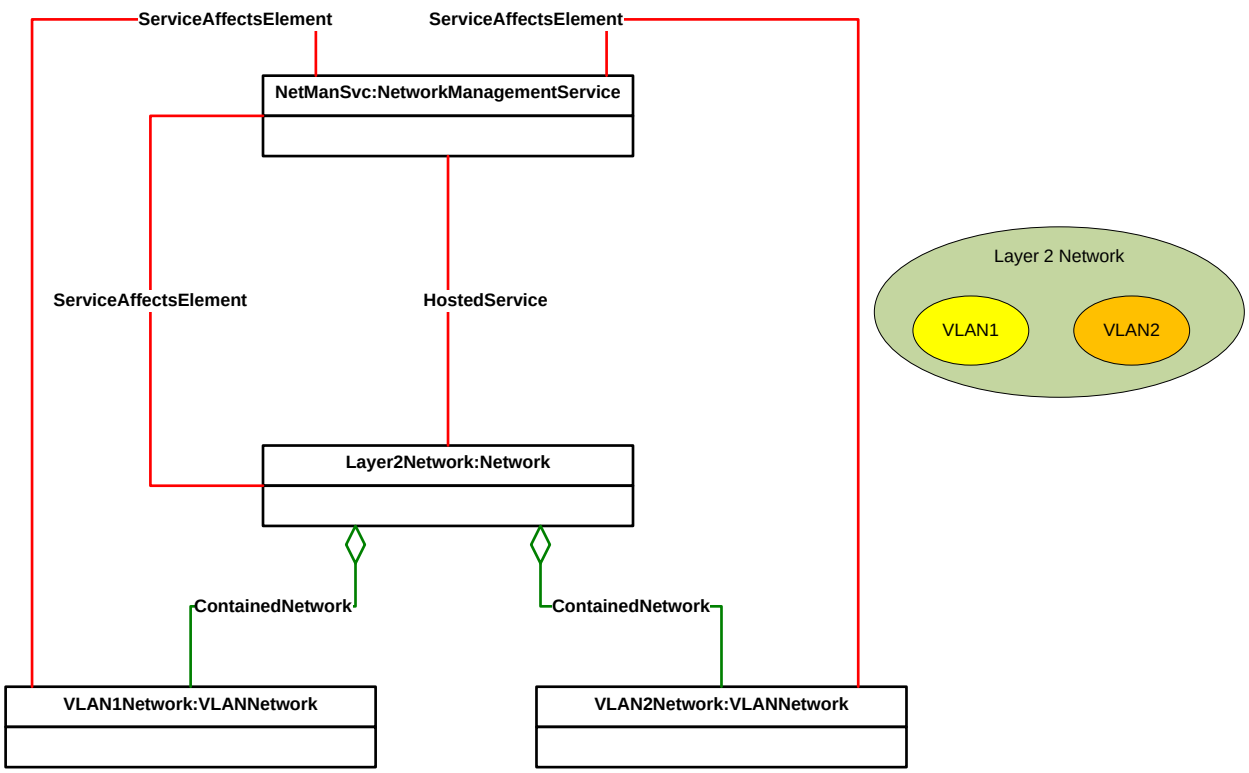


Figure 3 – Two VLAN networks within a Layer 2 network

In this example, two networks with their individual VLAN domains are instantiated inside a layer 2 network. The instance of layer 2 network *Layer2Network* is the parent of the instances *VLAN1Network* and *VLAN2Network*. *NetManSvc* represents the service that is hosted on the layer 2 network. *NetManSvc* manages all three networks as represented by *ServiceAffectsElement*.

9.3 Representing underlay IP networks within an L2 overlay network

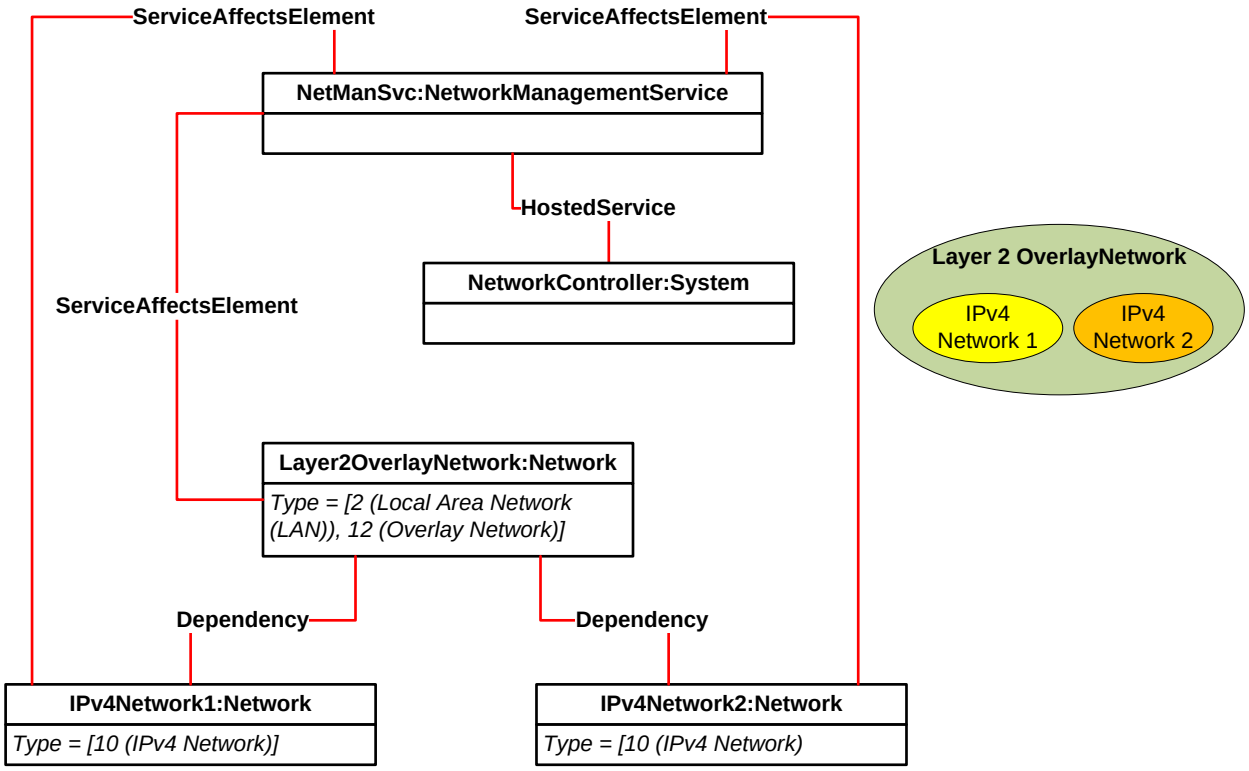


Figure 4 – Two IPv4 underlay networks creating a layer 2 overlay network

In this example, two IPv4 networks with their individual domains are instantiated to create a layer 2 overlay network. The instance of layer 2 overlay network *Layer2OverlayNetwork* is dependent on the instances *IPv4Network1* and *IPv4Network2*. *NetManSvc* represents the service that is hosted on the *NetworkController* (e.g., an SDN controller). *NetManSvc* manages all three networks (one overlay network and two underlay networks) as represented by *ServiceAffectsElement*.

9.4 Representing two peer IP networks

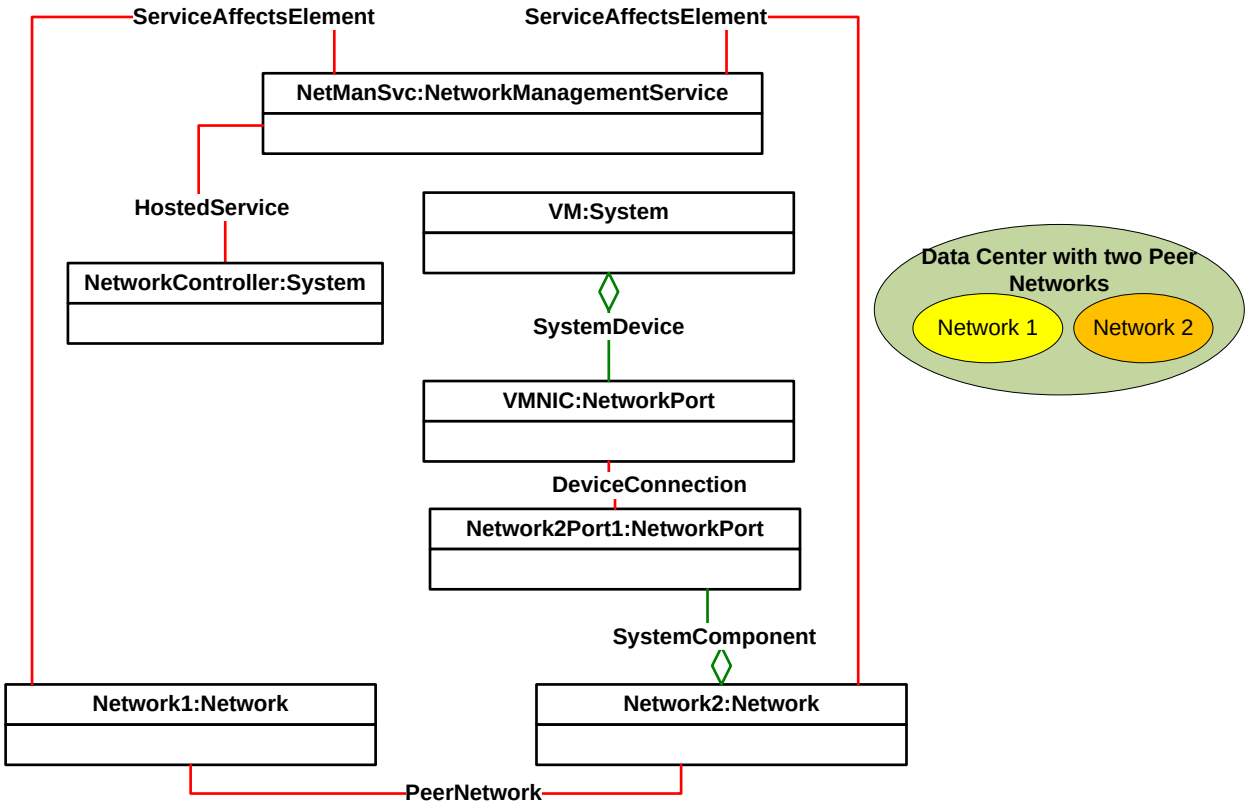


Figure 5 – Two peer managed networks

A network administrator trying to deploy a VM on a network *Network1* finds out that *Network1* does not have additional resources. In this case, the network administrator finds a peer network *Network2* with available network resources and deploys the VM on the peer network *Network2*.

In this example, two peer networks are represented by two instances *Network1* and *Network2*. The instance of *PeerNetwork* shows relationship between *Network1* and *Network2*. *NetManSvc* represents the service that is hosted on a system *NetworkController*. *NetManSvc* manages both peer networks as represented by *ServiceAffectsElement*. The instance *VM* is connected to *Network2.* That connection is represented by *DeviceConnection* association between *VMNIC* and *Network2Port1*.

Future Example: A data center administrator is supporting multiple tenants each with its own set of resources including networks. Each tenant within its domain can administer movement of VMs and network resources. When a tenant network runs out of network resources, the data center administrator finds peer networks with available network resources and reallocates network resources to the given tenant network.

9.5 Representing two tenant networks within a provider network

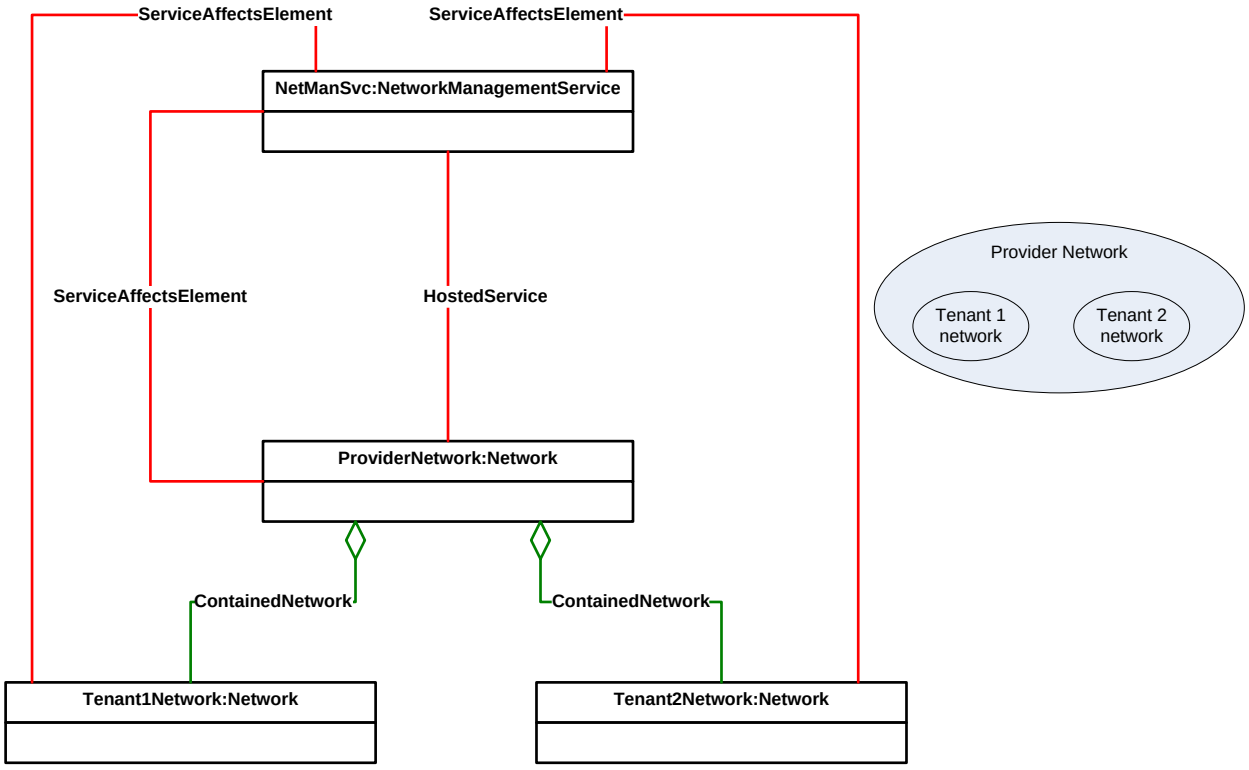


Figure 6 – Two tenant networks within a provider network

9.6 Representing ethernet ports of tenant networks

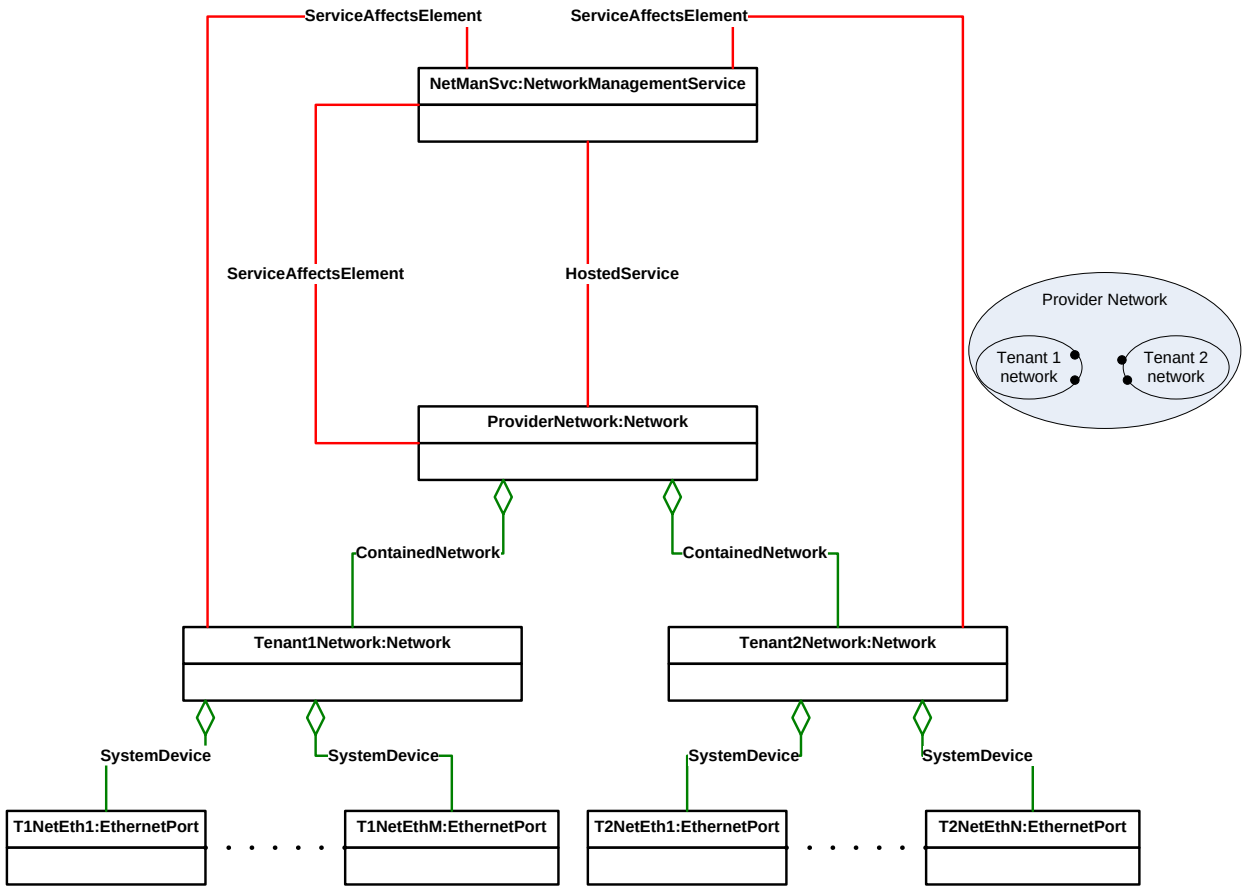


Figure 7 – Representing ethernet ports of two tenant networks within a provider network

9.7 Representing systems connected to ethernet ports of tenant networks

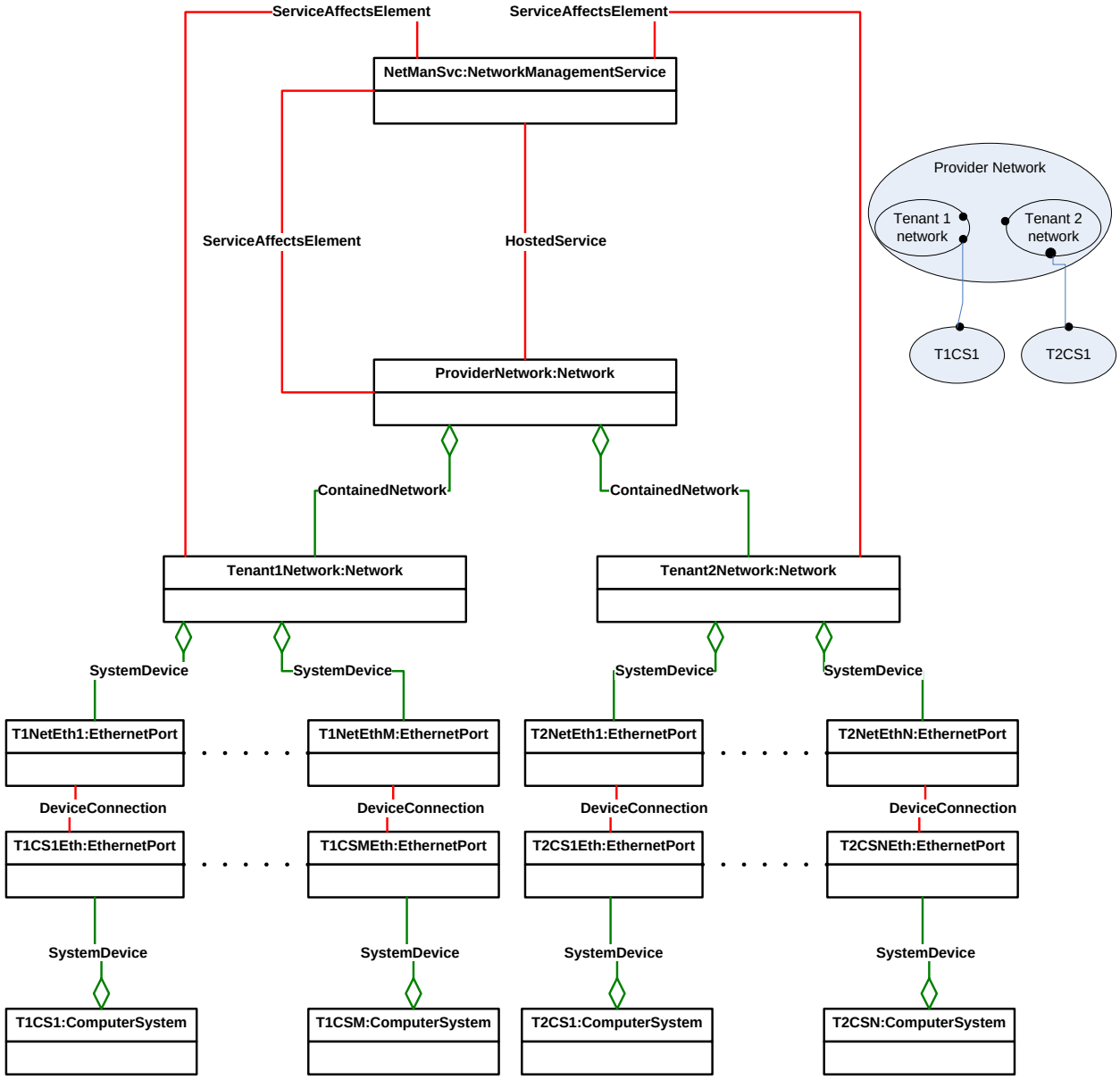


Figure 8 – Representing systems connected to ethernet ports of two tenant networks within a provider network

9.8 Representing a tunneled network connecting two ethernet networks

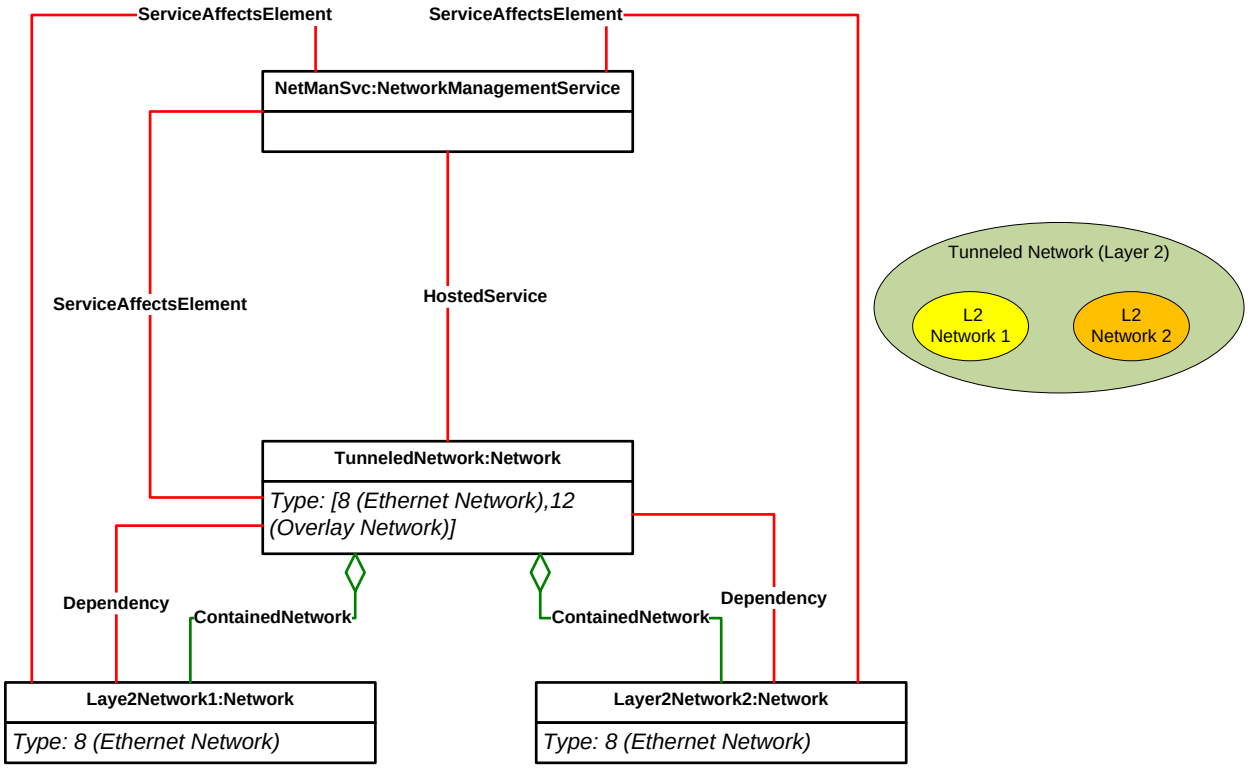


Figure 9 – Representing a tunneled network bridging two ethernet networks

9.9 Enumerate networks

A client can list all the networks by enumerating all instances of CIM_Network.

9.10 Enumerate contained networks within a specific network

A client can list all the networks contained within a network as follows:

1) Find all instances of CIM_Network that are associated with the given instance of CIM_Network through an instance of CIM_ContainedNetwork.

9.11 Create one or more networks

A client can create one or more networks contained within a network as follows:

1) Extrinsic method on CIM_NetworkManagementService.

9.12 Create one or more networks within a network

A client can create one or more networks contained within a network as follows:

1) Extrinsic method on CIM_Network.

9.13 Delete a network

A client can delete an instance of CIM_Network.

9.14 Discover logical ports of a network

A client can discover all the ports within a network as follows:

1) Enumerate all instances of CIM_NetworkPort that are associated with the given instance of CIM_Network through an instance of CIM_SystemComponent.

9.15 Discover logical port groups of a network

A client can discover all the logical port groups within a network as follows:

1) Enumerate all instances of CIM_LogicalPortGroup that are associated with the given instance of CIM_Network through an instance of CIM_HostedCollection.

9.16 Discover IP subnets of a network

A client can discover all the logical port groups within a network as follows:

1) Enumerate all instances of CIM_IPConnectivitySubnet that are associated with the given instance of CIM_Network through an instance of CIM_HostedCollection.

9.17 Discover VLANs of a network

A client can discover all the VLANs within a network as follows:

1) Enumerate all instances of CIM_NetworkVLAN that are associated with the given instance of CIM_Network through an instance of CIM_HostedCollection.
2) For each instance of CIM_NetworkVLAN in 1, Enumerate all instances of CIM_VLANEndpoint that are associated with the given instance of CIM_NetworkVLAN through an instance of CIM_MemberOfCollection.

9.18 Discover L2 segments of a network

A client can discover all the logical port groups within a network as follows:

1) Enumerate all instances of CIM_LANConnectivitySegment that are associated with the given instance of CIM_Network through an instance of CIM_HostedCollection.

9.19 Discover systems within a network

A client can discover all the logical port groups within a network as follows:

1) Enumerate all instances of CIM_System that are associated with the given instance of CIM_Network through an instance of CIM_SystemComponent.

9.20 Enumerate networks that a system is directly connected to (intrinsic method)

A client can discover all the logical port groups within a network as follows:

1) Enumerate all instances of CIM_Network that are associated with the given instance of CIM_System through an instance of CIM_SystemComponent.

10 CIM Elements

Table 2 shows the instances of CIM Elements for this profile. Instances of the CIM Elements shall be implemented as described in Table 2. Clauses 7 ("Implementation") and 8 ("Methods") may impose additional requirements on these elements.

Table 2 – CIM Elements: Network Services Management Profile

Element Name	Requirement	Description
Classes		
CIM_NetworkManagementService	Optional	See clause 8.2
CIM_NetworkManagementServiceCapabilities	Optional	See clause 8.3
CIM_NetworkPolicyService	Optional	See clause 8.4
CIM_Network	Mandatory	See clause 8.6
CIM_NetworkCapabilities	Optional	See clause 8.8
CIM_NetworkSettingData	Optional	See clause 8.9
CIM_EthernetPortAllocationSettingData	Optional	See clause 8.10
CIM_RedundancySet	Optional	See clause 8.5
CIM_LogicalPortGroup	Optional	See clause 8.13
CIM_NetworkPort	Optional	See clause 8.11
CIM_EthernetPort	Optional	See clause 8.12
CIM_System	Optional	See clause 8.14
CIM_ConnectivityCollection	Optional	See clause 8.15
CIM_LANConnectivitySegment	Optional	See clause 8.16
CIM_LANEndpoint	Optional	See clause 8.17
CIM_IPConnectivitySubnet	Optional	See clause 8.18
CIM_IPProtocolEndpoint	Optional	See clause 8.19
CIM_NetworkVLAN	Optional	See clause 8.20
CIM_VLANEndpoint	Optional	See clause 8.21
CIM_RegisteredProfile	Mandatory	See clause 8.22
Associations		
CIM_ElementConformsToProfile	Mandatory	
CIM_HostedService	Optional	
CIM_ElementCapabilities	Optional	
CIM_ServiceAffectsElement	Optional	
CIM_ContainedNetwork	Optional	
CIM_MemberOfCollection	Optional	
CIM_HostedCollection	Optional	
CIM_Dependency	Optional	

Element Name	Requirement	Description
CIM_PeerNetwork	Optional	
CIM_ElementSettingData	Optional	
CIM_SystemComponent	Optional	
CIM_SettingsDefineCapabilities	Optional	
CIM_SystemDevice	Optional	
CIM_DeviceConnection	Optional	
CIM_ActiveConnection	Optional	
CIM_DeviceSAPImplementation	Optional	
Indications		
None defined in this profile		

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ANNEX A
(informative)

Change log

Version	Date	Description
1.0.0	2020-05-18	