DMTF Management Standards for Edge Virtual Bridging (EVB) and Network Port Profiles

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DMTF Platform Management Sub-Committee Chair

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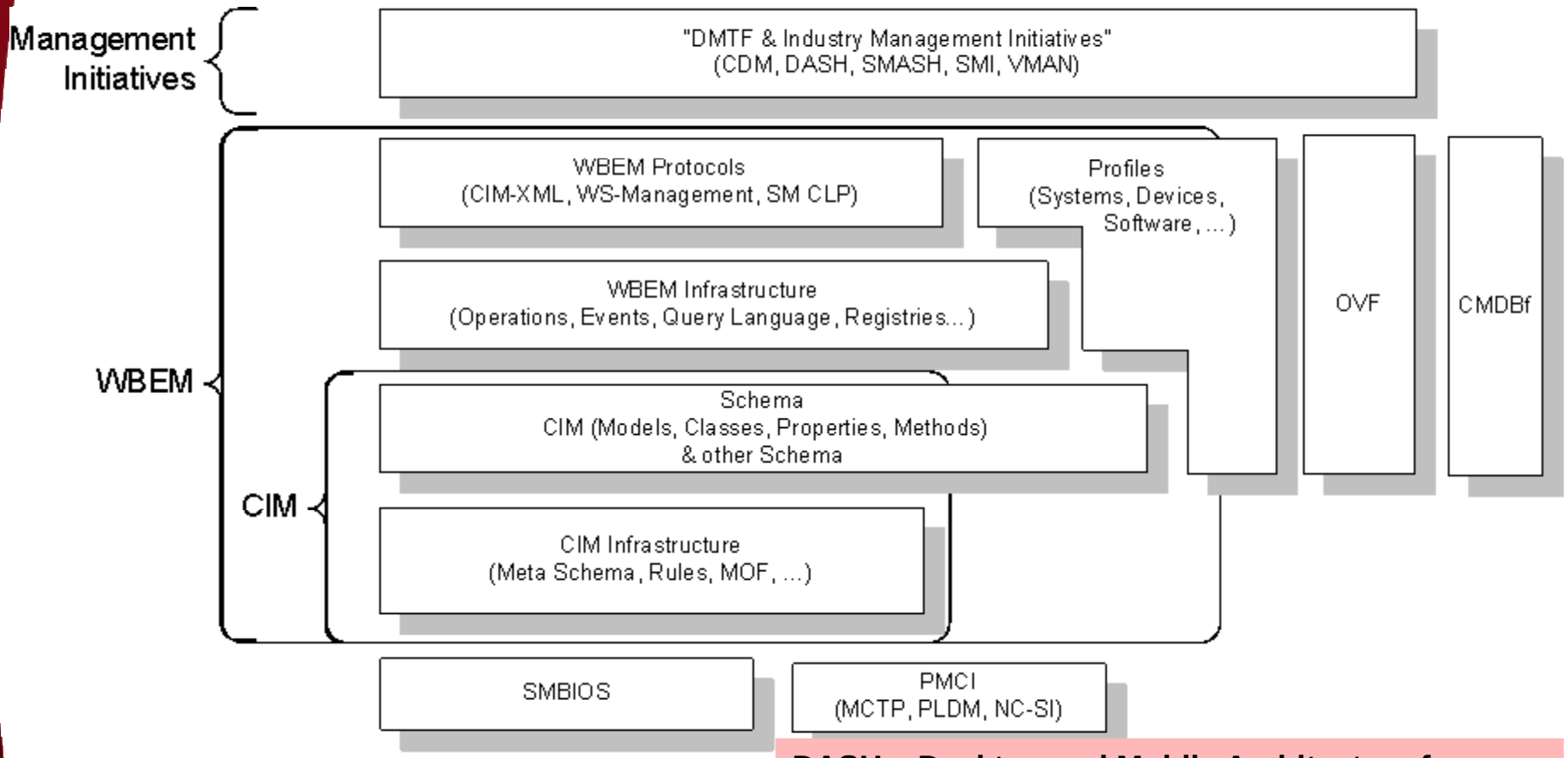
Agenda

- DMTF Overview
- IEEE/DMTF Areas of Collaboration
- DMTF Standards for EVB Management and Network Port Profiles
- VM Lifecycle Management
- Open Virtualization Format (OVF)
- Network Port Profiles
- CIM Profiles for Virtual Networking

Distributed Management Task Force (DMTF)

- Develops management standards for enterprise and Internet environments
- Formed in 1992
- More than 4,000 active participants
  - from nearly 200 organizations in over 40 countries
- 3 Major committees and 25+ Working Groups/Forums
  - Committees: Technical, Marketing, Interoperability…
- Over a dozen Alliance Partners
    - SNIA, OGF/GGF, NGN, TMF, TCG, OASIS, etc.
- Developed standards & initiatives
    - CIM, CIM-XML, SMBIOS, CDM, ASF, SMASH, DASH, WS-Management…

DMTF Technology Diagram

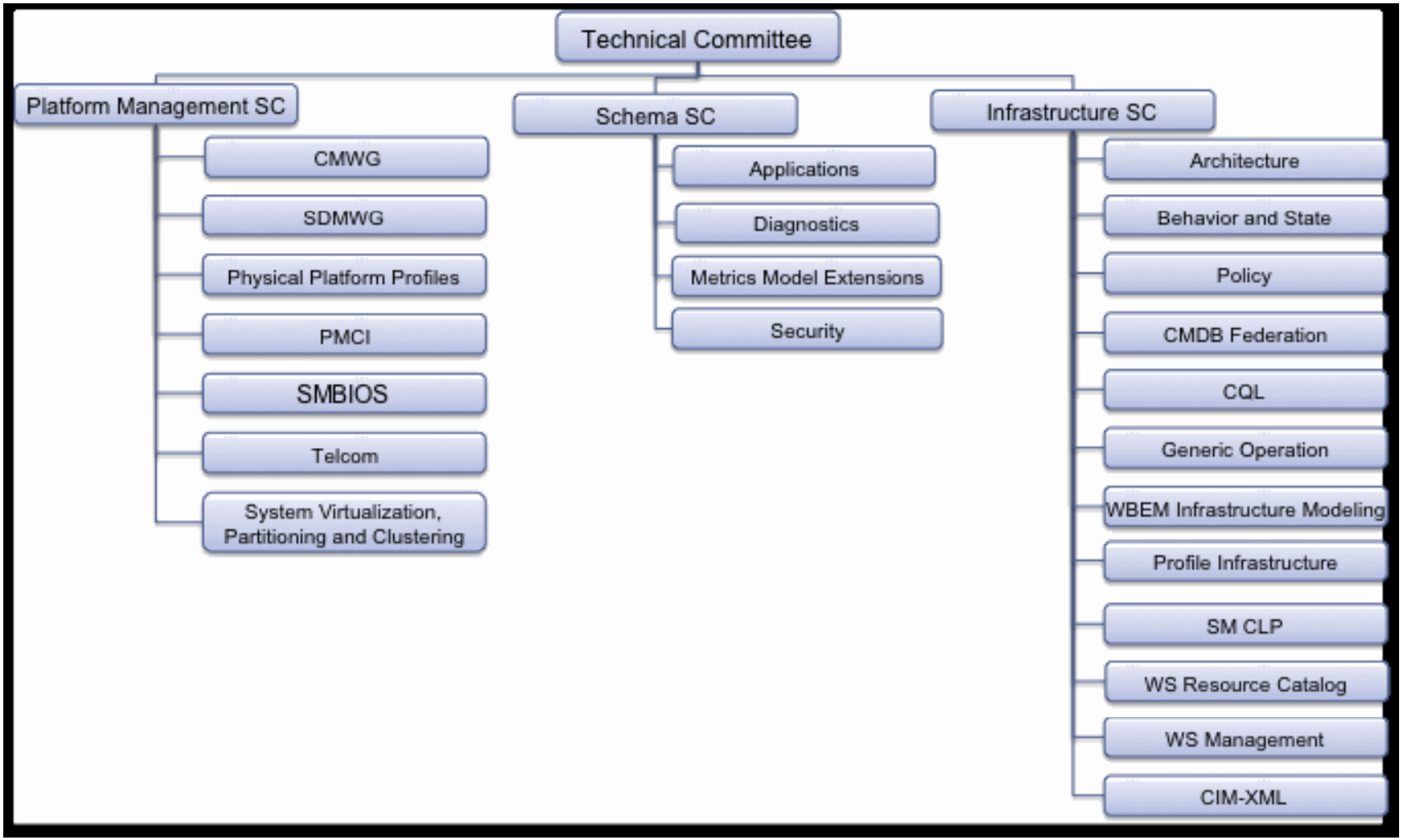


CIM – Common Information Model
WBEM – Web Based Enterprise Management
OVF – Open Virtualization Format
MOF – Managed Object Format
WS-Man – Web Services Based Management

DASH – Desktop and Mobile Architecture for System Hardware
SMASH – System Management Architecture for Server Hardware
SMI – Storage Management Initiative
CDM – Common Diagnostics Model
VMAN – Virtualization Management

DMTF Technical Committee Organization

http://www.dmtf.org/about/working-groups



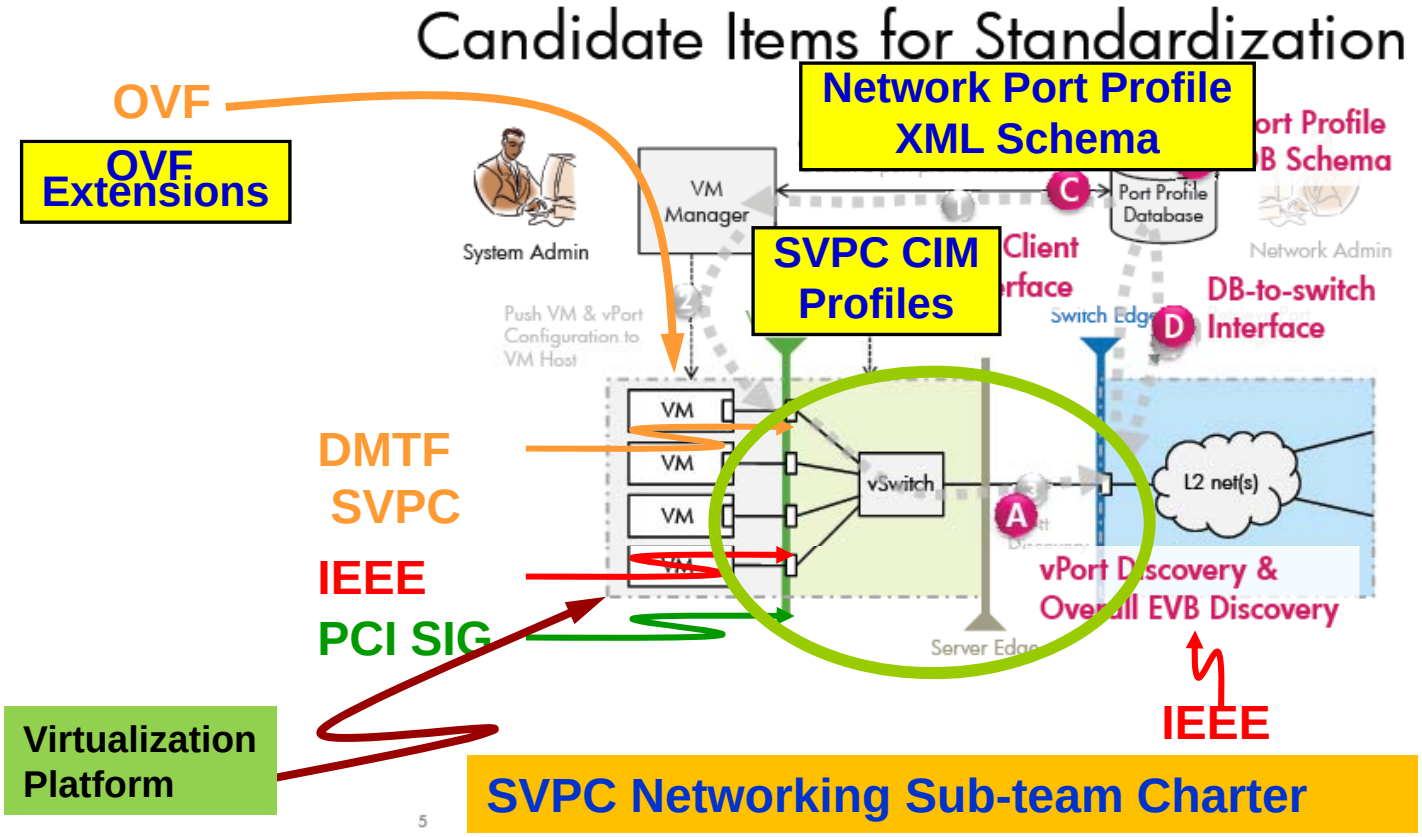
Platform Management Sub-Committee Overview

- Cloud Management Working Group (CMWG)
  - Focuses on management interfaces between cloud service/consumer and cloud provider
- Physical Platform Profiles (PPP) WG
  - Defines platform independent, interoperable, industry standard management data models, profiles and registries for the aspects of managing the physical aspects of platforms
- System Virtualization, Partitioning, and Clustering (SVPC) WG
  - Defines platform independent, interoperable, industry standard management data models, profiles, formats and registries for the aspects of managing the virtualization aspects of platforms
- Server, Desktop, and Mobile Working Group (SDMWG)
  - Defines platform independent, interoperable, industry standard specifications for the management of server, desktop, and mobile platforms (owns DASH and SMASH wrapper specifications)
- Platform Management Components Intercommunications (PMCI) WG
  - Defines specifications for the “Inside the box” communication between components within the platform management subsystem
- SMBIOS WG
  - Defines SMBIOS specifications for low level platform asset information
- Telco WG
  - Defines specifications for the management of telecommunications systems, services, and applications

IEEE/DMTF Collaboration Areas

- Network Port Profiles - SVPC WG
  - Network Port Profile XML Schema
  - OVF Extensions for Network Port Profiles
- Edge Virtual Bridge (EVB) Management - SVPC WG
  - CIM Schema Enhancements for EVB
  - CIM Profiles for EVB Management
    - Virtual Ethernet Switch and Ethernet Port Resource Virtualization Profiles
- Data Center Ethernet (DCE) Management – PPP WG
  - CIM Schema Enhancements for DCE
    - Priority-Based Flow Control (PFC) and Enhanced Transmission Selection (ETS) Initially
  - CIM Profiles for DCE Management
    - Ethernet Port and Data Center Ethernet Port Profiles

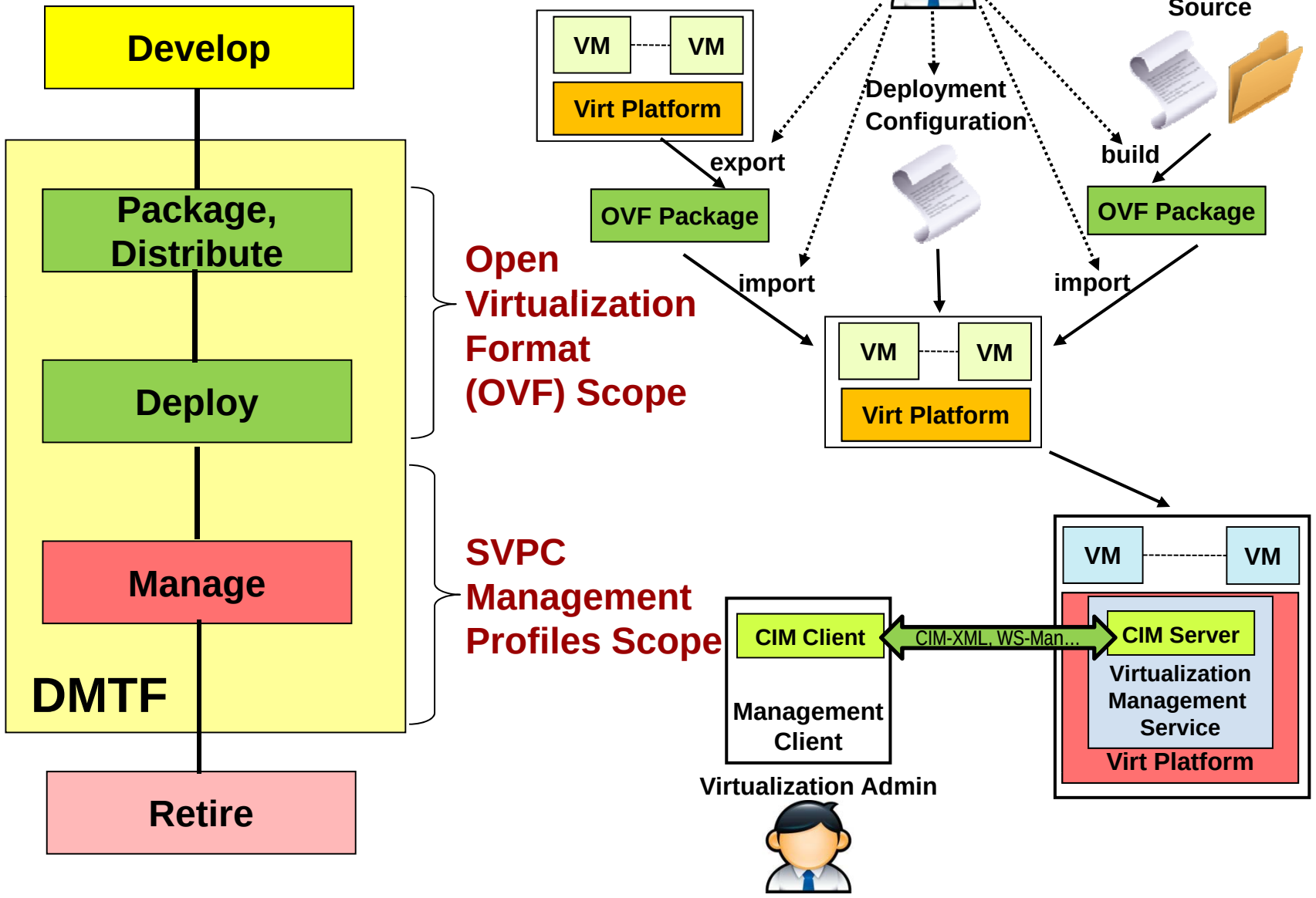
DMTF Standards for EVB Management and Network Port Profiles



SVPC Networking Sub-team Charter

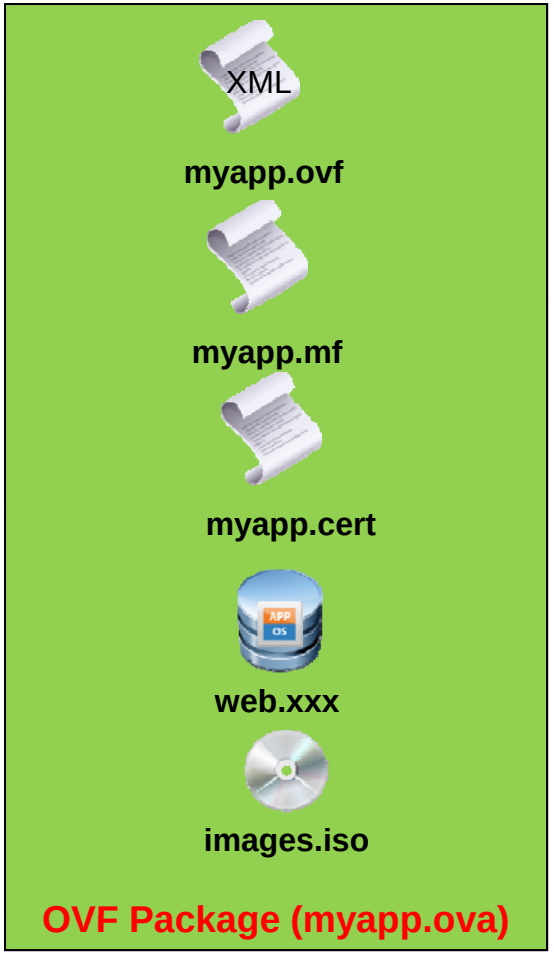
1. GOAL 1: Define CIM-based data models to allow Management of Network and Storage Networking on the Virtualization Platform
2. GOAL 2: Define OVF extensions in support of Network and Storage Networking deployment on the Virtualization Platform
3. GOAL 3: Define Port Profile XML Schema, for describing VSI Network attributes

VM Lifecycle Management

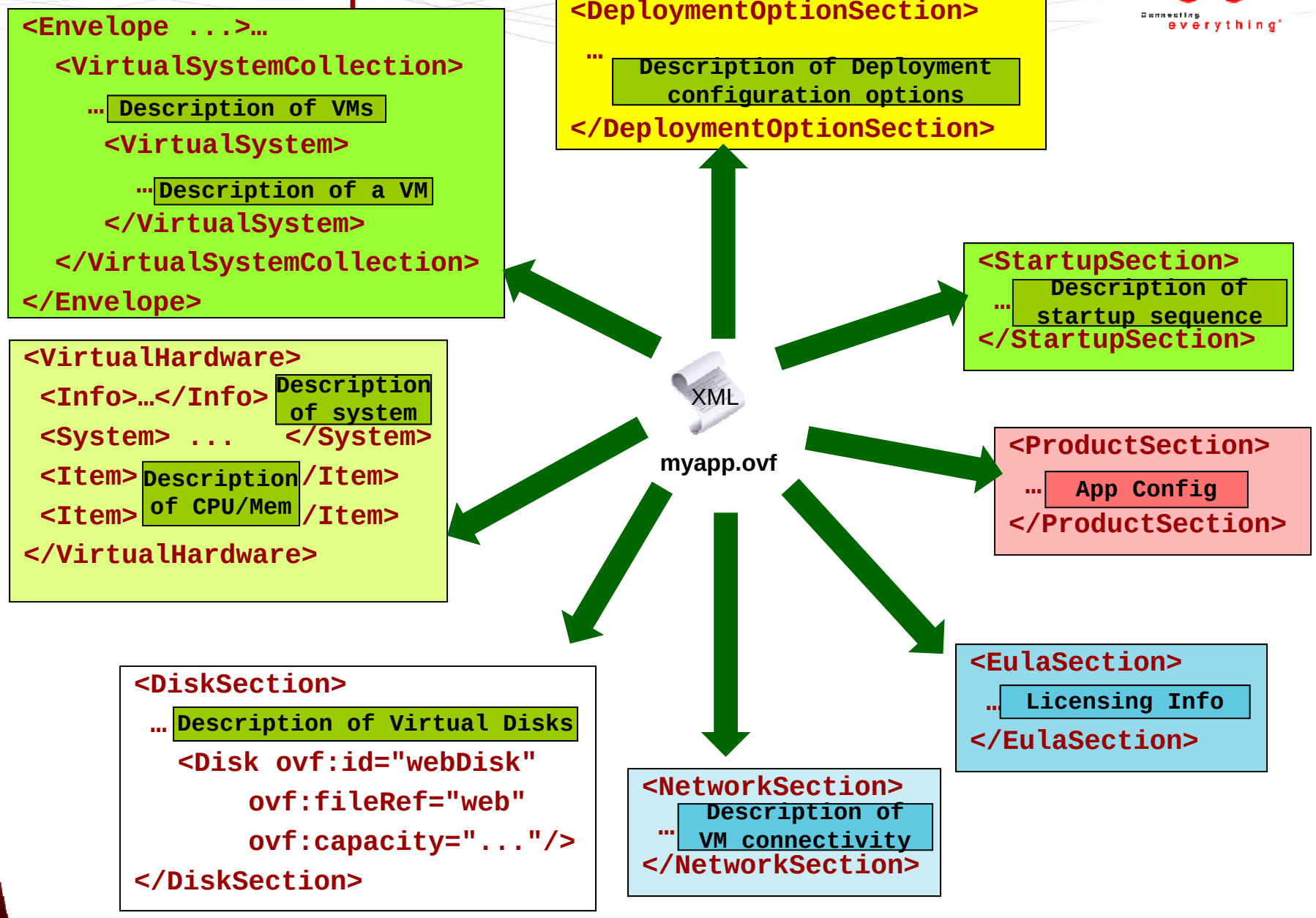


Open Virtualization Format (OVF)

- OVF
  - A distribution format for VMs
  - Supports single VM & multiple VM configs
  - Optimized for distribution & simple automation
  - Vendor and platform independent
- An OVF package consists of
  - One OVF descriptor with extension .ovf
  - zero or one OVF manifest (w/ extension .mf)
  - zero or one OVF certificate (w/ extension .cert)
  - zero or more disk image files
  - zero or more additional resource files
    - such as ISO images

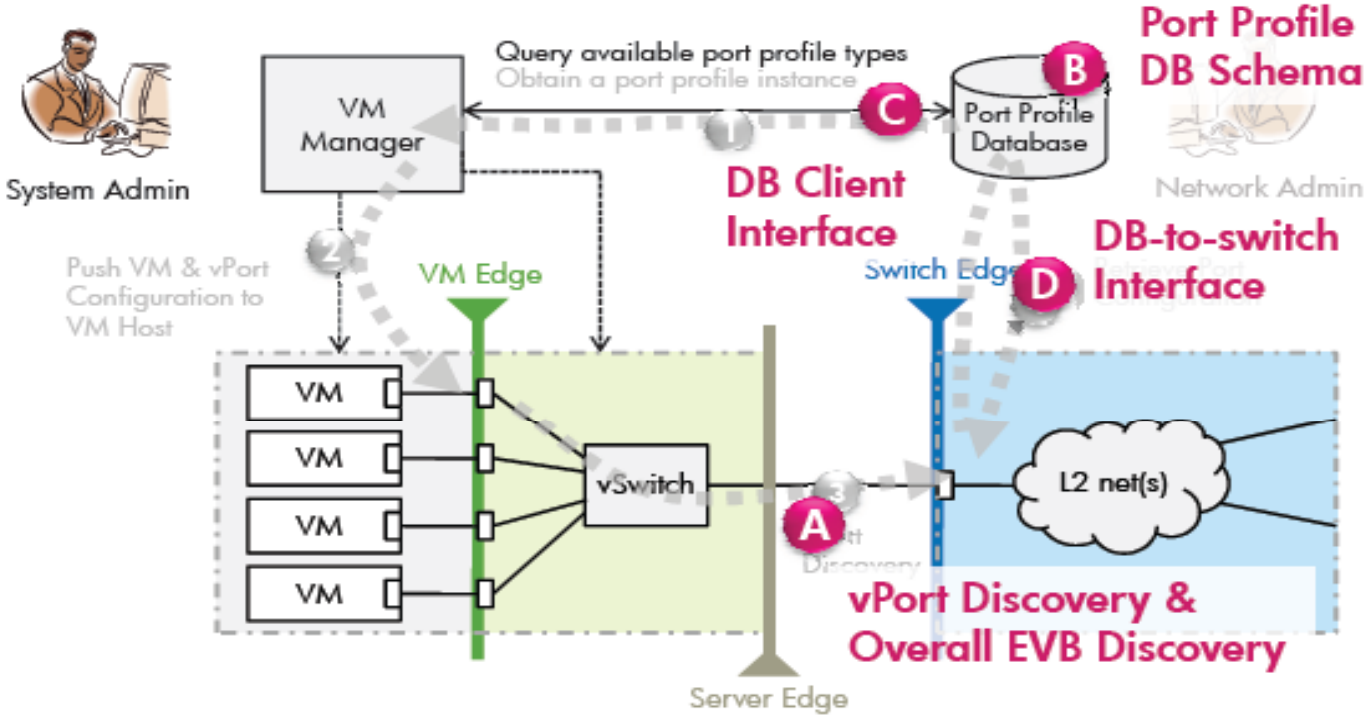


An OVF Example



Network Port Profile

Life Cycle of Network Port Profile

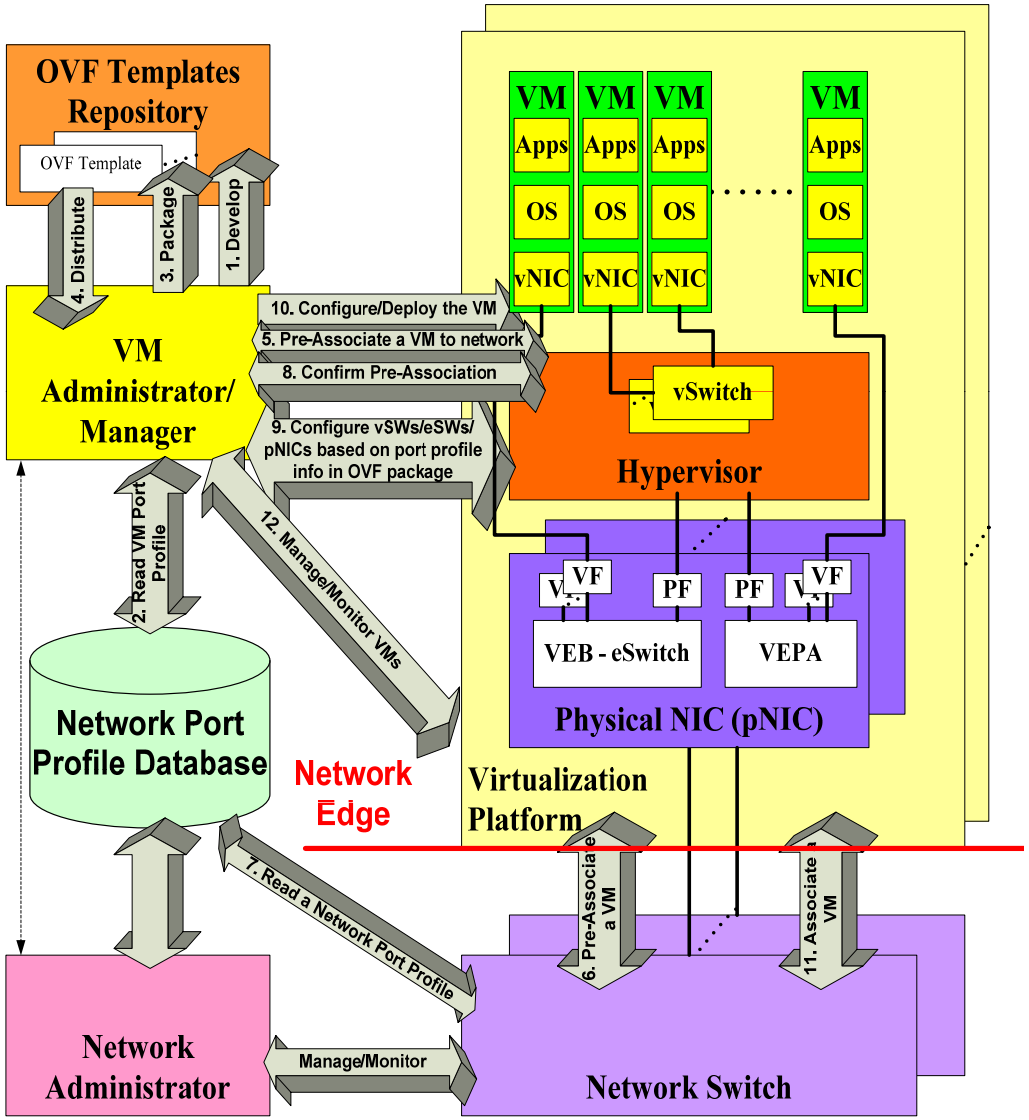


Network Port Profile

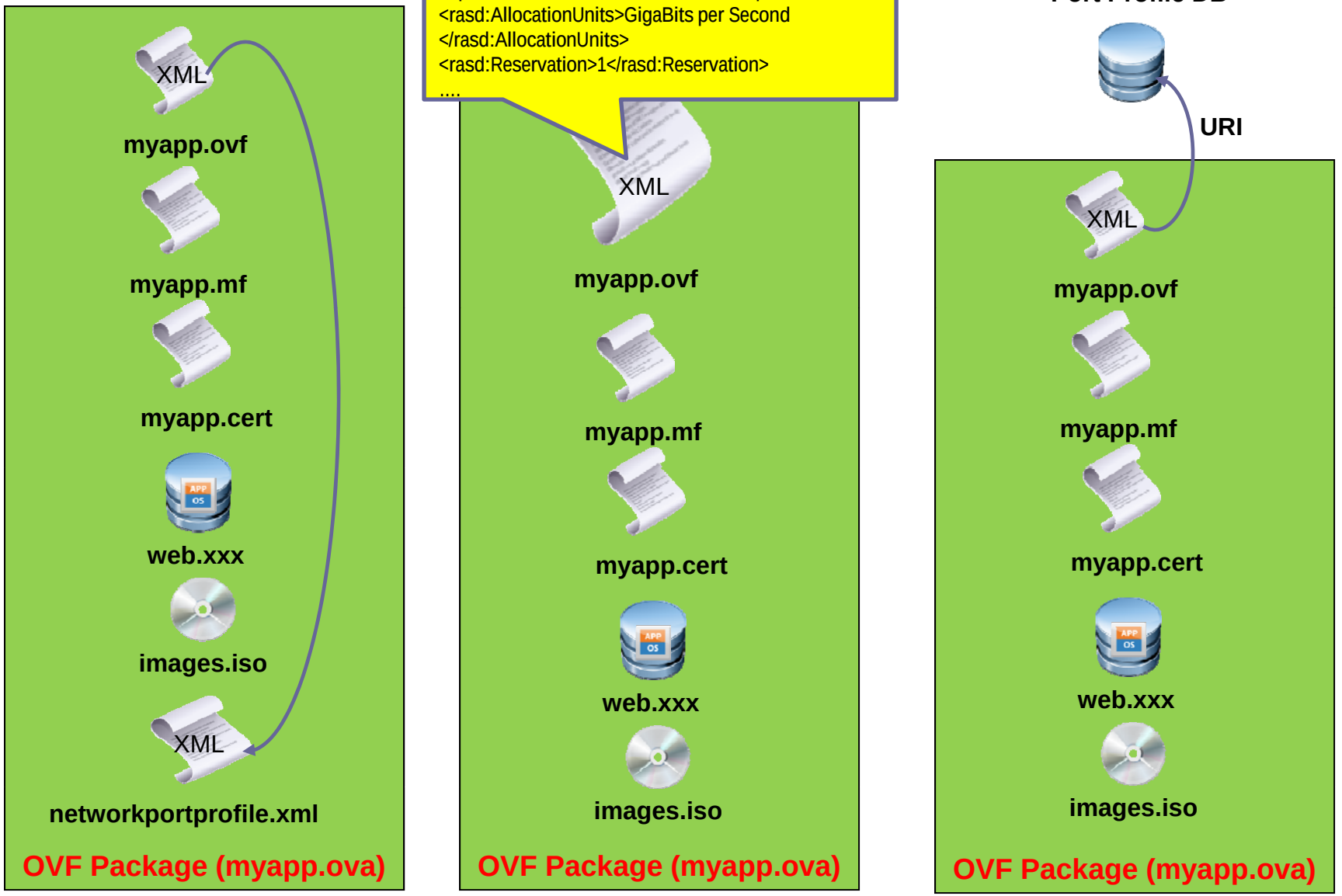
Refers to a set of network attributes that can be applied to one or more virtual machines

Network Port Profile Use Case

- Network Infrastructure is not pre-provisioned
  - Network switch accesses port profile DB during VM deployment
  - Network Port profile info is in the OVF package
  - VM Admin understands port profile metadata and schema
  - VM admin/Manager applies port profile config during VM deployment
- At the deployment time, VM Admin/Manager does not access Port Profile DB



Network Port Profile and OVF



Network Port Profile Schema Proposal

```
<xs:schema xmlns:ppns="http://schemas.dmtf.org/svpc/portprofile/1"
 xmlns:xs="http://www.w3.org/2001/XMLSchema"
 xmlns:cim="http://schemas.dmtf.org/wbem/wscim/1/common"
 xmlns:xml="http://www.w3.org/XML/1998/namespace"
 xmlns:rasd="http://schemas.dmtf.org/wbem/wscim/1/cim-schema/2/CIM_ResourceAllocationSettingData"
 xmlns:epasd="http://schemas.dmtf.org/wbem/wscim/1/cim-schema/2/CIM_EthernetPortAllocationSettingData"
 xmlns:ns1="http://schemas.dmtf.org/svpc/portporfile/1"
 targetNamespace="http://schemas.dmtf.org/svpc/portporfile/1" elementFormDefault="qualified" attributeFormDefault="qualified">
  <xs:import namespace="http://www.w3.org/XML/1998/namespace" schemaLocation="http://www.w3.org/2001/xml.xsd"/>
  <xs:import namespace="http://schemas.dmtf.org/wbem/wscim/1/common"
   schemaLocation="http://schemas.dmtf.org/wbem/wscim/1/common.xsd"/>
  <xs:import namespace="http://schemas.dmtf.org/wbem/wscim/1/cim-schema/2/CIM_ResourceAllocationSettingData"
   schemaLocation="http://schemas.dmtf.org/wbem/wscim/1/cim-schema/2.22.0/CIM_ResourceAllocationSettingData.xsd"/>
  <xs:import namespace="http://schemas.dmtf.org/wbem/wscim/1/cim-schema/2/CIM_EthernetPortAllocationSettingData"
   schemaLocation="http://schemas.dmtf.org/wbem/wscim/1/cim-schema/2.27.0/CIM_EthernetPortAllocationSettingData.xsd"/>
                    .......
   <xs:element name="PortProfile">
     <xs:annotation>
       <xs:documentation>Root element of Port Profile </xs:documentation>
     </xs:annotation>
     <xs:complexType>
       <xs:sequence>
         <xs:element name="Item" type="epasd:CIM_EthernetPortAllocationSettingData_Type" minOccurs="0" maxOccurs="unbounded"/>
         <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
       </xs:sequence>
     </xs:complexType>
   </xs:element>
</xs:schema>
```

Network Port Profile Examples

Bandwidth Reservation

```
<?xml version="1.0" encoding="UTF-8"?>
<ppns:PortProfile …>
        <epasd:NetworkPortProfileID>http://www.dmtf.org/portporfiles</epasd:NetworkPortProfileID>
        <epasd:NetworkPortProfileIDType>2</epasd:NetworkPortProfileIDType>
        <epasd:Address>00-16-8B-DB-00-5E</epasd:Address>
        <rasd:AllocationUnits>GigaBits per Second</rasd:AllocationUnits>
        <rasd:Reservation>1</rasd:Reservation>
</ppns:PortProfile>
```

Allowed MAC/VLAN Pairs

```
<?xml version="1.0" encoding="UTF-8"?>
<ppns:PortProfile ….>
        <epasd:NetworkPortProfileID>http://www.dmtf.org/portporfiles</epasd:NetworkPortProfileID>
        <epasd:NetworkPortProfileIDType>2</epasd:NetworkPortProfileIDType>
        <epasd:AllowedToTransmitMACAddresses>00-16-8B-DB-00-5E</epasd:AllowedToTransmitMACAddresses>
        <epasd:AllowedToTransmitMACAddresses>00-17-8B-DA-00-5E</epasd:AllowedToTransmitMACAddresses>
        <epasd:AllowedToTransmitVLANs> 5 </epasd:AllowedToTransmitVLANs>
        <epasd:AllowedToTransmitVLANs> 7 </epasd:AllowedToTransmitVLANs>
</ppns:PortProfile>
```

Note: MAC/VLAN Pairs are represented as indexed arrays.

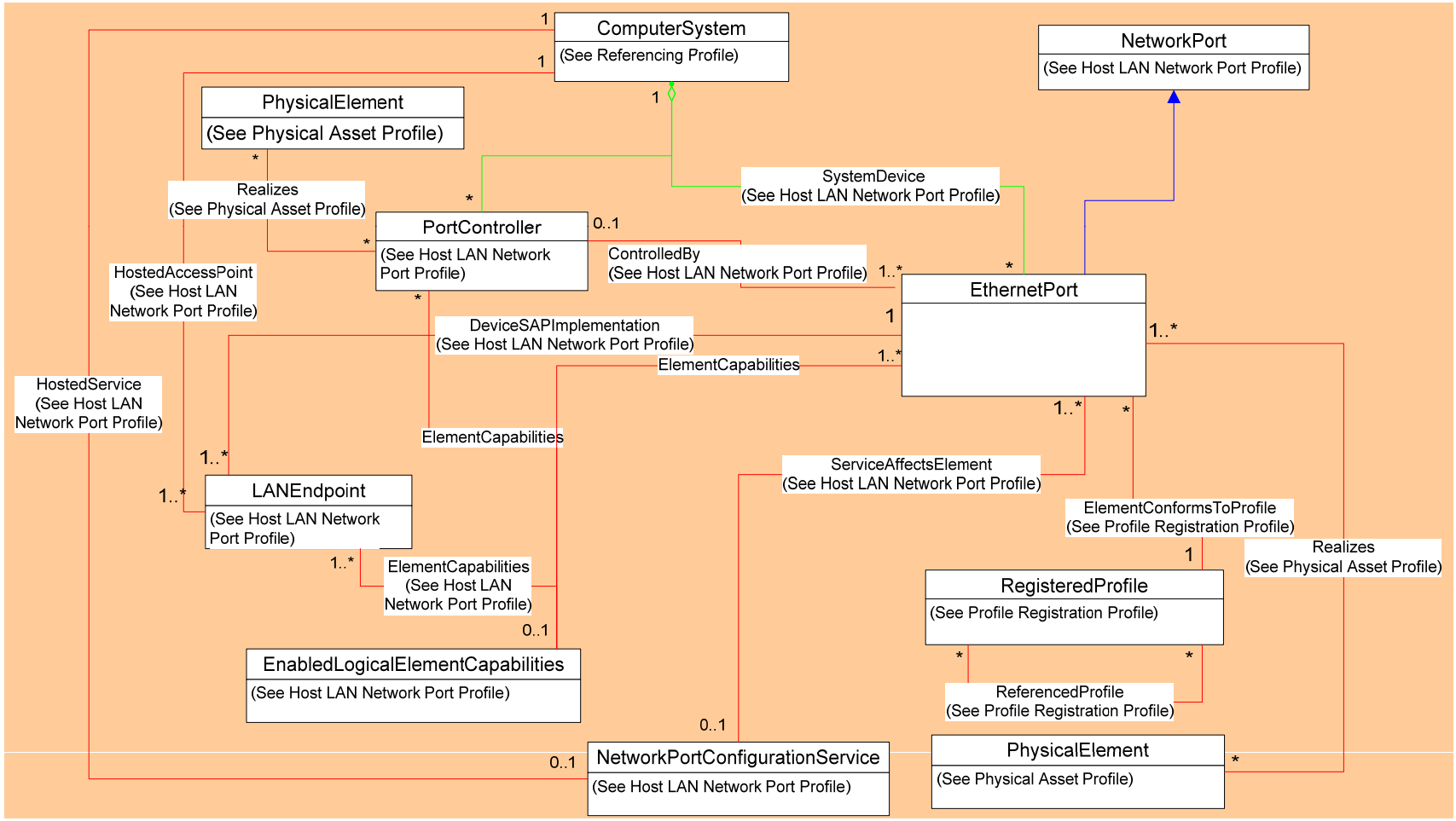
Allowed Priorities

```
<?xml version="1.0" encoding="UTF-8"?>
<ppns:PortProfile.…>
        <epasd:NetworkPortProfileID>http://www.dmtf.org/portporfiles</epasd:NetworkPortProfileID>
        <epasd:NetworkPortProfileIDType>2</epasd:NetworkPortProfileIDType>
        <epasd:AllowedPriorities>3</epasd:AllowedPriorities>
        <epasd:AllowedPriorities>5</epasd:AllowedPriorities>
</ppns:PortProfile>
```

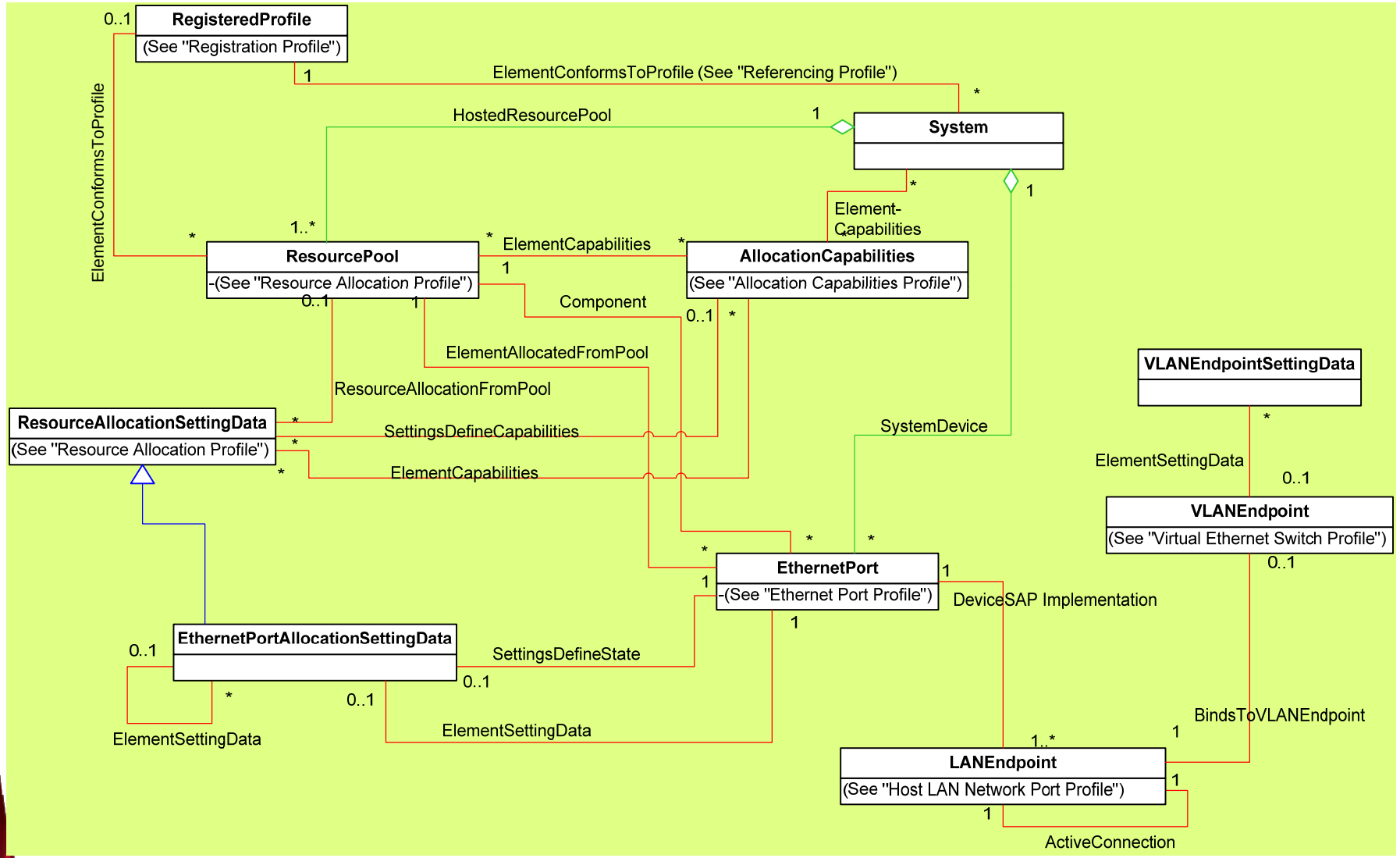
Management Profiles for EVB/DCB Proposal

- Models Ethernet Port Resource Virtualization/Virtual Ethernet Switch
- Specifically, covers
  - Ethernet adapters (vNIC) – each adapter modeled as an Ethernet Port
  - Virtual Ethernet Switch and switch settings
  - Ethernet switch ports (vSwitch)
  - Connections between vNIC and vSwitch Ports
  - VLANs
  - Port characteristics, settings (MAC, speed, duplex..), statistics…
- Already Published CIM Profiles
  - DSP1014 Ethernet Port Profile
  - DSP1050 Ethernet Port Resource Virtualization Profile
  - DSP1097 Virtual Ethernet Switch Profile

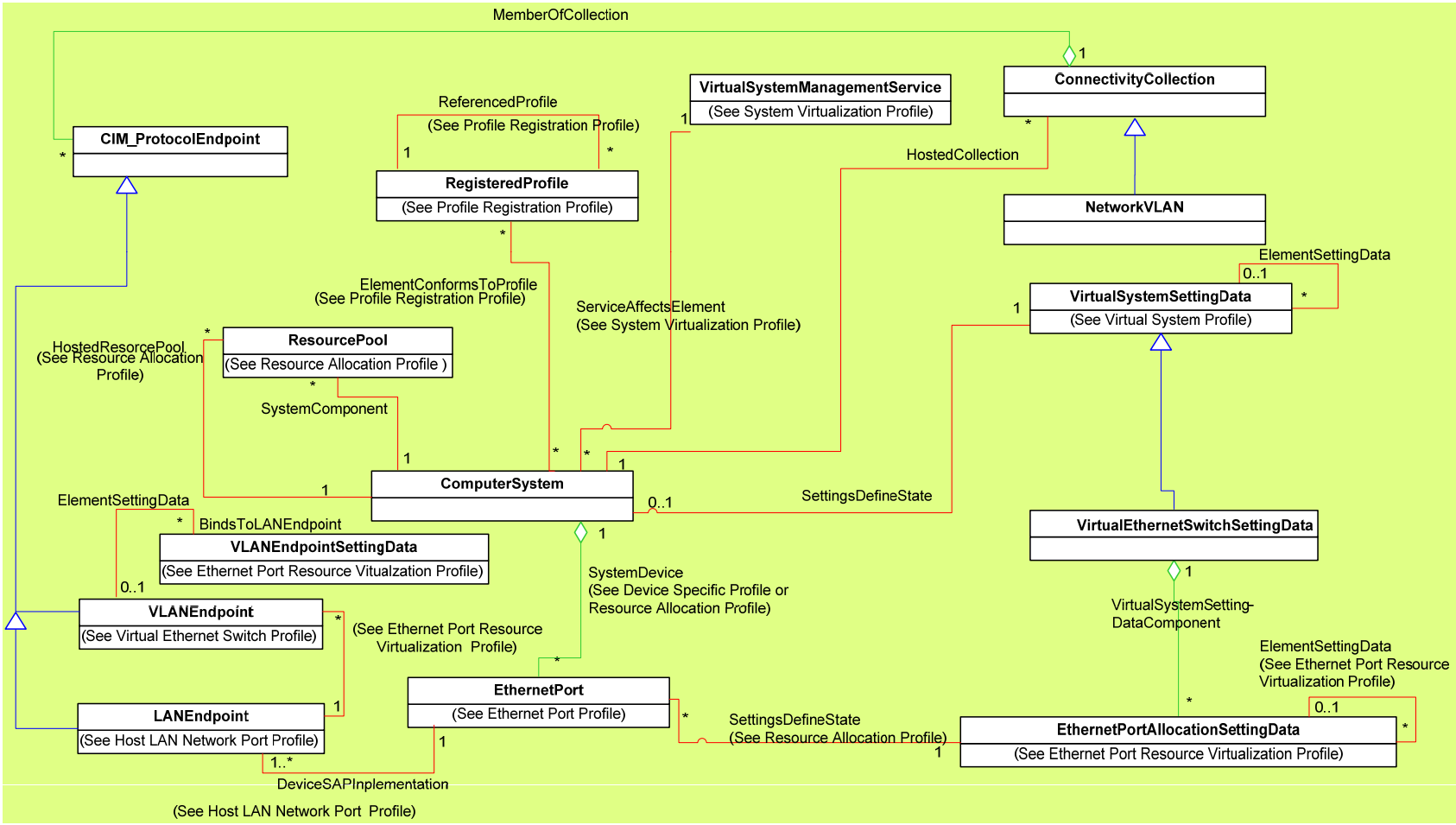
Ethernet Port Profile Class Diagram



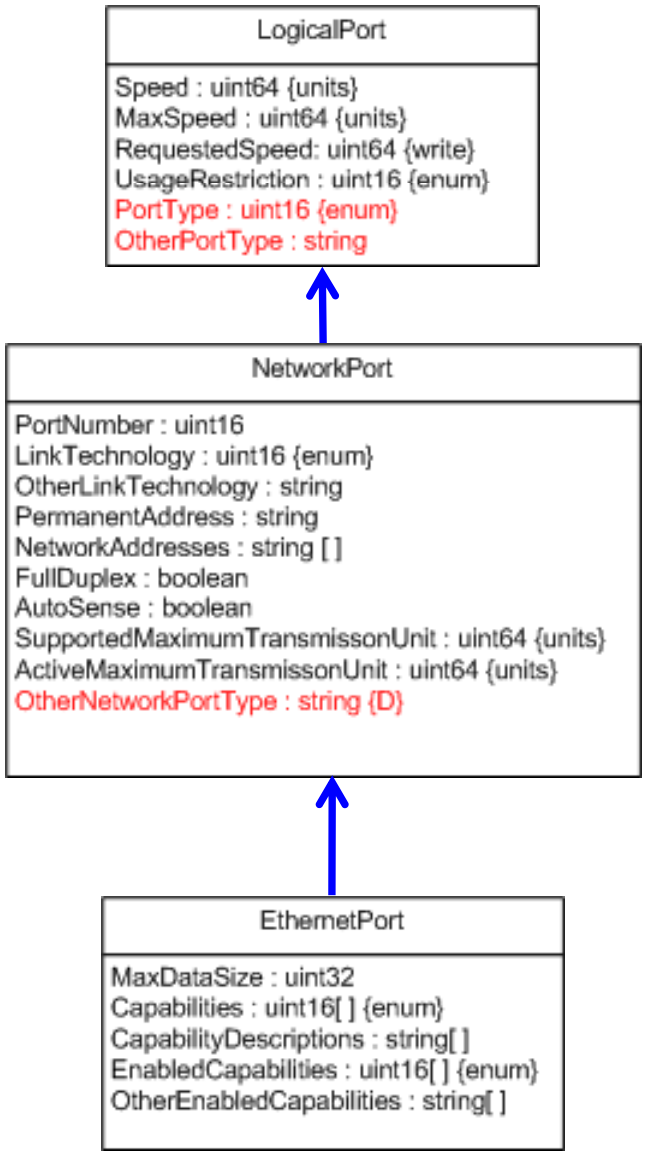
Ethernet Port Resource Virtualization Profile Class Diagram



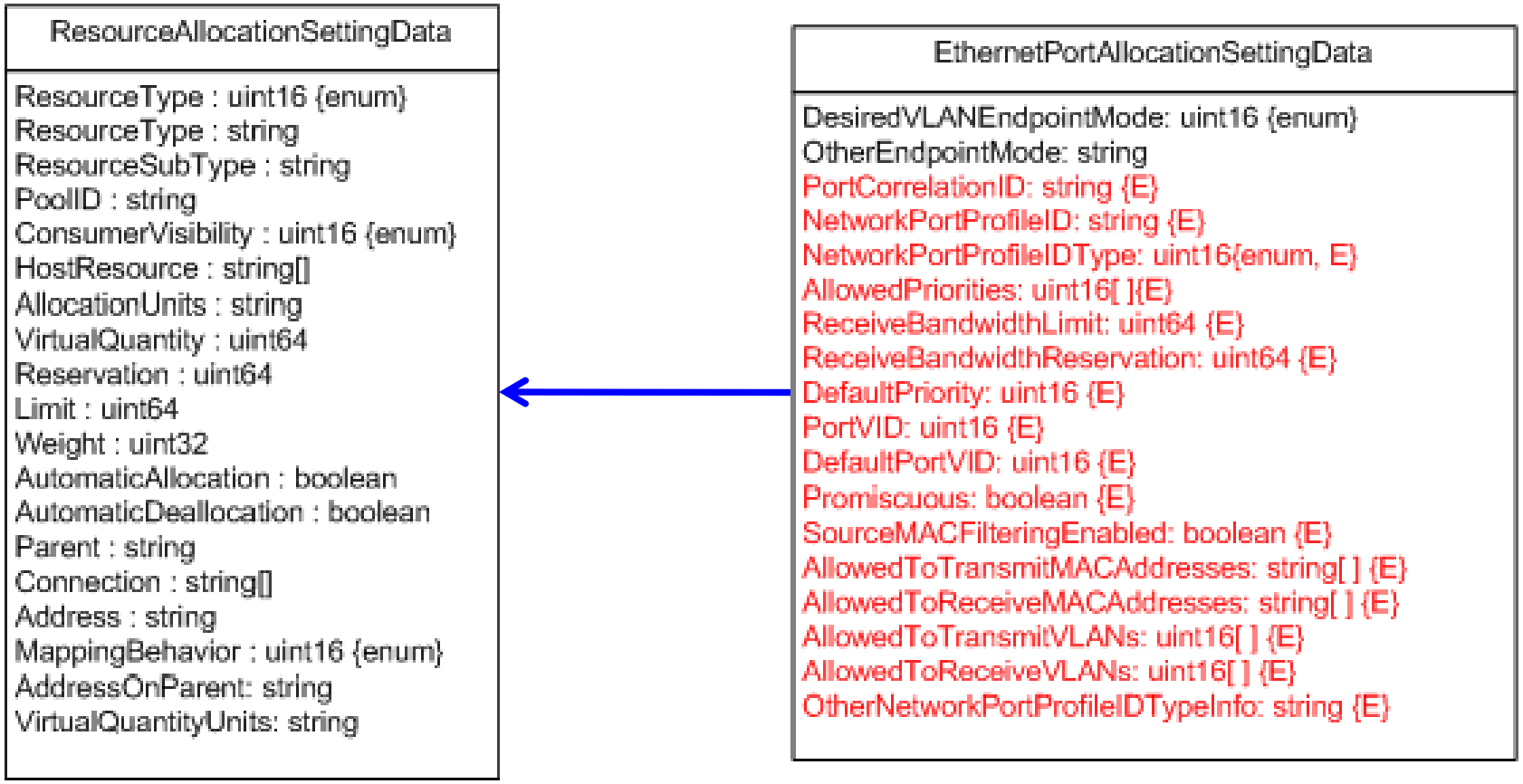
Virtual Ethernet Switch Profile Class Diagram



EthernetPort Class



EthernetPortAllocationSettingData Class



Useful Links

- CIM Profiles
  - DSP1014 Ethernet Port Profile
    - http://www.dmtf.org/sites/default/files/standards/documents/DSP1014_1.0.pdf
  - DSP1050 Ethernet Port Resource Virtualization Profile
    - http://www.dmtf.org/sites/default/files/standards/documents/DSP1050_1.0.0.pdf
  - DSP1097
    - http://www.dmtf.org/sites/default/files/standards/documents/DSP1097_1.0.0.pdf
- OVF
  - DSP0243 OVF 1.1 Specification
    - http://www.dmtf.org/sites/default/files/standards/documents/DSP0243_1.1.0.pdf
  - DSP8023 OVF 1.1 Envelope XSD
    - http://schemas.dmtf.org/ovf/envelope/1/dsp8023_1.1.xsd
  - DSP8027 OVF 1.1 Environment XSD
    - http://schemas.dmtf.org/ovf/environment/1/dsp8027_1.1.xsd
- White papers
  - DSP 2017 Open Virtualization Format White Paper 1.0.0
    - http://www.dmtf.org/sites/default/files/standards/documents/DSP2017_1.0.0.pdf
  - DSP 2025 Virtual Networking Management White Paper (Work-in-Progress)