Network Management Profile

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Foreword

The Network Management Profile (DSP1046) was prepared by the Network Services Management Working Group of the DMTF. DMTF is a not-for-profit association of industry members dedicated to promoting enterprise and systems management and interoperability.

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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 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.
1 Scope

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 Network.

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

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
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, 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 Peer Network

A Peer Network is a specific type of network that has a relationship with another peer network but it is neither dependent nor contained in the peer network.

3.13 Network Port

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

3.14 Network Port Group

A Network Port Group represents a collection of network ports.

3.15 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: 2.45

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.

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

<table>
<thead>
<tr>
<th>Profile Name</th>
<th>Organization</th>
<th>Version</th>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile Registration</td>
<td>DMTF</td>
<td>1.0</td>
<td>Mandatory</td>
<td>See DSP1033</td>
</tr>
<tr>
<td>Ethernet Port</td>
<td>DMTF</td>
<td>1.0</td>
<td>Optional</td>
<td>See DSP1014</td>
</tr>
<tr>
<td>Network Policy Management</td>
<td>DMTF</td>
<td>1.0</td>
<td>Optional</td>
<td>See DSP1048</td>
</tr>
</tbody>
</table>
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.
NetworkManagementService is the central class. NetworkManagementService represents the service that is managing networks represented by Network. NetworkManagementService class supports extrinsic methods for creation, deletion, and modification of networks and network resources. HostingSystem...
represents the system hosting the network management service. This relationship between
HostingSystem and NetworkManagementService is represented by HostedService. The capabilities of
the network management service are described by NetworkManagementServiceCapabilities. NetworkManagementServiceCapabilities is derived from the EnabledLogicalElementCapabilities class. NetworkManagementServiceCapabilities is associated with NetworkManagementService through ElementCapabilities. ServiceAffectsElement is used to represent the relationship between the NetworkManagementService and the resources managed by NetworkManagementService.

The Network class represents a logical, virtual, or physical network. 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 ContainedNetwork. The relationship between peer networks is represented by
PeerNetwork. A VLAN network is represented by VLANNetwork that is derived from Network.
RedundancySet is used to model failover and load balancing of networks.

Note: Add a new association class PeerNetwork.

A view of a network is represented by NetworkView. NetworkView is derived from the View class.
NetworkView is associated with Network through ElementView.

The capabilities of a network are described by one or more instances of NetworkCapabilities. NetworkCapabilities is derived from the EnabledLogicalElementCapabilities class. NetworkCapabilities is associated with Network through ElementCapabilities.

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

The following network resources are represented.

1. NetworkPort represents a port of a network. NetworkPort is associated with Network through
SystemComponent. EthernetPort is a derived class of NetworkPort that represents an Ethernet
port. Connection between two NetworkPort is represented by DeviceConnection.

2. ComponentSystem represents a system within a network. ComponentSystem is associated with
Network through SystemComponent. The relationship between NetworkPort and
ComponentSystem is represented by SystemDevice.

3. LogicalPortGroup represents a port group within a network. LogicalPortGroup is associated with
Network through HostedCollection.

4. LANConnectivitySegment represents a layer 2 segment or subnet within a network. LANConnectivitySegment is associated with Network through HostedCollection.

5. IPConnectivitySubnet represents a layer 2 segment or subnet within a network. IPConnectivitySubnet is associated with Network through HostedCollection.

6. NetworkVLAN represents a VLAN. NetworkVLAN is associated with Network through
HostedCollection.

7. ProtocolEndpoint represents a protocol endpoint. LANEndpoint represents layer 2 protocol
endpoint. LANEndpoint is derived from ProtocolEndpoint. The relationship of LANEndpoint with a
specific LANConnectivitySegment is modeled by MemberOfCollection. IPProtocolEndpoint
represents IP layer endpoint. IPProtocolEndpoint is also derived from ProtocolEndpoint. The
relationship of IPProtocolEndpoint with a specific IPConnectivitySubnet is modeled by
MemberOfCollection. VLANEndpoint represents layer 2 VLAN endpoint. VLANEndpoint is derived
from ProtocolEndpoint. The relationship of VLANEndpoint with a specific NetworkVLAN is
modeled by memberOfCollection. DeviceSAPImplementation models the relationship between NetworkPort and ProtocolEndpoint. Connectivity between LAN endpoints is modeled by ActiveConnection. Similarly, connectivity between IP protocol endpoints is modeled by ActiveConnection.

NetworkPolicyService represents the service that is managing network policies. HostingSystem represents the system hosting the network policy service. This relationship between HostingSystem and NetworkPolicyService is represented by HostedService. ServiceAffectsElement is used to represent the relationship between the NetworkPolicyService and the resources affected by NetworkPolicyService.

Support for the Network Management Profile is advertised by 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_NetworkManagementServiceCapabilities 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 of VLAN endpoints.

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.

### 7.3.4 Peer Networks

There are real life scenarios where two networks exhibit a peer relationship. For example, a network administrator trying to deploy a VM on a network finds out that the network does not have additional resources. In this case, the network administrator finds a peer network with available network resources and deploys the VM on the peer network.

CIM_PeerNetwork shall be used to show peer relationships between networks.

The peer relationship of a network represented by an instance of CIM_Network, that is a peer (neither contained nor dependent) to a network represented by another instance of CIM_Network, may be represented by an instance of CIM_PeerNetwork that associates these two instances of CIM_Network.

Peer networks mentioned in this section are described from the modeling relationship standpoint only. The modeling of peering points is out of the scope of this specification.

Open: Create a CR for PeerNetwork association.

### 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_NetworkView

An instance of CIM_NetworkView represents a view of a network.

Zero or more instances of CIM_NetworkView may exist.

An instance of CIM_NetworkView shall be associated to an instance of CIM_Network with an instance of CIM_ElementView.

7.8 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.

Open: Fix the class diagram to show an association between CIM_NetworkManagementService and CIM_NetworkSettingData,

Open: Define an extrinsic method on NetworkManagementService to create a network using a template configuration. This method creates an instance of Network as well as instances of CIM_NetworkSettingData that represent runtime configuration of the created network.

7.9 CIM_EthernetPortAllocationSettingData

An instance of CIM_EthernetPortAllocationSettingData represents a network port configuration.
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.

Open: How do we relate a network port profile represented by DSP8049 using CIM_NetworkCapabilities?

8 Methods

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

8.1 Extrinsic Methods

8.1.1 CIM_NetworkManagementService

Create one or more networks
Create/Delete logical port groups of a network
Create/Delete logical ports of a network
Create/Delete IP subnets of a network
Create/Delete VLANs of a network
Create/Delete L2 segments of a network
Modify a logical port group of a network – add or delete one or more ports
Modify an IP subnet of a network – add or delete one or more IP protocol endpoints
Modify a VLAN of a network – add or delete member VLAN endpoints
Modify a L2 segment of a network – add or delete LAN endpoints

Open: The above extrinsic methods need to be defined.

8.1.2 CIM_Network

Enumerate networks contained within a specific network
Create one or more networks within a network
Delete networks contained within a network

Open: The above extrinsic methods need to be defined.

8.2 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

8.3 CIM_NetworkManagementService
All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.4 CIM_NetworkManagementServiceCapabilities
All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.5 CIM_NetworkPolicyService
All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.6 CIM_RedundancySet
All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.7 CIM_Network
All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.8 CIM_VLANNetwork
All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.9 CIM_NetworkView
All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.10 CIM_NetworkCapabilities
All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.11 CIM_NetworkSettingData
All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.12 CIM_EthernetPortAllocationSettingData
All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.13 CIM_NetworkPort
All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.14 CIM_EthernetPort

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.15 CIM_System

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.16 CIM_ConnectivityCollection

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.17 CIM_LANConnectivitySegment

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.18 CIM_LANEndpoint

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.19 CIM_IPConnectivitySubnet

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.20 CIM_IPProtocolEndpoint

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.21 CIM_NetworkVLAN

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.22 CIM_VLANEndpoint

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.23 CIM_REGISTEREDPROFILE

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.24 CIM_ElementConformsToProfile

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.25 CIM_HostedService

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.26 CIM_ElementCapabilities

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.27 CIM_ServiceAffectsElement
All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.28 CIM_ContainedNetwork

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.29 CIM_MemberOfCollection

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.30 CIM_HostedCollection

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.31 CIM_Dependency

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.32 CIM_ElementView

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.33 CIM_PeerNetwork

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.34 CIM_ElementSettingData

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.35 CIM_SystemComponent

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.36 CIM_SettingsDefineCapabilities

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.37 CIM_SystemDevice

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.38 CIM_DeviceConnection

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.39 CIM_ActiveConnection

All operations in the default list in 8.2 shall be implemented as defined in DSP0200.

8.40 CIM_DeviceSAPImplementation

All operations in the default list in 8.2 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.

```
profile1 : RegisteredProfile
RegisteredOrganization : DMTF
RegisteredName : Network Management
RegisteredVersion : 1.0.0
net: Network
```

![Figure 2 – Registered profile](image-url)

9.2 Representing VLAN networks within an L2 network

![Figure 3 – Two VLAN networks within a Layer 2 network](image-url)
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

![Diagram of Layer 2 Overlay Network](image)

**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

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.

Figure 5 – Two Peer Managed Networks
9.5 Representing Two Tenant Networks within a Provider Network

Figure 6 – Two tenants networks within a provider network
9.6 Representing Ethernet ports of tenant networks

Figure 7 – Representing Ethernet Ports of Two tenants 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 tenants 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 a Network

9.12 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.

9.13 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.
9.14 Delete a network

A client can delete an instance of CIM_Network.

9.15 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.

9.16 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.

9.17 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.

9.18 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.

9.19 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.

9.20 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.
9.21 Create/Delete logical port groups of a network (extrinsic method of network management service)

9.22 Create/Delete logical ports of a network (extrinsic method of network management service)

9.23 Create/Delete IP subnets of a network (extrinsic method of network management service)

9.24 Create/Delete VLANs of a network (extrinsic method of network management service)

9.25 Create/Delete L2 segments of a network (extrinsic method of network management service)

9.26 Modify a logical port group of a network (extrinsic method of network management service) – add or delete one or more ports

9.27 Modify an IP subnet of a network (extrinsic method of network management service) – add or delete one or more IP protocol endpoints

9.28 Modify a VLAN of a network (extrinsic method of network management service) – add or delete member VLAN endpoints

9.29 Modify a L2 segment of a network (extrinsic method of network management service) – add or delete LAN endpoints

9.30 Create a network connection for a system (extrinsic method of network – creates network port and associations between the network/network port and the system)

9.31 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.

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**Associations**

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**Indications**

None defined in this profile
ANNEX A
(informative)

Change log

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